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412 Miller Street

TRAFFIC IMPACT STUDY

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Document Contents

1	Introduction	1
1.1	Study Purpose	1
1.2	Report Structure	1
2	Existing Conditions.....	2
2.1	Road Network	2
2.2	Traffic Volumes	4
2.3	Traffic Operations	5
3	Future Background Conditions.....	8
3.1	Road Network	8
3.2	Traffic Volumes	8
3.3	Traffic Operations	10
3.4	Need for Improvements	10
4	Proposed Development	13
4.1	Location	13
4.2	Phasing & Land-Use.....	13
4.3	Access	13
4.4	Traffic	14
5	Future Conditions	16
5.1	Traffic Volumes	16
5.2	Traffic Operations	16
5.3	Need for Improvements	16
6	Summary.....	20



Tables

Table 1: Highway 26 Traffic Volumes	5
Table 2: Intersection Operations – 2023.....	7
Table 3: Trip Generation – Golf Course Subdivision.....	10
Table 4: Intersection Operations – 2028 Background.....	11
Table 5: Intersection Operations – 2033 Background.....	11
Table 6: Intersection Operations – 2038 Background.....	12
Table 7: Sight Line Assessment	14
Table 8: Trip Generation – 412 Miller Street	15
Table 9: Intersection Operations – 2028 Total	17
Table 10: Intersection Operations – 2033 Total	17
Table 11: Intersection Operations – 2038 Total	18

Figures

Figure 1: Site Location	21
Figure 2: Area Road Network	22
Figure 3: Traffic Volumes – 2023 Counts.....	24
Figure 4: Traffic Volumes – 2023 Summer	25
Figure 5: Background Development Location	26
Figure 6: Traffic Volumes – Background Development	27
Figure 7: Traffic Volumes – 2028 Background	28
Figure 8: Traffic Volumes – 2033 Background	29
Figure 9: Traffic Volumes – 2038 Background	30
Figure 10: Site Plan	31
Figure 11: Traffic Volumes – 412 Miller Street	32
Figure 12: Traffic Volumes – 2028 Total.....	33
Figure 13: Traffic Volumes – 2033 Total.....	34
Figure 14: Traffic Volumes – 2038 Total.....	35

Appendices

Appendix A: Traffic Counts
Appendix B: LOS Definitions
Appendix C: Traffic Operations - Existing
Appendix D: Background Development
Appendix E: Traffic Operations – Future Background
Appendix F: Traffic Operations - Future Total
Appendix G: Left Turn Warrants



1 Introduction

Tatham Engineering Limited was retained by Harry Littler to address the traffic impacts associated with the residential development to be located at 412 Miller Street in the Municipality of Meaford. The location of the development site is illustrated in Figure 1.

1.1 STUDY PURPOSE

The purpose of this study is to address the requirements of the Municipality of Meaford and Grey County with respect to the potential transportation impacts of the development on the area road network. In particular, the following will be discussed:

- the operations of the study area road system prior to the proposed development;
- the growth in the traffic volumes not otherwise attributed to the development (i.e. from overall growth in the area and/or other developments);
- the number of new trips the proposed development is likely to generate;
- the operations of the study area road system upon completion of the proposed development; and
- the resulting impacts and need for mitigating measures (if required) to ensure acceptable overall road operations, including during the construction of the proposed development.

1.2 REPORT STRUCTURE

The report is structured as follows:

- Chapter 1: introduction and study purpose;
- Chapter 2: existing conditions, detailing the road system and corresponding traffic operations;
- Chapter 3: future conditions, prior to the completion of the proposed development (referred to as future background conditions), and the expected growth in traffic levels and the resulting operating conditions;
- Chapter 4: proposed development and associated details including land use, access and traffic volumes;
- Chapter 5: future conditions, with completion of the proposed development (referred to as future total conditions); and
- Chapter 6: summary of the report and key findings.



2 Existing Conditions

This chapter will describe the road network, traffic volumes and operations for the existing conditions.

2.1 ROAD NETWORK

The road network to be addressed by this study consists of Grey Road 12, Miller Street, Pearson Street, Gardiner Street and the following intersections:

- Miller Street with Gardiner Street;
- Miller Street with Pearson Street; and
- Pearson Street with Nelson Street West.

The road network is illustrated in Figure 2.

2.1.1 Roads

Grey Road 12

Grey Road 12 is a County Road under the jurisdiction of Grey County. The road has a 2-lane rural cross section (gravel shoulders and open ditches) with one travel lane per direction. Through the study area, the speed limit is 50 km/h and thus assumed design speed is 70 km/h (posted +20 km/h on County Roads). Through Meaford, Grey Road 12 is locally known as:

- Nelson Street West – east leg of the intersection of Nelson Street West with Pearson Street;
- Pearson Street – south leg of the intersection of Nelson Street West with Pearson Street; and
- Miller Street – west leg of the intersection of Pearson Street with Miller Street.

To keep consistency within the report, Grey Road 12 will be referred to by its local names.

Miller Street/Grey Road 12

Miller Street is an east-west:

- County road (Grey Road 12) to the west of its intersection with Pearson Street under the jurisdiction of the Grey County; and
- local road (Miller Street) to the east of its intersection with Pearson Street under the jurisdiction of the Municipality of Meaford.



The road has a 2-lane rural cross-section (gravel shoulders and open grass ditches) with one travel lane per direction. Speed limits are 40 km/h (local portion) and 50 km/h (County road portion), thus assumed design speeds are 50 km/h (posted +10 km/h on lower speed roads) and 70 km/h (posted +20 km/h on County roads).

Pearson Street/Grey Road 12

Pearson Street is a north-south:

- County road (Grey Road 12) to the south of its intersection with Nelson Street West under the jurisdiction of the Grey County; and
- local road (Pearson Street) to the north of its intersection with Nelson Street West under the jurisdiction of the Municipality of Meaford.

The road has a 2-lane urban cross-section (curb and gutter, sidewalk and open grass ditches) with one travel lane per direction. The speed limits are 40 km/h (local portion) and 50 km/h (County road portion), thus assumed design speeds are 50 km/h (posted +10 km/h on lower speed roads) and 70 km/h (posted +20 km/h on County roads).

Nelson Street West/Grey Road 12

Nelson Street West is an east-west:

- County road (Grey Road 12) to the east of its intersection with Pearson Street under the jurisdiction of the Grey County; and
- local road (Nelson Street West) to the west of its intersection with Pearson Street under the jurisdiction of the Municipality of Meaford.

The road has a 2-lane urban cross-section (curb and gutter, sidewalk and open grass ditches) with one travel lane per direction. The speed limit is 50 km/h and thus the assumed design speeds are 60 km/h (posted +10 km/h on lower speed roads) and 70 km/h (posted +20 km/h on County Roads).

Gardiner Street

Gardiner Street is a north-south local road under the jurisdiction of the Municipality of Meaford. The road has a 2-lane rural cross-section (open grass ditches) with one travel lane per direction. The speed limit is 50 km/h thus the assumed design speed is 60 km/h (posted +10 km/h on lower speed roads).



2.1.2 Intersections

Miller Street & Gardiner Street

The intersection of Miller Street and Gardiner Street is a 3-leg, unsignalized intersection with stop control on Gardiner Street. All approaches provide a single lane (left-through, left-right and through right).

Miller Street & Pearson Street

The intersection of Miller Street and Pearson Street is a 3-leg, unsignalized intersection with stop control on the east approach (Miller Street); the west and north leg serve through traffic. The north approach provides a through lane and a left turn lane, the east approach provides separate left and right turn lanes, and the west approach provides a shared through-right lane.

Pearson Street & Nelson Street West (County)

The intersection of Pearson Street and Nelson Street West is a 3-leg intersection with stop control on the north (Pearson Street) approach; the south and east legs serve through traffic. The north approach consists of a shared left-right lane, the east approach consists of a shared through-right lane and the west approach consists of separate left and through lanes.

Pearson Street & Nelson Street West (Local)

The intersection of Pearson Street and Nelson Street West is a 3-leg intersection with stop control on north (Pearson Street) and west (Nelson Street West) approaches. All approaches provide a shared through-turn (either right or left) lane.

2.2 TRAFFIC VOLUMES

2.2.1 Traffic Counts

Traffic counts were conducted on Wednesday September 27, 2023 from 7:00 to 10:00 and 15:00 to 18:00 at the key intersections as described above. The resulting AM and PM peak hour volumes are illustrated in Figure 3 whereas further count details are provided in Appendix A. Given the time of the counts (October), the volumes are considered reflective of average conditions.

2.2.2 Seasonal Adjustment

Within recreational areas and along key travel corridors, summer traffic volumes are typically the greatest and thus counts completed outside of the summer period are often adjusted accordingly. In absence of other data, to explore the need for such, seasonal traffic counts were obtained from the MTO for Highway 26 east and west of Meaford (summer and average daily



volumes from 2014 to 2019, which is the most current 5-year period). A summary of the seasonal traffic data and resulting ratios is provided in Table 1.

Table 1: Highway 26 Traffic Volumes

ROAD SECTION		DAILY TRAFFIC VOLUME					
		2014	2015	2016	2017	2018	2019
Highway 26 from Peel Street Culvert to Meaford East Limits	AADT	6900	6750	6800	6900	6950	7000
	SADT	6900	6750	6800	6850	6900	6900
	Ratio	1.00	1.00	1.00	0.99	0.99	0.99
Highway 26 Meaford West Limits to 14 th Avenue East	AADT	4850	5300	5300	5350	5350	5400
	SADT	5350	5850	5850	5850	5900	6550
	Ratio	1.10	1.10	1.10	1.09	1.10	1.21
AADT: Average Annual Daily Traffic		SADT: Summer Average Daily Traffic					

As noted, the summer average daily traffic volumes on Highway 26 east of Meaford are equivalent to the average daily traffic volumes (i.e. SADT = AADT) whereas to the west of Meaford, the summer volumes are approximately 10% greater (with the exception of 2019). For the purpose of this assignment, a summer factor of 10% has been employed, and applied to the through volumes on Miller Street and Pearson Street to the south of its intersection with Nelson Street West (i.e. the through travel corridor).

The remaining area roads (Gardiner Street, Nelson Street West and Pearson Street north of the intersection with Nelson Street West) are not expected to experience seasonal variations due to their local nature and thus no seasonal factors have been applied to the traffic volumes to/from those roads based on their limited reach and purpose.

The resulting adjusted 2023 traffic volumes, reflective of peak summer conditions, are illustrated in Figure 4.

2.3 TRAFFIC OPERATIONS

The assessment of existing conditions provides the baseline from which the future traffic volumes and operations (both with and without the subject development) can be assessed. As the capacity, and hence operations of a road system are effectively dictated by its intersections, the assessment focused on the operations of the noted key intersections based on the following:

- the 2023 summer peak hour traffic volumes;



- the existing intersection configurations and controls; and
- procedures outlined in the *2000 Highway Capacity Manual*¹ (using Synchro v.11 software).

For unsignalized intersections, the analysis considers the following for the critical (i.e. stop controlled) movements on the minor road and also the left turn movements (either separate or shared with the through lane) on the major road:

- the average delay (measured in seconds);
- level of service (LOS) - level of service 'A' corresponds to the best operating condition with minimal delays whereas level of service 'F' corresponds to poor operations resulting from high intersection delays (level of service definitions are provided in Appendix B); and
- volume to capacity (v/c) ratios - a v/c ratio of less than 1.0 indicates the intersection movement/approach is operating at less than capacity while v/c of 1.0 indicates capacity has been reached.

Due to the non-typical configurations of some of the study area intersections, the following were employed in the traffic modelling:

- Miller Street & Pearson Street: The eastbound approach has been modeled as northbound (thus the through movement is considered north-south).
- Pearson Street & Nelson Street West (Grey Road 12): The westbound approach has been modeled as southbound (thus the through movement is considered north-south).
- Nelson Street West & Pearson Street: To assess the performance of this intersection, the operations were simulated using *SimTraffic*, the traffic microsimulation module that accompanies Synchro (5 simulations were undertaken, each consisting of a 10-minute seed time and 60-minute run time, with the results of the simulations averaged). *SimTraffic* can output the average vehicle delay experienced on each leg of an intersection, which can be converted to an equivalent LOS per HCM 2000 definitions. *SimTraffic* does not however, output details on utilized capacity.

A summary of the analysis provided in Based on the existing volumes, intersection configuration and control, the key intersections provide good overall levels of service (LOS B or better) with short delays during both peak hours. As such, no intersection improvements are required to support the existing conditions

Table 2, whereas detailed operations worksheets are included in Appendix C.

¹ *Highway Capacity Manual*. Transportation Research Board, Washington DC, 2000.



Based on the existing volumes, intersection configuration and control, the key intersections provide good overall levels of service (LOS B or better) with short delays during both peak hours. As such, no intersection improvements are required to support the existing conditions

Table 2: Intersection Operations – 2023

INTERSECTION, MOVEMENT & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	V/C	Delay	LOS	V/C
Miller St & Gardiner St	EB LT	free	1	A	0.00	1	A	0.01
	SB LR	stop	10	A	0.01	10	A	0.01
Miller St & Pearson St	WB	stop	10	A	0.08	10	B	0.16
	SB L	free	8	A	0.02	8	A	0.01
Pearson St & Nelson St W (GR12)	EB LR	stop	9	A	0.06	9	A	0.06
	NB L	free	7	A	0.01	8	A	0.02
Pearson St & Nelson St W	EB LR	stop	2	A	-	6	A	-
	SB TR	stop	5	A	-	7	A	-
L left lane T through lane R right lane LT left-through TR through-right LTR left-through-right								



3 Future Background Conditions

This chapter will describe the road network and background traffic volumes expected for the years 2028, 2033 and 2038. The 2028 horizon year has been adopted to reflect full build-out of the proposed development, whereas the 2033 and 2038 horizons will address the longer-term impacts (5 and 10 years beyond build-out).

3.1 ROAD NETWORK

The *Transportation Master Plan*² (TMP) for Meaford identifies the following planned road improvements in/or near the study area:

- need for construction of optimal configuration of Miller Street east of Grey Road 12 as short (2021-2026) and medium (2026-2030) goal; and
- work with Grey County to implement signal work at the intersection of Pearson Street and Nelson Street West.

Since the works to be completed require further study and design, and are expected to further improve the operations of the road network, the road network as described in Section 2.1 has been maintained through the analyses of the future horizons. The need for improvements will be identified as resulting from the intersection operations, with consideration for the noted TMP improvements as appropriate.

3.2 TRAFFIC VOLUMES

Future background traffic volumes expected for the 2028, 2033 and 2038 horizon years for the study area have been determined based on the existing traffic volumes, historical and projected growth, and additional increases in volumes due to other developments (if any) within the immediate area (apart from the subject development).

3.2.1 Background Growth

Based on the Census data for the years 2011, 2016 and 2021, the population of the Municipality of Meaford decreased from 11,100 to 10,991 persons, then increased to 11,485 persons, which translates to annual growth of 0.9% between 2016 and 2021, and 0.3% between 2011 and 2021.

² *Municipality of Meaford Transportation Master Plan*. IBI Group. July 19, 2021.



As per the *Grey County Growth Management Strategy Update*³, the Municipality's population is expected to increase from 11,530 in 2016 (more than the Census data) to 12,600 in 2031, 12,920 in 2036 and 13,150 in 2041, reflective of an annual growth of 0.57%.

The *Transportation Master Plan* notes that population of Meaford is expected to grow to 12,180 by 2031, 12,440 by 2036, 12,650 by 2041 and 12,870 by 2045 which translates to an annual growth of 0.45%. The TMP also predicts that number of households and employment will increase, respectively, 0.48% and 0.52% annually.

Based on the above, an annual background growth of 1% has been assumed.

3.2.2 Development Growth

Further to the historical growth in traffic volumes and anticipated population growth in the area, consideration has been given to other planned developments in the area that are expected to contribute additional traffic volumes to the study area road network. In reviewing the Municipality of Meaford Interactive Mapping and through further consultation with the Municipality and County, the development as discussed below has been considered.

Golf Course (Phase B) Subdivision

The proposed Golf Course development is to be located at 408 Ridge Road (north of the 412 Miller Street development) as evident in is provided in Figure 5. For the purpose of this study, full buildout of the Golf Course Development has been assumed for 2028. As per the Municipality of Meaford Interactive Mapping, the development is to consist of 51 single family detached units whereas the Grey County Planning and Development website indicates 12 single family units and 50 townhouse units. For the purpose of this study the Municipality's development level has been implemented in that it will yield the greatest associated traffic volumes.

