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RE: TRAFFIC IMPACT BRIEF, 650 MAIN STREET WEST, PORT COLBORNE, ON

Paradigm Transportation Solutions Limited has been retained to prepare this traffic brief to support the proposed residential development at 650 Main Street West in Port Colborne, Ontario. **Figure 1 (attached)** illustrates the subject site's location and study area. This letter includes the following:

- Summarized existing volumes at the study area intersections
  - Main Street West & B&C Truck Centre East Driveway (unsignalized);
  - Main Street West & Shell Gas Station Driveway (unsignalized);
- Forecasts of the weekday AM and PM peak hour vehicle traffic volumes generated by the proposed development are based on data from the Institute of Transportation Engineers (ITE) Trip Generation Manual (11th Edition).
- Trip distribution based on 2016 Transportation Tomorrow Survey data.
- Document the findings and conclusions regarding the proposed development and its anticipated impact on the study area intersections.

Appendix A contains the pre-study consultation material. The study scope was developed in consultation with the Niagara Region in May 2022.

Development Proposal

The subject site is located on the south side of Main Street West, between Minor Road and 1st Avenue; the municipal address is 650 Main Street West in the City of Port Colborne. The property owner proposes redevelopment of the lands to permit 95 residential units and 326 square metres of commercial uses.

Vehicle access to the development is proposed through a single driveway connection to Main Street West at the eastern terminus of the property. The connection is noted to be offset from the Shell Driveway on the north side of the road by approximately 8 metres (curb radii to curb radii).

Figure 2 (attached) illustrates the proposed site plan.

Roadway Characteristics & Volumes

The following is noted about the study area roadways[1]:

- **Main Street West (Regional Road 3)** is an east-west two-lane regional arterial roadway with a posted speed limit of 60 km/h. There are no sidewalks or cycling lanes provided along this roadway.

Turning movement counts are used to quantify the movement of vehicles. The counts are usually taken during peak periods to complete the level of service analysis. Existing traffic data at an intersection or road section forms the foundation for analysis. Pyramid Traffic collected traffic count data in June 2022.

Figure 3 (attached) illustrates weekday peak-hour traffic at the study area intersections. **Appendix B** contains the traffic data.

[1] Niagara Region Official Plan, Schedule 'J1' Transportation Infrastructure, 2022

Trip Generation and Assignment

Trip generation for the proposed development was estimated by using trip generation rates provided by ITE's Trip Generation 11th Edition[2]. The following land used codes have been utilized.

- **Land Use Code (LUC) 221 – Multifamily Housing (Mid-Rise) -** Mid-rise multifamily housing includes apartments and condominiums located in a building that has between four and 10 floors of living space. Access to individual dwelling units is through an outside building entrance, a lobby, elevator, and a set of hallways.
- As the specific tenant is not know for the commercial component, a general land use code; **LUC 822 – Strip Retail Plaza (<40k)** that encompasses several commercial establishments, has been utilized. LUC 822 is defined as an integrated group of commercial establishments that is planned, developed, owned, and managed as a unit. Each study site in this land use has less than 40,000 square feet of gross leasable area (GLA).

The trip generation estimates are based upon peak trips corresponding to the AM and PM peak hours of adjacent street traffic. To remain conservative, no trip reductions were applied to reflect increased pedestrian/cycling activity.

A total of 44 AM new vehicle trips and 60 PM new vehicle trips are forecast to be generated by the proposed development using the average rates. **Table 1** summarizes the trip generation estimates for the weekday peak hours.

TABLE 1: ESTIMATED TRIP GENERATION

Land Use	GFA ft2	Units	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
221 – Multifamily Housing (Mid-Rise)	-	95	8	27	35	23	14	37
822 – Strip Retail Plaza (<40k)	3,509	-	5	4	9	12	11	23
Total Trip Generation			**13**	**31**	**44**	**35**	**25**	**60**

The directional distribution of traffic approaching and departing the development is a function of several variables: population densities, employment locations, existing travel patterns, and the efficiency of the site's roadways. The estimated distribution was developed using the current travel patterns on Main Street West. **Table 2** summarizes the estimated trip distribution for site-generated traffic volumes. **Figure 4 (attached)** illustrates the weekday peak hour site-generated traffic volumes.

[2] Trip Generation 11th Edition, Institute of Transportation Engineers, Washington D.C., 2021

TABLE 2: ESTIMATED TRIP DISTRIBUTION

Origin /Destination	Distribution
East via Main Street West	50%
West via Main Street West	50%
Total	**100%**

Future Traffic Volumes

A horizon year of five years after the year of study (2028) has been assessed. The likely future volumes near the subject site are estimated to consist of the following:

- Increased non-site traffic (generalized background traffic growth). A growth rate of 2% per annum was applied to existing traffic volumes; and
- Traffic generated by the subject site.

Figure 5 and Figure 6 (attached) illustrate the future background traffic and total traffic volumes, respectively.

Traffic Operations

An operational analysis was completed for the existing base year volumes and the future volumes under the 2028 horizon (with and without the proposed development). The evaluation criteria used to analyze the unsignalized intersections are based on the 2000 Highway Capacity Manual (HCM) 2000[3] utilizing Synchro 10 software. **Appendix C** contains the supporting detailed Synchro 11 output.

Level of service (LOS) denotes the different operating conditions on a given roadway segment under various traffic volume loads. It is a qualitative measure that indexes the operational qualities of a roadway segment or an intersection with designations ranging from LOS A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions. **Table 3** summarizes the operational analysis; the following is noted:

- Individual movements at the unsignalized intersection of Main Street West and Shell Driveway currently operate at LOS B or better under the 2022 Base year condition. Under the 2028 horizon, with additional growth in background and development traffic, the intersection will operate with similar levels of service: LOS B or better.
- At the unsignalized intersection of Main Street West and B&C Truck East Driveway, individual movements operate at LOS B or better under the 2022 Base year condition.

[3] Transportation Research Board, Highway Capacity Manual, Washington, D.C. 2003.

Under the 2028 horizon, with additional growth in background and development traffic, the intersection will operate with similar levels of service: LOS B.

- At the unsignalized intersection of Main Street West and the Site Driveway, individual movements are projected to operate at LOS B or better under the 2028 horizon.

Overall, the proposed site driveway is forecast to operate with minimal delay, with v/c ratios well within capacity during the AM and PM peak hours.

TABLE 3: TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	Horizon	MOE	Direction / Movement / Approach														Overall
					Eastbound				Westbound				Northbound				Southbound		
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	1 - Main Street West at Shell Driveway	TWSC	2022	LOS	A	A		A		A	A	A					A	A	A	1
				Delay	1	1		1		0	0	0					10	10	10		
				V/C	0.01	0.01				0.12	0.12						0.01	0.01			
				Q	0	0				0	0						0	0			
		TWSC	2028 (Background)	LOS	A	A		A		A	A	A					B	A	A	1
				Delay	1	1		1		0	0	0					12	10	10		
				V/C	0.02	0.02				0.13	0.13						0.01	0.01			
				Q	0	0				0	0						0	0			
		TWSC	2028 (Total)	LOS	A	A		A		A	A	A					B	A	A	1
				Delay	1	1		1		0	0	0					12	10	10		
				V/C	0.02	0.02				0.14	0.14						0.01	0.01			
				Q	0	0				0	0						0	0			
	2 - Main Street West at B&C Truck Driveway	TWSC	2022	LOS	A	A		A		A	A	A					A	A	A	0
				Delay	0	0		0		0	0	0					9	9	9		
				V/C	0.00	0.00				0.12	0.12						0.00	0.00			
				Q	0	0				0	0						0	0			
		TWSC	2028 (Background)	LOS	A	A		A		A	A	A					B	A	B	0
				Delay	0	0		0		0	0	0					12	9	12		
				V/C	0.00	0.00				0.14	0.14						0.02	0.00			
				Q	0	0				0	0						0	0			
		TWSC	2028 (Total)	LOS	A	A		A		A	A	A					B	A	B	0
				Delay	0	0		0		0	0	0					13	10	12		
				V/C	0.00	0.00				0.15	0.15						0.02	0.00			
				Q	0	0				0	0						1	0			
	3 - Main Street West at Driveway	TWSC	2028 (Total)	LOS		A	A	A	A	A		A	B		B	B				1
				Delay		0	0	0	0	0		0	11		11	11					
				V/C		0.17	0.17		0.01	0.01			0.05		0.05						
				Q		0	0		0	0			1		1						
PM Peak Hour	1 - Main Street West at Shell Driveway	TWSC	2022	LOS	A	A		A		A	A	A					A	A	A	0
				Delay	0	0		0		0	0	0					10	10	10		
				V/C	0.01	0.01				0.17	0.17						0.01	0.01			
				Q	0	0				0	0						0	0			
		TWSC	2028 (Background)	LOS	A	A		A		A	A	A					B	A	B	0
				Delay	0	0		0		0	0	0					13	10	11		
				V/C	0.01	0.01				0.19	0.19						0.00	0.01			
				Q	0	0				0	0						0	0			
		TWSC	2028 (Total)	LOS	A	A		A		A	A	A					B	A	B	0
				Delay	0	0		0		0	0	0					13	10	11		
				V/C	0.01	0.01				0.20	0.20						0.00	0.01			
				Q	0	0				0	0						13	10			
	2 - Main Street West at B&C Truck Driveway	TWSC	2022	LOS	A	A		A		A	A	A					B	A	B	0
				Delay	0	0		0		0	0	0					12	0	12		
				V/C	0.00	0.00				0.18	0.18						0.03	0.00			
				Q	0	0				0	0						1	0			
		TWSC	2028 (Background)	LOS	A	A		A		A	A	A					B	A	B	0
				Delay	0	0		0		0	0	0					13	0	13		
				V/C	0.00	0.00				0.20	0.20						0.03	0.00			
				Q	0	0				0	0						1	0			
		TWSC	2028 (Total)	LOS	A	A		A		A	A	A					B	A	B	0
				Delay	0	0		0		0	0	0					13	0	13		
				V/C	0.00	0.00				0.20	0.20						0.03	0.00			
				Q	0	0				0	0						0	0			
	3 - Main Street West at Driveway	TWSC	2028 (Total)	LOS		A	A	A	A	A		A	B		B	B				1
				Delay		0	0	0	1	1		0	12		12	12					
				V/C		0.15	0.15		0.01	0.01			0.05		0.05						
				Q		0	0		0	0			1		1						

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length (m)
Ex. - Existing Available Storage (m)
Avail. - Available Storage (m)

TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control

Left-Turn Lane Warrant

The site's driveway connection to Main Street West was assessed to determine if the projected traffic volumes warrant the installation of a left turn lane along the major roadway.

The warrant for a westbound left-turn lane at the unsignalized intersection of Main Street West and Shell West Driveway/Driveway follows the Ministry of Transportation's (MTO) Geometric Design Standards[4]. A design speed of 20 kilometres per hour over the posted speed limit has been used.

The percentages of left-turning vehicles in the approaching volume were rounded to the nearest 5 percent, as nomographs are only provided for 5 percent increments.

Table 4 summarizes the results of the left-turn lane warrant analyses. It indicates that a westbound left-turn lane is not warranted at the intersection of Main Street West and Shell West Driveway/Driveway under the 2028 horizon. **Appendix D** contains the nomographs.

TABLE 4: LEFT-TURN LANE SUMMARY

Main Street West at Driveway		
Approach Direction Design Speed	Westbound 80 km/h	
Horizon	Base Year	
Peak Hour	AM	PM
Advancing Volume	221	324
Opposing Volumes	270	243
Left Turning Traffic	7	18
% of Left Turning Traffic	3%	6%
Figure Used*	9A-14 (5%)	9A-14 (5%)
Warranted	**No**	**No**
Storage Length Required	--	--

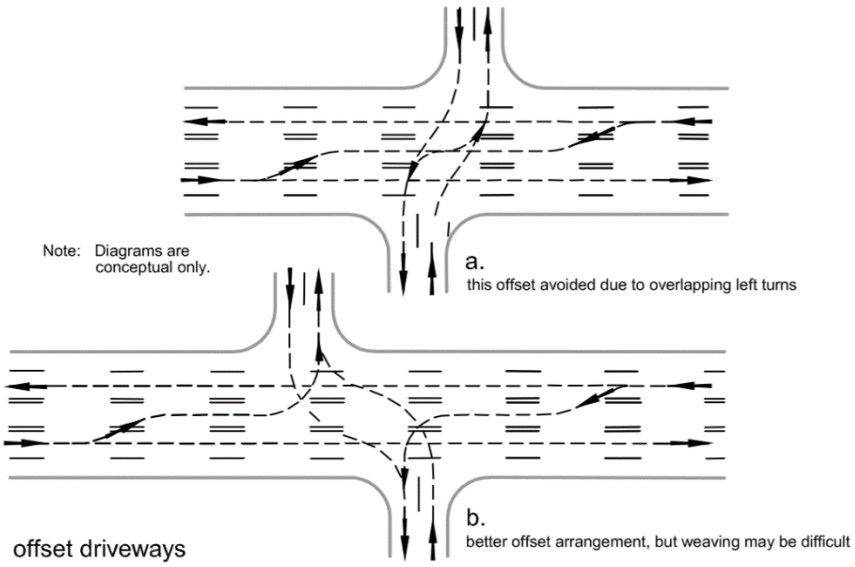
Based on MTO Design Supplement for TAC Geometric Design Guide for Canadian Road - June 2017

[4] MTO Design Supplement for TAC Geometric Design Guide for Canadian Roads - 2017

Driveway Location

Introducing a new driveway directly impacts the existing traffic operations to and from the Regional Road. Careful integration of a new driveway into the current operating character of the arterial road is required to minimize turning conflicts and disruption to traffic. A centreline of a new driveway to an arterial road should align with the centreline of any opposing existing driveway or roadway.

