

CASSONE DWELLINGS INC.

3770 MONTROSE ROAD TRAFFIC IMPACT ASSESSMENT REPORT

OCTOBER 30, 2025





3770 MONTROSE
ROAD
TRAFFIC IMPACT STUDY
CASSONE DWELLINGS INC.

TRAFFIC IMPACT ASSESSMENT REPORT

PROJECT NO.: CA0037480.8517.
DATE: OCTOBER 30, 2025

WSP

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October 30, 2025

Cassone Dwellings Inc.
101 Bradwick Dr
Concord, ON
L4K 1K5

Attention: Mr. Brandon Rossi, Project Manager

Dear Sir:

Subject: Traffic Impact Study

We are pleased to provide final Traffic Impact Study (Revision #2) for the proposed development at 3770 Montrose Road, Niagara Falls, ON.

The study analyzed the traffic impacts of the proposed residential developments to the adjacent intersections along with Montrose Road and the QEW ramp terminals at Thorold Stone Road.

Thank you for the opportunity to work with you on this study. Please contact me if there are any questions or comments about this report.

Yours SInc.erely,

A handwritten signature in blue ink, appearing to read 'Xiaobin Wang'.

Xiaobin Wang, P.Eng.
Senior Transportation Engineer

REVISION HISTORY

FIRST ISSUE

September 25, 2024	Final Report			
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REVISION 1

December 3, 2024	Revision -1 – Final Report			
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REVISION 2

October 30, 2025	Revision -1 – Final Report			
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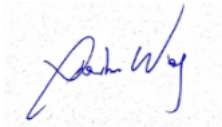


October 30, 2025

Bahar Vaezi, MUP
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APPROVED¹ BY *(must be reviewed for technical accuracy prior to approval)*



October 30, 2025

Xiaobin Wang, P.Eng.,
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Date

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1 STUDY BACKGROUND AND INTRODUCTION

WSP was retained by Cassone Dwellings Inc. to undertake a Transportation Impact Study (TIS) in support of the proposed residential development at 3770 Montrose Road, Niagara Falls, ON. The original Traffic Impact Study supported applications for a Zoning By-Law Amendment and Site Plan Control for the redevelopment of the vacant land to include a total of 244 units: 52 stacked townhomes, 174 townhomes (66 rear-lane and 108 two-storey), and 18 semi-detached homes.

Since the initial submission, the project has progressed to a revised planning stage and the TIA report is now being submitted in support of a Common Element Condominium Application and Draft Plan of Subdivision submission. The latest plan proposes a total of 257 residential units, with 182 rear-lane townhouses and 75 stacked townhouses.

A summary comparison of the original and revised land use is shown in the table below:

Table 1-1 Comparison of Land Use Unit Counts: Original vs. Revised Development Plans

Land Use	Original Units	Revised Units	Change in Units
Rear-lane Townhouses	66	182	+116
2-storey Townhouses	108	0	-108
Semi-Detached Homes	18	0	-18
Stacked Townhouses	52	75	+23

The TIA was previously submitted and reviewed by the Ontario Ministry of Transportation (MTO) based on an initial land use configuration. After the initial TIA approval, the development land use breakdown was revised. Updated trip generation calculations were communicated to MTO via email for review. Direct communication with MTO confirmed that, despite the increase of 13 units, the magnitude of change does not warrant an updated TIA review or amendment. Following MTO review, it was confirmed that the additional dwelling units in the revised land use breakdown do not require another TIS review or amendment. Below is a clear comparison of key changes between the approved TIA and the revised site plan:

Table 1-2 Summary of Total AM/PM Peak Hour Vehicle Trips by Scenario

Scenario	Total Units	AM Total Trips	PM Total Trips
Approved TIA	244	117	139
Revised Plan	257	123	146
Difference	+13	+6	+7

In this report, the traffic analysis is based on the initial land use configuration of 244 residential units from the approved TIA. Although the revised site plan reflects a slightly different land use breakdown with 257 units, the traffic generation and operational analysis in this report remain unchanged and continue to rely on the original land use assumptions. This approach is consistent with communications received from the MTO on September 22, 2025, who confirmed that the scale of changes in dwelling units does not necessitate an updated TIA review or amendment. Therefore, while the updated land use has been acknowledged throughout of the report, the core traffic analysis presented here is based on the previously approved scenario.

The key changes in this revised report compared to the previous TIA version are reflected in the following chapters:

- Chapter 4: Site Generated Traffic – updated to acknowledge revised land use and unit counts.
- Chapter 8: Parking Review – revised to reflect the updated parking supply and confirmed parking variance.
- Chapter 9: Transportation Demand Management – expanded to address updated TDM measures supporting reduced parking demand.

— Chapter 10: Conclusions and Recommendations – refined to Incorporate considerations from updated chapters and agency feedback.

The updated land use has proposed a total of 473 parking spots (439 for residents and 34 for visitors) are proposed. There will be a full movement unsignalized access just north of the Montrose Road and Southwood Drive intersection on the west side of the site, as well as a full movement unsignalized access just east of the Montrose Road and Southwood Drive intersection on the south side of the site. The site location context is shown in Figure 1. The most recent site plan has been provided in Appendix A.



Figure 1 - Study Area

A Term of Reference (ToR) was confirmed with the City of Niagara Falls, Niagara Region, and MTO transportation staff at the onset of the project and the correspondences are documented in Appendix B. The ToR comments received have been Incorporated in this study.

The objective of this study is to evaluate the level of traffic impact the proposed development will have on the transportation network and to identify improvements where necessary. Our study approach and findings are documented herein.

2 EXISTING CONDITIONS

This section of our assessment describes the existing road network and traffic conditions within the study area.

2.1 ROAD NETWORK

The existing study area network along with lane configuration and existing traffic control are shown in the Figure 1 - Study Area. The study area consists of following roads:

Thorold Stone Road - The road is an east-west regional thoroughfare managed by the Region, stretching from Stanley Avenue in the east to St. David's Road in the west, where it connects to Highway 406. It features a four-lane cross-section, with two travel lanes in each direction. All the major intersections are equipped with auxiliary turning lanes. There are sidewalks present on both sides of the road for most of the segments. The posted speed limit within the study area is 50 km/h.

Montrose Road - The road is a north-south regional route managed by the Region, extending from Kalar Road in the north to Netherby Road in the south, where it continues as Schihl Road. It typically features a two-lane cross-section, with one travel lane in each direction. However, between Cameron Street and Lundy's Lane, it expands to a four-lane cross-section, with two travel lanes per direction. Major intersections are equipped with auxiliary turning lanes. Continuous sidewalks are generally present on both sides of the road. The posted speed limit within the study area is 50 km/h.

Southwood Drive - The road is a local thoroughfare managed by the city, extending from Montrose Road in the east to Mount Carmel Boulevard in the north. It features a two-lane cross-section, with one travel lane in each direction. Continuous sidewalks are provided on the southwest side of the road. The speed limit within the study area is un-posted but maintained at 40 km/h.

Based on the terms of reference, the following study intersections have been evaluated in this TIS

1. Montrose Road & Mount Carmel Boulevard
2. Montrose Road & Southwood Drive
3. Montrose Road & Cameron Court
4. Montrose Road & Thorold Stone Road
5. Thorold Stone Road & QEW Southbound Ramp
6. Thorold Stone Road & QEW Northbound Ramp

It is noted that the intersections of Montrose Road & Thorold Stone Road and Thorold Stone Road & QEW Southbound Ramp are closely spaced, with approximately 137 m between stop bars.

2.2 EXISTING TRANSIT SERVICES

The study area lies in close proximity to Mt Carmel Centre, a shopping mall. The study area is served by the following transit operators:

- Niagara Region Transit: Two transit routes operate along Montrose Road -
- Route 113/213: This route operates between Mt Carmel Hub to Canadian Drive Hub along Montrose Road and Heartland Forest. The route connects riders to Mt Carmel Centre, stopping at stops along Montrose Road;
- Route 109/209: This route begins at Mt Carmel Road and runs along Montrose Road to Thorold Stone Road to Dorchester Road and terminates at the Morrison/Dorchester Hub.

2.3 TRAFFIC DATA

The existing traffic volumes were obtained from the count conducted by Pyramid Traffic dated July 3, 2024. The official signal timing plans were obtained from the Region and have been incorporated into the analysis. The volume diagrams, existing turning movement counts, and signal timing plans received are provided in Appendix C.

2.4 EXISTING TRAFFIC OPERATIONS

2.4.1 MODEL ASSUMPTIONS

The Synchro input parameters used in the analysis are in accordance with the Niagara Region Guidelines for Transportation Impact Studies, July 2023, and the Ministry of Transportation Ontario (MTO) Traffic Impact Study Guidelines, March 2023. The key Synchro input parameters are listed below:

- Existing lane configurations obtained from Google Maps' satellite and street views.
 - Signal timing plans provided by the Niagara Region.
 - Heavy vehicle percentages and conflicting pedestrian volumes as derived from the existing turning movement counts.
 - Ideal saturation flow in vehicles per hour per lane (vphpl) was coded as per Niagara Region's guidelines, which is lower than the Synchro default of 1,900. For the Niagara Falls, 1579, 1454, 2144 and 1301 for through, left, dual left and right movement respectively were used as per the Niagara Region TIA guidelines.
 - Ideal saturation flow for movements to and from MTO ramps has been coded as Synchro default of 1900 vphpl.
 - Lost time adjustment default of zero was applied at the signalized intersections during the weekday a.m. and p.m. peak hours.
 - The intersection peak hour factor (PHF) of 0.92 for all the intersections within the study area.
-

2.4.2 METHODOLOGY

To analyze existing traffic conditions in the study area, capacity analyses were undertaken using the Synchro 11 traffic analysis software. This software incorporates the methodology outlined in the Highway Capacity Manual (HCM), Transportation Research Board, 2000 and 2010. For the purpose of this study, all reported results are based on the Synchro 11 methodologies for the signalized intersections and HCM 2000 methodologies for the unsignalized intersections. An intersection capacity analysis provides an indication of traffic operations based on calculations of volume-to-capacity (v/c) and delays for individual movements at an intersection. Level of Service (LOS) denoted by letters 'A' through 'D', represent satisfactory traffic operations. LOS denoted by the letters 'E' and 'F' represents congested traffic operations.

The following criteria movement wise are considered critical as per the Niagara Region TIA guidelines:

Signalized intersections

- V/C ratios of 0.85 or greater for through or shared through/turning movements
- V/C ratios of 0.90 or greater for exclusive turning movements
- projected 95th percentile queues for the critical movements exceed the available storage
- Unsignalized intersections
- movements are expected to operate at LOS "D" or worse and/or where the estimated 95th percentile queue length for an individual movement exceeds the available queuing storage

Additionally, the following movements are critical as per the MTO Guidelines:

— V/C ratios of 0.75 or greater for the MTO off-ramp movements

2.5 EXISTING TRAFFIC CONDITIONS

The existing traffic conditions were analyzed using Synchro 11 software. Table 2-1 below provides the analysis for all the intersections within the study area. The jurisdiction, either Niagara Region or MTO, is specified for each intersection to account for the critical movement criteria within the respective TIA Guidelines. The detailed synchro results are presented in Appendix D.

Table 2-1 - Existing Conditions Results

Movement	Weekday AM Peak Hour				Weekday PM Peak Hour				Storage Length (m)
	LOS	V/C	Delay (s/veh)	95th %ile Q	LOS	V/C	Delay (s/veh)	95th %ile Q(m)	
Montrose Road & South Wood Dr (Niagara Region) – Signalized									
EBTLR	A	0.04	8.4	3.5	A	0	0	0	-
WBTL	B	0.09	13	7.9	C	0.57	27.4	33.5	-
WBR	A	0.04	0.2	0	A	0.21	6.1	8.5	-
NBL	A	0.0	4.0	0.6	A	0.01	8.3	2.3	50
NBT	A	0.12	7.7	20.1	B	0.36	19.4	51.8	-
NBR	A	0.04	1.9	2.9	A	0.12	4.3	6.1	50
SBL	A	0.02	3.9	2	A	0.12	8.6	10.2	40
SBTR	A	0.17	7.7	28.7	B	0.29	14.8	40.4	-
Montrose Road & Thorold Stone Rd (Niagara Region) – Signalized									
EBL	A	0.16	9.9	11.5	B	0.4	16.3	18.6	45
EBTR	C	0.74	27.2	85.8	D	0.88	40.9	#159.4	-
WBL	B	0.54	14.8	30.2	D	0.81	40.1	#90.2	85
WBTR	B	0.53	19.0	64	C	0.82	30.2	#189.3	-
NBL	B	0.18	18.1	18	C	0.46	29.5	34.4	60
NBT	C	0.35	33	24.2	D	0.52	45.1	32.1	-
NBR	B	0.62	11.2	23	B	0.78	18	30.4	35
SBL	B	0.41	19.9	44.9	D	0.86	53	#90.0	60
SBTR	B	0.22	18.3	18.1	C	0.51	34	35	-
QEW West Off-Ramp & Thorold Stone Rd (MTO) – Signalized									
EBT	B	0.67	18.3	54.6	C	0.84	26.1	108	-
EBR	A	0.52	4.3	15.3	A	0.65	8.1	33.3	60
WBL	A	0.40	6.9	13.6	C	0.72	24.9	63	210
WBT	A	0.42	8.0	33.9	A	0.64	9.8	80.6	-
SBL	C	0.3	21	19.4	C	0.49	35	37.1	40
SBR	A	0.25	7.8	10.6	C	0.48	24.9	33.3	25
QEW East On-Ramp & Thorold Stone Rd (MTO) – Signalized									
EBL	A	0.23	4.5	9.3	B	0.47	10.1	18	210

Movement	Weekday AM Peak Hour				Weekday PM Peak Hour				Storage Length (m)
	LOS	V/C	Delay (s/veh)	95th %ile Q	LOS	V/C	Delay (s/veh)	95th %ile Q(m)	
EBT	A	0.44	7.1	37	B	0.62	10.6	97.4	-
WBT	B	0.5	14.2	50.3	C	0.74	21.8	128.6	-
WBR	A	0.33	8.8	24.6	B	0.56	4.4	23.9	15
NBL	C	0.4	23.1	29.2	D	0.58	35.2	53.3	35
NBR	B	0.45	10.8	22.3	C	0.69	33.2	63.4	45
Montrose Road & Mt Carmel Road (Niagara Region) – Unsignalized									
EBLTR	A	0.07	9.6	1.7	A	0.06	9.9	1.4	-
WBLTR	A	0	0	0	A	0	0	0	-
NBLTR	A	0.02	1.2	0.4	A	0.04	1.3	0.9	-
SBLTR	A	0	0	0	A	0	0	0	-
Montrose Road & Cameron Ct (Niagara Region) – Unsignalized									
EBLTR	B	0.02	10.4	10.4	B	0.02	11.9	0.5	-
WBLTR	B	0.05	13.4	1.4	C	0.36	23.9	12.7	-
NBLTR	A	0.09	0	0	A	0.18	0.3	0.3	-
SBLTR	A	0.01	0.3	0.2	A	0	0.1	0.1	-
NOTES: Thresholds for the Niagara Region intersections: - V/C ratios of 0.85 for through or shared through turning movements - V/C ratios of 0.90 for exclusive Thresholds For MTO intersections: - V/C ratios of 0.75 # - 95th percentile volume queue exceeds capacity; queue may be longer.									

The analysis of the current traffic operations in the study area shows that most of the movements at the study intersections operate at LOS of D or better, indicating acceptable traffic operations during AM and PM peak. However, a few movements at Montrose Road & Thorold Stone Road and at QEW West Off-Ramp & Thorold Stone Rd intersection operate close to or exceed capacity. These movements include:

- EBTR, WBL and SBL movement at Montrose Road and Thorold Stone Road intersection operate at V/C ratios of 0.88, 0.81 and 0.82 during the PM peak hour. This can be attributed to the high vehicle volumes during the evening peak hour heading out of the area. The WBL and SBL queues slightly exceed the storage length by ~5m and 30m respectively.
- EBT movement at QEW West Off ramp & Thorold Stone Road intersection operate at V/C ratios of 0.84 with 26 s delay during the PM peak hour

It is noted that the assumptions of peak hour factors of 0.92 for all movements and ideal saturation flows from 1,301 to 1,579 vehicles per hour green for the intersections of Montrose Road and Thorold Stone Road and other Niagara Region intersections are conservative and actual operation may be better than indicated by this evaluation because some peak hour factors are already higher than 0.92 and saturation flows may also be higher than these values.

3 FUTURE BACKGROUND TRAFFIC CONDITIONS

3.1 HORIZON YEAR

As agreed with the City of Niagara Falls, Niagara Region and MTO, the future horizon years selected for analysis include the full build-out year in 2026, along with 5- and 10-years post-build-out corresponding to a 2031 and 2036 horizon. These planning horizons are also consistent with the requirements of the MTO based on their traffic impact study guidelines.

3.2 BACKGROUND DEVELOPMENTS

As confirmed from the development application portal and during the earlier stages with City, there are no planned and/or approved background developments located near the proposed site.

3.3 GENERAL TRAFFIC GROWTH

The growth rate of 2% was confirmed with the Niagara Region for all the existing movements based on the historical counts. For the Queen Elizabeth Way (QEW) ramps and Thorold Stone Road intersections, a 3% growth rate was used as requested by the Ministry of Transportation (MTO).

These rates were applied to the base condition analysis. In addition, historical AADT data for the QEW at Thorold Stone Road and Thorold Stone Road were reviewed and historical growth rates were calculated.

MTO traffic volume data were retrieved from this MTO website:

<https://www.library.mto.gov.on.ca/SydneyPLUS/TechPubs/Portal/tp/tvSplash.aspx>

Niagara Region traffic volume data were taken from this Niagara Region website:

<https://niagaraopendata.ca/dataset/regional-road-traffic-volumes>

The results of this calculation are summarised in Table 3-1

Table 3-1: Historical AADT and growth rates

Year	QEW at Thorold Stone Road		Thorold Stone Road at Montrose Road	
	AADT	% Inc.rease year to year	AADT	% Inc.rease year to year
2010	62,200			
2011	56,400	-9.3%		
2012	63,100	11.9%		
2013	63,500	0.6%		
2014	65,200	2.7%		

Year	QEW at Thorold Stone Road		Thorold Stone Road at Montrose Road	
	AADT	% Inc.rease year to year	AADT	% Inc.rease year to year
2015	66,300	1.7%	32800	
2016	67,400	1.7%		
2017	68,500	1.6%		
2018	69,600	1.6%	29400	-1.20%
2019	70,700	1.6%		

As Table 3-1 indicates, traffic volumes on the QEW have Inc.reased by 1.6% to 1.7% per year over the past 10 years. On Thorold Stone Road, traffic volumes have decreased by 1.2% per year between the dates with available count data, 2015 and 2018.

Based on these data and calculations, application of 3% per year to MTO ramps and 2% per year to other roads in the study is expected to yield a conservatively high forecast for background traffic volumes at the study area intersections.

3.4 FUTURE BACKGROUND VOLUMES

The projected 2026, 2031 and 2036 future background volumes were developed by superimposing the general growth rate onto the existing traffic volumes. The resulting 2026, 2031 and 2036 future background peak hour volumes are presented in Appendix E.

3.5 2026 HORIZON TRAFFIC CONDITIONS

As part of the future background assessment, the signal timings without optimizing splits for all the intersections were kept as per the existing conditions. Table 2 shows the 2026 future conditions results. The detailed synchro results are presented in Appendix F.

With the application of general traffic growth, all of the study's signalized intersections operate at an acceptable level of service under 2026 future background conditions. However, a few movements at Montrose Road & Thorold Stone Road, QEW West Off-Ramp & Thorold Stone Rd and at QEW East Off-Ramp & Thorold Stone Rd intersection operate close to or exceed capacity during the PM peak hour. These movements Inc.lude:

- EBTR, and WBTR at Montrose Road & Thorold Stone Road are expected to operate at v/c 0.91 and 0.86, respectively. With the queues of 103 m and 97 m for WBL and SBL exceeding the storage length of 85 m and 60 m respectively.
- EBT and WBL at QEW West Off-Ramp & Thorold Stone Rd are expected to operate at v/c of 0.86 and 0.83, respectively, which exceeds the MTO thresholds of 0.75. However, the queues for WBL are expected to be within the storage length.
- WBT at QEW East Off-Ramp & Thorold Stone Rd is expected to operate at v/c of 0.77.

This analysis indicates that if background traffic demand in this area Inc.reases at the assumed rates of 3% per year for MTO ramps and 2% per year for other roads, that problems with queues are expected at the intersection of Montrose Road & Thorold Stone Road, which would be a particular issue for the westbound left turn queue length due to the proximity of the QEW West Off-Ramp & Thorold Stone Road. It is noted that the assume traffic volume

Inc.reases are higher than historical growth, therefore, this level of background growth may not occur. Further, as traffic volumes Inc.rease due to background growth and area development it is likely that drivers would adapt with smaller headways between vehicles and more distributed traffic over the peak hour, resulting in higher base saturation flows and peak hour factors than assumed in the base analysis.

Table 3-2 - Future Background 2026 Results

Movement	Weekday AM Peak Hour				Weekday PM Peak Hour				Storage Length (m)
	LOS	V/C	Delay (s/veh)	95th %ile Q	LOS	V/C	Delay (s/veh)	95th %ile Q(m)	(m)
Montrose Road & South Wood Dr (Niagara Region) – Signalized									
EBTLR	A	0.04	8.8	3.9	A	0	0	0	-
WBTL	B	0.13	14.9	9.3	C	0.62	30	35.5	-
WBR	A	0.05	0.3	0	A	0.22	6.1	8.8	-
NBL	A	0	4.5	0.7	A	0.01	8.7	2.4	50
NBT	A	0.13	7.7	22.1	C	0.48	21.5	55	-
NBR	A	0.06	1.9	3.1	A	0.15	4.8	6.5	50
SBL	A	0.02	4.1	2.4	A	0.13	9.1	10.9	40
SBTR	A	0.23	8.4	34.5	B	0.37	16	43.1	-
Montrose Road & Thorold Stone Rd (Niagara Region) – Signalized									
EBL	B	0.21	11.9	14	B	0.44	17.9	19.8	45
EBTR	C	0.83	34.4	111.7	D	0.91	44.4	#173.8	-
WBL	C	0.67	23.3	44.1	D	0.88	52.4	#103.5	85
WBTR	C	0.58	21.5	81.7	C	0.86	32.9	#207.7	-
NBL	C	0.25	23	21	C	0.47	29.7	35.6	60
NBT	D	0.4	38.9	27	D	0.52	45.1	33.1	-
NBR	B	0.73	16.5	28	C	0.82	21.7	37.9	35
SBL	C	0.56	28.3	55.6	E	0.89	58.4	#97.0	60
SBTR	C	0.26	21.4	20.5	C	0.53	34.6	36.5	-
QEW West Off-Ramp & Thorold Stone Rd (MTO) – Signalized									
EBT	C	0.75	20.6	66.5	C	0.86	28.4	137.8	-
EBR	A	0.65	6.8	17.7	A	0.68	9.7	48.8	60
WBL	A	0.53	9.6	15.4	D	0.83	39.3	89.4	210
WBT	A	0.5	8.3	39.8	B	0.68	11.7	114.7	-
SBL	C	0.31	24	23.2	C	0.43	34.7	38.9	40
SBR	B	0.36	10.6	12.4	C	0.65	34.3	#38.7	25
QEW East Off-Ramp & Thorold Stone Rd (MTO) – Signalized									
EBL	A	0.31	5.4	10.7	B	0.53	13.6	25	210
EBT	A	0.52	7.7	45.8	B	0.65	11.6	114.5	-
WBT	B	0.59	16.2	63.7	C	0.77	23.7	146.2	-
WBR	B	0.46	11.6	33.5	B	0.59	17.8	75.1	15

Movement	Weekday AM Peak Hour				Weekday PM Peak Hour				Storage Length (m)
	LOS	V/C	Delay (s/veh)	95th %ile Q	LOS	V/C	Delay (s/veh)	95th %ile Q(m)	(m)
NBL	C	0.39	25.8	35.1	C	0.52	34.9	55	35
NBR	B	0.5	15	31.3	D	0.73	37.9	#69.8	45
Montrose Road & Mt Carmel Road (Niagara Region) – Unsignalized									
EBLTR	A	0.07	9.6	1.8	B	0.06	10	1.5	-
WBLTR	A	0	0	0	A	0	0	0	-
NBLTR	A	0.02	1.3	0.4	A	0.04	1.5	1	-
SBLTR	A	0	0	0	A	0	0	0	-
Montrose Road & Cameron Ct (Niagara Region) – Unsignalized									
EBLTR	B	0.02	10.9	0.3	B	0.02	12	0.5	-
WBLTR	B	0.05	13.8	1.5	D	0.4	23.9	14.5	-
NBLTR	A	0.09	0	0	A	0.19	0.3	0.3	-
SBLTR	A	0.01	0.3	0.2	A	0	0.1	0.1	-
NOTES: Thresholds for the Niagara Region intersections: - V/C ratios of 0.85 for through or shared through turning movements - V/C ratios of 0.90 for exclusive Thresholds For MTO intersections: - V/C ratios of 0.75 # - 95th percentile volume queue exceeds capacity; queue may be longer.									

3.6 2031 HORIZON TRAFFIC CONDITIONS

During the 2031 Future Background conditions, with the application of general traffic growth, all of the study signalized intersections operate at an acceptable level. However, a few movements at Montrose Road & Thorold Stone Road, QEW West Off-Ramp & Thorold Stone Rd and at QEW East Off-Ramp & Thorold Stone Rd intersection operate close to or exceed capacity. These movements include:

- During the AM peak hour, EBTR operate at v/c 0.85 and level of service D. During the PM peak hour, the EBTR, WBL, and WBTR are expected to operate overcapacity with v/c greater than 1.0 with levels of service E, F, and E respectively. The NBR and SBL are expected to operate at v/c 0.89 and 0.97. The NBR and WBL queues are expected to reach 68 m and 127 m extending beyond the storage length for these movements.
- During the PM peak hour, EBT and WBL at QEW West Off-Ramp & Thorold Stone Rd are expected to operate at v/c of 0.87 and 1.10 which is exceeding the MTO thresholds of 0.75. However, the queues for WBL are expected to be within the storage length of 210 m. The SBR queues are expected to exceed up to 46 m exceeding the storage length of 25 m.
- During the PM peak hour, WBT at QEW East Off-Ramp & Thorold Stone Rd is expected to operate at v/c of 0.87. The NBR queue during the PM peak to 82 m, exceeding the storage length of 45 m.

Table – 3 shows all the results for the Future background 2031 results. The detailed synchro results are presented in Appendix F. With the increase in background growth the saturation flow rate would increase as

well, using a higher saturation flow rate for the future conditions has been added as a sensitivity analysis in the section 3.8.

Table 3-3 - Future Background 2031 Results

Movement	Weekday AM Peak Hour				Weekday PM Peak Hour				Storage Length (m)
	LOS	V/C	Delay (s/veh)	95th %ile Q	LOS	V/C	Delay (s/veh)	95th %ile Q(m)	
Montrose Road & South Wood Dr (Niagara Region) – Signalized									
EBTLR	A	0.04	9	4.2	A	0	0	0	-
WBTL	B	0.19	17.7	10.4	C	0.65	32	40.6	-
WBR	A	0.06	0.4	0	A	0.23	6.1	9.4	-
NBL	A	0	4.5	0.7	A	0.02	9.1	2.7	50
NBT	A	0.16	9	24.3	C	0.52	23	62.9	-
NBR	A	0.07	2.2	3.5	A	0.17	5.6	7.8	50
SBL	A	0.03	4.8	2.5	A	0.15	9.7	12.3	40
SBTR	B	0.29	10.2	38.6	B	0.41	17.1	49.1	-
Montrose Road & Thorold Stone Rd (Niagara Region) – Signalized									
EBL	B	0.24	12.5	15.8	C	0.55	27.7	26	45
EBTR	D	0.85	37.4	#139.7	E	1.02	68.1	#200.0	-
WBL	C	0.73	29.4	65.9	F	1.05	98	#127.0	85
WBTR	C	0.59	21.9	95.8	E	1.01	59.3	#240.4	-
NBL	C	0.29	25.6	22.2	C	0.49	29.4	38.7	60
NBT	D	0.45	42.4	29	D	0.49	43.4	36	-
NBR	B	0.76	17.3	29.2	C	0.89	32	#67.5	35
SBL	C	0.65	34	60.8	E	0.97	71.9	88.1	60
SBTR	C	0.29	22.7	22.2	C	0.53	34.9	40.4	-
QEW West Off-Ramp & Thorold Stone Rd (MTO) – Signalized									
EBT	C	0.79	22.2	87.3	C	0.87	31	#197.7	-
EBR	A	0.68	7.3	20.2	B	0.71	10.3	64.8	60
WBL	B	0.63	14.5	28.1	F	1.1	108	#125.5	210
WBT	A	0.53	8.4	50.1	B	0.75	14.2	164.7	-
SBL	C	0.37	28.3	30.4	D	0.49	39	43.8	40
SBR	B	0.41	11.8	14.3	D	0.74	43	45.6	25
QEW East Off-Ramp & Thorold Stone Rd (MTO) – Signalized									
EBL	A	0.39	7.1	15.7	C	0.67	29.2	49.9	210
EBT	A	0.56	8.7	69	B	0.74	15.2	164.4	-
WBT	B	0.66	18.9	86.1	C	0.87	31.8	#209.3	-
WBR	B	0.51	13.5	45.4	C	0.67	23.2	101.8	15
NBL	C	0.45	29.8	45.9	D	0.57	37.7	62.3	35
NBR	C	0.62	24.7	52.1	D	0.8	44.5	#82.1	45
Montrose Road & Mt Carmel Road (Niagara Region) – Unsignalized									

Movement	Weekday AM Peak Hour				Weekday PM Peak Hour				Storage Length (m)
	LOS	V/C	Delay (s/veh)	95th %ile Q	LOS	V/C	Delay (s/veh)	95th %ile Q(m)	
EBLTR	A	0.08	9.8	2.0	B	0.06	12.4	1.7	-
WBLTR	A	0.0	0.0	0.0	A	0	0	0	-
NBLTR	A	0.02	1.3	0.4	A	0.04	1.6	1.1	-
SBLTR	A	0.0	0.0	0.0	A	0	0	0	-
Montrose Road & Cameron Ct (Niagara Region) – Unsignalized									
EBLTR	B	0.02	11	0.4	B	0.02	12	0.6	-
WBLTR	B	0.07	14.6	1.5	D	0.4	32.8	19.9	-
NBLTR	A	0.11	0	0	A	0.19	0.3	0.3	-
SBLTR	A	0.01	0.3	0.2	A	0	0.1	0.1	-
NOTES: Thresholds for the Niagara Region intersections: - V/C ratios of 0.85 for through or shared through turning movements - V/C ratios of 0.90 for exclusive Thresholds For MTO intersections: - V/C ratios of 0.75 # - 95th percentile volume queue exceeds capacity; queue may be longer.									

3.7 2036 HORIZON TRAFFIC CONDITIONS

During the 2036 Future Background conditions, with the application of general traffic growth, all of the study signalized intersections operate with some impact to the operations. The movements at Montrose Road & Thorold Stone Road, QEW West Off-Ramp & Thorold Stone Rd and at QEW East Off-Ramp & Thorold Stone Rd intersection operate close to or exceed capacity. These movements include:

- During the AM peak hour at Montrose Road & Thorold Stone Road, EBTR and WBL operate at v/c 0.88 and 0.79 with level of service D. During the PM peak hour, the EBTR, WBL, SBL and WBTR are expected to operate overcapacity with v/c greater than 1.0 with the level of service F. The queues for WBL, NBR and SBL extend up to 143 m, 90 m and 105 m which is beyond their respective storage length.
- During the PM peak hour, EBT, EBR, WBT and WBL at QEW West Off-Ramp & Thorold Stone Rd are expected to operate at v/c of 0.86, 0.80, 0.86 and 1.42 which is exceeding the MTO thresholds of 0.75. However, the queues for WBL are expected to be within the storage length of 210 m. The SBR and EBR queues are expected to exceed up to 53 m and 132 m respectively.
- During the PM peak hour, EBL, EBT, WBT and NBR at QEW East Off-Ramp & Thorold Stone Rd are expected to operate at v/c of 0.82, 0.85, 1.01 and 0.83 respectively. The NBR queue during the PM peak to 96 m, exceeding the storage length of 45 m.

Table 4 shows all the results for the Future Background 2036 results. The detailed synchro results are presented in Appendix F. The impacts to the intersection movements are due to the growth within the study area along with the lower saturation flow rate in the synchro model as per the Niagara Region guidelines. With the increase in background growth the saturation flow rate would increase as well, using a higher saturation flow rate for future conditions has been added as a sensitivity analysis in section 3.8.

Table 3-4 - Future Background 2036 Results

Movement	Weekday AM Peak Hour				Weekday PM Peak Hour				Storage Length (m)
	LOS	V/C	Delay (s/veh)	95th %ile Q	LOS	V/C	Delay (s/veh)	95th %ile Q(m)	
Montrose Road & South Wood Dr (Niagara Region) – Signalized									
EBTLR	A	0.05	9.1	4.4	A	0	0	0	-
WBTL	B	0.21	18.4	11.3	D	0.69	36	46.8	-
WBR	A	0.06	0.4	0	A	0.25	6.1	10	-
NBL	A	0	4.5	0.7	A	0.02	9.4	2.7	50
NBT	A	0.18	9	26.8	C	0.6	26.1	68.7	-
NBR	A	0.08	2.5	4.1	A	0.19	6.2	8.8	50
SBL	A	0.03	4.8	2.9	B	0.17	10.1	12.9	40
SBTR	B	0.32	10.5	43	B	0.43	17.5	53	-
Montrose Road & Thorold Stone Rd (Niagara Region) – Signalized									
EBL	B	0.28	13.4	18	C	0.59	31	29	45
EBTR	D	0.88	41	#167.3	F	1.15	112.1	#225.6	-
WBL	D	0.79	38.2	#87.8	F	1.18	142.9	#142.2	85
WBTR	C	0.6	22.9	113.2	F	1.16	112.2	#274.4	-
NBL	C	0.33	26.9	23.9	C	0.51	29.2	41.9	60
NBT	D	0.5	44.8	31.2	D	0.46	41.6	38.9	-
NBR	B	0.79	17.8	30.8	D	0.94	42.5	#90.0	35
SBL	D	0.74	40.9	66.1	F	1.03	87.1	#105.0	60
SBTR	C	0.33	23.5	23.8	C	0.53	34.7	44.4	-
QEW West Off-Ramp & Thorold Stone Rd (MTO) – Signalized									
EBT	C	0.82	25.1	107.9	E	0.86	60.8	#254.9	-
EBR	B	0.76	10.8	50.3	C	0.83	20.6	#147.2	60
WBL	C	0.7	22.5	#57.5	F	1.42	238.4	169.2	210
WBT	A	0.56	8.4	64.9	C	0.86	20.5	#257.6	-
SBL	C	0.45	34	37.5	D	0.49	38.4	48.4	40
SBR	C	0.51	20.2	23.7	D	0.78	45.9	53	25
QEW East Off-Ramp & Thorold Stone Rd (MTO) – Signalized									
EBL	B	0.49	10.2	21.3	D	0.82	53.3	#75.8	210
EBT	B	0.63	10.9	99.4	C	0.85	21.1	#238.8	-
WBT	C	0.71	22.2	115.3	E	1.04	62.7	#262.7	-
WBR	B	0.55	16.3	61.3	C	0.78	31.1	138.5	15
NBL	C	0.47	31.8	50.8	D	0.58	37.7	70.1	35
NBR	C	0.7	33	67.3	D	0.83	47.7	#95.7	45
Montrose Road & Mt Carmel Road (Niagara Region) – Unsignalized									
EBLTR	B	0.09	10	2.3	B	0.06	10.5	2	-
WBLTR	A	0	0	0	A	0	0	0	-
NBLTR	A	0.02	1.3	0.5	A	0.05	1.6	1.2	-

Movement	Weekday AM Peak Hour				Weekday PM Peak Hour				Storage Length (m)
	LOS	V/C	Delay (s/veh)	95th %ile Q	LOS	V/C	Delay (s/veh)	95th %ile Q(m)	
SBLTR	A	0	0	0	A	0	0	0	-
Montrose Road & Cameron Ct (Niagara Region) – Unsignalized									
EBLTR	B	0.02	11.2	0.5	B	0.02	12.9	0.7	-
WBLTR	C	0.07	15.5	2.1	E	0.62	45.3	19.9	-
NBLTR	A	0.12	0	0	A	0.19	0.4	0.4	-
SBLTR	A	0.01	0.3	0.3	A	0	0.2	0.1	-
NOTES: Thresholds for the Niagara Region intersections: - V/C ratios of 0.85 for through or shared through turning movements - V/C ratios of 0.90 for exclusive Thresholds For MTO intersections: - V/C ratios of 0.75 # - 95th percentile volume queue exceeds capacity; queue may be longer.									

2036 future background analysis for the intersection of Thorold Stone Road and Montrose Road indicates that during the PM peak, 95th percentile queue for the westbound left turn will be ~142 m which exceeds the available storage of 85 m.

3.8 SENSITIVITY ANALYSIS FUTURE BACKGROUND

As noted in the discussion of existing conditions, it is possible that the City of Niagara Falls default values for Saturation Flow and peak hour factors of 0.92 are conservatively low, resulting in an indication of problems where there are currently none. As traffic volumes in the area increase due to area growth, it is likely that during peak hours, driver behaviour will adapt so that there are shorter headways between vehicles and therefore higher saturation flows, and a more even distribution of vehicle demand over peak hours, resulting in higher peak hour factor

Sensitivity analysis was conducted to evaluate conditions based on saturation flow rates of 1,900 vehicles per hour per lane (as indicated in the July 2023 Niagara Region TIA guidelines).

A further sensitivity analysis was done for the intersection of Montrose Road and Thorold Stone Road to adjust any peak hour factors with existing values already higher than 0.92 to the existing value. For movements where the existing peak hour factor is already higher than 0.92, it is more likely that these would be the same or higher in future total conditions than existing conditions, therefore reducing the value to 0.92 would result in an artificially low peak hour factor and an artificially high adjusted peak hour volume.

The detailed synchro results are presented in Appendix F.

3.8.1 2026 FUTURE BACKGROUND SENSITIVITY ANALYSIS

The 2026 Future Background sensitivity analysis with the updated saturation flow rates outlined in Table 3-5 shows that all the movements are operating with an acceptable level of service during both AM and PM peak hours. However, a few movements at Montrose Road & Thorold Stone Road, QEW West Off-Ramp & Thorold Stone Rd and at QEW East Off-Ramp & Thorold Stone Rd intersection operate close to threshold during the PM peak hour. These movements include:

— EBT at QEW West Off-Ramp & Thorold Stone Rd is expected to operate at v/c 0.78 which is slightly above the MTO threshold of 0.75, however the LOS is C and these are the only exceeded thresholds.

Table 3-5 - 2026 Future Background Sensitivity Analysis with Ideal Saturation Flows of 1,900 vphgpl

Movement	Weekday PM Peak Hour				Storage Length (m)
	LOS	V/C	Delay (s)	95th %ile Q	
Montrose Road & Thorold Stone Rd					
EBL	B	0.34	13.6	16.0	45
EBTR	C	0.81	32.5	125.6	-
WBL	C	0.72	28.7	62.4	85
WBTR	C	0.75	24.6	136.6	-
NBL	C	0.37	25.3	34.8	60
NBT	D	0.46	41.4	33.2	-
NBR	B	0.72	14.5	30.6	35
SBL	C	0.65	31.5	75.4	60
SBTR	C	0.44	30.2	35.6	-
QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd					
EBT	C	0.78	23.7	121.8	-
EBR	A	0.54	6.4	35.0	60
WBL	C	0.70	24.0	#66.4	210
WBT	B	0.61	10.5	98.4	-
SBL	C	0.39	29.6	37.1	40
SBR	C	0.60	29.3	37.0	25
NOTES:					
Thresholds for the Niagara Region intersections:					
- V/C ratios of 0.85 for through or shared through turning movements - V/C ratios of 0.90 for exclusive					
Thresholds For MTO intersections:					
V/C ratios of 0.75					
# - 95th percentile volume queue exceeds capacity; queue may be longer.					

3.8.2 2031 FUTURE BACKGROUND SENSITIVITY ANALYSIS

The 2031 Future Background sensitivity analysis with the updated saturation flow rates shows that all the movements are operating with an acceptable level of service during both AM and PM peak hours. However, a few movements at Montrose Road & Thorold Stone Road, QEW West Off-Ramp & Thorold Stone Rd and at QEW East Off-Ramp & Thorold Stone Rd intersection operate close to threshold during the PM peak hour. These movements include:

— WBL at Montrose Road & Thorold Stone Road is expected to operate with acceptable v/c threshold, however the queues go up to 94 m which is slightly exceeding the storage length of 85 m. The EBTR is expected to operate at v/c of 0.86 with queues 165 m.

- EBT and WBL at QEW West Off-Ramp & Thorold Stone Rd are expected to operate at v/c 0.83 and 0.77 which is slightly above the MTO threshold of 0.75, however the LOS is C. The SBR and SBL queues are expected to extend slightly beyond 25 m and 40 m of storage length.
- NBR at QEW East Off-Ramp & Thorold Stone Rd is expected to operate at v/c 0.76 which is slightly above the MTO threshold of 0.75.

The V/C thresholds exceed the thresholds by a small amount and are limited to two measures for two movements at each intersection. With this level of exceeding the thresholds, it is not expected that improvements would be implemented also for the other intersections apart from the WBL at Montrose Road & Thorold Stone Road.

The 2031 future background sensitivity analysis for the intersection of Thorold Stone Road and Montrose Road indicates that during the PM peak, 95th percentile queue for the westbound left turn will be ~94m which exceeds the available storage of 85m.

Table 3-6 - 2031 Future Background Sensitivity Analysis with Ideal Saturation Flows of 1,900 vphgpl

Movement	Weekday AM Peak Hour			Weekday PM Peak Hour					Storage Length (m)
	LOS	V/C	Delay (s/veh)	95th %ile Q	LOS	V/C	Delay (s/veh)	95th %ile Q(m)	
Montrose Road & Thorold Stone Rd (Niagara Region) – Signalized									
EBL	B	0.19	10.4	13	B	0.42	16.8	19.5	45
EBTR	C	0.77	28.8	105	D	0.86	37	#164.7	-
WBL	B	0.62	19	41.1	D	0.80	39.2	#93.9	85
WBTR	B	0.55	19.3	74.6	C	0.80	28.7	#189.2	-
NBL	C	0.21	20.9	22.1	C	0.40	26.5	37.2	60
NBT	D	0.38	36.5	29	D	0.48	42.3	35.4	-
NBR	B	0.66	12.1	25.9	C	0.79	21.5	45.7	35
SBL	C	0.48	23.5	57.4	D	0.74	36.9	82.3	60
SBTR	B	0.24	19.8	21.6	C	0.47	32.1	39.1	-
QEW West Off-Ramp & Thorold Stone Rd (MTO) – Signalized									
EBT	B	0.72	19.1	73.6	C	0.83	25.3	134.1	-
EBR	A	0.58	5.1	21.9	A	0.59	7.8	46.3	60
WBL	A	0.54	9.8	19.5	C	0.77	32.6	90.7	210
WBT	A	0.48	8.3	46.3	B	0.65	10.2	104.1	-
SBL	C	0.38	24.1	26	D	0.56	36.7	45.3	40
SBR	B	0.39	10.1	12.9	C	0.55	28.4	42.3	25
QEW East Off-Ramp & Thorold Stone Rd (MTO) – Signalized									
EBL	A	0.34	6.2	16.3	B	0.56	18.4	37.2	210
EBT	A	0.50	7.9	65.7	B	0.64	12.3	136.2	-
WBT	B	0.57	16.5	76.3	C	0.74	23.8	168.4	-
WBR	B	0.37	13.2	38.2	B	0.48	15.7	78.7	15
NBL	C	0.48	27.2	41.7	D	0.61	36.4	63.9	35
NBR	C	0.59	21.7	46.9	D	0.76	39.8	#82.1	45
NOTES:									
Thresholds for the Niagara Region intersections:									
- V/C ratios of 0.85 for through or shared through turning movements - V/C ratios of 0.90 for exclusive									
Thresholds For MTO intersections:									
V/C ratios of 0.75									
# - 95th percentile volume queue exceeds capacity; queue may be longer.									

Further sensitivity analysis was conducted, including saturation flow, peak hour factor adjustments and signal timing optimization for intersection at Montrose Road & Thorold Stone Rd is summarized in Table 3-7. During the sensitivity analysis, movements with a PHF of 0.92 or lower than the existing PHF were adjusted to match the existing PHF, while the others remained unchanged. For signal timing optimizations, the splits were adjusted to provide more green time to the east-west movements. The ideal saturation flow of 1900 vphgpl was used as part of this analysis.

Following the adjustments to saturation flow, peak hour factor, and signal timing optimization, all movements are operating within acceptable thresholds. It should be noted that the SBL queues slightly exceed the storage length by, but this is also observed under existing conditions.

Table 3-7: 2031 Future Background Sensitivity Analysis with Ideal Saturation Flows of 1,900 vphgpl, PHF and Signal Optimization

Movement	Weekday PM Peak Hour				
	LOS	V/C	Delay (s)	95th %ile Q	Storage Length (m)
Montrose Road & Thorold Stone Rd					
EBL	B	0.40	16.6	18.4	45
EBTR	D	0.84	36.7	#162.7	-
WBL	D	0.79	37.5	77.0	85
WBTR	C	0.79	27.7	163.7	-
NBL	C	0.41	27.5	40.2	60
NBT	D	0.50	45.1	37.2	-
NBR	B	0.74	14.8	32.6	35
SBL	D	0.72	36.0	88.7	60
SBTR	C	0.46	32.9	40.9	-
NOTES: Thresholds for the Niagara Region intersections: - V/C ratios of 0.85 for through or shared through turning movements - V/C ratios of 0.90 for exclusive Thresholds For MTO intersections: - V/C ratios of 0.75 # - 95th percentile volume queue exceeds capacity; queue may be longer.					

3.8.3 2036 FUTURE BACKGROUND SENSITIVITY ANALYSIS

The 2036 Future Background sensitivity analysis with the updated saturation flow rates shows that all the movements are operating with better level of service than without the assumptions during both AM and PM peak hours. However, a few movements at Montrose Road & Thorold Stone Road, QEW West Off-Ramp & Thorold Stone Rd and at QEW East Off-Ramp & Thorold Stone Rd intersection operate close to threshold during the PM peak hour. These movements include:

- EBTR and WBTR are expected to operate overcapacity with v/c 0.91 and 0.89 respectively. The queues for WBL, NBR and SBL extend up to 117 m, 61 m and 97 m which is beyond their respective storage length.
- EBT and WBL at QEW West Off-Ramp & Thorold Stone Rd are expected to operate at v/c of 0.85 and 0.98 which is exceeding the MTO thresholds of 0.75. However, the queues for WBL are expected to be within the storage length of 210 m. The SBR queue during the PM peak to 49 m, exceeding the storage length of 25 m The MTO queue analysis captures the SBR queues in section 6.

— WBT and NBR at QEW East Off-Ramp & Thorold Stone Rd are expected to operate at v/c of 0.83, and 0.82 respectively. The NBR queue during the PM peak to 96 m, exceeding the storage length of 45 m. The MTO queue analysis captures the NBR queues in section 6.

As mentioned for the 2031 Sensitivity analysis as well, the 2036 future background sensitivity analysis for the intersection of Thorold Stone Road and Montrose Road indicates that during the PM peak, 95th percentile queue for the westbound left turn will be ~117 m which exceeds the available storage of 85 m.

For the NBR movement at intersection at Montrose Road & Thorold Stone Road, the queues extend the storage length and might require future improvements by 2036. The NBR queues extending ~50 m beyond the storage length could slightly impact the NBT movement, however the NBT has some capacity. There could be a potential need to extend the NBR storage to future proof the infrastructure and this may require property from the adjacent developments.

The detailed synchro results are provided in Appendix F.

Table 3-8 - 2036 Future Background Sensitivity Analysis with Ideal Saturation Flows of 1,900 vphgpl

	Weekday AM Peak Hour				Weekday PM Peak Hour				Storage Length (m)
Movement	LOS	V/C	Delay (s)	95th %ile Q	LOS	V/C	Delay (s)	95th %ile Q	
Montrose Road & Thorold Stone Rd (Niagara Region) – Signalized									
EBL	B	0.22	11.1	14.5	C	0.49	21.1	24.6	45
EBTR	C	0.81	31.9	120.4	D	0.91	42.9	#199.5	-
WBL	C	0.67	24.9	54.6	D	0.87	50.7	#116.8	85
WBTR	B	0.56	19.8	86.0	D	0.89	38.3	#235.1	-
NBL	C	0.24	22.9	23.7	C	0.44	27.3	39.8	60
NBT	D	0.42	39.3	31.3	D	0.48	42.7	38.0	-
NBR	B	0.69	12.3	26.7	C	0.85	29.1	60.9	35
SBL	C	0.53	26.4	62.0	D	0.83	45.5	#96.7	60
SBTR	C	0.27	21.0	23.3	C	0.49	33.7	43.0	-
QEW West Off-Ramp & Thorold Stone Rd (MTO) – Signalized									
EBT	C	0.75	20.6	97.2	C	0.85	27.7	172.3	-
EBR	A	0.59	4.4	19.7	A	0.61	7.8	55.9	60
WBL	B	0.63	15.6	35.7	E	0.98	68.3	#124.5	210
WBT	A	0.51	8.5	58.2	B	0.71	11.9	143.4	-
SBL	C	0.43	28.2	33.4	D	0.62	40.8	50.2	40
SBR	B	0.46	16.7	21.3	C	0.62	33.0	48.7	25
QEW East On-Ramp & Thorold Stone Rd (MTO) – Signalized									
EBL	A	0.40	7.8	19.7	C	0.69	33.9	53.0	210
EBT	A	0.54	9.4	84.8	B	0.71	15.1	171.8	-
WBT	B	0.61	18.3	97.0	C	0.83	29.1	#221.0	-
WBR	A	0.35	3.1	14.3	A	0.46	6.3	37.6	15
NBL	C	0.51	30.2	50.8	D	0.65	38.2	72.0	35
NBR	C	0.68	30.1	66.1	D	0.82	45.3	#95.7	45
NOTES:									
Thresholds for the Niagara Region intersections:									
- V/C ratios of 0.85 for through or shared through turning movements - V/C ratios of 0.90 for exclusive									
Thresholds For MTO intersections:									
V/C ratios of 0.75									
# - 95th percentile volume queue exceeds capacity; queue may be longer.									

Further sensitivity analysis was conducted including saturation flow, peak hour factor adjustments and lost time adjustments for intersection at Montrose Road & Thorold Stone Rd is summarized in Table 3-9. During the sensitivity analysis, movements with a PHF of 0.92 or lower than the existing PHF were adjusted to match the existing PHF, while the others remained unchanged. For signal timing optimizations, the splits were adjusted to provide more green time to the east-west movements. The ideal saturation flow of 1900 vphgpl was used as part of this analysis.

Following the adjustments to saturation flow, peak hour factor, and signal timing, all movements are operating within acceptable thresholds during the PM peak, with the exception of EBTR and WBTR, which have a v/c ratio of 0.89. The queue lengths for WBL, NBR, and SBL slightly exceed the storage by approximately 2m, 12m, and 40m, respectively. This additional queue length is attributed to background growth in the area.

Table 3-9: 2036 Future Background Sensitivity Analysis with saturation flow, PHF and lost time adjustment

Movement	Weekday PM Peak Hour				
	LOS	V/C	Delay (s)	95th %ile Q	Storage Length (m)
Montrose Road & Thorold Stone Rd					
EBL	C	0.48	22.1	24.0	45
EBTR	D	0.89	42.1	#187.3	-
WBL	D	0.81	40.6	#87.3	85
WBTR	D	0.89	42.2	#213.9	-
NBL	C	0.46	29.6	43.3	60
NBT	D	0.55	48.3	40.6	-
NBR	C	0.82	22.2	48.9	35
SBL	D	0.80	42.7	#104.5	60
SBTR	C	0.49	35.0	44.7	-
NOTES: Thresholds for the Niagara Region intersections: - V/C ratios of 0.85 for through or shared through turning movements - V/C ratios of 0.90 for exclusive Thresholds For MTO intersections: - V/C ratios of 0.75 # - 95th percentile volume queue exceeds capacity; queue may be longer.					

4 SITE GENERATED TRAFFIC

4.1 DESCRIPTION OF PROPOSED DEVELOPMENT

The proposed development initially included the redevelopment of the vacant land at 3770 Montrose Road to consist of a total of 244 residential units: 52 stacked townhomes, 174 townhomes (66 rear-lane and 108 two-storey units), and 18 semi-detached homes. A total of 313 parking spots (262 for residents and 51 for visitors) were proposed. However, the current plan has been updated to include 257 units, consisting of 182 rear-lane townhouses and 75 stacked townhouses. Although the land use breakdown has changed, this report's traffic analysis remains based on the original 244-unit configuration, consistent with confirmation from the Ministry of Transportation of Ontario. Site-generated traffic volumes for the original plan are presented in Appendix E.

4.2 SITE ACCESS

There will be a full movement unsignalized access just north of the Montrose Road and Southwood Drive intersection on the west side of the site, as well as a full movement unsignalized access just east of the Montrose Road and Southwood Drive intersection on the south side of the site

4.3 TRIP GENERATION

Below is the estimated trip generation for the initial land use. The auto trips generated by the proposed development during the weekday a.m. and p.m. peak hours were estimated using the vehicle trip generation equation rates outlined in the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition.

Table 4-1 - Trip Generation Calculation

Land Use	ITE Code	Size	Unit	AM Peak Hour					
				Avg. Rate	% in	% out	Total Trips	Trips In	Trips Out
Single-Family Attached Housing - Townhouses (rear-lanes)	215	66	Dwellings	0.48	25%	75%	32	8	24
Single-Family Attached Housing - Townhouses (2-storey)	215	108	Dwellings	0.48	25%	75%	52	13	39
Single-Family Attached Housing - Semi-Detached	215	18	Dwellings	0.48	25%	75%	9	2	6
Single-Family Attached Housing - Stacked Townhouse	215	52	Dwellings	0.48	25%	75%	25	6	19
Total New Trips							117	29	88
Land Use	ITE Code	Size	Unit	PM Peak Hour					
				Avg. Rate	% in	% out	Total Trips	Trips In	Trips Out
Single-Family Attached Housing - Townhouses (rear-lanes)	215	66	Dwellings	0.57	59%	41%	38	22	15
Single-Family Attached Housing - Townhouses (2-storey)	215	108	Dwellings	0.57	59%	41%	62	36	25
Single-Family Attached Housing - Semi-Detached	215	18	Dwellings	0.57	59%	41%	10	6	4
Single-Family Attached Housing - Stacked Townhouse	215	52	Dwellings	0.57	59%	41%	30	17	12
Total New Trips							139	82	57

For the most updated site plan, the trip generation was calculated using the same ITE Trip Generation Manual, 11th Edition rates for the applicable land uses. The primary residential components include rear-lane townhouses and stacked townhouses, each assigned the Single-Family Detached Housing - General Urban/Suburban (ITE Code 215) trip generation rate. The trip generation estimates for the revised land use composition are as follows:

				AM Peak Hour					
Land Use	ITE Code	Size	Unit	Avg. Rate	% in	% out	Total Trips	Trips In	Trips Out
Single-Family Attached Housing - Townhouses (rear-lanes)	215	182	Dwellings	0.48	25%	75%	87	22	66
Single-Family Attached Housing - Townhouses (2-storey)	215		Dwellings	0.48	25%	75%	0	0	0
Single-Family Attached Housing - Semi-Detached	215		Dwellings	0.48	25%	75%	0	0	0
Single-Family Attached Housing - Stacked Townhouse	215	75	Dwellings	0.48	25%	75%	36	9	27
Total New Trips							123	31	93
				PM Peak Hour					
Land Use	ITE Code	Size	Unit	Avg. Rate	% in	% out	Total Trips	Trips In	Trips Out
Single-Family Attached Housing - Townhouses (rear-lanes)	215	182	Dwellings	0.57	59%	41%	104	61	43
Single-Family Attached Housing - Townhouses (2-storey)	215	0	Dwellings	0.57	59%	41%	0	0	0
Single-Family Attached Housing - Semi-Detached	215	0	Dwellings	0.57	59%	41%	0	0	0
Single-Family Attached Housing - Stacked Townhouse	215	75	Dwellings	0.57	59%	41%	43	25	18
Total New Trips							146	86	60

The resulting total trip generation for the updated site plan yields slightly higher vehicle trips than the original 244-unit scenario; however, as confirmed by the Ministry of Transportation of Ontario (MTO) on September 22, 2025, these differences are not significant with respect to total trip volumes or impact assessment conclusions.

4.4 TRIP DISTRIBUTION AND ASSIGNMENT

The site-generated auto traffic assignments were developed based on the proposed site access arrangement, the road network, and the trip distribution information presented in Table 4-2 and Table 4-3 is based on the existing traffic as mentioned in the terms of reference. The Site Volume diagram has been outlined in Appendix E

Table 4-2 - Trip Distribution AM Peak

Direction (to/from)	% In	% Out
North	14%*	15%
via Montrose Rd	6%	4%
via QEW NB Ramp	-	11%
via QEW SB Ramp	9%	-
South	30%	31%
via Montrose Rd	15%	12%
via QEW NB Ramp	15%	-
via QEW SB Ramp	-	19%
East	28%	33%
via Thorold Stone Rd	28%	33%
West	28%*	21%

via Thorold Stone Rd	25%	20%
via Mount Carmel Blvd	2%	1%
via South Wood Dr	0%	0%
via Cameron Ct	0%	0%
Total	100%	100%

* Note that these values have been rounded, therefore the sum of percentages distributed to individual routes differs from the summed value for each direction by 1%

Table 4-3 - Trip Distribution PM Peak

<i>Direction (to/from)</i>	<i>% In</i>	<i>% Out</i>
North	14%	16%
via Montrose Rd	5%	6%
via QEW NB Ramp	-	10%
via QEW SB Ramp	9%	-
South	30%	27%*
via Montrose Rd	15%	12%
via QEW NB Ramp	15%	-
via QEW SB Ramp	-	16%
East	31%	32%
via Thorold Stone Rd	31%	32%
West	25%	24%
via Thorold Stone Rd	23%	23%
via Mount Carmel Blvd	1%	1%
via South Wood Dr	0%	0%
via Cameron Ct	0%	0%
Total	100%	100%

*Note that these values have been rounded, therefore the sum of percentages distributed to individual routes differs from the summed value for each direction by 1%

5 FUTURE TOTAL TRAFFIC CONDITIONS

5.1 FUTURE TOTAL VOLUMES

The future total traffic volumes were developed by combining the future background and site-generated traffic. The future total volume diagrams are provided in Appendix E.

5.2 2026 HORIZON TRAFFIC CONDITIONS

During the 2026 Future Total conditions, with the application of general traffic growth all of the study signalized intersections operate at acceptable level. However, a few movements at Montrose Road & Thorold Stone Road, QEW West Off-Ramp & Thorold Stone Rd and at QEW East Off-Ramp & Thorold Stone Rd intersection operate close to or exceed capacity. These movements include:

- EBTR, WBTR and SBL at Montrose Road & Thorold Stone Road are expected to operate at v/c 0.92, 0.96 and 1.0 respectively during the PM peak hour. With the queues of 107 m, 42 m, and 92 m for WBL, NBR and SBL exceeding the storage length of 85 m, 35 m and 60 m respectively.
- EBT at QEW West Off-Ramp & Thorold Stone Rd are expected to operate at v/c of 0.76 which is slightly above the MTO thresholds of 0.75 during the AM peak. During the PM Peak, EBT and WBL at QEW West Off-Ramp & Thorold Stone Rd are expected to operate at v/c of 0.86 which is exceeding the MTO thresholds of 0.75. However, the queues for SBR are expected to 41 m which is exceeding the storage length of 25 m for the southbound turning movement at the intersection.
- WBT at QEW East Off-Ramp & Thorold Stone Rd during the PM peak is expected to operate at v/c of 0.79.

Table 5-1 shows all the analysis for the Future total 2026 results. As indicated in the future background analysis, based on the saturation flow assumptions for the City of Niagara Falls in the Region of Niagara TIA Guidelines, congestion is expected to increase with growth in regional traffic volumes. Given higher volume conditions, drivers are expected to adapt with smaller headways, and it is expected that saturation flows will increase to 1900 vehicle per hour per lane. The additional sensitivity analysis with higher saturation flow rate has been added in section 5.5.

Table 5-1 - 2026 Future Total Analysis Results

Movement	Weekday AM Peak Hour				Weekday PM Peak Hour				Storage Length (m)
	LOS	V/C	Delay (s/veh)	95th %ile Q	LOS	V/C	Delay (s/veh)	95th %ile Q(m)	
Montrose Road & South Wood Dr (Niagara Region) – Signalized									
EBTLR	A	0.04	9.2	4.3	A	0	0	0	-
WBTL	C	0.33	20.6	17.4	C	0.66	33.7	44.3	-
WBR	A	0.05	0.3	0	A	0.22	6.2	9.4	-
NBL	A	0	5.5	0.8	A	0.01	9.2	2.5	50
NBT	A	0.17	9.9	27.9	C	0.55	23.5	69.6	-
NBR	A	0.08	2.6	4.4	A	0.21	6.2	10.1	50
SBL	A	0.02	5.8	3	A	0.15	9.8	11.6	40
SBTR	B	0.34	11.6	50.7	B	0.43	17.5	52.8	-
Montrose Road & Thorold Stone Rd (Niagara Region) – Signalized									
EBL	B	0.25	12.4	15.6	C	0.56	25.9	27.9	45
EBTR	D	0.83	35.2	111.7	D	0.92	45.6	#173.8	-
WBL	C	0.68	24.2	44.5	E	0.90	56.3	#106.5	85
WBTR	C	0.6	22.3	84.3	D	0.96	45.7	#226.5	-
NBL	C	0.26	23.1	21	C	0.47	29.5	35.6	60

Movement	Weekday AM Peak Hour				Weekday PM Peak Hour				Storage Length (m)
	LOS	V/C	Delay (s/veh)	95th %ile Q	LOS	V/C	Delay (s/veh)	95th %ile Q(m)	
NBT	D	0.42	39.4	27.7	D	0.53	45.2	35.1	-
NBR	B	0.73	16.7	28	C	0.83	23.7	41.8	35
SBL	C	0.7	34.2	#73.2	F	1.00	81.4	#92.4	60
SBTR	B	0.29	20	22.5	C	0.54	33.4	38.1	-
QEW West Off-Ramp & Thorold Stone Rd (MTO) – Signalized									
EBT	C	0.76	20.8	71.2	C	0.86	29.3	146.8	-
EBR	A	0.66	6.8	17.9	B	0.69	10.2	53.8	60
WBL	B	0.55	10.2	15.7	D	0.86	44.1	#93.9	210
WBT	A	0.5	8.2	40.8	B	0.7	12.4	126.8	-
SBL	C	0.31	24.8	24.1	C	0.42	35	38.8	40
SBR	B	0.37	10.9	12.8	D	0.68	36.5	41.4	25
QEW East On-Ramp & Thorold Stone Rd (MTO) – Signalized									
EBL	A	0.34	5.7	11.7	B	0.56	15.5	29.4	210
EBT	A	0.52	7.6	49.2	B	0.66	11.7	117.6	-
WBT	B	0.62	17.4	66.3	C	0.79	24.9	152	-
WBR	A	0.47	12.0	34.4	B	0.59	18.2	75.6	15
NBL	C	0.42	26.6	36.1	D	0.54	35.6	56.7	35
NBR	B	0.53	16.6	33.4	D	0.73	38.4	69.8	45
Montrose Road & Mt Carmel Road (Niagara Region) – Unsignalized									
EBLTR	A	0.07	9.7	1.8	B	0.06	10.0	2	-
WBLTR	B	0.13	13.4	3.5	C	0.10	15.7	2.6	-
NBLTR	A	0.02	1.1	0.4	A	0.04	1.2	1.5	-
SBLTR	A	0	0	0	A	0	0	0	-
Montrose Road & Cameron Ct (Niagara Region) – Unsignalized									
EBLTR	B	0.02	11.6	0.5	B	0.02	13.0	0.7	-
WBLTR	C	0.07	15.5	1.8	E	0.51	36.8	20.7	-
NBLTR	A	0.11	0	0	A	0.21	0.2	0.3	-
SBLTR	A	0.01	0.3	0.3	A	0	0.1	0.1	-
NOTES: Thresholds for the Niagara Region intersections: - V/C ratios of 0.85 for through or shared through turning movements - V/C ratios of 0.90 for exclusive Thresholds For MTO intersections: - V/C ratios of 0.75 # - 95th percentile volume queue exceeds capacity; queue may be longer.									

5.3 2031 HORIZON TRAFFIC CONDITIONS

During the 2031 Future Total conditions, with the application of general traffic growth all of the study signalized intersections operate at acceptable level. However, a few movements at Montrose Road & Thorold Stone Road, QEW West Off-Ramp & Thorold Stone Rd and at QEW East Off-Ramp & Thorold Stone Rd intersection operate close to or exceed capacity. These movements include:

- During the AM peak hour, EBTR operate at v/c 0.85 and level of service D. During the PM peak hour, the EBTR, WBL, WBTR, and SBL are expected to operate overcapacity with v/c greater than 1.0 with levels of

service E, F, F, and F respectively. The NBR is expected to operate at v/c 0.89. The WBL, NBR and SBL queues are expected to reach 128 m, 71 m and 110 m extending beyond the storage length for these movements.

- During the PM peak hour, EBT, WBL, WBT and SBR at QEW West Off-Ramp & Thorold Stone Rd are expected to operate at v/c of 0.89, 1.14, 0.77, and 0.76 which is exceeding the MTO thresholds of 0.75. However, the queues for WBL are expected to be 131 m which is within the storage length. The SBR queues are expected to exceed up to 49 m, exceeding from the storage length of 25 m.
- During the PM peak hour, EBT, WBT and NBR at QEW East Off-Ramp & Thorold Stone Rd are expected to operate at v/c of 0.75, 0.89, and 0.79 respectively. The NBR queue during the PM peak is 82 m, slightly exceeding the storage length of 45 m.

Table 5-2 shows all the analysis for the Future total 2031 results. As stated in the future background conditions section, this analysis is based on the saturation flows from the Niagara Region guidelines. These are lower than the synchro default saturation flows of 1900 vehicle per hour per lane. As traffic volumes increase, drivers are likely to maintain slightly smaller headways, resulting in higher saturation flow rates. With the increase in background growth the saturation flow rate would increase as well, using a higher saturation flow rate for future conditions has been added as a sensitivity analysis in section 5.5. The detailed synchro results are provided in Appendix F.

Table 5-2 - 2031 Future Total Analysis Results

Movement	Weekday AM Peak Hour				Weekday PM Peak Hour				Storage Length (m)
	LOS	V/C	Delay (s/veh)	95th %ile Q	LOS	V/C	Delay (s/veh)	95th %ile Q(m)	
Montrose Road & South Wood Dr (Niagara Region) – Signalized									
EBTLR	A	0.04	9.4	4.4	A	0.0	0.0	0.0	-
WBTL	C	0.37	22.8	19	D	0.71	38.1	#54.5	-
WBR	A	0.06	0.4	0	A	0.23	6.3	10.1	-
NBL	A	0	5.5	0.8	A	0.02	9.4	2.7	50
NBT	B	0.22	10.8	30.6	C	0.63	27	75.9	-
NBR	A	0.1	2.9	4.8	A	0.23	6.2	10.3	50
SBL	A	0.03	5.8	3.4	B	0.17	10.2	12.4	40
SBTR	B	0.43	13.4	55.6	B	0.45	18	57.2	-
Montrose Road & Thorold Stone Rd (Niagara Region) – Signalized									
EBL	B	0.28	13	17.3	C	0.62	32.5	32.9	45
EBTR	D	0.85	37.9	#139.7	E	1.03	70.8	#200.0	-
WBL	C	0.73	30.3	#66.5	F	1.06	101.5	#128.0	85
WBTR	C	0.6	22.5	98.8	F	1.09	83.3	#257.7	-
NBL	C	0.3	25.7	22.2	C	0.49	29.2	38.7	60
NBT	D	0.47	42.8	29.8	D	0.5	43.2	37.6	-
NBR	B	0.76	17.3	29.2	C	0.89	33.7	#71.0	35
SBL	D	0.80	43.9	#84.1	F	1.08	100.6	#109.8	60
SBTR	C	0.33	21.6	24.2	C	0.55	34.2	42.5	-
QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd (MTO) – Signalized									
EBT	C	0.8	22.7	92.6	C	0.89	33.6	209.4	-
EBR	A	0.71	8.5	33.2	B	0.75	14.2	92.1	60
WBL	B	0.64	15.9	30.8	F	1.14	122.9	#131.2	210
WBT	A	0.53	8.2	51	B	0.77	15.6	181.7	-

Movement	Weekday AM Peak Hour				Weekday PM Peak Hour				Storage Length (m)
	LOS	V/C	Delay (s/veh)	95th %ile Q	LOS	V/C	Delay (s/veh)	95th %ile Q(m)	
SBL	C	0.38	29.7	31.2	D	0.47	38.6	43.6	40
SBR	B	0.42	12.2	14.9	D	0.76	44.7	48.8	25
QEW East On-Ramp & Thorold Stone Rd (MTO) – Signalized									
EBL	A	0.42	7.7	17.1	C	0.71	34.2	#56.9	210
EBT	A	0.58	9	73.9	B	0.75	15.6	169.2	-
WBT	B	0.66	19.3	88.4	C	0.89	34	216.7	-
WBR	B	0.51	13.6	46.1	C	0.67	23.8	102.3	15
NBL	C	0.46	30.1	46.6	D	0.58	37.9	64	35
NBR	C	0.63	26	53.9	D	0.79	43.9	82.1	45
Montrose Road & Mt Carmel Road (Niagara Region) – Unsignalized									
EBLTR	A	0.08	9.8	2.0	B	0.07	10.2	1.7	-
WBLTR	B	0.13	14	3.7	C	0.12	17.2	3.2	-
NBLTR	A	0.02	1.1	0.5	A	0.04	1.6	1.1	-
SBLTR	A	0.00	0.0	0.0	A	0.00	0.0	0.0	-
Montrose Road & Cameron Ct (Niagara Region) – Unsignalized									
EBLTR	B	0.02	11.7	0.5	B	0.02	13	0.7	-
WBLTR	C	0.07	16.6	2.1	E	0.51	36.8	20.7	-
NBLTR	A	0.2	0	0	A	0.21	0.2	0.3	-
SBLTR	A	0.01	0.3	0.3	A	0	0.1	0.1	-
NOTES: Thresholds for the Niagara Region intersections: - V/C ratios of 0.85 for through or shared through turning movements - V/C ratios of 0.90 for exclusive Thresholds For MTO intersections: - V/C ratios of 0.75 # - 95th percentile volume queue exceeds capacity; queue may be longer.									

5.4 2036 HORIZON TRAFFIC CONDITIONS

During the 2036 Future Total conditions, with the application of general traffic growth all of the study signalized intersections operate at acceptable level. However, a few movements at Montrose Road & Thorold Stone Road, QEW West Off-Ramp & Thorold Stone Rd and at QEW East Off-Ramp & Thorold Stone Rd intersection operate close to or exceed capacity. These movements include:

- During the AM peak hour, EBTR operate at v/c 0.89 and level of service D. During the PM peak hour, the EBTR, SBL, WBL, and WBTR are expected to operate overcapacity with v/c greater than 1.0 with levels of service F, F, and F respectively. The NBR is expected to operate at v/c 0.94. The WBL, NBR and SBL queues are expected to reach 143 m, 93 m and 127 m extending beyond the storage length for these movements.
- During the AM peak hour, EBT operate at v/c 0.83. During the PM peak hour, EBT, EBR, WBL, WBT and SBR at QEW West Off-Ramp & Thorold Stone Rd are expected to operate at v/c close to 1.0 or above, exceeding the MTO thresholds of 0.75. However, the queues for WBL are expected to be 170 m which is within the storage

length. The EBR and SBR queues are expected to reach up to 137 m and 56 m, exceeding from the storage length of these movements.

- During the PM peak hour, EBL, EBT, WBT and NBR at QEW East Off-Ramp & Thorold Stone Rd are expected to operate at v/c close to 1.0 or above. The WBR, NBL, NBR queues during the PM peak are 53 m, 72 m, 96 m, exceeding their storage length of 15 m, 35 m, 45 m, respectively.

Table 5-3 shows all the analysis for the Future total 2036 results. The operational impacts on all the above movements are primarily due to the growth within study area along with the lower saturation flow rate in the synchro model as per the Niagara Region guidelines. Note that this is based on the assumed saturation flows based on the Niagara Region guidelines. These are lower than the synchro default saturation flows of 1900 vehicle per hour per lane. As traffic volumes increase, drivers are likely to maintain slightly smaller headways, resulting in higher saturation flow rates. With the increase in background growth conditions will become more congested and a higher saturation flow rate for future conditions is expected. The sensitivity analysis with these changes have been added in section 5.5. The detailed synchro results are provided in Appendix F.

Table 5-3 - 2036 Future Total Analysis Results

Movement	Weekday AM Peak Hour				Weekday PM Peak Hour				Storage Length (m)
	LOS	V/C	Delay (s/veh)	95th %ile Q	LOS	V/C	Delay (s/veh)	95th %ile Q(m)	
Montrose Road & South Wood Dr (Niagara Region) – Signalized									
EBTLR	A	0.04	9.6	4.7	A	0	0	0	-
WBTL	C	0.39	24	20.9	D	0.73	40.2	63.6	-
WBR	A	0.07	0.4	0	A	0.24	6.2	10.8	-
NBL	A	0	5.5	0.8	A	0.02	9.6	2.7	50
NBT	B	0.23	10.9	33.1	C	0.69	29.6	82.3	-
NBR	A	0.1	3.1	5.5	A	0.25	6.1	10.6	50
SBL	A	0.03	5.9	3.6	B	0.2	10.8	13	40
SBTR	B	0.45	13.8	61.5	B	0.5	19.2	61.6	-
Montrose Road & Thorold Stone Rd (Niagara Region) – Signalized									
EBL	B	0.31	14	19.4	D	0.66	36	35.9	45
EBTR	D	0.89	42.3	168.4	F	1.16	115.9	225.6	-
WBL	D	0.8	40.6	#89.6	F	1.19	147.5	#142.6	85
WBTR	C	0.63	23.8	117.3	F	1.24	143.9	287.5	-
NBL	C	0.34	26.9	23.9	C	0.52	29.4	41.9	60
NBT	D	0.51	44.9	32	D	0.47	41.5	40.8	-
NBR	C	0.81	21.3	37.1	D	0.94	44.1	#93.2	35
SBL	E	0.89	57.8	#96.4	F	1.14	120.1	#126.7	60
SBTR	C	0.36	22.4	25.7	C	0.54	34	46.5	-
QEW West Off-Ramp & Thorold Stone Rd (MTO) – Signalized									
EBT	C	0.83	25.5	116.3	E	1.02	70.5	#263.3	-
EBR	A	0.74	8.6	36.3	B	0.82	17.6	#137.1	60
WBL	C	0.71	24.7	#62.5	F	1.43	242.4	169.8	210
WBT	A	0.55	8.3	68	C	0.88	22.5	#269.6	-
SBL	D	0.46	35.3	38	D	0.48	38	48.4	40

Movement	Weekday AM Peak Hour				Weekday PM Peak Hour				Storage Length (m)
	LOS	V/C	Delay (s/veh)	95th %ile Q	LOS	V/C	Delay (s/veh)	95th %ile Q(m)	
SBR	C	0.54	22.1	25.5	D	0.79	47.5	56	25
QEW East On-Ramp & Thorold Stone Rd (MTO) – Signalized									
EBL	B	0.52	11.2	23.3	E	0.84	55.8	79.3	210
EBT	B	0.64	11.3	105.5	C	0.86	21.7	244.1	-
WBT	C	0.71	22.2	115.3	E	1.04	62.9	262.7	-
WBR	A	0.46	4.5	16.2	B	0.63	10.2	53.3	15
NBL	C	0.47	32.1	51.3	D	0.60	38	71.8	35
NBR	C	0.7	34.1	68.4	D	0.83	47.7	95.7	45
Montrose Road & Mt Carmel Road (Niagara Region) – Unsignalized									
EBLTR	A	0.09	10.0	2.3	B	0.08	10.6	2	-
WBLTR	B	0.13	14.7	4	C	0.13	18.9	3.7	-
NBLTR	A	0.02	1.3	0.5	A	0.05	1.6	1.2	-
SBLTR	A	0	0	0	A	0	0	0	-
Montrose Road & Cameron Ct (Niagara Region) – Unsignalized									
EBLTR	B	0.02	11.9	0.6	B	0.03	13.5	0.7	-
WBLTR	C	0.1	17.8	2.5	F	0.63	51.5	20.7	-
NBLTR	A	0.13	0	0	A	0.01	0.23	0.3	-
SBLTR	A	0.01	0.3	0.2	A	0	0.1	0.1	-
NOTES: Thresholds for the Niagara Region intersections: - V/C ratios of 0.85 for through or shared through turning movements - V/C ratios of 0.90 for exclusive Thresholds For MTO intersections: - V/C ratios of 0.75 # - 95th percentile volume queue exceeds capacity; queue may be longer.									

5.5 SENSITIVITY ANALYSIS FUTURE TOTAL

As noted in the discussion of existing conditions, it is possible that the City of Niagara Falls default values for Saturation Flow and peak hour factors of 0.92 are conservatively low, resulting in an indication of problems where there are currently none. As traffic volumes in the area increase due to area growth, it is likely that during peak hours, driver behaviour will adapt so that there are shorter headways between vehicles and therefore higher saturation flows, and a more even distribution of vehicle demand over peak hours, resulting in higher peak hour factor

Sensitivity analysis was conducted to evaluate conditions based on saturation flow rates of 1,900 vehicles per hour per lane (as indicated in the July 2023 Niagara Region TIA guidelines).

A further sensitivity analysis was done for the intersection of Montrose Road and Thorold Stone Road to adjust any peak hour factors with existing values already higher than 0.92 to the existing value. For movements where the

existing peak hour factor is already higher than 0.92, it is more likely that these would be the same or higher in future total conditions than existing conditions, therefore reducing the value to 0.92 would result in an artificially low peak hour factor and an artificially high adjusted peak hour volume.

The detailed synchro results are presented in Appendix F.

5.5.1 2026 FUTURE TOTAL SENSITIVITY ANALYSIS

The 2026 Future Total sensitivity analysis with updated saturated flow rates as 1900 vehicles per hour per lane (vphpl) as outlined in Table 5-4, shows that all the movements are operating with better and an acceptable level of service during both AM and PM peak hours. As only the PM peak hour shows movements exceeding the thresholds, the sensitivity analysis focused exclusively on the PM peak. However, a few movements at at QEW East Off-Ramp & Thorold Stone Rd intersection operate close to threshold during the PM peak hour. These movements include:

- EBT at QEW West Off-Ramp & Thorold Stone Rd is expected to operate at v/c 0.79 which is slightly above the MTO threshold of 0.75 The SBR queues are 36 m exceeding slightly by ~10 m from the storage length.

This shows that the proposed development will not be impacting the network causing any concerns for the 2026 horizon. The detailed synchro results are provided in Appendix F.

Table 5-4 - 2026 Future Total Sensitivity Analysis Results with Ideal Saturation Flows of 1,900 vphgpl

Movement	Weekday PM Peak Hour				
	LOS	V/C	Delay (veh/s)	95th %ile Q	Storage Length (m)
QEW West Off-Ramp & Thorold Stone Rd (MTO) – Signalized					
EBT	C	0.79	23	112.4	-
EBR	A	0.53	4.8	23.6	60
WBL	C	0.68	21.6	56.9	210
WBT	A	0.61	9.6	85.5	-
SBL	C	0.47	31.8	36.8	40
SBR	C	0.50	24.6	36.0	25
NOTES: Thresholds for the Niagara Region intersections: • V/C ratios of 0.85 for through or shared through turning movements • V/C ratios of 0.90 for exclusive Thresholds For MTO intersections: • V/C ratios of 0.75 # - 95th percentile volume queue exceeds capacity; queue may be longer.					

5.5.2 2031 FUTURE TOTAL SENSITIVITY ANALYSIS

The 2031 Future Total sensitivity analysis with the updated saturated flow rates 1900 vphpl as outlined in Table 5-5 shows that all the movements are operating with acceptable level of service during both AM and PM peak hour. However, a few movements at Montrose Road & Thorold Stone Road, QEW West Off-Ramp & Thorold Stone Rd and at QEW East Off-Ramp & Thorold Stone Rd intersection operate close to threshold during the PM peak hour. These movements include:

- WBL at Montrose Road & Thorold Stone Road is expected to operate with acceptable v/c threshold, however the queues go up to 96 m which is slightly exceeding the storage length of 85 m. The WBTR is expected to operate at v/c of 0.88. The SBL and NBR are expected with queues up to 103 m and 49 m, slightly exceeding the storage length for these movements.

- EBT and WBL at QEW West Off-Ramp & Thorold Stone Rd are expected to operate at v/c 0.85 and 0.82 which is slightly above the MTO threshold of 0.75, however the LOS is C. The SBL and SBR queues are expected to extend up to 44 m and 49 m which is above their storage lengths of 40 m and 25 m, respectively.
- NBR and WBT at QEW West Off-Ramp & Thorold Stone Rd are expected to operate at v/c 0.76 which is slightly above the MTO threshold of 0.75. The NBR queues are expected to go up to 82 m, MTO queue analysis captures the NBR queues in section 6.

The V/C thresholds exceed the thresholds by a small amount and are limited to two measures for two movements at each intersection. With this level of exceeding the thresholds, it is not expected that improvements would be implemented, also for the other intersections apart from the WBL at Montrose Road & Thorold Stone Road.

As mentioned for the future background conditions, the 2031 future total sensitivity analysis for the intersection of Thorold Stone Road and Montrose Road indicates that during the PM peak, 95th percentile queue for the westbound left turn will be ~96m which exceeds the available storage of 85m.

For the NBR movement at intersection of Thorold Stone Road and Montrose Road, the queues extend the storage length and might require future improvements by 2036. The detailed synchro results are provided in Appendix F.

Table 5-5 - 2031 Future Total Sensitivity Analysis Results with Ideal Saturation Flows of 1,900 vphgpl

Movement	Weekday AM Peak Hour				Weekday PM Peak Hour				Storage Length (m)
	LOS	V/C	Delay (s/veh)	95th %ile Q	LOS	V/C	Delay (s/veh)	95th %ile Q(m)	
Montrose Road & Thorold Stone Rd (Niagara Region) – Signalized									
EBL	B	0.22	10.9	14	C	0.5	20.5	26.1	45
EBTR	C	0.78	29.6	105	D	0.84	36.1	#167.1	-
WBL	B	0.63	20	41.8	D	0.81	41.1	#96.3	85
WBTR	C	0.56	20.1	76.5	D	0.88	35.4	#210.9	-
NBL	C	0.22	21.1	22.1	C	0.41	26.7	37.3	60
NBT	D	0.4	37.3	29.8	D	0.49	42.9	37.1	-
NBR	B	0.67	12.2	25.9	C	0.80	23.1	48.6	35
SBL	C	0.58	25.7	72.4	D	0.83	44.7	#102.6	60
SBTR	B	0.27	18.6	23.5	C	0.49	31.8	41.1	-
QEW West Off-Ramp & Thorold Stone Rd (MTO) – Signalized									
EBT	B	0.73	19.2	79.2	C	0.85	29	166.9	-
EBR	A	0.56	4	16.6	A	0.59	7.1	46.1	60
WBL	B	0.56	10.9	22.6	D	0.82	40.2	109.8	210
WBT	A	0.48	8.3	47.7	B	0.68	12.8	146.8	-
SBL	C	0.38	25	26.9	C	0.48	34.7	44.3	40
SBR	B	0.39	10.4	13.4	D	0.71	37.9	48.8	25
QEW East On-Ramp & Thorold Stone Rd (MTO) – Signalized									
EBL	A	0.34	6.2	16.3	C	0.59	21.3	41.2	210
EBT	A	0.5	8.2	65.7	B	0.64	12.5	139.4	-
WBT	B	0.57	16.8	78.3	C	0.76	24.6	174	-
WBR	A	0.33	3.2	13.4	A	0.41	4.8	26.6	15
NBL	C	0.49	27.7	42.8	D	0.62	37	65.6	35
NBR	C	0.6	23	48.8	D	0.76	39.9	82.1	45
NOTES:									
Thresholds for the Niagara Region intersections:									
- V/C ratios of 0.85 for through or shared through turning movements - V/C ratios of 0.90 for exclusive									
Thresholds For MTO intersections:									
V/C ratios of 0.75									
# - 95th percentile volume queue exceeds capacity; queue may be longer.									

Further sensitivity analysis was conducted, including saturation flow, peak hour factor adjustments and signal timing optimization for intersection at Montrose Road & Thorold Stone Rd is summarized in Table 5-6. As only the PM peak hour shows movements exceeding the thresholds compared to the above analysis, the sensitivity analysis focused exclusively on the PM peak. During the sensitivity analysis, movements with a PHF of 0.92 or lower than the existing PHF were adjusted to match the existing PHF, while the others remained unchanged. For signal timing optimizations, the splits were adjusted to provide more green time to the east-west movements. The ideal saturation flow of 1900 vphgpl was used as part of this analysis.

Following the adjustments to saturation flow, peak hour factor, and signal timing optimization, all movements are operating within acceptable thresholds, with exception to WBTR slightly exceeding the v/c threshold of 0.85. It should be noted that the SBL queues slightly exceed the storage length by, but this is also observed under existing conditions.

Table 5-6: Ideal Saturation Flows of 1,900 vphgpl, updated PHF and Lost Time Adjustment

	Weekday AM Peak Hour				
Movement	LOS	V/C	Delay (s)	95th %ile Q	Storage Length
Montrose Road & Thorold Stone Rd					
EBL	C	0.50	22.1	26.9	45
EBTR	D	0.82	36.5	#162.7	-
WBL	D	0.80	40.0	80.3	85
WBTR	D	0.88	36.8	#203.5	-
NBL	C	0.43	28.0	39.5	60
NBT	D	0.54	47.0	39.1	-
NBR	B	0.76	17.2	37.4	35
SBL	D	0.79	41.1	#103.8	60
SBTR	C	0.47	32.0	42.2	-
NOTES:					
Thresholds for the Niagara Region intersections:					
- V/C ratios of 0.85 for through or shared through turning movements - V/C ratios of 0.90 for exclusive					
Thresholds For MTO intersections:					
V/C ratios of 0.75					
# - 95th percentile volume queue exceeds capacity; queue may be longer.					

5.5.3 2036 FUTURE TOTAL SENSITIVITY ANALYSIS

The 2036 Future Total sensitivity analysis with the updated saturated flow rates as outlined in Table 5-7 shows that all the movements are operating with acceptable level of service during both AM and PM peak hours. However, a few movements at Montrose Road & Thorold Stone Road, QEW West Off-Ramp & Thorold Stone Rd and at QEW East Off-Ramp & Thorold Stone Rd intersection operate close to threshold during the PM peak hour. These movements include:

- EBTR, SBL and WBTR at Montrose Road & Thorold Stone Road are expected to operate overcapacity with v/c 0.92, 0.92 and 0.95 respectively. The queues for WBL, NBR and SBL extend up to 117 m, 63 m and 95 m which is beyond their respective storage length.
- EBT and WBL at QEW West Off-Ramp & Thorold Stone Rd are expected to operate at v/c of 0.86 and 0.99 which is exceeding the MTO thresholds of 0.75. However, the queues for WBL are expected to be within the storage length of 210 m. The SBR queue during the PM peak to 50 m, exceeding the storage length of 25 m. The MTO queue analysis captures the SBR queues in section 6.
- WBT and NBR at QEW East Off-Ramp & Thorold Stone Rd are expected to operate at v/c of 0.84, and 0.82 respectively. The NBR queue during the PM peak to 96 m, exceeding the storage length of 45 m. The MTO queue analysis captures the NBR queues in section 6.

As mentioned for the 2031 Sensitivity analysis as well, the 2036 future total sensitivity analysis for the intersection of Thorold Stone Road and Montrose Road indicates that during the PM peak, 95th percentile queue for the westbound left turn will be ~117 m which exceeds the available storage of 85 m.

Based on aerial photography, there is approximately 140 m available between the westbound stop bar and the stop bar for the eastbound approach to the intersection of Thorold Stone Road and the QEW West Off- ramp. Since drivers cannot make eastbound left turns at the QEW West Off- ramp, an eastbound left turn lane is not required at this intersection, and it would be possible to modify the westbound left turn lane at the intersection of Thorold Stone

Road and Montrose Road to increase the length to approximately 120 m with a short taper west of Thorold Stone Road and QEW West off ramp for future horizon year.

For the NBR movement at intersection of Thorold Stone Road and Montrose Road, the queues extend the storage length and might require future improvements by 2036.

With exception to WBL movement at QEW West off ramp and Thorold Stone Road during PM peak, operating at LOS F. The additional sensitivity analysis was conducted with update to the lost time in section 5.5.4 which address this concern. The detailed synchro results are provided in Appendix F.

Table 5-7 - 2036 Future Total Sensitivity Analysis Results with Ideal Saturation Flows of 1,900 vphgpl

Movement	Weekday AM Peak Hour				Weekday PM Peak Hour				Storage Length (m)
	LOS	V/C	Delay (s/veh)	95th %ile Q	LOS	V/C	Delay (s/veh)	95th %ile Q(m)	
Montrose Road & Thorold Stone Rd (Niagara Region) – Signalized									
EBL	B	0.25	11.6	15.6	C	0.55	24.2	31	45
EBTR	C	0.82	32.6	121.5	D	0.92	44.4	#199.5	-
WBL	C	0.68	25.9	55.2	D	0.88	52.2	#117.2	85
WBTR	C	0.58	20.5	89.3	D	0.95	49.3	#252.7	-
NBL	C	0.25	23	23.7	C	0.44	27.2	39.8	60
NBT	D	0.44	39.7	31.8	D	0.49	42.8	39.9	-
NBR	B	0.71	14.5	31.1	C	0.85	29.7	63	35
SBL	C	0.64	29.5	77.7	E	0.92	56.2	#94.9	60
SBTR	B	0.29	19.8	25.2	C	0.5	32.9	44.9	-
QEW West Off-Ramp & Thorold Stone Rd (MTO) – Signalized									
EBT	C	0.76	21.1	104.4	C	0.86	34.5	#228.9	-
EBR	A	0.6	4.9	23.6	A	0.64	9.4	74.2	30
WBL	B	0.64	17.1	39.5	E	0.99	74.5	#127.3	210
WBT	A	0.51	8.5	61.2	B	0.72	12.3	154.0	-
SBL	C	0.44	29.4	34.4	D	0.62	41.4	50.9	40
SBR	B	0.37	14.6	21.3	D	0.64	34.8	50.2	25
QEW East On-Ramp & Thorold Stone Rd (MTO) – Signalized									
EBL	A	0.42	8.1	21.1	D	0.71	35.9	55.2	210
EBT	A	0.55	9.7	88.8	B	0.72	15.3	175.9	-
WBT	B	0.61	18.6	99.7	C	0.84	29.9	#228.6	-
WBR	B	0.40	12.0	48.7	B	0.54	18.7	95.3	15
NBL	C	0.52	30.5	51.7	D	0.66	38.9	73.8	35
NBR	C	0.68	31.1	67.5	D	0.82	45.7	95.7	45
NOTES:									
Thresholds for the Niagara Region intersections:									
- V/C ratios of 0.85 for through or shared through turning movements - V/C ratios of 0.90 for exclusive									
Thresholds For MTO intersections:									
V/C ratios of 0.75									
# - 95th percentile volume queue exceeds capacity; queue may be longer.									

