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Traffic Study
164 Thorold Road, Welland, Ontario, L3C 3V6



Prepared for

164 Thorold Rd Development Corp

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Introduction

Canadian Engineering Group (CEG) was retained to complete a Traffic Study for the proposed development at 164 Thorold Road in Welland, Ontario, which consists of a 90-unit, 8-storey multi-family rental apartment building. The development will provide on-site parking on Level 1 both outside and inside the building. The Traffic Study is required to evaluate the potential effects of the proposed development on the surrounding road network.

The City of Welland is experiencing significant growth. The *Welland Transportation Master Plan (TMP)* projects the City's population to reach approximately 149,400 residents by 2051, with substantial residential intensification expected in the downtown and northern areas. The TMP's vision is *"An inclusive and barrier-free transportation system that promotes the development of vibrant and livable communities through multimodal mobility, safe roads, intraregional connectivity, and conservation of Welland's rich heritage and water features."* This TIS aligns with that vision by assessing traffic impacts, promoting active transportation, and ensuring that the development integrates smoothly with the City's long-term transportation goals.

The study area is located along Thorold Road, a major east-west arterial corridor in Welland. Key intersections within the study area includes:

1. First Avenue and Thorold Road (Signalized)
2. Thorold Road and Northhaven Road (Un-signalized)
3. Thorold Road and Nelson Trail (Un-signalized)
4. Thorold Road and Edgar Street (Un-signalized)
5. Thorold Road and Carlton Avenue (Un-signalized)
6. Niagara Street and Thorold Road (Signalized)

These intersections serve a mix of residential, commercial, and institutional land uses and experience varying traffic volumes throughout the day.

This Traffic Study uses **Synchro** traffic modelling software to analyze existing and future traffic conditions. The analysis covers:

- **AM peak hour** (7:00–9:00 AM)
- **PM peak hour** (4:00–6:00 PM)
- **Saturday peak hour** (12:00–2:00 PM)

Future scenarios are projected for the years **2031, 2036, and 2041** using a conservative annual growth rate of **2%** applied to background traffic volumes. Trip generation for the proposed development is calculated using the *Institute of Transportation Engineers (ITE) Trip Generation Manual*, 12th Edition.

The objectives of this study are to:

- Determine the trip generation of the proposed development for AM, PM, and Saturday peak hours.
- Complete a Traffic Movement Count for the intersection of First Ave and Thorold Rd as per the request of the City of Welland

- Assess the Level of Service (LOS), delays, and Intersection Capacity Utilization at critical nearby intersections under existing (2026), existing with development (2026), and future (2031, 2036, 2041) conditions.
- Confirm that the proposed number of parking spaces is adequate through a parking analysis.
- Demonstrate, using Autoturn, that passenger vehicles, a single-unit delivery truck, and a fire truck can safely maneuver within the site.
- Propose a Transportation Demand Management (TDM) plan and active transportation connections that align with the Welland TMP.

Findings from this study will support the development application and ensure that the proposed building does not create unacceptable traffic impacts or compromise the long-term functionality of the Thorold Road corridor.

Below is Figure 1 showing Google Maps aerial of the subject property and study intersections and Figure 2 shows the site plan for the proposed development.

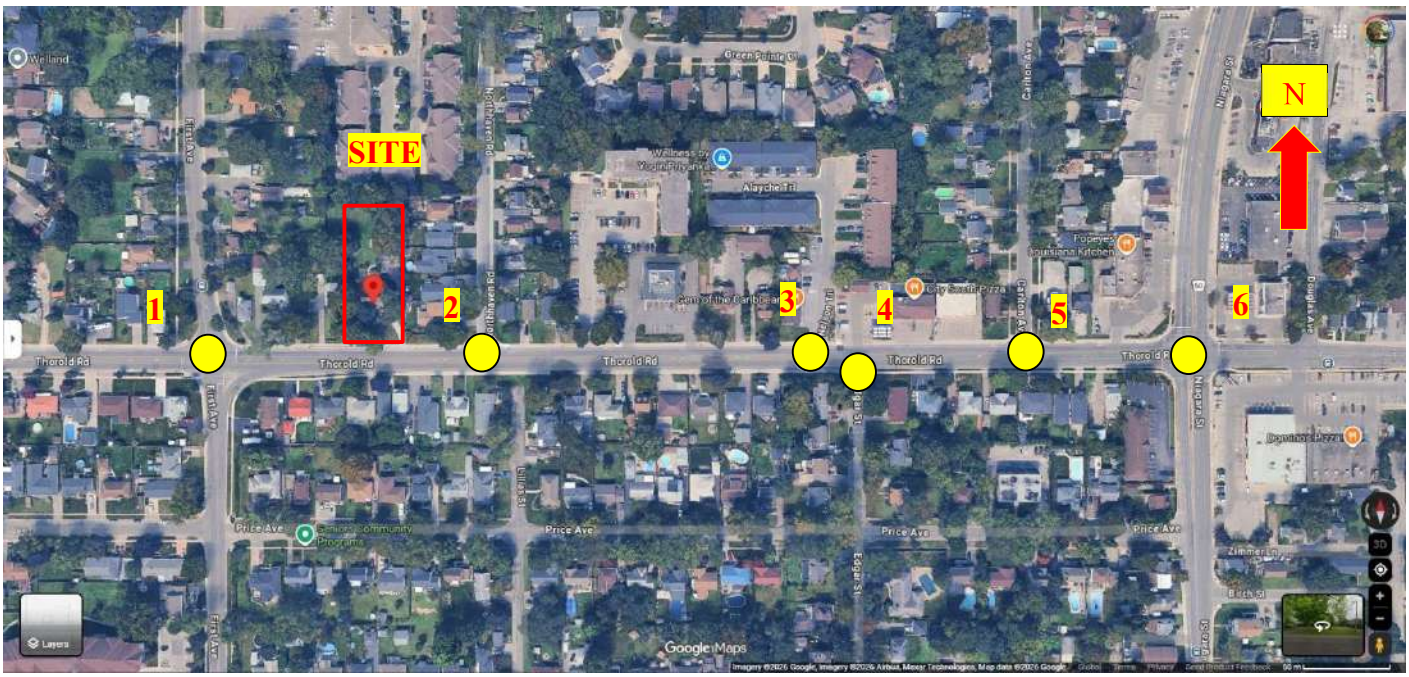


Figure 1: Google Maps Aerial of Subject Property, Surrounding Area and the Study Intersections

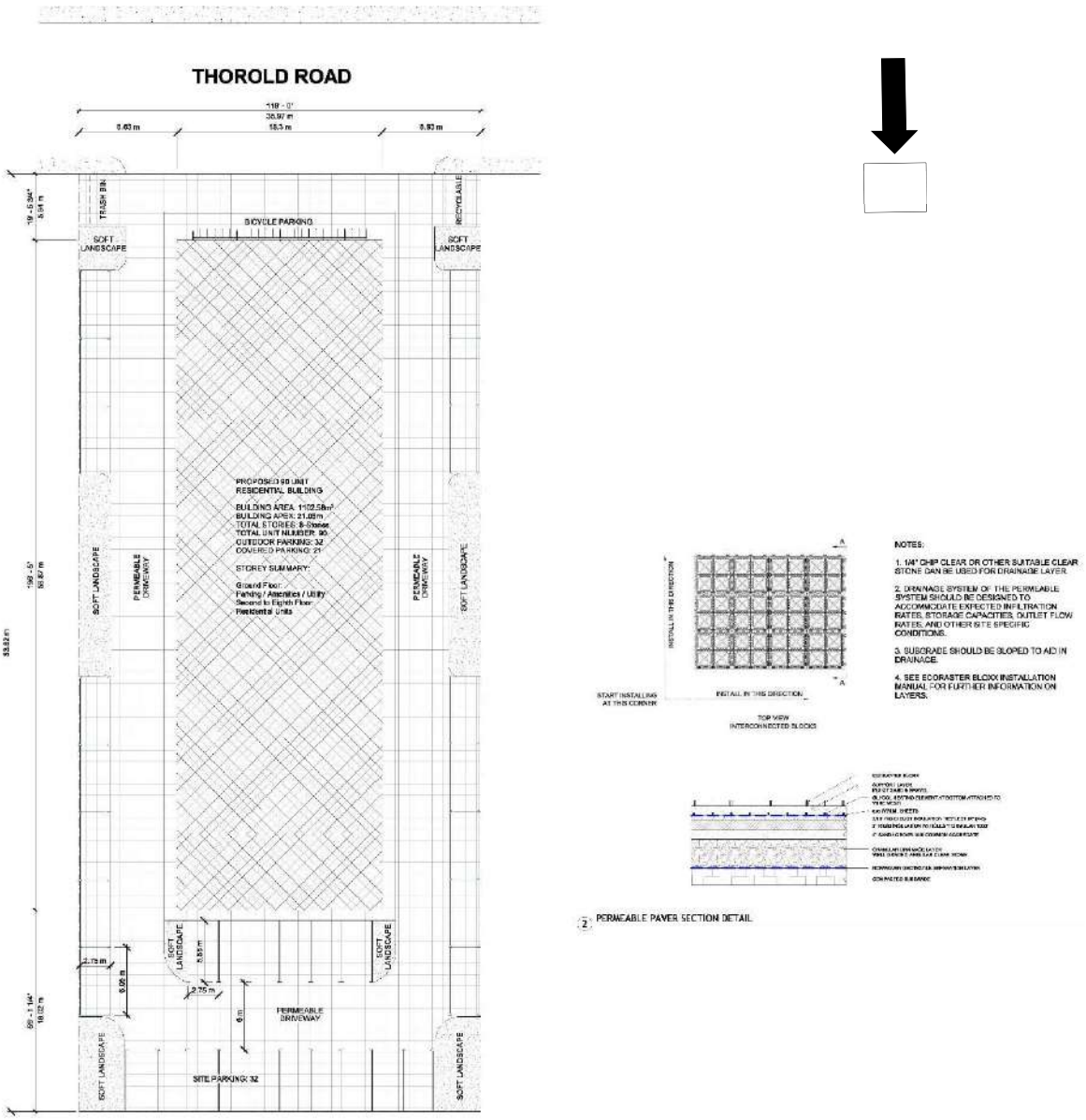


Figure 2: Proposed Site Plan

Study Approach and Methodology

This Traffic Study has been prepared following industry-standard traffic engineering practices and the guidance of the **Welland Transportation Master Plan**. The analysis methodology comprises the following key components:

1. **Reviewing the project site plan and related documents** to incorporate for 164 Thorold Road (90-unit, 8-storey rental apartment) including access, parking (ground-level interior/exterior), and loading.
   Key TMP policies referenced include:
   - **Vision Zero** – commitment to eliminate serious injuries and fatalities.
   - **Complete Streets** – design that accommodates all users.
   - **Default 40 km/h speed limit** on local and minor collector roads.
   - **Active transportation network** – cycling infill links and wayfinding.

2. **Reviewing the adjacent roadway network** to identify key intersections impacted by the development, including:
   1. First Avenue and Thorold Road (Signalized)
   2. Thorold Road and Northhaven Road (Un-signalized)
   3. Thorold Road and Nelson Trail (Un-signalized)
   4. Thorold Road and Edgar Street (Un-signalized)
   5. Thorold Road and Carlton Avenue (Un-signalized)
   6. Niagara Street and Thorold Road (Signalized)

3. **Conducting turning movement counts** at key intersections during peak hours (AM, PM, and Saturday peak) to establish 2026 existing conditions, with validation from historical data and growth trends for accuracy. Specifically, the City of Welland requested that a new turning movement count be completed for the intersection of **First Avenue and Thorold Road** as part of this study, which is attached in Appendix C.

4. **Projecting traffic volumes** into future scenarios (2031, 2036, and 2041) by applying growth rate of 2% to model future conditions with proposed development.

5. **Using the ITE Trip Generation Manual** to calculate Trip generation for the 90-unit multi-family rental apartment, was calculated using ITE Land Use Code 221 – Multifamily Housing (Mid-Rise) Not Close to Rail Transit.

6. **Performing capacity analysis** using Synchro to evaluate Level of Service (LOS), delays, and intersection capacity utilization for all study intersections under:

   - Existing 2026 conditions (pre-development)
   - Future build conditions (2026–2041 with development traffic)

7. **Evaluating traffic impacts** by comparing existing vs. future scenarios, identifying deficiencies (e.g., LOS degradation), and recommending mitigation measures.

8. **Conducting a parking analysis** to verify the adequacy of proposed spaces using demand calculations for peak periods, ensuring compliance with municipal standards.

9. **Performing Autoturn analysis** to demonstrate accessibility for passenger vehicles, a single-unit delivery truck, and a fire truck can safely enter the site, access all parking areas (ground-floor interior and exterior), circulate, and exit.

10. The highway capacity analysis will be performed the utilizing industry standard software Synchro 11. The software faithfully duplicates the methods and computations found in the 7th Edition of the Highway Capacity Manual published by the Transportation Research Board. For the signalized intersections (First Avenue & Thorold Road and Niagara Street & Thorold Road), optimal signal timing and advanced green phases were assumed as permitted by the City of Welland

Table 1: Level-of-Service Criteria for Signalized Intersections

Level of Service	Average Control Delay (seconds/vehicle)	General Description
A	≤10	Free flow
B	>10 – 20	Stable flow (slight delays)
C	>20 – 35	Stable flow (acceptable delays)
D	>35 – 55	Approaching unstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)
E	>55 – 80	Unstable flow (intolerable delay)
F	>80	Forced flow (congested and queues fail to clear)

Table 2: Level-of-Service Criteria for Un-signalized Intersections

Level of Service	Average Control Delay (seconds/vehicle)	General Description
A	≤5	Free flow
B	>5 – 10	Stable flow (slight delays)
C	>10 – 20	Stable flow (acceptable delays)
D	>20-30	Approaching unstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)
E	>30 – 45	Unstable flow (intolerable delay)
F	≥45	Forced flow (congested and queues fail to clear)

Highway Capacity Analysis: Existing Conditions

Existing Conditions

First Avenue and Thorold Road (Signalized)

First Avenue is a north-south collector road that intersects Thorold Road at a fully signalized, four-leg intersection. Both approaches on Thorold Road provide left-turn lanes, through lanes, and right-turn lanes. First Avenue provides a single lane in each direction plus a left-turn lane. The intersection serves a mix of residential and commercial traffic and is a key gateway to neighbourhoods south of Thorold Road. Pedestrian crosswalks and advanced green phases are present.

Thorold Road and Northhaven Road (Unsignalized)

Northhaven Road is a local residential street that intersects Thorold Road from the south only, forming a three-leg T-intersection. The movement on Northhaven Road is stop-controlled, while Thorold Road has free-flow priority. No dedicated turn lanes are present on Thorold Road at this location. The intersection experiences low to moderate turning volumes, primarily during peak hours.

Thorold Road and Nelson Trail (Unsignalized)

Nelson Trail is a local street intersecting Thorold Road from the north. This three-leg T-intersection is stop-controlled on Nelson Trail. Thorold Road traffic is not required to stop. The intersection serves local access to a residential area north of Thorold Road. Turning movements are relatively light, with occasional delays during peak periods for vehicles exiting Nelson Trail.

Thorold Road and Edgar Street (Unsignalized)

Edgar Street is a local road that meets Thorold Road from the south in a three-leg T-intersection. Stop control is applied to Edgar Street. The intersection geometry includes no auxiliary lanes on Thorold Road. Traffic from Edgar Street must wait for adequate gaps in Thorold Road traffic. Volumes are typical of a local street connection.

Thorold Road and Carlton Avenue (Unsignalized)

Carlton Avenue is a local street intersecting Thorold Road from the north, forming a three-leg unsignalized intersection. Carlton Avenue is stop-controlled. The intersection provides access to a small residential enclave. Peak hour turning movements are low, and operational performance is generally good under existing volumes.

Niagara Street and Thorold Road (Signalized)

Niagara Street is a major north-south arterial that crosses Thorold Road. This is a fully signalized four-leg intersection with dedicated left-turn lanes on all approaches, through lanes on Thorold

Road. Traffic volumes at this intersection are among the highest in the study area. Advanced green phases are provided for left-turning vehicles. Sidewalks and pedestrian signals are present.

Existing Conditions Traffic Volumes

Turning movement counts were collected at the study intersections in April 2026. It should be noted that the turning movement count at the intersection of First Ave and Thorold was completed on Wednesday April 1, 2026 from 7:00am – 9:00am and from 4:00pm – 6:00pm, which was a specific requirement from the City of Welland. The traffic movement count peak hour during the AM was at 7:30am - 8:30am, while the peak hour during the PM was at 4:15pm - 5:15pm for this critical intersection. All movement count information is included in Appendix C of the report.

In this report, three-peak hour traffic counts are used, for AM, PM and SAT Peak hour traffic count. Normal timing of peak hours are: 7:00 – 9:00 AM, 4:00 – 6:00 PM and 12:00 – 2:00 PM, respectively. Figure 3 shows the existing traffic volumes at the intersections in the study area for both AM, PM and Saturday peak hours. It also represents the actual geometry and traffic count displayed on Synchro layouts. For the signalized intersections (First Avenue & Thorold Road and Niagara Street & Thorold Road), optimal signal timing and advanced green phases were applicable.



Figure 3. Existing Condition Traffic Volume for AM Peak Hour



Figure 4: Existing Condition Traffic Volume for PM Peak Hour



Figure 5: Existing Condition Traffic Volume for Sat Peak Hour

Existing Conditions Capacity Analysis

The existing traffic conditions across the study area show that most intersections are functioning efficiently, with minimal delay and good Levels of Service during the AM, PM, and Saturday peak periods. Many of the unsignalized intersections such as Thorold Road & Northhaven Road, Thorold Road & Nelson Trail, and Thorold Road & Edgar Street consistently operate at LOS A. These locations also exhibit relatively low Intersection Capacity Utilization (ICU), which is a measure of how much of an intersection's available capacity is being used. Low ICU values (ranging from 35% to 42%) mean that the current traffic volumes are well within what the intersection can comfortably handle, allowing drivers to move through with little disruption or queuing.

A few intersections show higher capacity utilization during PM and Saturday peaks. Thorold Road & Carlton Avenue has ICU values of nearly 50% (AM) and 55.6% (PM), remaining below concern levels but suggesting sensitivity to future growth. Niagara Street & Thorold Road exhibits elevated ICU, reaching 84.2% in the PM peak yet still operates at LOS B, indicating efficient performance without significant congestion.

The two signalized intersections in the study, First Avenue and Thorold Road, along with Niagara Street and Thorold Road provide the most complete operational picture because signalized locations allow for direct measurement of average delay. At First Avenue and Thorold Road, delays range from about 8.7 to 12.3 seconds per vehicle, corresponding to LOS A or B depending on the period, while ICU values rise into the mid-50% range during the PM peak (57.1%). Niagara Street and Thorold Road shows higher activity, with AM delay of 11.5 seconds (LOS B) and ICU of 63.8%, while the PM peak sees ICU at 84.2% but delay remains at LOS B, indicating that the intersection is operating near its practical capacity but still managing traffic efficiently. Overall, even at the busier locations, the network remains well within operational capacity, and no intersection is approaching a level that would suggest significant congestion or immediate need for mitigation.

Table 3: Existing Conditions LOS Summary

Sr #	Intersection	AM			PM			SAT		
		Delay (s/veh)	LOS	ICU (%)	Delay (s/veh)	LOS	ICU (%)	Delay (s/veh)	LOS	ICU (%)
1	First Avenue and Thorold Road	9.2	A	46.8	12.3	B	57.1	8.7	A	38.1
2	Thorold Road and Northhaven Road	-	A	35.2	-	A	39	-	A	31.4
3	Thorold Road and Nelson Trail	-	A	35.3	-	A	42	-	A	31.5
4	Thorold Road and Edgar Street	-	A	35.4	-	A	39	-	A	31.6
5	Thorold Road and Carlton Avenue	-	A	49.7	-	B	55.6	-	A	44.2
6	Niagara Street and Thorold Road	11.5	B	63.8	18.7	B	84.2	9.9	B	57.2

Highway Capacity Analysis: Existing Condition with Development

Proposed Site Access and River Road East

The proposed site access will be provided via two private driveways connecting directly to Thorold Road. The primary traffic control at these new junctions is expected to be unsignalized, with a stop sign installed for all exiting traffic from the site driveway. Thorold Road will function as the through road with the right-of-way. This design aims to integrate the new site traffic with minimal disruption to the flow of through traffic while maintaining safe access for the residential building and its residents.

Trip Generation

The Institute of Transportation Engineers (ITE) Trip Generation is a key tool used in transportation planning to estimate the number of vehicle trips associated with different land uses. By analyzing trip generation rates, engineers can predict traffic flow, assess infrastructure needs, and develop strategies to manage congestion. These rates vary depending on factors such as land use type, time of day, and day of the week (weekday vs. weekend). The ITE Trip Generation Manual provides standardized data to help professionals evaluate how developments such as residential areas, offices, or shopping centers affect surrounding road networks.

In order to estimate the trips generated by the proposed project, reference will be made to the *Trip Generation Manual, 12th Edition*, published by the Institute of Transportation Engineers (ITE). Table 4 illustrates the calculation for generated trips for the proposed project (for details see Appendix C). The table details the projected vehicle trips generated by the proposed development for three distinct peak periods. The pattern reveals a clear and logical relationship between the land uses and their traffic impacts throughout the day.

AM Peak Hour (Weekday)

During the AM peak hour, the site functions primarily as a trip generator, with a notable surplus of outbound vehicles compared to inbound ones. This is characteristic of a multi-family residential building, where a large number of residents depart the site in the morning for work or daily activities. The residential component dominates the AM traffic, further reinforcing this pattern of morning exodus.

PM Peak Hour (Weekday)

The situation reverses in the PM peak hour, where the site becomes a major trip attractor. The number of inbound vehicles rises substantially, surpassing the outbound flow. This indicates residents are returning home after work or arriving for evening activities. The residential nature of the development drives this inbound surge, which is typical for apartment buildings as they attract returning occupants in the evening.

Saturday Peak Hour

On Saturday, the site exhibits a balanced traffic pattern characterized by nearly equal numbers of inbound and outbound trips. This is a strong indicator of the site's role as both a generator and attractor on weekends. The similar number of arrivals and departures aligns with a residential building where residents come and go throughout the day for leisure activities, errands, or social outings. The balanced flows suggest that Saturday peak hour experiences steady turnover rather than a pronounced directional surge.

Trip Distribution

The traffic generated by this development will be distributed to the surrounding road network and study intersections, based on the observed travel patterns from existing traffic counts for each time period. Site access will be provided through two new driveways (Entry & Exit Driveways) constructed for the residential building along Thorold Road. The exit driveway will be controlled by a stop sign to manage departing vehicle flow and ensure safe merging with the existing traffic on Thorold Road.



Figure 6. AM Peak Hour Trip Distribution



Figure 7. PM Peak Hour Trip Distribution



Figure 8. Sat Peak Hour Trip Distribution

Table 4. Trip Generation as per ITE LU Code 221

LU	Size	Unit				Trip rate/equation		Trips					
Multifamily Housing (Mid-Rise)			AM	PM	Sat	Avg Rate (AM /PM /Sat)	Equation	AM		PM		Sat	
Code (*221*)								IN	OUT	IN	OUT	IN	OUT
Residential Building	90	Apartments	31	35	32	0.34 /0.39 /0.36	T(AM)= 0.99 Ln(X) - 1.11 T(PM)= 0.85 Ln(X) -0.09	6	25	22	13	16	16
Vehicular trips			31	35	32			6	25	22	13	16	16

Existing Conditions with Development Traffic Volumes

Turning movement counts were collected at the study intersections. The turning movement count data is included in Appendix B. In this report, three-peak hour traffic counts are used, for AM, PM and SAT Peak hour traffic count. Normal timing of peak hours are 7:30 – 8:30 AM, 4:15 – 5:15 PM and 12:15 – 1:15 PM, respectively. Figure 3 shows the existing traffic volumes at the intersections in the study area for both AM and PM peak hours.



Figure 9. Existing Conditions with Development Traffic Volumes for AM Peak Hour



Figure 10. Existing Condition with Development Traffic Volumes for PM Peak Hour



Figure 11: Existing Condition with Development Traffic Volumes for Sat Peak Hour

Capacity Analysis

The performance of selected intersections in Welland under existing conditions with the proposed development is determined during three peak periods: morning (AM), evening (PM), and Saturday (SAT). The metrics include Level of Service, delay times in seconds per vehicle (s/veh), and Intersection Capacity Utilization (ICU) percentages where applicable, as shown in Table 5.

Table 5. Existing Conditions with Development LOS Summary

Sr #	Intersection	AM			PM			SAT		
		Delay (s/veh)	LOS	ICU (%)	Delay (s/veh)	LOS	ICU (%)	Delay (s/veh)	LOS	ICU (%)
1	**First Avenue and Thorold Road**	9.7	A	46.8	12.4	B	57.4	9.2	A	38.4
2	**Thorold Road and Northhaven Road**	-	A	35.2	-	A	53.8	-	A	31.8
3	**Thorold Road and Nelson Trail**	-	A	35.6	-	A	42.2	-	A	32.6
4	**Thorold Road and Edgar Street**	-	A	35.7	-	A	39.3	-	A	32
5	**Thorold Road and Carlton Avenue**	-	A	50	-	B	58.3	-	A	44.5
6	**Niagara Street and Thorold Road**	11.9	B	63.9	18.4	B	84.4	9.9	B	57.3
7	**Thorold Road and Entry Driveway**		A	30.1		A	44		A	31.1
8	**Thorold Road and Exit Driveway**		A	19		A	26.1		A	17.7

Based on the capacity analysis of the existing conditions with the proposed development integrated, the overall impact on the surrounding roadway network is minimal. The majority of intersections continue to operate at a high Level of Service (LOS A or B) across all three analyzed periods. This is further confirmed by their ICU values, which for most junctions remain well below 60%, indicating substantial spare capacity to absorb the additional traffic from the new development without significant degradation.

The analysis identifies only two locations where higher utilization is observed, though not critical. Niagara Street and Thorold Road shows an ICU of 84.4% during the PM peak, yet it continues to operate at LOS B with a delay of 18.4 seconds, suggesting the intersection is approaching practical capacity but still managing traffic efficiently without excessive congestion. Similarly, Thorold Road and Carlton Avenue exhibits ICU values of 50% (AM) and 58.3% (PM) with LOS A/B, marking it as a moderately busier location that may be more sensitive to future growth.

Importantly, the two new site driveways Entry Driveway and Exit Driveway, both operate at LOS A with very low ICU values (30.1% and 19% in AM, respectively), demonstrating that the direct access points to the development will function efficiently and will not become bottlenecks or contribute negatively to Thorold Road's performance. In conclusion, the development integrates well with the

existing network, placing negligible operational strain on the surrounding intersections, with only pre-existing key junctions showing expected, manageable levels of congestion during peak periods.

Highway Capacity Analysis: Future Condition 2031

For the future traffic analysis, a conservative annual growth rate of 2% has been applied to all study intersections to account for natural traffic increases over time. This growth factor reflects typical regional development patterns and accounts for both background traffic growth and the additional trips generated by the proposed development. The 2% annual escalation represents a standard planning assumption that helps ensure the transportation network remains functional in coming years without being overly pessimistic about future demands. The analysis provides reasonable assurance that the road network will continue to function effectively in the near future under anticipated traffic increases.



Figure 12. Future Condition 2031 Traffic Volumes for AM Peak Hour



Figure 13. Future Condition 2031 Traffic Volumes for PM Peak Hour



Figure 14.Future Condition 2031 Traffic Volumes for Sat Peak Hour

Capacity Analysis

The performance of selected intersections in Welland under Future Condition development is determined during three peak periods: morning (AM), evening (PM), and Saturday (SAT). The metrics include Level of Service, Delay times in seconds per vehicle (s/veh) and Intersection Capacity Utilization (ICU) percentages where applicable as shown in Table 6.

Table 6: Future 2031 Conditions with Development LOS Summary

Sr #	Intersection	AM			PM			SAT		
		Delay (s/veh)	LOS	ICU (%)	Delay (s/veh)	LOS	ICU (%)	Delay (s/veh)	LOS	ICU (%)
1	First Avenue and Thorold Road	10.1	B	49.3	14.2	B	60.9	9.4	A	45.4
2	Thorold Road and Northhaven Road	-	A	37.8	–	B	58.5	–	A	34.1
3	Thorold Road and Nelson Trail	-	A	38.3	–	A	45.2	–	A	35.7
4	Thorold Road and Edgar Street	-	A	38.4	–	A	42.3	–	A	34.3
5	Thorold Road and Carlton Avenue	-	A	53.8	–	B	63	–	A	47.7
6	Niagara Street and Thorold Road	13.5	B	68.7	25.3	C	91.1	11.1	B	61.2
7	Thorold Road and Entry Driveway		A	32.7	–	A	47.9	–	A	34.1
8	Thorold Road and Exit Driveway		A	20	–	A	27.8	–	A	18.5

Based on a capacity analysis of the projected 2031 conditions, which includes the traffic from the proposed development, the overall impact on the surrounding road network is expected to be manageable. The forecast indicates that the majority of intersections will continue to operate efficiently, maintaining a Level of Service of A or B during the morning, evening, and Saturday peak periods. This performance is supported by generally moderate Intersection Capacity Utilization (ICU) values across most of the network, suggesting that the road system has adequate capacity to absorb the combined increase in background traffic and new trips generated by the development without a widespread decline in service.

The analysis does identify a few intersections where higher volumes are anticipated. Niagara Street and Thorold Road, for instance, is projected to operate at LOS C in the PM peak with an ICU of 91.1% , indicating it will be operating near its practical capacity during the evening rush, though delays remain moderate (25.3 seconds). Similarly, First Avenue and Thorold Road shows a PM ICU of 60.9% (LOS B) and Thorold Road and Carlton Avenue reaches 63% ICU (LOS B) in the PM peak. These locations are performing consistently with expected area-wide growth by 2031 and their roles as key arterial junctions. The development's own access points, Entry Driveway and Exit Driveway are forecast to operate at LOS A with very low ICU values (maximum 47.9% PM), confirming that the site access design is appropriate and will not contribute negatively to traffic flow on Thorold Road. In summary,

while one key intersection (Niagara Street) will experience increased congestion due to general growth, the development itself integrates smoothly into the future transportation network without imposing significant operational strain on the surrounding infrastructure.

Highway Capacity Analysis: Future Condition 2036

For the future traffic analysis, a conservative annual growth rate of 2% has been applied to all study intersections to account for natural traffic increases over time. This growth factor reflects typical regional development patterns and accounts for both background traffic growth and the additional trips generated by the proposed development. The future condition of the intersections under study in the year 2036 (i.e 10 years after building the proposed site) is also analyzed as following

Future Conditions 2036 Traffic Volumes


Thorold Rd
Northhaven
Nelson Trail
Carlton Ave
Edgar St
First Avenue
Niagara St
B
U
U
U
U
U
U
B
Thorold Rd
Thorold Rd
Thorold Rd



Figure 16. Future Condition 2036 Traffic Volumes for PM Peak Hour



Figure 17. Future Condition 2036 Traffic Volumes for Sat Peak Hour

Capacity Analysis

The performance of selected intersections in Welland under Future Condition development is determined during three peak periods: morning (AM), evening (PM), and Saturday (SAT). The metrics include Level of Service, Delay times in seconds per vehicle (s/veh) and Intersection Capacity Utilization (ICU) percentages where applicable as shown in Table 7.