The current concept plan depicts an offset arrangement with respect to the opposing driveways on the north side of Main Street West. The primary issues to consider with offset driveways are the possibility of overlapping left turns and the potential difficulty in making a weaving maneuver to travel between the offset legs of the intersection. These issues are illustrated below as outlined by TAC[5].



The proposed location of the driveway to the development would result in a similar situation as shown in Diagram "a," which is identified as the offset that should be avoided due to overlapping left turns. Given that the offset would create left-turn lane overlaps, it is recommended that the proposed driveway be restricted to right-in only with right/left-out operations.

Concerning the weaving manoeuvre that would be required to travel between the development and the gas station, it is reasoned that the potential for this traffic movement is negligible as there is not expected to be much interaction between these two driveways. Therefore, unlike a situation where offset intersections may comprise two busy public roads or private driveways with a high expectation of weaving traffic between the offset legs, it can be concluded that this is of no consequence.

[5] Transportation Association of Canada (TAC), Geometric Design Guide for Canadian Road, 1999

Sensitivity Analysis

A sensitivity analysis has been conducted to assess the intersection operating as a right-in only with right/left-out movements for the 2028 Total traffic conditions.

Table 5 summarizes the results of the sensitivity analysis. **Appendix E** contains the detailed Synchro reports. Overall, the intersections within the study area are expected to operate with acceptable operations.

TABLE 5: TRAFFIC OPERATIONS (SENSITIVITY ANALYSIS)

Analysis Period	Intersection	Control Type	Horizon	MOE	Direction / Movement / Approach														Overall
					Eastbound				Westbound				Northbound				Southbound			
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	1 - Main Street West at Shell Driveway	TWSC	2022	LOS	A	A		A		A	A	A					A	A	A	
				Delay	1	1		1		0	0	0					10	10	10	1
				V/C	0.01	0.01				0.12	0.12						0.01	0.01		
				Q	0	0				0	0						0	0		
		TWSC	2028 (Background)	LOS	A	A		A		A	A	A					B	A	A	
				Delay	1	1		1		0	0	0					12	10	10	1
				V/C	0.02	0.02				0.13	0.13						0.01	0.01		
				Q	0	0				0	0						0	0		
		TWSC	2028 (Total)	LOS	A	A		A		A	A	A					B	A	A	
				Delay	1	1		1		0	0	0					12	10	10	1
				V/C	0.02	0.02				0.13	0.13						0.01	0.01		
				Q	0	0				0	0						0	0		
	2 - Main Street West at B&C Truck Driveway	TWSC	2022	LOS	A	A		A		A	A	A					A	A	A	
				Delay	0	0		0		0	0	0					9	9	9	0
				V/C	0.00	0.00				0.12	0.12						0.00	0.00		
				Q	0	0				0	0						0	0		
		TWSC	2028 (Background)	LOS	A	A		A		A	A	A					B	A	B	
				Delay	0	0		0		0	0	0					12	9	12	0
				V/C	0.00	0.00				0.14	0.14						0.02	0.00		
				Q	0	0				0	0						0	0		
		TWSC	2028 (Total)	LOS	A	A		A		A	A	A					B	A	B	
				Delay	0	0		0		0	0	0					13	10	12	0
				V/C	0.00	0.00				0.15	0.15						0.02	0.00		
				Q	0	0				0	0						1	0		
	3 - Main Street West at Driveway	TWSC	2028 (Total)	LOS		A	A	A		A		A	B		B	B				
				Delay		0	0	0		0		0	11		11	11				1
				V/C		0.18	0.18			0.14			0.05		0.05					
				Q		0	0			0			1		1					
PM Peak Hour	1 - Main Street West at Shell Driveway	TWSC	2022	LOS	A	A		A		A	A	A					A	A	A	
				Delay	0	0		0		0	0	0					10	10	10	0
				V/C	0.01	0.01				0.17	0.17						0.01	0.01		
				Q	0	0				0	0						0	0		
		TWSC	2028 (Background)	LOS	A	A		A		A	A	A					B	A	B	
				Delay	0	0		0		0	0	0					13	10	11	0
				V/C	0.01	0.01				0.19	0.19						0.00	0.01		
				Q	0	0				0	0						0	0		
		TWSC	2028 (Total)	LOS	A	A		A		A	A	A					B	A	B	
				Delay	0	0		0		0	0	0					13	10	11	0
				V/C	0.01	0.01				0.19	0.19						0.00	0.01		
				Q	0	0				0	0						13	10		
	2 - Main Street West at B&C Truck Driveway	TWSC	2022	LOS	A	A		A		A	A	A					B	A	B	
				Delay	0	0		0		0	0	0					12	0	12	0
				V/C	0.00	0.00				0.18	0.18						0.03	0.00		
				Q	0	0				0	0						1	0		
		TWSC	2028 (Background)	LOS	A	A		A		A	A	A					B	A	B	
				Delay	0	0		0		0	0	0					13	0	13	0
				V/C	0.00	0.00				0.20	0.20						0.03	0.00		
				Q	0	0				0	0						1	0		
		TWSC	2028 (Total)	LOS	A	A		A		A	A	A					B	A	B	
				Delay	0	0		0		0	0	0					13	0	13	0
				V/C	0.00	0.00				0.20	0.20						0.03	0.00		
				Q	0	0				0	0						0	0		
	3 - Main Street West at Driveway	TWSC	2028 (Total)	LOS		A	A	A		A		A	B		B	B				
				Delay		0	0	0		1		0	12		12	12				1
				V/C		0.16	0.16			0.20			0.05		0.05					
				Q		0	0			0			1		1					

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length (m)
Ex. - Existing Available Storage (m)
Avail. - Available Storage (m)

TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control

Parking Review

Zoning By-Law

The current parking guidelines for this development are governed by the City of Port Colborne Zoning By-law 6757-30-18. It is recognized that the actual demand for parking spaces may vary from development to development. The minimum parking rates for the proposed development under the Zoning By-law are as follows:

- 1.25 parking spaces per dwelling unit; and
- 1.00 spaces per 20m^2 of GFA for commercial uses

Table 6 summarizes the minimum parking standard calculation. The parking guideline for the development under the City's Zoning By-Law is 136 spaces. The development is proposing 132 parking spaces.

TABLE 6: ZONING PARKING BY-LAW REQUIREMENTS

Use	Units/GFA	City By-Law	
		Parking Rate	Parking Spaces Required
Apartment	95 units	1.25 space per unit	118.75
Commercial	326 m^2	1.00 space per 20 m^2	16.30
Total			**136**

Secondary Source Data

Given that parking standards reflect an "average" condition, they will rarely prescribe the number of parking spaces to match the parking demands of any individual development project exactly. Other municipalities recognize the advantages of parking ratios supporting broader Official Plan objectives. The empirical challenge is understanding how parking demand for a given use may vary. The policy question is where the parking standard or ratio should be set in that range.

Numerous industry associations and institutions are dedicated to surveying and reviewing parking requirements related to various land uses. These associations, such as the Institute of Transportation Engineers (ITE), collect, review and disseminate information about parking demand, supply, and appropriate design standards. This data helps establish a typical range of requirements.

The most recent parking generation manual available is the 5th Edition[6], a comparative resource to determine baseline assumptions. This study includes ITE peak period parking demand rates as guidelines to benchmark how the proposed supply compares to industry

[6] ITE Parking Generation 5th Edition, Washington DC, 2019.

standards based on collected data at various proxy sites. The following ITE Land Use Code (LUC) was reviewed:

- **LUC 221 (Multifamily Housing – Mid Rise)** includes multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and with between three and 10 levels (floors) of residence. The weekday peak parking demand ratio is 1.31 per unit.
- As the Applicant does not know a specific tenant for the commercial component, a general land use code; **LUC 820 (Shopping Centre)** that encompasses a number of commercial establishments, has been utilized. LUC 820 is described as an integrated group of commercial establishments planned, developed, owned, and managed as a unit. A shopping center's composition is related to its market area in terms of size, location, and type of store. A shopping center also provides on-site parking facilities to serve its parking demands. The weekday peak parking demand ratio is 1.95 spaces per 1,000 square feet of GFA.

Table 7 outlines the calculated supply for the development based on the ITE parking rates. The commercial parking requirements prescribed in the City's Zoning By-law are significantly higher than those outlined by ITE. The ITE parking rates stipulate that 125 parking spaces are required for the residential component and 7 spaces for the commercial component, for a total of 132 parking spaces for the subject site.

TABLE 7: ITE PARKING REQUIREMENTS

Use	Units/GFA	ITE Rates	
		Parking Rate	Parking Spaces Required
Apartment	95 units	1.31 space per unit	124.45
Commercial	3,509 square feet	1.95 space per 1,000 square feet	6.84
Total			**132**

Adjacent Municipalities Review

The City of Welland and the Town of Pelham have recently undertaken a comprehensive review of the zoning by-law to ensure that land and growth are appropriately managed and that the zoning regulations are current. As part of this work, updated parking requirements were developed, which require the following parking rates to be applied:

- City of Welland
  - Multiple dwellings to provide a parking rate of 1.00 parking space per unit;
  - Commercial uses to provide 1.00 space per 30 m^2 of GFA.
- Town of Pelham
  - Apartment units to provide a parking rate of 1.25 parking spaces per unit;
  - Commercial uses to provide 3.00 spaces per 100 m^2 of GFA.

Similar to the ITE rates, the City of Port Colborne's commercial parking requirement is significantly higher than the adjacent municipalities. **Appendix F** contains the adjacent municipalities' zoning requirements.

Table 8 summarizes the standard parking calculations utilizing the rates within the City of Welland and the Town of Pelham's by-law. These adjacent municipalities indicate that the proposed supply of 132 spaces would be sufficient to meet parking demand.

TABLE 8: ADJACENT MUNICIPALITY PARKING REQUIREMENTS

Use	Units/GFA	City of Welland By-Law	
		Parking Rate	Parking Spaces Required
Apartment	95 units	1.00 space per unit	95.00
Commercial	326 m^2	1.00 space per 30 m^2	10.87
Total			**106**
Use	**Units/GFA**	**Town of Pelham By-Law**	
		Parking Rate	**Parking Spaces Required**
Apartment	95 units	1.00 space per unit	118.75
Commercial	326 m^2	3.00 space per 100 m^2	9.78
Total			**129**

Conclusion

Based on the assessment carried out, the following summarizes the findings:

- The proposed development plan comprises 95 residential units and 326 square metres of commercial uses at 650 Main Street West in Port Colborne.
- Trip generation estimates indicate that the proposed development will generate approximately 44 trips during the weekday AM peak hour and 60 trips during the weekday PM peak hour. The site-generated traffic is not expected to impact intersection operations.
- The site's driveway connection to Main Street West was assessed to determine if the projected traffic volumes warrant the installation of a left turn lane along the major roadway. The analysis indicates that a westbound left-turn lane is not warranted along Main Street West at the Site's Driveway.
- The study area road network can accommodate forecast traffic demands and study area intersections, and site driveways will operate suitably. No remedial measures are recommended.
- The development provides for a total parking supply of 132 spaces, whereas the City's Zoning requirements stipulate a total supply of 136 spaces are required.
- A review of ITE parking data and comparable zoning requirements from adjacent municipalities (City of Welland and Town of Pelham) support the proposed parking supply of 132 spaces as sufficient.

Based on the findings of the study, the following is recommended:

- The driveway has access restricted to right-in only with right/left-out operations to mitigate the negative offset arrangement.
- The City approve the proposed parking supply of 132 spaces.