5.5.4 2036 FUTURE TOTAL SENSITIVITY ANALYSIS – 2

The 2036 Future Total sensitivity analysis with the updated lost-time adjustment or WBL at QEW West off ramp and Thorold Stone Road during PM peak. This shows that the proposed development will not be impacting the network causing any concerns for the 2036 horizon. Table 5-8 shows the results of the 2036 Future Total Sensitivity analysis. As only the PM peak hour shows movements exceeding the thresholds compared to the above analysis, the sensitivity analysis focused exclusively on the PM peak.

Table 5-8 - 2036 Future Total Sensitivity Analysis – 2 with Ideal Saturation Flows of 1,900 vphgpl, Updated PHF and Lost Time Adjustment

QEW West Off-Ramp & Thorold Stone Rd (MTO) – Signalized									
Movement	LOS	V/C	Delay (s/veh)	95th %ile Q	LOS	V/C	Delay (s/veh)	95th %ile Q(m)	Storage Length (m)
EBT	C	0.76	21.1	104.4	C	0.89	34.5	#228.9	-
EBR	A	0.6	4.9	23.6	A	0.63	9.4	71.2	60
WBL	B	0.64	17.1	39.5	E	0.93	61.1	#136.7	210
WBT	A	0.51	8.5	61.2	B	0.75	15.7	198.2	-
SBL	C	0.44	29.4	34.4	D	0.52	37.6	49.3	40
SBR	B	0.49	18.3	23.1	D	0.77	44.4	56	25
NOTES: Thresholds for the Niagara Region intersections: - V/C ratios of 0.85 for through or shared through turning movements - V/C ratios of 0.90 for exclusive Thresholds For MTO intersections: - V/C ratios of 0.75 # - 95th percentile volume queue exceeds capacity; queue may be longer.									

Sensitivity analysis including saturation flow, peak hour factor adjustments and lost time adjustments (including signal timing optimization) for intersection at Montrose Road & Thorold Stone Rd is summarized in Table 5-9. During the sensitivity analysis, movements with a PHF of 0.92 or lower than the existing PHF were adjusted to match the existing PHF, while the others remained unchanged. For signal timing optimizations, the splits were adjusted to provide more green time to the east-west movements.

Following the adjustments to saturation flow, peak hour factor, and signal timing, all movements are operating within acceptable thresholds during the PM peak, with the exception of EBTR and WBTR, which have a v/c ratio of 0.90 and 0.95. The queue lengths for WBL, NBR, and SBL slightly exceed the storage by approximately 2m, 15m, and 40m, respectively. This additional queue length is attributed to background growth in the area.

Table 5-9: 2036 Future Total Sensitivity analysis including Ideal Saturation Flows of 1,900 vphgpl, PHF Adjustments, Lost Time adjustment and Signal Optimization

Movement	Weekday PM Peak Hour				
	LOS	V/C	Delay (s)	95th %ile Q	Storage Length (m)
Montrose Road & Thorold Stone Rd – (Signalized)					
EBL	C	0.54	25.1	30.2	45
EBTR	D	0.90	43.8	#187.3	-
WBL	D	0.81	41.5	#87.3	85
WBTR	E	0.95	60.1	#232.2	-
NBL	C	0.46	29.5	43.3	60
NBT	D	0.56	48.4	42.6	-
NBR	C	0.82	22.7	51.2	35
SBL	D	0.87	49.9	#106.2	60
SBTR	C	0.50	34.1	46.8	-
NOTES: Thresholds for the Niagara Region intersections: - V/C ratios of 0.85 for through or shared through turning movements - V/C ratios of 0.90 for exclusive Thresholds For MTO intersections: - V/C ratios of 0.75 # - 95th percentile volume queue exceeds capacity; queue may be longer.					

6 MTO QUEUE ANALYSIS

6.1 METHODOLOGY

This section explains the methodology for determining queue lengths and storage lane requirements for both left-turn and right-turn movements at signalized intersections. The methodology follows the guidelines provided by the Ministry of Transportation of Ontario (MTO) and the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads. These guidelines provide the basis for safe and efficient traffic flow by ensuring that the storage lanes are adequately sized to handle peak vehicle volumes without causing queue spillovers into traffic lanes. It must be noted that the per lane storage length was measured using google maps for the dual lanes. Also, the analysis is based on a lane distribution split of 60/40 and given the additional storage in the adjacent left turn lane, it is expected that drivers will adjust their distribution split to make more use of the additional storage in the adjacent lane. For the purpose of these calculations truck volumes were converted to passenger car equivalent (PCE).

6.1.1 LEFT-TURN STORAGE LANE ANALYSIS

For left-turn movements, the MTO method uses a graphical approach to determine the appropriate storage lane length based on the Left Turns “To Be Accommodated” (vehicles per cycle) and the cycle length at an intersection. This approach is visualized in the chart (Figure 2), which helps calculate the storage lane requirements by considering factors such as left-turn volume, the signal cycle length, and the green time allocated for left-turn phases.

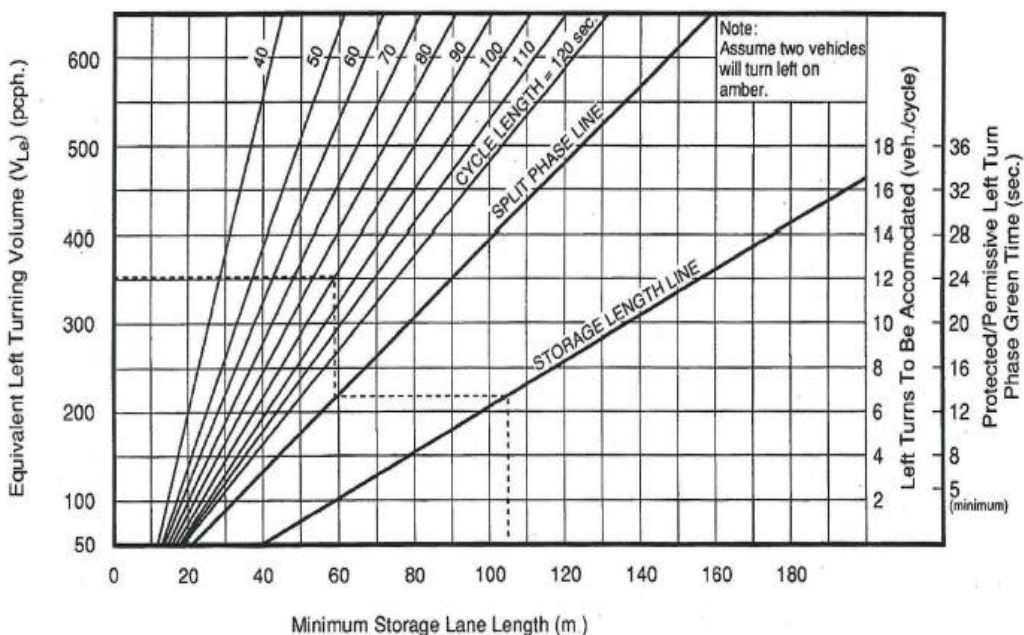


Figure 2 Length of Left Turn Storage Lanes and Protected/Permissive Left Timing

6.1.2 RIGHT-TURN STORAGE LANE ANALYSIS

For right-turn movements, the TAC Geometric Design Guide for Canadian Roads offers a comprehensive methodology to determine the storage lane length. This method is designed to accommodate the queue lengths based on the design speed of the road and the number of vehicles expected to make a right turn during each cycle. The approach ensures that the storage lane is long enough to prevent vehicles from queuing into through lanes, especially on higher-speed roads where stopping distances and safety considerations are more critical.

According to TAC, if the design speed is 60 km/h or less, the storage lane length is calculated using the following formula:

$$\text{Storage Lane Length (m)} = 1.5 \times \text{Number of Vehicle} \div \frac{3600 \text{ sec}}{\text{Cycle Length}} \times (\text{Passenger Vehicle Length} + \text{Spacing between Stopped Vehicles})$$

For roadways with design speeds greater than 60 km/h, the formula increases the storage requirements to account for the longer stopping distances and higher vehicle speeds:

$$\text{Storage Lane Length (m)} = 2 \times \text{Number of Vehicle} \div \frac{3600 \text{ sec}}{\text{Cycle Length}} \times (\text{Passenger Vehicle Length} + \text{Spacing between Stopped Vehicles})$$

This methodology is critical when dealing with higher-speed roads, where queuing vehicles can create hazardous conditions if the storage lane is too short. By increasing the storage requirements for speeds over 60 km/h, TAC ensures that right-turn queues do not spill into the main traffic lanes, thereby improving safety and intersection efficiency.

6.2 SCENARIOS

The study area has been evaluated under three scenarios to determine the adequacy of the existing and proposed storage lanes at key intersections. The analysis includes the following scenarios:

- 1 Existing Conditions: This scenario represents the current traffic volumes and storage requirements at the intersections without any future development.
- 2 Future Background (FB): This scenario projects future traffic volumes considering background growth in the region but without the proposed development.
- 3 Future Total (FT): This scenario combines both future background traffic volumes and the additional traffic expected from the proposed development.

6.3 RESULTS

The analysis examines the storage lengths provided at two critical intersections: the QEW East Off Ramp & Thorold Stone Road (NBR movement) and the QEW West Off Ramp & Thorold Stone Road (SBR movement). Table 6-1 shows the calculated left turn storage length.

The measurement of storage length is taken from the stop line at the intersection back along the left-turn lane until the highway ramp, accounting for the number of vehicles that are expected to queue. For the dual left-turn lanes, storage length per lane is measured separately to ensure both lanes can accommodate the required number of vehicles independently, ensuring smooth operation for each lane.

For QEW West-off Ramp and QEW East off Ramp, the storage capacity remains adequate for both current and future scenarios up to 2036, highlighting a robust infrastructure capable of handling increased traffic without major modifications. It must also be noted that the analysis is based on a lane distribution split of 60/40 and given the additional storage in the adjacent left turn lane, it is expected that drivers will adjust their distribution split to make more use of the additional storage in the adjacent lane.

QEW West Off Ramp (SBL) – The SBL consists of one lane with 60 m of storage adjacent to a lane with 240 m of storage.

- AM Peak: By 2036, Lane 1 queue is expected to be 60 m, which is approximately equal to the available storage of ~60 m and Lane 2 queue is expected to be 89 m, which is less than the total available storage of 240 m.
- PM Peak: By 2036, Lane 1 queue is expected to be 66 m, slightly exceeding the available storage of 60 m. Lane 2 will have reserve queue storage space, with a queue length of 106 m and 240 m of available storage. Therefore, drivers from Lane 1 will be able to queue in Lane 2, when needed, without exceeding available storage.

QEW East Off Ramp (NBL) – The NBL consists of one lane with 60 m of storage adjacent to a lane with 235 m of storage.

- AM Peak: By 2036, Lane 1 queue is expected to be 88 m, exceeding the available storage of ~60 m and Lane 2 queue is expected to be 111 m, which is less than the available storage of 240 m. The exceeding queue can be accommodated, since the adjacent lane has available storage of ~130 m.
- PM Peak: By 2036, Lane 1 queue is expected to be 105 m, exceeding the available storage of ~60 m. Lane 2 will have reserve queue storage space, with a queue length of 138 m and 235 m of available storage. Therefore, drivers from Lane 1 will be able to queue in Lane 2, when needed, without exceeding available storage.

Table 6-1 Left Turn Storage Lane Estimation for Lane 1 and Lane 2

Intersection	Peak hour	Lane	Movement	Existing Storage (metres)	Required Storage (Calculated)						
					Existing	FB 2026	FB 2031	FB 2036	FT 2026	FT 2031	FT 2036
QEW West Off Ramp & Thorold Stone Rd	AM	Lane 1	SBL	60	54	55	58	60	55	58	60
		Lane 2	SBL	240	76	78	84	89	78	84	89
	PM	Lane 1	SBL	60	59	61	64	66	61	64	66
		Lane 2	SBL	240	89	92	99	106	92	99	106
QEW East Off Ramp & Thorold Stone Rd	AM	Lane 1	NBL	60	75	77	82	88	78	83	88
		Lane 2	NBL	235	93	96	104	111	97	104	112
	PM	Lane 1	NBL	60	88	91	98	105	92	100	107
		Lane 2	NBL	235	112	116	127	138	119	129	140

6.3.1 RIGHT TURN

The analysis for Right Turn Lane evaluates the existing and projected storage requirements for Southbound Right (SBR) and Northbound Right (NBR) movements at the QEW Off Ramps & Thorold Stone Road during both AM and PM peak hours. The results demonstrate the adequacy of the current infrastructure and the ability to accommodate future traffic growth. Table 6-2 shows the calculated right turn storage length.

As shown in the table, the storage capacity at these ramps remains sufficient for both current and future scenarios modeled up to 2036, ensuring that no major modifications are required to handle the projected increases in traffic.

Table 6-2 Right Turn Storage Lane Estimation

Ramp	Peak	Movement	Existing Storage (metres)	Storage Required (metres)						
				Existing	FB 2026	FB 2031	FB 2036	FT 2026	FT 2031	FT 2036
QEW West Off Ramp & Thorold Stone Rd	AM	SBR	25	22	23	26	30	24	27	30
	PM	SBR	25	34	36	41	46	37	42	48
QEW East Off Ramp & Thorold Stone Rd	AM	NBR	45	47	50	57	65	50	57	65
	PM	NBR	45	58	61	70	79	61	70	79

The Southbound right lane at the QEW West off Ramp, exceeds the storage length for the movement. However, it must also be noted that the adjacent shared lane has capacity to accommodate the additional queues from the right lane. During the PM peak, the right lane queues for SBR for the future background and future total scenario exceed maximum by 35 m in 2036 Future Total scenario. However as shown in Table 6-1 the southbound lane 2 has enough capacity to accommodate these minimal queues exceeding. Table 6-3 also provides the combined effective storage calculation for L/R lane.

The NBR predicted queues for QEW East off Ramp & Thorold Stone Rd intersection seems to be exceed up to 79 m during the 2036 future horizon, hence as shown in Table 6-1 the queues can be accommodated by the second left turn which has enough capacity of ~100 m.

Table 6-3 provides the details regarding the calculations various movements at the QEW West and East Off Ramps and Thorold Stone Road intersection. Our assumption is that when individual turning lanes are full, approaching drivers will queue in the adjacent lane, resulting in longer queues than initially predicted. This table details the existing storage lengths and the required storage lengths for future background (FB) and future total (FT) conditions for the years 2026, 2031, and 2036. The analysis indicates that additional queues in Lane 1 for SBL or NBL can be accommodated by the adjacent lane which has available storage as calculated and outlined in the table below. Hence, no additional storage will be required to accommodate the projected traffic volumes.

Table 6-3: Combined effect storage length calculations

Intersection	Peak hour	Movement	Lane	Existing Storage (m)	Required Storage (Calculated)						
					Existing	FB 2026	FB 2031	FB 2036	FT 2026	FT 2031	FT 2036
QEW West Off Ramp & Thorold Stone Rd	AM	SBL	Lane 1	60	54	55	58	60	55	58	60
		SBL	Lane 2	240	76	78	84	89	78	84	89
		SBR	-	25	22	23	26	30	24	27	30
		Additional Storage required for SBR					1	5		2	5
		Adjusted SBR		25	22	23	25	25	24	25	25
		Combined Queue length SBL lane 2		240	76	78	85	94	78	86	94
	PM	SBL	Lane 1	60	59	61	64	66	61	64	66
		Additional Storage required for SBL				1	4	6	1	4	6
		Adjusted SBL		60	59	60	60	60	60	60	60
		SBL	Lane 2	240	89	92	99	106	92	99	106
		SBR	-	25	34	36	41	46	37	42	48
		Additional Storage required for SBR	-		9	11	16	21	12	17	23
		Adjusted SBR		25	25	25	25	25	25	25	25
		Combined Queue length SBL lane 2		240	98	104	119	133	105	120	135
QEW East Off Ramp & Thorold Stone Rd	AM	NBL	Lane 1	60	75	77	82	88	78	83	88
		Additional Storage required for NBL	-		15	17	22	28	18	23	28
		Adjusted NBL		60	60	60	60	60	60	60	60
		NBL	Lane 2	235	93	96	104	111	97	104	112
		NBR	-	60	47	50	57	65	50	57	65
		Additional Storage required for NBR						5			5
		Adjusted NBR		60	47	50	57	60	50	57	60

Intersection	Peak hour	Movement	Lane	Existing Storage (m)	Required Storage (Calculated)						
					Existing	FB 2026	FB 2031	FB 2036	FT 2026	FT 2031	FT 2036
	PM	Combined Queue length NBL lane 2		235	108	113	126	144	115	127	145
		NBL	Lane 1	60	88	91	98	105	92	100	107
		Additional Storage required for NBL	-		28	31	38	45	32	40	47
		Adjusted NBL		60	60	60	60	60	60	60	60
		NBL	Lane 2	235	112	116	127	138	119	129	140
		NBR	-	60	58	61	70	79	61	70	79
		Additional Storage required for NBR				1	10	19	1	10	19
		Adjusted NBR		60	58	60	60	60	60	60	60
		Combined Queue length NBL lane 2		235	140	148	175	202	152	179	206

7 MULTI MODAL ANALYSIS

7.1 METHODOLOGY

Multi-modal Level of Service (MMLOS) analysis is a methodology for analyzing the level of service experienced by users of different modes along street segments and at intersections. A Multi-Modal Level of Service (MMLOS) analysis was completed for the Existing scenario to estimate the level of service (LOS) that will be provided for all modes of travel at key signalized intersections and segments within the study area. It must be noted that no major changes are planned for the future conditions infrastructure. Hence, this analysis remains valid for the future conditions as well. The MMLOS analysis follows the Ontario Traffic Council's Multi-Modal Level of Service Guidelines.

7.2 ACTIVE TRANSPORTATION

7.2.1 INTERSECTION LEVEL OF SERVICE

The intersection- pedestrian level of service was evaluated based on the Ontario Traffic Council (OTC) guidelines. The OTC guidelines provide methodology to evaluate the pedestrian and bike level of service per segment- as well as intersection.

7.2.1.1 PEDESTRIAN LEVEL OF SERVICE

The existing pedestrian level of service (PLOS) for segments within the study area, as detailed in Table 7-1 does not meet the target LOS for any segment within the study area. This assessment is based on four measures for signalized intersections – Enhanced Pedestrian Measures, Average Effective Turning Radius, Signal Cycle Length, and Number of Uncontrolled conflicts (conflicts/approach) outlined with the OTC guidelines. The OTC spreadsheet results are attached in Appendix G.

Table 7-1 - Pedestrian Level of Service - Intersection

Intersection	PLOS	Target PLOS
Montrose Road and Thorold Stone Road	E	C
Montrose Road and Southwood Dr	D	C
QEW West off Ramp and Thorold Stone Road	E	C
QEW East off Ramp and Thorold Stone Road	E	C

Future conditions are expected to have the same pedestrian LOS because no improvements are currently planned. Niagara Region and the City of Niagara Falls could improve enhanced pedestrian measures, Increase the active transportation connection to move toward the target LOS for the above intersections.

7.2.1.2 BIKE LEVEL OF SERVICE

The bike level of service (BLOS) for segments within the study area, as detailed in Table 7-2, does not meet the target LOS for any segment within the study area. This assessment is based on four measures for signalized intersections – Enhanced Bike Measures, Average Effective Turning Radius, Signal Cycle Length, and Number of Uncontrolled conflicts (conflicts/approach) outlined with the OTC guidelines. The OTC spreadsheet results are attached in Appendix G.

Table 7-2 - Bike Level of Service - Intersection

Intersection	BLOS	Target BLOS
Montrose Road and Thorold Stone Road	E	C
Montrose Road and Southwood Dr	D	C
QEW West off Ramp and Thorold Stone Road	E	C
QEW East off Ramp and Thorold Stone Road	E	C

Future conditions are expected to have the same pedestrian LOS because no improvements are currently planned. Niagara Region and the City of Niagara Falls could improve enhanced bike measures, provide dedicated bike and increase the active transportation connection to move toward the target LOS for the above intersections.

7.2.2 SEGMENT LEVEL OF SERVICE

The OTC guidelines provide a methodology to evaluate the pedestrian and bike level of service per segment- as well as intersection-. The segments were divided based on the maximum distance between controlled crossing which was one of the measures for evaluating the level of service. The Table 7-3 provides the results based on the OTC methodology along with the target level of service.

7.2.2.1 PEDESTRIAN LEVEL OF SERVICE

The pedestrian level of service (LOS) for segments within the study area, as detailed in Table 7-3, does not meet the target LOS for any segment within the study area. This assessment is based on three measures outlined in the OTC guidelines – Pedestrian Facility width, Pedestrian Buffer width, Max distance between controlled crossings. The OTC spreadsheet results are attached in Appendix G.

Table 7-3 - Pedestrian Level of Service - Segment

Intersection	PLOS	Target PLOS
Southwood Dr to Thorold Stone Dr	E	C
Montrose Road to QEW West off Ramp	D	C
QEW West off Ramp to QEW East off Ramp	D	C

Future conditions are expected to have the same pedestrian LOS because no improvements are currently planned. Niagara Region and the City of Niagara Falls could improve enhanced pedestrian measures and increase the active transportation connection to move toward the target LOS for the above segments.

7.2.2.2 BIKE LEVEL OF SERVICE

The Bike level of service (LOS) for segments within the study area, as detailed Table 7-4, does not meet the target LOS for any segment within the study area. This assessment is based on three measures outlined with the OTC guidelines – Bike Facility width, Bike Buffer width, Max distance between controlled crossings. The OTC spreadsheet results are attached in Appendix G.

Table 7-4 - Bike Level of Service - Segment

Intersection	BLOS	Target BLOS
Southwood Dr to Thorold Stone Dr	F	C
Montrose Road to QEW West off Ramp	F	C
QEW West off Ramp to QEW East off Ramp	F	C

Future conditions are expected to have the same pedestrian LOS because no improvements are currently planned. Niagara Region and the City of Niagara Falls could improve enhanced bike measures, provide dedicated bike and increase the active transportation connection to move toward the target LOS for the above segments.

8 PARKING REVIEW

The proposed residential development at 3770 Montrose Road, Niagara Falls, ON, initially includes a total of 244 units: 52 units of stacked townhomes, 174 units of townhomes (66 rear-lane and 108 2-storey), and 18 units of semi-detached homes. The proposed parking supply is for 1 parking spaces per dwelling unit, compared to the Zoning By-law No. 79-200 requirement of 1.4 spaces per dwelling. The proposed variance is supported by a Transportation Demand Management (TDM) Plan and the proximity of transit services and amenities that will accommodate residents who do not own cars. The parking variance was approved by City of Niagara Falls, Committee of Adjustment dated May 21, 2024, and the final date of appeal was June 10, 2024.

For the most recent site plan, the parking supply has been updated to accommodate the revised unit count of 257 units, reflecting adjustments in land use. The updated parking provision aligns with the overall planning strategy and continues to incorporate TDM measures and transit accessibility to justify the reduced parking requirement compared to the zoning standard.

8.1 AUTOMOBILE PARKING REQUIREMENTS

According to the by-law:

- Residential Units: For dwellings containing three or more units (excluding on-street townhouse dwellings), the by-law requires 1.4 parking spaces per dwelling unit.
- Visitor Parking: While the specific visitor parking rate isn't explicitly stated in the provided document excerpts, a typical standard or by-law rate might be applicable.

Based on the site plan dated October 21, 2025, For the 257 units planned, the required and proposed automobile parking is summarized in the table below:

Table 8-1 - Parking Requirements as per City's By-law

Use	Parking Rate (Required)	Total Required Spaces	Proposed Supply	Surplus/Shortfall
Residential Units	1.4 spaces per unit	360 spaces	75 Spaces for Stacked Towns 364 Spaces for Townhouses 34 Spaces for Visitors Total = 473	113 spaces Surplus

The proposed parking supply for the residential development at 3770 Montrose Road is compared to the parking requirements under the applicable zoning by-law. The required parking rate for residential units is 1.4 spaces per dwelling unit, which for 257 units equates to 360 parking spaces. The proposed parking supply consists of 75 spaces allocated for stacked townhomes, 364 spaces for townhouses, and 34 visitor parking spaces, resulting in a total of 473 parking spaces. This represents a surplus of 113 parking spaces compared to the zoning requirement.

As shown in the Table 8-1, the development provides ample total number of parking to meet and exceed the zoning requirements, supporting the needs of residents and visitors. However, the general zoning by-law requires 1.4 parking spaces per residential unit, stacked townhouse dwellings have a lower required rate, 1.0 spaces per unit. To further mitigate this matter, the Transportation Demand Management (TDM) plan measures encouraging alternative transportation modes.

The total number of parking spaces provided in the development is 473 spaces. The Transportation Demand Management measures mentioned in the TDM section will be undertaken to facilitate other modes of travel to and from the site and reduce the demand for resident parking on site.

The study area is served by two regional transit routes:

- Route 113/213: Operates between Mt. Carmel Hub and Canadian Drive Hub, connecting riders to Mt. Carmel Centre and Heartland Forest.
- Route 109/209: Begins at Mt. Carmel Road and runs along Montrose Road to Dorchester Road, terminating at the Morrison/Dorchester Hub.

Both routes offer a frequency of 30 minutes, providing convenient transportation options for residents and commuters. The bus stops are within 200 m from the site. Given the connectivity of these routes to surrounding areas, it is anticipated that increased transit usage will help address parking concerns and promote public transportation in the region.

The surrounding area of the proposed development along Montrose Road, is within close proximity to various retail services and daily necessities, further reducing the need for car ownership. The residents can travel to these retailers by walking or cycling, including Mt Carmel Centre (shopping mall), Food basics, Harvey's within ~300 m, A&W, Tim Hortons, Bakery within ~500 m, Burger King, Starbucks, Mohito House within ~800 m from the proposed development.

Additionally, the area benefits from existing active transportation infrastructure, such as pedestrian pathways along Montrose Road between Thorold Stone Road and Mt Carmel Road, which encourage walking or biking for day-to-day travel.

It must be noted that the parking variance for the 39 spaces shortfall was approved by City of Niagara Falls, Committee of Adjustments.

9 TRANSPORTATION DEMAND MANAGEMENT

This section discusses the Transportation Demand Management (TDM) measures that could be considered for implementation in conjunction with the proposed residential development at 3770 Montrose Road, Niagara Falls, ON. The objective of a TDM strategy is to inform, encourage, and facilitate the use of non-automobile travel options within the study area. The TDM strategy outlines proposed measures, strategies, infrastructure, and the level of commitment to the TDM Plan that will be implemented for this development, including an estimate of associated costs. The following TDM measures and associated costs are provided for consideration:

- Reduction in Residential Parking Supply

The parking requirements for stacked townhouses in the Niagara Region, including Niagara Falls, typically have a reduced parking rate compared to other residential unit types. While the general zoning by-law requires 1.4 parking spaces per residential unit, stacked townhouse dwellings have a lower required rate, 1.0 spaces per unit, to reflect their higher density, transit accessibility, and smaller unit size.

The parking supply provides 75 spaces for stacked townhomes, which is below the standard 1.4 spaces per unit but consistent with lower stacked townhouse rates approved in the region.

- Limited Visitor Parking

Visitor parking is limited to 34 spaces within the development. This approach aims to reduce automobile use by visitors, encouraging them to consider alternative transportation modes or utilize nearby public parking facilities.

- Provision of Car-Share Spaces

Car sharing is a membership-based vehicle service available to qualified drivers. Members have access to a network of shared vehicles 24 hours a day, 7 days a week, for a fee per use. Car-share spaces can be provided on-site or at convenient locations near the site. This option reduces parking requirements and offers an alternative to owning a car, contributing to the reduction of auto trips. Arrangements for car-share services can be deferred until later in the development process when the full range of available services can be considered, and the most suitable arrangements secured.

- Provision of Pre-loaded WEGOP Passes

To incentivize the use of public transit, pre-loaded WEGO passes could be provided to new residents. This measure would encourage residents to become familiar with local transit services and adopt transit-dependent lifestyles.

- Construction of On-site Pedestrian Infrastructure

The development plan includes the construction of wide public sidewalks with connections to existing sidewalks and public transit stops. This infrastructure improves accessibility and encourages walking as a transportation option. (Mention ped friendly).

10 CONCLUSIONS AND RECOMMENDATIONS

WSP was retained by Cassone Dwellings Inc. to undertake a Transportation Impact Study (TIS) in support of the proposed residential development at 3770 Montrose Road, Niagara Falls, ON. The original Traffic Impact Study supported applications for a Zoning By-Law Amendment and Site Plan Control for the redevelopment of the vacant land to include a total of 244 units: 52 stacked townhomes, 174 townhomes (66 rear-lane and 108 two-storey), and 18 semi-detached homes.

Since the initial submission, the project has progressed to a revised planning stage and the TIA report is now being submitted in support of a Common Element Condominium Application and Draft Plan of Subdivision submission. The latest plan proposes a total of 257 residential units, with 182 rear-lane townhouses and 75 stacked townhouses.

Traffic Impact Study

- The estimated trip generation for the initial and updated land uses of the proposed residential development at 3770 Montrose Road, Niagara Falls, were based on the vehicle trip generation rates from the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition. For the initial land use of 244 dwellings consisting of rear-lane townhouses, two-storey townhouses, semi-detached homes, and stacked townhouses, the total new weekday trips during the AM peak hour were estimated at 117, splitting into 29 inbound and 88 outbound trips, and 139 total trips during the PM peak hour with 82 inbound and 57 outbound trips. For the updated site plan with 257 units, mostly rear-lane and stacked townhouses, the total trips were slightly higher at 123 total trips in the AM peak hour (31 inbound, 93 outbound) and 146 total trips in the PM peak hour (86 inbound, 60 outbound). These differences were confirmed by the Ministry of Transportation of Ontario (MTO) to be insignificant, thus the impact assessment remains based on the initial land use trip generation.
- The growth rate of 2% was applied to all the intersections within the study area apart from the MTO ramp terminals. For the Queen Elizabeth Way (QEW) ramps and Thorold Stone Road intersections, a 3% growth rate was used as requested by the Ministry of Transportation (MTO) from the study terms of reference. These are higher than historical growth rates based on available AADT data for this area and may overestimate future background traffic growth.
- Existing Conditions:
 - During the AM and PM peak hours, most intersections operate well under capacity. However, at Montrose Road & Thorold Stone Road during the PM peak hour, the EBTR movement exceed the V/C thresholds, of 0.88 indicating busy operations to the intersection operations during existing conditions. The WBL and SBL queues at ~90m exceeding storage length of 85m and 50m respectively.
 - At the QEW West Off-Ramp & Thorold Stone Road intersection, the EBT movement exceeds the V/C threshold of 0.75 during PM peak hours, showing impact to the intersection operation during existing conditions.
 - For Future Background and Future Total analysis, capacity analysis was completed using Region of Niagara saturation flows for Niagara Falls. Further sensitivity analysis was done assuming higher saturation flows of 1,900 vphpl that would be expected as traffic volumes in Niagara Falls increase and conditions become more congested. The results for the base assumptions and sensitivity analysis for each future horizon year, with future background and future total traffic volumes are summarized in Table 10-1 for the AM peak hour and Table 10-2 for the PM peak hour.
- 2026 Conditions:
 - During the AM peak as outlined in Table 10-1, there is a minimal impact when comparing the future background and future total conditions.
 - When comparing the Future Background and Future Total Conditions without assumption adjustments as shown in Table 10-2, during the PM peak for the intersection at Montrose Road & Thorold Stone Road and QEW West off Ramp and Thorold Stone Road few movements exceed the thresholds by a small amount and are limited to

two measures for two movements at each intersection for both Future background and Future Total conditions. With this level of exceeding the thresholds, it is not expected that improvements would be implemented.

- For the sensitivity analysis, during the AM peak there is a minimal impact when comparing the future background and future total conditions with assumption adjustments. As shown in Table 10-2, during the PM peak for the intersection at Montrose Road & Thorold Stone Road and QEW West off Ramp and Thorold Stone Road few movements exceed the thresholds by a small amount and are limited to two measures for two movements at each intersection for both Future background and Future Total conditions with assumption adjustments.
- 2031 Conditions
- When comparing the Future Background and Future Conditions without assumption adjustments as shown in Table 10-1 and Table 10-2, during the AM and PM peak hour for the intersection at Montrose Road & Thorold Stone Road SBL, WBTR exceed the thresholds by a small amount and are limited to two measures for two movements.
- For the intersection at QEW West off Ramp & Thorold Stone during AM and PM peak hour there is a minimal impact when comparing the EBT, WBL and WBT movements in Table 10-1 and Table 10-2 for Future background and Future Total conditions without assumption adjustments. For the intersection at QEW East off Ramp & Thorold Stone AM and PM peak hour there is a minimal impact when comparing WBT movement in Table 10-1 and Table 10-2 for Future background and Future Total conditions without assumption adjustments.
- For the sensitivity analysis, during the AM peak as shown in Table 10-1, there is a minimal impact when comparing the future background and future total conditions with assumption adjustments. As shown in Table 10-2, during the PM peak for the intersection at Montrose Road & Thorold Stone Road, QEW West off Ramp & Thorold Stone Road and QEW East off Ramp & Thorold Stone Road a few movements exceed the thresholds by a small amount and are limited to two performance measures for three movements at each intersection for both Future background and Future Total conditions with assumption adjustments
- 2036 Conditions
- For the 2036 conditions, comparing the Future Background and Future Conditions without assumption adjustments as shown in Table 10-1 and Table 10-2, during the AM and PM peak hour for the intersection at Montrose Road & Thorold Stone Road SBL, WBTR exceed the thresholds by a small amount and are limited to two measures for two movements.
- For the intersection at QEW West off Ramp & Thorold Stone during AM and PM peak hour there is a minimal impact when comparing the EBT, WBL and WBT movements in Table 10-1 and Table 10-2 for Future background and Future Total conditions without assumption adjustments.
- For the intersection at QEW East off Ramp & Thorold Stone AM and PM peak hour there is a minimal impact when comparing WBT movement in Table 10-1 and Table 10-2 for Future background and Future Total conditions without assumption adjustments.
- For the sensitivity analysis, during the AM peak as shown in Table 10-1 there is a minimal impact when comparing the future background and future total conditions with assumption adjustments. As shown in Table 10-2, during the PM peak for the intersection at Montrose Road & Thorold Stone Road, QEW West off Ramp & Thorold Stone Road and QEW East off Ramp & Thorold Stone Road few movements exceed the thresholds by a small amount and are limited to two intersection performance measures for three movements at each intersection for both Future background and Future Total conditions with assumption adjustments
- As part of sensitivity analysis for 2036 Future total conditions, additional analysis was carried out for the QEW East off Ramp & Thorold Stone Road with lost time adjustments on top of the lane adjustments as highlighted in Table 10-2, with the assumption adjustments WBL operates at v/c of 0.93.

The queues for the westbound left (WBL) and southbound left (SBL) movements at the intersection of Montrose Road and Thorold Stone Road are anticipated to slightly exceed the storage length under future conditions. This is primarily due to a 3% growth rate at MTO ramps impacting these movements.

Based on all the sensitivity analysis adjustments the future background queue length for southbound left turn will be 104.5m. The available storage is 60m, the proposed site traffic would result in 106.2 m of queue length for the

southbound turn lane. Therefore, the site adds ~2m of queue length. Sensitivity analysis for future background and total conditions indicates that WBL operations are not affected by the proposed development. This issue could be addressed in future discussions and updates by the Region and MTO. The proposed site does not contribute to this concern.

Table 10-1 – Summary of Critical Locations and the Impact of Sensitivity Adjustments – AM Peak

		Future Background			Future Total	
Intersection		Movements	Without Assumption Adjustments	With Assumption Adjustments	Without Assumption Adjustments	With Assumption Adjustments
AM Peak Hour						
2026	QEW West Off-Ramp & Thorold Stone Rd	EBT			V/C: 0.76, exceeding the threshold of 0.75	
2031	QEW West Off-Ramp & Thorold Stone Rd	EBT	V/C: 0.76, exceeding the threshold of 0.75		V/C: 0.83, exceeding the threshold of 0.75	
2036	Montrose Road & Thorold Stone Rd	EBTR	V/C: 0.88, exceeding the threshold of 0.85		V/C: 0.89, exceeding the threshold of 0.85	
	QEW West Off-Ramp & Thorold Stone Rd	EBT	V/C: 0.82, exceeding the threshold of 0.75		V/C: 0.83, exceeding the threshold of 0.75	V/C: 0.76, exceeding the threshold of 0.75

Table 10-2 – Summary of Critical Locations and the Impact of Sensitivity Adjustments – PM Peak

			Future Background		Future Total	
Intersection		Movements	Without Assumption Adjustments	With Assumption Adjustments	Without Assumption Adjustments	With Assumption Adjustments
			PM Peak Hour			
2026	Montrose Road & Thorold Stone Rd	EBTR	V/C: 0.91, exceeding the threshold of 0.85		V/C: 0.92, exceeding the threshold of 0.85	
		WBTR	V/C: 0.86, exceeding the threshold of 0.85		V/C: 0.96, exceeding the threshold of 0.85	
	QEW West Off-Ramp & Thorold Stone Rd	EBT	V/C: 0.86, exceeding the threshold of 0.75	V/C: 0.78, exceeding the threshold of 0.75	V/C: 0.86, exceeding the threshold of 0.75	V/C: 0.79, exceeding the threshold of 0.75
		WBL	V/C: 0.83, exceeding the threshold of 0.75		V/C: 0.86, exceeding the threshold of 0.75	
2031	Montrose Road & Thorold Stone Rd	EBTR	- LOS: E - V/C: 1.02, exceeding the threshold of 0.85		- LOS: E - V/C: 1.03, exceeding the threshold of 0.85	
		WBL	- LOS: F - V/C: 1.05, exceeding the threshold of 0.90 95th %ile Q: #127.0 m exceeding storage length of 85 m		- LOS: F - V/C: 1.06, exceeding the threshold of 0.90 95th %ile Q: #128.0 m exceeding storage length of 85 m	
		WBTR	- LOS: E - V/C: 1.01, exceeding the threshold of 0.85		- LOS: F - V/C: 1.09, exceeding the threshold of 0.85	V/C: 0.88, exceeding the threshold of 0.85
		NBR	- V/C: 0.89, exceeding the threshold of 0.90 95th %ile Q: #67.5 m exceeding storage length of 35 m		- V/C: 0.89, exceeding the threshold of 0.90 95th %ile Q: #71.0 m exceeding storage length of 35 m	95th %ile Q: #37.5 m slightly exceeding storage length of 35 m
		SBL	- LOS: E - V/C: 0.97, exceeding the threshold of 0.90		- LOS: E - V/C: 1.08, exceeding the threshold of 0.90	95th %ile Q: #103.8 m exceeding storage length of 60 m

	Intersection	Movements	Future Background		Future Total	
			Without Assumption Adjustments	With Assumption Adjustments	Without Assumption Adjustments	With Assumption Adjustments
2036	QEW West Off-Ramp & Thorold Stone Rd		95th %ile Q: #88.1 m exceeding storage length of 60 m	95th %ile Q: 88.7 m exceeding storage length of 60 m	95th %ile Q: #109.8 m exceeding storage length of 60 m	
		EBT	V/C: 0.87, exceeding the threshold of 0.75	V/C: 0.83, exceeding the threshold of 0.75	V/C: 0.89, exceeding the threshold of 0.75	V/C: 0.85, exceeding the threshold of 0.75
		WBL	- LOS: F - V/C: 1.1, exceeding the threshold of 0.75	V/C: 0.77, exceeding the threshold of 0.75	- LOS: F - V/C: 1.14, exceeding the threshold of 0.75	V/C: 0.82, exceeding the threshold of 0.75
	QEW East Off-Ramp & Thorold Stone Rd	WBT	V/C: 0.87, exceeding the threshold of 0.75		V/C: 0.89, exceeding the threshold of 0.75	V/C: 0.76, exceeding the threshold of 0.75
	Montrose Road & Thorold Stone Rd	EBTR	- LOS: F - V/C: 1.15, exceeding the threshold of 0.85	V/C: 0.89, exceeding the threshold of 0.85	- LOS: F - V/C: 1.16, exceeding the threshold of 0.85	V/C: 0.90, exceeding the threshold of 0.85
		WBL	- LOS: F - V/C: 1.18, exceeding the threshold of 0.90 95th %ile Q: #142.2 m exceeding storage length of 85 m	95th %ile Q: #87.3 m exceeding storage length of 85 m	- LOS: F - V/C: 1.19, exceeding the threshold of 0.90 95th %ile Q: #142.6 m exceeding storage length of 85 m	95th %ile Q: #87.3 m slightly exceeding storage length of 85 m
		WBTR	- LOS: F - V/C: 1.16, exceeding the threshold of 0.85	V/C: 0.89, exceeding the threshold of 0.85	- LOS: F - V/C: 1.24, exceeding the threshold of 0.85	V/C: 0.95, exceeding the threshold of 0.85
		NBR	- V/C: 0.94, exceeding the threshold of 0.90 95th %ile Q: #90.0 m exceeding storage length of 35 m	95th %ile Q: #48.9 m exceeding storage length of 35 m	- V/C: 0.94, exceeding the threshold of 0.90 95th %ile Q: #93.2 m exceeding storage length of 35 m	95th %ile Q: #51.2 m exceeding storage length of 35 m
		SBL	- LOS: F - V/C: 1.03, exceeding the threshold of 0.90		- LOS: F - V/C: 1.14, exceeding the threshold of 0.90	

Intersection	Movements	Future Background		Future Total	
		Without Assumption Adjustments	With Assumption Adjustments	Without Assumption Adjustments	With Assumption Adjustments
		95th %ile Q: #105.0 m exceeding storage length of 60 m	95th %ile Q: #104.5 m exceeding storage length of 60 m	95th %ile Q: #126.7 m exceeding storage length of 60 m	95th %ile Q: #106.2 m exceeding storage length of 60 m
QEW West Off-Ramp & Thorold Stone Rd	EBT	- LOS: E - V/C: 0.86, exceeding the threshold of 0.75	V/C: 0.83, exceeding the threshold of 0.75	- LOS: E - V/C: 1.02, exceeding the threshold of 0.75	V/C: 0.89, exceeding the threshold of 0.75
	WBL	- LOS: F - V/C: 1.42, exceeding the threshold of 0.75	- LOS: E - V/C: 0.98, exceeding the threshold of 0.75	- LOS: F - V/C: 1.43, exceeding the threshold of 0.75	- LOS E - V/C: 0.99, exceeding the threshold of 0.75 - LOS E* - V/C: 0.93, exceeding the threshold of 0.75*
	WBT	- LOS: E - V/C: 0.86, exceeding the threshold of 0.75		V/C: 0.88, exceeding the threshold of 0.75	
QEW East Off-Ramp & Thorold Stone Rd	WBT	- LOS: E - V/C: 1.01, exceeding the threshold of 0.75		- LOS: E - V/C: 1.04, exceeding the threshold of 0.75	V/C: 0.84, exceeding the threshold of 0.75
NOTES <i>* Additional sensitivity analysis – 2 with lost time adjustment – section 5.5.4</i> <i>^ Improvement for Future Background – section 3.8.3</i>					

- MTO Queue Analysis is summarized in Table 10-3.
- The MTO queue analysis examines the storage lengths provided at two critical intersections: the QEW East Off Ramp & Thorold Stone Road (NBR movement) and the QEW West Off Ramp & Thorold Stone Road (SBR movement).
- The measurement of storage length is taken from the stop line at the intersection back along the left-turn lane until the highway ramp, accounting for the number of vehicles that are expected to queue. For the dual left-turn lanes, storage length per lane is measured separately to ensure both lanes can accommodate the required number of vehicles independently, ensuring smooth operation for each lane.
- For the intersection at QEW West- Off ramp and Thorold Stone Road during the PM peak for all the future horizons the SBR exceeds the storage length of 25 m. However, the with the adjacent left turn lane having unused storage length of more than 100 m, the queues can be well accommodated on the ramp, without nearing the freeway, for the future horizons.
- For the intersection at QEW East Off Ramp and Thorold Stone Road during the AM and PM peak hour for all the future horizons, the NBL left lane 1 exceeds the storage length slightly. However, with more than 100 m of unused storage in the adjacent left lane 2, the queues can be accommodated without impacting the ramp operations. For the NBR movement during the future base 2036 conditions and future total 2036 conditions the queues extend by ~5 m. With the available storage in the left lane 2 these can be accommodated without impacting the ramp operations.
- In each case, the overall ramp storage capacity will be adequate since the ramp has considerable storage space available upstream of these storage lanes.

Table 10-3 - Summary of MTO Queue Analysis

Intersection	Peak hour	Movement	Lane	Existing Storage (m)	Required Storage (Calculated)						
					Existing	FB 2026	FB 2031	FB 2036	FT 2026	FT 2031	FT 2036
QEW West Off Ramp & Thorold Stone Rd	AM	SBL	Lane 1	60	54	55	58	60	55	58	60
		SBL	Lane 2	240	76	78	84	89	78	84	89
		Adjusted SBR	-	25	22	23	25	25	24	25	25
	PM	Adjusted SBL	Lane 1	60	59	60	60	60	60	60	60
		SBL	Lane 2	240	89	92	99	106	92	99	106
		Adjusted SBR	-	25	25	25	25	25	25	25	25
QEW East Off Ramp & Thorold Stone Rd	AM	Adjusted NBL	Lane 1	60	60	60	60	60	60	60	60
		NBL	Lane 2	235	93	96	104	111	97	104	112
		Adjusted NBR	-	60	47	50	57	60	50	57	60
	PM	Adjusted NBL	Lane 1	60	60	60	60	60	60	60	60
		NBL	Lane 2	235	112	116	127	138	119	129	140
		Adjusted NBR	-	60	58	60	60	60	60	60	60

- MMLOS Analysis:
- The Existing Pedestrian LOS and Bike LOS for the intersection and segments within the study area does not meet the target LOS of C. This is primarily due to the current pedestrian and bike measures.
- Future conditions are expected to have the same pedestrian LOS because no improvements are currently planned. Niagara Region and the City of Niagara Falls could improve enhanced pedestrian measures and increase the active transportation connection to move toward the target LOS for the above segments
- The Site plan of the proposed development shows well connectivity with the area as well as connectivity to the municipal sidewalks and active transportation infrastructure where available.
- With improvement in the pedestrian measures and bike measures such as dedicated bike lanes in the future by City of Niagara Falls or Niagara Region, it can be helpful for the proposed development residents to promote other modes of transportation i.e. biking or walking.
- Parking:
- The development provides a total of 473 parking spaces for the 364 residential units, consisting of both resident and visitor parking.
- Based on the City of Niagara Falls Zoning By-law, the required parking supply for this development is 360 spaces.
- The parking variance was approved by City of Niagara Falls, Committee of Adjustment dated May 21, 2024, and the final date of appeal was June 10, 2024.
- To support the reduced parking, a Transportation Demand Management (TDM) strategy has been proposed to reduce parking demand by promoting alternative modes of transportation and reducing car dependency among residents and visitors.
- Transportation Demand Management (TDM) Measures:
 - The following TDM measures are recommended to support the development's goal of reducing parking demand and promoting alternative modes of transportation:
- Reduction in the residential parking supply to encourage non-car ownership.
- Limited visitor parking to discourage excessive vehicle usage.
- Provision of dedicated car-share spaces to offer residents and visitors alternatives to private vehicle ownership.
- Enhanced on-site pedestrian infrastructure to increase walkability and connectivity to public transit routes and surrounding amenities.
- Provision of secure bicycle parking and connections to nearby cycling networks to further reduce car dependency.
- Integration with ridesharing or bike-sharing programs, providing flexible and convenient transportation options for residents and visitors.
- Recommendations:
- It is recommended that the City of Niagara Falls, Niagara Region, and MTO consider this Traffic Impact Study in support of the Zoning By-law Amendment for the proposed development.
- The implementation of TDM measures, as outlined, should be prioritized to reduce parking demand and promote sustainable transportation options.

APPENDIX

A

Site Plan





APPENDIX

B

Terms of
Reference,
Scope
Correspondence

TIS TERMS OF REFERENCE

TO: Mackenzie Ceci, City of Niagara Falls; Katie Young, Niagara Region; Usama Ali, Ministry of Transportation, Ontario

FROM: Kari Fellows, P.Eng.; Shubham Bohra, P.Eng.; Niki Tsiolas EIT

SUBJECT: **Proposed Residential Development at 3770 Montrose Road – TIS Terms of Reference confirmation**

DATE: July 4, 2024

INTRODUCTION

WSP Canada Inc. is undertaking a Transportation Impact Study (TIS) in support for the proposed residential development at 3770 Montrose Road, Niagara Falls, ON and would like to confirm the terms of reference with the City. The Traffic Impact Study will also support a Zoning By-Law Amendment and a Site Plan Control application for this development. The proposed development will include the redevelopment of the vacant land at 3770 Montrose Road to include a total of 244 units: 52 units of stacked townhomes, 174 units of townhomes (66 rear-lanes and 108 2-storey), and 18 units of semi-detached homes. A total of 313 parking spots (262 for residents and 51 for visitors) are proposed. There will be a full movement unsignalized access just north of the Montrose Road and Southwood Drive intersection on the west side of the site, as well as a full movement unsignalized access just east of the Montrose Road and Southwood Drive intersection on the south side of the site. The site location context is shown in Figure 1.

Figure 1 - Site Location



This document presents an outline for the TIS to be completed for this development. The proposed outline has been prepared to align with the 2023 Niagara Region Transportation Impact Assessment Guidelines and the 2011 Niagara Region Traffic Considerations for Site Plan Preparation document. Additionally, the proximity of the site to the Queen Elizabeth Way (QEW) necessitates the proposed outline to be in accordance with MTO TIS Guidelines as well.

The TIS will cover the following aspects, which are expanded upon further in the following sections.

- Project background and site/development description
- Study area and existing transportation conditions.
- Background growth
- Site travel demand
- Impact analysis:
 - Existing conditions
 - Horizon year/analysis periods/scenario
 - Future background conditions
 - Site-generated trips: generation and distribution
 - Future total conditions
- Transportation improvements
- Parking Review
- Site plan review: design vehicle manoeuvring and site layout.
- Conclusion and recommendations

PROJECT BACKGROUND

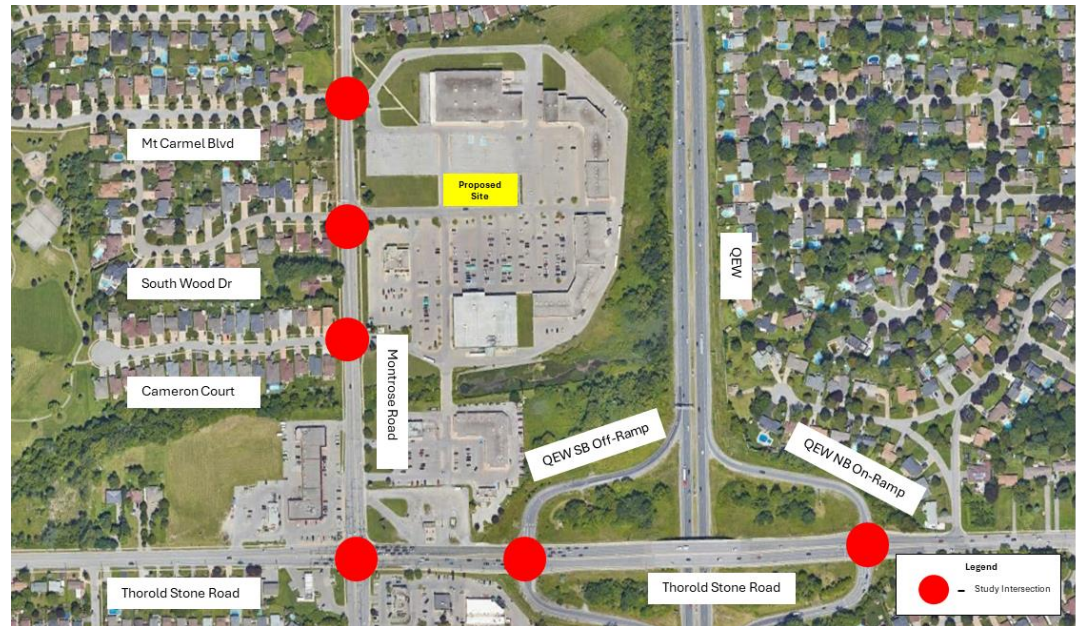
The 3770 Montrose Road is a vacant fenced site with grass on certain sections of the land. Previously the site was occupied by various commercial uses including a Canadian Tire store, a grocery store, restaurants, and other general retail stores. South of the site, there are more commercial land uses and surface parking lots. Primary access to the site is via the Montrose Road/Southwood Crescent signalized intersection; secondary access to the site is via the Montrose Road/Mount Carmel Boulevard unsignalized intersection and the Montrose Road/Cameron Court unsignalized intersection.

The proposed development will include the redevelopment of the vacant land at 3770 Montrose Road to include a total of 244 units: 52 units of stacked townhomes, 174 units of townhomes (66 rear-lanes and 108 2-storey), and 18 units of semi-detached homes. A total of 313 parking spots (262 for residents and 51 for visitors) and a full movement unsignalized access just north of the Southwood Drive intersection on the west side of the site, as well as a full movement unsignalized access just east of the Montrose Road and Southwood Drive intersection on the south side of the site.

STUDY AREA AND DATA COLLECTION

For the purpose of this study following study intersections were identified, shown in Figure 2 below.

Figure 2 - Study Intersections



Study Intersections

1. Montrose Road & Mount Carmel Boulevard
2. Montrose Road & Southwood Drive
3. Montrose Road & Cameron Court
4. Montrose Road & Thorold Stone Road
5. Thorold Stone Road & QEW Southbound Ramp
6. Thorold Stone Road & QEW Northbound Ramp

Due to the project timing, our proposed data collection program will be in July 2024. It must be noted that count data collected will be used for the analysis purposes.

HORIZON YEAR AND ANALYSIS SCENARIO

The MTO TIA Guidelines (2023) and Niagara Regions TIA guidelines (2023), require horizon year(s) of existing conditions, completion of major phases in multi-phased development, opening date of development/full build-out, 5-years from the opening date of development to be analyzed in the TIS. Additionally, MTO guidelines also states the requirement for 10 years post build-out analysis from the opening date.

Based on these requirements and an expected opening year of 2024, the TIS would evaluate the following scenarios:

- Existing conditions (2024) - Opening year (2026)
- Existing building with ultimate configuration

- 5 years post opening (2031)
- 10 years post opening (2036)

EXISTING TRAFFIC ANALYSIS

Synchro 11.0 Traffic Software, which is the software implementation of the Highway Capacity Manual, the recognized standard for traffic operations analysis in North America, will be used to analyze the traffic volumes collected at the existing study intersections. The existing conditions will be modelled based on the existing transportation network, lane configurations and surveyed parameters for the peak hour traffic volumes.

FUTURE BACKGROUND TRAFFIC ANALYSIS

Future background volumes for the horizon year 2029 and 2034 will be developed by considering the applicable general growth, planned changes to the surrounding road network and background developments confirmed by City of Niagara Falls and Niagara Region. The general growth will be developed based on a review of available historical traffic data and applicable background studies. If the City or Region has a specific preference on corridor growth rate assumption, it is requested that WSP be advised of such in response to this TOR.

WSP will estimate the traffic increases related to these other developments (if not available through site specific traffic impact studies) and assign this traffic to the boundary roadways in the vicinity of the subject site. The background development volumes and any applicable general growth volumes will then be superimposed onto the existing volumes.

The future background traffic operations will be analyzed, which includes identifying whether improvements to the study area road network are required because of other background developments and general background traffic growth in the area.

TRIP GENERATION AND ASSIGNMENT

The study will use ITE Trip Generation Manual 11th Edition trip generation rate for a Single-Family Attached Housing (215) land use in a general suburban setting to reflect the site's characteristics. The site-generated traffic volume will be distributed and assigned to the study road network based on the existing traffic patterns.

FUTURE TOTAL TRAFFIC ANALYSIS

The site-generated traffic will be superimposed onto the future background volumes to develop the future total traffic volumes based on the projected a.m. and p.m. peak hour volumes for the horizon year. The future study intersection performances will be evaluated in accordance with the requirements of Niagara Region Transportation Impact Assessment Guidelines (2023) and MTO Traffic Impact Assessment Guidelines (2023).

The study will focus on the level of impact the proposed development will have on the boundary road network. The future assessment will include a review of queuing relative to existing, future background conditions and future total traffic conditions.



MULTI MODAL ANALYSIS

The multi-modal connection to the site will be reviewed and MMLOS analysis will be conducted based on the Ontario Traffic Council (OTC) Method.

PARKING REVIEW

The parking requirements will be reviewed based on the proposed land uses in accordance with Niagara Zoning By-Law.

SITE PLANNING REVIEW

Comprehensive site access and circulation review of the development plan will be completed using AutoTURN to ensure that automobile and truck manoeuvres can be adequately accommodated. WSP will also conduct a detailed review of driveway dimensions and curb radii, parking space dimensions (including accessible parking spaces), loading space dimensions, drive aisles and ramp widths based on Niagara Region By-Laws and Transportation Association of Canada (TAC) standards.

RECOMMENDATION AND CONCLUSION

The findings of the above-noted evaluation will be documented in a TIS and submitted to the City of Niagara Falls, Niagara Region and MTO for review.

We sincerely thank you for reviewing our terms of reference and would appreciate your feedback and confirmation. If you have any questions, please contact Shubham Bohra at shubham.bohra@wsp.com or (343) 227-9158.

Bohra, Shubham

From: Ali, Usama (MTO) <Usama.Ali@ontario.ca>
Sent: July 11, 2024 2:30 PM
To: Bohra, Shubham
Cc: Smith, Shawn; Fellows, Kari; Brandon Rossi
Subject: RE: 3770 Montrose Road- Terms of reference

Good Afternoon Shubham:

Traffic has responded your questions. Traffic's response to your questions is in **Green Bold**.

- MTO require the submission of a full TIS (following MTO TIS guidelines and by a RAQS qualified consultant) to assess the future impact of the proposed development to identify if there are any warranted highway/road improvements. – **Noted, The TIS will follow MTO TIS guidelines and WSP is a RAQS qualified consultant**
- They should use Synchro version 12; Digital Synchro version 12 files are required at the time of submission. – **We would like to proceed with Synchro 11, since WSP has not upgraded to the version 12. Can you advise whether this would be acceptable?**
 - **We will accept Synchro version 11 until Dec 31, 2024 then we will only accept version 12.**
- Any data collected must be done by a RAQS qualified consultant/company. – **Noted and can confirm that the data collected is done by RAQS qualified company.**
- Study intersections are acceptable.
- Horizon years are ok.
- 3.0% growth rate should be used. – **The historical counts and AADT from Niagara Region show a growth rate around 2%, and historical MTO counts should a growth rate of less than 1.5% per year. Is there a reason why 3.0% is recommended. ? We are concerned that using 3% over a <10 year> period would overestimate the future volumes and may falsely indicate future operating problems. We propose a growth rate of 2% to provide a conservative forecast while avoiding overestimation and overdesign. Can you advise whether this is acceptable?**
 - **3% gr is from the latest 2021 AADT and should be used for MTO ramps/infrastructure.**
- All intersection capacity analysis on impacted intersections or interchanges within MTO facilities should follow MTO/TAC protocols.- **Noted, it would be worth if you can provide any document which outlines MTO/TAC protocols. Can you advise more specifically which protocols you would like to be applied for which locations?**
 - **All intersection capacity analysis on impacted intersections or interchanges within MTO facilities should follow MTO/TAC protocols – this is in the TIS guidelines, using MTO TAC supplement etc.**
- The need for geometric improvements shall be reviewed at all locations in the study area and for each proposed development stage. The TIS shall clearly identify transportation

impacts by movement, the transportation system improvements that are needed to mitigate these impacts, and the timing of any recommended improvements. A schematic representation of all geometric improvements shall be included as part of the TIS, identifying lane arrangements and intersection improvements for each horizon year.

Thank You,

Usama Ali

Corridor Management Planner (Hamilton/Niagara) | Corridor Management Office/Operations Division
Ministry of Transportation (Central Operations) | Ontario Public Service
416-457-8973 | usama.ali@ontario.ca



Taking pride in strengthening Ontario, its places and its people

From: Brandon Rossi <brandonr@treasurehill.com>

Sent: Thursday, July 11, 2024 11:47 AM

To: Bohra, Shubham <Shubham.Bohra@wsp.com>; Ali, Usama (MTO) <Usama.Ali@ontario.ca>

Cc: Smith, Shawn <Shawn.Smith@wsp.com>; Fellows, Kari <kari.fellows@wsp.com>

Subject: RE: 3770 Montrose Road- Terms of reference

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Good morning Usama,

Has staff had the opportunity to review the email below?

Thank you

Brandon Rossi BES (Hons), LEED Green Associate
Project Manager – Land Development

TREASURE HILL

Tel: 416 987 5500 Ext. 138 | Fax: 905 326 3600
101 Bradwick Dr Concord, Ontario L4K 1K5

brandonr@treasurehill.com | www.treasurehill.com

You may withdraw your consent to receive electronic communications at any time by contacting the sender at the contact information provided.

From: Bohra, Shubham <Shubham.Bohra@wsp.com>

Sent: Tuesday, July 09, 2024 2:01 PM

To: Ali, Usama (MTO) <Usama.Ali@ontario.ca>

Cc: Brandon Rossi <brandonr@treasurehill.com>; Smith, Shawn <Shawn.Smith@wsp.com>; Fellows, Kari <kari.fellows@wsp.com>

Subject: RE: 3770 Montrose Road- Terms of reference

Hi Usama,

Thank you for providing the comments. Appreciate it. Here are our thoughts on the comments in red below.

- MTO require the submission of a full TIS (following MTO TIS guidelines and by a RAQS qualified consultant) to assess the future impact of the proposed development to identify if there are any warranted highway/road improvements. – **Noted, The TIS will follow MTO TIS guidelines and WSP is a RAQS qualified consultant**
- They should use Synchro version 12; Digital Synchro version 12 files are required at the time of submission. – **We would like to proceed with Synchro 11, since WSP has not upgraded to the version 12. Can you advise whether this would be acceptable?**
- Any data collected must be done by a RAQS qualified consultant/company. – **Noted and can confirm that the data collected is done by RAQS qualified company.**
- Study intersections are acceptable.
- Horizon years are ok.
- 3.0% growth rate should be used. – **The historical counts and AADT from Niagara Region show a growth rate around 2%, and historical MTO counts should a growth rate of less than 1.5% per year. Is there a reason why 3.0% is recommended. ? We are concerned that using 3% over a <10 year> period would overestimate the future volumes and may falsely indicate future operating problems. We propose a growth rate of 2% to provide a conservative forecast while avoiding overestimation and overdesign. Can you advise whether this is acceptable?**
- All intersection capacity analysis on impacted intersections or interchanges within MTO facilities should follow MTO/TAC protocols.- **Noted, it would be worth if you can provide any document which outlines MTO/TAC protocols. Can you advise more specifically which protocols you would like to be applied for which locations?**
- The need for geometric improvements shall be reviewed at all locations in the study area and for each proposed development stage. The TIS shall clearly identify transportation impacts by movement, the transportation system improvements that are needed to mitigate these impacts, and the timing of any recommended improvements. A schematic representation of all geometric improvements shall be included as part of the TIS, identifying lane arrangements and intersection improvements for each horizon year.

Let me know if you have any questions. We would be happy to discuss these in a brief team meeting if that works for you.

Thanks,
Shubham



Shubham Bohra, M.Eng., P.Eng.
Transportation Engineer
Transportation Planning & Science, Ottawa
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From: Ali, Usama (MTO) <Usama.Ali@ontario.ca>

Sent: Saturday, July 6, 2024 5:41 PM

To: Bohra, Shubham <Shubham.Bohra@wsp.com>

Cc: Brandon Rossi <brandonr@treasurehill.com>; Smith, Shawn <Shawn.Smith@wsp.com>; Fellows, Kari <kari.fellows@wsp.com>

Subject: RE: 3770 Montrose Road- Terms of reference

Good Day Shubham;

I have sent your terms of reference to our traffic office. They have provided us with the comments noted below:

- MTO require the submission of a full TIS (following MTO TIS guidelines and by a RAQS qualified consultant) to assess the future impact of the proposed development to identify if there are any warranted highway/road improvements.
- They should use Synchro version 12, Digital Synchro version 12 files are required at the time of submission.
- Any data collected must be done by a RAQS qualified consultant/company.
- Study intersections are acceptable.
- Horizon years are ok.
- 3.0% growth rate should be used.
- All intersection capacity analysis on impacted intersections or interchanges within MTO facilities should follow MTO/TAC protocols.
- The need for geometric improvements shall be reviewed at all locations in the study area and for each proposed development stage. The TIS shall clearly identify transportation impacts by movement, the transportation system improvements that are needed to mitigate these impacts, and the timing of any recommended improvements. A schematic representation of all geometric improvements shall be included as part of the TIS, identifying lane arrangements and intersection improvements for each horizon year.

It is noted in the ToR that data collection will be in July 2024. Our Traffic departments sends a reminder that the data being conducted must by a RAQS-qualified consultant/company.

If you have any further questions, please feel free to reach out to me.

Kind Regards,

Usama Ali

Corridor Management Planner (Hamilton/Niagara) | Corridor Management Office/Operations Division
Ministry of Transportation (Central Operations) | Ontario Public Service
416-457-8973 | usama.ali@ontario.ca



Taking pride in strengthening Ontario, its places and its people

From: Bohra, Shubham <Shubham.Bohra@wsp.com>

Sent: Thursday, July 4, 2024 3:25 PM

To: mceci@niagarafalls.ca; katie.young@niagararegion.ca; Ali, Usama (MTO) <Usama.Ali@ontario.ca>

Cc: Brandon Rossi <brandonr@treasurehill.com>; Smith, Shawn <Shawn.Smith@wsp.com>; Fellows, Kari

<kari.fellows@wsp.com>

Subject: 3770 Montrose Road- Terms of reference

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Hello all,

I hope you are doing well.

I am emailing you with regards to a proposed zoning by-law amendment application by Treasure Hill.

WSP Canada Inc. is undertaking a Transportation Impact Study (TIS) in support for the proposed residential development at 3770 Montrose Road, Niagara Falls, ON and would like to confirm the terms of reference with the City. The Traffic Impact Study will also support a Zoning By-Law Amendment and a Site Plan Control application for this development. The proposed development will include the redevelopment of the vacant land at 3770 Montrose Road to include a total of 244 units: 52 units of stacked townhomes, 174 units of townhomes (66 rear-lanes and 108 2-storey), and 18 units of semi-detached homes.

Attached is a Terms of Reference (ToR) document in accordance with the Niagara Region TIS Guideline (2023) and MTO TIS Guidelines (2023) , outlining our proposed methodology for your review and comments.

I hope to hear from you soon.

Thanks,
Shubham



Shubham Bohra, M.Eng., P.Eng.
Transportation Engineer
Transportation Planning & Science, Ottawa
He / Him

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www.wsp.com

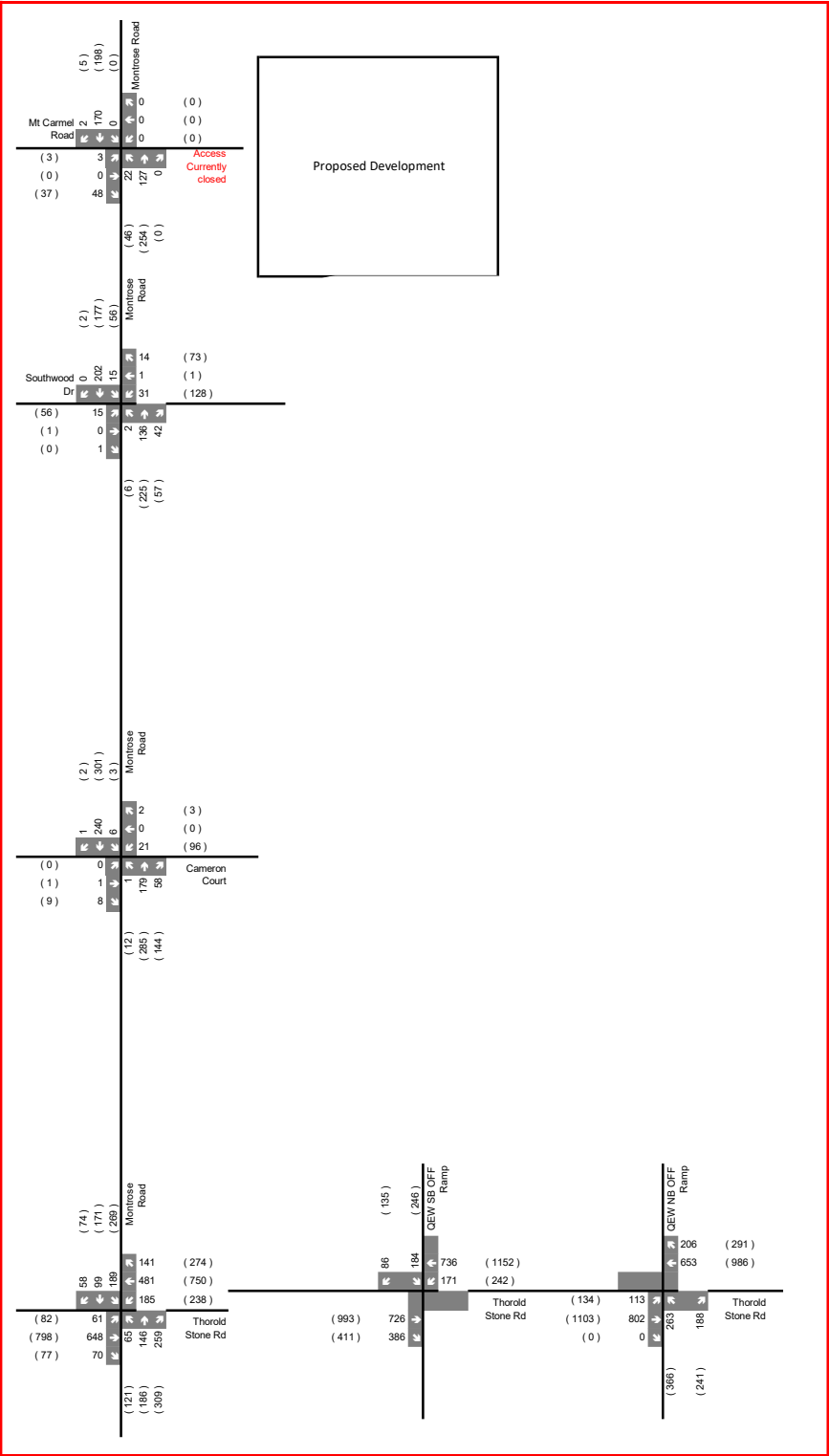
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APPENDIX

C

Existing
Conditions
Volume
Diagrams,
TMC and
Signal Timing
Data



Legend

xx A.M. Peak Hour Traffic Volumes (xx) P.M. Peak Hour Traffic Volumes

Existing (2024) Peak Hour Vehicular Volumes

Montrose Rd @ Cameron Crt

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Niagara Falls

Site #: 0000000003

Intersection: Montrose Rd & Cameron Crt

TFR File #: 3

Count date: 3-Jul-2024

Weather conditions:

Clear/Dry

Person(s) who counted:

Pyramid Traffic Inc

** Non-Signalized Intersection **

Major Road: Montrose Rd runs N/S

North Leg Total: 428

North Entering: 247

North Peds: 1

Peds Cross: $\times$

Heavys	1	9	3	13
Trucks	0	5	0	5
Cars	0	226	3	229
Totals	1	240	6	



Heavys	6
Trucks	6
Cars	169
Totals	181

East Leg Total: 88

East Entering: 23

East Peds: 4

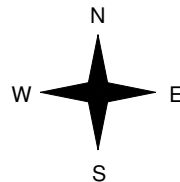
Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
1	0	1	2



Cameron Crt

Heavys	Trucks	Cars	Totals
0	0	0	0
0	0	1	1
0	0	8	8
0	0	9	



Montrose Rd



Cars	Trucks	Heavys	Totals
2	0	0	2
0	0	0	0
20	0	1	21
22	0	1	

Driveway



Cars	Trucks	Heavys	Totals
57	0	8	65

Peds Cross: $\times$

West Peds: 4

West Entering: 9

West Leg Total: 11

Cars	254	Cars	1	167	53	221
Trucks	5	Trucks	0	6	0	6
Heavys	10	Heavys	0	6	5	11
Totals	269	Totals	1	179	58	



Peds Cross: $\times$

South Peds: 3

South Entering: 238

South Leg Total: 507

Comments

Montrose Rd @ Cameron Crt

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 18:00:00

One Hour Peak

From: 16:15:00

To: 17:15:00

Municipality: Niagara Falls

Site #: 0000000003

Intersection: Montrose Rd & Cameron Crt

TFR File #: 3

Count date: 3-Jul-2024

Weather conditions:

Clear/Dry

Person(s) who counted:

Pyramid Traffic Inc

** Non-Signalized Intersection **

Major Road: Montrose Rd runs N/S

North Leg Total: 594

North Entering: 306

North Peds: 1

Peds Cross: $\times$

Heavys	0	7	2	9
Trucks	0	0	0	0
Cars	2	294	1	297
Totals	2	301	3	



Heavys 0

Trucks 1

Cars 287

Totals 288

East Leg Total: 247

East Entering: 99

East Peds: 1

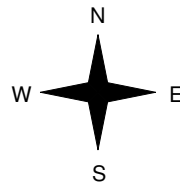
Peds Cross: $\times$

Heavys	0	0	14	14



Cameron Crt

Heavys	0	0	0	0
Trucks	0	1	0	1
Cars	0	0	9	9
Totals	0	1	9	



Montrose Rd

Montrose Rd

Cars	3	0	0	3
Trucks	0	0	0	0
Heavys	96	0	0	96
Totals	99	0	0	

Driveway



Cars	140	1	7	148

Peds Cross: $\times$

West Peds: 2

West Entering: 10

West Leg Total: 24

Cars	399	12	284	139	435
Trucks	0	0	1	0	1
Heavys	7	0	0	5	5
Totals	406	12	285	144	



Peds Cross: $\times$

South Peds: 0

South Entering: 441

South Leg Total: 847

Comments

Montrose Rd @ Cameron Crt

Total Count Diagram

Municipality: Niagara Falls
Site #: 0000000003
Intersection: Montrose Rd & Cameron Crt
TFR File #: 3
Count date: 3-Jul-2024

Weather conditions:
Clear/Dry
Person(s) who counted:
Pyramid Traffic Inc

**** Non-Signalized Intersection ****

Major Road: Montrose Rd runs N/S

North Leg Total: 1824
North Entering: 988
North Peds: 3
Peds Cross: $\bowtie$

Heavys	1	27	11	39
Trucks	0	10	0	10
Cars	8	925	6	939
Totals	9	962	17	



Heavys	12
Trucks	17
Cars	807
Totals	836

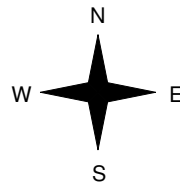
East Leg Total: 591
East Entering: 217
East Peds: 14
Peds Cross: $\bowtie$

Heavys	Trucks	Cars	Totals
1	0	34	35



Cameron Crt

Heavys	Trucks	Cars	Totals
0	1	3	4
0	2	1	3
0	1	30	31
0	4	34	



Montrose Rd



Cars	Trucks	Heavys	Totals
10	0	0	10
1	0	0	1
202	3	1	206
213	3	1	

Driveway



Cars	Trucks	Heavys	Totals
339	4	31	374

Peds Cross: $\bowtie$
West Peds: 11
West Entering: 38
West Leg Total: 73

Cars	1157
Trucks	14
Heavys	28
Totals	1199



Cars	25	794	332	1151
Trucks	0	16	2	18
Heavys	0	12	20	32
Totals	25	822	354	

Peds Cross: $\bowtie$
South Peds: 6
South Entering: 1201
South Leg Total: 2400

Comments

Montrose Rd @ Mt Carmel Blvd

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Niagara Falls

Site #: 0000000001

Intersection: Montrose Rd & Mt Carmel Blvd

TFR File #: 1

Count date: 3-Jul-2024

Weather conditions:

Clear/Dry

Person(s) who counted:

Pyramid Traffic Inc

** Non-Signalized Intersection **

Major Road: Montrose Rd runs N/S

North Leg Total: 302

North Entering: 172

North Peds: 2

Peds Cross: 

Heavys 0 6

Trucks 0 4

Cars 2 160

Totals 2 170

6

4

162



Heavys 7

Trucks 6

Cars 117

Totals 130

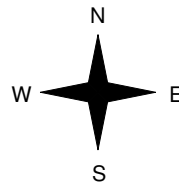
Heavys Trucks Cars Totals
0 0 24 24



Mt Carmel Blvd

Heavys Trucks Cars Totals
0 0 3 3

0 0 48 48
0 0 51



Montrose Rd



Peds Cross: 

West Peds: 13

West Entering: 51

West Leg Total: 75

Cars 208

Trucks 4

Heavys 6

Totals 218



Cars 22 114

Trucks 0 6

Heavys 0 7

Totals 22 127

136

6

7

Peds Cross: 

South Peds: 2

South Entering: 149

South Leg Total: 367

Comments

Montrose Rd @ Mt Carmel Blvd

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 18:00:00

One Hour Peak

From: 16:15:00

To: 17:15:00

Municipality: Niagara Falls

Site #: 0000000001

Intersection: Montrose Rd & Mt Carmel Blvd

TFR File #: 1

Count date: 3-Jul-2024

Weather conditions:

Clear/Dry

Person(s) who counted:

Pyramid Traffic Inc

** Non-Signalized Intersection **

Major Road: Montrose Rd runs N/S

North Leg Total: 460

North Entering: 203

North Peds: 1

Peds Cross: 

Heavys	0	3	3
Trucks	0	0	0
Cars	5	195	200
Totals	5	198	



Heavys 3

Trucks 0

Cars 254

Totals 257

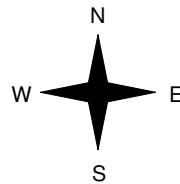
Heavys	0	Trucks	1	Cars	50	Totals	51



Montrose Rd



Mt Carmel Blvd



Heavys	0	Trucks	0	Cars	3	Totals	3
0	0	37	37				
0	0	40					



Montrose Rd



Peds Cross: 

West Peds: 1

West Entering: 40

West Leg Total: 91

Cars	232	Cars	45	251	296
Trucks	0	Trucks	1	0	1
Heavys	3	Heavys	0	3	3
Totals	235	Totals	46	254	



Peds Cross: 

South Peds: 0

South Entering: 300

South Leg Total: 535

Comments

Montrose Rd @ Mt Carmel Blvd

Total Count Diagram

Municipality: Niagara Falls
Site #: 0000000001
Intersection: Montrose Rd & Mt Carmel Blvd
TFR File #: 1
Count date: 3-Jul-2024

Weather conditions:
Clear/Dry
Person(s) who counted:
Pyramid Traffic Inc

**** Non-Signalized Intersection ****

Major Road: Montrose Rd runs N/S

North Leg Total: 1355
North Entering: 665
North Peds: 10
Peds Cross: 

Heavys	0	17	17
Trucks	0	8	8
Cars	10	630	640
Totals	10	655	

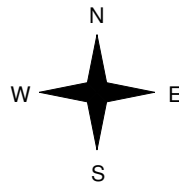
Heavys	20
Trucks	12
Cars	658
Totals	690

Heavys	Trucks	Cars	Totals
0	1	122	123



Mt Carmel Blvd

Heavys	Trucks	Cars	Totals
0	0	9	9
0	0	136	136
0	0	145	



Montrose Rd

Peds Cross: 
West Peds: 27
West Entering: 145
West Leg Total: 268

Cars	766
Trucks	8
Heavys	17
Totals	791

Cars	112	649	761
Trucks	1	12	13
Heavys	0	20	20
Totals	113	681	

Peds Cross: 
South Peds: 4
South Entering: 794
South Leg Total: 1585

Comments

Montrose Rd @ South Wood Dr

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Niagara Falls

Site #: 0000000002

Intersection: Montrose Rd & South Wood Dr

TFR File #: 2

Count date: 3-Jul-2024

Weather conditions:

Clear/Dry

Person(s) who counted:

Pyramid Traffic Inc

** Signalized Intersection **

Major Road: Montrose Rd runs N/S

North Leg Total: 367

North Entering: 217

North Peds: 3

Peds Cross: $\times$

Heavys	0	6	0	6
Trucks	0	4	0	4
Cars	0	192	15	207
Totals	0	202	15	



Heavys 7

Trucks 6

Cars 137

Totals 150

East Leg Total: 104

East Entering: 46

East Peds: 5

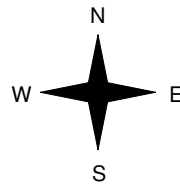
Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
0	0	3	3



South Wood Dr

Heavys	Trucks	Cars	Totals
0	0	0	0
0	0	1	1
0	0	13	13
0	0	14	



Montrose Rd



Cars	Trucks	Heavys	Totals
12	0	2	14
1	0	0	1
24	1	6	31
37	1	8	

Driveway



Cars	Trucks	Heavys	Totals
57	0	1	58

Peds Cross: $\times$

West Peds: 11

West Entering: 14

West Leg Total: 17

Cars	229	Cars	2	125	41	168
Trucks	5	Trucks	0	6	0	6
Heavys	12	Heavys	0	5	1	6
Totals	246	Totals	2	136	42	



Peds Cross: $\times$

South Peds: 0

South Entering: 180

South Leg Total: 426

Comments

Montrose Rd @ South Wood Dr

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 18:00:00

One Hour Peak

From: 16:15:00

To: 17:15:00

Municipality: Niagara Falls

Site #: 0000000002

Intersection: Montrose Rd & South Wood Dr

TFR File #: 2

Count date: 3-Jul-2024

Weather conditions:

Clear/Dry

Person(s) who counted:

Pyramid Traffic Inc

** Signalized Intersection **

Major Road: Montrose Rd runs N/S

North Leg Total: 534

North Entering: 235

North Peds: 0

Peds Cross: $\nlessgtr$

Heavys	0	3	0	3
Trucks	0	0	0	0
Cars	2	174	56	232
Totals	2	177	56	

Heavys	2
Trucks	1
Cars	296
Totals	299

East Leg Total: 315

East Entering: 202

East Peds: 1

Peds Cross: $\nlessgtr$

Heavys	0
Trucks	0
Cars	9
Totals	9

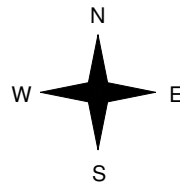


South Wood Dr

Heavys	0
Trucks	0
Cars	1
Totals	1
Heavys	0
Trucks	0
Cars	0
Totals	0
Heavys	0
Trucks	0
Cars	1
Totals	1
Heavys	0
Trucks	0
Cars	2
Totals	2



Montrose Rd



Cars	71
Trucks	0
Heavys	2
Totals	73
Cars	1
Trucks	0
Heavys	0
Totals	1
Cars	121
Trucks	1
Heavys	6
Totals	128
Cars	193
Trucks	1
Heavys	8
Totals	

Driveway



Cars	113
Trucks	0
Heavys	0
Totals	113

Peds Cross: $\nlessgtr$

West Peds: 2

West Entering: 2

West Leg Total: 11

Cars	296
Trucks	1
Heavys	9
Totals	306
Cars	6
Trucks	0
Heavys	0
Totals	6
Cars	224
Trucks	1
Heavys	0
Totals	225
Cars	57
Trucks	0
Heavys	0
Totals	57
Cars	287
Trucks	1
Heavys	0
Totals	

Peds Cross: $\nlessgtr$

South Peds: 1

South Entering: 288

South Leg Total: 594

Comments

Montrose Rd @ South Wood Dr

Total Count Diagram

Municipality: Niagara Falls

Site #: 0000000002

Intersection: Montrose Rd & South Wood Dr

TFR File #: 2

Count date: 3-Jul-2024

Weather conditions:

Clear/Dry

Person(s) who counted:

Pyramid Traffic Inc

**** Signalized Intersection ****

Major Road: Montrose Rd runs N/S

North Leg Total: 1587

North Entering: 794

North Peds: 4

Peds Cross: $\bowtie$

Heavys	0	16	1	17
Trucks	0	8	0	8
Cars	2	635	132	769
Totals	2	659	133	

Heavys 20

Trucks 12

Cars 761

Totals 793

East Leg Total: 760

East Entering: 450

East Peds: 8

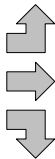
Peds Cross: $\bowtie$

Heavys	Trucks	Cars	Totals
0	0	20	20

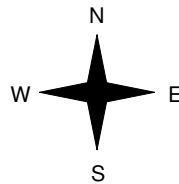


South Wood Dr

Heavys	Trucks	Cars	Totals
0	0	1	1
0	0	3	3
0	0	26	26
0	0	30	



Montrose Rd



Cars	Trucks	Heavys	Totals
139	0	8	147
4	0	0	4
274	3	22	299
417	3	30	

Driveway



Cars	Trucks	Heavys	Totals
305	3	2	310

Peds Cross: $\bowtie$

West Peds: 23

West Entering: 30

West Leg Total: 50

Cars	935	Cars	14	621	170	805
Trucks	11	Trucks	0	12	3	15
Heavys	38	Heavys	0	12	1	13
Totals	984	Totals	14	645	174	

Peds Cross: $\bowtie$

South Peds: 2

South Entering: 833

South Leg Total: 1817

Comments

Signal Code: 057098**Intersection: RR57(Thorold Stone Rd.) & RR98 (Montrose Rd.)****Municipality: niagarafalls****Owner: Region****Last Modified: 2017-02-23 11:45:33 AM**

Timing Parameters	EBD/WBD ADV	EBD/WBD Thorold Stone	NBD/SBD ADV	NBD/SBD Montrose	n/a	n/a
Min Green	6	10	6	8	0	0
Walk	0	11	0	11	0	0
Ped Clearance	0	19	0	19	0	0
Vehicle Ext.	2.5	2.5	2.5	2.5	0	0
Max Green	17	38	16	27	0	0
Yellow	3	3.5	3	3.3	0	0
All Red	0	2.1	0	2.1	0	0

Offset		
Minimum Cycle	29	0
Pedestrian Cycle	71	
Maximum Cycle	115	0
Operation	FA	

Installed On: 2009-06-09

Count Date: 2012-07-05

FA = Fully Actuated

SA = Semi Actuated

FT = Fixed Time

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Signal Code: 057QEE**Intersection: RR57 (THOROLD STONE RD.) & QEW EAST RAMP****Municipality: niagarafalls****Owner: MTO****Last Modified: 2010-11-19 9:36:10 AM**

Timing Parameters	EBD ADV. THOROLD STONE RD.	EBD & WBD THRU THOROLD STONE RD.	NBD QEW OFF-RAMP	n/a	n/a	n/a
Min Green	6	10	10	0	0	0
Walk	0	15	15	0	0	0
Ped Clearance	0	15	15	0	0	0
Vehicle Ext.	2.5	5	3.2	0	0	0
Max Green	16	50	32	0	0	0
Yellow	3	4	4	0	0	0
All Red	0	3	3	0	0	0

Offset		
Minimum Cycle	34	0
Pedestrian Cycle	74	
Maximum Cycle	115	0
Operation	FA	

Installed On: 1998-11-26

Count Date: 2007-11-30

FA = Fully Actuated

SA = Semi Actuated

FT = Fixed Time

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Signal Code: 057QEW**Intersection: RR57 (THOROLD STONE RD.) & QEW WEST RAMP****Municipality: niagarafalls****Owner: MTO****Last Modified: 2011-10-20 9:33:09 AM**

Timing Parameters	WBD ADV. THOROLD STONE RD.	EBD & WBD THRU THOROLD STONE RD.	SBD QEW OFF-RAMP	n/a	n/a	n/a
Min Green	6	10	10	0	0	0
Walk	0	15	12	0	0	0
Ped Clearance	0	15	21	0	0	0
Vehicle Ext.	2.5	2.2	3.2	0	0	0
Max Green	15	51	32	0	0	0
Yellow	3	4	4	0	0	0
All Red	0	3	3	0	0	0

Offset

Minimum Cycle	34	0
Pedestrian Cycle	77	
Maximum Cycle	115	0
Operation	FA	

Installed On: 1998-12-15

Count Date: 2007-11-30

FA = Fully Actuated

SA = Semi Actuated

FT = Fixed Time

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Signal Code: 098STH

Intersection: RR98 (MONTROSE RD.) & SOUTHWOOD DR.