While a traffic impact study was prepared for this development, it dates back to 2009⁴. In this regard, updated traffic volumes associated with the development were prepared based on trip generation rates provided in the *ITE Trip Generation Manual, 11th Edition* for the *single family detached* (ITE code 210) land use. The trip rates and estimates are provided in Table 3. As noted, the Golf Course development is expected to generate in order of 35 to 48 additional new peak hour trips upon full build-out. However, it is recognized that not all of these trips will travel through the study area road network considered in this report. As assumed in the initial traffic impact study (excerpts provided in Appendix D), 50% of the trips have been distributed to the

³ *Growth Management Strategy Update*. Hemson Consulting Ltd. December 15, 2015.

⁴ *Traffic Impact Assessment Proposed Condominium Development on the Meaford Golf Course Municipality of Meaford*. Gamsby and Mannerow Limited Consulting Professional Engineers. June 2009.



study area road network (as illustrated in Figure 6) whereas, the remaining 50% are expected to travel north towards Highway 26 (thus travelling away from the study area).

Table 3: Trip Generation – Golf Course Subdivision

LAND USE	RATE/ ESTIMATE	VARIABLE/ SIZE	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			In	Out	Total	In	Out	Total
single family detached (ITE 210)	rate	units	0.18	0.52	0.70	0.59	0.35	0.94
	estimate	51	9	26	35	30	18	48

3.2.3 Background Traffic Volumes

The future background traffic volumes for the 2028, 2033 and 2038 horizon years are illustrated in Figure 7 through Figure 9. The volumes are based on the 2023 volumes, adjusted to reflect annual background growth, summer conditions and the noted background development.

3.3 TRAFFIC OPERATIONS

The key intersections were again analyzed for each horizon year given the projected background volumes and maintaining the existing intersection configurations and controls. The results of the operational assessment are summarized in Table 4 through Table 6 (detailed worksheets are provided in Appendix E).

As indicated, the key intersection will continue to provide good operations (LOS B or better) through the 2038 horizon under the future background conditions.

3.4 NEED FOR IMPROVEMENTS

Given the projected operating conditions at the noted intersections, no additional improvements are required to accommodate the future background conditions from a traffic operations perspective.



Table 4: Intersection Operations – 2028 Background

INTERSECTION, MOVEMENT & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	V/C	Delay	LOS	V/C
Miller St & Gardiner St	EB LT	free	1	A	0.00	1	A	0.01
	SB LR	stop	10	A	0.01	10	A	0.01
Miller St & Pearson St	WB	stop	10	A	0.08	10	B	0.16
	SB L	free	8	A	0.02	8	A	0.01
Pearson St & Nelson St W (GR12)	EB LR	stop	9	A	0.08	10	A	0.08
	NB L	free	7	A	0.02	8	A	0.03
Pearson St & Nelson St W	EB LR	stop	3	A	-	4	A	-
	SB TR	stop	5	A	-	5	A	-

L left lane T through lane R right lane LT left-through TR through-right LTR left-through-right

Table 5: Intersection Operations – 2033 Background

INTERSECTION, MOVEMENT & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	V/C	Delay	LOS	V/C
Miller St & Gardiner St	EB LT	free	1	A	0.00	1	A	0.01
	SB LR	stop	10	A	0.01	10	A	0.01
Miller St & Pearson St	WB	stop	10	B	0.09	10	B	0.17
	SB L	free	8	A	0.02	8	A	0.01
Pearson St & Nelson St W (GR12)	EB LR	stop	10	A	0.08	10	A	0.08
	NB L	free	10	A	0.02	8	A	0.03
Pearson St & Nelson St W	EB LR	stop	2	A	-	4	A	-
	SB TR	stop	5	A	-	5	A	-

L left lane T through lane R right lane LT left-through TR through-right LTR left-through-right



Table 6: Intersection Operations – 2038 Background

INTERSECTION, MOVEMENT & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	V/C	Delay	LOS	V/C
Miller St & Gardiner St	EB LT	free	1	A	0.00	1	A	0.01
	SB LR	stop	10	A	0.02	10	A	0.01
Miller St & Pearson St	WB	stop	10	B	0.09	11	B	0.18
	SB L	free	8	A	0.02	8	A	0.02
Pearson St & Nelson St W (GR12)	EB LR	stop	10	A	0.09	10	A	0.08
	NB L	free	7	A	0.02	8	A	0.03
Pearson St & Nelson St W	EB LR	stop	2	A	-	4	A	-
	SB TR	stop	5	A	-	5	A	-
L left lane T through lane R right lane LT left-through TR through-right LTR left-through-right								



4 Proposed Development

This section will provide additional details with respect to the proposed residential development, including its location, the projected site generated traffic volumes and the assignment of such to the adjacent road network.

4.1 LOCATION

The subject development is located at 412 Miller Street in the Municipality of Meaford (as per Figure 1).

4.2 PHASING & LAND-USE

The proposed development is expected to be built in one phase and be fully occupied by 2028, with the following breakdown:

- 18 single detached units;
- 46 semi-detached units;
- 26 townhouse units; and
- 73 condominium units.

A site plan is provided in Figure 10.

4.3 ACCESS

4.3.1 Location & Configuration

As evident in the site plan, access to the development will be provided via a new municipal road connection to Miller Street referred to as Street A, which will provide for a single inbound lane and a single outbound lane, and will be constructed to municipal road standards (i.e. minimum 20.0 metres right-of-way).

4.3.2 Sight Lines

The sight lines along Miller Street at the proposed Street A location have been reviewed in context of the minimum stopping sight distance and intersection sight distance requirements as per the Transportation Association of Canada (TAC) *Geometric Design Guide for Canadian Roads*⁵, which are further explained below.

⁵ *Geometric Design Guide for Canadian Roads, Chapter 9*. Transportation Association of Canada. June 2017.



- Minimum stopping sight distance provides sufficient distance for an approaching motorist to observe a hazard in the road and bring their vehicle to a complete stop prior to the hazard.
- Intersection sight distance allows a vehicle to enter a main road from a side street (or site access) and attain the appropriate operating speed without significantly impacting the operating speed of an approaching vehicle.

The minimum stopping sight and intersection sight distance requirements are provided in Table 7 for design speed of 70 km/h. The available sight lines along Miller Street at site access, as determined from site measures, are also provided in Table 7.

Table 7: Sight Line Assessment

LOCATION	DESIGN SPEED	STOPPING SIGHT DISTANCE	INTERSECTION SIGHT DISTANCE		AVAILABLE SIGHTLINES TO/FROM	
			Left Turn	Right Turn	West	East
Site Access	70 km/h	105 m	150 m	130 m	>160 m	>160 m

As indicated, the available sight distances along Miller Street at the site access satisfy the minimum stopping and intersection sight distance requirements for the noted design speed. Thus, the available sight distances are considered appropriate.

4.4 TRAFFIC

4.4.1 Trip Generation

The number of vehicle trips to be generated by the proposed development has been determined based on type of use, developments size and trip generation rates published in the *ITE Trip Generation Manual, 11th Edition*⁶. Based on the proposed development, the following trip rates have been employed:

- *single family detached* (ITE code 210);
- *single family attached* (ITE code 215); and
- *multifamily housing – mid-rise* (ITE code 221).

The associated trip rates and trip estimates are provided in

⁶ *ITE Trip Generation Manual, 11th Edition*. Institute of Transportation Engineers. September 2021.



Table 8. As indicated, the proposed development is expected to generate 74 new trips during the AM peak hour and 86 new trips during the PM peak hour (total of inbound and outbound trips).

Table 8: Trip Generation – 412 Miller Street

LAND USE	RATE/ ESTIMATE	VARIABLE/ SIZE	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			In	Out	Total	In	Out	Total
single family detached (ITE 210)	rate	units	0.18	0.52	0.70	0.59	0.35	0.94
	estimate	18	3	9	12	11	6	17
single family attached (ITE 215)	rate	units	0.15	0.33	0.48	0.32	0.25	0.57
	estimate	72	11	24	35	23	18	41
multifamily housing – mid-rise (ITE 221)	rate	units	0.09	0.28	0.37	0.24	0.15	0.39
	estimate	73	6	21	27	17	11	28
Total			20	54	74	51	35	86

4.4.2 Trip Distribution & Assignment

The distribution and assignment of the site generated traffic to the road system has been established based on the traffic patterns observed during the traffic counts. The following has been assumed:

- to/from the north via Pearson Street – 5%;
- to/from the east – 75%:
 - east/south (to Highway 26) via Miller Street – 45%;
 - east/south (to Highway 26) via Pearson Street & Nelson Street West – 30%; and
- to/from the west via Miller Street – 20%.

The assignment of the trips generated by the development onto the area road network is based on the trip distribution noted above with consideration given to the expected travel routes.

The assignment of the site generated traffic to the road network is illustrated in Figure 11.



5 Future Conditions

This chapter will address the future total conditions (i.e. with consideration for the additional site generated traffic) and the resulting impacts of the proposed development on the adjacent road system. The following areas are to be addressed:

- future total traffic volumes (future background volumes + site volumes);
- operations at the key intersections and site access point; and
- potential improvements to the study area road network, if necessary.

5.1 TRAFFIC VOLUMES

To assess the impacts of the increased traffic volumes resulting from the proposed development, the site generated traffic was combined with the 2028, 2033 and 2038 background traffic volumes. The resulting future total traffic volumes are presented in Figure 12 to Figure 14.

5.2 TRAFFIC OPERATIONS

The operations of the key intersection were again investigated considering the total traffic volumes for each horizon year. The operations of the proposed site access location have also been reviewed, assuming a shared left-right lane configuration operating under stop control. The results of the operational review are provided in Table 9 through Table 11, whereas detailed worksheets are provided in Appendix F. As indicated, the key intersections will continue to provide good operations (LOS B or better) as will the site access through the 2038 horizon.

5.3 NEED FOR IMPROVEMENTS

5.3.1 Intersection Operations

Based on the results of the intersection operational analyses, no additional improvements are required to accommodate the future total conditions.

5.3.2 Turn Lane Requirements

Despite the otherwise good operations provided at the intersection of Miller Street with the site access the need for exclusive turn lanes has been reviewed based on the following:

- MTO guidelines for auxiliary lanes at unsignalized intersections;
- a design speed of 70 km/h (reflective of 50 km/h speed limit on Miller Street); and
- the projected 2038 (the most crucial) future total traffic volumes.



Table 9: Intersection Operations – 2028 Total

INTERSECTION, MOVEMENT & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	V/C	Delay	LOS	V/C
Miller St & Gardiner St	EB LT	free	1	A	0.00	1	A	0.01
	SB LR	stop	10	A	0.01	10	A	0.01
Miller St & Pearson St	WB	stop	10	B	0.10	11	B	0.20
	SB L	free	8	A	0.02	8	A	0.01
Pearson St & Nelson St W (GR12)	EB LR	stop	10	A	0.08	10	A	0.08
	NB L	free	7	A	0.02	8	A	0.03
Pearson St & Nelson St W	EB LR	stop	2	A	-	4	A	-
	SB TR	stop	5	A	-	5	A	-
Miller St & Site Access	EB LT	free	1	A	0.00	1	A	0.01
	SB LR	stop	11	B	0.08	11	B	0.06
L left lane T through lane R right lane LT left-through TR through-right LTR left-through-right								

Table 10: Intersection Operations – 2033 Total

INTERSECTION, MOVEMENT & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	V/C	Delay	LOS	V/C
Miller St & Gardiner St	EB LT	free	1	A	0.00	1	A	0.01
	SB LR	stop	10	A	0.01	10	A	0.01
Miller St & Pearson St	WB	stop	10	B	0.11	11	B	0.21
	SB L	free	1	A	0.03	8	A	0.02
Pearson St & Nelson St W (GR12)	EB LR	stop	10	A	0.09	10	A	0.09
	NB L	free	7	A	0.02	8	A	0.03



INTERSECTION, MOVEMENT & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	V/C	Delay	LOS	V/C
Pearson St & Nelson St W	EB LR	stop	3	A	-	5	A	-
	SB TR	stop	5	A	-	5	A	-
Miller St & Site Access	EB LT	free	1	A	0.00	1	A	0.01
	SB LR	stop	10	B	0.08	11	B	0.06

L left lane T through lane R right lane LT left-through TR through-right LTR left-through-right

Table 11: Intersection Operations – 2038 Total

INTERSECTION, MOVEMENT & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	V/C	Delay	LOS	V/C
Miller St & Gardiner St	EB LT	free	1	A	0.00	1	A	0.01
	SB LR	stop	10	A	0.02	10	B	0.01
Miller St & Pearson St	WB	stop	11	B	0.11	11	B	0.23
	SB L	free	8	A	0.02	8	A	0.02
Pearson St & Nelson St W (GR12)	EB LR	stop	10	A	0.09	10	A	0.09
	NB L	free	7	A	0.02	8	A	0.03
Pearson St & Nelson St W	EB LR	stop	2	A	-	4	A	-
	SB TR	stop	5	A	-	5	A	-
Miller St & Site Access	EB LT	free	1	A	0.00	1	A	0.01
	SB LR	stop	11	B	0.08	11	B	0.06

L left lane T through lane R right lane LT left-through TR through-right LTR left-through-right



Right Turn Lane

MTO guidelines suggest that an exclusive right turn lane be considered where right turn volumes exceed 60 vehicles per hour and/or impede the operations of through traffic.

The projected westbound right turns will be relatively minor (less than 50 vehicles per hour). In consideration of the above, the right turn lane on Miller Street is not considered necessary.

Left Turn Lane

For unsignalized intersections on two-lane undivided highways, MTO warrants are based on design speed, the volume of left turning traffic, advancing volume (i.e. traffic travelling in the same direction as the left-turning traffic) and opposing volume (i.e. traffic travelling in the opposite direction as the left-turning traffic).

Given the low left turning volumes (10 vehicles or less as per Figure 14) coupled with the reduced volumes on Miller Street, a left turn lane is not warranted at the site access (completed warrants are provided in Appendix G).



6 Summary

Proposed Development

This study has addressed the transportation impacts associated with the development located at 412 Miller Street within the Municipality of Meaford. Upon completion, the development is expected to generate 74 trips during the AM peak hour and 86 trips during the PM peak hour.

Transportation Impacts

In addressing the study area traffic operations, the key intersections as described in Chapter 2 were analysed under existing (2023) and future (2028, 2033 and 2038) horizon periods.

The results of the operational analyses indicate that the subject intersections will provide good (LOS B or better with marginal delays) operating conditions through the 2038 horizon under the future total conditions. As such, no intersection improvements are required to support the proposed development from a traffic operations perspective.

Turn Lane Requirements

The need for exclusive turn lanes on Miller Street at the proposed site access was reviewed in context of MTO warrants. After review of the volumes for the 2038 total traffic scenario (considered the most crucial), it was concluded that the projected volumes do not warrant either an exclusive right turn lane or a left turn lane.

Sight Line Assessment

The available sight lines along Miller Street at site access were reviewed in consideration of MTO sight and intersection distance requirements. In all instances, and in consideration of a design speed of 70 km/h, the available sight lines exceed the requirements and thus vehicles will be able to manoeuvre safely to/from the development site..