Yours very truly,

PARADIGM TRANSPORTATION SOLUTIONS LIMITED

Adam J. Makarewicz
Dipl. T., C.E.T. MITE
Senior Project Manager

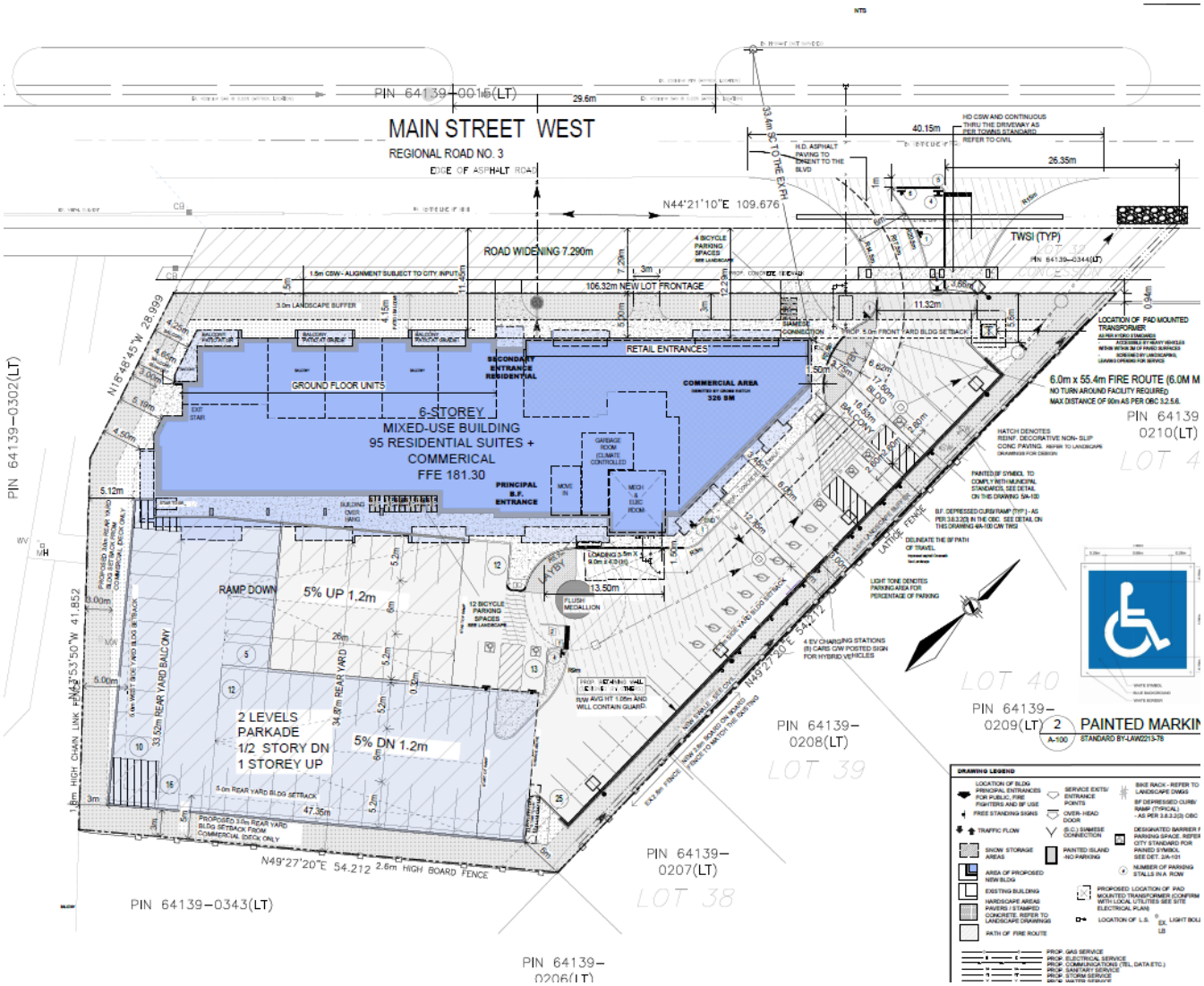
Stew Elkins
BES, MITE
Vice President and Chief Resource Officer

Attachments

N.T.S.
Image Source: www.openstreetmap. org

paradigm TRANSPORTATION SOLUTIONS LIMITED

Location of Subject Site



N.T.S.

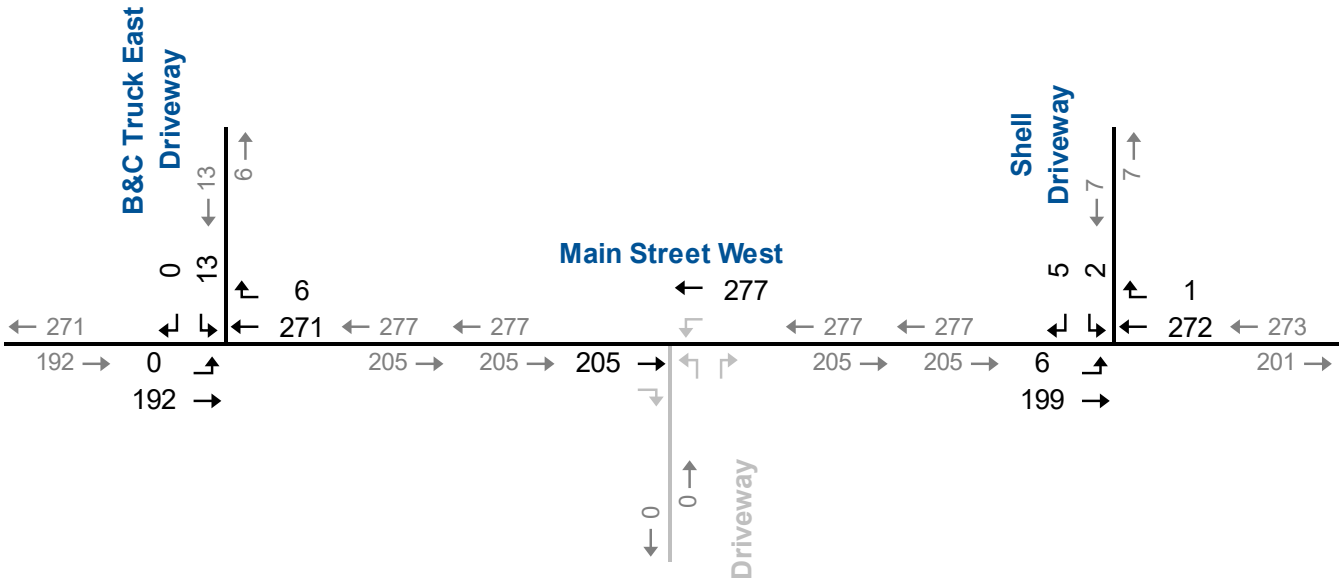
Proposed Site Plan

650 Main Street West Traffic Brief
220277

Figure 2

Weekday AM Peak Hour

Weekday PM Peak Hour



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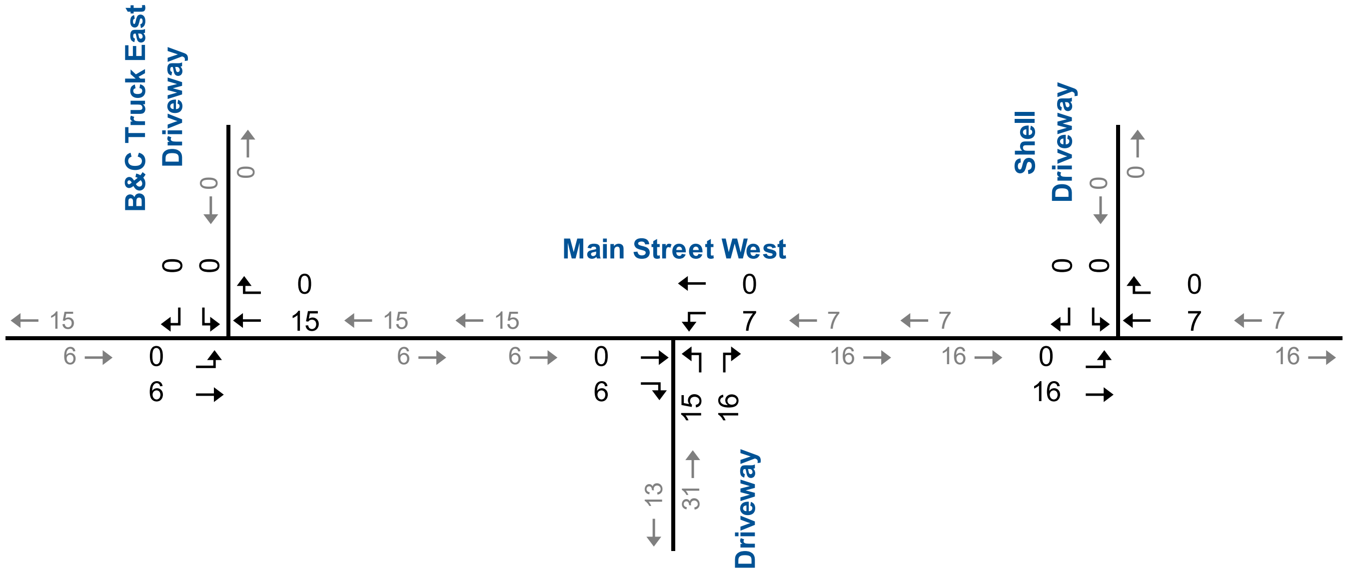
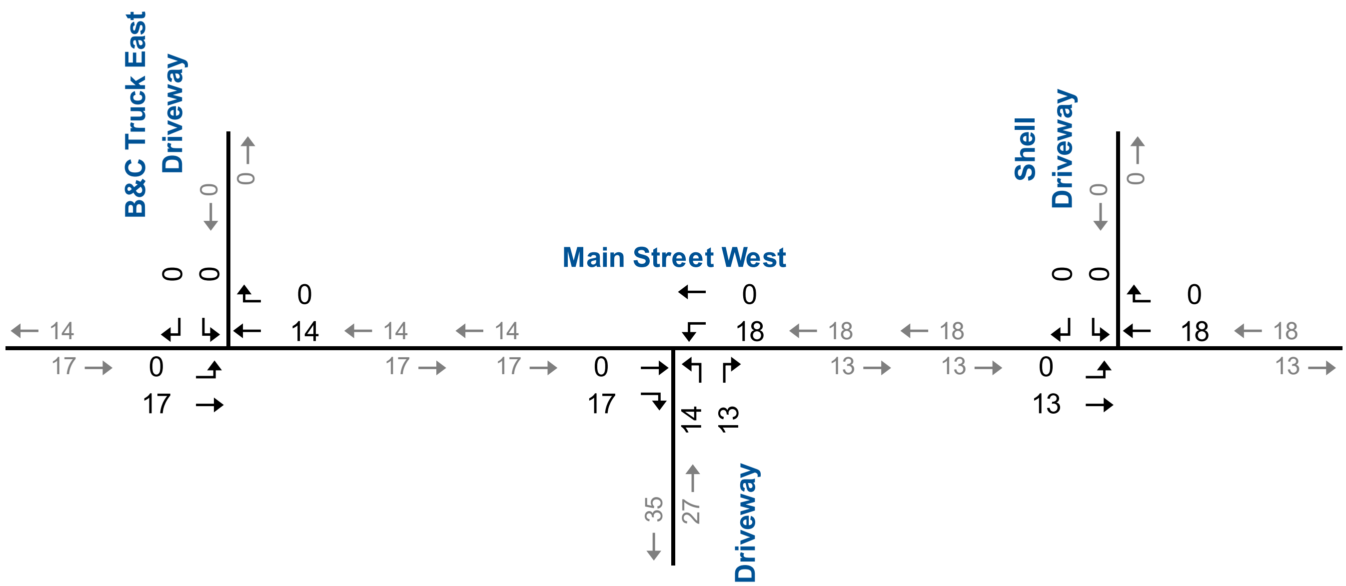
2022 Base Year Traffic Volumes

