

April 15, 2024

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# EAST ROBINSON RESIDENTIAL

TOWN OF AMHERST, NY

**PREPARED FOR:**  
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**TABLE OF CONTENTS**

**1.0 EXECUTIVE SUMMARY ..... 2**

**2.0 INTRODUCTION..... 4**

2.1 Study Purpose and Objectives .....4

2.2 Project Location .....4

2.3 Study Area.....4

**3.0 TRANSPORTATION SETTING ..... 4**

3.1 Description of Study Area Roadways.....4

    Table 1: Existing Highway System..... 5

3.2 Description of Multimodal Network.....5

    Table 2: Multimodal Network..... 5

3.3 Planned/Programmed Highway Improvements.....5

**4.0 EXISTING CONDITIONS ANALYSIS ..... 6**

4.1 Peak Intervals for Analysis .....6

4.2 Existing Traffic Volume Data.....6

    Table 3: Study Intersection Peak Hours..... 6

4.3 Field Observations .....6

4.4 Existing Crash Investigation.....6

    Table 4: Intersection Crash Rate Analysis ..... 7

**5.0 BACKGROUND (NO BUILD) CONDITIONS ..... 8**

**6.0 PROPOSED DEVELOPMENT CONDITIONS ..... 8**

6.1 Project Description.....8

6.2 Proposed Traffic Generation.....8

    Table 5: Site Generated Trips..... 8

6.3 Trip Distribution.....9

6.4 Full Development Volumes.....9

**7.0 TRAFFIC OPERATIONS AND ANALYSIS..... 9**

7.1 Description of Capacity Analysis .....9

    Table 6: Level of Service Criteria ..... 10

7.2 Capacity Analysis Results .....10

    Table 7: Capacity Analysis Results ..... 11

**8.0 CONCLUSIONS AND RECOMMENDATIONS ..... 13**

**9.0 REFERENCES ..... 14**

**10.0 FIGURES..... 14**

**APPENDICES**

- APPENDIX A:** EXISTING TRAFFIC COUNT DATA
- APPENDIX B:** MISCELLANEOUS CALCULATIONS
- APPENDIX C:** LOS CALCULATIONS – EXISTING CONDITIONS
- APPENDIX D:** LOS CALCULATIONS – BACKGROUND CONDITIONS
- APPENDIX E:** LOS CALCULATIONS – FULL BUILD CONDITIONS

April 15, 2024

## 1.0 EXECUTIVE SUMMARY

The purpose of this report is to evaluate the potential traffic impacts related to the proposed East Robinson Residential Development. Within this report, the operating characteristics of the proposed access points and impacts to the adjacent roadway network are evaluated. To define traffic impact, this analysis establishes existing baseline traffic conditions, projects background traffic flow including area growth, and determines the traffic operations that would result from the proposed project.

### **Project Location and Description**

The project site is located at 3880-3910 East Robinson in the Town of Amherst, Erie County, NY. The project site is bounded by a private access road to the north, Naples Lane to the east, East Robinson Road to the south, and a Tops Plaza to the west. The project site is currently vacant that is zoned General Business District. Land uses within the vicinity of the Project Site are generally commercial, service, and residential.

The proposed project consists of constructing a mix of senior housing (232 units) and townhomes/duplexes (24 units). Access to the site will be provided via new driveways along East Robinson Road with cross access onto Naples Lane via a private road. Naples Lane traffic can access Niagara Falls Boulevard via the existing traffic signal servicing Wegmans and Delta Sonic. The Concept Site Plan prepared by Carmina Wood Design is included at the end of this report.

### **Existing Conditions**

Passero Associates collected turning movement traffic counts on Tuesday, March 12, 2024. Traffic counts were conducted from 7:00-9:00 AM and 4:00 to 6:00 PM to determine peak hour traffic volumes at the study intersections. All traffic counts were collected on a typical weekday while local schools were in session. No significant adverse weather conditions impacted the traffic counts.

### **Background Conditions**

Background traffic volumes represent the traffic conditions during the proposed build year without development of the project. Construction of the proposed project is anticipated to reach full build-out within three years. Local municipal personnel were contacted to discuss any other specific projects that are currently approved or under construction that would generate additional traffic in the study area. No nearby projects were identified. To account for normal increases in background traffic growth, including any unforeseen developments in the study area, a growth rate of 0.5% per year was applied to the existing traffic volumes.

### **Conclusions and Recommendations**

This report identified and evaluated the potential traffic impacts that can be expected from the proposed East Robinson Residential project. The results of this comprehensive study determined that the existing transportation network can adequately accommodate the projected traffic volumes and resulting minor impacts to study area intersections. The following sets forth the study's conclusions and recommendations:

1. The proposed project consists of constructing a mix of senior housing (232 units) and townhomes/duplexes (24 units). Access to the site will be provided via new driveways along East Robinson Road with cross access onto Naples Lane via a private road. Naples Lane traffic can access Niagara Falls Boulevard via the existing traffic signal servicing Wegmans and Delta Sonic.
2. Sidewalks are proposed throughout the site with proposed off-site connections provided to Wegmans to the north, the Tops Plaza to the west, and the existing sidewalk along East Robinson Road to the south.
3. The proposed project is expected to generate approximately 19 entering/39 exiting vehicle trips during the AM peak hour and 40 entering/32 exiting vehicle trips during the PM peak hour.

*April 15, 2024*

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4. Section 4.4 describes the results of the crash investigation. Rear end crashes were the predominant crash type at the intersection of Niagara Falls Boulevard and East Robinson Road. Crashes of this nature are characteristic of signalized intersections with moderate to high traffic volumes. There are no recommended geometric strategies for improvement of the existing condition. This is an existing condition that, if addressed, should be undertaken by the Town and/or NYSDOT.
5. Very minor increases in delays are projected under full build conditions during the peak hours at the existing study intersections. The proposed project constitutes less than 0.89% of total peak hour traffic during either peak hour at the signalized intersections of Niagara Falls Boulevard at Delta Sonic/Wegmans and East Robinson Road. The additional traffic volumes generated by the proposed project can be accommodated. Therefore, no improvements are warranted nor recommended under full build conditions.
6. The proposed driveways are projected to operate at LOS B or better during the AM and PM peak hours. No capacity improvements are warranted nor recommended under full build conditions.

April 15, 2024

## 2.0 INTRODUCTION

### 2.1 Study Purpose and Objectives

The purpose of this report is to evaluate the potential traffic impacts related to the proposed East Robinson Road Development. Within this report, the operating characteristics of the proposed access point and impacts to the adjacent roadway network are evaluated. Mitigating measures are identified, if needed, to minimize operational concerns. To define traffic impact, this analysis establishes existing baseline traffic conditions, projects background traffic flow including area growth, and determines the traffic operations that would result from the proposed project. All figures and supporting calculations are included at the end of this report.

### 2.2 Project Location

The project site is located at 3880-3910 East Robinson in the Town of Amherst, Erie County, NY. The project site is bounded by a private access road to the north, Naples Lane to the east, East Robinson Road to the south, and a Tops Plaza to the west. The project site is currently vacant that is zoned General Business District. Land uses within the vicinity of the Project Site are generally commercial, service, and residential.

### 2.3 Study Area

To ensure a comprehensive analysis of potential traffic impacts, a study area was selected consisting of the following intersections: The project site location and study area are illustrated in **Figure 1**.

- Niagara Falls Boulevard at Delta Sonic and Wegmans
- Niagara Falls Boulevard at East Robinson Road
- East Robinson Road at Naples Lane

## 3.0 TRANSPORTATION SETTING

### 3.1 Description of Study Area Roadways

The information outlined in **Table 1** provides a description of the existing roadway network within the study area. **Figure 2** illustrates the lane geometry, traffic controls at each of the study intersections, and the Annual Average Daily Traffic (AADT) volumes on the study roadways. The AADTs, in vehicles per day (vpd), reflect the most recently collected data obtained from the NYSDOT.

Functional classification of roadways is determined by the NYSDOT and the Federal Highway Administration (FHWA). Both the NYSDOT and FHWA groups roads, streets, and highways into different classes based on how they are used. This is called functional classification. Roads and streets do not work alone to move traffic. Instead, they form a network. Functional classification defines how each road or street fits into this network, how it provides access to nearby properties, and whether it is in an urban or rural area. The primary functional classifications within the study area:

- Urban Principal Arterial - Other (Class 14)
- Urban Local (Class 19)

April 15, 2024

**Table 1: Existing Highway System**

Roadway	Class <sup>1</sup>	Agency <sup>2</sup>	Speed	Typical Cross Section <sup>3</sup>	AADT
Niagara Falls Boulevard (US-62)	14	NYSDOT	40 mph	4-lane w/ TWLTL	29,282 (NYSDOT 2022)
East Robinson Road (CR-299)	14	County	40 mph	4-lane w/ TWLTL	15,571 (NYSDOT 2022)
Naples Lane	19	Town	30 mph	2-lane undivided	2,900 (Passero 2024)

1. Functional Classification.
2. Roadway ownership.
3. Excludes turning lanes at intersections. TWLTL = Two-way left-turn lane.

### 3.2 Description of Multimodal Network

The following summarizes the traffic controls, pedestrian, bicycle, and transit accommodations for the study area intersections. **Figure 2** also illustrates the turn lane lengths and traffic controls at the study intersections.

**Table 2: Multimodal Network**

Feature	Niagara Falls Blvd @ Delta Sonic and Wegmans	Niagara Falls Blvd @ East Robinson Road	East Robinson Road @ Naples Lane
Intersection Control Type	Signalized	Signalized	Unsignalized
Sidewalks	+	++	+
Crosswalks	++	++	+
Curb Ramps	++	++	+
Pedestrian Signal	++	++	Not Present
Pedestrian Actuation	++	++	Not Present
Pedestrian Countdown	++	++	Not Present
Bicycle Facilities	+	+	+
Street Lighting	++	++	+
Transit Route	Not Present	+	+

- ++ Present at entire intersection
- + Present at portion of intersection

### 3.3 Planned/Programmed Highway Improvements

There are no planned/programmed highway improvement projects in the study area.

## 4.0 EXISTING CONDITIONS ANALYSIS

### 4.1 Peak Intervals for Analysis

Given the functional characteristics of the corridors, adjacent land uses, and the proposed land use for the project site, the peak hours selected for analysis are the weekday commuter AM and PM peak periods. The combination of site traffic and adjacent through traffic produces the greatest demand during these time periods.

### 4.2 Existing Traffic Volume Data

Passero Associates collected turning movement traffic counts on Tuesday, March 12, 2024. Traffic counts were conducted from 7:00-9:00 AM and 4:00 to 6:00 PM to determine peak hour traffic volumes at the study intersections. **Table 3** depicts the peak hours at each study intersection.

**Table 3:** Study Intersection Peak Hours

Intersection	AM Peak Hour	PM Peak Hour
Niagara Falls Boulevard at Delta Sonic and Wegmans	7:15-8:15 AM	4:30-5:30 PM
Niagara Falls Boulevard at East Robinson Road	7:30-8:30 AM	4:15-5:15 PM
East Robinson Road at Naples Lane	7:30-8:30 AM	4:30-5:30 PM

All traffic counts were collected on a typical weekday while local schools were in session. No significant adverse weather conditions impacted data collection. The traffic volumes were reviewed to confirm accuracy, seasonality, and relative balance between intersections. NYSDOT determines seasonality factors based on the month of the year, whether the data was taken during the week or weekend, and the factor group of the surrounding roadways, which is commuter dominated during the weekday for this project. Given the time of year the traffic counts were conducted, no seasonality adjustments were necessary. The actual differences in traffic volumes can be attributed to temporal variations in traffic volumes as well as activity related to driveways located in the segments between the study intersections. **Figure 3** illustrates the existing peak hour traffic conditions.

### 4.3 Field Observations

The study intersections were observed during peak intervals to assess current traffic operations. Signal timing and phasing information was obtained from the NYSDOT to determine peak hour phasing plans and phase durations during each interval at the signalized intersections of Niagara Falls Boulevard at Delta Sonic/Wegmans and East Robinson Road. This information was used to support and/or calibrate capacity analysis models described in detail later in this report.

### 4.4 Existing Crash Investigation

The purpose of this crash analysis is to identify inherent safety issues by studying and quantifying historical crashes at the study intersections and identifying potential crash patterns and clusters. A crash cluster is defined as an abnormal occurrence of similar crash types occurring at approximately the same location or involving the same geometric features. The severity of the crashes should also be considered. A history of crashes is an indication that further analysis is required to determine the cause(s) of the crash(es) and to identify what actions, if any, could be taken to mitigate the crashes.

Crash history data was obtained from MV-104A Police Accident Reports provided by the NYSDOT *Crash Location & Engineering Analysis & Reporting (CLEAR)* database. Intersection rates are listed as accidents (crashes) per million entering

April 15, 2024

vehicle (Acc/MEV). This study conducted the evaluation from August 31, 2018, through August 31, 2023. A summary of the crashes that occurred at intersection locations are shown in **Table 4**.

**Table 4: Intersection Crash Rate Analysis**

Intersection	Total Crashes	Injury	ADT	Actual Crash Rate	Statewide Average Crash Rate
Niagara Falls Blvd at Delta Sonic and Wegmans	10	6	34,158 vpd	0.16	0.26
Niagara Falls Blvd at East Robinson Road	81	28	42,768 vpd	1.04	0.26
East Robinson Road at Naples Lane	3	2	17,442 vpd	0.09	0.07

The Niagara Falls Boulevard at Delta Sonic/Wegmans and East Robinson Road at Naples Lane intersections are at or below the statewide average crash rate. However, given that the Niagara Falls Boulevard at East Robinson Road intersection experienced a higher crash rate compared to statewide averages, this intersection is discussed in greater detail.

**Niagara Falls Blvd at East Robinson Road**

<i>Crash Types</i>	51%	Rear End
	17%	Left Turn
	16%	Sideswipe
	7%	Right Angle
	5%	Right Turn
	2%	Fixed Object
	1%	Bike/Pedestrian

*Description* There were 81 total crashes during the five-year study period. Most of the contributing factors for these crashes were ‘driver inattention’, ‘following too closely’, and ‘failure to yield the right-of-way’. The frequency of rear end crashes is characteristic of signalized intersections along moderate to heavily trafficked corridors, such as Niagara Falls Boulevard. Of the 41 rear end crashes, 18 occurred in the northbound direction, 14 occurred in the southbound direction, and six occurred in the westbound direction.

*Potential Improvement* Recent improvements were made to the intersection, such as installing backplates on the signal heads and converting the permissive/protected left-turn signal heads to flashing yellow. Additionally, the corridor speed limit was reduced from 45 mph to 40 mph within the past six years. There are no recommended geometric strategies. Potential operational improvement strategies may include optimizing the change and clearance intervals. This is an existing condition that, if addressed, should be led by the Town and/or NYSDOT and future applicants should not be made to bear the full expense of this improvement.



## 5.0 BACKGROUND (NO BUILD) CONDITIONS

Background traffic volumes represent the traffic conditions during the proposed build year without development of the project. Construction of the proposed project is anticipated to reach full build-out within three years. The widely accepted methodology for preparing traffic impact studies requires that any projects in the study area that are currently approved and/or under construction must be considered in the traffic analysis. Projects that are contemplated but not yet approved are not included in a traffic analysis. Local municipal personnel were contacted to discuss any other specific projects that are currently approved or under construction that would generate additional traffic in the study area. No nearby projects were identified.

A review of available historical NYSDOT traffic volume data in the vicinity of the site indicates that traffic has decreased between 2010 and 2019. To account for normal increases in background traffic growth, including any unforeseen developments in the study area, a growth rate of 0.5% per year was applied to the existing traffic volumes. **Figure 4** illustrates the background traffic conditions.

## 6.0 PROPOSED DEVELOPMENT CONDITIONS

### 6.1 Project Description

The proposed project consists of constructing a mix of senior housing (232 units) and townhomes/duplexes (24 units). Access to the site will be provided via new driveways along East Robinson Road with cross access onto Naples Lane via a private road. Naples Lane traffic can access Niagara Falls Boulevard via the existing traffic signal servicing Wegmans and Delta Sonic. The Concept Site Plan prepared by Carmina Wood Design is included at the end of this report.

Sidewalks are proposed throughout the site with off-site connections provided to Wegmans to the north, the Tops Plaza to the west, and the existing sidewalk along East Robinson Road to the south.

### 6.2 Proposed Traffic Generation

The volume of traffic generated by a site is dependent on the intended land use and size of the development. Trip generation is an estimate of the number of trips generated by a specific building or land use. These trips represent the volume of traffic entering and exiting the development. *Trip Generation Manual (11<sup>th</sup> Edition)* published by the Institute of Transportation Engineers (ITE) is used as a reference for this information. The trip rate for the peak hour of the generator may or may not coincide in time or volume with the trip rate for the peak hour of adjacent street traffic. Volumes generated during the peak hour of the adjacent street traffic and proposed land use, in this case, the weekday commuter AM and PM peak hours, represent a more critical volume when analyzing the capacity of the system; those intervals will provide the basis of this analysis. **Table 5** shows the trip generation estimates during the peak hours.

**Table 5:** Site Generated Trips

Description	Size	AM Peak Hour		PM Peak Hour	
		Enter	Exit	Enter	Exit
Townhomes (ITE 215)	24 units	3	9	8	6
Senior Housing (ITE 252)	232 units	16	30	32	26
<b>Total Trip Generation</b>		<b>19</b>	<b>39</b>	<b>40</b>	<b>32</b>

April 15, 2024

The proposed project is expected to generate approximately 19 entering/39 exiting vehicle trips during the AM peak hour and 40 entering/32 exiting vehicle trips during the PM peak hour.

### 6.3 Trip Distribution

The cumulative effect of site-generated traffic on the transportation network is dependent on the origins and destinations of that traffic and the location of the access drives serving the site. The proposed arrival/departure distribution of traffic generated by the proposed project is considered a function of several parameters, including:

- Employment centers using U.S. Census Data
- Nearby commercial centers
- Proximity to recreational areas
- Site driveway locations
- Existing traffic patterns
- Existing traffic conditions and controls

**Figure 5** shows the anticipated trip distribution pattern percentage for the project site. The analysis assumed 7% of site traffic will travel to/from Wegmans. **Figure 6** shows the total site generated trips based on the distribution patterns.

### 6.4 Full Development Volumes

The proposed design hour traffic volumes are developed for the peak hours by combining the background traffic conditions (**Figure 4**) and the new site-generated traffic volumes (**Figure 6**) to yield the traffic volumes under full development conditions. **Figure 7** illustrates the full build traffic conditions.

## 7.0 TRAFFIC OPERATIONS AND ANALYSIS

### 7.1 Description of Capacity Analysis

Capacity analysis is a technique used for determining a measure of effectiveness for a section of roadway and/or intersection based on the number of vehicles during a specific time period. The measure of effectiveness used for the capacity analysis is referred to as a Level of Service (LOS). Levels of service are calculated to provide an indication of the amount of delay that a motorist experiences while traveling along a roadway or through an intersection. Since the most amount of delay to motorists usually occurs at intersections, capacity analysis focuses on intersections, as opposed to highway segments.

The standard procedure for capacity analysis of signalized and unsignalized intersections is outlined in the *Highway Capacity Manual (HCM) 7<sup>th</sup> Edition* published by the TRB. Traffic analysis software, Synchro 12, which is based on procedures and methodologies contained in the HCM, was used to analyze operating conditions at study area intersections. The procedure yields a level of service based on the HCM as an indicator of how well intersections operate.

Six levels of service are defined for analysis purposes. They are assigned letter designations, from "A" to "F", with LOS "A" representing the conditions with little to no delay, and LOS "F" conditions with very long delays. LOS "C" or better is desirable, but LOS "D" for signalized locations and LOS "E" for unsignalized locations are generally thresholds of acceptable operation during peak periods so long as the volume to capacity ratio (v/c) is below 1.0. **Table 6** depicts level of service criteria for both signalized and unsignalized intersections.

**Table 6:** *Level of Service Criteria*

Level of Service	Signalized Control Delay per Vehicle (seconds)	Stop Control Delay per Vehicle (seconds)
A	< 10	< 10
B	10 – 20	10 – 15
C	20 – 35	15 – 25
D	35 – 55	25 – 35
E	55 – 80	35 – 50
F	> 80	> 50

LOS for signalized intersections is defined in terms of delay specifically, average total delay per vehicle for a 15-minute analysis period. LOS for unsignalized intersections, however, are different from a signalized intersection. The primary reason for this is driver expectation that a signalized intersection is designed to carry higher volumes than an unsignalized intersection. Unsignalized intersections are also associated with more uncertainty for users, as delays are less predictable than they are at signals.

The v/c ratio, also referred to as degree of saturation, represents the sufficiency of an intersection to accommodate the vehicular demand. A v/c ratio less than 0.85 generally indicates that adequate capacity is available, and vehicles are not expected to experience significant queues and delays. As the v/c ratio approaches 1.0, traffic flow may become unstable, and delay and queuing conditions may occur.

## 7.2 Capacity Analysis Results

Existing and background operating conditions during the peak study periods are evaluated to determine a basis for comparison with the projected future conditions. Future traffic conditions generated by the project are analyzed to assess the operation of the study area intersections. **Table 7** describes the capacity results for existing, background, and full development conditions. The discussion following the table summarizes capacity conditions.

**Table 7: Capacity Analysis Results**

Intersection	2024 Existing Base Conditions				2027 Background Conditions				2027 Full Build Conditions			
	AM		PM		AM		PM		AM		PM	
<b>1. Niagara Falls Blvd at Delta Sonic/Wegmans (S)</b>												
EB Left - Delta Sonic	E	70.0	E	71.3	E	70.0	E	70.9	E	69.8	E	70.4
EB Thru/Right - Delta Sonic	C	28.5	E	64.5	C	28.4	E	65.0	C	28.8	E	65.9
WB Left - Wegmans	F	82.0	F	99.3	F	82.6	F	99.3	F	82.2	F	99.0
WB Left/Thru - Wegmans	F	82.4	F	98.9	F	82.4	F	98.9	F	82.6	F	99.0
WB Right - Wegmans	A	0.4	B	10.8	A	0.4	B	10.7	A	0.7	B	10.3
NB Left - Niagara Falls Blvd	C	24.4	C	23.9	C	26.6	C	25.9	C	26.8	C	26.3
NB Thru - Niagara Falls Blvd	A	6.6	B	17.1	A	8.6	B	17.7	A	8.9	B	18.4
NB Right - Niagara Falls Blvd	A	0.2	A	6.7	A	0.9	A	7.1	A	1.0	A	7.4
SB Left - Niagara Falls Blvd	A	5.9	B	14.1	A	6.0	B	14.7	A	6.0	B	15.0
SB Thru - Niagara Falls Blvd	B	16.7	C	28.1	B	17.1	C	29.2	B	17.2	C	29.6
SB Right - Niagara Falls Blvd	A	2.1	A	2.8	A	2.2	A	2.9	A	2.2	A	2.9
<b>Overall LOS</b>	<b>B</b>	<b>15.8</b>	<b>C</b>	<b>29.8</b>	<b>B</b>	<b>16.7</b>	<b>C</b>	<b>30.6</b>	<b>B</b>	<b>16.8</b>	<b>C</b>	<b>31.0</b>
<b>v/c Ratio</b>	<b>0.75</b>		<b>0.84</b>		<b>0.75</b>		<b>0.84</b>		<b>0.75</b>		<b>0.84</b>	
<b>2. Niagara Falls Blvd at East Robinson Road (S)</b>												
EB Left - East Robinson Road	D	39.1	E	63.4	D	39.0	E	63.5	D	38.9	E	63.2
EB Thru/Right - East Robinson Road	F	80.0	E	61.5	E	75.9	E	61.6	E	76.4	E	62.6
WB Left - East Robinson Road	E	59.6	D	51.5	E	64.0	D	51.4	E	70.2	D	52.4
WB Thru/Right - East Robinson Road	C	20.3	F	81.6	C	20.1	F	82.3	C	20.3	F	82.8
NB Left - Niagara Falls Blvd	C	22.5	D	36.5	C	24.8	D	40.6	C	25.1	D	40.8
NB Thru/Right - Niagara Falls Blvd	D	39.3	D	50.6	D	46.1	D	52.1	D	46.9	D	53.2
SB Left - Niagara Falls Blvd	D	45.0	E	76.9	D	39.3	F	82.8	D	42.0	F	87.7
SB Thru/Right - Niagara Falls Blvd	C	25.2	D	35.3	C	25.7	D	35.8	C	25.9	D	35.9
<b>Overall LOS</b>	<b>D</b>	<b>40.7</b>	<b>D</b>	<b>53.7</b>	<b>D</b>	<b>41.5</b>	<b>D</b>	<b>54.9</b>	<b>D</b>	<b>42.5</b>	<b>E</b>	<b>55.7</b>
<b>v/c Ratio</b>	<b>0.93</b>		<b>0.94</b>		<b>0.91</b>		<b>0.94</b>		<b>0.92</b>		<b>0.94</b>	
<b>3. East Robinson Road at Westerly Site Dwy (U)</b>												
EB Left - East Robinson Road	N/A		N/A		N/A		N/A		A	8.2	B	10.0
SB - Westerly Site Dwy	N/A		N/A		N/A		N/A		B	10.7	B	13.5
<b>4. East Robinson Road at Easterly Site Dwy (U)</b>												
EB Left - East Robinson Road	N/A		N/A		N/A		N/A		A	8.2	A	10.0
SB - Easterly Site Dwy	N/A		N/A		N/A		N/A		B	10.7	B	14.0
<b>5. East Robinson Road at Naples Lane (U)</b>												
EB Left - East Robinson Road	A	8.4	B	10.5	A	8.4	B	10.6	A	8.4	B	10.7
SB - Naples Lane	B	14.4	D	27.0	B	14.5	D	27.9	B	14.6	D	28.4

A(2.8) = Level of Service (Delay in seconds per vehicle)

(S) = Signalized; (U) = Unsignalized

NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound

N/A = Approach does not exist and/or was not analyzed during this condition

Green shaded cells indicate low delays, yellow shaded cells indicate moderate delays, red shaded cells indicate long delays.