Municipality: niagarafalls

Owner: region

Last Modified: 2024-07-26 8:28:21 AM

Timing Parameters	NBD & SBD ADV MONTROSE RD.	NBD& SBD THRU MONTROSE RD.	EBD & WBD THRU SOUTHWOOD/PLAZA	n/a	n/a	n/a
Min Green	6	10	8	0	0	0
Walk	0	9	8	0	0	0
Ped Clearance	0	14	13	0	0	0
Vehicle Ext.	2.5	2.5	2.5	0	0	0
Max Green	15	35	30	0	0	0
Yellow	3	4.1	4.1	0	0	0
All Red	0	2.6	3.1	0	0	0

Offset		
Minimum Cycle		31.9
Pedestrian Cycle		57.9
Maximum Cycle		96.9
Operation		FA

Installed On: --/--/----

Count Date: 2009-09-08

FA = Fully Actuated SA = Semi Actuated FT = Fixed Time

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Thorold Stone Rd @ Montrose Rd

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Niagara Falls

Site #: 0000000004

Intersection: Thorold Stone Rd & Montrose Rd

TFR File #: 4

Count date: 3-Jul-2024

Weather conditions:

Clear/Dry

Person(s) who counted:

Pyramid Traffic Inc

** Signalized Intersection **

Major Road: Thorold Stone Rd runs W/E

North Leg Total: 694

North Entering: 346

North Peds: 2

Peds Cross: $\times$

Heavys	2	5	3	10
Trucks	1	2	1	4
Cars	55	92	185	332
Totals	58	99	189	

Heavys 11

Trucks 7

Cars 330

Totals 348

East Leg Total: 1903

East Entering: 807

East Peds: 2

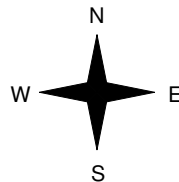
Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
21	8	575	604



Thorold Stone Rd

Heavys	Trucks	Cars	Totals
3	0	58	61
21	8	619	648
3	4	63	70
27	12	740	



Montrose Rd

Montrose Rd

Cars	Trucks	Heavys	Totals
139	1	1	141
458	5	18	481
175	8	2	185
772	14	21	

Thorold Stone Rd



Cars	Trucks	Heavys	Totals
1057	13	26	1096

Peds Cross: $\times$

West Peds: 7

West Entering: 779

West Leg Total: 1383

Cars	330	Cars	62	133	253	448
Trucks	14	Trucks	2	6	4	12
Heavys	10	Heavys	1	7	2	10
Totals	354	Totals	65	146	259	

Peds Cross: $\times$

South Peds: 1

South Entering: 470

South Leg Total: 824

Comments

Thorold Stone Rd @ Montrose Rd

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 18:00:00

One Hour Peak

From: 16:15:00

To: 17:15:00

Municipality: Niagara Falls

Site #: 0000000004

Intersection: Thorold Stone Rd & Montrose Rd

TFR File #: 4

Count date: 3-Jul-2024

Weather conditions:

Clear/Dry

Person(s) who counted:

Pyramid Traffic Inc

** Signalized Intersection **

Major Road: Thorold Stone Rd runs W/E

North Leg Total: 1056

North Entering: 514

North Peds: 8

Peds Cross: $\times$

Heavys	3	3	2	8
Trucks	0	1	2	3
Cars	71	167	265	503
Totals	74	171	269	

Heavys	5
Trucks	3
Cars	534
Totals	542

East Leg Total: 2638

East Entering: 1262

East Peds: 15

Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
16	4	925	945

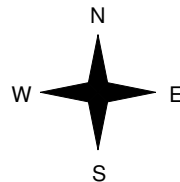


Thorold Stone Rd

Heavys	Trucks	Cars	Totals
2	0	80	82
12	6	780	798
2	1	74	77
16	7	934	



Montrose Rd



Cars	Trucks	Heavys	Totals
270	2	2	274
735	4	11	750
235	2	1	238
1240	8	14	

Thorold Stone Rd



Cars	Trucks	Heavys	Totals
1349	9	18	1376

Peds Cross: $\times$

West Peds: 13

West Entering: 957

West Leg Total: 1902

Cars	476	Cars	119	184	304	607
Trucks	4	Trucks	0	1	1	2
Heavys	6	Heavys	2	1	4	7
Totals	486	Totals	121	186	309	



Peds Cross: $\times$

South Peds: 7

South Entering: 616

South Leg Total: 1102

Comments

Thorold Stone Rd @ Montrose Rd

Total Count Diagram

Municipality: Niagara Falls

Site #: 0000000004

Intersection: Thorold Stone Rd & Montrose Rd

TFR File #: 4

Count date: 3-Jul-2024

Weather conditions:

Clear/Dry

Person(s) who counted:

Pyramid Traffic Inc

**** Signalized Intersection ****

Major Road: Thorold Stone Rd runs W/E

North Leg Total: 3194

North Entering: 1609

North Peds: 13

Peds Cross: $\bowtie$

Heavys	10	12	12	34
Trucks	4	9	8	21
Cars	242	488	824	1554
Totals	256	509	844	

Heavys 35

Trucks 20

Cars 1530

Totals 1585

East Leg Total: 8372

East Entering: 3857

East Peds: 19

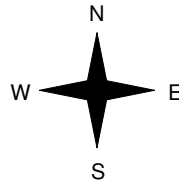
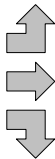
Peds Cross: $\bowtie$

Heavys	Trucks	Cars	Totals
64	33	2810	2907



Thorold Stone Rd

Heavys	Trucks	Cars	Totals
11	0	254	265
49	25	2572	2646
8	6	262	276
68	31	3088	



Montrose Rd

Cars	Trucks	Heavys	Totals
727	8	8	743
2254	24	49	2327
766	14	7	787
3747	46	64	

Thorold Stone Rd



Cars	Trucks	Heavys	Totals
4402	42	71	4515

Peds Cross: $\bowtie$

West Peds: 25

West Entering: 3187

West Leg Total: 6094

Cars	1516	Cars	314	549	1006	1869
Trucks	29	Trucks	5	12	9	26
Heavys	27	Heavys	5	16	10	31
Totals	1572	Totals	324	577	1025	



Peds Cross: $\bowtie$

South Peds: 18

South Entering: 1926

South Leg Total: 3498

Comments

Thorold Stone Rd @ QEW NB Ramps

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Niagara Falls

Site #: 0000000006

Intersection: Thorold Stone Rd & QEW NB Ramp

TFR File #: 6

Count date: 3-Jul-2024

Weather conditions:

Clear/Dry

Person(s) who counted:

Pyramid Traffic Inc

** Signalized Intersection **

Major Road: Thorold Stone Rd runs W/E

North Leg Total: 319

North Entering: 0

North Peds: 0

Peds Cross: $\times$

Heavys	0	0	0	0
Trucks	0	0	0	0
Cars	0	0	0	0
Totals	0	0	0	0



Heavys 11

Trucks 6

Cars 302

Totals 319

East Leg Total: 1849

East Entering: 859

East Peds: 0

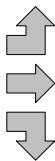
Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
22	18	876	916

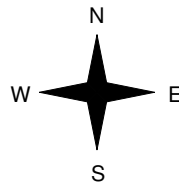


Thorold Stone Rd

Heavys	Trucks	Cars	Totals
6	3	104	113
20	7	775	802
0	0	0	0
26	10	879	



QEW NB Off Ramp



QEW NB On Ramp

Cars	Trucks	Heavys	Totals
198	3	5	206
624	13	16	653
0	0	0	0
822	16	21	



Thorold Stone Rd



Cars	Trucks	Heavys	Totals
953	12	25	990

Peds Cross: $\times$

West Peds: 0

West Entering: 915

West Leg Total: 1831

Cars	0	Cars	252	0	178	430
Trucks	0	Trucks	5	0	5	10
Heavys	0	Heavys	6	0	5	11
Totals	0	Totals	263	0	188	



Peds Cross: $\times$

South Peds: 0

South Entering: 451

South Leg Total: 451

Comments

Thorold Stone Rd @ QEW NB Ramps

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 18:00:00

One Hour Peak

From: 16:15:00

To: 17:15:00

Municipality: Niagara Falls

Site #: 0000000006

Intersection: Thorold Stone Rd & QEW NB Ramp

TFR File #: 6

Count date: 3-Jul-2024

Weather conditions:

Clear/Dry

Person(s) who counted:

Pyramid Traffic Inc

** Signalized Intersection **

Major Road: Thorold Stone Rd runs W/E

North Leg Total: 428

North Entering: 0

North Peds: 5

Peds Cross: $\times$

Heavys	0	0	0	0
Trucks	0	0	0	0
Cars	0	0	0	0
Totals	0	0	0	0



Heavys 7

Trucks 6

Cars 415

Totals 428

East Leg Total: 2621

East Entering: 1277

East Peds: 1

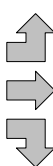
Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
12	7	1333	1352

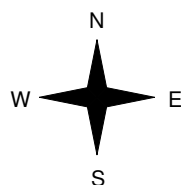


Thorold Stone Rd

Heavys	Trucks	Cars	Totals
5	3	126	134
15	10	1078	1103
0	0	0	0
20	13	1204	



QEW NB Off Ramp



QEW NB On Ramp



Cars	Trucks	Heavys	Totals
286	3	2	291
976	5	5	986
0	0	0	0
1262	8	7	

Thorold Stone Rd



Cars	Trucks	Heavys	Totals
1318	10	16	1344

Peds Cross: $\times$

West Peds: 0

West Entering: 1237

West Leg Total: 2589

Cars	0	Cars	357	3	240	600
Trucks	0	Trucks	2	0	0	2
Heavys	0	Heavys	7	0	1	8
Totals	0	Totals	366	3	241	



Peds Cross: $\times$

South Peds: 6

South Entering: 610

South Leg Total: 610

Comments

Thorold Stone Rd @ QEW NB Ramps

Total Count Diagram

Municipality: Niagara Falls

Site #: 0000000006

Intersection: Thorold Stone Rd & QEW NB Ramp

TFR File #: 6

Count date: 3-Jul-2024

Weather conditions:

Clear/Dry

Person(s) who counted:

Pyramid Traffic Inc

**** Signalized Intersection ****

Major Road: Thorold Stone Rd runs W/E

North Leg Total: 1418

North Entering: 0

North Peds: 12

Peds Cross: $\times$

Heavys	0	0	0	0
Trucks	0	0	0	0
Cars	0	0	0	0
Totals	0	0	0	0



Heavys 31

Trucks 19

Cars 1368

Totals 1418

East Leg Total: 8147

East Entering: 3985

East Peds: 3

Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
65	47	4078	4190

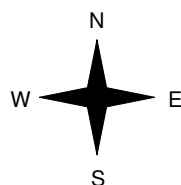


Thorold Stone Rd

Heavys	Trucks	Cars	Totals
15	8	440	463
55	28	3332	3415
0	0	0	0
70	36	3772	



QEW NB On Ramp



Cars	Trucks	Heavys	Totals
925	11	16	952
2957	33	43	3033
0	0	0	0
3882	44	59	



Thorold Stone Rd



Cars	Trucks	Heavys	Totals
4061	34	67	4162

Peds Cross: $\times$

West Peds: 0

West Entering: 3878

West Leg Total: 8068

Cars	0	Cars	1121	3	729	1853
Trucks	0	Trucks	14	0	6	20
Heavys	0	Heavys	22	0	12	34
Totals	0	Totals	1157	3	747	



QEW NB Off Ramp



Peds Cross: $\times$

South Peds: 12

South Entering: 1907

South Leg Total: 1907

Comments

Thorold Stone Rd @ QEW SB Ramps

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Niagara Falls

Site #: 0000000005

Intersection: Thorold Stone Rd & QEW SB Ramp

TFR File #: 5

Count date: 3-Jul-2024

Weather conditions:

Clear/Dry

Person(s) who counted:

Pyramid Traffic Inc

** Signalized Intersection **

Major Road: Thorold Stone Rd runs W/E

North Leg Total: 270

North Entering: 270

North Peds: 0

Peds Cross: 0

Heavys	2	0	4	6
Trucks	3	0	1	4
Cars	81	0	179	260
Totals	86	0	184	

Heavys 0

Trucks 0

Cars 0

Totals 0

East Leg Total: 1817

East Entering: 907

East Peds: 0

Peds Cross: 0

Heavys	Trucks	Cars	Totals
20	15	787	822



Thorold Stone Rd

Heavys	Trucks	Cars	Totals
0	0	0	0
19	11	696	726
6	8	372	386
25	19	1068	

Peds Cross: 0

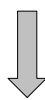
West Peds: 0

West Entering: 1112

West Leg Total: 1934

Cars	532
Trucks	17
Heavys	8
Totals	557

QEW SB On Ramp



Cars	0	0	0	0
Trucks	0	0	0	0
Heavys	0	0	0	0
Totals	0	0	0	0



QEW SB Off Ramp

Cars	Trucks	Heavys	Totals
0	0	0	0
706	12	18	736
160	9	2	171
866	21	20	

Thorold Stone Rd



Cars	Trucks	Heavys	Totals
875	12	23	910

Peds Cross: 0

South Peds: 0

South Entering: 0

South Leg Total: 557

Comments

Thorold Stone Rd @ QEW SB Ramps

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 18:00:00

One Hour Peak

From: 16:15:00

To: 17:15:00

Municipality: Niagara Falls

Site #: 0000000005

Intersection: Thorold Stone Rd & QEW SB Ramp

TFR File #: 5

Count date: 3-Jul-2024

Weather conditions:

Clear/Dry

Person(s) who counted:

Pyramid Traffic Inc

** Signalized Intersection **

Major Road: Thorold Stone Rd runs W/E

North Leg Total: 381

North Entering: 381

North Peds: 7

Peds Cross: $\times$

Heavys	2	0	6	8
Trucks	3	0	2	5
Cars	130	0	238	368
Totals	135	0	246	

Heavys 0

Trucks 0

Cars 0

Totals 0

East Leg Total: 2633

East Entering: 1394

East Peds: 0

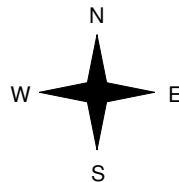
Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
14	8	1265	1287



Thorold Stone Rd

Heavys	Trucks	Cars	Totals
0	0	0	0
13	6	974	993
4	4	403	411
17	10	1377	



QEW SB Off Ramp



Cars	Trucks	Heavys	Totals
0	0	0	0
1135	5	12	1152
241	0	1	242
1376	5	13	

Thorold Stone Rd



Cars	Trucks	Heavys	Totals
1212	8	19	1239

Peds Cross: $\times$

West Peds: 0

West Entering: 1404

West Leg Total: 2691

Cars	644
Trucks	4
Heavys	5
Totals	653



Cars	0	0	0	0
Trucks	0	0	0	0
Heavys	0	0	0	0
Totals	0	0	0	0

Peds Cross: $\times$

South Peds: 1

South Entering: 0

South Leg Total: 653

Comments

Thorold Stone Rd @ QEW SB Ramps

Total Count Diagram

Municipality: Niagara Falls

Site #: 0000000005

Intersection: Thorold Stone Rd & QEW SB Ramp

TFR File #: 5

Count date: 3-Jul-2024

Weather conditions:

Clear/Dry

Person(s) who counted:

Pyramid Traffic Inc

**** Signalized Intersection ****

Major Road: Thorold Stone Rd runs W/E

North Leg Total: 1216

North Entering: 1216

North Peds: 12

Peds Cross: $\nlessgtr$

Heavys	12	0	21	33
Trucks	15	0	5	20
Cars	400	0	763	1163
Totals	427	0	789	

Heavys 0

Trucks 0

Cars 0

Totals 0

East Leg Total: 8104

East Entering: 4213

East Peds: 0

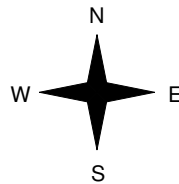
Peds Cross: $\nlessgtr$

Heavys	Trucks	Cars	Totals
65	47	3810	3922



Thorold Stone Rd

Heavys	Trucks	Cars	Totals
0	0	0	0
47	27	3028	3102
23	20	1408	1451
70	47	4436	



QEW SB Off Ramp



Cars	Trucks	Heavys	Totals
0	0	0	0
3410	32	53	3495
699	10	9	718
4109	42	62	

Thorold Stone Rd



Cars	Trucks	Heavys	Totals
3791	32	68	3891

Peds Cross: $\nlessgtr$

West Peds: 0

West Entering: 4553

West Leg Total: 8475

Cars	2107
Trucks	30
Heavys	32
Totals	2169



Cars	0	0	0	0
Trucks	0	0	0	0
Heavys	0	0	0	0
Totals	0	0	0	0

Peds Cross: $\nlessgtr$

South Peds: 7

South Entering: 0

South Leg Total: 2169

Comments

APPENDIX

D

Existing
Conditions
Synchro Results

Lanes, Volumes, Timings

1: Montrose Road & Mt Carmel Blvd

Existing Conditions AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	48	0	0	0	22	127	0	0	170	2
Future Volume (vph)	3	0	48	0	0	0	22	127	0	0	170	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.872									0.999	
Flt Protected		0.997						0.993				
Satd. Flow (prot)	0	1652	0	0	1900	0	0	1855	0	0	1861	0
Flt Permitted		0.997						0.993				
Satd. Flow (perm)	0	1652	0	0	1900	0	0	1855	0	0	1861	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		97.9			84.1			125.1			220.4	
Travel Time (s)		7.0			6.1			9.0			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Adj. Flow (vph)	3	0	52	0	0	0	24	138	0	0	185	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	55	0	0	0	0	0	162	0	0	187	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	30.3%						ICU Level of Service A					
Analysis Period (min)	15											

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr

Existing Conditions AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1	13	31	1	14	2	136	42	15	202	0
Future Volume (vph)	0	1	13	31	1	14	2	136	42	15	202	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	50.0		50.0	40.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.874				0.850			0.850			
Flt Protected					0.954		0.950			0.950		
Satd. Flow (prot)	0	1661	0	0	1729	1568	1805	1900	1615	1805	1863	0
Flt Permitted							0.621			0.663		
Satd. Flow (perm)	0	1661	0	0	1812	1568	1180	1900	1615	1260	1863	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14				75			81			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		92.8			50.0			126.5			125.1	
Travel Time (s)		6.7			3.6			9.1			9.0	
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%	0%	0%	5%	0%	3%	0%	0%	0%	0%	2%	0%
Adj. Flow (vph)	0	1	14	34	1	15	2	148	46	16	220	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	15	0	0	35	15	2	148	46	16	220	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type		NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr

Existing Conditions AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	6.0	10.0	10.0	6.0	10.0	
Minimum Split (s)	28.2	28.2		28.2	28.2	28.2	12.0	29.7	29.7	10.5	29.7	
Total Split (s)	37.2	37.2		37.2	37.2	37.2	18.0	41.7	41.7	18.0	41.7	
Total Split (%)	38.4%	38.4%		38.4%	38.4%	38.4%	18.6%	43.0%	43.0%	18.6%	43.0%	
Maximum Green (s)	30.0	30.0		30.0	30.0	30.0	15.0	35.0	35.0	15.0	35.0	
Yellow Time (s)	4.1	4.1		4.1	4.1	4.1	3.0	4.1	4.1	3.0	4.1	
All-Red Time (s)	3.1	3.1		3.1	3.1	3.1	0.0	2.6	2.6	0.0	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)		7.2			7.2	7.2	3.0	6.7	6.7	3.0	6.7	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Walk Time (s)	8.0	8.0		8.0	8.0	8.0		9.0	9.0		9.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0		14.0	14.0		14.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effct Green (s)		8.1			8.1	8.1	25.3	25.0	25.0	25.3	25.0	
Actuated g/C Ratio		0.24			0.24	0.24	0.74	0.73	0.73	0.74	0.73	
v/c Ratio		0.04			0.08	0.04	0.00	0.11	0.04	0.02	0.16	
Control Delay		8.3			12.8	0.1	4.0	7.6	2.0	3.9	7.6	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		8.3			12.8	0.1	4.0	7.6	2.0	3.9	7.6	
LOS		A			B	A	A	A	A	A	A	
Approach Delay		8.3			9.0			6.2			7.3	
Approach LOS		A			A			A			A	
Queue Length 50th (m)		0.1			1.4	0.0	0.0	0.0	0.0	0.1	0.0	
Queue Length 95th (m)		3.5			7.8	0.0	0.6	19.6	3.0	2.0	28.2	
Internal Link Dist (m)		68.8			26.0			102.5			101.1	
Turn Bay Length (m)							50.0		50.0	40.0		
Base Capacity (vph)		1471			1603	1396	1161	1824	1553	1185	1788	
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		0.01			0.02	0.01	0.00	0.08	0.03	0.01	0.12	
Intersection Summary												
Area Type:	Other											
Cycle Length: 96.9												
Actuated Cycle Length: 34.4												
Natural Cycle: 70												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.16												
Intersection Signal Delay: 7.1	Intersection LOS: A											
Intersection Capacity Utilization 39.2%	ICU Level of Service A											
Analysis Period (min) 15												

Lanes, Volumes, Timings
2: Montrose Road & South Wood Dr

Existing Conditions AM

Splits and Phases: 2: Montrose Road & South Wood Dr

 Ø1	 Ø2	 Ø4
18 s	41.7 s	37.2 s
 Ø5	 Ø6	 Ø8
18 s	41.7 s	37.2 s

Lanes, Volumes, Timings

3: Montrose Road & Cameron Ct

Existing Conditions AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1	8	21	0	2	1	179	58	6	240	1
Future Volume (vph)	0	1	8	21	0	2	1	179	58	6	240	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.878				0.989		0.964				0.999	
Flt Protected					0.956				0.999			
Satd. Flow (prot)	0	1517	0	0	1796	0	0	3455	0	0	1829	0
Flt Permitted					0.956				0.999			
Satd. Flow (perm)	0	1517	0	0	1796	0	0	3455	0	0	1829	0
Link Speed (k/h)	50				50				50			
Link Distance (m)	167.1				30.7				126.5			
Travel Time (s)	12.0				2.2				9.1			
Confl. Peds. (#/hr)	1		3	3		1	4		4	4		4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	100%	0%	0%	0%	0%	0%	0%	3%	67%	2%	0%
Adj. Flow (vph)	0	1	9	23	0	2	1	195	63	7	261	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	10	0	0	25	0	0	259	0	0	269	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0				0.0				3.6			
Link Offset(m)	0.0				0.0				0.0			
Crosswalk Width(m)	4.8				4.8				4.8			
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control	Stop				Stop				Free			
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	32.3%											
Analysis Period (min)	15											
ICU Level of Service A												

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

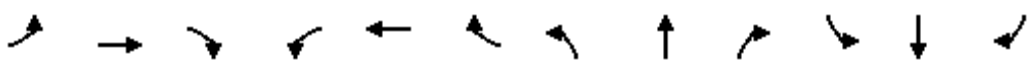
Existing Conditions AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	648	70	185	481	141	65	146	259	189	99	58
Future Volume (vph)	61	648	70	185	481	141	65	146	259	189	99	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	85.0		0.0	60.0		35.0	60.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	1.00		0.99		0.99	1.00	0.99	
Frt		0.985			0.966				0.850		0.945	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3475	0	1787	3415	0	1770	3574	1583	1787	3296	0
Flt Permitted	0.370			0.188			0.644			0.505		
Satd. Flow (perm)	689	3475	0	354	3415	0	1192	3574	1561	948	3296	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			35				282		63	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		697.4			182.6			114.0			232.7	
Travel Time (s)		50.2			13.1			8.2			16.8	
Confl. Peds. (#/hr)	2		1	1		2	7		2	2		7
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 (%)	2%	2%	4%	1%	2%	1%	2%	1%	2%	1%	2%	4%
Adj. Flow (vph)	66	704	76	201	523	153	71	159	282	205	108	63
Shared Lane Traffic (%)												
Lane Group Flow (vph)	66	780	0	201	676	0	71	159	282	205	171	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

Existing Conditions AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	8.0	8.0	6.0	8.0	
Minimum Split (s)	10.5	35.6		10.5	35.6		9.0	35.4	35.4	9.0	35.4	
Total Split (s)	20.0	43.6		20.0	43.6		19.0	32.4	32.4	19.0	32.4	
Total Split (%)	17.4%	37.9%		17.4%	37.9%		16.5%	28.2%	28.2%	16.5%	28.2%	
Maximum Green (s)	17.0	38.0		17.0	38.0		16.0	27.0	27.0	16.0	27.0	
Yellow Time (s)	3.0	3.5		3.0	3.5		3.0	3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.1		0.0	2.1		0.0	2.1	2.1	0.0	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	5.6		3.0	5.6		3.0	5.4	5.4	3.0	5.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	2.5		3.0	2.5		2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None		None	Min	Min	None	Min	
Walk Time (s)		11.0			11.0			11.0	11.0		11.0	
Flash Dont Walk (s)		19.0			19.0			19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effect Green (s)	31.1	21.0		36.3	25.9		19.6	9.6	9.6	26.6	15.8	
Actuated g/C Ratio	0.45	0.30		0.52	0.37		0.28	0.14	0.14	0.38	0.23	
v/c Ratio	0.16	0.74		0.52	0.52		0.18	0.32	0.62	0.41	0.21	
Control Delay	9.9	26.6		14.2	18.9		17.5	31.9	11.1	19.4	17.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	9.9	26.6		14.2	18.9		17.5	31.9	11.1	19.4	17.8	
LOS	A	C		B	B		B	C	B	B	B	
Approach Delay		25.3			17.8			18.5			18.6	
Approach LOS		C			B			B			B	
Queue Length 50th (m)	3.8	46.4		12.7	35.0		5.9	10.2	0.0	18.4	6.3	
Queue Length 95th (m)	11.4	84.2		29.7	63.3		17.4	23.6	22.6	43.7	17.6	
Internal Link Dist (m)		673.4			158.6			90.0			208.7	
Turn Bay Length (m)	45.0			85.0			60.0		35.0	60.0		
Base Capacity (vph)	638	1978		550	1954		584	1441	798	563	1367	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.10	0.39		0.37	0.35		0.12	0.11	0.35	0.36	0.13	
Intersection Summary												
Area Type:	Other											
Cycle Length: 115												
Actuated Cycle Length: 69.5												
Natural Cycle: 95												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.74												
Intersection Signal Delay: 20.5							Intersection LOS: C					
Intersection Capacity Utilization 64.7%							ICU Level of Service C					

Analysis Period (min) 15

Splits and Phases: 4: Montrose Road & Thorold Stone Rd

 Ø1	 Ø2	 Ø3	 Ø4
19 s	32.4 s	20 s	43.6 s
 Ø5	 Ø6	 Ø7	 Ø8
19 s	32.4 s	20 s	43.6 s

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

Existing Conditions AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑					↖↗		↖
Traffic Volume (vph)	0	726	386	171	736	0	0	0	0	184	0	86
Future Volume (vph)	0	726	386	171	736	0	0	0	0	184	0	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		60.0	210.0		0.0	0.0		0.0	60.0		25.0
Storage Lanes	0		1	1		0	0		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3471	1553	1805	3574	0	0	0	0	3400	0	1524
Flt Permitted				0.245						0.950		
Satd. Flow (perm)	0	3471	1553	466	3574	0	0	0	0	3400	0	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			420									93
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		182.6			352.3			184.1			151.2	
Travel Time (s)		13.1			25.4			13.3			10.9	
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%	4%	4%	0%	1%	0%	0%	0%	0%	3%	0%	6%
Adj. Flow (vph)	0	789	420	186	800	0	0	0	0	200	0	93
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	789	420	186	800	0	0	0	0	200	0	93
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (m)		10.0	2.0	2.0	10.0					2.0		2.0
Trailing Detector (m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Position(m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Size(m)		0.6	2.0	2.0	0.6					2.0		2.0
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm	pm+pt	NA					Prot		Perm
Protected Phases		4		3	8					1		

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

Existing Conditions AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4	8								1
Detector Phase		4	4	3	8					1		1
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					10.0		10.0
Minimum Split (s)		37.0	37.0	9.0	17.0					40.0		40.0
Total Split (s)		58.0	58.0	17.0	75.0					40.0		40.0
Total Split (%)		50.4%	50.4%	14.8%	65.2%					34.8%		34.8%
Maximum Green (s)		51.0	51.0	14.0	68.0					33.0		33.0
Yellow Time (s)		4.0	4.0	3.0	4.0					4.0		4.0
All-Red Time (s)		3.0	3.0	0.0	3.0					3.0		3.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		7.0	7.0	3.0	7.0					7.0		7.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		2.2	2.2	2.5	2.2					3.2		3.2
Recall Mode		Min	Min	None	Min					None		None
Walk Time (s)		15.0	15.0							12.0		12.0
Flash Dont Walk (s)		15.0	15.0							21.0		21.0
Pedestrian Calls (#/hr)		0	0							0		0
Act Effect Green (s)		17.8	17.8	32.3	28.2					10.4		10.4
Actuated g/C Ratio		0.34	0.34	0.61	0.53					0.20		0.20
v/c Ratio		0.67	0.52	0.40	0.42					0.30		0.25
Control Delay		18.1	4.3	6.9	8.0					20.9		7.7
Queue Delay		0.0	0.0	0.0	0.0					0.0		0.0
Total Delay		18.1	4.3	6.9	8.0					20.9		7.7
LOS		B	A	A	A					C		A
Approach Delay		13.3			7.8						16.7	
Approach LOS		B			A						B	
Queue Length 50th (m)		33.7	0.0	6.4	21.7					8.7		0.0
Queue Length 95th (m)		54.2	15.1	13.6	33.9					19.2		10.5
Internal Link Dist (m)		158.6			328.3			160.1			127.2	
Turn Bay Length (m)			60.0	210.0						60.0		25.0
Base Capacity (vph)		3282	1491	644	3574					2150		998
Starvation Cap Reductn		0	0	0	0					0		0
Spillback Cap Reductn		0	0	0	0					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		0.24	0.28	0.29	0.22					0.09		0.09
Intersection Summary												
Area Type:	Other											
Cycle Length: 115												
Actuated Cycle Length: 52.8												
Natural Cycle: 90												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.67												
Intersection Signal Delay: 11.5	Intersection LOS: B											
Intersection Capacity Utilization 56.7%	ICU Level of Service B											
Analysis Period (min) 15												

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

Existing Conditions AM

Splits and Phases: 5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

 Ø1 40 s	 Ø3 17 s	 Ø4 58 s
	 Ø8 75 s	

Lanes, Volumes, Timings
6: QEW East On-Ramp & Thorold Stone Rd

Existing Conditions AM

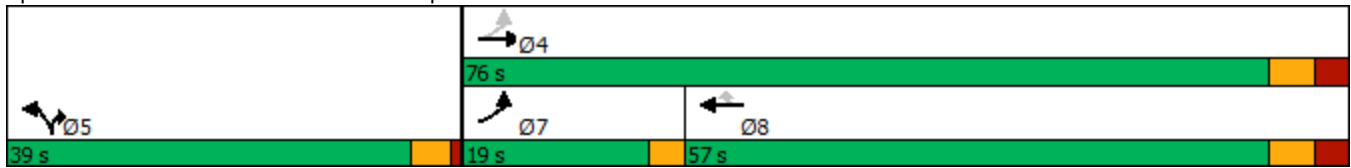
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 					
Traffic Volume (vph)	113	802	0	0	653	206	263	0	188	0	0	0
Future Volume (vph)	113	802	0	0	653	206	263	0	188	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	210.0		0.0	0.0		15.0	35.0		45.0	0.0		0.0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1671	3505	0	0	3471	1553	3367	0	1538	0	0	0
Flt Permitted	0.313						0.950					
Satd. Flow (perm)	551	3505	0	0	3471	1553	3367	0	1538	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						95			162			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		352.3			289.2			161.6			154.2	
Travel Time (s)		25.4			20.8			11.6			11.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	3%	0%	0%	4%	4%	4%	0%	5%	0%	0%	0%
Adj. Flow (vph)	123	872	0	0	710	224	286	0	204	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	123	872	0	0	710	224	286	0	204	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2			2	1	1		1			
Detector Template	Left	Thru			Thru	Right	Left		Right			
Leading Detector (m)	2.0	10.0			10.0	2.0	2.0		2.0			
Trailing Detector (m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Position(m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Size(m)	2.0	0.6			0.6	2.0	2.0		2.0			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Delay (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type	pm+pt	NA			NA	Perm	Prot		Prot			
Protected Phases	7	4			8		5		5			

Lanes, Volumes, Timings
6: QEW East On-Ramp & Thorold Stone Rd

Existing Conditions AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4					8						
Detector Phase	7	4			8	8	5		5			
Switch Phase												
Minimum Initial (s)	6.0	10.0			10.0	10.0	10.0		10.0			
Minimum Split (s)	9.0	37.0			37.0	37.0	14.5		14.5			
Total Split (s)	19.0	76.0			57.0	57.0	39.0		39.0			
Total Split (%)	16.5%	66.1%			49.6%	49.6%	33.9%		33.9%			
Maximum Green (s)	16.0	69.0			50.0	50.0	34.5		34.5			
Yellow Time (s)	3.0	4.0			4.0	4.0	3.5		3.5			
All-Red Time (s)	0.0	3.0			3.0	3.0	1.0		1.0			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Total Lost Time (s)	3.0	7.0			7.0	7.0	4.5		4.5			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	2.5	5.0			5.0	5.0	3.0		3.0			
Recall Mode	None	Min			Min	Min	None		None			
Walk Time (s)		15.0			15.0	15.0						
Flash Dont Walk (s)		15.0			15.0	15.0						
Pedestrian Calls (#/hr)		0			0	0						
Act Effct Green (s)	35.2	31.0			22.2	22.2	11.6		11.6			
Actuated g/C Ratio	0.64	0.57			0.41	0.41	0.21		0.21			
v/c Ratio	0.23	0.44			0.50	0.33	0.40		0.45			
Control Delay	4.5	7.1			14.2	8.8	23.1		10.8			
Queue Delay	0.0	0.0			0.0	0.0	0.0		0.0			
Total Delay	4.5	7.1			14.2	8.8	23.1		10.8			
LOS	A	A			B	A	C		B			
Approach Delay		6.8			12.9			18.0				
Approach LOS		A			B			B				
Queue Length 50th (m)	3.5	21.6			28.2	8.5	13.8		3.7			
Queue Length 95th (m)	9.3	37.0			50.3	24.6	29.2		22.3			
Internal Link Dist (m)		328.3			265.2			137.6			130.2	
Turn Bay Length (m)	210.0					15.0	35.0		45.0			
Base Capacity (vph)	698	3479			3079	1388	2230		1073			
Starvation Cap Reductn	0	0			0	0	0		0			
Spillback Cap Reductn	0	0			0	0	0		0			
Storage Cap Reductn	0	0			0	0	0		0			
Reduced v/c Ratio	0.18	0.25			0.23	0.16	0.13		0.19			
Intersection Summary												
Area Type:	Other											
Cycle Length: 115												
Actuated Cycle Length: 54.7												
Natural Cycle: 65												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.50												
Intersection Signal Delay: 11.4						Intersection LOS: B						
Intersection Capacity Utilization 56.7%						ICU Level of Service B						
Analysis Period (min) 15												

Splits and Phases: 6: QEW East On-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

1: Montrose Road & Mt Carmel Blvd

Existing Conditions PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	37	0	0	0	46	254	0	0	198	5
Future Volume (vph)	3	0	37	0	0	0	46	254	0	0	198	5
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1900	1433	1900	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.874									0.997	
Flt Protected		0.997						0.992				
Satd. Flow (prot)	0	1249	0	0	1433	0	0	1398	0	0	1401	0
Flt Permitted		0.997						0.992				
Satd. Flow (perm)	0	1249	0	0	1433	0	0	1398	0	0	1401	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		97.9			84.1			125.1			220.4	
Travel Time (s)		7.0			6.1			9.0			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Adj. Flow (vph)	3	0	40	0	0	0	50	276	0	0	215	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	43	0	0	0	0	0	326	0	0	220	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	48.6%						ICU Level of Service A					
Analysis Period (min)	15											

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr

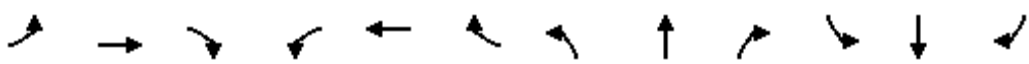
Existing Conditions PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	128	1	73	6	225	57	56	177	2
Future Volume (vph)	1	0	1	128	1	73	6	225	57	56	177	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1178	1301	1454	1579	1301	1454	1338	1900
Storage Length (m)	0.0		0.0	0.0		0.0	50.0		50.0	40.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00		1.00		0.98	1.00	1.00	
Frt		0.932				0.850			0.850		0.998	
Flt Protected		0.976			0.953		0.950			0.950		
Satd. Flow (prot)	0	1709	0	0	1070	1074	1381	1579	1106	1381	1309	0
Flt Permitted		0.856			0.727		0.636			0.532		
Satd. Flow (perm)	0	1499	0	0	814	1074	922	1579	1081	772	1309	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		75				79			81		1	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		92.8			50.0			126.5			125.1	
Travel Time (s)		6.7			3.6			9.1			9.0	
Confl. Peds. (#/hr)			1	1			2		1	1		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	5%	0%	3%	0%	0%	0%	0%	2%	0%
Adj. Flow (vph)	1	0	1	139	1	79	7	245	62	61	192	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2	0	0	140	79	7	245	62	61	194	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.80	1.60	1.40	1.26	1.60	1.40	1.55	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr

Existing Conditions PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	6.0	10.0	10.0	6.0	10.0	
Minimum Split (s)	28.2	28.2		28.2	28.2	28.2	12.0	29.7	29.7	10.5	29.7	
Total Split (s)	37.2	37.2		37.2	37.2	37.2	18.0	41.7	41.7	18.0	41.7	
Total Split (%)	38.4%	38.4%		38.4%	38.4%	38.4%	18.6%	43.0%	43.0%	18.6%	43.0%	
Maximum Green (s)	30.0	30.0		30.0	30.0	30.0	15.0	35.0	35.0	15.0	35.0	
Yellow Time (s)	4.1	4.1		4.1	4.1	4.1	3.0	4.1	4.1	3.0	4.1	
All-Red Time (s)	3.1	3.1		3.1	3.1	3.1	0.0	2.6	2.6	0.0	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)		7.2			7.2	7.2	3.0	6.7	6.7	3.0	6.7	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Walk Time (s)	8.0	8.0		8.0	8.0	8.0		9.0	9.0		9.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0		14.0	14.0		14.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effct Green (s)		15.3			15.3	15.3	26.7	21.7	21.7	28.9	25.7	
Actuated g/C Ratio		0.30			0.30	0.30	0.53	0.43	0.43	0.57	0.51	
v/c Ratio		0.00			0.57	0.21	0.01	0.36	0.12	0.12	0.29	
Control Delay		0.0			27.4	6.1	8.3	19.4	4.3	8.6	14.8	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		0.0			27.4	6.1	8.3	19.4	4.3	8.6	14.8	
LOS		A			C	A	A	B	A	A	B	
Approach Delay					19.7			16.2			13.3	
Approach LOS					B			B			B	
Queue Length 50th (m)		0.0			11.5	0.0	0.3	20.4	0.0	2.6	11.2	
Queue Length 95th (m)		0.0			33.5	8.5	2.3	51.8	6.1	10.2	40.4	
Internal Link Dist (m)		68.8			26.0			102.5			101.1	
Turn Bay Length (m)							50.0		50.0	40.0		
Base Capacity (vph)		1008			533	731	679	1175	825	643	974	
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		0.00			0.26	0.11	0.01	0.21	0.08	0.09	0.20	
Intersection Summary												
Area Type:	Other											
Cycle Length:	96.9											
Actuated Cycle Length:	50.6											
Natural Cycle:	70											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.57											
Intersection Signal Delay:	16.2						Intersection LOS: B					
Intersection Capacity Utilization	52.5%						ICU Level of Service A					

Lanes, Volumes, Timings 2: Montrose Road & South Wood Dr

Existing Conditions PM

Analysis Period (min) 15

Splits and Phases: 2: Montrose Road & South Wood Dr



Lanes, Volumes, Timings

3: Montrose Road & Cameron Ct

Existing Conditions PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1	9	96	0	3	12	285	144	3	301	2
Future Volume (vph)	0	1	9	96	0	3	12	285	144	3	301	2
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1454	1579	1301	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.877				0.996				0.951		0.999	
Flt Protected					0.954				0.999			
Satd. Flow (prot)	0	1152	0	0	1362	0	0	2823	0	0	1396	0
Flt Permitted					0.954				0.999			
Satd. Flow (perm)	0	1152	0	0	1362	0	0	2823	0	0	1396	0
Link Speed (k/h)	50				50				50		50	
Link Distance (m)	167.1				30.7				232.7		126.5	
Travel Time (s)	12.0				2.2				16.8		9.1	
Confl. Peds. (#/hr)	1					1	2			1	1	2
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%	100%	0%	0%	0%	0%	0%	0%	3%	67%	2%	0%
Adj. Flow (vph)	0	1	10	104	0	3	13	310	157	3	327	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	11	0	0	107	0	0	480	0	0	332	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0				0.0				3.6		3.6	
Link Offset(m)	0.0				0.0				0.0		0.0	
Crosswalk Width(m)	4.8				4.8				4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.40	1.26	1.60	1.00	1.42	1.00
Turning Speed (k/h)	25	15		25	15		25	15		25	15	
Sign Control	Stop				Stop				Free		Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	45.0%				ICU Level of Service A							
Analysis Period (min)	15											

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

Existing Conditions PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	798	77	238	750	274	121	186	309	269	171	74
Future Volume (vph)	82	798	77	238	750	274	121	186	309	269	171	74
Ideal Flow (vphpl)	1454	1579	1301	1454	1579	1301	1454	1579	1301	1454	1579	1301
Storage Length (m)	45.0		0.0	85.0		0.0	60.0		35.0	60.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00		1.00	0.99		0.99		0.97	0.99	0.99	
Frt		0.987			0.960				0.850		0.955	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1354	2893	0	1368	2815	0	1354	2970	1084	1368	2770	0
Flt Permitted	0.186			0.142			0.588			0.506		
Satd. Flow (perm)	265	2893	0	204	2815	0	830	2970	1053	719	2770	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			48				336		55	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		697.4			182.6			114.0			232.7	
Travel Time (s)		50.2			13.1			8.2			16.8	
Confl. Peds. (#/hr)	8		7	7		8	13		15	15		13
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 (%)	2%	2%	4%	1%	2%	1%	2%	1%	2%	1%	2%	4%
Adj. Flow (vph)	89	867	84	259	815	298	132	202	336	292	186	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	89	951	0	259	1113	0	132	202	336	292	266	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.40	1.26	1.60	1.40	1.26	1.60	1.40	1.26	1.60	1.40	1.26	1.60
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

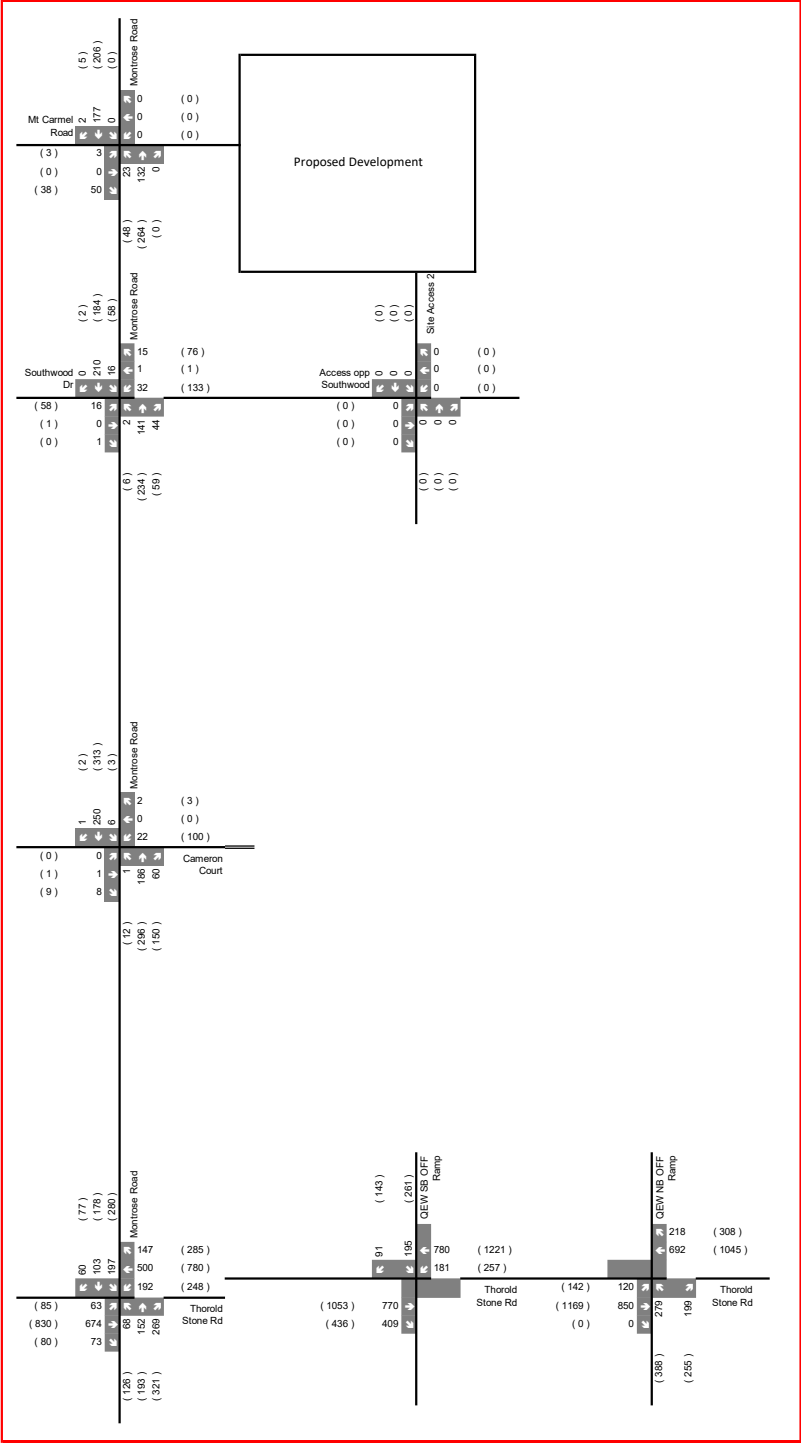
Existing Conditions PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	8.0	8.0	6.0	8.0	
Minimum Split (s)	10.5	35.6		10.5	35.6		9.0	35.4	35.4	9.0	35.4	
Total Split (s)	20.0	43.6		20.0	43.6		19.0	32.4	32.4	19.0	32.4	
Total Split (%)	17.4%	37.9%		17.4%	37.9%		16.5%	28.2%	28.2%	16.5%	28.2%	
Maximum Green (s)	17.0	38.0		17.0	38.0		16.0	27.0	27.0	16.0	27.0	
Yellow Time (s)	3.0	3.5		3.0	3.5		3.0	3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.1		0.0	2.1		0.0	2.1	2.1	0.0	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	5.6		3.0	5.6		3.0	5.4	5.4	3.0	5.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	2.5		3.0	2.5		2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None		None	Min	Min	None	Min	
Walk Time (s)		11.0			11.0			11.0	11.0		11.0	
Flash Dont Walk (s)		19.0			19.0			19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effct Green (s)	48.7	37.4		60.1	47.7		27.5	13.3	13.3	33.6	17.1	
Actuated g/C Ratio	0.48	0.37		0.60	0.47		0.27	0.13	0.13	0.33	0.17	
v/c Ratio	0.40	0.88		0.81	0.82		0.46	0.52	0.78	0.86	0.51	
Control Delay	16.3	40.9		40.1	30.2		29.5	45.1	18.0	53.0	34.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	16.3	40.9		40.1	30.2		29.5	45.1	18.0	53.0	34.0	
LOS	B	D		D	C		C	D	B	D	C	
Approach Delay		38.8			32.1			28.4			43.9	
Approach LOS		D			C			C			D	
Queue Length 50th (m)	7.0	91.1		30.0	95.8		19.7	20.7	0.0	50.0	20.8	
Queue Length 95th (m)	18.6	#159.4		#90.2	#189.3		34.4	32.1	30.4	#90.0	35.0	
Internal Link Dist (m)		673.4			158.6			90.0			208.7	
Turn Bay Length (m)	45.0			85.0			60.0		35.0	60.0		
Base Capacity (vph)	335	1105		319	1360		346	802	529	344	788	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.27	0.86		0.81	0.82		0.38	0.25	0.64	0.85	0.34	
Intersection Summary												
Area Type:	Other											
Cycle Length: 115												
Actuated Cycle Length: 100.5												
Natural Cycle: 95												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.88												
Intersection Signal Delay: 35.1							Intersection LOS: D					
Intersection Capacity Utilization 96.0%							ICU Level of Service F					

APPENDIX

E

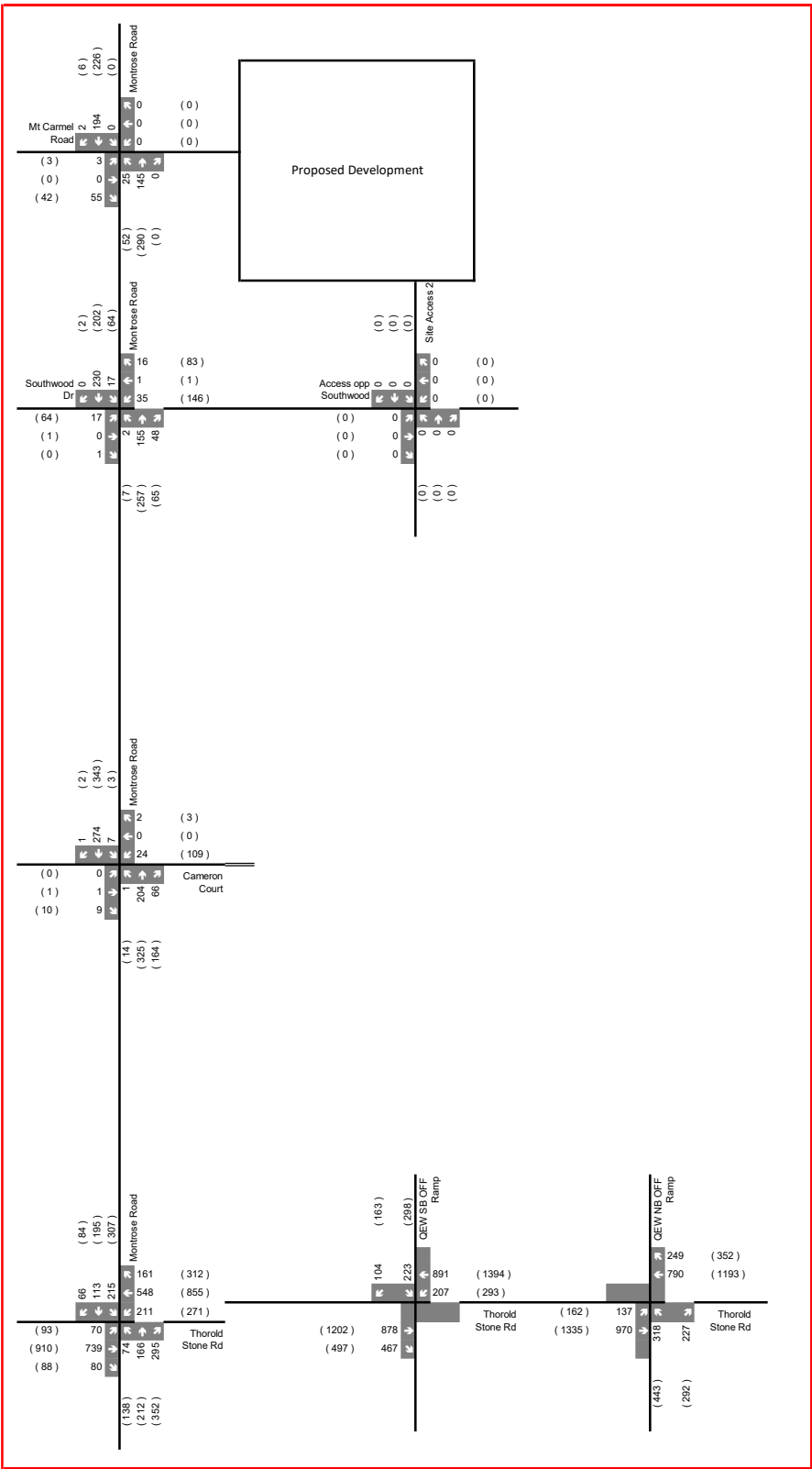
Future
Background,
Site Generated
and Future Total
Volumes



Legend

xx A.M. Peak Hour Traffic Volumes (xx) P.M. Peak Hour Traffic Volumes

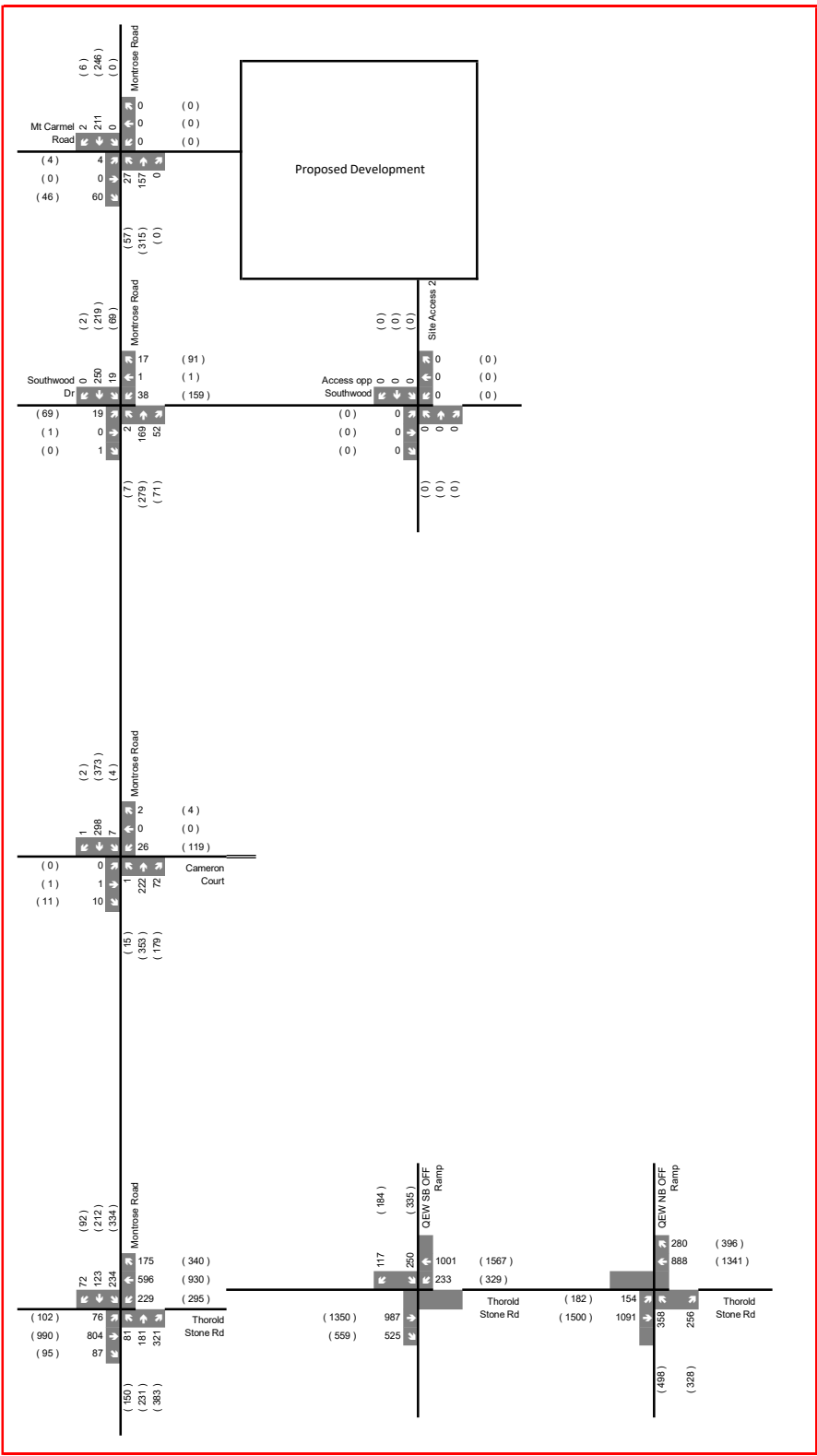
Future Background
2026 Hour Vehicular
Volumes



Legend

xx A.M. Peak Hour Traffic Volumes (xx) P.M. Peak Hour Traffic Volumes

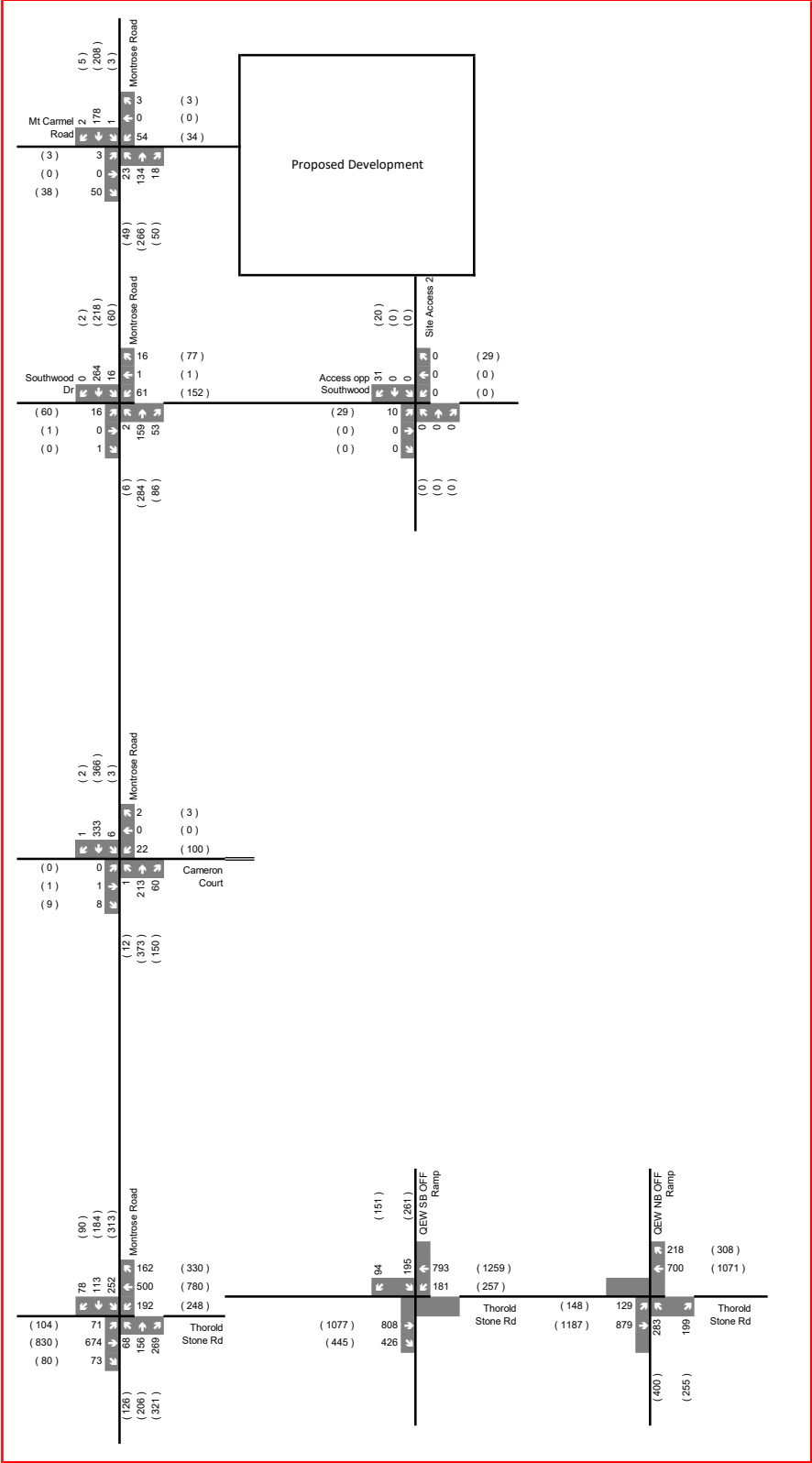
Future Background
2031 Peak Hour
Vehicular Volumes



Legend

xx A.M. Peak Hour Traffic Volumes (xx) P.M. Peak Hour Traffic Volumes

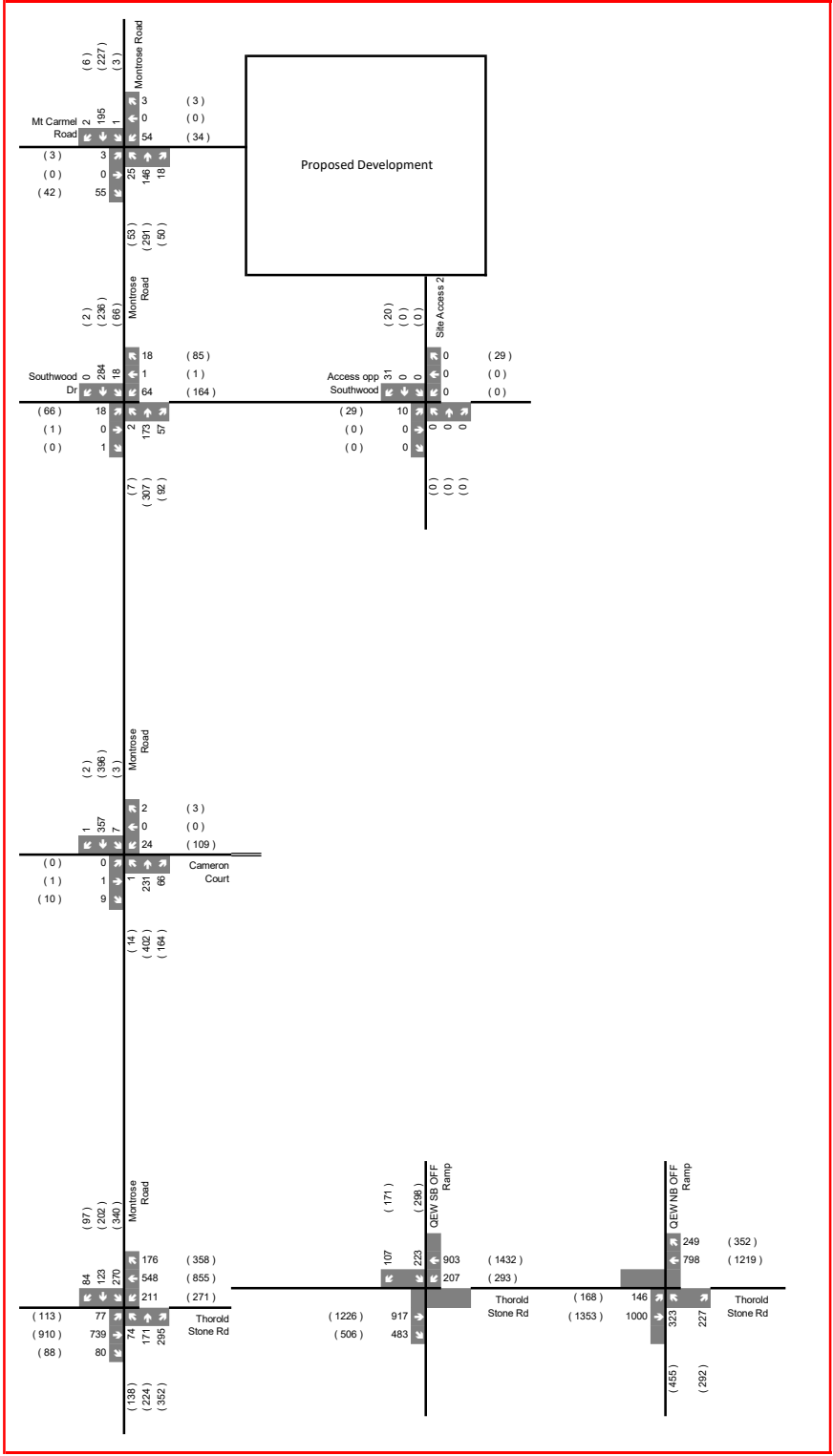
Future Background
2036 Peak Hour
Vehicular Volumes



Legend

xx A.M. Peak Hour Traffic Volumes (xx) P.M. Peak Hour Traffic Volumes

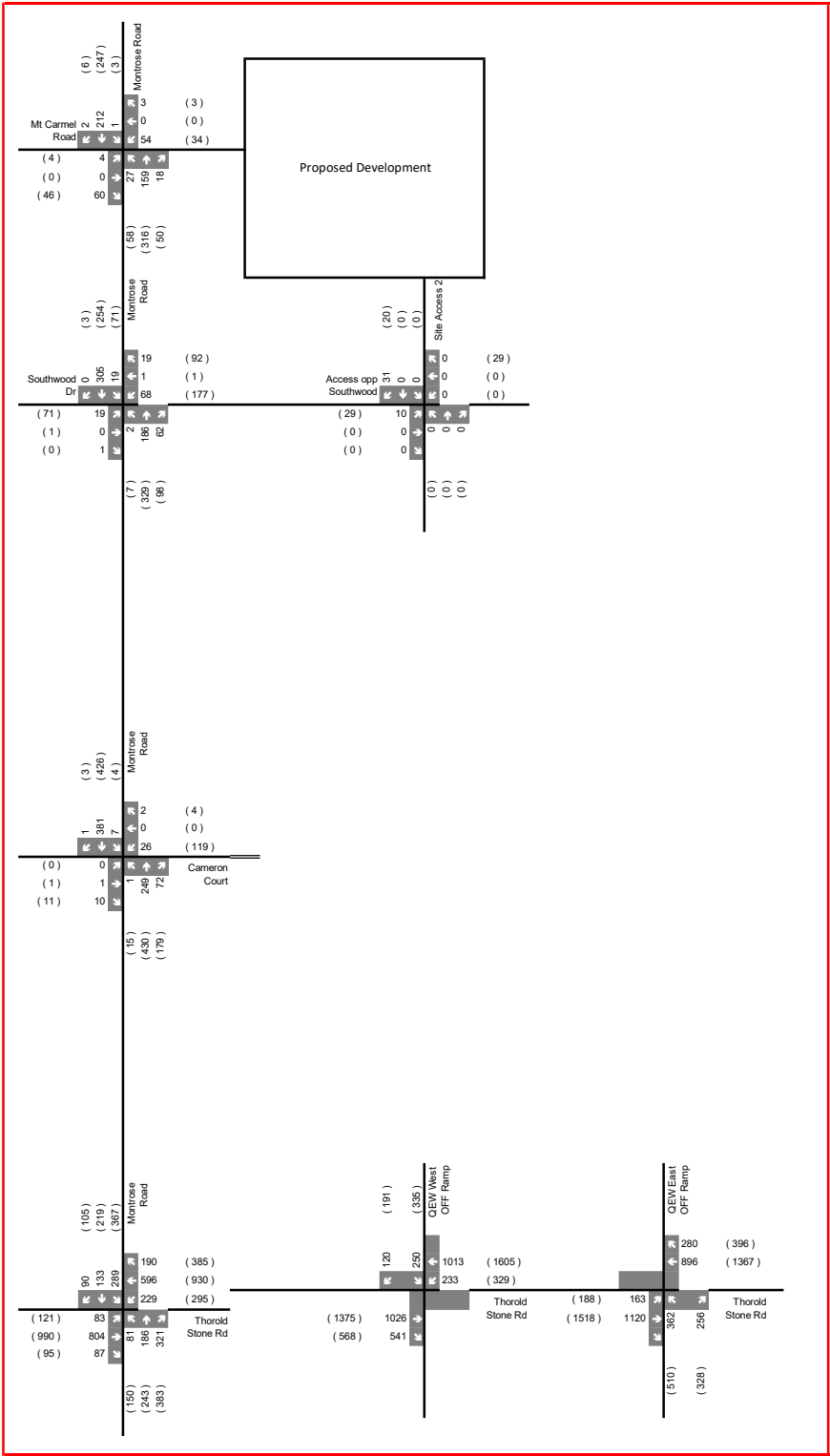
Future Total 2026 Peak Hour Vehicular Volumes



Legend

xx A.M. Peak Hour Traffic Volumes (xx) P.M. Peak Hour Traffic Volumes

Future Total 2031 Peak Hour Vehicular Volumes



Legend

xx A.M. Peak Hour Traffic Volumes (xx) P.M. Peak Hour Traffic Volumes

Future Total 2036 Peak Hour Vehicular Volumes

APPENDIX

F

Future
Background and
Future Total
Synchro Results

APPENDIX

F-1

*Future
Background
Synchro Results*

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2036 Future Background AM

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 78

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 17.7

Intersection LOS: B

Intersection Capacity Utilization 87.7%

ICU Level of Service E

Analysis Period (min) 15

90th %ile Actuated Cycle: 97.7

70th %ile Actuated Cycle: 83.9

50th %ile Actuated Cycle: 76.6

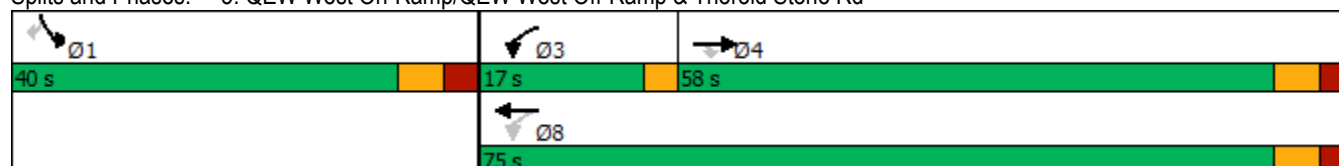
30th %ile Actuated Cycle: 69.6

10th %ile Actuated Cycle: 62.2

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

Queue shown is maximum after two cycles.

Splits and Phases: 5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings
6: QEW East On-Ramp & Thorold Stone Rd

2036 Future Background AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	154	1091	0	0	888	280	358	0	256	0	0	0
Future Volume (vph)	154	1091	0	0	888	280	358	0	256	0	0	0
Ideal Flow (vphpl)	1454	1579	1301	1454	1579	1301	2144	1900	1900	1900	1900	1900
Storage Length (m)	210.0		0.0	0.0		15.0	35.0		45.0	0.0		0.0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1303	2941	0	0	2970	1084	3951	0	1615	0	0	0
Flt Permitted	0.202						0.950					
Satd. Flow (perm)	277	2941	0	0	2970	1084	3951	0	1615	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						95			78			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		352.3			289.2			188.0			154.2	
Travel Time (s)		25.4			20.8			13.5			11.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	2%	0%	0%	1%	2%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	167	1186	0	0	965	304	389	0	278	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	167	1186	0	0	965	304	389	0	278	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.40	1.26	1.60	1.40	1.26	1.60	0.85	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2			2	1	1		1			
Detector Template	Left	Thru			Thru	Right	Left		Right			
Leading Detector (m)	2.0	10.0			10.0	2.0	2.0		2.0			
Trailing Detector (m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Position(m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Size(m)	2.0	0.6			0.6	2.0	2.0		2.0			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Delay (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type	pm+pt	NA			NA	Perm	Prot		Prot			
Protected Phases	7	4			8		5		5			

Lanes, Volumes, Timings
6: QEW East On-Ramp & Thorold Stone Rd

2036 Future Background AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4					8						
Detector Phase	7	4			8	8	5		5			
Switch Phase												
Minimum Initial (s)	6.0	10.0			10.0	10.0	10.0		10.0			
Minimum Split (s)	9.0	37.0			37.0	37.0	14.5		14.5			
Total Split (s)	19.0	76.0			57.0	57.0	39.0		39.0			
Total Split (%)	16.5%	66.1%			49.6%	49.6%	33.9%		33.9%			
Maximum Green (s)	16.0	69.0			50.0	50.0	34.5		34.5			
Yellow Time (s)	3.0	4.0			4.0	4.0	3.5		3.5			
All-Red Time (s)	0.0	3.0			3.0	3.0	1.0		1.0			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Total Lost Time (s)	3.0	7.0			7.0	7.0	4.5		4.5			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	2.5	5.0			5.0	5.0	3.0		3.0			
Recall Mode	None	Min			Min	Min	None		None			
Walk Time (s)		15.0			15.0	15.0						
Flash Dont Walk (s)		15.0			15.0	15.0						
Pedestrian Calls (#/hr)		0			0	0						
Act Effct Green (s)	56.7	52.5			37.5	37.5	17.1		17.1			
Actuated g/C Ratio	0.69	0.64			0.46	0.46	0.21		0.21			
v/c Ratio	0.49	0.63			0.71	0.55	0.47		0.70			
Control Delay	10.2	10.9			21.8	16.1	31.8		33.0			
Queue Delay	0.0	0.0			0.0	0.0	0.0		0.0			
Total Delay	10.2	10.9			21.8	16.1	31.8		33.0			
LOS	B	B			C	B	C		C			
Approach Delay		10.9			20.4			32.3				
Approach LOS		B			C			C				
90th %ile Green (s)	16.0	69.0			50.0	50.0	28.0		28.0			
90th %ile Term Code	Max	Hold			Max	Max	Gap		Gap			
70th %ile Green (s)	13.8	64.2			47.4	47.4	20.4		20.4			
70th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
50th %ile Green (s)	12.3	53.7			38.4	38.4	16.8		16.8			
50th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
30th %ile Green (s)	9.8	43.5			30.7	30.7	12.7		12.7			
30th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
10th %ile Green (s)	7.2	33.0			22.8	22.8	10.0		10.0			
10th %ile Term Code	Gap	Hold			Gap	Gap	Min		Min			
Queue Length 50th (m)	7.8	51.9			62.9	22.5	29.3		30.6			
Queue Length 95th (m)	21.3	99.4			112.5	60.4	50.8		67.3			
Internal Link Dist (m)		328.3			265.2			164.0			130.2	
Turn Bay Length (m)	210.0					15.0	35.0		45.0			
Base Capacity (vph)	405	2467			1928	737	1770		766			
Starvation Cap Reductn	0	0			0	0	0		0			
Spillback Cap Reductn	0	0			0	0	0		0			
Storage Cap Reductn	0	0			0	0	0		0			
Reduced v/c Ratio	0.41	0.48			0.50	0.41	0.22		0.36			
Intersection Summary												

Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2036 Future Background AM

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 81.8

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 18.9

Intersection LOS: B

Intersection Capacity Utilization 87.7%

ICU Level of Service E

Analysis Period (min) 15

90th %ile Actuated Cycle: 108.5

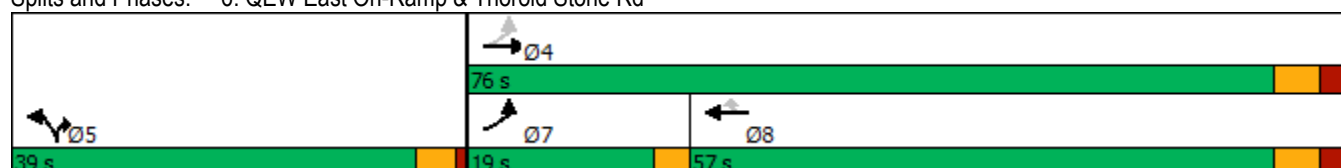
70th %ile Actuated Cycle: 96.1

50th %ile Actuated Cycle: 82

30th %ile Actuated Cycle: 67.7

10th %ile Actuated Cycle: 54.5

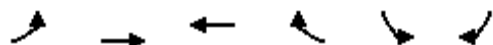
Splits and Phases: 6: QEW East On-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

8: Access Opp Southwood Dr & Site Access 2#

2036 Future Background AM



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	0	1863	1863	0	1863	0
Flt Permitted						
Satd. Flow (perm)	0	1863	1863	0	1863	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		175.4	35.0		70.7	
Travel Time (s)		12.6	2.5		5.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control		Stop	Stop		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	0.0%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

1: Montrose Road & Mt Carmel Blvd

2036 Future Background PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	46	0	0	0	57	315	0	0	246	6
Future Volume (vph)	4	0	46	0	0	0	57	315	0	0	246	6
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1900	1433	1900	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.875									0.997	
Flt Protected		0.996						0.992				
Satd. Flow (prot)	0	1249	0	0	1433	0	0	1398	0	0	1401	0
Flt Permitted		0.996						0.992				
Satd. Flow (perm)	0	1249	0	0	1433	0	0	1398	0	0	1401	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		97.9			84.1			51.6			220.4	
Travel Time (s)		7.0			6.1			3.7			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Adj. Flow (vph)	4	0	50	0	0	0	62	342	0	0	267	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	54	0	0	0	0	0	404	0	0	274	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	57.9%						ICU Level of Service B					
Analysis Period (min)	15											

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

2036 Future Background PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	159	1	91	7	279	71	69	219	2
Future Volume (vph)	1	0	1	159	1	91	7	279	71	69	219	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1178	1301	1454	1579	1301	1454	1338	1900
Storage Length (m)	0.0		0.0	0.0		50.0	50.0		50.0	40.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00		1.00		0.98	1.00	1.00	
Frt		0.932				0.850			0.850		0.999	
Flt Protected		0.976			0.953		0.950			0.950		
Satd. Flow (prot)	0	1709	0	0	1069	1074	1381	1579	1106	1381	1310	0
Flt Permitted		0.891			0.727		0.610			0.465		
Satd. Flow (perm)	0	1560	0	0	814	1074	884	1579	1081	675	1310	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		75				99			81			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		92.8			175.4			126.5			73.6	
Travel Time (s)		6.7			12.6			9.1			5.3	
Confl. Peds. (#/hr)			1	1			2		1	1		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	5%	0%	3%	0%	0%	0%	0%	2%	0%
Adj. Flow (vph)	1	0	1	173	1	99	8	303	77	75	238	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2	0	0	174	99	8	303	77	75	240	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.80	1.60	1.40	1.26	1.60	1.40	1.55	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

2036 Future Background PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	6.0	10.0	10.0	6.0	10.0	
Minimum Split (s)	28.2	28.2		28.2	28.2	28.2	12.0	29.7	29.7	10.5	29.7	
Total Split (s)	37.2	37.2		37.2	37.2	37.2	18.0	41.7	41.7	18.0	41.7	
Total Split (%)	38.4%	38.4%		38.4%	38.4%	38.4%	18.6%	43.0%	43.0%	18.6%	43.0%	
Maximum Green (s)	30.0	30.0		30.0	30.0	30.0	15.0	35.0	35.0	15.0	35.0	
Yellow Time (s)	4.1	4.1		4.1	4.1	4.1	3.0	4.1	4.1	3.0	4.1	
All-Red Time (s)	3.1	3.1		3.1	3.1	3.1	0.0	2.6	2.6	0.0	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)		7.2			7.2	7.2	3.0	6.7	6.7	3.0	6.7	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Walk Time (s)	8.0	8.0		8.0	8.0	8.0		9.0	9.0		9.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0		14.0	14.0		14.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effct Green (s)		19.1			19.1	19.1	28.5	19.9	19.9	31.9	26.6	
Actuated g/C Ratio		0.31			0.31	0.31	0.46	0.32	0.32	0.52	0.43	
v/c Ratio		0.00			0.69	0.25	0.02	0.60	0.19	0.17	0.43	
Control Delay		0.0			36.0	6.1	9.4	26.1	6.2	10.1	17.5	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		0.0			36.0	6.1	9.4	26.1	6.2	10.1	17.5	
LOS		A			D	A	A	C	A	B	B	
Approach Delay					25.2			21.8			15.8	
Approach LOS					C			C			B	
90th %ile Green (s)	30.0	30.0		30.0	30.0	30.0	6.0	27.7	27.7	9.6	31.3	
90th %ile Term Code	Hold	Hold		Max	Max	Max	Min	Gap	Gap	Gap	Hold	
70th %ile Green (s)	25.1	25.1		25.1	25.1	25.1	0.0	21.9	21.9	8.2	33.1	
70th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Gap	Hold	
50th %ile Green (s)	19.1	19.1		19.1	19.1	19.1	0.0	17.3	17.3	7.0	27.3	
50th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Gap	Hold	
30th %ile Green (s)	14.6	14.6		14.6	14.6	14.6	0.0	13.4	13.4	6.0	22.4	
30th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Min	Hold	
10th %ile Green (s)	9.8	9.8		9.8	9.8	9.8	0.0	17.8	17.8	0.0	17.8	
10th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Dwell	Dwell	Skip	Dwell	
Queue Length 50th (m)		0.0			17.3	0.0	0.4	30.9	0.0	4.1	17.7	
Queue Length 95th (m)		0.0			46.8	10.0	2.7	68.7	8.8	12.9	53.0	
Internal Link Dist (m)		68.8			151.4			102.5			49.6	
Turn Bay Length (m)						50.0	50.0		50.0	40.0		
Base Capacity (vph)		841			420	602	584	951	683	530	789	
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		0.00			0.41	0.16	0.01	0.32	0.11	0.14	0.30	

Intersection Summary

Area Type: Other

Cycle Length: 96.9

Actuated Cycle Length: 61.8

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 20.8

Intersection LOS: C

Intersection Capacity Utilization 58.6%

ICU Level of Service B

Analysis Period (min) 15

90th %ile Actuated Cycle: 84.2

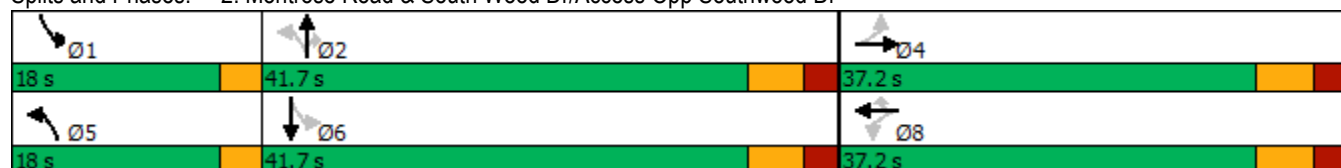
70th %ile Actuated Cycle: 72.1

50th %ile Actuated Cycle: 60.3

30th %ile Actuated Cycle: 50.9

10th %ile Actuated Cycle: 41.5

Splits and Phases: 2: Montrose Road & South Wood Dr/Access Opp Southwood Dr



Lanes, Volumes, Timings

3: Montrose Road & Cameron Ct

2036 Future Background PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1	11	119	0	4	15	353	179	4	373	2
Future Volume (vph)	0	1	11	119	0	4	15	353	179	4	373	2
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1454	1579	1301	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.875			0.996			0.951			0.999	
Flt Protected					0.954			0.999				
Satd. Flow (prot)	0	1164	0	0	1362	0	0	2822	0	0	1395	0
Flt Permitted					0.954			0.999				
Satd. Flow (perm)	0	1164	0	0	1362	0	0	2822	0	0	1395	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		167.1			64.9			232.7			126.5	
Travel Time (s)		12.0			4.7			16.8			9.1	
Confl. Peds. (#/hr)	1					1	2		1	1		2
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%	100%	0%	0%	0%	0%	0%	0%	3%	67%	2%	0%
Adj. Flow (vph)	0	1	12	129	0	4	16	384	195	4	405	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	13	0	0	133	0	0	595	0	0	411	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.40	1.26	1.60	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	52.8%						ICU Level of Service A					
Analysis Period (min)	15											

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2036 Future Background PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	102	990	95	295	930	340	150	231	383	334	212	92
Future Volume (vph)	102	990	95	295	930	340	150	231	383	334	212	92
Ideal Flow (vphpl)	1454	1579	1301	1454	1579	1301	1454	1579	1301	1454	1579	1301
Storage Length (m)	45.0		0.0	85.0		0.0	60.0		35.0	60.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00			0.99		0.99		0.97	0.99	0.99	
Frt		0.987			0.960				0.850		0.955	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1354	2893	0	1368	2815	0	1354	2970	1084	1368	2770	0
Flt Permitted	0.105			0.097			0.532			0.476		
Satd. Flow (perm)	150	2893	0	140	2815	0	752	2970	1053	677	2770	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			48				307		55	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		337.7			182.6			114.0			232.7	
Travel Time (s)		24.3			13.1			8.2			16.8	
Confl. Peds. (#/hr)	8		7	7		8	13		15	15		13
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 (%)	2%	2%	4%	1%	2%	1%	2%	1%	2%	1%	2%	4%
Adj. Flow (vph)	111	1076	103	321	1011	370	163	251	416	363	230	100
Shared Lane Traffic (%)												
Lane Group Flow (vph)	111	1179	0	321	1381	0	163	251	416	363	330	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.40	1.26	1.60	1.40	1.26	1.60	1.40	1.26	1.60	1.40	1.26	1.60
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2036 Future Background PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	8.0	8.0	6.0	8.0	
Minimum Split (s)	10.5	35.6		10.5	35.6		9.0	35.4	35.4	9.0	35.4	
Total Split (s)	20.0	43.6		20.0	43.6		19.0	32.4	32.4	19.0	32.4	
Total Split (%)	17.4%	37.9%		17.4%	37.9%		16.5%	28.2%	28.2%	16.5%	28.2%	
Maximum Green (s)	17.0	38.0		17.0	38.0		16.0	27.0	27.0	16.0	27.0	
Yellow Time (s)	3.0	3.5		3.0	3.5		3.0	3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.1		0.0	2.1		0.0	2.1	2.1	0.0	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	5.6		3.0	5.6		3.0	5.4	5.4	3.0	5.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	2.5		3.0	2.5		2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None		None	Min	Min	None	Min	
Walk Time (s)		11.0			11.0			11.0	11.0		11.0	
Flash Dont Walk (s)		19.0			19.0			19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effct Green (s)	51.4	38.2		60.4	44.7		35.4	19.8	19.8	40.0	22.7	
Actuated g/C Ratio	0.48	0.35		0.56	0.41		0.33	0.18	0.18	0.37	0.21	
v/c Ratio	0.59	1.15		1.18	1.16		0.51	0.46	0.94	1.03	0.53	
Control Delay	31.0	112.1		142.9	112.2		29.2	41.6	42.5	87.1	34.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	31.0	112.1		142.9	112.2		29.2	41.6	42.5	87.1	34.7	
LOS	C	F		F	F		C	D	D	F	C	
Approach Delay		105.1			118.0			39.6			62.1	
Approach LOS		F			F			D			E	
90th %ile Green (s)	16.4	38.0		17.0	38.6		16.0	27.0	27.0	16.0	27.0	
90th %ile Term Code	Gap	Max		Max	Hold		Max	Max	Max	Max	Hold	
70th %ile Green (s)	12.8	38.0		17.0	42.2		16.0	27.0	27.0	16.0	27.0	
70th %ile Term Code	Gap	Max		Max	Hold		Max	Max	Max	Max	Hold	
50th %ile Green (s)	10.0	38.0		17.0	45.0		14.1	23.6	23.6	16.0	25.5	
50th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
30th %ile Green (s)	8.1	38.0		17.0	46.9		11.7	14.2	14.2	16.0	18.5	
30th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
10th %ile Green (s)	6.4	38.0		17.0	48.6		8.6	9.3	9.3	16.0	16.7	
10th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
Queue Length 50th (m)	12.1	~172.2		~77.6	~198.5		25.0	26.3	26.2	66.6	28.8	
Queue Length 95th (m)	29.0	#225.6		#142.2	#274.4		41.9	38.9	#90.0	#105.0	44.4	
Internal Link Dist (m)		313.7			158.6			90.0			208.7	
Turn Bay Length (m)	45.0			85.0			60.0		35.0	60.0		
Base Capacity (vph)	270	1026		272	1190		355	744	494	352	735	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.41	1.15		1.18	1.16		0.46	0.34	0.84	1.03	0.45	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2036 Future Background PM

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 108.2

Natural Cycle: 145

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.18

Intersection Signal Delay: 91.3

Intersection LOS: F

Intersection Capacity Utilization 112.5%

ICU Level of Service H

Analysis Period (min) 15

90th %ile Actuated Cycle: 115

70th %ile Actuated Cycle: 115

50th %ile Actuated Cycle: 111.6

30th %ile Actuated Cycle: 102.2

10th %ile Actuated Cycle: 97.3

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Montrose Road & Thorold Stone Rd

 Ø1	 Ø2	 Ø3	 Ø4
19 s	32.4 s	20 s	43.6 s
 Ø5	 Ø6	 Ø7	 Ø8
19 s	32.4 s	20 s	43.6 s

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2036 Future Background PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑					↖↗		↖
Traffic Volume (vph)	0	1350	559	329	1567	0	0	0	0	335	0	184
Future Volume (vph)	0	1350	559	329	1567	0	0	0	0	335	0	184
Ideal Flow (vphpl)	1454	1579	1301	1454	1579	1301	1900	1900	1900	2144	1900	1301
Storage Length (m)	0.0		60.0	210.0		0.0	0.0		0.0	40.0		25.0
Storage Lanes	0		1	1		0	0		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	2941	1084	1381	2970	0	0	0	0	3836	0	1063
Flt Permitted				0.074						0.950		
Satd. Flow (perm)	0	2941	1084	108	2970	0	0	0	0	3836	0	1063
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			377									66
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		182.6			352.3			184.1			149.0	
Travel Time (s)		13.1			25.4			13.3			10.7	
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%	2%	2%	0%	1%	0%	0%	0%	0%	3%	0%	4%
Adj. Flow (vph)	0	1467	608	358	1703	0	0	0	0	364	0	200
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1467	608	358	1703	0	0	0	0	364	0	200
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.40	1.26	1.60	1.40	1.26	1.60	1.00	1.00	1.00	0.85	1.00	1.60
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (m)		10.0	2.0	2.0	10.0					2.0		2.0
Trailing Detector (m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Position(m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Size(m)		0.6	2.0	2.0	0.6					2.0		2.0
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm	pm+pt	NA					Prot		Perm
Protected Phases		4		3	8					1		

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2036 Future Background PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4	8								1
Detector Phase		4	4	3	8					1		1
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					10.0		10.0
Minimum Split (s)		37.0	37.0	9.0	17.0					40.0		40.0
Total Split (s)		58.0	58.0	17.0	75.0					40.0		40.0
Total Split (%)		50.4%	50.4%	14.8%	65.2%					34.8%		34.8%
Maximum Green (s)		51.0	51.0	14.0	68.0					33.0		33.0
Yellow Time (s)		4.0	4.0	3.0	4.0					4.0		4.0
All-Red Time (s)		3.0	3.0	0.0	3.0					3.0		3.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		7.0	7.0	3.0	7.0					7.0		7.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		2.2	2.2	2.5	2.2					3.2		3.2
Recall Mode		Min	Min	None	Min					None		None
Walk Time (s)		15.0	15.0							12.0		12.0
Flash Dont Walk (s)		15.0	15.0							21.0		21.0
Pedestrian Calls (#/hr)		0	0							0		0
Act Effect Green (s)		51.3	51.3	72.4	68.4					19.7		19.7
Actuated g/C Ratio		0.50	0.50	0.71	0.67					0.19		0.19
v/c Ratio		0.99	0.83	1.42	0.86					0.49		0.78
Control Delay		48.9	20.6	238.4	20.5					38.4		45.9
Queue Delay		11.8	0.0	0.0	0.0					0.0		0.0
Total Delay		60.8	20.6	238.4	20.5					38.4		45.9
LOS		E	C	F	C					D		D
Approach Delay		49.0			58.3						41.0	
Approach LOS		D			E						D	
90th %ile Green (s)		51.0	51.0	14.0	68.0					32.7		32.7
90th %ile Term Code		Max	Max	Max	Max					Gap		Gap
70th %ile Green (s)		51.0	51.0	14.0	68.0					23.8		23.8
70th %ile Term Code		Max	Max	Max	Max					Gap		Gap
50th %ile Green (s)		51.0	51.0	14.0	68.0					18.8		18.8
50th %ile Term Code		Max	Max	Max	Hold					Gap		Gap
30th %ile Green (s)		51.0	51.0	14.0	68.0					14.2		14.2
30th %ile Term Code		Max	Max	Max	Hold					Gap		Gap
10th %ile Green (s)		51.0	51.0	14.0	68.0					11.0		11.0
10th %ile Term Code		Max	Max	Max	Hold					Gap		Gap
Queue Length 50th (m)		150.0	39.8	~86.4	125.3					35.0		26.8
Queue Length 95th (m)		#254.9	#147.2	#169.2	#257.6					48.4		53.0
Internal Link Dist (m)		158.6			328.3			160.1			125.0	
Turn Bay Length (m)			60.0	210.0						40.0		25.0
Base Capacity (vph)		1477	731	252	1988					1246		389
Starvation Cap Reductn		59	0	0	0					0		0
Spillback Cap Reductn		0	0	0	0					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		1.03	0.83	1.42	0.86					0.29		0.51
Intersection Summary												

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2036 Future Background PM

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 102.1

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.42

Intersection Signal Delay: 52.1

Intersection LOS: D

Intersection Capacity Utilization 97.8%

ICU Level of Service F

Analysis Period (min) 15

90th %ile Actuated Cycle: 114.7

70th %ile Actuated Cycle: 105.8

50th %ile Actuated Cycle: 100.8

30th %ile Actuated Cycle: 96.2

10th %ile Actuated Cycle: 93

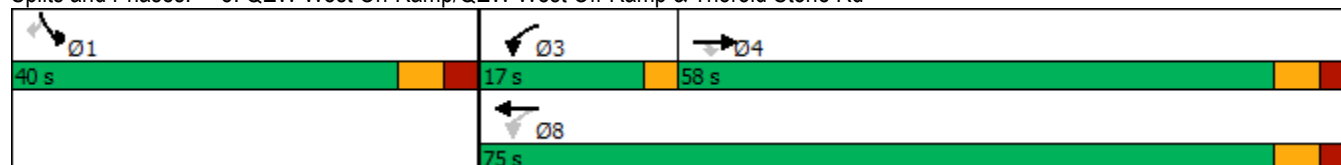
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings
6: QEW East On-Ramp & Thorold Stone Rd

2036 Future Background PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 					
Traffic Volume (vph)	182	1500	0	0	1341	396	498	0	328	0	0	0
Future Volume (vph)	182	1500	0	0	1341	396	498	0	328	0	0	0
Ideal Flow (vphpl)	1454	1579	1301	1454	1579	1301	2144	1900	1900	1900	1900	1900
Storage Length (m)	210.0		0.0	0.0		15.0	35.0		45.0	0.0		0.0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						0.97						
Frt						0.850			0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1303	2941	0	0	2970	1084	3951	0	1615	0	0	0
Flt Permitted	0.075						0.950					
Satd. Flow (perm)	103	2941	0	0	2970	1052	3951	0	1615	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						89			66			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		352.3			289.2			188.0			154.2	
Travel Time (s)		25.4			20.8			13.5			11.1	
Confl. Peds. (#/hr)	5		6	6		5			1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	2%	0%	0%	1%	2%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	198	1630	0	0	1458	430	541	0	357	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	198	1630	0	0	1458	430	541	0	357	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.40	1.26	1.60	1.40	1.26	1.60	0.85	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2			2	1	1		1			
Detector Template	Left	Thru			Thru	Right	Left		Right			
Leading Detector (m)	2.0	10.0			10.0	2.0	2.0		2.0			
Trailing Detector (m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Position(m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Size(m)	2.0	0.6			0.6	2.0	2.0		2.0			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Delay (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							

Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2036 Future Background PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA			NA	Perm	Prot		Prot			
Protected Phases	7	4			8		5		5			
Permitted Phases	4					8						
Detector Phase	7	4			8	8	5		5			
Switch Phase												
Minimum Initial (s)	6.0	10.0			10.0	10.0	10.0		10.0			
Minimum Split (s)	9.0	37.0			37.0	37.0	14.5		14.5			
Total Split (s)	19.0	76.0			57.0	57.0	39.0		39.0			
Total Split (%)	16.5%	66.1%			49.6%	49.6%	33.9%		33.9%			
Maximum Green (s)	16.0	69.0			50.0	50.0	34.5		34.5			
Yellow Time (s)	3.0	4.0			4.0	4.0	3.5		3.5			
All-Red Time (s)	0.0	3.0			3.0	3.0	1.0		1.0			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Total Lost Time (s)	3.0	7.0			7.0	7.0	4.5		4.5			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	2.5	5.0			5.0	5.0	3.0		3.0			
Recall Mode	None	Min			Min	Min	None		None			
Walk Time (s)		15.0			15.0	15.0						
Flash Dont Walk (s)		15.0			15.0	15.0						
Pedestrian Calls (#/hr)		0			0	0						
Act Effct Green (s)	72.1	68.0			50.4	50.4	24.5		24.5			
Actuated g/C Ratio	0.69	0.65			0.48	0.48	0.24		0.24			
v/c Ratio	0.83	0.85			1.01	0.77	0.58		0.83			
Control Delay	54.4	21.2			55.9	30.7	37.5		47.4			
Queue Delay	0.0	0.0			0.0	0.0	0.0		0.0			
Total Delay	54.4	21.2			55.9	30.7	37.5		47.4			
LOS	D	C			E	C	D		D			
Approach Delay		24.8			50.2			41.5				
Approach LOS		C			D			D				
90th %ile Green (s)	16.0	69.0			50.0	50.0	34.5		34.5			
90th %ile Term Code	Max	Max			Max	Max	Max		Max			
70th %ile Green (s)	16.0	69.0			50.0	50.0	30.4		30.4			
70th %ile Term Code	Max	Max			Max	Max	Gap		Gap			
50th %ile Green (s)	16.0	69.0			50.0	50.0	25.6		25.6			
50th %ile Term Code	Max	Max			Max	Max	Gap		Gap			
30th %ile Green (s)	14.7	67.7			50.0	50.0	20.3		20.3			
30th %ile Term Code	Gap	Hold			Max	Max	Gap		Gap			
10th %ile Green (s)	10.4	63.4			50.0	50.0	13.9		13.9			
10th %ile Term Code	Gap	Hold			Max	Max	Gap		Gap			
Queue Length 50th (m)	28.3	133.3			~181.1	62.2	53.5		60.7			
Queue Length 95th (m)	#75.8	#238.8			#255.1	#138.2	70.1		95.7			
Internal Link Dist (m)		328.3			265.2			164.0			130.2	
Turn Bay Length (m)	210.0					15.0	35.0		45.0			
Base Capacity (vph)	257	1966			1439	555	1320		583			
Starvation Cap Reductn	0	0			0	0	0		0			
Spillback Cap Reductn	0	0			0	0	0		0			
Storage Cap Reductn	0	0			0	0	0		0			
Reduced v/c Ratio	0.77	0.83			1.01	0.77	0.41		0.61			

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 104.1

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.01

Intersection Signal Delay: 38.4 Intersection LOS: D

Intersection Capacity Utilization 97.8% ICU Level of Service F

Analysis Period (min) 15

90th %ile Actuated Cycle: 115

70th %ile Actuated Cycle: 110.9

50th %ile Actuated Cycle: 106.1

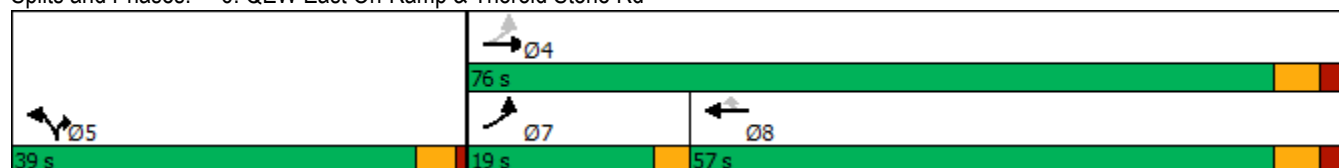
30th %ile Actuated Cycle: 99.5

10th %ile Actuated Cycle: 88.8

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

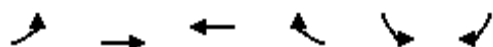
Splits and Phases: 6: QEW East On-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

8: Access Opp Southwood Dr & Site Access 2#

2036 Future Background PM



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	0	1863	1863	0	1863	0
Flt Permitted						
Satd. Flow (perm)	0	1863	1863	0	1863	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		175.4	35.0		70.7	
Travel Time (s)		12.6	2.5		5.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control		Stop	Stop		Stop	
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utilization 0.0%				ICU Level of Service A		
Analysis Period (min) 15						

Lanes, Volumes, Timings

1: Montrose Road & Mt Carmel Blvd

2026 Future Background PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	38	0	0	0	48	264	0	0	206	5
Future Volume (vph)	3	0	38	0	0	0	48	264	0	0	206	5
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1900	1433	1900	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.874									0.997	
Flt Protected		0.997						0.992				
Satd. Flow (prot)	0	1249	0	0	1433	0	0	1398	0	0	1401	0
Flt Permitted		0.997						0.992				
Satd. Flow (perm)	0	1249	0	0	1433	0	0	1398	0	0	1401	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		97.9			84.1			51.6			220.4	
Travel Time (s)		7.0			6.1			3.7			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Adj. Flow (vph)	3	0	41	0	0	0	52	287	0	0	224	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	44	0	0	0	0	0	339	0	0	229	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	50.1%						ICU Level of Service A					
Analysis Period (min)	15											

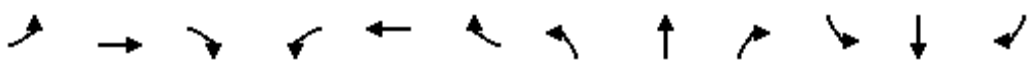
Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp South Wood Dr Background PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	133	1	76	6	234	59	58	184	2
Future Volume (vph)	1	0	1	133	1	76	6	234	59	58	184	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1178	1301	1454	1579	1301	1454	1338	1900
Storage Length (m)	0.0		0.0	0.0		50.0	50.0		50.0	40.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00		1.00		0.98	1.00	1.00	
Frt		0.932				0.850			0.850		0.999	
Flt Protected		0.976			0.953		0.950			0.950		
Satd. Flow (prot)	0	1709	0	0	1070	1074	1381	1579	1106	1381	1310	0
Flt Permitted		0.881			0.727		0.631			0.522		
Satd. Flow (perm)	0	1543	0	0	814	1074	915	1579	1081	758	1310	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		75				83			81			1
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		92.8			175.4			126.5			73.6	
Travel Time (s)		6.7			12.6			9.1			5.3	
Confl. Peds. (#/hr)			1	1			2		1	1		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	5%	0%	3%	0%	0%	0%	0%	2%	0%
Adj. Flow (vph)	1	0	1	145	1	83	7	254	64	63	200	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2	0	0	146	83	7	254	64	63	202	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.80	1.60	1.40	1.26	1.60	1.40	1.55	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp South Wood Dr Background PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	6.0	10.0	10.0	6.0	10.0	
Minimum Split (s)	28.2	28.2		28.2	28.2	28.2	12.0	29.7	29.7	10.5	29.7	
Total Split (s)	37.2	37.2		37.2	37.2	37.2	18.0	41.7	41.7	18.0	41.7	
Total Split (%)	38.4%	38.4%		38.4%	38.4%	38.4%	18.6%	43.0%	43.0%	18.6%	43.0%	
Maximum Green (s)	30.0	30.0		30.0	30.0	30.0	15.0	35.0	35.0	15.0	35.0	
Yellow Time (s)	4.1	4.1		4.1	4.1	4.1	3.0	4.1	4.1	3.0	4.1	
All-Red Time (s)	3.1	3.1		3.1	3.1	3.1	0.0	2.6	2.6	0.0	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)		7.2			7.2	7.2	3.0	6.7	6.7	3.0	6.7	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Walk Time (s)	8.0	8.0		8.0	8.0	8.0		9.0	9.0		9.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0		14.0	14.0		14.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effect Green (s)		16.0			16.0	16.0	25.7	18.6	18.6	28.0	22.8	
Actuated g/C Ratio		0.29			0.29	0.29	0.47	0.34	0.34	0.51	0.42	
v/c Ratio		0.00			0.62	0.22	0.01	0.48	0.15	0.13	0.37	
Control Delay		0.0			30.0	6.1	8.7	21.5	4.8	9.1	16.0	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		0.0			30.0	6.1	8.7	21.5	4.8	9.1	16.0	
LOS		A			C	A	A	C	A	A	B	
Approach Delay					21.4			17.9			14.4	
Approach LOS					C			B			B	
90th %ile Green (s)	27.9	27.9		27.9	27.9	27.9	6.0	23.4	23.4	9.0	26.4	
90th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Min	Gap	Gap	Gap	Hold	
70th %ile Green (s)	19.4	19.4		19.4	19.4	19.4	0.0	17.6	17.6	7.4	28.0	
70th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Gap	Hold	
50th %ile Green (s)	15.0	15.0		15.0	15.0	15.0	0.0	13.9	13.9	6.4	23.3	
50th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Gap	Hold	
30th %ile Green (s)	11.5	11.5		11.5	11.5	11.5	0.0	11.1	11.1	0.0	11.1	
30th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Skip	Hold	
10th %ile Green (s)	8.3	8.3		8.3	8.3	8.3	0.0	25.0	25.0	0.0	25.0	
10th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Dwell	Dwell	Skip	Dwell	
Queue Length 50th (m)		0.0			12.4	0.0	0.3	21.8	0.0	2.8	12.1	
Queue Length 95th (m)		0.0			35.5	8.8	2.4	55.0	6.5	10.9	43.1	
Internal Link Dist (m)		68.8			151.4			102.5			49.6	
Turn Bay Length (m)						50.0	50.0		50.0	40.0		
Base Capacity (vph)		929			473	659	604	1072	759	569	889	
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		0.00			0.31	0.13	0.01	0.24	0.08	0.11	0.23	

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

2026 Future Background PM - with Ideal Sat flow 1900vphgpl

Intersection Summary		
Area Type:	Other	
Cycle Length:	96.9	
Actuated Cycle Length:	54.9	
Natural Cycle:	70	
Control Type:	Actuated-Uncoordinated	
Maximum v/c Ratio:	0.62	
Intersection Signal Delay:	17.7	Intersection LOS: B
Intersection Capacity Utilization	53.5%	ICU Level of Service A
Analysis Period (min)	15	
90th %ile Actuated Cycle:	77.2	
70th %ile Actuated Cycle:	61.3	
50th %ile Actuated Cycle:	52.2	
30th %ile Actuated Cycle:	36.5	
10th %ile Actuated Cycle:	47.2	

Splits and Phases: 2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

 Ø1	 Ø2	 Ø4
18 s	41.7 s	37.2 s
 Ø5	 Ø6	 Ø8
18 s	41.7 s	37.2 s

Lanes, Volumes, Timings

3: Montrose Road & Cameron Ct

2026 Future Background PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1	9	100	0	3	12	296	150	3	313	2
Future Volume (vph)	0	1	9	100	0	3	12	296	150	3	313	2
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1454	1579	1301	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.877			0.996			0.951			0.999	
Flt Protected					0.954			0.999				
Satd. Flow (prot)	0	1152	0	0	1362	0	0	2823	0	0	1396	0
Flt Permitted					0.954			0.999				
Satd. Flow (perm)	0	1152	0	0	1362	0	0	2823	0	0	1396	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		167.1			64.9			232.7			126.5	
Travel Time (s)		12.0			4.7			16.8			9.1	
Confl. Peds. (#/hr)	1					1	2		1	1		2
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%	100%	0%	0%	0%	0%	0%	0%	3%	67%	2%	0%
Adj. Flow (vph)	0	1	10	109	0	3	13	322	163	3	340	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	11	0	0	112	0	0	498	0	0	345	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.40	1.26	1.60	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	46.1%						ICU Level of Service A					
Analysis Period (min)	15											

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2026 Future Background PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	830	80	248	780	285	126	193	321	280	178	77
Future Volume (vph)	85	830	80	248	780	285	126	193	321	280	178	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	85.0		0.0	60.0		35.0	60.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00		1.00	0.99		0.99		0.97	0.99	0.99	
Frt		0.987			0.960				0.850		0.955	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3481	0	1787	3387	0	1770	3574	1583	1787	3333	0
Flt Permitted	0.154			0.118			0.581			0.491		
Satd. Flow (perm)	287	3481	0	222	3387	0	1072	3574	1538	912	3333	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			48				331		55	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		337.7			182.6			114.0			232.7	
Travel Time (s)		24.3			13.1			8.2			16.8	
Confl. Peds. (#/hr)	8		7	7		8	13		15	15		13
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 (%)	2%	2%	4%	1%	2%	1%	2%	1%	2%	1%	2%	4%
Adj. Flow (vph)	92	902	87	270	848	310	137	210	349	304	193	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	92	989	0	270	1158	0	137	210	349	304	277	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2026 Future Background PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	8.0	8.0	6.0	8.0	
Minimum Split (s)	10.5	35.6		10.5	35.6		9.0	35.4	35.4	9.0	35.4	
Total Split (s)	20.0	43.6		20.0	43.6		19.0	32.4	32.4	19.0	32.4	
Total Split (%)	17.4%	37.9%		17.4%	37.9%		16.5%	28.2%	28.2%	16.5%	28.2%	
Maximum Green (s)	17.0	38.0		17.0	38.0		16.0	27.0	27.0	16.0	27.0	
Yellow Time (s)	3.0	3.5		3.0	3.5		3.0	3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.1		0.0	2.1		0.0	2.1	2.1	0.0	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	5.6		3.0	5.6		3.0	5.4	5.4	3.0	5.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	2.5		3.0	2.5		2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None		None	Min	Min	None	Min	
Walk Time (s)		11.0			11.0			11.0	11.0		11.0	
Flash Dont Walk (s)		19.0			19.0			19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effect Green (s)	41.8	31.1		51.0	39.7		24.2	11.4	11.4	31.4	15.8	
Actuated g/C Ratio	0.47	0.35		0.57	0.45		0.27	0.13	0.13	0.35	0.18	
v/c Ratio	0.34	0.81		0.72	0.75		0.37	0.46	0.72	0.65	0.44	
Control Delay	13.6	32.5		29.1	24.6		25.1	41.2	15.0	31.2	30.1	
Queue Delay	0.0	0.0		0.0	0.1		0.0	0.0	0.0	0.0	0.0	
Total Delay	13.6	32.5		29.1	24.7		25.1	41.2	15.0	31.2	30.1	
LOS	B	C		C	C		C	D	B	C	C	
Approach Delay		30.9			25.5			24.9			30.7	
Approach LOS		C			C			C			C	
90th %ile Green (s)	10.3	38.0		17.0	44.7		14.5	18.1	18.1	16.0	19.6	
90th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
70th %ile Green (s)	8.5	35.4		17.0	43.9		12.1	11.8	11.8	16.0	15.7	
70th %ile Term Code	Gap	Gap		Max	Hold		Gap	Gap	Gap	Max	Hold	
50th %ile Green (s)	8.0	31.4		15.5	38.9		10.5	10.6	10.6	16.0	16.1	
50th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Gap	Gap	Max	Hold	
30th %ile Green (s)	7.2	32.3		12.2	37.3		8.8	9.1	9.1	15.0	15.3	
30th %ile Term Code	Gap	Hold		Gap	Gap		Gap	Gap	Gap	Gap	Hold	
10th %ile Green (s)	0.0	19.7		9.2	31.9		6.6	8.0	8.0	10.5	11.9	
10th %ile Term Code	Skip	Gap		Gap	Hold		Gap	Min	Min	Gap	Hold	
Queue Length 50th (m)	6.9	84.9		27.3	89.4		17.3	19.2	3.0	42.7	19.0	
Queue Length 95th (m)	16.1	125.4		#64.9	137.4		34.5	33.0	31.6	75.0	35.5	
Internal Link Dist (m)		313.7			158.6			90.0			208.7	
Turn Bay Length (m)	45.0			85.0			60.0		35.0	60.0		
Base Capacity (vph)	452	1538		435	1608		486	1118	709	484	1081	
Starvation Cap Reductn	0	0		0	26		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.20	0.64		0.62	0.73		0.28	0.19	0.49	0.63	0.26	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2026 Future Background PM - with Ideal Sat flow 1900vphgpl

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 88.8

Natural Cycle: 95

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 27.7

Intersection LOS: C

Intersection Capacity Utilization 84.5%

ICU Level of Service E

Analysis Period (min) 15

90th %ile Actuated Cycle: 106.1

70th %ile Actuated Cycle: 97.2

50th %ile Actuated Cycle: 90.5

30th %ile Actuated Cycle: 85.6

10th %ile Actuated Cycle: 64.4

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Montrose Road & Thorold Stone Rd

 Ø1	 Ø2	 Ø3	 Ø4
19 s	32.4 s	20 s	43.6 s
 Ø5	 Ø6	 Ø7	 Ø8
19 s	32.4 s	20 s	43.6 s

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2026 Stone Rd Round PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑					↖↗		↗
Traffic Volume (vph)	0	1053	436	257	1221	0	0	0	0	261	0	143
Future Volume (vph)	0	1053	436	257	1221	0	0	0	0	261	0	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	2144	1900	1301
Storage Length (m)	0.0		60.0	210.0		0.0	0.0		0.0	40.0		25.0
Storage Lanes	0		1	1		0	0		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3539	1583	1805	3574	0	0	0	0	3836	0	1063
Flt Permitted				0.119						0.950		
Satd. Flow (perm)	0	3539	1583	226	3574	0	0	0	0	3836	0	1063
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			376									66
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		182.6			352.3			184.1			149.0	
Travel Time (s)		13.1			25.4			13.3			10.7	
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%	2%	2%	0%	1%	0%	0%	0%	0%	3%	0%	4%
Adj. Flow (vph)	0	1145	474	279	1327	0	0	0	0	284	0	155
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1145	474	279	1327	0	0	0	0	284	0	155
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	1.00	1.60
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (m)		10.0	2.0	2.0	10.0					2.0		2.0
Trailing Detector (m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Position(m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Size(m)		0.6	2.0	2.0	0.6					2.0		2.0
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm	pm+pt	NA					Prot		Perm
Protected Phases		4		3	8					1		

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2020 EBL Backround PM - with Ideal Sat flow 1900vphgpl



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4	8								1
Detector Phase		4	4	3	8					1		1
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					10.0		10.0
Minimum Split (s)		37.0	37.0	9.0	17.0					40.0		40.0
Total Split (s)		58.0	58.0	17.0	75.0					40.0		40.0
Total Split (%)		50.4%	50.4%	14.8%	65.2%					34.8%		34.8%
Maximum Green (s)		51.0	51.0	14.0	68.0					33.0		33.0
Yellow Time (s)		4.0	4.0	3.0	4.0					4.0		4.0
All-Red Time (s)		3.0	3.0	0.0	3.0					3.0		3.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		7.0	7.0	3.0	7.0					7.0		7.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		2.2	2.2	2.5	2.2					3.2		3.2
Recall Mode		Min	Min	None	Min					None		None
Walk Time (s)		15.0	15.0							12.0		12.0
Flash Dont Walk (s)		15.0	15.0							21.0		21.0
Pedestrian Calls (#/hr)		0	0							0		0
Act Effect Green (s)		30.9	30.9	50.0	45.8					14.4		14.4
Actuated g/C Ratio		0.41	0.41	0.67	0.61					0.19		0.19
v/c Ratio		0.78	0.54	0.70	0.61					0.39		0.60
Control Delay		23.7	6.4	24.0	10.5					29.6		29.3
Queue Delay		0.0	0.0	0.0	0.0					0.0		0.0
Total Delay		23.7	6.4	24.0	10.5					29.6		29.3
LOS		C	A	C	B					C		C
Approach Delay		18.7			12.8						29.5	
Approach LOS		B			B						C	
90th %ile Green (s)		46.8	46.8	14.0	63.8					24.0		24.0
90th %ile Term Code		Gap	Gap	Max	Hold					Gap		Gap
70th %ile Green (s)		36.5	36.5	14.0	53.5					17.0		17.0
70th %ile Term Code		Gap	Gap	Max	Hold					Gap		Gap
50th %ile Green (s)		30.3	30.3	12.5	45.8					12.8		12.8
50th %ile Term Code		Gap	Gap	Gap	Hold					Gap		Gap
30th %ile Green (s)		24.3	24.3	9.6	36.9					10.0		10.0
30th %ile Term Code		Gap	Gap	Gap	Hold					Min		Min
10th %ile Green (s)		19.6	19.6	8.3	30.9					10.0		10.0
10th %ile Term Code		Gap	Gap	Gap	Hold					Min		Min
Queue Length 50th (m)		72.0	8.4	17.5	51.4					18.8		11.6
Queue Length 95th (m)		121.8	35.0	#66.4	98.4					37.1		37.0
Internal Link Dist (m)		158.6			328.3			160.1			125.0	
Turn Bay Length (m)			60.0	210.0						40.0		25.0
Base Capacity (vph)		2529	1238	460	3152					1773		527
Starvation Cap Reductn		56	11	0	0					0		0
Spillback Cap Reductn		0	0	0	0					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		0.46	0.39	0.61	0.42					0.16		0.29

Intersection Summary

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 74.9

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 17.4

Intersection LOS: B

Intersection Capacity Utilization 66.7%

ICU Level of Service C

Analysis Period (min) 15

90th %ile Actuated Cycle: 101.8

70th %ile Actuated Cycle: 84.5

50th %ile Actuated Cycle: 72.6

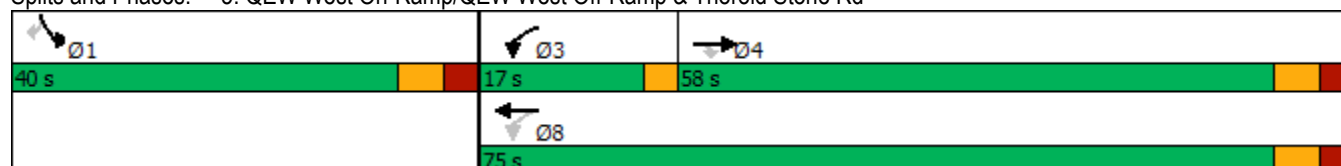
30th %ile Actuated Cycle: 60.9

10th %ile Actuated Cycle: 54.9

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

Queue shown is maximum after two cycles.

Splits and Phases: 5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2026 Future Background PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	142	1169	0	0	1045	308	388	0	255	0	0	0
Future Volume (vph)	142	1169	0	0	1045	308	388	0	255	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	210.0		0.0	0.0		15.0	35.0		45.0	0.0		0.0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00					0.97						
Frt						0.850			0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1703	3539	0	0	3574	1583	3502	0	1615	0	0	0
Flt Permitted	0.152						0.950					
Satd. Flow (perm)	272	3539	0	0	3574	1537	3502	0	1615	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						89			66			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		352.3			289.2			127.3			154.2	
Travel Time (s)		25.4			20.8			9.2			11.1	
Confl. Peds. (#/hr)	5		6	6		5			1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	2%	0%	0%	1%	2%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	154	1271	0	0	1136	335	422	0	277	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	154	1271	0	0	1136	335	422	0	277	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2			2	1	1		1			
Detector Template	Left	Thru			Thru	Right	Left		Right			
Leading Detector (m)	2.0	10.0			10.0	2.0	2.0		2.0			
Trailing Detector (m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Position(m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Size(m)	2.0	0.6			0.6	2.0	2.0		2.0			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Delay (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							

Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2026 Future Background PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA			NA	Perm	Prot		Prot			
Protected Phases	7	4			8		5		5			
Permitted Phases	4					8						
Detector Phase	7	4			8	8	5		5			
Switch Phase												
Minimum Initial (s)	6.0	10.0			10.0	10.0	10.0		10.0			
Minimum Split (s)	9.0	37.0			37.0	37.0	14.5		14.5			
Total Split (s)	19.0	76.0			57.0	57.0	39.0		39.0			
Total Split (%)	16.5%	66.1%			49.6%	49.6%	33.9%		33.9%			
Maximum Green (s)	16.0	69.0			50.0	50.0	34.5		34.5			
Yellow Time (s)	3.0	4.0			4.0	4.0	3.5		3.5			
All-Red Time (s)	0.0	3.0			3.0	3.0	1.0		1.0			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Total Lost Time (s)	3.0	7.0			7.0	7.0	4.5		4.5			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	2.5	5.0			5.0	5.0	3.0		3.0			
Recall Mode	None	Min			Min	Min	None		None			
Walk Time (s)		15.0			15.0	15.0						
Flash Dont Walk (s)		15.0			15.0	15.0						
Pedestrian Calls (#/hr)		0			0	0						
Act Effct Green (s)	57.6	53.4			40.3	40.3	17.8		17.8			
Actuated g/C Ratio	0.69	0.64			0.48	0.48	0.21		0.21			
v/c Ratio	0.43	0.56			0.66	0.42	0.56		0.70			
Control Delay	8.8	9.8			19.1	12.7	33.6		34.4			
Queue Delay	0.0	0.0			0.0	0.0	0.0		0.0			
Total Delay	8.8	9.8			19.1	12.7	33.6		34.4			
LOS	A	A			B	B	C		C			
Approach Delay		9.7			17.6			33.9				
Approach LOS		A			B			C				
90th %ile Green (s)	13.8	66.8			50.0	50.0	28.0		28.0			
90th %ile Term Code	Gap	Hold			Max	Max	Gap		Gap			
70th %ile Green (s)	11.2	64.2			50.0	50.0	21.7		21.7			
70th %ile Term Code	Gap	Hold			Max	Max	Gap		Gap			
50th %ile Green (s)	10.0	54.5			41.5	41.5	17.2		17.2			
50th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
30th %ile Green (s)	8.6	45.9			34.3	34.3	13.6		13.6			
30th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
10th %ile Green (s)	6.6	35.9			26.3	26.3	10.6		10.6			
10th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
Queue Length 50th (m)	7.0	52.6			69.5	23.4	32.9		32.9			
Queue Length 95th (m)	18.9	96.4			122.0	57.4	54.8		68.0			
Internal Link Dist (m)		328.3			265.2			103.3			130.2	
Turn Bay Length (m)	210.0					15.0	35.0		45.0			
Base Capacity (vph)	476	2943			2252	1001	1522		739			
Starvation Cap Reductn	0	0			0	0	0		0			
Spillback Cap Reductn	0	0			0	0	0		0			
Storage Cap Reductn	0	0			0	0	0		0			
Reduced v/c Ratio	0.32	0.43			0.50	0.33	0.28		0.37			

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 83.2

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 17.7

Intersection LOS: B

Intersection Capacity Utilization 66.7%

ICU Level of Service C

Analysis Period (min) 15

90th %ile Actuated Cycle: 106.3

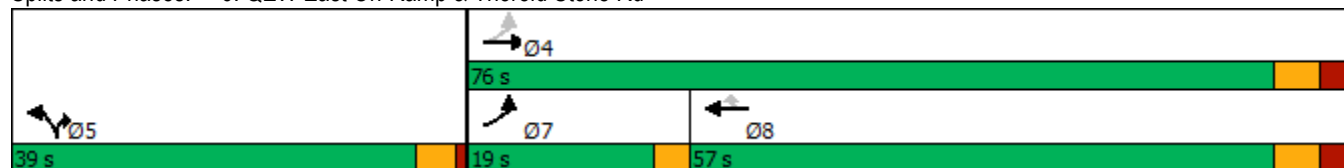
70th %ile Actuated Cycle: 97.4

50th %ile Actuated Cycle: 83.2

30th %ile Actuated Cycle: 71

10th %ile Actuated Cycle: 58

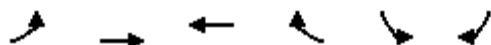
Splits and Phases: 6: QEW East On-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

8: Access Opp Southwood Dr & Site Access #2

2026 Future Background PM - with Ideal Sat flow 1900vphgpl



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	0	1863	1863	0	1863	0
Flt Permitted						
Satd. Flow (perm)	0	1863	1863	0	1863	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		175.4	35.0		70.7	
Travel Time (s)		12.6	2.5		5.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control		Stop	Stop		Stop	
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utilization 0.0%				ICU Level of Service A		
Analysis Period (min) 15						

Lanes, Volumes, Timings

1: Montrose Road & Mt Carmel Blvd

2031 Future Background AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	55	0	0	0	26	149	0	0	195	2
Future Volume (vph)	3	0	55	0	0	0	26	149	0	0	195	2
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1900	1433	1900	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.871									0.999	
Flt Protected		0.998						0.993				
Satd. Flow (prot)	0	1246	0	0	1433	0	0	1399	0	0	1404	0
Flt Permitted		0.998						0.993				
Satd. Flow (perm)	0	1246	0	0	1433	0	0	1399	0	0	1404	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		97.9			84.1			51.6			220.4	
Travel Time (s)		7.0			6.1			3.7			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Adj. Flow (vph)	3	0	60	0	0	0	28	162	0	0	212	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	63	0	0	0	0	0	190	0	0	214	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	40.8%						ICU Level of Service A					
Analysis Period (min)	15											

Lanes, Volumes, Timings

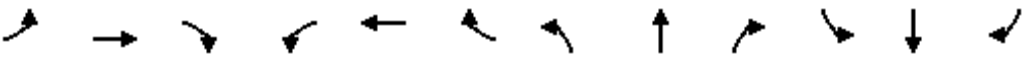
2: Montrose Road & South Wood Dr/Access Opp South Wood Dr Background AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1	15	64	1	18	2	173	57	18	284	0
Future Volume (vph)	0	1	15	64	1	18	2	173	57	18	284	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1178	1301	1454	1579	1301	1454	1338	1900
Storage Length (m)	0.0		0.0	0.0		50.0	50.0		50.0	40.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.873				0.850			0.850			
Flt Protected					0.953		0.950			0.950		
Satd. Flow (prot)	0	1659	0	0	1070	1074	1381	1579	1106	1381	1312	0
Flt Permitted					0.717		0.572			0.639		
Satd. Flow (perm)	0	1659	0	0	805	1074	832	1579	1106	929	1312	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16				75			81			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		92.8			175.4			126.5			73.6	
Travel Time (s)		6.7			12.6			9.1			5.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	5%	0%	3%	0%	0%	0%	0%	2%	0%
Adj. Flow (vph)	0	1	16	70	1	20	2	188	62	20	309	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	17	0	0	71	20	2	188	62	20	309	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.80	1.60	1.40	1.26	1.60	1.40	1.55	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type		NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp South Wood Dr

2031 Future Background AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	6.0	10.0	10.0	6.0	10.0	
Minimum Split (s)	28.2	28.2		28.2	28.2	28.2	12.0	29.7	29.7	10.5	29.7	
Total Split (s)	37.2	37.2		37.2	37.2	37.2	18.0	41.7	41.7	18.0	41.7	
Total Split (%)	38.4%	38.4%		38.4%	38.4%	38.4%	18.6%	43.0%	43.0%	18.6%	43.0%	
Maximum Green (s)	30.0	30.0		30.0	30.0	30.0	15.0	35.0	35.0	15.0	35.0	
Yellow Time (s)	4.1	4.1		4.1	4.1	4.1	3.0	4.1	4.1	3.0	4.1	
All-Red Time (s)	3.1	3.1		3.1	3.1	3.1	0.0	2.6	2.6	0.0	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)		7.2			7.2	7.2	3.0	6.7	6.7	3.0	6.7	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Walk Time (s)	8.0	8.0		8.0	8.0	8.0		9.0	9.0		9.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0		14.0	14.0		14.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effect Green (s)		11.1			11.1	11.1	28.2	25.4	25.4	28.3	25.5	
Actuated g/C Ratio		0.24			0.24	0.24	0.61	0.55	0.55	0.61	0.55	
v/c Ratio		0.04			0.37	0.06	0.00	0.22	0.10	0.03	0.43	
Control Delay		9.4			22.8	0.4	5.5	10.8	2.9	5.8	13.4	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		9.4			22.8	0.4	5.5	10.8	2.9	5.8	13.4	
LOS		A			C	A	A	B	A	A	B	
Approach Delay		9.4			17.9			8.8			13.0	
Approach LOS		A			B			A			B	
90th %ile Green (s)	17.6	17.6		17.6	17.6	17.6	6.0	27.8	27.8	6.2	28.0	
90th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Min	Hold	Hold	Gap	Gap	
70th %ile Green (s)	11.7	11.7		11.7	11.7	11.7	0.0	17.0	17.0	0.0	17.0	
70th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Hold	Hold	Skip	Gap	
50th %ile Green (s)	9.6	9.6		9.6	9.6	9.6	0.0	16.3	16.3	0.0	16.3	
50th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Dwell	Dwell	Skip	Dwell	
30th %ile Green (s)	8.4	8.4		8.4	8.4	8.4	0.0	26.1	26.1	0.0	26.1	
30th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Dwell	Dwell	Skip	Dwell	
10th %ile Green (s)	0.0	0.0		0.0	0.0	0.0	0.0	25.0	25.0	0.0	25.0	
10th %ile Term Code	Skip	Skip		Skip	Skip	Skip	Skip	Dwell	Dwell	Skip	Dwell	
Queue Length 50th (m)		0.1			4.2	0.0	0.1	8.3	0.0	0.6	15.8	
Queue Length 95th (m)		4.4			19.0	0.0	0.8	30.6	4.8	3.4	55.6	
Internal Link Dist (m)		68.8			151.4			102.5			49.6	
Turn Bay Length (m)						50.0	50.0		50.0	40.0		
Base Capacity (vph)		1153			557	766	706	1242	887	733	1032	
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		0.01			0.13	0.03	0.00	0.15	0.07	0.03	0.30	
Intersection Summary												

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr 2031.500 Background AM - with Ideal Sat flow 1900vphgpl

Area Type: Other

Cycle Length: 96.9

Actuated Cycle Length: 46.2

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.43

Intersection Signal Delay: 12.0

Intersection LOS: B

Intersection Capacity Utilization 45.3%

ICU Level of Service A

Analysis Period (min) 15

90th %ile Actuated Cycle: 68.5

70th %ile Actuated Cycle: 42.6

50th %ile Actuated Cycle: 39.8

30th %ile Actuated Cycle: 48.4

10th %ile Actuated Cycle: 31.7

Splits and Phases: 2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

 Ø1	 Ø2	 Ø4
18 s	41.7 s	37.2 s
 Ø5	 Ø6	 Ø8
18 s	41.7 s	37.2 s

Lanes, Volumes, Timings

3: Montrose Road & Cameron Ct

2031 Future Background AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1	9	24	0	2	1	231	66	7	357	1
Future Volume (vph)	0	1	9	24	0	2	1	231	66	7	357	1
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1454	1579	1301	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.877				0.990				0.967			
Flt Protected					0.956						0.999	
Satd. Flow (prot)	0	1152	0	0	1356	0	0	2882	0	0	1386	0
Flt Permitted					0.956						0.999	
Satd. Flow (perm)	0	1152	0	0	1356	0	0	2882	0	0	1386	0
Link Speed (k/h)	50				50				50		50	
Link Distance (m)	167.1				64.9				232.7		126.5	
Travel Time (s)	12.0				4.7				16.8		9.1	
Confl. Peds. (#/hr)	1		3	3		1	4		4	4		4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	100%	0%	0%	0%	0%	0%	0%	3%	67%	2%	0%
Adj. Flow (vph)	0	1	10	26	0	2	1	251	72	8	388	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	11	0	0	28	0	0	324	0	0	397	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0				0.0				3.6		3.6	
Link Offset(m)	0.0				0.0				0.0		0.0	
Crosswalk Width(m)	4.8				4.8				4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.40	1.26	1.60	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control	Stop				Stop				Free		Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	47.9%				ICU Level of Service A							
Analysis Period (min)	15											

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2031 Future Background AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	739	80	211	548	176	74	171	295	270	123	84
Future Volume (vph)	77	739	80	211	548	176	74	171	295	270	123	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	85.0		0.0	60.0		35.0	60.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	1.00		0.99		0.99	1.00	0.99	
Frt		0.985			0.964				0.850		0.939	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3475	0	1787	3408	0	1770	3574	1583	1787	3271	0
Flt Permitted	0.304			0.146			0.611			0.500		
Satd. Flow (perm)	566	3475	0	275	3408	0	1132	3574	1561	939	3271	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			40				321		91	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		337.7			182.6			114.0			232.7	
Travel Time (s)		24.3			13.1			8.2			16.8	
Confl. Peds. (#/hr)	2		1	1		2	7		2	2		7
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 (%)	2%	2%	4%	1%	2%	1%	2%	1%	2%	1%	2%	4%
Adj. Flow (vph)	84	803	87	229	596	191	80	186	321	293	134	91
Shared Lane Traffic (%)												
Lane Group Flow (vph)	84	890	0	229	787	0	80	186	321	293	225	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2031 Future Background AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	8.0	8.0	6.0	8.0	
Minimum Split (s)	10.5	35.6		10.5	35.6		9.0	35.4	35.4	9.0	35.4	
Total Split (s)	20.0	43.6		20.0	43.6		19.0	32.4	32.4	19.0	32.4	
Total Split (%)	17.4%	37.9%		17.4%	37.9%		16.5%	28.2%	28.2%	16.5%	28.2%	
Maximum Green (s)	17.0	38.0		17.0	38.0		16.0	27.0	27.0	16.0	27.0	
Yellow Time (s)	3.0	3.5		3.0	3.5		3.0	3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.1		0.0	2.1		0.0	2.1	2.1	0.0	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	5.6		3.0	5.6		3.0	5.4	5.4	3.0	5.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	2.5		3.0	2.5		2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None		None	Min	Min	None	Min	
Walk Time (s)		11.0			11.0			11.0	11.0		11.0	
Flash Dont Walk (s)		19.0			19.0			19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effect Green (s)	36.6	26.1		43.0	32.0		20.8	10.3	10.3	30.1	18.9	
Actuated g/C Ratio	0.46	0.33		0.54	0.40		0.26	0.13	0.13	0.38	0.24	
v/c Ratio	0.22	0.78		0.63	0.56		0.22	0.40	0.67	0.58	0.27	
Control Delay	10.9	29.6		20.0	20.1		21.1	37.3	12.2	25.7	18.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	10.9	29.6		20.0	20.1		21.1	37.3	12.2	25.7	18.6	
LOS	B	C		C	C		C	D	B	C	B	
Approach Delay		27.9			20.1			21.4			22.6	
Approach LOS		C			C			C			C	
90th %ile Green (s)	9.4	38.0		17.0	45.6		10.8	15.5	15.5	16.0	20.7	
90th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
70th %ile Green (s)	8.7	30.4		12.7	34.4		9.1	10.9	10.9	16.0	17.8	
70th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Gap	Gap	Max	Hold	
50th %ile Green (s)	7.8	25.9		10.9	29.0		7.7	9.4	9.4	16.0	17.7	
50th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Gap	Gap	Max	Hold	
30th %ile Green (s)	6.9	22.0		9.2	24.3		6.7	8.1	8.1	13.1	14.5	
30th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Gap	Gap	Gap	Hold	
10th %ile Green (s)	0.0	16.2		7.5	26.7		0.0	8.0	8.0	9.5	20.5	
10th %ile Term Code	Skip	Gap		Gap	Hold		Skip	Min	Min	Gap	Hold	
Queue Length 50th (m)	6.0	65.3		18.0	49.8		7.9	14.6	0.0	33.1	9.1	
Queue Length 95th (m)	14.0	105.0		41.8	76.5		22.1	29.8	25.9	72.4	23.5	
Internal Link Dist (m)		313.7			158.6			90.0			208.7	
Turn Bay Length (m)	45.0			85.0			60.0		35.0	60.0		
Base Capacity (vph)	571	1732		485	1762		538	1261	758	532	1213	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.15	0.51		0.47	0.45		0.15	0.15	0.42	0.55	0.19	

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 79.5

Natural Cycle: 95

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 23.2

Intersection LOS: C

Intersection Capacity Utilization 73.4%

ICU Level of Service D

Analysis Period (min) 15

90th %ile Actuated Cycle: 103.5

70th %ile Actuated Cycle: 87

50th %ile Actuated Cycle: 79.2

30th %ile Actuated Cycle: 69.4

10th %ile Actuated Cycle: 58.2

Splits and Phases: 4: Montrose Road & Thorold Stone Rd

 Ø1	 Ø2	 Ø3	 Ø4
19 s	32.4 s	20 s	43.6 s
 Ø5	 Ø6	 Ø7	 Ø8
19 s	32.4 s	20 s	43.6 s

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2011 Stone Rd Round AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	917	483	207	903	0	0	0	0	223	0	107
Future Volume (vph)	0	917	483	207	903	0	0	0	0	223	0	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1301
Storage Length (m)	0.0		60.0	210.0		0.0	0.0		0.0	40.0		25.0
Storage Lanes	0		1	1		0	0		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3539	1583	1805	3574	0	0	0	0	3400	0	1063
Flt Permitted				0.167						0.950		
Satd. Flow (perm)	0	3539	1583	317	3574	0	0	0	0	3400	0	1063
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			478									116
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		182.6			352.3			184.1			149.0	
Travel Time (s)		13.1			25.4			13.3			10.7	
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%	2%	2%	0%	1%	0%	0%	0%	0%	3%	0%	4%
Adj. Flow (vph)	0	997	525	225	982	0	0	0	0	242	0	116
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	997	525	225	982	0	0	0	0	242	0	116
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.60
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (m)		10.0	2.0	2.0	10.0					2.0		2.0
Trailing Detector (m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Position(m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Size(m)		0.6	2.0	2.0	0.6					2.0		2.0
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm	pm+pt	NA					Prot		Prot
Protected Phases		4		3	8					1		1

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2011 Stone Rd Round AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4	8								
Detector Phase		4	4	3	8					1		1
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					10.0		10.0
Minimum Split (s)		37.0	37.0	9.0	17.0					40.0		40.0
Total Split (s)		58.0	58.0	17.0	75.0					40.0		40.0
Total Split (%)		50.4%	50.4%	14.8%	65.2%					34.8%		34.8%
Maximum Green (s)		51.0	51.0	14.0	68.0					33.0		33.0
Yellow Time (s)		4.0	4.0	3.0	4.0					4.0		4.0
All-Red Time (s)		3.0	3.0	0.0	3.0					3.0		3.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		7.0	7.0	3.0	7.0					7.0		7.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		2.2	2.2	2.5	2.2					3.2		3.2
Recall Mode		Min	Min	None	Min					None		None
Walk Time (s)		15.0	15.0							12.0		12.0
Flash Dont Walk (s)		15.0	15.0							21.0		21.0
Pedestrian Calls (#/hr)		0	0							0		0
Act Effect Green (s)		23.3	23.3	38.6	34.5					11.3		11.3
Actuated g/C Ratio		0.39	0.39	0.64	0.57					0.19		0.19
v/c Ratio		0.73	0.58	0.56	0.48					0.38		0.39
Control Delay		19.2	5.1	10.9	8.3					25.0		10.4
Queue Delay		0.0	0.0	0.0	0.0					0.0		0.0
Total Delay		19.2	5.1	10.9	8.3					25.0		10.4
LOS		B	A	B	A					C		B
Approach Delay		14.3			8.7						20.3	
Approach LOS		B			A						C	
90th %ile Green (s)		33.8	33.8	10.9	47.7					14.5		14.5
90th %ile Term Code		Gap	Gap	Gap	Hold					Gap		Gap
70th %ile Green (s)		26.4	26.4	8.8	38.2					11.7		11.7
70th %ile Term Code		Gap	Gap	Gap	Hold					Gap		Gap
50th %ile Green (s)		23.2	23.2	7.8	34.0					10.3		10.3
50th %ile Term Code		Gap	Gap	Gap	Hold					Gap		Gap
30th %ile Green (s)		19.5	19.5	7.2	29.7					10.0		10.0
30th %ile Term Code		Gap	Gap	Gap	Hold					Min		Min
10th %ile Green (s)		15.6	15.6	6.3	24.9					10.0		10.0
10th %ile Term Code		Gap	Gap	Gap	Hold					Min		Min
Queue Length 50th (m)		47.2	3.1	8.2	29.0					12.5		0.0
Queue Length 95th (m)		79.2	21.9	22.6	47.7					26.9		13.4
Internal Link Dist (m)		158.6			328.3			160.1			125.0	
Turn Bay Length (m)			60.0	210.0						40.0		25.0
Base Capacity (vph)		3037	1426	557	3497					1907		647
Starvation Cap Reductn		0	0	0	0					0		0
Spillback Cap Reductn		0	0	0	0					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		0.33	0.37	0.40	0.28					0.13		0.18
Intersection Summary												

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 60.2

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 12.8

Intersection LOS: B

Intersection Capacity Utilization 64.7%

ICU Level of Service C

Analysis Period (min) 15

90th %ile Actuated Cycle: 76.2

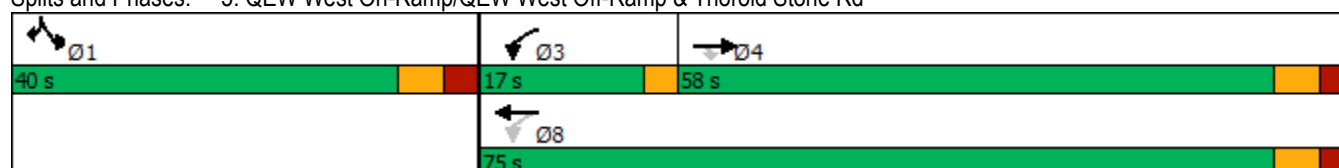
70th %ile Actuated Cycle: 63.9

50th %ile Actuated Cycle: 58.3

30th %ile Actuated Cycle: 53.7

10th %ile Actuated Cycle: 48.9

Splits and Phases: 5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2031 Future Background AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	146	1000	0	0	798	249	323	0	227	0	0	0
Future Volume (vph)	146	1000	0	0	798	249	323	0	227	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	210.0		0.0	0.0		15.0	35.0		45.0	0.0		0.0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1703	3539	0	0	3574	1583	3502	0	1615	0	0	0
Flt Permitted	0.234						0.950					
Satd. Flow (perm)	419	3539	0	0	3574	1583	3502	0	1615	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						95			99			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		352.3			289.2			127.3			154.2	
Travel Time (s)		25.4			20.8			9.2			11.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	2%	0%	0%	1%	2%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	159	1087	0	0	867	271	351	0	247	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	159	1087	0	0	867	271	351	0	247	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2			2	1	1		1			
Detector Template	Left	Thru			Thru	Right	Left		Right			
Leading Detector (m)	2.0	10.0			10.0	2.0	2.0		2.0			
Trailing Detector (m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Position(m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Size(m)	2.0	0.6			0.6	2.0	2.0		2.0			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Delay (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type	pm+pt	NA			NA	Perm	Prot		Prot			
Protected Phases	7	4			8		5		5			

Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2031 Future Background AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4					8						
Detector Phase	7	4			8	8	5		5			
Switch Phase												
Minimum Initial (s)	6.0	10.0			10.0	10.0	10.0		10.0			
Minimum Split (s)	9.0	37.0			37.0	37.0	14.5		14.5			
Total Split (s)	19.0	76.0			57.0	57.0	39.0		39.0			
Total Split (%)	16.5%	66.1%			49.6%	49.6%	33.9%		33.9%			
Maximum Green (s)	16.0	69.0			50.0	50.0	34.5		34.5			
Yellow Time (s)	3.0	4.0			4.0	4.0	3.5		3.5			
All-Red Time (s)	0.0	3.0			3.0	3.0	1.0		1.0			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Total Lost Time (s)	3.0	7.0			7.0	7.0	4.5		4.5			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	2.5	5.0			5.0	5.0	3.0		3.0			
Recall Mode	None	Min			Min	Min	None		None			
Walk Time (s)		15.0			15.0	15.0						
Flash Dont Walk (s)		15.0			15.0	15.0						
Pedestrian Calls (#/hr)		0			0	0						
Act Effct Green (s)	45.4	41.2			28.4	28.4	13.9		13.9			
Actuated g/C Ratio	0.68	0.61			0.42	0.42	0.21		0.21			
v/c Ratio	0.34	0.50			0.57	0.37	0.49		0.60			
Control Delay	6.2	8.2			16.8	10.5	27.7		23.0			
Queue Delay	0.0	0.0			0.0	0.0	0.0		0.0			
Total Delay	6.2	8.2			16.8	10.5	27.7		23.0			
LOS	A	A			B	B	C		C			
Approach Delay		7.9			15.3			25.7				
Approach LOS		A			B			C				
90th %ile Green (s)	14.1	60.6			43.5	43.5	22.5		22.5			
90th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
70th %ile Green (s)	11.1	47.1			33.0	33.0	15.3		15.3			
70th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
50th %ile Green (s)	9.2	39.1			26.9	26.9	12.2		12.2			
50th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
30th %ile Green (s)	7.9	33.6			22.7	22.7	10.5		10.5			
30th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
10th %ile Green (s)	6.4	27.5			18.1	18.1	10.0		10.0			
10th %ile Term Code	Gap	Hold			Gap	Gap	Min		Min			
Queue Length 50th (m)	5.4	32.4			40.0	13.2	19.9		16.2			
Queue Length 95th (m)	16.3	65.7			78.3	38.2	42.8		48.8			
Internal Link Dist (m)		328.3			265.2			103.3			130.2	
Turn Bay Length (m)	210.0					15.0	35.0		45.0			
Base Capacity (vph)	605	3300			2788	1255	1894		919			
Starvation Cap Reductn	0	0			0	0	0		0			
Spillback Cap Reductn	0	0			0	0	0		0			
Storage Cap Reductn	0	0			0	0	0		0			
Reduced v/c Ratio	0.26	0.33			0.31	0.22	0.19		0.27			
Intersection Summary												

Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2031 Future Background AM - with Ideal Sat flow 1900vphgpl

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 67.2

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.60

Intersection Signal Delay: 14.3

Intersection LOS: B

Intersection Capacity Utilization 64.7%

ICU Level of Service C

Analysis Period (min) 15

90th %ile Actuated Cycle: 94.6

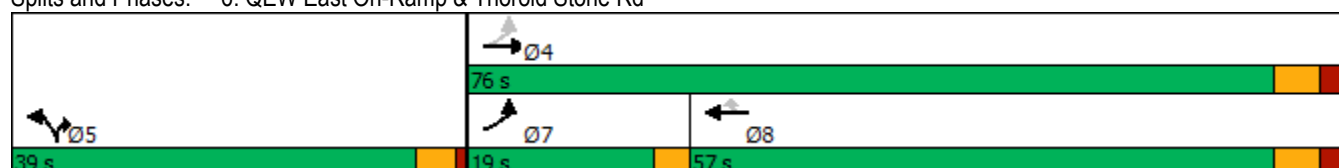
70th %ile Actuated Cycle: 73.9

50th %ile Actuated Cycle: 62.8

30th %ile Actuated Cycle: 55.6

10th %ile Actuated Cycle: 49

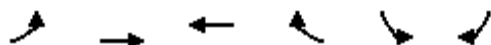
Splits and Phases: 6: QEW East On-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

8: Access Opp Southwood Dr & Site Access #2

2031 Future Background AM - with Ideal Sat flow 1900vphgpl



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	0	0	0	0	31
Future Volume (vph)	10	0	0	0	0	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.865					
Fl _t Protected	0.950					
Satd. Flow (prot)	0	1770	1863	0	1611	0
Fl _t Permitted	0.950					
Satd. Flow (perm)	0	1770	1863	0	1611	0
Link Speed (k/h)	50					
Link Distance (m)	175.4					35.0
Travel Time (s)	12.6					2.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	0	0	0	0	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	11	0	0	34	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)	0.0					0.0
Link Offset(m)	0.0					0.0
Crosswalk Width(m)	4.8					4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control	Stop		Stop	Stop		
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utilization 13.3%				ICU Level of Service A		
Analysis Period (min) 15						

Lanes, Volumes, Timings

1: Montrose Road & Mt Carmel Blvd

2031 Future Background PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	42	0	0	0	52	290	0	0	226	6
Future Volume (vph)	3	0	42	0	0	0	52	290	0	0	226	6
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1900	1433	1900	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.873									0.996	
Flt Protected		0.997						0.992				
Satd. Flow (prot)	0	1247	0	0	1433	0	0	1398	0	0	1400	0
Flt Permitted		0.997						0.992				
Satd. Flow (perm)	0	1247	0	0	1433	0	0	1398	0	0	1400	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		97.9			84.1			51.6			220.4	
Travel Time (s)		7.0			6.1			3.7			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Adj. Flow (vph)	3	0	46	0	0	0	57	315	0	0	246	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	49	0	0	0	0	0	372	0	0	253	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	54.0%						ICU Level of Service A					
Analysis Period (min)	15											

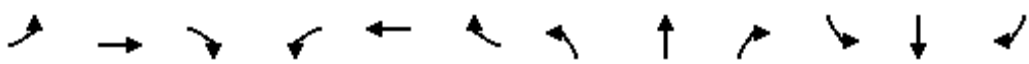
Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp South Wood Dr Background PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	146	1	83	7	257	65	64	202	2
Future Volume (vph)	1	0	1	146	1	83	7	257	65	64	202	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1178	1301	1454	1579	1301	1454	1338	1900
Storage Length (m)	0.0		0.0	0.0		50.0	50.0		50.0	40.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00		1.00		0.98	1.00	1.00	
Frt		0.932				0.850			0.850		0.999	
Flt Protected		0.976			0.953		0.950			0.950		
Satd. Flow (prot)	0	1709	0	0	1069	1074	1381	1579	1106	1381	1310	0
Flt Permitted		0.887			0.727		0.620			0.504		
Satd. Flow (perm)	0	1553	0	0	814	1074	899	1579	1081	732	1310	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		75				90			81		1	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		92.8			175.4			126.5			73.6	
Travel Time (s)		6.7			12.6			9.1			5.3	
Confl. Peds. (#/hr)			1	1			2		1	1		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	5%	0%	3%	0%	0%	0%	0%	2%	0%
Adj. Flow (vph)	1	0	1	159	1	90	8	279	71	70	220	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2	0	0	160	90	8	279	71	70	222	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.80	1.60	1.40	1.26	1.60	1.40	1.55	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp South Wood Dr Background PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	6.0	10.0	10.0	6.0	10.0	
Minimum Split (s)	28.2	28.2		28.2	28.2	28.2	12.0	29.7	29.7	10.5	29.7	
Total Split (s)	37.2	37.2		37.2	37.2	37.2	18.0	41.7	41.7	18.0	41.7	
Total Split (%)	38.4%	38.4%		38.4%	38.4%	38.4%	18.6%	43.0%	43.0%	18.6%	43.0%	
Maximum Green (s)	30.0	30.0		30.0	30.0	30.0	15.0	35.0	35.0	15.0	35.0	
Yellow Time (s)	4.1	4.1		4.1	4.1	4.1	3.0	4.1	4.1	3.0	4.1	
All-Red Time (s)	3.1	3.1		3.1	3.1	3.1	0.0	2.6	2.6	0.0	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)		7.2			7.2	7.2	3.0	6.7	6.7	3.0	6.7	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Walk Time (s)	8.0	8.0		8.0	8.0	8.0		9.0	9.0		9.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0		14.0	14.0		14.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effect Green (s)		17.6			17.6	17.6	26.7	19.6	19.6	29.2	24.0	
Actuated g/C Ratio		0.31			0.31	0.31	0.46	0.34	0.34	0.51	0.42	
v/c Ratio		0.00			0.65	0.23	0.02	0.52	0.17	0.15	0.41	
Control Delay		0.0			32.0	6.1	9.1	23.0	5.6	9.7	17.1	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		0.0			32.0	6.1	9.1	23.0	5.6	9.7	17.1	
LOS		A			C	A	A	C	A	A	B	
Approach Delay					22.7			19.2			15.3	
Approach LOS					C			B			B	
90th %ile Green (s)	30.0	30.0		30.0	30.0	30.0	6.0	25.5	25.5	9.3	28.8	
90th %ile Term Code	Hold	Hold		Max	Max	Max	Min	Gap	Gap	Gap	Hold	
70th %ile Green (s)	21.8	21.8		21.8	21.8	21.8	0.0	19.8	19.8	7.9	30.7	
70th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Gap	Hold	
50th %ile Green (s)	16.8	16.8		16.8	16.8	16.8	0.0	15.5	15.5	6.7	25.2	
50th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Gap	Hold	
30th %ile Green (s)	12.8	12.8		12.8	12.8	12.8	0.0	12.2	12.2	0.0	12.2	
30th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Skip	Hold	
10th %ile Green (s)	9.0	9.0		9.0	9.0	9.0	0.0	22.9	22.9	0.0	22.9	
10th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Dwell	Dwell	Skip	Dwell	
Queue Length 50th (m)		0.0			14.7	0.0	0.4	25.9	0.0	3.5	14.6	
Queue Length 95th (m)		0.0			40.6	9.4	2.7	62.9	7.8	12.3	49.1	
Internal Link Dist (m)		68.8			151.4			102.5			49.6	
Turn Bay Length (m)						50.0	50.0		50.0	40.0		
Base Capacity (vph)		897			452	637	589	1024	730	551	850	
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		0.00			0.35	0.14	0.01	0.27	0.10	0.13	0.26	

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

2031 Future Background PM - with Ideal Sat flow 1900vphgpl

Intersection Summary	
Area Type:	Other
Cycle Length:	96.9
Actuated Cycle Length:	57.7
Natural Cycle:	70
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.65
Intersection Signal Delay:	18.9
Intersection LOS:	B
Intersection Capacity Utilization	56.1%
ICU Level of Service	B
Analysis Period (min)	15
90th %ile Actuated Cycle:	81.7
70th %ile Actuated Cycle:	66.4
50th %ile Actuated Cycle:	55.9
30th %ile Actuated Cycle:	38.9
10th %ile Actuated Cycle:	45.8

Splits and Phases: 2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

 Ø1	 Ø2	 Ø4
18 s	41.7 s	37.2 s
 Ø5	 Ø6	 Ø8
18 s	41.7 s	37.2 s

Lanes, Volumes, Timings

3: Montrose Road & Cameron Ct

2031 Future Background PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1	10	109	0	3	14	325	164	3	343	2
Future Volume (vph)	0	1	10	109	0	3	14	325	164	3	343	2
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1454	1579	1301	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.876				0.997				0.951		0.999	
Flt Protected					0.954				0.999			
Satd. Flow (prot)	0	1159	0	0	1363	0	0	2823	0	0	1397	0
Flt Permitted					0.954				0.999			
Satd. Flow (perm)	0	1159	0	0	1363	0	0	2823	0	0	1397	0
Link Speed (k/h)	50				50				50			
Link Distance (m)	167.1				64.9				232.7			
Travel Time (s)	12.0				4.7				16.8			
Confl. Peds. (#/hr)	1							1	2	1	1	2
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%	100%	0%	0%	0%	0%	0%	0%	3%	67%	2%	0%
Adj. Flow (vph)	0	1	11	118	0	3	15	353	178	3	373	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	12	0	0	121	0	0	546	0	0	378	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0				0.0				3.6			
Link Offset(m)	0.0				0.0				0.0			
Crosswalk Width(m)	4.8				4.8				4.8			
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.40	1.26	1.60	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control	Stop			Stop			Free			Free		
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	48.9%				ICU Level of Service A							
Analysis Period (min)	15											

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2031 Future Background PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	910	88	271	855	312	138	212	352	307	195	84
Future Volume (vph)	93	910	88	271	855	312	138	212	352	307	195	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	85.0		0.0	60.0		35.0	60.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00			0.99		0.99		0.97	0.99	0.99	
Frt		0.987			0.960				0.850		0.955	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3481	0	1787	3387	0	1770	3574	1583	1787	3333	0
Flt Permitted	0.118			0.104			0.567			0.471		
Satd. Flow (perm)	220	3481	0	196	3387	0	1046	3574	1538	875	3333	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			48				318		55	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		337.7			182.6			114.0			232.7	
Travel Time (s)		24.3			13.1			8.2			16.8	
Confl. Peds. (#/hr)	8		7	7		8	13		15	15		13
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 (%)	2%	2%	4%	1%	2%	1%	2%	1%	2%	1%	2%	4%
Adj. Flow (vph)	101	989	96	295	929	339	150	230	383	334	212	91
Shared Lane Traffic (%)												
Lane Group Flow (vph)	101	1085	0	295	1268	0	150	230	383	334	303	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2031 Future Background PM - with Ideal Sat flow 1900vphgpl

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	8.0	8.0	6.0	8.0	
Minimum Split (s)	10.5	35.6		10.5	35.6		9.0	35.4	35.4	9.0	35.4	
Total Split (s)	20.0	43.6		20.0	43.6		19.0	32.4	32.4	19.0	32.4	
Total Split (%)	17.4%	37.9%		17.4%	37.9%		16.5%	28.2%	28.2%	16.5%	28.2%	
Maximum Green (s)	17.0	38.0		17.0	38.0		16.0	27.0	27.0	16.0	27.0	
Yellow Time (s)	3.0	3.5		3.0	3.5		3.0	3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.1		0.0	2.1		0.0	2.1	2.1	0.0	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	5.6		3.0	5.6		3.0	5.4	5.4	3.0	5.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	2.5		3.0	2.5		2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None		None	Min	Min	None	Min	
Walk Time (s)		11.0			11.0			11.0	11.0		11.0	
Flash Dont Walk (s)		19.0			19.0			19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effect Green (s)	45.6	34.7		55.8	44.2		26.4	13.0	13.0	33.5	17.4	
Actuated g/C Ratio	0.48	0.36		0.58	0.46		0.28	0.14	0.14	0.35	0.18	
v/c Ratio	0.42	0.86		0.80	0.80		0.40	0.48	0.79	0.74	0.47	
Control Delay	16.8	37.0		39.2	27.8		26.5	42.3	21.5	36.9	32.1	
Queue Delay	0.0	0.0		0.0	0.8		0.0	0.0	0.0	0.0	0.0	
Total Delay	16.8	37.0		39.2	28.7		26.5	42.3	21.5	36.9	32.1	
LOS	B	D		D	C		C	D	C	D	C	
Approach Delay		35.2			30.7			28.7			34.6	
Approach LOS		D			C			C			C	
90th %ile Green (s)	11.6	38.0		17.0	43.4		15.3	23.4	23.4	16.0	24.1	
90th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
70th %ile Green (s)	8.8	38.0		17.0	46.2		12.8	14.3	14.3	16.0	17.5	
70th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
50th %ile Green (s)	7.8	38.0		17.0	47.2		11.1	11.2	11.2	16.0	16.1	
50th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
30th %ile Green (s)	7.3	33.4		15.1	41.2		9.5	9.9	9.9	16.0	16.4	
30th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Gap	Gap	Max	Hold	
10th %ile Green (s)	0.0	26.1		11.1	40.2		7.1	8.0	8.0	12.5	13.4	
10th %ile Term Code	Skip	Gap		Gap	Hold		Gap	Min	Min	Gap	Hold	
Queue Length 50th (m)	7.8	100.8		37.1	104.5		22.1	23.5	12.4	55.3	24.2	
Queue Length 95th (m)	19.5	#164.7		#93.9	#189.2		37.2	35.4	45.7	82.3	39.1	
Internal Link Dist (m)		313.7			158.6			90.0			208.7	
Turn Bay Length (m)	45.0			85.0			60.0		35.0	60.0		
Base Capacity (vph)	403	1411		401	1587		468	1025	668	460	996	
Starvation Cap Reductn	0	0		0	113		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.25	0.77		0.74	0.86		0.32	0.22	0.57	0.73	0.30	

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 95.8

Natural Cycle: 95

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 32.2

Intersection LOS: C

Intersection Capacity Utilization 89.8%

ICU Level of Service E

Analysis Period (min) 15

90th %ile Actuated Cycle: 111.4

70th %ile Actuated Cycle: 102.3

50th %ile Actuated Cycle: 99.2

30th %ile Actuated Cycle: 91.4

10th %ile Actuated Cycle: 74.7

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

Queue shown is maximum after two cycles.

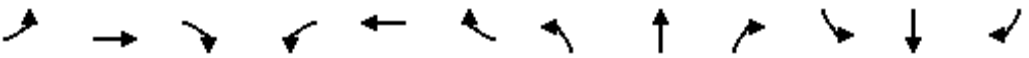
Splits and Phases: 4: Montrose Road & Thorold Stone Rd

 Ø1	 Ø2	 Ø3	 Ø4
19 s	32.4 s	20 s	43.6 s
 Ø5	 Ø6	 Ø7	 Ø8
19 s	32.4 s	20 s	43.6 s

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2011 Stone Rd Round PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑					↖↗		↖
Traffic Volume (vph)	0	1202	497	293	1394	0	0	0	0	298	0	163
Future Volume (vph)	0	1202	497	293	1394	0	0	0	0	298	0	163
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		60.0	210.0		0.0	0.0		0.0	40.0		25.0
Storage Lanes	0		1	1		0	0		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3539	1583	1805	3574	0	0	0	0	3400	0	1553
Flt Permitted				0.100						0.950		
Satd. Flow (perm)	0	3539	1583	190	3574	0	0	0	0	3400	0	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			375									66
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		182.6			352.3			184.1			149.0	
Travel Time (s)		13.1			25.4			13.3			10.7	
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%	2%	2%	0%	1%	0%	0%	0%	0%	3%	0%	4%
Adj. Flow (vph)	0	1307	540	318	1515	0	0	0	0	324	0	177
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1307	540	318	1515	0	0	0	0	324	0	177
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (m)		10.0	2.0	2.0	10.0					2.0		2.0
Trailing Detector (m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Position(m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Size(m)		0.6	2.0	2.0	0.6					2.0		2.0
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm	pm+pt	NA					Prot		Prot
Protected Phases		4		3	8					1		1

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2014 Stone Rd Round PM - with Ideal Sat flow 1900vphgpl



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4	8								
Detector Phase		4	4	3	8					1		1
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					10.0		10.0
Minimum Split (s)		37.0	37.0	9.0	17.0					40.0		40.0
Total Split (s)		58.0	58.0	17.0	75.0					40.0		40.0
Total Split (%)		50.4%	50.4%	14.8%	65.2%					34.8%		34.8%
Maximum Green (s)		51.0	51.0	14.0	68.0					33.0		33.0
Yellow Time (s)		4.0	4.0	3.0	4.0					4.0		4.0
All-Red Time (s)		3.0	3.0	0.0	3.0					3.0		3.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		7.0	7.0	3.0	7.0					7.0		7.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		2.2	2.2	2.5	2.2					3.2		3.2
Recall Mode		Min	Min	None	Min					None		None
Walk Time (s)		15.0	15.0							12.0		12.0
Flash Dont Walk (s)		15.0	15.0							21.0		21.0
Pedestrian Calls (#/hr)		0	0							0		0
Act Effect Green (s)		36.9	36.9	58.4	54.3					14.2		14.2
Actuated g/C Ratio		0.45	0.45	0.71	0.66					0.17		0.17
v/c Ratio		0.83	0.59	0.77	0.65					0.56		0.55
Control Delay		25.2	7.8	32.6	10.2					36.7		28.4
Queue Delay		0.0	0.0	0.0	0.0					0.0		0.0
Total Delay		25.3	7.8	32.6	10.2					36.7		28.4
LOS		C	A	C	B					D		C
Approach Delay		20.2			14.1						33.7	
Approach LOS		C			B						C	
90th %ile Green (s)		51.0	51.0	14.0	68.0					19.2		19.2
90th %ile Term Code		Max	Max	Max	Hold					Gap		Gap
70th %ile Green (s)		42.7	42.7	14.0	59.7					16.2		16.2
70th %ile Term Code		Gap	Gap	Max	Hold					Gap		Gap
50th %ile Green (s)		36.8	36.8	14.0	53.8					14.2		14.2
50th %ile Term Code		Gap	Gap	Max	Hold					Gap		Gap
30th %ile Green (s)		31.5	31.5	14.0	48.5					12.2		12.2
30th %ile Term Code		Gap	Gap	Max	Hold					Gap		Gap
10th %ile Green (s)		25.3	25.3	14.0	42.3					10.0		10.0
10th %ile Term Code		Gap	Gap	Max	Hold					Min		Min
Queue Length 50th (m)		95.0	16.0	30.7	68.3					25.3		16.4
Queue Length 95th (m)		134.1	46.3	#90.7	104.1					45.3		42.3
Internal Link Dist (m)		158.6			328.3			160.1			125.0	
Turn Bay Length (m)			60.0	210.0						40.0		25.0
Base Capacity (vph)		2226	1134	412	2979					1384		671
Starvation Cap Reductn		79	22	0	0					0		0
Spillback Cap Reductn		0	0	0	0					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		0.61	0.49	0.77	0.51					0.23		0.26

Intersection Summary

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 82.8

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 19.1

Intersection LOS: B

Intersection Capacity Utilization 73.0%

ICU Level of Service C

Analysis Period (min) 15

90th %ile Actuated Cycle: 101.2

70th %ile Actuated Cycle: 89.9

50th %ile Actuated Cycle: 82

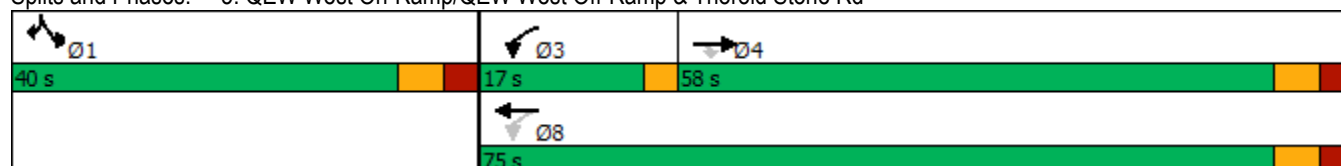
30th %ile Actuated Cycle: 74.7

10th %ile Actuated Cycle: 66.3

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

Queue shown is maximum after two cycles.

Splits and Phases: 5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2031 Future Background PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 					
Traffic Volume (vph)	162	1335	0	0	1193	352	443	0	292	0	0	0
Future Volume (vph)	162	1335	0	0	1193	352	443	0	292	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	210.0		0.0	0.0		15.0	35.0		45.0	0.0		0.0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						0.97						
Frt						0.850			0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1703	3539	0	0	3574	1583	3502	0	1615	0	0	0
Flt Permitted	0.105						0.950					
Satd. Flow (perm)	188	3539	0	0	3574	1537	3502	0	1615	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						89			66			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		352.3			289.2			127.3			154.2	
Travel Time (s)		25.4			20.8			9.2			11.1	
Confl. Peds. (#/hr)	5		6	6		5			1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	2%	0%	0%	1%	2%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	176	1451	0	0	1297	383	482	0	317	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	176	1451	0	0	1297	383	482	0	317	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2			2	1	1		1			
Detector Template	Left	Thru			Thru	Right	Left		Right			
Leading Detector (m)	2.0	10.0			10.0	2.0	2.0		2.0			
Trailing Detector (m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Position(m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Size(m)	2.0	0.6			0.6	2.0	2.0		2.0			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Delay (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							

Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2031 Future Background PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA			NA	Perm	Prot		Prot			
Protected Phases	7	4			8		5		5			
Permitted Phases	4					8						
Detector Phase	7	4			8	8	5		5			
Switch Phase												
Minimum Initial (s)	6.0	10.0			10.0	10.0	10.0		10.0			
Minimum Split (s)	9.0	37.0			37.0	37.0	14.5		14.5			
Total Split (s)	19.0	76.0			57.0	57.0	39.0		39.0			
Total Split (%)	16.5%	66.1%			49.6%	49.6%	33.9%		33.9%			
Maximum Green (s)	16.0	69.0			50.0	50.0	34.5		34.5			
Yellow Time (s)	3.0	4.0			4.0	4.0	3.5		3.5			
All-Red Time (s)	0.0	3.0			3.0	3.0	1.0		1.0			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Total Lost Time (s)	3.0	7.0			7.0	7.0	4.5		4.5			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	2.5	5.0			5.0	5.0	3.0		3.0			
Recall Mode	None	Min			Min	Min	None		None			
Walk Time (s)		15.0			15.0	15.0						
Flash Dont Walk (s)		15.0			15.0	15.0						
Pedestrian Calls (#/hr)		0			0	0						
Act Effct Green (s)	64.1	60.0			45.5	45.5	21.1		21.1			
Actuated g/C Ratio	0.69	0.65			0.49	0.49	0.23		0.23			
v/c Ratio	0.56	0.64			0.74	0.48	0.61		0.76			
Control Delay	18.3	12.3			23.7	15.7	36.3		39.7			
Queue Delay	0.0	0.0			0.0	0.0	0.0		0.0			
Total Delay	18.3	12.3			23.7	15.7	36.3		39.7			
LOS	B	B			C	B	D		D			
Approach Delay		12.9			21.9			37.6				
Approach LOS		B			C			D				
90th %ile Green (s)	16.0	69.0			50.0	50.0	33.3		33.3			
90th %ile Term Code	Max	Max			Max	Max	Gap		Gap			
70th %ile Green (s)	14.0	67.0			50.0	50.0	26.0		26.0			
70th %ile Term Code	Gap	Hold			Max	Max	Gap		Gap			
50th %ile Green (s)	11.4	64.4			50.0	50.0	20.4		20.4			
50th %ile Term Code	Gap	Hold			Max	Max	Gap		Gap			
30th %ile Green (s)	9.2	55.8			43.6	43.6	16.4		16.4			
30th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
10th %ile Green (s)	7.3	42.9			32.6	32.6	12.4		12.4			
10th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
Queue Length 50th (m)	9.6	74.5			95.9	33.5	44.7		47.5			
Queue Length 95th (m)	36.9	136.2			168.4	78.7	63.9		82.1			
Internal Link Dist (m)		328.3			265.2			103.3			130.2	
Turn Bay Length (m)	210.0					15.0	35.0		45.0			
Base Capacity (vph)	399	2694			1989	894	1344		660			
Starvation Cap Reductn	0	0			0	0	0		0			
Spillback Cap Reductn	0	0			0	0	0		0			
Storage Cap Reductn	0	0			0	0	0		0			
Reduced v/c Ratio	0.44	0.54			0.65	0.43	0.36		0.48			

Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2031 Future Background PM - with Ideal Sat flow 1900vphgpl

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 93

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 21.4

Intersection LOS: C

Intersection Capacity Utilization 73.0%

ICU Level of Service C

Analysis Period (min) 15

90th %ile Actuated Cycle: 113.8

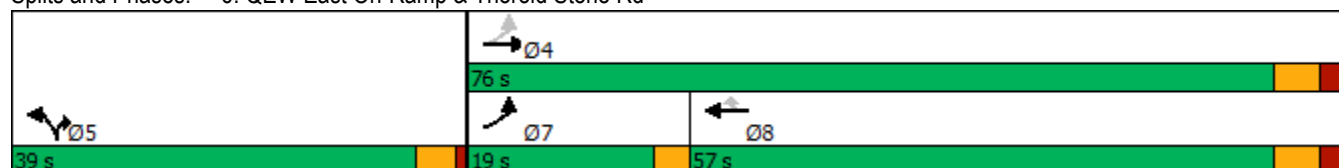
70th %ile Actuated Cycle: 104.5

50th %ile Actuated Cycle: 96.3

30th %ile Actuated Cycle: 83.7

10th %ile Actuated Cycle: 66.8

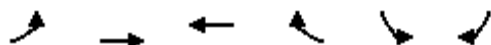
Splits and Phases: 6: QEW East On-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

8: Access Opp Southwood Dr & Site Access #2

2031 Future Background PM - with Ideal Sat flow 1900vphgpl



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	0	1863	1863	0	1863	0
Flt Permitted						
Satd. Flow (perm)	0	1863	1863	0	1863	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		175.4	35.0		70.7	
Travel Time (s)		12.6	2.5		5.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control		Stop	Stop		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	0.0%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings

1: Montrose Road & Mt Carmel Blvd

2036 Future Background AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	60	0	0	0	27	157	0	0	211	2
Future Volume (vph)	4	0	60	0	0	0	27	157	0	0	211	2
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1900	1433	1900	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.873									0.999	
Flt Protected		0.997						0.993				
Satd. Flow (prot)	0	1247	0	0	1433	0	0	1399	0	0	1404	0
Flt Permitted		0.997						0.993				
Satd. Flow (perm)	0	1247	0	0	1433	0	0	1399	0	0	1404	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		97.9			84.1			51.6			220.4	
Travel Time (s)		7.0			6.1			3.7			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Adj. Flow (vph)	4	0	65	0	0	0	29	171	0	0	229	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	69	0	0	0	0	0	200	0	0	231	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	43.0%											
Analysis Period (min)	15											
ICU Level of Service A												

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr Background AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔	↔	↔	↔	
Traffic Volume (vph)	0	1	16	38	1	17	2	169	52	19	250	0
Future Volume (vph)	0	1	16	38	1	17	2	169	52	19	250	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1178	1301	1454	1579	1301	1454	1338	1900
Storage Length (m)	0.0		0.0	0.0		50.0	50.0		50.0	40.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.872				0.850			0.850			
Flt Protected					0.953		0.950			0.950		
Satd. Flow (prot)	0	1657	0	0	1070	1074	1381	1579	1106	1381	1312	0
Flt Permitted					0.760		0.592			0.641		
Satd. Flow (perm)	0	1657	0	0	854	1074	861	1579	1106	932	1312	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17				75			81			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		92.8			175.4			126.5			73.6	
Travel Time (s)		6.7			12.6			9.1			5.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	5%	0%	3%	0%	0%	0%	0%	2%	0%
Adj. Flow (vph)	0	1	17	41	1	18	2	184	57	21	272	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	18	0	0	42	18	2	184	57	21	272	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.80	1.60	1.40	1.26	1.60	1.40	1.55	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type		NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

2036 Future Background AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	6.0	10.0	10.0	6.0	10.0	
Minimum Split (s)	28.2	28.2		28.2	28.2	28.2	12.0	29.7	29.7	10.5	29.7	
Total Split (s)	37.2	37.2		37.2	37.2	37.2	18.0	41.7	41.7	18.0	41.7	
Total Split (%)	38.4%	38.4%		38.4%	38.4%	38.4%	18.6%	43.0%	43.0%	18.6%	43.0%	
Maximum Green (s)	30.0	30.0		30.0	30.0	30.0	15.0	35.0	35.0	15.0	35.0	
Yellow Time (s)	4.1	4.1		4.1	4.1	4.1	3.0	4.1	4.1	3.0	4.1	
All-Red Time (s)	3.1	3.1		3.1	3.1	3.1	0.0	2.6	2.6	0.0	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)		7.2			7.2	7.2	3.0	6.7	6.7	3.0	6.7	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Walk Time (s)	8.0	8.0		8.0	8.0	8.0		9.0	9.0		9.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0		14.0	14.0		14.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effct Green (s)		9.2			9.2	9.2	27.3	26.0	26.0	27.3	26.0	
Actuated g/C Ratio		0.23			0.23	0.23	0.68	0.65	0.65	0.68	0.65	
v/c Ratio		0.05			0.21	0.06	0.00	0.18	0.08	0.03	0.32	
Control Delay		9.1			18.4	0.4	4.5	9.0	2.5	4.8	10.5	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		9.1			18.4	0.4	4.5	9.0	2.5	4.8	10.5	
LOS		A			B	A	A	A	A	A	B	
Approach Delay		9.1			13.0			7.4			10.1	
Approach LOS		A			B			A			B	
90th %ile Green (s)	12.6	12.6		12.6	12.6	12.6	6.0	22.2	22.2	6.0	22.2	
90th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Min	Hold	Hold	Min	Gap	
70th %ile Green (s)	8.8	8.8		8.8	8.8	8.8	0.0	14.0	14.0	0.0	14.0	
70th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Hold	Hold	Skip	Gap	
50th %ile Green (s)	8.0	8.0		8.0	8.0	8.0	0.0	20.1	20.1	0.0	20.1	
50th %ile Term Code	Hold	Hold		Min	Min	Min	Skip	Dwell	Dwell	Skip	Dwell	
30th %ile Green (s)	0.0	0.0		0.0	0.0	0.0	0.0	25.0	25.0	0.0	25.0	
30th %ile Term Code	Skip	Skip		Skip	Skip	Skip	Skip	Dwell	Dwell	Skip	Dwell	
10th %ile Green (s)	0.0	0.0		0.0	0.0	0.0	0.0	25.0	25.0	0.0	25.0	
10th %ile Term Code	Skip	Skip		Skip	Skip	Skip	Skip	Dwell	Dwell	Skip	Dwell	
Queue Length 50th (m)		0.1			2.8	0.0	0.1	7.3	0.0	0.6	12.1	
Queue Length 95th (m)		4.4			11.3	0.0	0.7	26.8	4.1	2.9	43.0	
Internal Link Dist (m)		68.8			151.4			102.5			49.6	
Turn Bay Length (m)						50.0	50.0		50.0	40.0		
Base Capacity (vph)		1310			674	863	801	1387	981	823	1153	
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		0.01			0.06	0.02	0.00	0.13	0.06	0.03	0.24	
Intersection Summary												

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

Area Type:	Other
Cycle Length:	96.9
Actuated Cycle Length:	40
Natural Cycle:	70
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.32
Intersection Signal Delay:	9.3
Intersection LOS:	A
Intersection Capacity Utilization	42.4%
ICU Level of Service	A
Analysis Period (min)	15
90th %ile Actuated Cycle:	57.7
70th %ile Actuated Cycle:	36.7
50th %ile Actuated Cycle:	42
30th %ile Actuated Cycle:	31.7
10th %ile Actuated Cycle:	31.7

Splits and Phases: 2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

 Ø1	 Ø2	 Ø4
18 s	41.7 s	37.2 s
 Ø5	 Ø6	 Ø8
18 s	41.7 s	37.2 s

Lanes, Volumes, Timings

3: Montrose Road & Cameron Ct

2036 Future Background AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1	10	26	0	2	1	222	72	7	298	1
Future Volume (vph)	0	1	10	26	0	2	1	222	72	7	298	1
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1454	1579	1301	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.876			0.991			0.963				
Flt Protected					0.955						0.999	
Satd. Flow (prot)	0	1159	0	0	1356	0	0	2868	0	0	1382	0
Flt Permitted					0.955						0.999	
Satd. Flow (perm)	0	1159	0	0	1356	0	0	2868	0	0	1382	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		167.1			64.9			232.7			126.5	
Travel Time (s)		12.0			4.7			16.8			9.1	
Confl. Peds. (#/hr)	1		3	3		1	4		4	4		4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	100%	0%	0%	0%	0%	0%	0%	3%	67%	2%	0%
Adj. Flow (vph)	0	1	11	28	0	2	1	241	78	8	324	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	12	0	0	30	0	0	320	0	0	333	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.40	1.26	1.60	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	43.9%											
Analysis Period (min)	15											
ICU Level of Service A												

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

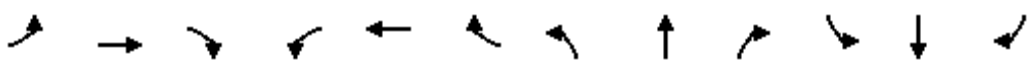
2036 Future Background AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	76	804	87	229	596	175	81	181	321	234	123	72
Future Volume (vph)	76	804	87	229	596	175	81	181	321	234	123	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	85.0		0.0	60.0		35.0	60.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	1.00		0.99		0.99	1.00	0.99	
Frt		0.985			0.966				0.850		0.945	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3475	0	1787	3415	0	1770	3574	1583	1787	3296	0
Flt Permitted	0.299			0.123			0.619			0.501		
Satd. Flow (perm)	557	3475	0	231	3415	0	1146	3574	1561	941	3296	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			35				349		78	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		337.7			182.6			114.0			232.7	
Travel Time (s)		24.3			13.1			8.2			16.8	
Confl. Peds. (#/hr)	2		1	1		2	7		2	2		7
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 (%)	2%	2%	4%	1%	2%	1%	2%	1%	2%	1%	2%	4%
Adj. Flow (vph)	83	874	95	249	648	190	88	197	349	254	134	78
Shared Lane Traffic (%)												
Lane Group Flow (vph)	83	969	0	249	838	0	88	197	349	254	212	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2036 Future Background AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	8.0	8.0	6.0	8.0	
Minimum Split (s)	10.5	35.6		10.5	35.6		9.0	35.4	35.4	9.0	35.4	
Total Split (s)	20.0	43.6		20.0	43.6		19.0	32.4	32.4	19.0	32.4	
Total Split (%)	17.4%	37.9%		17.4%	37.9%		16.5%	28.2%	28.2%	16.5%	28.2%	
Maximum Green (s)	17.0	38.0		17.0	38.0		16.0	27.0	27.0	16.0	27.0	
Yellow Time (s)	3.0	3.5		3.0	3.5		3.0	3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.1		0.0	2.1		0.0	2.1	2.1	0.0	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	5.6		3.0	5.6		3.0	5.4	5.4	3.0	5.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	2.5		3.0	2.5		2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None		None	Min	Min	None	Min	
Walk Time (s)		11.0			11.0			11.0	11.0		11.0	
Flash Dont Walk (s)		19.0			19.0			19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effect Green (s)	39.3	28.8		47.6	36.6		21.9	11.0	11.0	30.4	18.9	
Actuated g/C Ratio	0.47	0.34		0.56	0.43		0.26	0.13	0.13	0.36	0.22	
v/c Ratio	0.22	0.81		0.67	0.56		0.24	0.42	0.69	0.53	0.27	
Control Delay	11.1	31.9		24.9	19.8		22.9	39.3	12.3	26.4	21.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	11.1	31.9		24.9	19.8		22.9	39.3	12.3	26.4	21.0	
LOS	B	C		C	B		C	D	B	C	C	
Approach Delay		30.2			21.0			22.2			24.0	
Approach LOS		C			C			C			C	
90th %ile Green (s)	9.5	38.0		17.0	45.5		11.3	17.2	17.2	16.0	21.9	
90th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
70th %ile Green (s)	8.3	34.1		16.7	42.5		9.6	11.4	11.4	16.0	17.8	
70th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Gap	Gap	Max	Hold	
50th %ile Green (s)	7.8	30.3		13.6	36.1		8.4	10.2	10.2	15.8	17.6	
50th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Gap	Gap	Gap	Hold	
30th %ile Green (s)	6.9	25.1		10.3	28.5		7.1	8.6	8.6	12.6	14.1	
30th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Gap	Gap	Gap	Hold	
10th %ile Green (s)	0.0	18.1		8.3	29.4		0.0	8.0	8.0	9.0	20.0	
10th %ile Term Code	Skip	Gap		Gap	Hold		Skip	Min	Min	Gap	Hold	
Queue Length 50th (m)	6.1	78.5		21.9	55.5		10.2	17.2	0.0	32.6	10.3	
Queue Length 95th (m)	14.5	120.4		54.6	86.0		23.7	31.3	26.7	62.0	23.3	
Internal Link Dist (m)		313.7			158.6			90.0			208.7	
Turn Bay Length (m)	45.0			85.0			60.0		35.0	60.0		
Base Capacity (vph)	562	1634		456	1699		515	1190	752	506	1149	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.15	0.59		0.55	0.49		0.17	0.17	0.46	0.50	0.18	

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 84.3

Natural Cycle: 95

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 24.6

Intersection LOS: C

Intersection Capacity Utilization 74.3%

ICU Level of Service D

Analysis Period (min) 15

90th %ile Actuated Cycle: 105.2

70th %ile Actuated Cycle: 95.2

50th %ile Actuated Cycle: 86.9

30th %ile Actuated Cycle: 73.6

10th %ile Actuated Cycle: 60.4

Splits and Phases: 4: Montrose Road & Thorold Stone Rd

 Ø1	 Ø2	 Ø3	 Ø4
19 s	32.4 s	20 s	43.6 s
 Ø5	 Ø6	 Ø7	 Ø8
19 s	32.4 s	20 s	43.6 s

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2016 Stone Rd Round AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑					↖↗		↖
Traffic Volume (vph)	0	987	525	233	1001	0	0	0	0	250	0	117
Future Volume (vph)	0	987	525	233	1001	0	0	0	0	250	0	117
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		60.0	210.0		0.0	0.0		0.0	40.0		25.0
Storage Lanes	0		1	1		0	0		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3539	1583	1805	3574	0	0	0	0	3400	0	1553
Flt Permitted				0.144						0.950		
Satd. Flow (perm)	0	3539	1583	274	3574	0	0	0	0	3400	0	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			483									95
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		182.6			352.3			184.1			149.0	
Travel Time (s)		13.1			25.4			13.3			10.7	
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%	2%	2%	0%	1%	0%	0%	0%	0%	3%	0%	4%
Adj. Flow (vph)	0	1073	571	253	1088	0	0	0	0	272	0	127
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1073	571	253	1088	0	0	0	0	272	0	127
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (m)		10.0	2.0	2.0	10.0					2.0		2.0
Trailing Detector (m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Position(m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Size(m)		0.6	2.0	2.0	0.6					2.0		2.0
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm	pm+pt	NA					Prot		Prot
Protected Phases		4		3	8					1		1

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2016 ES - Back Round AM - with Ideal Sat flow 1900vphgpl



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4	8								
Detector Phase		4	4	3	8					1		1
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					10.0		10.0
Minimum Split (s)		37.0	37.0	9.0	17.0					40.0		40.0
Total Split (s)		58.0	58.0	17.0	75.0					40.0		40.0
Total Split (%)		50.4%	50.4%	14.8%	65.2%					34.8%		34.8%
Maximum Green (s)		51.0	51.0	14.0	68.0					33.0		33.0
Yellow Time (s)		4.0	4.0	3.0	4.0					4.0		4.0
All-Red Time (s)		3.0	3.0	0.0	3.0					3.0		3.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		7.0	7.0	3.0	7.0					7.0		7.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		2.2	2.2	2.5	2.2					3.2		3.2
Recall Mode		Min	Min	None	Min					None		None
Walk Time (s)		15.0	15.0							12.0		12.0
Flash Dont Walk (s)		15.0	15.0							21.0		21.0
Pedestrian Calls (#/hr)		0	0							0		0
Act Effect Green (s)		26.8	26.8	43.5	39.3					12.2		12.2
Actuated g/C Ratio		0.41	0.41	0.66	0.60					0.18		0.18
v/c Ratio		0.75	0.62	0.63	0.51					0.43		0.35
Control Delay		20.6	6.1	15.5	8.5					28.2		13.4
Queue Delay		0.0	0.0	0.0	0.0					0.0		0.0
Total Delay		20.6	6.1	15.5	8.5					28.2		13.4
LOS		C	A	B	A					C		B
Approach Delay		15.6			9.8						23.5	
Approach LOS		B			A						C	
90th %ile Green (s)		39.0	39.0	14.0	56.0					16.3		16.3
90th %ile Term Code		Gap	Gap	Max	Hold					Gap		Gap
70th %ile Green (s)		31.7	31.7	10.9	45.6					13.3		13.3
70th %ile Term Code		Gap	Gap	Gap	Hold					Gap		Gap
50th %ile Green (s)		25.9	25.9	8.7	37.6					11.4		11.4
50th %ile Term Code		Gap	Gap	Gap	Hold					Gap		Gap
30th %ile Green (s)		21.5	21.5	7.7	32.2					10.0		10.0
30th %ile Term Code		Gap	Gap	Gap	Hold					Min		Min
10th %ile Green (s)		17.9	17.9	6.8	27.7					10.0		10.0
10th %ile Term Code		Gap	Gap	Gap	Hold					Min		Min
Queue Length 50th (m)		56.0	6.4	10.1	35.5					15.4		3.3
Queue Length 95th (m)		96.8	33.0	35.5	57.7					33.4		19.7
Internal Link Dist (m)		158.6			328.3			160.1			125.0	
Turn Bay Length (m)			60.0	210.0						40.0		25.0
Base Capacity (vph)		2826	1361	516	3374					1757		848
Starvation Cap Reductn		2	0	0	0					0		0
Spillback Cap Reductn		0	0	0	0					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		0.38	0.42	0.49	0.32					0.15		0.15