Table 7: Future 2036 Conditions with Development LOS Summary

Sr #	Intersection	AM			PM			SAT		
		Delay (s/veh)	LOS	ICU (%)	Delay (s/veh)	LOS	ICU (%)	Delay (s/veh)	LOS	ICU (%)
1	First Avenue and Thorold Road	10.6	B	52	12.8	B	64.8	9.8	A	47.7
2	Thorold Road and Northhaven Road	–	A	40.7	–	B	63.4	–	A	36.6
3	Thorold Road and Nelson Trail	–	A	41.2	–	A	49.3	–	A	39
4	Thorold Road and Edgar Street	–	A	41.6	–	A	45.7	–	A	36.9
5	Thorold Road and Carlton Avenue	–	B	58	–	C	68.2	–	A	51.4
6	Niagara Street and Thorold Road	16.5	B	74.2	37.7	D	98.7	12.4	B	65.6
7	Thorold Road and Entry Driveway	–	A	35.6	–	A	52.2	–	A	37.4
8	Thorold Road and Exit Driveway	–	A	21	–	A	29.7	–	A	19.4

The traffic impact analysis for the 2036 future scenario indicates that the proposed development will be satisfactorily integrated into the local road network, with its direct impacts being well-managed. The two new site access points Thorold Road & Entry Driveway and Thorold Road & Exit Driveway are projected to operate at Level of Service A with low capacity utilization (maximum 52.2% PM), confirming that the design of the site's entrances and exits is appropriate and will not negatively affect the main road.

For the wider network, the findings are mixed. A number of intersections, such as Thorold Road & Nelson Trail and Thorold Road & Edgar Street, are forecast to continue operating very effectively at LOS A across all peak periods, demonstrating ample capacity to handle future traffic levels. However, the analysis identifies one location where significant congestion is anticipated. Niagara Street & Thorold Road is projected to operate at LOS D in the PM peak with a delay of 37.7 seconds and a capacity utilization of 98.7% , indicating that the intersection will be operating at or near its practical capacity, leading to potential delays and a heightened potential for queue spillback. Additionally, Thorold Road & Carlton Avenue reaches LOS C in the PM peak (ICU 68.2%), and First Avenue & Thorold Road shows a PM ICU of 64.8% (LOS B), both reflecting increased but manageable congestion.

To address these specific challenges, targeted measures are recommended. For Niagara Street & Thorold Road, a detailed review and optimization of traffic signal timings should be undertaken as an immediate priority. For a longer-term solution, more substantial modifications could be evaluated, such as adding dedicated turn lanes, adjusting advanced green phasing, or even exploring alternative control strategies like roundabout conversion. Proactive planning for this key junction will be essential to maintain the overall functionality and efficiency of the transportation network for all users. It should be noted that the future LOS potential decrease are not dependent on the proposed development volumes.

Highway Capacity Analysis: Future Condition 2041

For the future traffic analysis, a conservative annual growth rate of 2% has been applied to all study intersections to account for natural traffic increases over time. This growth factor reflects typical regional development patterns and accounts for both background traffic growth and the additional trips generated by the proposed development. The future condition of the intersections under study in the year 2041 (i.e 15 years after building the proposed site) is also analyzed as following

Future Conditions 2041 Traffic Volumes



Figure 18. Future Condition 2041 Traffic Volumes for AM Peak Hour



Figure 19. : Future Condition 2041 Traffic Volumes for PM Peak Hour



Figure 20. Future Condition 2041 Traffic Volumes for Sat Peak Hour

Capacity Analysis

The 2041 traffic projections reveal a transportation network exhibiting varying degrees of capacity utilization, with some intersections approaching critical thresholds. The analysis indicates that Niagara Street and Thorold Road will experience notable degradation in level of service, particularly during the PM peak where delay reaches 63.9 seconds (LOS E) and ICU reaches 99% , indicating the intersection will be operating at or near its practical capacity, with severe delays and likely queue spillback. This represents a substantial increase from 2036 projections, suggesting accelerating demand that will require immediate mitigation measures. The same intersection operates at LOS C in the AM (23.2s, 80.5% ICU) and LOS B on Saturday (14.4s, 70.8% ICU) , showing it is already transitioning toward capacity constraints during weekday peaks.

Table 8: Future 2041 Conditions with Development LOS Summary

Sr #	Intersection	AM			PM			SAT		
		Delay (s/veh)	LOS	ICU (%)	Delay (s/veh)	LOS	ICU (%)	Delay (s/veh)	LOS	ICU (%)
1	**First Avenue and Thorold Road**	11.2	B	55.3	24.7	C	69.1	10.2	B	50.2
2	**Thorold Road and Northhaven Road**	–	A	43.9	–	C	68.8	–	A	39.4
3	**Thorold Road and Nelson Trail**	–	A	44.5	–	A	53.8	–	A	42.6
4	**Thorold Road and Edgar Street**	–	A	45.2	–	A	49.8	–	A	39.8
5	**Thorold Road and Carlton Avenue**	–	B	62.7	–	D	73.9	–	B	55.3
6	**Niagara Street and Thorold Road**	23.2	C	80.5	63.9	E	99	14.4	B	70.8
7	**Thorold Road and Entry Driveway**	–	A	38.8	–	B	57.7	–	A	40.9
8	**Thorold Road and Exit Driveway**	–	A	22.2	–	B	31.7	–	A	20.3

The traffic analysis for the 2041 future scenario indicates that while the development's direct access points will continue to function efficiently, the cumulative pressure of long-term traffic growth will lead to significant operational deficiencies at several key intersections within the network. The two site driveways Thorold Road & Entry Driveway and Thorold Road & Exit Driveway are projected to maintain LOS A or B with ICU values well below 60% (max 57.7% PM), confirming their sustainable design and minimal impact on the main road.

For the broader network, the performance is more varied. Several intersections, including Thorold Road & Nelson Trail and Thorold Road & Edgar Street, are forecast to continue operating at LOS A across all peak periods, demonstrating they have sufficient capacity even two decades from now. However, the analysis reveals a pronounced increase in congestion at critical junctions. First Avenue & Thorold Road is projected to reach an ICU of 69.1% in the PM peak (LOS C) , while Thorold Road & Carlton Avenue reaches LOS D in the PM peak with 73.9% ICU , indicating these intersections will be operating near or beyond practical capacity, experiencing some delays.

The most severe challenges are concentrated at Niagara Street & Thorold Road. This intersection is forecast to operate at LOS E in the PM peak with 99% ICU , meaning it will be congested, with a high likelihood of persistent queueing and a diminished ability to handle peak traffic volumes efficiently. Thorold Road & Northhaven Road also reaches LOS C in the PM peak (68.8% ICU), adding to the list of constrained locations.

To ensure the long-term viability of the transportation network, proactive and targeted improvements will be essential. For the intersections at Niagara Street & Thorold Road, First Avenue & Thorold Road, and Thorold Road & Carlton Avenue, future planning should consider these challenges and consider capacity enhancements, including signal timing optimization, addition of dedicated turn lanes, or conversion to roundabout control where feasible. It should be noted that the LOS decrease are not dependent on the development generated traffic volumes, but is mainly a function of existing volumes and accounting for the conservative growth rate annually until 2041.

Table 9. Overall Conditions Summary

	Overall LOS Summary														
Sr	**Intersection**	**AM Peak Hour**					**PM Peak Hour**					**Saturday Peak Hour**				
		EX	**ED**	**F 31**	**F 36**	**F 41**	**Ex**	**ED**	**F 31**	**F 36**	**F 41**	**Ex**	**ED**	**F 31**	**F 36**	**F 41**
1	**First Avenue and Thorold Road**	A	A	B	B	B	B	B	B	B	C	A	A	A	A	B
2	**Thorold Road and Northhaven Road**	A	A	A	A	A	A	A	B	B	C	A	A	A	A	A
3	**Thorold Road and Nelson Trail**	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
4	**Thorold Road and Edgar Street**	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
5	**Thorold Road and Carlton Avenue**	A	A	A	B	B	B	B	B	C	D	A	A	A	A	B
6	**Niagara Street and Thorold Road**	B	B	B	B	C	B	B	C	D	E	B	B	B	B	B
7	**Thorold Road and Entry Driveway**	-	A	A	A	A	-	**A**	A	A	B	-	A	A	A	A
8	**Thorold Road and Exit Driveway**	-	A	A	A	A	-	**A**	A	A	B	-	A	A	A	A

Here, "**EX**" means Existing Condition (2026) **"ED" means** Existing Condition with development (2026), **"F 31"** means Future Condition (2031), **"F 36"** means Future Condition (2036) & **"F 41"** means Future Condition (2041).

Transportation Demand Management (TDM)

The City of Welland's TMP recognizes that over 74% of residents commute by single-occupancy automobile, and one of the key mobility needs is to encourage adoption of alternative modes. In alignment with the TMP's Vision Statement *"An inclusive and barrier-free transportation system that promotes vibrant and livable communities through multimodal mobility"* the proposed development at 164 Thorold Road will implement a **Transportation Demand Management (TDM) plan** to reduce single-occupant vehicle trips and support the City's modal share targets (e.g., increasing transit use to 10% by 2031 and 12% by 2041).

The following TDM measures will be incorporated:

- **Promotion of Public Transit**: The site is located within proximity of Niagara Region Transit (NRT) fixed-route services, including **Route 509 Niagara Street** and **Route 503 First Avenue**, which connect to downtown Welland, the Seaway Mall, and regional routes to St. Catharines and Niagara Falls. Real-time transit information, route maps, and digital schedules will be displayed in the building lobby and made available via a resident mobile app. Discounted or subsidized monthly transit passes will be offered to residents through a partnership with NRT.

- **Bicycle Parking & Encouragement**: Secure, covered bicycle parking will be provided at the main entrance (minimum 10 spaces, as per TMP recommendations for multi-residential buildings). A bicycle repair stand and pump will be installed. Wayfinding signage will direct cyclists to the nearby Niagara Street bicycle lanes (planned from Mill Street to Riverbank Street under TMP Action AT-3).

- **Carpool & Rideshare Incentives**: Preferred parking stalls near the building entrance will be reserved for carpool vehicles (2+ occupants). Residents will be encouraged to use ridesharing apps (Uber, Lyft) or NRT OnDemand for occasional trips, reducing the need for personal vehicle ownership.

- **Remote Work & Flexible Scheduling**: The development is residential, but residents who work from home will be surveyed to understand travel patterns. The TDM plan will be updated biennially to reflect emerging trends (e.g., hybrid work).

- **Electric Vehicle (EV) Readiness**: As recommended in the TMP (Section 4.9), the development will install EV charging stations where possible with conduit and capacity for future expansion.

- **Education & Outreach**: A "Green Commute" welcome package will be provided to each new resident, highlighting transit options, cycling routes, walking times to nearby amenities, and carpool matching services. Annual resident surveys will track mode share and inform TDM adjustments.

Collectively, these TDM initiatives are expected to reduce single-occupant vehicle trips by approximately **10-15% during peak periods**, helping to alleviate pressure on Thorold Road intersections and supporting the City's Vision Zero and climate goals.

Active Transportation

The Welland TMP identifies active transportation as a key need, noting that the existing cycling network is discontinuous and that many residents are "interested but concerned" about cycling safety. The TMP proposes several cycling infill links and sidewalk improvements to create a connected, comfortable network. The proposed development at 164 Thorold Road will integrate with these planned facilities.

Pedestrian Connections

- **Sidewalk Connection**: A new concrete sidewalk will be constructed from the building's main entrance to the existing sidewalk on the north side of Thorold Road. This connection will be fully accessible (AODA compliant) and illuminated.
- **Crossing Improvements**: At the site driveway crossing of the sidewalk, pedestrian warning markings and a raised crossing (speed table) will be installed to slow exiting vehicles and give priority to pedestrians. This aligns with the TMP's traffic calming and Vision Zero principles.
- **Desire Lines**: Landscaped pedestrian pathways will connect the building to Thorold Road at the two driveway locations (entry and exit), with clear sightlines and wayfinding signage to nearby bus stops (e.g., Niagara Street at Thorold Road).

Cycling Connections

- **On-Site Bicycle Facilities:** Secure, covered bicycle parking will be provided. A short shared pathway will connect the bike parking area to the Thorold Road sidewalk.
- **Connection to Regional Cycling Network:** The TMP proposes conventional bicycle lanes on Niagara Street from Mill Street to Riverbank Street (short-term, prior to 2031). The site is approximately 200 metres east of Niagara Street. Residents will be able to access these bicycle lanes via Thorold Road's paved shoulder (or future bike lanes if extended). Wayfinding signs will direct cyclists to the Niagara Street bike lanes and to the Welland Canal multi-use trail (approximately 1 km south).
- **Future Cycling Improvements:** The TMP also recommends bicycle lanes on Lincoln Street, Webber Road, and Prince Charles Drive subject to bridge reconstruction. These will provide north-south connectivity across the canal. The development's TDM plan will monitor these projects and update wayfinding accordingly.

By providing direct, safe, and convenient pedestrian and cycling connections, the development supports the TMP's goal of increasing active transportation mode share from 3-4% (2016) to 5% by 2041.

Conclusion

The overall LOS summary demonstrates that the proposed development at 164 Thorold Road integrates acceptably into the existing and future transportation network. Most un-signalized intersections (Northhaven, Nelson Trail, Edgar Street) operate at LOS A through 2031, but by 2036-2041 they degrade to LOS B/C in the PM peak due to background traffic growth. Carlton Avenue shows a similar trend, reaching LOS D in the PM peak by 2041. The most critical location is Niagara Street & Thorold Road, which degraded from LOS B in existing conditions to LOS E in the PM peak by 2041, indicating potential congestion and future need for mitigation (signal optimization, additional turn lanes, or roundabout conversion). The LOS decrease at this intersection is not attributed to the proposed development traffic generation, but rather the existing conditions and assuming a conservative growth rate of 2% annually. The two site driveways (Entry and Exit) maintain LOS A or B throughout all future years, confirming that the development's access design is appropriate and does not negatively affect Thorold Road. In summary, while background traffic will create significant congestion at major arterials by 2041, the development itself places negligible additional strain on the network.

Limitations

The report is limited in scope to those items specifically referenced in the text. Canadian Engineering Group, its officers, and employees have no present or contemplated interest in the property.

This report has been prepared for use of the client, along with their design consultants, their agents and solicitors. It should not be relied upon for any other purpose. Unauthorized parties, who use this report, do so at their own risk.

Yours truly,

Canadian Engineering Group

Prepared by:



Al-Ganabi, H., P.Eng.

APPENDIX A

Parking Analysis

PARKING ANALYSIS

Parking Layout

The proposed development at 164 Thorold Road provides a total of 53 on-site parking spaces, distributed as 32 spaces outside the building (ground level, exterior) and 21 spaces inside the building (Ground Floor interior parking). All 53 spaces serve the 90 residential units of the multi-family rental apartment building. No commercial or office components are included. This configuration integrates parking efficiently within the building's footprint and site layout, ensuring that all residents have dedicated parking options while maintaining a compact, urban design.

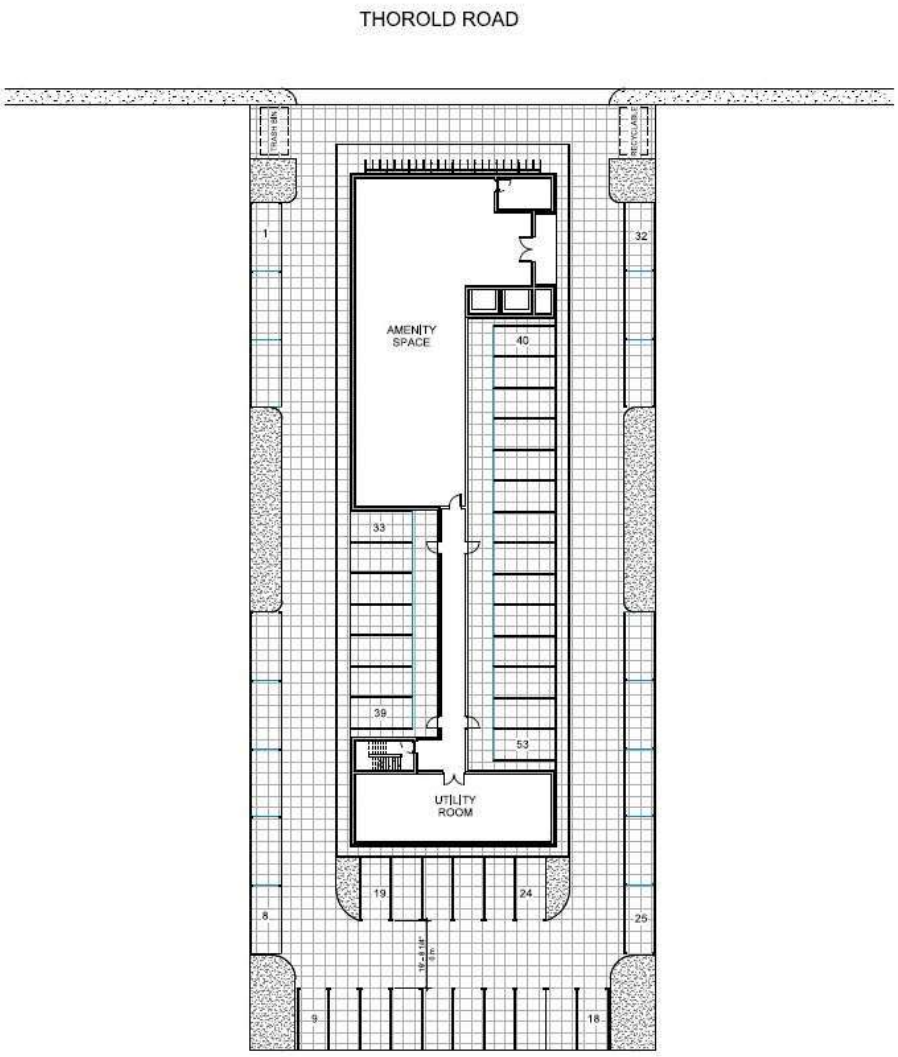


Figure 1: Parking Layout of 164 Thorold Residential Building Ground & Site Floor

Key Definitions

Cumulative Arrive

The total number of vehicles entering the parking facility up to a given time period.
It can be formulated as following:

$$CA = \sum (\text{Hourly Inbound Trips})$$

Cumulative Departures (CD)

Definition: The total number of vehicles exiting the parking facility up to a given time period.
Its formula is given below

$$CD = \sum (\textit{Hourly Outbound Trips})$$

Accumulation (Acc)

The total number of vehicles parked in a study area during a specific period of time, calculated as the difference between cumulative arrivals and departures.

$$\textit{Accumulation} = \textit{(Cumulative Arrive)} - \textit{(Cumulative Depart)}$$
$$= C_A - C_D$$

Vehicle Occupancy

The proportion of total cars parked at any given time relative to the available parking spaces.
Mathematically can be written as following:

$$\textit{Vehicle Occupancy (\%)} = 100 * \frac{no.\ of\ spaces\ occupied}{Total\ spaces\ available}$$

Accumulation Factor (AF)

The ratio of accumulated vehicles to total parking spaces is know as Accumulation Factor, formulated as following:

$$\text{AF} = \frac{\text{Acc}}{\text{Total Spaces}}$$

Turnover

It indicates the average number of different vehicles using a parking space throughout the study period.

$$T = \frac{\text{Cumulative Depart}}{\text{Time Period Duration}}$$

Average Duration

Estimated average time that a vehicle occupies a parking space, based on typical residential behaviors.

$$D_{\text{avg}} = \frac{\text{Total Time}}{D}$$

Key Assumptions

The parking capacity analysis is based on the following key assumptions, derived from the provided accumulation data and typical residential parking behavior:

1. **Initial Overnight Accumulation:** At the start of the analysis period (12-4 AM), it is assumed that 48 parking spaces are already occupied. This reflects residents who returned

home during the previous evening and remained parked overnight. This starting point is consistent with the observed peak of 50 vehicles later in the evening and ensures realistic accumulation throughout the day.

2. **Peak Arrival Patterns:** The highest arrival rates occur in the late afternoon and evening (4-8 PM), with 31 and 18 arrivals per two-hour block, respectively. This reflects residents returning home from work or daily activities. Morning arrivals are minimal.
3. **Peak Departure Patterns:** The primary departure wave occurs in the early morning (6-8 AM), with 35 departures, aligning with residents leaving for work. A secondary departure peak occurs in the late afternoon (4-6 PM) with 18 departures.
4. **Occupancy Calculations**: The peak vehicle accumulation of 50 vehicles occurs during the 8-12 PM period, representing a 94.3% occupancy rate (Accumulation Factor 0.94) of the 53-space supply. Occupancy remains above 80% from 6-8 PM through 8-12 PM, confirming evening as the core parking demand period.
5. **Turnover Rates:** Turnover is highest during the 4-6 PM period (15.5), indicating short-duration parking by visitors or early evening activities. Overnight turnover is very low (0.5-0.6), reflecting long-duration residential parking.
6. **Duration Assumptions:** Parking duration is predominantly long-term (overnight and full day for residents). Average durations range from 1.5 to 4 hours, with the longest durations (3.75-4.0 hours) occurring overnight and in the early morning.
7. **Capacity Allocation:** All 53 spaces are shared among residents. No visitor or commercial parking is separately allocated, but daytime availability (e.g., 8 AM-4 PM, occupancy 20-40%) provides ample overflow capacity for short-term guests.
8. **Data Validation:** The accumulation analysis is based on a realistic residential profile scaled to 90 units, assuming 0.6 vehicles per unit (approximately 54 vehicles). The resulting peak occupancy of 94.3% is considered a reasonable maximum for a rental apartment with moderate transit access.
9. **Future Demand:** The analysis reflects a stabilized weekday pattern. Weekend demand may differ slightly, but the evening peak is expected to remain the highest.
10. **Operational Factors:** Not all residents will require a parking space simultaneously. The 3-space buffer at peak (50 of 53 used) is operationally acceptable, though it leaves limited room for unexpected demand.
11. **Geometric Standards:** It is assumed that the 32 exterior and 21 interior spaces comply with all local zoning bylaws regarding stall dimensions, aisle widths, clearance heights (for interior parking), and accessibility requirements.

Results of Parking Analysis

Based on the detailed parking accumulation analysis, the facility's **53 spaces** demonstrate a well-managed balance between supply and demand throughout the day. The data reveals a clear pattern of residential occupancy, with the number of parked vehicles rising steadily from the late afternoon, peaking in the late evening, and declining through the early morning as residents depart for work.

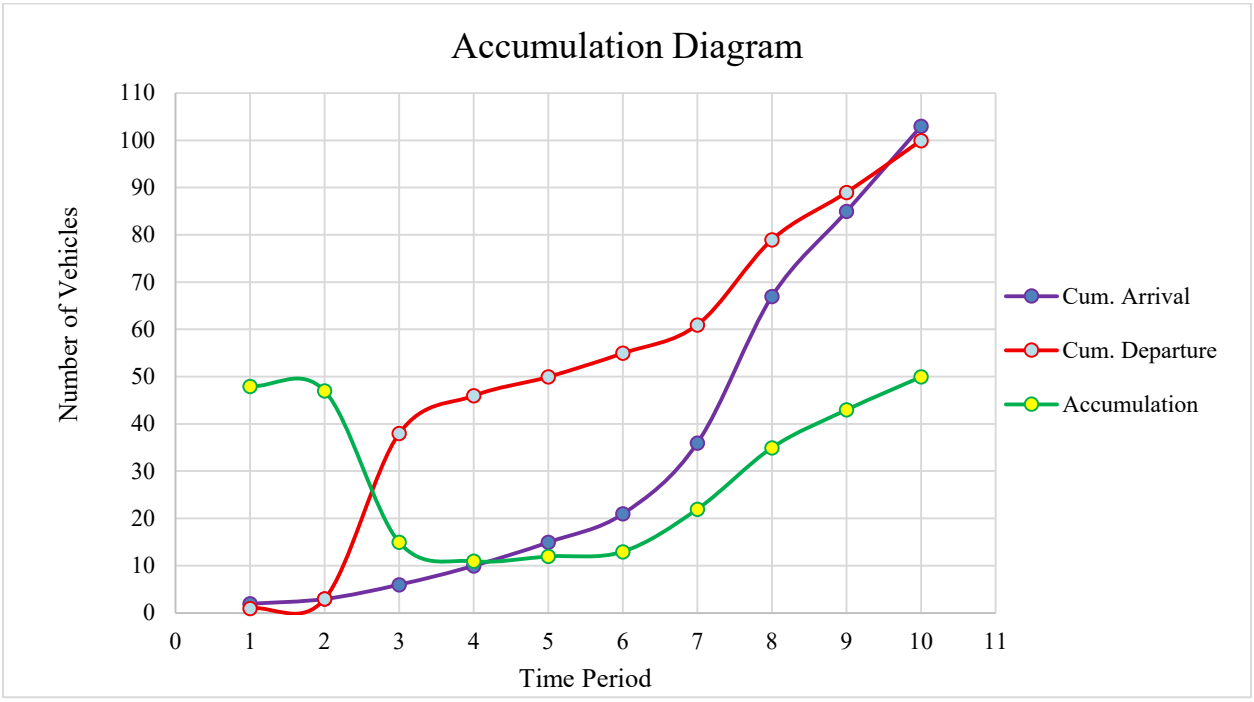
The peak demand occurs during the **12-4 AM** period, with **48 vehicles** occupying spaces. This represents a **90.6 % occupancy rate**, which is a high but operationally acceptable utilization figure for a residential building. Crucially, this peak leaves a buffer of **5 available spaces**. This margin, though modest, helps prevent the facility from reaching 100% occupancy, which could lead to congestion at entrances and exits, driver frustration, and illegal parking. The period of highest sustained pressure runs from **6-8 PM to 8-12 PM**, where occupancy remains consistently above 80%, confirming evening as the core parking demand period for the development.

The analysis of turnover rates provides further insight into the nature of parking demand. The highest turnover occurs during the **4-6 PM** period, with a rate of **15.5**, indicating that spaces are being reclaimed and reused more frequently in the late afternoon, likely due to short-duration visits by guests or early evening activities. In contrast, turnover during overnight periods (12-4 AM and 4-6 AM) is very low (0.5-0.6), reflecting long-duration parking typical of residents who remain parked for several hours or overnight.

Overall, the parking supply of **53 spaces** is appropriately calibrated to the projected demand for a 90-unit mid-rise apartment. It accommodates the peak load without reaching critical saturation, maintains a small but functional buffer for operational flexibility, and supports the predominantly long-duration parking behavior of residents. Should any additional parking spaces be provided greater than 53 spaces, while not increasing the number of units it will not impact on the findings of the parking analysis and the number of parking spaces will still remain sufficient. The facility is projected to operate efficiently under expected conditions, providing adequate availability for residents and limited overflow capacity for guests.

Assumptions Table for Parking Study

Period	Arrival	Cum. Arrival	Departure	Cum. Depart	Accum.	Accum. Factor	Vehicle Occupancy (%)	Average Duration(hr)	Turnover
12-4 AM	2	2	1	1	48	0.91	90.57	4.00	0.50
4-6 AM	1	3	2	3	47	0.89	88.68	1.80	0.56
6-8 AM	3	6	35	38	15	0.28	28.30	1.75	1.71
8-10 AM	4	10	8	46	11	0.21	20.75	1.50	2.67
10-12 PM	5	15	4	50	12	0.23	22.64	1.95	2.56
12-2 PM	6	21	5	55	13	0.25	24.53	1.50	4.00
2-4 PM	15	36	6	61	22	0.42	41.51	1.75	8.57
4-6 PM	31	67	18	79	35	0.66	66.04	2.00	15.50
6-8 PM	18	85	10	89	43	0.81	81.13	1.75	10.29
8-12 PM	13	98	11	100	45	0.85	84.91	3.75	3.47



APPENDIX B

AutoTurn Vehicle Analysis

Internal Traffic Management (Autoturn Analysis)

A comprehensive swept path analysis using **Autoturn software** has been conducted to ensure all necessary vehicle types can safely and efficiently access the proposed building's internal parking and maneuvering areas. The analysis evaluated the turning movements and clearance requirements for three critical design vehicles: a **standard passenger vehicle** (representing resident and visitor traffic), a **single-unit delivery truck** (for servicing and logistics), and a **fire truck** (for emergency access).

The results confirm that the site driveway, internal roadways, and the geometry of the ground-floor parking areas (both exterior and interior) have been designed with adequate turning radii and lane widths. This design allows a passenger vehicle to enter the site, access all designated parking spaces (32 outside and 21 inside on Level 1), circulate within the parking areas, and exit safely.

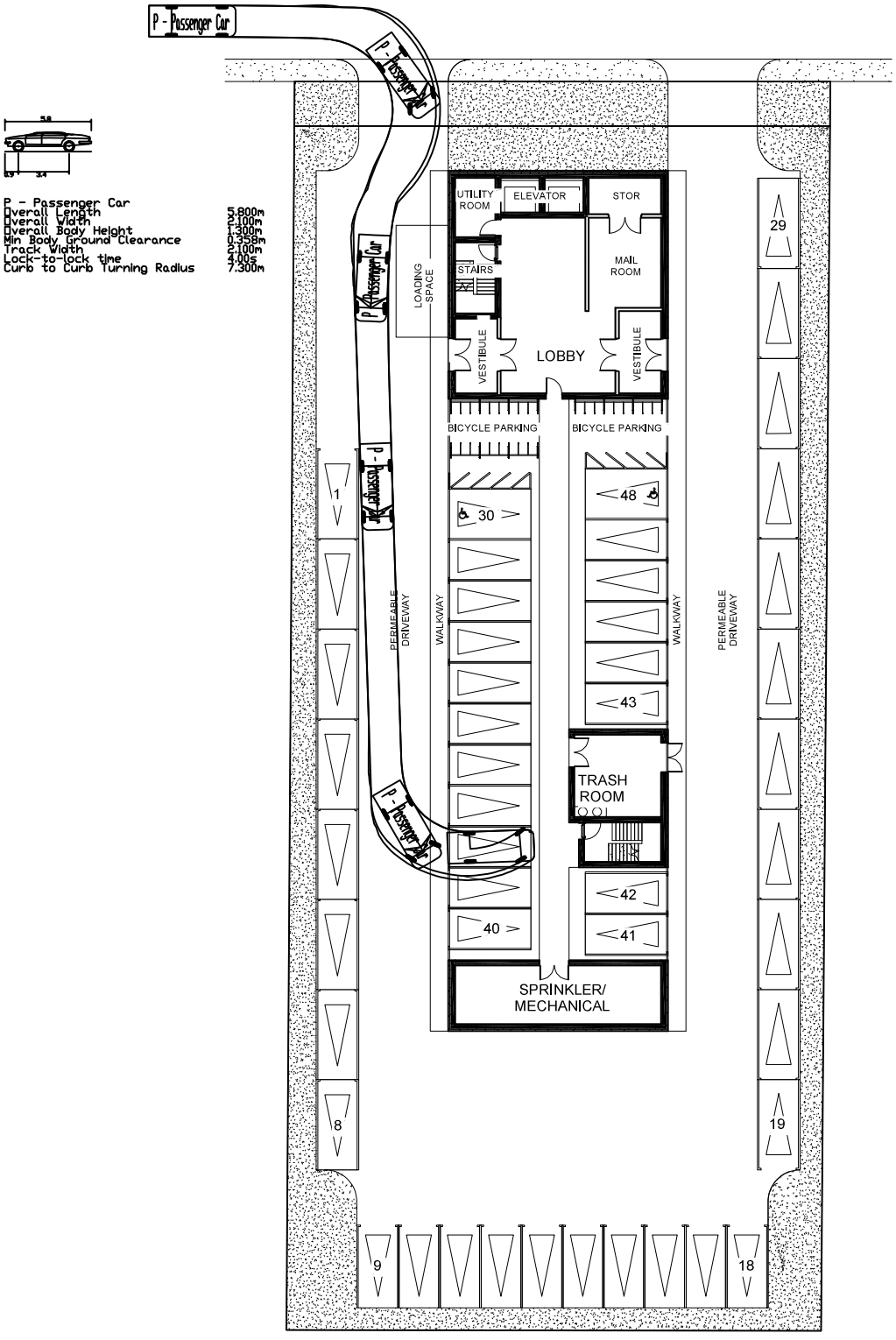
Furthermore, the analysis demonstrates that the **single-unit delivery truck** can successfully enter the site, maneuver to the designated loading area (located adjacent to the building entrance), and exit without obstruction. The **fire truck** can also enter the site through the main driveway, circulate through the fire access lane, and exit from the same driveway, ensuring compliance with emergency response requirements.