Weekday AM Peak Hour



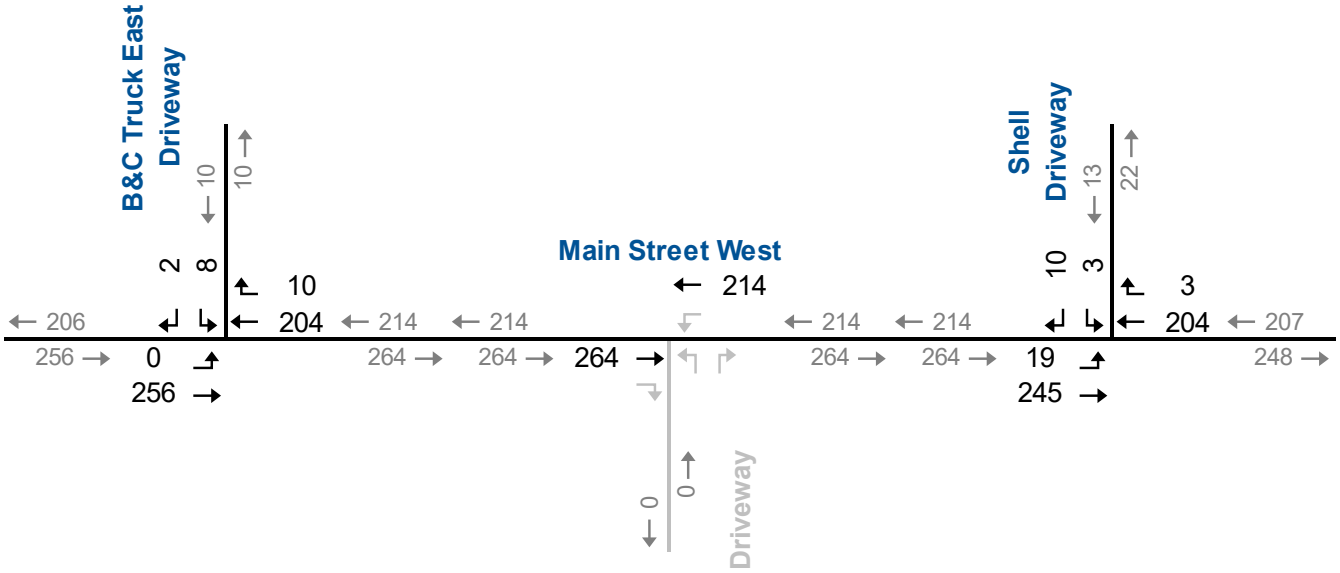
Weekday PM Peak Hour



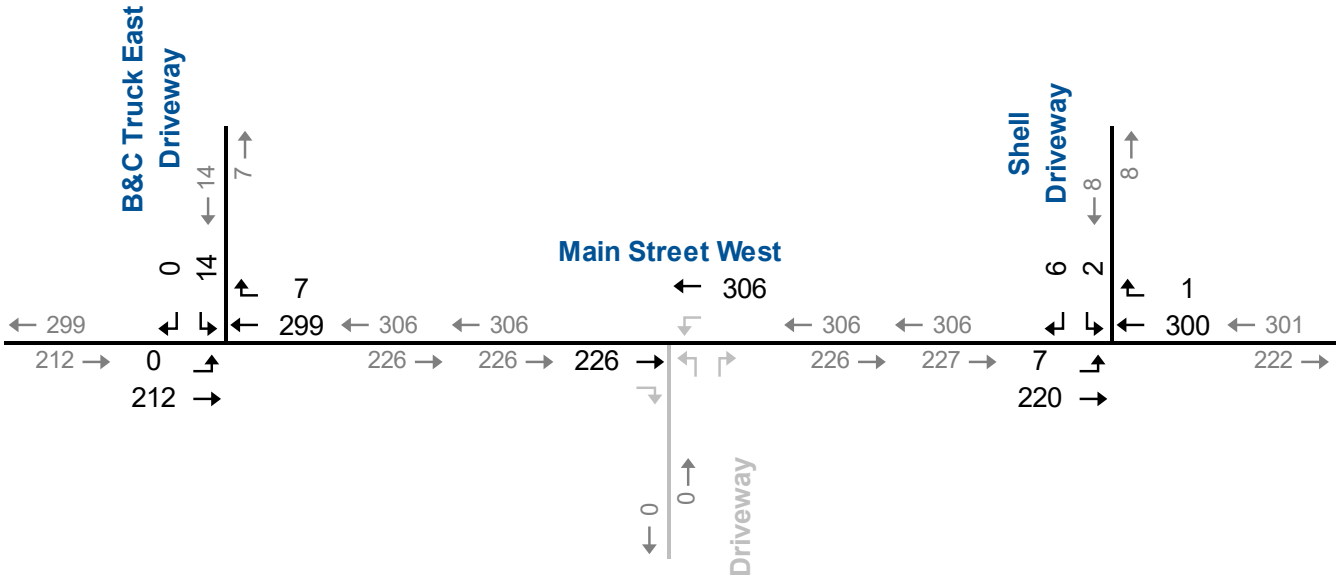
Site Generated Traffic Volumes

Figure 4

Weekday AM Peak Hour

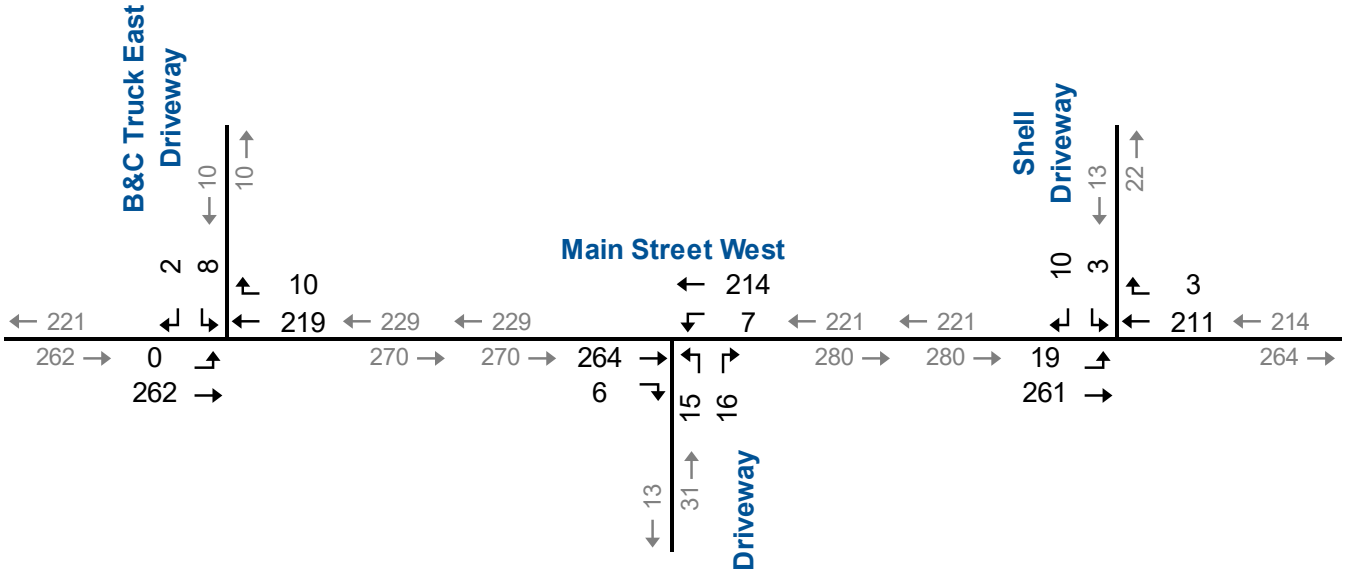


Weekday PM Peak Hour

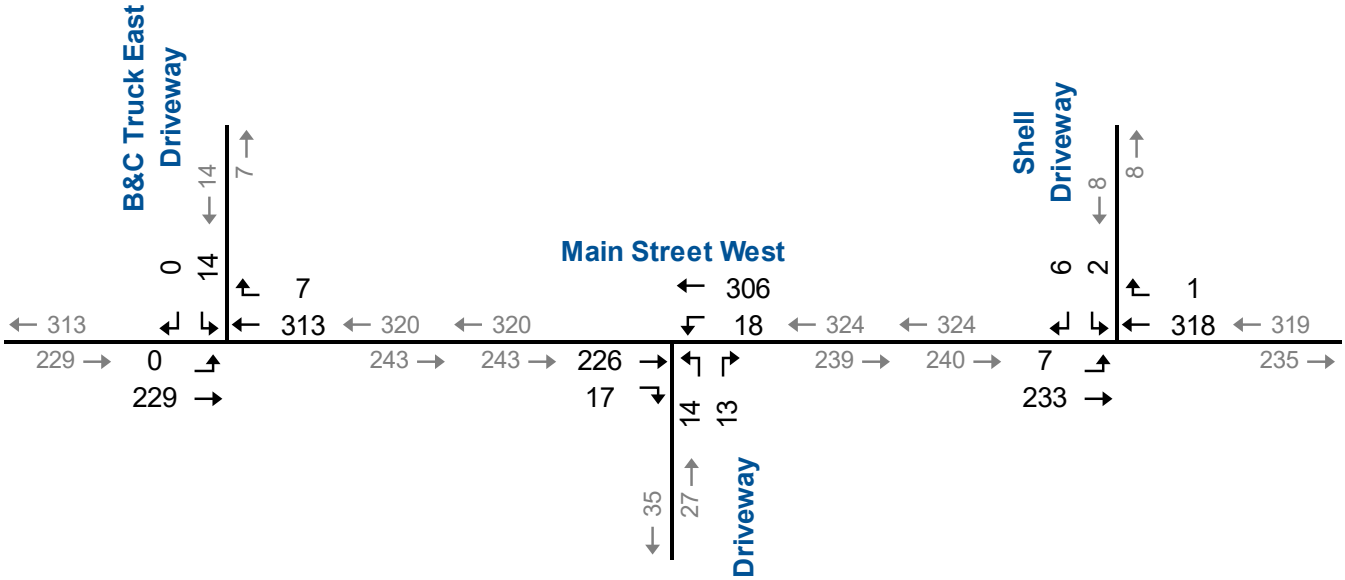


2028 Background Traffic Volumes

Weekday AM Peak Hour



Weekday PM Peak Hour



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2028 Total Traffic Volumes

Appendix A

TERMS OF REFERENCE

From: Dunsmore, Susan
To: Adam Makarewicz
Subject: RE: 220277: 650 Main Street West (Regional Road 3) - Port Colborne - Traffic Brief - Scop of Work
Date: May 25, 2022 7:54:01 AM
Attachments: image001.png

Hello Adam

Our Regional transportation planning staff have reviewed the scope you have provided and have provided the comments below in green. If you require Regional traffic data requests are to be made through the Regional website using the following link: https://www.niagararegion.ca/living/roads/permits/traffic-data-requests.aspx.

If the traffic impact study results in changes to the Regional ROW then a function plan is to be included in the submitted report.

If you require anything further please contact me at your convenience.

Thank you

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

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

Niagara Region

From: Adam Makarewicz <amakarewicz@ptsl.com>
Sent: Tuesday, May 17, 2022 9:36 AM
To: Dunsmore, Susan <Susan.Dunsmore@niagararegion.ca>
Subject: 220277: 650 Main Street West (Regional Road 3) - Port Colborne - Traffic Brief - Scop of Work

Good Morning Susan,

We have been retained to complete a transportation impact brief for a development located at 650 Main Street in the City of Port Colborne. The property owner proposes

redevelopment of the lands to permit 58 townhouse units and 706 square metres of commercial uses. Vehicle access to the development is proposed through a single connection to Main Street East (eastern entrance). The western access will be provided solely as a secondary emergency connection; our traffic brief will speak to this. Confirmed that the report will address/provide justification for the need for the second emergency access.

Below is our Scope of Work for the traffic brief for your review and comments:

Study Area Intersections:
- Main Street Weast at B&C Truck Centre East Driveway
- Main Street West at Shell Gas Station Driveway
- Developments driveway connection

Planning Horizons:
- Five years from the date of the study (2027). Accepted

Analysis Periods:
- Weekday AM and PM peak hours. Accepted

Existing Traffic:
- Undertake new traffic counts at the study area intersections. Accepted

Background Traffic:
- A background growth rate of 2.0% per annum Accepted

Site Generated Traffic:
- ITE Trip Generation Manual (11th Edition)
    - LUC 221 – Multifamily Housing (Mid-Rise) – Since the proposed development has been updated into townhouses, then LUC 220 is more appropriate.
    - LUC 822 – Strip Retail Plaza (<40k)
- Trip Distribution based on Existing Traffic Patterns and/or 2016 TTS Survey data Accepted

Thanks,

Adam J. Makarewicz
Senior Project Manager

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w: www.ptsl.com

Appendix B

TRAFFIC DATA

Main St W @ B&C Truck Centre

Morning Peak Diagram

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

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

Municipality: Port Colborne
Site #: 0000000001
Intersection: Main St W & B&C Truck Centre
TFR File #: 1
Count date: 1-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

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

Major Road: Main St W runs W/E

North Leg Total: 18
North Entering: 9
North Peds: 1
Peds Cross: ⋈

Heavys	0	0	0
Trucks	0	1	1
Cars	2	6	8
Totals	2	7	

Heavys	2
Trucks	0
Cars	7
Totals	9

East Leg Total: 433
East Entering: 194
East Peds: 0
Peds Cross: ⧖

B&C Truck Centre

Heavys	Trucks	Cars	Totals
22	5	160	187

Main St W

Heavys	Trucks	Cars	Totals
0	0	0	0
19	7	206	232
19	7	206	

Cars	Trucks	Heavys	Totals
7	0	2	9
158	5	22	185
165	5	24	

N
W E
S

Main St W

Cars	Trucks	Heavys	Totals
212	8	19	239

Peds Cross: ⧖
West Peds: 0
West Entering: 232
West Leg Total: 419

Comments

Main St W @ B&C Truck Centre

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 14:00:00

One Hour Peak
From: 12:15:00
To: 13:15:00

Municipality: Port Colborne
Site #: 0000000001
Intersection: Main St W & B&C Truck Centre
TFR File #: 1
Count date: 1-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

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

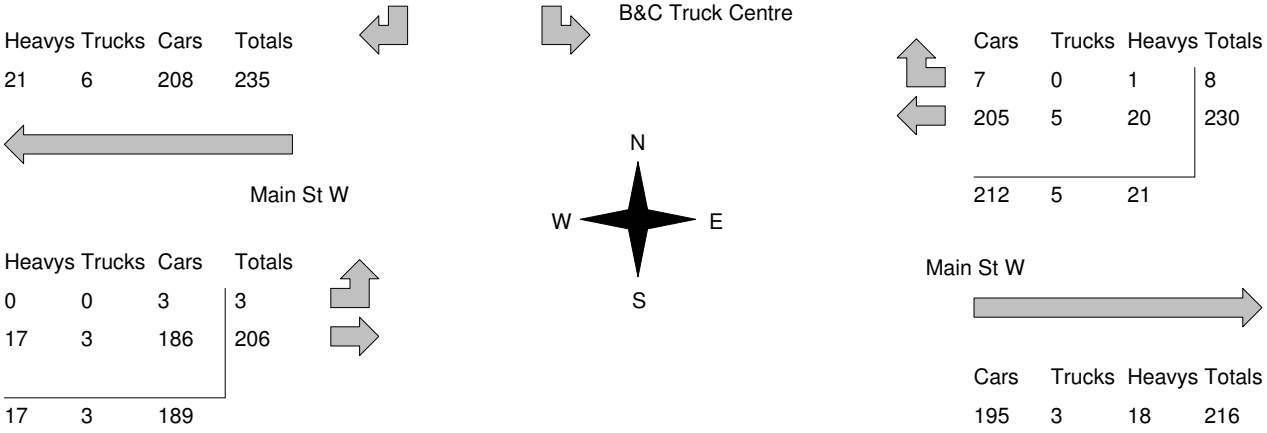
Major Road: Main St W runs W/E

North Leg Total: 26
North Entering: 15
North Peds: 0
Peds Cross: ⋈

Heavys	1	1	2
Trucks	1	0	1
Cars	3	9	12
Totals	5	10	

Heavys	1
Trucks	0
Cars	10
Totals	11

East Leg Total: 454
East Entering: 238
East Peds: 0
Peds Cross: ⧖



Peds Cross: ⧖
West Peds: 0
West Entering: 209
West Leg Total: 444

Comments

Main St W @ B&C Truck Centre

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 15:45:00
To: 16:45:00

Municipality: Port Colborne
Site #: 0000000001
Intersection: Main St W & B&C Truck Centre
TFR File #: 1
Count date: 1-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