Intersection Summary

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 66

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 14.2

Intersection LOS: B

Intersection Capacity Utilization 68.7%

ICU Level of Service C

Analysis Period (min) 15

90th %ile Actuated Cycle: 86.3

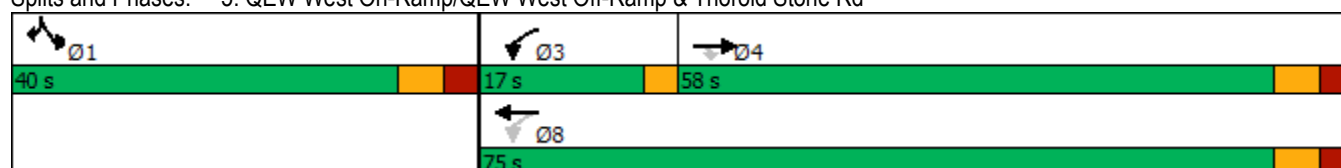
70th %ile Actuated Cycle: 72.9

50th %ile Actuated Cycle: 63

30th %ile Actuated Cycle: 56.2

10th %ile Actuated Cycle: 51.7

Splits and Phases: 5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2036 Future Background AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	154	1091	0	0	888	280	358	0	256	0	0	0
Future Volume (vph)	154	1091	0	0	888	280	358	0	256	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	210.0		0.0	0.0		15.0	35.0		45.0	0.0		0.0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1703	3539	0	0	3574	1583	3502	0	1615	0	0	0
Flt Permitted	0.199						0.950					
Satd. Flow (perm)	357	3539	0	0	3574	1583	3502	0	1615	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						95			78			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		352.3			289.2			127.3			154.2	
Travel Time (s)		25.4			20.8			9.2			11.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	2%	0%	0%	1%	2%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	167	1186	0	0	965	304	389	0	278	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	167	1186	0	0	965	304	389	0	278	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2			2	1	1		1			
Detector Template	Left	Thru			Thru	Right	Left		Right			
Leading Detector (m)	2.0	10.0			10.0	2.0	2.0		2.0			
Trailing Detector (m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Position(m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Size(m)	2.0	0.6			0.6	2.0	2.0		2.0			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Delay (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type	pm+pt	NA			NA	Perm	Prot		Prot			
Protected Phases	7	4			8		5		5			

Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2036 Future Background AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4					8						
Detector Phase	7	4			8	8	5		5			
Switch Phase												
Minimum Initial (s)	6.0	10.0			10.0	10.0	10.0		10.0			
Minimum Split (s)	9.0	37.0			37.0	37.0	14.5		14.5			
Total Split (s)	19.0	76.0			57.0	57.0	39.0		39.0			
Total Split (%)	16.5%	66.1%			49.6%	49.6%	33.9%		33.9%			
Maximum Green (s)	16.0	69.0			50.0	50.0	34.5		34.5			
Yellow Time (s)	3.0	4.0			4.0	4.0	3.5		3.5			
All-Red Time (s)	0.0	3.0			3.0	3.0	1.0		1.0			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Total Lost Time (s)	3.0	7.0			7.0	7.0	4.5		4.5			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	2.5	5.0			5.0	5.0	3.0		3.0			
Recall Mode	None	Min			Min	Min	None		None			
Walk Time (s)		15.0			15.0	15.0						
Flash Dont Walk (s)		15.0			15.0	15.0						
Pedestrian Calls (#/hr)		0			0	0						
Act Effct Green (s)	51.4	47.1			33.7	33.7	16.5		16.5			
Actuated g/C Ratio	0.68	0.62			0.44	0.44	0.22		0.22			
v/c Ratio	0.40	0.54			0.61	0.40	0.51		0.68			
Control Delay	7.8	9.4			18.3	11.8	30.2		30.1			
Queue Delay	0.0	0.0			0.0	0.0	0.0		0.0			
Total Delay	7.8	9.4			18.3	11.8	30.2		30.1			
LOS	A	A			B	B	C		C			
Approach Delay		9.2			16.7			30.2				
Approach LOS		A			B			C				
90th %ile Green (s)	14.1	67.1			50.0	50.0	27.1		27.1			
90th %ile Term Code	Gap	Hold			Max	Max	Gap		Gap			
70th %ile Green (s)	12.1	55.4			40.3	40.3	19.9		19.9			
70th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
50th %ile Green (s)	10.1	46.3			33.2	33.2	15.5		15.5			
50th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
30th %ile Green (s)	8.3	38.1			26.8	26.8	12.0		12.0			
30th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
10th %ile Green (s)	6.6	30.2			20.6	20.6	10.0		10.0			
10th %ile Term Code	Gap	Hold			Gap	Gap	Min		Min			
Queue Length 50th (m)	7.0	43.8			52.7	18.3	26.0		26.6			
Queue Length 95th (m)	19.7	84.8			97.0	47.9	50.8		66.1			
Internal Link Dist (m)		328.3			265.2			103.3			130.2	
Turn Bay Length (m)	210.0					15.0	35.0		45.0			
Base Capacity (vph)	544	3106			2508	1139	1696		822			
Starvation Cap Reductn	0	0			0	0	0		0			
Spillback Cap Reductn	0	0			0	0	0		0			
Storage Cap Reductn	0	0			0	0	0		0			
Reduced v/c Ratio	0.31	0.38			0.38	0.27	0.23		0.34			
Intersection Summary												

Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2036 Future Background AM - with Ideal Sat flow 1900vphgpl

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 75.8

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 16.4

Intersection LOS: B

Intersection Capacity Utilization 68.7%

ICU Level of Service C

Analysis Period (min) 15

90th %ile Actuated Cycle: 105.7

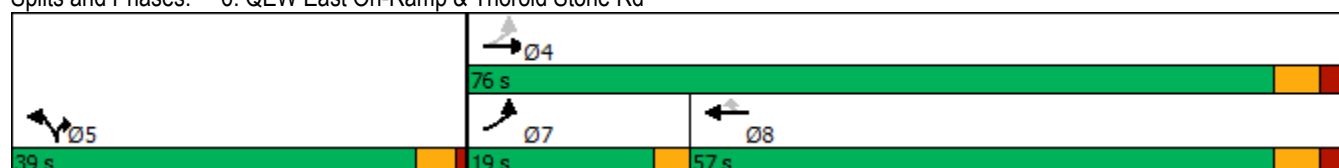
70th %ile Actuated Cycle: 86.8

50th %ile Actuated Cycle: 73.3

30th %ile Actuated Cycle: 61.6

10th %ile Actuated Cycle: 51.7

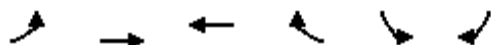
Splits and Phases: 6: QEW East On-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

8: Access Opp Southwood Dr & Site Access #2

2036 Future Background AM - with Ideal Sat flow 1900vphgpl



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frts						
Flt Protected						
Satd. Flow (prot)	0	1863	1863	0	1863	0
Flt Permitted						
Satd. Flow (perm)	0	1863	1863	0	1863	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		175.4	35.0		70.7	
Travel Time (s)		12.6	2.5		5.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control		Stop	Stop		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 0.0%	ICU Level of Service A					
Analysis Period (min) 15						

Lanes, Volumes, Timings

1: Montrose Road & Mt Carmel Blvd

2036 Future Background PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	46	0	0	0	57	315	0	0	246	6
Future Volume (vph)	4	0	46	0	0	0	57	315	0	0	246	6
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1900	1433	1900	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.875									0.997	
Flt Protected		0.996						0.992				
Satd. Flow (prot)	0	1249	0	0	1433	0	0	1398	0	0	1401	0
Flt Permitted		0.996						0.992				
Satd. Flow (perm)	0	1249	0	0	1433	0	0	1398	0	0	1401	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		97.9			84.1			51.6			220.4	
Travel Time (s)		7.0			6.1			3.7			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Adj. Flow (vph)	4	0	50	0	0	0	62	342	0	0	267	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	54	0	0	0	0	0	404	0	0	274	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	57.9%						ICU Level of Service B					
Analysis Period (min)	15											

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp South Wood Dr Background PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	159	1	91	7	279	71	69	219	2
Future Volume (vph)	1	0	1	159	1	91	7	279	71	69	219	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1178	1301	1454	1579	1301	1454	1338	1900
Storage Length (m)	0.0		0.0	0.0		50.0	50.0		50.0	40.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00		1.00		0.98	1.00	1.00	
Frt		0.932				0.850			0.850		0.999	
Flt Protected		0.976			0.953		0.950			0.950		
Satd. Flow (prot)	0	1709	0	0	1069	1074	1381	1579	1106	1381	1310	0
Flt Permitted		0.891			0.727		0.610			0.465		
Satd. Flow (perm)	0	1560	0	0	814	1074	884	1579	1081	675	1310	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		75				99			81			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		92.8			175.4			126.5			73.6	
Travel Time (s)		6.7			12.6			9.1			5.3	
Confl. Peds. (#/hr)			1	1			2		1	1		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	5%	0%	3%	0%	0%	0%	0%	2%	0%
Adj. Flow (vph)	1	0	1	173	1	99	8	303	77	75	238	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2	0	0	174	99	8	303	77	75	240	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.80	1.60	1.40	1.26	1.60	1.40	1.55	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp South Wood Dr Background PM - with Ideal Sat flow 1900vphgpl

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	6.0	10.0	10.0	6.0	10.0	
Minimum Split (s)	28.2	28.2		28.2	28.2	28.2	12.0	29.7	29.7	10.5	29.7	
Total Split (s)	37.2	37.2		37.2	37.2	37.2	18.0	41.7	41.7	18.0	41.7	
Total Split (%)	38.4%	38.4%		38.4%	38.4%	38.4%	18.6%	43.0%	43.0%	18.6%	43.0%	
Maximum Green (s)	30.0	30.0		30.0	30.0	30.0	15.0	35.0	35.0	15.0	35.0	
Yellow Time (s)	4.1	4.1		4.1	4.1	4.1	3.0	4.1	4.1	3.0	4.1	
All-Red Time (s)	3.1	3.1		3.1	3.1	3.1	0.0	2.6	2.6	0.0	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)		7.2			7.2	7.2	3.0	6.7	6.7	3.0	6.7	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Walk Time (s)	8.0	8.0		8.0	8.0	8.0		9.0	9.0		9.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0		14.0	14.0		14.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effect Green (s)		19.1			19.1	19.1	28.5	19.9	19.9	31.9	26.6	
Actuated g/C Ratio		0.31			0.31	0.31	0.46	0.32	0.32	0.52	0.43	
v/c Ratio		0.00			0.69	0.25	0.02	0.60	0.19	0.17	0.43	
Control Delay		0.0			36.0	6.1	9.4	26.1	6.2	10.1	17.5	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		0.0			36.0	6.1	9.4	26.1	6.2	10.1	17.5	
LOS		A			D	A	A	C	A	B	B	
Approach Delay					25.2			21.8			15.8	
Approach LOS					C			C			B	
90th %ile Green (s)	30.0	30.0		30.0	30.0	30.0	6.0	27.7	27.7	9.6	31.3	
90th %ile Term Code	Hold	Hold		Max	Max	Max	Min	Gap	Gap	Gap	Hold	
70th %ile Green (s)	25.1	25.1		25.1	25.1	25.1	0.0	21.9	21.9	8.2	33.1	
70th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Gap	Hold	
50th %ile Green (s)	19.1	19.1		19.1	19.1	19.1	0.0	17.3	17.3	7.0	27.3	
50th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Gap	Hold	
30th %ile Green (s)	14.6	14.6		14.6	14.6	14.6	0.0	13.4	13.4	6.0	22.4	
30th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Min	Hold	
10th %ile Green (s)	9.8	9.8		9.8	9.8	9.8	0.0	17.8	17.8	0.0	17.8	
10th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Dwell	Dwell	Skip	Dwell	
Queue Length 50th (m)		0.0			17.3	0.0	0.4	30.9	0.0	4.1	17.7	
Queue Length 95th (m)		0.0			46.8	10.0	2.7	68.7	8.8	12.9	53.0	
Internal Link Dist (m)		68.8			151.4			102.5			49.6	
Turn Bay Length (m)						50.0	50.0		50.0	40.0		
Base Capacity (vph)		841			420	602	584	951	683	530	789	
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		0.00			0.41	0.16	0.01	0.32	0.11	0.14	0.30	

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

Background PM - with Ideal Sat flow 1900vphgpl

Intersection Summary	
Area Type:	Other
Cycle Length:	96.9
Actuated Cycle Length:	61.8
Natural Cycle:	70
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.69
Intersection Signal Delay:	20.8
Intersection LOS:	C
Intersection Capacity Utilization	58.6%
ICU Level of Service	B
Analysis Period (min)	15
90th %ile Actuated Cycle:	84.2
70th %ile Actuated Cycle:	72.1
50th %ile Actuated Cycle:	60.3
30th %ile Actuated Cycle:	50.9
10th %ile Actuated Cycle:	41.5

Splits and Phases: 2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

 Ø1	 Ø2	 Ø4
18 s	41.7 s	37.2 s
 Ø5	 Ø6	 Ø8
18 s	41.7 s	37.2 s

Lanes, Volumes, Timings

3: Montrose Road & Cameron Ct

2036 Future Background PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1	11	119	0	4	15	353	179	4	373	2
Future Volume (vph)	0	1	11	119	0	4	15	353	179	4	373	2
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1454	1579	1301	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.875			0.996			0.951			0.999	
Flt Protected					0.954			0.999				
Satd. Flow (prot)	0	1164	0	0	1362	0	0	2822	0	0	1395	0
Flt Permitted					0.954			0.999				
Satd. Flow (perm)	0	1164	0	0	1362	0	0	2822	0	0	1395	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		167.1			64.9			232.7			126.5	
Travel Time (s)		12.0			4.7			16.8			9.1	
Confl. Peds. (#/hr)	1					1	2		1	1		2
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%	100%	0%	0%	0%	0%	0%	0%	3%	67%	2%	0%
Adj. Flow (vph)	0	1	12	129	0	4	16	384	195	4	405	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	13	0	0	133	0	0	595	0	0	411	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.40	1.26	1.60	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	52.8%						ICU Level of Service A					
Analysis Period (min)	15											

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2036 Future Background PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	102	990	95	295	930	340	150	231	383	334	212	92
Future Volume (vph)	102	990	95	295	930	340	150	231	383	334	212	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	85.0		0.0	60.0		35.0	60.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00			0.99		0.99		0.97	0.99	0.99	
Frt		0.987			0.960				0.850		0.955	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3481	0	1787	3387	0	1770	3574	1583	1787	3333	0
Flt Permitted	0.105			0.097			0.553			0.447		
Satd. Flow (perm)	196	3481	0	182	3387	0	1021	3574	1538	831	3333	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			48				306		55	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		337.7			182.6			114.0			232.7	
Travel Time (s)		24.3			13.1			8.2			16.8	
Confl. Peds. (#/hr)	8		7	7		8	13		15	15		13
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 (%)	2%	2%	4%	1%	2%	1%	2%	1%	2%	1%	2%	4%
Adj. Flow (vph)	111	1076	103	321	1011	370	163	251	416	363	230	100
Shared Lane Traffic (%)												
Lane Group Flow (vph)	111	1179	0	321	1381	0	163	251	416	363	330	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2036 Future Background PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	8.0	8.0	6.0	8.0	
Minimum Split (s)	10.5	35.6		10.5	35.6		9.0	35.4	35.4	9.0	35.4	
Total Split (s)	20.0	43.6		20.0	43.6		19.0	32.4	32.4	19.0	32.4	
Total Split (%)	17.4%	37.9%		17.4%	37.9%		16.5%	28.2%	28.2%	16.5%	28.2%	
Maximum Green (s)	17.0	38.0		17.0	38.0		16.0	27.0	27.0	16.0	27.0	
Yellow Time (s)	3.0	3.5		3.0	3.5		3.0	3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.1		0.0	2.1		0.0	2.1	2.1	0.0	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	5.6		3.0	5.6		3.0	5.4	5.4	3.0	5.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	2.5		3.0	2.5		2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None		None	Min	Min	None	Min	
Walk Time (s)		11.0			11.0			11.0	11.0		11.0	
Flash Dont Walk (s)		19.0			19.0			19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effect Green (s)	49.5	38.2		60.5	46.2		29.2	15.2	15.2	35.7	19.3	
Actuated g/C Ratio	0.48	0.37		0.59	0.45		0.28	0.15	0.15	0.35	0.19	
v/c Ratio	0.49	0.91		0.87	0.89		0.44	0.48	0.85	0.83	0.49	
Control Delay	21.1	42.9		50.7	35.4		27.3	42.7	29.1	45.5	33.7	
Queue Delay	0.0	0.0		0.0	2.9		0.0	0.0	0.0	0.0	0.0	
Total Delay	21.1	42.9		50.7	38.3		27.3	42.7	29.1	45.5	33.7	
LOS	C	D		D	D		C	D	C	D	C	
Approach Delay		41.1			40.6			32.9			39.9	
Approach LOS		D			D			C			D	
90th %ile Green (s)	12.9	38.0		17.0	42.1		16.0	27.0	27.0	16.0	27.0	
90th %ile Term Code	Gap	Max		Max	Hold		Max	Max	Max	Max	Hold	
70th %ile Green (s)	9.5	38.0		17.0	45.5		13.5	18.7	18.7	16.0	21.2	
70th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
50th %ile Green (s)	8.2	38.0		17.0	46.8		11.7	13.1	13.1	16.0	17.4	
50th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
30th %ile Green (s)	7.2	38.0		17.0	47.8		10.0	10.4	10.4	16.0	16.4	
30th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
10th %ile Green (s)	6.2	38.0		15.2	47.0		7.7	8.5	8.5	14.6	15.4	
10th %ile Term Code	Gap	Max		Gap	Hold		Gap	Gap	Gap	Gap	Hold	
Queue Length 50th (m)	9.1	118.1		46.5	126.5		24.2	25.8	21.9	61.4	27.3	
Queue Length 95th (m)	24.6	#199.5		#116.8	#235.1		39.8	38.0	60.9	#96.7	43.0	
Internal Link Dist (m)		313.7			158.6			90.0			208.7	
Turn Bay Length (m)	45.0			85.0			60.0		35.0	60.0		
Base Capacity (vph)	371	1297		373	1547		450	942	631	437	919	
Starvation Cap Reductn	0	0		0	93		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.30	0.91		0.86	0.95		0.36	0.27	0.66	0.83	0.36	

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 102.9

Natural Cycle: 95

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 39.2

Intersection LOS: D

Intersection Capacity Utilization 95.0%

ICU Level of Service F

Analysis Period (min) 15

90th %ile Actuated Cycle: 115

70th %ile Actuated Cycle: 106.7

50th %ile Actuated Cycle: 101.1

30th %ile Actuated Cycle: 98.4

10th %ile Actuated Cycle: 93.3

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Montrose Road & Thorold Stone Rd

 Ø1	 Ø2	 Ø3	 Ø4
19 s	32.4 s	20 s	43.6 s
 Ø5	 Ø6	 Ø7	 Ø8
19 s	32.4 s	20 s	43.6 s

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2016 Stone Rd Round PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑					↖		↗
Traffic Volume (vph)	0	1350	559	329	1567	0	0	0	0	335	0	184
Future Volume (vph)	0	1350	559	329	1567	0	0	0	0	335	0	184
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		60.0	210.0		0.0	0.0		0.0	40.0		25.0
Storage Lanes	0		1	1		0	0		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3539	1583	1805	3574	0	0	0	0	3400	0	1553
Flt Permitted				0.084						0.950		
Satd. Flow (perm)	0	3539	1583	160	3574	0	0	0	0	3400	0	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			377									66
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		182.6			352.3			184.1			149.0	
Travel Time (s)		13.1			25.4			13.3			10.7	
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%	2%	2%	0%	1%	0%	0%	0%	0%	3%	0%	4%
Adj. Flow (vph)	0	1467	608	358	1703	0	0	0	0	364	0	200
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1467	608	358	1703	0	0	0	0	364	0	200
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (m)		10.0	2.0	2.0	10.0					2.0		2.0
Trailing Detector (m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Position(m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Size(m)		0.6	2.0	2.0	0.6					2.0		2.0
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm	pm+pt	NA					Prot		Perm
Protected Phases		4		3	8					1		

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2016 EBL-EBT Backround PM - with Ideal Sat flow 1900vphgpl



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4	8								1
Detector Phase		4	4	3	8					1		1
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					10.0		10.0
Minimum Split (s)		37.0	37.0	9.0	17.0					40.0		40.0
Total Split (s)		58.0	58.0	17.0	75.0					40.0		40.0
Total Split (%)		50.4%	50.4%	14.8%	65.2%					34.8%		34.8%
Maximum Green (s)		51.0	51.0	14.0	68.0					33.0		33.0
Yellow Time (s)		4.0	4.0	3.0	4.0					4.0		4.0
All-Red Time (s)		3.0	3.0	0.0	3.0					3.0		3.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		7.0	7.0	3.0	7.0					7.0		7.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		2.2	2.2	2.5	2.2					3.2		3.2
Recall Mode		Min	Min	None	Min					None		None
Walk Time (s)		15.0	15.0							12.0		12.0
Flash Dont Walk (s)		15.0	15.0							21.0		21.0
Pedestrian Calls (#/hr)		0	0							0		0
Act Effect Green (s)		44.8	44.8	66.0	62.0					16.0		16.0
Actuated g/C Ratio		0.49	0.49	0.72	0.67					0.17		0.17
v/c Ratio		0.85	0.63	0.98	0.71					0.62		0.62
Control Delay		27.0	9.5	68.3	11.9					40.8		33.0
Queue Delay		0.6	0.1	0.0	0.0					0.0		0.0
Total Delay		27.7	9.6	68.3	11.9					40.8		33.0
LOS		C	A	E	B					D		C
Approach Delay		22.4			21.7						38.1	
Approach LOS		C			C						D	
90th %ile Green (s)		51.0	51.0	14.0	68.0					22.5		22.5
90th %ile Term Code		Max	Max	Max	Hold					Gap		Gap
70th %ile Green (s)		51.0	51.0	14.0	68.0					17.6		17.6
70th %ile Term Code		Max	Max	Max	Hold					Gap		Gap
50th %ile Green (s)		48.0	48.0	14.0	65.0					15.8		15.8
50th %ile Term Code		Gap	Gap	Max	Hold					Gap		Gap
30th %ile Green (s)		41.4	41.4	14.0	58.4					14.1		14.1
30th %ile Term Code		Gap	Gap	Max	Hold					Gap		Gap
10th %ile Green (s)		33.6	33.6	14.0	50.6					11.2		11.2
10th %ile Term Code		Gap	Gap	Max	Hold					Gap		Gap
Queue Length 50th (m)		119.6	25.9	49.9	90.7					34.0		23.9
Queue Length 95th (m)		172.3	68.4	#124.5	143.4					50.2		48.7
Internal Link Dist (m)		158.6			328.3			160.1			125.0	
Turn Bay Length (m)			60.0	210.0						40.0		25.0
Base Capacity (vph)		1982	1052	367	2669					1232		604
Starvation Cap Reductn		206	53	0	0					0		0
Spillback Cap Reductn		0	0	0	0					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		0.83	0.61	0.98	0.64					0.30		0.33

Intersection Summary

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 92.2

Natural Cycle: 110

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.98

Intersection Signal Delay: 24.0

Intersection LOS: C

Intersection Capacity Utilization 80.1%

ICU Level of Service D

Analysis Period (min) 15

90th %ile Actuated Cycle: 104.5

70th %ile Actuated Cycle: 99.6

50th %ile Actuated Cycle: 94.8

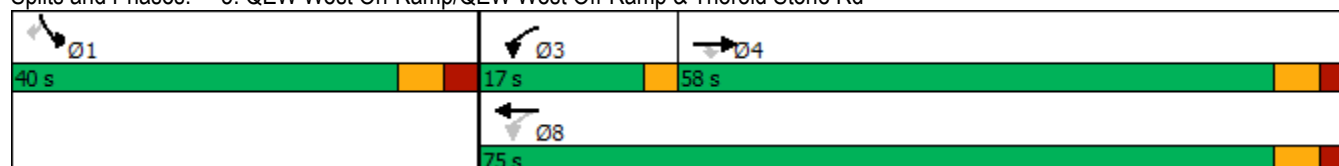
30th %ile Actuated Cycle: 86.5

10th %ile Actuated Cycle: 75.8

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

Queue shown is maximum after two cycles.

Splits and Phases: 5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2036 Future Background PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	182	1500	0	0	1341	396	498	0	328	0	0	0
Future Volume (vph)	182	1500	0	0	1341	396	498	0	328	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	210.0		0.0	0.0		15.0	35.0		45.0	0.0		0.0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						0.97						
Frt						0.850			0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1703	3539	0	0	3574	1583	3502	0	1615	0	0	0
Flt Permitted	0.076						0.950					
Satd. Flow (perm)	136	3539	0	0	3574	1537	3502	0	1615	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						89			66			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		352.3			289.2			127.3			154.2	
Travel Time (s)		25.4			20.8			9.2			11.1	
Confl. Peds. (#/hr)	5		6	6		5			1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	2%	0%	0%	1%	2%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	198	1630	0	0	1458	430	541	0	357	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	198	1630	0	0	1458	430	541	0	357	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2			2	1	1		1			
Detector Template	Left	Thru			Thru	Right	Left		Right			
Leading Detector (m)	2.0	10.0			10.0	2.0	2.0		2.0			
Trailing Detector (m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Position(m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Size(m)	2.0	0.6			0.6	2.0	2.0		2.0			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Delay (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							

Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2036 Future Background PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA			NA	Perm	Prot		Prot			
Protected Phases	7	4			8		5		5			
Permitted Phases	4					8						
Detector Phase	7	4			8	8	5		5			
Switch Phase												
Minimum Initial (s)	6.0	10.0			10.0	10.0	10.0		10.0			
Minimum Split (s)	9.0	37.0			37.0	37.0	14.5		14.5			
Total Split (s)	19.0	57.0			57.0	57.0	39.0		39.0			
Total Split (%)	16.5%	49.6%			49.6%	49.6%	33.9%		33.9%			
Maximum Green (s)	16.0	50.0			50.0	50.0	34.5		34.5			
Yellow Time (s)	3.0	4.0			4.0	4.0	3.5		3.5			
All-Red Time (s)	0.0	3.0			3.0	3.0	1.0		1.0			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Total Lost Time (s)	3.0	7.0			7.0	7.0	4.5		4.5			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	2.5	5.0			5.0	5.0	3.0		3.0			
Recall Mode	None	Min			Min	Min	None		None			
Walk Time (s)		15.0			15.0	15.0						
Flash Dont Walk (s)		15.0			15.0	15.0						
Pedestrian Calls (#/hr)		0			0	0						
Act Effct Green (s)	68.8	64.7			49.3	49.3	24.0		24.0			
Actuated g/C Ratio	0.69	0.64			0.49	0.49	0.24		0.24			
v/c Ratio	0.69	0.71			0.83	0.54	0.65		0.82			
Control Delay	33.9	15.1			29.1	18.6	38.2		45.3			
Queue Delay	0.0	0.0			0.0	0.0	0.0		0.0			
Total Delay	33.9	15.1			29.1	18.6	38.2		45.3			
LOS	C	B			C	B	D		D			
Approach Delay		17.2			26.7			41.0				
Approach LOS		B			C			D				
90th %ile Green (s)	16.0	69.0			50.0	50.0	34.5		34.5			
90th %ile Term Code	Max	Hold			Max	Max	Max		Max			
70th %ile Green (s)	16.0	69.0			50.0	50.0	30.3		30.3			
70th %ile Term Code	Max	Hold			Max	Max	Gap		Gap			
50th %ile Green (s)	13.2	66.2			50.0	50.0	24.8		24.8			
50th %ile Term Code	Gap	Hold			Max	Max	Gap		Gap			
30th %ile Green (s)	9.9	62.9			50.0	50.0	19.0		19.0			
30th %ile Term Code	Gap	Hold			Max	Max	Gap		Gap			
10th %ile Green (s)	7.7	54.5			43.8	43.8	14.2		14.2			
10th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
Queue Length 50th (m)	22.0	107.0			133.9	47.3	52.5		58.4			
Queue Length 95th (m)	53.0	171.8			#221.0	95.0	72.0		95.7			
Internal Link Dist (m)		328.3			265.2			103.3			130.2	
Turn Bay Length (m)	210.0					15.0	35.0		45.0			
Base Capacity (vph)	346	2473			1810	822	1223		607			
Starvation Cap Reductn	0	0			0	0	0		0			
Spillback Cap Reductn	0	0			0	0	0		0			
Storage Cap Reductn	0	0			0	0	0		0			
Reduced v/c Ratio	0.57	0.66			0.81	0.52	0.44		0.59			

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 100.4

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 25.7

Intersection LOS: C

Intersection Capacity Utilization 80.1%

ICU Level of Service D

Analysis Period (min) 15

90th %ile Actuated Cycle: 115

70th %ile Actuated Cycle: 110.8

50th %ile Actuated Cycle: 102.5

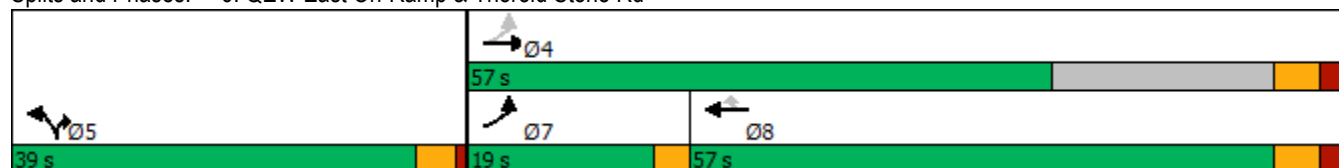
30th %ile Actuated Cycle: 93.4

10th %ile Actuated Cycle: 80.2

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

Queue shown is maximum after two cycles.

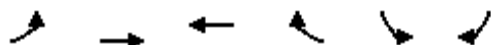
Splits and Phases: 6: QEW East On-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

8: Access Opp Southwood Dr & Site Access #2

2036 Future Background PM - with Ideal Sat flow 1900vphgpl



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr t						
Flt Protected						
Satd. Flow (prot)	0	1863	1863	0	1863	0
Flt Permitted						
Satd. Flow (perm)	0	1863	1863	0	1863	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		175.4	35.0		70.7	
Travel Time (s)		12.6	2.5		5.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control		Stop	Stop		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 0.0%	ICU Level of Service A					
Analysis Period (min) 15						

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd 2031 Future Background PM - with with Ideal Sat flow 1900vphgpl, PHF & LT adj

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	910	88	271	855	312	138	212	352	307	195	84
Future Volume (vph)	93	910	88	271	855	312	138	212	352	307	195	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	85.0		0.0	60.0		35.0	60.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00		1.00	0.99		0.99		0.97	0.99	0.99	
Frt		0.986			0.959				0.850		0.954	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3477	0	1787	3384	0	1770	3574	1583	1787	3329	0
Flt Permitted	0.128			0.105			0.571			0.469		
Satd. Flow (perm)	238	3477	0	197	3384	0	1053	3574	1538	872	3329	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			51				372		54	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		337.7			182.6			114.0			232.7	
Travel Time (s)		24.3			13.1			8.2			16.8	
Confl. Peds. (#/hr)	8		7	7		8	13		15	15		13
Peak Hour Factor	0.93	0.96	0.92	0.92	0.95	0.92	0.92	0.95	0.92	0.92	0.95	0.92
Heavy Vehicles (%)	2%	2%	4%	1%	2%	1%	2%	1%	2%	1%	2%	4%
Adj. Flow (vph)	100	948	96	295	900	339	150	223	383	334	205	91
Shared Lane Traffic (%)												
Lane Group Flow (vph)	100	1044	0	295	1239	0	150	223	383	334	296	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd 2031 Future Background PM - with with Ideal Sat flow 1900vphgpl, PHF & LT adj

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	8.0	8.0	6.0	8.0	
Minimum Split (s)	10.5	35.6		10.5	35.6		9.0	35.4	35.4	9.0	35.4	
Total Split (s)	25.4	43.6		25.4	43.6		19.0	25.0	25.0	21.0	27.0	
Total Split (%)	22.1%	37.9%		22.1%	37.9%		16.5%	21.7%	21.7%	18.3%	23.5%	
Maximum Green (s)	22.4	38.0		22.4	38.0		16.0	19.6	19.6	18.0	21.6	
Yellow Time (s)	3.0	3.5		3.0	3.5		3.0	3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.1		0.0	2.1		0.0	2.1	2.1	0.0	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	5.6		3.0	5.6		3.0	5.4	5.4	3.0	5.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	2.5		3.0	2.5		2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None		None	Min	Min	None	Min	
Walk Time (s)		11.0			11.0			11.0	11.0		11.0	
Flash Dont Walk (s)		19.0			19.0			19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effct Green (s)	45.5	34.4		55.9	44.1		25.7	12.0	12.0	34.1	17.4	
Actuated g/C Ratio	0.47	0.36		0.58	0.46		0.27	0.12	0.12	0.35	0.18	
v/c Ratio	0.40	0.84		0.79	0.79		0.41	0.50	0.74	0.72	0.46	
Control Delay	16.6	36.7		37.5	27.1		27.5	45.1	14.8	36.0	32.9	
Queue Delay	0.0	0.0		0.0	0.7		0.0	0.0	0.0	0.0	0.0	
Total Delay	16.6	36.7		37.5	27.7		27.5	45.1	14.8	36.0	32.9	
LOS	B	D		D	C		C	D	B	D	C	
Approach Delay		34.9			29.6			26.2			34.6	
Approach LOS		C			C			C			C	
90th %ile Green (s)	12.0	38.0		22.4	48.4		16.0	19.6	19.6	18.0	21.6	
90th %ile Term Code	Gap	Max		Max	Hold		Max	Max	Max	Max	Hold	
70th %ile Green (s)	8.9	38.0		20.3	49.4		13.4	12.9	12.9	18.0	17.5	
70th %ile Term Code	Gap	Max		Gap	Hold		Gap	Gap	Gap	Max	Hold	
50th %ile Green (s)	8.1	36.5		16.5	44.9		11.3	11.2	11.2	18.0	17.9	
50th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Gap	Gap	Max	Hold	
30th %ile Green (s)	7.5	32.5		13.0	38.0		9.5	9.7	9.7	16.9	17.1	
30th %ile Term Code	Gap	Hold		Gap	Max		Gap	Gap	Gap	Gap	Hold	
10th %ile Green (s)	0.0	26.2		8.8	38.0		7.1	8.0	8.0	12.1	13.0	
10th %ile Term Code	Skip	Hold		Gap	Max		Gap	Min	Min	Gap	Hold	
Queue Length 50th (m)	8.2	98.0		38.1	105.3		21.4	22.7	2.0	53.5	22.9	
Queue Length 95th (m)	18.4	#162.7		77.0	163.7		40.2	37.2	32.6	88.7	40.9	
Internal Link Dist (m)		313.7			158.6			90.0			208.7	
Turn Bay Length (m)	45.0			85.0			60.0		35.0	60.0		
Base Capacity (vph)	502	1414		493	1578		457	746	615	484	808	
Starvation Cap Reductn	0	0		0	108		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.20	0.74		0.60	0.84		0.33	0.30	0.62	0.69	0.37	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd 2031 Future Background PM - with with Ideal Sat flow 1900vphgpl, PHF & LT adj

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 96.3

Natural Cycle: 95

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 31.2

Intersection LOS: C

Intersection Capacity Utilization 89.8%

ICU Level of Service E

Analysis Period (min) 15

90th %ile Actuated Cycle: 115

70th %ile Actuated Cycle: 106.2

50th %ile Actuated Cycle: 99.2

30th %ile Actuated Cycle: 89.1

10th %ile Actuated Cycle: 72.1

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Montrose Road & Thorold Stone Rd

 Ø1	 Ø2	 Ø3	 Ø4
21 s	25 s	25.4 s	43.6 s
 Ø5	 Ø6	 Ø7	 Ø8
19 s	27 s	25.4 s	43.6 s

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd 2036 Future Background PM - with with Ideal Sat flow 1900vphgpl, PHF & LT adj

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	102	990	95	295	930	340	150	231	383	334	212	92
Future Volume (vph)	102	990	95	295	930	340	150	231	383	334	212	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	85.0		0.0	60.0		35.0	60.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00			0.99		0.99		0.97	0.99	0.99	
Frt		0.986			0.960				0.850		0.954	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3477	0	1787	3387	0	1770	3574	1583	1787	3328	0
Flt Permitted	0.106			0.099			0.556			0.429		
Satd. Flow (perm)	197	3477	0	186	3387	0	1026	3574	1538	798	3328	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			48				363		55	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		337.7			182.6			114.0			232.7	
Travel Time (s)		24.3			13.1			8.2			16.8	
Confl. Peds. (#/hr)	8		7	7		8	13		15	15		13
Peak Hour Factor	0.93	0.96	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.95	0.92
Heavy Vehicles (%)	2%	2%	4%	1%	2%	1%	2%	1%	2%	1%	2%	4%
Adj. Flow (vph)	110	1031	103	321	1011	370	163	243	416	363	223	100
Shared Lane Traffic (%)												
Lane Group Flow (vph)	110	1134	0	321	1381	0	163	243	416	363	323	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd 2036 Future Background PM - with with Ideal Sat flow 1900vphgpl, PHF & LT adj

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	8.0	8.0	6.0	8.0	
Minimum Split (s)	10.5	35.6		10.5	35.6		9.0	35.4	35.4	9.0	35.4	
Total Split (s)	25.4	43.6		25.4	43.6		19.0	24.0	24.0	22.0	27.0	
Total Split (%)	22.1%	37.9%		22.1%	37.9%		16.5%	20.9%	20.9%	19.1%	23.5%	
Maximum Green (s)	22.4	38.0		22.4	38.0		16.0	18.6	18.6	19.0	21.6	
Yellow Time (s)	3.0	3.5		3.0	3.5		3.0	3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.1		0.0	2.1		0.0	2.1	2.1	0.0	2.1	
Lost Time Adjust (s)	0.0	0.0		-1.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	5.6		2.0	5.6		3.0	5.4	5.4	3.0	5.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	2.5		3.0	2.5		2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None		None	Min	Min	None	Min	
Walk Time (s)		11.0			11.0			11.0	11.0		11.0	
Flash Dont Walk (s)		19.0			19.0			19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effect Green (s)	49.1	37.6		61.7	46.2		27.0	12.7	12.7	36.3	19.0	
Actuated g/C Ratio	0.48	0.36		0.60	0.45		0.26	0.12	0.12	0.35	0.18	
v/c Ratio	0.48	0.89		0.81	0.89		0.46	0.55	0.82	0.80	0.49	
Control Delay	22.1	42.1		40.6	35.0		29.6	48.3	22.2	42.7	35.0	
Queue Delay	0.0	0.0		0.0	7.2		0.0	0.0	0.0	0.0	0.0	
Total Delay	22.1	42.1		40.6	42.2		29.6	48.3	22.2	42.7	35.0	
LOS	C	D		D	D		C	D	C	D	C	
Approach Delay		40.3			41.9			31.4			39.1	
Approach LOS		D			D			C			D	
90th %ile Green (s)	12.8	38.0		22.4	47.6		16.0	18.6	18.6	19.0	21.6	
90th %ile Term Code	Gap	Max		Max	Hold		Max	Max	Max	Max	Hold	
70th %ile Green (s)	9.7	38.0		22.4	50.7		14.2	15.5	15.5	19.0	20.3	
70th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
50th %ile Green (s)	8.4	38.0		19.0	48.6		12.1	12.1	12.1	19.0	19.0	
50th %ile Term Code	Gap	Max		Gap	Hold		Gap	Gap	Gap	Max	Hold	
30th %ile Green (s)	7.5	38.0		15.1	45.6		10.0	10.4	10.4	19.0	19.4	
30th %ile Term Code	Gap	Max		Gap	Hold		Gap	Gap	Gap	Max	Hold	
10th %ile Green (s)	6.3	34.4		9.9	38.0		7.6	8.2	8.2	14.4	15.0	
10th %ile Term Code	Gap	Hold		Gap	Max		Gap	Gap	Gap	Gap	Hold	
Queue Length 50th (m)	9.5	119.0		46.9	132.4		25.0	26.5	10.6	63.4	27.3	
Queue Length 95th (m)	24.0	#187.3		#87.3	#213.9		43.3	40.6	48.9	#104.5	44.7	
Internal Link Dist (m)		313.7			158.6			90.0			208.7	
Turn Bay Length (m)	45.0			85.0			60.0		35.0	60.0		
Base Capacity (vph)	460	1304		479	1544		429	653	577	465	749	
Starvation Cap Reductn	0	0		0	141		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.24	0.87		0.67	0.98		0.38	0.37	0.72	0.78	0.43	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd 2036 Future Background PM - with with Ideal Sat flow 1900vphgpl, PHF & LT adj

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 103.1

Natural Cycle: 95

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 39.1

Intersection LOS: D

Intersection Capacity Utilization 95.0%

ICU Level of Service F

Analysis Period (min) 15

90th %ile Actuated Cycle: 115

70th %ile Actuated Cycle: 111.9

50th %ile Actuated Cycle: 105.1

30th %ile Actuated Cycle: 99.5

10th %ile Actuated Cycle: 83.9

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Montrose Road & Thorold Stone Rd

 Ø1	 Ø2	 Ø3	 Ø4
22 s	24 s	25.4 s	43.6 s
 Ø5	 Ø6	 Ø7	 Ø8
19 s	27 s	25.4 s	43.6 s

APPENDIX

F-2

*Future Total
Synchro Results*

Lanes, Volumes, Timings

1: Montrose Road & Mt Carmel Blvd

2026 Future Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	50	54	0	3	23	134	18	1	178	2
Future Volume (vph)	3	0	50	54	0	3	23	134	18	1	178	2
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1900	1433	1900	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.872			0.993			0.986			0.999	
Flt Protected		0.997			0.955			0.993				
Satd. Flow (prot)	0	1246	0	0	1359	0	0	1382	0	0	1404	0
Flt Permitted		0.997			0.955			0.993				
Satd. Flow (perm)	0	1246	0	0	1359	0	0	1382	0	0	1404	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		97.9			84.1			51.6			220.4	
Travel Time (s)		7.0			6.1			3.7			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Adj. Flow (vph)	3	0	54	59	0	3	25	146	20	1	193	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	57	0	0	62	0	0	191	0	0	196	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	46.0%						ICU Level of Service A					
Analysis Period (min)	15											

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

2026 Future Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1	14	61	1	16	2	159	53	16	264	0
Future Volume (vph)	0	1	14	61	1	16	2	159	53	16	264	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1178	1301	1454	1579	1301	1454	1338	1900
Storage Length (m)	0.0		0.0	0.0		50.0	50.0		50.0	40.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.873				0.850			0.850			
Flt Protected					0.953		0.950			0.950		
Satd. Flow (prot)	0	1659	0	0	1070	1074	1381	1579	1106	1381	1312	0
Flt Permitted					0.718		0.584			0.648		
Satd. Flow (perm)	0	1659	0	0	806	1074	849	1579	1106	942	1312	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15				75			81			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		92.8			175.4			126.5			73.6	
Travel Time (s)		6.7			12.6			9.1			5.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	5%	0%	3%	0%	0%	0%	0%	2%	0%
Adj. Flow (vph)	0	1	15	66	1	17	2	173	58	17	287	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	16	0	0	67	17	2	173	58	17	287	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.80	1.60	1.40	1.26	1.60	1.40	1.55	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type		NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

2026 Future Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	6.0	10.0	10.0	6.0	10.0	
Minimum Split (s)	28.2	28.2		28.2	28.2	28.2	12.0	29.7	29.7	10.5	29.7	
Total Split (s)	37.2	37.2		37.2	37.2	37.2	18.0	41.7	41.7	18.0	41.7	
Total Split (%)	38.4%	38.4%		38.4%	38.4%	38.4%	18.6%	43.0%	43.0%	18.6%	43.0%	
Maximum Green (s)	30.0	30.0		30.0	30.0	30.0	15.0	35.0	35.0	15.0	35.0	
Yellow Time (s)	4.1	4.1		4.1	4.1	4.1	3.0	4.1	4.1	3.0	4.1	
All-Red Time (s)	3.1	3.1		3.1	3.1	3.1	0.0	2.6	2.6	0.0	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)		7.2			7.2	7.2	3.0	6.7	6.7	3.0	6.7	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Walk Time (s)	8.0	8.0		8.0	8.0	8.0		9.0	9.0		9.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0		14.0	14.0		14.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effct Green (s)		10.6			10.7	10.7	28.2	27.0	27.0	28.2	27.0	
Actuated g/C Ratio		0.25			0.25	0.25	0.67	0.64	0.64	0.67	0.64	
v/c Ratio		0.04			0.33	0.05	0.00	0.17	0.08	0.02	0.34	
Control Delay		9.2			20.6	0.3	5.5	9.9	2.6	5.8	11.6	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		9.2			20.6	0.3	5.5	9.9	2.6	5.8	11.6	
LOS		A			C	A	A	A	A	A	B	
Approach Delay		9.2			16.5			8.0			11.3	
Approach LOS		A			B			A			B	
90th %ile Green (s)	16.9	16.9		16.9	16.9	16.9	6.0	25.6	25.6	6.0	25.6	
90th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Min	Hold	Hold	Min	Gap	
70th %ile Green (s)	11.1	11.1		11.1	11.1	11.1	0.0	15.7	15.7	0.0	15.7	
70th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Hold	Hold	Skip	Gap	
50th %ile Green (s)	9.3	9.3		9.3	9.3	9.3	0.0	17.1	17.1	0.0	17.1	
50th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Dwell	Dwell	Skip	Dwell	
30th %ile Green (s)	0.0	0.0		0.0	0.0	0.0	0.0	25.5	25.5	0.0	25.5	
30th %ile Term Code	Skip	Skip		Skip	Skip	Skip	Skip	Dwell	Dwell	Skip	Dwell	
10th %ile Green (s)	0.0	0.0		0.0	0.0	0.0	0.0	25.0	25.0	0.0	25.0	
10th %ile Term Code	Skip	Skip		Skip	Skip	Skip	Skip	Dwell	Dwell	Skip	Dwell	
Queue Length 50th (m)		0.1			4.1	0.0	0.1	7.4	0.0	0.5	14.1	
Queue Length 95th (m)		4.3			17.4	0.0	0.8	27.9	4.4	3.0	50.7	
Internal Link Dist (m)		68.8			151.4			102.5			49.6	
Turn Bay Length (m)						50.0	50.0		50.0	40.0		
Base Capacity (vph)		1270			615	837	778	1346	955	806	1119	
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		0.01			0.11	0.02	0.00	0.13	0.06	0.02	0.26	
Intersection Summary												

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

2026 Future Total AM

Area Type: Other

Cycle Length: 96.9

Actuated Cycle Length: 42.1

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.34

Intersection Signal Delay: 10.7

Intersection LOS: B

Intersection Capacity Utilization 43.5%

ICU Level of Service A

Analysis Period (min) 15

90th %ile Actuated Cycle: 65.4

70th %ile Actuated Cycle: 40.7

50th %ile Actuated Cycle: 40.3

30th %ile Actuated Cycle: 32.2

10th %ile Actuated Cycle: 31.7

Splits and Phases: 2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

 Ø1	 Ø2	 Ø4
18 s	41.7 s	37.2 s
 Ø5	 Ø6	 Ø8
18 s	41.7 s	37.2 s

Lanes, Volumes, Timings

3: Montrose Road & Cameron Ct

2026 Future Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1	8	22	0	2	1	213	60	6	333	1
Future Volume (vph)	0	1	8	22	0	2	1	213	60	6	333	1
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1454	1579	1301	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.878			0.990			0.967					
Flt Protected				0.956						0.999		
Satd. Flow (prot)	0	1144	0	0	1356	0	0	2882	0	0	1387	0
Flt Permitted				0.956						0.999		
Satd. Flow (perm)	0	1144	0	0	1356	0	0	2882	0	0	1387	0
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	167.1			64.9			232.7			126.5		
Travel Time (s)	12.0			4.7			16.8			9.1		
Confl. Peds. (#/hr)	1		3	3		1	4		4	4		4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	100%	0%	0%	0%	0%	0%	0%	3%	67%	2%	0%
Adj. Flow (vph)	0	1	9	24	0	2	1	232	65	7	362	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	10	0	0	26	0	0	298	0	0	370	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0			0.0			3.6			3.6		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.40	1.26	1.60	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control	Stop			Stop			Free			Free		
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	45.0%						ICU Level of Service A					
Analysis Period (min)	15											

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2026 Future Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	674	73	192	500	162	68	156	269	252	113	78
Future Volume (vph)	71	674	73	192	500	162	68	156	269	252	113	78
Ideal Flow (vphpl)	1454	1579	1301	1454	1579	1301	1454	1579	1301	1454	1579	1301
Storage Length (m)	45.0		0.0	85.0		0.0	60.0		35.0	60.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	1.00		0.99		0.99	1.00	0.99	
Frt		0.985			0.963				0.850		0.939	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1354	2888	0	1368	2829	0	1354	2970	1084	1368	2718	0
Flt Permitted	0.352			0.185			0.621			0.520		
Satd. Flow (perm)	501	2888	0	266	2829	0	880	2970	1069	747	2718	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			41				292		85	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		337.7			182.6			114.0			232.7	
Travel Time (s)		24.3			13.1			8.2			16.8	
Confl. Peds. (#/hr)	2		1	1		2	7		2	2		7
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 (%)	2%	2%	4%	1%	2%	1%	2%	1%	2%	1%	2%	4%
Adj. Flow (vph)	77	733	79	209	543	176	74	170	292	274	123	85
Shared Lane Traffic (%)												
Lane Group Flow (vph)	77	812	0	209	719	0	74	170	292	274	208	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.40	1.26	1.60	1.40	1.26	1.60	1.40	1.26	1.60	1.40	1.26	1.60
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2026 Future Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	8.0	8.0	6.0	8.0	
Minimum Split (s)	10.5	35.6		10.5	35.6		9.0	35.4	35.4	9.0	35.4	
Total Split (s)	20.0	43.6		20.0	43.6		19.0	32.4	32.4	19.0	32.4	
Total Split (%)	17.4%	37.9%		17.4%	37.9%		16.5%	28.2%	28.2%	16.5%	28.2%	
Maximum Green (s)	17.0	38.0		17.0	38.0		16.0	27.0	27.0	16.0	27.0	
Yellow Time (s)	3.0	3.5		3.0	3.5		3.0	3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.1		0.0	2.1		0.0	2.1	2.1	0.0	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	5.6		3.0	5.6		3.0	5.4	5.4	3.0	5.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	2.5		3.0	2.5		2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None		None	Min	Min	None	Min	
Walk Time (s)		11.0			11.0			11.0	11.0		11.0	
Flash Dont Walk (s)		19.0			19.0			19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effect Green (s)	40.0	29.0		47.5	35.8		23.0	11.8	11.8	32.5	20.6	
Actuated g/C Ratio	0.46	0.34		0.55	0.42		0.27	0.14	0.14	0.38	0.24	
v/c Ratio	0.25	0.83		0.68	0.60		0.26	0.42	0.73	0.70	0.29	
Control Delay	12.4	35.2		24.2	22.3		23.1	39.4	16.7	34.2	20.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	12.4	35.2		24.2	22.3		23.1	39.4	16.7	34.2	20.0	
LOS	B	D		C	C		C	D	B	C	C	
Approach Delay		33.2			22.7			24.8			28.1	
Approach LOS		C			C			C			C	
90th %ile Green (s)	11.1	38.0		17.0	43.9		12.4	22.0	22.0	16.0	25.6	
90th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
70th %ile Green (s)	9.1	35.3		14.8	41.0		10.2	11.8	11.8	16.0	17.6	
70th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Gap	Gap	Max	Hold	
50th %ile Green (s)	8.3	30.2		12.8	34.7		8.7	10.3	10.3	16.0	17.6	
50th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Gap	Gap	Max	Hold	
30th %ile Green (s)	7.2	24.3		10.9	28.0		7.0	8.6	8.6	15.8	17.4	
30th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Gap	Gap	Gap	Hold	
10th %ile Green (s)	0.0	18.7		8.4	30.1		0.0	8.0	8.0	10.9	21.9	
10th %ile Term Code	Skip	Gap		Gap	Hold		Skip	Min	Min	Gap	Hold	
Queue Length 50th (m)	5.8	65.2		17.4	48.1		8.5	14.7	0.0	37.0	9.4	
Queue Length 95th (m)	15.6	111.7		44.5	84.3		21.0	27.7	28.0	#73.2	22.5	
Internal Link Dist (m)		313.7			158.6			90.0			208.7	
Turn Bay Length (m)	45.0			85.0			60.0		35.0	60.0		
Base Capacity (vph)	446	1326		371	1362		400	964	544	401	940	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.17	0.61		0.56	0.53		0.18	0.18	0.54	0.68	0.22	

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 86.2

Natural Cycle: 95

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 27.3

Intersection LOS: C

Intersection Capacity Utilization 81.1%

ICU Level of Service D

Analysis Period (min) 15

90th %ile Actuated Cycle: 110

70th %ile Actuated Cycle: 94.9

50th %ile Actuated Cycle: 86.3

30th %ile Actuated Cycle: 76.6

10th %ile Actuated Cycle: 63

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

Queue shown is maximum after two cycles.

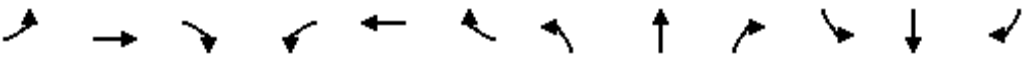
Splits and Phases: 4: Montrose Road & Thorold Stone Rd

 Ø1	 Ø2	 Ø3	 Ø4
19 s	32.4 s	20 s	43.6 s
 Ø5	 Ø6	 Ø7	 Ø8
19 s	32.4 s	20 s	43.6 s

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2026 Future Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑					↖↗		↖
Traffic Volume (vph)	0	808	426	181	793	0	0	0	0	195	0	94
Future Volume (vph)	0	808	426	181	793	0	0	0	0	195	0	94
Ideal Flow (vphpl)	1454	1579	1301	1454	1579	1301	1900	1900	1900	2144	1900	1301
Storage Length (m)	0.0		60.0	210.0		0.0	0.0		0.0	40.0		25.0
Storage Lanes	0		1	1		0	0		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	2941	1084	1381	2970	0	0	0	0	3836	0	1063
Flt Permitted				0.220						0.950		
Satd. Flow (perm)	0	2941	1084	320	2970	0	0	0	0	3836	0	1063
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			463									102
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		182.6			352.3			184.1			149.0	
Travel Time (s)		13.1			25.4			13.3			10.7	
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%	2%	2%	0%	1%	0%	0%	0%	0%	3%	0%	4%
Adj. Flow (vph)	0	878	463	197	862	0	0	0	0	212	0	102
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	878	463	197	862	0	0	0	0	212	0	102
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.40	1.26	1.60	1.40	1.26	1.60	1.00	1.00	1.00	0.85	1.00	1.60
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (m)		10.0	2.0	2.0	10.0					2.0		2.0
Trailing Detector (m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Position(m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Size(m)		0.6	2.0	2.0	0.6					2.0		2.0
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm	pm+pt	NA					Prot		Perm
Protected Phases		4		3	8					1		

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2026 Future Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4	8								1
Detector Phase		4	4	3	8					1		1
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					10.0		10.0
Minimum Split (s)		37.0	37.0	9.0	17.0					40.0		40.0
Total Split (s)		58.0	58.0	17.0	75.0					40.0		40.0
Total Split (%)		50.4%	50.4%	14.8%	65.2%					34.8%		34.8%
Maximum Green (s)		51.0	51.0	14.0	68.0					33.0		33.0
Yellow Time (s)		4.0	4.0	3.0	4.0					4.0		4.0
All-Red Time (s)		3.0	3.0	0.0	3.0					3.0		3.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		7.0	7.0	3.0	7.0					7.0		7.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		2.2	2.2	2.5	2.2					3.2		3.2
Recall Mode		Min	Min	None	Min					None		None
Walk Time (s)		15.0	15.0							12.0		12.0
Flash Dont Walk (s)		15.0	15.0							21.0		21.0
Pedestrian Calls (#/hr)		0	0							0		0
Act Effect Green (s)		23.5	23.5	39.1	35.0					10.7		10.7
Actuated g/C Ratio		0.39	0.39	0.65	0.58					0.18		0.18
v/c Ratio		0.76	0.66	0.55	0.50					0.31		0.37
Control Delay		20.8	6.6	10.2	8.2					24.8		10.9
Queue Delay		0.0	0.2	0.0	0.0					0.0		0.0
Total Delay		20.8	6.8	10.2	8.2					24.8		10.9
LOS		C	A	B	A					C		B
Approach Delay		16.0			8.6						20.3	
Approach LOS		B			A						C	
90th %ile Green (s)		34.4	34.4	11.2	48.6					12.7		12.7
90th %ile Term Code		Gap	Gap	Gap	Hold					Gap		Gap
70th %ile Green (s)		26.5	26.5	9.2	38.7					10.5		10.5
70th %ile Term Code		Gap	Gap	Gap	Hold					Gap		Gap
50th %ile Green (s)		23.0	23.0	8.3	34.3					10.0		10.0
50th %ile Term Code		Gap	Gap	Gap	Hold					Min		Min
30th %ile Green (s)		19.3	19.3	7.5	29.8					10.0		10.0
30th %ile Term Code		Gap	Gap	Gap	Hold					Min		Min
10th %ile Green (s)		16.1	16.1	6.4	25.5					10.0		10.0
10th %ile Term Code		Gap	Gap	Gap	Hold					Min		Min
Queue Length 50th (m)		43.0	0.0	7.2	25.6					10.8		0.0
Queue Length 95th (m)		71.2	17.9	15.7	40.8					24.1		12.8
Internal Link Dist (m)		158.6			328.3			160.1			125.0	
Turn Bay Length (m)			60.0	210.0						40.0		25.0
Base Capacity (vph)		2533	998	461	2912					2153		641
Starvation Cap Reductn		0	129	0	0					0		0
Spillback Cap Reductn		0	0	0	0					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		0.35	0.53	0.43	0.30					0.10		0.16
Intersection Summary												

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2026 Future Total AM

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 60

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 13.6

Intersection LOS: B

Intersection Capacity Utilization 75.0%

ICU Level of Service D

Analysis Period (min) 15

90th %ile Actuated Cycle: 75.3

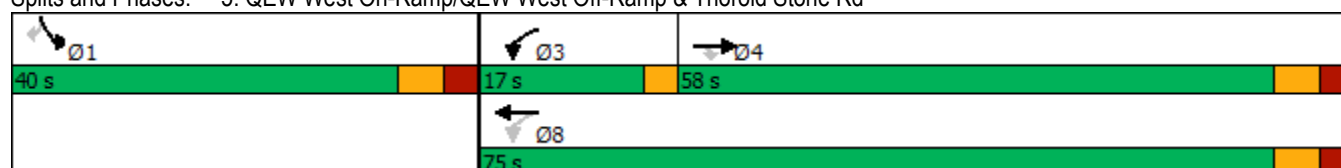
70th %ile Actuated Cycle: 63.2

50th %ile Actuated Cycle: 58.3

30th %ile Actuated Cycle: 53.8

10th %ile Actuated Cycle: 49.5

Splits and Phases: 5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings
6: QEW East On-Ramp & Thorold Stone Rd

2026 Future Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 					
Traffic Volume (vph)	129	879	0	0	700	218	283	0	199	0	0	0
Future Volume (vph)	129	879	0	0	700	218	283	0	199	0	0	0
Ideal Flow (vphpl)	1454	1579	1301	1454	1579	1301	2144	1900	1900	1900	1900	1900
Storage Length (m)	210.0		0.0	0.0		15.0	35.0		45.0	0.0		0.0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1303	2941	0	0	2970	1084	3951	0	1615	0	0	0
Flt Permitted	0.283						0.950					
Satd. Flow (perm)	388	2941	0	0	2970	1084	3951	0	1615	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						94			134			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		352.3			289.2			188.0			154.2	
Travel Time (s)		25.4			20.8			13.5			11.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	2%	0%	0%	1%	2%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	140	955	0	0	761	237	308	0	216	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	140	955	0	0	761	237	308	0	216	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.40	1.26	1.60	1.40	1.26	1.60	0.85	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2			2	1	1		1			
Detector Template	Left	Thru			Thru	Right	Left		Right			
Leading Detector (m)	2.0	10.0			10.0	2.0	2.0		2.0			
Trailing Detector (m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Position(m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Size(m)	2.0	0.6			0.6	2.0	2.0		2.0			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Delay (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type	pm+pt	NA			NA	Perm	Prot		Prot			
Protected Phases	7	4			8		5		5			

Lanes, Volumes, Timings
6: QEW East On-Ramp & Thorold Stone Rd

2026 Future Total AM

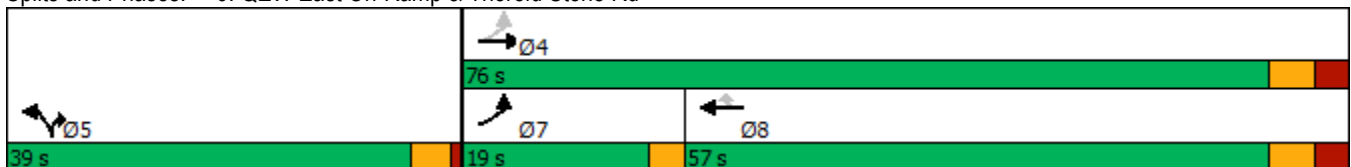
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4					8						
Detector Phase	7	4			8	8	5		5			
Switch Phase												
Minimum Initial (s)	6.0	10.0			10.0	10.0	10.0		10.0			
Minimum Split (s)	9.0	37.0			37.0	37.0	14.5		14.5			
Total Split (s)	19.0	76.0			57.0	57.0	39.0		39.0			
Total Split (%)	16.5%	66.1%			49.6%	49.6%	33.9%		33.9%			
Maximum Green (s)	16.0	69.0			50.0	50.0	34.5		34.5			
Yellow Time (s)	3.0	4.0			4.0	4.0	3.5		3.5			
All-Red Time (s)	0.0	3.0			3.0	3.0	1.0		1.0			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Total Lost Time (s)	3.0	7.0			7.0	7.0	4.5		4.5			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	2.5	5.0			5.0	5.0	3.0		3.0			
Recall Mode	None	Min			Min	Min	None		None			
Walk Time (s)		15.0			15.0	15.0						
Flash Dont Walk (s)		15.0			15.0	15.0						
Pedestrian Calls (#/hr)		0			0	0						
Act Effct Green (s)	43.7	39.5			26.2	26.2	11.9		11.9			
Actuated g/C Ratio	0.69	0.62			0.41	0.41	0.19		0.19			
v/c Ratio	0.34	0.52			0.62	0.47	0.42		0.53			
Control Delay	5.7	7.6			17.4	12.0	26.6		16.6			
Queue Delay	0.0	0.0			0.0	0.0	0.0		0.0			
Total Delay	5.7	7.6			17.4	12.0	26.6		16.6			
LOS	A	A			B	B	C		B			
Approach Delay		7.4			16.1			22.5				
Approach LOS		A			B			C				
90th %ile Green (s)	15.6	57.3			38.7	38.7	16.5		16.5			
90th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
70th %ile Green (s)	11.9	44.8			29.9	29.9	12.1		12.1			
70th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
50th %ile Green (s)	9.9	38.1			25.2	25.2	10.5		10.5			
50th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
30th %ile Green (s)	8.3	33.1			21.8	21.8	10.0		10.0			
30th %ile Term Code	Gap	Hold			Gap	Gap	Min		Min			
10th %ile Green (s)	6.4	26.6			17.2	17.2	10.0		10.0			
10th %ile Term Code	Gap	Hold			Gap	Gap	Min		Min			
Queue Length 50th (m)	4.2	26.5			34.6	10.6	16.7		8.4			
Queue Length 95th (m)	11.7	49.2			66.3	34.4	36.1		33.4			
Internal Link Dist (m)		328.3			265.2			164.0			130.2	
Turn Bay Length (m)	210.0					15.0	35.0		45.0			
Base Capacity (vph)	507	2829			2414	898	2237		972			
Starvation Cap Reductn	0	0			0	0	0		0			
Spillback Cap Reductn	0	0			0	0	0		0			
Storage Cap Reductn	0	0			0	0	0		0			
Reduced v/c Ratio	0.28	0.34			0.32	0.26	0.14		0.22			
Intersection Summary												

Lanes, Volumes, Timings 6: QEW East On-Ramp & Thorold Stone Rd

2026 Future Total AM

Area Type:	Other		
Cycle Length:	115		
Actuated Cycle Length:	63.3		
Natural Cycle:	65		
Control Type:	Actuated-Uncoordinated		
Maximum v/c Ratio:	0.62		
Intersection Signal Delay:	13.7	Intersection LOS:	B
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		
90th %ile Actuated Cycle:	85.3		
70th %ile Actuated Cycle:	68.4		
50th %ile Actuated Cycle:	60.1		
30th %ile Actuated Cycle:	54.6		
10th %ile Actuated Cycle:	48.1		

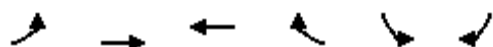
Splits and Phases: 6: QEW East On-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

8: Access Opp Southwood Dr & Site Access 2#

2026 Future Total AM



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	0	0	0	0	31
Future Volume (vph)	10	0	0	0	0	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.865					
Fl _t Protected	0.950					
Satd. Flow (prot)	0	1770	1863	0	1611	0
Fl _t Permitted	0.950					
Satd. Flow (perm)	0	1770	1863	0	1611	0
Link Speed (k/h)	50					
Link Distance (m)	175.4					35.0
Travel Time (s)	12.6					2.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	0	0	0	0	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	11	0	0	34	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)	0.0					0.0
Link Offset(m)	0.0					0.0
Crosswalk Width(m)	4.8					4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control	Stop		Stop	Stop		
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utilization 13.3%				ICU Level of Service A		
Analysis Period (min) 15						

Lanes, Volumes, Timings

1: Montrose Road & Mt Carmel Blvd

2026 Future Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	39	31	0	3	49	268	0	0	210	5
Future Volume (vph)	3	0	39	31	0	3	49	268	0	0	210	5
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1900	1433	1900	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.874			0.989						0.997	
Flt Protected		0.997			0.956			0.992				
Satd. Flow (prot)	0	1249	0	0	1355	0	0	1398	0	0	1401	0
Flt Permitted		0.997			0.956			0.992				
Satd. Flow (perm)	0	1249	0	0	1355	0	0	1398	0	0	1401	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		97.9			84.1			51.6			220.4	
Travel Time (s)		7.0			6.1			3.7			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Adj. Flow (vph)	3	0	42	34	0	3	53	291	0	0	228	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	45	0	0	37	0	0	344	0	0	233	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	56.5%						ICU Level of Service B					
Analysis Period (min)	15											

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

2026 Future Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	152	1	77	6	284	86	60	218	2
Future Volume (vph)	1	0	1	152	1	77	6	284	86	60	218	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1178	1301	1454	1579	1301	1454	1338	1900
Storage Length (m)	0.0		0.0	0.0		50.0	50.0		50.0	40.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00		1.00		0.98	1.00	1.00	
Frt		0.932				0.850			0.850		0.999	
Flt Protected		0.976			0.953		0.950			0.950		
Satd. Flow (prot)	0	1709	0	0	1069	1074	1381	1579	1106	1381	1310	0
Flt Permitted		0.890			0.727		0.610			0.472		
Satd. Flow (perm)	0	1558	0	0	814	1074	884	1579	1081	685	1310	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		75				84			93			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		92.8			175.4			126.5			73.6	
Travel Time (s)		6.7			12.6			9.1			5.3	
Confl. Peds. (#/hr)			1	1			2		1	1		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	5%	0%	3%	0%	0%	0%	0%	2%	0%
Adj. Flow (vph)	1	0	1	165	1	84	7	309	93	65	237	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2	0	0	166	84	7	309	93	65	239	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.80	1.60	1.40	1.26	1.60	1.40	1.55	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

2026 Future Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	6.0	10.0	10.0	6.0	10.0	
Minimum Split (s)	28.2	28.2		28.2	28.2	28.2	12.0	29.7	29.7	10.5	29.7	
Total Split (s)	37.2	37.2		37.2	37.2	37.2	18.0	41.7	41.7	18.0	41.7	
Total Split (%)	38.4%	38.4%		38.4%	38.4%	38.4%	18.6%	43.0%	43.0%	18.6%	43.0%	
Maximum Green (s)	30.0	30.0		30.0	30.0	30.0	15.0	35.0	35.0	15.0	35.0	
Yellow Time (s)	4.1	4.1		4.1	4.1	4.1	3.0	4.1	4.1	3.0	4.1	
All-Red Time (s)	3.1	3.1		3.1	3.1	3.1	0.0	2.6	2.6	0.0	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)		7.2			7.2	7.2	3.0	6.7	6.7	3.0	6.7	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Walk Time (s)	8.0	8.0		8.0	8.0	8.0		9.0	9.0		9.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0		14.0	14.0		14.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effect Green (s)		18.6			18.6	18.6	28.4	21.3	21.3	30.8	25.6	
Actuated g/C Ratio		0.31			0.31	0.31	0.47	0.35	0.35	0.51	0.42	
v/c Ratio		0.00			0.66	0.22	0.01	0.55	0.21	0.15	0.43	
Control Delay		0.0			33.7	6.2	9.2	23.5	6.2	9.8	17.5	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		0.0			33.7	6.2	9.2	23.5	6.2	9.8	17.5	
LOS		A			C	A	A	C	A	A	B	
Approach Delay					24.5			19.3			15.8	
Approach LOS					C			B			B	
90th %ile Green (s)	30.0	30.0		30.0	30.0	30.0	6.0	28.0	28.0	9.1	31.1	
90th %ile Term Code	Hold	Hold		Max	Max	Max	Min	Gap	Gap	Gap	Hold	
70th %ile Green (s)	23.6	23.6		23.6	23.6	23.6	0.0	22.1	22.1	7.8	32.9	
70th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Gap	Hold	
50th %ile Green (s)	18.0	18.0		18.0	18.0	18.0	0.0	17.1	17.1	6.6	26.7	
50th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Gap	Hold	
30th %ile Green (s)	13.7	13.7		13.7	13.7	13.7	0.0	13.4	13.4	0.0	13.4	
30th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Skip	Hold	
10th %ile Green (s)	9.7	9.7		9.7	9.7	9.7	0.0	23.8	23.8	0.0	23.8	
10th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Dwell	Dwell	Skip	Dwell	
Queue Length 50th (m)		0.0			16.0	0.0	0.3	30.3	0.0	3.4	16.9	
Queue Length 95th (m)		0.0			44.3	9.4	2.5	69.6	10.1	11.6	52.8	
Internal Link Dist (m)		68.8			151.4			102.5			49.6	
Turn Bay Length (m)						50.0	50.0		50.0	40.0		
Base Capacity (vph)		863			432	610	584	979	706	535	813	
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		0.00			0.38	0.14	0.01	0.32	0.13	0.12	0.29	

Intersection Summary

Area Type: Other

Cycle Length: 96.9

Actuated Cycle Length: 60.3

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 19.5

Intersection LOS: B

Intersection Capacity Utilization 58.3%

ICU Level of Service B

Analysis Period (min) 15

90th %ile Actuated Cycle: 84

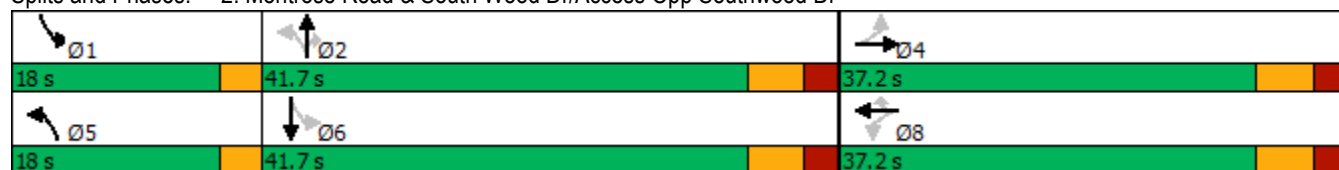
70th %ile Actuated Cycle: 70.4

50th %ile Actuated Cycle: 58.6

30th %ile Actuated Cycle: 41

10th %ile Actuated Cycle: 47.4

Splits and Phases: 2: Montrose Road & South Wood Dr/Access Opp Southwood Dr



Lanes, Volumes, Timings

3: Montrose Road & Cameron Ct

2026 Future Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1	9	100	0	3	12	373	150	3	366	2
Future Volume (vph)	0	1	9	100	0	3	12	373	150	3	366	2
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1454	1579	1301	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.877			0.996			0.958			0.999	
Flt Protected					0.954			0.999				
Satd. Flow (prot)	0	1152	0	0	1362	0	0	2847	0	0	1397	0
Flt Permitted					0.954			0.999				
Satd. Flow (perm)	0	1152	0	0	1362	0	0	2847	0	0	1397	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		167.1			64.9			232.7			126.5	
Travel Time (s)		12.0			4.7			16.8			9.1	
Confl. Peds. (#/hr)	1					1	2		1	1		2
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%	100%	0%	0%	0%	0%	0%	0%	3%	67%	2%	0%
Adj. Flow (vph)	0	1	10	109	0	3	13	405	163	3	398	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	11	0	0	112	0	0	581	0	0	403	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.40	1.26	1.60	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	49.8%						ICU Level of Service A					
Analysis Period (min)	15											

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

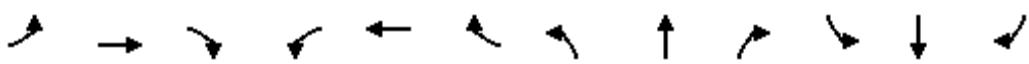
2026 Future Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	104	830	80	248	780	330	126	206	321	313	184	90
Future Volume (vph)	104	830	80	248	780	330	126	206	321	313	184	90
Ideal Flow (vphpl)	1454	1579	1301	1454	1579	1301	1454	1579	1301	1454	1579	1301
Storage Length (m)	45.0		0.0	85.0		0.0	60.0		35.0	60.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00		1.00	0.99		0.99		0.97	0.99	0.99	
Frt		0.987			0.955				0.850		0.951	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1354	2893	0	1368	2800	0	1354	2970	1084	1368	2755	0
Flt Permitted	0.117			0.123			0.570			0.479		
Satd. Flow (perm)	167	2893	0	177	2800	0	805	2970	1053	681	2755	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			61				319		68	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		337.7			182.6			114.0			232.7	
Travel Time (s)		24.3			13.1			8.2			16.8	
Confl. Peds. (#/hr)	8		7	7		8	13		15	15		13
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 (%)	2%	2%	4%	1%	2%	1%	2%	1%	2%	1%	2%	4%
Adj. Flow (vph)	113	902	87	270	848	359	137	224	349	340	200	98
Shared Lane Traffic (%)												
Lane Group Flow (vph)	113	989	0	270	1207	0	137	224	349	340	298	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.40	1.26	1.60	1.40	1.26	1.60	1.40	1.26	1.60	1.40	1.26	1.60
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2026 Future Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	8.0	8.0	6.0	8.0	
Minimum Split (s)	10.5	35.6		10.5	35.6		9.0	35.4	35.4	9.0	35.4	
Total Split (s)	20.0	43.6		20.0	43.6		19.0	32.4	32.4	19.0	32.4	
Total Split (%)	17.4%	37.9%		17.4%	37.9%		16.5%	28.2%	28.2%	16.5%	28.2%	
Maximum Green (s)	17.0	38.0		17.0	38.0		16.0	27.0	27.0	16.0	27.0	
Yellow Time (s)	3.0	3.5		3.0	3.5		3.0	3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.1		0.0	2.1		0.0	2.1	2.1	0.0	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	5.6		3.0	5.6		3.0	5.4	5.4	3.0	5.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	2.5		3.0	2.5		2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None		None	Min	Min	None	Min	
Walk Time (s)		11.0			11.0			11.0	11.0		11.0	
Flash Dont Walk (s)		19.0			19.0			19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effect Green (s)	50.9	38.2		60.4	45.1		29.1	14.5	14.5	35.2	18.5	
Actuated g/C Ratio	0.49	0.37		0.59	0.44		0.28	0.14	0.14	0.34	0.18	
v/c Ratio	0.56	0.92		0.90	0.96		0.47	0.53	0.83	1.00	0.54	
Control Delay	25.9	45.6		56.3	45.7		29.5	45.2	23.7	81.4	33.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	25.9	45.6		56.3	45.7		29.5	45.2	23.7	81.4	33.4	
LOS	C	D		E	D		C	D	C	F	C	
Approach Delay		43.6			47.6			31.6			59.0	
Approach LOS		D			D			C			E	
90th %ile Green (s)	16.6	38.0		17.0	38.4		16.0	27.0	27.0	16.0	27.0	
90th %ile Term Code	Gap	Max		Max	Hold		Max	Max	Max	Max	Hold	
70th %ile Green (s)	11.6	38.0		17.0	43.4		14.6	15.5	15.5	16.0	16.9	
70th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
50th %ile Green (s)	9.1	38.0		17.0	45.9		12.4	12.3	12.3	16.0	15.9	
50th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
30th %ile Green (s)	7.9	38.0		17.0	47.1		10.4	10.8	10.8	16.0	16.4	
30th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
10th %ile Green (s)	6.5	38.0		17.0	48.5		7.7	8.7	8.7	16.0	17.0	
10th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
Queue Length 50th (m)	9.3	97.9		36.4	113.3		20.5	23.2	5.6	~61.4	23.1	
Queue Length 95th (m)	27.9	#173.8		#106.5	#226.5		35.6	35.1	41.8	#92.4	38.1	
Internal Link Dist (m)		313.7			158.6			90.0			208.7	
Turn Bay Length (m)	45.0			85.0			60.0		35.0	60.0		
Base Capacity (vph)	290	1078		301	1260		343	782	512	340	775	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.39	0.92		0.90	0.96		0.40	0.29	0.68	1.00	0.38	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2026 Future Total PM

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 102.9

Natural Cycle: 115

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.00

Intersection Signal Delay: 45.4 Intersection LOS: D

Intersection Capacity Utilization 101.2% ICU Level of Service G

Analysis Period (min) 15

90th %ile Actuated Cycle: 115

70th %ile Actuated Cycle: 103.5

50th %ile Actuated Cycle: 100.3

30th %ile Actuated Cycle: 98.8

10th %ile Actuated Cycle: 96.7

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Montrose Road & Thorold Stone Rd

 Ø1	 Ø2	 Ø3	 Ø4
19 s	32.4 s	20 s	43.6 s
 Ø5	 Ø6	 Ø7	 Ø8
19 s	32.4 s	20 s	43.6 s

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2026 Future Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1077	445	257	1259	0	0	0	0	261	0	151
Future Volume (vph)	0	1077	445	257	1259	0	0	0	0	261	0	151
Ideal Flow (vphpl)	1454	1579	1301	1454	1579	1301	1900	1900	1900	2144	1900	1301
Storage Length (m)	0.0		60.0	210.0		0.0	0.0		0.0	40.0		25.0
Storage Lanes	0		1	1		0	0		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	2941	1084	1381	2970	0	0	0	0	3836	0	1063
Flt Permitted				0.128						0.950		
Satd. Flow (perm)	0	2941	1084	186	2970	0	0	0	0	3836	0	1063
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			376									66
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		182.6			352.3			184.1			149.0	
Travel Time (s)		13.1			25.4			13.3			10.7	
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%	2%	2%	0%	1%	0%	0%	0%	0%	3%	0%	4%
Adj. Flow (vph)	0	1171	484	279	1368	0	0	0	0	284	0	164
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1171	484	279	1368	0	0	0	0	284	0	164
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.40	1.26	1.60	1.40	1.26	1.60	1.00	1.00	1.00	0.85	1.00	1.60
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (m)		10.0	2.0	2.0	10.0					2.0		2.0
Trailing Detector (m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Position(m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Size(m)		0.6	2.0	2.0	0.6					2.0		2.0
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm	pm+pt	NA					Prot		Perm
Protected Phases		4		3	8					1		

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2026 Future Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4	8								1
Detector Phase		4	4	3	8					1		1
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					10.0		10.0
Minimum Split (s)		37.0	37.0	9.0	17.0					40.0		40.0
Total Split (s)		58.0	58.0	17.0	75.0					40.0		40.0
Total Split (%)		50.4%	50.4%	14.8%	65.2%					34.8%		34.8%
Maximum Green (s)		51.0	51.0	14.0	68.0					33.0		33.0
Yellow Time (s)		4.0	4.0	3.0	4.0					4.0		4.0
All-Red Time (s)		3.0	3.0	0.0	3.0					3.0		3.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		7.0	7.0	3.0	7.0					7.0		7.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		2.2	2.2	2.5	2.2					3.2		3.2
Recall Mode		Min	Min	None	Min					None		None
Walk Time (s)		15.0	15.0							12.0		12.0
Flash Dont Walk (s)		15.0	15.0							21.0		21.0
Pedestrian Calls (#/hr)		0	0							0		0
Act Effect Green (s)		40.7	40.7	62.2	58.1					15.6		15.6
Actuated g/C Ratio		0.46	0.46	0.71	0.66					0.18		0.18
v/c Ratio		0.86	0.69	0.86	0.70					0.42		0.68
Control Delay		29.3	10.2	44.1	12.4					35.0		36.5
Queue Delay		0.0	0.0	0.0	0.0					0.0		0.0
Total Delay		29.3	10.2	44.1	12.4					35.0		36.5
LOS		C	B	D	B					C		D
Approach Delay		23.7			17.8						35.5	
Approach LOS		C			B						D	
90th %ile Green (s)		51.0	51.0	14.0	68.0					25.5		25.5
90th %ile Term Code		Max	Max	Max	Hold					Gap		Gap
70th %ile Green (s)		50.6	50.6	14.0	67.6					19.0		19.0
70th %ile Term Code		Gap	Gap	Max	Hold					Gap		Gap
50th %ile Green (s)		41.5	41.5	14.0	58.5					14.9		14.9
50th %ile Term Code		Gap	Gap	Max	Hold					Gap		Gap
30th %ile Green (s)		33.9	33.9	14.0	50.9					10.8		10.8
30th %ile Term Code		Gap	Gap	Max	Hold					Gap		Gap
10th %ile Green (s)		28.2	28.2	14.0	45.2					10.0		10.0
10th %ile Term Code		Gap	Gap	Max	Hold					Min		Min
Queue Length 50th (m)		90.8	10.7	27.2	68.1					23.3		16.1
Queue Length 95th (m)		146.8	53.8	#93.9	126.8					38.8		41.4
Internal Link Dist (m)		158.6			328.3			160.1			125.0	
Turn Bay Length (m)			60.0	210.0						40.0		25.0
Base Capacity (vph)		1750	797	326	2356					1477		450
Starvation Cap Reductn		21	0	0	0					0		0
Spillback Cap Reductn		0	0	0	0					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		0.68	0.61	0.86	0.58					0.19		0.36
Intersection Summary												

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2026 Future Total PM

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 88.1

Natural Cycle: 110

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 22.5

Intersection LOS: C

Intersection Capacity Utilization 82.2%

ICU Level of Service E

Analysis Period (min) 15

90th %ile Actuated Cycle: 107.5

70th %ile Actuated Cycle: 100.6

50th %ile Actuated Cycle: 87.4

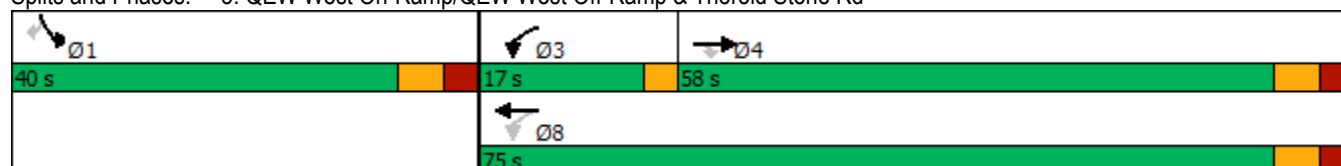
30th %ile Actuated Cycle: 75.7

10th %ile Actuated Cycle: 69.2

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

Queue shown is maximum after two cycles.