Source: Meaford Maps

412 MILLER STREET

Figure 1: Site Location





Source: Meaford Maps

412 MILLER STREET
Figure 2A: Area Road Network





Looking east along Miller Street towards site access



Looking west along Miller Street towards site access



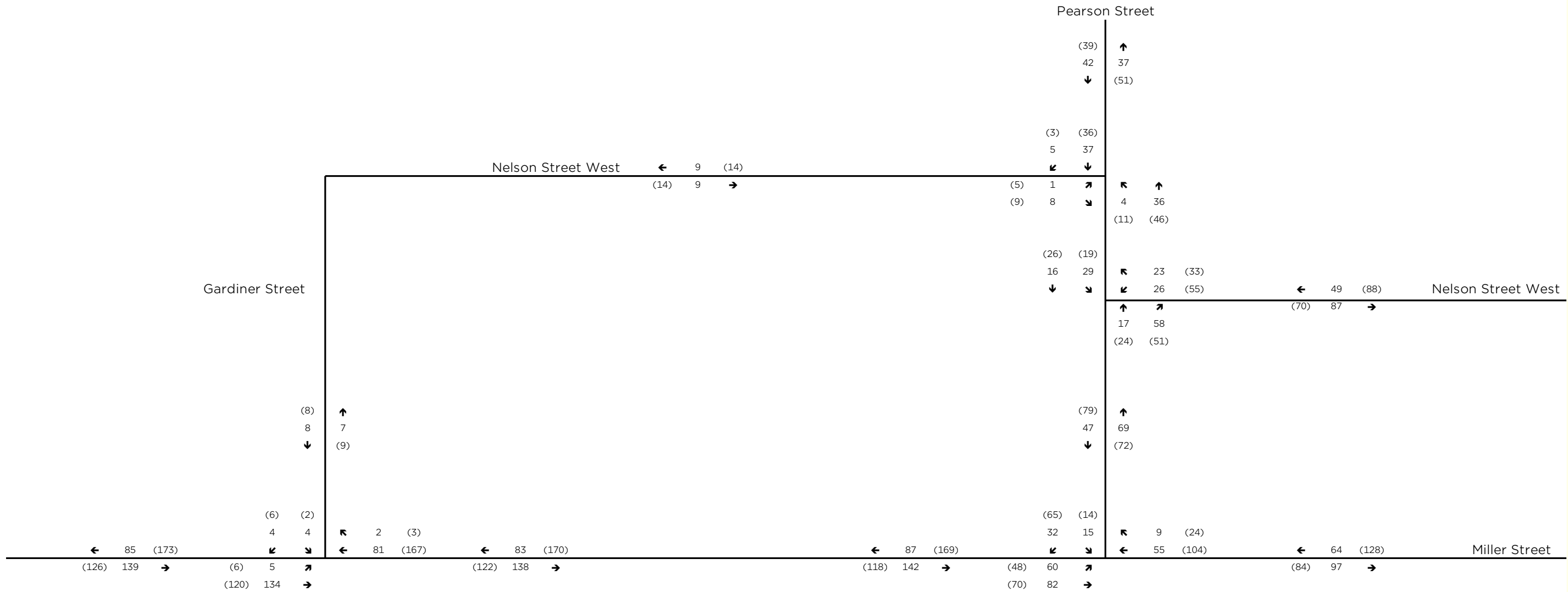
Looking east along Miller Street from the site access



Looking west along Miller Street from the site access

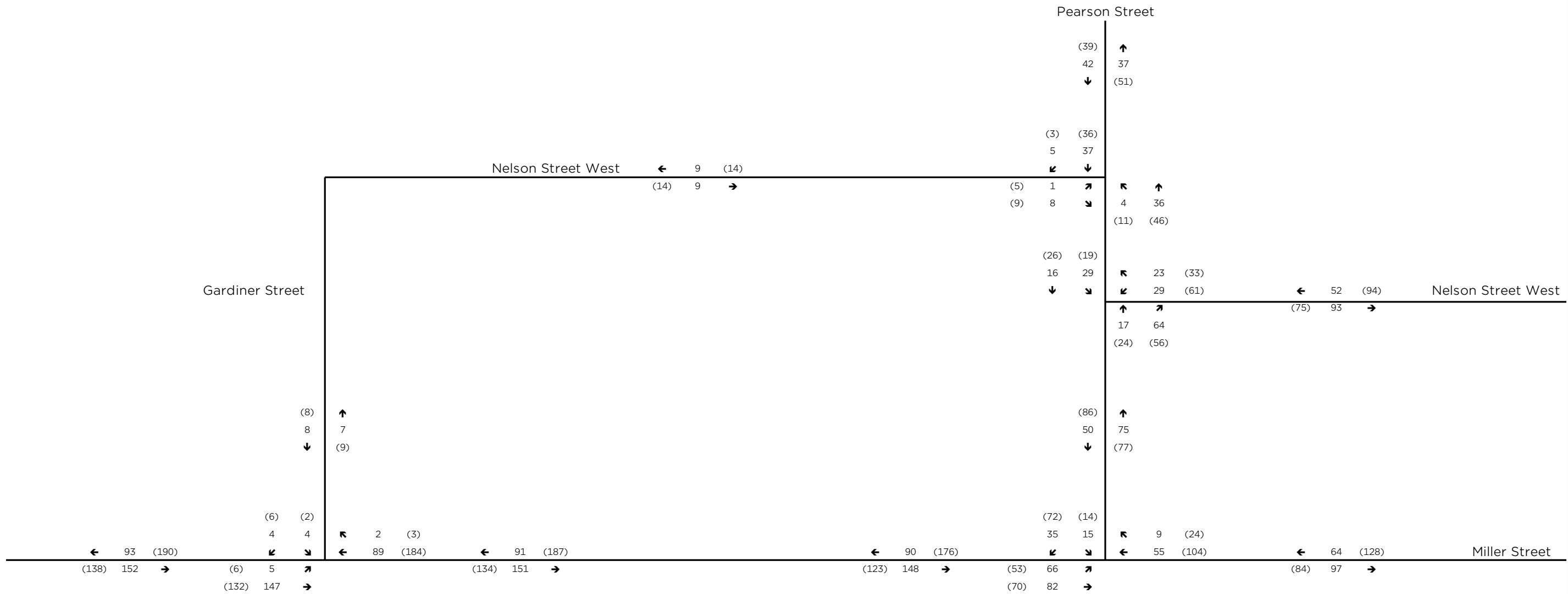
412 MILLER STREET
Figure 2B: Area Road Network





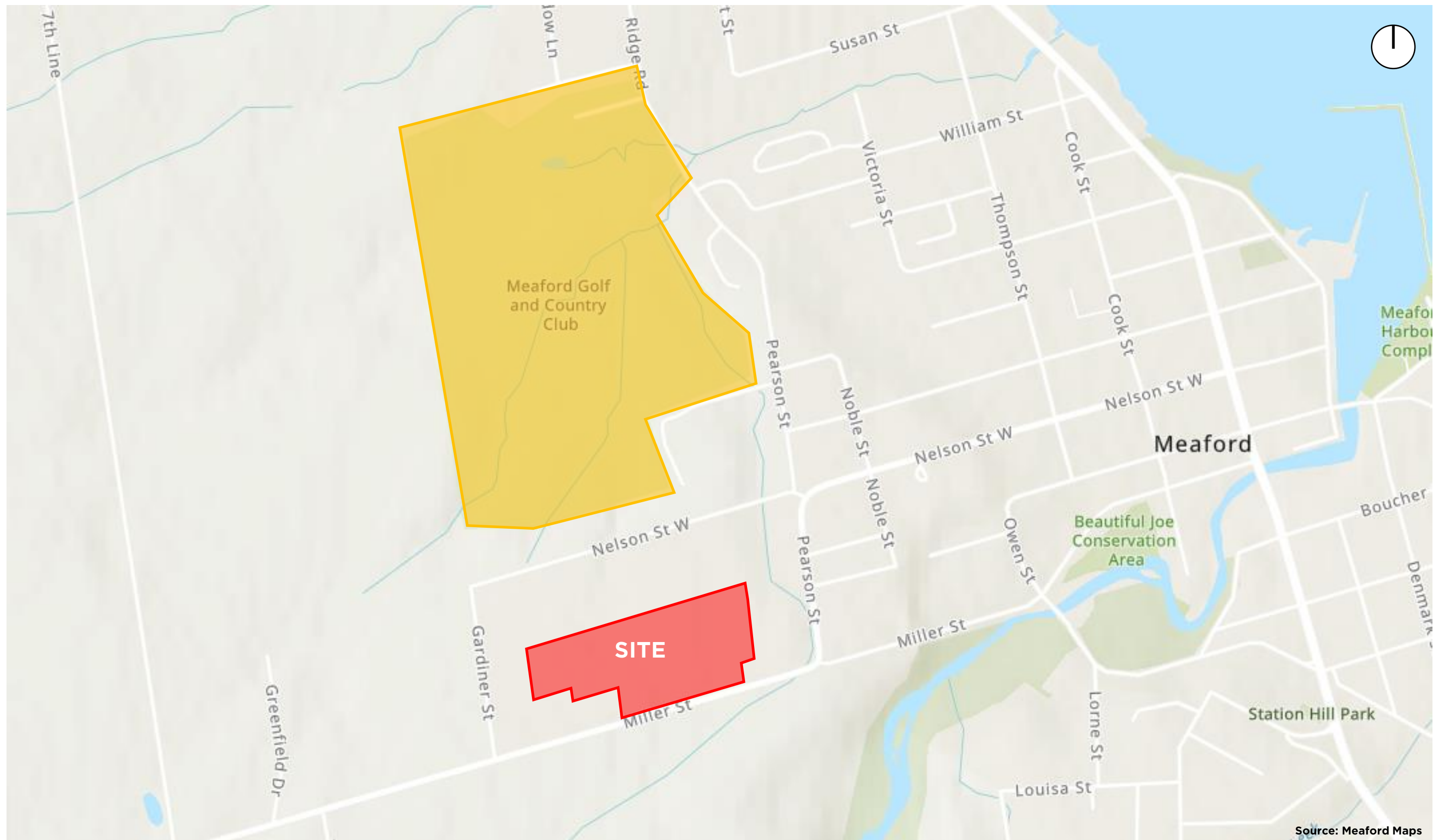
412 MILLER STREET
Figure 3: Traffic Volumes – 2023 Counts





412 MILLER STREET
Figure 4: Traffic Volumes - 2023 Summer

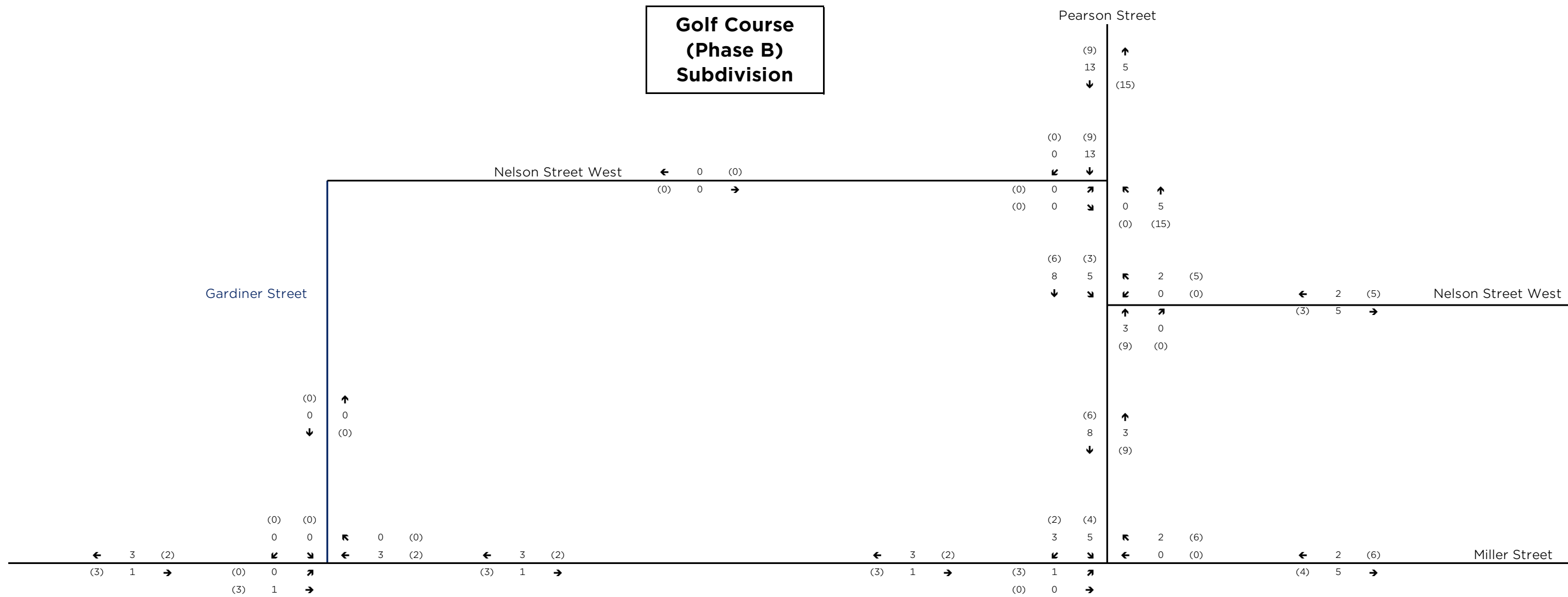




412 MILLER STREET

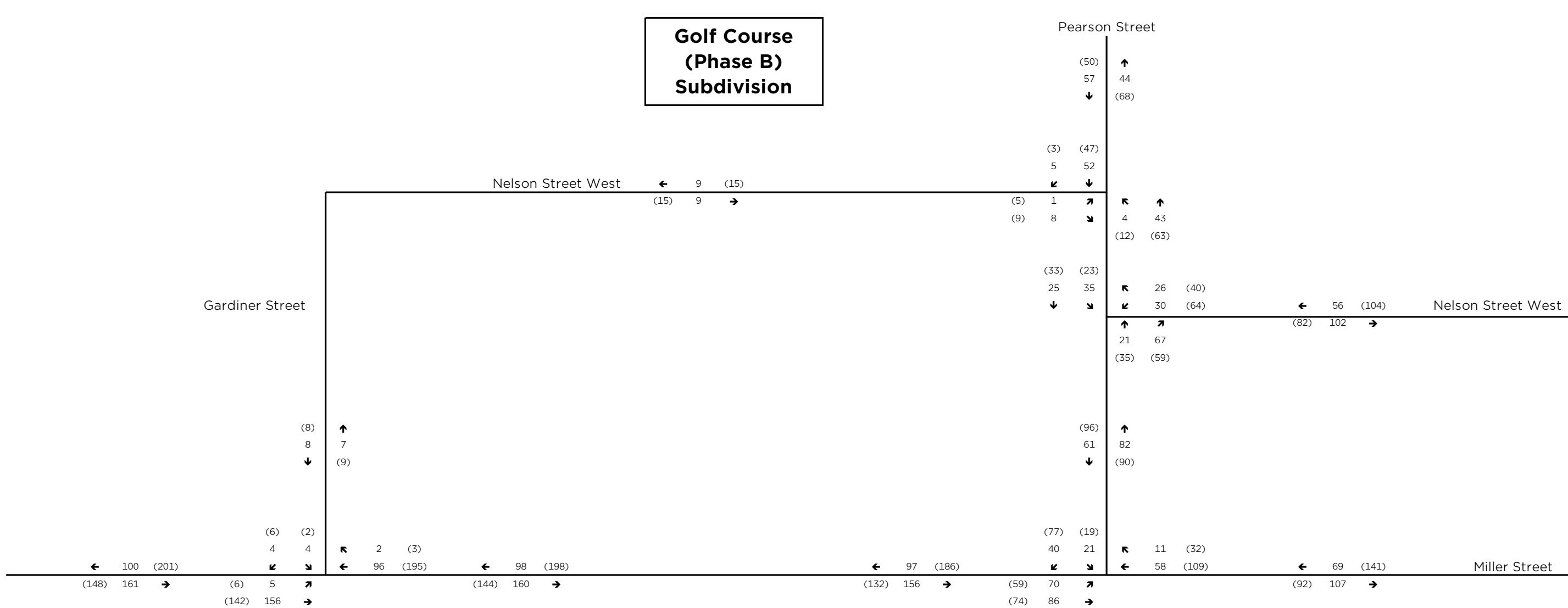
Figure 5: Background Development Location





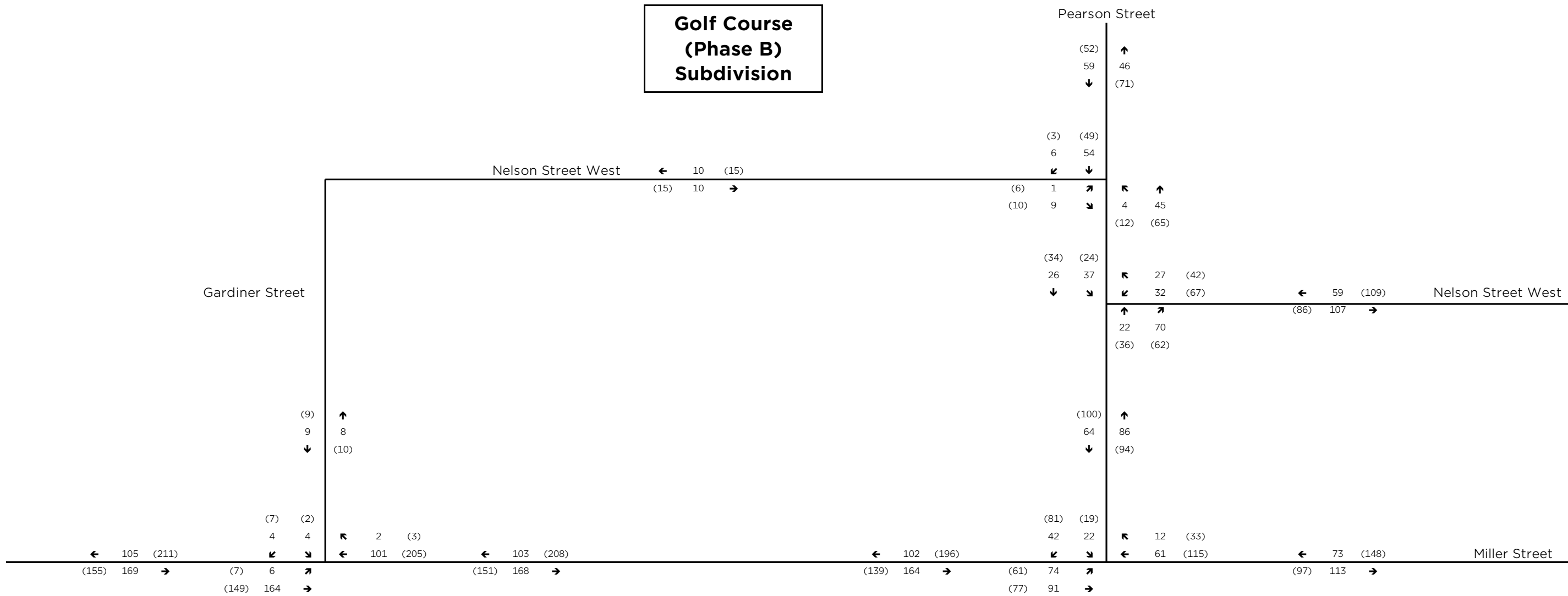
412 MILLER STREET
Figure 6: Traffic Volumes – Background Development