April 15, 2024

### 1. Niagara Falls Boulevard at Delta Sonic and Wegmans

The Niagara Falls Boulevard corridor is heavily traveled and turning movements can experience moderate to long delays during the commuting peak hours. Notably, the eastbound and westbound approaches at this intersection during both peak hours experience long delays. Existing and projected background levels of service for the westbound left and left/through movements operate at F during the AM and PM peak hours. The remaining movements generally operate at LOS an acceptable C or better. The overall LOS is B during the AM peak hour and C during the PM peak hour and remains unchanged under background conditions.

Very minor increases in delays are projected under full build conditions during the peak hours. The proposed project constitutes less than 0.63% of total peak hour traffic during either peak hour. The additional traffic volumes generated by the proposed project can be accommodated, as there is available intersection capacity. Therefore, no improvements are warranted nor recommended under full build conditions.

### 2. Niagara Falls Boulevard at East Robinson Road

Most movements operate at LOS D or better during both peak hours under existing conditions. The exceptions are the eastbound left (PM peak hour), eastbound through/right (AM and PM peak hour), westbound through/right (PM peak hour), and southbound left (PM peak hour). Minor signal timing changes are recommended under background conditions during the AM peak hour and consist of reallocating the green time for the eastbound and westbound left-turn movements.

Very minor increases in delays are projected under full build conditions during the peak hours. The proposed project constitutes less than 0.89% of total peak hour traffic during either peak hour. The additional traffic volumes generated by the proposed project can be accommodated. Therefore, no improvements are warranted nor recommended under full build conditions.

### 3. East Robinson Road at Proposed Westerly Driveway

All movements are projected to operate at LOS B or better during both peak hours. No capacity improvements are warranted nor recommended under full build conditions.

### 4. East Robinson Road at Proposed Easterly Driveway

All movements are projected to operate at LOS B or better during both peak hours. No capacity improvements are warranted nor recommended under full build conditions.

### 5. East Robinson Road at Naples Lane

All movements operate at an acceptable LOS D or better during both peak hours under existing and projected background conditions. Very minor increases in delays are projected under full build conditions during the peak hours. The additional traffic volumes generated by the proposed project can be accommodated, as there is available intersection capacity. Therefore, no improvements are warranted nor recommended under full build conditions.

## 8.0 CONCLUSIONS AND RECOMMENDATIONS

This report identified and evaluated the potential traffic impacts that can be expected from the proposed East Robinson Residential project. The results of this comprehensive study determined that the existing transportation network can adequately accommodate the projected traffic volumes and resulting minor impacts to study area intersections. The following sets forth the study's conclusions and recommendations:

1. The proposed project consists of constructing a mix of senior housing (232 units) and townhomes/duplexes (24 units). Access to the site will be provided via new driveways along East Robinson Road with cross access onto Naples Lane via a private road. Naples Lane traffic can access Niagara Falls Boulevard via the existing traffic signal servicing Wegmans and Delta Sonic.
2. Sidewalks are proposed throughout the site with proposed off-site connections provided to Wegmans to the north, the Tops Plaza to the west, and the existing sidewalk along East Robinson Road to the south.
3. The proposed project is expected to generate approximately 19 entering/39 exiting vehicle trips during the AM peak hour and 40 entering/32 exiting vehicle trips during the PM peak hour.
4. Section 4.4 describes the results of the crash investigation. Rear end crashes were the predominant crash type at the intersection of Niagara Falls Boulevard and East Robinson Road. Crashes of this nature are characteristic of signalized intersections with moderate to high traffic volumes. There are no recommended geometric strategies for improvement of the existing condition. This is an existing condition that, if addressed, should be undertaken by the Town and/or NYSDOT.
5. Very minor increases in delays are projected under full build conditions during the peak hours at the existing study intersections. The proposed project constitutes less than 0.89% of total peak hour traffic during either peak hour at the signalized intersections of Niagara Falls Boulevard at Delta Sonic/Wegmans and East Robinson Road. The additional traffic volumes generated by the proposed project can be accommodated. Therefore, no improvements are warranted nor recommended under full build conditions.
6. The proposed driveways are projected to operate at LOS B or better during the AM and PM peak hours. No capacity improvements are warranted nor recommended under full build conditions.

April 15, 2024

## 9.0 REFERENCES

- Synchro 12 Software. Cubic ITS. 2023.
- Highway Capacity Manual (7<sup>th</sup> Edition). Transportation Research Board (TRB). Washington, DC. 2022.
- Trip Generation Manual (11<sup>th</sup> Edition). Institute of Transportation Engineers (ITE). Washington, DC. 2021.
- Trip Generation Handbook (3<sup>rd</sup> Edition). Institute of Transportation Engineers (ITE). Washington, DC. 2017.
- OnTheMap. United States Census Bureau. 2024.
- Traffic Data Viewer. New York State Department of Transportation (NYSDOT). 2024.
- Manual on Uniform Traffic Control Devices (11<sup>th</sup> Edition). Federal Highway Administration (FHWA). 2023.
- Highway Functional Classification Concepts, Criteria, and Procedures. Federal Highway Administration (FHWA). 2023.
- Crash Location and Engineering Analysis Repository (CLEAR). New York State Department of Transportation. 2024.
- Niagara Frontier Transportation Authority (NFTA). 2024.

## 10.0 FIGURES

Figures 1 through 7 are included on the following pages.

No.	Description	Date

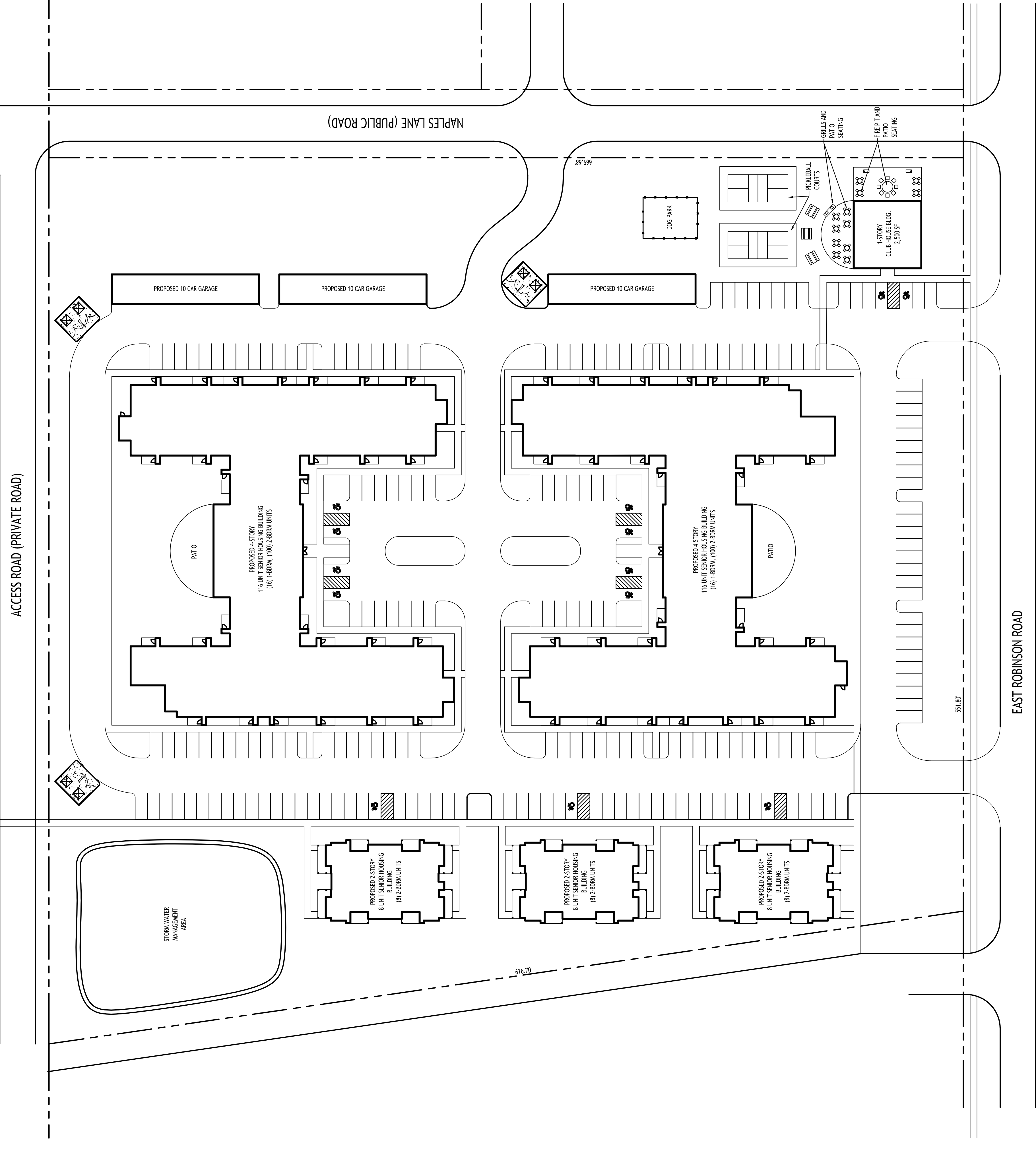
**PRELIMINARY**  
NOT FOR CONSTRUCTION

**DRAWING NAME:**  
Site Plan  
Concept  
MFR-7 Zoning

Date: 03.22.24  
Drawn By: C. Wood  
Scale: As Noted  
**DRAWING NO.:**

**C-100**  
Project No: 23-4117

NOTE: BOUNDARY AND TOPOGRAPHIC INFORMATION PROVIDED BY OTHERS. CARMINA WOOD DESIGN ASSUMES NO RESPONSIBILITY FOR ITS ACCURACY.



**SITE AREA = 9.2 ACRES**  
ZONING = G8, TO BE REZONED MFR-7

**MFR ZONING SEPARATION AND SETBACK REQUIREMENTS:**  
- BASED ON 0.5' MEDIAN BUILDING HEIGHT (4-STORY)  
- BASED ON 0.6' MEDIAN BUILDING HEIGHT (2-STORY)

**BUILDING:**  
1. LONG WALL PARALLEL TO R.O.W. OR PROPERTY LINE: 2' H = 100.0 FT (4-STORY), 32 FT (2-STORY)  
2. SHORT WALL PARALLEL TO R.O.W. OR PROPERTY LINE: 1.5' X H = 97.5 FT (4-STORY), 30 FT (2-STORY)  
OR WALLS AT ANGLE BY TN 30° OR 60 DEGREES:  
3. LONG WALLS OF BUILDINGS PARALLEL: (H1 + H2) / 2 \* 1.66 = 75.53 FT  
4. LONG WALL AND SHORT WALL PARALLEL: (H1 + H2) / 2 \* 1.15 = 68.25 FT  
OR 2 SHORT WALLS PARALLEL:  
5. WALLS AT ANGLE BY TN: 30° OR 60 DEGREES: ((H1 + H2) / 2) \* 1.15 = 68.25 FT

**MFR ZONING PARKING SETBACK REQUIREMENTS:**

	REQUIRED	PROVIDED
FRONT	30 FT	> 30 FT
SIDE REAR	5 FT	> 5 FT
SIDE REAR (ABUTTING RI)	10 FT	> 10 FT
FROM MAIN WALL	15 FT	15 FT MIN.
FROM END WALL	10 FT	10 FT MIN.

**BUILDING COVERAGE:**

REQUIRED BY CODE	PROVIDED
40% MAX. (160,200 SF)	31.3% (50,173 SF)

**INTERIOR PARKING GREENSPACE:**

REQUIRED BY CODE	PROVIDED
5% (13,500 SF)	15.6% (11,010 SF)

**PARKING REQUIREMENTS:**  
2. TOTAL REQUIRED PER UNIT: 3 PER DWELLING UNIT  
REQUIRED PER UNIT = 514 SPACES  
RECD. PARKING = 2,728 UNITS = 514 SPACES

**PARKING PROVIDED:**  
36 GARAGES  
(75) 17' x 9' SPACES  
TOTAL PROVIDED = 514 SPACES

**DENSITY REQUIREMENTS:**  
0 TO 1 BEDROOM - 75 SF LAND AREA REQUIRED PER UNIT  
2 OR MORE BEDROOMS - 1,000 SF LAND AREA REQUIRED PER UNIT

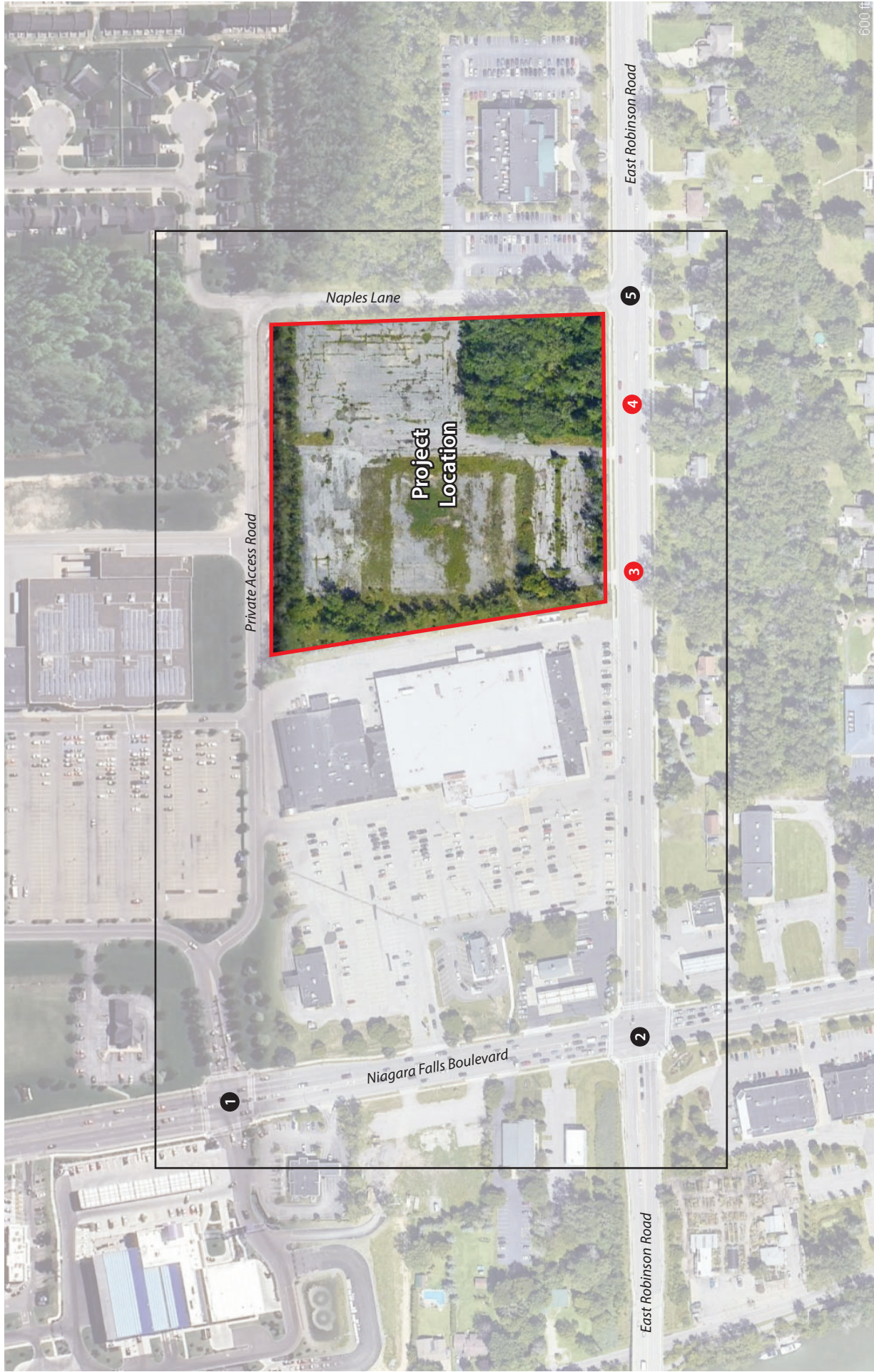
**TOTAL AREA = 9.2 ACRES = 400,752 SF**  
**PROPOSED UNITS = (124 \* 725) + (124 \* 1,000) = 247,200 SF = 5.7 AC. RECD.**

**N Site Plan**  
SCALE: 1"=40'

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Figure 1



East Robinson Residential | Town of Amherst, Erie County, NY

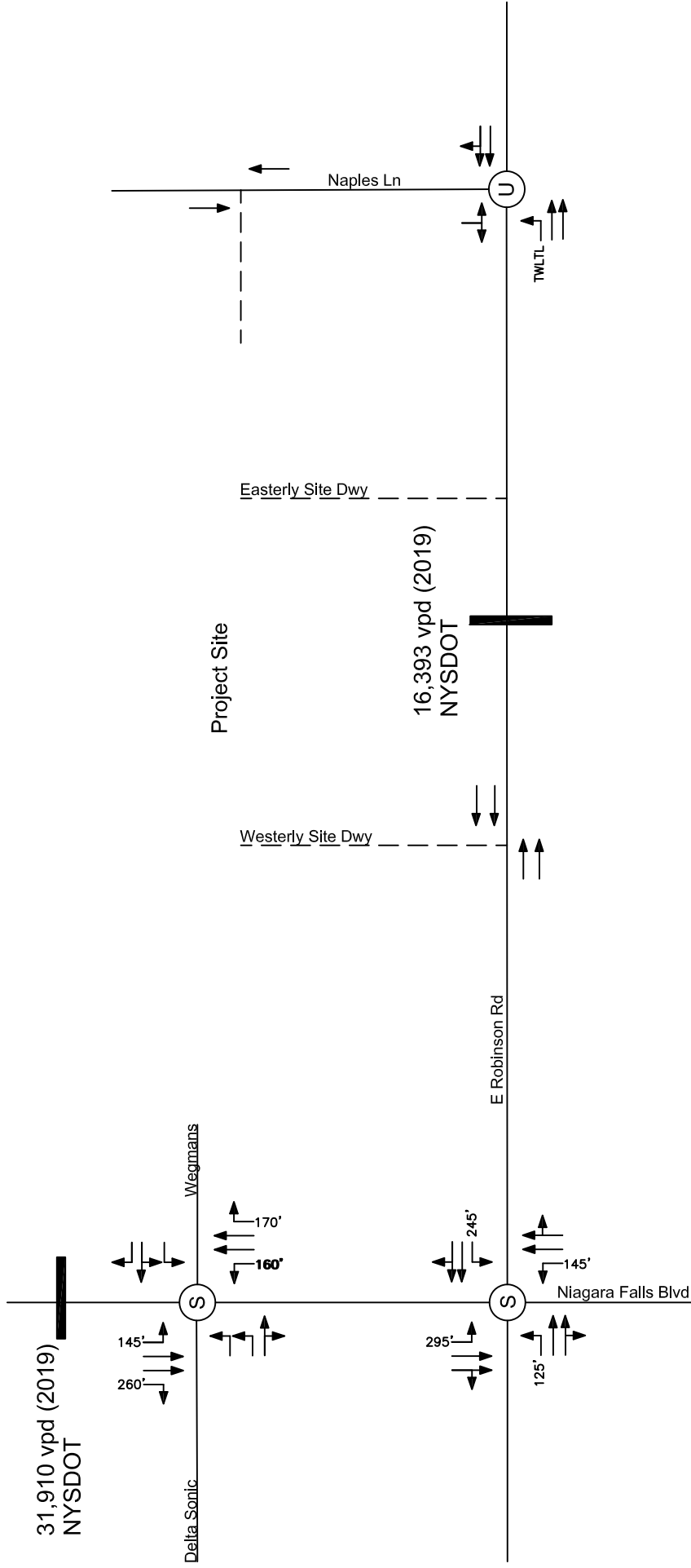
Site Location and Study Area



- Key:
- # Study Intersection
  - # Proposed Intersection
  - Study Area

**Figure 2**

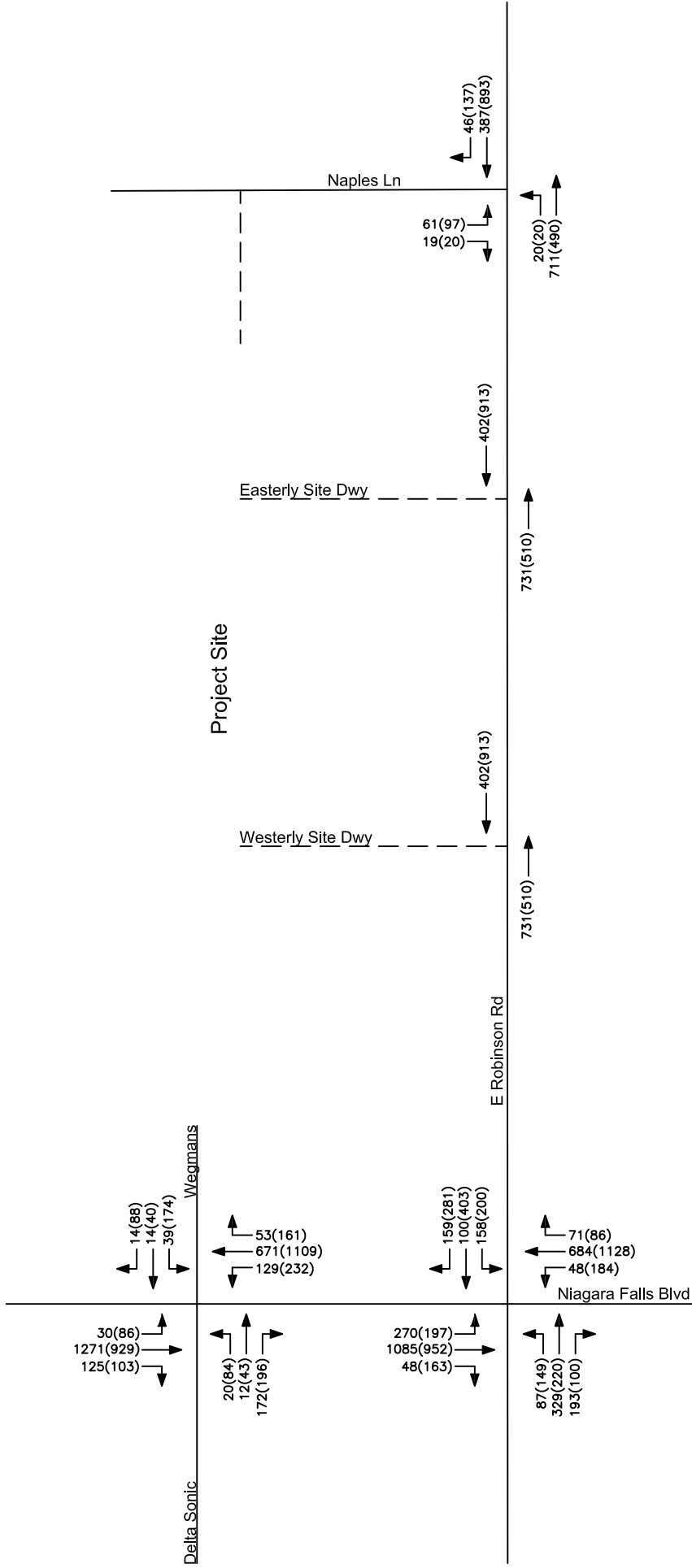
- Notes:
- All AADT volumes by those noted:
    - 1.1. NYSDOT = New York State Department of Transportation.
    - 1.2. PA = Passero
  - vpd = Vehicles per day.
  - The planned NYSDOT project will include the indicated storage lengths.