Splits and Phases: 5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings
6: QEW East On-Ramp & Thorold Stone Rd

2026 Future Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 					
Traffic Volume (vph)	148	1187	0	0	1071	308	400	0	255	0	0	0
Future Volume (vph)	148	1187	0	0	1071	308	400	0	255	0	0	0
Ideal Flow (vphpl)	1454	1579	1301	1454	1579	1301	2144	1900	1900	1900	1900	1900
Storage Length (m)	210.0		0.0	0.0		15.0	35.0		45.0	0.0		0.0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00					0.97						
Frt						0.850			0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1303	2941	0	0	2970	1084	3951	0	1615	0	0	0
Flt Permitted	0.147						0.950					
Satd. Flow (perm)	201	2941	0	0	2970	1052	3951	0	1615	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						87			66			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		352.3			289.2			188.0			154.2	
Travel Time (s)		25.4			20.8			13.5			11.1	
Confl. Peds. (#/hr)	5		6	6		5			1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	2%	0%	0%	1%	2%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	161	1290	0	0	1164	335	435	0	277	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	161	1290	0	0	1164	335	435	0	277	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.40	1.26	1.60	1.40	1.26	1.60	0.85	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2			2	1	1		1			
Detector Template	Left	Thru			Thru	Right	Left		Right			
Leading Detector (m)	2.0	10.0			10.0	2.0	2.0		2.0			
Trailing Detector (m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Position(m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Size(m)	2.0	0.6			0.6	2.0	2.0		2.0			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Delay (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							

Lanes, Volumes, Timings
6: QEW East On-Ramp & Thorold Stone Rd

2026 Future Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA			NA	Perm	Prot		Prot			
Protected Phases	7	4			8		5		5			
Permitted Phases	4					8						
Detector Phase	7	4			8	8	5		5			
Switch Phase												
Minimum Initial (s)	6.0	10.0			10.0	10.0	10.0		10.0			
Minimum Split (s)	9.0	37.0			37.0	37.0	14.5		14.5			
Total Split (s)	19.0	76.0			57.0	57.0	39.0		39.0			
Total Split (%)	16.5%	66.1%			49.6%	49.6%	33.9%		33.9%			
Maximum Green (s)	16.0	69.0			50.0	50.0	34.5		34.5			
Yellow Time (s)	3.0	4.0			4.0	4.0	3.5		3.5			
All-Red Time (s)	0.0	3.0			3.0	3.0	1.0		1.0			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Total Lost Time (s)	3.0	7.0			7.0	7.0	4.5		4.5			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	2.5	5.0			5.0	5.0	3.0		3.0			
Recall Mode	None	Min			Min	Min	None		None			
Walk Time (s)		15.0			15.0	15.0						
Flash Dont Walk (s)		15.0			15.0	15.0						
Pedestrian Calls (#/hr)		0			0	0						
Act Effct Green (s)	64.2	60.0			45.0	45.0	18.3		18.3			
Actuated g/C Ratio	0.71	0.66			0.50	0.50	0.20		0.20			
v/c Ratio	0.56	0.66			0.79	0.59	0.54		0.73			
Control Delay	15.6	11.7			24.8	18.2	35.6		38.3			
Queue Delay	0.0	0.0			0.0	0.0	0.0		0.0			
Total Delay	15.6	11.7			24.8	18.2	35.6		38.3			
LOS	B	B			C	B	D		D			
Approach Delay		12.2			23.3			36.6				
Approach LOS		B			C			D				
90th %ile Green (s)	16.0	69.0			50.0	50.0	28.9		28.9			
90th %ile Term Code	Max	Max			Max	Max	Gap		Gap			
70th %ile Green (s)	15.0	68.0			50.0	50.0	22.7		22.7			
70th %ile Term Code	Gap	Hold			Max	Max	Gap		Gap			
50th %ile Green (s)	11.9	64.9			50.0	50.0	17.6		17.6			
50th %ile Term Code	Gap	Hold			Max	Max	Gap		Gap			
30th %ile Green (s)	10.0	55.3			42.3	42.3	14.1		14.1			
30th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
10th %ile Green (s)	7.6	42.4			31.8	31.8	10.9		10.9			
10th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
Queue Length 50th (m)	7.8	62.2			85.1	29.1	39.4		38.8			
Queue Length 95th (m)	29.4	117.6			152.0	75.6	56.7		69.8			
Internal Link Dist (m)		328.3			265.2			164.0			130.2	
Turn Bay Length (m)	210.0					15.0	35.0		45.0			
Base Capacity (vph)	345	2289			1703	640	1563		678			
Starvation Cap Reductn	0	0			0	0	0		0			
Spillback Cap Reductn	0	0			0	0	0		0			
Storage Cap Reductn	0	0			0	0	0		0			
Reduced v/c Ratio	0.47	0.56			0.68	0.52	0.28		0.41			

Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2026 Future Total PM

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 90.3

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 21.5 Intersection LOS: C

Intersection Capacity Utilization 82.2% ICU Level of Service E

Analysis Period (min) 15

90th %ile Actuated Cycle: 109.4

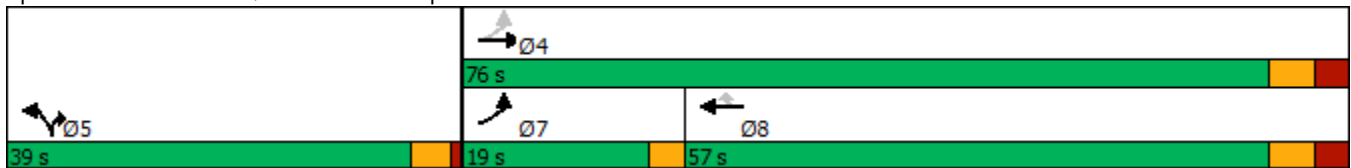
70th %ile Actuated Cycle: 102.2

50th %ile Actuated Cycle: 94

30th %ile Actuated Cycle: 80.9

10th %ile Actuated Cycle: 64.8

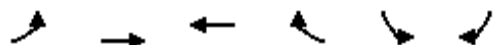
Splits and Phases: 6: QEW East On-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

8: Access Opp Southwood Dr & Site Access 2#

2026 Future Total PM



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	29	0	0	0	0	20
Future Volume (vph)	29	0	0	0	0	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected	0.950					
Satd. Flow (prot)	0	1770	1863	0	1611	0
Flt Permitted	0.950					
Satd. Flow (perm)	0	1770	1863	0	1611	0
Link Speed (k/h)	50		50	50		
Link Distance (m)	175.4		35.0	70.7		
Travel Time (s)	12.6		2.5	5.1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	0	0	0	0	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	32	0	0	22	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)	0.0		0.0	3.6		
Link Offset(m)	0.0		0.0	0.0		
Crosswalk Width(m)	4.8		4.8	4.8		
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control	Stop		Stop	Stop		
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utilization 13.3%				ICU Level of Service A		
Analysis Period (min) 15						

Lanes, Volumes, Timings

1: Montrose Road & Mt Carmel Blvd

2031 Future Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	55	54	0	3	26	149	0	0	195	2
Future Volume (vph)	3	0	55	54	0	3	26	149	0	0	195	2
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1900	1433	1900	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.871			0.993						0.999	
Flt Protected		0.998			0.955			0.993				
Satd. Flow (prot)	0	1246	0	0	1359	0	0	1399	0	0	1404	0
Flt Permitted		0.998			0.955			0.993				
Satd. Flow (perm)	0	1246	0	0	1359	0	0	1399	0	0	1404	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		97.9			84.1			51.6			220.4	
Travel Time (s)		7.0			6.1			3.7			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Adj. Flow (vph)	3	0	60	59	0	3	28	162	0	0	212	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	63	0	0	62	0	0	190	0	0	214	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	46.9%						ICU Level of Service A					
Analysis Period (min)	15											

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

2031 Future Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1	15	64	1	18	2	173	57	18	284	0
Future Volume (vph)	0	1	15	64	1	18	2	173	57	18	284	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1178	1301	1454	1579	1301	1454	1338	1900
Storage Length (m)	0.0		0.0	0.0		50.0	50.0		50.0	40.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.873				0.850			0.850			
Flt Protected					0.953		0.950			0.950		
Satd. Flow (prot)	0	1659	0	0	1070	1074	1381	1579	1106	1381	1312	0
Flt Permitted					0.717		0.572			0.639		
Satd. Flow (perm)	0	1659	0	0	805	1074	832	1579	1106	929	1312	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16				75			81			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		92.8			175.4			126.5			73.6	
Travel Time (s)		6.7			12.6			9.1			5.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	5%	0%	3%	0%	0%	0%	0%	2%	0%
Adj. Flow (vph)	0	1	16	70	1	20	2	188	62	20	309	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	17	0	0	71	20	2	188	62	20	309	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.80	1.60	1.40	1.26	1.60	1.40	1.55	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type		NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

2031 Future Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	6.0	10.0	10.0	6.0	10.0	
Minimum Split (s)	28.2	28.2		28.2	28.2	28.2	12.0	29.7	29.7	10.5	29.7	
Total Split (s)	37.2	37.2		37.2	37.2	37.2	18.0	41.7	41.7	18.0	41.7	
Total Split (%)	38.4%	38.4%		38.4%	38.4%	38.4%	18.6%	43.0%	43.0%	18.6%	43.0%	
Maximum Green (s)	30.0	30.0		30.0	30.0	30.0	15.0	35.0	35.0	15.0	35.0	
Yellow Time (s)	4.1	4.1		4.1	4.1	4.1	3.0	4.1	4.1	3.0	4.1	
All-Red Time (s)	3.1	3.1		3.1	3.1	3.1	0.0	2.6	2.6	0.0	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)		7.2			7.2	7.2	3.0	6.7	6.7	3.0	6.7	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Walk Time (s)	8.0	8.0		8.0	8.0	8.0		9.0	9.0		9.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0		14.0	14.0		14.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effect Green (s)		11.1			11.1	11.1	28.2	25.4	25.4	28.3	25.5	
Actuated g/C Ratio		0.24			0.24	0.24	0.61	0.55	0.55	0.61	0.55	
v/c Ratio		0.04			0.37	0.06	0.00	0.22	0.10	0.03	0.43	
Control Delay		9.4			22.8	0.4	5.5	10.8	2.9	5.8	13.4	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		9.4			22.8	0.4	5.5	10.8	2.9	5.8	13.4	
LOS		A			C	A	A	B	A	A	B	
Approach Delay		9.4			17.9			8.8			13.0	
Approach LOS		A			B			A			B	
90th %ile Green (s)	17.6	17.6		17.6	17.6	17.6	6.0	27.8	27.8	6.2	28.0	
90th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Min	Hold	Hold	Gap	Gap	
70th %ile Green (s)	11.7	11.7		11.7	11.7	11.7	0.0	17.0	17.0	0.0	17.0	
70th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Hold	Hold	Skip	Gap	
50th %ile Green (s)	9.6	9.6		9.6	9.6	9.6	0.0	16.3	16.3	0.0	16.3	
50th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Dwell	Dwell	Skip	Dwell	
30th %ile Green (s)	8.4	8.4		8.4	8.4	8.4	0.0	26.1	26.1	0.0	26.1	
30th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Dwell	Dwell	Skip	Dwell	
10th %ile Green (s)	0.0	0.0		0.0	0.0	0.0	0.0	25.0	25.0	0.0	25.0	
10th %ile Term Code	Skip	Skip		Skip	Skip	Skip	Skip	Dwell	Dwell	Skip	Dwell	
Queue Length 50th (m)		0.1			4.2	0.0	0.1	8.3	0.0	0.6	15.8	
Queue Length 95th (m)		4.4			19.0	0.0	0.8	30.6	4.8	3.4	55.6	
Internal Link Dist (m)		68.8			151.4			102.5			49.6	
Turn Bay Length (m)						50.0	50.0		50.0	40.0		
Base Capacity (vph)		1153			557	766	706	1242	887	733	1032	
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		0.01			0.13	0.03	0.00	0.15	0.07	0.03	0.30	
Intersection Summary												

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

2031 Future Total AM

Area Type: Other

Cycle Length: 96.9

Actuated Cycle Length: 46.2

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.43

Intersection Signal Delay: 12.0

Intersection LOS: B

Intersection Capacity Utilization 45.3%

ICU Level of Service A

Analysis Period (min) 15

90th %ile Actuated Cycle: 68.5

70th %ile Actuated Cycle: 42.6

50th %ile Actuated Cycle: 39.8

30th %ile Actuated Cycle: 48.4

10th %ile Actuated Cycle: 31.7

Splits and Phases: 2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

 Ø1	 Ø2	 Ø4
18 s	41.7 s	37.2 s
 Ø5	 Ø6	 Ø8
18 s	41.7 s	37.2 s

Lanes, Volumes, Timings

3: Montrose Road & Cameron Ct

2031 Future Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1	9	24	0	2	1	231	66	7	357	1
Future Volume (vph)	0	1	9	24	0	2	1	231	66	7	357	1
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1454	1579	1301	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.877			0.990			0.967					
Flt Protected				0.956						0.999		
Satd. Flow (prot)	0	1152	0	0	1356	0	0	2882	0	0	1386	0
Flt Permitted				0.956						0.999		
Satd. Flow (perm)	0	1152	0	0	1356	0	0	2882	0	0	1386	0
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	167.1			64.9			232.7			126.5		
Travel Time (s)	12.0			4.7			16.8			9.1		
Confl. Peds. (#/hr)	1		3	3		1	4		4	4		4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	100%	0%	0%	0%	0%	0%	0%	3%	67%	2%	0%
Adj. Flow (vph)	0	1	10	26	0	2	1	251	72	8	388	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	11	0	0	28	0	0	324	0	0	397	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0			0.0			3.6			3.6		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.40	1.26	1.60	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control	Stop			Stop			Free			Free		
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	47.9%						ICU Level of Service A					
Analysis Period (min)	15											

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2031 Future Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	739	80	211	548	176	74	171	295	270	123	84
Future Volume (vph)	77	739	80	211	548	176	74	171	295	270	123	84
Ideal Flow (vphpl)	1454	1579	1301	1454	1579	1301	1454	1579	1301	1454	1579	1301
Storage Length (m)	45.0		0.0	85.0		0.0	60.0		35.0	60.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	1.00		0.99		0.99	1.00	0.99	
Frt		0.985			0.964				0.850		0.939	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1354	2888	0	1368	2832	0	1354	2970	1084	1368	2718	0
Flt Permitted	0.333			0.159			0.611			0.518		
Satd. Flow (perm)	474	2888	0	229	2832	0	866	2970	1069	744	2718	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			40				321		91	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		337.7			182.6			114.0			232.7	
Travel Time (s)		24.3			13.1			8.2			16.8	
Confl. Peds. (#/hr)	2		1	1		2	7		2	2		7
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 (%)	2%	2%	4%	1%	2%	1%	2%	1%	2%	1%	2%	4%
Adj. Flow (vph)	84	803	87	229	596	191	80	186	321	293	134	91
Shared Lane Traffic (%)												
Lane Group Flow (vph)	84	890	0	229	787	0	80	186	321	293	225	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.40	1.26	1.60	1.40	1.26	1.60	1.40	1.26	1.60	1.40	1.26	1.60
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2031 Future Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	8.0	8.0	6.0	8.0	
Minimum Split (s)	10.5	35.6		10.5	35.6		9.0	35.4	35.4	9.0	35.4	
Total Split (s)	20.0	43.6		20.0	43.6		19.0	32.4	32.4	19.0	32.4	
Total Split (%)	17.4%	37.9%		17.4%	37.9%		16.5%	28.2%	28.2%	16.5%	28.2%	
Maximum Green (s)	17.0	38.0		17.0	38.0		16.0	27.0	27.0	16.0	27.0	
Yellow Time (s)	3.0	3.5		3.0	3.5		3.0	3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.1		0.0	2.1		0.0	2.1	2.1	0.0	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	5.6		3.0	5.6		3.0	5.4	5.4	3.0	5.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	2.5		3.0	2.5		2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None		None	Min	Min	None	Min	
Walk Time (s)		11.0			11.0			11.0	11.0		11.0	
Flash Dont Walk (s)		19.0			19.0			19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effect Green (s)	44.7	33.7		54.3	42.5		24.2	12.6	12.6	33.6	21.3	
Actuated g/C Ratio	0.48	0.36		0.58	0.45		0.26	0.13	0.13	0.36	0.23	
v/c Ratio	0.28	0.85		0.73	0.60		0.30	0.47	0.76	0.80	0.33	
Control Delay	13.0	37.9		30.3	22.5		25.7	42.8	17.3	43.9	21.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	13.0	37.9		30.3	22.5		25.7	42.8	17.3	43.9	21.6	
LOS	B	D		C	C		C	D	B	D	C	
Approach Delay		35.7			24.3			26.5			34.2	
Approach LOS		D			C			C			C	
90th %ile Green (s)	11.8	38.0		17.0	43.2		12.9	23.8	23.8	16.0	26.9	
90th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
70th %ile Green (s)	9.0	38.0		17.0	46.0		10.6	12.4	12.4	16.0	17.8	
70th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
50th %ile Green (s)	8.1	37.0		16.6	45.5		9.1	11.0	11.0	16.0	17.9	
50th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Gap	Gap	Max	Hold	
30th %ile Green (s)	7.5	32.2		13.4	38.1		7.7	9.6	9.6	16.0	17.9	
30th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Gap	Gap	Max	Hold	
10th %ile Green (s)	0.0	23.6		10.6	37.2		0.0	8.0	8.0	12.6	23.6	
10th %ile Term Code	Skip	Gap		Gap	Hold		Skip	Min	Min	Gap	Hold	
Queue Length 50th (m)	6.5	81.1		19.8	55.4		11.2	18.6	0.0	49.1	12.1	
Queue Length 95th (m)	17.3	#139.7		#66.5	98.8		22.2	29.8	29.2	#84.1	24.2	
Internal Link Dist (m)		313.7			158.6			90.0			208.7	
Turn Bay Length (m)	45.0			85.0			60.0		35.0	60.0		
Base Capacity (vph)	428	1200		343	1308		373	872	540	374	862	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.20	0.74		0.67	0.60		0.21	0.21	0.59	0.78	0.26	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2031 Future Total AM

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 94

Natural Cycle: 95

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 30.0 Intersection LOS: C

Intersection Capacity Utilization 86.6% ICU Level of Service E

Analysis Period (min) 15

90th %ile Actuated Cycle: 111.8

70th %ile Actuated Cycle: 100.4

50th %ile Actuated Cycle: 97.6

30th %ile Actuated Cycle: 88.2

10th %ile Actuated Cycle: 71.8

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Montrose Road & Thorold Stone Rd

 Ø1	 Ø2	 Ø3	 Ø4
19 s	32.4 s	20 s	43.6 s
 Ø5	 Ø6	 Ø7	 Ø8
19 s	32.4 s	20 s	43.6 s

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2031 Future Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑					↖↗		↖
Traffic Volume (vph)	0	917	483	207	903	0	0	0	0	223	0	107
Future Volume (vph)	0	917	483	207	903	0	0	0	0	223	0	107
Ideal Flow (vphpl)	1454	1579	1301	1454	1579	1301	1900	1900	1900	2144	1900	1301
Storage Length (m)	0.0		60.0	210.0		0.0	0.0		0.0	40.0		25.0
Storage Lanes	0		1	1		0	0		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	2941	1084	1381	2970	0	0	0	0	3836	0	1063
Flt Permitted				0.180						0.950		
Satd. Flow (perm)	0	2941	1084	262	2970	0	0	0	0	3836	0	1063
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			478									116
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		182.6			352.3			184.1			149.0	
Travel Time (s)		13.1			25.4			13.3			10.7	
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%	2%	2%	0%	1%	0%	0%	0%	0%	3%	0%	4%
Adj. Flow (vph)	0	997	525	225	982	0	0	0	0	242	0	116
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	997	525	225	982	0	0	0	0	242	0	116
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.40	1.26	1.60	1.40	1.26	1.60	1.00	1.00	1.00	0.85	1.00	1.60
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (m)		10.0	2.0	2.0	10.0					2.0		2.0
Trailing Detector (m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Position(m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Size(m)		0.6	2.0	2.0	0.6					2.0		2.0
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm	pm+pt	NA					Prot		Perm
Protected Phases		4		3	8					1		

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2031 Future Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4	8								1
Detector Phase		4	4	3	8					1		1
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					10.0		10.0
Minimum Split (s)		37.0	37.0	9.0	17.0					40.0		40.0
Total Split (s)		58.0	58.0	17.0	75.0					40.0		40.0
Total Split (%)		50.4%	50.4%	14.8%	65.2%					34.8%		34.8%
Maximum Green (s)		51.0	51.0	14.0	68.0					33.0		33.0
Yellow Time (s)		4.0	4.0	3.0	4.0					4.0		4.0
All-Red Time (s)		3.0	3.0	0.0	3.0					3.0		3.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		7.0	7.0	3.0	7.0					7.0		7.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		2.2	2.2	2.5	2.2					3.2		3.2
Recall Mode		Min	Min	None	Min					None		None
Walk Time (s)		15.0	15.0							12.0		12.0
Flash Dont Walk (s)		15.0	15.0							21.0		21.0
Pedestrian Calls (#/hr)		0	0							0		0
Act Effect Green (s)		29.3	29.3	47.0	42.9					11.5		11.5
Actuated g/C Ratio		0.43	0.43	0.68	0.62					0.17		0.17
v/c Ratio		0.80	0.71	0.64	0.53					0.38		0.42
Control Delay		22.7	8.5	15.9	8.2					29.7		12.2
Queue Delay		0.0	0.0	0.0	0.0					0.0		0.0
Total Delay		22.7	8.5	15.9	8.2					29.7		12.2
LOS		C	A	B	A					C		B
Approach Delay		17.8			9.6						24.1	
Approach LOS		B			A						C	
90th %ile Green (s)		42.6	42.6	14.0	59.6					14.2		14.2
90th %ile Term Code		Gap	Gap	Max	Hold					Gap		Gap
70th %ile Green (s)		34.7	34.7	12.6	50.3					12.2		12.2
70th %ile Term Code		Gap	Gap	Gap	Hold					Gap		Gap
50th %ile Green (s)		29.0	29.0	10.0	42.0					10.5		10.5
50th %ile Term Code		Gap	Gap	Gap	Hold					Gap		Gap
30th %ile Green (s)		23.8	23.8	8.9	35.7					10.0		10.0
30th %ile Term Code		Gap	Gap	Gap	Hold					Min		Min
10th %ile Green (s)		18.9	18.9	7.7	29.6					10.0		10.0
10th %ile Term Code		Gap	Gap	Gap	Hold					Min		Min
Queue Length 50th (m)		55.5	3.4	8.7	31.8					14.7		0.0
Queue Length 95th (m)		92.6	33.2	30.8	51.0					31.2		14.9
Internal Link Dist (m)		158.6			328.3			160.1			125.0	
Turn Bay Length (m)			60.0	210.0						40.0		25.0
Base Capacity (vph)		2247	941	413	2770					1896		584
Starvation Cap Reductn		0	0	0	0					0		0
Spillback Cap Reductn		0	0	0	0					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		0.44	0.56	0.54	0.35					0.13		0.20
Intersection Summary												

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2031 Future Total AM

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 68.8

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 15.3

Intersection LOS: B

Intersection Capacity Utilization 82.0%

ICU Level of Service D

Analysis Period (min) 15

90th %ile Actuated Cycle: 87.8

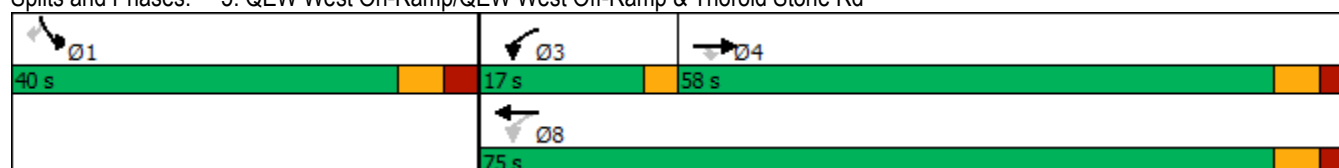
70th %ile Actuated Cycle: 76.5

50th %ile Actuated Cycle: 66.5

30th %ile Actuated Cycle: 59.7

10th %ile Actuated Cycle: 53.6

Splits and Phases: 5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2031 Future Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	146	1000	0	0	798	249	323	0	227	0	0	0
Future Volume (vph)	146	1000	0	0	798	249	323	0	227	0	0	0
Ideal Flow (vphpl)	1454	1579	1301	1454	1579	1301	2144	1900	1900	1900	1900	1900
Storage Length (m)	210.0		0.0	0.0		15.0	35.0		45.0	0.0		0.0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1303	2941	0	0	2970	1084	3951	0	1615	0	0	0
Flt Permitted	0.238						0.950					
Satd. Flow (perm)	326	2941	0	0	2970	1084	3951	0	1615	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						95			99			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		352.3			289.2			188.0			154.2	
Travel Time (s)		25.4			20.8			13.5			11.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	2%	0%	0%	1%	2%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	159	1087	0	0	867	271	351	0	247	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	159	1087	0	0	867	271	351	0	247	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.40	1.26	1.60	1.40	1.26	1.60	0.85	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2			2	1	1		1			
Detector Template	Left	Thru			Thru	Right	Left		Right			
Leading Detector (m)	2.0	10.0			10.0	2.0	2.0		2.0			
Trailing Detector (m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Position(m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Size(m)	2.0	0.6			0.6	2.0	2.0		2.0			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Delay (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type	pm+pt	NA			NA	Perm	Prot		Prot			
Protected Phases	7	4			8		5		5			

Lanes, Volumes, Timings
6: QEW East On-Ramp & Thorold Stone Rd

2031 Future Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4					8						
Detector Phase	7	4			8	8	5		5			
Switch Phase												
Minimum Initial (s)	6.0	10.0			10.0	10.0	10.0		10.0			
Minimum Split (s)	9.0	37.0			37.0	37.0	14.5		14.5			
Total Split (s)	19.0	76.0			57.0	57.0	39.0		39.0			
Total Split (%)	16.5%	66.1%			49.6%	49.6%	33.9%		33.9%			
Maximum Green (s)	16.0	69.0			50.0	50.0	34.5		34.5			
Yellow Time (s)	3.0	4.0			4.0	4.0	3.5		3.5			
All-Red Time (s)	0.0	3.0			3.0	3.0	1.0		1.0			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Total Lost Time (s)	3.0	7.0			7.0	7.0	4.5		4.5			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	2.5	5.0			5.0	5.0	3.0		3.0			
Recall Mode	None	Min			Min	Min	None		None			
Walk Time (s)		15.0			15.0	15.0						
Flash Dont Walk (s)		15.0			15.0	15.0						
Pedestrian Calls (#/hr)		0			0	0						
Act Effct Green (s)	51.0	46.7			32.3	32.3	14.3		14.3			
Actuated g/C Ratio	0.70	0.64			0.44	0.44	0.20		0.20			
v/c Ratio	0.42	0.58			0.66	0.51	0.46		0.63			
Control Delay	7.7	9.0			19.3	13.6	30.1		26.0			
Queue Delay	0.0	0.0			0.0	0.0	0.0		0.0			
Total Delay	7.7	9.0			19.3	13.6	30.1		26.0			
LOS	A	A			B	B	C		C			
Approach Delay		8.9			17.9			28.4				
Approach LOS		A			B			C				
90th %ile Green (s)	16.0	69.0			50.0	50.0	22.9		22.9			
90th %ile Term Code	Max	Hold			Max	Max	Gap		Gap			
70th %ile Green (s)	13.8	55.0			38.2	38.2	16.6		16.6			
70th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
50th %ile Green (s)	11.1	44.8			30.7	30.7	12.7		12.7			
50th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
30th %ile Green (s)	9.1	37.5			25.4	25.4	10.3		10.3			
30th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
10th %ile Green (s)	6.9	29.8			19.9	19.9	10.0		10.0			
10th %ile Term Code	Gap	Hold			Gap	Gap	Min		Min			
Queue Length 50th (m)	5.7	36.6			46.3	15.1	22.1		18.2			
Queue Length 95th (m)	17.1	73.9			88.4	46.1	46.6		53.9			
Internal Link Dist (m)		328.3			265.2			164.0			130.2	
Turn Bay Length (m)	210.0					15.0	35.0		45.0			
Base Capacity (vph)	453	2645			2155	812	1978		857			
Starvation Cap Reductn	0	0			0	0	0		0			
Spillback Cap Reductn	0	0			0	0	0		0			
Storage Cap Reductn	0	0			0	0	0		0			
Reduced v/c Ratio	0.35	0.41			0.40	0.33	0.18		0.29			
Intersection Summary												

Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2031 Future Total AM

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 73.2

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 16.2

Intersection LOS: B

Intersection Capacity Utilization 82.0%

ICU Level of Service D

Analysis Period (min) 15

90th %ile Actuated Cycle: 103.4

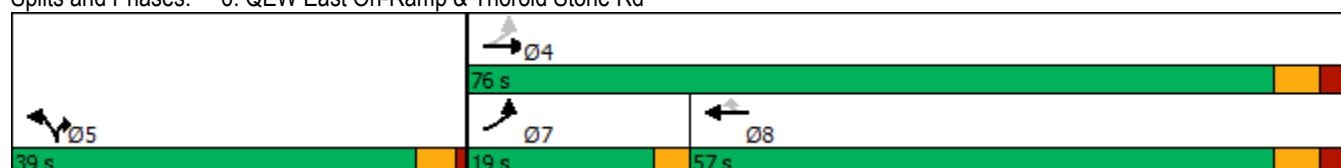
70th %ile Actuated Cycle: 83.1

50th %ile Actuated Cycle: 69

30th %ile Actuated Cycle: 59.3

10th %ile Actuated Cycle: 51.3

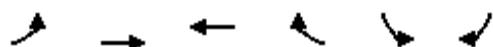
Splits and Phases: 6: QEW East On-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

8: Access Opp Southwood Dr & Site Access 2#

2031 Future Total AM



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	0	0	0	0	31
Future Volume (vph)	10	0	0	0	0	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected	0.950					
Satd. Flow (prot)	0	1770	1863	0	1611	0
Flt Permitted	0.950					
Satd. Flow (perm)	0	1770	1863	0	1611	0
Link Speed (k/h)	50					
Link Distance (m)	175.4					35.0
Travel Time (s)	12.6					2.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	0	0	0	0	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	11	0	0	34	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)	0.0					0.0
Link Offset(m)	0.0					0.0
Crosswalk Width(m)	4.8					4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control	Stop		Stop	Stop		
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utilization 13.3%				ICU Level of Service A		
Analysis Period (min) 15						

Lanes, Volumes, Timings

1: Montrose Road & Mt Carmel Blvd

2031 Future Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	43	34	0	3	53	293	0	0	230	6
Future Volume (vph)	3	0	43	34	0	3	53	293	0	0	230	6
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1900	1433	1900	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.873			0.990						0.996	
Flt Protected		0.997			0.956			0.992				
Satd. Flow (prot)	0	1247	0	0	1356	0	0	1398	0	0	1400	0
Flt Permitted		0.997			0.956			0.992				
Satd. Flow (perm)	0	1247	0	0	1356	0	0	1398	0	0	1400	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		97.9			84.1			51.6			220.4	
Travel Time (s)		7.0			6.1			3.7			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Adj. Flow (vph)	3	0	47	37	0	3	58	318	0	0	250	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	50	0	0	40	0	0	376	0	0	257	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	60.3%						ICU Level of Service B					
Analysis Period (min)	15											

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

2031 Future Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	164	1	85	7	307	92	66	236	2
Future Volume (vph)	1	0	1	164	1	85	7	307	92	66	236	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1178	1301	1454	1579	1301	1454	1338	1900
Storage Length (m)	0.0		0.0	0.0		50.0	50.0		50.0	40.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00		1.00		0.98	1.00	1.00	
Frt		0.932				0.850			0.850		0.999	
Flt Protected		0.976			0.953		0.950			0.950		
Satd. Flow (prot)	0	1709	0	0	1069	1074	1381	1579	1106	1381	1310	0
Flt Permitted		0.894			0.727		0.599			0.433		
Satd. Flow (perm)	0	1565	0	0	814	1074	869	1579	1081	629	1310	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		75				92			100			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		92.8			175.4			126.5			73.6	
Travel Time (s)		6.7			12.6			9.1			5.3	
Confl. Peds. (#/hr)			1	1			2		1	1		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	5%	0%	3%	0%	0%	0%	0%	2%	0%
Adj. Flow (vph)	1	0	1	178	1	92	8	334	100	72	257	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2	0	0	179	92	8	334	100	72	259	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.80	1.60	1.40	1.26	1.60	1.40	1.55	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

2031 Future Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	6.0	10.0	10.0	6.0	10.0	
Minimum Split (s)	28.2	28.2		28.2	28.2	28.2	12.0	29.7	29.7	10.5	29.7	
Total Split (s)	37.2	37.2		37.2	37.2	37.2	18.0	41.7	41.7	18.0	41.7	
Total Split (%)	38.4%	38.4%		38.4%	38.4%	38.4%	18.6%	43.0%	43.0%	18.6%	43.0%	
Maximum Green (s)	30.0	30.0		30.0	30.0	30.0	15.0	35.0	35.0	15.0	35.0	
Yellow Time (s)	4.1	4.1		4.1	4.1	4.1	3.0	4.1	4.1	3.0	4.1	
All-Red Time (s)	3.1	3.1		3.1	3.1	3.1	0.0	2.6	2.6	0.0	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)		7.2			7.2	7.2	3.0	6.7	6.7	3.0	6.7	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Walk Time (s)	8.0	8.0		8.0	8.0	8.0		9.0	9.0		9.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0		14.0	14.0		14.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effect Green (s)		20.0			20.0	20.0	30.0	21.5	21.5	33.4	28.1	
Actuated g/C Ratio		0.31			0.31	0.31	0.47	0.33	0.33	0.52	0.44	
v/c Ratio		0.00			0.71	0.23	0.02	0.63	0.23	0.17	0.45	
Control Delay		0.0			38.1	6.3	9.4	27.0	6.2	10.2	18.0	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		0.0			38.1	6.3	9.4	27.0	6.2	10.2	18.0	
LOS		A			D	A	A	C	A	B	B	
Approach Delay					27.3			22.0			16.3	
Approach LOS					C			C			B	
90th %ile Green (s)	30.0	30.0		30.0	30.0	30.0	6.0	30.4	30.4	9.4	33.8	
90th %ile Term Code	Hold	Hold		Max	Max	Max	Min	Gap	Gap	Gap	Hold	
70th %ile Green (s)	26.9	26.9		26.9	26.9	26.9	0.0	23.9	23.9	8.1	35.0	
70th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Gap	Hold	
50th %ile Green (s)	20.4	20.4		20.4	20.4	20.4	0.0	19.1	19.1	7.0	29.1	
50th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Gap	Hold	
30th %ile Green (s)	15.5	15.5		15.5	15.5	15.5	0.0	14.7	14.7	6.0	23.7	
30th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Min	Hold	
10th %ile Green (s)	10.3	10.3		10.3	10.3	10.3	0.0	18.2	18.2	0.0	18.2	
10th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Dwell	Dwell	Skip	Dwell	
Queue Length 50th (m)		0.0			18.9	0.0	0.5	36.0	0.0	4.2	20.3	
Queue Length 95th (m)		0.0			#54.5	10.1	2.7	75.9	10.3	12.4	57.2	
Internal Link Dist (m)		68.8			151.4			102.5			49.6	
Turn Bay Length (m)						50.0	50.0		50.0	40.0		
Base Capacity (vph)		816			404	580	578	916	669	513	760	
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		0.00			0.44	0.16	0.01	0.36	0.15	0.14	0.34	

Intersection Summary

Area Type: Other

Cycle Length: 96.9

Actuated Cycle Length: 64.3

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 21.5

Intersection LOS: C

Intersection Capacity Utilization 60.8%

ICU Level of Service B

Analysis Period (min) 15

90th %ile Actuated Cycle: 86.7

70th %ile Actuated Cycle: 75.8

50th %ile Actuated Cycle: 63.4

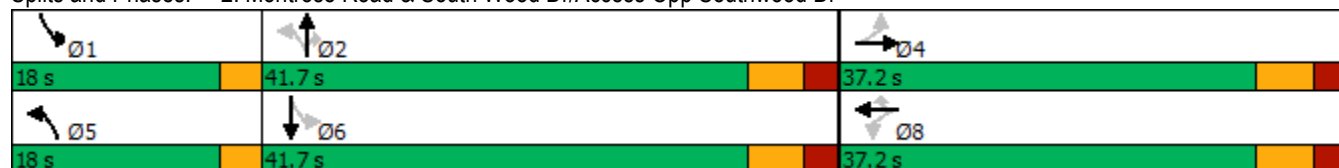
30th %ile Actuated Cycle: 53.1

10th %ile Actuated Cycle: 42.4

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: Montrose Road & South Wood Dr/Access Opp Southwood Dr



Lanes, Volumes, Timings

3: Montrose Road & Cameron Ct

2031 Future Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1	10	109	0	3	14	402	164	3	396	2
Future Volume (vph)	0	1	10	109	0	3	14	402	164	3	396	2
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1454	1579	1301	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.876			0.997			0.958			0.999	
Flt Protected					0.954			0.999				
Satd. Flow (prot)	0	1159	0	0	1363	0	0	2847	0	0	1397	0
Flt Permitted					0.954			0.999				
Satd. Flow (perm)	0	1159	0	0	1363	0	0	2847	0	0	1397	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		167.1			64.9			232.7			126.5	
Travel Time (s)		12.0			4.7			16.8			9.1	
Confl. Peds. (#/hr)	1					1	2		1	1		2
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%	100%	0%	0%	0%	0%	0%	0%	3%	67%	2%	0%
Adj. Flow (vph)	0	1	11	118	0	3	15	437	178	3	430	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	12	0	0	121	0	0	630	0	0	435	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.40	1.26	1.60	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	52.5%						ICU Level of Service A					
Analysis Period (min)	15											

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2031 Future Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	910	88	271	855	358	138	224	352	340	202	97
Future Volume (vph)	113	910	88	271	855	358	138	224	352	340	202	97
Ideal Flow (vphpl)	1454	1579	1301	1454	1579	1301	1454	1579	1301	1454	1579	1301
Storage Length (m)	45.0		0.0	85.0		0.0	60.0		35.0	60.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00			0.99		0.99		0.97	0.99	0.99	
Frt		0.987			0.956				0.850		0.952	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1354	2893	0	1368	2803	0	1354	2970	1084	1368	2759	0
Flt Permitted	0.105			0.097			0.551			0.471		
Satd. Flow (perm)	150	2893	0	140	2803	0	778	2970	1053	670	2759	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			60				308		65	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		337.7			182.6			114.0			232.7	
Travel Time (s)		24.3			13.1			8.2			16.8	
Confl. Peds. (#/hr)	8		7	7		8	13		15	15		13
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 (%)	2%	2%	4%	1%	2%	1%	2%	1%	2%	1%	2%	4%
Adj. Flow (vph)	123	989	96	295	929	389	150	243	383	370	220	105
Shared Lane Traffic (%)												
Lane Group Flow (vph)	123	1085	0	295	1318	0	150	243	383	370	325	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.40	1.26	1.60	1.40	1.26	1.60	1.40	1.26	1.60	1.40	1.26	1.60
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2031 Future Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	8.0	8.0	6.0	8.0	
Minimum Split (s)	10.5	35.6		10.5	35.6		9.0	35.4	35.4	9.0	35.4	
Total Split (s)	20.0	43.6		20.0	43.6		19.0	32.4	32.4	19.0	32.4	
Total Split (%)	17.4%	37.9%		17.4%	37.9%		16.5%	28.2%	28.2%	16.5%	28.2%	
Maximum Green (s)	17.0	38.0		17.0	38.0		16.0	27.0	27.0	16.0	27.0	
Yellow Time (s)	3.0	3.5		3.0	3.5		3.0	3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.1		0.0	2.1		0.0	2.1	2.1	0.0	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	5.6		3.0	5.6		3.0	5.4	5.4	3.0	5.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	2.5		3.0	2.5		2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None		None	Min	Min	None	Min	
Walk Time (s)		11.0			11.0			11.0	11.0		11.0	
Flash Dont Walk (s)		19.0			19.0			19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effct Green (s)	51.7	38.2		60.3	44.3		32.3	17.2	17.2	37.6	20.6	
Actuated g/C Ratio	0.49	0.36		0.57	0.42		0.31	0.16	0.16	0.36	0.20	
v/c Ratio	0.62	1.03		1.06	1.09		0.49	0.50	0.89	1.08	0.55	
Control Delay	32.5	70.8		101.5	83.3		29.2	43.2	33.7	100.6	34.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	32.5	70.8		101.5	83.3		29.2	43.2	33.7	100.6	34.2	
LOS	C	E		F	F		C	D	C	F	C	
Approach Delay		66.9			86.6			35.8			69.5	
Approach LOS		E			F			D			E	
90th %ile Green (s)	17.0	38.0		17.0	38.0		16.0	27.0	27.0	16.0	27.0	
90th %ile Term Code	Max	Max		Max	Max		Max	Max	Max	Max	Hold	
70th %ile Green (s)	13.6	38.0		17.0	41.4		15.6	25.0	25.0	16.0	25.4	
70th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
50th %ile Green (s)	10.1	38.0		17.0	44.9		13.2	15.6	15.6	16.0	18.4	
50th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
30th %ile Green (s)	8.2	38.0		17.0	46.8		11.1	11.4	11.4	16.0	16.3	
30th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
10th %ile Green (s)	6.6	38.0		17.0	48.4		8.1	9.1	9.1	16.0	17.0	
10th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
Queue Length 50th (m)	11.4	~123.5		~54.4	~157.8		22.7	25.4	15.1	~75.3	26.7	
Queue Length 95th (m)	32.9	#200.0		#128.0	#257.7		38.7	37.6	#71.0	#109.8	42.5	
Internal Link Dist (m)		313.7			158.6			90.0			208.7	
Turn Bay Length (m)	45.0			85.0			60.0		35.0	60.0		
Base Capacity (vph)	276	1051		278	1211		350	762	499	344	756	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.45	1.03		1.06	1.09		0.43	0.32	0.77	1.08	0.43	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2031 Future Total PM

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 105.6

Natural Cycle: 135

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.09

Intersection Signal Delay: 69.1 Intersection LOS: E

Intersection Capacity Utilization 108.1% ICU Level of Service G

Analysis Period (min) 15

90th %ile Actuated Cycle: 115

70th %ile Actuated Cycle: 113

50th %ile Actuated Cycle: 103.6

30th %ile Actuated Cycle: 99.4

10th %ile Actuated Cycle: 97.1

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Montrose Road & Thorold Stone Rd

 Ø1	 Ø2	 Ø3	 Ø4
19 s	32.4 s	20 s	43.6 s
 Ø5	 Ø6	 Ø7	 Ø8
19 s	32.4 s	20 s	43.6 s

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2031 Future Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑					↖↗		↖
Traffic Volume (vph)	0	1226	506	293	1432	0	0	0	0	298	0	171
Future Volume (vph)	0	1226	506	293	1432	0	0	0	0	298	0	171
Ideal Flow (vphpl)	1454	1579	1301	1454	1579	1301	1900	1900	1900	2144	1900	1301
Storage Length (m)	0.0		60.0	210.0		0.0	0.0		0.0	40.0		25.0
Storage Lanes	0		1	1		0	0		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	2941	1084	1381	2970	0	0	0	0	3836	0	1063
Flt Permitted				0.102						0.950		
Satd. Flow (perm)	0	2941	1084	148	2970	0	0	0	0	3836	0	1063
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			375									66
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		182.6			352.3			184.1			149.0	
Travel Time (s)		13.1			25.4			13.3			10.7	
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%	2%	2%	0%	1%	0%	0%	0%	0%	3%	0%	4%
Adj. Flow (vph)	0	1333	550	318	1557	0	0	0	0	324	0	186
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1333	550	318	1557	0	0	0	0	324	0	186
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.40	1.26	1.60	1.40	1.26	1.60	1.00	1.00	1.00	0.85	1.00	1.60
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (m)		10.0	2.0	2.0	10.0					2.0		2.0
Trailing Detector (m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Position(m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Size(m)		0.6	2.0	2.0	0.6					2.0		2.0
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm	pm+pt	NA					Prot		Perm
Protected Phases		4		3	8					1		

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2031 Future Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4	8								1
Detector Phase		4	4	3	8					1		1
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					10.0		10.0
Minimum Split (s)		37.0	37.0	9.0	17.0					40.0		40.0
Total Split (s)		58.0	58.0	17.0	75.0					40.0		40.0
Total Split (%)		50.4%	50.4%	14.8%	65.2%					34.8%		34.8%
Maximum Green (s)		51.0	51.0	14.0	68.0					33.0		33.0
Yellow Time (s)		4.0	4.0	3.0	4.0					4.0		4.0
All-Red Time (s)		3.0	3.0	0.0	3.0					3.0		3.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		7.0	7.0	3.0	7.0					7.0		7.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		2.2	2.2	2.5	2.2					3.2		3.2
Recall Mode		Min	Min	None	Min					None		None
Walk Time (s)		15.0	15.0							12.0		12.0
Flash Dont Walk (s)		15.0	15.0							21.0		21.0
Pedestrian Calls (#/hr)		0	0							0		0
Act Effect Green (s)		51.2	51.2	72.3	68.3					17.9		17.9
Actuated g/C Ratio		0.51	0.51	0.72	0.68					0.18		0.18
v/c Ratio		0.89	0.75	1.14	0.77					0.47		0.76
Control Delay		32.0	14.2	122.9	15.6					38.6		44.7
Queue Delay		1.6	0.0	0.0	0.0					0.0		0.0
Total Delay		33.6	14.2	122.9	15.6					38.6		44.7
LOS		C	B	F	B					D		D
Approach Delay		27.9			33.8						40.8	
Approach LOS		C			C						D	
90th %ile Green (s)		51.0	51.0	14.0	68.0					29.3		29.3
90th %ile Term Code		Max	Max	Max	Max					Gap		Gap
70th %ile Green (s)		51.0	51.0	14.0	68.0					21.8		21.8
70th %ile Term Code		Max	Max	Max	Hold					Gap		Gap
50th %ile Green (s)		51.0	51.0	14.0	68.0					17.2		17.2
50th %ile Term Code		Max	Max	Max	Hold					Gap		Gap
30th %ile Green (s)		51.0	51.0	14.0	68.0					13.0		13.0
30th %ile Term Code		Max	Max	Max	Hold					Gap		Gap
10th %ile Green (s)		51.0	51.0	14.0	68.0					10.2		10.2
10th %ile Term Code		Max	Max	Max	Hold					Gap		Gap
Queue Length 50th (m)		120.4	23.2	~56.3	96.6					30.8		23.6
Queue Length 95th (m)		#209.4	92.1	#131.2	181.7					43.6		48.8
Internal Link Dist (m)		158.6			328.3			160.1			125.0	
Turn Bay Length (m)			60.0	210.0						40.0		25.0
Base Capacity (vph)		1502	737	279	2022					1267		395
Starvation Cap Reductn		66	0	0	0					0		0
Spillback Cap Reductn		0	0	0	0					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		0.93	0.75	1.14	0.77					0.26		0.47
Intersection Summary												

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2031 Future Total PM

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 100.3

Natural Cycle: 130

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.14

Intersection Signal Delay: 32.1

Intersection LOS: C

Intersection Capacity Utilization 90.3%

ICU Level of Service E

Analysis Period (min) 15

90th %ile Actuated Cycle: 111.3

70th %ile Actuated Cycle: 103.8

50th %ile Actuated Cycle: 99.2

30th %ile Actuated Cycle: 95

10th %ile Actuated Cycle: 92.2

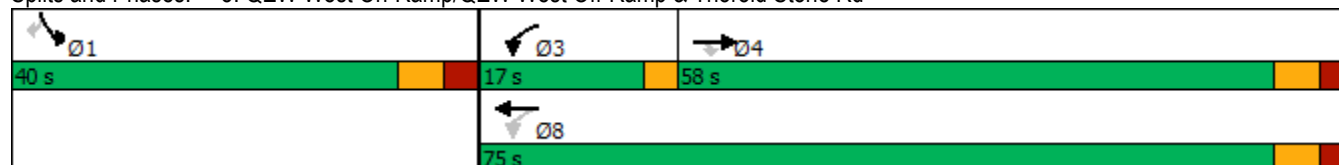
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings
6: QEW East On-Ramp & Thorold Stone Rd

2031 Future Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 					
Traffic Volume (vph)	168	1353	0	0	1219	352	455	0	292	0	0	0
Future Volume (vph)	168	1353	0	0	1219	352	455	0	292	0	0	0
Ideal Flow (vphpl)	1454	1579	1301	1454	1579	1301	2144	1900	1900	1900	1900	1900
Storage Length (m)	210.0		0.0	0.0		15.0	35.0		45.0	0.0		0.0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						0.97						
Frt						0.850			0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1303	2941	0	0	2970	1084	3951	0	1615	0	0	0
Flt Permitted	0.099						0.950					
Satd. Flow (perm)	136	2941	0	0	2970	1052	3951	0	1615	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						87			66			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		352.3			289.2			188.0			154.2	
Travel Time (s)		25.4			20.8			13.5			11.1	
Confl. Peds. (#/hr)	5		6	6		5			1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	2%	0%	0%	1%	2%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	183	1471	0	0	1325	383	495	0	317	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	183	1471	0	0	1325	383	495	0	317	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.40	1.26	1.60	1.40	1.26	1.60	0.85	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2			2	1	1		1			
Detector Template	Left	Thru			Thru	Right	Left		Right			
Leading Detector (m)	2.0	10.0			10.0	2.0	2.0		2.0			
Trailing Detector (m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Position(m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Size(m)	2.0	0.6			0.6	2.0	2.0		2.0			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Delay (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							

Lanes, Volumes, Timings
6: QEW East On-Ramp & Thorold Stone Rd

2031 Future Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA			NA	Perm	Prot		Prot			
Protected Phases	7	4			8		5		5			
Permitted Phases	4					8						
Detector Phase	7	4			8	8	5		5			
Switch Phase												
Minimum Initial (s)	6.0	10.0			10.0	10.0	10.0		10.0			
Minimum Split (s)	9.0	37.0			37.0	37.0	14.5		14.5			
Total Split (s)	19.0	76.0			57.0	57.0	39.0		39.0			
Total Split (%)	16.5%	66.1%			49.6%	49.6%	33.9%		33.9%			
Maximum Green (s)	16.0	69.0			50.0	50.0	34.5		34.5			
Yellow Time (s)	3.0	4.0			4.0	4.0	3.5		3.5			
All-Red Time (s)	0.0	3.0			3.0	3.0	1.0		1.0			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Total Lost Time (s)	3.0	7.0			7.0	7.0	4.5		4.5			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	2.5	5.0			5.0	5.0	3.0		3.0			
Recall Mode	None	Min			Min	Min	None		None			
Walk Time (s)		15.0			15.0	15.0						
Flash Dont Walk (s)		15.0			15.0	15.0						
Pedestrian Calls (#/hr)		0			0	0						
Act Effct Green (s)	71.5	67.5			50.5	50.5	21.9		21.9			
Actuated g/C Ratio	0.71	0.67			0.50	0.50	0.22		0.22			
v/c Ratio	0.71	0.75			0.89	0.67	0.58		0.79			
Control Delay	34.2	15.6			34.0	23.8	37.9		43.9			
Queue Delay	0.0	0.0			0.0	0.0	0.0		0.0			
Total Delay	34.2	15.6			34.0	23.8	37.9		43.9			
LOS	C	B			C	C	D		D			
Approach Delay		17.7			31.7			40.2				
Approach LOS		B			C			D				
90th %ile Green (s)	16.0	69.0			50.0	50.0	33.3		33.3			
90th %ile Term Code	Max	Max			Max	Max	Gap		Gap			
70th %ile Green (s)	16.0	69.0			50.0	50.0	26.6		26.6			
70th %ile Term Code	Max	Max			Max	Max	Gap		Gap			
50th %ile Green (s)	16.0	69.0			50.0	50.0	22.5		22.5			
50th %ile Term Code	Max	Hold			Max	Max	Gap		Gap			
30th %ile Green (s)	13.1	66.1			50.0	50.0	17.1		17.1			
30th %ile Term Code	Gap	Hold			Max	Max	Gap		Gap			
10th %ile Green (s)	9.5	62.5			50.0	50.0	12.4		12.4			
10th %ile Term Code	Gap	Hold			Max	Max	Gap		Gap			
Queue Length 50th (m)	18.3	96.6			131.4	46.8	48.3		50.6			
Queue Length 95th (m)	#56.9	169.2			#216.7	102.3	64.0		82.1			
Internal Link Dist (m)		328.3			265.2			164.0			130.2	
Turn Bay Length (m)	210.0					15.0	35.0		45.0			
Base Capacity (vph)	282	2027			1483	569	1362		599			
Starvation Cap Reductn	0	0			0	0	0		0			
Spillback Cap Reductn	0	0			0	0	0		0			
Storage Cap Reductn	0	0			0	0	0		0			
Reduced v/c Ratio	0.65	0.73			0.89	0.67	0.36		0.53			

Lanes, Volumes, Timings 6: QEW East On-Ramp & Thorold Stone Rd

2031 Future Total PM

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 101

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 27.8 Intersection LOS: C

Intersection Capacity Utilization 90.3% ICU Level of Service E

Analysis Period (min) 15

90th %ile Actuated Cycle: 113.8

70th %ile Actuated Cycle: 107.1

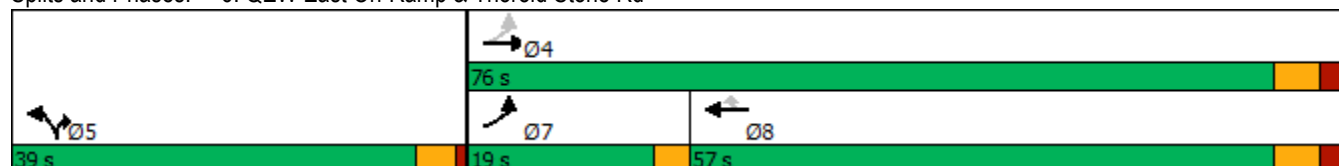
50th %ile Actuated Cycle: 103

30th %ile Actuated Cycle: 94.7

10th %ile Actuated Cycle: 86.4

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

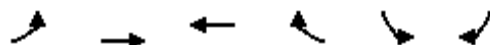
Splits and Phases: 6: QEW East On-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

8: Access Opp Southwood Dr & Site Access 2#

2031 Future Total PM



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	29	0	0	0	0	20
Future Volume (vph)	29	0	0	0	0	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected	0.950					
Satd. Flow (prot)	0	1770	1863	0	1611	0
Flt Permitted	0.950					
Satd. Flow (perm)	0	1770	1863	0	1611	0
Link Speed (k/h)	50		50	50		
Link Distance (m)	175.4		35.0	70.7		
Travel Time (s)	12.6		2.5	5.1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	0	0	0	0	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	32	0	0	22	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)	0.0		0.0	3.6		
Link Offset(m)	0.0		0.0	0.0		
Crosswalk Width(m)	4.8		4.8	4.8		
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control	Stop		Stop	Stop		
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utilization 13.3%				ICU Level of Service A		
Analysis Period (min) 15						

Lanes, Volumes, Timings

1: Montrose Road & Mt Carmel Blvd

2036 Future Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	60	54	0	3	28	161	0	0	212	2
Future Volume (vph)	4	0	60	54	0	3	28	161	0	0	212	2
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1900	1433	1900	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.873			0.993						0.999	
Flt Protected		0.997			0.955			0.993				
Satd. Flow (prot)	0	1247	0	0	1359	0	0	1399	0	0	1404	0
Flt Permitted		0.997			0.955			0.993				
Satd. Flow (perm)	0	1247	0	0	1359	0	0	1399	0	0	1404	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		97.9			84.1			51.6			220.4	
Travel Time (s)		7.0			6.1			3.7			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Adj. Flow (vph)	4	0	65	59	0	3	30	175	0	0	230	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	69	0	0	62	0	0	205	0	0	232	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	49.1%						ICU Level of Service A					
Analysis Period (min)	15											

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

2036 Future Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1	16	68	1	19	2	186	62	19	305	0
Future Volume (vph)	0	1	16	68	1	19	2	186	62	19	305	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1178	1301	1454	1579	1301	1454	1338	1900
Storage Length (m)	0.0		0.0	0.0		50.0	50.0		50.0	40.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.872				0.850			0.850			
Flt Protected					0.953		0.950			0.950		
Satd. Flow (prot)	0	1657	0	0	1070	1074	1381	1579	1106	1381	1312	0
Flt Permitted					0.716		0.560			0.631		
Satd. Flow (perm)	0	1657	0	0	804	1074	814	1579	1106	917	1312	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17				75			81			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		92.8			175.4			126.5			73.6	
Travel Time (s)		6.7			12.6			9.1			5.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	5%	0%	3%	0%	0%	0%	0%	2%	0%
Adj. Flow (vph)	0	1	17	74	1	21	2	202	67	21	332	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	18	0	0	75	21	2	202	67	21	332	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.80	1.60	1.40	1.26	1.60	1.40	1.55	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type		NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

2036 Future Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	6.0	10.0	10.0	6.0	10.0	
Minimum Split (s)	28.2	28.2		28.2	28.2	28.2	12.0	29.7	29.7	10.5	29.7	
Total Split (s)	37.2	37.2		37.2	37.2	37.2	18.0	41.7	41.7	18.0	41.7	
Total Split (%)	38.4%	38.4%		38.4%	38.4%	38.4%	18.6%	43.0%	43.0%	18.6%	43.0%	
Maximum Green (s)	30.0	30.0		30.0	30.0	30.0	15.0	35.0	35.0	15.0	35.0	
Yellow Time (s)	4.1	4.1		4.1	4.1	4.1	3.0	4.1	4.1	3.0	4.1	
All-Red Time (s)	3.1	3.1		3.1	3.1	3.1	0.0	2.6	2.6	0.0	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)		7.2			7.2	7.2	3.0	6.7	6.7	3.0	6.7	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Walk Time (s)	8.0	8.0		8.0	8.0	8.0		9.0	9.0		9.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0		14.0	14.0		14.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effct Green (s)		11.5			11.5	11.5	29.3	26.6	26.6	29.4	26.6	
Actuated g/C Ratio		0.24			0.24	0.24	0.61	0.56	0.56	0.62	0.56	
v/c Ratio		0.04			0.39	0.07	0.00	0.23	0.10	0.03	0.45	
Control Delay		9.6			24.0	0.4	5.5	10.9	3.1	5.9	13.8	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		9.6			24.0	0.4	5.5	10.9	3.1	5.9	13.8	
LOS		A			C	A	A	B	A	A	B	
Approach Delay		9.6			18.8			8.9			13.3	
Approach LOS		A			B			A			B	
90th %ile Green (s)	18.4	18.4		18.4	18.4	18.4	6.0	30.5	30.5	6.3	30.8	
90th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Min	Hold	Hold	Gap	Gap	
70th %ile Green (s)	12.5	12.5		12.5	12.5	12.5	0.0	18.5	18.5	0.0	18.5	
70th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Hold	Hold	Skip	Gap	
50th %ile Green (s)	10.0	10.0		10.0	10.0	10.0	0.0	16.4	16.4	0.0	16.4	
50th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Dwell	Dwell	Skip	Dwell	
30th %ile Green (s)	8.7	8.7		8.7	8.7	8.7	0.0	26.9	26.9	0.0	26.9	
30th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Dwell	Dwell	Skip	Dwell	
10th %ile Green (s)	0.0	0.0		0.0	0.0	0.0	0.0	25.0	25.0	0.0	25.0	
10th %ile Term Code	Skip	Skip		Skip	Skip	Skip	Skip	Dwell	Dwell	Skip	Dwell	
Queue Length 50th (m)		0.1			4.5	0.0	0.1	9.2	0.0	0.7	17.7	
Queue Length 95th (m)		4.7			20.9	0.0	0.8	33.1	5.5	3.6	61.5	
Internal Link Dist (m)		68.8			151.4			102.5			49.6	
Turn Bay Length (m)						50.0	50.0		50.0	40.0		
Base Capacity (vph)		1125			543	750	699	1212	868	729	1007	
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		0.02			0.14	0.03	0.00	0.17	0.08	0.03	0.33	
Intersection Summary												

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

2036 Future Total AM

Area Type: Other

Cycle Length: 96.9

Actuated Cycle Length: 47.7

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 12.3

Intersection LOS: B

Intersection Capacity Utilization 47.2%

ICU Level of Service A

Analysis Period (min) 15

90th %ile Actuated Cycle: 72.1

70th %ile Actuated Cycle: 44.9

50th %ile Actuated Cycle: 40.3

30th %ile Actuated Cycle: 49.5

10th %ile Actuated Cycle: 31.7

Splits and Phases: 2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

 Ø1	 Ø2	 Ø4
18 s	41.7 s	37.2 s
 Ø5	 Ø6	 Ø8
18 s	41.7 s	37.2 s

Lanes, Volumes, Timings

3: Montrose Road & Cameron Ct

2036 Future Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1	10	26	0	2	1	249	72	7	381	1
Future Volume (vph)	0	1	10	26	0	2	1	249	72	7	381	1
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1454	1579	1301	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.876				0.991				0.967			
Flt Protected					0.955						0.999	
Satd. Flow (prot)	0	1159	0	0	1356	0	0	2882	0	0	1387	0
Flt Permitted					0.955						0.999	
Satd. Flow (perm)	0	1159	0	0	1356	0	0	2882	0	0	1387	0
Link Speed (k/h)	50				50				50		50	
Link Distance (m)	167.1				64.9				232.7		126.5	
Travel Time (s)	12.0				4.7				16.8		9.1	
Confl. Peds. (#/hr)	1		3	3		1	4		4	4		4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	100%	0%	0%	0%	0%	0%	0%	3%	67%	2%	0%
Adj. Flow (vph)	0	1	11	28	0	2	1	271	78	8	414	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	12	0	0	30	0	0	350	0	0	423	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0				0.0				3.6		3.6	
Link Offset(m)	0.0				0.0				0.0		0.0	
Crosswalk Width(m)	4.8				4.8				4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.40	1.26	1.60	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control	Stop				Stop				Free		Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	49.7%				ICU Level of Service A							
Analysis Period (min)	15											

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2036 Future Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	804	87	229	596	190	81	186	321	289	133	90
Future Volume (vph)	83	804	87	229	596	190	81	186	321	289	133	90
Ideal Flow (vphpl)	1454	1579	1301	1454	1579	1301	1454	1579	1301	1454	1579	1301
Storage Length (m)	45.0		0.0	85.0		0.0	60.0		35.0	60.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	1.00		0.99		0.99	1.00	0.99	
Frt		0.985			0.964				0.850		0.940	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1354	2888	0	1368	2832	0	1354	2970	1084	1368	2721	0
Flt Permitted	0.306			0.133			0.601			0.510		
Satd. Flow (perm)	436	2888	0	191	2832	0	852	2970	1069	733	2721	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			40				331		98	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		337.7			182.6			114.0			232.7	
Travel Time (s)		24.3			13.1			8.2			16.8	
Confl. Peds. (#/hr)	2		1	1		2	7		2	2		7
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 (%)	2%	2%	4%	1%	2%	1%	2%	1%	2%	1%	2%	4%
Adj. Flow (vph)	90	874	95	249	648	207	88	202	349	314	145	98
Shared Lane Traffic (%)												
Lane Group Flow (vph)	90	969	0	249	855	0	88	202	349	314	243	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.40	1.26	1.60	1.40	1.26	1.60	1.40	1.26	1.60	1.40	1.26	1.60
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2036 Future Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	8.0	8.0	6.0	8.0	
Minimum Split (s)	10.5	35.6		10.5	35.6		9.0	35.4	35.4	9.0	35.4	
Total Split (s)	20.0	43.6		20.0	43.6		19.0	32.4	32.4	19.0	32.4	
Total Split (%)	17.4%	37.9%		17.4%	37.9%		16.5%	28.2%	28.2%	16.5%	28.2%	
Maximum Green (s)	17.0	38.0		17.0	38.0		16.0	27.0	27.0	16.0	27.0	
Yellow Time (s)	3.0	3.5		3.0	3.5		3.0	3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.1		0.0	2.1		0.0	2.1	2.1	0.0	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	5.6		3.0	5.6		3.0	5.4	5.4	3.0	5.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	2.5		3.0	2.5		2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None		None	Min	Min	None	Min	
Walk Time (s)		11.0			11.0			11.0	11.0		11.0	
Flash Dont Walk (s)		19.0			19.0			19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effct Green (s)	49.3	38.2		60.8	48.6		25.7	13.7	13.7	35.1	22.2	
Actuated g/C Ratio	0.48	0.37		0.60	0.48		0.25	0.13	0.13	0.34	0.22	
v/c Ratio	0.31	0.89		0.80	0.63		0.34	0.51	0.81	0.89	0.36	
Control Delay	14.0	42.3		40.6	23.8		26.9	44.9	21.3	57.8	22.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	14.0	42.3		40.6	23.8		26.9	44.9	21.3	57.8	22.4	
LOS	B	D		D	C		C	D	C	E	C	
Approach Delay		39.9			27.6			29.5			42.3	
Approach LOS		D			C			C			D	
90th %ile Green (s)	12.6	38.0		17.0	42.4		13.6	27.0	27.0	16.0	29.4	
90th %ile Term Code	Gap	Max		Max	Hold		Gap	Max	Max	Max	Hold	
70th %ile Green (s)	9.4	38.0		17.0	45.6		11.2	13.7	13.7	16.0	18.5	
70th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
50th %ile Green (s)	8.2	38.0		17.0	46.8		9.6	11.6	11.6	16.0	18.0	
50th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
30th %ile Green (s)	7.2	38.0		17.0	47.8		8.0	10.1	10.1	16.0	18.1	
30th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
10th %ile Green (s)	0.0	38.0		17.0	58.0		0.0	8.1	8.1	16.0	27.1	
10th %ile Term Code	Skip	Max		Max	Hold		Skip	Gap	Gap	Max	Hold	
Queue Length 50th (m)	7.1	93.6		29.2	63.4		12.7	20.7	3.4	55.0	13.5	
Queue Length 95th (m)	19.4	#168.4		#89.6	117.3		23.9	32.0	37.1	#96.4	25.7	
Internal Link Dist (m)		313.7			158.6			90.0			208.7	
Turn Bay Length (m)	45.0			85.0			60.0		35.0	60.0		
Base Capacity (vph)	400	1085		310	1367		347	788	527	351	805	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.23	0.89		0.80	0.63		0.25	0.26	0.66	0.89	0.30	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2036 Future Total AM

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 102.1

Natural Cycle: 105

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 34.3

Intersection LOS: C

Intersection Capacity Utilization 92.8%

ICU Level of Service F

Analysis Period (min) 15

90th %ile Actuated Cycle: 115

70th %ile Actuated Cycle: 101.7

50th %ile Actuated Cycle: 99.6

30th %ile Actuated Cycle: 98.1

10th %ile Actuated Cycle: 96.1

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Montrose Road & Thorold Stone Rd

 Ø1	 Ø2	 Ø3	 Ø4
19 s	32.4 s	20 s	43.6 s
 Ø5	 Ø6	 Ø7	 Ø8
19 s	32.4 s	20 s	43.6 s

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2036 Future Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑					↖↗		↗
Traffic Volume (vph)	0	1026	541	233	1013	0	0	0	0	250	0	120
Future Volume (vph)	0	1026	541	233	1013	0	0	0	0	250	0	120
Ideal Flow (vphpl)	1454	1579	1301	1454	1579	1301	1900	1900	1900	2144	1900	1301
Storage Length (m)	0.0		60.0	210.0		0.0	0.0		0.0	40.0		25.0
Storage Lanes	0		1	1		0	0		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	2941	1084	1381	2970	0	0	0	0	3836	0	1063
Flt Permitted				0.146						0.950		
Satd. Flow (perm)	0	2941	1084	212	2970	0	0	0	0	3836	0	1063
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			479									92
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		182.6			352.3			184.1			149.0	
Travel Time (s)		13.1			25.4			13.3			10.7	
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%	2%	2%	0%	1%	0%	0%	0%	0%	3%	0%	4%
Adj. Flow (vph)	0	1115	588	253	1101	0	0	0	0	272	0	130
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1115	588	253	1101	0	0	0	0	272	0	130
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.40	1.26	1.60	1.40	1.26	1.60	1.00	1.00	1.00	0.85	1.00	1.60
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (m)		10.0	2.0	2.0	10.0					2.0		2.0
Trailing Detector (m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Position(m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Size(m)		0.6	2.0	2.0	0.6					2.0		2.0
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm	pm+pt	NA					Prot		Perm
Protected Phases		4		3	8					1		

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2036 Future Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4	8								1
Detector Phase		4	4	3	8					1		1
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					10.0		10.0
Minimum Split (s)		37.0	37.0	9.0	17.0					40.0		40.0
Total Split (s)		58.0	58.0	17.0	75.0					40.0		40.0
Total Split (%)		50.4%	50.4%	14.8%	65.2%					34.8%		34.8%
Maximum Green (s)		51.0	51.0	14.0	68.0					33.0		33.0
Yellow Time (s)		4.0	4.0	3.0	4.0					4.0		4.0
All-Red Time (s)		3.0	3.0	0.0	3.0					3.0		3.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		7.0	7.0	3.0	7.0					7.0		7.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		2.2	2.2	2.5	2.2					3.2		3.2
Recall Mode		Min	Min	None	Min					None		None
Walk Time (s)		15.0	15.0							12.0		12.0
Flash Dont Walk (s)		15.0	15.0							21.0		21.0
Pedestrian Calls (#/hr)		0	0							0		0
Act Effect Green (s)		37.0	37.0	58.4	54.3					12.5		12.5
Actuated g/C Ratio		0.46	0.46	0.72	0.67					0.15		0.15
v/c Ratio		0.83	0.78	0.71	0.55					0.46		0.54
Control Delay		25.5	11.9	24.7	8.3					35.3		22.1
Queue Delay		0.0	0.0	0.0	0.0					0.0		0.0
Total Delay		25.5	11.9	24.7	8.3					35.3		22.1
LOS		C	B	C	A					D		C
Approach Delay		20.8			11.4						31.0	
Approach LOS		C			B						C	
90th %ile Green (s)		51.0	51.0	14.0	68.0					17.6		17.6
90th %ile Term Code		Max	Max	Max	Hold					Gap		Gap
70th %ile Green (s)		42.4	42.4	14.0	59.4					13.3		13.3
70th %ile Term Code		Gap	Gap	Max	Hold					Gap		Gap
50th %ile Green (s)		36.3	36.3	14.0	53.3					12.0		12.0
50th %ile Term Code		Gap	Gap	Max	Hold					Gap		Gap
30th %ile Green (s)		31.9	31.9	14.0	48.9					10.4		10.4
30th %ile Term Code		Gap	Gap	Max	Hold					Gap		Gap
10th %ile Green (s)		25.8	25.8	14.0	42.8					10.0		10.0
10th %ile Term Code		Gap	Gap	Max	Hold					Min		Min
Queue Length 50th (m)		77.7	10.0	15.9	41.0					20.5		5.4
Queue Length 95th (m)		116.3	60.3	#62.5	68.0					38.0		25.5
Internal Link Dist (m)		158.6			328.3			160.1			125.0	
Turn Bay Length (m)			60.0	210.0						40.0		25.0
Base Capacity (vph)		1883	866	358	2525					1589		494
Starvation Cap Reductn		23	0	0	0					0		0
Spillback Cap Reductn		0	0	0	0					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		0.60	0.68	0.71	0.44					0.17		0.26
Intersection Summary												

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2036 Future Total AM

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 81.1

Natural Cycle: 100

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 18.3

Intersection LOS: B

Intersection Capacity Utilization 89.1%

ICU Level of Service E

Analysis Period (min) 15

90th %ile Actuated Cycle: 99.6

70th %ile Actuated Cycle: 86.7

50th %ile Actuated Cycle: 79.3

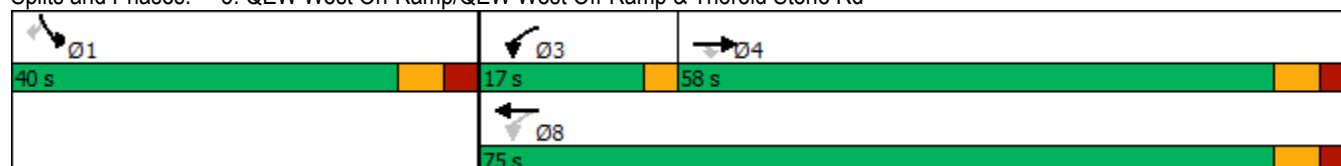
30th %ile Actuated Cycle: 73.3

10th %ile Actuated Cycle: 66.8

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

Queue shown is maximum after two cycles.

Splits and Phases: 5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings
6: QEW East On-Ramp & Thorold Stone Rd

2036 Future Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	163	1120	0	0	896	280	362	0	256	0	0	0
Future Volume (vph)	163	1120	0	0	896	280	362	0	256	0	0	0
Ideal Flow (vphpl)	1454	1579	1301	1454	1579	1301	2144	1900	1900	1900	1900	1900
Storage Length (m)	210.0		0.0	0.0		15.0	35.0		45.0	0.0		0.0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1303	2941	0	0	2970	1084	3951	0	1615	0	0	0
Flt Permitted	0.198						0.950					
Satd. Flow (perm)	272	2941	0	0	2970	1084	3951	0	1615	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						94			73			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		352.3			289.2			188.0			154.2	
Travel Time (s)		25.4			20.8			13.5			11.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	2%	0%	0%	1%	2%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	177	1217	0	0	974	304	393	0	278	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	177	1217	0	0	974	304	393	0	278	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.40	1.26	1.60	1.40	1.26	1.60	0.85	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2			2	1	1		1			
Detector Template	Left	Thru			Thru	Right	Left		Right			
Leading Detector (m)	2.0	10.0			10.0	2.0	2.0		2.0			
Trailing Detector (m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Position(m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Size(m)	2.0	0.6			0.6	2.0	2.0		2.0			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Delay (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type	pm+pt	NA			NA	Perm	Prot		Prot			
Protected Phases	7	4			8		5		5			

Lanes, Volumes, Timings
6: QEW East On-Ramp & Thorold Stone Rd

2036 Future Total AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4					8						
Detector Phase	7	4			8	8	5		5			
Switch Phase												
Minimum Initial (s)	6.0	10.0			10.0	10.0	10.0		10.0			
Minimum Split (s)	9.0	37.0			37.0	37.0	14.5		14.5			
Total Split (s)	19.0	76.0			57.0	57.0	39.0		39.0			
Total Split (%)	16.5%	66.1%			49.6%	49.6%	33.9%		33.9%			
Maximum Green (s)	16.0	69.0			50.0	50.0	34.5		34.5			
Yellow Time (s)	3.0	4.0			4.0	4.0	3.5		3.5			
All-Red Time (s)	0.0	3.0			3.0	3.0	1.0		1.0			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Total Lost Time (s)	3.0	7.0			7.0	7.0	4.5		4.5			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	2.5	5.0			5.0	5.0	3.0		3.0			
Recall Mode	None	Min			Min	Min	None		None			
Walk Time (s)		15.0			15.0	15.0						
Flash Dont Walk (s)		15.0			15.0	15.0						
Pedestrian Calls (#/hr)		0			0	0						
Act Effct Green (s)	57.6	53.3			38.2	38.2	17.4		17.4			
Actuated g/C Ratio	0.69	0.64			0.46	0.46	0.21		0.21			
v/c Ratio	0.52	0.64			0.71	0.55	0.47		0.70			
Control Delay	11.2	11.3			22.2	16.3	32.1		34.1			
Queue Delay	0.0	0.0			0.0	0.0	0.0		0.0			
Total Delay	11.2	11.3			22.2	16.3	32.1		34.1			
LOS	B	B			C	B	C		C			
Approach Delay		11.3			20.8			32.9				
Approach LOS		B			C			C				
90th %ile Green (s)	16.0	69.0			50.0	50.0	28.6		28.6			
90th %ile Term Code	Max	Hold			Max	Max	Gap		Gap			
70th %ile Green (s)	14.0	65.2			48.2	48.2	20.8		20.8			
70th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
50th %ile Green (s)	12.6	54.6			39.0	39.0	17.1		17.1			
50th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
30th %ile Green (s)	10.2	44.3			31.1	31.1	13.1		13.1			
30th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
10th %ile Green (s)	7.5	34.5			24.0	24.0	10.0		10.0			
10th %ile Term Code	Gap	Hold			Gap	Gap	Min		Min			
Queue Length 50th (m)	8.5	54.8			64.7	23.1	30.0		31.9			
Queue Length 95th (m)	23.3	105.5			115.3	61.3	51.3		68.4			
Internal Link Dist (m)		328.3			265.2			164.0			130.2	
Turn Bay Length (m)	210.0					15.0	35.0		45.0			
Base Capacity (vph)	399	2452			1895	725	1739		751			
Starvation Cap Reductn	0	0			0	0	0		0			
Spillback Cap Reductn	0	0			0	0	0		0			
Storage Cap Reductn	0	0			0	0	0		0			
Reduced v/c Ratio	0.44	0.50			0.51	0.42	0.23		0.37			
Intersection Summary												

Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2036 Future Total AM

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 82.9

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 19.3

Intersection LOS: B

Intersection Capacity Utilization 89.1%

ICU Level of Service E

Analysis Period (min) 15

90th %ile Actuated Cycle: 109.1

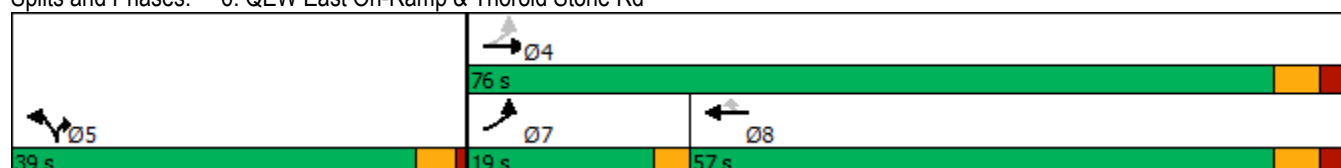
70th %ile Actuated Cycle: 97.5

50th %ile Actuated Cycle: 83.2

30th %ile Actuated Cycle: 68.9

10th %ile Actuated Cycle: 56

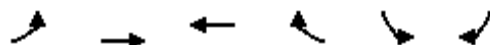
Splits and Phases: 6: QEW East On-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

8: Access Opp Southwood Dr & Site Access 2#

2036 Future Total AM



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	0	0	0	0	31
Future Volume (vph)	10	0	0	0	0	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected	0.950					
Satd. Flow (prot)	0	1770	1863	0	1611	0
Flt Permitted	0.950					
Satd. Flow (perm)	0	1770	1863	0	1611	0
Link Speed (k/h)	50					
Link Distance (m)	175.4					35.0
Travel Time (s)	12.6					2.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	0	0	0	0	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	11	0	0	34	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)	0.0					0.0
Link Offset(m)	0.0					0.0
Crosswalk Width(m)	4.8					4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control	Stop		Stop	Stop		
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utilization 13.3%				ICU Level of Service A		
Analysis Period (min) 15						

Lanes, Volumes, Timings

1: Montrose Road & Mt Carmel Blvd

2036 Future Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	47	34	0	3	58	318	0	0	250	6
Future Volume (vph)	4	0	47	34	0	3	58	318	0	0	250	6
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1900	1433	1900	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.875			0.990						0.997	
Flt Protected		0.996			0.956			0.992				
Satd. Flow (prot)	0	1249	0	0	1356	0	0	1398	0	0	1401	0
Flt Permitted		0.996			0.956			0.992				
Satd. Flow (perm)	0	1249	0	0	1356	0	0	1398	0	0	1401	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		97.9			84.1			51.6			220.4	
Travel Time (s)		7.0			6.1			3.7			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Adj. Flow (vph)	4	0	51	37	0	3	63	346	0	0	272	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	55	0	0	40	0	0	409	0	0	279	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	63.8%						ICU Level of Service B					
Analysis Period (min)	15											

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

2036 Future Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	177	1	92	7	329	98	71	254	3
Future Volume (vph)	1	0	1	177	1	92	7	329	98	71	254	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1178	1301	1454	1579	1301	1454	1338	1900
Storage Length (m)	0.0		0.0	0.0		50.0	50.0		50.0	40.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00		1.00		0.98	1.00	1.00	
Frt		0.932				0.850			0.850		0.998	
Flt Protected		0.976			0.953		0.950			0.950		
Satd. Flow (prot)	0	1709	0	0	1069	1074	1381	1579	1106	1381	1309	0
Flt Permitted		0.899			0.727		0.588			0.398		
Satd. Flow (perm)	0	1574	0	0	814	1074	853	1579	1081	578	1309	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		75				100			107			1
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		92.8			175.4			126.5			73.6	
Travel Time (s)		6.7			12.6			9.1			5.3	
Confl. Peds. (#/hr)			1	1			2		1	1		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	5%	0%	3%	0%	0%	0%	0%	2%	0%
Adj. Flow (vph)	1	0	1	192	1	100	8	358	107	77	276	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2	0	0	193	100	8	358	107	77	279	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.80	1.60	1.40	1.26	1.60	1.40	1.55	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

2036 Future Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	6.0	10.0	10.0	6.0	10.0	
Minimum Split (s)	28.2	28.2		28.2	28.2	28.2	12.0	29.7	29.7	10.5	29.7	
Total Split (s)	37.2	37.2		37.2	37.2	37.2	18.0	41.7	41.7	18.0	41.7	
Total Split (%)	38.4%	38.4%		38.4%	38.4%	38.4%	18.6%	43.0%	43.0%	18.6%	43.0%	
Maximum Green (s)	30.0	30.0		30.0	30.0	30.0	15.0	35.0	35.0	15.0	35.0	
Yellow Time (s)	4.1	4.1		4.1	4.1	4.1	3.0	4.1	4.1	3.0	4.1	
All-Red Time (s)	3.1	3.1		3.1	3.1	3.1	0.0	2.6	2.6	0.0	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)		7.2			7.2	7.2	3.0	6.7	6.7	3.0	6.7	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Walk Time (s)	8.0	8.0		8.0	8.0	8.0		9.0	9.0		9.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0		14.0	14.0		14.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effect Green (s)		21.9			21.9	21.9	30.6	22.1	22.1	34.1	28.7	
Actuated g/C Ratio		0.33			0.33	0.33	0.46	0.33	0.33	0.51	0.43	
v/c Ratio		0.00			0.73	0.24	0.02	0.69	0.25	0.20	0.50	
Control Delay		0.0			40.2	6.2	9.6	29.6	6.1	10.8	19.2	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		0.0			40.2	6.2	9.6	29.6	6.1	10.8	19.2	
LOS		A			D	A	A	C	A	B	B	
Approach Delay					28.6			24.0			17.4	
Approach LOS					C			C			B	
90th %ile Green (s)	30.0	30.0		30.0	30.0	30.0	6.0	32.8	32.8	9.7	36.5	
90th %ile Term Code	Hold	Hold		Max	Max	Max	Min	Gap	Gap	Gap	Hold	
70th %ile Green (s)	30.0	30.0		30.0	30.0	30.0	0.0	25.8	25.8	8.3	37.1	
70th %ile Term Code	Hold	Hold		Max	Max	Max	Skip	Gap	Gap	Gap	Hold	
50th %ile Green (s)	23.1	23.1		23.1	23.1	23.1	0.0	21.3	21.3	7.3	31.6	
50th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Gap	Hold	
30th %ile Green (s)	17.5	17.5		17.5	17.5	17.5	0.0	16.2	16.2	6.2	25.4	
30th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Gap	Hold	
10th %ile Green (s)	11.2	11.2		11.2	11.2	11.2	0.0	14.5	14.5	0.0	14.5	
10th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Dwell	Dwell	Skip	Dwell	
Queue Length 50th (m)		0.0			22.2	0.0	0.5	42.5	0.0	5.0	24.3	
Queue Length 95th (m)		0.0			#63.6	10.8	2.7	82.3	10.6	13.0	61.6	
Internal Link Dist (m)		68.8			151.4			102.5			49.6	
Turn Bay Length (m)						50.0	50.0		50.0	40.0		
Base Capacity (vph)		803			395	572	561	894	658	488	753	
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		0.00			0.49	0.17	0.01	0.40	0.16	0.16	0.37	

Intersection Summary

Area Type: Other

Cycle Length: 96.9

Actuated Cycle Length: 67.1

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 23.1

Intersection LOS: C

Intersection Capacity Utilization 63.5%

ICU Level of Service B

Analysis Period (min) 15

90th %ile Actuated Cycle: 89.4

70th %ile Actuated Cycle: 81

50th %ile Actuated Cycle: 68.6

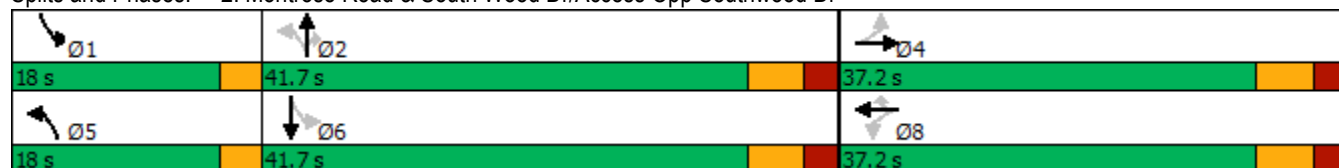
30th %ile Actuated Cycle: 56.8

10th %ile Actuated Cycle: 39.6

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: Montrose Road & South Wood Dr/Access Opp Southwood Dr



Lanes, Volumes, Timings

3: Montrose Road & Cameron Ct

2036 Future Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1	11	119	0	4	15	430	179	4	426	3
Future Volume (vph)	0	1	11	119	0	4	15	430	179	4	426	3
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1454	1579	1301	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.875			0.996			0.957			0.999	
Flt Protected					0.954			0.999				
Satd. Flow (prot)	0	1164	0	0	1362	0	0	2844	0	0	1396	0
Flt Permitted					0.954			0.999				
Satd. Flow (perm)	0	1164	0	0	1362	0	0	2844	0	0	1396	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		167.1			64.9			232.7			126.5	
Travel Time (s)		12.0			4.7			16.8			9.1	
Confl. Peds. (#/hr)	1					1	2		1	1		2
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%	100%	0%	0%	0%	0%	0%	0%	3%	67%	2%	0%
Adj. Flow (vph)	0	1	12	129	0	4	16	467	195	4	463	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	13	0	0	133	0	0	678	0	0	470	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.40	1.26	1.60	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	56.6%						ICU Level of Service B					
Analysis Period (min)	15											

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2036 Future Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	121	990	95	295	930	385	150	243	383	367	219	105
Future Volume (vph)	121	990	95	295	930	385	150	243	383	367	219	105
Ideal Flow (vphpl)	1454	1579	1301	1454	1579	1301	1454	1579	1301	1454	1579	1301
Storage Length (m)	45.0		0.0	85.0		0.0	60.0		35.0	60.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00			0.99		0.99		0.97	0.99	0.99	
Frt		0.987			0.956				0.850		0.951	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1354	2893	0	1368	2803	0	1354	2970	1084	1368	2756	0
Flt Permitted	0.105			0.097			0.501			0.466		
Satd. Flow (perm)	150	2893	0	140	2803	0	708	2970	1053	663	2756	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			59				299		66	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		337.7			182.6			114.0			232.7	
Travel Time (s)		24.3			13.1			8.2			16.8	
Confl. Peds. (#/hr)	8		7	7		8	13		15	15		13
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 (%)	2%	2%	4%	1%	2%	1%	2%	1%	2%	1%	2%	4%
Adj. Flow (vph)	132	1076	103	321	1011	418	163	264	416	399	238	114
Shared Lane Traffic (%)												
Lane Group Flow (vph)	132	1179	0	321	1429	0	163	264	416	399	352	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.40	1.26	1.60	1.40	1.26	1.60	1.40	1.26	1.60	1.40	1.26	1.60
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2036 Future Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	8.0	8.0	6.0	8.0	
Minimum Split (s)	10.5	35.6		10.5	35.6		9.0	35.4	35.4	9.0	35.4	
Total Split (s)	20.0	43.6		20.0	43.6		19.0	32.4	32.4	19.0	32.4	
Total Split (%)	17.4%	37.9%		17.4%	37.9%		16.5%	28.2%	28.2%	16.5%	28.2%	
Maximum Green (s)	17.0	38.0		17.0	38.0		16.0	27.0	27.0	16.0	27.0	
Yellow Time (s)	3.0	3.5		3.0	3.5		3.0	3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.1		0.0	2.1		0.0	2.1	2.1	0.0	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	5.6		3.0	5.6		3.0	5.4	5.4	3.0	5.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	2.5		3.0	2.5		2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None		None	Min	Min	None	Min	
Walk Time (s)		11.0			11.0			11.0	11.0		11.0	
Flash Dont Walk (s)		19.0			19.0			19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effect Green (s)	52.4	38.2		60.2	43.6		36.2	20.6	20.6	40.8	23.5	
Actuated g/C Ratio	0.48	0.35		0.55	0.40		0.33	0.19	0.19	0.37	0.22	
v/c Ratio	0.66	1.16		1.19	1.24		0.52	0.47	0.94	1.14	0.54	
Control Delay	36.0	115.9		147.5	143.9		29.4	41.5	44.1	120.1	34.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	36.0	115.9		147.5	143.9		29.4	41.5	44.1	120.1	34.0	
LOS	D	F		F	F		C	D	D	F	C	
Approach Delay		107.9			144.5			40.4			79.8	
Approach LOS		F			F			D			E	
90th %ile Green (s)	17.0	38.0		17.0	38.0		16.0	27.0	27.0	16.0	27.0	
90th %ile Term Code	Max	Max		Max	Max		Max	Max	Max	Max	Hold	
70th %ile Green (s)	14.7	38.0		17.0	40.3		16.0	27.0	27.0	16.0	27.0	
70th %ile Term Code	Gap	Max		Max	Hold		Max	Max	Max	Max	Hold	
50th %ile Green (s)	11.8	38.0		17.0	43.2		14.1	25.4	25.4	16.0	27.3	
50th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
30th %ile Green (s)	8.8	38.0		17.0	46.2		11.7	15.9	15.9	16.0	20.2	
30th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
10th %ile Green (s)	6.9	38.0		17.0	48.1		8.6	9.7	9.7	16.0	17.1	
10th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
Queue Length 50th (m)	16.0	~177.1		~80.2	~221.1		25.0	27.7	28.8	~86.4	30.1	
Queue Length 95th (m)	35.9	#225.6		#142.6	#287.5		41.9	40.8	#93.2	#126.7	46.5	
Internal Link Dist (m)		313.7			158.6			90.0			208.7	
Turn Bay Length (m)	45.0			85.0			60.0		35.0	60.0		
Base Capacity (vph)	268	1018		269	1155		349	738	486	351	736	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.49	1.16		1.19	1.24		0.47	0.36	0.86	1.14	0.48	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2036 Future Total PM

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 109

Natural Cycle: 145

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.24

Intersection Signal Delay: 104.9 Intersection LOS: F

Intersection Capacity Utilization 115.1% ICU Level of Service H

Analysis Period (min) 15

90th %ile Actuated Cycle: 115

70th %ile Actuated Cycle: 115

50th %ile Actuated Cycle: 113.4

30th %ile Actuated Cycle: 103.9

10th %ile Actuated Cycle: 97.7

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

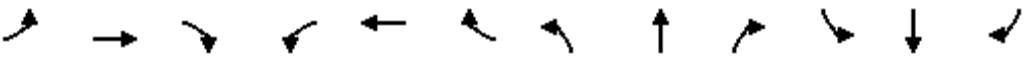
Splits and Phases: 4: Montrose Road & Thorold Stone Rd

 Ø1	 Ø2	 Ø3	 Ø4
19 s	32.4 s	20 s	43.6 s
 Ø5	 Ø6	 Ø7	 Ø8
19 s	32.4 s	20 s	43.6 s

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2036 Future Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑					↖↗		↖
Traffic Volume (vph)	0	1375	568	329	1605	0	0	0	0	335	0	191
Future Volume (vph)	0	1375	568	329	1605	0	0	0	0	335	0	191
Ideal Flow (vphpl)	1454	1579	1301	1454	1579	1301	1900	1900	1900	2144	1900	1301
Storage Length (m)	0.0		60.0	210.0		0.0	0.0		0.0	40.0		25.0
Storage Lanes	0		1	1		0	0		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	2941	1084	1381	2970	0	0	0	0	3836	0	1063
Flt Permitted				0.074						0.950		
Satd. Flow (perm)	0	2941	1084	108	2970	0	0	0	0	3836	0	1063
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			375									66
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		182.6			352.3			184.1			149.0	
Travel Time (s)		13.1			25.4			13.3			10.7	
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%	2%	2%	0%	1%	0%	0%	0%	0%	3%	0%	4%
Adj. Flow (vph)	0	1495	617	358	1745	0	0	0	0	364	0	208
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1495	617	358	1745	0	0	0	0	364	0	208
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.40	1.26	1.60	1.40	1.26	1.60	1.00	1.00	1.00	0.85	1.00	1.60
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (m)		10.0	2.0	2.0	10.0					2.0		2.0
Trailing Detector (m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Position(m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Size(m)		0.6	2.0	2.0	0.6					2.0		2.0
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm	pm+pt	NA					Prot		Perm
Protected Phases		4		3	8					1		

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2036 Future Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4	8								1
Detector Phase		4	4	3	8					1		1
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					10.0		10.0
Minimum Split (s)		37.0	37.0	9.0	17.0					40.0		40.0
Total Split (s)		58.0	58.0	17.0	75.0					40.0		40.0
Total Split (%)		50.4%	50.4%	14.8%	65.2%					34.8%		34.8%
Maximum Green (s)		51.0	51.0	14.0	68.0					33.0		33.0
Yellow Time (s)		4.0	4.0	3.0	4.0					4.0		4.0
All-Red Time (s)		3.0	3.0	0.0	3.0					3.0		3.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		7.0	7.0	3.0	7.0					7.0		7.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		2.2	2.2	2.5	2.2					3.2		3.2
Recall Mode		Min	Min	None	Min					None		None
Walk Time (s)		15.0	15.0							12.0		12.0
Flash Dont Walk (s)		15.0	15.0							21.0		21.0
Pedestrian Calls (#/hr)		0	0							0		0
Act Effect Green (s)		51.3	51.3	72.4	68.4					20.3		20.3
Actuated g/C Ratio		0.50	0.50	0.70	0.67					0.20		0.20
v/c Ratio		1.02	0.85	1.43	0.88					0.48		0.79
Control Delay		55.6	22.2	242.4	22.5					38.0		47.5
Queue Delay		14.9	0.0	0.0	0.0					0.0		0.0
Total Delay		70.5	22.2	242.4	22.5					38.0		47.5
LOS		E	C	F	C					D		D
Approach Delay		56.4			60.0						41.5	
Approach LOS		E			E						D	
90th %ile Green (s)		51.0	51.0	14.0	68.0					33.0		33.0
90th %ile Term Code		Max	Max	Max	Max					Max		Max
70th %ile Green (s)		51.0	51.0	14.0	68.0					24.8		24.8
70th %ile Term Code		Max	Max	Max	Max					Gap		Gap
50th %ile Green (s)		51.0	51.0	14.0	68.0					19.7		19.7
50th %ile Term Code		Max	Max	Max	Max					Gap		Gap
30th %ile Green (s)		51.0	51.0	14.0	68.0					15.1		15.1
30th %ile Term Code		Max	Max	Max	Hold					Gap		Gap
10th %ile Green (s)		51.0	51.0	14.0	68.0					11.0		11.0
10th %ile Term Code		Max	Max	Max	Hold					Gap		Gap
Queue Length 50th (m)		~163.6	44.3	~87.9	137.2					35.0		28.8
Queue Length 95th (m)		#263.3	#152.8	#169.8	#269.6					48.4		56.0
Internal Link Dist (m)		158.6			328.3			160.1			125.0	
Turn Bay Length (m)			60.0	210.0						40.0		25.0
Base Capacity (vph)		1468	728	250	1976					1239		388
Starvation Cap Reductn		58	0	0	0					0		0
Spillback Cap Reductn		0	0	0	0					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		1.06	0.85	1.43	0.88					0.29		0.54
Intersection Summary												

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

2036 Future Total PM

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 102.7

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.43

Intersection Signal Delay: 56.2

Intersection LOS: E

Intersection Capacity Utilization 98.7%

ICU Level of Service F

Analysis Period (min) 15

90th %ile Actuated Cycle: 115

70th %ile Actuated Cycle: 106.8

50th %ile Actuated Cycle: 101.7

30th %ile Actuated Cycle: 97.1

10th %ile Actuated Cycle: 93

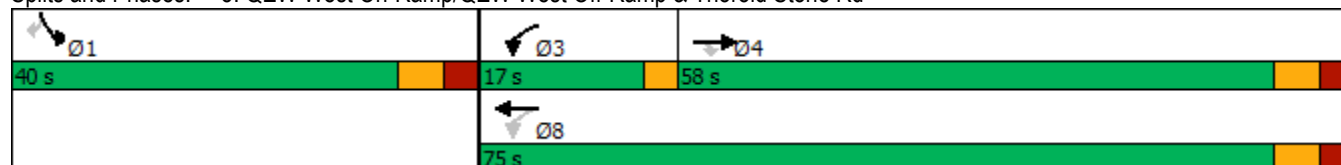
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings
6: QEW East On-Ramp & Thorold Stone Rd

2036 Future Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 					
Traffic Volume (vph)	188	1518	0	0	1367	396	510	0	328	0	0	0
Future Volume (vph)	188	1518	0	0	1367	396	510	0	328	0	0	0
Ideal Flow (vphpl)	1454	1579	1301	1454	1579	1301	2144	1900	1900	1900	1900	1900
Storage Length (m)	210.0		0.0	0.0		15.0	35.0		45.0	0.0		0.0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						0.97						
Frt						0.850			0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1303	2941	0	0	2970	1084	3951	0	1615	0	0	0
Flt Permitted	0.075						0.950					
Satd. Flow (perm)	103	2941	0	0	2970	1052	3951	0	1615	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						88			66			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		352.3			289.2			188.0			154.2	
Travel Time (s)		25.4			20.8			13.5			11.1	
Confl. Peds. (#/hr)	5		6	6		5			1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	2%	0%	0%	1%	2%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	204	1650	0	0	1486	430	554	0	357	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	204	1650	0	0	1486	430	554	0	357	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.40	1.26	1.60	1.40	1.26	1.60	0.85	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2			2	1	1		1			
Detector Template	Left	Thru			Thru	Right	Left		Right			
Leading Detector (m)	2.0	10.0			10.0	2.0	2.0		2.0			
Trailing Detector (m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Position(m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Size(m)	2.0	0.6			0.6	2.0	2.0		2.0			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Delay (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							