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

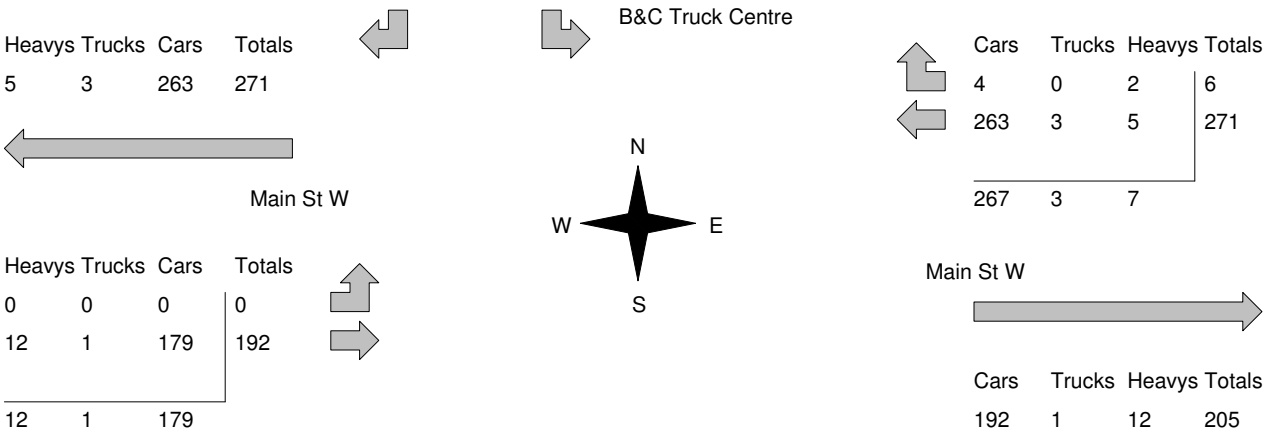
Major Road: Main St W runs W/E

North Leg Total: 19
North Entering: 13
North Peds: 0
Peds Cross: ⋈

Heavys	0	0	0
Trucks	0	0	0
Cars	0	13	13
Totals	0	13	

Heavys	2
Trucks	0
Cars	4
Totals	6

East Leg Total: 482
East Entering: 277
East Peds: 0
Peds Cross: ⧖



Peds Cross: ⧖
West Peds: 0
West Entering: 192
West Leg Total: 463

Comments

Main St W @ B&C Truck Centre

Total Count Diagram

Municipality: Port Colborne
Site #: 0000000001
Intersection: Main St W & B&C Truck Centre
TFR File #: 1
Count date: 1-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

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

Major Road: Main St W runs W/E

North Leg Total: 146
North Entering: 78
North Peds: 4
Peds Cross: ⋈

Heavys	6	4	10
Trucks	2	4	6
Cars	8	54	62
Totals	16	62	

Heavys	14
Trucks	6
Cars	48
Totals	68

East Leg Total: 3355
East Entering: 1764
East Peds: 0
Peds Cross: ⧖

B&C Truck Centre

Heavys	Trucks	Cars	Totals
124	25	1568	1717

Main St W

Heavys	Trucks	Cars	Totals
1	1	3	5
123	22	1384	1529
124	23	1387	

Cars	Trucks	Heavys	Totals
45	5	13	63
1560	23	118	1701
1605	28	131	

Main St W

Cars	Trucks	Heavys	Totals
1438	26	127	1591

N
W E
S

Peds Cross: ⧖
West Peds: 1
West Entering: 1534
West Leg Total: 3251

Comments

Main St W @ Shell Gas Station

Morning Peak Diagram

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

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

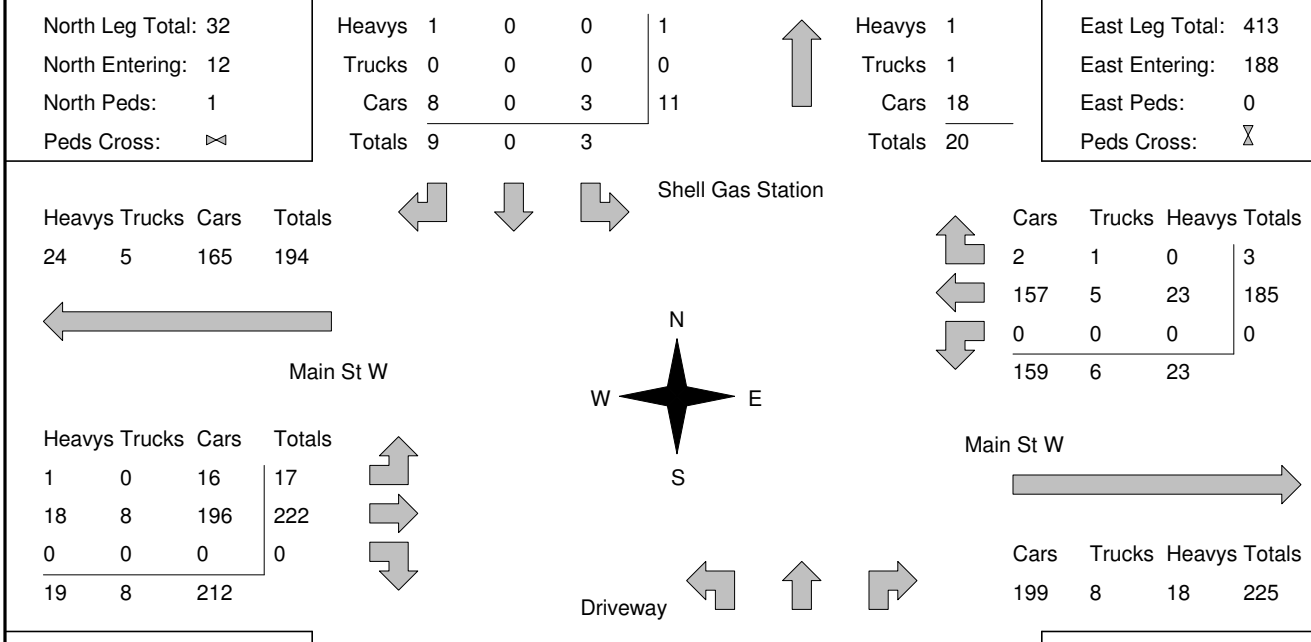
Municipality: Port Colborne
Site #: 0000000002
Intersection: Main St W & Shell Gas Station
TFR File #: 2
Count date: 1-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

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

Major Road: Main St W runs W/E



Comments

Main St W @ Shell Gas Station

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 14:00:00

One Hour Peak
From: 12:15:00
To: 13:15:00

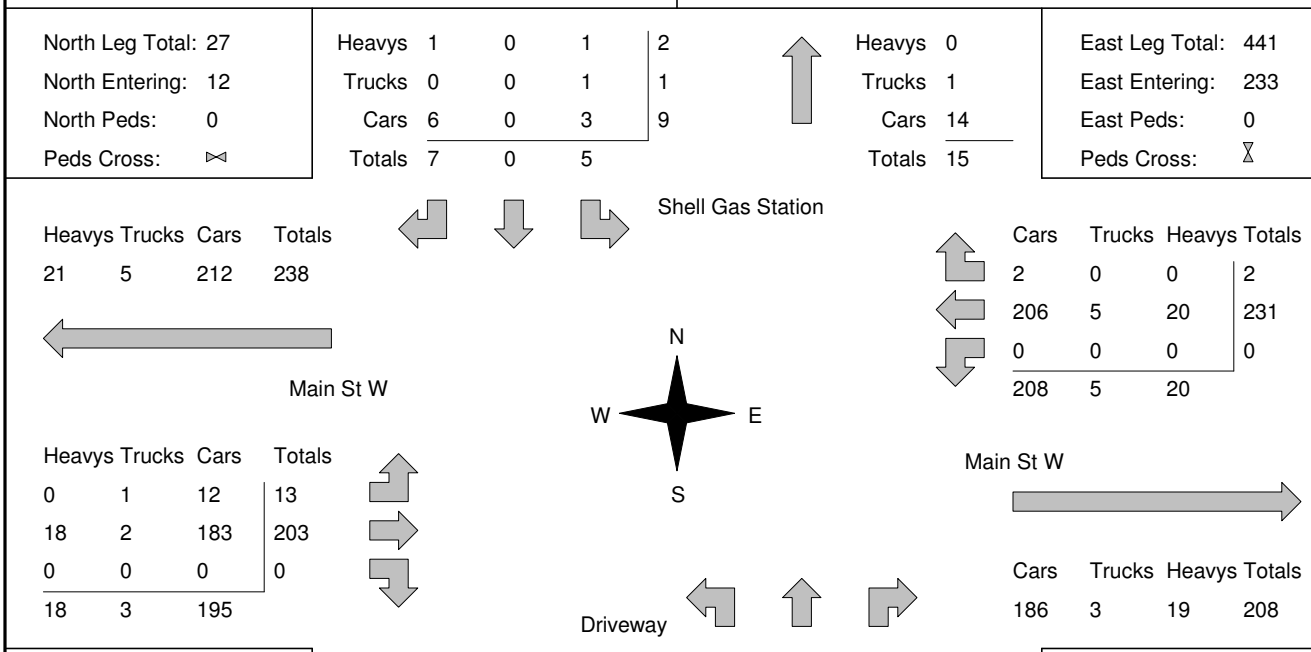
Municipality: Port Colborne
Site #: 0000000002
Intersection: Main St W & Shell Gas Station
TFR File #: 2
Count date: 1-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

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

Major Road: Main St W runs W/E



Comments

Main St W @ Shell Gas Station

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 15:45:00
To: 16:45:00

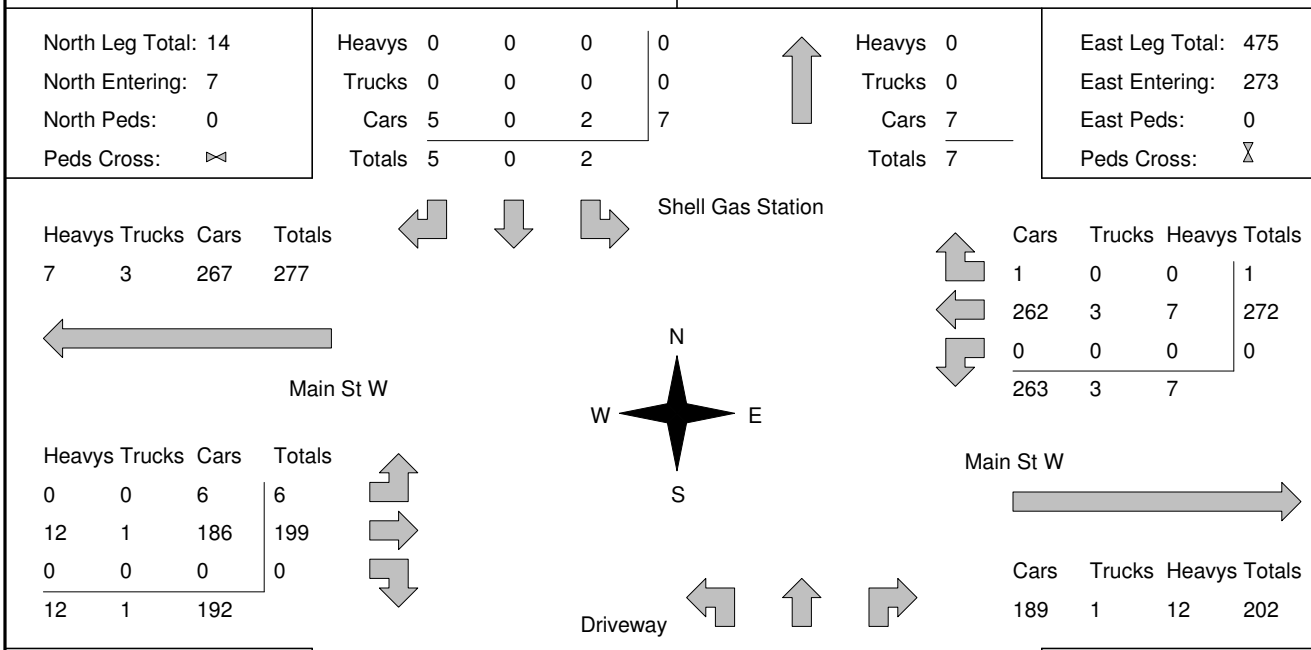
Municipality: Port Colborne
Site #: 0000000002
Intersection: Main St W & Shell Gas Station
TFR File #: 2
Count date: 1-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