- KEY:
- Proposed Access
  - U = Unsignalized
  - S = Signalized

**E Robinson Residential | Town of Amherst, NY**  
**Lane Geometry and Intersection Control**

Figure 3

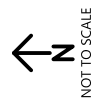
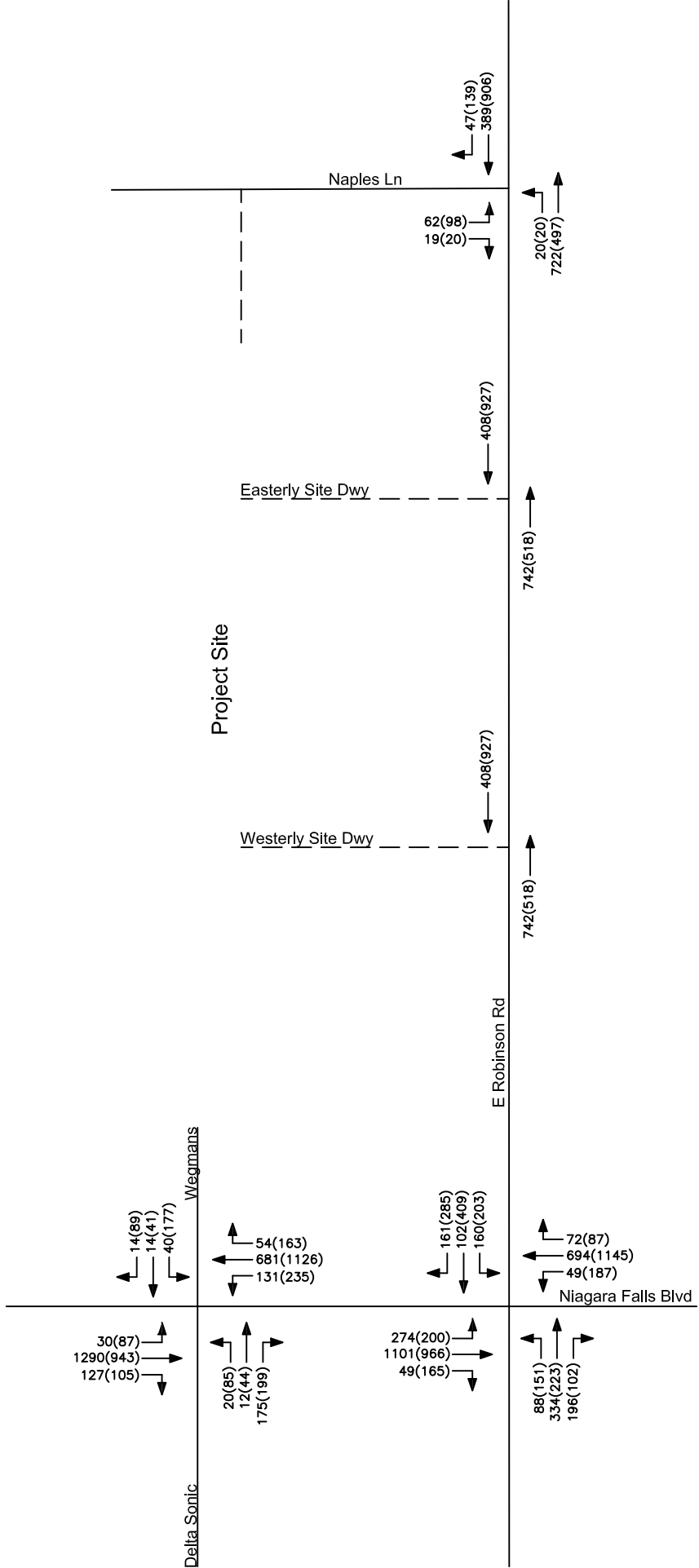


**E Robinson Residential | Town of Amherst, NY**

**Peak Hour Volumes  
2024 Existing Conditions**

KEY:  
00(00) = AM(PM)  
--- Proposed Access

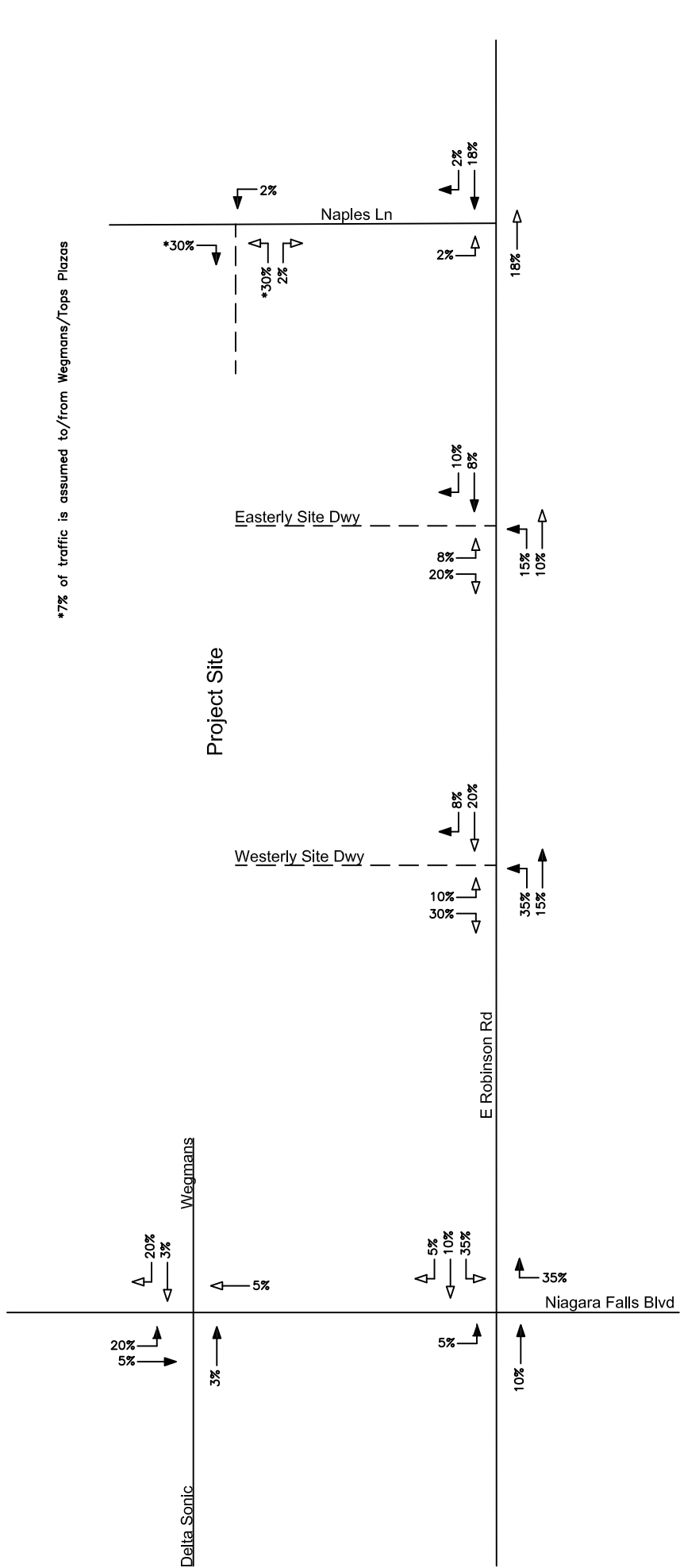
Figure 4



KEY:  
 00(00) = AM(PM)  
 - - - Proposed Access

**E Robinson Residential | Town of Amherst, NY**  
**Peak Hour Volumes**  
**2027 Background Conditions**

Figure 5

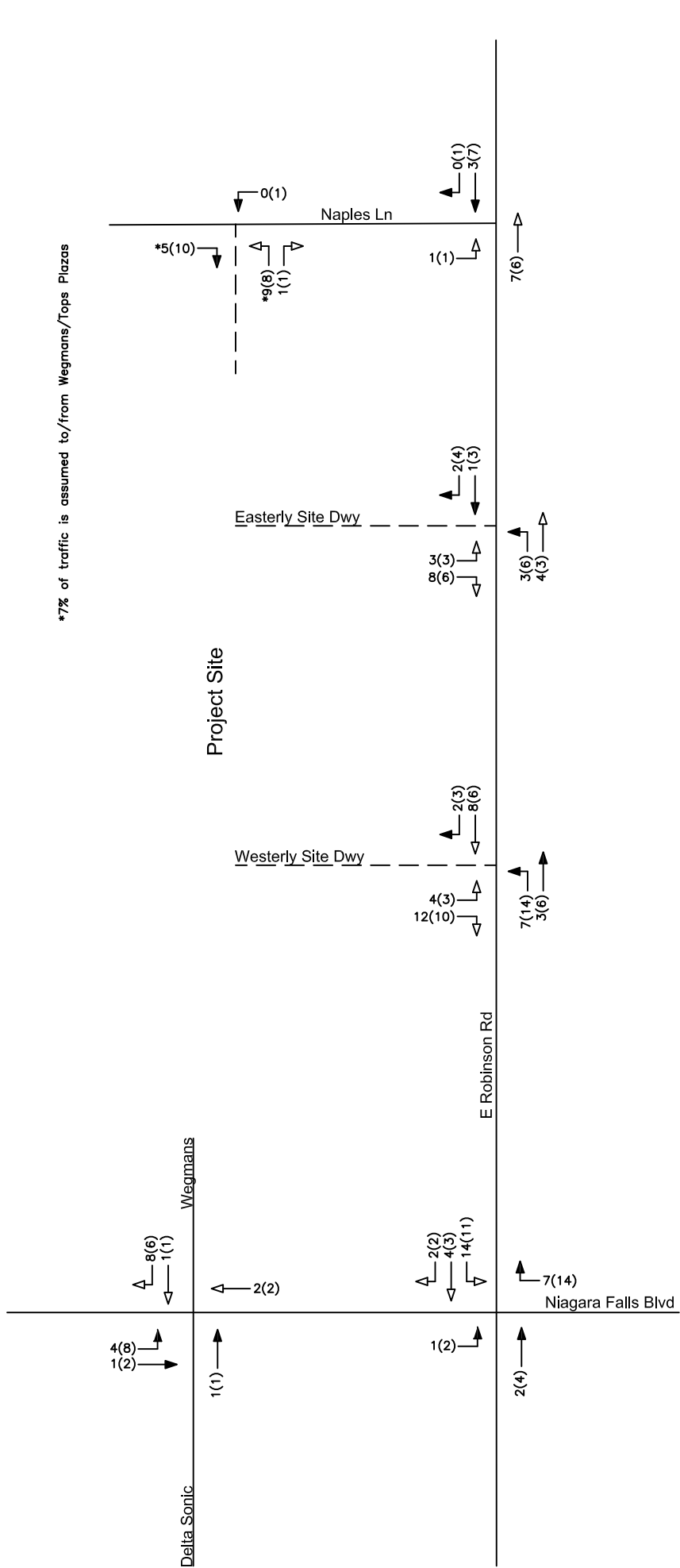


← N  
NOT TO SCALE

KEY:  
 00(00) = AM(PM)  
 ↑ Entering Trip  
 ↓ Exiting Trip  
 - - - Proposed Access

**E Robinson Residential | Town of Amherst, NY**  
**Trip Distribution**

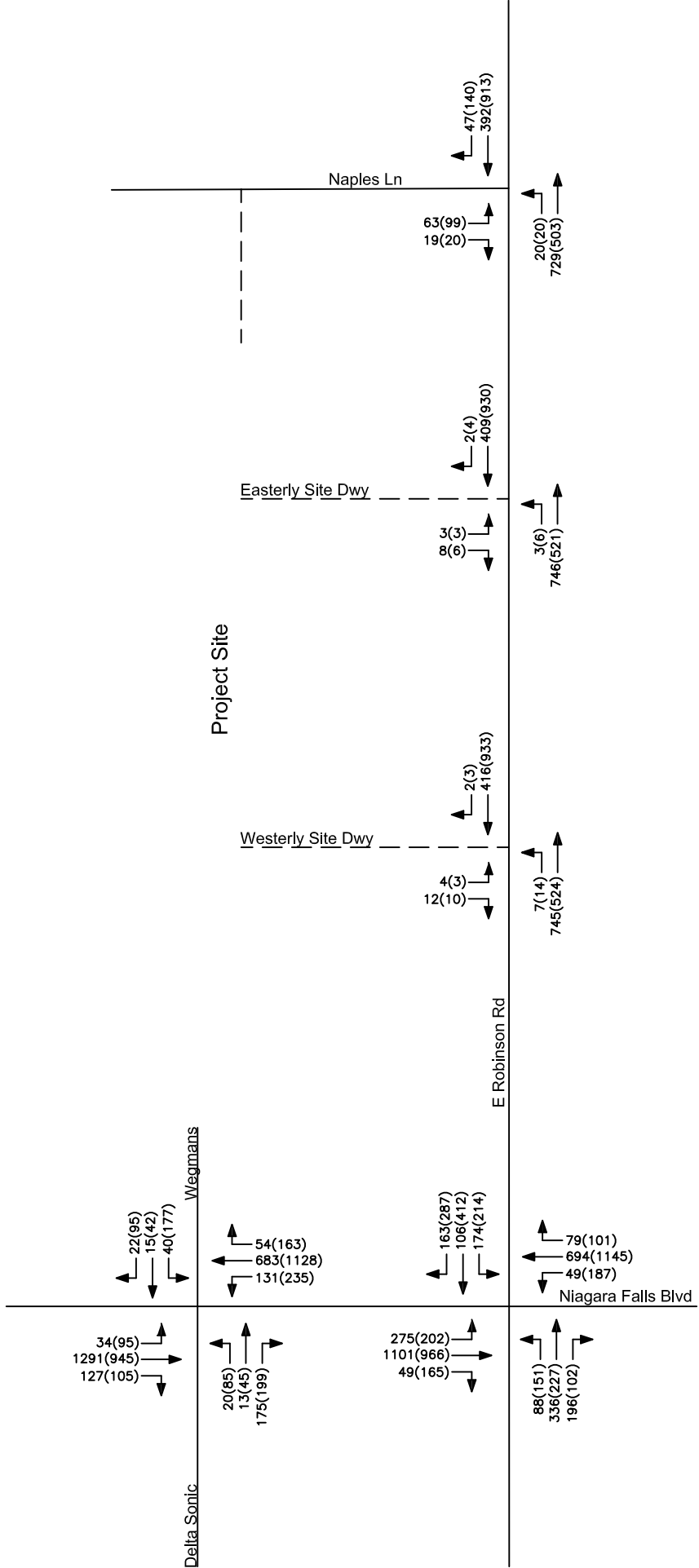
Figure 6



NOT TO SCALE  
 KEY:  
 00(00) = AM(PM)  
 Entering Trip  
 Exiting Trip  
 Proposed Access

**E Robinson Residential | Town of Amherst, NY**  
**Site Generated Trips**

Figure 7



**E Robinson Residential | Town of Amherst, NY**

**Peak Hour Volumes  
Full Build Conditions**

KEY:  
00(00) = AM(PM)  
--- Proposed Access

# APPENDICES



**APPENDIX A: EXISTING TRAFFIC COUNT DATA**

Project ID: 24-400007-001  
 Location: Niagra Falls Blvd & Wegmans/Delta Sonic Dwy's  
 City: Amherst

Day: Tuesday  
 Date: 3/12/2024

Groups Printed - Cars, PU, Vans - Heavy Trucks

Start Time	Niagra Falls Blvd Northbound						Niagra Falls Blvd Southbound						Wegmans/Delta Sonic Dwy's Eastbound						Wegmans/Delta Sonic Dwy's Westbound					
	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total
7:00 AM	31	123	14	0	0	168	7	288	34	0	0	329	4	1	29	0	1	34	3	1	1	0	0	5
7:15 AM	36	137	14	0	0	187	9	325	31	0	0	365	4	1	45	0	0	50	13	1	3	0	0	17
7:30 AM	25	175	15	0	0	215	7	373	35	0	0	415	6	2	42	0	1	50	9	4	2	0	0	15
7:45 AM	40	194	13	0	0	247	10	346	28	0	0	384	1	3	45	0	0	49	7	4	0	0	0	15
Total	132	629	56	0	0	817	33	1332	128	0	0	1493	15	7	161	0	2	183	32	10	10	0	0	52
8:00 AM	28	165	11	0	0	204	4	227	31	0	0	262	9	6	40	0	0	55	10	5	5	0	0	20
8:15 AM	41	165	12	0	0	218	8	283	33	0	0	324	12	4	41	0	0	57	4	1	0	0	0	8
8:30 AM	39	135	16	0	0	190	8	270	31	0	0	309	3	7	48	0	0	58	5	7	6	0	0	18
8:45 AM	37	135	17	0	0	189	11	238	25	0	0	274	15	6	37	0	0	58	18	0	0	0	0	18
Total	145	600	56	0	0	801	31	1018	120	0	0	1169	39	23	166	0	0	228	36	16	12	0	0	64
***BREAK***																								
4:00 PM	44	277	44	0	0	365	21	240	20	0	0	281	13	5	49	0	0	67	45	9	21	0	0	75
4:15 PM	68	289	43	0	0	400	20	222	26	0	0	268	14	10	40	0	0	64	40	6	17	0	0	63
4:30 PM	58	276	41	0	0	375	23	243	21	0	0	287	17	15	43	0	1	75	40	9	20	0	0	69
4:45 PM	62	260	43	0	0	365	22	233	31	0	0	286	20	11	52	0	0	83	49	10	19	0	0	78
Total	232	1102	171	0	0	1505	86	938	98	0	0	1122	64	41	184	0	1	289	174	34	77	0	0	285
5:00 PM	57	279	36	0	0	372	24	227	27	0	0	278	22	11	50	0	0	83	46	11	29	0	0	86
5:15 PM	55	294	41	0	0	390	17	226	24	0	1	267	25	6	51	0	1	82	39	10	20	0	0	69
5:30 PM	54	281	31	0	0	366	23	221	41	0	0	285	19	8	48	0	0	75	43	9	24	0	0	76
5:45 PM	50	260	32	0	0	342	21	208	25	0	0	254	27	13	43	0	0	83	40	11	20	0	0	71
Total	216	1114	140	0	0	1470	85	882	117	0	1	1084	93	38	192	0	1	323	168	41	93	0	0	302
Grand Total	725	3445	423	0	0	4593	235	4170	463	0	1	4868	211	109	703	0	4	1023	410	101	192	0	0	703
Approach %	15.8	75.0	9.2	0.0	0.0	41.1	4.8	85.7	9.5	0.0	0.0	20.6	10.7	68.7	0.0	0.4	58.3	14.4	27.3	0.0	0.0	0.0	6.3	
Total %	6.5	30.8	3.8	0.0	0.0	41.1	2.1	37.3	4.1	0.0	0.0	43.5	1.9	1.0	6.3	0.0	9.1	3.7	0.9	1.7	0.0	0.0	6.3	
Cars, PU, Vans	717	3318	414	0	0	4449	234	4043	461	0	0	4738	208	108	693	0	1009	408	99	191	0	0	698	
% Cars, PU, Vans	98.9	96.3	97.9	0.0	0.0	96.9	99.6	97.0	99.6	0.0	0.0	97.3	98.6	99.1	98.6	0.0	98.6	99.5	98.0	99.5	0.0	0.0	99.3	
Heavy trucks	8	127	9	0	0	144	1	127	2	0	0	130	3	1	10	0	14	2	2	1	0	0	5	
% Heavy trucks	1.1	3.7	2.1	0.0	0.0	3.1	0.4	3.0	0.4	0.0	0.0	2.7	1.4	0.9	1.4	0.0	1.4	0.5	2.0	0.5	0.0	0.0	0.7	

Project ID: 24-400007-001

Location: Niagra Falls Blvd & Wegmans/Delta Sonic Dwy's

City: Amherst

# PEAK HOURS

Day: Tuesday

Date: 3/12/2024

## AM

Start Time	Niagra Falls Blvd Northbound					Niagra Falls Blvd Southbound					Wegmans/Delta Sonic Dwy's Eastbound					Wegmans/Delta Sonic Dwy's Westbound					
	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
7:15 AM	36	137	14	0	187	9	325	31	0	365	4	1	45	0	50	13	1	3	0	17	619
7:30 AM	25	175	15	0	215	7	373	35	0	415	6	2	42	0	50	9	4	2	0	15	695
7:45 AM	40	194	13	0	247	10	346	28	0	384	1	3	45	0	49	7	4	4	0	15	695
8:00 AM	28	165	11	0	204	4	227	31	0	262	9	6	40	0	55	10	5	5	0	20	541
Total Volume	129	671	53	0	853	30	1271	125	0	1426	20	12	172	0	204	39	14	14	0	67	2550
% App. Total	15.1	78.7	6.2	0.0	100	2.1	89.1	8.8	0.0	100	9.8	5.9	84.3	0.0	100	58.2	20.9	20.9	0.0	100	
PHF	0.863					0.859					0.927					0.838					0.917
Cars, PU, Vans	125	616	48	0	789	29	1227	125	0	1381	20	11	166	0	197	38	13	13	0	64	2431
% Cars, PU, Vans	96.9	91.8	90.6	0.0	92.5	96.7	96.5	100.0	0.0	96.8	100.0	91.7	96.5	0.0	96.6	97.4	92.9	92.9	0.0	95.5	95.3
Heavy trucks	4	55	5	0	64	1	44	0	0	45	0	1	6	0	7	1	1	1	0	3	119
% Heavy trucks	3.1	8.2	9.4	0.0	7.5	3.3	3.5	0.0	0.0	3.2	0.0	8.3	3.5	0.0	3.4	2.6	7.1	7.1	0.0	4.5	4.7