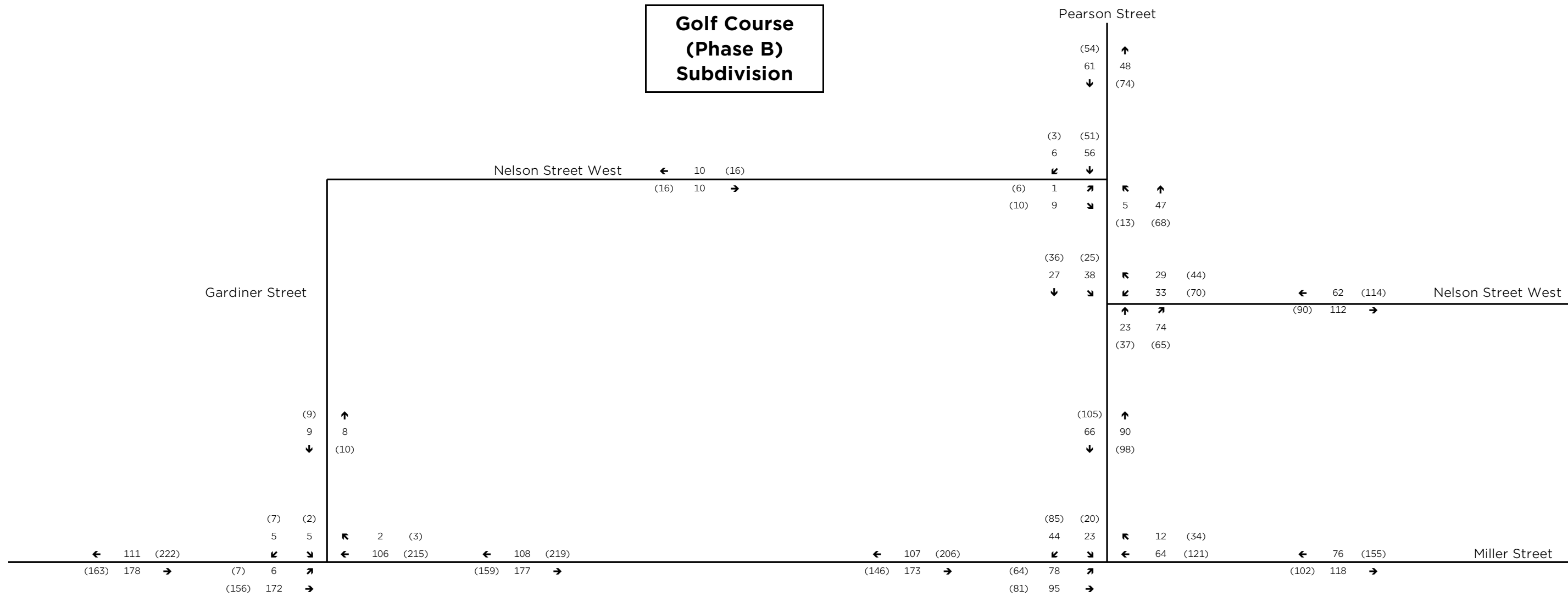
412 MILLER STREET
Figure 7: Traffic Volumes – 2028 Background





412 MILLER STREET
Figure 8: Traffic Volumes – 2033 Background





412 MILLER STREET
Figure 9: Traffic Volumes – 2038 Background



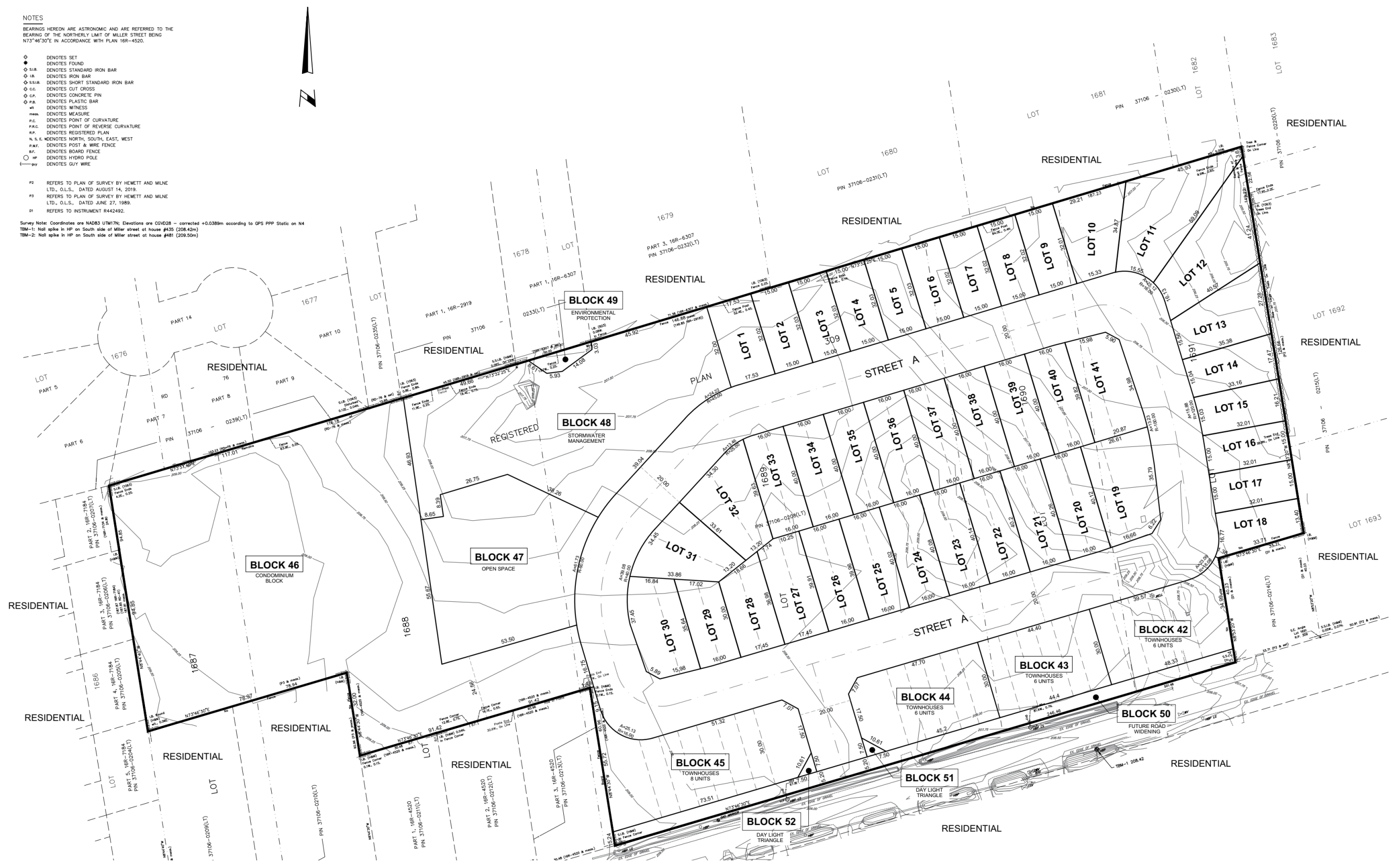
NOTES

BEARINGS HEREON ARE ASTROMOMIC AND ARE REFERRED TO THE BEARING OF THE NORTHERLY LIMIT OF MILLER STREET BEING N73°46'30"E IN ACCORDANCE WITH PLAN 16R-4520.

- ⊙ DENOTES SET
- DENOTES FOUND
- ⊙ S.I.B. DENOTES STANDARD IRON BAR
- ⊙ I.B. DENOTES IRON BAR
- ⊙ S.S.I.B. DENOTES SHORT STANDARD IRON BAR
- ⊙ C.C. DENOTES CUT CROSS
- ⊙ C.P. DENOTES CONCRETE PIN
- ⊙ P.B. DENOTES PLASTIC BAR
- ⊙ W. DENOTES WITNESS
- ⊙ M.S. DENOTES MEASURE
- ⊙ P.C. DENOTES POINT OF CURVATURE
- ⊙ P.R.C. DENOTES POINT OF REVERSE CURVATURE
- ⊙ R.P. DENOTES REGISTERED PLAN
- ⊙ N. S. E. W. DENOTES NORTH, SOUTH, EAST, WEST
- ⊙ P.W.F. DENOTES POST & WIRE FENCE
- ⊙ B.F. DENOTES BOARD FENCE
- ⊙ H.P. DENOTES HYDRO POLE
- ⊙ G.W. DENOTES GUY WIRE

- P2 REFERS TO PLAN OF SURVEY BY HEWETT AND MILNE LTD., O.L.S., DATED AUGUST 14, 2019.
- P3 REFERS TO PLAN OF SURVEY BY HEWETT AND MILNE LTD., O.L.S., DATED JUNE 27, 1989.
- P1 REFERS TO INSTRUMENT R442492.

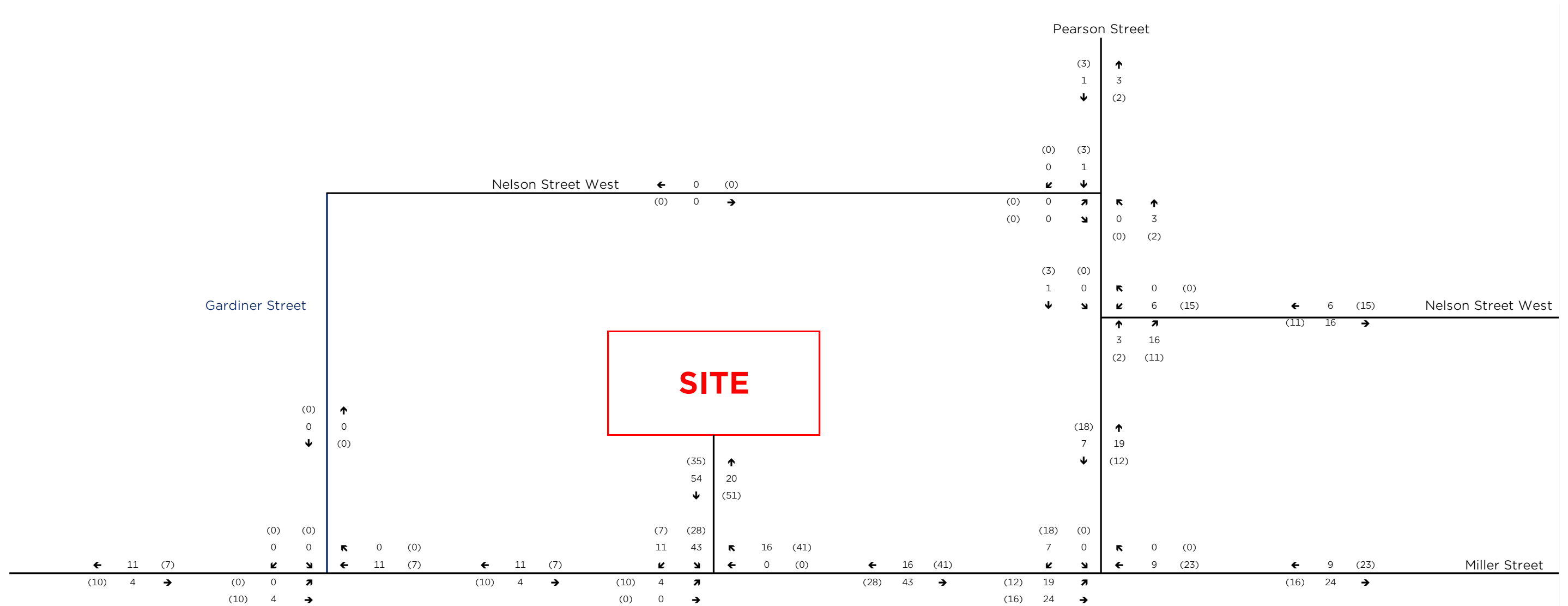
Survey Note: Coordinates are NAD83 UTM17N; Elevations are CGVD28 - corrected +0.0389m according to GPS PPP Static on N4 TBM-1; Nail spike in HP on South side of Miller street at house #435 (208.42m)
TBM-2: Nail spike in HP on South side of Miller street at house #481 (209.50m)



412 MILLER STREET

Figure 10: Site Plan





412 MILLER STREET
Figure 11: Traffic Volumes – 412 Miller Street





412 MILLER STREET
Figure 12: Traffic Volumes – 2028 Total





412 MILLER STREET
Figure 13: Traffic Volumes – 2033 Total





412 MILLER STREET
Figure 14: Traffic Volumes – 2038 Total



Appendix A: Traffic Counts

Morning Peak Diagram		Specified Period From: 7:00:00 To: 10:00:00	One Hour Peak From: 8:15:00 To: 9:15:00
Municipality: Meaford Site #: 2321400001 Intersection: Miller St & Gardiner St TFR File #: 1 Count date: 27-Sep-23		Weather conditions: Person counted: Person prepared: Person checked:	
** Non-Signalized Intersection **		Major Road: Miller St runs W/E	

North Leg Total: 15 North Entering: 8 North Peds: 4 Peds Cross:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding: 2px;">Buses 1</td> <td style="padding: 2px;">0</td> <td style="border-right: 1px solid black; padding: 2px;">1</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">Trucks 0</td> <td style="padding: 2px;">0</td> <td style="border-right: 1px solid black; padding: 2px;">0</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">Cars 3</td> <td style="padding: 2px;">4</td> <td style="border-right: 1px solid black; padding: 2px;">7</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">Totals 4</td> <td style="padding: 2px;">4</td> <td style="border-right: 1px solid black; padding: 2px;"></td> </tr> </table>	Buses 1	0	1	Trucks 0	0	0	Cars 3	4	7	Totals 4	4			<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding: 2px;">Buses 1</td> <td style="padding: 2px;">0</td> <td style="border-right: 1px solid black; padding: 2px;">0</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">Trucks 0</td> <td style="padding: 2px;">0</td> <td style="border-right: 1px solid black; padding: 2px;">0</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">Cars 6</td> <td style="padding: 2px;">0</td> <td style="border-right: 1px solid black; padding: 2px;">0</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">Totals 7</td> <td style="padding: 2px;">0</td> <td style="border-right: 1px solid black; padding: 2px;">0</td> </tr> </table>	Buses 1	0	0	Trucks 0	0	0	Cars 6	0	0	Totals 7	0	0	East Leg Total: 221 East Entering: 83 East Peds: 0 Peds Cross:
Buses 1	0	1																										
Trucks 0	0	0																										
Cars 3	4	7																										
Totals 4	4																											
Buses 1	0	0																										
Trucks 0	0	0																										
Cars 6	0	0																										
Totals 7	0	0																										

Buses	Trucks	Cars	Totals
3	6	76	85

Miller St

Buses	Trucks	Cars	Totals
1	0	4	5
4	4	126	134
5	4	130	

Gardiner St

Cars	Trucks	Buses	Totals
2	0	0	2
73	6	2	81
75	6	2	

Miller St

Cars	Trucks	Buses	Totals
130	4	4	138

Peds Cross:	West Peds: 9 West Entering: 139 West Leg Total: 224
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Comments