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

Major Road: Main St W runs W/E



Comments

Main St W @ Shell Gas Station

Total Count Diagram

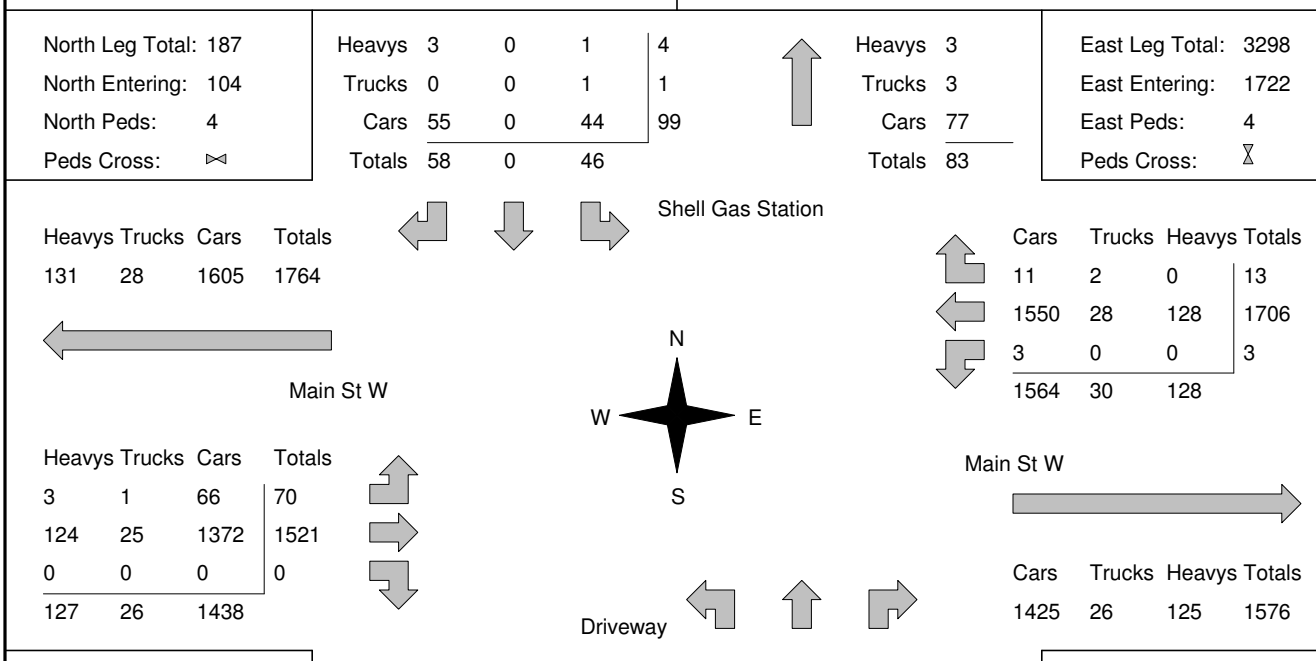
Municipality: Port Colborne
Site #: 0000000002
Intersection: Main St W & Shell Gas Station
TFR File #: 2
Count date: 1-Jun-2022

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

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

Major Road: Main St W runs W/E



Comments

Appendix C

SYNCHRO DETAILED REPORTS

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	17	222	185	3	3	9
Future Volume (vph)	17	222	185	3	3	9
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.998			0.850
Flt Protected		0.997			0.950	
Satd. Flow (prot)	0	1618	1515	0	1662	1340
Flt Permitted		0.997			0.950	
Satd. Flow (perm)	0	1618	1515	0	1662	1340
Link Speed (k/h)		50	50		50	
Link Distance (m)		81.2	306.9		38.4	
Travel Time (s)		5.8	22.1		2.8	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	8%	15%	33%	0%	11%
Adj. Flow (vph)	18	241	201	3	3	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	259	204	0	3	10
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	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	37.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	17	222	185	3	3	9
Future Volume (Veh/h)	17	222	185	3	3	9
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	241	201	3	3	10
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	205				480	204
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	205				480	204
tC, single (s)	4.2				6.4	6.3
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.4
p0 queue free %	99				99	99
cM capacity (veh/h)	1342				540	814

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	259	204	3	10
Volume Left	18	0	3	0
Volume Right	0	3	0	10
cSH	1342	1700	540	814
Volume to Capacity	0.01	0.12	0.01	0.01
Queue Length 95th (m)	0.3	0.0	0.1	0.3
Control Delay (s)	0.6	0.0	11.7	9.5
Lane LOS	A		B	A
Approach Delay (s)	0.6	0.0	10.0	
Approach LOS			A	

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	37.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	232	185	9	7	2
Future Volume (vph)	0	232	185	9	7	2
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.994			0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	1577	1508	0	1433	1488
Flt Permitted					0.950	
Satd. Flow (perm)	0	1577	1508	0	1433	1488
Link Speed (k/h)		50	50		50	
Link Distance (m)		145.7	81.2		33.7	
Travel Time (s)		10.5	5.8		2.4	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	11%	15%	22%	16%	0%
Adj. Flow (vph)	0	252	201	10	8	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	252	211	0	8	2
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	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	23.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	232	185	9	7	2
Future Volume (Veh/h)	0	232	185	9	7	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	252	201	10	8	2
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	212				459	207
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	212				459	207
tC, single (s)	4.1				6.6	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	1369				535	838

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	252	211	8	2
Volume Left	0	0	8	0
Volume Right	0	10	0	2
cSH	1369	1700	535	838
Volume to Capacity	0.00	0.12	0.01	0.00
Queue Length 95th (m)	0.0	0.0	0.4	0.1
Control Delay (s)	0.0	0.0	11.8	9.3
Lane LOS			B	A
Approach Delay (s)	0.0	0.0	11.3	
Approach LOS			B	

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	23.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	6	199	272	1	2	5
Future Volume (vph)	6	199	272	1	2	5
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected		0.998			0.950	
Satd. Flow (prot)	0	1636	1683	0	1662	1488
Flt Permitted		0.998			0.950	
Satd. Flow (perm)	0	1636	1683	0	1662	1488
Link Speed (k/h)		50	50		50	
Link Distance (m)		84.5	306.9		38.4	
Travel Time (s)		6.1	22.1		2.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	7%	4%	0%	0%	0%
Adj. Flow (vph)	7	216	296	1	2	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	223	297	0	2	5
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	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	26.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	199	272	1	2	5
Future Volume (Veh/h)	6	199	272	1	2	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	216	296	1	2	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	297				526	296
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	297				526	296
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				100	99
cM capacity (veh/h)	1276				513	748

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	223	297	2	5
Volume Left	7	0	2	0
Volume Right	0	1	0	5
cSH	1276	1700	513	748
Volume to Capacity	0.01	0.17	0.00	0.01
Queue Length 95th (m)	0.1	0.0	0.1	0.2
Control Delay (s)	0.3	0.0	12.1	9.8
Lane LOS	A		B	A
Approach Delay (s)	0.3	0.0	10.5	
Approach LOS			B	

Intersection Summary				
Average Delay		0.3		
Intersection Capacity Utilization		26.6%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	192	271	6	13	0
Future Volume (vph)	0	192	271	6	13	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.997			
Flt Protected					0.950	
Satd. Flow (prot)	0	1636	1683	0	1662	1750
Flt Permitted					0.950	
Satd. Flow (perm)	0	1636	1683	0	1662	1750
Link Speed (k/h)		50	50		50	
Link Distance (m)		145.7	84.5		33.7	
Travel Time (s)		10.5	6.1		2.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	7%	3%	33%	0%	0%
Adj. Flow (vph)	0	209	295	7	14	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	209	302	0	14	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	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	25.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	192	271	6	13	0
Future Volume (Veh/h)	0	192	271	6	13	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	209	295	7	14	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	302				508	298
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	302				508	298
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				97	100
cM capacity (veh/h)	1270				529	746

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	209	302	14	0
Volume Left	0	0	14	0
Volume Right	0	7	0	0
cSH	1270	1700	529	1700
Volume to Capacity	0.00	0.18	0.03	0.00
Queue Length 95th (m)	0.0	0.0	0.7	0.0
Control Delay (s)	0.0	0.0	12.0	0.0
Lane LOS			B	A
Approach Delay (s)	0.0	0.0	12.0	
Approach LOS			B	

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	25.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	19	245	204	3	3	10
Future Volume (vph)	19	245	204	3	3	10
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.998			0.850
Flt Protected		0.996			0.950	
Satd. Flow (prot)	0	1616	1516	0	1662	1340
Flt Permitted		0.996			0.950	
Satd. Flow (perm)	0	1616	1516	0	1662	1340
Link Speed (k/h)		50	50		50	
Link Distance (m)		79.4	306.9		38.4	
Travel Time (s)		5.7	22.1		2.8	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	8%	15%	33%	0%	11%
Adj. Flow (vph)	21	266	222	3	3	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	287	225	0	3	11
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	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	40.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	19	245	204	3	3	10
Future Volume (Veh/h)	19	245	204	3	3	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	266	222	3	3	11
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	226				532	224
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	226				532	224
tC, single (s)	4.2				6.4	6.3
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.4
p0 queue free %	98				99	99
cM capacity (veh/h)	1318				503	792

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	287	225	3	11
Volume Left	21	0	3	0
Volume Right	0	3	0	11
cSH	1318	1700	503	792
Volume to Capacity	0.02	0.13	0.01	0.01
Queue Length 95th (m)	0.4	0.0	0.1	0.3
Control Delay (s)	0.7	0.0	12.2	9.6
Lane LOS	A		B	A
Approach Delay (s)	0.7	0.0	10.2	
Approach LOS			B	

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	40.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	256	204	10	8	2
Future Volume (vph)	0	256	204	10	8	2
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.994			0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	1577	1508	0	1433	1488
Flt Permitted					0.950	
Satd. Flow (perm)	0	1577	1508	0	1433	1488
Link Speed (k/h)		50	50		50	
Link Distance (m)		145.7	79.4		33.7	
Travel Time (s)		10.5	5.7		2.4	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	11%	15%	22%	16%	0%
Adj. Flow (vph)	0	278	222	11	9	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	278	233	0	9	2
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	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	24.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	256	204	10	8	2
Future Volume (Veh/h)	0	256	204	10	8	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	278	222	11	9	2
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	234				506	228
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	234				506	228
tC, single (s)	4.1				6.6	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.3
p0 queue free %	100				98	100
cM capacity (veh/h)	1344				501	815

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	278	233	9	2
Volume Left	0	0	9	0
Volume Right	0	11	0	2
cSH	1344	1700	501	815
Volume to Capacity	0.00	0.14	0.02	0.00
Queue Length 95th (m)	0.0	0.0	0.4	0.1
Control Delay (s)	0.0	0.0	12.3	9.4
Lane LOS			B	A
Approach Delay (s)	0.0	0.0	11.8	
Approach LOS			B	

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	24.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	7	220	300	1	2	6
Future Volume (vph)	7	220	300	1	2	6
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected		0.998			0.950	
Satd. Flow (prot)	0	1636	1683	0	1662	1488
Flt Permitted		0.998			0.950	
Satd. Flow (perm)	0	1636	1683	0	1662	1488
Link Speed (k/h)		50	50		50	
Link Distance (m)		81.1	306.9		38.4	
Travel Time (s)		5.8	22.1		2.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	7%	4%	0%	0%	0%
Adj. Flow (vph)	8	239	326	1	2	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	247	327	0	2	7
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	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	28.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	220	300	1	2	6
Future Volume (Veh/h)	7	220	300	1	2	6
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	239	326	1	2	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	327				582	326
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	327				582	326
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				100	99
cM capacity (veh/h)	1244				476	719

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	247	327	2	7
Volume Left	8	0	2	0
Volume Right	0	1	0	7
cSH	1244	1700	476	719
Volume to Capacity	0.01	0.19	0.00	0.01
Queue Length 95th (m)	0.2	0.0	0.1	0.2
Control Delay (s)	0.3	0.0	12.6	10.1
Lane LOS	A		B	B
Approach Delay (s)	0.3	0.0	10.6	
Approach LOS			B	

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	28.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	212	299	7	14	0
Future Volume (vph)	0	212	299	7	14	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.997			
Flt Protected					0.950	
Satd. Flow (prot)	0	1636	1682	0	1662	1750
Flt Permitted					0.950	
Satd. Flow (perm)	0	1636	1682	0	1662	1750
Link Speed (k/h)		50	50		50	
Link Distance (m)		145.7	81.1		33.7	
Travel Time (s)		10.5	5.8		2.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	7%	3%	33%	0%	0%
Adj. Flow (vph)	0	230	325	8	15	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	230	333	0	15	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	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	27.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	212	299	7	14	0
Future Volume (Veh/h)	0	212	299	7	14	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	230	325	8	15	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	333				559	329
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	333				559	329
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				97	100
cM capacity (veh/h)	1238				494	717

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	230	333	15	0
Volume Left	0	0	15	0
Volume Right	0	8	0	0
cSH	1238	1700	494	1700
Volume to Capacity	0.00	0.20	0.03	0.00
Queue Length 95th (m)	0.0	0.0	0.8	0.0
Control Delay (s)	0.0	0.0	12.5	0.0
Lane LOS			B	A
Approach Delay (s)	0.0	0.0	12.5	
Approach LOS			B	

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	27.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	19	261	211	3	3	10
Future Volume (vph)	19	261	211	3	3	10
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.998			0.850
Flt Protected		0.997			0.950	
Satd. Flow (prot)	0	1618	1516	0	1662	1340
Flt Permitted		0.997			0.950	
Satd. Flow (perm)	0	1618	1516	0	1662	1340
Link Speed (k/h)		50	50		50	
Link Distance (m)		31.3	306.9		38.4	
Travel Time (s)		2.3	22.1		2.8	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	8%	15%	33%	0%	11%
Adj. Flow (vph)	21	284	229	3	3	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	305	232	0	3	11
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	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

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

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	19	261	211	3	3	10
Future Volume (Veh/h)	19	261	211	3	3	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	284	229	3	3	11
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	233				558	232
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	233				558	232
tC, single (s)	4.2				6.4	6.3
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.4
p0 queue free %	98				99	99
cM capacity (veh/h)	1310				486	785

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	305	232	3	11
Volume Left	21	0	3	0
Volume Right	0	3	0	11
cSH	1310	1700	486	785
Volume to Capacity	0.02	0.14	0.01	0.01
Queue Length 95th (m)	0.4	0.0	0.1	0.3
Control Delay (s)	0.7	0.0	12.5	9.7
Lane LOS	A		B	A
Approach Delay (s)	0.7	0.0	10.3	
Approach LOS			B	