## PM

Start Time	Niagra Falls Blvd Northbound					Niagra Falls Blvd Southbound					Wegmans/Delta Sonic Dwy's Eastbound					Wegmans/Delta Sonic Dwy's Westbound					
	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
4:30 PM	58	276	41	0	375	23	243	21	0	287	17	15	43	0	75	40	9	20	0	69	806
4:45 PM	62	260	43	0	365	22	233	31	0	286	20	11	52	0	83	49	10	19	0	78	812
5:00 PM	57	279	36	0	372	24	227	27	0	278	22	11	50	0	83	46	11	29	0	86	819
5:15 PM	55	294	41	0	390	17	226	24	0	267	25	6	51	0	82	39	10	20	0	69	808
Total Volume	232	1109	161	0	1502	86	929	103	0	1118	84	43	196	0	323	174	40	88	0	302	3245
% App. Total	15.4	73.8	10.7	0.0	100	7.7	83.1	9.2	0.0	100	26.0	13.3	60.7	0.0	100	57.6	13.2	29.1	0.0	100	
PHF	0.963					0.974					0.973					0.878					0.991
Cars, PU, Vans	232	1096	160	0	1488	86	915	103	0	1104	84	43	195	0	322	174	40	88	0	302	3216
% Cars, PU, Vans	100.0	98.8	99.4	0.0	99.1	100.0	98.5	100.0	0.0	98.7	100.0	100.0	99.5	0.0	99.7	100.0	100.0	100.0	0.0	100.0	99.1
Heavy trucks	0	13	1	0	14	0	14	0	0	14	0	0	1	0	1	0	0	0	0	0	29
% Heavy trucks	0.0	1.2	0.6	0.0	0.9	0.0	1.5	0.0	0.0	1.3	0.0	0.0	0.5	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.9

Peak Hour for Entire Intersection Begins at 04:30 PM

Project ID: 24-400007-002  
 Location: Niagra Falls Blvd & E Robinson Rd  
 City: Amherst

Day: Tuesday  
 Date: 3/12/2024

Groups Printed - Cars, PU, Vans - Heavy Trucks

Start Time	Niagra Falls Blvd Northbound						Niagra Falls Blvd Southbound						E Robinson Rd Eastbound						E Robinson Rd Westbound					
	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total
7:00 AM	7	118	5	0	0	130	66	246	9	0	0	321	21	39	34	0	0	94	28	20	38	0	0	86
7:15 AM	11	144	15	0	0	170	73	264	15	0	0	352	21	65	46	0	0	132	30	28	31	0	0	89
7:30 AM	9	168	14	0	0	191	74	334	10	0	0	418	27	104	72	0	0	203	46	22	36	0	0	104
7:45 AM	16	196	24	0	0	236	64	309	16	0	0	389	16	79	42	0	0	137	27	25	38	0	0	90
Total	43	626	58	0	0	727	277	1153	50	0	0	1480	85	287	194	0	0	566	131	95	143	0	0	369
8:00 AM	7	161	16	0	0	184	55	208	10	0	0	273	22	74	51	0	0	147	46	26	38	0	0	110
8:15 AM	16	159	17	0	0	192	77	234	12	0	0	323	22	72	28	0	0	122	39	27	47	0	0	113
8:30 AM	15	152	23	0	0	190	56	239	13	0	0	308	20	79	42	0	0	141	35	29	33	0	0	97
8:45 AM	26	158	22	0	0	206	61	224	17	0	0	302	28	66	31	0	0	125	37	37	38	0	0	112
Total	64	630	78	0	0	772	249	905	52	0	0	1206	92	291	152	0	0	535	157	119	156	0	0	432
***BREAK***																								
4:00 PM	41	274	28	0	0	343	46	254	35	0	0	335	37	51	25	0	0	113	47	80	74	0	0	201
4:15 PM	53	299	19	0	1	371	47	225	48	0	0	320	36	61	25	0	1	122	57	87	74	0	0	218
4:30 PM	40	277	22	0	1	339	49	239	34	0	0	322	39	45	25	0	1	109	53	97	62	0	0	212
4:45 PM	47	259	19	0	0	325	52	246	47	0	0	345	43	56	22	0	0	121	40	116	80	0	1	236
Total	181	1109	88	0	2	1378	194	964	164	0	0	1322	155	213	97	0	2	465	197	380	290	0	3	867
5:00 PM	44	293	26	0	2	363	49	242	34	0	0	325	31	58	28	0	2	117	50	103	65	0	0	218
5:15 PM	45	274	25	0	0	344	56	237	31	0	0	324	35	54	21	0	0	110	56	101	80	0	0	237
5:30 PM	37	264	23	0	0	324	41	226	39	0	0	306	38	50	18	0	0	106	49	74	66	0	0	189
5:45 PM	38	263	14	0	0	315	40	222	37	0	1	299	25	63	31	0	0	119	39	70	61	0	0	170
Total	164	1094	88	0	2	1346	186	927	141	0	1	1254	129	225	98	0	2	452	194	348	272	0	0	814
Grand Total	452	3459	312	0	4	4223	906	3949	407	0	1	5262	461	1016	541	0	4	2018	679	942	861	0	3	2482
Approach %	10.7	81.9	7.4	0.0	0.1	30.2	17.2	75.0	7.7	0.0	0.0	37.6	22.8	50.3	26.8	0.0	0.2	14.4	27.4	38.0	34.7	0.0	0.1	17.7
Total %	3.2	24.7	2.2	0.0	0.0	40.65	6.5	28.2	2.9	0.0	0.0	37.6	3.3	7.3	3.9	0.0	0.0	14.4	4.9	6.7	6.2	0.0	0.0	17.7
Cars, PU, Vans	438	3336	291	0	0	4065	889	3838	401	0	0	5128	454	1003	523	0	0	1980	642	933	844	0	0	2419
% Cars, PU, Vans	96.9	96.4	93.3	0.0	0.0	96.3	98.1	97.2	98.5	0.0	0.0	97.5	98.5	98.7	96.7	0.0	0.0	98.1	94.6	99.0	98.0	0.0	0.0	97.2
Heavy trucks	14	123	21	0	0	158	17	111	6	0	0	134	7	13	18	0	0	38	37	9	17	0	0	63
% Heavy trucks	3.1	3.6	6.7	0.0	0.0	3.7	1.9	2.8	1.5	0.0	0.0	2.5	1.5	1.3	3.3	0.0	0.0	1.9	5.4	1.0	2.0	0.0	0.0	2.5

Project ID: 24-400007-002

Location: Niagra Falls Blvd & E Robinson Rd

City: Amherst

Day: Tuesday

Date: 3/12/2024

## PEAK HOURS

### AM

Start Time	Niagra Falls Blvd Northbound					Niagra Falls Blvd Southbound					E Robinson Rd Eastbound					E Robinson Rd Westbound					
	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
7:30 AM	9	168	14	0	191	74	334	10	0	418	27	104	72	0	203	46	22	36	0	104	916
7:45 AM	16	196	24	0	236	64	309	16	0	389	16	79	42	0	137	27	25	38	0	90	852
8:00 AM	7	161	16	0	184	55	208	10	0	273	22	74	51	0	147	46	26	38	0	110	714
8:15 AM	16	159	17	0	192	77	234	12	0	323	22	72	28	0	122	39	27	47	0	113	750
Total Volume	48	684	71	0	803	270	1085	48	0	1403	87	329	193	0	609	158	100	159	0	417	3232
% App. Total	6.0	85.2	8.8	0.0	100	19.2	77.3	3.4	0.0	100	14.3	54.0	31.7	0.0	100	37.9	24.0	38.1	0.0	100	
PHF	0.851					0.839					0.750					0.923					0.882
Cars, PU, Vans	46	634	66	0	746	263	1041	45	0	1349	85	326	180	0	591	140	96	152	0	388	3074
% Cars, PU, Vans	95.8	92.7	93.0	0.0	92.9	97.4	95.9	93.8	0.0	96.2	97.7	99.1	93.3	0.0	97.0	88.6	96.0	95.6	0.0	93.0	95.1
Heavy trucks	2	50	5	0	57	7	44	3	0	54	2	3	13	0	18	18	4	7	0	29	158
% Heavy trucks	4.2	7.3	7.0	0.0	7.1	2.6	4.1	6.3	0.0	3.8	2.3	0.9	6.7	0.0	3.0	11.4	4.0	4.4	0.0	7.0	4.9

### PM

Start Time	Niagra Falls Blvd Northbound					Niagra Falls Blvd Southbound					E Robinson Rd Eastbound					E Robinson Rd Westbound					
	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
4:15 PM	53	299	19	0	371	47	225	48	0	320	36	61	25	0	122	57	87	74	0	218	1031
4:30 PM	40	277	22	0	339	49	239	34	0	322	39	45	25	0	109	53	97	62	0	212	982
4:45 PM	47	259	19	0	325	52	246	47	0	345	43	56	22	0	121	40	116	80	0	236	1027
5:00 PM	44	293	26	0	363	49	242	34	0	325	31	58	28	0	117	50	103	65	0	218	1023
Total Volume	184	1128	86	0	1398	197	952	163	0	1312	149	220	100	0	469	200	403	281	0	884	4063
% App. Total	13.2	80.7	6.2	0.0	100	15.0	72.6	12.4	0.0	100	31.8	46.9	21.3	0.0	100	22.6	45.6	31.8	0.0	100	
PHF	0.942					0.951					0.961					0.936					0.985
Cars, PU, Vans	181	1118	82	0	1381	194	941	162	0	1297	149	218	100	0	467	194	402	277	0	873	4018
% Cars, PU, Vans	98.4	99.1	95.3	0.0	98.8	98.5	98.8	99.4	0.0	98.9	100.0	99.1	100.0	0.0	99.6	97.0	99.8	98.6	0.0	98.8	98.9
Heavy trucks	3	10	4	0	17	3	11	1	0	15	0	2	0	0	2	6	1	4	0	11	45
% Heavy trucks	1.6	0.9	4.7	0.0	1.2	1.5	1.2	0.6	0.0	1.1	0.0	0.9	0.0	0.4	0.4	3.0	0.2	1.4	0.0	1.2	1.1

Peak Hour for Entire Intersection Begins at 04:15 PM

Project ID: 24-400007-003

Location: Naples Ln & E Robinson Rd

City: Amherst

Day: Tuesday

Date: 3/12/2024

Groups Printed - Cars, PU, Vans - Heavy Trucks

Start Time	Naples Ln Northbound						Naples Ln Southbound						E Robinson Rd Eastbound						E Robinson Rd Westbound					
	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total
7:00 AM	0	0	0	0	0	0	8	0	0	6	0	14	1	119	0	0	0	120	0	82	8	0	0	90
7:15 AM	0	0	0	0	0	0	19	0	6	0	0	25	3	159	0	0	0	162	0	72	13	0	0	85
7:30 AM	0	0	0	0	0	0	17	0	4	0	1	21	2	191	0	0	0	193	0	85	17	0	0	102
7:45 AM	0	0	0	0	0	0	19	0	4	0	0	23	6	191	0	0	0	197	0	98	8	0	0	106
Total	0	0	0	0	0	0	63	0	22	0	1	85	12	660	0	0	0	672	0	337	46	0	0	383
8:00 AM	0	0	0	0	0	0	13	0	3	0	0	16	7	158	0	0	0	165	0	87	13	0	0	100
8:15 AM	0	0	0	0	0	0	12	0	6	0	0	18	5	171	0	0	0	176	0	113	8	0	0	121
8:30 AM	0	0	0	0	0	0	14	0	6	0	0	20	5	170	0	0	0	175	0	95	13	0	0	108
8:45 AM	0	0	0	0	0	0	9	0	8	0	0	17	8	146	0	0	0	154	0	87	8	0	0	95
Total	0	0	0	0	0	0	48	0	23	0	0	71	25	645	0	0	0	670	0	382	42	0	0	424
***BREAK***																								
4:00 PM	0	0	0	0	0	0	20	0	2	0	1	22	3	126	0	0	0	129	0	200	43	0	0	243
4:15 PM	0	0	0	0	0	0	31	0	8	0	0	39	5	129	0	0	0	134	0	207	36	0	0	243
4:30 PM	0	0	0	0	1	0	26	0	7	0	0	33	3	112	0	0	0	115	0	208	33	0	0	241
4:45 PM	0	0	0	0	0	0	30	0	1	0	0	31	4	131	0	0	0	135	0	222	32	0	0	254
Total	0	0	0	0	1	0	107	0	18	0	1	125	15	498	0	0	0	513	0	837	144	0	0	981
5:00 PM	0	0	0	0	1	0	20	0	6	0	0	26	10	123	0	0	0	133	0	224	41	0	0	265
5:15 PM	0	0	0	0	0	0	21	0	6	0	0	27	3	124	0	0	0	127	0	239	31	0	0	270
5:30 PM	0	0	0	0	0	0	20	0	4	0	0	24	4	114	0	0	0	118	0	171	20	0	0	191
5:45 PM	0	0	0	0	0	0	21	0	2	0	0	23	4	123	0	0	0	127	0	178	16	0	0	194
Total	0	0	0	0	1	0	82	0	18	0	0	100	21	484	0	0	0	505	0	812	108	0	0	920
Grand Total	0	0	0	0	2	0	300	0	81	0	2	381	73	2287	0	0	0	2360	0	2368	340	0	0	2708
Approach %	0.0	0.0	0.0	0.0	0.0	0.0	78.7	0.0	21.3	0.0	0.5	7.0	3.1	96.9	0.0	0.0	0.0	43.3	0.0	87.4	12.6	0.0	0.0	49.7
Total %	0.0	0.0	0.0	0.0	0.0	0.0	5.5	0.0	1.5	0.0	0.0	7.0	1.3	42.0	0.0	0.0	0.0	43.3	0.0	43.5	6.2	0.0	0.0	49.7
Cars, PU, Vans	0	0	0	0	0	0	298	0	79	0	0	377	70	2244	0	0	0	2314	0	2311	337	0	0	2648
% Cars, PU, Vans	0.0	0.0	0.0	0.0	0.0	0.0	99.3	0.0	97.5	0.0	0.0	99.0	95.9	98.1	0.0	0.0	0.0	98.1	0.0	97.6	99.1	0.0	0.0	97.8
Heavy trucks	0	0	0	0	0	0	2	0	2	0	0	4	3	43	0	0	0	46	0	57	3	0	0	60
% Heavy trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	2.5	0.0	1.0	1.0	4.1	1.9	0.0	0.0	1.9	0.0	2.4	0.9	0.0	0.0	2.2	

Project ID: 24-400007-003

Location: Naples Ln & E Robinson Rd  
City: Amherst

Day: Tuesday  
Date: 3/12/2024

# PEAK HOURS

AM

Start Time	Naples Ln Northbound				Naples Ln Southbound				E Robinson Rd Eastbound				E Robinson Rd Westbound			
	Left	Thru	Rgt	Uturn	Left	Thru	Rgt	Uturn	Left	Thru	Rgt	Uturn	Left	Thru	Rgt	Uturn
Peak Hour Analysis from 07:00 AM - 09:00 AM																
Peak Hour for Entire Intersection Begins at 07:30 AM																
7:30 AM	0	0	0	0	17	0	4	0	2	191	0	0	0	85	17	0
7:45 AM	0	0	0	0	19	0	6	0	6	191	0	0	0	98	8	0
8:00 AM	0	0	0	0	13	0	3	0	7	158	0	0	0	87	13	0
8:15 AM	0	0	0	0	12	0	6	0	5	171	0	0	0	113	8	0
Total Volume	0	0	0	0	61	0	19	0	20	711	0	0	0	383	46	0
% App. Total	0.0	0.0	0.0	0.0	76.3	0.0	23.8	0.0	2.7	97.3	0.0	0.0	0.0	89.3	10.7	0.0
PHF					0.800				0.928				0.886			
Cars, PU, Vans	0	0	0	0	61	0	17	0	19	696	0	0	0	360	45	0
% Cars, PU, Vans	0.0	0.0	0.0	0.0	100.0	0.0	89.5	0.0	95.0	97.9	0.0	0.0	0.0	94.0	97.8	0.0
Heavy trucks	0	0	0	0	0	0	2	0	1	15	0	0	0	23	1	0
% Heavy trucks	0.0	0.0	0.0	0.0	0.0	0.0	10.5	0.0	5.0	2.1	0.0	0.0	0.0	6.0	2.2	0.0

PM

Start Time	Naples Ln Northbound				Naples Ln Southbound				E Robinson Rd Eastbound				E Robinson Rd Westbound			
	Left	Thru	Rgt	Uturn	Left	Thru	Rgt	Uturn	Left	Thru	Rgt	Uturn	Left	Thru	Rgt	Uturn
Peak Hour Analysis from 04:00 PM - 06:00 PM																
Peak Hour for Entire Intersection Begins at 04:30 PM																
4:30 PM	0	0	0	0	26	0	7	0	3	112	0	0	0	208	33	0
4:45 PM	0	0	0	0	30	0	1	0	4	131	0	0	0	222	32	0
5:00 PM	0	0	0	0	20	0	6	0	10	123	0	0	0	224	41	0
5:15 PM	0	0	0	0	21	0	6	0	3	124	0	0	0	239	31	0
Total Volume	0	0	0	0	97	0	20	0	20	490	0	0	0	893	137	0
% App. Total	0.0	0.0	0.0	0.0	82.9	0.0	17.1	0.0	3.9	96.1	0.0	0.0	0.0	86.7	13.3	0.0
PHF					0.886				0.939				0.954			
Cars, PU, Vans	0	0	0	0	96	0	20	0	20	482	0	0	0	884	137	0
% Cars, PU, Vans	0.0	0.0	0.0	0.0	99.0	0.0	100.0	0.0	100.0	98.4	0.0	0.0	0.0	99.0	100.0	0.0
Heavy trucks	0	0	0	0	1	0	0	0	0	8	0	0	0	9	0	0
% Heavy trucks	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	1.0	0.0	0.0

## **APPENDIX B: MISCELLANEOUS CALCULATIONS**



## East Robinson Residential

### Town of Amherst, NY

Documentation of Ambient Traffic Volume Growth

Roadway	Segment starts at	Segment end at	2010	2011	2014	2016	2017	2019	Annual Growth
Niagara Falls Blvd	E Robinson Rd	Eire/Niagara Co Line	34,514			34,541		31,910	-0.87%
E Robinson Rd	Niagara Falls Blvd	N French Rd		16,729				16,393	-0.25%
E Robinson Rd	Sweet St	Erie Canal	12,281		11,563		12,309		0.03%

**Average -0.36%**

Intersection Crash Rate Calculations	
East Robinson Residential	
<b>Intersection #1:</b>	Niagara Falls Blvd at Wegmans Dwy at Delta Sonic Dwy
<b>Date of Count:</b>	Tuesday, March 12, 2024
<b>Number of Crashes:</b>	10
<b>Number of Injuries:</b>	6
<b>Number of Fatalities:</b>	0
<b>Entering Vehicles (PM):</b>	3245
<b>ADT:</b>	34158
<b>Start Date:</b>	August 31, 2018
<b>End Date:</b>	August 31, 2023
<b>Number of Years:</b>	5
<b>Intersection Type:</b>	4 Legged
<b>Area Type:</b>	Urban
<b>Control Type:</b>	Signal w/ Left Turn 5 or More Lanes
crash rate =	$\frac{\text{Number of Crashes} \times 1 \text{ Million}}{\text{ADT} \times 365 \text{ Days per Year} \times \text{Number of Years}}$
crash rate =	$\frac{10}{34158 \times 365 \times 5} \times 1,000,000$
<b>Study Intersection</b>	<b>Crash Rate</b>
<b>Statewide Average*</b>	<b>Fatality Rate</b>
	<b>Injury Rate</b>
	<b>60%</b>

ADT = Average Daily Total vehicles entering intersection  
 cr/mve = crashes per million entering vehicles  
 \* Most recent available 2019 Average Crash Rates for State Highways by Facility Type

Type	Direction			Totals
	Northbound	Southbound	Eastbound	
Left turn				0
Rear-end	3	3	1	7
Overtaking				0
Right Angle				0
Right Turn	1			1
Head On				0
Side-swipe	1	1		2
Fixed Object				0
Backing				0
Other				0
Bike/Ped				0
Animal				0
Totals	5	4	1	10

PDO	4
Injury	6
Injury + PDO	
Fatal	
NR	
Total	10

Intersection Crash Rate Calculations	
East Robinson Residential	
<b>Intersection #2:</b>	Niagara Falls Blvd at East Robinson Rd
<b>Date of Count:</b>	Tuesday, March 12, 2024
<b>Number of Crashes:</b>	81
<b>Number of Injuries:</b>	28
<b>Number of Fatalities:</b>	0
<b>Entering Vehicles (PM):</b>	4063
<b>ADT:</b>	42768
<b>Start Date:</b>	August 31, 2018
<b>End Date:</b>	August 31, 2023
<b>Number of Years:</b>	5
<b>Intersection Type:</b>	4 Legged
<b>Area Type:</b>	Urban
<b>Control Type:</b>	Signal w/ Left Turn 5 or More Lanes
crash rate =	$\frac{\text{Number of Crashes} \times 1 \text{ Million}}{\text{ADT} \times 365 \text{ Days per Year} \times \text{Number of Years}}$
crash rate =	$\frac{81}{42768 \times 365 \times 5} \times 1,000,000$
<b>Study Intersection</b>	<b>Crash Rate</b>
<b>Statewide Average*</b>	<b>Fatality Rate</b>
	<b>Injury Rate</b>
	<b>35%</b>

ADT = Average Daily Total vehicles entering intersection  
 cr/mve = crashes per million entering vehicles  
 \* Most recent available 2019 Average Crash Rates for State Highways by Facility Type

Type	Direction			Totals
	Northbound	Southbound	Eastbound	
Left turn	2	5	4	14
Rear-end	18	14	2	41
Overtaking				0
Right Angle		4	1	6
Right Turn		2	2	4
Head On		4	3	13
Side-swipe	4	4	2	10
Fixed Object			1	1
Backing				0
Other				0
Bike/Ped		1		1
Animal				0
Totals	24	28	13	81

PDO	53
Injury	28
Injury + PDO	
Fatal	
NR	
Total	81

Intersection Crash Rate Calculations	
East Robinson Residential	
<b>Intersection #4:</b>	East Robinson Rd at Naples Ln
<b>Date of Count:</b>	Tuesday, March 12, 2024
<b>Number of Crashes:</b>	3
<b>Number of Injuries:</b>	2
<b>Number of Fatalities:</b>	0
<b>Entering Vehicles (PM):</b>	1657
<b>ADT:</b>	17442
<b>Start Date:</b>	August 31, 2018
<b>End Date:</b>	August 31, 2023
<b>Number of Years:</b>	5
<b>Intersection Type:</b>	3 Legged
<b>Area Type:</b>	Urban
<b>Control Type:</b>	Sign 5 or More Lanes
<b>crash rate =</b>	$\frac{\text{Number of Crashes} \times 1 \text{ Million}}{\text{ADT} \times 365 \text{ Days per Year} \times \text{Number of Years}}$
<b>crash rate =</b>	$\frac{17442}{3 \times 365 \times 5} \times 1,000,000$
<b>Study Intersection Statewide Average*</b>	$\frac{\text{Crash Rate}}{0.09 \text{ cr/mve}}$ $\frac{\text{Fatality Rate}}{0\%}$ $\frac{\text{Injury Rate}}{67\%}$
	$\frac{0.07 \text{ cr/mve}}{0.09 \text{ cr/mve}}$ $\frac{0\%}{0\%}$ $\frac{67\%}{67\%}$

ADT = Average Daily Total vehicles entering intersection  
 cr/mve = crashes per million entering vehicles  
 \* Most recent available 2019 Average Crash Rates for State Highways by Facility Type

Type	Direction			Totals
	Northbound	Southbound	Eastbound	
Left turn		1		1
Rear-end				0
Overtaking				0
Right Angle		1		1
Right Turn				0
Head On				0
Side-swipe				0
Fixed Object				0
Backing				0
Other				0
Bike/Ped				0
Animal				1
Totals	0	2	1	3

Direction	Westbound	Unknown	Totals
Northbound			0
Southbound			0
Eastbound			0
Unknown			0