Afternoon Peak Diagram		Specified Period From: 15:00:00 To: 18:00:00	One Hour Peak From: 16:15:00 To: 17:15:00
Municipality: Meaford Site #: 2321400001 Intersection: Miller St & Gardiner St TFR File #: 1 Count date: 27-Sep-23		Weather conditions: Person counted: Person prepared: Person checked:	
** Non-Signalized Intersection **		Major Road: Miller St runs W/E	

North Leg Total: 17 North Entering: 8 North Peds: 1 Peds Cross:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td>Buses</td><td>0</td><td>0</td><td>0</td></tr> <tr> <td>Trucks</td><td>0</td><td>1</td><td>1</td></tr> <tr> <td>Cars</td><td>6</td><td>1</td><td>7</td></tr> <tr> <td>Totals</td><td>6</td><td>2</td><td></td></tr> </table>	Buses	0	0	0	Trucks	0	1	1	Cars	6	1	7	Totals	6	2		<table style="width: 100%; border-collapse: collapse;"> <tr> <td>Buses</td><td>0</td></tr> <tr> <td>Trucks</td><td>0</td></tr> <tr> <td>Cars</td><td>9</td></tr> <tr> <td>Totals</td><td>9</td></tr> </table>	Buses	0	Trucks	0	Cars	9	Totals	9	East Leg Total: 292 East Entering: 170 East Peds: 0 Peds Cross:
Buses	0	0	0																								
Trucks	0	1	1																								
Cars	6	1	7																								
Totals	6	2																									
Buses	0																										
Trucks	0																										
Cars	9																										
Totals	9																										

Buses	Trucks	Cars	Totals
0	1	172	173

Miller St

Buses	Trucks	Cars	Totals
0	0	6	6
0	1	119	120
0	1	125	

Gardiner St

Cars	Trucks	Buses	Totals
3	0	0	3
166	1	0	167
169	1	0	

Miller St

Cars	Trucks	Buses	Totals
120	2	0	122

Peds Cross: West Peds: 0 West Entering: 126 West Leg Total: 299
--

Comments

Traffic Count Summary

Intersection: Miller St & Gardiner St

Count Date: 27-Sep-23

Municipality: Meaford

North Approach Totals						North/South Total Approaches	South Approach Totals						
Hour Ending	Includes Cars, Trucks, & Buses				Total Peds		Hour Ending	Includes Cars, Trucks, & Buses				Total Peds	
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total		
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0	
8:00:00	2	0	9	11	0	11	8:00:00	0	0	0	0	0	
9:00:00	4	0	5	9	10	9	9:00:00	0	0	0	0	0	
10:00:00	4	0	3	7	0	7	10:00:00	0	0	0	0	0	
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0	
16:00:00	2	0	6	8	8	8	16:00:00	0	0	0	0	0	
17:00:00	3	0	6	9	0	9	17:00:00	0	0	0	0	0	
18:00:00	8	0	6	14	1	14	18:00:00	0	0	0	0	0	

Morning Peak Diagram		Specified Period From: 7:00:00 To: 10:00:00	One Hour Peak From: 8:15:00 To: 9:15:00
Municipality: Meaford Site #: 2321400002 Intersection: Miller St & Pearson St TFR File #: 1 Count date: 27-Sep-23		Weather conditions: Person counted: Person prepared: Person checked:	
** Non-Signalized Intersection **		Major Road: Miller St runs W/E	

North Leg Total: 116 North Entering: 47 North Peds: 0 Peds Cross:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td>Buses</td><td>0</td><td>0</td><td>0</td></tr> <tr> <td>Trucks</td><td>5</td><td>0</td><td>5</td></tr> <tr> <td>Cars</td><td>27</td><td>15</td><td>42</td></tr> <tr> <td>Totals</td><td>32</td><td>15</td><td></td></tr> </table>	Buses	0	0	0	Trucks	5	0	5	Cars	27	15	42	Totals	32	15		<table style="width: 100%; border-collapse: collapse;"> <tr> <td>Buses</td><td>2</td></tr> <tr> <td>Trucks</td><td>3</td></tr> <tr> <td>Cars</td><td>64</td></tr> <tr> <td>Totals</td><td>69</td></tr> </table>	Buses	2	Trucks	3	Cars	64	Totals	69	East Leg Total: 161 East Entering: 64 East Peds: 0 Peds Cross:
Buses	0	0	0																								
Trucks	5	0	5																								
Cars	27	15	42																								
Totals	32	15																									
Buses	2																										
Trucks	3																										
Cars	64																										
Totals	69																										

Buses	Trucks	Cars	Totals
1	8	78	87

Miller St

Buses	Trucks	Cars	Totals
2	3	55	60
1	1	80	82
3	4	135	

Pearson St

Cars	Trucks	Buses	Totals
9	0	0	9
51	3	1	55
60	3	1	

Miller St

Cars	Trucks	Buses	Totals
95	1	1	97

Peds Cross: West Peds: 0 West Entering: 142 West Leg Total: 229	Comments
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Afternoon Peak Diagram		Specified Period From: 15:00:00 To: 18:00:00	One Hour Peak From: 16:15:00 To: 17:15:00																																																	
Municipality: Meaford Site #: 2321400002 Intersection: Miller St & Pearson St TFR File #: 1 Count date: 27-Sep-23		Weather conditions: Person counted: Person prepared: Person checked:																																																		
** Non-Signalized Intersection **		Major Road: Miller St runs W/E																																																		
North Leg Total: 151 North Entering: 79 North Peds: 0 Peds Cross:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Buses</td> <td style="text-align: right;">0</td> <td style="text-align: right;">0</td> <td style="text-align: right;">0</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">2</td> <td style="text-align: right;">0</td> <td style="text-align: right;">2</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">63</td> <td style="text-align: right;">14</td> <td style="text-align: right;">77</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">65</td> <td style="text-align: right;">14</td> <td></td> </tr> </table>	Buses	0	0	0	Trucks	2	0	2	Cars	63	14	77	Totals	65	14			<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Buses</td> <td style="text-align: right;">0</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">1</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">71</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">72</td> </tr> </table>	Buses	0	Trucks	1	Cars	71	Totals	72	East Leg Total: 212 East Entering: 128 East Peds: 0 Peds Cross:																								
Buses	0	0	0																																																	
Trucks	2	0	2																																																	
Cars	63	14	77																																																	
Totals	65	14																																																		
Buses	0																																																			
Trucks	1																																																			
Cars	71																																																			
Totals	72																																																			
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Buses</td> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">Cars</td> <td style="text-align: right;">Totals</td> </tr> <tr> <td style="text-align: right;">0</td> <td style="text-align: right;">2</td> <td style="text-align: right;">167</td> <td style="text-align: right;">169</td> </tr> </table> Miller St Pearson St <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Buses</td> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">Cars</td> <td style="text-align: right;">Totals</td> </tr> <tr> <td style="text-align: right;">0</td> <td style="text-align: right;">1</td> <td style="text-align: right;">47</td> <td style="text-align: right;">48</td> </tr> <tr> <td style="text-align: right;">0</td> <td style="text-align: right;">1</td> <td style="text-align: right;">69</td> <td style="text-align: right;">70</td> </tr> <tr> <td style="text-align: right;">0</td> <td style="text-align: right;">2</td> <td style="text-align: right;">116</td> <td></td> </tr> </table> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">Buses</td> <td style="text-align: right;">Totals</td> </tr> <tr> <td style="text-align: right;">24</td> <td style="text-align: right;">0</td> <td style="text-align: right;">0</td> <td style="text-align: right;">24</td> </tr> <tr> <td style="text-align: right;">104</td> <td style="text-align: right;">0</td> <td style="text-align: right;">0</td> <td style="text-align: right;">104</td> </tr> <tr> <td style="text-align: right;">128</td> <td style="text-align: right;">0</td> <td style="text-align: right;">0</td> <td></td> </tr> </table> Miller St <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">Buses</td> <td style="text-align: right;">Totals</td> </tr> <tr> <td style="text-align: right;">83</td> <td style="text-align: right;">1</td> <td style="text-align: right;">0</td> <td style="text-align: right;">84</td> </tr> </table>					Buses	Trucks	Cars	Totals	0	2	167	169	Buses	Trucks	Cars	Totals	0	1	47	48	0	1	69	70	0	2	116		Cars	Trucks	Buses	Totals	24	0	0	24	104	0	0	104	128	0	0		Cars	Trucks	Buses	Totals	83	1	0	84
Buses	Trucks	Cars	Totals																																																	
0	2	167	169																																																	
Buses	Trucks	Cars	Totals																																																	
0	1	47	48																																																	
0	1	69	70																																																	
0	2	116																																																		
Cars	Trucks	Buses	Totals																																																	
24	0	0	24																																																	
104	0	0	104																																																	
128	0	0																																																		
Cars	Trucks	Buses	Totals																																																	
83	1	0	84																																																	
Peds Cross: West Peds: 0 West Entering: 118 West Leg Total: 287																																																				
Comments																																																				

Total Count Diagram

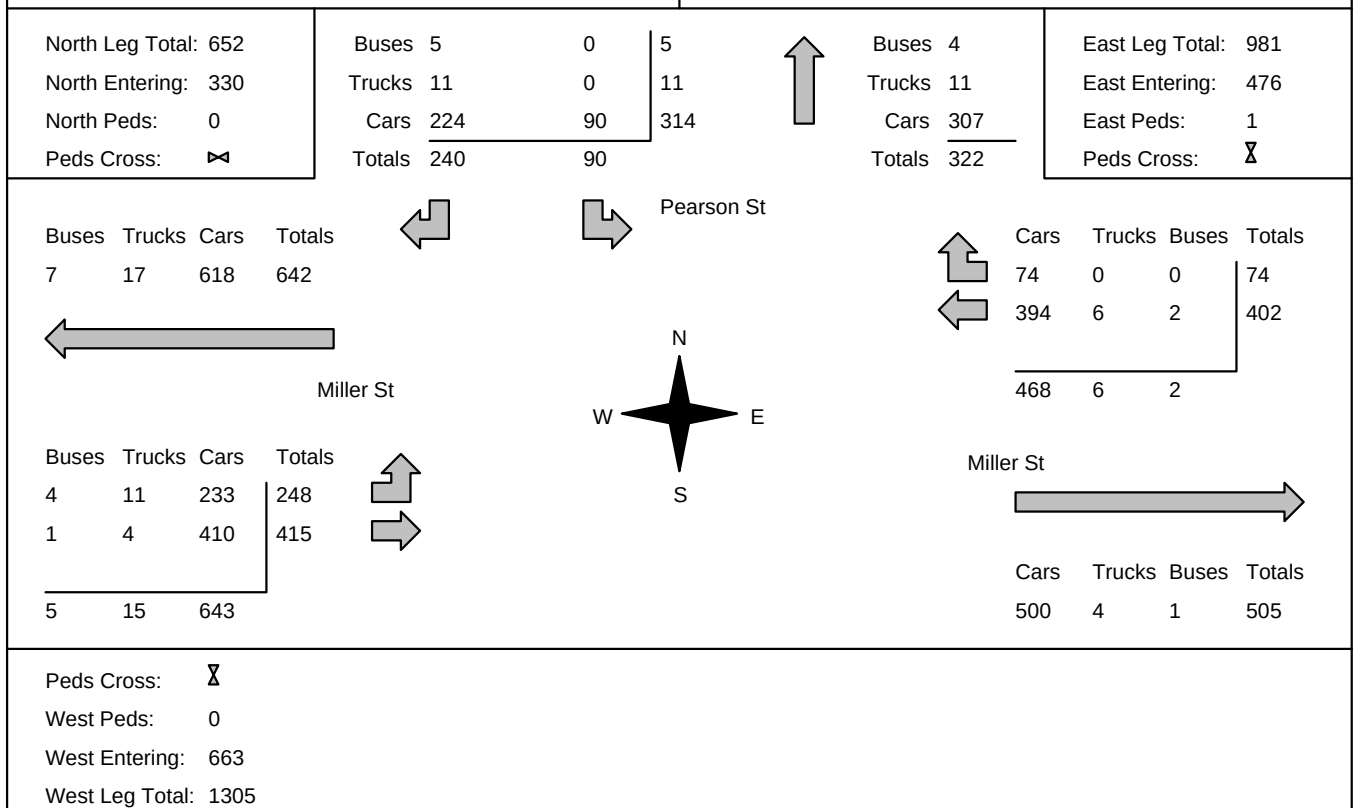
Municipality: Meaford
Site #: 2321400002
Intersection: Miller St & Pearson St
TFR File #: 1
Count date: 27-Sep-23

Weather conditions:

Person counted:
Person prepared:
Person checked:

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

Major Road: Miller St runs W/E



Traffic Count Summary

Intersection: Miller St & Pearson St

Count Date: 27-Sep-23

Municipality: Meaford

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Buses				Total Peds		Hour Ending	Includes Cars, Trucks, & Buses				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	10	0	21	31	0	31	8:00:00	0	0	0	0	0
9:00:00	15	0	32	47	0	47	9:00:00	0	0	0	0	0
10:00:00	11	0	32	43	0	43	10:00:00	0	0	0	0	0
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	29	0	57	86	0	86	16:00:00	0	0	0	0	0
17:00:00	15	0	55	70	0	70	17:00:00	0	0	0	0	0
18:00:00	10	0	43	53	0	53	18:00:00	0	0	0	0	0

Morning Peak Diagram		Specified Period From: 7:00:00 To: 10:00:00	One Hour Peak From: 8:45:00 To: 9:45:00
Municipality: Meaford Site #: 2321400003 Intersection: Pearson St & Nelson St TFR File #: 1 Count date: 27-Sep-23		Weather conditions: Person counted: Person prepared: Person checked:	
** Non-Signalized Intersection **		Major Road: Pearson St runs N/S	

North Leg Total: 79 North Entering: 42 North Peds: 3 Peds Cross:	<table style="width: 100%; border-collapse: collapse;"> <tr><td>Buses</td><td>0</td><td>0</td><td>1</td><td style="border-left: 1px solid black;">1</td></tr> <tr><td>Trucks</td><td>0</td><td>1</td><td>1</td><td style="border-left: 1px solid black;">2</td></tr> <tr><td>Cars</td><td>5</td><td>14</td><td>20</td><td style="border-left: 1px solid black;">39</td></tr> <tr><td>Totals</td><td>5</td><td>15</td><td>22</td><td style="border-left: 1px solid black;"></td></tr> </table>	Buses	0	0	1	1	Trucks	0	1	1	2	Cars	5	14	20	39	Totals	5	15	22		<table style="width: 100%; border-collapse: collapse;"> <tr><td>Buses</td><td>0</td></tr> <tr><td>Trucks</td><td>1</td></tr> <tr><td>Cars</td><td>36</td></tr> <tr><td>Totals</td><td>37</td></tr> </table>	Buses	0	Trucks	1	Cars	36	Totals	37	East Leg Total: 140 East Entering: 49 East Peds: 0 Peds Cross:
Buses	0	0	1	1																											
Trucks	0	1	1	2																											
Cars	5	14	20	39																											
Totals	5	15	22																												
Buses	0																														
Trucks	1																														
Cars	36																														
Totals	37																														

Buses	Trucks	Cars	Totals
0	0	9	9

Pearson St

Cars	Trucks	Buses	Totals
21	0	0	21
2	0	0	2
25	1	0	26
48	1	0	

Buses	Trucks	Cars	Totals
0	0	1	1
0	0	7	7
0	0	0	0
0	0	8	

Nelson St

Cars	Trucks	Buses	Totals
85	5	1	91

Peds Cross:
 West Peds: 1
 West Entering: 8
 West Leg Total: 17

Pearson St

Cars	39
Trucks	2
Buses	0
Totals	41

Cars	2	14	58	74
Trucks	0	1	4	5
Buses	0	0	0	0
Totals	2	15	62	

Nelson St

Peds Cross:
 South Peds: 1
 South Entering: 79
 South Leg Total: 120

Comments

Afternoon Peak Diagram		Specified Period From: 15:00:00 To: 18:00:00	One Hour Peak From: 15:30:00 To: 16:30:00
Municipality: Meaford Site #: 2321400003 Intersection: Pearson St & Nelson St TFR File #: 1 Count date: 27-Sep-23		Weather conditions: Person counted: Person prepared: Person checked:	
** Non-Signalized Intersection **		Major Road: Pearson St runs N/S	