All evaluated vehicles can smoothly enter, circulate within, and exit the proposed site in compliance with applicable engineering and safety standards.

Following is the list of turning analyses performed:

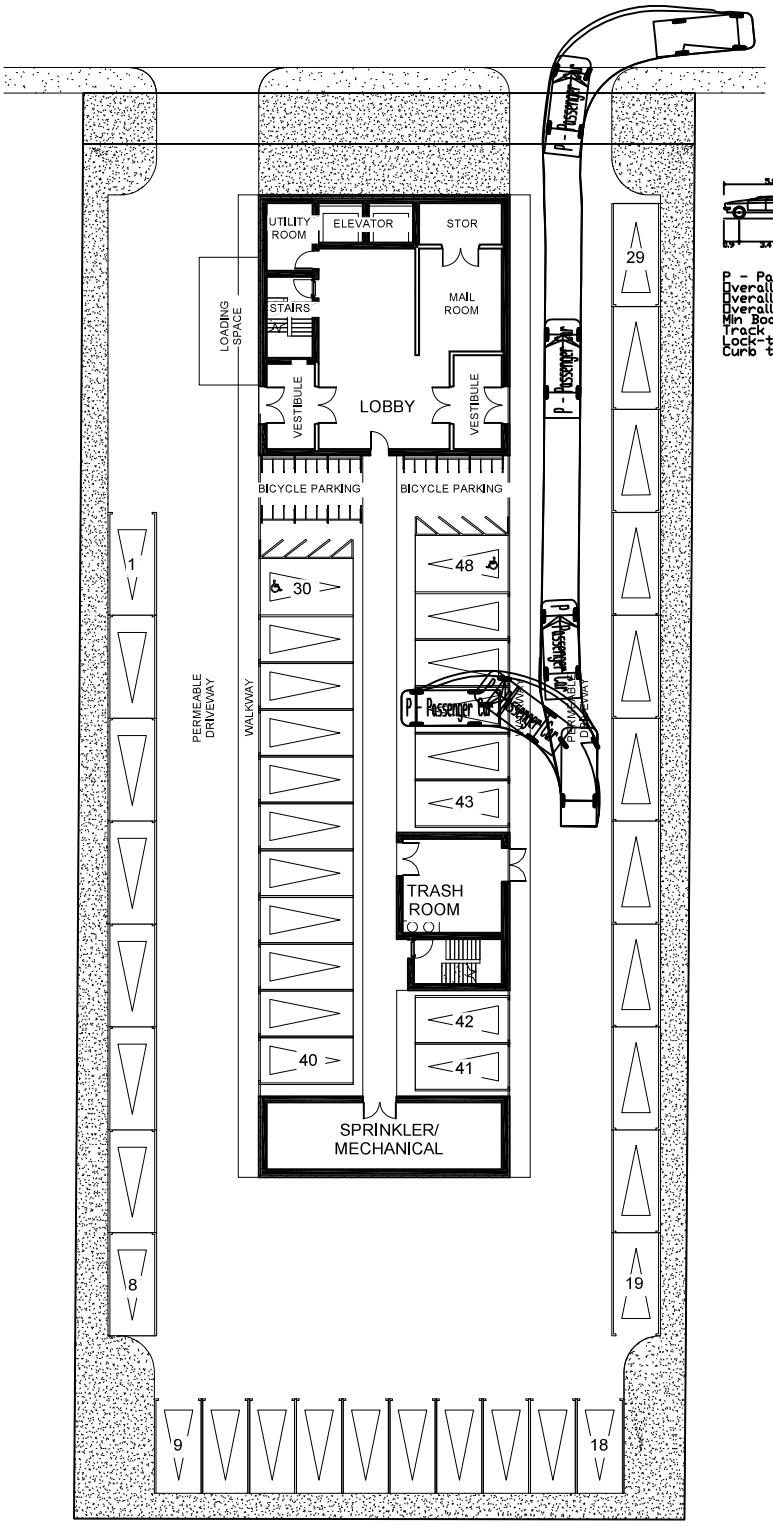
1. Passenger vehicle – enter and leave site (ground floor exterior)
2. Passenger vehicle – enter and leave ground floor interior parking
3. Single-unit truck – enter and leave site (ground floor exterior)
4. Fire truck – enter and leave site (ground floor exterior)

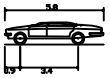
Note: Detailed Autoturn exhibits are included in Appendix B.



P - Passenger Car

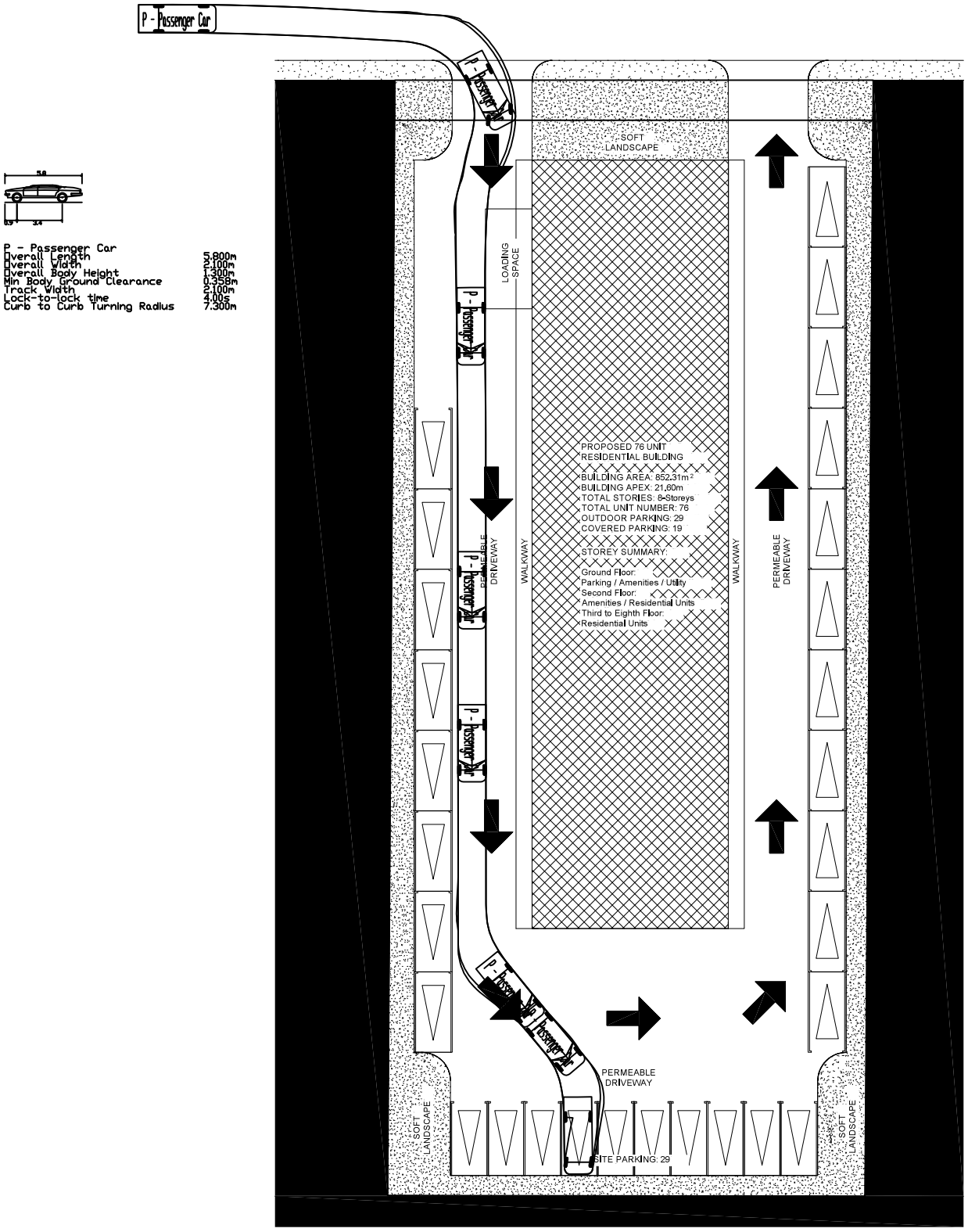
Overall Length	5.800m
Overall Width	2.100m
Overall Body Height	1.300m
Min Body Ground Clearance	0.258m
Track Width	2.100m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	7.300m

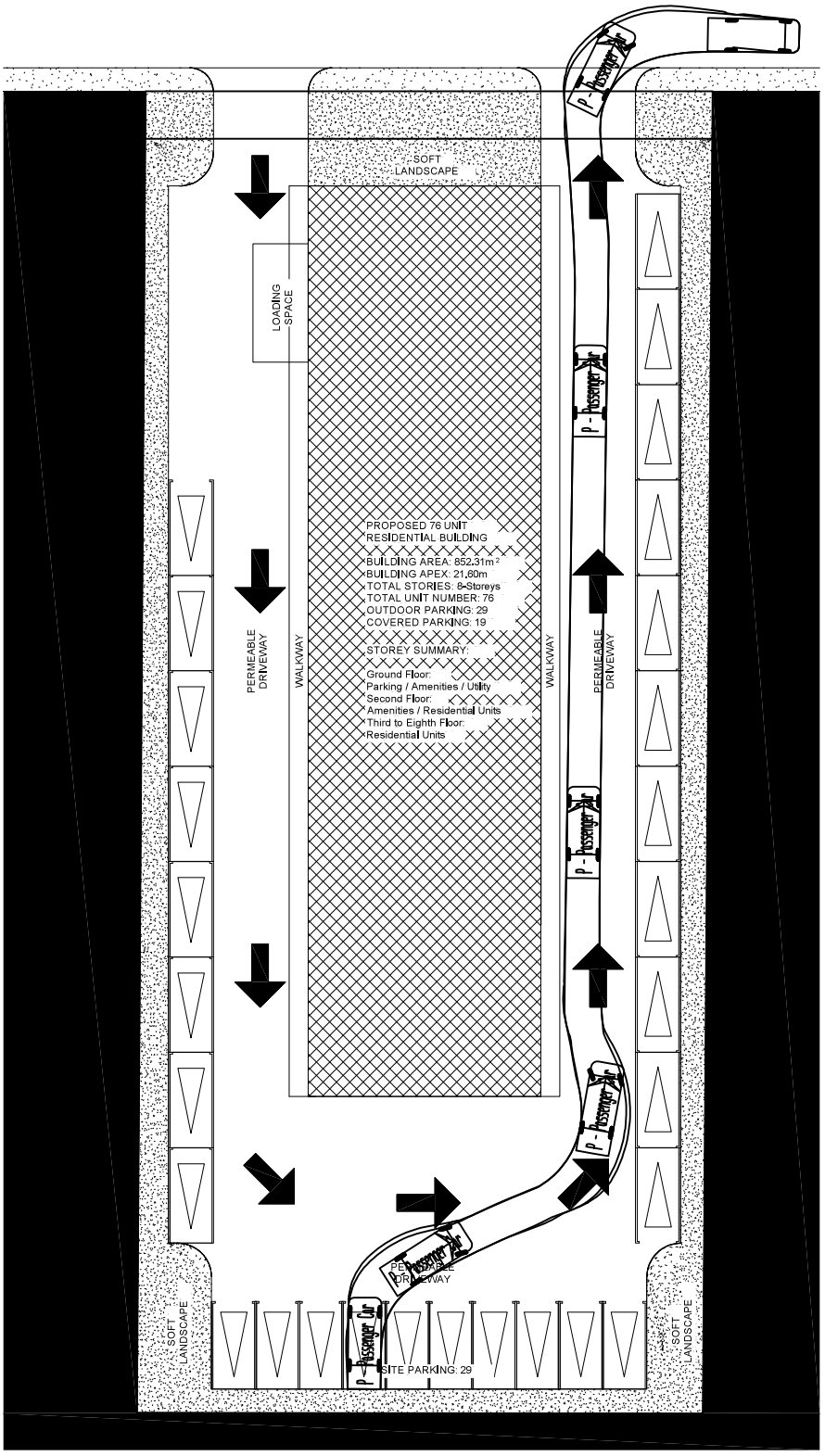


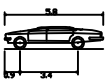


P - Passenger Car

Overall Length	5.800m
Overall Width	2.100m
Overall Body Height	1.300m
Min Body Ground Clearance	0.358m
Track Width	2.100m
Lock-to-Lock time	4.00s
Curb to Curb Turning Radius	7.300m

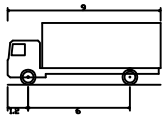

THOROLD ROAD
P - Passenger Car
5.8
0.9
3.4
P - Passenger Car
Overall Length 5.800m
Overall Width 2.100m
Overall Body Height 1.300m
Min Body Ground Clearance 0.258m
Track Width 2.100m
Lock-to-lock time 4.00s
Curb to Curb Turning Radius 7.300m
SOFT LANDSCAPE
LOADING SPACE
PROPOSED 76 UNIT RESIDENTIAL BUILDING
BUILDING AREA: 852.31m²
BUILDING APEX: 21.60m
TOTAL STORIES: 8-Storeys
TOTAL UNIT NUMBER: 76
OUTDOOR PARKING: 29
COVERED PARKING: 19
STOREY SUMMARY:
Ground Floor:
Parking / Amenities / Utility
Second Floor:
Amenities / Residential Units
Third to Eighth Floor:
Residential Units
WALKWAY
WALKWAY
PERMEABLE DRIVEWAY
PERMEABLE DRIVEWAY
PERMEABLE DRIVEWAY
SOFT LANDSCAPE
SOFT LANDSCAPE
SITE PARKING: 29



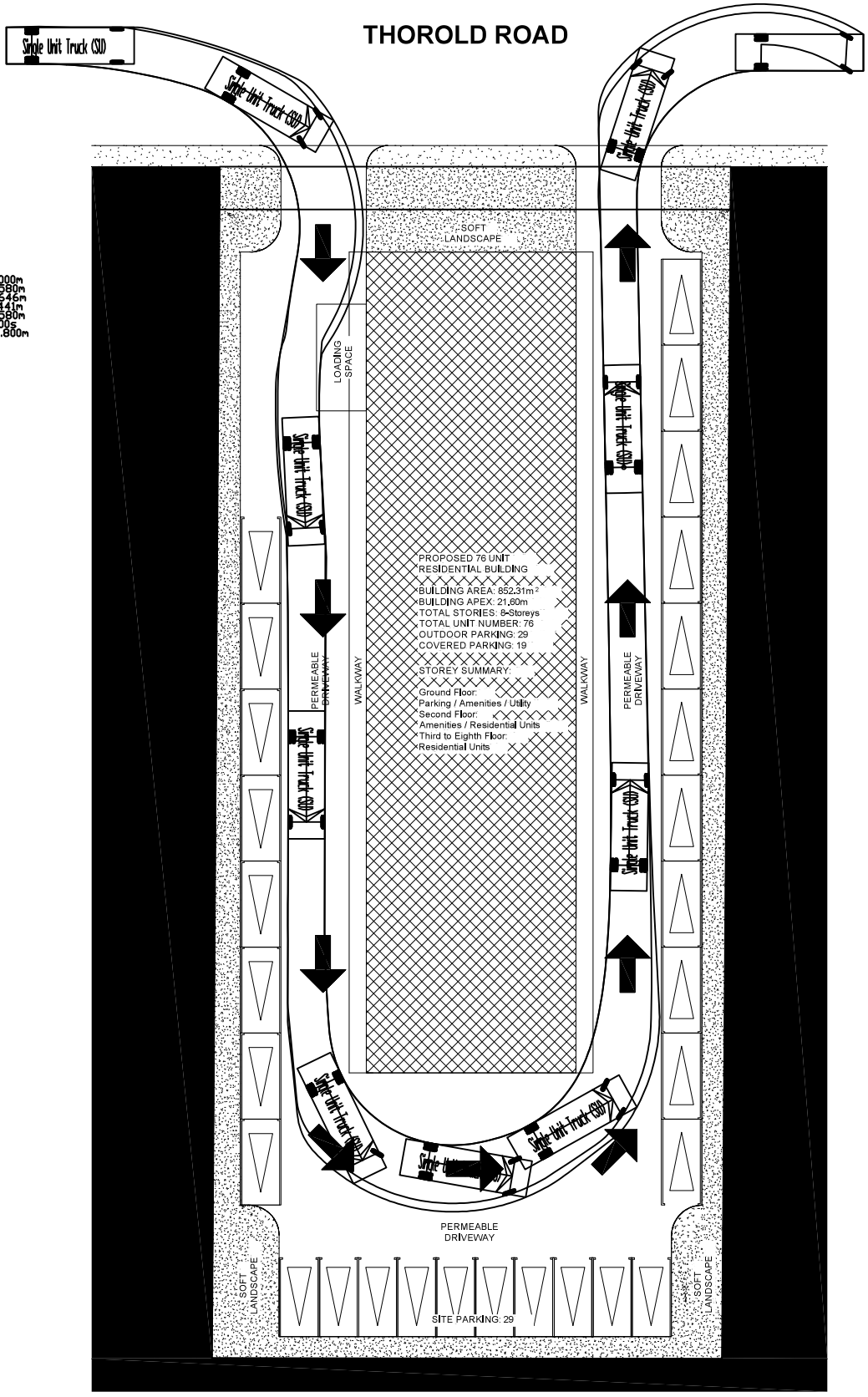


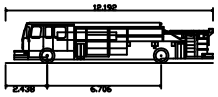
P - Passenger Car

Overall Length	5.800m
Overall Width	2.100m
Overall Body Height	1.300m
Min Body Ground Clearance	0.358m
Track Width	2.100m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	7.300m



Single Unit Truck (SU)	
Overall Length	9.000m
Overall Width	2.580m
Overall Body Height	3.646m
Min Body Ground Clearance	0.441m
Track Width	2.580m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	12.800m





Pumper Fire Truck	
Overall Length	12.192m
Overall Width	2.489m
Overall Body Height	2.361m
Min Body Ground Clearance	0.200m
Track Width	2.489m
Lock-to-lock time	5.00s
Max Wheel Angle	45.00°

APPENDIX C

Trip Generation Reference &

Traffic Movement Count

Multifamily Housing (Mid-Rise)
Not Close to Rail Transit (221)

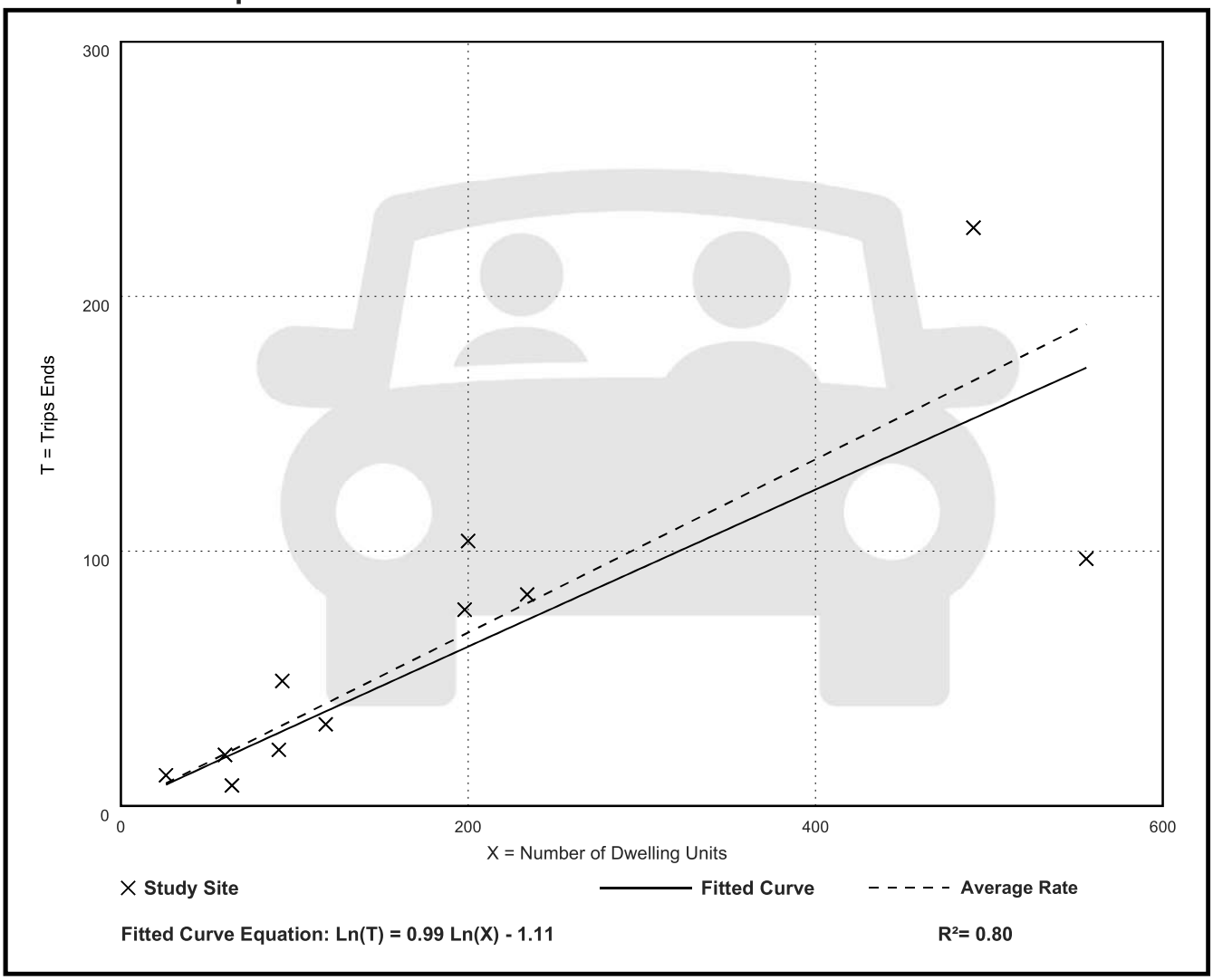
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
AM Peak Hour of Generator

Setting/Location: **General Urban/Suburban**
Number of Studies: 11
Avg. Num. of Dwelling Units: 194
Directional Distribution: 20% entering, 80% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.34	0.13 - 0.53	0.14

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.99 Ln(X) - 1.11

R^2= 0.80

Multifamily Housing (Mid-Rise)
Not Close to Rail Transit (221)

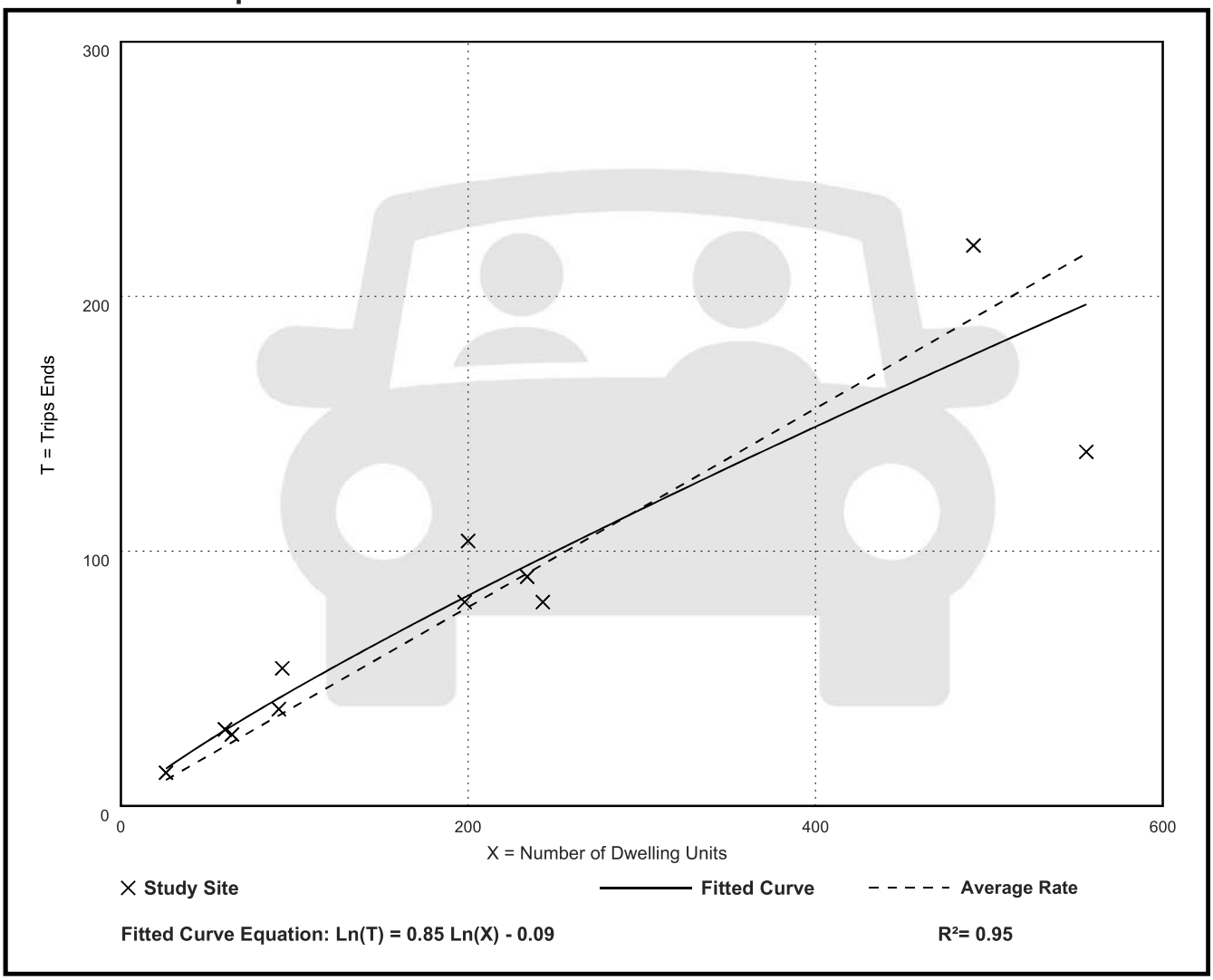
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
PM Peak Hour of Generator

Setting/Location: **General Urban/Suburban**
Number of Studies: 11
Avg. Num. of Dwelling Units: 205
Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.39	0.25 - 0.58	0.10

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.85 Ln(X) - 0.09

R^2= 0.95

Multifamily Housing (Mid-Rise)
Not Close to Rail Transit (221)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Saturday, Peak Hour of Generator**

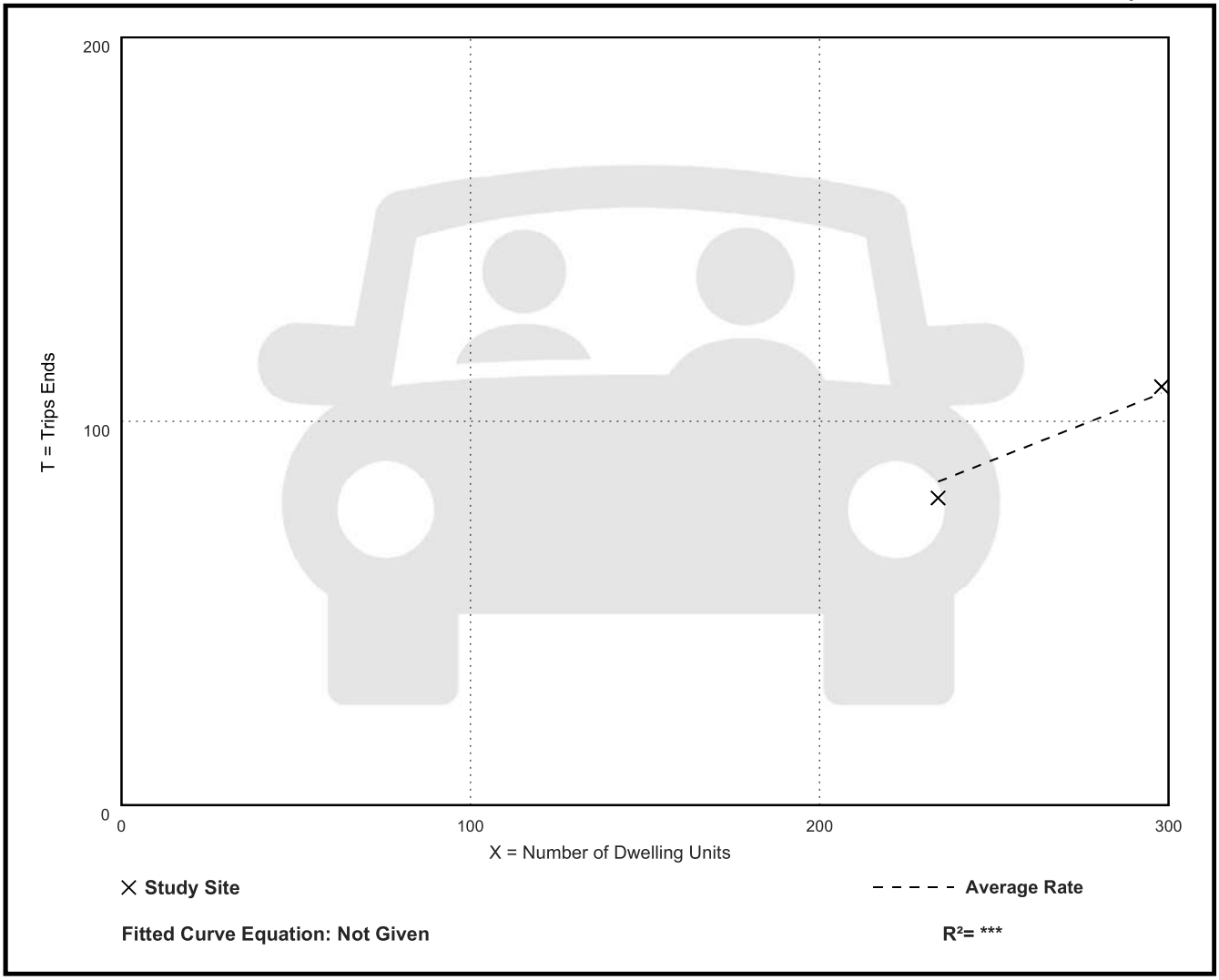
Setting/Location: **General Urban/Suburban**
Number of Studies: 2
Avg. Num. of Dwelling Units: 266
Directional Distribution: 51% entering, 49% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.36	0.34 - 0.37	***