Lanes, Volumes, Timings
6: QEW East On-Ramp & Thorold Stone Rd

2036 Future Total PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA			NA	Perm	Prot		Prot			
Protected Phases	7	4			8		5		5			
Permitted Phases	4					8						
Detector Phase	7	4			8	8	5		5			
Switch Phase												
Minimum Initial (s)	6.0	10.0			10.0	10.0	10.0		10.0			
Minimum Split (s)	9.0	37.0			37.0	37.0	14.5		14.5			
Total Split (s)	19.0	76.0			57.0	57.0	39.0		39.0			
Total Split (%)	16.5%	66.1%			49.6%	49.6%	33.9%		33.9%			
Maximum Green (s)	16.0	69.0			50.0	50.0	34.5		34.5			
Yellow Time (s)	3.0	4.0			4.0	4.0	3.5		3.5			
All-Red Time (s)	0.0	3.0			3.0	3.0	1.0		1.0			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Total Lost Time (s)	3.0	7.0			7.0	7.0	4.5		4.5			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	2.5	5.0			5.0	5.0	3.0		3.0			
Recall Mode	None	Min			Min	Min	None		None			
Walk Time (s)		15.0			15.0	15.0						
Flash Dont Walk (s)		15.0			15.0	15.0						
Pedestrian Calls (#/hr)		0			0	0						
Act Effct Green (s)	72.3	68.3			50.4	50.4	24.6		24.6			
Actuated g/C Ratio	0.69	0.65			0.48	0.48	0.24		0.24			
v/c Ratio	0.85	0.86			1.04	0.78	0.60		0.83			
Control Delay	56.4	21.8			62.7	31.1	37.9		47.5			
Queue Delay	0.0	0.0			0.0	0.0	0.0		0.0			
Total Delay	56.4	21.8			62.7	31.1	37.9		47.5			
LOS	E	C			E	C	D		D			
Approach Delay		25.6			55.6			41.7				
Approach LOS		C			E			D				
90th %ile Green (s)	16.0	69.0			50.0	50.0	34.5		34.5			
90th %ile Term Code	Max	Max			Max	Max	Max		Max			
70th %ile Green (s)	16.0	69.0			50.0	50.0	30.4		30.4			
70th %ile Term Code	Max	Max			Max	Max	Gap		Gap			
50th %ile Green (s)	16.0	69.0			50.0	50.0	25.6		25.6			
50th %ile Term Code	Max	Max			Max	Max	Gap		Gap			
30th %ile Green (s)	15.3	68.3			50.0	50.0	20.3		20.3			
30th %ile Term Code	Gap	Hold			Max	Max	Gap		Gap			
10th %ile Green (s)	11.2	64.2			50.0	50.0	14.2		14.2			
10th %ile Term Code	Gap	Hold			Max	Max	Gap		Gap			
Queue Length 50th (m)	29.7	137.1			~187.8	62.5	55.0		60.7			
Queue Length 95th (m)	#79.3	#244.1			#262.7	#138.5	71.8		95.7			
Internal Link Dist (m)		328.3			265.2			164.0			130.2	
Turn Bay Length (m)	210.0					15.0	35.0		45.0			
Base Capacity (vph)	256	1958			1433	553	1315		581			
Starvation Cap Reductn	0	0			0	0	0		0			
Spillback Cap Reductn	0	0			0	0	0		0			
Storage Cap Reductn	0	0			0	0	0		0			
Reduced v/c Ratio	0.80	0.84			1.04	0.78	0.42		0.61			

Lanes, Volumes, Timings 6: QEW East On-Ramp & Thorold Stone Rd

2036 Future Total PM

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 104.4

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.04

Intersection Signal Delay: 41.0 Intersection LOS: D

Intersection Capacity Utilization 98.7% ICU Level of Service F

Analysis Period (min) 15

90th %ile Actuated Cycle: 115

70th %ile Actuated Cycle: 110.9

50th %ile Actuated Cycle: 106.1

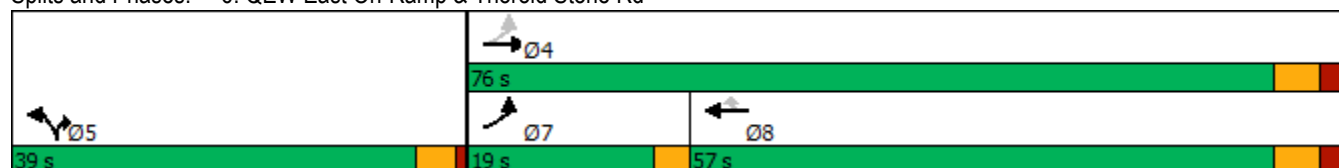
30th %ile Actuated Cycle: 100.1

10th %ile Actuated Cycle: 89.9

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

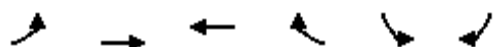
Splits and Phases: 6: QEW East On-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

8: Access Opp Southwood Dr & Site Access 2#

2036 Future Total PM



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	29	0	0	0	0	20
Future Volume (vph)	29	0	0	0	0	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected	0.950					
Satd. Flow (prot)	0	1770	1863	0	1611	0
Flt Permitted	0.950					
Satd. Flow (perm)	0	1770	1863	0	1611	0
Link Speed (k/h)	50					
Link Distance (m)	175.4					35.0
Travel Time (s)	12.6					2.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	0	0	0	0	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	32	0	0	22	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)	0.0					0.0
Link Offset(m)	0.0					0.0
Crosswalk Width(m)	4.8					4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control	Stop		Stop	Stop		
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utilization 13.3%				ICU Level of Service A		
Analysis Period (min) 15						

Lanes, Volumes, Timings

1: Montrose Road & Mt Carmel Blvd

2026 Future Total PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	39	0	0	0	49	268	0	0	210	5
Future Volume (vph)	3	0	39	0	0	0	49	268	0	0	210	5
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1900	1433	1900	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.874									0.997	
Flt Protected		0.997						0.992				
Satd. Flow (prot)	0	1249	0	0	1433	0	0	1398	0	0	1401	0
Flt Permitted		0.997						0.992				
Satd. Flow (perm)	0	1249	0	0	1433	0	0	1398	0	0	1401	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		97.9			84.1			51.6			220.4	
Travel Time (s)		7.0			6.1			3.7			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Adj. Flow (vph)	3	0	42	0	0	0	53	291	0	0	228	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	45	0	0	0	0	0	344	0	0	233	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	50.8%						ICU Level of Service A					
Analysis Period (min)	15											

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

Future Total PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	152	1	77	6	284	86	60	218	2
Future Volume (vph)	1	0	1	152	1	77	6	284	86	60	218	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1178	1301	1454	1579	1301	1454	1338	1900
Storage Length (m)	0.0		0.0	0.0		50.0	50.0		50.0	40.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00		1.00		0.98	1.00	1.00	
Frt		0.932				0.850			0.850		0.999	
Flt Protected		0.976			0.953		0.950			0.950		
Satd. Flow (prot)	0	1709	0	0	1069	1074	1381	1579	1106	1381	1310	0
Flt Permitted		0.890			0.727		0.610			0.472		
Satd. Flow (perm)	0	1558	0	0	814	1074	884	1579	1081	685	1310	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		75				84			93			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		92.8			175.4			126.5			73.6	
Travel Time (s)		6.7			12.6			9.1			5.3	
Confl. Peds. (#/hr)			1	1			2		1	1		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	5%	0%	3%	0%	0%	0%	0%	2%	0%
Adj. Flow (vph)	1	0	1	165	1	84	7	309	93	65	237	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2	0	0	166	84	7	309	93	65	239	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.80	1.60	1.40	1.26	1.60	1.40	1.55	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

2025 Future Total PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	6.0	10.0	10.0	6.0	10.0	
Minimum Split (s)	28.2	28.2		28.2	28.2	28.2	12.0	29.7	29.7	10.5	29.7	
Total Split (s)	37.2	37.2		37.2	37.2	37.2	18.0	41.7	41.7	18.0	41.7	
Total Split (%)	38.4%	38.4%		38.4%	38.4%	38.4%	18.6%	43.0%	43.0%	18.6%	43.0%	
Maximum Green (s)	30.0	30.0		30.0	30.0	30.0	15.0	35.0	35.0	15.0	35.0	
Yellow Time (s)	4.1	4.1		4.1	4.1	4.1	3.0	4.1	4.1	3.0	4.1	
All-Red Time (s)	3.1	3.1		3.1	3.1	3.1	0.0	2.6	2.6	0.0	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)		7.2			7.2	7.2	3.0	6.7	6.7	3.0	6.7	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Walk Time (s)	8.0	8.0		8.0	8.0	8.0		9.0	9.0		9.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0		14.0	14.0		14.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effect Green (s)		18.6			18.6	18.6	28.4	21.3	21.3	30.8	25.6	
Actuated g/C Ratio		0.31			0.31	0.31	0.47	0.35	0.35	0.51	0.42	
v/c Ratio		0.00			0.66	0.22	0.01	0.55	0.21	0.15	0.43	
Control Delay		0.0			33.7	6.2	9.2	23.5	6.2	9.8	17.5	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		0.0			33.7	6.2	9.2	23.5	6.2	9.8	17.5	
LOS		A			C	A	A	C	A	A	B	
Approach Delay					24.5			19.3			15.8	
Approach LOS					C			B			B	
90th %ile Green (s)	30.0	30.0		30.0	30.0	30.0	6.0	28.0	28.0	9.1	31.1	
90th %ile Term Code	Hold	Hold		Max	Max	Max	Min	Gap	Gap	Gap	Hold	
70th %ile Green (s)	23.6	23.6		23.6	23.6	23.6	0.0	22.1	22.1	7.8	32.9	
70th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Gap	Hold	
50th %ile Green (s)	18.0	18.0		18.0	18.0	18.0	0.0	17.1	17.1	6.6	26.7	
50th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Gap	Hold	
30th %ile Green (s)	13.7	13.7		13.7	13.7	13.7	0.0	13.4	13.4	0.0	13.4	
30th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Skip	Hold	
10th %ile Green (s)	9.7	9.7		9.7	9.7	9.7	0.0	23.8	23.8	0.0	23.8	
10th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Dwell	Dwell	Skip	Dwell	
Queue Length 50th (m)		0.0			16.0	0.0	0.3	30.3	0.0	3.4	16.9	
Queue Length 95th (m)		0.0			44.3	9.4	2.5	69.6	10.1	11.6	52.8	
Internal Link Dist (m)		68.8			151.4			102.5			49.6	
Turn Bay Length (m)						50.0	50.0		50.0	40.0		
Base Capacity (vph)		863			432	610	584	979	706	535	813	
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		0.00			0.38	0.14	0.01	0.32	0.13	0.12	0.29	

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

Future Total PM - with Ideal Sat flow 1900vphgpl

Intersection Summary	
Area Type:	Other
Cycle Length: 96.9	
Actuated Cycle Length: 60.3	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.66	
Intersection Signal Delay: 19.5	Intersection LOS: B
Intersection Capacity Utilization 58.3%	ICU Level of Service B
Analysis Period (min) 15	
90th %ile Actuated Cycle: 84	
70th %ile Actuated Cycle: 70.4	
50th %ile Actuated Cycle: 58.6	
30th %ile Actuated Cycle: 41	
10th %ile Actuated Cycle: 47.4	

Splits and Phases: 2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

 Ø1	 Ø2	 Ø4
18 s	41.7 s	37.2 s
 Ø5	 Ø6	 Ø8
18 s	41.7 s	37.2 s

Lanes, Volumes, Timings

3: Montrose Road & Cameron Ct

2026 Future Total PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1	9	100	0	3	12	373	150	3	366	2
Future Volume (vph)	0	1	9	100	0	3	12	373	150	3	366	2
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1454	1579	1301	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.877				0.996		0.958				0.999	
Flt Protected					0.954		0.999					
Satd. Flow (prot)	0	1152	0	0	1362	0	0	2847	0	0	1397	0
Flt Permitted					0.954		0.999					
Satd. Flow (perm)	0	1152	0	0	1362	0	0	2847	0	0	1397	0
Link Speed (k/h)	50				50				50			
Link Distance (m)	167.1				64.9				126.5			
Travel Time (s)	12.0				4.7				9.1			
Confl. Peds. (#/hr)	1							1	2	1	1	2
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%	100%	0%	0%	0%	0%	0%	0%	3%	67%	2%	0%
Adj. Flow (vph)	0	1	10	109	0	3	13	405	163	3	398	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	11	0	0	112	0	0	581	0	0	403	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0				0.0				3.6			
Link Offset(m)	0.0				0.0				0.0			
Crosswalk Width(m)	4.8				4.8				4.8			
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.40	1.26	1.60	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control	Stop			Stop			Free			Free		
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	49.8%				ICU Level of Service A							
Analysis Period (min)	15											

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2026 Future Total PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	104	830	80	248	780	330	126	206	321	313	184	90
Future Volume (vph)	104	830	80	248	780	330	126	206	321	313	184	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	85.0		0.0	60.0		35.0	60.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00		1.00	0.99		0.99		0.97	0.99	0.99	
Frt		0.987			0.955				0.850		0.951	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3481	0	1787	3369	0	1770	3574	1583	1787	3315	0
Flt Permitted	0.115			0.129			0.570			0.476		
Satd. Flow (perm)	214	3481	0	242	3369	0	1052	3574	1538	884	3315	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			61				321		68	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		337.7			182.6			114.0			232.7	
Travel Time (s)		24.3			13.1			8.2			16.8	
Confl. Peds. (#/hr)	8		7	7		8	13		15	15		13
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 (%)	2%	2%	4%	1%	2%	1%	2%	1%	2%	1%	2%	4%
Adj. Flow (vph)	113	902	87	270	848	359	137	224	349	340	200	98
Shared Lane Traffic (%)												
Lane Group Flow (vph)	113	989	0	270	1207	0	137	224	349	340	298	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2026 Future Total PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	8.0	8.0	6.0	8.0	
Minimum Split (s)	10.5	35.6		10.5	35.6		9.0	35.4	35.4	9.0	35.4	
Total Split (s)	20.0	43.6		20.0	43.6		19.0	32.4	32.4	19.0	32.4	
Total Split (%)	17.4%	37.9%		17.4%	37.9%		16.5%	28.2%	28.2%	16.5%	28.2%	
Maximum Green (s)	17.0	38.0		17.0	38.0		16.0	27.0	27.0	16.0	27.0	
Yellow Time (s)	3.0	3.5		3.0	3.5		3.0	3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.1		0.0	2.1		0.0	2.1	2.1	0.0	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	5.6		3.0	5.6		3.0	5.4	5.4	3.0	5.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	2.5		3.0	2.5		2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None		None	Min	Min	None	Min	
Walk Time (s)		11.0			11.0			11.0	11.0		11.0	
Flash Dont Walk (s)		19.0			19.0			19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effect Green (s)	46.2	34.9		54.6	40.3		24.5	11.7	11.7	32.2	16.7	
Actuated g/C Ratio	0.50	0.37		0.59	0.43		0.26	0.13	0.13	0.35	0.18	
v/c Ratio	0.45	0.76		0.72	0.81		0.38	0.50	0.74	0.75	0.46	
Control Delay	17.4	30.8		27.7	28.1		25.6	42.5	16.5	36.9	29.5	
Queue Delay	0.0	0.0		0.0	0.1		0.0	0.0	0.0	0.0	0.0	
Total Delay	17.4	30.8		27.7	28.2		25.6	42.5	16.5	36.9	29.5	
LOS	B	C		C	C		C	D	B	D	C	
Approach Delay		29.4			28.1			26.4			33.5	
Approach LOS		C			C			C			C	
90th %ile Green (s)	12.0	38.0		17.0	43.0		14.5	19.1	19.1	16.0	20.6	
90th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
70th %ile Green (s)	9.2	35.6		17.0	43.4		12.1	12.3	12.3	16.0	16.2	
70th %ile Term Code	Gap	Gap		Max	Hold		Gap	Gap	Gap	Max	Hold	
50th %ile Green (s)	8.6	31.6		15.5	38.5		10.5	11.0	11.0	16.0	16.5	
50th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Gap	Gap	Max	Hold	
30th %ile Green (s)	7.7	33.3		12.4	38.0		8.7	9.5	9.5	16.0	16.8	
30th %ile Term Code	Gap	Hold		Gap	Max		Gap	Gap	Gap	Max	Hold	
10th %ile Green (s)	6.5	35.1		9.4	38.0		6.7	8.0	8.0	12.3	13.6	
10th %ile Term Code	Gap	Hold		Gap	Max		Gap	Min	Min	Gap	Hold	
Queue Length 50th (m)	8.7	85.6		25.6	96.6		17.4	20.7	4.7	49.2	19.8	
Queue Length 95th (m)	21.0	127.2		#62.2	151.8		34.5	34.8	34.2	#86.6	37.0	
Internal Link Dist (m)		313.7			158.6			90.0			208.7	
Turn Bay Length (m)	45.0			85.0			60.0		35.0	60.0		
Base Capacity (vph)	408	1436		426	1492		464	1044	676	461	1016	
Starvation Cap Reductn	0	0		0	14		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.28	0.69		0.63	0.82		0.30	0.21	0.52	0.74	0.29	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2026 Future Total PM - with Ideal Sat flow 1900vphgpl

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 93.2

Natural Cycle: 95

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 29.0

Intersection LOS: C

Intersection Capacity Utilization 86.3%

ICU Level of Service E

Analysis Period (min) 15

90th %ile Actuated Cycle: 107.1

70th %ile Actuated Cycle: 97.9

50th %ile Actuated Cycle: 91.1

30th %ile Actuated Cycle: 88.2

10th %ile Actuated Cycle: 81.8

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Montrose Road & Thorold Stone Rd

 Ø1	 Ø2	 Ø3	 Ø4
19 s	32.4 s	20 s	43.6 s
 Ø5	 Ø6	 Ø7	 Ø8
19 s	32.4 s	20 s	43.6 s

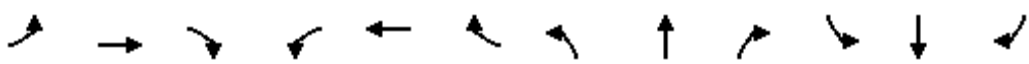
Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd 3000 Feet Red Total PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1077	445	257	1259	0	0	0	0	261	0	151
Future Volume (vph)	0	1077	445	257	1259	0	0	0	0	261	0	151
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		60.0	210.0		0.0	0.0		0.0	40.0		25.0
Storage Lanes	0		1	1		0	0		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3539	1583	1805	3574	0	0	0	0	3400	0	1553
Flt Permitted				0.118						0.950		
Satd. Flow (perm)	0	3539	1583	224	3574	0	0	0	0	3400	0	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			376									66
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		182.6			352.3			184.1			149.0	
Travel Time (s)		13.1			25.4			13.3			10.7	
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%	2%	2%	0%	1%	0%	0%	0%	0%	3%	0%	4%
Adj. Flow (vph)	0	1171	484	279	1368	0	0	0	0	284	0	164
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1171	484	279	1368	0	0	0	0	284	0	164
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (m)		10.0	2.0	2.0	10.0					2.0		2.0
Trailing Detector (m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Position(m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Size(m)		0.6	2.0	2.0	0.6					2.0		2.0
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm	pm+pt	NA					Prot		Prot
Protected Phases		4		3	8					1		1

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd 3000 Feet Total PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4	8								
Detector Phase		4	4	3	8					1		1
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					10.0		10.0
Minimum Split (s)		37.0	37.0	9.0	17.0					40.0		40.0
Total Split (s)		58.0	58.0	17.0	75.0					40.0		40.0
Total Split (%)		50.4%	50.4%	14.8%	65.2%					34.8%		34.8%
Maximum Green (s)		51.0	51.0	14.0	68.0					33.0		33.0
Yellow Time (s)		4.0	4.0	3.0	4.0					4.0		4.0
All-Red Time (s)		3.0	3.0	0.0	3.0					3.0		3.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		7.0	7.0	3.0	7.0					7.0		7.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		2.2	2.2	2.5	2.2					3.2		3.2
Recall Mode		Min	Min	None	Min					None		None
Walk Time (s)		15.0	15.0							12.0		12.0
Flash Dont Walk (s)		15.0	15.0							21.0		21.0
Pedestrian Calls (#/hr)		0	0							0		0
Act Effect Green (s)		30.8	30.8	50.1	46.0					13.0		13.0
Actuated g/C Ratio		0.42	0.42	0.68	0.63					0.18		0.18
v/c Ratio		0.79	0.55	0.68	0.61					0.47		0.50
Control Delay		23.0	6.4	21.6	9.6					31.8		24.6
Queue Delay		0.0	0.0	0.0	0.0					0.0		0.0
Total Delay		23.0	6.4	21.6	9.6					31.8		24.6
LOS		C	A	C	A					C		C
Approach Delay		18.2			11.6						29.2	
Approach LOS		B			B						C	
90th %ile Green (s)		44.0	44.0	14.0	61.0					18.0		18.0
90th %ile Term Code		Gap	Gap	Max	Hold					Gap		Gap
70th %ile Green (s)		35.8	35.8	14.0	52.8					14.3		14.3
70th %ile Term Code		Gap	Gap	Max	Hold					Gap		Gap
50th %ile Green (s)		30.8	30.8	13.3	47.1					12.4		12.4
50th %ile Term Code		Gap	Gap	Gap	Hold					Gap		Gap
30th %ile Green (s)		25.6	25.6	10.4	39.0					10.6		10.6
30th %ile Term Code		Gap	Gap	Gap	Hold					Gap		Gap
10th %ile Green (s)		20.2	20.2	8.7	31.9					10.0		10.0
10th %ile Term Code		Gap	Gap	Gap	Hold					Min		Min
Queue Length 50th (m)		75.2	9.5	17.5	52.8					19.5		12.8
Queue Length 95th (m)		112.4	33.6	#56.9	85.5					36.8		36.0
Internal Link Dist (m)		158.6			328.3			160.1			125.0	
Turn Bay Length (m)			60.0	210.0						40.0		25.0
Base Capacity (vph)		2537	1241	463	3213					1577		755
Starvation Cap Reductn		39	2	0	0					0		0
Spillback Cap Reductn		0	0	0	0					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		0.47	0.39	0.60	0.43					0.18		0.22
Intersection Summary												

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd 3125 East Rd Total PM - with Ideal Sat flow 1900vphgpl

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 73.4

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 16.6

Intersection LOS: B

Intersection Capacity Utilization 67.3%

ICU Level of Service C

Analysis Period (min) 15

90th %ile Actuated Cycle: 93

70th %ile Actuated Cycle: 81.1

50th %ile Actuated Cycle: 73.5

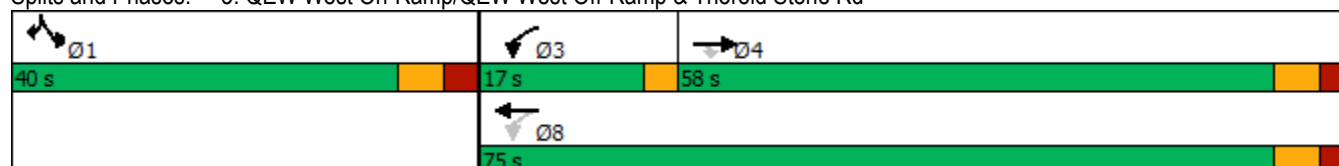
30th %ile Actuated Cycle: 63.6

10th %ile Actuated Cycle: 55.9

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

Queue shown is maximum after two cycles.

Splits and Phases: 5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2026 Future Total PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 					
Traffic Volume (vph)	148	1187	0	0	1071	308	400	0	255	0	0	0
Future Volume (vph)	148	1187	0	0	1071	308	400	0	255	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	210.0		0.0	0.0		15.0	35.0		45.0	0.0		0.0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00					0.97						
Frt						0.850			0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1703	3539	0	0	3574	1583	3502	0	1615	0	0	0
Flt Permitted	0.143						0.950					
Satd. Flow (perm)	256	3539	0	0	3574	1537	3502	0	1615	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						87			66			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		352.3			289.2			127.3			154.2	
Travel Time (s)		25.4			20.8			9.2			11.1	
Confl. Peds. (#/hr)	5		6	6		5			1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	2%	0%	0%	1%	2%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	161	1290	0	0	1164	335	435	0	277	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	161	1290	0	0	1164	335	435	0	277	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2			2	1	1		1			
Detector Template	Left	Thru			Thru	Right	Left		Right			
Leading Detector (m)	2.0	10.0			10.0	2.0	2.0		2.0			
Trailing Detector (m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Position(m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Size(m)	2.0	0.6			0.6	2.0	2.0		2.0			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Delay (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							

Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2026 Future Total PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA			NA	Perm	Prot		Prot			
Protected Phases	7	4			8		5		5			
Permitted Phases	4					8						
Detector Phase	7	4			8	8	5		5			
Switch Phase												
Minimum Initial (s)	6.0	10.0			10.0	10.0	10.0		10.0			
Minimum Split (s)	9.0	37.0			37.0	37.0	14.5		14.5			
Total Split (s)	19.0	76.0			57.0	57.0	39.0		39.0			
Total Split (%)	16.5%	66.1%			49.6%	49.6%	33.9%		33.9%			
Maximum Green (s)	16.0	69.0			50.0	50.0	34.5		34.5			
Yellow Time (s)	3.0	4.0			4.0	4.0	3.5		3.5			
All-Red Time (s)	0.0	3.0			3.0	3.0	1.0		1.0			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Total Lost Time (s)	3.0	7.0			7.0	7.0	4.5		4.5			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	2.5	5.0			5.0	5.0	3.0		3.0			
Recall Mode	None	Min			Min	Min	None		None			
Walk Time (s)		15.0			15.0	15.0						
Flash Dont Walk (s)		15.0			15.0	15.0						
Pedestrian Calls (#/hr)		0			0	0						
Act Effct Green (s)	58.6	54.4			40.9	40.9	18.0		18.0			
Actuated g/C Ratio	0.69	0.64			0.48	0.48	0.21		0.21			
v/c Ratio	0.45	0.57			0.67	0.42	0.58		0.70			
Control Delay	9.2	9.9			19.7	13.0	34.4		34.9			
Queue Delay	0.0	0.0			0.0	0.0	0.0		0.0			
Total Delay	9.2	9.9			19.7	13.0	34.4		34.9			
LOS	A	A			B	B	C		C			
Approach Delay		9.9			18.2			34.6				
Approach LOS		A			B			C				
90th %ile Green (s)	15.0	68.0			50.0	50.0	28.4		28.4			
90th %ile Term Code	Gap	Hold			Max	Max	Gap		Gap			
70th %ile Green (s)	11.6	64.6			50.0	50.0	21.8		21.8			
70th %ile Term Code	Gap	Hold			Max	Max	Gap		Gap			
50th %ile Green (s)	10.2	56.5			43.3	43.3	17.2		17.2			
50th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
30th %ile Green (s)	8.8	46.8			35.0	35.0	13.9		13.9			
30th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
10th %ile Green (s)	6.8	36.6			26.8	26.8	10.8		10.8			
10th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
Queue Length 50th (m)	7.4	53.9			72.4	23.8	35.3		34.1			
Queue Length 95th (m)	19.8	99.4			130.0	59.4	57.3		69.2			
Internal Link Dist (m)		328.3			265.2			103.3			130.2	
Turn Bay Length (m)	210.0					15.0	35.0		45.0			
Base Capacity (vph)	464	2909			2217	986	1499		729			
Starvation Cap Reductn	0	0			0	0	0		0			
Spillback Cap Reductn	0	0			0	0	0		0			
Storage Cap Reductn	0	0			0	0	0		0			
Reduced v/c Ratio	0.35	0.44			0.53	0.34	0.29		0.38			

Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2026 Future Total PM - with Ideal Sat flow 1900vphgpl

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 84.4

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 18.1 Intersection LOS: B

Intersection Capacity Utilization 67.3% ICU Level of Service C

Analysis Period (min) 15

90th %ile Actuated Cycle: 107.9

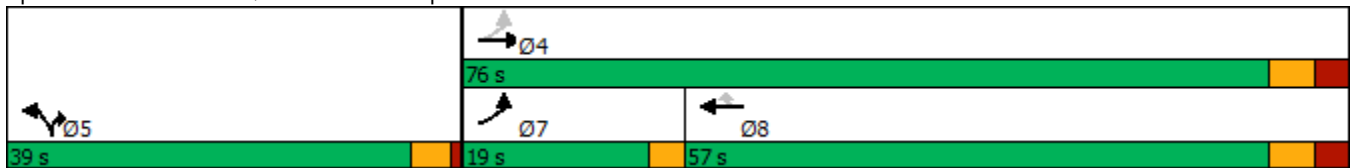
70th %ile Actuated Cycle: 97.9

50th %ile Actuated Cycle: 85.2

30th %ile Actuated Cycle: 72.2

10th %ile Actuated Cycle: 58.9

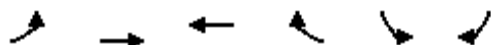
Splits and Phases: 6: QEW East On-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

8: Access Opp Southwood Dr & Site Access #2

2026 Future Total PM - with Ideal Sat flow 1900vphgpl



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	29	0	0	0	0	20
Future Volume (vph)	29	0	0	0	0	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected		0.950				
Satd. Flow (prot)	0	1770	1863	0	1611	0
Flt Permitted		0.950				
Satd. Flow (perm)	0	1770	1863	0	1611	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		175.4	35.0		70.7	
Travel Time (s)		12.6	2.5		5.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	0	0	0	0	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	32	0	0	22	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control		Stop	Stop		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 13.3% ICU Level of Service A

Analysis Period (min) 15

Lanes, Volumes, Timings

1: Montrose Road & Mt Carmel Blvd

2031 Future Total AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	55	0	0	0	26	149	0	0	195	2
Future Volume (vph)	3	0	55	0	0	0	26	149	0	0	195	2
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1900	1433	1900	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.871									0.999	
Flt Protected		0.998						0.993				
Satd. Flow (prot)	0	1246	0	0	1433	0	0	1399	0	0	1404	0
Flt Permitted		0.998						0.993				
Satd. Flow (perm)	0	1246	0	0	1433	0	0	1399	0	0	1404	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		97.9			84.1			51.6			220.4	
Travel Time (s)		7.0			6.1			3.7			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Adj. Flow (vph)	3	0	60	0	0	0	28	162	0	0	212	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	63	0	0	0	0	0	190	0	0	214	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	40.8%						ICU Level of Service A					
Analysis Period (min)	15											

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

Future Total AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1	15	64	1	18	2	173	57	18	284	0
Future Volume (vph)	0	1	15	64	1	18	2	173	57	18	284	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1178	1301	1454	1579	1301	1454	1338	1900
Storage Length (m)	0.0		0.0	0.0		50.0	50.0		50.0	40.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.873				0.850			0.850			
Flt Protected					0.953		0.950			0.950		
Satd. Flow (prot)	0	1659	0	0	1070	1074	1381	1579	1106	1381	1312	0
Flt Permitted					0.717		0.572			0.639		
Satd. Flow (perm)	0	1659	0	0	805	1074	832	1579	1106	929	1312	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16				75			81			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		92.8			175.4			126.5			73.6	
Travel Time (s)		6.7			12.6			9.1			5.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	5%	0%	3%	0%	0%	0%	0%	2%	0%
Adj. Flow (vph)	0	1	16	70	1	20	2	188	62	20	309	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	17	0	0	71	20	2	188	62	20	309	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.80	1.60	1.40	1.26	1.60	1.40	1.55	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type		NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

2021 Future Total AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	6.0	10.0	10.0	6.0	10.0	
Minimum Split (s)	28.2	28.2		28.2	28.2	28.2	12.0	29.7	29.7	10.5	29.7	
Total Split (s)	37.2	37.2		37.2	37.2	37.2	18.0	41.7	41.7	18.0	41.7	
Total Split (%)	38.4%	38.4%		38.4%	38.4%	38.4%	18.6%	43.0%	43.0%	18.6%	43.0%	
Maximum Green (s)	30.0	30.0		30.0	30.0	30.0	15.0	35.0	35.0	15.0	35.0	
Yellow Time (s)	4.1	4.1		4.1	4.1	4.1	3.0	4.1	4.1	3.0	4.1	
All-Red Time (s)	3.1	3.1		3.1	3.1	3.1	0.0	2.6	2.6	0.0	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)		7.2			7.2	7.2	3.0	6.7	6.7	3.0	6.7	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Walk Time (s)	8.0	8.0		8.0	8.0	8.0		9.0	9.0		9.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0		14.0	14.0		14.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effect Green (s)		11.1			11.1	11.1	28.2	25.4	25.4	28.3	25.5	
Actuated g/C Ratio		0.24			0.24	0.24	0.61	0.55	0.55	0.61	0.55	
v/c Ratio		0.04			0.37	0.06	0.00	0.22	0.10	0.03	0.43	
Control Delay		9.4			22.8	0.4	5.5	10.8	2.9	5.8	13.4	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		9.4			22.8	0.4	5.5	10.8	2.9	5.8	13.4	
LOS		A			C	A	A	B	A	A	B	
Approach Delay		9.4			17.9			8.8			13.0	
Approach LOS		A			B			A			B	
90th %ile Green (s)	17.6	17.6		17.6	17.6	17.6	6.0	27.8	27.8	6.2	28.0	
90th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Min	Hold	Hold	Gap	Gap	
70th %ile Green (s)	11.7	11.7		11.7	11.7	11.7	0.0	17.0	17.0	0.0	17.0	
70th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Hold	Hold	Skip	Gap	
50th %ile Green (s)	9.6	9.6		9.6	9.6	9.6	0.0	16.3	16.3	0.0	16.3	
50th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Dwell	Dwell	Skip	Dwell	
30th %ile Green (s)	8.4	8.4		8.4	8.4	8.4	0.0	26.1	26.1	0.0	26.1	
30th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Dwell	Dwell	Skip	Dwell	
10th %ile Green (s)	0.0	0.0		0.0	0.0	0.0	0.0	25.0	25.0	0.0	25.0	
10th %ile Term Code	Skip	Skip		Skip	Skip	Skip	Skip	Dwell	Dwell	Skip	Dwell	
Queue Length 50th (m)		0.1			4.2	0.0	0.1	8.3	0.0	0.6	15.8	
Queue Length 95th (m)		4.4			19.0	0.0	0.8	30.6	4.8	3.4	55.6	
Internal Link Dist (m)		68.8			151.4			102.5			49.6	
Turn Bay Length (m)						50.0	50.0		50.0	40.0		
Base Capacity (vph)		1153			557	766	706	1242	887	733	1032	
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		0.01			0.13	0.03	0.00	0.15	0.07	0.03	0.30	
Intersection Summary												

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

Area Type:	Other
Cycle Length:	96.9
Actuated Cycle Length:	46.2
Natural Cycle:	70
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.43
Intersection Signal Delay:	12.0
Intersection LOS:	B
Intersection Capacity Utilization	45.3%
ICU Level of Service	A
Analysis Period (min)	15
90th %ile Actuated Cycle:	68.5
70th %ile Actuated Cycle:	42.6
50th %ile Actuated Cycle:	39.8
30th %ile Actuated Cycle:	48.4
10th %ile Actuated Cycle:	31.7

Splits and Phases: 2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

 Ø1	 Ø2	 Ø4
18 s	41.7 s	37.2 s
 Ø5	 Ø6	 Ø8
18 s	41.7 s	37.2 s

Lanes, Volumes, Timings

3: Montrose Road & Cameron Ct

2031 Future Total AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1	9	24	0	2	1	231	66	7	357	1
Future Volume (vph)	0	1	9	24	0	2	1	231	66	7	357	1
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1454	1579	1301	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.877				0.990				0.967			
Flt Protected					0.956						0.999	
Satd. Flow (prot)	0	1152	0	0	1356	0	0	2882	0	0	1386	0
Flt Permitted					0.956						0.999	
Satd. Flow (perm)	0	1152	0	0	1356	0	0	2882	0	0	1386	0
Link Speed (k/h)	50				50				50		50	
Link Distance (m)	167.1				64.9				232.7		126.5	
Travel Time (s)	12.0				4.7				16.8		9.1	
Confl. Peds. (#/hr)	1		3	3		1	4		4	4		4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	100%	0%	0%	0%	0%	0%	0%	3%	67%	2%	0%
Adj. Flow (vph)	0	1	10	26	0	2	1	251	72	8	388	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	11	0	0	28	0	0	324	0	0	397	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0				0.0				3.6		3.6	
Link Offset(m)	0.0				0.0				0.0		0.0	
Crosswalk Width(m)	4.8				4.8				4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.40	1.26	1.60	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control	Stop				Stop				Free		Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	47.9%				ICU Level of Service A							
Analysis Period (min)	15											

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2031 Future Total AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	739	80	211	548	176	74	171	295	270	123	84
Future Volume (vph)	77	739	80	211	548	176	74	171	295	270	123	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	85.0		0.0	60.0		35.0	60.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	1.00		0.99		0.99	1.00	0.99	
Frt		0.985			0.964				0.850		0.939	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3475	0	1787	3408	0	1770	3574	1583	1787	3271	0
Flt Permitted	0.304			0.146			0.611			0.500		
Satd. Flow (perm)	566	3475	0	275	3408	0	1132	3574	1561	939	3271	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			40				321		91	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		337.7			182.6			114.0			232.7	
Travel Time (s)		24.3			13.1			8.2			16.8	
Confl. Peds. (#/hr)	2		1	1		2	7		2	2		7
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 (%)	2%	2%	4%	1%	2%	1%	2%	1%	2%	1%	2%	4%
Adj. Flow (vph)	84	803	87	229	596	191	80	186	321	293	134	91
Shared Lane Traffic (%)												
Lane Group Flow (vph)	84	890	0	229	787	0	80	186	321	293	225	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2031 Future Total AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	8.0	8.0	6.0	8.0	
Minimum Split (s)	10.5	35.6		10.5	35.6		9.0	35.4	35.4	9.0	35.4	
Total Split (s)	20.0	43.6		20.0	43.6		19.0	32.4	32.4	19.0	32.4	
Total Split (%)	17.4%	37.9%		17.4%	37.9%		16.5%	28.2%	28.2%	16.5%	28.2%	
Maximum Green (s)	17.0	38.0		17.0	38.0		16.0	27.0	27.0	16.0	27.0	
Yellow Time (s)	3.0	3.5		3.0	3.5		3.0	3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.1		0.0	2.1		0.0	2.1	2.1	0.0	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	5.6		3.0	5.6		3.0	5.4	5.4	3.0	5.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	2.5		3.0	2.5		2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None		None	Min	Min	None	Min	
Walk Time (s)		11.0			11.0			11.0	11.0		11.0	
Flash Dont Walk (s)		19.0			19.0			19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effect Green (s)	36.6	26.1		43.0	32.0		20.8	10.3	10.3	30.1	18.9	
Actuated g/C Ratio	0.46	0.33		0.54	0.40		0.26	0.13	0.13	0.38	0.24	
v/c Ratio	0.22	0.78		0.63	0.56		0.22	0.40	0.67	0.58	0.27	
Control Delay	10.9	29.6		20.0	20.1		21.1	37.3	12.2	25.7	18.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	10.9	29.6		20.0	20.1		21.1	37.3	12.2	25.7	18.6	
LOS	B	C		C	C		C	D	B	C	B	
Approach Delay		27.9			20.1			21.4			22.6	
Approach LOS		C			C			C			C	
90th %ile Green (s)	9.4	38.0		17.0	45.6		10.8	15.5	15.5	16.0	20.7	
90th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
70th %ile Green (s)	8.7	30.4		12.7	34.4		9.1	10.9	10.9	16.0	17.8	
70th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Gap	Gap	Max	Hold	
50th %ile Green (s)	7.8	25.9		10.9	29.0		7.7	9.4	9.4	16.0	17.7	
50th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Gap	Gap	Max	Hold	
30th %ile Green (s)	6.9	22.0		9.2	24.3		6.7	8.1	8.1	13.1	14.5	
30th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Gap	Gap	Gap	Hold	
10th %ile Green (s)	0.0	16.2		7.5	26.7		0.0	8.0	8.0	9.5	20.5	
10th %ile Term Code	Skip	Gap		Gap	Hold		Skip	Min	Min	Gap	Hold	
Queue Length 50th (m)	6.0	65.3		18.0	49.8		7.9	14.6	0.0	33.1	9.1	
Queue Length 95th (m)	14.0	105.0		41.8	76.5		22.1	29.8	25.9	72.4	23.5	
Internal Link Dist (m)		313.7			158.6			90.0			208.7	
Turn Bay Length (m)	45.0			85.0			60.0		35.0	60.0		
Base Capacity (vph)	571	1732		485	1762		538	1261	758	532	1213	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.15	0.51		0.47	0.45		0.15	0.15	0.42	0.55	0.19	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2031 Future Total AM - with Ideal Sat flow 1900vphgpl

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 79.5

Natural Cycle: 95

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 23.2

Intersection LOS: C

Intersection Capacity Utilization 73.4%

ICU Level of Service D

Analysis Period (min) 15

90th %ile Actuated Cycle: 103.5

70th %ile Actuated Cycle: 87

50th %ile Actuated Cycle: 79.2

30th %ile Actuated Cycle: 69.4

10th %ile Actuated Cycle: 58.2

Splits and Phases: 4: Montrose Road & Thorold Stone Rd

 Ø1	 Ø2	 Ø3	 Ø4
19 s	32.4 s	20 s	43.6 s
 Ø5	 Ø6	 Ø7	 Ø8
19 s	32.4 s	20 s	43.6 s

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑					↖↗		↖
Traffic Volume (vph)	0	917	483	207	903	0	0	0	0	223	0	107
Future Volume (vph)	0	917	483	207	903	0	0	0	0	223	0	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1301
Storage Length (m)	0.0		60.0	210.0		0.0	0.0		0.0	40.0		25.0
Storage Lanes	0		1	1		0	0		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3539	1583	1805	3574	0	0	0	0	3400	0	1063
Flt Permitted				0.167						0.950		
Satd. Flow (perm)	0	3539	1583	317	3574	0	0	0	0	3400	0	1063
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			478									116
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		182.6			352.3			184.1			149.0	
Travel Time (s)		13.1			25.4			13.3			10.7	
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%	2%	2%	0%	1%	0%	0%	0%	0%	3%	0%	4%
Adj. Flow (vph)	0	997	525	225	982	0	0	0	0	242	0	116
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	997	525	225	982	0	0	0	0	242	0	116
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.60
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (m)		10.0	2.0	2.0	10.0					2.0		2.0
Trailing Detector (m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Position(m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Size(m)		0.6	2.0	2.0	0.6					2.0		2.0
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm	pm+pt	NA					Prot		Perm
Protected Phases		4		3	8					1		

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd 301-Fut Rd Total AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4	8								1
Detector Phase		4	4	3	8					1		1
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					10.0		10.0
Minimum Split (s)		37.0	37.0	9.0	17.0					40.0		40.0
Total Split (s)		58.0	58.0	17.0	75.0					40.0		40.0
Total Split (%)		50.4%	50.4%	14.8%	65.2%					34.8%		34.8%
Maximum Green (s)		51.0	51.0	14.0	68.0					33.0		33.0
Yellow Time (s)		4.0	4.0	3.0	4.0					4.0		4.0
All-Red Time (s)		3.0	3.0	0.0	3.0					3.0		3.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		7.0	7.0	3.0	7.0					7.0		7.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		2.2	2.2	2.5	2.2					3.2		3.2
Recall Mode		Min	Min	None	Min					None		None
Walk Time (s)		15.0	15.0							12.0		12.0
Flash Dont Walk (s)		15.0	15.0							21.0		21.0
Pedestrian Calls (#/hr)		0	0							0		0
Act Effect Green (s)		23.3	23.3	38.6	34.5					11.3		11.3
Actuated g/C Ratio		0.39	0.39	0.64	0.57					0.19		0.19
v/c Ratio		0.73	0.58	0.56	0.48					0.38		0.39
Control Delay		19.2	5.1	10.9	8.3					25.0		10.4
Queue Delay		0.0	0.0	0.0	0.0					0.0		0.0
Total Delay		19.2	5.1	10.9	8.3					25.0		10.4
LOS		B	A	B	A					C		B
Approach Delay		14.3			8.7						20.3	
Approach LOS		B			A						C	
90th %ile Green (s)		33.8	33.8	10.9	47.7					14.5		14.5
90th %ile Term Code		Gap	Gap	Gap	Hold					Gap		Gap
70th %ile Green (s)		26.4	26.4	8.8	38.2					11.7		11.7
70th %ile Term Code		Gap	Gap	Gap	Hold					Gap		Gap
50th %ile Green (s)		23.2	23.2	7.8	34.0					10.3		10.3
50th %ile Term Code		Gap	Gap	Gap	Hold					Gap		Gap
30th %ile Green (s)		19.5	19.5	7.2	29.7					10.0		10.0
30th %ile Term Code		Gap	Gap	Gap	Hold					Min		Min
10th %ile Green (s)		15.6	15.6	6.3	24.9					10.0		10.0
10th %ile Term Code		Gap	Gap	Gap	Hold					Min		Min
Queue Length 50th (m)		47.2	3.1	8.2	29.0					12.5		0.0
Queue Length 95th (m)		79.2	21.9	22.6	47.7					26.9		13.4
Internal Link Dist (m)		158.6			328.3			160.1			125.0	
Turn Bay Length (m)			60.0	210.0						40.0		25.0
Base Capacity (vph)		3037	1426	557	3497					1907		647
Starvation Cap Reductn		0	0	0	0					0		0
Spillback Cap Reductn		0	0	0	0					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		0.33	0.37	0.40	0.28					0.13		0.18
Intersection Summary												

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd 301-5-1-1 Total AM - with Ideal Sat flow 1900vphgpl

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 60.2

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 12.8

Intersection LOS: B

Intersection Capacity Utilization 64.7%

ICU Level of Service C

Analysis Period (min) 15

90th %ile Actuated Cycle: 76.2

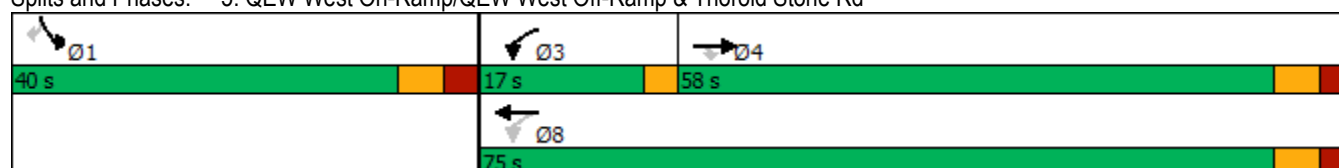
70th %ile Actuated Cycle: 63.9

50th %ile Actuated Cycle: 58.3

30th %ile Actuated Cycle: 53.7

10th %ile Actuated Cycle: 48.9

Splits and Phases: 5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2031 Future Total AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	146	1000	0	0	798	249	323	0	227	0	0	0
Future Volume (vph)	146	1000	0	0	798	249	323	0	227	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	210.0		0.0	0.0		15.0	35.0		45.0	0.0		0.0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1703	3539	0	0	3574	1583	3502	0	1615	0	0	0
Flt Permitted	0.234						0.950					
Satd. Flow (perm)	419	3539	0	0	3574	1583	3502	0	1615	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						95			99			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		352.3			289.2			127.3			154.2	
Travel Time (s)		25.4			20.8			9.2			11.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	2%	0%	0%	1%	2%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	159	1087	0	0	867	271	351	0	247	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	159	1087	0	0	867	271	351	0	247	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2			2	1	1		1			
Detector Template	Left	Thru			Thru	Right	Left		Right			
Leading Detector (m)	2.0	10.0			10.0	2.0	2.0		2.0			
Trailing Detector (m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Position(m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Size(m)	2.0	0.6			0.6	2.0	2.0		2.0			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Delay (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type	pm+pt	NA			NA	Perm	Prot		Prot			
Protected Phases	7	4			8		5		5			

Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2031 Future Total AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4					8						
Detector Phase	7	4			8	8	5		5			
Switch Phase												
Minimum Initial (s)	6.0	10.0			10.0	10.0	10.0		10.0			
Minimum Split (s)	9.0	37.0			37.0	37.0	14.5		14.5			
Total Split (s)	19.0	76.0			57.0	57.0	39.0		39.0			
Total Split (%)	16.5%	66.1%			49.6%	49.6%	33.9%		33.9%			
Maximum Green (s)	16.0	69.0			50.0	50.0	34.5		34.5			
Yellow Time (s)	3.0	4.0			4.0	4.0	3.5		3.5			
All-Red Time (s)	0.0	3.0			3.0	3.0	1.0		1.0			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Total Lost Time (s)	3.0	7.0			7.0	7.0	4.5		4.5			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	2.5	5.0			5.0	5.0	3.0		3.0			
Recall Mode	None	Min			Min	Min	None		None			
Walk Time (s)		15.0			15.0	15.0						
Flash Dont Walk (s)		15.0			15.0	15.0						
Pedestrian Calls (#/hr)		0			0	0						
Act Effct Green (s)	45.4	41.2			28.4	28.4	13.9		13.9			
Actuated g/C Ratio	0.68	0.61			0.42	0.42	0.21		0.21			
v/c Ratio	0.34	0.50			0.57	0.37	0.49		0.60			
Control Delay	6.2	8.2			16.8	10.5	27.7		23.0			
Queue Delay	0.0	0.0			0.0	0.0	0.0		0.0			
Total Delay	6.2	8.2			16.8	10.5	27.7		23.0			
LOS	A	A			B	B	C		C			
Approach Delay		7.9			15.3			25.7				
Approach LOS		A			B			C				
90th %ile Green (s)	14.1	60.6			43.5	43.5	22.5		22.5			
90th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
70th %ile Green (s)	11.1	47.1			33.0	33.0	15.3		15.3			
70th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
50th %ile Green (s)	9.2	39.1			26.9	26.9	12.2		12.2			
50th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
30th %ile Green (s)	7.9	33.6			22.7	22.7	10.5		10.5			
30th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
10th %ile Green (s)	6.4	27.5			18.1	18.1	10.0		10.0			
10th %ile Term Code	Gap	Hold			Gap	Gap	Min		Min			
Queue Length 50th (m)	5.4	32.4			40.0	13.2	19.9		16.2			
Queue Length 95th (m)	16.3	65.7			78.3	38.2	42.8		48.8			
Internal Link Dist (m)		328.3			265.2			103.3			130.2	
Turn Bay Length (m)	210.0					15.0	35.0		45.0			
Base Capacity (vph)	605	3300			2788	1255	1894		919			
Starvation Cap Reductn	0	0			0	0	0		0			
Spillback Cap Reductn	0	0			0	0	0		0			
Storage Cap Reductn	0	0			0	0	0		0			
Reduced v/c Ratio	0.26	0.33			0.31	0.22	0.19		0.27			
Intersection Summary												

Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2031 Future Total AM - with Ideal Sat flow 1900vphgpl

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 67.2

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.60

Intersection Signal Delay: 14.3

Intersection LOS: B

Intersection Capacity Utilization 64.7%

ICU Level of Service C

Analysis Period (min) 15

90th %ile Actuated Cycle: 94.6

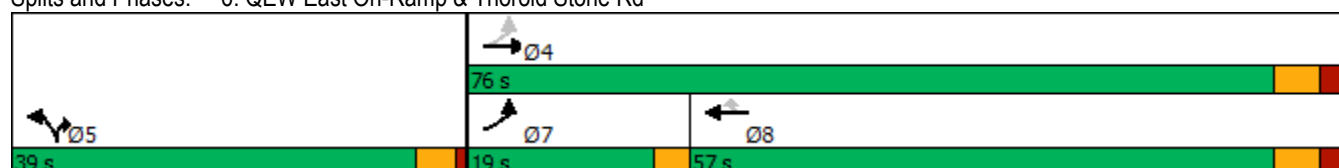
70th %ile Actuated Cycle: 73.9

50th %ile Actuated Cycle: 62.8

30th %ile Actuated Cycle: 55.6

10th %ile Actuated Cycle: 49

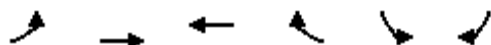
Splits and Phases: 6: QEW East On-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

8: Access Opp Southwood Dr & Site Access #2

2031 Future Total AM - with Ideal Sat flow 1900vphgpl



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	0	0	0	0	31
Future Volume (vph)	10	0	0	0	0	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected		0.950				
Satd. Flow (prot)	0	1770	1863	0	1611	0
Flt Permitted		0.950				
Satd. Flow (perm)	0	1770	1863	0	1611	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		175.4	35.0		70.7	
Travel Time (s)		12.6	2.5		5.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	0	0	0	0	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	11	0	0	34	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control		Stop	Stop		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 13.3% ICU Level of Service A

Analysis Period (min) 15

Lanes, Volumes, Timings

1: Montrose Road & Mt Carmel Blvd

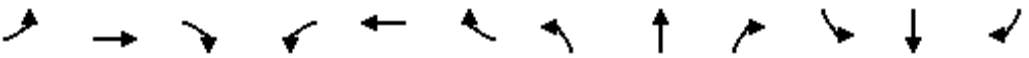
2031 Future Total PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	43	0	0	0	53	293	0	0	230	6
Future Volume (vph)	3	0	43	0	0	0	53	293	0	0	230	6
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1900	1433	1900	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.873									0.996	
Flt Protected		0.997						0.992				
Satd. Flow (prot)	0	1247	0	0	1433	0	0	1398	0	0	1400	0
Flt Permitted		0.997						0.992				
Satd. Flow (perm)	0	1247	0	0	1433	0	0	1398	0	0	1400	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		97.9			84.1			51.6			220.4	
Travel Time (s)		7.0			6.1			3.7			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Adj. Flow (vph)	3	0	47	0	0	0	58	318	0	0	250	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	50	0	0	0	0	0	376	0	0	257	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	54.6%						ICU Level of Service A					
Analysis Period (min)	15											

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

Future Total PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	164	1	85	7	307	92	66	236	2
Future Volume (vph)	1	0	1	164	1	85	7	307	92	66	236	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1178	1301	1454	1579	1301	1454	1338	1900
Storage Length (m)	0.0		0.0	0.0		50.0	50.0		50.0	40.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00		1.00		0.98	1.00	1.00	
Frt		0.932				0.850			0.850		0.999	
Flt Protected		0.976			0.953		0.950			0.950		
Satd. Flow (prot)	0	1709	0	0	1069	1074	1381	1579	1106	1381	1310	0
Flt Permitted		0.894			0.727		0.599			0.433		
Satd. Flow (perm)	0	1565	0	0	814	1074	869	1579	1081	629	1310	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		75				92			100			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		92.8			175.4			126.5			73.6	
Travel Time (s)		6.7			12.6			9.1			5.3	
Confl. Peds. (#/hr)			1	1			2		1	1		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	5%	0%	3%	0%	0%	0%	0%	2%	0%
Adj. Flow (vph)	1	0	1	178	1	92	8	334	100	72	257	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2	0	0	179	92	8	334	100	72	259	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.80	1.60	1.40	1.26	1.60	1.40	1.55	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

Future Total PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	6.0	10.0	10.0	6.0	10.0	
Minimum Split (s)	28.2	28.2		28.2	28.2	28.2	12.0	29.7	29.7	10.5	29.7	
Total Split (s)	37.2	37.2		37.2	37.2	37.2	18.0	41.7	41.7	18.0	41.7	
Total Split (%)	38.4%	38.4%		38.4%	38.4%	38.4%	18.6%	43.0%	43.0%	18.6%	43.0%	
Maximum Green (s)	30.0	30.0		30.0	30.0	30.0	15.0	35.0	35.0	15.0	35.0	
Yellow Time (s)	4.1	4.1		4.1	4.1	4.1	3.0	4.1	4.1	3.0	4.1	
All-Red Time (s)	3.1	3.1		3.1	3.1	3.1	0.0	2.6	2.6	0.0	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)		7.2			7.2	7.2	3.0	6.7	6.7	3.0	6.7	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Walk Time (s)	8.0	8.0		8.0	8.0	8.0		9.0	9.0		9.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0		14.0	14.0		14.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effect Green (s)		20.0			20.0	20.0	30.0	21.5	21.5	33.4	28.1	
Actuated g/C Ratio		0.31			0.31	0.31	0.47	0.33	0.33	0.52	0.44	
v/c Ratio		0.00			0.71	0.23	0.02	0.63	0.23	0.17	0.45	
Control Delay		0.0			38.1	6.3	9.4	27.0	6.2	10.2	18.0	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		0.0			38.1	6.3	9.4	27.0	6.2	10.2	18.0	
LOS		A			D	A	A	C	A	B	B	
Approach Delay					27.3			22.0			16.3	
Approach LOS					C			C			B	
90th %ile Green (s)	30.0	30.0		30.0	30.0	30.0	6.0	30.4	30.4	9.4	33.8	
90th %ile Term Code	Hold	Hold		Max	Max	Max	Min	Gap	Gap	Gap	Hold	
70th %ile Green (s)	26.9	26.9		26.9	26.9	26.9	0.0	23.9	23.9	8.1	35.0	
70th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Gap	Hold	
50th %ile Green (s)	20.4	20.4		20.4	20.4	20.4	0.0	19.1	19.1	7.0	29.1	
50th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Gap	Hold	
30th %ile Green (s)	15.5	15.5		15.5	15.5	15.5	0.0	14.7	14.7	6.0	23.7	
30th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Min	Hold	
10th %ile Green (s)	10.3	10.3		10.3	10.3	10.3	0.0	18.2	18.2	0.0	18.2	
10th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Dwell	Dwell	Skip	Dwell	
Queue Length 50th (m)		0.0			18.9	0.0	0.5	36.0	0.0	4.2	20.3	
Queue Length 95th (m)		0.0			#54.5	10.1	2.7	75.9	10.3	12.4	57.2	
Internal Link Dist (m)		68.8			151.4			102.5			49.6	
Turn Bay Length (m)						50.0	50.0		50.0	40.0		
Base Capacity (vph)		816			404	580	578	916	669	513	760	
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		0.00			0.44	0.16	0.01	0.36	0.15	0.14	0.34	

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

Future Total PM - with Ideal Sat flow 1900vphgpl

Intersection Summary	
Area Type:	Other
Cycle Length:	96.9
Actuated Cycle Length:	64.3
Natural Cycle:	70
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.71
Intersection Signal Delay:	21.5
Intersection LOS:	C
Intersection Capacity Utilization	60.8%
ICU Level of Service	B
Analysis Period (min)	15
90th %ile Actuated Cycle:	86.7
70th %ile Actuated Cycle:	75.8
50th %ile Actuated Cycle:	63.4
30th %ile Actuated Cycle:	53.1
10th %ile Actuated Cycle:	42.4
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

 Ø1	 Ø2	 Ø4
18 s	41.7 s	37.2 s
 Ø5	 Ø6	 Ø8
18 s	41.7 s	37.2 s

Lanes, Volumes, Timings

3: Montrose Road & Cameron Ct

2031 Future Total PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1	10	109	0	3	14	402	164	3	396	2
Future Volume (vph)	0	1	10	109	0	3	14	402	164	3	396	2
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1454	1579	1301	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.876				0.997				0.958		0.999	
Flt Protected					0.954				0.999			
Satd. Flow (prot)	0	1159	0	0	1363	0	0	2847	0	0	1397	0
Flt Permitted					0.954				0.999			
Satd. Flow (perm)	0	1159	0	0	1363	0	0	2847	0	0	1397	0
Link Speed (k/h)	50				50				50			
Link Distance (m)	167.1				64.9				232.7			
Travel Time (s)	12.0				4.7				16.8			
Confl. Peds. (#/hr)	1							1	2	1	1	2
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%	100%	0%	0%	0%	0%	0%	0%	3%	67%	2%	0%
Adj. Flow (vph)	0	1	11	118	0	3	15	437	178	3	430	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	12	0	0	121	0	0	630	0	0	435	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0				0.0				3.6			
Link Offset(m)	0.0				0.0				0.0			
Crosswalk Width(m)	4.8				4.8				4.8			
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.40	1.26	1.60	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control	Stop				Stop				Free		Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	52.5%				ICU Level of Service A							
Analysis Period (min)	15											

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

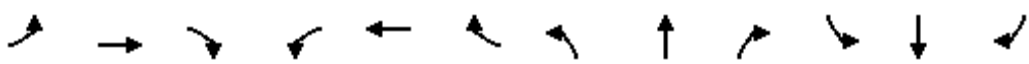
2031 Future Total PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	910	88	271	855	358	138	224	352	340	202	97
Future Volume (vph)	113	910	88	271	855	358	138	224	352	340	202	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	85.0		0.0	60.0		35.0	60.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00			0.99		0.99		0.97	0.99	0.99	
Frt		0.987			0.956				0.850		0.952	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3481	0	1787	3372	0	1770	3574	1583	1787	3319	0
Flt Permitted	0.110			0.102			0.555			0.453		
Satd. Flow (perm)	205	3481	0	192	3372	0	1025	3574	1538	842	3319	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			60				308		65	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		337.7			182.6			114.0			232.7	
Travel Time (s)		24.3			13.1			8.2			16.8	
Confl. Peds. (#/hr)	8		7	7		8	13		15	15		13
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 (%)	2%	2%	4%	1%	2%	1%	2%	1%	2%	1%	2%	4%
Adj. Flow (vph)	123	989	96	295	929	389	150	243	383	370	220	105
Shared Lane Traffic (%)												
Lane Group Flow (vph)	123	1085	0	295	1318	0	150	243	383	370	325	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2031 Future Total PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	8.0	8.0	6.0	8.0	
Minimum Split (s)	10.5	35.6		10.5	35.6		9.0	35.4	35.4	9.0	35.4	
Total Split (s)	20.0	43.6		20.0	43.6		19.0	32.4	32.4	19.0	32.4	
Total Split (%)	17.4%	37.9%		17.4%	37.9%		16.5%	28.2%	28.2%	16.5%	28.2%	
Maximum Green (s)	17.0	38.0		17.0	38.0		16.0	27.0	27.0	16.0	27.0	
Yellow Time (s)	3.0	3.5		3.0	3.5		3.0	3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.1		0.0	2.1		0.0	2.1	2.1	0.0	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	5.6		3.0	5.6		3.0	5.4	5.4	3.0	5.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	2.5		3.0	2.5		2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None		None	Min	Min	None	Min	
Walk Time (s)		11.0			11.0			11.0	11.0		11.0	
Flash Dont Walk (s)		19.0			19.0			19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effect Green (s)	48.0	36.3		57.4	42.7		26.9	13.5	13.5	34.2	18.1	
Actuated g/C Ratio	0.49	0.37		0.59	0.44		0.27	0.14	0.14	0.35	0.18	
v/c Ratio	0.50	0.84		0.81	0.88		0.41	0.49	0.80	0.83	0.49	
Control Delay	20.5	36.1		41.1	33.4		26.7	42.9	23.1	44.7	31.8	
Queue Delay	0.0	0.0		0.0	2.1		0.0	0.0	0.0	0.0	0.0	
Total Delay	20.5	36.1		41.1	35.4		26.7	42.9	23.1	44.7	31.8	
LOS	C	D		D	D		C	D	C	D	C	
Approach Delay		34.6			36.5			30.0			38.7	
Approach LOS		C			D			C			D	
90th %ile Green (s)	13.5	38.0		17.0	41.5		15.3	24.3	24.3	16.0	25.0	
90th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
70th %ile Green (s)	9.7	38.0		17.0	45.3		12.8	15.1	15.1	16.0	18.3	
70th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
50th %ile Green (s)	8.4	38.0		17.0	46.6		11.1	11.6	11.6	16.0	16.5	
50th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
30th %ile Green (s)	7.8	33.5		15.2	40.9		9.5	10.2	10.2	16.0	16.7	
30th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Gap	Gap	Max	Hold	
10th %ile Green (s)	6.6	33.3		11.3	38.0		7.1	8.1	8.1	13.8	14.8	
10th %ile Term Code	Gap	Hold		Gap	Max		Gap	Gap	Gap	Gap	Hold	
Queue Length 50th (m)	9.7	101.5		37.9	112.8		22.1	25.0	14.4	62.9	25.5	
Queue Length 95th (m)	26.1	#167.1		#96.3	#210.9		37.0	37.1	48.6	#102.6	41.1	
Internal Link Dist (m)		313.7			158.6			90.0			208.7	
Turn Bay Length (m)	45.0			85.0			60.0		35.0	60.0		
Base Capacity (vph)	389	1367		391	1502		457	993	650	449	970	
Starvation Cap Reductn	0	0		0	87		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.32	0.79		0.75	0.93		0.33	0.24	0.59	0.82	0.34	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2031 Future Total PM - with Ideal Sat flow 1900vphgpl

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 98.1

Natural Cycle: 95

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 35.1

Intersection LOS: D

Intersection Capacity Utilization 91.6%

ICU Level of Service F

Analysis Period (min) 15

90th %ile Actuated Cycle: 112.3

70th %ile Actuated Cycle: 103.1

50th %ile Actuated Cycle: 99.6

30th %ile Actuated Cycle: 91.9

10th %ile Actuated Cycle: 83.5

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Montrose Road & Thorold Stone Rd

 Ø1	 Ø2	 Ø3	 Ø4
19 s	32.4 s	20 s	43.6 s
 Ø5	 Ø6	 Ø7	 Ø8
19 s	32.4 s	20 s	43.6 s

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd 301-501-101 Total PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑					↖↗		↗
Traffic Volume (vph)	0	1226	506	293	1432	0	0	0	0	298	0	171
Future Volume (vph)	0	1226	506	293	1432	0	0	0	0	298	0	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1301
Storage Length (m)	0.0		60.0	210.0		0.0	0.0		0.0	40.0		25.0
Storage Lanes	0		1	1		0	0		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3539	1583	1805	3574	0	0	0	0	3400	0	1063
Flt Permitted				0.095						0.950		
Satd. Flow (perm)	0	3539	1583	180	3574	0	0	0	0	3400	0	1063
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			375									66
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		182.6			352.3			184.1			149.0	
Travel Time (s)		13.1			25.4			13.3			10.7	
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%	2%	2%	0%	1%	0%	0%	0%	0%	3%	0%	4%
Adj. Flow (vph)	0	1333	550	318	1557	0	0	0	0	324	0	186
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1333	550	318	1557	0	0	0	0	324	0	186
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.60
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (m)		10.0	2.0	2.0	10.0					2.0		2.0
Trailing Detector (m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Position(m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Size(m)		0.6	2.0	2.0	0.6					2.0		2.0
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm	pm+pt	NA					Prot		Prot
Protected Phases		4		3	8					1		1

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd 301-Fut Rd Total PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4	8								
Detector Phase		4	4	3	8					1		1
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					10.0		10.0
Minimum Split (s)		37.0	37.0	9.0	17.0					40.0		40.0
Total Split (s)		58.0	58.0	17.0	75.0					40.0		40.0
Total Split (%)		50.4%	50.4%	14.8%	65.2%					34.8%		34.8%
Maximum Green (s)		51.0	51.0	14.0	68.0					33.0		33.0
Yellow Time (s)		4.0	4.0	3.0	4.0					4.0		4.0
All-Red Time (s)		3.0	3.0	0.0	3.0					3.0		3.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		7.0	7.0	3.0	7.0					7.0		7.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		2.2	2.2	2.5	2.2					3.2		3.2
Recall Mode		Min	Min	None	Min					None		None
Walk Time (s)		15.0	15.0							12.0		12.0
Flash Dont Walk (s)		15.0	15.0							21.0		21.0
Pedestrian Calls (#/hr)		0	0							0		0
Act Effect Green (s)		39.0	39.0	60.7	56.6					17.4		17.4
Actuated g/C Ratio		0.44	0.44	0.69	0.64					0.20		0.20
v/c Ratio		0.85	0.61	0.82	0.68					0.48		0.71
Control Delay		28.9	9.0	40.2	12.8					34.7		37.9
Queue Delay		0.1	0.0	0.0	0.0					0.0		0.0
Total Delay		29.0	9.0	40.2	12.8					34.7		37.9
LOS		C	A	D	B					C		D
Approach Delay		23.2			17.5						35.9	
Approach LOS		C			B						D	
90th %ile Green (s)		51.0	51.0	14.0	68.0					29.3		29.3
90th %ile Term Code		Max	Max	Max	Hold					Gap		Gap
70th %ile Green (s)		47.9	47.9	14.0	64.9					21.8		21.8
70th %ile Term Code		Gap	Gap	Max	Hold					Gap		Gap
50th %ile Green (s)		39.6	39.6	14.0	56.6					17.0		17.0
50th %ile Term Code		Gap	Gap	Max	Hold					Gap		Gap
30th %ile Green (s)		32.6	32.6	14.0	49.6					12.3		12.3
30th %ile Term Code		Gap	Gap	Max	Hold					Gap		Gap
10th %ile Green (s)		26.2	26.2	14.0	43.2					10.0		10.0
10th %ile Term Code		Gap	Gap	Max	Hold					Min		Min
Queue Length 50th (m)		105.1	18.4	35.3	80.7					26.4		19.9
Queue Length 95th (m)		166.9	59.2	#109.8	146.8					44.3		48.8
Internal Link Dist (m)		158.6			328.3			160.1			125.0	
Turn Bay Length (m)			60.0	210.0						40.0		25.0
Base Capacity (vph)		2107	1094	389	2829					1310		450
Starvation Cap Reductn		87	20	0	0					0		0
Spillback Cap Reductn		0	0	0	0					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		0.66	0.51	0.82	0.55					0.25		0.41
Intersection Summary												

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd 301-5-1-1 Total PM - with Ideal Sat flow 1900vphgpl

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 88.5

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 22.2

Intersection LOS: C

Intersection Capacity Utilization 73.6%

ICU Level of Service D

Analysis Period (min) 15

90th %ile Actuated Cycle: 111.3

70th %ile Actuated Cycle: 100.7

50th %ile Actuated Cycle: 87.6

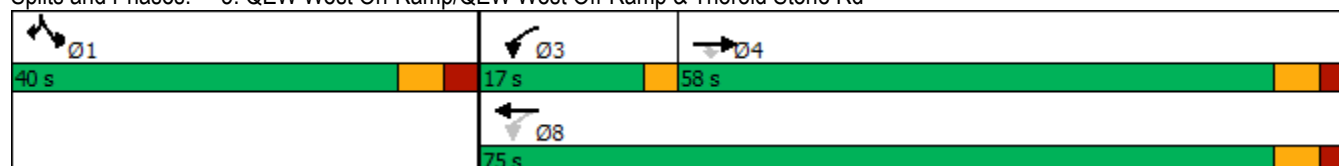
30th %ile Actuated Cycle: 75.9

10th %ile Actuated Cycle: 67.2

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

Queue shown is maximum after two cycles.

Splits and Phases: 5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2031 Future Total PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	168	1353	0	0	1219	352	455	0	292	0	0	0
Future Volume (vph)	168	1353	0	0	1219	352	455	0	292	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	210.0		0.0	0.0		15.0	35.0		45.0	0.0		0.0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						0.97						
Frt						0.850			0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1703	3539	0	0	3574	1583	3502	0	1615	0	0	0
Flt Permitted	0.097						0.950					
Satd. Flow (perm)	174	3539	0	0	3574	1537	3502	0	1615	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						87			66			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		352.3			289.2			127.3			154.2	
Travel Time (s)		25.4			20.8			9.2			11.1	
Confl. Peds. (#/hr)	5		6	6		5			1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	2%	0%	0%	1%	2%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	183	1471	0	0	1325	383	495	0	317	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	183	1471	0	0	1325	383	495	0	317	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2			2	1	1		1			
Detector Template	Left	Thru			Thru	Right	Left		Right			
Leading Detector (m)	2.0	10.0			10.0	2.0	2.0		2.0			
Trailing Detector (m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Position(m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Size(m)	2.0	0.6			0.6	2.0	2.0		2.0			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Delay (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							

Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2031 Future Total PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA			NA	Perm	Prot		Prot			
Protected Phases	7	4			8		5		5			
Permitted Phases	4					8						
Detector Phase	7	4			8	8	5		5			
Switch Phase												
Minimum Initial (s)	6.0	10.0			10.0	10.0	10.0		10.0			
Minimum Split (s)	9.0	37.0			37.0	37.0	14.5		14.5			
Total Split (s)	19.0	76.0			57.0	57.0	39.0		39.0			
Total Split (%)	16.5%	66.1%			49.6%	49.6%	33.9%		33.9%			
Maximum Green (s)	16.0	69.0			50.0	50.0	34.5		34.5			
Yellow Time (s)	3.0	4.0			4.0	4.0	3.5		3.5			
All-Red Time (s)	0.0	3.0			3.0	3.0	1.0		1.0			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Total Lost Time (s)	3.0	7.0			7.0	7.0	4.5		4.5			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	2.5	5.0			5.0	5.0	3.0		3.0			
Recall Mode	None	Min			Min	Min	None		None			
Walk Time (s)		15.0			15.0	15.0						
Flash Dont Walk (s)		15.0			15.0	15.0						
Pedestrian Calls (#/hr)		0			0	0						
Act Effct Green (s)	65.2	61.0			46.2	46.2	21.5		21.5			
Actuated g/C Ratio	0.69	0.65			0.49	0.49	0.23		0.23			
v/c Ratio	0.59	0.64			0.76	0.48	0.62		0.76			
Control Delay	21.5	12.5			24.5	16.0	36.9		39.8			
Queue Delay	0.0	0.0			0.0	0.0	0.0		0.0			
Total Delay	21.5	12.5			24.5	16.0	36.9		39.8			
LOS	C	B			C	B	D		D			
Approach Delay		13.5			22.6			38.0				
Approach LOS		B			C			D				
90th %ile Green (s)	16.0	69.0			50.0	50.0	33.3		33.3			
90th %ile Term Code	Max	Max			Max	Max	Gap		Gap			
70th %ile Green (s)	14.6	67.6			50.0	50.0	26.2		26.2			
70th %ile Term Code	Gap	Hold			Max	Max	Gap		Gap			
50th %ile Green (s)	11.9	64.9			50.0	50.0	21.5		21.5			
50th %ile Term Code	Gap	Hold			Max	Max	Gap		Gap			
30th %ile Green (s)	9.6	58.5			45.9	45.9	16.5		16.5			
30th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
10th %ile Green (s)	7.5	44.1			33.6	33.6	12.8		12.8			
10th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
Queue Length 50th (m)	11.8	79.5			103.2	35.2	46.4		47.8			
Queue Length 95th (m)	41.2	139.4			174.0	79.2	65.6		82.1			
Internal Link Dist (m)		328.3			265.2			103.3			130.2	
Turn Bay Length (m)	210.0					15.0	35.0		45.0			
Base Capacity (vph)	387	2664			1954	879	1321		650			
Starvation Cap Reductn	0	0			0	0	0		0			
Spillback Cap Reductn	0	0			0	0	0		0			
Storage Cap Reductn	0	0			0	0	0		0			
Reduced v/c Ratio	0.47	0.55			0.68	0.44	0.37		0.49			

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 94.4

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 22.0

Intersection LOS: C

Intersection Capacity Utilization 73.6%

ICU Level of Service D

Analysis Period (min) 15

90th %ile Actuated Cycle: 113.8

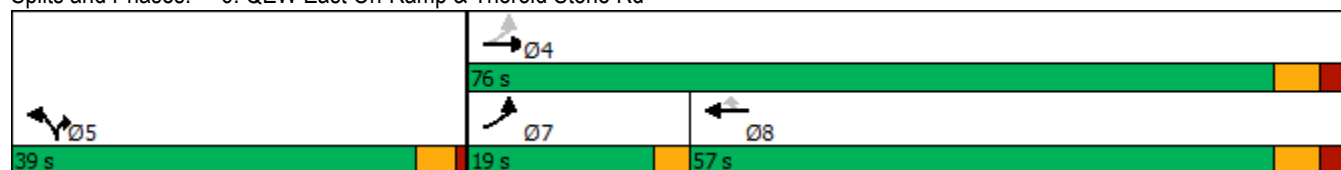
70th %ile Actuated Cycle: 105.3

50th %ile Actuated Cycle: 97.9

30th %ile Actuated Cycle: 86.5

10th %ile Actuated Cycle: 68.4

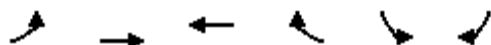
Splits and Phases: 6: QEW East On-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

8: Access Opp Southwood Dr & Site Access #2

2031 Future Total PM - with Ideal Sat flow 1900vphgpl



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	29	0	0	0	0	20
Future Volume (vph)	29	0	0	0	0	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.865					
Fl _t Protected	0.950					
Satd. Flow (prot)	0	1770	1863	0	1611	0
Fl _t Permitted	0.950					
Satd. Flow (perm)	0	1770	1863	0	1611	0
Link Speed (k/h)	50					
Link Distance (m)	175.4					35.0
Travel Time (s)	12.6					2.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	0	0	0	0	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	32	0	0	22	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)	0.0					0.0
Link Offset(m)	0.0					0.0
Crosswalk Width(m)	4.8					4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control	Stop		Stop	Stop		
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utilization 13.3%				ICU Level of Service A		
Analysis Period (min) 15						

Lanes, Volumes, Timings

1: Montrose Road & Mt Carmel Blvd

2036 Future Total AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	60	0	0	0	28	161	0	0	212	2
Future Volume (vph)	4	0	60	0	0	0	28	161	0	0	212	2
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1900	1433	1900	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.873									0.999	
Flt Protected		0.997						0.993				
Satd. Flow (prot)	0	1247	0	0	1433	0	0	1399	0	0	1404	0
Flt Permitted		0.997						0.993				
Satd. Flow (perm)	0	1247	0	0	1433	0	0	1399	0	0	1404	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		97.9			84.1			51.6			220.4	
Travel Time (s)		7.0			6.1			3.7			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Adj. Flow (vph)	4	0	65	0	0	0	30	175	0	0	230	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	69	0	0	0	0	0	205	0	0	232	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	43.5%						ICU Level of Service A					
Analysis Period (min)	15											

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

Future Total AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1	16	68	1	19	2	186	62	19	305	0
Future Volume (vph)	0	1	16	68	1	19	2	186	62	19	305	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1178	1301	1454	1579	1301	1454	1338	1900
Storage Length (m)	0.0		0.0	0.0		50.0	50.0		50.0	40.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.872				0.850			0.850			
Flt Protected					0.953		0.950			0.950		
Satd. Flow (prot)	0	1657	0	0	1070	1074	1381	1579	1106	1381	1312	0
Flt Permitted					0.716		0.560			0.631		
Satd. Flow (perm)	0	1657	0	0	804	1074	814	1579	1106	917	1312	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17				75			81			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		92.8			175.4			126.5			73.6	
Travel Time (s)		6.7			12.6			9.1			5.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	5%	0%	3%	0%	0%	0%	0%	2%	0%
Adj. Flow (vph)	0	1	17	74	1	21	2	202	67	21	332	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	18	0	0	75	21	2	202	67	21	332	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.80	1.60	1.40	1.26	1.60	1.40	1.55	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type		NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

2025 Future Total AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	6.0	10.0	10.0	6.0	10.0	
Minimum Split (s)	28.2	28.2		28.2	28.2	28.2	12.0	29.7	29.7	10.5	29.7	
Total Split (s)	37.2	37.2		37.2	37.2	37.2	18.0	41.7	41.7	18.0	41.7	
Total Split (%)	38.4%	38.4%		38.4%	38.4%	38.4%	18.6%	43.0%	43.0%	18.6%	43.0%	
Maximum Green (s)	30.0	30.0		30.0	30.0	30.0	15.0	35.0	35.0	15.0	35.0	
Yellow Time (s)	4.1	4.1		4.1	4.1	4.1	3.0	4.1	4.1	3.0	4.1	
All-Red Time (s)	3.1	3.1		3.1	3.1	3.1	0.0	2.6	2.6	0.0	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)		7.2			7.2	7.2	3.0	6.7	6.7	3.0	6.7	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Walk Time (s)	8.0	8.0		8.0	8.0	8.0		9.0	9.0		9.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0		14.0	14.0		14.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effct Green (s)		11.5			11.5	11.5	29.3	26.6	26.6	29.4	26.6	
Actuated g/C Ratio		0.24			0.24	0.24	0.61	0.56	0.56	0.62	0.56	
v/c Ratio		0.04			0.39	0.07	0.00	0.23	0.10	0.03	0.45	
Control Delay		9.6			24.0	0.4	5.5	10.9	3.1	5.9	13.8	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		9.6			24.0	0.4	5.5	10.9	3.1	5.9	13.8	
LOS		A			C	A	A	B	A	A	B	
Approach Delay		9.6			18.8			8.9			13.3	
Approach LOS		A			B			A			B	
90th %ile Green (s)	18.4	18.4		18.4	18.4	18.4	6.0	30.5	30.5	6.3	30.8	
90th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Min	Hold	Hold	Gap	Gap	
70th %ile Green (s)	12.5	12.5		12.5	12.5	12.5	0.0	18.5	18.5	0.0	18.5	
70th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Hold	Hold	Skip	Gap	
50th %ile Green (s)	10.0	10.0		10.0	10.0	10.0	0.0	16.4	16.4	0.0	16.4	
50th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Dwell	Dwell	Skip	Dwell	
30th %ile Green (s)	8.7	8.7		8.7	8.7	8.7	0.0	26.9	26.9	0.0	26.9	
30th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Dwell	Dwell	Skip	Dwell	
10th %ile Green (s)	0.0	0.0		0.0	0.0	0.0	0.0	25.0	25.0	0.0	25.0	
10th %ile Term Code	Skip	Skip		Skip	Skip	Skip	Skip	Dwell	Dwell	Skip	Dwell	
Queue Length 50th (m)		0.1			4.5	0.0	0.1	9.2	0.0	0.7	17.7	
Queue Length 95th (m)		4.7			20.9	0.0	0.8	33.1	5.5	3.6	61.5	
Internal Link Dist (m)		68.8			151.4			102.5			49.6	
Turn Bay Length (m)						50.0	50.0		50.0	40.0		
Base Capacity (vph)		1125			543	750	699	1212	868	729	1007	
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		0.02			0.14	0.03	0.00	0.17	0.08	0.03	0.33	
Intersection Summary												

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr 2635 Future Total AM - with Ideal Sat flow 1900vphgpl

Area Type: Other

Cycle Length: 96.9

Actuated Cycle Length: 47.7

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 12.3

Intersection LOS: B

Intersection Capacity Utilization 47.2%

ICU Level of Service A

Analysis Period (min) 15

90th %ile Actuated Cycle: 72.1

70th %ile Actuated Cycle: 44.9

50th %ile Actuated Cycle: 40.3

30th %ile Actuated Cycle: 49.5

10th %ile Actuated Cycle: 31.7

Splits and Phases: 2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

 Ø1	 Ø2	 Ø4
18 s	41.7 s	37.2 s
 Ø5	 Ø6	 Ø8
18 s	41.7 s	37.2 s

Lanes, Volumes, Timings

3: Montrose Road & Cameron Ct

2036 Future Total AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1	10	26	0	2	1	249	72	7	381	1
Future Volume (vph)	0	1	10	26	0	2	1	249	72	7	381	1
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1454	1579	1301	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.876				0.991				0.967			
Flt Protected					0.955						0.999	
Satd. Flow (prot)	0	1159	0	0	1356	0	0	2882	0	0	1387	0
Flt Permitted					0.955						0.999	
Satd. Flow (perm)	0	1159	0	0	1356	0	0	2882	0	0	1387	0
Link Speed (k/h)	50				50				50		50	
Link Distance (m)	167.1				64.9				232.7		126.5	
Travel Time (s)	12.0				4.7				16.8		9.1	
Confl. Peds. (#/hr)	1	3		3			1	4	4	4	4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	100%	0%	0%	0%	0%	0%	0%	3%	67%	2%	0%
Adj. Flow (vph)	0	1	11	28	0	2	1	271	78	8	414	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	12	0	0	30	0	0	350	0	0	423	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0				0.0				3.6		3.6	
Link Offset(m)	0.0				0.0				0.0		0.0	
Crosswalk Width(m)	4.8				4.8				4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.40	1.26	1.60	1.00	1.42	1.00
Turning Speed (k/h)	25	15		25	15		25	15		25	15	
Sign Control	Stop				Stop				Free		Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	49.7%				ICU Level of Service A							
Analysis Period (min)	15											

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2036 Future Total AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	804	87	229	596	190	81	186	321	289	133	90
Future Volume (vph)	83	804	87	229	596	190	81	186	321	289	133	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	85.0		0.0	60.0		35.0	60.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	1.00		0.99		0.99	1.00	0.99	
Frt		0.985			0.964				0.850		0.940	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3475	0	1787	3408	0	1770	3574	1583	1787	3274	0
Flt Permitted	0.283			0.122			0.601			0.500		
Satd. Flow (perm)	527	3475	0	229	3408	0	1113	3574	1561	939	3274	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			40				332		98	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		337.7			182.6			114.0			232.7	
Travel Time (s)		24.3			13.1			8.2			16.8	
Confl. Peds. (#/hr)	2		1	1		2	7		2	2		7
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 (%)	2%	2%	4%	1%	2%	1%	2%	1%	2%	1%	2%	4%
Adj. Flow (vph)	90	874	95	249	648	207	88	202	349	314	145	98
Shared Lane Traffic (%)												
Lane Group Flow (vph)	90	969	0	249	855	0	88	202	349	314	243	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2036 Future Total AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	8.0	8.0	6.0	8.0	
Minimum Split (s)	10.5	35.6		10.5	35.6		9.0	35.4	35.4	9.0	35.4	
Total Split (s)	20.0	43.6		20.0	43.6		19.0	32.4	32.4	19.0	32.4	
Total Split (%)	17.4%	37.9%		17.4%	37.9%		16.5%	28.2%	28.2%	16.5%	28.2%	
Maximum Green (s)	17.0	38.0		17.0	38.0		16.0	27.0	27.0	16.0	27.0	
Yellow Time (s)	3.0	3.5		3.0	3.5		3.0	3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.1		0.0	2.1		0.0	2.1	2.1	0.0	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	5.6		3.0	5.6		3.0	5.4	5.4	3.0	5.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	2.5		3.0	2.5		2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None		None	Min	Min	None	Min	
Walk Time (s)		11.0			11.0			11.0	11.0		11.0	
Flash Dont Walk (s)		19.0			19.0			19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effect Green (s)	39.7	29.1		48.0	36.7		22.0	11.1	11.1	31.5	20.0	
Actuated g/C Ratio	0.46	0.34		0.56	0.43		0.26	0.13	0.13	0.37	0.23	
v/c Ratio	0.25	0.82		0.68	0.58		0.25	0.44	0.71	0.64	0.29	
Control Delay	11.6	32.6		25.9	20.5		23.0	39.7	14.5	29.5	19.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	11.6	32.6		25.9	20.5		23.0	39.7	14.5	29.5	19.8	
LOS	B	C		C	C		C	D	B	C	B	
Approach Delay		30.8			21.7			23.6			25.3	
Approach LOS		C			C			C			C	
90th %ile Green (s)	9.9	38.0		17.0	45.1		11.3	17.8	17.8	16.0	22.5	
90th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
70th %ile Green (s)	8.5	34.2		16.7	42.4		9.6	11.6	11.6	16.0	18.0	
70th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Gap	Gap	Max	Hold	
50th %ile Green (s)	8.0	30.4		13.6	36.0		8.4	10.3	10.3	16.0	17.9	
50th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Gap	Gap	Max	Hold	
30th %ile Green (s)	7.1	25.9		10.6	29.4		7.0	8.8	8.8	15.0	16.8	
30th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Gap	Gap	Gap	Hold	
10th %ile Green (s)	0.0	18.7		8.4	30.1		0.0	8.0	8.0	10.5	21.5	
10th %ile Term Code	Skip	Gap		Gap	Hold		Skip	Min	Min	Gap	Hold	
Queue Length 50th (m)	6.7	79.0		22.3	57.2		10.2	17.7	2.7	42.0	11.2	
Queue Length 95th (m)	15.6	121.5		55.2	89.3		23.7	31.8	31.1	77.7	25.2	
Internal Link Dist (m)		313.7			158.6			90.0			208.7	
Turn Bay Length (m)	45.0			85.0			60.0		35.0	60.0		
Base Capacity (vph)	543	1598		447	1659		509	1163	732	509	1131	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.17	0.61		0.56	0.52		0.17	0.17	0.48	0.62	0.21	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2036 Future Total AM - with Ideal Sat flow 1900vphgpl

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 85.7

Natural Cycle: 95

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 25.5

Intersection LOS: C

Intersection Capacity Utilization 77.4%

ICU Level of Service D

Analysis Period (min) 15

90th %ile Actuated Cycle: 105.8

70th %ile Actuated Cycle: 95.5

50th %ile Actuated Cycle: 87.3

30th %ile Actuated Cycle: 77.3

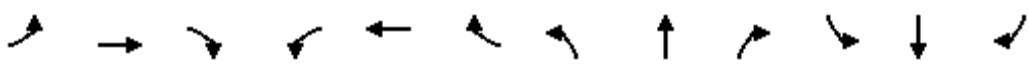
10th %ile Actuated Cycle: 62.6

Splits and Phases: 4: Montrose Road & Thorold Stone Rd

 Ø1	 Ø2	 Ø3	 Ø4
19 s	32.4 s	20 s	43.6 s
 Ø5	 Ø6	 Ø7	 Ø8
19 s	32.4 s	20 s	43.6 s

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑					↖↗		↗
Traffic Volume (vph)	0	1026	541	233	1013	0	0	0	0	250	0	120
Future Volume (vph)	0	1026	541	233	1013	0	0	0	0	250	0	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		60.0	210.0		0.0	0.0		0.0	40.0		25.0
Storage Lanes	0		1	1		0	0		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3539	1583	1805	3574	0	0	0	0	3400	0	1553
Flt Permitted				0.134						0.950		
Satd. Flow (perm)	0	3539	1583	255	3574	0	0	0	0	3400	0	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			479									92
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		182.6			352.3			184.1			149.0	
Travel Time (s)		13.1			25.4			13.3			10.7	
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%	2%	2%	0%	1%	0%	0%	0%	0%	3%	0%	4%
Adj. Flow (vph)	0	1115	588	253	1101	0	0	0	0	272	0	130
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1115	588	253	1101	0	0	0	0	272	0	130
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (m)		10.0	2.0	2.0	10.0					2.0		2.0
Trailing Detector (m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Position(m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Size(m)		0.6	2.0	2.0	0.6					2.0		2.0
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm	pm+pt	NA					Prot		Prot
Protected Phases		4		3	8					1		1

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd

300 Feet Red Total AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4	8								
Detector Phase		4	4	3	8					1		1
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					10.0		10.0
Minimum Split (s)		37.0	37.0	9.0	17.0					40.0		40.0
Total Split (s)		58.0	58.0	17.0	75.0					40.0		40.0
Total Split (%)		50.4%	50.4%	14.8%	65.2%					34.8%		34.8%
Maximum Green (s)		51.0	51.0	14.0	68.0					33.0		33.0
Yellow Time (s)		4.0	4.0	3.0	4.0					4.0		4.0
All-Red Time (s)		3.0	3.0	0.0	3.0					3.0		3.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		7.0	7.0	3.0	7.0					7.0		7.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		2.2	2.2	2.5	2.2					3.2		3.2
Recall Mode		Min	Min	None	Min					None		None
Walk Time (s)		15.0	15.0							12.0		12.0
Flash Dont Walk (s)		15.0	15.0							21.0		21.0
Pedestrian Calls (#/hr)		0	0							0		0
Act Effect Green (s)		28.4	28.4	45.6	41.5					12.3		12.3
Actuated g/C Ratio		0.42	0.42	0.67	0.61					0.18		0.18
v/c Ratio		0.76	0.63	0.64	0.51					0.44		0.37
Control Delay		21.0	6.6	16.7	8.4					29.4		14.6
Queue Delay		0.0	0.0	0.0	0.0					0.0		0.0
Total Delay		21.0	6.6	16.7	8.4					29.4		14.6
LOS		C	A	B	A					C		B
Approach Delay		16.0			9.9						24.6	
Approach LOS		B			A						C	
90th %ile Green (s)		40.7	40.7	14.0	57.7					16.6		16.6
90th %ile Term Code		Gap	Gap	Max	Hold					Gap		Gap
70th %ile Green (s)		33.6	33.6	12.2	48.8					13.6		13.6
70th %ile Term Code		Gap	Gap	Gap	Hold					Gap		Gap
50th %ile Green (s)		27.7	27.7	9.3	40.0					11.6		11.6
50th %ile Term Code		Gap	Gap	Gap	Hold					Gap		Gap
30th %ile Green (s)		23.5	23.5	8.0	34.5					10.0		10.0
30th %ile Term Code		Gap	Gap	Gap	Hold					Min		Min
10th %ile Green (s)		18.7	18.7	7.1	28.8					10.0		10.0
10th %ile Term Code		Gap	Gap	Gap	Hold					Min		Min
Queue Length 50th (m)		60.8	8.3	10.2	36.5					16.2		4.2
Queue Length 95th (m)		102.3	37.5	38.4	59.1					34.2		21.3
Internal Link Dist (m)		158.6			328.3			160.1			125.0	
Turn Bay Length (m)			60.0	210.0						40.0		25.0
Base Capacity (vph)		2732	1331	498	3331					1698		822
Starvation Cap Reductn		16	0	0	0					0		0
Spillback Cap Reductn		0	0	0	0					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		0.41	0.44	0.51	0.33					0.16		0.16
Intersection Summary												

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd 300 Feet Total AM - with Ideal Sat flow 1900vphgpl