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	41.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	262	219	10	8	2
Future Volume (vph)	0	262	219	10	8	2
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.994			0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	1577	1509	0	1433	1488
Flt Permitted					0.950	
Satd. Flow (perm)	0	1577	1509	0	1433	1488
Link Speed (k/h)		50	50		50	
Link Distance (m)		145.7	48.5		33.7	
Travel Time (s)		10.5	3.5		2.4	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	11%	15%	22%	16%	0%
Adj. Flow (vph)	0	285	238	11	9	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	285	249	0	9	2
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	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	25.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	262	219	10	8	2
Future Volume (Veh/h)	0	262	219	10	8	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	285	238	11	9	2
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	250				530	244
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	250				530	244
tC, single (s)	4.1				6.6	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.3
p0 queue free %	100				98	100
cM capacity (veh/h)	1326				486	799

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	285	249	9	2
Volume Left	0	0	9	0
Volume Right	0	11	0	2
cSH	1326	1700	486	799
Volume to Capacity	0.00	0.15	0.02	0.00
Queue Length 95th (m)	0.0	0.0	0.5	0.1
Control Delay (s)	0.0	0.0	12.5	9.5
Lane LOS			B	A
Approach Delay (s)	0.0	0.0	12.0	
Approach LOS			B	

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	25.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	264	6	7	214	15	16
Future Volume (vph)	264	6	7	214	15	16
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.997				0.930	
Flt Protected				0.998	0.976	
Satd. Flow (prot)	1711	0	0	1712	1557	0
Flt Permitted				0.998	0.976	
Satd. Flow (perm)	1711	0	0	1712	1557	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	48.5			31.3	49.3	
Travel Time (s)	3.5			2.3	3.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	287	7	8	233	16	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	294	0	0	241	33	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	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	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	28.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	264	6	7	214	15	16
Future Volume (Veh/h)	264	6	7	214	15	16
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	287	7	8	233	16	17
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			294		540	290
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			294		540	290
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		97	98
cM capacity (veh/h)			1268		500	749

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	294	241	33
Volume Left	0	8	16
Volume Right	7	0	17
cSH	1700	1268	603
Volume to Capacity	0.17	0.01	0.05
Queue Length 95th (m)	0.0	0.2	1.4
Control Delay (s)	0.0	0.3	11.3
Lane LOS		A	B
Approach Delay (s)	0.0	0.3	11.3
Approach LOS			B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	28.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	7	233	318	1	2	6
Future Volume (vph)	7	233	318	1	2	6
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected		0.998			0.950	
Satd. Flow (prot)	0	1636	1683	0	1662	1488
Flt Permitted		0.998			0.950	
Satd. Flow (perm)	0	1636	1683	0	1662	1488
Link Speed (k/h)		50	50		50	
Link Distance (m)		41.7	306.9		38.4	
Travel Time (s)		3.0	22.1		2.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	7%	4%	0%	0%	0%
Adj. Flow (vph)	8	253	346	1	2	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	261	347	0	2	7
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	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 29.4%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	233	318	1	2	6
Future Volume (Veh/h)	7	233	318	1	2	6
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	253	346	1	2	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	347				616	346
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	347				616	346
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				100	99
cM capacity (veh/h)	1223				455	701

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	261	347	2	7
Volume Left	8	0	2	0
Volume Right	0	1	0	7
cSH	1223	1700	455	701
Volume to Capacity	0.01	0.20	0.00	0.01
Queue Length 95th (m)	0.2	0.0	0.1	0.2
Control Delay (s)	0.3	0.0	13.0	10.2
Lane LOS	A		B	B
Approach Delay (s)	0.3	0.0	10.8	
Approach LOS			B	

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	29.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	229	313	7	14	0
Future Volume (vph)	0	229	313	7	14	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.997			
Flt Protected					0.950	
Satd. Flow (prot)	0	1636	1683	0	1662	1750
Flt Permitted					0.950	
Satd. Flow (perm)	0	1636	1683	0	1662	1750
Link Speed (k/h)		50	50		50	
Link Distance (m)		145.7	43.0		33.7	
Travel Time (s)		10.5	3.1		2.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	7%	3%	33%	0%	0%
Adj. Flow (vph)	0	249	340	8	15	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	249	348	0	15	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	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	28.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	229	313	7	14	0
Future Volume (Veh/h)	0	229	313	7	14	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	249	340	8	15	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	348				593	344
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	348				593	344
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				97	100
cM capacity (veh/h)	1222				472	703

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	249	348	15	0
Volume Left	0	0	15	0
Volume Right	0	8	0	0
cSH	1222	1700	472	1700
Volume to Capacity	0.00	0.20	0.03	0.00
Queue Length 95th (m)	0.0	0.0	0.8	0.0
Control Delay (s)	0.0	0.0	12.9	0.0
Lane LOS			B	A
Approach Delay (s)	0.0	0.0	12.9	
Approach LOS			B	

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	28.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	226	17	18	306	14	13
Future Volume (vph)	226	17	18	306	14	13
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.991				0.935	
Flt Protected				0.997	0.975	
Satd. Flow (prot)	1700	0	0	1711	1564	0
Flt Permitted				0.997	0.975	
Satd. Flow (perm)	1700	0	0	1711	1564	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	43.0			41.7	45.6	
Travel Time (s)	3.1			3.0	3.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	246	18	20	333	15	14
Shared Lane Traffic (%)						
Lane Group Flow (vph)	264	0	0	353	29	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	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	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		

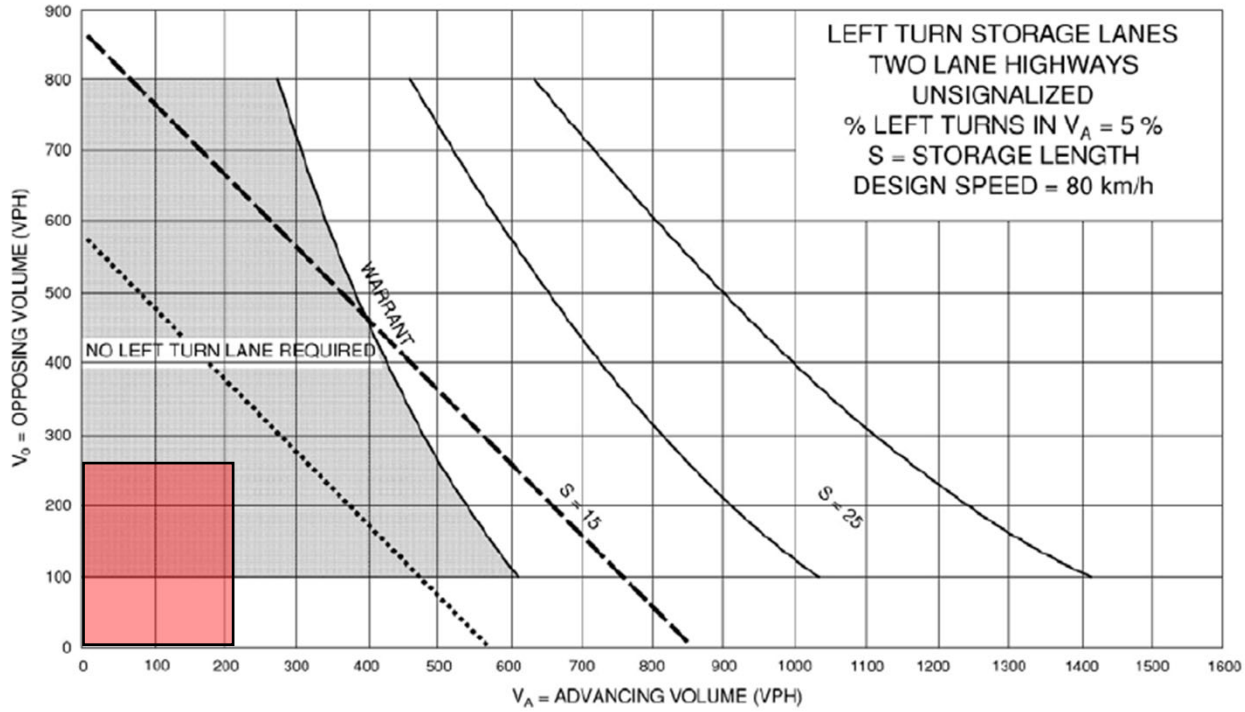
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	226	17	18	306	14	13
Future Volume (Veh/h)	226	17	18	306	14	13
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	246	18	20	333	15	14
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			264		628	255
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			264		628	255
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		97	98
cM capacity (veh/h)			1300		440	784

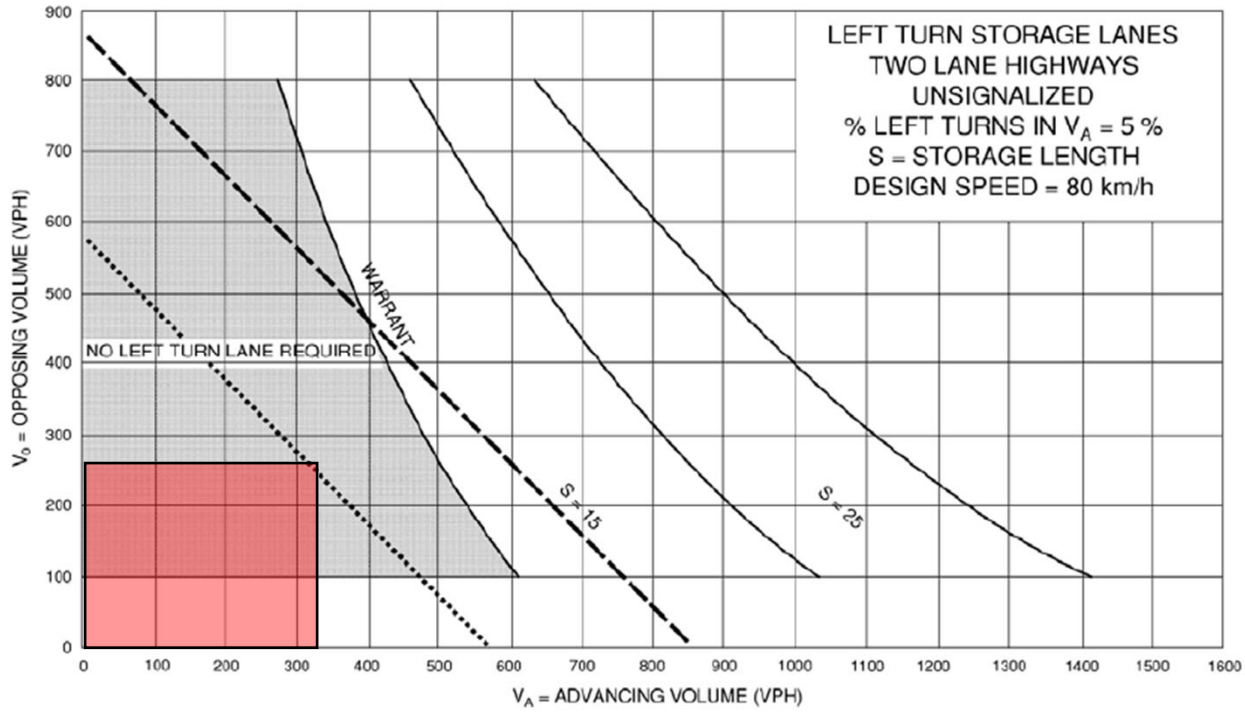
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	264	353	29
Volume Left	0	20	15
Volume Right	18	0	14
cSH	1700	1300	558
Volume to Capacity	0.16	0.02	0.05
Queue Length 95th (m)	0.0	0.4	1.3
Control Delay (s)	0.0	0.6	11.8
Lane LOS		A	B
Approach Delay (s)	0.0	0.6	11.8
Approach LOS			B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix D

LEFT-TURN LANE NOMOGRAPHS





Main Street West at Driveway
Left Turn Lane Warrant

Appendix E

SYNCHRO DETAILED REPORTS (SENSITIVITY ANALYSIS)

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	19	261	204	3	3	10
Future Volume (vph)	19	261	204	3	3	10
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.998			0.850
Flt Protected		0.997			0.950	
Satd. Flow (prot)	0	1618	1516	0	1662	1340
Flt Permitted		0.997			0.950	
Satd. Flow (perm)	0	1618	1516	0	1662	1340
Link Speed (k/h)		50	50		50	
Link Distance (m)		31.3	306.9		38.4	
Travel Time (s)		2.3	22.1		2.8	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	8%	15%	33%	0%	11%
Adj. Flow (vph)	21	284	222	3	3	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	305	225	0	3	11
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	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	19	261	204	3	3	10
Future Volume (Veh/h)	19	261	204	3	3	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	284	222	3	3	11
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	226				550	224
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	226				550	224
tC, single (s)	4.2				6.4	6.3
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.4
p0 queue free %	98				99	99
cM capacity (veh/h)	1318				491	792

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	305	225	3	11
Volume Left	21	0	3	0
Volume Right	0	3	0	11
cSH	1318	1700	491	792
Volume to Capacity	0.02	0.13	0.01	0.01
Queue Length 95th (m)	0.4	0.0	0.1	0.3
Control Delay (s)	0.7	0.0	12.4	9.6
Lane LOS	A		B	A
Approach Delay (s)	0.7	0.0	10.2	
Approach LOS			B	