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: Not Given

R^2= ***

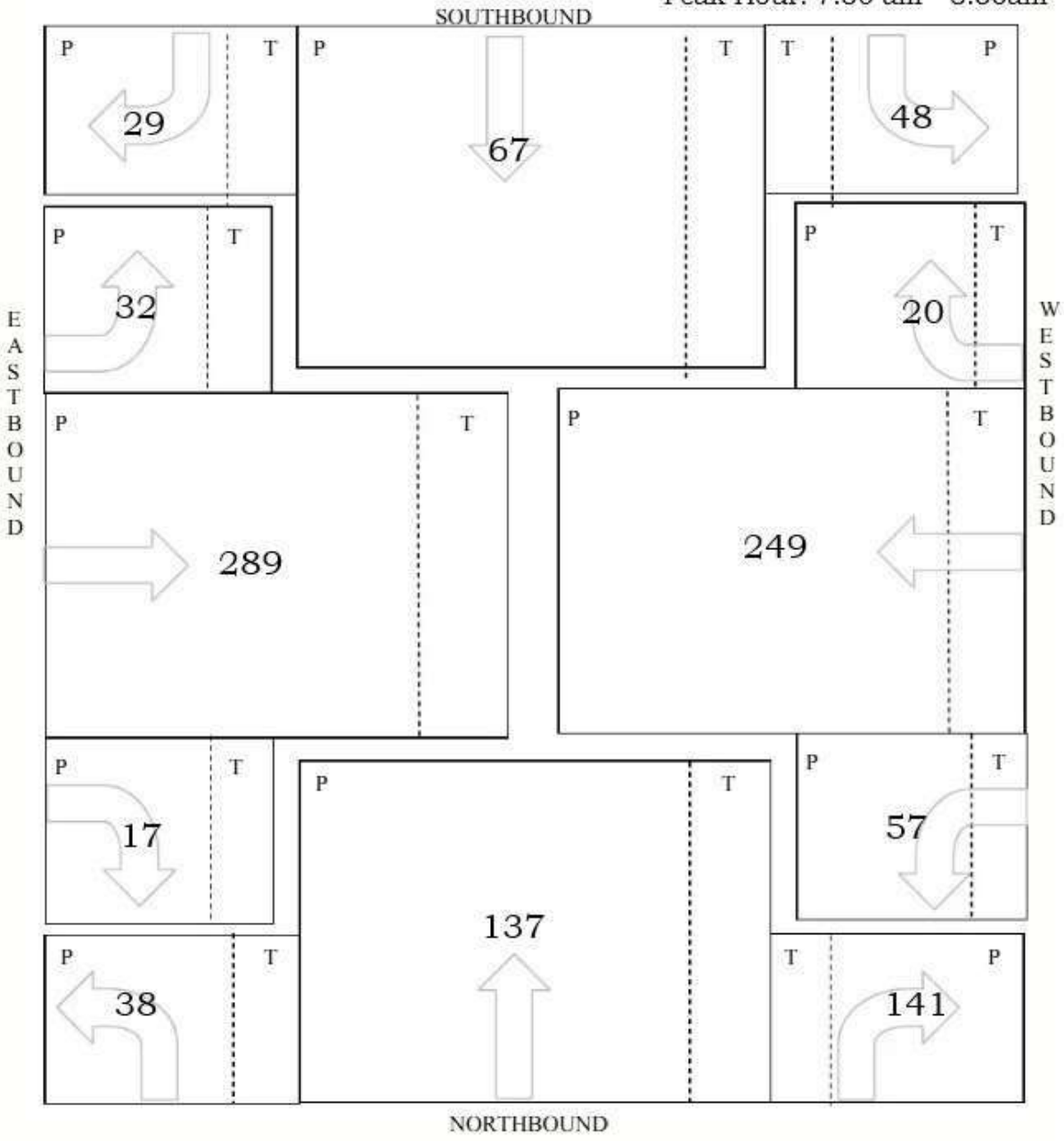
FIELD DATA SHEET

Intersection: Thorold Rd and First Ave

Date: April 1 , 2026 Time: 7:00 am - 9:00 pm

P: Passenger Cars, Motorcycles and Pick-up Trucks T: Trucks or Buses B: School Buses

Peak Hour: 7:30 am - 8:30am



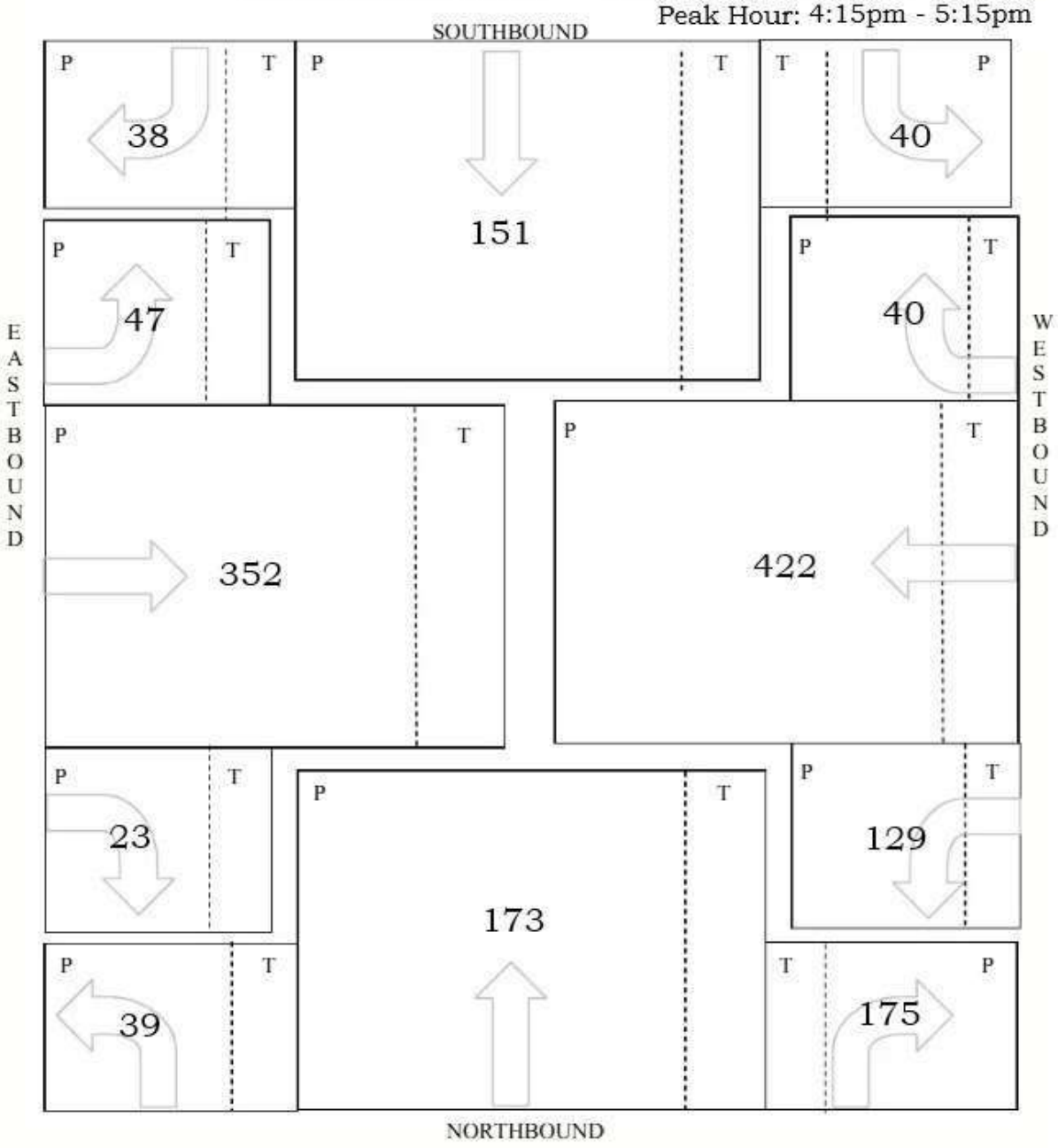
FIELD DATA SHEET

Intersection: Thorold Rd and First Ave

Date: April 1, 2026 Time: 4:00 pm - 6:00 pm

P: Passenger Cars, Motorcycles and Pick-up Trucks T: Trucks or Buses B: School Buses

Peak Hour: 4:15pm - 5:15pm



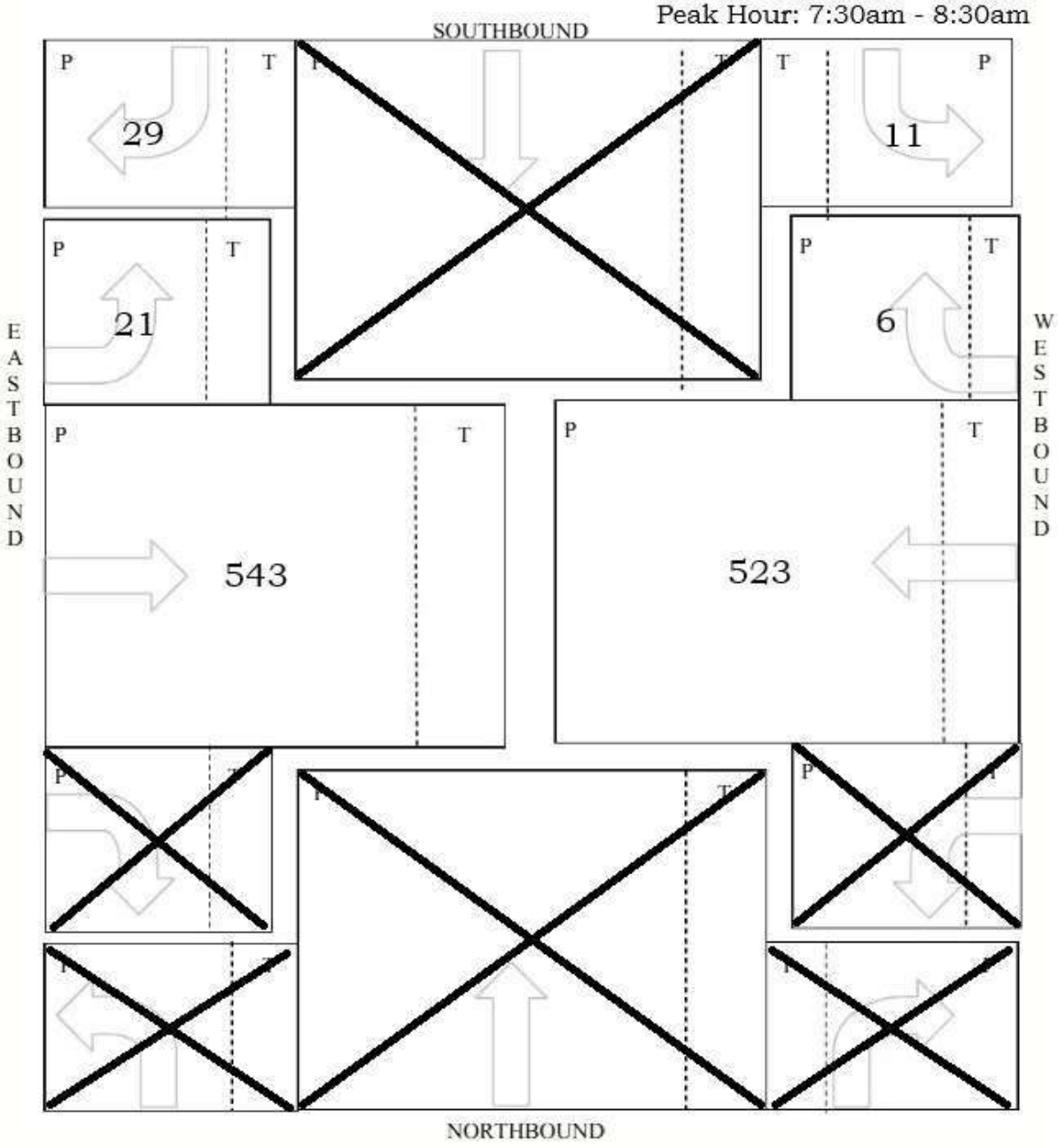
FIELD DATA SHEET

Intersection: Thorold Rd and Carlton Ave

Date: April 1, 2026 Time: 7:00am - 9:00am

P: Passenger Cars, Motorcycles and Pick-up Trucks T: Trucks or Buses B: School Buses

Peak Hour: 7:30am - 8:30am



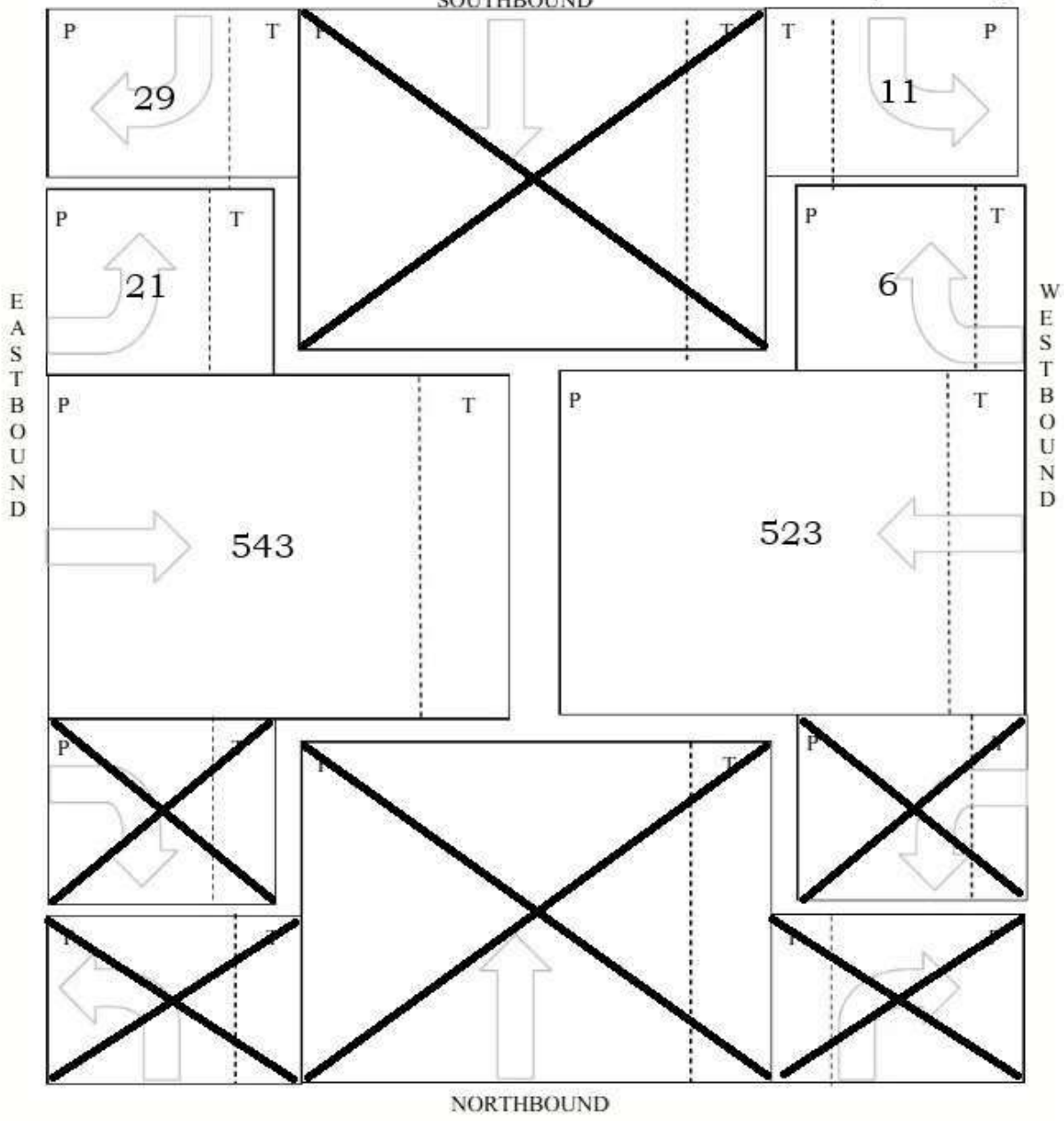
FIELD DATA SHEET

Intersection: Thorold Rd and Carlton Ave

Date: April 1, 2026 Time: 4:00pm - 6:00pm

P: Passenger Cars, Motorcycles and Pick-up Trucks T: Trucks or Buses B: School Buses

Peak Hour: 4:15pm - 5:15pm



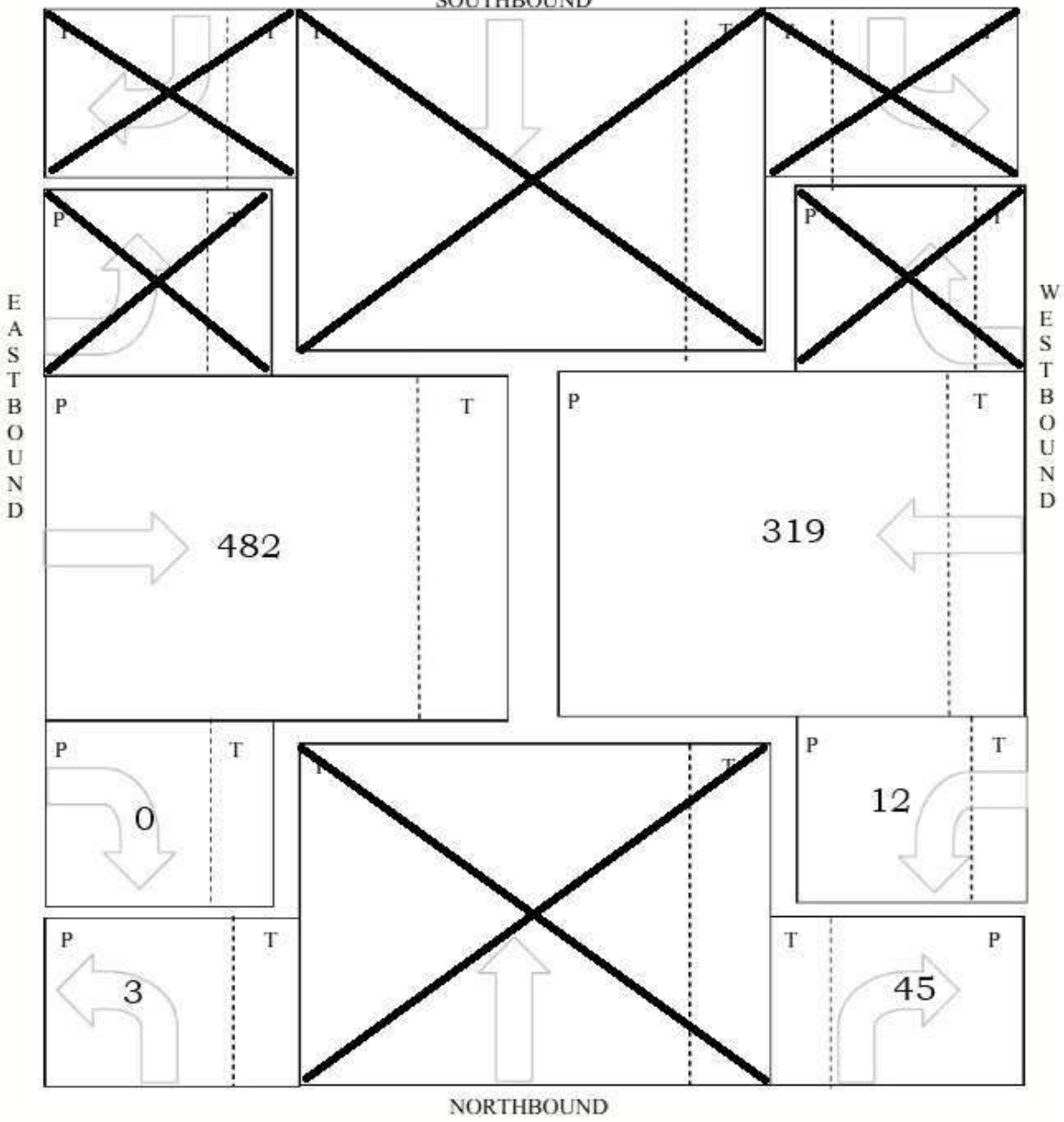
FIELD DATA SHEET

Intersection: Thorold Rd and Edgar St

Date: April 1, 2026 Time: 7:00am - 9:00am

P: Passenger Cars, Motorcycles and Pick-up Trucks T: Trucks or Buses B: School Buses

Peak Hour: 7:30am - 8:30am



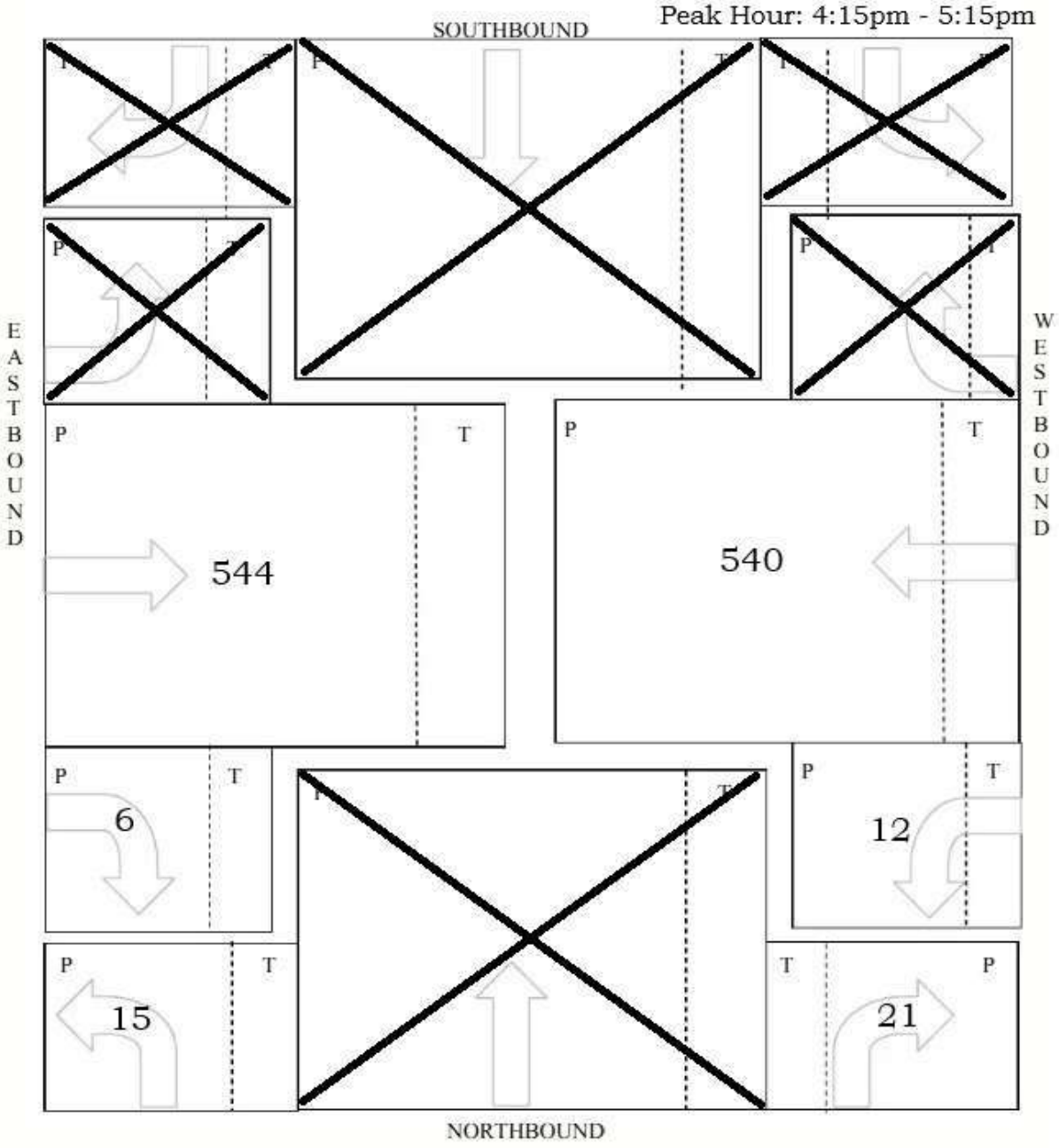
FIELD DATA SHEET

Intersection: Thorold Rd and Edgar St

Date: April 1, 2026 Time: 4:00pm - 6:00pm

P: Passenger Cars, Motorcycles and Pick-up Trucks T: Trucks or Buses B: School Buses

Peak Hour: 4:15pm - 5:15pm



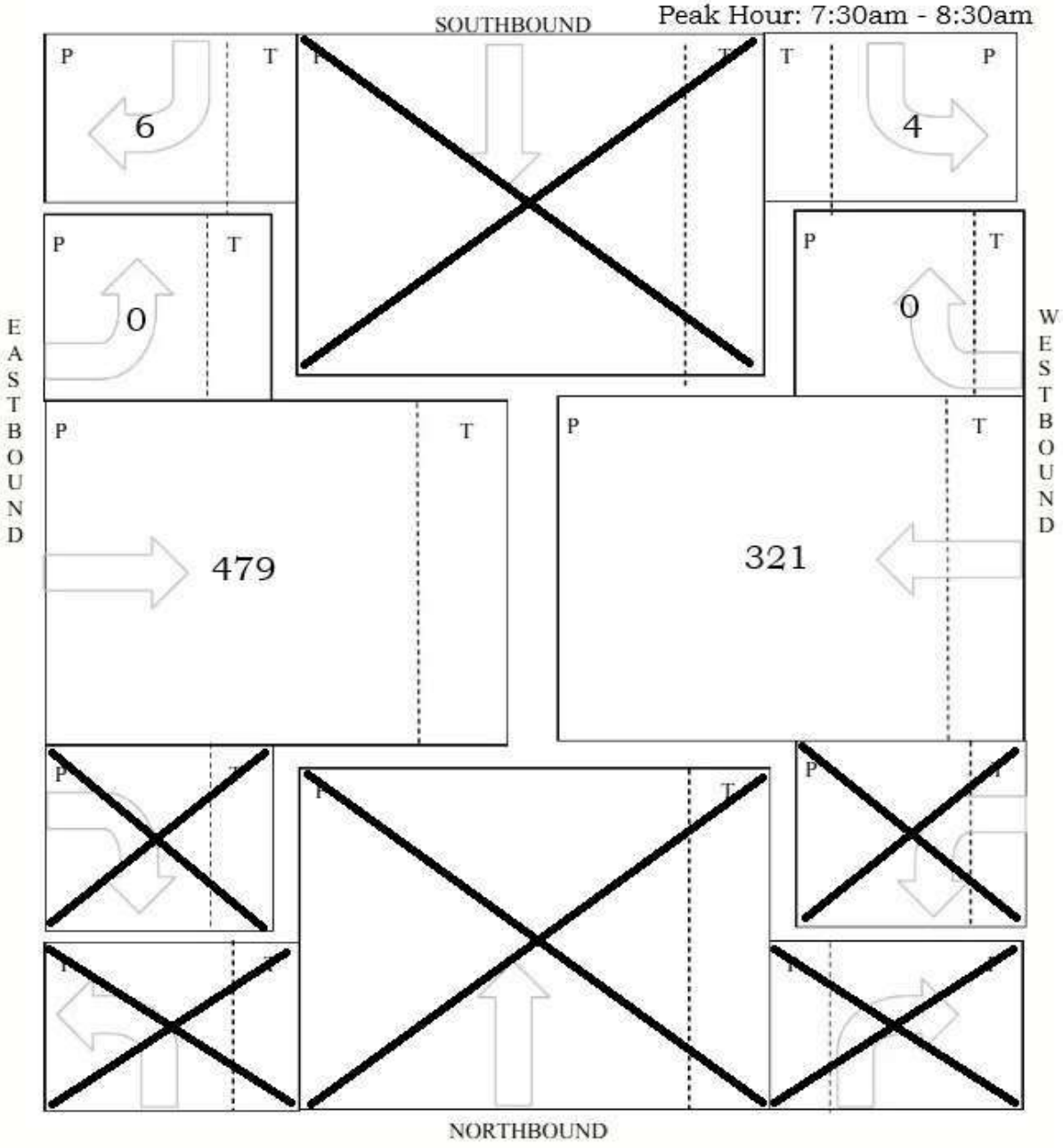
FIELD DATA SHEET

Intersection: Thorold Rd and Nelson Trl

Date: April 1, 2026 Time: 7:00am - 9:00am

P: Passenger Cars, Motorcycles and Pick-up Trucks T: Trucks or Buses B: School Buses

Peak Hour: 7:30am - 8:30am



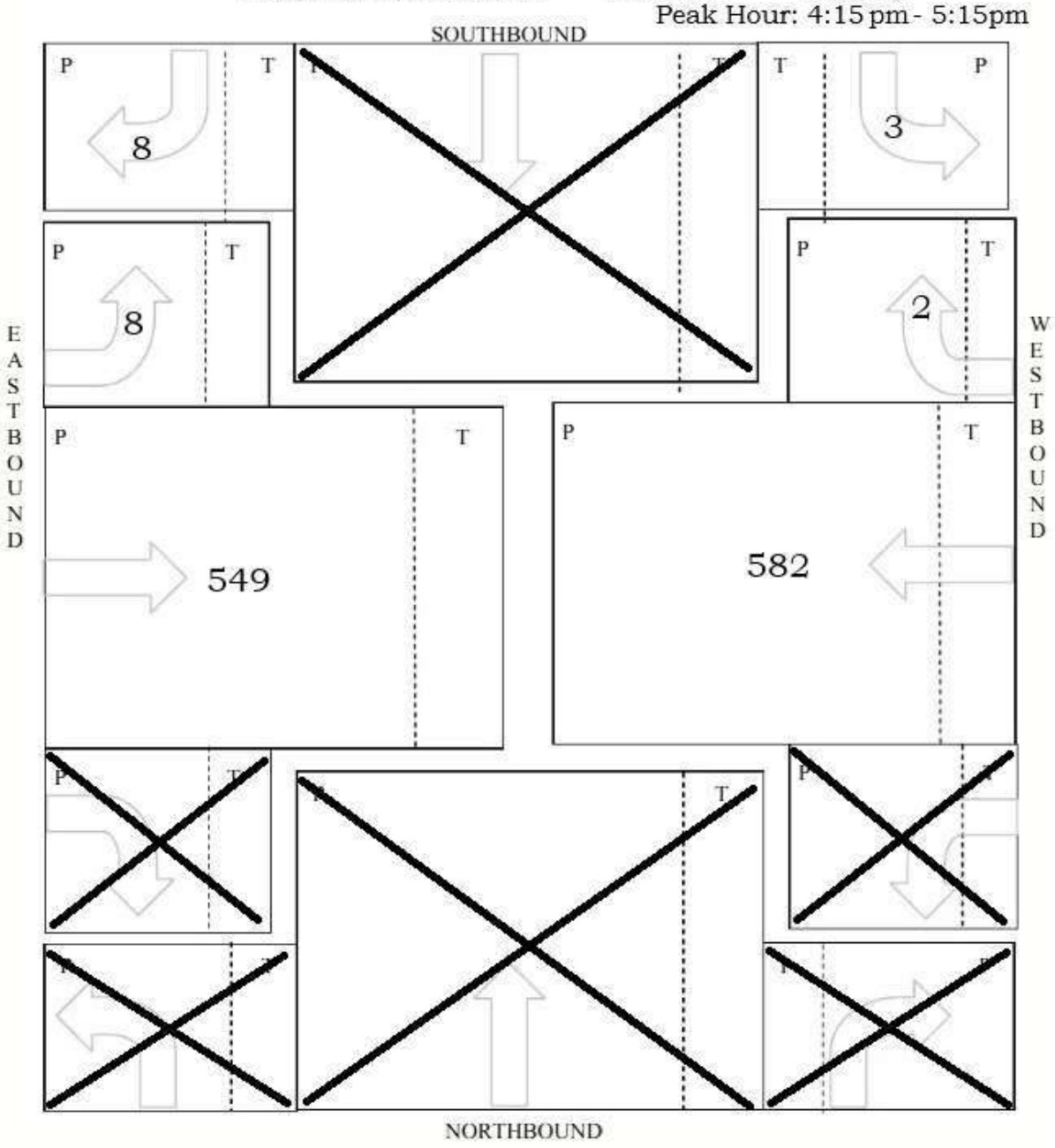
FIELD DATA SHEET

Intersection: Thorold Rd and Nelson Trl

Date: April 1, 2026 Time: 4:00pm - 6:00pm

P: Passenger Cars, Motorcycles and Pick-up Trucks T: Trucks or Buses B: School Buses