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 68.3

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 14.6

Intersection LOS: B

Intersection Capacity Utilization 69.7%

ICU Level of Service C

Analysis Period (min) 15

90th %ile Actuated Cycle: 88.3

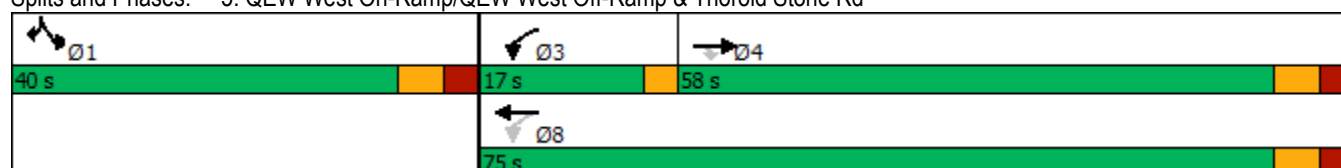
70th %ile Actuated Cycle: 76.4

50th %ile Actuated Cycle: 65.6

30th %ile Actuated Cycle: 58.5

10th %ile Actuated Cycle: 52.8

Splits and Phases: 5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

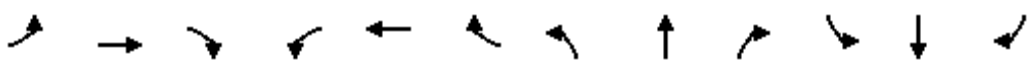
2036 Future Total AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	163	1120	0	0	896	280	362	0	256	0	0	0
Future Volume (vph)	163	1120	0	0	896	280	362	0	256	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	210.0		0.0	0.0		15.0	35.0		45.0	0.0		0.0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1703	3539	0	0	3574	1583	3502	0	1615	0	0	0
Flt Permitted	0.196						0.950					
Satd. Flow (perm)	351	3539	0	0	3574	1583	3502	0	1615	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						94			73			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		352.3			289.2			127.3			154.2	
Travel Time (s)		25.4			20.8			9.2			11.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	2%	0%	0%	1%	2%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	177	1217	0	0	974	304	393	0	278	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	177	1217	0	0	974	304	393	0	278	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2			2	1	1		1			
Detector Template	Left	Thru			Thru	Right	Left		Right			
Leading Detector (m)	2.0	10.0			10.0	2.0	2.0		2.0			
Trailing Detector (m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Position(m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Size(m)	2.0	0.6			0.6	2.0	2.0		2.0			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Delay (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type	pm+pt	NA			NA	Perm	Prot		Prot			
Protected Phases	7	4			8		5		5			

Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2036 Future Total AM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4					8						
Detector Phase	7	4			8	8	5		5			
Switch Phase												
Minimum Initial (s)	6.0	10.0			10.0	10.0	10.0		10.0			
Minimum Split (s)	9.0	37.0			37.0	37.0	14.5		14.5			
Total Split (s)	19.0	76.0			57.0	57.0	39.0		39.0			
Total Split (%)	16.5%	66.1%			49.6%	49.6%	33.9%		33.9%			
Maximum Green (s)	16.0	69.0			50.0	50.0	34.5		34.5			
Yellow Time (s)	3.0	4.0			4.0	4.0	3.5		3.5			
All-Red Time (s)	0.0	3.0			3.0	3.0	1.0		1.0			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Total Lost Time (s)	3.0	7.0			7.0	7.0	4.5		4.5			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	2.5	5.0			5.0	5.0	3.0		3.0			
Recall Mode	None	Min			Min	Min	None		None			
Walk Time (s)		15.0			15.0	15.0						
Flash Dont Walk (s)		15.0			15.0	15.0						
Pedestrian Calls (#/hr)		0			0	0						
Act Effct Green (s)	52.1	47.9			34.3	34.3	16.7		16.7			
Actuated g/C Ratio	0.68	0.62			0.45	0.45	0.22		0.22			
v/c Ratio	0.42	0.55			0.61	0.40	0.52		0.68			
Control Delay	8.2	9.7			18.6	12.0	30.5		31.0			
Queue Delay	0.0	0.0			0.0	0.0	0.0		0.0			
Total Delay	8.2	9.7			18.6	12.0	30.5		31.0			
LOS	A	A			B	B	C		C			
Approach Delay		9.5			17.0			30.7				
Approach LOS		A			B			C				
90th %ile Green (s)	14.3	67.3			50.0	50.0	27.5		27.5			
90th %ile Term Code	Gap	Hold			Max	Max	Gap		Gap			
70th %ile Green (s)	12.3	56.2			40.9	40.9	20.3		20.3			
70th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
50th %ile Green (s)	10.3	46.9			33.6	33.6	15.8		15.8			
50th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
30th %ile Green (s)	8.6	38.7			27.1	27.1	12.3		12.3			
30th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
10th %ile Green (s)	6.8	31.5			21.7	21.7	10.0		10.0			
10th %ile Term Code	Gap	Hold			Gap	Gap	Min		Min			
Queue Length 50th (m)	7.6	46.3			54.3	18.6	26.5		27.7			
Queue Length 95th (m)	21.1	89.0			99.2	48.7	51.4		67.5			
Internal Link Dist (m)		328.3			265.2			103.3			130.2	
Turn Bay Length (m)	210.0					15.0	35.0		45.0			
Base Capacity (vph)	537	3088			2470	1123	1670		808			
Starvation Cap Reductn	0	0			0	0	0		0			
Spillback Cap Reductn	0	0			0	0	0		0			
Storage Cap Reductn	0	0			0	0	0		0			
Reduced v/c Ratio	0.33	0.39			0.39	0.27	0.24		0.34			
Intersection Summary												

Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2036 Future Total AM - with Ideal Sat flow 1900vphgpl

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 76.8

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 16.6

Intersection LOS: B

Intersection Capacity Utilization 69.7%

ICU Level of Service C

Analysis Period (min) 15

90th %ile Actuated Cycle: 106.3

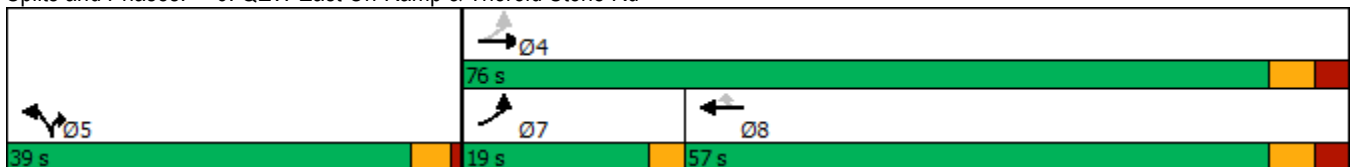
70th %ile Actuated Cycle: 88

50th %ile Actuated Cycle: 74.2

30th %ile Actuated Cycle: 62.5

10th %ile Actuated Cycle: 53

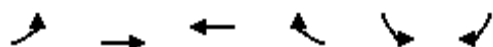
Splits and Phases: 6: QEW East On-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

8: Access Opp Southwood Dr & Site Access #2

2036 Future Total AM - with Ideal Sat flow 1900vphgpl



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	0	0	0	0	31
Future Volume (vph)	10	0	0	0	0	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected		0.950				
Satd. Flow (prot)	0	1770	1863	0	1611	0
Flt Permitted		0.950				
Satd. Flow (perm)	0	1770	1863	0	1611	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		175.4	35.0		70.7	
Travel Time (s)		12.6	2.5		5.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	0	0	0	0	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	11	0	0	34	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control		Stop	Stop		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 13.3% ICU Level of Service A

Analysis Period (min) 15

Lanes, Volumes, Timings

1: Montrose Road & Mt Carmel Blvd

2031 Future Total PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	43	0	0	0	53	293	0	0	230	6
Future Volume (vph)	3	0	43	0	0	0	53	293	0	0	230	6
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1900	1433	1900	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.873									0.996	
Flt Protected		0.997						0.992				
Satd. Flow (prot)	0	1247	0	0	1433	0	0	1398	0	0	1400	0
Flt Permitted		0.997						0.992				
Satd. Flow (perm)	0	1247	0	0	1433	0	0	1398	0	0	1400	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		97.9			84.1			51.6			220.4	
Travel Time (s)		7.0			6.1			3.7			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Adj. Flow (vph)	3	0	47	0	0	0	58	318	0	0	250	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	50	0	0	0	0	0	376	0	0	257	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	54.6%						ICU Level of Service A					
Analysis Period (min)	15											

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

Future Total PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	164	1	85	7	307	92	66	236	2
Future Volume (vph)	1	0	1	164	1	85	7	307	92	66	236	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1178	1301	1454	1579	1301	1454	1338	1900
Storage Length (m)	0.0		0.0	0.0		50.0	50.0		50.0	40.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00		1.00		0.98	1.00	1.00	
Frt		0.932				0.850			0.850		0.999	
Flt Protected		0.976			0.953		0.950			0.950		
Satd. Flow (prot)	0	1709	0	0	1069	1074	1381	1579	1106	1381	1310	0
Flt Permitted		0.894			0.727		0.599			0.433		
Satd. Flow (perm)	0	1565	0	0	814	1074	869	1579	1081	629	1310	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		75				92			100			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		92.8			175.4			126.5			73.6	
Travel Time (s)		6.7			12.6			9.1			5.3	
Confl. Peds. (#/hr)			1	1			2		1	1		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	5%	0%	3%	0%	0%	0%	0%	2%	0%
Adj. Flow (vph)	1	0	1	178	1	92	8	334	100	72	257	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2	0	0	179	92	8	334	100	72	259	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.80	1.60	1.40	1.26	1.60	1.40	1.55	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

Future Total PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	6.0	10.0	10.0	6.0	10.0	
Minimum Split (s)	28.2	28.2		28.2	28.2	28.2	12.0	29.7	29.7	10.5	29.7	
Total Split (s)	37.2	37.2		37.2	37.2	37.2	18.0	41.7	41.7	18.0	41.7	
Total Split (%)	38.4%	38.4%		38.4%	38.4%	38.4%	18.6%	43.0%	43.0%	18.6%	43.0%	
Maximum Green (s)	30.0	30.0		30.0	30.0	30.0	15.0	35.0	35.0	15.0	35.0	
Yellow Time (s)	4.1	4.1		4.1	4.1	4.1	3.0	4.1	4.1	3.0	4.1	
All-Red Time (s)	3.1	3.1		3.1	3.1	3.1	0.0	2.6	2.6	0.0	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)		7.2			7.2	7.2	3.0	6.7	6.7	3.0	6.7	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Walk Time (s)	8.0	8.0		8.0	8.0	8.0		9.0	9.0		9.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0		14.0	14.0		14.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effect Green (s)		20.0			20.0	20.0	30.0	21.5	21.5	33.4	28.1	
Actuated g/C Ratio		0.31			0.31	0.31	0.47	0.33	0.33	0.52	0.44	
v/c Ratio		0.00			0.71	0.23	0.02	0.63	0.23	0.17	0.45	
Control Delay		0.0			38.1	6.3	9.4	27.0	6.2	10.2	18.0	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		0.0			38.1	6.3	9.4	27.0	6.2	10.2	18.0	
LOS		A			D	A	A	C	A	B	B	
Approach Delay					27.3			22.0			16.3	
Approach LOS					C			C			B	
90th %ile Green (s)	30.0	30.0		30.0	30.0	30.0	6.0	30.4	30.4	9.4	33.8	
90th %ile Term Code	Hold	Hold		Max	Max	Max	Min	Gap	Gap	Gap	Hold	
70th %ile Green (s)	26.9	26.9		26.9	26.9	26.9	0.0	23.9	23.9	8.1	35.0	
70th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Gap	Hold	
50th %ile Green (s)	20.4	20.4		20.4	20.4	20.4	0.0	19.1	19.1	7.0	29.1	
50th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Gap	Hold	
30th %ile Green (s)	15.5	15.5		15.5	15.5	15.5	0.0	14.7	14.7	6.0	23.7	
30th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Min	Hold	
10th %ile Green (s)	10.3	10.3		10.3	10.3	10.3	0.0	18.2	18.2	0.0	18.2	
10th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Dwell	Dwell	Skip	Dwell	
Queue Length 50th (m)		0.0			18.9	0.0	0.5	36.0	0.0	4.2	20.3	
Queue Length 95th (m)		0.0			#54.5	10.1	2.7	75.9	10.3	12.4	57.2	
Internal Link Dist (m)		68.8			151.4			102.5			49.6	
Turn Bay Length (m)						50.0	50.0		50.0	40.0		
Base Capacity (vph)		816			404	580	578	916	669	513	760	
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		0.00			0.44	0.16	0.01	0.36	0.15	0.14	0.34	

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

Future Total PM - with Ideal Sat flow 1900vphgpl

Intersection Summary	
Area Type:	Other
Cycle Length:	96.9
Actuated Cycle Length:	64.3
Natural Cycle:	70
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.71
Intersection Signal Delay:	21.5
Intersection LOS:	C
Intersection Capacity Utilization	60.8%
ICU Level of Service	B
Analysis Period (min)	15
90th %ile Actuated Cycle:	86.7
70th %ile Actuated Cycle:	75.8
50th %ile Actuated Cycle:	63.4
30th %ile Actuated Cycle:	53.1
10th %ile Actuated Cycle:	42.4
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

 Ø1	 Ø2	 Ø4
18 s	41.7 s	37.2 s
 Ø5	 Ø6	 Ø8
18 s	41.7 s	37.2 s

Lanes, Volumes, Timings

3: Montrose Road & Cameron Ct

2031 Future Total PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1	10	109	0	3	14	402	164	3	396	2
Future Volume (vph)	0	1	10	109	0	3	14	402	164	3	396	2
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1454	1579	1301	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.876				0.997				0.958		0.999	
Flt Protected					0.954				0.999			
Satd. Flow (prot)	0	1159	0	0	1363	0	0	2847	0	0	1397	0
Flt Permitted					0.954				0.999			
Satd. Flow (perm)	0	1159	0	0	1363	0	0	2847	0	0	1397	0
Link Speed (k/h)	50				50				50			
Link Distance (m)	167.1				64.9				232.7			
Travel Time (s)	12.0				4.7				16.8			
Confl. Peds. (#/hr)	1							1	2	1	1	2
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%	100%	0%	0%	0%	0%	0%	0%	3%	67%	2%	0%
Adj. Flow (vph)	0	1	11	118	0	3	15	437	178	3	430	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	12	0	0	121	0	0	630	0	0	435	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0				0.0				3.6			
Link Offset(m)	0.0				0.0				0.0			
Crosswalk Width(m)	4.8				4.8				4.8			
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.40	1.26	1.60	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control	Stop				Stop				Free		Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	52.5%				ICU Level of Service A							
Analysis Period (min)	15											

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2031 Future Total PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	910	88	271	855	358	138	224	352	340	202	97
Future Volume (vph)	113	910	88	271	855	358	138	224	352	340	202	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	85.0		0.0	60.0		35.0	60.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00			0.99		0.99		0.97	0.99	0.99	
Frt		0.987			0.956				0.850		0.952	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3481	0	1787	3372	0	1770	3574	1583	1787	3319	0
Flt Permitted	0.110			0.102			0.555			0.453		
Satd. Flow (perm)	205	3481	0	192	3372	0	1025	3574	1538	842	3319	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			60				308		65	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		337.7			182.6			114.0			232.7	
Travel Time (s)		24.3			13.1			8.2			16.8	
Confl. Peds. (#/hr)	8		7	7		8	13		15	15		13
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 (%)	2%	2%	4%	1%	2%	1%	2%	1%	2%	1%	2%	4%
Adj. Flow (vph)	123	989	96	295	929	389	150	243	383	370	220	105
Shared Lane Traffic (%)												
Lane Group Flow (vph)	123	1085	0	295	1318	0	150	243	383	370	325	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2031 Future Total PM - with Ideal Sat flow 1900vphgpl

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	8.0	8.0	6.0	8.0	
Minimum Split (s)	10.5	35.6		10.5	35.6		9.0	35.4	35.4	9.0	35.4	
Total Split (s)	20.0	43.6		20.0	43.6		19.0	32.4	32.4	19.0	32.4	
Total Split (%)	17.4%	37.9%		17.4%	37.9%		16.5%	28.2%	28.2%	16.5%	28.2%	
Maximum Green (s)	17.0	38.0		17.0	38.0		16.0	27.0	27.0	16.0	27.0	
Yellow Time (s)	3.0	3.5		3.0	3.5		3.0	3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.1		0.0	2.1		0.0	2.1	2.1	0.0	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	5.6		3.0	5.6		3.0	5.4	5.4	3.0	5.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	2.5		3.0	2.5		2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None		None	Min	Min	None	Min	
Walk Time (s)		11.0			11.0			11.0	11.0		11.0	
Flash Dont Walk (s)		19.0			19.0			19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effect Green (s)	48.0	36.3		57.4	42.7		26.9	13.5	13.5	34.2	18.1	
Actuated g/C Ratio	0.49	0.37		0.59	0.44		0.27	0.14	0.14	0.35	0.18	
v/c Ratio	0.50	0.84		0.81	0.88		0.41	0.49	0.80	0.83	0.49	
Control Delay	20.5	36.1		41.1	33.4		26.7	42.9	23.1	44.7	31.8	
Queue Delay	0.0	0.0		0.0	2.1		0.0	0.0	0.0	0.0	0.0	
Total Delay	20.5	36.1		41.1	35.4		26.7	42.9	23.1	44.7	31.8	
LOS	C	D		D	D		C	D	C	D	C	
Approach Delay		34.6			36.5			30.0			38.7	
Approach LOS		C			D			C			D	
90th %ile Green (s)	13.5	38.0		17.0	41.5		15.3	24.3	24.3	16.0	25.0	
90th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
70th %ile Green (s)	9.7	38.0		17.0	45.3		12.8	15.1	15.1	16.0	18.3	
70th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
50th %ile Green (s)	8.4	38.0		17.0	46.6		11.1	11.6	11.6	16.0	16.5	
50th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
30th %ile Green (s)	7.8	33.5		15.2	40.9		9.5	10.2	10.2	16.0	16.7	
30th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Gap	Gap	Max	Hold	
10th %ile Green (s)	6.6	33.3		11.3	38.0		7.1	8.1	8.1	13.8	14.8	
10th %ile Term Code	Gap	Hold		Gap	Max		Gap	Gap	Gap	Gap	Hold	
Queue Length 50th (m)	9.7	101.5		37.9	112.8		22.1	25.0	14.4	62.9	25.5	
Queue Length 95th (m)	26.1	#167.1		#96.3	#210.9		37.0	37.1	48.6	#102.6	41.1	
Internal Link Dist (m)		313.7			158.6			90.0			208.7	
Turn Bay Length (m)	45.0			85.0			60.0		35.0	60.0		
Base Capacity (vph)	389	1367		391	1502		457	993	650	449	970	
Starvation Cap Reductn	0	0		0	87		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.32	0.79		0.75	0.93		0.33	0.24	0.59	0.82	0.34	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2031 Future Total PM - with Ideal Sat flow 1900vphgpl

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 98.1

Natural Cycle: 95

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 35.1

Intersection LOS: D

Intersection Capacity Utilization 91.6%

ICU Level of Service F

Analysis Period (min) 15

90th %ile Actuated Cycle: 112.3

70th %ile Actuated Cycle: 103.1

50th %ile Actuated Cycle: 99.6

30th %ile Actuated Cycle: 91.9

10th %ile Actuated Cycle: 83.5

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Montrose Road & Thorold Stone Rd

 Ø1	 Ø2	 Ø3	 Ø4
19 s	32.4 s	20 s	43.6 s
 Ø5	 Ø6	 Ø7	 Ø8
19 s	32.4 s	20 s	43.6 s

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd 301-501 Rd Total PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1226	506	293	1432	0	0	0	0	298	0	171
Future Volume (vph)	0	1226	506	293	1432	0	0	0	0	298	0	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1301
Storage Length (m)	0.0		60.0	210.0		0.0	0.0		0.0	40.0		25.0
Storage Lanes	0		1	1		0	0		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3539	1583	1805	3574	0	0	0	0	3400	0	1063
Flt Permitted				0.095						0.950		
Satd. Flow (perm)	0	3539	1583	180	3574	0	0	0	0	3400	0	1063
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			375									66
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		182.6			352.3			184.1			149.0	
Travel Time (s)		13.1			25.4			13.3			10.7	
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%	2%	2%	0%	1%	0%	0%	0%	0%	3%	0%	4%
Adj. Flow (vph)	0	1333	550	318	1557	0	0	0	0	324	0	186
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1333	550	318	1557	0	0	0	0	324	0	186
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.60
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (m)		10.0	2.0	2.0	10.0					2.0		2.0
Trailing Detector (m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Position(m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Size(m)		0.6	2.0	2.0	0.6					2.0		2.0
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm	pm+pt	NA					Prot		Prot
Protected Phases		4		3	8					1		1

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd 301-Fut Rd Total PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4	8								
Detector Phase		4	4	3	8					1		1
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					10.0		10.0
Minimum Split (s)		37.0	37.0	9.0	17.0					40.0		40.0
Total Split (s)		58.0	58.0	17.0	75.0					40.0		40.0
Total Split (%)		50.4%	50.4%	14.8%	65.2%					34.8%		34.8%
Maximum Green (s)		51.0	51.0	14.0	68.0					33.0		33.0
Yellow Time (s)		4.0	4.0	3.0	4.0					4.0		4.0
All-Red Time (s)		3.0	3.0	0.0	3.0					3.0		3.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0		0.0
Total Lost Time (s)		7.0	7.0	3.0	7.0					7.0		7.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		2.2	2.2	2.5	2.2					3.2		3.2
Recall Mode		Min	Min	None	Min					None		None
Walk Time (s)		15.0	15.0							12.0		12.0
Flash Dont Walk (s)		15.0	15.0							21.0		21.0
Pedestrian Calls (#/hr)		0	0							0		0
Act Effect Green (s)		39.0	39.0	60.7	56.6					17.4		17.4
Actuated g/C Ratio		0.44	0.44	0.69	0.64					0.20		0.20
v/c Ratio		0.85	0.61	0.82	0.68					0.48		0.71
Control Delay		28.9	9.0	40.2	12.8					34.7		37.9
Queue Delay		0.1	0.0	0.0	0.0					0.0		0.0
Total Delay		29.0	9.0	40.2	12.8					34.7		37.9
LOS		C	A	D	B					C		D
Approach Delay		23.2			17.5						35.9	
Approach LOS		C			B						D	
90th %ile Green (s)		51.0	51.0	14.0	68.0					29.3		29.3
90th %ile Term Code		Max	Max	Max	Hold					Gap		Gap
70th %ile Green (s)		47.9	47.9	14.0	64.9					21.8		21.8
70th %ile Term Code		Gap	Gap	Max	Hold					Gap		Gap
50th %ile Green (s)		39.6	39.6	14.0	56.6					17.0		17.0
50th %ile Term Code		Gap	Gap	Max	Hold					Gap		Gap
30th %ile Green (s)		32.6	32.6	14.0	49.6					12.3		12.3
30th %ile Term Code		Gap	Gap	Max	Hold					Gap		Gap
10th %ile Green (s)		26.2	26.2	14.0	43.2					10.0		10.0
10th %ile Term Code		Gap	Gap	Max	Hold					Min		Min
Queue Length 50th (m)		105.1	18.4	35.3	80.7					26.4		19.9
Queue Length 95th (m)		166.9	59.2	#109.8	146.8					44.3		48.8
Internal Link Dist (m)		158.6			328.3			160.1			125.0	
Turn Bay Length (m)			60.0	210.0						40.0		25.0
Base Capacity (vph)		2107	1094	389	2829					1310		450
Starvation Cap Reductn		87	20	0	0					0		0
Spillback Cap Reductn		0	0	0	0					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		0.66	0.51	0.82	0.55					0.25		0.41
Intersection Summary												

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd 301-5-1-1 Total PM - with Ideal Sat flow 1900vphgpl

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 88.5

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 22.2

Intersection LOS: C

Intersection Capacity Utilization 73.6%

ICU Level of Service D

Analysis Period (min) 15

90th %ile Actuated Cycle: 111.3

70th %ile Actuated Cycle: 100.7

50th %ile Actuated Cycle: 87.6

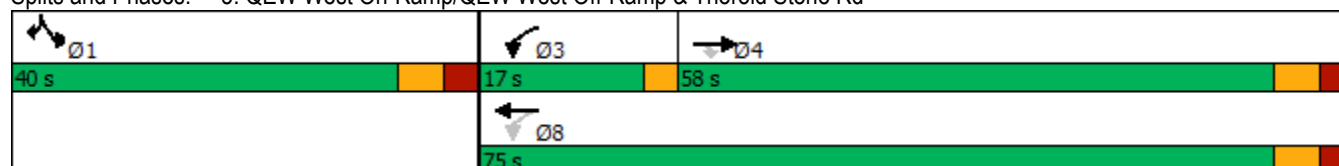
30th %ile Actuated Cycle: 75.9

10th %ile Actuated Cycle: 67.2

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

Queue shown is maximum after two cycles.

Splits and Phases: 5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2031 Future Total PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	168	1353	0	0	1219	352	455	0	292	0	0	0
Future Volume (vph)	168	1353	0	0	1219	352	455	0	292	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	210.0		0.0	0.0		15.0	35.0		45.0	0.0		0.0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						0.97						
Frt						0.850			0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1703	3539	0	0	3574	1583	3502	0	1615	0	0	0
Flt Permitted	0.097						0.950					
Satd. Flow (perm)	174	3539	0	0	3574	1537	3502	0	1615	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						87			66			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		352.3			289.2			127.3			154.2	
Travel Time (s)		25.4			20.8			9.2			11.1	
Confl. Peds. (#/hr)	5		6	6		5			1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	2%	0%	0%	1%	2%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	183	1471	0	0	1325	383	495	0	317	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	183	1471	0	0	1325	383	495	0	317	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2			2	1	1		1			
Detector Template	Left	Thru			Thru	Right	Left		Right			
Leading Detector (m)	2.0	10.0			10.0	2.0	2.0		2.0			
Trailing Detector (m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Position(m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Size(m)	2.0	0.6			0.6	2.0	2.0		2.0			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Delay (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							

Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2031 Future Total PM - with Ideal Sat flow 1900vphgpl

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA			NA	Perm	Prot		Prot			
Protected Phases	7	4			8		5		5			
Permitted Phases	4					8						
Detector Phase	7	4			8	8	5		5			
Switch Phase												
Minimum Initial (s)	6.0	10.0			10.0	10.0	10.0		10.0			
Minimum Split (s)	9.0	37.0			37.0	37.0	14.5		14.5			
Total Split (s)	19.0	76.0			57.0	57.0	39.0		39.0			
Total Split (%)	16.5%	66.1%			49.6%	49.6%	33.9%		33.9%			
Maximum Green (s)	16.0	69.0			50.0	50.0	34.5		34.5			
Yellow Time (s)	3.0	4.0			4.0	4.0	3.5		3.5			
All-Red Time (s)	0.0	3.0			3.0	3.0	1.0		1.0			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Total Lost Time (s)	3.0	7.0			7.0	7.0	4.5		4.5			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	2.5	5.0			5.0	5.0	3.0		3.0			
Recall Mode	None	Min			Min	Min	None		None			
Walk Time (s)		15.0			15.0	15.0						
Flash Dont Walk (s)		15.0			15.0	15.0						
Pedestrian Calls (#/hr)		0			0	0						
Act Effct Green (s)	65.2	61.0			46.2	46.2	21.5		21.5			
Actuated g/C Ratio	0.69	0.65			0.49	0.49	0.23		0.23			
v/c Ratio	0.59	0.64			0.76	0.48	0.62		0.76			
Control Delay	21.5	12.5			24.5	16.0	36.9		39.8			
Queue Delay	0.0	0.0			0.0	0.0	0.0		0.0			
Total Delay	21.5	12.5			24.5	16.0	36.9		39.8			
LOS	C	B			C	B	D		D			
Approach Delay		13.5			22.6			38.0				
Approach LOS		B			C			D				
90th %ile Green (s)	16.0	69.0			50.0	50.0	33.3		33.3			
90th %ile Term Code	Max	Max			Max	Max	Gap		Gap			
70th %ile Green (s)	14.6	67.6			50.0	50.0	26.2		26.2			
70th %ile Term Code	Gap	Hold			Max	Max	Gap		Gap			
50th %ile Green (s)	11.9	64.9			50.0	50.0	21.5		21.5			
50th %ile Term Code	Gap	Hold			Max	Max	Gap		Gap			
30th %ile Green (s)	9.6	58.5			45.9	45.9	16.5		16.5			
30th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
10th %ile Green (s)	7.5	44.1			33.6	33.6	12.8		12.8			
10th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
Queue Length 50th (m)	11.8	79.5			103.2	35.2	46.4		47.8			
Queue Length 95th (m)	41.2	139.4			174.0	79.2	65.6		82.1			
Internal Link Dist (m)		328.3			265.2			103.3			130.2	
Turn Bay Length (m)	210.0					15.0	35.0		45.0			
Base Capacity (vph)	387	2664			1954	879	1321		650			
Starvation Cap Reductn	0	0			0	0	0		0			
Spillback Cap Reductn	0	0			0	0	0		0			
Storage Cap Reductn	0	0			0	0	0		0			
Reduced v/c Ratio	0.47	0.55			0.68	0.44	0.37		0.49			

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 94.4

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 22.0

Intersection LOS: C

Intersection Capacity Utilization 73.6%

ICU Level of Service D

Analysis Period (min) 15

90th %ile Actuated Cycle: 113.8

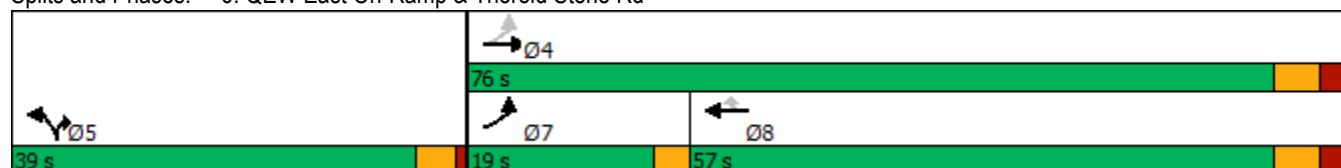
70th %ile Actuated Cycle: 105.3

50th %ile Actuated Cycle: 97.9

30th %ile Actuated Cycle: 86.5

10th %ile Actuated Cycle: 68.4

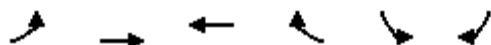
Splits and Phases: 6: QEW East On-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

8: Access Opp Southwood Dr & Site Access #2

2031 Future Total PM - with Ideal Sat flow 1900vphgpl



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	29	0	0	0	0	20
Future Volume (vph)	29	0	0	0	0	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected		0.950				
Satd. Flow (prot)	0	1770	1863	0	1611	0
Flt Permitted		0.950				
Satd. Flow (perm)	0	1770	1863	0	1611	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		175.4	35.0		70.7	
Travel Time (s)		12.6	2.5		5.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	0	0	0	0	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	32	0	0	22	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control		Stop	Stop		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 13.3% ICU Level of Service A

Analysis Period (min) 15

Lanes, Volumes, Timings

1: Montrose Road & Mt Carmel Blvd

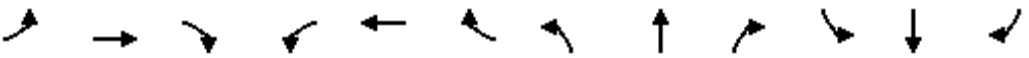
2036 Future Total PM -with Ideal Sat flow 1900vphgpl & LT adj

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	47	0	0	0	58	318	0	0	250	6
Future Volume (vph)	4	0	47	0	0	0	58	318	0	0	250	6
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1900	1433	1900	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.875									0.997	
Flt Protected		0.996						0.992				
Satd. Flow (prot)	0	1249	0	0	1433	0	0	1398	0	0	1401	0
Flt Permitted		0.996						0.992				
Satd. Flow (perm)	0	1249	0	0	1433	0	0	1398	0	0	1401	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		97.9			84.1			51.6			220.4	
Travel Time (s)		7.0			6.1			3.7			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Adj. Flow (vph)	4	0	51	0	0	0	63	346	0	0	272	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	55	0	0	0	0	0	409	0	0	279	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	58.5%						ICU Level of Service B					
Analysis Period (min)	15											

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

2016 Future TDR PM -with Ideal Sat flow 1900vphgpl & LT adj

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	177	1	92	7	329	98	71	254	3
Future Volume (vph)	1	0	1	177	1	92	7	329	98	71	254	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1178	1301	1454	1579	1301	1454	1338	1900
Storage Length (m)	0.0		0.0	0.0		50.0	50.0		50.0	40.0		0.0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00		1.00		0.98	1.00	1.00	
Frt		0.932				0.850			0.850		0.998	
Flt Protected		0.976			0.953		0.950			0.950		
Satd. Flow (prot)	0	1709	0	0	1069	1074	1381	1579	1106	1381	1309	0
Flt Permitted		0.899			0.727		0.588			0.398		
Satd. Flow (perm)	0	1574	0	0	814	1074	853	1579	1081	578	1309	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		75				100			107			1
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		92.8			175.4			126.5			73.6	
Travel Time (s)		6.7			12.6			9.1			5.3	
Confl. Peds. (#/hr)			1	1			2		1	1		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	5%	0%	3%	0%	0%	0%	0%	2%	0%
Adj. Flow (vph)	1	0	1	192	1	100	8	358	107	77	276	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2	0	0	193	100	8	358	107	77	279	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.80	1.60	1.40	1.26	1.60	1.40	1.55	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

2016-5-10 PM -with Ideal Sat flow 1900vphgpl & LT adj

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	6.0	10.0	10.0	6.0	10.0	
Minimum Split (s)	28.2	28.2		28.2	28.2	28.2	12.0	29.7	29.7	10.5	29.7	
Total Split (s)	37.2	37.2		37.2	37.2	37.2	18.0	41.7	41.7	18.0	41.7	
Total Split (%)	38.4%	38.4%		38.4%	38.4%	38.4%	18.6%	43.0%	43.0%	18.6%	43.0%	
Maximum Green (s)	30.0	30.0		30.0	30.0	30.0	15.0	35.0	35.0	15.0	35.0	
Yellow Time (s)	4.1	4.1		4.1	4.1	4.1	3.0	4.1	4.1	3.0	4.1	
All-Red Time (s)	3.1	3.1		3.1	3.1	3.1	0.0	2.6	2.6	0.0	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)		7.2			7.2	7.2	3.0	6.7	6.7	3.0	6.7	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Walk Time (s)	8.0	8.0		8.0	8.0	8.0		9.0	9.0		9.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0		14.0	14.0		14.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effect Green (s)		21.9			21.9	21.9	30.6	22.1	22.1	34.1	28.7	
Actuated g/C Ratio		0.33			0.33	0.33	0.46	0.33	0.33	0.51	0.43	
v/c Ratio		0.00			0.73	0.24	0.02	0.69	0.25	0.20	0.50	
Control Delay		0.0			40.2	6.2	9.6	29.6	6.1	10.8	19.2	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		0.0			40.2	6.2	9.6	29.6	6.1	10.8	19.2	
LOS		A			D	A	A	C	A	B	B	
Approach Delay					28.6			24.0			17.4	
Approach LOS					C			C			B	
90th %ile Green (s)	30.0	30.0		30.0	30.0	30.0	6.0	32.8	32.8	9.7	36.5	
90th %ile Term Code	Hold	Hold		Max	Max	Max	Min	Gap	Gap	Gap	Hold	
70th %ile Green (s)	30.0	30.0		30.0	30.0	30.0	0.0	25.8	25.8	8.3	37.1	
70th %ile Term Code	Hold	Hold		Max	Max	Max	Skip	Gap	Gap	Gap	Hold	
50th %ile Green (s)	23.1	23.1		23.1	23.1	23.1	0.0	21.3	21.3	7.3	31.6	
50th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Gap	Hold	
30th %ile Green (s)	17.5	17.5		17.5	17.5	17.5	0.0	16.2	16.2	6.2	25.4	
30th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Gap	Gap	Gap	Hold	
10th %ile Green (s)	11.2	11.2		11.2	11.2	11.2	0.0	14.5	14.5	0.0	14.5	
10th %ile Term Code	Hold	Hold		Gap	Gap	Gap	Skip	Dwell	Dwell	Skip	Dwell	
Queue Length 50th (m)		0.0			22.2	0.0	0.5	42.5	0.0	5.0	24.3	
Queue Length 95th (m)		0.0			#63.6	10.8	2.7	82.3	10.6	13.0	61.6	
Internal Link Dist (m)		68.8			151.4			102.5			49.6	
Turn Bay Length (m)						50.0	50.0		50.0	40.0		
Base Capacity (vph)		803			395	572	561	894	658	488	753	
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		0.00			0.49	0.17	0.01	0.40	0.16	0.16	0.37	

Lanes, Volumes, Timings

2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

2016-5-10 PM -with Ideal Sat flow 1900vphgpl & LT adj

Intersection Summary	
Area Type:	Other
Cycle Length:	96.9
Actuated Cycle Length:	67.1
Natural Cycle:	70
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.73
Intersection Signal Delay:	23.1
Intersection LOS:	C
Intersection Capacity Utilization	63.5%
ICU Level of Service	B
Analysis Period (min)	15
90th %ile Actuated Cycle:	89.4
70th %ile Actuated Cycle:	81
50th %ile Actuated Cycle:	68.6
30th %ile Actuated Cycle:	56.8
10th %ile Actuated Cycle:	39.6
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 2: Montrose Road & South Wood Dr/Access Opp Southwood Dr

 Ø1	 Ø2	 Ø4
18 s	41.7 s	37.2 s
 Ø5	 Ø6	 Ø8
18 s	41.7 s	37.2 s

Lanes, Volumes, Timings

3: Montrose Road & Cameron Ct

2036 Future Total PM -with Ideal Sat flow 1900vphgpl & LT adj

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1	11	119	0	4	15	430	179	4	426	3
Future Volume (vph)	0	1	11	119	0	4	15	430	179	4	426	3
Ideal Flow (vphpl)	1900	1433	1900	1900	1433	1900	1454	1579	1301	1900	1433	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.875			0.996			0.957			0.999	
Flt Protected					0.954			0.999				
Satd. Flow (prot)	0	1164	0	0	1362	0	0	2844	0	0	1396	0
Flt Permitted					0.954			0.999				
Satd. Flow (perm)	0	1164	0	0	1362	0	0	2844	0	0	1396	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		167.1			64.9			232.7			126.5	
Travel Time (s)		12.0			4.7			16.8			9.1	
Confl. Peds. (#/hr)	1					1	2		1	1		2
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%	100%	0%	0%	0%	0%	0%	0%	3%	67%	2%	0%
Adj. Flow (vph)	0	1	12	129	0	4	16	467	195	4	463	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	13	0	0	133	0	0	678	0	0	470	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.42	1.00	1.00	1.42	1.00	1.40	1.26	1.60	1.00	1.42	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 56.6%	ICU Level of Service B											
Analysis Period (min) 15												

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2036 Future Total PM -with Ideal Sat flow 1900vphpl & LT adj

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	121	990	95	295	930	385	150	243	383	367	219	105
Future Volume (vph)	121	990	95	295	930	385	150	243	383	367	219	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	85.0		0.0	60.0		35.0	60.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00			0.99		0.99		0.97	0.99	0.99	
Frt		0.987			0.956				0.850		0.951	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3481	0	1787	3372	0	1770	3574	1583	1787	3316	0
Flt Permitted	0.105			0.097			0.541			0.433		
Satd. Flow (perm)	196	3481	0	182	3372	0	999	3574	1538	805	3316	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			59				299		66	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		337.7			182.6			114.0			232.7	
Travel Time (s)		24.3			13.1			8.2			16.8	
Confl. Peds. (#/hr)	8		7	7		8	13		15	15		13
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 (%)	2%	2%	4%	1%	2%	1%	2%	1%	2%	1%	2%	4%
Adj. Flow (vph)	132	1076	103	321	1011	418	163	264	416	399	238	114
Shared Lane Traffic (%)												
Lane Group Flow (vph)	132	1179	0	321	1429	0	163	264	416	399	352	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2036 Future Total PM -with Ideal Sat flow 1900vphgpl & LT adj

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	8.0	8.0	6.0	8.0	
Minimum Split (s)	10.5	35.6		10.5	35.6		9.0	35.4	35.4	9.0	35.4	
Total Split (s)	20.0	43.6		20.0	43.6		19.0	32.4	32.4	19.0	32.4	
Total Split (%)	17.4%	37.9%		17.4%	37.9%		16.5%	28.2%	28.2%	16.5%	28.2%	
Maximum Green (s)	17.0	38.0		17.0	38.0		16.0	27.0	27.0	16.0	27.0	
Yellow Time (s)	3.0	3.5		3.0	3.5		3.0	3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.1		0.0	2.1		0.0	2.1	2.1	0.0	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	5.6		3.0	5.6		3.0	5.4	5.4	3.0	5.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	2.5		3.0	2.5		2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None		None	Min	Min	None	Min	
Walk Time (s)		11.0			11.0			11.0	11.0		11.0	
Flash Dont Walk (s)		19.0			19.0			19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effect Green (s)	50.3	38.2		60.4	45.4		29.8	15.8	15.8	36.6	20.2	
Actuated g/C Ratio	0.48	0.37		0.58	0.44		0.29	0.15	0.15	0.35	0.19	
v/c Ratio	0.55	0.92		0.88	0.95		0.44	0.49	0.85	0.92	0.50	
Control Delay	24.2	44.4		52.2	42.6		27.2	42.8	29.7	56.2	32.9	
Queue Delay	0.0	0.0		0.0	6.7		0.0	0.0	0.0	0.0	0.0	
Total Delay	24.2	44.4		52.2	49.3		27.2	42.8	29.7	56.2	32.9	
LOS	C	D		D	D		C	D	C	E	C	
Approach Delay		42.4			49.9			33.3			45.3	
Approach LOS		D			D			C			D	
90th %ile Green (s)	14.5	38.0		17.0	40.5		16.0	27.0	27.0	16.0	27.0	
90th %ile Term Code	Gap	Max		Max	Hold		Max	Max	Max	Max	Hold	
70th %ile Green (s)	10.8	38.0		17.0	44.2		13.5	20.4	20.4	16.0	22.9	
70th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
50th %ile Green (s)	8.8	38.0		17.0	46.2		11.7	13.8	13.8	16.0	18.1	
50th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
30th %ile Green (s)	7.7	38.0		17.0	47.3		10.0	10.8	10.8	16.0	16.8	
30th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
10th %ile Green (s)	6.5	38.0		15.4	46.9		7.7	8.8	8.8	16.0	17.1	
10th %ile Term Code	Gap	Max		Gap	Hold		Gap	Gap	Gap	Max	Hold	
Queue Length 50th (m)	11.2	119.6		47.0	137.4		24.2	27.3	23.8	69.2	28.5	
Queue Length 95th (m)	31.0	#199.5		#117.2	#252.7		39.8	39.9	63.0	#94.9	44.9	
Internal Link Dist (m)		313.7			158.6			90.0			208.7	
Turn Bay Length (m)	45.0			85.0			60.0		35.0	60.0		
Base Capacity (vph)	367	1285		369	1506		449	933	622	436	914	
Starvation Cap Reductn	0	0		0	71		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.36	0.92		0.87	1.00		0.36	0.28	0.67	0.92	0.39	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2036 Future Total PM -with Ideal Sat flow 1900vphgpl & LT adj

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 103.8

Natural Cycle: 105

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 44.0

Intersection LOS: D

Intersection Capacity Utilization 96.9%

ICU Level of Service F

Analysis Period (min) 15

90th %ile Actuated Cycle: 115

70th %ile Actuated Cycle: 108.4

50th %ile Actuated Cycle: 101.8

30th %ile Actuated Cycle: 98.8

10th %ile Actuated Cycle: 95.2

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Montrose Road & Thorold Stone Rd

 Ø1	 Ø2	 Ø3	 Ø4
19 s	32.4 s	20 s	43.6 s
 Ø5	 Ø6	 Ø7	 Ø8
19 s	32.4 s	20 s	43.6 s

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd -with Ideal Sat flow 1900vphgpl & LT adj

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗	↖	↑↑					↖↗		↗
Traffic Volume (vph)	0	1375	568	329	1605	0	0	0	0	335	0	191
Future Volume (vph)	0	1375	568	329	1605	0	0	0	0	335	0	191
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		60.0	210.0		0.0	0.0		0.0	40.0		25.0
Storage Lanes	0		1	1		0	0		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3539	1583	1805	3574	0	0	0	0	3400	0	1553
Flt Permitted				0.081						0.950		
Satd. Flow (perm)	0	3539	1583	154	3574	0	0	0	0	3400	0	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			375									66
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		182.6			352.3			184.1			149.0	
Travel Time (s)		13.1			25.4			13.3			10.7	
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%	2%	2%	0%	1%	0%	0%	0%	0%	3%	0%	4%
Adj. Flow (vph)	0	1495	617	358	1745	0	0	0	0	364	0	208
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1495	617	358	1745	0	0	0	0	364	0	208
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (m)		10.0	2.0	2.0	10.0					2.0		2.0
Trailing Detector (m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Position(m)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Size(m)		0.6	2.0	2.0	0.6					2.0		2.0
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Perm	pm+pt	NA					Prot		Prot
Protected Phases		4		3	8					1		1

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd -with Ideal Sat flow 1900vphgpl & LT adj

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4	8								
Detector Phase		4	4	3	8					1		1
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					10.0		10.0
Minimum Split (s)		37.0	37.0	9.0	17.0					40.0		40.0
Total Split (s)		58.0	58.0	17.0	75.0					40.0		40.0
Total Split (%)		50.4%	50.4%	14.8%	65.2%					34.8%		34.8%
Maximum Green (s)		51.0	51.0	14.0	68.0					33.0		33.0
Yellow Time (s)		4.0	4.0	3.0	4.0					4.0		4.0
All-Red Time (s)		3.0	3.0	0.0	3.0					3.0		3.0
Lost Time Adjust (s)		0.0	0.0	-2.0	0.0					0.0		0.0
Total Lost Time (s)		7.0	7.0	1.0	7.0					7.0		7.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		2.2	2.2	2.5	2.2					3.2		3.2
Recall Mode		Min	Min	None	Min					None		None
Walk Time (s)		15.0	15.0							12.0		12.0
Flash Dont Walk (s)		15.0	15.0							21.0		21.0
Pedestrian Calls (#/hr)		0	0							0		0
Act Effect Green (s)		46.1	46.1	69.4	63.3					16.2		16.2
Actuated g/C Ratio		0.49	0.49	0.74	0.68					0.17		0.17
v/c Ratio		0.86	0.64	0.90	0.72					0.62		0.64
Control Delay		27.4	9.8	52.1	12.3					41.4		34.8
Queue Delay		1.2	0.2	0.0	0.0					0.0		0.0
Total Delay		28.5	10.0	52.1	12.3					41.4		34.8
LOS		C	B	D	B					D		C
Approach Delay		23.1			19.0						39.0	
Approach LOS		C			B						D	
90th %ile Green (s)		51.0	51.0	14.0	68.0					23.3		23.3
90th %ile Term Code		Max	Max	Max	Hold					Gap		Gap
70th %ile Green (s)		51.0	51.0	14.0	68.0					17.6		17.6
70th %ile Term Code		Max	Max	Max	Hold					Gap		Gap
50th %ile Green (s)		50.3	50.3	14.0	67.3					15.8		15.8
50th %ile Term Code		Gap	Gap	Max	Hold					Gap		Gap
30th %ile Green (s)		43.6	43.6	14.0	60.6					14.1		14.1
30th %ile Term Code		Gap	Gap	Max	Hold					Gap		Gap
10th %ile Green (s)		35.6	35.6	14.0	52.6					11.4		11.4
10th %ile Term Code		Gap	Gap	Max	Hold					Gap		Gap
Queue Length 50th (m)		123.7	27.9	50.1	95.2					35.1		26.4
Queue Length 95th (m)		180.6	72.9	#119.3	154.0					50.2		50.9
Internal Link Dist (m)		158.6			328.3			160.1			125.0	
Turn Bay Length (m)			60.0	210.0						40.0		25.0
Base Capacity (vph)		1946	1039	399	2621					1210		595
Starvation Cap Reductn		231	66	0	0					0		0
Spillback Cap Reductn		0	0	0	0					0		0
Storage Cap Reductn		0	0	0	0					0		0
Reduced v/c Ratio		0.87	0.63	0.90	0.67					0.30		0.35
Intersection Summary												

Lanes, Volumes, Timings

5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd -with Ideal Sat flow 1900vphgpl & LT adj

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 93.7

Natural Cycle: 110

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 23.2

Intersection LOS: C

Intersection Capacity Utilization 80.8%

ICU Level of Service D

Analysis Period (min) 15

90th %ile Actuated Cycle: 105.3

70th %ile Actuated Cycle: 99.6

50th %ile Actuated Cycle: 97.1

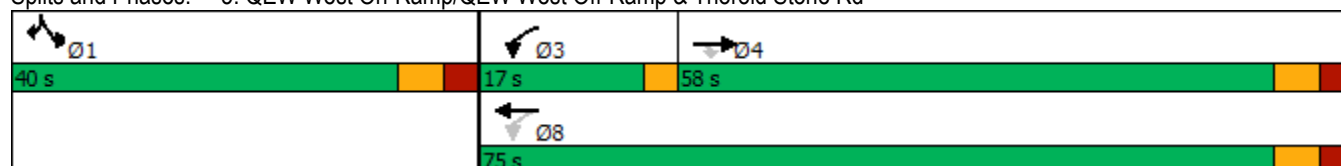
30th %ile Actuated Cycle: 88.7

10th %ile Actuated Cycle: 78

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

Queue shown is maximum after two cycles.

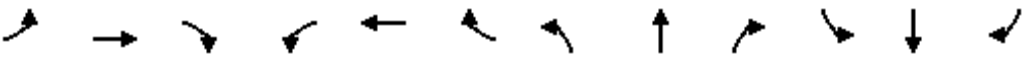
Splits and Phases: 5: QEW West On-Ramp/QEW West Off-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2036 Future Total PM -with Ideal Sat flow 1900vphgpl & LT adj

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	188	1518	0	0	1367	396	510	0	328	0	0	0
Future Volume (vph)	188	1518	0	0	1367	396	510	0	328	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	210.0		0.0	0.0		15.0	35.0		45.0	0.0		0.0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						0.97						
Frt						0.850			0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1703	3539	0	0	3574	1583	3502	0	1615	0	0	0
Flt Permitted	0.075						0.950					
Satd. Flow (perm)	134	3539	0	0	3574	1537	3502	0	1615	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						88			66			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		352.3			289.2			127.3			154.2	
Travel Time (s)		25.4			20.8			9.2			11.1	
Confl. Peds. (#/hr)	5		6	6		5			1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	2%	0%	0%	1%	2%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	204	1650	0	0	1486	430	554	0	357	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	204	1650	0	0	1486	430	554	0	357	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2			2	1	1		1			
Detector Template	Left	Thru			Thru	Right	Left		Right			
Leading Detector (m)	2.0	10.0			10.0	2.0	2.0		2.0			
Trailing Detector (m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Position(m)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Size(m)	2.0	0.6			0.6	2.0	2.0		2.0			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Delay (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							

Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2036 Future Total PM -with Ideal Sat flow 1900vphgpl & LT adj

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA			NA	Perm	Prot		Prot			
Protected Phases	7	4			8		5		5			
Permitted Phases	4					8						
Detector Phase	7	4			8	8	5		5			
Switch Phase												
Minimum Initial (s)	6.0	10.0			10.0	10.0	10.0		10.0			
Minimum Split (s)	9.0	37.0			37.0	37.0	14.5		14.5			
Total Split (s)	19.0	76.0			57.0	57.0	39.0		39.0			
Total Split (%)	16.5%	66.1%			49.6%	49.6%	33.9%		33.9%			
Maximum Green (s)	16.0	69.0			50.0	50.0	34.5		34.5			
Yellow Time (s)	3.0	4.0			4.0	4.0	3.5		3.5			
All-Red Time (s)	0.0	3.0			3.0	3.0	1.0		1.0			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Total Lost Time (s)	3.0	7.0			7.0	7.0	4.5		4.5			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	2.5	5.0			5.0	5.0	3.0		3.0			
Recall Mode	None	Min			Min	Min	None		None			
Walk Time (s)		15.0			15.0	15.0						
Flash Dont Walk (s)		15.0			15.0	15.0						
Pedestrian Calls (#/hr)		0			0	0						
Act Effct Green (s)	69.5	65.4			50.0	50.0	24.3		24.3			
Actuated g/C Ratio	0.69	0.64			0.49	0.49	0.24		0.24			
v/c Ratio	0.72	0.72			0.84	0.54	0.66		0.82			
Control Delay	36.4	15.4			29.9	18.7	38.7		45.3			
Queue Delay	0.0	0.0			0.0	0.0	0.0		0.0			
Total Delay	36.4	15.4			29.9	18.7	38.7		45.3			
LOS	D	B			C	B	D		D			
Approach Delay		17.7			27.4			41.3				
Approach LOS		B			C			D				
90th %ile Green (s)	16.0	69.0			50.0	50.0	34.5		34.5			
90th %ile Term Code	Max	Max			Max	Max	Max		Max			
70th %ile Green (s)	16.0	69.0			50.0	50.0	30.4		30.4			
70th %ile Term Code	Max	Max			Max	Max	Gap		Gap			
50th %ile Green (s)	13.1	66.1			50.0	50.0	25.6		25.6			
50th %ile Term Code	Gap	Hold			Max	Max	Gap		Gap			
30th %ile Green (s)	10.1	63.1			50.0	50.0	19.1		19.1			
30th %ile Term Code	Gap	Hold			Max	Max	Gap		Gap			
10th %ile Green (s)	7.9	58.0			47.1	47.1	14.5		14.5			
10th %ile Term Code	Gap	Hold			Gap	Gap	Gap		Gap			
Queue Length 50th (m)	24.0	112.6			140.5	48.2	53.9		58.3			
Queue Length 95th (m)	55.2	175.9			#228.6	95.3	73.8		95.7			
Internal Link Dist (m)		328.3			265.2			103.3			130.2	
Turn Bay Length (m)	210.0					15.0	35.0		45.0			
Base Capacity (vph)	342	2441			1786	812	1207		600			
Starvation Cap Reductn	0	0			0	0	0		0			
Spillback Cap Reductn	0	0			0	0	0		0			
Storage Cap Reductn	0	0			0	0	0		0			
Reduced v/c Ratio	0.60	0.68			0.83	0.53	0.46		0.59			

Lanes, Volumes, Timings

6: QEW East On-Ramp & Thorold Stone Rd

2036 Future Total PM -with Ideal Sat flow 1900vphgpl & LT adj

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 101.4

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 26.3

Intersection LOS: C

Intersection Capacity Utilization 80.8%

ICU Level of Service D

Analysis Period (min) 15

90th %ile Actuated Cycle: 115

70th %ile Actuated Cycle: 110.9

50th %ile Actuated Cycle: 103.2

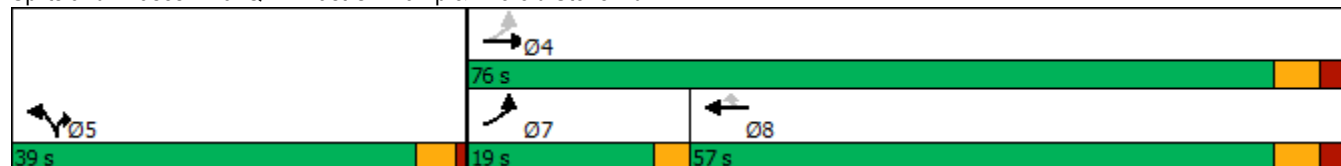
30th %ile Actuated Cycle: 93.7

10th %ile Actuated Cycle: 84

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

Queue shown is maximum after two cycles.

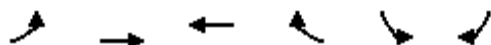
Splits and Phases: 6: QEW East On-Ramp & Thorold Stone Rd



Lanes, Volumes, Timings

8: Access Opp Southwood Dr & Site Access #2

2036 Future Total PM -with Ideal Sat flow 1900vphgpl & LT adj



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	29	0	0	0	0	20
Future Volume (vph)	29	0	0	0	0	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected	0.950					
Satd. Flow (prot)	0	1770	1863	0	1611	0
Flt Permitted	0.950					
Satd. Flow (perm)	0	1770	1863	0	1611	0
Link Speed (k/h)	50		50	50		
Link Distance (m)	175.4		35.0	70.7		
Travel Time (s)	12.6		2.5	5.1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	0	0	0	0	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	32	0	0	22	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)	0.0		0.0	3.6		
Link Offset(m)	0.0		0.0	0.0		
Crosswalk Width(m)	4.8		4.8	4.8		
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	100			100	100	100
Sign Control	Stop		Stop	Stop		
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utilization 13.3%				ICU Level of Service A		
Analysis Period (min) 15						

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2031 Future Total PM -with Ideal Sat flow 1900vphgpl, PHF & LT adj

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	910	88	271	855	358	138	224	352	340	202	97
Future Volume (vph)	113	910	88	271	855	358	138	224	352	340	202	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	85.0		0.0	60.0		35.0	60.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00		1.00	0.99		0.99		0.97	0.99	0.99	
Frt		0.986			0.956				0.850		0.950	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3477	0	1787	3372	0	1770	3574	1583	1787	3311	0
Flt Permitted	0.109			0.101			0.559			0.443		
Satd. Flow (perm)	203	3477	0	190	3372	0	1031	3574	1538	824	3311	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			60				357		66	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		337.7			182.6			114.0			232.7	
Travel Time (s)		24.3			13.1			8.2			16.8	
Confl. Peds. (#/hr)	8		7	7		8	13		15	15		13
Peak Hour Factor	0.93	0.96	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.95	0.92
Heavy Vehicles (%)	2%	2%	4%	1%	2%	1%	2%	1%	2%	1%	2%	4%
Adj. Flow (vph)	122	948	96	295	929	389	150	236	383	370	213	105
Shared Lane Traffic (%)												
Lane Group Flow (vph)	122	1044	0	295	1318	0	150	236	383	370	318	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2031 Future Total PM -with Ideal Sat flow 1900vphgpl, PHF & LT adj

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	8.0	8.0	6.0	8.0	
Minimum Split (s)	10.5	35.6		10.5	35.6		9.0	35.4	35.4	9.0	35.4	
Total Split (s)	24.4	43.6		24.4	43.6		19.0	25.0	25.0	22.0	28.0	
Total Split (%)	21.2%	37.9%		21.2%	37.9%		16.5%	21.7%	21.7%	19.1%	24.3%	
Maximum Green (s)	21.4	38.0		21.4	38.0		16.0	19.6	19.6	19.0	22.6	
Yellow Time (s)	3.0	3.5		3.0	3.5		3.0	3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.1		0.0	2.1		0.0	2.1	2.1	0.0	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	5.6		3.0	5.6		3.0	5.4	5.4	3.0	5.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	2.5		3.0	2.5		2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None		None	Min	Min	None	Min	
Walk Time (s)		11.0			11.0			11.0	11.0		11.0	
Flash Dont Walk (s)		19.0			19.0			19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effect Green (s)	48.6	36.6		58.3	43.3		26.0	12.3	12.3	35.7	19.0	
Actuated g/C Ratio	0.49	0.37		0.58	0.43		0.26	0.12	0.12	0.36	0.19	
v/c Ratio	0.50	0.82		0.80	0.88		0.43	0.54	0.76	0.79	0.47	
Control Delay	22.1	36.5		40.0	34.2		28.0	47.0	17.2	41.1	32.0	
Queue Delay	0.0	0.0		0.0	2.6		0.0	0.0	0.0	0.0	0.0	
Total Delay	22.1	36.5		40.0	36.8		28.0	47.0	17.2	41.1	32.0	
LOS	C	D		D	D		C	D	B	D	C	
Approach Delay		35.0			37.4			28.4			36.9	
Approach LOS		C			D			C			D	
90th %ile Green (s)	13.8	38.0		21.4	45.6		16.0	19.6	19.6	19.0	22.6	
90th %ile Term Code	Gap	Max		Max	Hold		Max	Max	Max	Max	Hold	
70th %ile Green (s)	10.2	38.0		21.0	48.8		13.3	13.3	13.3	19.0	19.0	
70th %ile Term Code	Gap	Max		Gap	Hold		Gap	Gap	Gap	Max	Hold	
50th %ile Green (s)	8.8	37.3		17.1	45.6		11.4	11.7	11.7	19.0	19.3	
50th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Gap	Gap	Max	Hold	
30th %ile Green (s)	8.1	32.5		13.6	38.0		9.4	10.1	10.1	19.0	19.7	
30th %ile Term Code	Gap	Hold		Gap	Max		Gap	Gap	Gap	Max	Hold	
10th %ile Green (s)	6.6	35.4		9.2	38.0		7.1	8.0	8.0	13.6	14.5	
10th %ile Term Code	Gap	Hold		Gap	Max		Gap	Min	Min	Gap	Hold	
Queue Length 50th (m)	10.5	101.6		40.3	121.4		21.9	24.9	5.0	62.3	24.5	
Queue Length 95th (m)	26.9	#162.7		#80.3	#203.5		39.5	39.1	37.4	#103.8	42.2	
Internal Link Dist (m)		313.7			158.6			90.0			208.7	
Turn Bay Length (m)	45.0			85.0			60.0		35.0	60.0		
Base Capacity (vph)	455	1342		456	1492		437	708	591	478	808	
Starvation Cap Reductn	0	0		0	93		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.27	0.78		0.65	0.94		0.34	0.33	0.65	0.77	0.39	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2031 Future Total PM -with Ideal Sat flow 1900vphgpl, PHF & LT adj

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 100.2

Natural Cycle: 95

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 35.0

Intersection LOS: D

Intersection Capacity Utilization 91.6%

ICU Level of Service F

Analysis Period (min) 15

90th %ile Actuated Cycle: 115

70th %ile Actuated Cycle: 108.3

50th %ile Actuated Cycle: 102.1

30th %ile Actuated Cycle: 92.2

10th %ile Actuated Cycle: 83.2

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Montrose Road & Thorold Stone Rd

 Ø1	 Ø2	 Ø3	 Ø4
22 s	25 s	24.4 s	43.6 s
 Ø5	 Ø6	 Ø7	 Ø8
19 s	28 s	24.4 s	43.6 s

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

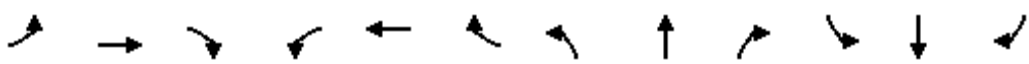
2036 Future Total PM -with Ideal Sat flow 1900vphgpl, PHF & LT adj

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	121	990	95	295	930	385	150	243	383	367	219	105
Future Volume (vph)	121	990	95	295	930	385	150	243	383	367	219	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	85.0		0.0	60.0		35.0	60.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor		1.00			0.99		0.99		0.97	0.99	0.99	
Frt		0.986			0.956				0.850		0.950	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3477	0	1787	3372	0	1770	3574	1583	1787	3311	0
Flt Permitted	0.107			0.099			0.545			0.413		
Satd. Flow (perm)	199	3477	0	186	3372	0	1006	3574	1538	768	3311	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			59				356		65	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		337.7			182.6			114.0			232.7	
Travel Time (s)		24.3			13.1			8.2			16.8	
Confl. Peds. (#/hr)	8		7	7		8	13		15	15		13
Peak Hour Factor	0.93	0.96	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.95	0.92
Heavy Vehicles (%)	2%	2%	4%	1%	2%	1%	2%	1%	2%	1%	2%	4%
Adj. Flow (vph)	130	1031	103	321	1011	418	163	256	416	399	231	114
Shared Lane Traffic (%)												
Lane Group Flow (vph)	130	1134	0	321	1429	0	163	256	416	399	345	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2036 Future Total PM -with Ideal Sat flow 1900vphgpl, PHF & LT adj

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	8.0	8.0	6.0	8.0	
Minimum Split (s)	10.5	35.6		10.5	35.6		9.0	35.4	35.4	9.0	35.4	
Total Split (s)	25.4	43.6		25.4	43.6		19.0	24.0	24.0	22.0	27.0	
Total Split (%)	22.1%	37.9%		22.1%	37.9%		16.5%	20.9%	20.9%	19.1%	23.5%	
Maximum Green (s)	22.4	38.0		22.4	38.0		16.0	18.6	18.6	19.0	21.6	
Yellow Time (s)	3.0	3.5		3.0	3.5		3.0	3.3	3.3	3.0	3.3	
All-Red Time (s)	0.0	2.1		0.0	2.1		0.0	2.1	2.1	0.0	2.1	
Lost Time Adjust (s)	0.0	0.0		-1.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	5.6		2.0	5.6		3.0	5.4	5.4	3.0	5.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	2.5		3.0	2.5		2.5	2.5	2.5	2.5	2.5	
Recall Mode	None	None		None	None		None	Min	Min	None	Min	
Walk Time (s)		11.0			11.0			11.0	11.0		11.0	
Flash Dont Walk (s)		19.0			19.0			19.0	19.0		19.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effct Green (s)	49.9	37.5		61.8	45.4		27.6	13.3	13.3	37.5	20.2	
Actuated g/C Ratio	0.48	0.36		0.59	0.44		0.26	0.13	0.13	0.36	0.19	
v/c Ratio	0.54	0.90		0.81	0.95		0.46	0.56	0.82	0.87	0.50	
Control Delay	25.1	43.8		41.5	43.0		29.5	48.4	22.7	49.9	34.1	
Queue Delay	0.0	0.0		0.0	17.1		0.0	0.0	0.0	0.0	0.0	
Total Delay	25.1	43.8		41.5	60.1		29.5	48.4	22.7	49.9	34.1	
LOS	C	D		D	E		C	D	C	D	C	
Approach Delay		41.8			56.7			31.9			42.6	
Approach LOS		D			E			C			D	
90th %ile Green (s)	14.5	38.0		22.4	45.9		16.0	18.6	18.6	19.0	21.6	
90th %ile Term Code	Gap	Max		Max	Hold		Max	Max	Max	Max	Hold	
70th %ile Green (s)	11.2	38.0		22.4	49.2		14.2	17.3	17.3	19.0	22.1	
70th %ile Term Code	Gap	Max		Max	Hold		Gap	Gap	Gap	Max	Hold	
50th %ile Green (s)	9.0	38.0		19.0	48.0		12.1	12.5	12.5	19.0	19.4	
50th %ile Term Code	Gap	Max		Gap	Hold		Gap	Gap	Gap	Max	Hold	
30th %ile Green (s)	8.0	38.0		15.2	45.2		10.0	10.8	10.8	19.0	19.8	
30th %ile Term Code	Gap	Max		Gap	Hold		Gap	Gap	Gap	Max	Hold	
10th %ile Green (s)	6.7	34.4		10.3	38.0		7.6	8.6	8.6	16.9	17.9	
10th %ile Term Code	Gap	Hold		Gap	Max		Gap	Gap	Gap	Gap	Hold	
Queue Length 50th (m)	11.5	119.8		47.2	142.6		25.0	28.0	12.1	71.5	28.7	
Queue Length 95th (m)	30.2	#187.3		#87.3	#232.2		43.3	42.6	51.2	#106.2	46.8	
Internal Link Dist (m)		313.7			158.6			90.0			208.7	
Turn Bay Length (m)	45.0			85.0			60.0		35.0	60.0		
Base Capacity (vph)	454	1286		473	1499		426	644	569	463	747	
Starvation Cap Reductn	0	0		0	116		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.29	0.88		0.68	1.03		0.38	0.40	0.73	0.86	0.46	

Lanes, Volumes, Timings

4: Montrose Road & Thorold Stone Rd

2036 Future Total PM -with Ideal Sat flow 1900vphgpl, PHF & LT adj

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 104.3

Natural Cycle: 105

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 45.8

Intersection LOS: D

Intersection Capacity Utilization 96.9%

ICU Level of Service F

Analysis Period (min) 15

90th %ile Actuated Cycle: 115

70th %ile Actuated Cycle: 113.7

50th %ile Actuated Cycle: 105.5

30th %ile Actuated Cycle: 100

10th %ile Actuated Cycle: 87.2

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Montrose Road & Thorold Stone Rd

 Ø1	 Ø2	 Ø3	 Ø4
22 s	24 s	25.4 s	43.6 s
 Ø5	 Ø6	 Ø7	 Ø8
19 s	27 s	25.4 s	43.6 s

APPENDIX

G

Multi-Modal Level of Service Analysis

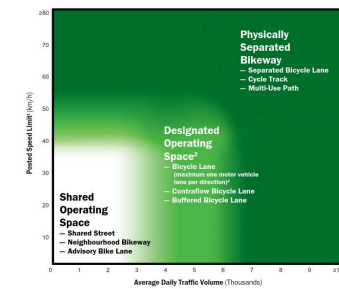
LOS AND DATA ENTRY - Use this to enter what you know and for detailed or summary results presentation

Actual	E	E			
SCENARIO: 2026					
Area Type: Neighbourhood Main Street					
MODE					
Thorold Stone Road and QEW East OFF RAMP					
Type	SIGNALIZED INTERSECTIONS				
Target (Custom if necessary)	C	C	D	D	D
Adjustment for Planning Direction	None	None	None	None	None
Reasons for adjustment (if applicable)					
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	E	E			

Active Transportation Design Check	
Are marked pedestrian crossings provided to connect all approaching pedestrian facilities?	Yes
Does the approaching bike facility continue at a consistent width up to the edge of the intersection (crosswalk or curb edge of intersecting roadway)?	No
Is a continuous amount of space and accompanying pavement makings delineated for cyclists through the intersection?	No
Does the intersection design provide features which facilitate all the intended turn movements for cyclists (e.g. bike boxes, queuing space, protected intersection, etc)?	No
Have Accessibility for Ontarians with Disabilities Act (AODA) and municipal accessibility standards (if applicable) been considered?	No

MMLOS Evaluation					
Measure 1	Enhanced Pedestrian Measures	Enhanced Bicycle Facilities	Transit Priority Measures	Average Effective Turning Radius (m)	% of Movements with Dedicated Turn Lanes
	0	0			
Measure 2	Average Effective Turning Radius (m)	Average Effective Turning Radius (m)	Transit Movement Delay (s)	Car Level of Service	Intersection Delay (s)
	13.0 - 14.9	13.0 - 14.9			
Measure 3	Signal Cycle Length (s)	Signal Cycle Length (s)	Pedestrian Level of Service	-	-
	106 - 120	106 - 120			
Measure 4	Number of Uncontrolled Conflicts (conflicts/approach)	Number of Uncontrolled Conflicts (conflicts/approach)	-	-	-
	2.1 - 2.5	2.1 - 2.5			

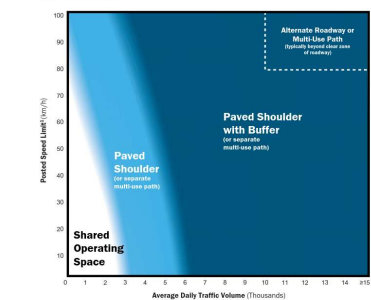
Desirable Cycling Facility Pre-Selection Nomograph
Urban/Suburban Context



- Operating speeds are assumed to be similar to posted speeds. If evidence suggests this is not the case, practitioners may consider using 85th percentile speeds or implementing measures to reduce operating speeds.
- Physically separated bikeways may obtain the designated operating space area of the nomograph.
- On corridors with two or more lanes per direction (including multi-lane one-way roads), a buffered bicycle lane should be considered the minimum with a typical facility being a physically separated bikeway.

Figure 5.5 – Desirable Cycling Facility Pre-selection Nomograph – Urban/Suburban Context

Desirable Cycling Facility Pre-Selection Nomograph
Rural Context¹



- In rural towns/villages, the urban/suburban nomograph may be used.
- Operating speeds are assumed to be similar to posted speeds. If evidence suggests this is not the case, practitioners may consider using 85th percentile speeds or implementing measures to reduce operating speeds.

Figure 5.6 – Desirable Cycling Facility Pre-selection Nomograph – Rural Context

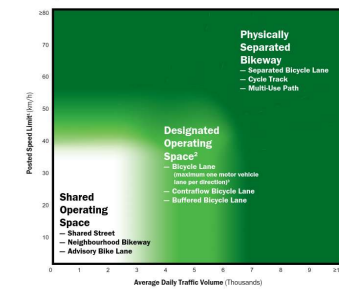
LOS AND DATA ENTRY - Use this to enter what you know and for detailed or summary results presentation

Actual	E	E			
SCENARIO: 2026					
Area Type: Neighbourhood Main Street					
MODE					
Thorold Stone Road and QEW West Off Ramp					
Type	SIGNALIZED INTERSECTIONS				
Target (Custom if necessary)	C	C	D	D	D
Adjustment for Planning Direction	None	None	None	None	None
Reasons for adjustment (if applicable)					
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	E	E			

Active Transportation Design Check	
Are marked pedestrian crossings provided to connect all approaching pedestrian facilities?	Yes
Does the approaching bike facility continue at a consistent width up to the edge of the intersection (crosswalk or curb edge of intersecting roadway)?	No
Is a continuous amount of space and accompanying pavement makings delineated for cyclists through the intersection?	No
Does the intersection design provide features which facilitate all the intended turn movements for cyclists (e.g. bike boxes, queuing space, protected intersection, etc)?	No
Have Accessibility for Ontarians with Disabilities Act (AODA) and municipal accessibility standards (if applicable) been considered?	No

MMLOS Evaluation					
Measure 1	Enhanced Pedestrian Measures	Enhanced Bicycle Facilities	Transit Priority Measures	Average Effective Turning Radius (m)	% of Movements with Dedicated Turn Lanes
	0	0			
Measure 2	Average Effective Turning Radius (m)	Average Effective Turning Radius (m)	Transit Movement Delay (s)	Car Level of Service	Intersection Delay (s)
	13.0 - 14.9	13.0 - 14.9			
Measure 3	Signal Cycle Length (s)	Signal Cycle Length (s)	Pedestrian Level of Service	-	-
	106 - 120	106 - 120			
Measure 4	Number of Uncontrolled Conflicts (conflicts/approach)	Number of Uncontrolled Conflicts (conflicts/approach)	-	-	-
	2.1 - 2.5	2.1 - 2.5			

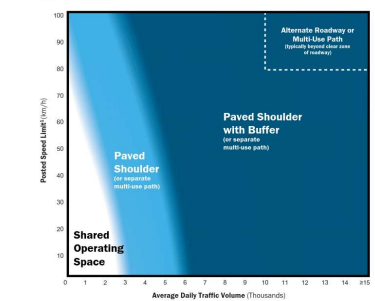
Desirable Cycling Facility Pre-Selection Nomograph
Urban/Suburban Context



- Operating speeds are assumed to be similar to posted speeds. If evidence suggests this is not the case, practitioners may consider using 85th percentile speeds or implementing measures to reduce operating speeds.
- Physically separated bikeways may obtain be considered in the designated operating space area of the nomograph.
- On corridors with two or more lanes per direction (including multi-lane one-way roads), a buffered bicycle lane should be considered the minimum with a typical facility being a physically separated bikeway.

Figure 5.5 – Desirable Cycling Facility Pre-selection Nomograph – Urban/Suburban Context

Desirable Cycling Facility Pre-Selection Nomograph
Rural Context¹



- In rural towns/villages, the urban/suburban nomograph may be used.
- Operating speeds are assumed to be similar to posted speeds. If evidence suggests this is not the case, practitioners may consider using 85th percentile speeds or implementing measures to reduce operating speeds.

Figure 5.6 – Desirable Cycling Facility Pre-selection Nomograph – Rural Context

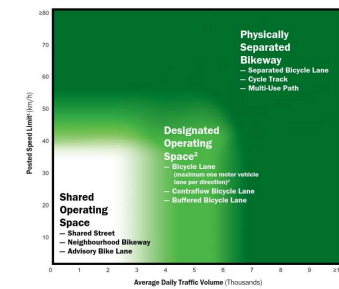
LOS AND DATA ENTRY - Use this to enter what you know and for detailed or summary results presentation

Actual	D	D			
SCENARIO:	2026				
Area Type:	Neighbourhood Main Street				
MODE					
Montrose Road and Southwood Dr					
Type	SIGNALIZED INTERSECTIONS				
Target (Custom if necessary)	C	C	D	D	D
Adjustment for Planning Direction	None	None	None	None	None
Reasons for adjustment (if applicable)					
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	D	D			

Active Transportation Design Check	
Are marked pedestrian crossings provided to connect all approaching pedestrian facilities?	Yes
Does the approaching bike facility continue at a consistent width up to the edge of the intersection (crosswalk or curb edge of intersecting roadway)?	No
Is a continuous amount of space and accompanying pavement makings delineated for cyclists through the intersection?	No
Does the intersection design provide features which facilitate all the intended turn movements for cyclists (e.g. bike boxes, queuing space, protected intersection, etc)?	No
Have Accessibility for Ontarians with Disabilities Act (AODA) and municipal accessibility standards (if applicable) been considered?	No

MMLOS Evaluation					
Measure 1	Enhanced Pedestrian Measures	Enhanced Bicycle Facilities	Transit Priority Measures	Average Effective Turning Radius (m)	% of Movements with Dedicated Turn Lanes
	0.01 - 0.25	0			
Measure 2	Average Effective Turning Radius (m)	Average Effective Turning Radius (m)	Transit Movement Delay (s)	Car Level of Service	Intersection Delay (s)
	11.0 - 12.9	11.0 - 12.9			
Measure 3	Signal Cycle Length (s)	Signal Cycle Length (s)	Pedestrian Level of Service	-	-
	91 - 105	91 - 105			
Measure 4	Number of Uncontrolled Conflicts (conflicts/approach)	Number of Uncontrolled Conflicts (conflicts/approach)	-	-	-
	2.1 - 2.5	2.1 - 2.5			

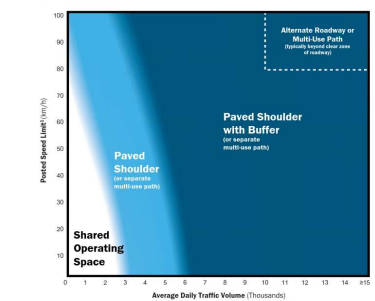
Desirable Cycling Facility Pre-Selection Nomograph
Urban/Suburban Context



- Operating speeds are assumed to be similar to posted speeds. If evidence suggests this is not the case, practitioners may consider using 85th percentile speeds or implementing measures to reduce operating speeds.
- Physically separated bikeways may obtain be considered in the designated operating space area of the nomograph.
- On corridors with two or more lanes per direction (including multi-lane one-way roads), a buffered bicycle lane should be considered the minimum with a typical facility being a physically separated bikeway.

Figure 5.5 – Desirable Cycling Facility Pre-selection Nomograph – Urban/Suburban Context

Desirable Cycling Facility Pre-Selection Nomograph
Rural Context¹



- In rural towns/villages contexts, the urban/suburban nomograph may be used.
- Operating speeds are assumed to be similar to posted speeds. If evidence suggests this is not the case, practitioners may consider using 85th percentile speeds or implementing measures to reduce operating speeds.

Figure 5.6 – Desirable Cycling Facility Pre-selection Nomograph – Rural Context

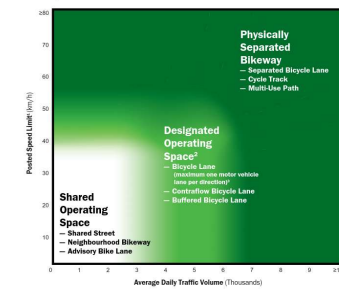
LOS AND DATA ENTRY - Use this to enter what you know and for detailed or summary results presentation

Actual	E	E			
SCENARIO:	2026				
Area Type:	Neighbourhood Main Street				
MODE					
Montrose Road and Thorold Stone Road					
Type	SIGNALIZED INTERSECTIONS				
Target (Custom if necessary)	C	C	D	D	D
Adjustment for Planning Direction	None	None	None	None	None
Reasons for adjustment (if applicable)					
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	E	E			

Active Transportation Design Check	
Are marked pedestrian crossings provided to connect all approaching pedestrian facilities?	Yes
Does the approaching bike facility continue at a consistent width up to the edge of the intersection (crosswalk or curb edge of intersecting roadway)?	No
Is a continuous amount of space and accompanying pavement makings delineated for cyclists through the intersection?	No
Does the intersection design provide features which facilitate all the intended turn movements for cyclists (e.g. bike boxes, queuing space, protected intersection, etc)?	No
Have Accessibility for Ontarians with Disabilities Act (AODA) and municipal accessibility standards (if applicable) been considered?	No

MMLOS Evaluation					
Measure 1	Enhanced Pedestrian Measures	Enhanced Bicycle Facilities	Transit Priority Measures	Average Effective Turning Radius (m)	% of Movements with Dedicated Turn Lanes
	0	0.01 - 0.25			
Measure 2	Average Effective Turning Radius (m)	Average Effective Turning Radius (m)	Transit Movement Delay (s)	Car Level of Service	Intersection Delay (s)
	11.0 - 12.9	11.0 - 12.9			
Measure 3	Signal Cycle Length (s)	Signal Cycle Length (s)	Pedestrian Level of Service	-	-
	106 - 120	106 - 120			
Measure 4	Number of Uncontrolled Conflicts (conflicts/approach)	Number of Uncontrolled Conflicts (conflicts/approach)	-	-	-
	Greater than 3	Greater than 3			

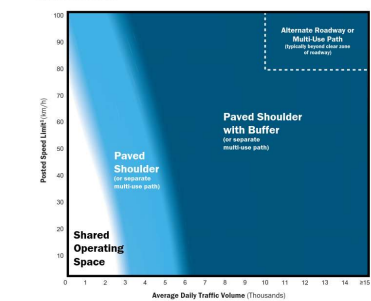
Desirable Cycling Facility Pre-Selection Nomograph
Urban/Suburban Context



- Operating speeds are assumed to be similar to posted speeds. If evidence suggests this is not the case, practitioners may consider using 85th percentile speeds or implementing measures to reduce operating speeds.
- Physically separated bikeways may obtain the designated operating space area of the nomograph.
- On corridors with two or more lanes per direction (including multi-lane one-way roads), a buffered bicycle lane should be considered the minimum with a typical facility being a physically separated bikeway.

Figure 5.5 – Desirable Cycling Facility Pre-selection Nomograph – Urban/Suburban Context

Desirable Cycling Facility Pre-Selection Nomograph
Rural Context¹

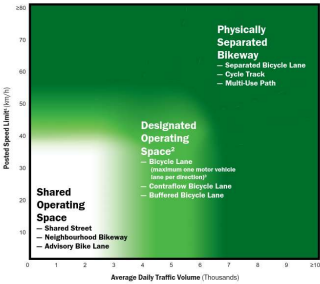


- In rural towns/villages, the urban/suburban nomograph may be used.
- Operating speeds are assumed to be similar to posted speeds. If evidence suggests this is not the case, practitioners may consider using 85th percentile speeds or implementing measures to reduce operating speeds.

Figure 5.6 – Desirable Cycling Facility Pre-selection Nomograph – Rural Context

LOS AND DATA ENTRY - Use this to enter what you know and for detailed or summary results presentation					
Actual	D	F			
SCENARIO: 2026					
Area Type: Neighbourhood Main Street					
MODE					
Montrose Road to QEW West off ramp					
Type	SEGMENTS				
Target (Custom if necessary)	C	C	D	D	D
Adjustment for Planning Direction	None	None	None	None	None
Reasons for adjustment (if applicable)					
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	D	F			
Active Transportation Design Check					
Do the pedestrian facilities provide direct access to all properties along the segment? (Direct access can be provided by an adjacent facility or designated crossing to the property in question)					Yes
Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph (Figure 6.1, 6.2)?					No
MMLOS Evaluation					
Measure 1	Pedestrian Facility Width (m)	Bike Facility Width per Direction (m)	Transit Facility Type	Width of Curb Lane (m)	Mid-block V/C Ratio
	Less than 1.5				
Measure 2	Pedestrian Buffer Width (m)	Bike Buffer Width (m)	Transit Passenger Amenities	Car Level of Service	Curb Lane Conflicts
	1.0 - 1.2	Has no physical measures and buffer width is < 0.5			
Measure 3	Max Distance Between Controlled Crossings (m)	Conflicts with Other Modes (in-lane conflicts and cross point conflicts)	Pedestrian Level of Service	-	-
	200	Two "high" conflict indicators			
Measure 4		-	-	-	-

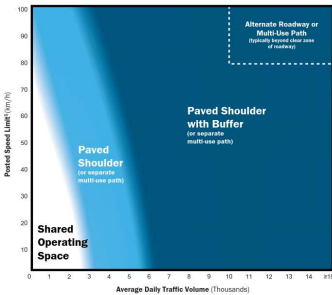
Desirable Cycling Facility Pre-Selection Nomograph
Urban/Suburban Context



- Operating speeds are assumed to be similar to posted speeds. If evidence suggests this is not the case, practitioners may consider using 85th percentile speeds or implementing measures to reduce operating speeds.
- Physically separated bikeways may obtain be considered in the designated operating space area of the nomograph.
- On corridors with two or more lanes per direction (including multi-lane one-way roadways) a buffered bicycle lane should be considered the minimum with a typical facility being a physically separated bikeway.

Figure 5.5 – Desirable Cycling Facility Pre-selection Nomograph – Urban/Suburban Context

Desirable Cycling Facility Pre-Selection Nomograph
Rural Context¹

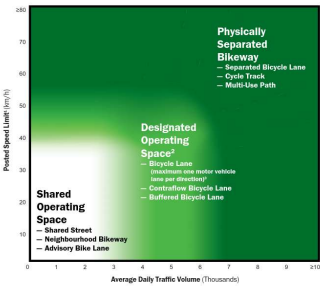


- In rural town/village/village contexts, the urban/suburban nomograph may be used.
- Operating speeds are assumed to be similar to posted speeds. If evidence suggests this is not the case, practitioners may consider using 85th percentile speeds or implementing measures to reduce operating speeds.

Figure 5.6 – Desirable Cycling Facility Pre-selection Nomograph – Rural Context

LOS AND DATA ENTRY - Use this to enter what you know and for detailed or summary results presentation						
Actual		E	F			
SCENARIO:		2026				
Area Type:		Neighbourhood Main Street				
MODE						
Southwood Dr to Thorold Stone Road						
Type		SEGMENTS				
Target (Custom if necessary)		C	C	D	D	D
Adjustment for Planning Direction		None	None	None	None	None
Reasons for adjustment (if applicable)						
Adjustment for Strategic Policy		None	None	None	None	None
Reasons for adjustment (if applicable)						
Actual		E	F			
Active Transportation Design Check						
Do the pedestrian facilities provide direct access to all properties along the segment? (Direct access can be provided by an adjacent facility or designated crossing to the property in question)						Yes
Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph (Figure 6.1, 6.2)?						No
MMLOS Evaluation						
Measure 1	Pedestrian Facility Width (m)	Bike Facility Width per Direction (m)	Transit Facility Type	Width of Curb Lane (m)	Mid-block V/C Ratio	
	1.5 - 1.7					
Measure 2	Pedestrian Buffer Width (m)	Bike Buffer Width (m)	Transit Passenger Amenities	Car Level of Service	Curb Lane Conflicts	
	1.6 - 2.0	Has physical measures and buffer width is 0.3 - 0.5 OR Unobstructed minimum buffer				
Measure 3	Max Distance Between Controlled Crossings (m)	Conflicts with Other Modes (in-lane conflicts and cross point conflicts)	Pedestrian Level of Service	-	-	
	Greater than 320	Two "high" conflict indicators				
Measure 4		-	-	-	-	

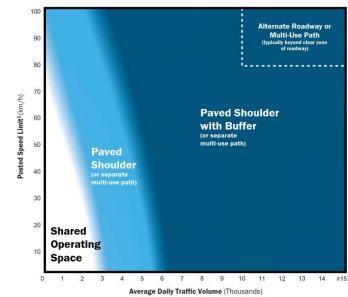
Desirable Cycling Facility Pre-Selection Nomograph
Urban/Suburban Context



- Operating speeds are assumed to be similar to posted speeds. If evidence suggests this is not the case, practitioners may consider using 85th percentile speeds or implementing measures to reduce operating speeds.
- Physically separated bikeways may obtain be considered in the designated operating space area of the nomograph.
- On corridors with two or more lanes per direction (including multi-lane one-way roadways), a buffered bicycle lane should be considered the minimum with a typical facility being a physically separated bikeway.

Figure 5.5 – Desirable Cycling Facility Pre-selection Nomograph – Urban/Suburban Context

Desirable Cycling Facility Pre-Selection Nomograph
Rural Context¹

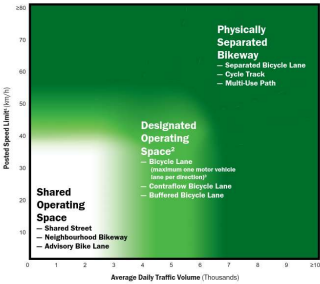


- In rural town/village/village contexts, the urban/suburban nomograph may be used.
- Operating speeds are assumed to be similar to posted speeds. If evidence suggests this is not the case, practitioners may consider using 85th percentile speeds or implementing measures to reduce operating speeds.

Figure 5.6 – Desirable Cycling Facility Pre-selection Nomograph – Rural Context

LOS AND DATA ENTRY - Use this to enter what you know and for detailed or summary results presentation					
Actual	D	F			
SCENARIO: 2026					
Area Type: Neighbourhood Main Street					
MODE					
QEW West off ramp to QEW East off Ramp					
Type	SEGMENTS				
Target (Custom if necessary)	C	C	D	D	D
Adjustment for Planning Direction	None	None	None	None	None
Reasons for adjustment (if applicable)					
Adjustment for Strategic Policy	None	None	None	None	None
Reasons for adjustment (if applicable)					
Actual	D	F			
Active Transportation Design Check					
Do the pedestrian facilities provide direct access to all properties along the segment? (Direct access can be provided by an adjacent facility or designated crossing to the property in question)					Yes
Does the bicycle facility selected correspond with the minimum appropriate facility type identified in the context appropriate nomograph (Figure 6.1, 6.2)?					No
MMLOS Evaluation					
Measure 1	Pedestrian Facility Width (m)	Bike Facility Width per Direction (m)	Transit Facility Type	Width of Curb Lane (m)	Mid-block V/C Ratio
	Less than 1.5				
Measure 2	Pedestrian Buffer Width (m)	Bike Buffer Width (m)	Transit Passenger Amenities	Car Level of Service	Curb Lane Conflicts
	1.0 - 1.2	Has no physical measures and buffer width is < 0.5			
Measure 3	Max Distance Between Controlled Crossings (m)	Conflicts with Other Modes (in-lane conflicts and cross point conflicts)	Pedestrian Level of Service	-	-
	200	Two "high" conflict indicators			
Measure 4		-	-	-	-

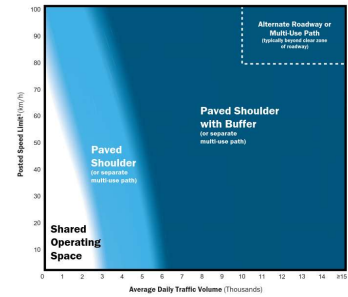
Desirable Cycling Facility Pre-Selection Nomograph
Urban/Suburban Context



- Operating speeds are assumed to be similar to posted speeds. If evidence suggests this is not the case, practitioners may consider using 85th percentile speeds or implementing measures to reduce operating speeds.
- Physically separated bikeways may obtain be considered in the designated operating space area of the nomograph.
- On corridors with two or more lanes per direction (including multi-lane one-way roadways or buffered bicycle lane) should be considered the maximum with a typical facility being a physically separated bikeway.

Figure 5.5 – Desirable Cycling Facility Pre-selection Nomograph – Urban/Suburban Context

Desirable Cycling Facility Pre-Selection Nomograph
Rural Context¹



- In rural town/village/village contexts, the urban/suburban nomograph may be used.
- Operating speeds are assumed to be similar to posted speeds. If evidence suggests this is not the case, practitioners may consider using 85th percentile speeds or implementing measures to reduce operating speeds.

Figure 5.6 – Desirable Cycling Facility Pre-selection Nomograph – Rural Context