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	269	219	10	8	2
Future Volume (vph)	0	269	219	10	8	2
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.994			0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	1577	1509	0	1433	1488
Flt Permitted					0.950	
Satd. Flow (perm)	0	1577	1509	0	1433	1488
Link Speed (k/h)		50	50		50	
Link Distance (m)		145.7	48.5		33.7	
Travel Time (s)		10.5	3.5		2.4	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	11%	15%	22%	16%	0%
Adj. Flow (vph)	0	292	238	11	9	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	292	249	0	9	2
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	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	25.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	269	219	10	8	2
Future Volume (Veh/h)	0	269	219	10	8	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	292	238	11	9	2
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	250				536	244
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	250				536	244
tC, single (s)	4.1				6.6	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.3
p0 queue free %	100				98	100
cM capacity (veh/h)	1326				481	799

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	292	249	9	2
Volume Left	0	0	9	0
Volume Right	0	11	0	2
cSH	1326	1700	481	799
Volume to Capacity	0.00	0.15	0.02	0.00
Queue Length 95th (m)	0.0	0.0	0.5	0.1
Control Delay (s)	0.0	0.0	12.6	9.5
Lane LOS			B	A
Approach Delay (s)	0.0	0.0	12.1	
Approach LOS			B	

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	25.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	264	13	0	214	15	16
Future Volume (vph)	264	13	0	214	15	16
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.994				0.930	
Flt Protected					0.976	
Satd. Flow (prot)	1705	0	0	1716	1557	0
Flt Permitted					0.976	
Satd. Flow (perm)	1705	0	0	1716	1557	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	48.5			31.3	49.3	
Travel Time (s)	3.5			2.3	3.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	287	14	0	233	16	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	301	0	0	233	33	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	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	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	25.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	264	13	0	214	15	16
Future Volume (Veh/h)	264	13	0	214	15	16
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	287	14	0	233	16	17
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			301		527	294
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			301		527	294
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		97	98
cM capacity (veh/h)			1260		512	745

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	301	233	33
Volume Left	0	0	16
Volume Right	14	0	17
cSH	1700	1700	610
Volume to Capacity	0.18	0.14	0.05
Queue Length 95th (m)	0.0	0.0	1.4
Control Delay (s)	0.0	0.0	11.2
Lane LOS			B
Approach Delay (s)	0.0	0.0	11.2
Approach LOS			B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	25.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	7	233	300	1	2	6
Future Volume (vph)	7	233	300	1	2	6
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected		0.998			0.950	
Satd. Flow (prot)	0	1636	1683	0	1662	1488
Flt Permitted		0.998			0.950	
Satd. Flow (perm)	0	1636	1683	0	1662	1488
Link Speed (k/h)		50	50		50	
Link Distance (m)		41.7	306.9		38.4	
Travel Time (s)		3.0	22.1		2.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	7%	4%	0%	0%	0%
Adj. Flow (vph)	8	253	326	1	2	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	261	327	0	2	7
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	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	29.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	233	300	1	2	6
Future Volume (Veh/h)	7	233	300	1	2	6
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	253	326	1	2	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	327				596	326
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	327				596	326
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				100	99
cM capacity (veh/h)	1244				467	719

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	261	327	2	7
Volume Left	8	0	2	0
Volume Right	0	1	0	7
cSH	1244	1700	467	719
Volume to Capacity	0.01	0.19	0.00	0.01
Queue Length 95th (m)	0.2	0.0	0.1	0.2
Control Delay (s)	0.3	0.0	12.7	10.1
Lane LOS	A		B	B
Approach Delay (s)	0.3	0.0	10.7	
Approach LOS			B	

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	29.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	27	313	7	14	0
Future Volume (vph)	0	27	313	7	14	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.997			
Flt Protected					0.950	
Satd. Flow (prot)	0	1636	1683	0	1662	1750
Flt Permitted					0.950	
Satd. Flow (perm)	0	1636	1683	0	1662	1750
Link Speed (k/h)		50	50		50	
Link Distance (m)		145.7	43.0		33.7	
Travel Time (s)		10.5	3.1		2.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	7%	3%	33%	0%	0%
Adj. Flow (vph)	0	29	340	8	15	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	29	348	0	15	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	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	28.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	27	313	7	14	0
Future Volume (Veh/h)	0	27	313	7	14	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	29	340	8	15	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	348				373	344
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	348				373	344
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				98	100
cM capacity (veh/h)	1222				632	703

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	29	348	15	0
Volume Left	0	0	15	0
Volume Right	0	8	0	0
cSH	1222	1700	632	1700
Volume to Capacity	0.00	0.20	0.02	0.00
Queue Length 95th (m)	0.0	0.0	0.6	0.0
Control Delay (s)	0.0	0.0	10.8	0.0
Lane LOS			B	A
Approach Delay (s)	0.0	0.0	10.8	
Approach LOS			B	

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	28.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	226	35	0	306	14	13
Future Volume (vph)	226	35	0	306	14	13
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.982				0.935	
Flt Protected					0.975	
Satd. Flow (prot)	1685	0	0	1716	1564	0
Flt Permitted					0.975	
Satd. Flow (perm)	1685	0	0	1716	1564	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	43.0			41.7	45.6	
Travel Time (s)	3.1			3.0	3.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	246	38	0	333	15	14
Shared Lane Traffic (%)						
Lane Group Flow (vph)	284	0	0	333	29	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	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	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	27.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	226	35	0	306	14	13
Future Volume (Veh/h)	226	35	0	306	14	13
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	246	38	0	333	15	14
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			284		598	265
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			284		598	265
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		97	98
cM capacity (veh/h)			1278		465	774

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	284	333	29
Volume Left	0	0	15
Volume Right	38	0	14
cSH	1700	1700	576
Volume to Capacity	0.17	0.20	0.05
Queue Length 95th (m)	0.0	0.0	1.3
Control Delay (s)	0.0	0.0	11.6
Lane LOS			B
Approach Delay (s)	0.0	0.0	11.6
Approach LOS			B

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	27.5%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix F

ADJACENT MUNCPALITES ZONING REQUIREMENTS

ii) Where a change in use occurs that has the effect of requiring the additional spaces identified in Subsection 6.2 b).

6.3 Downtown Zones - Required Parking and Queuing Spaces

No parking and queuing spaces is required for all permitted uses and for dwelling units in buildings containing not more than three dwelling units. For buildings containing four or more dwelling units, one parking space for each dwelling unit above three units shall be required except where a dwelling unit is 50.0 m^2 in gross floor area or less, in which case, parking shall be provided at a rate of 0.3 spaces for each unit.

6.4 All Zones Except Downtown Zones – Required Parking and Queuing Spaces by Use

The minimum required parking and queuing spaces for permitted uses in all Zones, except Downtown Zones permitted by this By-law shall be in accordance with the following Tables.

Table 6.4.1: Residential and Accessory Residential Uses in All Zones Except Downtown Zones - Required Parking Spaces

Column 1	Column 2
Use	**Required Number of Parking Spaces**
Accessory Dwelling	1 additional tandem parking space
Apartment Dwelling Multiple Dwelling	1 space per unit, except where a dwelling unit is 50.0 m^2 in gross floor area or less, in which case, parking shall be provided at a rate of 0.3 spaces for each such unit and no visitor parking is required
Bed and Breakfast	1 additional parking space per guest room permitted in the front yard
	Where 3 guest rooms are provided, one required parking space is not required to have direct, unobstructed access to a public street
Boarding or Lodging House	0.25 additional space per lodging unit

Column 1	Column 2
Use	**Required Number of Parking Spaces**
Emergency Shelter, Group Home, Residential Care Facility	1 space for each 5 persons accommodated or designed for accommodation
	Where the building is less than 350.0 m^2 in gross floor area:
	i) Up to 3 in tandem parking spaces are permitted;
	ii) Two of the 3 parking spaces may be located in the driveway, and they may be located in a front yard if they are located in the laneway that leads to a required parking space;
	iii) Only one of the 3 parking spaces must have direct access to a public street or public lane by a driveway; and
	iv) Where parking is occurring in-tandem anywhere on the lot, no parking is permitted in the rear yard of the lot.
Detached Dwelling Two-Unit Dwelling Street Townhouse Dwelling	1 space per unit; one of which may be provided in an attached or detached garage
Dwelling Units on the 2nd and 3rd Floor of a 2 or 3 storey commercial building	1 space per unit
Home Day Care	No minimum required
Home Industry	No minimum required
Home Occupation	No minimum required

Column 1	Column 2
Use	**Required Number of Parking Spaces**
Retirement Home	0.25 spaces per assisted living unit and dwelling unit
Short-Term Rental	0.5 additional parking space per guest room

Table 6.4.2: Commercial Uses in All Zones except Downtown Zones - Required Parking Spaces

Column 1	Column 2
USE	**Required Number of Parking Spaces**
Adult Entertainment Establishment	1 space per 2 person capacity
Bank; Financial Establishment	1 space for each 50.0 m^2 of gross floor area which accommodates such use
Bowling Alley	1 space per lane, not including restaurant
Building and Lumber Supply Establishment; Building or Contracting Supply Establishment	1 space for each 50.0 m^2 of gross floor area, which accommodates the office, retail and showroom component of the use
Driving Range/Mini Golf	1.5 spaces per tee or hole
Funeral Home	1 space per 20.0 m^2 of gross floor area, 15 spaces minimum
Golf Course	4 spaces for each hole
Hotel/Motel	1 space per guest room or suite
Kennel	1 space per employee plus 1 per 100.0 m^2 gross floor area

Column 1	Column 2
USE	**Required Number of Parking Spaces**
Lodge, Fraternity, Private Club	10 spaces per 100.0 m^2 of gross floor area
Motor Vehicle Body Shop, Motor Vehicle Dealership, Motor Vehicle Rental Establishment, Motor Vehicle Repair Establishment,	1 space per 110.0 m^2 of gross floor area
	25% of all required parking need not have direct, unobstructed access to a public street
Motor Vehicle Service Station	
Motor Vehicle Washing Establishment	1 space per 30.0 m^2 of gross floor area
Movie Theatre	1 space per 4 seats
Office:	
i) Medical Office orClinic	1 space per 30.0 m^2 of gross floor area
ii) Other	1 space per 30.0 m^2 of gross floor area
Personal Services	1 space for each 30.0 m^2 of gross floor area which accommodates such use
Pet Care Establishment	1 space for each 30.0 m^2 of gross floor area which accommodates such use
Place of Assembly	10 spaces per 100.0 m^2 of gross floor area
Recreational Establishment	1 space per 30.0 m^2 of gross floor area
Restaurant	1 space per 30.0 m^2 of gross floor area

Column 1	Column 2
USE	**Required Number of Parking Spaces**
Retail or Retail Centre	1 space per 30.0 m^2 of gross floor area
Service Commercial Establishment	1 space per 30.0 m^2 of gross floor area
Tavern/Bar/Pub	1 space per 30.0 m^2 of gross floor area
Trucking Operation	1 space for each 30.0 m^2 of gross floor area which accommodates the office component of the use
Other Commercial Uses Not Listed Above	1 space for each 30.0 m^2 of gross floor area which accommodates such use

Table 6.4.3: Drive-Through Commercial Uses - Required Queuing Spaces

Column 1	Column 2
Use	**Minimum Number of Queuing Spaces Required**
Motor Vehicle Washing Establishment	Manual: 3 at the entrance and 1 at the bay exit
	Automatic: 5 at the entrance and 2 at the bay exit
Drive-Through Facility	8
In All Other Cases	2

Table 6.4.4: Institutional and Community Uses - Required Parking Spaces

SECTION 4: PARKING AND LOADING REQUIREMENTS

4.1 PARKING SPACE REQUIREMENTS

4.1.1 Minimum Parking Requirements

a) A minimum number of parking spaces shall be provided and maintained on a lot in accordance with the following:

Use	Minimum # of Parking Spaces
AGRICULTURAL USES	
Agri-tourism/Value Added Use	1 space per 55 m^2 GFA
Agricultural-Related Use	1 space per 55 m^2 GFA
Greenhouse and Hoop House Use	1 space per 55 m^2 GFA
On-farm Diversified Use	1 space per 55 m^2 GFA
RESIDENTIAL USES	
Apartment Dwelling	1.25 spaces per dwelling unit
Bed and Breakfast	2 spaces per dwelling unit plus 1 additional space for each guest room
Home Industry	2 spaces per dwelling unit plus 1 additional space for home industry use
Home Occupation	2 spaces per dwelling unit plus 1 additional space for home occupation use
Second Dwelling Unit	1 space per dwelling unit
Semi-Detached Dwelling	2 spaces per dwelling unit
Single Detached Dwelling	2 spaces per dwelling unit
Short Term Accommodation	1 space per guest room
Street Townhouse Dwelling	2 spaces per dwelling unit
Other Permitted Residential	1.25 spaces per dwelling unit
COMMERCIAL USES	
Drive-thru Facility	Restaurant – 10 tandem spaces All Other Uses – 3 tandem spaces
Medical Office	4.5 spaces per 100m^2 GLFA
Office	3.0 spaces per 100m^2 GLFA
Retail Place of Entertainment and Restaurant	3.25 spaces per 100m^2 GLFA
Other Permitted Commercial	3.0 spaces per 100m^2 GLFA
INDUSTRIAL USES	
Industrial	1 space per 50m^2 of GLFA
PUBLIC/INSTITUTIONAL	
Public and Institutional including associated office space and/or retail, restaurants and personal service uses	3.5 spaces per 100m^2 of GLFA