Peak Hour: 4:15 pm - 5:15pm



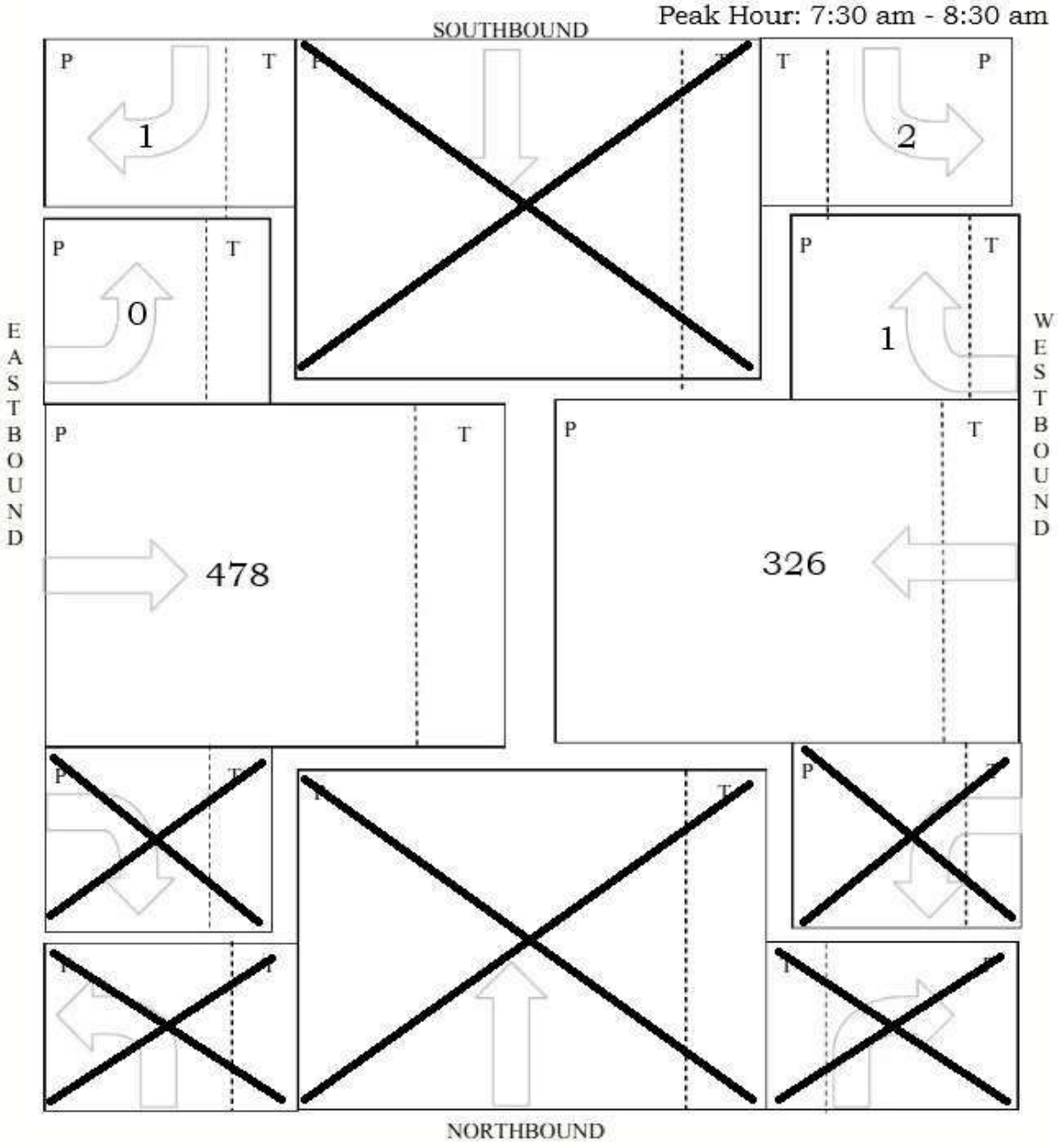
FIELD DATA SHEET

Intersection: Thorold Rd and Northhaven Rd

Date: April 1, 2026 Time: 7:00 am - 9:00 am

P: Passenger Cars, Motorcycles and Pick-up Trucks T: Trucks or Buses B: School Buses

Peak Hour: 7:30 am - 8:30 am



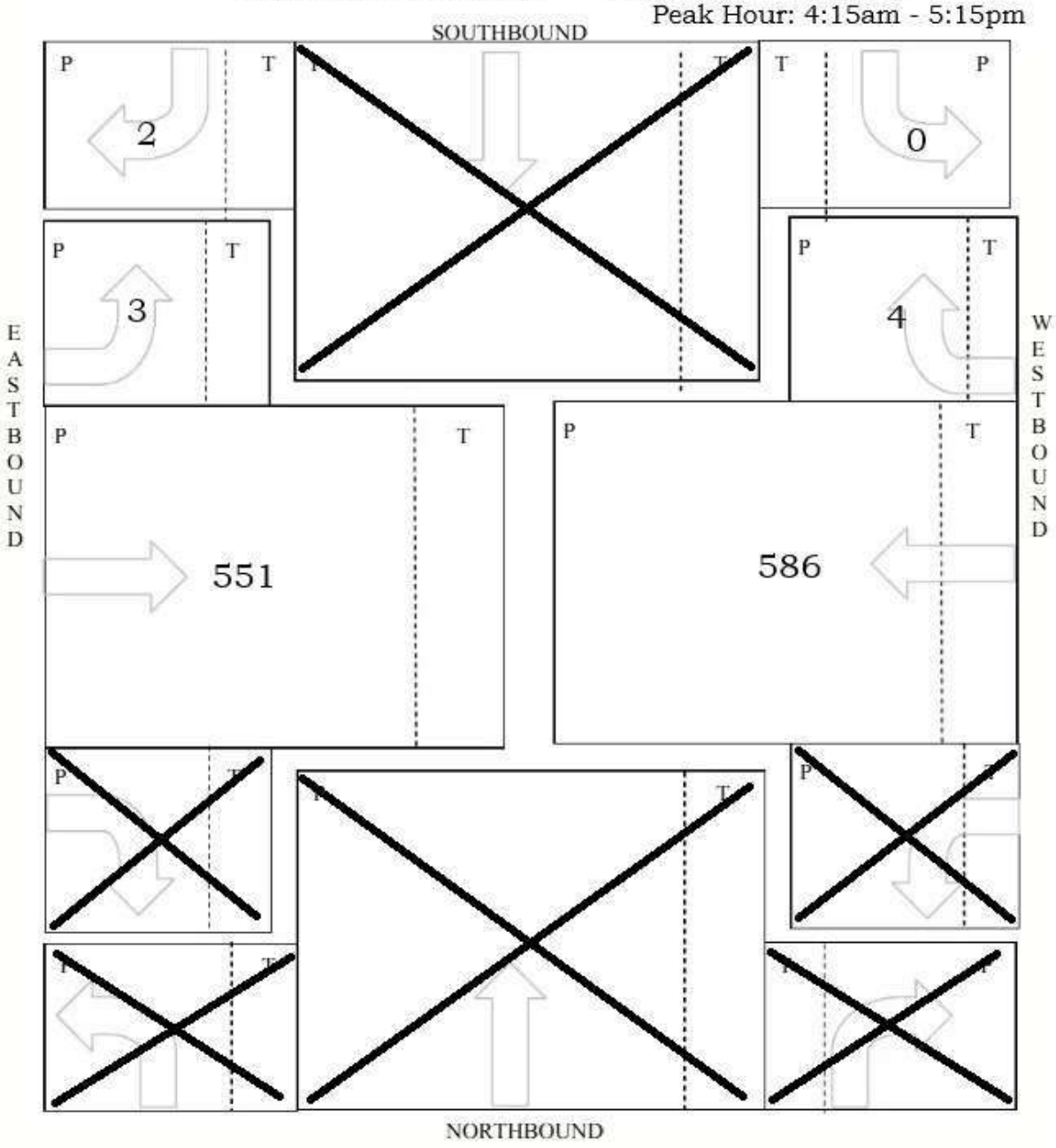
FIELD DATA SHEET

Intersection: Thorold Rd and Northhaven Rd

Date: April 1, 2026 Time: 4:00pm - 6:00pm

P: Passenger Cars, Motorcycles and Pick-up Trucks T: Trucks or Buses B: School Buses

Peak Hour: 4:15am - 5:15pm



Niagara St @ Thorold Rd

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:45:00
To: 8:45:00

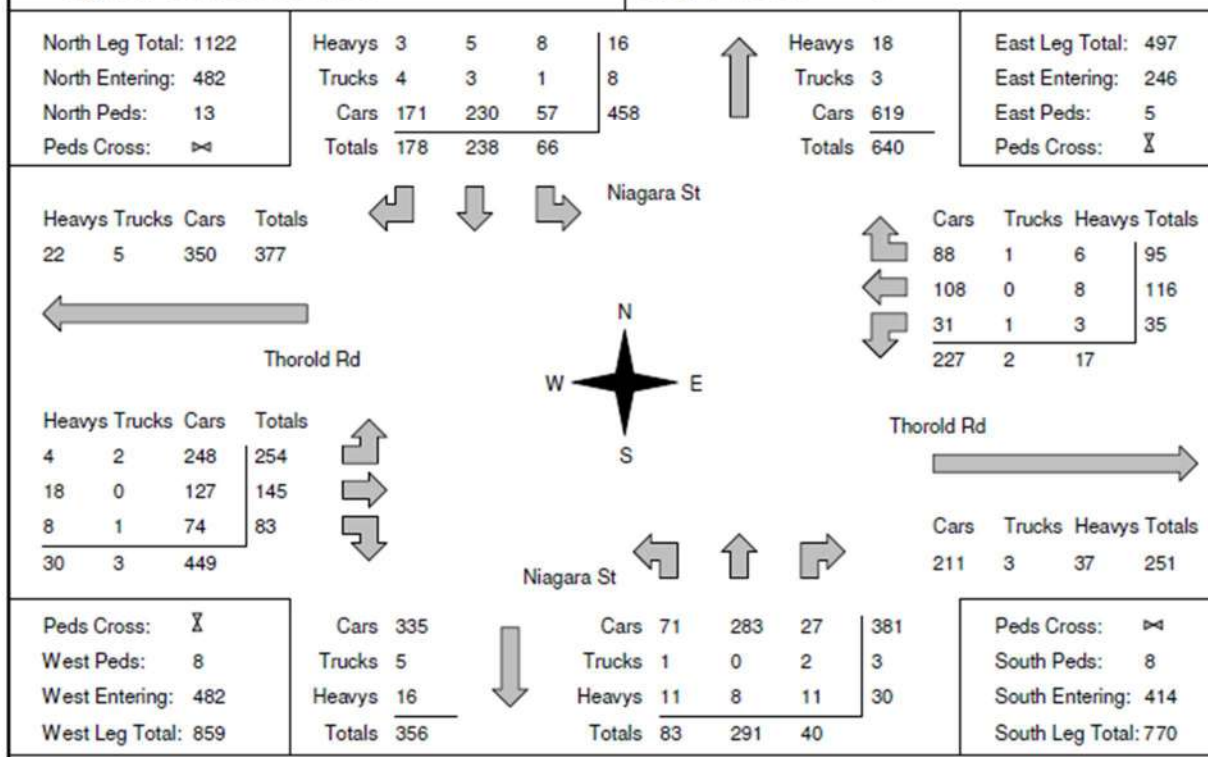
Municipality: Welland
Site #: 0000000004
Intersection: Niagara St & Thorold Rd
TFR File #: 4
Count date: 4-Oct-2023

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Niagara St runs N/S



Comments

Niagara St @ Thorold Rd

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

One Hour Peak
From: 16:15:00
To: 17:15:00

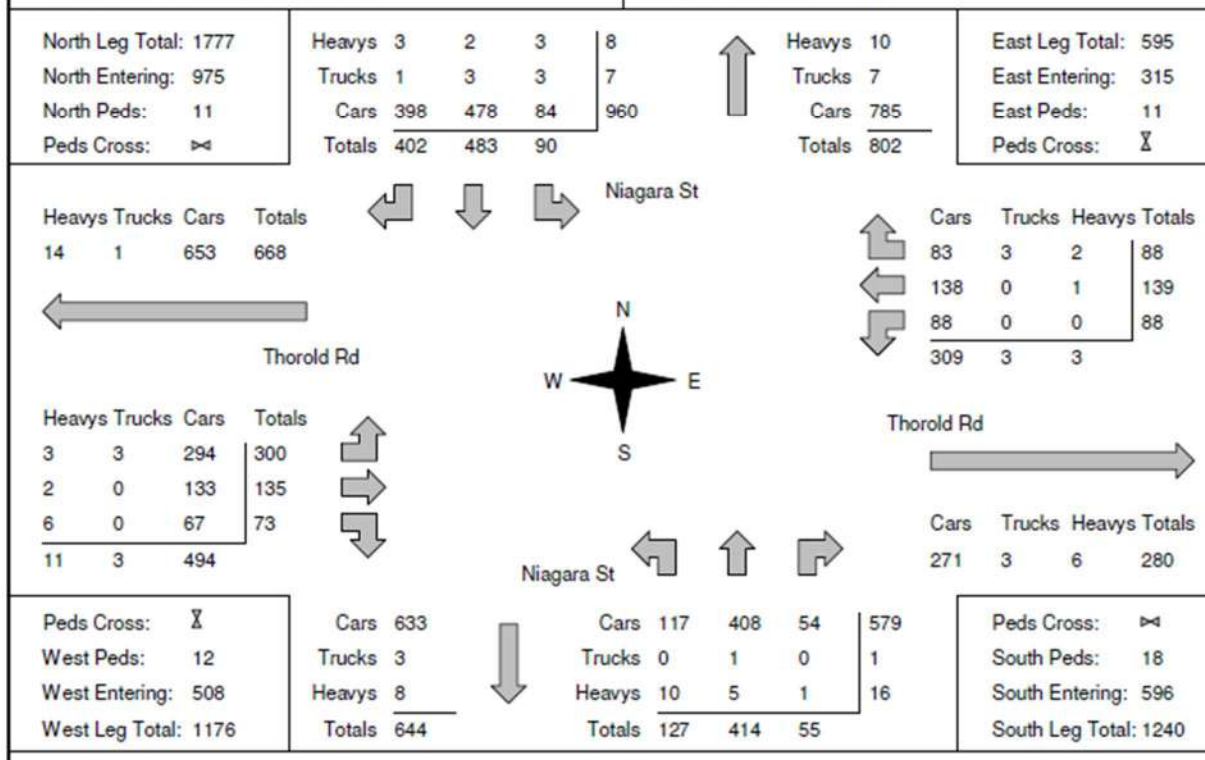
Municipality: Welland
Site #: 0000000004
Intersection: Niagara St & Thorold Rd
TFR File #: 4
Count date: 4-Oct-2023

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Niagara St runs N/S



Comments

Proposed Development Existing Site at 164 Thorold









Traffic Movement Count at First Ave and Thorold Rd





Traffic Movement at Additional Intersections






Thorold Rd.
STOP


Northhaven Rd.
STOP

APPENDIX D

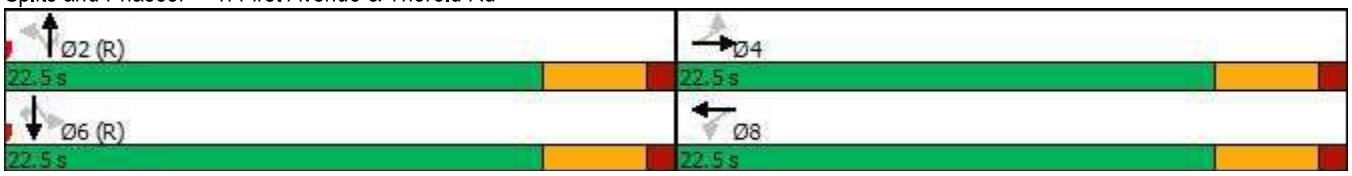
Existing Condition 2026 Capacity Analysis Report

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	289	17	57	249	20	38	137	141	48	67	29
Future Volume (vph)	32	289	17	57	249	20	38	137	141	48	67	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	131		0	131		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
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		0.992			0.989				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1848	0	1770	1842	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.557			0.510			0.709			0.662		
Satd. Flow (perm)	1038	1848	0	950	1842	0	1321	1863	1583	1233	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			11				153			36
Link Speed (mph)		31			31			31			31	
Link Distance (ft)		241			425			574			537	
Travel Time (s)		5.3			9.3			12.6			11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	35	314	18	62	271	22	41	149	153	52	73	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	35	332	0	62	293	0	41	149	153	52	73	32
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(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		48			48			48			48	
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 (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	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	22.5
Total Split (%)	50.0%	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	18.0
Yellow Time (s)	3.5	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	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	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	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	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	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.08	0.45		0.16	0.39		0.08	0.20	0.21	0.11	0.10	0.05

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	9.1	12.0		8.8	9.8		8.9	9.7	3.0	9.2	8.9	3.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.1	12.0		8.8	9.8		8.9	9.7	3.0	9.2	8.9	3.8
LOS	A	B		A	A		A	A	A	A	A	A
Approach Delay		11.7			9.6			6.6			8.0	
Approach LOS		B			A			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.45			
Intersection Signal Delay: 9.2		Intersection LOS: A	
Intersection Capacity Utilization 46.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: First Avenue & Thorold Rd





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	478	326	1	2	1
Future Volume (vph)	0	478	326	1	2	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt					0.955	
Flt Protected					0.968	
Satd. Flow (prot)	1863	1863	3539	0	1722	0
Flt Permitted					0.968	
Satd. Flow (perm)	1863	1863	3539	0	1722	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		425	522		384	
Travel Time (s)		9.3	11.5		8.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	520	354	1	2	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	520	355	0	3	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 35.2%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	480	321	0	2	3
Future Volume (vph)	0	480	321	0	2	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt					0.919	
Flt Protected					0.980	
Satd. Flow (prot)	0	1863	3539	0	1678	0
Flt Permitted					0.980	
Satd. Flow (perm)	0	1863	3539	0	1678	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		522	139		227	
Travel Time (s)		11.5	3.1		5.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	522	349	0	2	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	522	349	0	5	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 35.3%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	482	0	12	319	2	45
Future Volume (vph)	482	0	12	319	2	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt					0.870	
Flt Protected				0.998	0.998	
Satd. Flow (prot)	1863	0	0	3532	1617	0
Flt Permitted				0.998	0.998	
Satd. Flow (perm)	1863	0	0	3532	1617	0
Link Speed (mph)	31			31	31	
Link Distance (ft)	139			189	288	
Travel Time (s)	3.1			4.2	6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	524	0	13	347	2	49
Shared Lane Traffic (%)						
Lane Group Flow (vph)	524	0	0	360	51	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	48			48	48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	16		16	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 35.4%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	21	506	302	6	11	29
Future Volume (vph)	21	506	302	6	11	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.997		0.902	
Flt Protected		0.998			0.987	
Satd. Flow (prot)	0	1859	3529	0	1658	0
Flt Permitted		0.998			0.987	
Satd. Flow (perm)	0	1859	3529	0	1658	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		189	257		535	
Travel Time (s)		4.2	5.7		11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	550	328	7	12	32
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	573	335	0	44	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

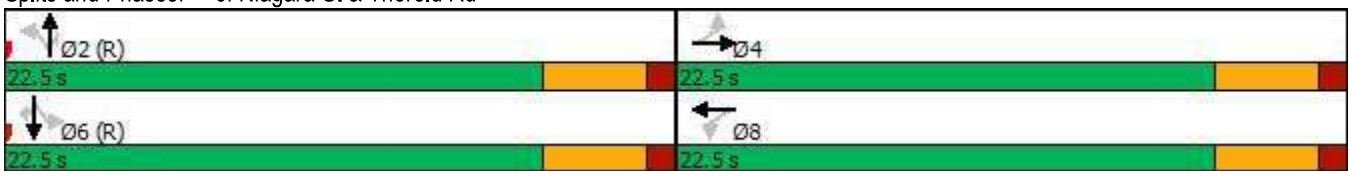
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 49.7%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	310	135	72	37	89	93	60	309	42	70	253	159
Future Volume (vph)	310	135	72	37	89	93	60	309	42	70	253	159
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	270		0	0		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.948			0.923			0.998	0.850		0.991	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1766	0	1770	1719	0	1770	1766	1504	1770	1754	1504
Flt Permitted	0.633			0.618			0.539			0.479		
Satd. Flow (perm)	1179	1766	0	1151	1719	0	1004	1766	1504	892	1754	1504
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		71			101			2	41		8	156
Link Speed (mph)		31			31			31			31	
Link Distance (ft)		257			220			560			547	
Travel Time (s)		5.7			4.8			12.3			12.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	337	147	78	40	97	101	65	336	46	76	275	173
Shared Lane Traffic (%)									10%			10%
Lane Group Flow (vph)	337	225	0	40	198	0	65	341	41	76	292	156
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(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		48			48			48			48	
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 (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	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	22.5
Total Split (%)	50.0%	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	18.0
Yellow Time (s)	3.5	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	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	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	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	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	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.72	0.30		0.09	0.26		0.16	0.48	0.07	0.21	0.41	0.22

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	22.0	6.4		9.1	6.0		10.0	12.8	3.9	10.8	11.7	3.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.0	6.4		9.1	6.0		10.0	12.8	3.9	10.8	11.7	3.0
LOS	C	A		A	A		B	B	A	B	B	A
Approach Delay		15.8			6.5			11.6			9.0	
Approach LOS		B			A			B			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 11.5		Intersection LOS: B	
Intersection Capacity Utilization 63.8%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 6: Niagara St & Thorold Rd

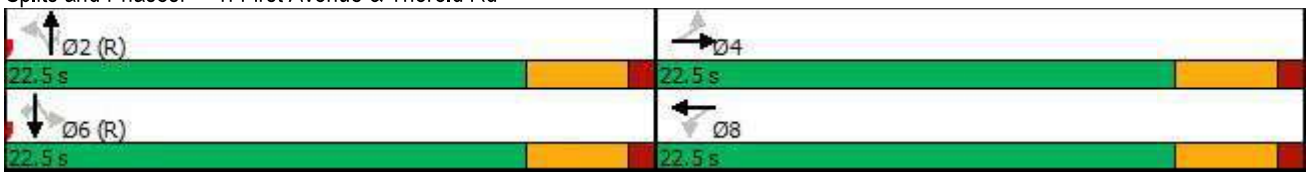


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	352	23	129	422	40	39	173	175	40	151	38
Future Volume (vph)	47	352	23	129	422	40	39	173	175	40	151	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	131		0	131		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991			0.987				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1846	0	1770	1839	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.321			0.424			0.653			0.639		
Satd. Flow (perm)	598	1846	0	790	1839	0	1216	1863	1583	1190	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			12				190			41
Link Speed (mph)		31			31			31			31	
Link Distance (ft)		241			425			574			537	
Travel Time (s)		5.3			9.3			12.6			11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	51	383	25	140	459	43	42	188	190	43	164	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	51	408	0	140	502	0	42	188	190	43	164	41
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(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		48			48			48			48	
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 (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	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	22.5
Total Split (%)	50.0%	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	18.0
Yellow Time (s)	3.5	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	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	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	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	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	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.21	0.55		0.44	0.68		0.09	0.25	0.25	0.09	0.22	0.06
Control Delay	11.7	13.6		15.5	16.7		9.1	10.2	2.9	9.1	9.9	3.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.7	13.6		15.5	16.7		9.1	10.2	2.9	9.1	9.9	3.8
LOS	B	B		B	B		A	B	A	A	A	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		13.4			16.4			6.8			8.8	
Approach LOS		B			B			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 12.3		Intersection LOS: B	
Intersection Capacity Utilization 57.1%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: First Avenue & Thorold Rd





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	16	551	586	4	0	2
Future Volume (vph)	16	551	586	4	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.999		0.865	
Flt Protected	0.950					
Satd. Flow (prot)	1770	1863	3536	0	1611	0
Flt Permitted	0.950					
Satd. Flow (perm)	1770	1863	3536	0	1611	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		425	522		384	
Travel Time (s)		9.3	11.5		8.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	599	637	4	0	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	17	599	641	0	2	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 39.0%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	4	547	582	2	3	8
Future Volume (vph)	4	547	582	2	3	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt					0.899	
Flt Protected					0.988	
Satd. Flow (prot)	0	1863	3539	0	1655	0
Flt Permitted					0.988	
Satd. Flow (perm)	0	1863	3539	0	1655	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		522	139		227	
Travel Time (s)		11.5	3.1		5.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	595	633	2	3	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	599	635	0	12	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

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



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	544	6	12	540	15	21
Future Volume (vph)	544	6	12	540	15	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt	0.998				0.920	
Flt Protected				0.999	0.980	
Satd. Flow (prot)	1859	0	0	3536	1679	0
Flt Permitted				0.999	0.980	
Satd. Flow (perm)	1859	0	0	3536	1679	0
Link Speed (mph)	31			31	31	
Link Distance (ft)	139			189	288	
Travel Time (s)	3.1			4.2	6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	591	7	13	587	16	23
Shared Lane Traffic (%)						
Lane Group Flow (vph)	598	0	0	600	39	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	48			48	48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	16		16	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 39.0%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	21	543	523	6	11	29
Future Volume (vph)	21	543	523	6	11	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.998		0.902	
Flt Protected		0.998			0.987	
Satd. Flow (prot)	0	1859	3532	0	1658	0
Flt Permitted		0.998			0.987	
Satd. Flow (perm)	0	1859	3532	0	1658	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		189	257		535	
Travel Time (s)		4.2	5.7		11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	590	568	7	12	32
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	613	575	0	44	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

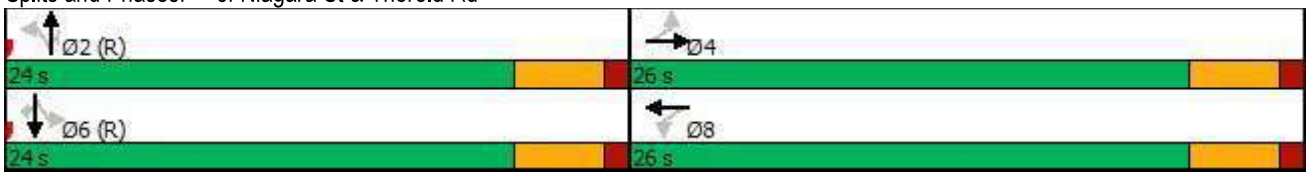
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 55.6%		ICU Level of Service B	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	324	150	80	328	118	93	58	439	58	96	512	353
Future Volume (vph)	324	150	80	328	118	93	58	439	58	96	512	353
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	270		0	0		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.948			0.934			0.998	0.850		0.990	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1766	0	1770	1740	0	1770	1766	1504	1770	1752	1504
Flt Permitted	0.616			0.601			0.205			0.293		
Satd. Flow (perm)	1147	1766	0	1120	1740	0	382	1766	1504	546	1752	1504
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		67			100			1	57		8	346
Link Speed (mph)		31			31			31			31	
Link Distance (ft)		257			220			560			547	
Travel Time (s)		5.7			4.8			12.3			12.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	352	163	87	357	128	101	63	477	63	104	557	384
Shared Lane Traffic (%)									10%			10%
Lane Group Flow (vph)	352	250	0	357	229	0	63	483	57	104	595	346
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(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		48			48			48			48	
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 (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	26.0	26.0		26.0	26.0		24.0	24.0	24.0	24.0	24.0	24.0
Total Split (%)	52.0%	52.0%		52.0%	52.0%		48.0%	48.0%	48.0%	48.0%	48.0%	48.0%
Maximum Green (s)	21.5	21.5		21.5	21.5		19.5	19.5	19.5	19.5	19.5	19.5
Yellow Time (s)	3.5	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	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	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	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	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	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	21.5	21.5		21.5	21.5		19.5	19.5	19.5	19.5	19.5	19.5
Actuated g/C Ratio	0.43	0.43		0.43	0.43		0.39	0.39	0.39	0.39	0.39	0.39
v/c Ratio	0.71	0.31		0.74	0.28		0.43	0.70	0.09	0.49	0.86	0.43
Control Delay	22.7	8.1		24.6	6.5		22.1	19.9	3.9	21.4	30.5	3.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.7	8.1		24.6	6.5		22.1	19.9	3.9	21.4	30.5	3.5
LOS	C	A		C	A		C	B	A	C	C	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		16.6			17.5			18.6			20.6	
Approach LOS		B			B			B			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 50			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 50			
Control Type: Pretimed			
Maximum v/c Ratio: 0.86			
Intersection Signal Delay: 18.7		Intersection LOS: B	
Intersection Capacity Utilization 84.2%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 6: Niagara St & Thorold Rd

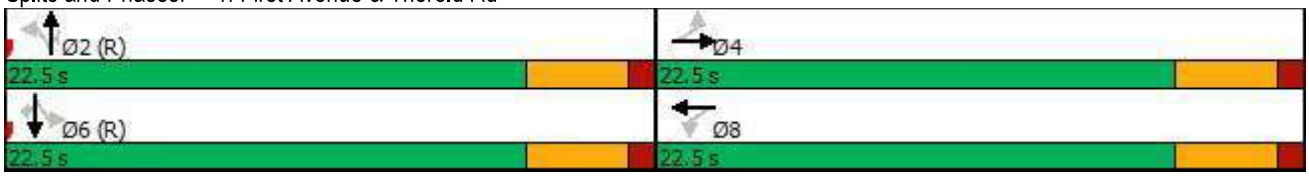


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	246	14	48	212	18	32	116	120	40	57	25
Future Volume (vph)	27	246	14	48	212	18	32	116	120	40	57	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	131		0	131		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
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		0.992			0.988				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1848	0	1770	1840	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.604			0.570			0.717			0.676		
Satd. Flow (perm)	1125	1848	0	1062	1840	0	1336	1863	1583	1259	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			12				130			36
Link Speed (mph)		31			31			31			31	
Link Distance (ft)		241			425			574			537	
Travel Time (s)		5.3			9.3			12.6			11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	267	15	52	230	20	35	126	130	43	62	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	282	0	52	250	0	35	126	130	43	62	27
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(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		48			48			48			48	
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 (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	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	22.5
Total Split (%)	50.0%	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	18.0
Yellow Time (s)	3.5	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	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	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	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	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	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.06	0.38		0.12	0.34		0.07	0.17	0.18	0.09	0.08	0.04
Control Delay	8.9	11.2		8.3	9.1		8.8	9.5	3.0	9.0	8.8	3.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.9	11.2		8.3	9.1		8.8	9.5	3.0	9.0	8.8	3.4
LOS	A	B		A	A		A	A	A	A	A	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		11.0			9.0			6.5			7.8	
Approach LOS		B			A			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.38			
Intersection Signal Delay: 8.7		Intersection LOS: A	
Intersection Capacity Utilization 38.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: First Avenue & Thorold Rd





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	406	277	1	2	1
Future Volume (vph)	0	406	277	1	2	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt					0.955	
Flt Protected					0.968	
Satd. Flow (prot)	1863	1863	3539	0	1722	0
Flt Permitted					0.968	
Satd. Flow (perm)	1863	1863	3539	0	1722	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		425	522		384	
Travel Time (s)		9.3	11.5		8.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	441	301	1	2	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	441	302	0	3	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 31.4%		ICU Level of Service A	
Analysis Period (min) 15			



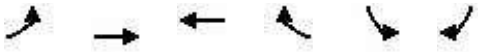
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	408	273	0	2	3
Future Volume (vph)	0	408	273	0	2	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt					0.919	
Flt Protected					0.980	
Satd. Flow (prot)	0	1863	3539	0	1678	0
Flt Permitted					0.980	
Satd. Flow (perm)	0	1863	3539	0	1678	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		522	139		227	
Travel Time (s)		11.5	3.1		5.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	443	297	0	2	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	443	297	0	5	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 31.5%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	410	0	10	271	2	38
Future Volume (vph)	410	0	10	271	2	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt					0.871	
Flt Protected				0.998	0.998	
Satd. Flow (prot)	1863	0	0	3532	1619	0
Flt Permitted				0.998	0.998	
Satd. Flow (perm)	1863	0	0	3532	1619	0
Link Speed (mph)	31			31	31	
Link Distance (ft)	139			189	288	
Travel Time (s)	3.1			4.2	6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	446	0	11	295	2	41
Shared Lane Traffic (%)						
Lane Group Flow (vph)	446	0	0	306	43	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	48			48	48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	16		16	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 31.6%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	18	430	257	5	9	24
Future Volume (vph)	18	430	257	5	9	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.997		0.902	
Flt Protected		0.998			0.986	
Satd. Flow (prot)	0	1859	3529	0	1657	0
Flt Permitted		0.998			0.986	
Satd. Flow (perm)	0	1859	3529	0	1657	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		189	257		535	
Travel Time (s)		4.2	5.7		11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	20	467	279	5	10	26
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	487	284	0	36	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