North Leg Total: 90 North Entering: 39 North Peds: 13 Peds Cross:	<table style="margin: auto;"> <tr><td>Buses</td><td>0</td><td>2</td><td>0</td><td>2</td></tr> <tr><td>Trucks</td><td>0</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>Cars</td><td>3</td><td>21</td><td>12</td><td>36</td></tr> <tr><td>Totals</td><td>3</td><td>23</td><td>13</td><td></td></tr> </table>	Buses	0	2	0	2	Trucks	0	0	1	1	Cars	3	21	12	36	Totals	3	23	13		<table style="margin: auto;"> <tr><td>Buses</td><td>2</td></tr> <tr><td>Trucks</td><td>0</td></tr> <tr><td>Cars</td><td>49</td></tr> <tr><td>Totals</td><td>51</td></tr> </table>	Buses	2	Trucks	0	Cars	49	Totals	51	East Leg Total: 158 East Entering: 88 East Peds: 1 Peds Cross:
Buses	0	2	0	2																											
Trucks	0	0	1	1																											
Cars	3	21	12	36																											
Totals	3	23	13																												
Buses	2																														
Trucks	0																														
Cars	49																														
Totals	51																														

Buses	Trucks	Cars	Totals
0	0	14	14

Pearson St

Nelson St

Cars	Trucks	Buses	Totals
24	0	1	25
8	0	0	8
54	0	1	55
86	0	2	

Buses	Trucks	Cars	Totals
0	0	5	5
0	0	6	6
0	0	3	3
0	0	14	

Pearson St

Nelson St

Cars	Trucks	Buses	Totals
69	1	0	70

Peds Cross: West Peds: 0 West Entering: 14 West Leg Total: 28	<table style="margin: auto;"> <tr><td>Cars</td><td>78</td></tr> <tr><td>Trucks</td><td>0</td></tr> <tr><td>Buses</td><td>3</td></tr> <tr><td>Totals</td><td>81</td></tr> </table>	Cars	78	Trucks	0	Buses	3	Totals	81	<table style="margin: auto;"> <tr><td>Cars</td><td>3</td><td>20</td><td>51</td><td>74</td></tr> <tr><td>Trucks</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Buses</td><td>0</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>Totals</td><td>3</td><td>21</td><td>51</td><td></td></tr> </table>	Cars	3	20	51	74	Trucks	0	0	0	0	Buses	0	1	0	1	Totals	3	21	51		Peds Cross: South Peds: 1 South Entering: 75 South Leg Total: 156
Cars	78																														
Trucks	0																														
Buses	3																														
Totals	81																														
Cars	3	20	51	74																											
Trucks	0	0	0	0																											
Buses	0	1	0	1																											
Totals	3	21	51																												

Comments

Total Count Diagram

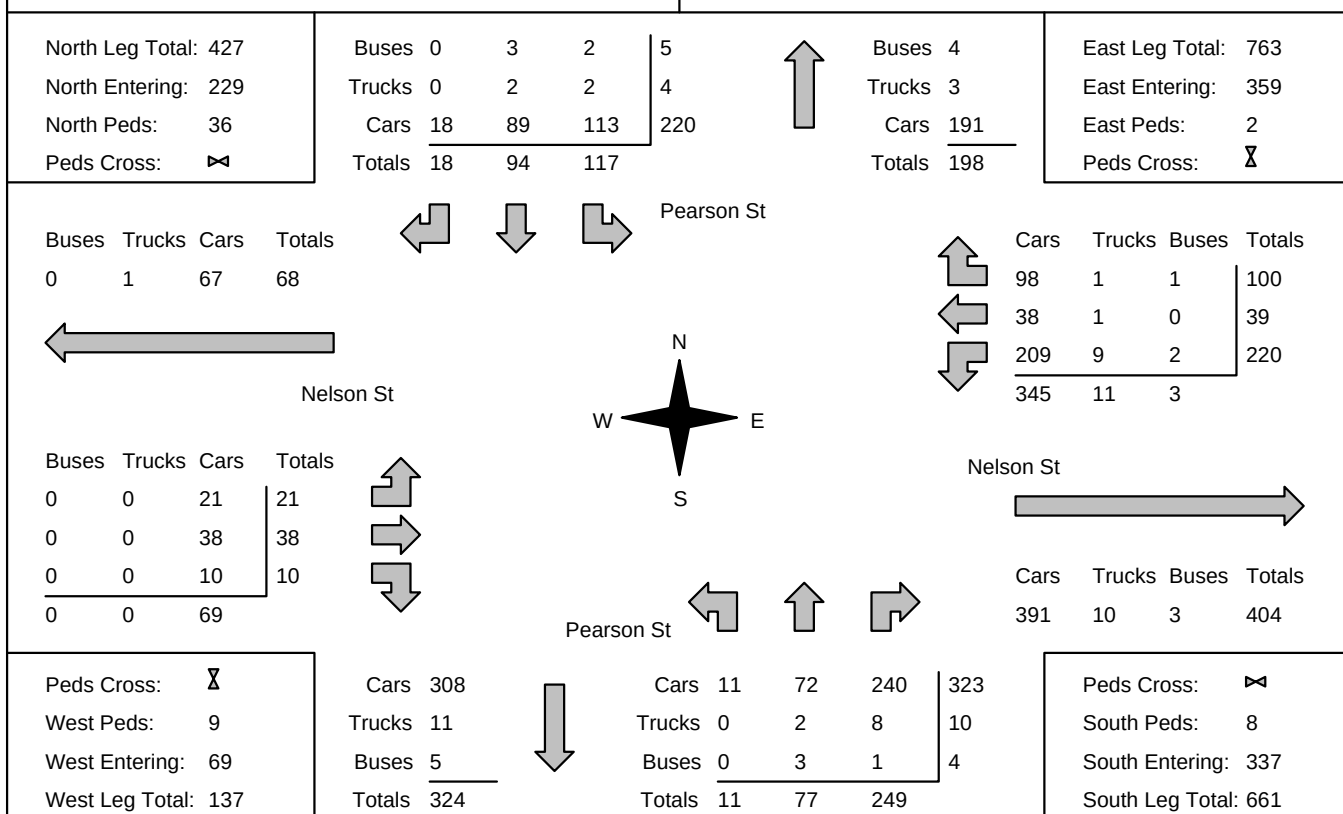
Municipality: Meaford
Site #: 2321400003
Intersection: Pearson St & Nelson St
TFR File #: 1
Count date: 27-Sep-23

Weather conditions:

Person counted:
Person prepared:
Person checked:

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

Major Road: Pearson St runs N/S



Comments

Traffic Count Summary

Intersection: Pearson St & Nelson St

Count Date: 27-Sep-23

Municipality: Meaford

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Buses				Total Peds		Hour Ending	Includes Cars, Trucks, & Buses				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	14	6	3	23	3	52	8:00:00	1	4	24	29	1
9:00:00	34	19	2	55	8	118	9:00:00	1	10	52	63	1
10:00:00	18	15	4	37	4	105	10:00:00	2	18	48	68	2
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	16	27	3	46	9	101	16:00:00	1	15	39	55	1
17:00:00	14	18	3	35	10	111	17:00:00	4	17	55	76	2
18:00:00	21	9	3	33	2	79	18:00:00	2	13	31	46	1



Count Date: 27-Sep-23 Site #: 2321400003

Interval Time	Passenger Cars - East Approach						Trucks - East Approach						Buses - East Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		East Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	2	2	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30:00	8	6	2	2	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45:00	14	6	2	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00:00	19	5	4	2	7	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15:00	24	5	4	0	8	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
8:30:00	28	4	7	3	9	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45:00	33	5	7	0	11	2	4	3	0	0	0	0	0	0	0	0	0	0	0	0
9:00:00	40	7	7	0	17	6	4	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15:00	47	7	8	1	22	5	5	1	0	0	0	0	0	0	0	0	0	0	0	0
9:30:00	52	5	8	0	29	7	5	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45:00	58	6	9	1	32	3	5	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00:00	65	7	10	1	37	5	6	1	0	0	1	1	0	0	0	0	0	0	0	0
10:15:00	65	0	10	0	37	0	6	0	0	0	1	0	0	0	0	0	0	0	0	0
15:00:00	65	0	10	0	37	0	6	0	0	0	1	0	0	0	0	0	0	0	0	0
15:15:00	77	12	11	1	45	8	6	0	0	0	1	0	0	0	0	0	0	0	0	0
15:30:00	88	11	17	6	48	3	7	1	0	0	1	0	1	1	0	0	0	0	0	0
15:45:00	105	17	19	2	54	6	7	0	0	0	1	0	1	0	0	0	1	1	1	1
16:00:00	118	13	24	5	56	2	7	0	0	0	1	0	2	1	0	0	1	0	1	0
16:15:00	127	9	24	0	64	8	7	0	0	0	1	0	2	0	0	0	1	0	1	0
16:30:00	142	15	25	1	72	8	7	0	0	0	1	0	2	0	0	0	1	0	1	0
16:45:00	158	16	28	3	77	5	8	1	0	0	1	0	2	0	0	0	1	0	1	0
17:00:00	168	10	29	1	78	1	8	0	1	1	1	0	2	0	0	0	1	0	1	0
17:15:00	185	17	29	0	82	4	9	1	1	0	1	0	2	0	0	0	1	0	1	0
17:30:00	195	10	31	2	87	5	9	0	1	0	1	0	2	0	0	0	1	0	1	0
17:45:00	203	8	32	1	92	5	9	0	1	0	1	0	2	0	0	0	1	0	2	1
18:00:00	209	6	38	6	98	6	9	0	1	0	1	0	2	0	0	0	1	0	2	0
18:15:00	209	0	38	0	98	0	9	0	1	0	1	0	2	0	0	0	1	0	2	0
18:15:15	209	0	38	0	98	0	9	0	1	0	1	0	2	0	0	0	1	0	2	0

Appendix B: LOS Definitions

CAPACITY ANALYSIS AT UNSIGNALIZED INTERSECTIONS

Highway Capacity Manual Methodology

The level of service at an unsignalized intersection is determined on the basis of control delay for each critical lane. This method of analysis is taken from the Highway Capacity Manual, Special Report 209, by the Transportation Research Board, 1997.

The average control delay for any particular critical movement (control delay includes initial deceleration, queue move-up time, stopped delay, and final acceleration delay) is a function of the service rate or capacity of the approach and degree of saturation. The level of service criteria for unsignalized intersections is outlined below and is related to ranges in vehicle delay.

Level of Service	Expected Delay to Minor Street Traffic	Average Control Delay 'd' (sec/veh)
A	Little or no delays	$0 < d \leq 10$
B	Short traffic delays	$10 \leq d \leq 15$
C	Average traffic delays	$15 \leq d \leq 25$
D	Long traffic delays	$25 \leq d \leq 35$
E	Very long traffic delays	$35 \leq d \leq 50$
F	Extreme delays with queuing which may cause congestion affecting other traffic movements in the intersection	$d > 50$

Appendix C: Traffic Operations - Existing

HCM Unsignalized Intersection Capacity Analysis

2023 Existing Conditions

4: Miller St & Gardiner St

AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↩	↩		↩	
Traffic Volume (veh/h)	5	147	89	2	4	4
Future Volume (Veh/h)	5	147	89	2	4	4
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	6	169	102	2	5	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	104				284	103
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	104				284	103
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				99	99
cM capacity (veh/h)	1488				703	952
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	175	104	10			
Volume Left	6	0	5			
Volume Right	0	2	5			
cSH	1488	1700	809			
Volume to Capacity	0.00	0.06	0.01			
Queue Length 95th (m)	0.1	0.0	0.3			
Control Delay (s)	0.3	0.0	9.5			
Lane LOS	A		A			
Approach Delay (s)	0.3	0.0	9.5			
Approach LOS			A			
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			21.8%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 5: Miller St & Pearson St

2023 Existing Conditions
AM Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	55	9	66	82	15	35
Future Volume (Veh/h)	55	9	66	82	15	35
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	10	72	89	16	38
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		5				
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	186	116			161	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	186	116			161	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	99			99	
cM capacity (veh/h)	794	936			1418	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	70	161	16	38		
Volume Left	60	0	16	0		
Volume Right	10	89	0	0		
cSH	926	1700	1418	1700		
Volume to Capacity	0.08	0.09	0.01	0.02		
Queue Length 95th (m)	1.9	0.0	0.3	0.0		
Control Delay (s)	9.8	0.0	7.6	0.0		
Lane LOS	A		A			
Approach Delay (s)	9.8	0.0	2.2			
Approach LOS	A					
Intersection Summary						
Average Delay			2.8			
Intersection Capacity Utilization			22.5%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

6: Pearson St & Nelson St W

2023 Existing Conditions

AM Peak

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	29	16	17	64	29	23
Future Volume (Veh/h)	29	16	17	64	29	23
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	33	18	20	74	33	26
Pedestrians					1	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	161	46	59			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	161	46	59			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	98	99			
cM capacity (veh/h)	818	1023	1545			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	51	20	74	59		
Volume Left	33	20	0	0		
Volume Right	18	0	0	26		
cSH	881	1545	1700	1700		
Volume to Capacity	0.06	0.01	0.04	0.03		
Queue Length 95th (m)	1.4	0.3	0.0	0.0		
Control Delay (s)	9.3	7.4	0.0	0.0		
Lane LOS	A	A				
Approach Delay (s)	9.3	1.6		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			3.1			
Intersection Capacity Utilization			17.6%	ICU Level of Service		A
Analysis Period (min)			15			

Intersection Sign configuration not allowed in HCM analysis.

7: Pearson St & Nelson St W Performance by movement

Movement	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.1	0.1
Total Del/Veh (s)	1.8	0.1	0.1	4.6	2.7	2.1

HCM Unsignalized Intersection Capacity Analysis

2023 Existing Conditions

4: Miller St & Gardiner St

PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	132	184	3	2	6
Future Volume (Veh/h)	6	132	184	3	2	6
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	7	150	209	3	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	212				374	210
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	212				374	210
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)	1358				623	830
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	157	212	9			
Volume Left	7	0	2			
Volume Right	0	3	7			
cSH	1358	1700	773			
Volume to Capacity	0.01	0.12	0.01			
Queue Length 95th (m)	0.1	0.0	0.3			
Control Delay (s)	0.4	0.0	9.7			
Lane LOS	A		A			
Approach Delay (s)	0.4	0.0	9.7			
Approach LOS			A			
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization		21.8%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

5: Miller St & Pearson St

2023 Existing Conditions

PM Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	104	24	53	70	14	72
Future Volume (Veh/h)	104	24	53	70	14	72
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	121	28	62	81	16	84
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		5				
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	218	102			143	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	218	102			143	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	84	97			99	
cM capacity (veh/h)	761	953			1440	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	149	143	16	84		
Volume Left	121	0	16	0		
Volume Right	28	81	0	0		
cSH	937	1700	1440	1700		
Volume to Capacity	0.16	0.08	0.01	0.05		
Queue Length 95th (m)	4.3	0.0	0.3	0.0		
Control Delay (s)	10.3	0.0	7.5	0.0		
Lane LOS	B		A			
Approach Delay (s)	10.3	0.0	1.2			
Approach LOS	B					
Intersection Summary						
Average Delay		4.2				
Intersection Capacity Utilization		24.1%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

2023 Existing Conditions

6: Pearson St & Nelson St W

PM Peak

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	19	26	24	56	61	33
Future Volume (Veh/h)	19	26	24	56	61	33
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	21	29	27	63	69	37
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	204	88	106			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	204	88	106			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	97	98			
cM capacity (veh/h)	770	971	1485			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	50	27	63	106		
Volume Left	21	27	0	0		
Volume Right	29	0	0	37		
cSH	875	1485	1700	1700		
Volume to Capacity	0.06	0.02	0.04	0.06		
Queue Length 95th (m)	1.4	0.4	0.0	0.0		
Control Delay (s)	9.4	7.5	0.0	0.0		
Lane LOS	A	A				
Approach Delay (s)	9.4	2.2		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization			18.0%	ICU Level of Service		A
Analysis Period (min)			15			

Intersection Sign configuration not allowed in HCM analysis.

7: Pearson St & Nelson St W Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	5.6	5.4	0.4	0.3	5.5	6.5	2.8

Appendix D: Background Development

MEAFORD GOLF COURSE

TRAFFIC STUDY

Updated notes on traffic study done by Gamsby and Mannerow on June 2009

The position of both intersections remains the same with both having sightlines of over 120 m on Ridge Road.

The traffic flow has not measurably increased during those 8 years.

The number of units originally intended for the Driving Range was 50 town houses and 12 single family dwellings for a total of 62 units. The new proposal has 38 units (approx. 40% less).

For Hilton Head Heights, the original proposal was for 26 single family units. The new proposal is for 31 units (approx. 19% increase).

An additional point, our membership has declined over the past 8 years by quite a large percentage (40%) partially due to the age of our members who are no longer able to play.