PROJECT: East Robinson Residential

LOCATION: Town of Amherst, NY

PEAK HOUR: Weekday PM

Figure Number

3

4  
Num of yrs  
3

5

6

7

LOCATION NUMBER	INTERSECTION DESCRIPTION	2024 Collected Volumes	No Build Volumes 0.5%	Trip Generation and Distribution				Total Site Trips	Full Build Volumes
				Enter Dist. %	Exit Dist. %	Trips IN 40	Trips OUT 32		
1	Niagara Falls Boulevard at Delta Sonic / Wegmans								
	SR	103	105					2	105
	ST	929	943	5%		2		8	945
	SL	86	87	20%		8			95
	WR	88	89		20%		6	6	95
	WT	40	41		3%		1	1	42
	WL	174	177						177
	NR	161	163						163
	NT	1109	1126		5%		2	2	1128
	NL	232	235						235
	ER	196	199					1	199
	ET	43	44	3%		1			45
	EL	84	85						85
2	Niagara Falls Boulevard at East Robinson Road								
	SR	163	165						165
	ST	952	966						966
	SL	197	200	5%		2		2	202
	WR	281	285		5%		2	2	287
	WT	403	409		10%		3	3	412
	WL	200	203		35%		11	11	214
	NR	86	87	35%		14		14	101
	NT	1128	1145						1145
	NL	184	187						187
	ER	100	102					4	102
	ET	220	223	10%		4		4	227
	EL	149	151						151
3	Proposed Westerly Driveway at East Robinson Road								
	SR				30%		10	10	10
	ST				10%		3	3	3
	SL								
	WR			8%		3		3	3
	WT	913	927		20%		6	6	933
	WL								
	NR								
	NT								
	NL								
	ER	510	518	15%		6		6	524
	EL			35%		14		14	14
4	Proposed Easterly Driveway at East Robinson Road								
	SR				20%		6	6	6
	ST				8%		3	3	3
	SL								
	WR			10%		4		4	4
	WT	913	927	8%		3		3	930
	WL								
	NR								
	NT								
	NL								
	ER	510	518		10%		3	3	521
	EL			15%		6		6	6
5	Naples Lane at East Robinson Road								
	SR	20	20						20
	ST				2%		1	1	99
	SL	97	98						
	WR	137	139	2%		1		1	140
	WT	893	906	18%		7		7	913
	WL								
	NR								
	NT								
	NL								
	ER	490	497		18%		6	6	503
	EL	20	20						20

# Single-Family Attached Housing (215)

**Vehicle Trip Ends vs: Dwelling Units**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 7 and 9 a.m.**

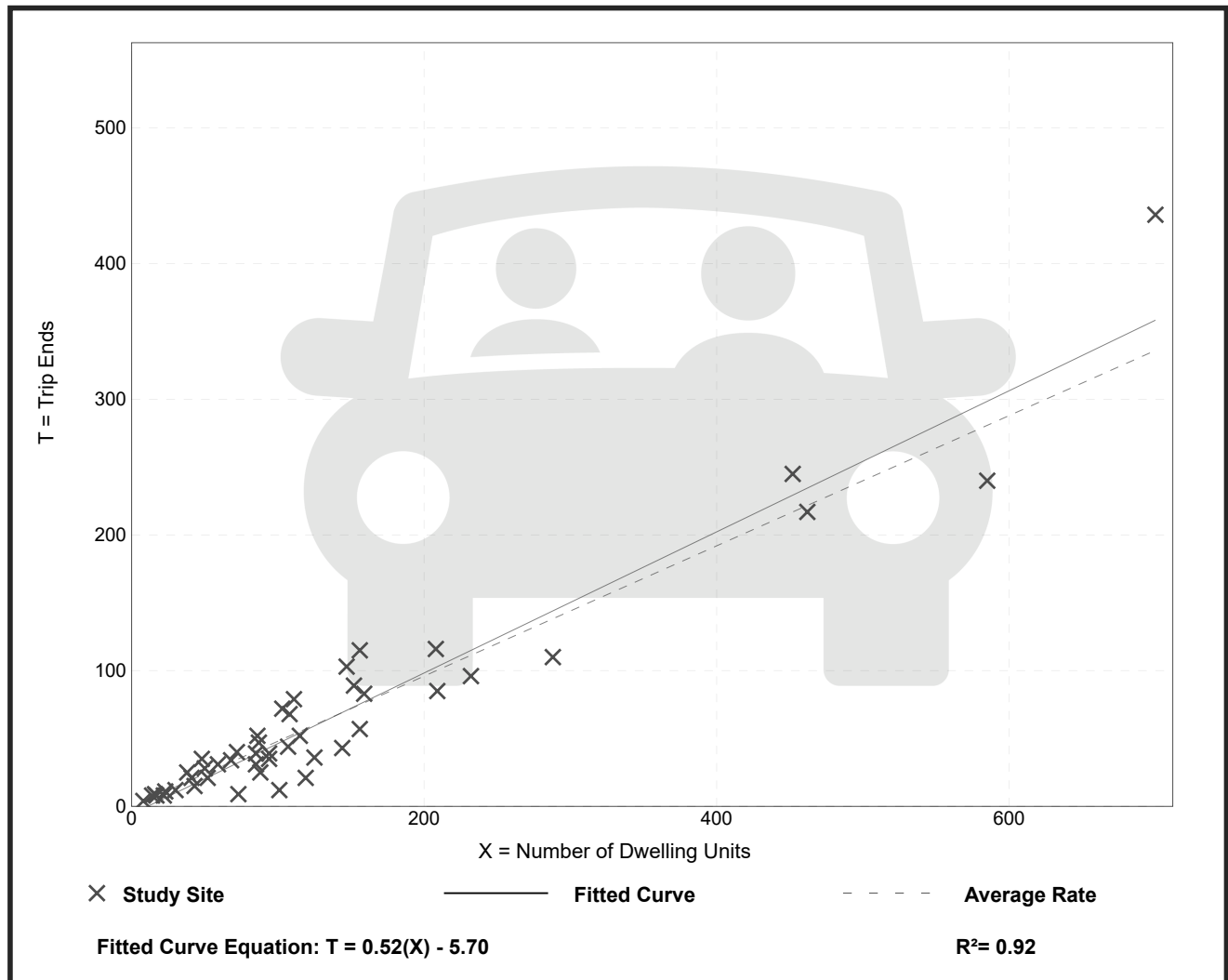
**Setting/Location: General Urban/Suburban**

Number of Studies: 46  
 Avg. Num. of Dwelling Units: 135  
 Directional Distribution: 25% entering, 75% exiting

## Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.48	0.12 - 0.74	0.14

## Data Plot and Equation



# Single-Family Attached Housing (215)

**Vehicle Trip Ends vs: Dwelling Units**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 4 and 6 p.m.**

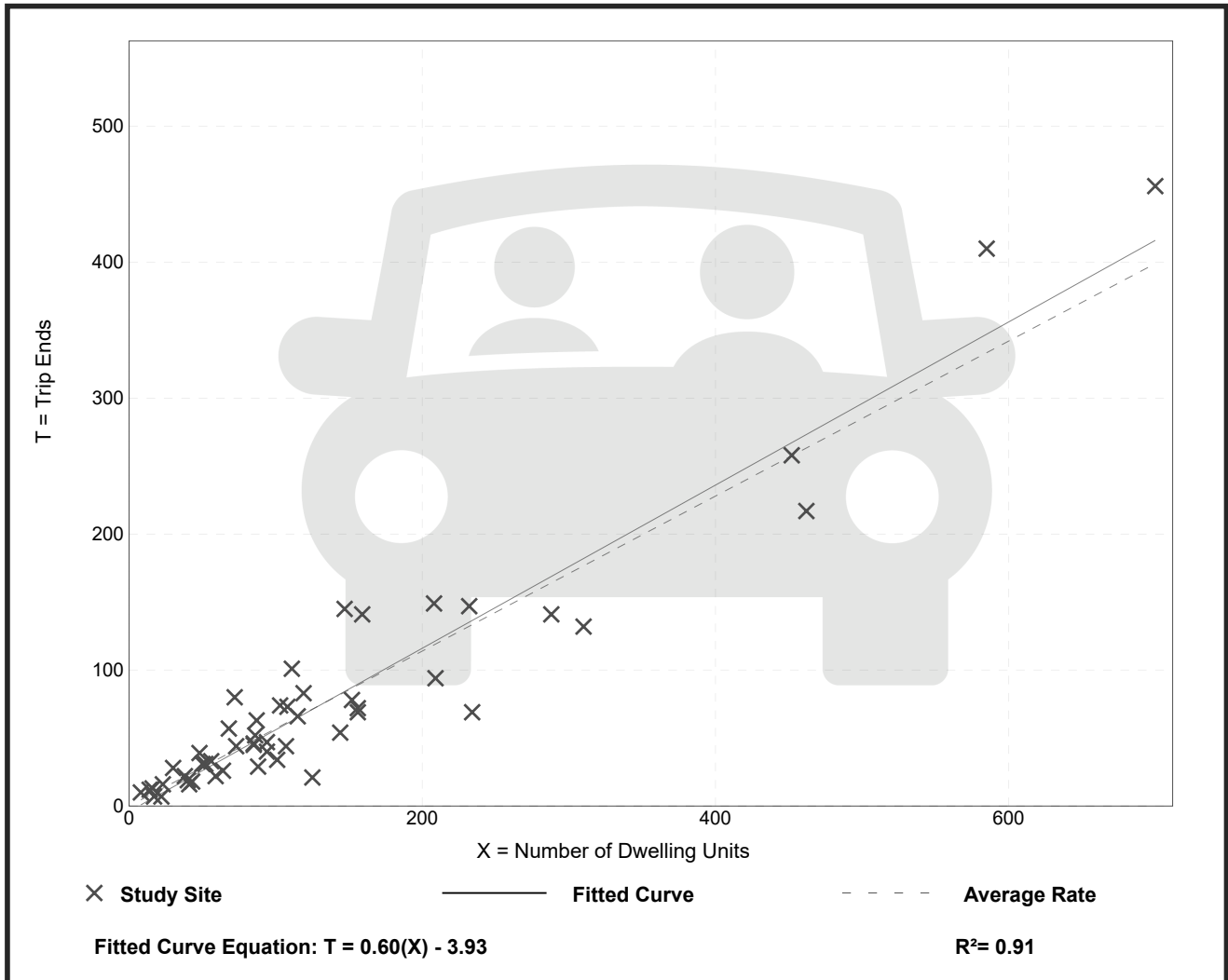
**Setting/Location: General Urban/Suburban**

Number of Studies: 51  
 Avg. Num. of Dwelling Units: 136  
 Directional Distribution: 59% entering, 41% exiting

## Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.57	0.17 - 1.25	0.18

## Data Plot and Equation



# Senior Adult Housing - Multifamily (252)

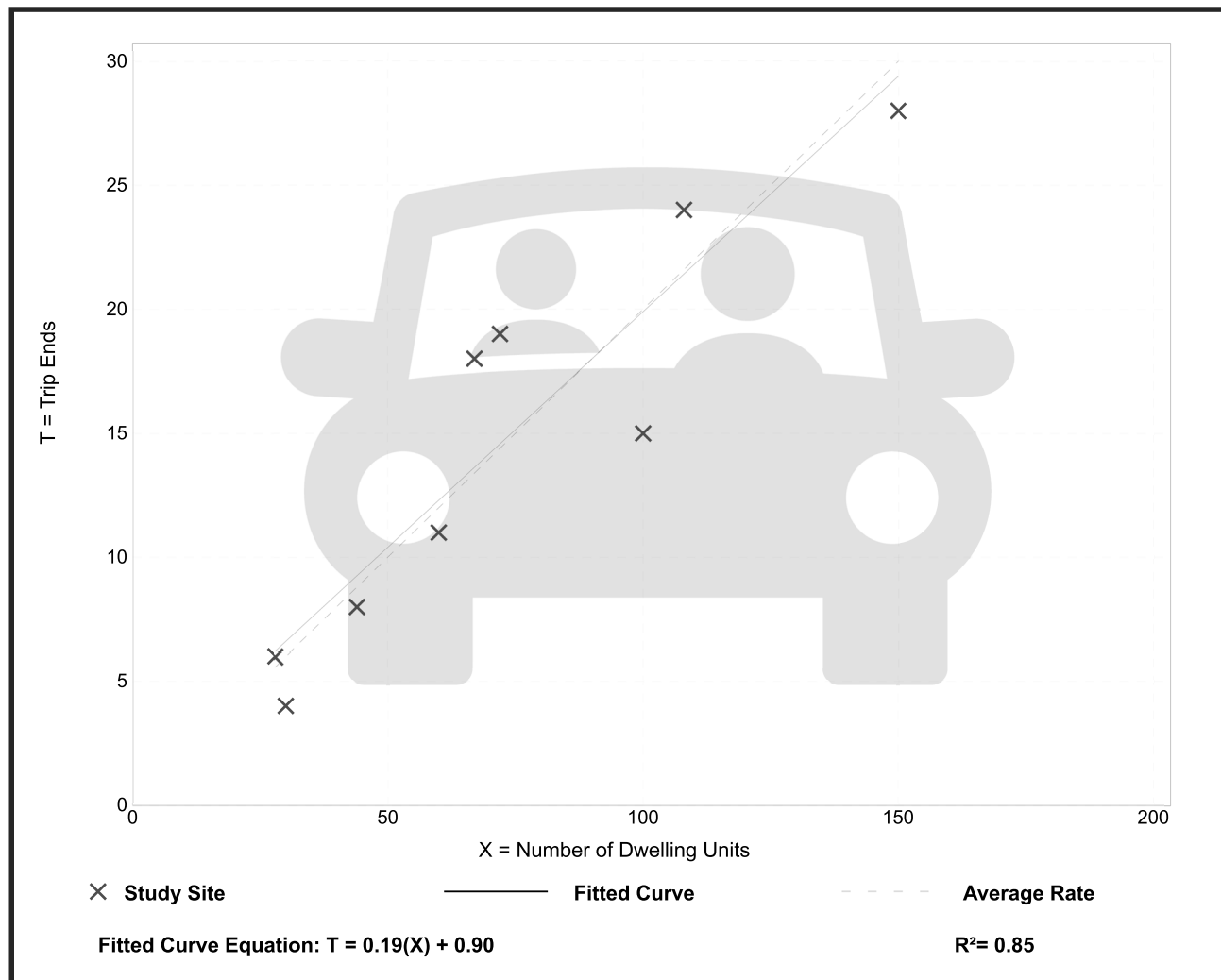
**Vehicle Trip Ends vs: Dwelling Units**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 7 and 9 a.m.**

**Setting/Location: General Urban/Suburban**  
 Number of Studies: 9  
 Avg. Num. of Dwelling Units: 73  
 Directional Distribution: 34% entering, 66% exiting

## Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.20	0.13 - 0.27	0.04

## Data Plot and Equation





# Senior Adult Housing - Multifamily (252)

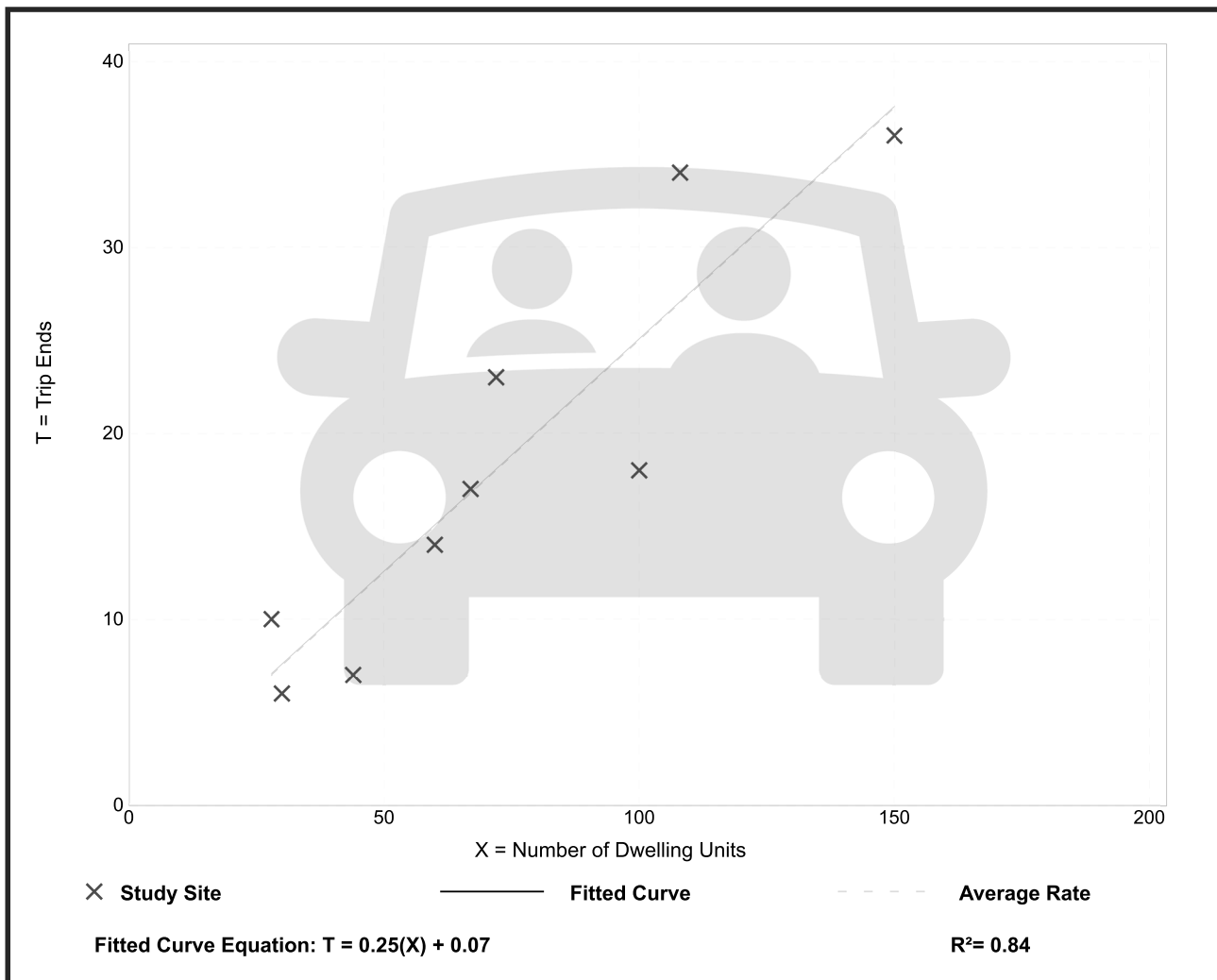
**Vehicle Trip Ends vs: Dwelling Units**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 4 and 6 p.m.**

**Setting/Location: General Urban/Suburban**  
 Number of Studies: 9  
 Avg. Num. of Dwelling Units: 73  
 Directional Distribution: 56% entering, 44% exiting

## Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.25	0.16 - 0.36	0.06

## Data Plot and Equation



**APPENDIX C: LOS CALCULATIONS – EXISTING CONDITIONS**



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	12	172	39	14	14	129	671	53	30	1271	125
Future Volume (vph)	20	12	172	39	14	14	129	671	53	30	1271	125
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	160		140	145		225
Storage Lanes	2		0	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.860					0.850		0.850			0.850
Flt Protected	0.950			0.950	0.976		0.950			0.950		
Satd. Flow (prot)	3502	1581	0	1665	1677	1509	1752	3343	1482	1752	3505	1615
Flt Permitted	0.950			0.950	0.976		0.136			0.369		
Satd. Flow (perm)	3502	1581	0	1665	1677	1509	251	3343	1482	681	3505	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		187				62			104			95
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		595			761			833			999	
Travel Time (s)		13.5			17.3			14.2			17.0	
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
Heavy Vehicles (%)	0%	8%	3%	3%	7%	7%	3%	8%	9%	3%	3%	0%
Adj. Flow (vph)	22	13	187	42	15	15	140	729	58	33	1382	136
Shared Lane Traffic (%)				33%								
Lane Group Flow (vph)	22	200	0	28	29	15	140	729	58	33	1382	136
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)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes			Yes	
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)	15		9	15		9	15		9	15		9
Turn Type	Split	NA		Split	NA	pm+ov	pm+pt	NA	Perm	pm+pt	NA	pm+ov
Protected Phases	4	4		8	8	1	5	2		1	6	4
Permitted Phases						8	2		2	6		6
Detector Phase	4	4		8	8	1	5	2	2	1	6	4
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	3.0	3.0	15.0	15.0	3.0	15.0	6.0
Minimum Split (s)	35.1	35.1		40.1	40.1	11.0	11.0	34.0	34.0	11.0	34.0	35.1
Total Split (s)	35.0	35.0		40.0	40.0	25.0	25.0	60.0	60.0	25.0	60.0	35.0
Total Split (%)	21.9%	21.9%		25.0%	25.0%	15.6%	15.6%	37.5%	37.5%	15.6%	37.5%	21.9%
Maximum Green (s)	28.9	28.9		33.9	33.9	19.0	19.0	54.0	54.0	19.0	54.0	28.9
Yellow Time (s)	3.2	3.2		3.2	3.2	3.9	3.9	3.9	3.9	3.9	3.9	3.2
All-Red Time (s)	2.9	2.9		2.9	2.9	2.1	2.1	2.1	2.1	2.1	2.1	2.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1		6.1	6.1	6.0	6.0	6.0	6.0	6.0	6.0	6.1
Lead/Lag						Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	2.7	2.7	3.0	2.7	3.0
Recall Mode	Min	Min		Min	Min	None	None	C-Max	C-Max	None	C-Max	Min

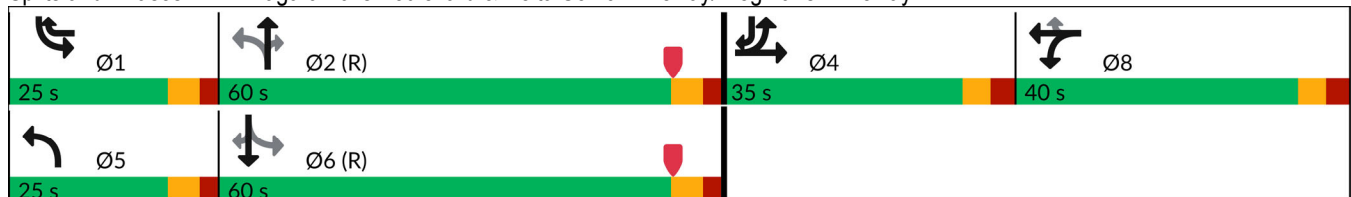


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	22.0	22.0		27.0	27.0			21.0	21.0		21.0	22.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	0
Act Effect Green (s)	9.3	9.3		8.4	8.4	20.7	122.5	114.2	114.2	114.0	107.8	123.1
Actuated g/C Ratio	0.06	0.06		0.05	0.05	0.13	0.77	0.71	0.71	0.71	0.67	0.77
v/c Ratio	0.10	0.74		0.32	0.33	0.06	0.48	0.30	0.05	0.06	0.58	0.10
Control Delay (s/veh)	70.0	28.5		82.0	82.4	0.4	24.4	6.6	0.2	5.9	16.7	2.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	70.0	28.5		82.0	82.4	0.4	24.4	6.6	0.2	5.9	16.7	2.1
LOS	E	C		F	F	A	C	A	A	A	B	A
Approach Delay (s/veh)		32.6			65.2			8.9			15.3	
Approach LOS		C			E			A			B	
Queue Length 50th (ft)	11	13		30	31	0	47	92	0	6	351	9
Queue Length 95th (ft)	26	97		67	69	0	128	133	m1	20	605	33
Internal Link Dist (ft)		515			681			753			919	
Turn Bay Length (ft)							160		140	145		225
Base Capacity (vph)	632	438		352	355	365	372	2385	1087	652	2361	1450
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.46		0.08	0.08	0.04	0.38	0.31	0.05	0.05	0.59	0.09

Intersection Summary

Area Type: Other  
 Cycle Length: 160  
 Actuated Cycle Length: 160  
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow  
 Natural Cycle: 145  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.75  
 Intersection Signal Delay (s/veh): 15.8      Intersection LOS: B  
 Intersection Capacity Utilization 74.8%      ICU Level of Service D  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Niagara Falls Boulevard & Delta Sonic Driveway/Wegmans Driveway