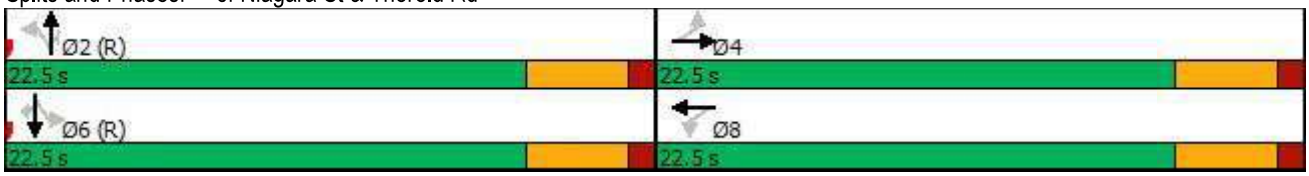
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 44.2%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	264	115	60	31	76	79	51	263	36	60	215	135
Future Volume (vph)	264	115	60	31	76	79	51	263	36	60	215	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	270		0	0		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.949			0.924			0.998	0.850		0.991	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1768	0	1770	1721	0	1770	1766	1504	1770	1754	1504
Flt Permitted	0.650			0.638			0.594			0.542		
Satd. Flow (perm)	1211	1768	0	1188	1721	0	1106	1766	1504	1010	1754	1504
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		65			86			2	36		9	132
Link Speed (mph)		31			31			31			31	
Link Distance (ft)		257			220			560			547	
Travel Time (s)		5.7			4.8			12.3			12.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	287	125	65	34	83	86	55	286	39	65	234	147
Shared Lane Traffic (%)									10%			10%
Lane Group Flow (vph)	287	190	0	34	169	0	55	290	35	65	249	132
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(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		48			48			48			48	
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 (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	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	22.5
Total Split (%)	50.0%	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	18.0
Yellow Time (s)	3.5	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	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	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	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	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	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.59	0.25		0.07	0.23		0.12	0.41	0.06	0.16	0.35	0.19
Control Delay	15.9	6.1		8.9	5.9		9.5	11.8	4.0	10.0	10.9	3.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.9	6.1		8.9	5.9		9.5	11.8	4.0	10.0	10.9	3.1
LOS	B	A		A	A		A	B	A	A	B	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		12.0			6.4			10.8			8.4	
Approach LOS		B			A			B			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.59			
Intersection Signal Delay: 9.9		Intersection LOS: A	
Intersection Capacity Utilization 57.2%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 6: Niagara St & Thorold Rd



APPENDIX E

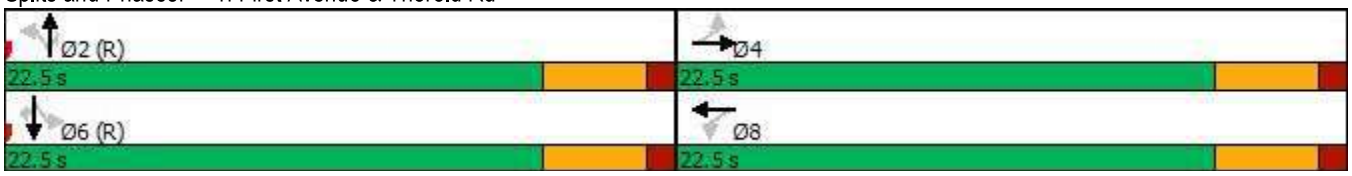
Existing Condition with Development (2026) Capacity Analysis Report

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	290	17	61	255	27	38	137	142	48	67	29
Future Volume (vph)	32	290	17	61	255	27	38	137	142	48	67	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	131		0	131		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
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		0.992			0.986				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1848	0	1770	1837	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.541			0.509			0.709			0.662		
Satd. Flow (perm)	1008	1848	0	948	1837	0	1321	1863	1583	1233	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			14				154			36
Link Speed (mph)		31			31			31			31	
Link Distance (ft)		241			146			574			537	
Travel Time (s)		5.3			3.2			12.6			11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	35	315	18	66	277	29	41	149	154	52	73	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	35	333	0	66	306	0	41	149	154	52	73	32
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(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		48			48			48			48	
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 (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	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	22.5
Total Split (%)	50.0%	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	18.0
Yellow Time (s)	3.5	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	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	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	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	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	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.09	0.45		0.17	0.41		0.08	0.20	0.21	0.11	0.10	0.05

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	9.2	12.0		10.2	11.3		8.9	9.7	3.0	9.2	8.9	3.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.2	12.0		10.2	11.3		8.9	9.7	3.0	9.2	8.9	3.8
LOS	A	B		B	B		A	A	A	A	A	A
Approach Delay		11.8			11.1			6.6			8.0	
Approach LOS		B			B			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.45			
Intersection Signal Delay: 9.7		Intersection LOS: A	
Intersection Capacity Utilization 46.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: First Avenue & Thorold Rd





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	478	330	1	2	1
Future Volume (vph)	0	478	330	1	2	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt					0.955	
Flt Protected					0.968	
Satd. Flow (prot)	0	1863	3539	0	1722	0
Flt Permitted					0.968	
Satd. Flow (perm)	0	1863	3539	0	1722	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		150	522		384	
Travel Time (s)		3.3	11.5		8.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	520	359	1	2	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	520	360	0	3	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 35.2%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	486	324	0	2	3
Future Volume (vph)	0	486	324	0	2	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt					0.919	
Flt Protected					0.980	
Satd. Flow (prot)	0	1863	3539	0	1678	0
Flt Permitted					0.980	
Satd. Flow (perm)	0	1863	3539	0	1678	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		522	139		227	
Travel Time (s)		11.5	3.1		5.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	528	352	0	2	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	528	352	0	5	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 35.6%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	487	1	12	319	3	45
Future Volume (vph)	487	1	12	319	3	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt					0.873	
Flt Protected				0.998	0.997	
Satd. Flow (prot)	1863	0	0	3532	1621	0
Flt Permitted				0.998	0.997	
Satd. Flow (perm)	1863	0	0	3532	1621	0
Link Speed (mph)	31			31	31	
Link Distance (ft)	139			189	288	
Travel Time (s)	3.1			4.2	6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	529	1	13	347	3	49
Shared Lane Traffic (%)						
Lane Group Flow (vph)	530	0	0	360	52	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	48			48	48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	16		16	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 35.7%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	23	509	304	6	11	30
Future Volume (vph)	23	509	304	6	11	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.997		0.901	
Flt Protected		0.998			0.987	
Satd. Flow (prot)	0	1859	3529	0	1657	0
Flt Permitted		0.998			0.987	
Satd. Flow (perm)	0	1859	3529	0	1657	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		189	257		535	
Travel Time (s)		4.2	5.7		11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	553	330	7	12	33
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	578	337	0	45	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

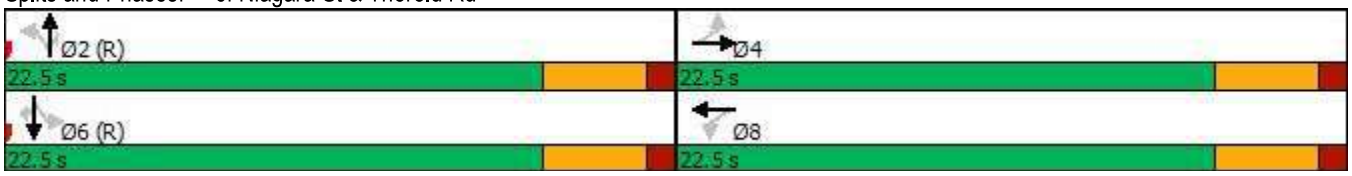
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 50.0%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	311	136	73	31	90	93	60	309	42	70	253	160
Future Volume (vph)	311	136	73	31	90	93	60	309	42	70	253	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	270		0	0		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.948			0.924			0.998	0.850		0.991	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1766	0	1770	1721	0	1770	1766	1504	1770	1754	1504
Flt Permitted	0.633			0.617			0.539			0.479		
Satd. Flow (perm)	1179	1766	0	1149	1721	0	1004	1766	1504	892	1754	1504
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		71			101			2	41		8	157
Link Speed (mph)		31			31			31			31	
Link Distance (ft)		257			220			560			547	
Travel Time (s)		5.7			4.8			12.3			12.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	338	148	79	34	98	101	65	336	46	76	275	174
Shared Lane Traffic (%)									10%			10%
Lane Group Flow (vph)	338	227	0	34	199	0	65	341	41	76	292	157
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(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		48			48			48			48	
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 (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	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	22.5
Total Split (%)	50.0%	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	18.0
Yellow Time (s)	3.5	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	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	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	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	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	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.72	0.30		0.07	0.27		0.16	0.48	0.07	0.21	0.41	0.23

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	23.2	7.7		9.0	6.0		10.0	12.8	3.9	10.8	11.7	3.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.2	7.7		9.0	6.0		10.0	12.8	3.9	10.8	11.7	3.1
LOS	C	A		A	A		B	B	A	B	B	A
Approach Delay		17.0			6.4			11.6			9.0	
Approach LOS		B			A			B			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 11.9		Intersection LOS: B	
Intersection Capacity Utilization 63.9%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 6: Niagara St & Thorold Rd





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	2	478	327	4	0	0
Future Volume (vph)	2	478	327	4	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.998			
Flt Protected						
Satd. Flow (prot)	0	1863	3532	0	0	0
Flt Permitted						
Satd. Flow (perm)	0	1863	3532	0	0	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		129	150		120	
Travel Time (s)		2.8	3.3		2.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	520	355	4	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	522	359	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

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



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	327	0	8	17
Future Volume (vph)	0	0	327	0	8	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00
Frt					0.910	
Flt Protected					0.984	
Satd. Flow (prot)	0	1863	3539	0	1668	0
Flt Permitted					0.984	
Satd. Flow (perm)	0	1863	3539	0	1668	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		146	129		115	
Travel Time (s)		3.2	2.8		2.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	355	0	9	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	355	0	27	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

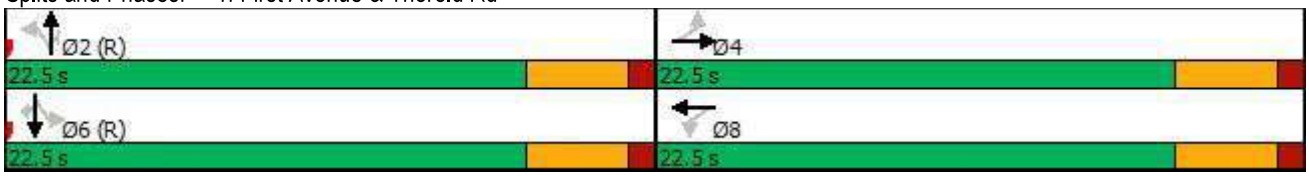
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 19.0%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	358	23	130	424	43	39	173	177	45	151	38
Future Volume (vph)	47	358	23	130	424	43	39	173	177	45	151	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	131		0	131		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991			0.986				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1846	0	1770	1837	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.315			0.417			0.653			0.639		
Satd. Flow (perm)	587	1846	0	777	1837	0	1216	1863	1583	1190	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			14				192			41
Link Speed (mph)		31			31			31			31	
Link Distance (ft)		241			146			574			537	
Travel Time (s)		5.3			3.2			12.6			11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	51	389	25	141	461	47	42	188	192	49	164	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	51	414	0	141	508	0	42	188	192	49	164	41
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(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		48			48			48			48	
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 (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	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	22.5
Total Split (%)	50.0%	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	18.0
Yellow Time (s)	3.5	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	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	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	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	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	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.22	0.56		0.45	0.68		0.09	0.25	0.26	0.10	0.22	0.06
Control Delay	11.9	13.7		15.8	16.9		9.1	10.2	2.9	9.2	9.9	3.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.9	13.7		15.8	16.9		9.1	10.2	2.9	9.2	9.9	3.8
LOS	B	B		B	B		A	B	A	A	A	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		13.5			16.7			6.8			8.8	
Approach LOS		B			B			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 12.4		Intersection LOS: B	
Intersection Capacity Utilization 57.4%		ICU Level of Service B	
Analysis Period (min) 15			

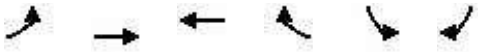
Splits and Phases: 1: First Avenue & Thorold Rd





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	18	556	593	4	0	2
Future Volume (vph)	18	556	593	4	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.999		0.865	
Flt Protected		0.998				
Satd. Flow (prot)	0	1859	3536	0	1611	0
Flt Permitted		0.998				
Satd. Flow (perm)	0	1859	3536	0	1611	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		150	522		384	
Travel Time (s)		3.3	11.5		8.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	20	604	645	4	0	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	624	649	0	2	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

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



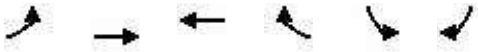
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	4	552	589	2	3	8
Future Volume (vph)	4	552	589	2	3	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt					0.899	
Flt Protected					0.988	
Satd. Flow (prot)	0	1863	3539	0	1655	0
Flt Permitted					0.988	
Satd. Flow (perm)	0	1863	3539	0	1655	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		522	139		227	
Travel Time (s)		11.5	3.1		5.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	600	640	2	3	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	604	642	0	12	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 42.2%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	548	7	12	545	17	21
Future Volume (vph)	548	7	12	545	17	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt	0.998				0.924	
Flt Protected				0.999	0.979	
Satd. Flow (prot)	1859	0	0	3536	1685	0
Flt Permitted				0.999	0.979	
Satd. Flow (perm)	1859	0	0	3536	1685	0
Link Speed (mph)	31			31	31	
Link Distance (ft)	139			189	288	
Travel Time (s)	3.1			4.2	6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	596	8	13	592	18	23
Shared Lane Traffic (%)						
Lane Group Flow (vph)	604	0	0	605	41	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	48			48	48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	16		16	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 39.3%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	26	546	527	6	11	30
Future Volume (vph)	26	546	527	6	11	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.998		0.901	
Flt Protected		0.998			0.987	
Satd. Flow (prot)	0	1859	3532	0	1657	0
Flt Permitted		0.998			0.987	
Satd. Flow (perm)	0	1859	3532	0	1657	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		189	257		535	
Travel Time (s)		4.2	5.7		11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	28	593	573	7	12	33
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	621	580	0	45	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

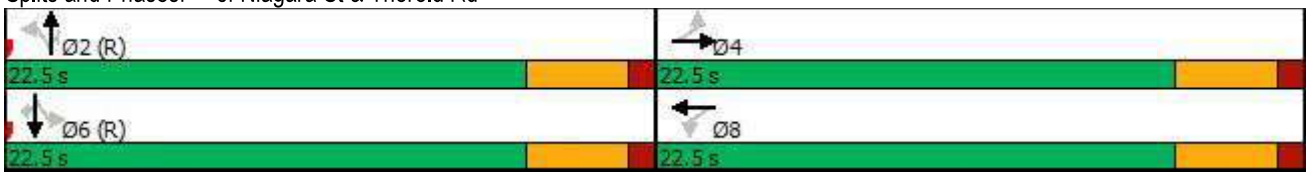
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 58.3%		ICU Level of Service B	
Analysis Period (min) 15			

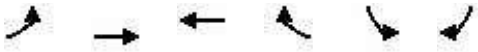
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	325	151	81	328	119	93	59	440	58	96	512	355
Future Volume (vph)	325	151	81	328	119	93	59	440	58	96	512	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	270		0	0		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.948			0.934			0.998	0.850		0.990	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1766	0	1770	1740	0	1770	1766	1504	1770	1752	1504
Flt Permitted	0.615			0.603			0.222			0.313		
Satd. Flow (perm)	1146	1766	0	1123	1740	0	414	1766	1504	583	1752	1504
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		72			101			2	57		9	347
Link Speed (mph)		31			31			31			31	
Link Distance (ft)		257			220			560			547	
Travel Time (s)		5.7			4.8			12.3			12.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	353	164	88	357	129	101	64	478	63	104	557	386
Shared Lane Traffic (%)									10%			10%
Lane Group Flow (vph)	353	252	0	357	230	0	64	484	57	104	596	347
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(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		48			48			48			48	
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 (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	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	22.5
Total Split (%)	50.0%	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	18.0
Yellow Time (s)	3.5	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	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	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	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	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	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.77	0.34		0.80	0.30		0.39	0.68	0.09	0.45	0.84	0.43
Control Delay	27.0	8.1		29.2	6.7		18.1	17.6	3.6	17.5	26.8	3.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.0	8.1		29.2	6.7		18.1	17.6	3.6	17.5	26.8	3.3
LOS	C	A		C	A		B	B	A	B	C	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		19.1			20.4			16.3			18.1	
Approach LOS		B			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 50			
Control Type: Pretimed			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 18.4		Intersection LOS: B	
Intersection Capacity Utilization 84.4%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 6: Niagara St & Thorold Rd





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	13	574	584	9	0	0
Future Volume (vph)	13	574	584	9	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.998			
Flt Protected		0.999				
Satd. Flow (prot)	0	1861	3532	0	0	0
Flt Permitted		0.999				
Satd. Flow (perm)	0	1861	3532	0	0	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		129	150		120	
Travel Time (s)		2.8	3.3		2.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	624	635	10	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	638	645	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 44.0%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	584	0	7	6
Future Volume (vph)	0	0	584	0	7	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00
Frt					0.937	
Flt Protected					0.974	
Satd. Flow (prot)	0	1863	3539	0	1700	0
Flt Permitted					0.974	
Satd. Flow (perm)	0	1863	3539	0	1700	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		146	129		115	
Travel Time (s)		3.2	2.8		2.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	635	0	8	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	635	0	15	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

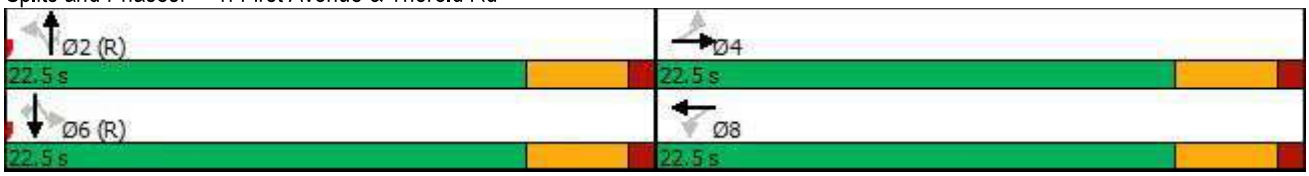
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 26.1%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	248	14	50	216	20	32	116	123	43	57	25
Future Volume (vph)	27	248	14	50	216	20	32	116	123	43	57	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	131		0	131		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
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		0.992			0.987				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1848	0	1770	1839	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.600			0.566			0.717			0.676		
Satd. Flow (perm)	1118	1848	0	1054	1839	0	1336	1863	1583	1259	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			12				134			36
Link Speed (mph)		31			31			31			31	
Link Distance (ft)		241			146			574			537	
Travel Time (s)		5.3			3.2			12.6			11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	270	15	54	235	22	35	126	134	47	62	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	285	0	54	257	0	35	126	134	47	62	27
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(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		48			48			48			48	
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 (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	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	22.5
Total Split (%)	50.0%	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	18.0
Yellow Time (s)	3.5	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	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	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	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	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	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.06	0.38		0.13	0.35		0.07	0.17	0.19	0.09	0.08	0.04
Control Delay	8.9	11.2		9.6	10.6		8.8	9.5	3.0	9.1	8.8	3.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.9	11.2		9.6	10.6		8.8	9.5	3.0	9.1	8.8	3.4
LOS	A	B		A	B		A	A	A	A	A	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		11.0			10.4			6.5			7.8	
Approach LOS		B			B			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.38			
Intersection Signal Delay: 9.2		Intersection LOS: A	
Intersection Capacity Utilization 38.4%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: First Avenue & Thorold Rd





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	414	283	1	2	3
Future Volume (vph)	0	414	283	1	2	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt					0.919	
Flt Protected					0.980	
Satd. Flow (prot)	0	1863	3539	0	1678	0
Flt Permitted					0.980	
Satd. Flow (perm)	0	1863	3539	0	1678	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		150	522		384	
Travel Time (s)		3.3	11.5		8.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	450	308	1	2	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	450	309	0	5	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 31.8%		ICU Level of Service A	
Analysis Period (min) 15			

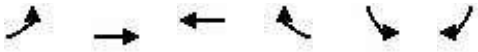


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	1	415	277	0	2	3
Future Volume (vph)	1	415	277	0	2	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt					0.919	
Flt Protected					0.980	
Satd. Flow (prot)	0	1863	3539	0	1678	0
Flt Permitted					0.980	
Satd. Flow (perm)	0	1863	3539	0	1678	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		522	139		227	
Travel Time (s)		11.5	3.1		5.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	451	301	0	2	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	452	301	0	5	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 32.6%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	414	3	10	271	2	38
Future Volume (vph)	414	3	10	271	2	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt	0.999				0.871	
Flt Protected				0.998	0.998	
Satd. Flow (prot)	1861	0	0	3532	1619	0
Flt Permitted				0.998	0.998	
Satd. Flow (perm)	1861	0	0	3532	1619	0
Link Speed (mph)	31			31	31	
Link Distance (ft)	139			189	288	
Travel Time (s)	3.1			4.2	6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	450	3	11	295	2	41
Shared Lane Traffic (%)						
Lane Group Flow (vph)	453	0	0	306	43	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	48			48	48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	16		16	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 32.0%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	19	433	259	5	9	26
Future Volume (vph)	19	433	259	5	9	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.997		0.901	
Flt Protected		0.998			0.987	
Satd. Flow (prot)	0	1859	3529	0	1657	0
Flt Permitted		0.998			0.987	
Satd. Flow (perm)	0	1859	3529	0	1657	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		189	257		535	
Travel Time (s)		4.2	5.7		11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	471	282	5	10	28
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	492	287	0	38	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

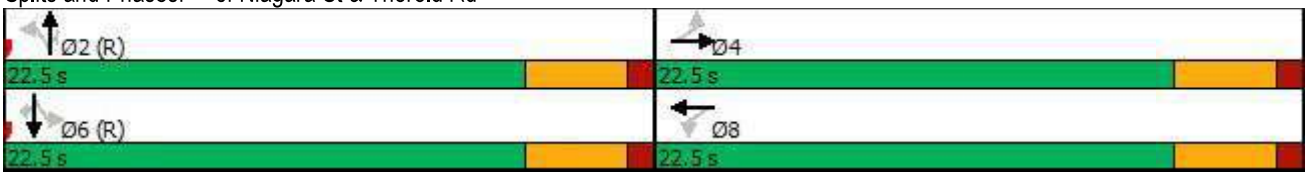
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 44.5%		ICU Level of Service A	
Analysis Period (min) 15			

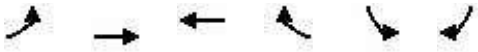
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	265	116	61	31	76	79	52	263	36	60	215	136
Future Volume (vph)	265	116	61	31	76	79	52	263	36	60	215	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	270		0	0		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.948			0.924			0.998	0.850		0.991	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1766	0	1770	1721	0	1770	1766	1504	1770	1754	1504
Flt Permitted	0.650			0.637			0.594			0.542		
Satd. Flow (perm)	1211	1766	0	1187	1721	0	1106	1766	1504	1010	1754	1504
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		66			86			2	36		9	133
Link Speed (mph)		31			31			31			31	
Link Distance (ft)		257			220			560			547	
Travel Time (s)		5.7			4.8			12.3			12.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	288	126	66	34	83	86	57	286	39	65	234	148
Shared Lane Traffic (%)									10%			10%
Lane Group Flow (vph)	288	192	0	34	169	0	57	290	35	65	249	133
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(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		48			48			48			48	
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 (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	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	22.5
Total Split (%)	50.0%	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	18.0
Yellow Time (s)	3.5	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	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	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	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	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	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.60	0.26		0.07	0.23		0.13	0.41	0.06	0.16	0.35	0.20
Control Delay	16.9	7.2		8.9	5.9		9.5	11.8	4.0	10.0	10.9	3.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.9	7.2		8.9	5.9		9.5	11.8	4.0	10.0	10.9	3.1
LOS	B	A		A	A		A	B	A	A	B	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		13.0			6.4			10.8			8.4	
Approach LOS		B			A			B			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.60			
Intersection Signal Delay: 10.2		Intersection LOS: B	
Intersection Capacity Utilization 57.3%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 6: Niagara St & Thorold Rd





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	8	406	278	8	0	0
Future Volume (vph)	8	406	278	8	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.996			
Flt Protected		0.999				
Satd. Flow (prot)	0	1861	3525	0	0	0
Flt Permitted		0.999				
Satd. Flow (perm)	0	1861	3525	0	0	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		129	150		120	
Travel Time (s)		2.8	3.3		2.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	441	302	9	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	450	311	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 31.1%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	278	0	8	8
Future Volume (vph)	0	0	278	0	8	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00
Frt					0.932	
Flt Protected					0.976	
Satd. Flow (prot)	0	1863	3539	0	1694	0
Flt Permitted					0.976	
Satd. Flow (perm)	0	1863	3539	0	1694	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		146	129		115	
Travel Time (s)		3.2	2.8		2.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	302	0	9	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	302	0	18	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 17.7%		ICU Level of Service A	
Analysis Period (min) 15			

APPENDIX F

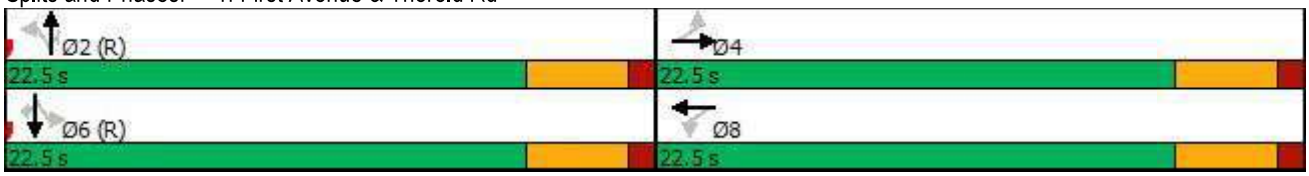
2031 Future Condition Capacity Analysis Report

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	320	19	67	282	30	42	151	157	53	74	32
Future Volume (vph)	35	320	19	67	282	30	42	151	157	53	74	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	131		0	131		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991			0.985				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1846	0	1770	1835	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.501			0.468			0.705			0.653		
Satd. Flow (perm)	933	1846	0	872	1835	0	1313	1863	1583	1216	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			14				171			36
Link Speed (mph)		31			31			31			31	
Link Distance (ft)		241			146			574			537	
Travel Time (s)		5.3			3.2			12.6			11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	348	21	73	307	33	46	164	171	58	80	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	369	0	73	340	0	46	164	171	58	80	35
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(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		48			48			48			48	
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 (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	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	22.5
Total Split (%)	50.0%	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	18.0
Yellow Time (s)	3.5	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	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	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	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	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	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.10	0.50		0.21	0.46		0.09	0.22	0.23	0.12	0.11	0.05
Control Delay	9.4	12.7		10.8	12.0		9.0	9.9	2.9	9.4	9.0	3.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.4	12.7		10.8	12.0		9.0	9.9	2.9	9.4	9.0	3.9
LOS	A	B		B	B		A	A	A	A	A	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		12.4			11.8			6.7			8.1	
Approach LOS		B			B			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.50			
Intersection Signal Delay: 10.1		Intersection LOS: B	
Intersection Capacity Utilization 49.3%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: First Avenue & Thorold Rd





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	528	364	1	2	1
Future Volume (vph)	0	528	364	1	2	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt					0.955	
Flt Protected					0.968	
Satd. Flow (prot)	0	1863	3539	0	1722	0
Flt Permitted					0.968	
Satd. Flow (perm)	0	1863	3539	0	1722	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		150	522		384	
Travel Time (s)		3.3	11.5		8.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	574	396	1	2	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	574	397	0	3	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 37.8%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	537	358	0	2	3
Future Volume (vph)	0	537	358	0	2	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt					0.919	
Flt Protected					0.980	
Satd. Flow (prot)	0	1863	3539	0	1678	0
Flt Permitted					0.980	
Satd. Flow (perm)	0	1863	3539	0	1678	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		522	139		227	
Travel Time (s)		11.5	3.1		5.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	584	389	0	2	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	584	389	0	5	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

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



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	538	1	13	352	3	50
Future Volume (vph)	538	1	13	352	3	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt					0.872	
Flt Protected				0.998	0.997	
Satd. Flow (prot)	1863	0	0	3532	1619	0
Flt Permitted				0.998	0.997	
Satd. Flow (perm)	1863	0	0	3532	1619	0
Link Speed (mph)	31			31	31	
Link Distance (ft)	139			189	288	
Travel Time (s)	3.1			4.2	6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	585	1	14	383	3	54
Shared Lane Traffic (%)						
Lane Group Flow (vph)	586	0	0	397	57	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	48			48	48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	16		16	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 38.4%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	25	562	336	7	12	33
Future Volume (vph)	25	562	336	7	12	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.997		0.901	
Flt Protected		0.998			0.987	
Satd. Flow (prot)	0	1859	3529	0	1657	0
Flt Permitted		0.998			0.987	
Satd. Flow (perm)	0	1859	3529	0	1657	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		189	257		535	
Travel Time (s)		4.2	5.7		11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	611	365	8	13	36
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	638	373	0	49	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

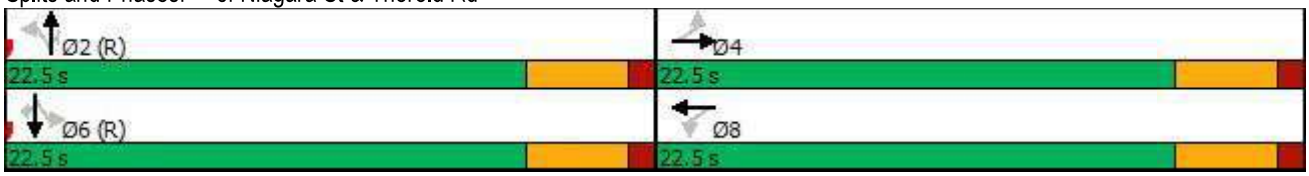
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 53.8%		ICU Level of Service A	
Analysis Period (min) 15			

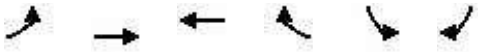
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	343	150	81	34	99	103	66	341	46	77	279	177
Future Volume (vph)	343	150	81	34	99	103	66	341	46	77	279	177
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	270		0	0		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.947			0.924			0.998	0.850		0.991	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1764	0	1770	1721	0	1770	1766	1504	1770	1754	1504
Flt Permitted	0.621			0.603			0.502			0.437		
Satd. Flow (perm)	1157	1764	0	1123	1721	0	935	1766	1504	814	1754	1504
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		72			112			2	45		8	173
Link Speed (mph)		31			31			31			31	
Link Distance (ft)		257			220			560			547	
Travel Time (s)		5.7			4.8			12.3			12.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	373	163	88	37	108	112	72	371	50	84	303	192
Shared Lane Traffic (%)									10%			10%
Lane Group Flow (vph)	373	251	0	37	220	0	72	376	45	84	322	173
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(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		48			48			48			48	
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 (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	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	22.5
Total Split (%)	50.0%	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	18.0
Yellow Time (s)	3.5	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	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	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	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	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	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.81	0.34		0.08	0.29		0.19	0.53	0.07	0.26	0.46	0.25
Control Delay	29.8	8.1		9.1	6.1		10.5	13.6	3.8	11.7	12.3	3.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.8	8.1		9.1	6.1		10.5	13.6	3.8	11.7	12.3	3.0
LOS	C	A		A	A		B	B	A	B	B	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		21.1			6.5			12.3			9.4	
Approach LOS		C			A			B			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 50			
Control Type: Pretimed			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 13.5		Intersection LOS: B	
Intersection Capacity Utilization 68.7%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 6: Niagara St & Thorold Rd