MEAFORD GOLF COURSE

TRAFFIC IMPACT STUDY

AND

SERVICING OF CONDOMINIUM UNITS

SEWER AND WATER

06/12/09 09:38 FAX 5183788977

GAMSBY MANNEROW

001

**TRAFFIC IMPACT ASSESSMENT
PROPOSED CONDOMINIUM DEVELOPMENT
ON THE
MEAFORD GOLF COURSE
MUNICIPALITY OF MEAFORD**

**GAMSBY AND MANNEROW LIMITED
CONSULTING PROFESSIONAL ENGINEERS
GUELPH - KITCHENER - LISTOWEL - OWEN SOUND**

June 2009
Our File: C-6546





Gamsby and Mannerow
ENGINEERS



September 7, 2007
Our File: C-6546

Municipality of Meaford
21 Trowbridge Street West
MEAFORD, Ontario
N4L 1A1

Attn: Gerry Murphy
Director of Development Services

Re: Proposed Subdivision – Meaford Golf Course
Intersection with Ridge Road

Dear Sir,

As requested, I have reviewed the location of the intersection of a proposed subdivision street with Ridge Road in the Municipality of Meaford.

The proposed intersection would be approximately 120m from the existing entrance to the Meaford Golf Course from Ridge Road and at the bottom of a 3% to 4% downgrade (average over the distance). A 60m section with a grade of approximately 6% is found within the 120m length.

Ridge Road has a posted speed of 50 kph. A design speed of 70 kph is used to assess the stopping sight distance requirements as follows:

Design Speed:	70 kph
Minimum stopping sight distance required:	110m
Adjustment for downgrade (wet conditions at 6%):	10m
Adjusted minimum stopping sight distance:	120m

From this review, it is in our opinion that the adequate stopping sight distance would be available for a new street intersection at the proposed location.

GAMSBY AND MANNEROW LIMITED

Per:

K. A. Cameron

K. A. Cameron, P.Eng.

KAC/ah

cc: Ivan Alderdice

File No. C-6546

people engineering environments

Gamsby and Mannerow Limited • Guelph, Kitchener, Listowel, Owen Sound

1260 Second Avenue E., Unit 1, Owen Sound, ON N4K 2J3

519-376-1805 fax 519-376-8977 www.gamsby.com

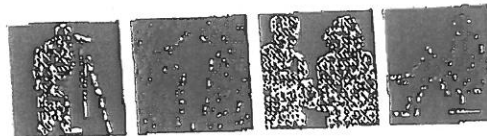
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GAMSBY MANNEROW

002



Gamsby and Mannerow
ENGINEERS



**TRAFFIC IMPACT ASSESSMENT
PROPOSED CONDOMINIUM DEVELOPMENT
ON THE
MEAFORD GOLF COURSE
MUNICIPALITY OF MEAFORD
June 2009
Our File: C-6546**

1.0 PROPOSED DEVELOPMENT

It is proposed to develop 12 single family residences and 50 townhouse condominium units adjacent to the northerly limit of the Meaford Golf Course property. All dwellings would be located along a single street with access to Ridge Road.

The Municipality of Meaford has requested a "transportation/traffic review" of the proposal. This report has been prepared to respond to this request.

2.0 SITE GENERATED TRAFFIC

Based on the trip generation rates (TGF) for single family and townhouse/condominium found in the 7th Edition of the Trip Generation Manual, the estimated site generated traffic is as follows:

TABLE 1 - Site Generated Trips - Single Family Residential						
Period	TGF	% Enter	%Exit	Total Trips	Trips Enter	Trips Exit
Weekday, AM Peak Hour (7-9 a.m.)	0.75	25%	75%	19	2	7
Weekday, PM Peak Hour (4-6 p.m.)	1.01	63%	37%	12	8	4
Saturday, Peak Hour	0.94	54%	46%	11	6	5
Sunday, Peak Hour	0.86	53%	47%	10	5	5

TABLE 2 - Site Generated Trips - Townhouse / Condominium Units						
Period	TGF	% Enter	%Exit	Total Trips	Trips Enter	Trips Exit
Weekday, AM Peak Hour (7-9 a.m.)	0.44	17%	83%	22	4	18
Weekday, PM Peak Hour (4-6 p.m.)	0.52	67%	33%	26	17	9
Saturday, Peak Hour	0.47	54%	46%	24	13	11
Sunday, Peak Hour	0.45	49%	51%	23	12	11

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GAMSBY MANNEROW

004

C-6546
Meaford Golf Course
Traffic Impact Assessment
Municipality of Meaford

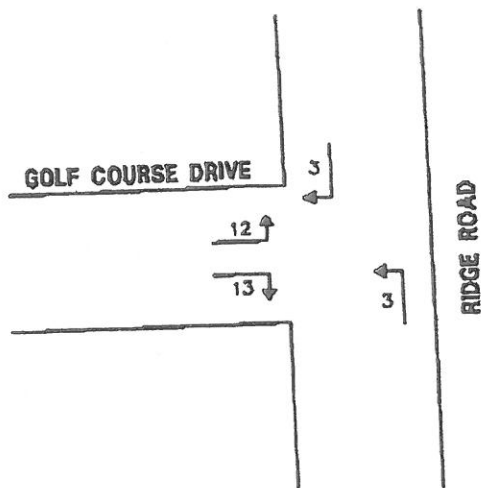
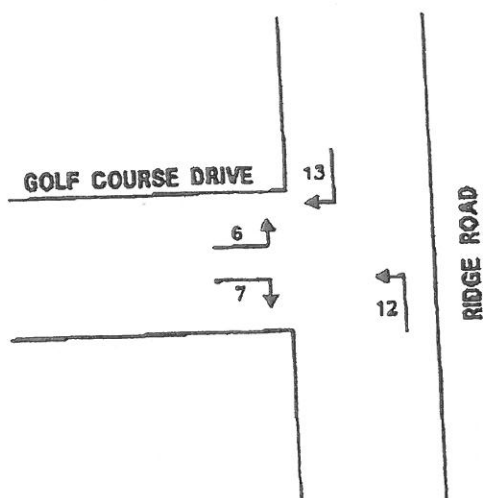


**FIGURE No. 1 : A.M. PEAK HOUR - SITE
GENERATED TRIPS TURNING MOVEMENTS**



Not To Scale
June 2009

**TRIP
DISTRIBUTION**

Figure No. 1

**FIGURE No. 2 : P.M. PEAK HOUR - SITE
GENERATED TRIPS TURNING MOVEMENTS**



**Gamsby and Mannerow
ENGINEERS**

The minimum size of sanitary sewer in the collection system is 200 mm Ø (other than individual services to dwellings or other establishments). The minimum grade on a 200 mm Ø sewer is 0.40% (MOE). The desired minimum grade in Meaford is 0.5%.

A 200 mm Ø sanitary sewer at 0.4% will accommodate 20.75 litres/second. A 200 mm Ø sanitary sewer at 0.5% will accommodate 23.2 litres/second. So there are no capacity issues within our collection system. The combination flow from Phase 1, 3 and 4 will flow easterly via a 200 mm Ø sewer that has been placed in the last few years. At maximum flow and minimum grade you would be utilizing less than half of the capacity of that sewer. From the topography in that area, I believe that sewer has greater fall than minimum thereby providing greater capacity.

The flows from Phase 2 and Phase 5 may enter the Rogers Subdivision at different locations. However, the flow from Phase 5 is so low, it is almost irrelevant. I will consider only the combined flows. The combined flow from Phase 2 and Phase 5 will utilize only the most easterly section of sanitary sewer in the Rogers Subdivision which is 200 mm Ø PVC at 0.5% grade with a capacity of 23.2 L/S.

The design flow through this section of sewer when the subdivision is fully designed is 4.08 litres/second. The addition of 3.93 L/S will only increase the flow to about 35% of capacity.

Without more information on the Town sewer system, I cannot address the capacity of the downstream system.

Domestic water consumption closely mirrors sewage flows. It is usually fire flows that are the concern. A water system is usually a grid with fire flows affecting several sections of watermain. The only realistic way to determine the adequacy when expanding the grid is to model the system and then add your proposed expansion. I believe that the Town Engineers have the system modelled. We could provide them with your proposal and see what the results are. If there are problems, sometimes it can be solved by increasing your main size even if it results in a larger size than you are connecting to.

I have requested Town plans of the sanitary sewer system and the water system from Phil Taylor but, when I get them it would be far too time consuming and costly for us to develop or update the water system model when the Ainley Group already have it done.

Please advise if you want us to provide the required information to them. There will likely be a charge for running the model.

Yours truly,
GAMSBY AND MANNEROW LIMITED


J. V. Dowdall, C.E.T.
JVD/kd
cc: File C-6546



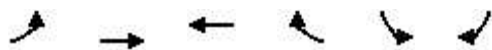
Appendix E: Traffic Operations – Future Background

HCM Unsignalized Intersection Capacity Analysis

2028 Background Conditions

4: Miller St & Gardiner St

AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	156	96	2	4	4
Future Volume (Veh/h)	5	156	96	2	4	4
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	6	179	110	2	5	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	112				302	111
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	112				302	111
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				99	99
cM capacity (veh/h)	1478				687	942
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	185	112	10			
Volume Left	6	0	5			
Volume Right	0	2	5			
cSH	1478	1700	795			
Volume to Capacity	0.00	0.07	0.01			
Queue Length 95th (m)	0.1	0.0	0.3			
Control Delay (s)	0.3	0.0	9.6			
Lane LOS	A		A			
Approach Delay (s)	0.3	0.0	9.6			
Approach LOS			A			
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization		22.2%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

5: Miller St & Pearson St

2028 Background Conditions

AM Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	58	11	70	86	21	40
Future Volume (Veh/h)	58	11	70	86	21	40
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	63	12	76	93	23	43
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		5				
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	212	122			169	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	212	122			169	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	99			98	
cM capacity (veh/h)	764	929			1409	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	75	169	23	43		
Volume Left	63	0	23	0		
Volume Right	12	93	0	0		
cSH	910	1700	1409	1700		
Volume to Capacity	0.08	0.10	0.02	0.03		
Queue Length 95th (m)	2.0	0.0	0.4	0.0		
Control Delay (s)	9.9	0.0	7.6	0.0		
Lane LOS	A		A			
Approach Delay (s)	9.9	0.0	2.6			
Approach LOS	A					
Intersection Summary						
Average Delay		3.0				
Intersection Capacity Utilization		25.6%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

6: Pearson St & Nelson St W

2028 Background Conditions

AM Peak

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	35	25	21	67	30	26
Future Volume (Veh/h)	35	25	21	67	30	26
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	40	29	24	77	34	30
Pedestrians					1	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	175	49	64			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	175	49	64			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	97	98			
cM capacity (veh/h)	801	1020	1538			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	69	24	77	64		
Volume Left	40	24	0	0		
Volume Right	29	0	0	30		
cSH	881	1538	1700	1700		
Volume to Capacity	0.08	0.02	0.05	0.04		
Queue Length 95th (m)	1.9	0.4	0.0	0.0		
Control Delay (s)	9.4	7.4	0.0	0.0		
Lane LOS	A	A				
Approach Delay (s)	9.4	1.8		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization			18.0%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection Sign configuration not allowed in HCM analysis.

7: Pearson St & Nelson St W Performance by movement

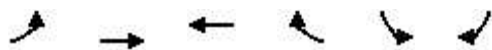
Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Total Del/Veh (s)	3.1	2.0	0.2	0.5	4.7	2.7	2.5

HCM Unsignalized Intersection Capacity Analysis

2028 Background Conditions

4: Miller St & Gardiner St

PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	142	195	3	2	6
Future Volume (Veh/h)	6	142	195	3	2	6
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	7	163	224	3	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	227				402	226
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	227				402	226
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)	1341				601	814
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	170	227	9			
Volume Left	7	0	2			
Volume Right	0	3	7			
cSH	1341	1700	754			
Volume to Capacity	0.01	0.13	0.01			
Queue Length 95th (m)	0.1	0.0	0.3			
Control Delay (s)	0.4	0.0	9.8			
Lane LOS	A		A			
Approach Delay (s)	0.4	0.0	9.8			
Approach LOS			A			
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			22.3%		ICU Level of Service	
Analysis Period (min)			15			
			A			

HCM Unsignalized Intersection Capacity Analysis

5: Miller St & Pearson St

2028 Background Conditions

PM Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	109	32	59	74	19	77
Future Volume (Veh/h)	109	32	59	74	19	77
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	118	35	64	80	21	84
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		5				
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	230	104			144	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	230	104			144	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	84	96			99	
cM capacity (veh/h)	747	951			1438	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	153	144	21	84		
Volume Left	118	0	21	0		
Volume Right	35	80	0	0		
cSH	969	1700	1438	1700		
Volume to Capacity	0.16	0.08	0.01	0.05		
Queue Length 95th (m)	4.3	0.0	0.3	0.0		
Control Delay (s)	10.3	0.0	7.5	0.0		
Lane LOS	B		A			
Approach Delay (s)	10.3	0.0	1.5			
Approach LOS	B					
Intersection Summary						
Average Delay		4.3				
Intersection Capacity Utilization		27.0%		ICU Level of Service	A	
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis 6: Pearson St & Nelson St W

2028 Background Conditions

PM Peak

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	23	33	35	59	64	40
Future Volume (Veh/h)	23	33	35	59	64	40
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	26	38	40	68	74	46
Pedestrians						1
Lane Width (m)						3.7
Walking Speed (m/s)						1.1
Percent Blockage						0
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	246	97	120			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	246	97	120			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	96	97			
cM capacity (veh/h)	721	959	1468			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	64	40	68	120		
Volume Left	26	40	0	0		
Volume Right	38	0	0	46		
cSH	846	1468	1700	1700		
Volume to Capacity	0.08	0.03	0.04	0.07		
Queue Length 95th (m)	1.9	0.6	0.0	0.0		
Control Delay (s)	9.6	7.5	0.0	0.0		
Lane LOS	A	A				
Approach Delay (s)	9.6	2.8		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay				3.1		
Intersection Capacity Utilization				18.6%	ICU Level of Service	A
Analysis Period (min)				15		

Intersection Sign configuration not allowed in HCM analysis.

7: Pearson St & Nelson St W Performance by movement

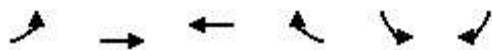
Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.1	0.1	0.1
Total Del/Veh (s)	3.8	1.9	0.1	0.5	4.6	2.5	2.1

HCM Unsignalized Intersection Capacity Analysis

2033 Background Conditions

4: Miller St & Gardiner St

AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↩	↩		↩	↩
Traffic Volume (veh/h)	6	164	101	2	4	4
Future Volume (Veh/h)	6	164	101	2	4	4
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	7	189	116	2	5	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	118				320	117
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	118				320	117
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				99	99
cM capacity (veh/h)	1470				670	935
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	196	118	10			
Volume Left	7	0	5			
Volume Right	0	2	5			
cSH	1470	1700	781			
Volume to Capacity	0.00	0.07	0.01			
Queue Length 95th (m)	0.1	0.0	0.3			
Control Delay (s)	0.3	0.0	9.7			
Lane LOS	A		A			
Approach Delay (s)	0.3	0.0	9.7			
Approach LOS			A			
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			23.5%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

5: Miller St & Pearson St

2033 Background Conditions

AM Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	61	12	74	91	22	42
Future Volume (Veh/h)	61	12	74	91	22	42
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	66	13	80	99	24	46
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		5				
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	224	130			179	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	224	130			179	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	91	99			98	
cM capacity (veh/h)	752	920			1397	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	79	179	24	46		
Volume Left	66	0	24	0		
Volume Right	13	99	0	0		
cSH	900	1700	1397	1700		
Volume to Capacity	0.09	0.11	0.02	0.03		
Queue Length 95th (m)	2.2	0.0	0.4	0.0		
Control Delay (s)	10.0	0.0	7.6	0.0		
Lane LOS	B		A			
Approach Delay (s)	10.0	0.0	2.6			
Approach LOS	B					
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization			26.2%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

6: Pearson St & Nelson St W

2033 Background Conditions

AM Peak

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	37	26	22	70	32	27
Future Volume (Veh/h)	37	26	22	70	32	27
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	43	30	25	80	37	31
Pedestrians						1
Lane Width (m)						3.7
Walking Speed (m/s)						1.1
Percent Blockage						0
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	184	52	68			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	184	52	68			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	97	98			
cM capacity (veh/h)	792	1015	1533			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	73	25	80	68		
Volume Left	43	25	0	0		
Volume Right	30	0	0	31		
cSH	871	1533	1700	1700		
Volume to Capacity	0.08	0.02	0.05	0.04		
Queue Length 95th (m)	2.1	0.4	0.0	0.0		
Control Delay (s)	9.5	7.4	0.0	0.0		
Lane LOS	A	A				
Approach Delay (s)	9.5	1.8		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			3.6			
Intersection Capacity Utilization			18.2%	ICU Level of Service	A	
Analysis Period (min)			15			

Intersection Sign configuration not allowed in HCM analysis.