Lanes, Volumes, Timings  
 2: Niagara Falls Boulevard & East Robinson Road

2024 Existing AM  
 03/25/2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕		↖	↕		↖	↕		↖	↕	
Traffic Volume (vph)	87	329	193	158	100	159	48	684	71	270	1085	48
Future Volume (vph)	87	329	193	158	100	159	48	684	71	270	1085	48
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	105		0	235		0	145		0	295		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	35			50			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.945			0.908			0.986			0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3305	0	1626	3152	0	1736	3327	0	1752	3447	0
Flt Permitted	0.572			0.113			0.112			0.189		
Satd. Flow (perm)	1065	3305	0	193	3152	0	205	3327	0	349	3447	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		65			181			8			3	
Link Speed (mph)		30			40			40			40	
Link Distance (ft)		1369			1445			678			833	
Travel Time (s)		31.1			24.6			11.6			14.2	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	2%	1%	7%	11%	4%	4%	4%	7%	7%	3%	4%	6%
Adj. Flow (vph)	99	374	219	180	114	181	55	777	81	307	1233	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	99	593	0	180	295	0	55	858	0	307	1288	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane					Yes			Yes			Yes	
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)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	3.0	6.0		3.0	6.0		3.0	15.0		1.0	15.0	
Minimum Split (s)	10.1	39.1		10.1	39.1		9.6	38.6		9.5	38.6	
Total Split (s)	22.0	36.0		29.0	43.0		35.0	70.0		25.0	60.0	
Total Split (%)	13.8%	22.5%		18.1%	26.9%		21.9%	43.8%		15.6%	37.5%	
Maximum Green (s)	14.9	28.9		21.9	35.9		28.4	63.4		18.4	53.4	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.1	3.1		3.1	3.1		2.6	2.6		2.6	2.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.1	7.1		7.1	7.1		6.6	6.6		6.6	6.6	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	2.7		3.0	2.7		3.0	2.7		3.0	2.7	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	

Lanes, Volumes, Timings  
 2: Niagara Falls Boulevard & East Robinson Road

2024 Existing AM  
 03/25/2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		25.0			25.0			25.0			25.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	39.7	28.2		55.0	36.4		74.6	66.7		91.2	79.2	
Actuated g/C Ratio	0.25	0.18		0.34	0.23		0.47	0.42		0.57	0.50	
v/c Ratio	0.31	0.93		0.74	0.34		0.32	0.61		0.86	0.75	
Control Delay (s/veh)	39.1	80.0		59.6	20.3		22.5	39.3		45.0	25.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	39.1	80.0		59.6	20.3		22.5	39.3		45.0	25.2	
LOS	D	F		E	C		C	D		D	C	
Approach Delay (s/veh)		74.2			35.2			38.4			29.1	
Approach LOS		E			D			D			C	
Queue Length 50th (ft)	70	292		135	49		26	378		111	607	
Queue Length 95th (ft)	114	#384		215	92		48	441		#283	626	
Internal Link Dist (ft)		1289			1365			598			753	
Turn Bay Length (ft)	105			235			145			295		
Base Capacity (vph)	352	650		262	873		388	1391		360	1706	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.28	0.91		0.69	0.34		0.14	0.62		0.85	0.75	

Intersection Summary

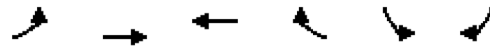
Area Type: Other  
 Cycle Length: 160  
 Actuated Cycle Length: 160  
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow  
 Natural Cycle: 110  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.93  
 Intersection Signal Delay (s/veh): 40.7      Intersection LOS: D  
 Intersection Capacity Utilization 83.0%      ICU Level of Service E  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 2: Niagara Falls Boulevard & East Robinson Road



Lanes, Volumes, Timings  
5: East Robinson Road & Naples Lane

2024 Existing AM  
03/25/2024



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	20	711	383	46	61	19
Future Volume (vph)	20	711	383	46	61	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.984		0.968	
Flt Protected	0.950				0.963	
Satd. Flow (prot)	1719	3539	3365	0	1730	0
Flt Permitted	0.950				0.963	
Satd. Flow (perm)	1719	3539	3365	0	1730	0
Link Speed (mph)		40	40		30	
Link Distance (ft)		1445	787		800	
Travel Time (s)		24.6	12.5		11.3	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	5%	2%	6%	2%	0%	10%
Adj. Flow (vph)	21	756	407	49	65	20
Shared Lane Traffic (%)						
Lane Group Flow (vph)	21	756	456	0	85	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)		16	16		16	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	30.9%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	711	383	46	61	19
Future Vol, veh/h	20	711	383	46	61	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	5	2	6	2	0	10
Mvmt Flow	21	756	407	49	65	20

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	456	0	-	0	853 228
Stage 1	-	-	-	-	432 -
Stage 2	-	-	-	-	421 -
Critical Hdwy	4.2	-	-	-	6.8 7.1
Critical Hdwy Stg 1	-	-	-	-	5.8 -
Critical Hdwy Stg 2	-	-	-	-	5.8 -
Follow-up Hdwy	2.25	-	-	-	3.5 3.4
Pot Cap-1 Maneuver	1080	-	-	-	302 750
Stage 1	-	-	-	-	628 -
Stage 2	-	-	-	-	636 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1080	-	-	-	296 750
Mov Cap-2 Maneuver	-	-	-	-	421 -
Stage 1	-	-	-	-	616 -
Stage 2	-	-	-	-	636 -

Approach	EB	WB	SB
HCM Control Delay, s/v	0.23	0	14.35
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1080	-	-	-	470
HCM Lane V/C Ratio	0.02	-	-	-	0.181
HCM Control Delay (s/veh)	8.4	-	-	-	14.4
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	43	196	174	40	88	232	1109	161	86	929	103
Future Volume (vph)	84	43	196	174	40	88	232	1109	161	86	929	103
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	160		140	145		225
Storage Lanes	2		0	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.877				0.850			0.850			0.850
Flt Protected	0.950			0.950	0.969		0.950			0.950		
Satd. Flow (prot)	3502	1653	0	1715	1749	1615	1805	3574	1599	1805	3539	1615
Flt Permitted	0.950			0.950	0.969		0.219			0.202		
Satd. Flow (perm)	3502	1653	0	1715	1749	1615	416	3574	1599	384	3539	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		113				89			92			93
Link Speed (mph)		30			30			40				40
Link Distance (ft)		595			761			833				999
Travel Time (s)		13.5			17.3			14.2				17.0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	1%	1%	0%	2%	0%
Adj. Flow (vph)	85	43	198	176	40	89	234	1120	163	87	938	104
Shared Lane Traffic (%)				39%								
Lane Group Flow (vph)	85	241	0	107	109	89	234	1120	163	87	938	104
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)		24			24			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane								Yes				Yes
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)	15		9	15		9	15		9	15		9
Turn Type	Split	NA		Split	NA	pm+ov	pm+pt	NA	Perm	pm+pt	NA	pm+ov
Protected Phases	4	4		8	8	1	5	2		1	6	4
Permitted Phases						8	2		2	6		6
Detector Phase	4	4		8	8	1	5	2	2	1	6	4
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	3.0	3.0	15.0	15.0	3.0	15.0	6.0
Minimum Split (s)	35.1	35.1		40.1	40.1	11.0	11.0	34.0	34.0	11.0	34.0	35.1
Total Split (s)	40.0	40.0		40.0	40.0	30.0	35.0	70.0	70.0	30.0	65.0	40.0
Total Split (%)	22.2%	22.2%		22.2%	22.2%	16.7%	19.4%	38.9%	38.9%	16.7%	36.1%	22.2%
Maximum Green (s)	33.9	33.9		33.9	33.9	24.0	29.0	64.0	64.0	24.0	59.0	33.9
Yellow Time (s)	3.2	3.2		3.2	3.2	3.9	3.9	3.9	3.9	3.9	3.9	3.2
All-Red Time (s)	2.9	2.9		2.9	2.9	2.1	2.1	2.1	2.1	2.1	2.1	2.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1		6.1	6.1	6.0	6.0	6.0	6.0	6.0	6.0	6.1
Lead/Lag						Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	2.7	2.7	3.0	2.7	3.0
Recall Mode	Min	Min		Min	Min	None	None	C-Max	C-Max	None	C-Max	Min

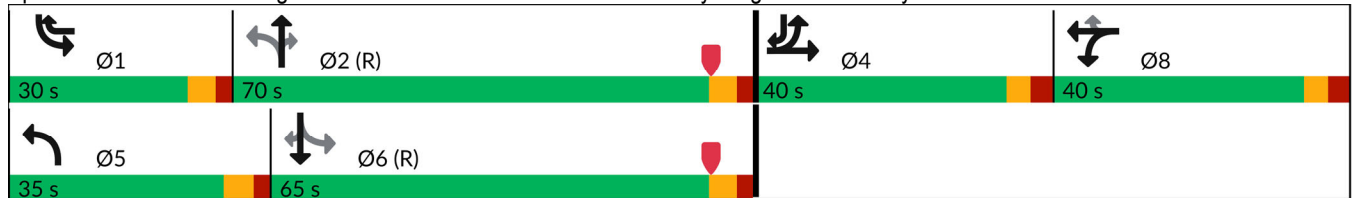


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	22.0	22.0		27.0	27.0			21.0	21.0		21.0	22.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	0
Act Effct Green (s)	20.4	20.4		16.6	16.6	32.8	124.1	108.7	108.7	110.7	100.6	127.0
Actuated g/C Ratio	0.11	0.11		0.09	0.09	0.18	0.69	0.60	0.60	0.62	0.56	0.71
v/c Ratio	0.21	0.83		0.67	0.67	0.24	0.54	0.51	0.16	0.27	0.47	0.08
Control Delay (s/veh)	71.3	64.5		99.3	98.9	10.8	23.9	16.9	6.7	14.1	28.1	2.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay (s/veh)	71.3	64.5		99.3	98.9	10.8	23.9	17.1	6.7	14.1	28.1	2.8
LOS	E	E		F	F	B	C	B	A	B	C	A
Approach Delay (s/veh)		66.3			73.4			17.1			24.7	
Approach LOS		E			E			B			C	
Queue Length 50th (ft)	47	154		131	133	0	73	237	10	31	340	4
Queue Length 95th (ft)	73	249		202	204	50	m204	351	m50	70	550	32
Internal Link Dist (ft)		515			681			753			919	
Turn Bay Length (ft)							160		140	145		225
Base Capacity (vph)	659	403		322	329	484	512	2157	1001	449	1977	1280
Starvation Cap Reductn	0	0		0	0	0	0	283	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.60		0.33	0.33	0.18	0.46	0.60	0.16	0.19	0.47	0.08

Intersection Summary

Area Type: Other  
 Cycle Length: 180  
 Actuated Cycle Length: 180  
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow  
 Natural Cycle: 135  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.84  
 Intersection Signal Delay (s/veh): 29.8      Intersection LOS: C  
 Intersection Capacity Utilization 78.9%      ICU Level of Service D  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Niagara Falls Boulevard & Delta Sonic Driveway/Wegmans Driveway



Lanes, Volumes, Timings  
2: Niagara Falls Boulevard & East Robinson Road

2024 Existing PM  
03/25/2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	149	220	100	200	403	281	184	1128	86	197	952	163
Future Volume (vph)	149	220	100	200	403	281	184	1128	86	197	952	163
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	105		0	235		0	145		0	295		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	35			50			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.953			0.938			0.989			0.978	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3417	0	1752	3353	0	1770	3525	0	1770	3496	0
Flt Permitted	0.124			0.365			0.120			0.074		
Satd. Flow (perm)	236	3417	0	673	3353	0	224	3525	0	138	3496	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37			89			5			11	
Link Speed (mph)		30			40			40			40	
Link Distance (ft)		1369			1445			678			833	
Travel Time (s)		31.1			24.6			11.6			14.2	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	1%	0%	3%	1%	1%	2%	1%	5%	2%	1%	1%
Adj. Flow (vph)	152	224	102	204	411	287	188	1151	88	201	971	166
Shared Lane Traffic (%)												
Lane Group Flow (vph)	152	326	0	204	698	0	188	1239	0	201	1137	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane					Yes			Yes			Yes	
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)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	3.0	6.0		3.0	6.0		3.0	15.0		1.0	15.0	
Minimum Split (s)	10.1	39.1		10.1	39.1		9.6	38.6		9.5	38.6	
Total Split (s)	35.0	45.0		35.0	45.0		35.0	65.0		35.0	65.0	
Total Split (%)	19.4%	25.0%		19.4%	25.0%		19.4%	36.1%		19.4%	36.1%	
Maximum Green (s)	27.9	37.9		27.9	37.9		28.4	58.4		28.4	58.4	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.1	3.1		3.1	3.1		2.6	2.6		2.6	2.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.1	7.1		7.1	7.1		6.6	6.6		6.6	6.6	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	2.7		3.0	2.7		3.0	2.7		3.0	2.7	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	

Lanes, Volumes, Timings  
 2: Niagara Falls Boulevard & East Robinson Road

2024 Existing PM  
 03/25/2024

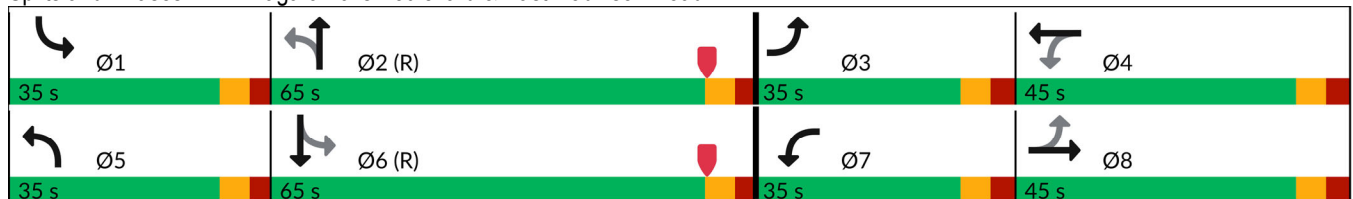


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		25.0			25.0			25.0			25.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effect Green (s)	49.5	32.3		57.4	36.2		96.6	77.8		101.7	80.4	
Actuated g/C Ratio	0.28	0.18		0.32	0.20		0.54	0.43		0.57	0.45	
v/c Ratio	0.70	0.50		0.59	0.93		0.66	0.81		0.74	0.72	
Control Delay (s/veh)	63.4	61.5		51.5	81.6		36.5	50.6		76.9	35.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	63.4	61.5		51.5	81.6		36.5	50.6		76.9	35.3	
LOS	E	E		D	F		D	D		E	D	
Approach Delay (s/veh)		62.1			74.9			48.8			41.6	
Approach LOS		E			E			D			D	
Queue Length 50th (ft)	129	163		180	380		102	679		159	625	
Queue Length 95th (ft)	195	217		242	#487		196	#943		284	#809	
Internal Link Dist (ft)		1289			1365			598			753	
Turn Bay Length (ft)	105			235			145			295		
Base Capacity (vph)	319	748		391	776		373	1526		337	1566	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.48	0.44		0.52	0.90		0.50	0.81		0.60	0.73	

Intersection Summary

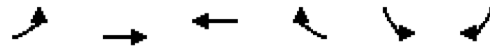
Area Type: Other  
 Cycle Length: 180  
 Actuated Cycle Length: 180  
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow  
 Natural Cycle: 110  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.94  
 Intersection Signal Delay (s/veh): 53.7      Intersection LOS: D  
 Intersection Capacity Utilization 96.1%      ICU Level of Service F  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 2: Niagara Falls Boulevard & East Robinson Road



Lanes, Volumes, Timings  
5: East Robinson Road & Naples Lane

2024 Existing PM  
03/25/2024



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	20	490	893	137	97	20
Future Volume (vph)	20	490	893	137	97	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.980		0.977	
Flt Protected	0.950				0.960	
Satd. Flow (prot)	1805	3539	3507	0	1767	0
Flt Permitted	0.950				0.960	
Satd. Flow (perm)	1805	3539	3507	0	1767	0
Link Speed (mph)		40	40		30	
Link Distance (ft)		1445	787		800	
Travel Time (s)		24.6	12.5		11.3	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%
Adj. Flow (vph)	20	500	911	140	99	20
Shared Lane Traffic (%)						
Lane Group Flow (vph)	20	500	1051	0	119	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)		16	16		16	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	42.3%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	490	893	137	97	20
Future Vol, veh/h	20	490	893	137	97	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	0	2	1	0	1	0
Mvmt Flow	20	500	911	140	99	20

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	1051	0	-	0	1272
Stage 1	-	-	-	-	981
Stage 2	-	-	-	-	291
Critical Hdwy	4.1	-	-	-	6.82
Critical Hdwy Stg 1	-	-	-	-	5.82
Critical Hdwy Stg 2	-	-	-	-	5.82
Follow-up Hdwy	2.2	-	-	-	3.51
Pot Cap-1 Maneuver	670	-	-	-	161
Stage 1	-	-	-	-	326
Stage 2	-	-	-	-	736
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	670	-	-	-	156
Mov Cap-2 Maneuver	-	-	-	-	257
Stage 1	-	-	-	-	316
Stage 2	-	-	-	-	736

Approach	EB	WB	SB
HCM Control Delay, s/v	0.41	0	27.04
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	670	-	-	-	280
HCM Lane V/C Ratio	0.03	-	-	-	0.426
HCM Control Delay (s/veh)	10.5	-	-	-	27
HCM Lane LOS	B	-	-	-	D
HCM 95th %tile Q(veh)	0.1	-	-	-	2

## **APPENDIX D: LOS CALCULATIONS – BACKGROUND CONDITIONS**



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	12	175	40	14	14	131	681	54	30	1290	127
Future Volume (vph)	20	12	175	40	14	14	131	681	54	30	1290	127
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	160		140	145		225
Storage Lanes	2		0	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.860					0.850		0.850			0.850
Flt Protected	0.950			0.950	0.976		0.950			0.950		
Satd. Flow (prot)	3502	1581	0	1665	1677	1509	1752	3343	1482	1752	3505	1615
Flt Permitted	0.950			0.950	0.976		0.131			0.365		
Satd. Flow (perm)	3502	1581	0	1665	1677	1509	242	3343	1482	673	3505	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		190				62			104			95
Link Speed (mph)		30			30			40				40
Link Distance (ft)		595			761			833				999
Travel Time (s)		13.5			17.3			14.2				17.0
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
Heavy Vehicles (%)	0%	8%	3%	3%	7%	7%	3%	8%	9%	3%	3%	0%
Adj. Flow (vph)	22	13	190	43	15	15	142	740	59	33	1402	138
Shared Lane Traffic (%)				33%								
Lane Group Flow (vph)	22	203	0	29	29	15	142	740	59	33	1402	138
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)		24			24			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane								Yes				Yes
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)	15		9	15		9	15		9	15		9
Turn Type	Split	NA		Split	NA	pm+ov	pm+pt	NA	Perm	pm+pt	NA	pm+ov
Protected Phases	4	4		8	8	1	5	2		1	6	4
Permitted Phases						8	2		2	6		6
Detector Phase	4	4		8	8	1	5	2	2	1	6	4
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	3.0	3.0	15.0	15.0	3.0	15.0	6.0
Minimum Split (s)	35.1	35.1		40.1	40.1	11.0	11.0	34.0	34.0	11.0	34.0	35.1
Total Split (s)	35.0	35.0		40.0	40.0	25.0	25.0	60.0	60.0	25.0	60.0	35.0
Total Split (%)	21.9%	21.9%		25.0%	25.0%	15.6%	15.6%	37.5%	37.5%	15.6%	37.5%	21.9%
Maximum Green (s)	28.9	28.9		33.9	33.9	19.0	19.0	54.0	54.0	19.0	54.0	28.9
Yellow Time (s)	3.2	3.2		3.2	3.2	3.9	3.9	3.9	3.9	3.9	3.9	3.2
All-Red Time (s)	2.9	2.9		2.9	2.9	2.1	2.1	2.1	2.1	2.1	2.1	2.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1		6.1	6.1	6.0	6.0	6.0	6.0	6.0	6.0	6.1
Lead/Lag						Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	2.7	2.7	3.0	2.7	3.0
Recall Mode	Min	Min		Min	Min	None	None	C-Max	C-Max	None	C-Max	Min



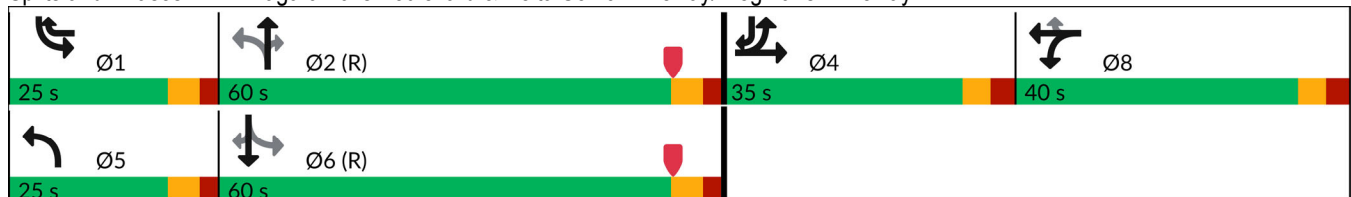


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	22.0	22.0		27.0	27.0			21.0	21.0		21.0	22.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	0
Act Effect Green (s)	9.3	9.3		8.4	8.4	20.7	122.6	114.2	114.2	113.9	107.6	122.9
Actuated g/C Ratio	0.06	0.06		0.05	0.05	0.13	0.77	0.71	0.71	0.71	0.67	0.77
v/c Ratio	0.10	0.74		0.33	0.33	0.06	0.50	0.31	0.05	0.06	0.59	0.10
Control Delay (s/veh)	70.0	28.4		82.6	82.4	0.4	26.6	8.6	0.9	6.0	17.0	2.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	70.0	28.4		82.6	82.4	0.4	26.6	8.6	0.9	6.0	17.1	2.2
LOS	E	C		F	F	A	C	A	A	A	B	A
Approach Delay (s/veh)		32.5			65.7			10.9			15.6	
Approach LOS		C			E			B			B	
Queue Length 50th (ft)	11	13		31	31	0	63	94	0	6	361	9
Queue Length 95th (ft)	26	98		69	69	0	m151	186	m3	20	623	34
Internal Link Dist (ft)		515			681			753			919	
Turn Bay Length (ft)							160		140	145		225
Base Capacity (vph)	632	441		352	355	365	367	2385	1086	646	2357	1449
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	3		0	0	0	0	0	0	0	64	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.46		0.08	0.08	0.04	0.39	0.31	0.05	0.05	0.61	0.10

Intersection Summary

Area Type: Other  
 Cycle Length: 160  
 Actuated Cycle Length: 160  
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow  
 Natural Cycle: 145  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.75  
 Intersection Signal Delay (s/veh): 16.7      Intersection LOS: B  
 Intersection Capacity Utilization 75.9%      ICU Level of Service D  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Niagara Falls Boulevard & Delta Sonic Driveway/Wegmans Driveway