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	2	528	361	4	0	0
Future Volume (vph)	2	528	361	4	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.998			
Flt Protected						
Satd. Flow (prot)	0	1863	3532	0	0	0
Flt Permitted						
Satd. Flow (perm)	0	1863	3532	0	0	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		129	150		120	
Travel Time (s)		2.8	3.3		2.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	574	392	4	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	576	396	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 32.7%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	361	0	9	19
Future Volume (vph)	0	0	361	0	9	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00
Frt					0.909	
Flt Protected					0.984	
Satd. Flow (prot)	0	1863	3539	0	1666	0
Flt Permitted					0.984	
Satd. Flow (perm)	0	1863	3539	0	1666	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		146	129		115	
Travel Time (s)		3.2	2.8		2.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	392	0	10	21
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	392	0	31	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

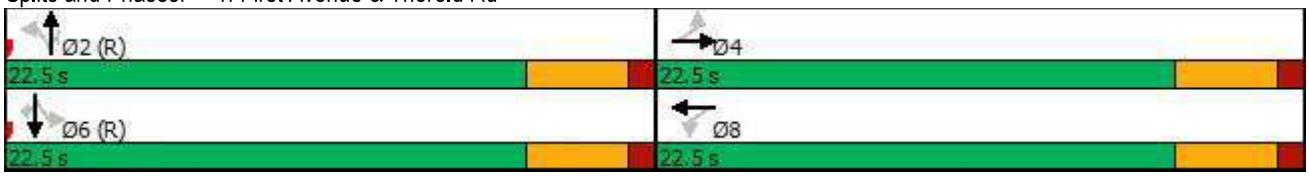
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 20.0%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	395	25	144	468	47	43	191	195	50	167	42
Future Volume (vph)	52	395	25	144	468	47	43	191	195	50	167	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	131		0	131		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991			0.986				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1846	0	1770	1837	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.260			0.371			0.643			0.628		
Satd. Flow (perm)	484	1846	0	691	1837	0	1198	1863	1583	1170	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			13				212			46
Link Speed (mph)		31			31			31			31	
Link Distance (ft)		241			146			574			537	
Travel Time (s)		5.3			3.2			12.6			11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	57	429	27	157	509	51	47	208	212	54	182	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	57	456	0	157	560	0	47	208	212	54	182	46
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(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		48			48			48			48	
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 (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	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	22.5
Total Split (%)	50.0%	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	18.0
Yellow Time (s)	3.5	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	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	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	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	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	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.30	0.61		0.57	0.75		0.10	0.28	0.28	0.12	0.24	0.07
Control Delay	14.3	14.9		21.5	20.3		9.2	10.4	2.9	9.4	10.1	3.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.3	14.9		21.5	20.3		9.2	10.4	2.9	9.4	10.1	3.8
LOS	B	B		C	C		A	B	A	A	B	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		14.9			20.5			6.9			8.9	
Approach LOS		B			C			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 50			
Control Type: Pretimed			
Maximum v/c Ratio: 0.75			
Intersection Signal Delay: 14.2		Intersection LOS: B	
Intersection Capacity Utilization 60.9%		ICU Level of Service B	
Analysis Period (min) 15			

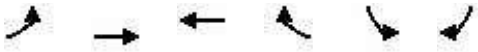
Splits and Phases: 1: First Avenue & Thorold Rd





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	20	614	655	5	0	3
Future Volume (vph)	20	614	655	5	0	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.999		0.865	
Flt Protected		0.998				
Satd. Flow (prot)	0	1859	3536	0	1611	0
Flt Permitted		0.998				
Satd. Flow (perm)	0	1859	3536	0	1611	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		150	522		384	
Travel Time (s)		3.3	11.5		8.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	667	712	5	0	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	689	717	0	3	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 58.5%		ICU Level of Service B	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	4	609	650	2	3	9
Future Volume (vph)	4	609	650	2	3	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt					0.896	
Flt Protected					0.989	
Satd. Flow (prot)	0	1863	3539	0	1651	0
Flt Permitted					0.989	
Satd. Flow (perm)	0	1863	3539	0	1651	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		522	139		227	
Travel Time (s)		11.5	3.1		5.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	662	707	2	3	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	666	709	0	13	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

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



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	605	8	13	602	19	23
Future Volume (vph)	605	8	13	602	19	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt	0.998				0.927	
Flt Protected				0.999	0.978	
Satd. Flow (prot)	1859	0	0	3536	1689	0
Flt Permitted				0.999	0.978	
Satd. Flow (perm)	1859	0	0	3536	1689	0
Link Speed (mph)	31			31	31	
Link Distance (ft)	139			189	288	
Travel Time (s)	3.1			4.2	6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	658	9	14	654	21	25
Shared Lane Traffic (%)						
Lane Group Flow (vph)	667	0	0	668	46	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	48			48	48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	16		16	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 42.3%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	29	603	582	7	12	33
Future Volume (vph)	29	603	582	7	12	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.998		0.901	
Flt Protected		0.998			0.987	
Satd. Flow (prot)	0	1859	3532	0	1657	0
Flt Permitted		0.998			0.987	
Satd. Flow (perm)	0	1859	3532	0	1657	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		189	257		535	
Travel Time (s)		4.2	5.7		11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	655	633	8	13	36
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	687	641	0	49	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

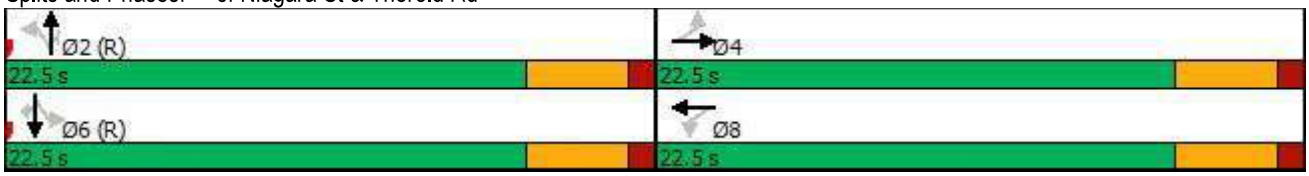
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 63.0%		ICU Level of Service B	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	359	167	89	362	131	103	65	486	64	106	565	392
Future Volume (vph)	359	167	89	362	131	103	65	486	64	106	565	392
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	270		0	0		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.948			0.934			0.998	0.850		0.990	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1766	0	1770	1740	0	1770	1766	1504	1770	1752	1504
Flt Permitted	0.602			0.573			0.222			0.257		
Satd. Flow (perm)	1121	1766	0	1067	1740	0	414	1766	1504	479	1752	1504
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		71			105			2	63		9	383
Link Speed (mph)		31			31			31			31	
Link Distance (ft)		257			220			560			547	
Travel Time (s)		5.7			4.8			12.3			12.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	390	182	97	393	142	112	71	528	70	115	614	426
Shared Lane Traffic (%)									10%			10%
Lane Group Flow (vph)	390	279	0	393	254	0	71	535	63	115	657	383
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(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		48			48			48			48	
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 (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	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	22.5
Total Split (%)	50.0%	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	18.0
Yellow Time (s)	3.5	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	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	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	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	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	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.87	0.37		0.92	0.33		0.43	0.76	0.10	0.60	0.93	0.46
Control Delay	37.5	8.7		46.6	7.0		20.0	21.1	3.5	29.2	37.6	3.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.5	8.7		46.6	7.0		20.0	21.1	3.5	29.2	37.6	3.4
LOS	D	A		D	A		C	C	A	C	D	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		25.5			31.1			19.3			25.4	
Approach LOS		C			C			B			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 50			
Control Type: Pretimed			
Maximum v/c Ratio: 0.93			
Intersection Signal Delay: 25.3		Intersection LOS: C	
Intersection Capacity Utilization 91.1%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 6: Niagara St & Thorold Rd





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	14	634	645	10	0	0
Future Volume (vph)	14	634	645	10	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.998			
Flt Protected		0.999				
Satd. Flow (prot)	0	1861	3532	0	0	0
Flt Permitted		0.999				
Satd. Flow (perm)	0	1861	3532	0	0	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		129	150		120	
Travel Time (s)		2.8	3.3		2.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	689	701	11	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	704	712	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 47.9%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	645	0	8	7
Future Volume (vph)	0	0	645	0	8	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00
Frt					0.936	
Flt Protected					0.974	
Satd. Flow (prot)	0	1863	3539	0	1698	0
Flt Permitted					0.974	
Satd. Flow (perm)	0	1863	3539	0	1698	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		146	129		115	
Travel Time (s)		3.2	2.8		2.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	701	0	9	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	701	0	17	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

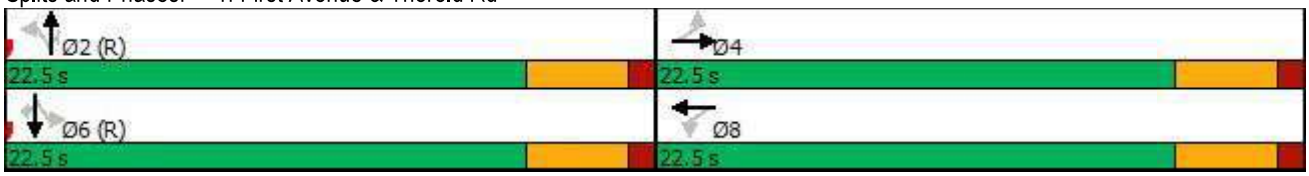
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 27.8%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	274	15	55	238	22	35	128	136	47	63	28
Future Volume (vph)	30	274	15	55	238	22	35	128	136	47	63	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	131		0	131		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
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		0.992			0.987				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1848	0	1770	1839	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.569			0.532			0.713			0.668		
Satd. Flow (perm)	1060	1848	0	991	1839	0	1328	1863	1583	1244	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			12				148			36
Link Speed (mph)		31			31			31			31	
Link Distance (ft)		241			146			574			537	
Travel Time (s)		5.3			3.2			12.6			11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	298	16	60	259	24	38	139	148	51	68	30
Shared Lane Traffic (%)												
Lane Group Flow (vph)	33	314	0	60	283	0	38	139	148	51	68	30
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(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		48			48			48			48	
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 (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	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	22.5
Total Split (%)	50.0%	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	18.0
Yellow Time (s)	3.5	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	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	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	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	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	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.08	0.42		0.15	0.38		0.07	0.19	0.20	0.10	0.09	0.05
Control Delay	9.0	11.7		9.9	11.0		8.9	9.6	3.0	9.2	8.9	3.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.0	11.7		9.9	11.0		8.9	9.6	3.0	9.2	8.9	3.6
LOS	A	B		A	B		A	A	A	A	A	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		11.5			10.8			6.5			7.9	
Approach LOS		B			B			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.42			
Intersection Signal Delay: 9.4		Intersection LOS: A	
Intersection Capacity Utilization 45.4%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: First Avenue & Thorold Rd





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	457	312	2	3	3
Future Volume (vph)	0	457	312	2	3	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.999		0.932	
Flt Protected					0.976	
Satd. Flow (prot)	0	1863	3536	0	1694	0
Flt Permitted					0.976	
Satd. Flow (perm)	0	1863	3536	0	1694	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		150	522		384	
Travel Time (s)		3.3	11.5		8.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	497	339	2	3	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	497	341	0	6	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 34.1%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	2	458	306	0	3	4
Future Volume (vph)	2	458	306	0	3	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt					0.923	
Flt Protected					0.979	
Satd. Flow (prot)	0	1863	3539	0	1683	0
Flt Permitted					0.979	
Satd. Flow (perm)	0	1863	3539	0	1683	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		522	139		227	
Travel Time (s)		11.5	3.1		5.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	498	333	0	3	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	500	333	0	7	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 35.7%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	457	4	11	299	3	42
Future Volume (vph)	457	4	11	299	3	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt	0.999				0.873	
Flt Protected				0.998	0.997	
Satd. Flow (prot)	1861	0	0	3532	1621	0
Flt Permitted				0.998	0.997	
Satd. Flow (perm)	1861	0	0	3532	1621	0
Link Speed (mph)	31			31	31	
Link Distance (ft)	139			189	288	
Travel Time (s)	3.1			4.2	6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	497	4	12	325	3	46
Shared Lane Traffic (%)						
Lane Group Flow (vph)	501	0	0	337	49	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	48			48	48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	16		16	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 34.3%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	21	478	286	6	10	29
Future Volume (vph)	21	478	286	6	10	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.997		0.900	
Flt Protected		0.998			0.987	
Satd. Flow (prot)	0	1859	3529	0	1655	0
Flt Permitted		0.998			0.987	
Satd. Flow (perm)	0	1859	3529	0	1655	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		189	257		535	
Travel Time (s)		4.2	5.7		11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	520	311	7	11	32
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	543	318	0	43	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

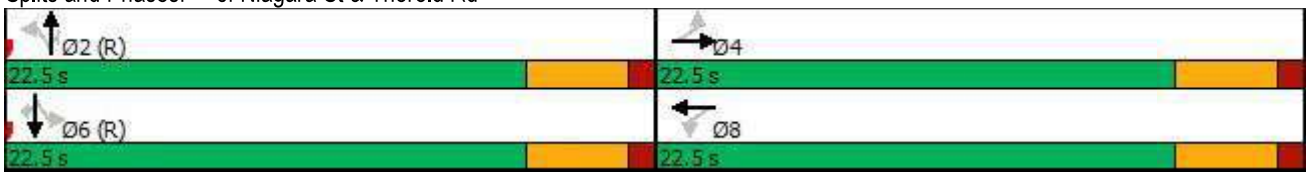
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 47.7%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	293	128	67	34	84	87	57	290	40	66	237	150
Future Volume (vph)	293	128	67	34	84	87	57	290	40	66	237	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	270		0	0		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.948			0.923			0.998	0.850		0.991	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1766	0	1770	1719	0	1770	1766	1504	1770	1754	1504
Flt Permitted	0.640			0.625			0.562			0.506		
Satd. Flow (perm)	1192	1766	0	1164	1719	0	1047	1766	1504	943	1754	1504
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		70			95			2	39		8	147
Link Speed (mph)		31			31			31			31	
Link Distance (ft)		257			220			560			547	
Travel Time (s)		5.7			4.8			12.3			12.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	318	139	73	37	91	95	62	315	43	72	258	163
Shared Lane Traffic (%)									10%			10%
Lane Group Flow (vph)	318	212	0	37	186	0	62	319	39	72	274	147
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(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		48			48			48			48	
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 (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	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	22.5
Total Split (%)	50.0%	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	18.0
Yellow Time (s)	3.5	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	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	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	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	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	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.67	0.28		0.08	0.25		0.15	0.45	0.06	0.19	0.39	0.21
Control Delay	20.4	7.4		9.0	5.9		9.8	12.4	3.9	10.5	11.3	3.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.4	7.4		9.0	5.9		9.8	12.4	3.9	10.5	11.3	3.1
LOS	C	A		A	A		A	B	A	B	B	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		15.2			6.4			11.2			8.7	
Approach LOS		B			A			B			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 11.1		Intersection LOS: B	
Intersection Capacity Utilization 61.2%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 6: Niagara St & Thorold Rd





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	9	448	307	9	0	0
Future Volume (vph)	9	448	307	9	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.996			
Flt Protected		0.999				
Satd. Flow (prot)	0	1861	3525	0	0	0
Flt Permitted		0.999				
Satd. Flow (perm)	0	1861	3525	0	0	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		129	150		120	
Travel Time (s)		2.8	3.3		2.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	487	334	10	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	497	344	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 34.1%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	307	0	9	9
Future Volume (vph)	0	0	307	0	9	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00
Frt					0.932	
Flt Protected					0.976	
Satd. Flow (prot)	0	1863	3539	0	1694	0
Flt Permitted					0.976	
Satd. Flow (perm)	0	1863	3539	0	1694	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		146	129		115	
Travel Time (s)		3.2	2.8		2.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	334	0	10	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	334	0	20	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 18.5%		ICU Level of Service A	
Analysis Period (min) 15			

APPENDIX G

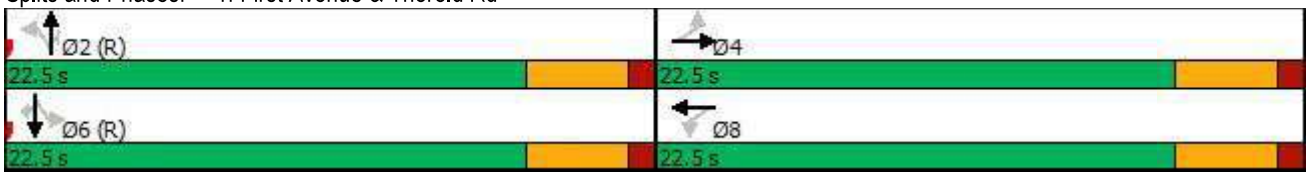
2036 Future Condition Capacity Analysis Report

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	353	21	74	311	33	46	167	173	59	82	35
Future Volume (vph)	39	353	21	74	311	33	46	167	173	59	82	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	131		0	131		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
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		0.992			0.986				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1848	0	1770	1837	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.462			0.425			0.699			0.643		
Satd. Flow (perm)	861	1848	0	792	1837	0	1302	1863	1583	1198	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			14				188			38
Link Speed (mph)		31			31			31			31	
Link Distance (ft)		241			146			574			537	
Travel Time (s)		5.3			3.2			12.6			11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	42	384	23	80	338	36	50	182	188	64	89	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	42	407	0	80	374	0	50	182	188	64	89	38
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(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		48			48			48			48	
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 (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	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	22.5
Total Split (%)	50.0%	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	18.0
Yellow Time (s)	3.5	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	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	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	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	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	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.12	0.55		0.25	0.50		0.10	0.24	0.25	0.13	0.12	0.06
Control Delay	9.7	13.6		11.7	12.7		9.1	10.1	2.9	9.5	9.1	3.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.7	13.6		11.7	12.7		9.1	10.1	2.9	9.5	9.1	3.9
LOS	A	B		B	B		A	B	A	A	A	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		13.2			12.5			6.8			8.2	
Approach LOS		B			B			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.55			
Intersection Signal Delay: 10.6		Intersection LOS: B	
Intersection Capacity Utilization 52.0%		ICU Level of Service A	
Analysis Period (min) 15			

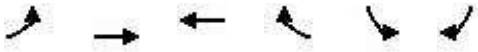
Splits and Phases: 1: First Avenue & Thorold Rd





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	583	402	1	2	1
Future Volume (vph)	0	583	402	1	2	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt					0.955	
Flt Protected					0.968	
Satd. Flow (prot)	0	1863	3539	0	1722	0
Flt Permitted					0.968	
Satd. Flow (perm)	0	1863	3539	0	1722	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		150	522		384	
Travel Time (s)		3.3	11.5		8.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	634	437	1	2	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	634	438	0	3	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 40.7%		ICU Level of Service A	
Analysis Period (min) 15			



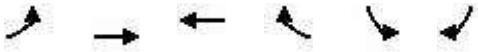
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	593	395	0	2	3
Future Volume (vph)	0	593	395	0	2	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt					0.919	
Flt Protected					0.980	
Satd. Flow (prot)	0	1863	3539	0	1678	0
Flt Permitted					0.980	
Satd. Flow (perm)	0	1863	3539	0	1678	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		522	139		227	
Travel Time (s)		11.5	3.1		5.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	645	429	0	2	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	645	429	0	5	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 41.2%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	594	1	14	389	3	55
Future Volume (vph)	594	1	14	389	3	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt					0.871	
Flt Protected				0.998	0.998	
Satd. Flow (prot)	1863	0	0	3532	1619	0
Flt Permitted				0.998	0.998	
Satd. Flow (perm)	1863	0	0	3532	1619	0
Link Speed (mph)	31			31	31	
Link Distance (ft)	139			189	288	
Travel Time (s)	3.1			4.2	6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	646	1	15	423	3	60
Shared Lane Traffic (%)						
Lane Group Flow (vph)	647	0	0	438	63	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	48			48	48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	16		16	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 41.6%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	28	620	371	8	13	36
Future Volume (vph)	28	620	371	8	13	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.997		0.901	
Flt Protected		0.998			0.987	
Satd. Flow (prot)	0	1859	3529	0	1657	0
Flt Permitted		0.998			0.987	
Satd. Flow (perm)	0	1859	3529	0	1657	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		189	257		535	
Travel Time (s)		4.2	5.7		11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	30	674	403	9	14	39
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	704	412	0	53	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

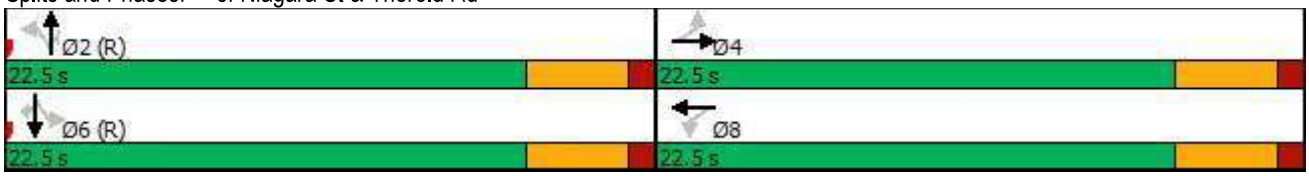
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 58.0%		ICU Level of Service B	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	379	166	89	38	109	114	73	376	51	85	308	195
Future Volume (vph)	379	166	89	38	109	114	73	376	51	85	308	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	270		0	0		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.947			0.923			0.998	0.850		0.991	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1764	0	1770	1719	0	1770	1766	1504	1770	1754	1504
Flt Permitted	0.608			0.576			0.461			0.392		
Satd. Flow (perm)	1133	1764	0	1073	1719	0	859	1766	1504	730	1754	1504
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		72			124			2	49		8	191
Link Speed (mph)		31			31			31			31	
Link Distance (ft)		257			220			560			547	
Travel Time (s)		5.7			4.8			12.3			12.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	412	180	97	41	118	124	79	409	55	92	335	212
Shared Lane Traffic (%)									10%			10%
Lane Group Flow (vph)	412	277	0	41	242	0	79	415	49	92	356	191
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(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		48			48			48			48	
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 (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	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	22.5
Total Split (%)	50.0%	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	18.0
Yellow Time (s)	3.5	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	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	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	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	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	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.91	0.37		0.10	0.32		0.23	0.59	0.08	0.32	0.50	0.27
Control Delay	43.0	8.7		9.2	6.1		11.2	14.7	3.7	13.0	13.0	3.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.0	8.7		9.2	6.1		11.2	14.7	3.7	13.0	13.0	3.0
LOS	D	A		A	A		B	B	A	B	B	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		29.2			6.6			13.2			10.0	
Approach LOS		C			A			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 50			
Control Type: Pretimed			
Maximum v/c Ratio: 0.91			
Intersection Signal Delay: 16.5		Intersection LOS: B	
Intersection Capacity Utilization 74.2%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 6: Niagara St & Thorold Rd





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	2	583	399	4	0	0
Future Volume (vph)	2	583	399	4	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.999			
Flt Protected						
Satd. Flow (prot)	0	1863	3536	0	0	0
Flt Permitted						
Satd. Flow (perm)	0	1863	3536	0	0	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		129	150		120	
Travel Time (s)		2.8	3.3		2.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	634	434	4	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	636	438	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 35.6%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	399	0	10	21
Future Volume (vph)	0	0	399	0	10	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00
Frt					0.909	
Flt Protected					0.984	
Satd. Flow (prot)	0	1863	3539	0	1666	0
Flt Permitted					0.984	
Satd. Flow (perm)	0	1863	3539	0	1666	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		146	129		115	
Travel Time (s)		3.2	2.8		2.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	434	0	11	23
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	434	0	34	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

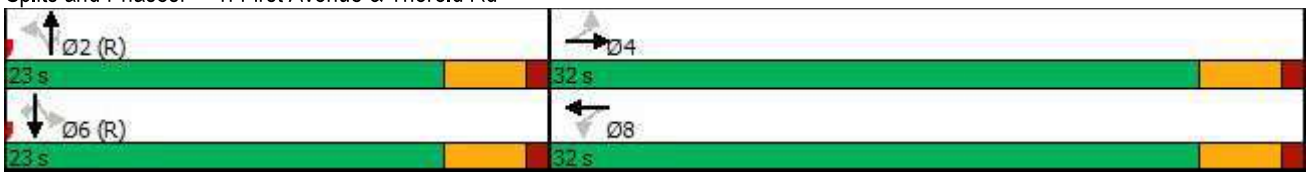
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 21.0%		ICU Level of Service A	
Analysis Period (min) 15			

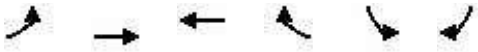
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	436	28	159	517	52	47	211	215	55	184	46
Future Volume (vph)	57	436	28	159	517	52	47	211	215	55	184	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	131		0	131		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991			0.986				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1846	0	1770	1837	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.275			0.371			0.630			0.588		
Satd. Flow (perm)	512	1846	0	691	1837	0	1174	1863	1583	1095	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			13				234			50
Link Speed (mph)		31			31			31			31	
Link Distance (ft)		241			146			574			537	
Travel Time (s)		5.3			3.2			12.6			11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	62	474	30	173	562	57	51	229	234	60	200	50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	62	504	0	173	619	0	51	229	234	60	200	50
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(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		48			48			48			48	
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 (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	32.0	32.0		32.0	32.0		23.0	23.0	23.0	23.0	23.0	23.0
Total Split (%)	58.2%	58.2%		58.2%	58.2%		41.8%	41.8%	41.8%	41.8%	41.8%	41.8%
Maximum Green (s)	27.5	27.5		27.5	27.5		18.5	18.5	18.5	18.5	18.5	18.5
Yellow Time (s)	3.5	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	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	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	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	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	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	27.5	27.5		27.5	27.5		18.5	18.5	18.5	18.5	18.5	18.5
Actuated g/C Ratio	0.50	0.50		0.50	0.50		0.34	0.34	0.34	0.34	0.34	0.34
v/c Ratio	0.24	0.54		0.50	0.67		0.13	0.37	0.34	0.16	0.32	0.09
Control Delay	10.9	12.0		15.5	14.6		13.8	15.9	3.9	14.3	15.4	5.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.9	12.0		15.5	14.6		13.8	15.9	3.9	14.3	15.4	5.1
LOS	B	B		B	B		B	B	A	B	B	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		11.9			14.8			10.3			13.5	
Approach LOS		B			B			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 55			
Actuated Cycle Length: 55			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 55			
Control Type: Pretimed			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 12.8		Intersection LOS: B	
Intersection Capacity Utilization 64.8%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: First Avenue & Thorold Rd





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	22	678	723	6	0	4
Future Volume (vph)	22	678	723	6	0	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.999		0.865	
Flt Protected		0.998				
Satd. Flow (prot)	0	1859	3536	0	1611	0
Flt Permitted		0.998				
Satd. Flow (perm)	0	1859	3536	0	1611	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		150	522		384	
Travel Time (s)		3.3	11.5		8.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	737	786	7	0	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	761	793	0	4	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 63.4%		ICU Level of Service B	
Analysis Period (min) 15			



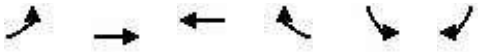
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	5	672	718	3	4	10
Future Volume (vph)	5	672	718	3	4	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.999		0.901	
Flt Protected					0.987	
Satd. Flow (prot)	0	1863	3536	0	1657	0
Flt Permitted					0.987	
Satd. Flow (perm)	0	1863	3536	0	1657	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		522	139		227	
Travel Time (s)		11.5	3.1		5.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	730	780	3	4	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	735	783	0	15	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 49.3%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	668	9	14	665	21	36
Future Volume (vph)	668	9	14	665	21	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt	0.998				0.915	
Flt Protected				0.999	0.982	
Satd. Flow (prot)	1859	0	0	3536	1674	0
Flt Permitted				0.999	0.982	
Satd. Flow (perm)	1859	0	0	3536	1674	0
Link Speed (mph)	31			31	31	
Link Distance (ft)	139			189	288	
Travel Time (s)	3.1			4.2	6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	726	10	15	723	23	39
Shared Lane Traffic (%)						
Lane Group Flow (vph)	736	0	0	738	62	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	48			48	48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	16		16	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 45.7%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	32	666	643	8	13	36
Future Volume (vph)	32	666	643	8	13	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.998		0.901	
Flt Protected		0.998			0.987	
Satd. Flow (prot)	0	1859	3532	0	1657	0
Flt Permitted		0.998			0.987	
Satd. Flow (perm)	0	1859	3532	0	1657	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		189	257		535	
Travel Time (s)		4.2	5.7		11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	35	724	699	9	14	39
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	759	708	0	53	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

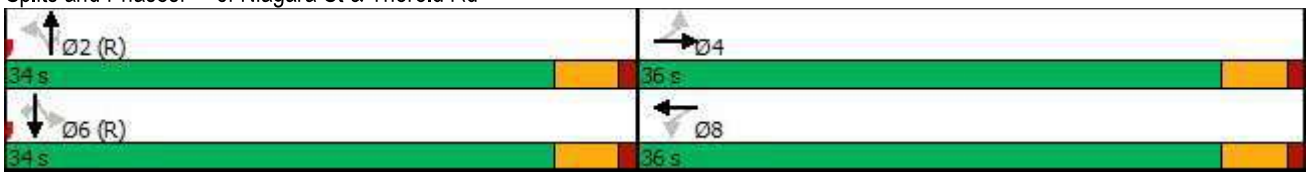
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 68.2%		ICU Level of Service C	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	396	184	99	400	145	113	72	536	71	117	624	433
Future Volume (vph)	396	184	99	400	145	113	72	536	71	117	624	433
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	270		0	0		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.947			0.934			0.998	0.850		0.990	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1764	0	1770	1740	0	1770	1766	1504	1770	1752	1504
Flt Permitted	0.538			0.510			0.136			0.183		
Satd. Flow (perm)	1002	1764	0	950	1740	0	253	1766	1504	341	1752	1504
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		50			73			1	69		6	424
Link Speed (mph)		31			31			31			31	
Link Distance (ft)		257			220			560			547	
Travel Time (s)		5.7			4.8			12.3			12.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	430	200	108	435	158	123	78	583	77	127	678	471
Shared Lane Traffic (%)									10%			10%
Lane Group Flow (vph)	430	308	0	435	281	0	78	591	69	127	725	424
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(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		48			48			48			48	
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 (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	36.0	36.0		36.0	36.0		34.0	34.0	34.0	34.0	34.0	34.0
Total Split (%)	51.4%	51.4%		51.4%	51.4%		48.6%	48.6%	48.6%	48.6%	48.6%	48.6%
Maximum Green (s)	31.5	31.5		31.5	31.5		29.5	29.5	29.5	29.5	29.5	29.5
Yellow Time (s)	3.5	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	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	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	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	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	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	31.5	31.5		31.5	31.5		29.5	29.5	29.5	29.5	29.5	29.5
Actuated g/C Ratio	0.45	0.45		0.45	0.45		0.42	0.42	0.42	0.42	0.42	0.42
v/c Ratio	0.96	0.38		1.02	0.34		0.74	0.79	0.10	0.89	0.98	0.48
Control Delay	55.0	12.1		71.8	10.4		61.0	27.6	4.0	76.2	50.8	3.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.0	12.1		71.8	10.4		61.0	27.6	4.0	76.2	50.8	3.6
LOS	E	B		E	B		E	C	A	E	D	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		37.1			47.7			28.9			37.6	
Approach LOS		D			D			C			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 70			
Control Type: Pretimed			
Maximum v/c Ratio: 1.02			
Intersection Signal Delay: 37.7		Intersection LOS: D	
Intersection Capacity Utilization 98.7%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 6: Niagara St & Thorold Rd





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	15	700	712	11	0	0
Future Volume (vph)	15	700	712	11	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.998			
Flt Protected		0.999				
Satd. Flow (prot)	0	1861	3532	0	0	0
Flt Permitted		0.999				
Satd. Flow (perm)	0	1861	3532	0	0	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		129	150		120	
Travel Time (s)		2.8	3.3		2.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	761	774	12	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	777	786	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 52.2%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	712	0	9	8
Future Volume (vph)	0	0	712	0	9	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00
Frt					0.936	
Flt Protected					0.974	
Satd. Flow (prot)	0	1863	3539	0	1698	0
Flt Permitted					0.974	
Satd. Flow (perm)	0	1863	3539	0	1698	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		146	129		115	
Travel Time (s)		3.2	2.8		2.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	774	0	10	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	774	0	19	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

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

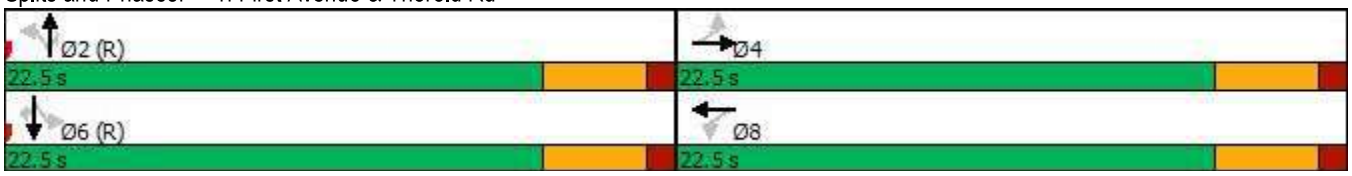


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	303	17	61	263	24	39	141	150	52	70	31
Future Volume (vph)	33	303	17	61	263	24	39	141	150	52	70	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	131		0	131		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
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		0.992			0.987				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1848	0	1770	1839	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.534			0.493			0.708			0.660		
Satd. Flow (perm)	995	1848	0	918	1839	0	1319	1863	1583	1229	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			12				163			36
Link Speed (mph)		31			31			31			31	
Link Distance (ft)		241			146			574			537	
Travel Time (s)		5.3			3.2			12.6			11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	36	329	18	66	286	26	42	153	163	57	76	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	36	347	0	66	312	0	42	153	163	57	76	34
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(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		48			48			48			48	
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 (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	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	22.5
Total Split (%)	50.0%	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	18.0
Yellow Time (s)	3.5	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	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	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	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	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	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.09	0.47		0.18	0.42		0.08	0.21	0.22	0.12	0.10	0.05

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	9.2	12.3		10.3	11.5		8.9	9.8	2.9	9.3	9.0	3.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.2	12.3		10.3	11.5		8.9	9.8	2.9	9.3	9.0	3.9
LOS	A	B		B	B		A	A	A	A	A	A
Approach Delay		12.0			11.3			6.6			8.1	
Approach LOS		B			B			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.47			
Intersection Signal Delay: 9.8		Intersection LOS: A	
Intersection Capacity Utilization 47.7%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: First Avenue & Thorold Rd





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	505	344	3	4	4
Future Volume (vph)	0	505	344	3	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.999		0.932	
Flt Protected					0.976	
Satd. Flow (prot)	0	1863	3536	0	1694	0
Flt Permitted					0.976	
Satd. Flow (perm)	0	1863	3536	0	1694	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		150	522		384	
Travel Time (s)		3.3	11.5		8.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	549	374	3	4	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	549	377	0	8	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 36.6%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	3	506	338	0	4	5
Future Volume (vph)	3	506	338	0	4	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt					0.925	
Flt Protected					0.978	
Satd. Flow (prot)	0	1863	3539	0	1685	0
Flt Permitted					0.978	
Satd. Flow (perm)	0	1863	3539	0	1685	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		522	139		227	
Travel Time (s)		11.5	3.1		5.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	550	367	0	4	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	553	367	0	9	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 39.0%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	505	5	12	330	4	46
Future Volume (vph)	505	5	12	330	4	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt	0.999				0.875	
Flt Protected				0.998	0.996	
Satd. Flow (prot)	1861	0	0	3532	1623	0
Flt Permitted				0.998	0.996	
Satd. Flow (perm)	1861	0	0	3532	1623	0
Link Speed (mph)	31			31	31	
Link Distance (ft)	139			189	288	
Travel Time (s)	3.1			4.2	6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	549	5	13	359	4	50
Shared Lane Traffic (%)						
Lane Group Flow (vph)	554	0	0	372	54	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	48			48	48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	16		16	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 36.9%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	23	528	316	7	11	32
Future Volume (vph)	23	528	316	7	11	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.997		0.899	
Flt Protected		0.998			0.987	
Satd. Flow (prot)	0	1859	3529	0	1653	0
Flt Permitted		0.998			0.987	
Satd. Flow (perm)	0	1859	3529	0	1653	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		189	257		535	
Travel Time (s)		4.2	5.7		11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	574	343	8	12	35
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	599	351	0	47	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

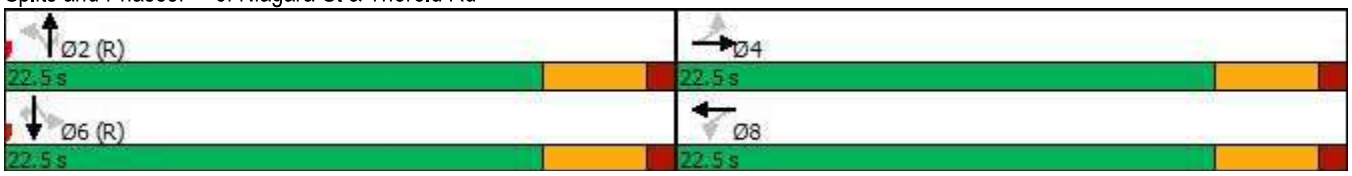
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 51.4%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	323	141	74	38	93	96	63	321	44	73	262	166
Future Volume (vph)	323	141	74	38	93	96	63	321	44	73	262	166
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	270		0	0		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.948			0.924			0.998	0.850		0.991	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1766	0	1770	1721	0	1770	1766	1504	1770	1754	1504
Flt Permitted	0.629			0.613			0.526			0.463		
Satd. Flow (perm)	1172	1766	0	1142	1721	0	980	1766	1504	862	1754	1504
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		70			104			2	43		8	162
Link Speed (mph)		31			31			31			31	
Link Distance (ft)		257			220			560			547	
Travel Time (s)		5.7			4.8			12.3			12.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	351	153	80	41	101	104	68	349	48	79	285	180
Shared Lane Traffic (%)									10%			10%
Lane Group Flow (vph)	351	233	0	41	205	0	68	354	43	79	303	162
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(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		48			48			48			48	
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 (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	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	22.5
Total Split (%)	50.0%	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	18.0
Yellow Time (s)	3.5	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	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	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	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	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	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.75	0.31		0.09	0.27		0.17	0.50	0.07	0.23	0.43	0.23

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	25.3	7.8		9.1	6.0		10.2	13.1	3.8	11.2	11.9	3.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.3	7.8		9.1	6.0		10.2	13.1	3.8	11.2	11.9	3.0
LOS	C	A		A	A		B	B	A	B	B	A
Approach Delay		18.3			6.5			11.8			9.1	
Approach LOS		B			A			B			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.75			
Intersection Signal Delay: 12.4		Intersection LOS: B	
Intersection Capacity Utilization 65.6%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 6: Niagara St & Thorold Rd





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	495	339	10	0	0
Future Volume (vph)	10	495	339	10	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.996			
Flt Protected		0.999				
Satd. Flow (prot)	0	1861	3525	0	0	0
Flt Permitted		0.999				
Satd. Flow (perm)	0	1861	3525	0	0	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		129	150		120	
Travel Time (s)		2.8	3.3		2.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	538	368	11	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	549	379	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 37.4%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	339	0	10	10
Future Volume (vph)	0	0	339	0	10	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00
Frt					0.932	
Flt Protected					0.976	
Satd. Flow (prot)	0	1863	3539	0	1694	0
Flt Permitted					0.976	
Satd. Flow (perm)	0	1863	3539	0	1694	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		146	129		115	
Travel Time (s)		3.2	2.8		2.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	368	0	11	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	368	0	22	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 19.4%		ICU Level of Service A	
Analysis Period (min) 15			

APPENDIX H

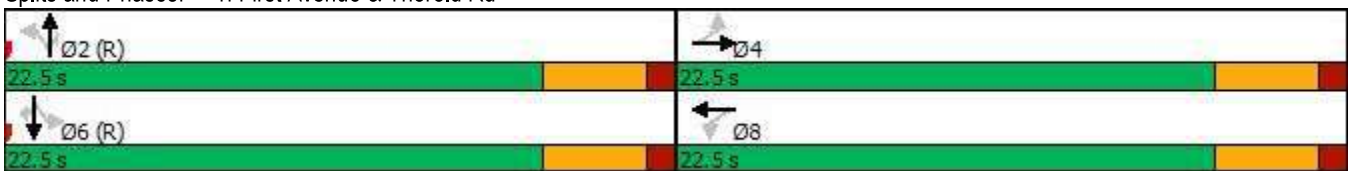
2041 Future Condition Capacity Analysis Report

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	390	23	82	343	36	51	184	191	65	91	39
Future Volume (vph)	43	390	23	82	343	36	51	184	191	65	91	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	131		0	131		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
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		0.992			0.986				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1848	0	1770	1837	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.419			0.378			0.693			0.632		
Satd. Flow (perm)	780	1848	0	704	1837	0	1291	1863	1583	1177	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			14				208			42
Link Speed (mph)		31			31			31			31	
Link Distance (ft)		241			146			574			537	
Travel Time (s)		5.3			3.2			12.6			11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	47	424	25	89	373	39	55	200	208	71	99	42
Shared Lane Traffic (%)												
Lane Group Flow (vph)	47	449	0	89	412	0	55	200	208	71	99	42
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(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		48			48			48			48	
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 (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	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	22.5
Total Split (%)	50.0%	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	18.0
Yellow Time (s)	3.5	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	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	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	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	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	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.15	0.60		0.32	0.55		0.11	0.27	0.27	0.15	0.13	0.06

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	10.2	14.7		13.2	13.5		9.2	10.3	2.9	9.7	9.2	3.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.2	14.7		13.2	13.5		9.2	10.3	2.9	9.7	9.2	3.8
LOS	B	B		B	B		A	B	A	A	A	A
Approach Delay		14.3			13.5			6.9			8.3	
Approach LOS		B			B			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.60			
Intersection Signal Delay: 11.2		Intersection LOS: B	
Intersection Capacity Utilization 55.3%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: First Avenue & Thorold Rd





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	644	444	2	3	2
Future Volume (vph)	0	644	444	2	3	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.999		0.946	
Flt Protected					0.971	
Satd. Flow (prot)	0	1863	3536	0	1711	0
Flt Permitted					0.971	
Satd. Flow (perm)	0	1863	3536	0	1711	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		150	522		384	
Travel Time (s)		3.3	11.5		8.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	700	483	2	3	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	700	485	0	5	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 43.9%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	655	436	0	2	3
Future Volume (vph)	0	655	436	0	2	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt					0.919	
Flt Protected					0.980	
Satd. Flow (prot)	0	1863	3539	0	1678	0
Flt Permitted					0.980	
Satd. Flow (perm)	0	1863	3539	0	1678	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		522	139		227	
Travel Time (s)		11.5	3.1		5.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	712	474	0	2	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	712	474	0	5	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 44.5%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	656	1	15	429	3	61
Future Volume (vph)	656	1	15	429	3	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt					0.871	
Flt Protected				0.998	0.998	
Satd. Flow (prot)	1863	0	0	3532	1619	0
Flt Permitted				0.998	0.998	
Satd. Flow (perm)	1863	0	0	3532	1619	0
Link Speed (mph)	31			31	31	
Link Distance (ft)	139			189	288	
Travel Time (s)	3.1			4.2	6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	713	1	16	466	3	66
Shared Lane Traffic (%)						
Lane Group Flow (vph)	714	0	0	482	69	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	48			48	48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	16		16	9
Sign Control	Free			Free	Stop	

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



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	31	685	410	9	14	40
Future Volume (vph)	31	685	410	9	14	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.997		0.900	
Flt Protected		0.998			0.987	
Satd. Flow (prot)	0	1859	3529	0	1655	0
Flt Permitted		0.998			0.987	
Satd. Flow (perm)	0	1859	3529	0	1655	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		189	257		535	
Travel Time (s)		4.2	5.7		11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	34	745	446	10	15	43
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	779	456	0	58	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

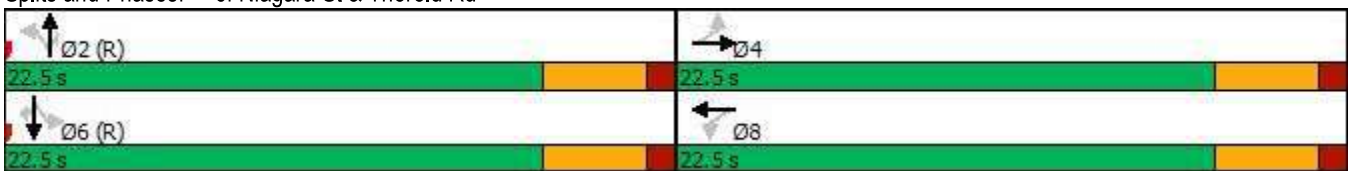
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 62.7%		ICU Level of Service B	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	418	183	99	41	121	126	80	416	56	94	340	216
Future Volume (vph)	418	183	99	41	121	126	80	416	56	94	340	216
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	270		0	0		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.947			0.924			0.998	0.850		0.991	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1764	0	1770	1721	0	1770	1766	1504	1770	1754	1504
Flt Permitted	0.586			0.540			0.416			0.342		
Satd. Flow (perm)	1092	1764	0	1006	1721	0	775	1766	1504	637	1754	1504
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		72			137			2	55		9	211
Link Speed (mph)		31			31			31			31	
Link Distance (ft)		257			220			560			547	
Travel Time (s)		5.7			4.8			12.3			12.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	454	199	108	45	132	137	87	452	61	102	370	235
Shared Lane Traffic (%)									10%			10%
Lane Group Flow (vph)	454	307	0	45	269	0	87	458	55	102	394	211
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(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		48			48			48			48	
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 (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	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	22.5
Total Split (%)	50.0%	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	18.0
Yellow Time (s)	3.5	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	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	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	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	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	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	1.04	0.41		0.11	0.35		0.28	0.65	0.09	0.40	0.56	0.29

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	74.5	9.3		9.5	6.3		12.2	16.1	3.6	15.6	13.9	3.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.5	9.3		9.5	6.3		12.2	16.1	3.6	15.6	13.9	3.0
LOS	E	A		A	A		B	B	A	B	B	A
Approach Delay		48.2			6.8			14.4			10.9	
Approach LOS		D			A			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 55			
Control Type: Pretimed			
Maximum v/c Ratio: 1.04			
Intersection Signal Delay: 23.2		Intersection LOS: C	
Intersection Capacity Utilization 80.5%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 6: Niagara St & Thorold Rd





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	2	644	441	5	0	0
Future Volume (vph)	2	644	441	5	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.998			
Flt Protected						
Satd. Flow (prot)	0	1863	3532	0	0	0
Flt Permitted						
Satd. Flow (perm)	0	1863	3532	0	0	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		129	150		120	
Travel Time (s)		2.8	3.3		2.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	700	479	5	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	702	484	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 38.8%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	441	0	11	23
Future Volume (vph)	0	0	441	0	11	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00
Frt					0.909	
Flt Protected					0.984	
Satd. Flow (prot)	0	1863	3539	0	1666	0
Flt Permitted					0.984	
Satd. Flow (perm)	0	1863	3539	0	1666	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		146	129		115	
Travel Time (s)		3.2	2.8		2.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	479	0	12	25
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	479	0	37	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

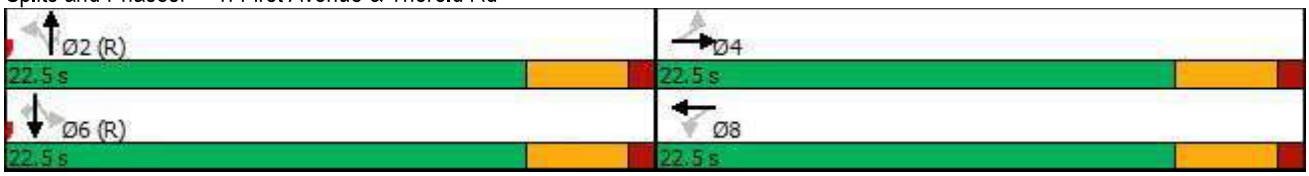
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 22.2%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	482	30	176	570	57	52	233	238	61	204	51
Future Volume (vph)	63	482	30	176	570	57	52	233	238	61	204	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	131		0	131		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991			0.986				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1846	0	1770	1837	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.222			0.263			0.620			0.602		
Satd. Flow (perm)	414	1846	0	490	1837	0	1155	1863	1583	1121	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			13				196			55
Link Speed (mph)		31			31			31			31	
Link Distance (ft)		241			146			574			537	
Travel Time (s)		5.3			3.2			12.6			11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	68	524	33	191	620	62	57	253	259	66	222	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	68	557	0	191	682	0	57	253	259	66	222	55
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(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		48			48			48			48	
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 (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	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	22.5
Total Split (%)	50.0%	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	18.0
Yellow Time (s)	3.5	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	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	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	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	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	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.41	0.75		0.97	0.92		0.12	0.34	0.35	0.15	0.30	0.08
Control Delay	19.0	20.1		81.3	34.9		9.5	11.0	4.5	9.7	10.6	3.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.0	20.1		81.3	34.9		9.5	11.0	4.5	9.7	10.6	3.6
LOS	B	C		F	C		A	B	A	A	B	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		20.0			45.0			7.9			9.3	
Approach LOS		B			D			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.97			
Intersection Signal Delay: 24.7		Intersection LOS: C	
Intersection Capacity Utilization 69.1%		ICU Level of Service C	
Analysis Period (min) 15			

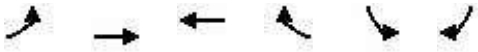
Splits and Phases: 1: First Avenue & Thorold Rd





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	24	749	799	7	0	5
Future Volume (vph)	24	749	799	7	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.999		0.865	
Flt Protected		0.998				
Satd. Flow (prot)	0	1859	3536	0	1611	0
Flt Permitted		0.998				
Satd. Flow (perm)	0	1859	3536	0	1611	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		150	522		384	
Travel Time (s)		3.3	11.5		8.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	26	814	868	8	0	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	840	876	0	5	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 68.8%		ICU Level of Service C	
Analysis Period (min) 15			



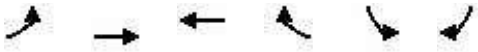
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	6	742	793	4	5	11
Future Volume (vph)	6	742	793	4	5	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.999		0.905	
Flt Protected					0.986	
Satd. Flow (prot)	0	1863	3536	0	1662	0
Flt Permitted					0.986	
Satd. Flow (perm)	0	1863	3536	0	1662	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		522	139		227	
Travel Time (s)		11.5	3.1		5.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	807	862	4	5	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	814	866	0	17	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

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



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	738	10	15	734	23	40
Future Volume (vph)	738	10	15	734	23	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt	0.998				0.915	
Flt Protected				0.999	0.982	
Satd. Flow (prot)	1859	0	0	3536	1674	0
Flt Permitted				0.999	0.982	
Satd. Flow (perm)	1859	0	0	3536	1674	0
Link Speed (mph)	31			31	31	
Link Distance (ft)	139			189	288	
Travel Time (s)	3.1			4.2	6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	802	11	16	798	25	43
Shared Lane Traffic (%)						
Lane Group Flow (vph)	813	0	0	814	68	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	48			48	48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	16		16	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 49.8%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	35	735	710	9	14	40
Future Volume (vph)	35	735	710	9	14	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.998		0.900	
Flt Protected		0.998			0.987	
Satd. Flow (prot)	0	1859	3532	0	1655	0
Flt Permitted		0.998			0.987	
Satd. Flow (perm)	0	1859	3532	0	1655	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		189	257		535	
Travel Time (s)		4.2	5.7		11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	799	772	10	15	43
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	837	782	0	58	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

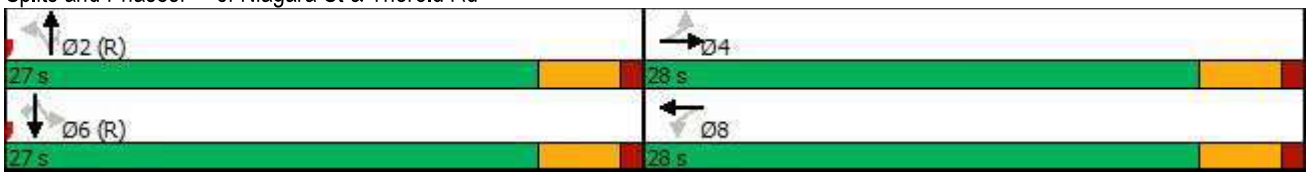
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 73.9%		ICU Level of Service D	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	437	203	109	442	160	125	79	592	78	129	689	478
Future Volume (vph)	437	203	109	442	160	125	79	592	78	129	689	478
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	270		0	0		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.948			0.934			0.998	0.850		0.990	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1766	0	1770	1740	0	1770	1766	1504	1770	1752	1504
Flt Permitted	0.522			0.490			0.178			0.178		
Satd. Flow (perm)	972	1766	0	913	1740	0	332	1766	1504	332	1752	1504
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		61			89			2	76		8	468
Link Speed (mph)		31			31			31			31	
Link Distance (ft)		257			220			560			547	
Travel Time (s)		5.7			4.8			12.3			12.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	475	221	118	480	174	136	86	643	85	140	749	520
Shared Lane Traffic (%)									10%			10%
Lane Group Flow (vph)	475	339	0	480	310	0	86	652	76	140	801	468
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(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		48			48			48			48	
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 (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	28.0	28.0		28.0	28.0		27.0	27.0	27.0	27.0	27.0	27.0
Total Split (%)	50.9%	50.9%		50.9%	50.9%		49.1%	49.1%	49.1%	49.1%	49.1%	49.1%
Maximum Green (s)	23.5	23.5		23.5	23.5		22.5	22.5	22.5	22.5	22.5	22.5
Yellow Time (s)	3.5	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	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	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	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	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	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	23.5	23.5		23.5	23.5		22.5	22.5	22.5	22.5	22.5	22.5
Actuated g/C Ratio	0.43	0.43		0.43	0.43		0.41	0.41	0.41	0.41	0.41	0.41
v/c Ratio	1.14	0.43		1.23	0.39		0.64	0.90	0.12	1.04	1.11	0.53
Control Delay	111.3	11.0		145.7	9.3		40.2	34.8	3.6	114.1	88.7	3.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	111.3	11.0		145.7	9.3		40.2	34.8	3.6	114.1	88.7	3.8
LOS	F	B		F	A		D	C	A	F	F	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		69.5			92.2			32.5			63.0	
Approach LOS		E			F			C			E	

Intersection Summary			
Area Type:	Other		
Cycle Length: 55			
Actuated Cycle Length: 55			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 55			
Control Type: Pretimed			
Maximum v/c Ratio: 1.23			
Intersection Signal Delay: 63.9		Intersection LOS: E	
Intersection Capacity Utilization 107.1%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 6: Niagara St & Thorold Rd





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	17	773	786	12	0	0
Future Volume (vph)	17	773	786	12	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.998			
Flt Protected		0.999				
Satd. Flow (prot)	0	1861	3532	0	0	0
Flt Permitted		0.999				
Satd. Flow (perm)	0	1861	3532	0	0	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		129	150		120	
Travel Time (s)		2.8	3.3		2.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	18	840	854	13	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	858	867	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 57.7%		ICU Level of Service B	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	786	0	10	9
Future Volume (vph)	0	0	786	0	10	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00
Frt					0.936	
Flt Protected					0.974	
Satd. Flow (prot)	0	1863	3539	0	1698	0
Flt Permitted					0.974	
Satd. Flow (perm)	0	1863	3539	0	1698	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		146	129		115	
Travel Time (s)		3.2	2.8		2.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	854	0	11	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	854	0	21	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

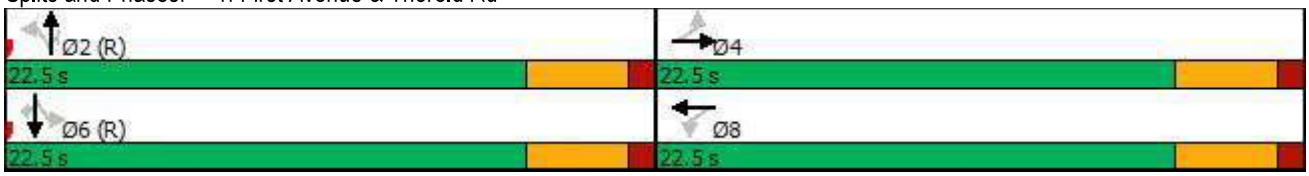
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 31.7%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	334	18	67	290	27	43	156	166	57	77	34
Future Volume (vph)	37	334	18	67	290	27	43	156	166	57	77	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	131		0	131		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
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		0.992			0.987				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1848	0	1770	1839	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.496			0.452			0.702			0.650		
Satd. Flow (perm)	924	1848	0	842	1839	0	1308	1863	1583	1211	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			12				180			37
Link Speed (mph)		31			31			31			31	
Link Distance (ft)		241			146			574			537	
Travel Time (s)		5.3			3.2			12.6			11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	40	363	20	73	315	29	47	170	180	62	84	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	383	0	73	344	0	47	170	180	62	84	37
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(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		48			48			48			48	
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 (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	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	22.5
Total Split (%)	50.0%	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	18.0
Yellow Time (s)	3.5	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	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	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	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	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	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.11	0.52		0.22	0.46		0.09	0.23	0.24	0.13	0.11	0.06
Control Delay	9.5	13.1		11.0	12.1		9.0	10.0	2.9	9.5	9.0	4.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.5	13.1		11.0	12.1		9.0	10.0	2.9	9.5	9.0	4.0
LOS	A	B		B	B		A	A	A	A	A	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		12.7			11.9			6.7			8.2	
Approach LOS		B			B			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 45			
Control Type: Pretimed			
Maximum v/c Ratio: 0.52			
Intersection Signal Delay: 10.2		Intersection LOS: B	
Intersection Capacity Utilization 50.2%		ICU Level of Service A	
Analysis Period (min) 15			

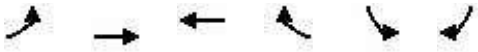
Splits and Phases: 1: First Avenue & Thorold Rd





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	558	380	4	5	5
Future Volume (vph)	0	558	380	4	5	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.999		0.932	
Flt Protected					0.976	
Satd. Flow (prot)	0	1863	3536	0	1694	0
Flt Permitted					0.976	
Satd. Flow (perm)	0	1863	3536	0	1694	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		150	522		384	
Travel Time (s)		3.3	11.5		8.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	607	413	4	5	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	607	417	0	10	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 39.4%		ICU Level of Service A	
Analysis Period (min) 15			



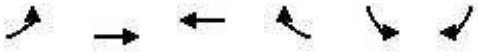
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	4	559	373	0	5	6
Future Volume (vph)	4	559	373	0	5	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt					0.921	
Flt Protected					0.980	
Satd. Flow (prot)	0	1863	3539	0	1681	0
Flt Permitted					0.980	
Satd. Flow (perm)	0	1863	3539	0	1681	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		522	139		227	
Travel Time (s)		11.5	3.1		5.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	608	405	0	5	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	612	405	0	12	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 42.6%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	558	6	13	364	5	51
Future Volume (vph)	558	6	13	364	5	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt	0.998				0.876	
Flt Protected				0.998	0.996	
Satd. Flow (prot)	1859	0	0	3532	1625	0
Flt Permitted				0.998	0.996	
Satd. Flow (perm)	1859	0	0	3532	1625	0
Link Speed (mph)	31			31	31	
Link Distance (ft)	139			189	288	
Travel Time (s)	3.1			4.2	6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	607	7	14	396	5	55
Shared Lane Traffic (%)						
Lane Group Flow (vph)	614	0	0	410	60	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	48			48	48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	16		16	9
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 39.8%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	25	583	349	8	12	35
Future Volume (vph)	25	583	349	8	12	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.997		0.899	
Flt Protected		0.998			0.987	
Satd. Flow (prot)	0	1859	3529	0	1653	0
Flt Permitted		0.998			0.987	
Satd. Flow (perm)	0	1859	3529	0	1653	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		189	257		535	
Travel Time (s)		4.2	5.7		11.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	634	379	9	13	38
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	661	388	0	51	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

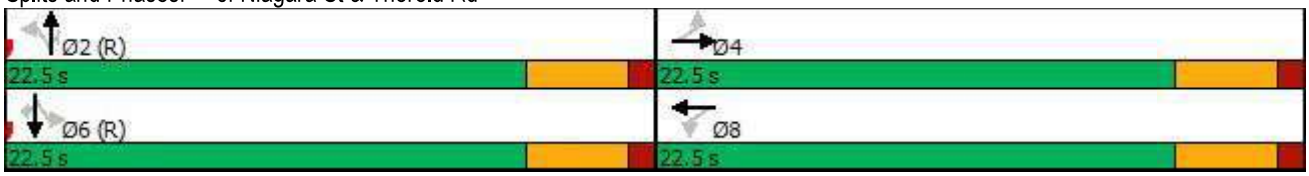
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 55.3%		ICU Level of Service B	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	357	156	82	42	103	106	70	354	49	81	289	183
Future Volume (vph)	357	156	82	42	103	106	70	354	49	81	289	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	270		0	0		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.948			0.924			0.998	0.850		0.991	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1766	0	1770	1721	0	1770	1766	1504	1770	1754	1504
Flt Permitted	0.617			0.598			0.488			0.421		
Satd. Flow (perm)	1149	1766	0	1114	1721	0	909	1766	1504	784	1754	1504
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		70			115			2	48		8	179
Link Speed (mph)		31			31			31			31	
Link Distance (ft)		257			220			560			547	
Travel Time (s)		5.7			4.8			12.3			12.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	388	170	89	46	112	115	76	385	53	88	314	199
Shared Lane Traffic (%)									10%			10%
Lane Group Flow (vph)	388	259	0	46	227	0	76	390	48	88	334	179
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(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		48			48			48			48	
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 (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	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	22.5
Total Split (%)	50.0%	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	18.0
Yellow Time (s)	3.5	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	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	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	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	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	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.85	0.35		0.10	0.30		0.21	0.55	0.08	0.28	0.47	0.25
Control Delay	33.9	8.3		9.3	6.1		10.7	14.0	3.7	12.2	12.5	3.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.9	8.3		9.3	6.1		10.7	14.0	3.7	12.2	12.5	3.0
LOS	C	A		A	A		B	B	A	B	B	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		23.7			6.6			12.6			9.6	
Approach LOS		C			A			B			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 50			
Control Type: Pretimed			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 14.4		Intersection LOS: B	
Intersection Capacity Utilization 70.8%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 6: Niagara St & Thorold Rd





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	11	547	374	11	0	0
Future Volume (vph)	11	547	374	11	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt			0.996			
Flt Protected		0.999				
Satd. Flow (prot)	0	1861	3525	0	0	0
Flt Permitted		0.999				
Satd. Flow (perm)	0	1861	3525	0	0	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		129	150		120	
Travel Time (s)		2.8	3.3		2.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	595	407	12	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	607	419	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 40.9%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	374	0	11	11
Future Volume (vph)	0	0	374	0	11	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	1.00
Frt					0.932	
Flt Protected					0.976	
Satd. Flow (prot)	0	1863	3539	0	1694	0
Flt Permitted					0.976	
Satd. Flow (perm)	0	1863	3539	0	1694	0
Link Speed (mph)		31	31		31	
Link Distance (ft)		146	129		115	
Travel Time (s)		3.2	2.8		2.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	407	0	12	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	407	0	24	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		48	48		48	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Free	Free		Stop	

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