Lanes, Volumes, Timings  
 2: Niagara Falls Boulevard & East Robinson Road

2027 Background AM  
 03/25/2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	334	196	160	102	161	49	694	72	274	1101	49
Future Volume (vph)	88	334	196	160	102	161	49	694	72	274	1101	49
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	105		0	235		0	145		0	295		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	35			50			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.945			0.908			0.986			0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3305	0	1626	3152	0	1736	3327	0	1752	3447	0
Flt Permitted	0.569			0.110			0.115			0.163		
Satd. Flow (perm)	1060	3305	0	188	3152	0	210	3327	0	301	3447	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		66			183			7			4	
Link Speed (mph)		30			40			40			40	
Link Distance (ft)		1369			1445			678			833	
Travel Time (s)		31.1			24.6			11.6			14.2	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	2%	1%	7%	11%	4%	4%	4%	7%	7%	3%	4%	6%
Adj. Flow (vph)	100	380	223	182	116	183	56	789	82	311	1251	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	100	603	0	182	299	0	56	871	0	311	1307	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane					Yes			Yes			Yes	
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)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	3.0	6.0		3.0	6.0		3.0	15.0		1.0	15.0	
Minimum Split (s)	10.1	39.1		10.1	39.1		9.6	38.6		9.5	38.6	
Total Split (s)	20.0	38.0		27.0	45.0		18.0	60.0		35.0	77.0	
Total Split (%)	12.5%	23.8%		16.9%	28.1%		11.3%	37.5%		21.9%	48.1%	
Maximum Green (s)	12.9	30.9		19.9	37.9		11.4	53.4		28.4	70.4	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.1	3.1		3.1	3.1		2.6	2.6		2.6	2.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.1	7.1		7.1	7.1		6.6	6.6		6.6	6.6	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	2.7		3.0	2.7		3.0	2.7		3.0	2.7	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	

Lanes, Volumes, Timings  
 2: Niagara Falls Boulevard & East Robinson Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		25.0			25.0			25.0			25.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effect Green (s)	40.5	29.3		55.2	37.0		68.9	61.0		91.0	79.0	
Actuated g/C Ratio	0.25	0.18		0.35	0.23		0.43	0.38		0.57	0.49	
v/c Ratio	0.31	0.91		0.78	0.34		0.33	0.68		0.81	0.76	
Control Delay (s/veh)	39.0	75.9		64.0	20.1		24.8	46.1		39.3	25.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.1	
Total Delay (s/veh)	39.0	75.9		64.0	20.1		24.8	46.1		39.3	25.7	
LOS	D	E		E	C		C	D		D	C	
Approach Delay (s/veh)		70.7			36.7			44.8			28.3	
Approach LOS		E			D			D			C	
Queue Length 50th (ft)	71	293		137	50		26	415		114	621	
Queue Length 95th (ft)	115	#366		#232	91		48	498		232	611	
Internal Link Dist (ft)		1289			1365			598			753	
Turn Bay Length (ft)	105			235			145			295		
Base Capacity (vph)	337	691		243	893		203	1272		428	1703	
Starvation Cap Reductn	0	0		0	0		0	0		0	32	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.30	0.87		0.75	0.33		0.28	0.68		0.73	0.78	

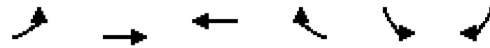
Intersection Summary

Area Type: Other  
 Cycle Length: 160  
 Actuated Cycle Length: 160  
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow  
 Natural Cycle: 110  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.91  
 Intersection Signal Delay (s/veh): 41.5      Intersection LOS: D  
 Intersection Capacity Utilization 83.9%      ICU Level of Service E  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 2: Niagara Falls Boulevard & East Robinson Road



Lanes, Volumes, Timings  
5: East Robinson Road & Naples Lane



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	20	722	389	47	62	19
Future Volume (vph)	20	722	389	47	62	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.984		0.969	
Flt Protected	0.950				0.963	
Satd. Flow (prot)	1719	3539	3365	0	1733	0
Flt Permitted	0.950				0.963	
Satd. Flow (perm)	1719	3539	3365	0	1733	0
Link Speed (mph)		40	40		30	
Link Distance (ft)		1445	787		800	
Travel Time (s)		24.6	12.5		11.3	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	5%	2%	6%	2%	0%	10%
Adj. Flow (vph)	21	768	414	50	66	20
Shared Lane Traffic (%)						
Lane Group Flow (vph)	21	768	464	0	86	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)		16	16		16	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	31.2%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	722	389	47	62	19
Future Vol, veh/h	20	722	389	47	62	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	5	2	6	2	0	10
Mvmt Flow	21	768	414	50	66	20

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	464	0	-	0	865 232
Stage 1	-	-	-	-	439 -
Stage 2	-	-	-	-	427 -
Critical Hdwy	4.2	-	-	-	6.8 7.1
Critical Hdwy Stg 1	-	-	-	-	5.8 -
Critical Hdwy Stg 2	-	-	-	-	5.8 -
Follow-up Hdwy	2.25	-	-	-	3.5 3.4
Pot Cap-1 Maneuver	1073	-	-	-	297 746
Stage 1	-	-	-	-	623 -
Stage 2	-	-	-	-	632 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1073	-	-	-	291 746
Mov Cap-2 Maneuver	-	-	-	-	416 -
Stage 1	-	-	-	-	611 -
Stage 2	-	-	-	-	632 -

Approach	EB	WB	SB
HCM Control Delay, s/v	0.23	0	14.51
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1073	-	-	-	464
HCM Lane V/C Ratio	0.02	-	-	-	0.186
HCM Control Delay (s/veh)	8.4	-	-	-	14.5
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	44	199	177	41	89	235	1126	163	87	943	105
Future Volume (vph)	85	44	199	177	41	89	235	1126	163	87	943	105
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	160		140	145		225
Storage Lanes	2		0	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.877				0.850			0.850			0.850
Flt Protected	0.950			0.950	0.969		0.950			0.950		
Satd. Flow (prot)	3502	1653	0	1715	1749	1615	1805	3574	1599	1805	3539	1615
Flt Permitted	0.950			0.950	0.969		0.211			0.197		
Satd. Flow (perm)	3502	1653	0	1715	1749	1615	401	3574	1599	374	3539	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		113				90			92			94
Link Speed (mph)		30			30			40				40
Link Distance (ft)		595			761			833				999
Travel Time (s)		13.5			17.3			14.2				17.0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	1%	1%	0%	2%	0%
Adj. Flow (vph)	86	44	201	179	41	90	237	1137	165	88	953	106
Shared Lane Traffic (%)				39%								
Lane Group Flow (vph)	86	245	0	109	111	90	237	1137	165	88	953	106
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)		24			24			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane								Yes				Yes
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)	15		9	15		9	15		9	15		9
Turn Type	Split	NA		Split	NA	pm+ov	pm+pt	NA	Perm	pm+pt	NA	pm+ov
Protected Phases	4	4		8	8	1	5	2		1	6	4
Permitted Phases						8	2		2	6		6
Detector Phase	4	4		8	8	1	5	2	2	1	6	4
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	3.0	3.0	15.0	15.0	3.0	15.0	6.0
Minimum Split (s)	35.1	35.1		40.1	40.1	11.0	11.0	34.0	34.0	11.0	34.0	35.1
Total Split (s)	40.0	40.0		40.0	40.0	30.0	35.0	70.0	70.0	30.0	65.0	40.0
Total Split (%)	22.2%	22.2%		22.2%	22.2%	16.7%	19.4%	38.9%	38.9%	16.7%	36.1%	22.2%
Maximum Green (s)	33.9	33.9		33.9	33.9	24.0	29.0	64.0	64.0	24.0	59.0	33.9
Yellow Time (s)	3.2	3.2		3.2	3.2	3.9	3.9	3.9	3.9	3.9	3.9	3.2
All-Red Time (s)	2.9	2.9		2.9	2.9	2.1	2.1	2.1	2.1	2.1	2.1	2.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1		6.1	6.1	6.0	6.0	6.0	6.0	6.0	6.0	6.1
Lead/Lag						Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	2.7	2.7	3.0	2.7	3.0
Recall Mode	Min	Min		Min	Min	None	None	C-Max	C-Max	None	C-Max	Min

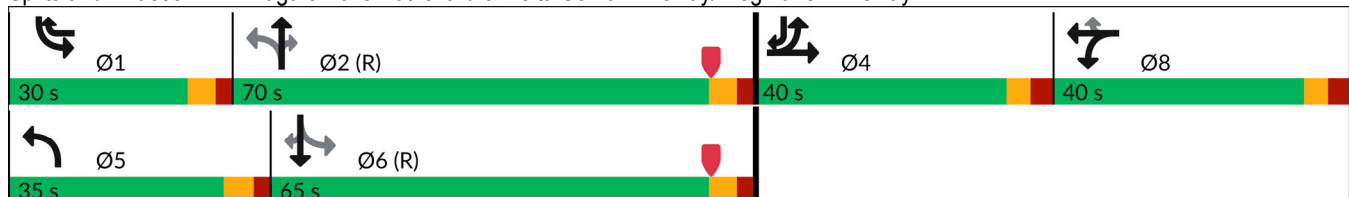


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	22.0	22.0		27.0	27.0			21.0	21.0		21.0	22.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	0
Act Effct Green (s)	20.9	20.9		16.8	16.8	33.1	123.5	107.9	107.9	109.4	99.2	126.0
Actuated g/C Ratio	0.12	0.12		0.09	0.09	0.18	0.69	0.60	0.60	0.61	0.55	0.70
v/c Ratio	0.21	0.84		0.68	0.68	0.24	0.56	0.53	0.16	0.28	0.48	0.09
Control Delay (s/veh)	70.9	65.0		99.3	98.9	10.7	25.9	17.5	7.1	14.7	29.2	2.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay (s/veh)	70.9	65.0		99.3	98.9	10.7	25.9	17.7	7.1	14.7	29.2	2.9
LOS	E	E		F	F	B	C	B	A	B	C	A
Approach Delay (s/veh)		66.5			73.5			17.9			25.7	
Approach LOS		E			E			B			C	
Queue Length 50th (ft)	48	160		133	135	0	87	241	10	32	355	4
Queue Length 95th (ft)	73	253		204	208	50	m208	356	m49	71	566	33
Internal Link Dist (ft)		515			681			753			919	
Turn Bay Length (ft)							160		140	145		225
Base Capacity (vph)	659	403		322	329	487	502	2142	995	441	1950	1269
Starvation Cap Reductn	0	0		0	0	0	0	278	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.61		0.34	0.34	0.18	0.47	0.61	0.17	0.20	0.49	0.08

Intersection Summary

Area Type: Other  
 Cycle Length: 180  
 Actuated Cycle Length: 180  
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow  
 Natural Cycle: 135  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.84  
 Intersection Signal Delay (s/veh): 30.6      Intersection LOS: C  
 Intersection Capacity Utilization 79.8%      ICU Level of Service D  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Niagara Falls Boulevard & Delta Sonic Driveway/Wegmans Driveway



Lanes, Volumes, Timings  
 2: Niagara Falls Boulevard & East Robinson Road

2027 Background PM  
 03/25/2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	151	223	102	203	409	285	187	1145	87	200	966	165
Future Volume (vph)	151	223	102	203	409	285	187	1145	87	200	966	165
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	105		0	235		0	145		0	295		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	35			50			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.953			0.938			0.989			0.978	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3417	0	1752	3353	0	1770	3525	0	1770	3496	0
Flt Permitted	0.123			0.359			0.111			0.067		
Satd. Flow (perm)	234	3417	0	662	3353	0	207	3525	0	125	3496	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37			89			5			11	
Link Speed (mph)		30			40			40			40	
Link Distance (ft)		1369			1445			678			833	
Travel Time (s)		31.1			24.6			11.6			14.2	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	1%	0%	3%	1%	1%	2%	1%	5%	2%	1%	1%
Adj. Flow (vph)	154	228	104	207	417	291	191	1168	89	204	986	168
Shared Lane Traffic (%)												
Lane Group Flow (vph)	154	332	0	207	708	0	191	1257	0	204	1154	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane					Yes			Yes			Yes	
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)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	3.0	6.0		3.0	6.0		3.0	15.0		1.0	15.0	
Minimum Split (s)	10.1	39.1		10.1	39.1		9.6	38.6		9.5	38.6	
Total Split (s)	35.0	45.0		35.0	45.0		35.0	65.0		35.0	65.0	
Total Split (%)	19.4%	25.0%		19.4%	25.0%		19.4%	36.1%		19.4%	36.1%	
Maximum Green (s)	27.9	37.9		27.9	37.9		28.4	58.4		28.4	58.4	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.1	3.1		3.1	3.1		2.6	2.6		2.6	2.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.1	7.1		7.1	7.1		6.6	6.6		6.6	6.6	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	2.7		3.0	2.7		3.0	2.7		3.0	2.7	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	



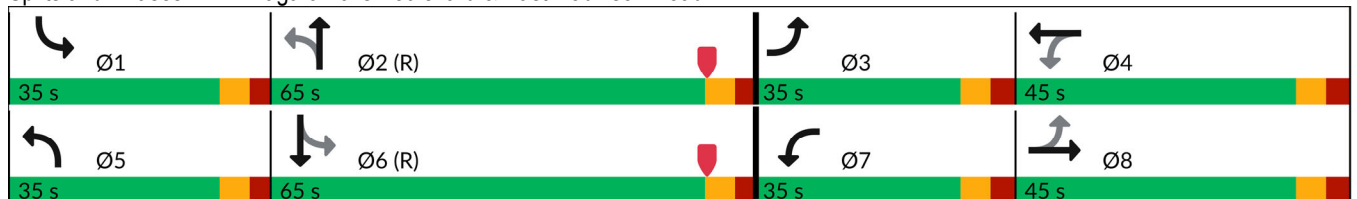
Lanes, Volumes, Timings  
 2: Niagara Falls Boulevard & East Robinson Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		25.0			25.0			25.0			25.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	50.0	32.6		58.0	36.6		96.2	77.1		101.0	79.5	
Actuated g/C Ratio	0.28	0.18		0.32	0.20		0.53	0.43		0.56	0.44	
v/c Ratio	0.70	0.51		0.60	0.94		0.69	0.83		0.76	0.74	
Control Delay (s/veh)	63.5	61.6		51.4	82.3		40.6	52.1		82.8	35.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	63.5	61.6		51.4	82.3		40.6	52.1		82.8	35.8	
LOS	E	E		D	F		D	D		F	D	
Approach Delay (s/veh)		62.2			75.4			50.6			42.9	
Approach LOS		E			E			D			D	
Queue Length 50th (ft)	131	166		183	387		108	698		175	642	
Queue Length 95th (ft)	198	221		246	#502		209	#969		294	#837	
Internal Link Dist (ft)		1289			1365			598			753	
Turn Bay Length (ft)	105			235			145			295		
Base Capacity (vph)	320	748		391	776		365	1512		331	1550	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.48	0.44		0.53	0.91		0.52	0.83		0.62	0.74	

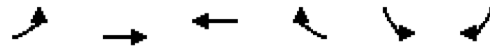
Intersection Summary

Area Type: Other  
 Cycle Length: 180  
 Actuated Cycle Length: 180  
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow  
 Natural Cycle: 120  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.94  
 Intersection Signal Delay (s/veh): 54.9      Intersection LOS: D  
 Intersection Capacity Utilization 97.1%      ICU Level of Service F  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 2: Niagara Falls Boulevard & East Robinson Road



Lanes, Volumes, Timings  
5: East Robinson Road & Naples Lane



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	20	497	906	139	98	20
Future Volume (vph)	20	497	906	139	98	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.980		0.977	
Flt Protected	0.950				0.960	
Satd. Flow (prot)	1805	3539	3507	0	1767	0
Flt Permitted	0.950				0.960	
Satd. Flow (perm)	1805	3539	3507	0	1767	0
Link Speed (mph)		40	40		30	
Link Distance (ft)		1445	787		800	
Travel Time (s)		24.6	12.5		11.3	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%
Adj. Flow (vph)	20	507	924	142	100	20
Shared Lane Traffic (%)						
Lane Group Flow (vph)	20	507	1066	0	120	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)		16	16		16	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	42.8%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	2.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑↑	↑↑		↘	
Traffic Vol, veh/h	20	497	906	139	98	20
Future Vol, veh/h	20	497	906	139	98	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	0	2	1	0	1	0
Mvmt Flow	20	507	924	142	100	20

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	1066	0	-	0	1290 533
Stage 1	-	-	-	-	995 -
Stage 2	-	-	-	-	294 -
Critical Hdwy	4.1	-	-	-	6.82 6.9
Critical Hdwy Stg 1	-	-	-	-	5.82 -
Critical Hdwy Stg 2	-	-	-	-	5.82 -
Follow-up Hdwy	2.2	-	-	-	3.51 3.3
Pot Cap-1 Maneuver	661	-	-	-	157 496
Stage 1	-	-	-	-	321 -
Stage 2	-	-	-	-	733 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	661	-	-	-	152 496
Mov Cap-2 Maneuver	-	-	-	-	252 -
Stage 1	-	-	-	-	311 -
Stage 2	-	-	-	-	733 -

Approach	EB	WB	SB
HCM Control Delay, s/v	0.41	0	27.85
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	661	-	-	-	275
HCM Lane V/C Ratio	0.031	-	-	-	0.437
HCM Control Delay (s/veh)	10.6	-	-	-	27.9
HCM Lane LOS	B	-	-	-	D
HCM 95th %tile Q(veh)	0.1	-	-	-	2.1

## **APPENDIX E: LOS CALCULATIONS – FULL BUILD CONDITIONS**



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	13	175	40	15	21	131	683	54	34	1291	127
Future Volume (vph)	20	13	175	40	15	21	131	683	54	34	1291	127
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	160		140	145		225
Storage Lanes	2		0	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.860				0.850			0.850			0.850
Flt Protected	0.950			0.950	0.977		0.950			0.950		
Satd. Flow (prot)	3502	1581	0	1665	1677	1509	1752	3343	1482	1752	3505	1615
Flt Permitted	0.950			0.950	0.977		0.130			0.364		
Satd. Flow (perm)	3502	1581	0	1665	1677	1509	240	3343	1482	671	3505	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		190				62			104			95
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		595			761			833			999	
Travel Time (s)		13.5			17.3			14.2			17.0	
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
Heavy Vehicles (%)	0%	8%	3%	3%	7%	7%	3%	8%	9%	3%	3%	0%
Adj. Flow (vph)	22	14	190	43	16	23	142	742	59	37	1403	138
Shared Lane Traffic (%)				32%								
Lane Group Flow (vph)	22	204	0	29	30	23	142	742	59	37	1403	138
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)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes			Yes	
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)	15		9	15		9	15		9	15		9
Turn Type	Split	NA		Split	NA	pm+ov	pm+pt	NA	Perm	pm+pt	NA	pm+ov
Protected Phases	4	4		8	8	1	5	2		1	6	4
Permitted Phases						8	2		2	6		6
Detector Phase	4	4		8	8	1	5	2	2	1	6	4
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	3.0	3.0	15.0	15.0	3.0	15.0	6.0
Minimum Split (s)	35.1	35.1		40.1	40.1	11.0	11.0	34.0	34.0	11.0	34.0	35.1
Total Split (s)	35.0	35.0		40.0	40.0	25.0	25.0	60.0	60.0	25.0	60.0	35.0
Total Split (%)	21.9%	21.9%		25.0%	25.0%	15.6%	15.6%	37.5%	37.5%	15.6%	37.5%	21.9%
Maximum Green (s)	28.9	28.9		33.9	33.9	19.0	19.0	54.0	54.0	19.0	54.0	28.9
Yellow Time (s)	3.2	3.2		3.2	3.2	3.9	3.9	3.9	3.9	3.9	3.9	3.2
All-Red Time (s)	2.9	2.9		2.9	2.9	2.1	2.1	2.1	2.1	2.1	2.1	2.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1		6.1	6.1	6.0	6.0	6.0	6.0	6.0	6.0	6.1
Lead/Lag						Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	2.7	2.7	3.0	2.7	3.0
Recall Mode	Min	Min		Min	Min	None	None	C-Max	C-Max	None	C-Max	Min

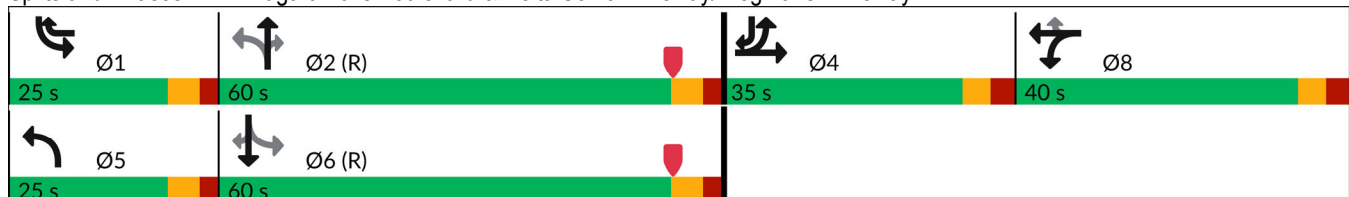


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	22.0	22.0		27.0	27.0			21.0	21.0		21.0	22.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	0
Act Effect Green (s)	9.4	9.4		8.5	8.5	20.9	122.4	113.9	113.9	113.7	107.4	122.8
Actuated g/C Ratio	0.06	0.06		0.05	0.05	0.13	0.77	0.71	0.71	0.71	0.67	0.77
v/c Ratio	0.10	0.75		0.33	0.34	0.09	0.50	0.31	0.05	0.07	0.59	0.10
Control Delay (s/veh)	69.8	28.7		82.2	82.6	0.7	26.8	8.9	1.0	6.0	17.2	2.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	69.8	28.8		82.2	82.6	0.7	26.8	8.9	1.0	6.0	17.2	2.2
LOS	E	C		F	F	A	C	A	A	A	B	A
Approach Delay (s/veh)		32.8			59.6			11.1			15.7	
Approach LOS		C			E			B			B	
Queue Length 50th (ft)	11	14		31	32	0	64	94	0	7	363	9
Queue Length 95th (ft)	26	99		69	71	0	m149	190	m4	22	626	34
Internal Link Dist (ft)		515			681			753			919	
Turn Bay Length (ft)							160		140	145		225
Base Capacity (vph)	632	441		352	355	365	365	2380	1085	644	2353	1447
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	3		0	0	0	0	0	0	0	62	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.47		0.08	0.08	0.06	0.39	0.31	0.05	0.06	0.61	0.10

Intersection Summary

Area Type: Other  
 Cycle Length: 160  
 Actuated Cycle Length: 160  
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow  
 Natural Cycle: 145  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.75  
 Intersection Signal Delay (s/veh): 16.8      Intersection LOS: B  
 Intersection Capacity Utilization 76.0%      ICU Level of Service D  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Niagara Falls Boulevard & Delta Sonic Driveway/Wegmans Driveway



Lanes, Volumes, Timings  
 2: Niagara Falls Boulevard & East Robinson Road

2027 Full AM  
 03/25/2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	336	196	174	106	163	49	694	79	275	1101	49
Future Volume (vph)	88	336	196	174	106	163	49	694	79	275	1101	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	105		0	235		0	145		0	295		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	35			50			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.945			0.909			0.985			0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3305	0	1626	3155	0	1736	3323	0	1752	3447	0
Flt Permitted	0.566			0.110			0.114			0.156		
Satd. Flow (perm)	1054	3305	0	188	3155	0	208	3323	0	288	3447	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		65			185			8			4	
Link Speed (mph)		30			40			40			40	
Link Distance (ft)		1369			915			678			833	
Travel Time (s)		31.1			15.6			11.6			14.2	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	2%	1%	7%	11%	4%	4%	4%	7%	7%	3%	4%	6%
Adj. Flow (vph)	100	382	223	198	120	185	56	789	90	313	1251	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	100	605	0	198	305	0	56	879	0	313	1307	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane					Yes			Yes			Yes	
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)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	3.0	6.0		3.0	6.0		3.0	15.0		1.0	15.0	
Minimum Split (s)	10.1	39.1		10.1	39.1		9.6	38.6		9.5	38.6	
Total Split (s)	20.0	38.0		27.0	45.0		18.0	60.0		35.0	77.0	
Total Split (%)	12.5%	23.8%		16.9%	28.1%		11.3%	37.5%		21.9%	48.1%	
Maximum Green (s)	12.9	30.9		19.9	37.9		11.4	53.4		28.4	70.4	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.1	3.1		3.1	3.1		2.6	2.6		2.6	2.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.1	7.1		7.1	7.1		6.6	6.6		6.6	6.6	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	2.7		3.0	2.7		3.0	2.7		3.0	2.7	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	

Lanes, Volumes, Timings  
 2: Niagara Falls Boulevard & East Robinson Road

2027 Full AM  
 03/25/2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		25.0			25.0			25.0			25.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	40.5	29.4		55.7	37.6		68.1	60.2		90.5	78.5	
Actuated g/C Ratio	0.25	0.18		0.35	0.24		0.43	0.38		0.57	0.49	
v/c Ratio	0.31	0.91		0.83	0.34		0.34	0.70		0.82	0.77	
Control Delay (s/veh)	38.9	76.4		70.2	20.3		25.1	46.9		42.0	25.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.1	
Total Delay (s/veh)	38.9	76.4		70.2	20.3		25.1	46.9		42.0	25.9	
LOS	D	E		E	C		C	D		D	C	
Approach Delay (s/veh)		71.1			40.0			45.6			29.1	
Approach LOS		E			D			D			C	
Queue Length 50th (ft)	71	295		154	52		26	422		124	620	
Queue Length 95th (ft)	115	#375		#271	93		48	504		244	603	
Internal Link Dist (ft)		1289			835			598			753	
Turn Bay Length (ft)	105			235			145			295		
Base Capacity (vph)	336	690		244	897		201	1255		422	1692	
Starvation Cap Reductn	0	0		0	0		0	0		0	33	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.30	0.88		0.81	0.34		0.28	0.70		0.74	0.79	

Intersection Summary

Area Type: Other  
 Cycle Length: 160  
 Actuated Cycle Length: 160  
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow  
 Natural Cycle: 110  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.92  
 Intersection Signal Delay (s/veh): 42.5      Intersection LOS: D  
 Intersection Capacity Utilization 85.0%      ICU Level of Service E  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

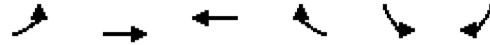
Splits and Phases: 2: Niagara Falls Boulevard & East Robinson Road





Lanes, Volumes, Timings  
 3: East Robinson Road & Proposed Westerly Driveway

2027 Full AM  
 03/25/2024



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	7	745	416	2	4	12
Future Volume (vph)	7	745	416	2	4	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.999		0.897	
Flt Protected	0.950				0.988	
Satd. Flow (prot)	1805	3539	3403	0	1684	0
Flt Permitted	0.950				0.988	
Satd. Flow (perm)	1805	3539	3403	0	1684	0
Link Speed (mph)		40	40		30	
Link Distance (ft)		915	280		504	
Travel Time (s)		15.6	4.8		11.5	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	2%	6%	0%	0%	0%
Adj. Flow (vph)	7	793	443	2	4	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	7	793	445	0	17	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)		16	16		16	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	30.6%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↙	↑↑	↑↑		↘	
Traffic Vol, veh/h	7	745	416	2	4	12
Future Vol, veh/h	7	745	416	2	4	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	2	6	0	0	0
Mvmt Flow	7	793	443	2	4	13

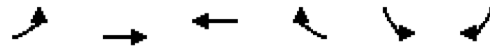
Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	445	0	-	0	855 222
Stage 1	-	-	-	-	444 -
Stage 2	-	-	-	-	411 -
Critical Hdwy	4.1	-	-	-	6.8 6.9
Critical Hdwy Stg 1	-	-	-	-	5.8 -
Critical Hdwy Stg 2	-	-	-	-	5.8 -
Follow-up Hdwy	2.2	-	-	-	3.5 3.3
Pot Cap-1 Maneuver	1126	-	-	-	301 787
Stage 1	-	-	-	-	620 -
Stage 2	-	-	-	-	643 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1126	-	-	-	299 787
Mov Cap-2 Maneuver	-	-	-	-	424 -
Stage 1	-	-	-	-	616 -
Stage 2	-	-	-	-	643 -

Approach	EB	WB	SB
HCM Control Delay, s/v	0.08	0	10.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1126	-	-	-	648
HCM Lane V/C Ratio	0.007	-	-	-	0.026
HCM Control Delay (s/veh)	8.2	-	-	-	10.7
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Lanes, Volumes, Timings  
 4: East Robinson Road & Proposed Easterly Driveway

2027 Full AM  
 03/25/2024



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	3	746	409	2	3	8
Future Volume (vph)	3	746	409	2	3	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.999		0.899	
Flt Protected	0.950				0.988	
Satd. Flow (prot)	1805	3539	3403	0	1688	0
Flt Permitted	0.950				0.988	
Satd. Flow (perm)	1805	3539	3403	0	1688	0
Link Speed (mph)		40	40		30	
Link Distance (ft)		280	250		492	
Travel Time (s)		4.8	4.3		11.2	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	2%	6%	0%	0%	0%
Adj. Flow (vph)	3	794	435	2	3	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	3	794	437	0	12	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)		16	16		16	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	30.6%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑↑	↑↑		↘	
Traffic Vol, veh/h	3	746	409	2	3	8
Future Vol, veh/h	3	746	409	2	3	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	2	6	0	0	0
Mvmt Flow	3	794	435	2	3	9

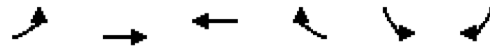
Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	437	0	-	0	839 219
Stage 1	-	-	-	-	436 -
Stage 2	-	-	-	-	403 -
Critical Hdwy	4.1	-	-	-	6.8 6.9
Critical Hdwy Stg 1	-	-	-	-	5.8 -
Critical Hdwy Stg 2	-	-	-	-	5.8 -
Follow-up Hdwy	2.2	-	-	-	3.5 3.3
Pot Cap-1 Maneuver	1133	-	-	-	308 792
Stage 1	-	-	-	-	625 -
Stage 2	-	-	-	-	649 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1133	-	-	-	307 792
Mov Cap-2 Maneuver	-	-	-	-	430 -
Stage 1	-	-	-	-	623 -
Stage 2	-	-	-	-	649 -

Approach	EB	WB	SB
HCM Control Delay, s/v	0.03	0	10.69
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1133	-	-	-	644
HCM Lane V/C Ratio	0.003	-	-	-	0.018
HCM Control Delay (s/veh)	8.2	-	-	-	10.7
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Lanes, Volumes, Timings  
5: East Robinson Road & Naples Lane

2027 Full AM  
03/25/2024



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	20	729	392	47	63	19
Future Volume (vph)	20	729	392	47	63	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.984		0.969	
Flt Protected	0.950				0.963	
Satd. Flow (prot)	1719	3539	3365	0	1733	0
Flt Permitted	0.950				0.963	
Satd. Flow (perm)	1719	3539	3365	0	1733	0
Link Speed (mph)		40	40		30	
Link Distance (ft)		250	787		800	
Travel Time (s)		24.6	12.5		11.3	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	5%	2%	6%	2%	0%	10%
Adj. Flow (vph)	21	776	417	50	67	20
Shared Lane Traffic (%)						
Lane Group Flow (vph)	21	776	467	0	87	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)		16	16		16	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	31.5%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	729	392	47	63	19
Future Vol, veh/h	20	729	392	47	63	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	5	2	6	2	0	10
Mvmt Flow	21	776	417	50	67	20

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	467	0	-	0	872
Stage 1	-	-	-	-	442
Stage 2	-	-	-	-	430
Critical Hdwy	4.2	-	-	-	6.8
Critical Hdwy Stg 1	-	-	-	-	5.8
Critical Hdwy Stg 2	-	-	-	-	5.8
Follow-up Hdwy	2.25	-	-	-	3.5
Pot Cap-1 Maneuver	1070	-	-	-	294
Stage 1	-	-	-	-	621
Stage 2	-	-	-	-	629
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1070	-	-	-	288
Mov Cap-2 Maneuver	-	-	-	-	414
Stage 1	-	-	-	-	608
Stage 2	-	-	-	-	629

Approach	EB	WB	SB
HCM Control Delay, s/v	0.23	0	14.62
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1070	-	-	-	461
HCM Lane V/C Ratio	0.02	-	-	-	0.189
HCM Control Delay (s/veh)	8.4	-	-	-	14.6
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	45	199	177	42	95	235	1128	163	95	945	105
Future Volume (vph)	85	45	199	177	42	95	235	1128	163	95	945	105
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	160		140	145		225
Storage Lanes	2		0	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.877				0.850			0.850			0.850
Flt Protected	0.950			0.950	0.970		0.950			0.950		
Satd. Flow (prot)	3502	1653	0	1715	1751	1615	1805	3574	1599	1805	3539	1615
Flt Permitted	0.950			0.950	0.970		0.209			0.193		
Satd. Flow (perm)	3502	1653	0	1715	1751	1615	397	3574	1599	367	3539	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		110				96			92			94
Link Speed (mph)		30			30			40				40
Link Distance (ft)		595			761			833				999
Travel Time (s)		13.5			17.3			14.2				17.0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	1%	1%	0%	2%	0%
Adj. Flow (vph)	86	45	201	179	42	96	237	1139	165	96	955	106
Shared Lane Traffic (%)				39%								
Lane Group Flow (vph)	86	246	0	109	112	96	237	1139	165	96	955	106
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)		24			24			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane								Yes				Yes
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)	15		9	15		9	15		9	15		9
Turn Type	Split	NA		Split	NA	pm+ov	pm+pt	NA	Perm	pm+pt	NA	pm+ov
Protected Phases	4	4		8	8	1	5	2		1	6	4
Permitted Phases						8	2		2	6		6
Detector Phase	4	4		8	8	1	5	2	2	1	6	4
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	3.0	3.0	15.0	15.0	3.0	15.0	6.0
Minimum Split (s)	35.1	35.1		40.1	40.1	11.0	11.0	34.0	34.0	11.0	34.0	35.1
Total Split (s)	40.0	40.0		40.0	40.0	30.0	35.0	70.0	70.0	30.0	65.0	40.0
Total Split (%)	22.2%	22.2%		22.2%	22.2%	16.7%	19.4%	38.9%	38.9%	16.7%	36.1%	22.2%
Maximum Green (s)	33.9	33.9		33.9	33.9	24.0	29.0	64.0	64.0	24.0	59.0	33.9
Yellow Time (s)	3.2	3.2		3.2	3.2	3.9	3.9	3.9	3.9	3.9	3.9	3.2
All-Red Time (s)	2.9	2.9		2.9	2.9	2.1	2.1	2.1	2.1	2.1	2.1	2.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1		6.1	6.1	6.0	6.0	6.0	6.0	6.0	6.0	6.1
Lead/Lag						Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	2.7	2.7	3.0	2.7	3.0
Recall Mode	Min	Min		Min	Min	None	None	C-Max	C-Max	None	C-Max	Min

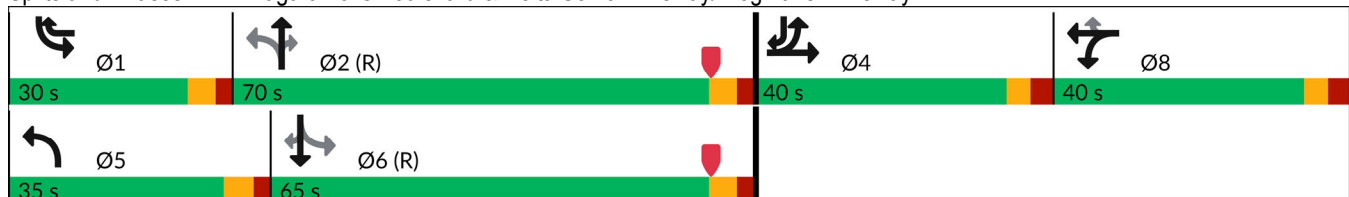


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	22.0	22.0		27.0	27.0			21.0	21.0		21.0	22.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	0
Act Effct Green (s)	21.3	21.3		16.9	16.9	33.9	123.0	106.7	106.7	109.5	98.6	125.9
Actuated g/C Ratio	0.12	0.12		0.09	0.09	0.19	0.68	0.59	0.59	0.61	0.55	0.70
v/c Ratio	0.20	0.84		0.68	0.68	0.25	0.56	0.53	0.16	0.30	0.49	0.09
Control Delay (s/veh)	70.4	65.9		99.0	99.0	10.3	26.3	18.2	7.4	15.0	29.6	2.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay (s/veh)	70.4	65.9		99.0	99.0	10.3	26.3	18.4	7.4	15.0	29.6	2.9
LOS	E	E		F	F	B	C	B	A	B	C	A
Approach Delay (s/veh)		67.1			72.2			18.5			26.0	
Approach LOS		E			E			B			C	
Queue Length 50th (ft)	48	164		133	137	0	89	242	11	35	360	4
Queue Length 95th (ft)	73	258		204	209	51	m206	m357	m48	77	570	33
Internal Link Dist (ft)		515			681			753			919	
Turn Bay Length (ft)							160		140	145		225
Base Capacity (vph)	659	400		322	329	492	499	2118	985	436	1938	1264
Starvation Cap Reductn	0	0		0	0	0	0	273	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.62		0.34	0.34	0.20	0.47	0.62	0.17	0.22	0.49	0.08

Intersection Summary

Area Type: Other  
 Cycle Length: 180  
 Actuated Cycle Length: 180  
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow  
 Natural Cycle: 135  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.84  
 Intersection Signal Delay (s/veh): 31.0      Intersection LOS: C  
 Intersection Capacity Utilization 79.9%      ICU Level of Service D  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Niagara Falls Boulevard & Delta Sonic Driveway/Wegmans Driveway





Lanes, Volumes, Timings  
 2: Niagara Falls Boulevard & East Robinson Road

2027 Full PM  
 03/25/2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	151	227	102	214	412	287	187	1145	101	202	966	165
Future Volume (vph)	151	227	102	214	412	287	187	1145	101	202	966	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	105		0	235		0	145		0	295		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	35			50			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.954			0.938			0.988			0.978	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3420	0	1752	3353	0	1770	3520	0	1770	3496	0
Flt Permitted	0.125			0.345			0.111			0.061		
Satd. Flow (perm)	238	3420	0	636	3353	0	207	3520	0	114	3496	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		36			88			5			11	
Link Speed (mph)		30			40			40			40	
Link Distance (ft)		1369			905			678			833	
Travel Time (s)		31.1			15.4			11.6			14.2	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	1%	0%	3%	1%	1%	2%	1%	5%	2%	1%	1%
Adj. Flow (vph)	154	232	104	218	420	293	191	1168	103	206	986	168
Shared Lane Traffic (%)												
Lane Group Flow (vph)	154	336	0	218	713	0	191	1271	0	206	1154	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane					Yes			Yes			Yes	
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)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	3.0	6.0		3.0	6.0		3.0	15.0		1.0	15.0	
Minimum Split (s)	10.1	39.1		10.1	39.1		9.6	38.6		9.5	38.6	
Total Split (s)	35.0	45.0		35.0	45.0		35.0	65.0		35.0	65.0	
Total Split (%)	19.4%	25.0%		19.4%	25.0%		19.4%	36.1%		19.4%	36.1%	
Maximum Green (s)	27.9	37.9		27.9	37.9		28.4	58.4		28.4	58.4	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.1	3.1		3.1	3.1		2.6	2.6		2.6	2.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.1	7.1		7.1	7.1		6.6	6.6		6.6	6.6	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	2.7		3.0	2.7		3.0	2.7		3.0	2.7	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	

Lanes, Volumes, Timings  
 2: Niagara Falls Boulevard & East Robinson Road

2027 Full PM  
 03/25/2024

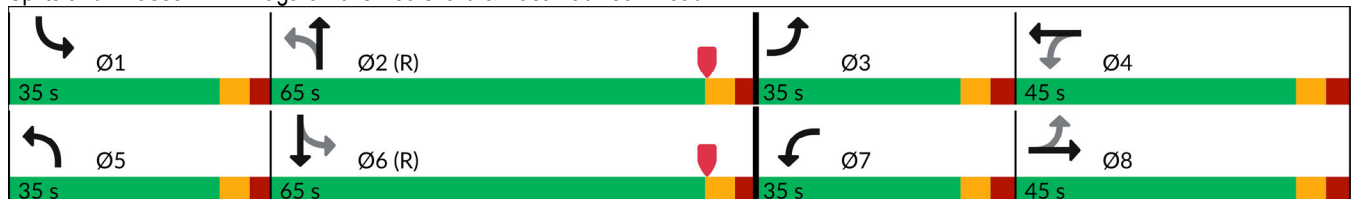


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		25.0			25.0			25.0			25.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	49.5	32.1		59.0	36.8		95.8	76.7		100.9	79.2	
Actuated g/C Ratio	0.28	0.18		0.33	0.20		0.53	0.43		0.56	0.44	
v/c Ratio	0.70	0.52		0.63	0.94		0.69	0.84		0.78	0.74	
Control Delay (s/veh)	63.2	62.6		52.4	82.8		40.8	53.2		87.7	35.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	63.2	62.6		52.4	82.8		40.8	53.2		87.7	35.9	
LOS	E	E		D	F		D	D		F	D	
Approach Delay (s/veh)		62.8			75.7			51.7			43.8	
Approach LOS		E			E			D			D	
Queue Length 50th (ft)	131	171		194	392		108	713		186	643	
Queue Length 95th (ft)	197	225		257	#508		210	#991		303	#840	
Internal Link Dist (ft)		1289			825			598			753	
Turn Bay Length (ft)	105			235			145			295		
Base Capacity (vph)	320	748		387	775		364	1502		326	1544	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.48	0.45		0.56	0.92		0.52	0.85		0.63	0.75	

Intersection Summary

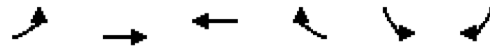
Area Type: Other  
 Cycle Length: 180  
 Actuated Cycle Length: 180  
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow  
 Natural Cycle: 120  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.94  
 Intersection Signal Delay (s/veh): 55.7      Intersection LOS: E  
 Intersection Capacity Utilization 97.8%      ICU Level of Service F  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 2: Niagara Falls Boulevard & East Robinson Road



Lanes, Volumes, Timings  
 3: East Robinson Road & Proposed Westerly Driveway

2027 Full PM  
 03/25/2024



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	14	524	933	3	3	10
Future Volume (vph)	14	524	933	3	3	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt					0.896	
Flt Protected	0.950				0.989	
Satd. Flow (prot)	1805	3539	3574	0	1684	0
Flt Permitted	0.950				0.989	
Satd. Flow (perm)	1805	3539	3574	0	1684	0
Link Speed (mph)		40	40		30	
Link Distance (ft)		905	280		727	
Travel Time (s)		15.4	4.8		16.5	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	2%	1%	0%	0%	0%
Adj. Flow (vph)	14	535	952	3	3	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	14	535	955	0	13	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		24	24		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	35.9%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↙	↑↑	↑↑		↘	
Traffic Vol, veh/h	14	524	933	3	3	10
Future Vol, veh/h	14	524	933	3	3	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	0	2	1	0	0	0
Mvmt Flow	14	535	952	3	3	10

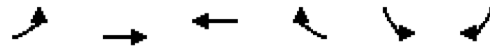
Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	955	0	-	0	1249 478
Stage 1	-	-	-	-	954 -
Stage 2	-	-	-	-	296 -
Critical Hdwy	4.1	-	-	-	6.8 6.9
Critical Hdwy Stg 1	-	-	-	-	5.8 -
Critical Hdwy Stg 2	-	-	-	-	5.8 -
Follow-up Hdwy	2.2	-	-	-	3.5 3.3
Pot Cap-1 Maneuver	728	-	-	-	168 539
Stage 1	-	-	-	-	340 -
Stage 2	-	-	-	-	735 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	728	-	-	-	164 539
Mov Cap-2 Maneuver	-	-	-	-	269 -
Stage 1	-	-	-	-	333 -
Stage 2	-	-	-	-	735 -

Approach	EB	WB	SB
HCM Control Delay, s/v	0.26	0	13.48
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	728	-	-	-	438
HCM Lane V/C Ratio	0.02	-	-	-	0.03
HCM Control Delay (s/veh)	10	-	-	-	13.5
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

Lanes, Volumes, Timings  
 4: East Robinson Road & Proposed Easterly Driveway

2027 Full PM  
 03/25/2024



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	6	521	930	4	3	6
Future Volume (vph)	6	521	930	4	3	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.999		0.910	
Flt Protected	0.950				0.984	
Satd. Flow (prot)	1805	3539	3571	0	1701	0
Flt Permitted	0.950				0.984	
Satd. Flow (perm)	1805	3539	3571	0	1701	0
Link Speed (mph)		40	40		30	
Link Distance (ft)		280	260		717	
Travel Time (s)		4.8	4.4		16.3	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	2%	1%	0%	0%	0%
Adj. Flow (vph)	6	532	949	4	3	6
Shared Lane Traffic (%)						
Lane Group Flow (vph)	6	532	953	0	9	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)		16	16		16	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	35.8%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑↑	↑↑		↘	
Traffic Vol, veh/h	6	521	930	4	3	6
Future Vol, veh/h	6	521	930	4	3	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	0	2	1	0	0	0
Mvmt Flow	6	532	949	4	3	6

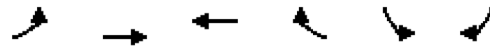
Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	953	0	-	0	1229 477
Stage 1	-	-	-	-	951 -
Stage 2	-	-	-	-	278 -
Critical Hdwy	4.1	-	-	-	6.8 6.9
Critical Hdwy Stg 1	-	-	-	-	5.8 -
Critical Hdwy Stg 2	-	-	-	-	5.8 -
Follow-up Hdwy	2.2	-	-	-	3.5 3.3
Pot Cap-1 Maneuver	729	-	-	-	173 540
Stage 1	-	-	-	-	341 -
Stage 2	-	-	-	-	750 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	729	-	-	-	171 540
Mov Cap-2 Maneuver	-	-	-	-	274 -
Stage 1	-	-	-	-	338 -
Stage 2	-	-	-	-	750 -

Approach	EB	WB	SB
HCM Control Delay, s/v	0.11	0	14.02
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	729	-	-	-	408
HCM Lane V/C Ratio	0.008	-	-	-	0.022
HCM Control Delay (s/veh)	10	-	-	-	14
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Lanes, Volumes, Timings  
5: East Robinson Road & Naples Lane

2027 Full PM  
03/25/2024



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	20	503	913	140	99	20
Future Volume (vph)	20	503	913	140	99	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.980		0.978	
Flt Protected	0.950				0.960	
Satd. Flow (prot)	1805	3539	3507	0	1769	0
Flt Permitted	0.950				0.960	
Satd. Flow (perm)	1805	3539	3507	0	1769	0
Link Speed (mph)		40	40		30	
Link Distance (ft)		260	787		800	
Travel Time (s)		24.6	12.5		11.3	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	2%	1%	0%	1%	0%
Adj. Flow (vph)	20	513	932	143	101	20
Shared Lane Traffic (%)						
Lane Group Flow (vph)	20	513	1075	0	121	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)		16	16		16	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	43.1%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	2.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	503	913	140	99	20
Future Vol, veh/h	20	503	913	140	99	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	0	2	1	0	1	0
Mvmt Flow	20	513	932	143	101	20

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	1074	0	-	0	1301 537
Stage 1	-	-	-	-	1003 -
Stage 2	-	-	-	-	297 -
Critical Hdwy	4.1	-	-	-	6.82 6.9
Critical Hdwy Stg 1	-	-	-	-	5.82 -
Critical Hdwy Stg 2	-	-	-	-	5.82 -
Follow-up Hdwy	2.2	-	-	-	3.51 3.3
Pot Cap-1 Maneuver	656	-	-	-	154 493
Stage 1	-	-	-	-	318 -
Stage 2	-	-	-	-	730 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	656	-	-	-	149 493
Mov Cap-2 Maneuver	-	-	-	-	250 -
Stage 1	-	-	-	-	308 -
Stage 2	-	-	-	-	730 -

Approach	EB	WB	SB
HCM Control Delay, s/v	0.41	0	28.41
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	656	-	-	-	273
HCM Lane V/C Ratio	0.031	-	-	-	0.446
HCM Control Delay (s/veh)	10.7	-	-	-	28.4
HCM Lane LOS	B	-	-	-	D
HCM 95th %tile Q(veh)	0.1	-	-	-	2.2