7: Pearson St & Nelson St W Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)		0.0	0.0	0.0	0.2	0.1	0.1
Total Del/Veh (s)		1.9	0.2	0.5	4.7	2.8	2.6

HCM Unsignalized Intersection Capacity Analysis

2033 Background Conditions

4: Miller St & Gardiner St

PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↩	↩		↩	
Traffic Volume (veh/h)	7	149	205	3	2	7
Future Volume (Veh/h)	7	149	205	3	2	7
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	8	171	236	3	2	8
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	239				424	238
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	239				424	238
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)	1328				583	801
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	179	239	10			
Volume Left	8	0	2			
Volume Right	0	3	8			
cSH	1328	1700	746			
Volume to Capacity	0.01	0.14	0.01			
Queue Length 95th (m)	0.1	0.0	0.3			
Control Delay (s)	0.4	0.0	9.9			
Lane LOS	A		A			
Approach Delay (s)	0.4	0.0	9.9			
Approach LOS			A			
Intersection Summary						
Average Delay		0.4				
Intersection Capacity Utilization		23.5%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

5: Miller St & Pearson St

2033 Background Conditions

PM Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	115	33	61	77	19	81
Future Volume (Veh/h)	115	33	61	77	19	81
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	36	66	84	21	88
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		5				
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	238	108			150	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	238	108			150	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	83	96			99	
cM capacity (veh/h)	739	946			1431	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	161	150	21	88		
Volume Left	125	0	21	0		
Volume Right	36	84	0	0		
cSH	952	1700	1431	1700		
Volume to Capacity	0.17	0.09	0.01	0.05		
Queue Length 95th (m)	4.6	0.0	0.3	0.0		
Control Delay (s)	10.4	0.0	7.6	0.0		
Lane LOS	B		A			
Approach Delay (s)	10.4	0.0	1.5			
Approach LOS	B					
Intersection Summary						
Average Delay			4.4			
Intersection Capacity Utilization			27.6%		ICU Level of Service	
					A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

6: Pearson St & Nelson St W

2033 Background Conditions

PM Peak

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	24	34	36	62	67	42
Future Volume (Veh/h)	24	34	36	62	67	42
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	28	39	41	71	77	48
Pedestrians					1	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	255	101	125			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	255	101	125			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	96	97			
cM capacity (veh/h)	712	954	1462			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	67	41	71	125		
Volume Left	28	41	0	0		
Volume Right	39	0	0	48		
cSH	836	1462	1700	1700		
Volume to Capacity	0.08	0.03	0.04	0.07		
Queue Length 95th (m)	2.0	0.7	0.0	0.0		
Control Delay (s)	9.7	7.5	0.0	0.0		
Lane LOS	A	A				
Approach Delay (s)	9.7	2.8		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			18.7%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection Sign configuration not allowed in HCM analysis.

7: Pearson St & Nelson St W Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.1	0.0	0.0	0.1	0.1	0.1
Total Del/Veh (s)	4.3	2.0	0.2	0.5	4.7	2.0	2.2

HCM Unsignalized Intersection Capacity Analysis

2038 Background Conditions

4: Miller St & Gardiner St

AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	172	106	2	5	5
Future Volume (Veh/h)	6	172	106	2	5	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	7	198	122	2	6	6
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	124				335	123
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	124				335	123
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				99	99
cM capacity (veh/h)	1463				657	928
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	205	124	12			
Volume Left	7	0	6			
Volume Right	0	2	6			
cSH	1463	1700	769			
Volume to Capacity	0.00	0.07	0.02			
Queue Length 95th (m)	0.1	0.0	0.4			
Control Delay (s)	0.3	0.0	9.8			
Lane LOS	A		A			
Approach Delay (s)	0.3	0.0	9.8			
Approach LOS			A			
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			23.9%		ICU Level of Service	
Analysis Period (min)			15			
			A			

HCM Unsignalized Intersection Capacity Analysis

5: Miller St & Pearson St

2038 Background Conditions

AM Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	64	12	78	95	23	44
Future Volume (Veh/h)	64	12	78	95	23	44
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	70	13	85	103	25	48
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		5				
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	234	136			188	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	234	136			188	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	91	99			98	
cM capacity (veh/h)	740	912			1386	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	83	188	25	48		
Volume Left	70	0	25	0		
Volume Right	13	103	0	0		
cSH	878	1700	1386	1700		
Volume to Capacity	0.09	0.11	0.02	0.03		
Queue Length 95th (m)	2.4	0.0	0.4	0.0		
Control Delay (s)	10.2	0.0	7.6	0.0		
Lane LOS	B		A			
Approach Delay (s)	10.2	0.0	2.6			
Approach LOS	B					
Intersection Summary						
Average Delay		3.0				
Intersection Capacity Utilization		26.8%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

6: Pearson St & Nelson St W

2038 Background Conditions

AM Peak

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	38	27	23	74	33	29
Future Volume (Veh/h)	38	27	23	74	33	29
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	44	31	26	85	38	33
Pedestrians					1	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	192	54	71			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	192	54	71			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	97	98			
cM capacity (veh/h)	782	1012	1529			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	75	26	85	71		
Volume Left	44	26	0	0		
Volume Right	31	0	0	33		
cSH	863	1529	1700	1700		
Volume to Capacity	0.09	0.02	0.05	0.04		
Queue Length 95th (m)	2.2	0.4	0.0	0.0		
Control Delay (s)	9.6	7.4	0.0	0.0		
Lane LOS	A	A				
Approach Delay (s)	9.6	1.7		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization			18.4%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection Sign configuration not allowed in HCM analysis.

7: Pearson St & Nelson St W Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)		0.0	0.0	0.0	0.1	0.1	0.1
Total Del/Veh (s)		1.9	0.2	0.4	4.6	2.6	2.4

HCM Unsignalized Intersection Capacity Analysis

2038 Background Conditions

4: Miller St & Gardiner St

PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↩	↩		↩	
Traffic Volume (veh/h)	7	156	215	3	2	7
Future Volume (Veh/h)	7	156	215	3	2	7
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	8	179	247	3	2	8
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	250				444	248
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	250				444	248
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)	1316				568	790
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	187	250	10			
Volume Left	8	0	2			
Volume Right	0	3	8			
cSH	1316	1700	733			
Volume to Capacity	0.01	0.15	0.01			
Queue Length 95th (m)	0.1	0.0	0.3			
Control Delay (s)	0.4	0.0	10.0			
Lane LOS	A		A			
Approach Delay (s)	0.4	0.0	10.0			
Approach LOS			A			
Intersection Summary						
Average Delay		0.4				
Intersection Capacity Utilization		23.9%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

5: Miller St & Pearson St

2038 Background Conditions

PM Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	121	34	64	81	20	85
Future Volume (Veh/h)	121	34	64	81	20	85
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	132	37	70	88	22	92
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		5				
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	250	114			158	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	250	114			158	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	82	96			98	
cM capacity (veh/h)	727	939			1422	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	169	158	22	92		
Volume Left	132	0	22	0		
Volume Right	37	88	0	0		
cSH	931	1700	1422	1700		
Volume to Capacity	0.18	0.09	0.02	0.05		
Queue Length 95th (m)	5.0	0.0	0.4	0.0		
Control Delay (s)	10.6	0.0	7.6	0.0		
Lane LOS	B		A			
Approach Delay (s)	10.6	0.0	1.5			
Approach LOS	B					
Intersection Summary						
Average Delay			4.4			
Intersection Capacity Utilization			28.4%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 6: Pearson St & Nelson St W

2038 Background Conditions

PM Peak

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	36	37	65	70	44
Future Volume (Veh/h)	25	36	37	65	70	44
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	29	41	43	75	80	51
Pedestrians					1	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	268	106	131			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	268	106	131			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	96	97			
cM capacity (veh/h)	700	949	1454			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	70	43	75	131		
Volume Left	29	43	0	0		
Volume Right	41	0	0	51		
cSH	827	1454	1700	1700		
Volume to Capacity	0.08	0.03	0.04	0.08		
Queue Length 95th (m)	2.1	0.7	0.0	0.0		
Control Delay (s)	9.8	7.6	0.0	0.0		
Lane LOS	A	A				
Approach Delay (s)	9.8	2.8		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay				3.2		
Intersection Capacity Utilization				19.0%	ICU Level of Service	A
Analysis Period (min)				15		

Intersection Sign configuration not allowed in HCM analysis.

7: Pearson St & Nelson St W Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	4.4	1.9	0.3	0.5	4.7	2.4	2.2

Appendix F: Traffic Operations - Future Total

HCM Unsignalized Intersection Capacity Analysis

2028 Total Conditions

3: Miller St & Site Access

AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↩	↩		↩	
Traffic Volume (veh/h)	4	160	97	16	43	11
Future Volume (Veh/h)	4	160	97	16	43	11
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)	4	174	105	17	47	12
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	122				296	114
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	122				296	114
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				93	99
cM capacity (veh/h)	1465				694	939
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	178	122	59			
Volume Left	4	0	47			
Volume Right	0	17	12			
cSH	1465	1700	733			
Volume to Capacity	0.00	0.07	0.08			
Queue Length 95th (m)	0.1	0.0	2.0			
Control Delay (s)	0.2	0.0	10.3			
Lane LOS	A		B			
Approach Delay (s)	0.2	0.0	10.3			
Approach LOS			B			
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			21.6%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

2028 Total Conditions

4: Miller St & Gardiner St

AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	160	107	2	4	4
Future Volume (Veh/h)	5	160	107	2	4	4
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	6	184	123	2	5	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	125				320	124
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	125				320	124
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				99	99
cM capacity (veh/h)	1462				671	927
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	190	125	10			
Volume Left	6	0	5			
Volume Right	0	2	5			
cSH	1462	1700	778			
Volume to Capacity	0.00	0.07	0.01			
Queue Length 95th (m)	0.1	0.0	0.3			
Control Delay (s)	0.3	0.0	9.7			
Lane LOS	A		A			
Approach Delay (s)	0.3	0.0	9.7			
Approach LOS			A			
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			22.5%		ICU Level of Service	
Analysis Period (min)			15		A	

HCM Unsignalized Intersection Capacity Analysis

5: Miller St & Pearson St

2028 Total Conditions
AM Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	67	11	89	110	21	47
Future Volume (Veh/h)	67	11	89	110	21	47
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	73	12	97	120	23	51
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		5				
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	254	157			217	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	254	157			217	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90	99			98	
cM capacity (veh/h)	722	889			1353	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	85	217	23	51		
Volume Left	73	0	23	0		
Volume Right	12	120	0	0		
cSH	841	1700	1353	1700		
Volume to Capacity	0.10	0.13	0.02	0.03		
Queue Length 95th (m)	2.6	0.0	0.4	0.0		
Control Delay (s)	10.3	0.0	7.7	0.0		
Lane LOS	B		A			
Approach Delay (s)	10.3	0.0	2.4			
Approach LOS	B					
Intersection Summary						
Average Delay			2.8			
Intersection Capacity Utilization			27.8%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

2028 Total Conditions

6: Pearson St & Nelson St W

AM Peak

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	35	26	24	83	36	26
Future Volume (Veh/h)	35	26	24	83	36	26
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	40	30	28	95	41	30
Pedestrians					1	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	208	56	71			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	208	56	71			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	97	98			
cM capacity (veh/h)	765	1011	1529			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	70	28	95	71		
Volume Left	40	28	0	0		
Volume Right	30	0	0	30		
cSH	854	1529	1700	1700		
Volume to Capacity	0.08	0.02	0.06	0.04		
Queue Length 95th (m)	2.0	0.4	0.0	0.0		
Control Delay (s)	9.6	7.4	0.0	0.0		
Lane LOS	A	A				
Approach Delay (s)	9.6	1.7		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			3.3			
Intersection Capacity Utilization			18.2%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection Sign configuration not allowed in HCM analysis.

7: Pearson St & Nelson St W Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)		0.0	0.0	0.0	0.1	0.2	0.1
Total Del/Veh (s)		1.9	0.2	0.5	4.6	2.7	2.5

HCM Unsignalized Intersection Capacity Analysis

2028 Total Conditions

3: Miller St & Site Access

PM Peak



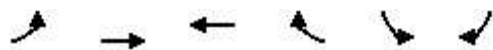
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↩	↩		↩	
Traffic Volume (veh/h)	10	144	186	41	28	7
Future Volume (Veh/h)	10	144	186	41	28	7
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	157	202	45	30	8
Pedestrians						
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	247				404	224
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	247				404	224
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				95	99
cM capacity (veh/h)	1319				598	815
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	168	247	38			
Volume Left	11	0	30			
Volume Right	0	45	8			
cSH	1319	1700	633			
Volume to Capacity	0.01	0.15	0.06			
Queue Length 95th (m)	0.2	0.0	1.5			
Control Delay (s)	0.6	0.0	11.0			
Lane LOS	A		B			
Approach Delay (s)	0.6	0.0	11.0			
Approach LOS			B			
Intersection Summary						
Average Delay		1.1				
Intersection Capacity Utilization		25.8%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

2028 Total Conditions

4: Miller St & Gardiner St

PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↶		↶	
Traffic Volume (veh/h)	6	152	202	3	2	6
Future Volume (Veh/h)	6	152	202	3	2	6
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	7	175	232	3	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	235				422	234
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	235				422	234
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)	1332				585	806
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	182	235	9			
Volume Left	7	0	2			
Volume Right	0	3	7			
cSH	1332	1700	743			
Volume to Capacity	0.01	0.14	0.01			
Queue Length 95th (m)	0.1	0.0	0.3			
Control Delay (s)	0.3	0.0	9.9			
Lane LOS	A		A			
Approach Delay (s)	0.3	0.0	9.9			
Approach LOS			A			
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			22.9%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

5: Miller St & Pearson St

2028 Total Conditions
PM Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	132	32	71	89	19	95
Future Volume (Veh/h)	132	32	71	89	19	95
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	143	35	77	97	21	103
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		5				
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	270	126			174	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	270	126			174	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	80	96			99	
cM capacity (veh/h)	708	925			1403	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	178	174	21	103		
Volume Left	143	0	21	0		
Volume Right	35	97	0	0		
cSH	881	1700	1403	1700		
Volume to Capacity	0.20	0.10	0.01	0.06		
Queue Length 95th (m)	5.7	0.0	0.3	0.0		
Control Delay (s)	10.9	0.0	7.6	0.0		
Lane LOS	B		A			
Approach Delay (s)	10.9	0.0	1.3			
Approach LOS	B					
Intersection Summary						
Average Delay			4.4			
Intersection Capacity Utilization			29.8%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

2028 Total Conditions

6: Pearson St & Nelson St W

PM Peak

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	23	36	36	69	79	40
Future Volume (Veh/h)	23	36	36	69	79	40
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	26	41	41	79	91	46
Pedestrians					1	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	276	114	137			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	276	114	137			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	96	97			
cM capacity (veh/h)	693	939	1447			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	67	41	79	137		
Volume Left	26	41	0	0		
Volume Right	41	0	0	46		
cSH	825	1447	1700	1700		
Volume to Capacity	0.08	0.03	0.05	0.08		
Queue Length 95th (m)	2.0	0.7	0.0	0.0		
Control Delay (s)	9.7	7.6	0.0	0.0		
Lane LOS	A	A				
Approach Delay (s)	9.7	2.6		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization			18.8%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection Sign configuration not allowed in HCM analysis.

7: Pearson St & Nelson St W Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.1	0.0	0.0	0.1	0.1	0.1
Total Del/Veh (s)	4.1	2.2	0.3	0.5	4.7	2.8	2.4

HCM Unsignalized Intersection Capacity Analysis

2033 Total Conditions

3: Miller St & Site Access

AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	168	102	16	43	11
Future Volume (Veh/h)	4	168	102	16	43	11
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)	4	183	111	17	47	12
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	128				310	120
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	128				310	120
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				93	99
cM capacity (veh/h)	1458				680	932
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	187	128	59			
Volume Left	4	0	47			
Volume Right	0	17	12			
cSH	1458	1700	720			
Volume to Capacity	0.00	0.08	0.08			
Queue Length 95th (m)	0.1	0.0	2.0			
Control Delay (s)	0.2	0.0	10.4			
Lane LOS	A		B			
Approach Delay (s)	0.2	0.0	10.4			
Approach LOS			B			
Intersection Summary						
Average Delay			1.7			
Intersection Capacity Utilization			22.1%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

2033 Total Conditions

4: Miller St & Gardiner St

AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↩	↩		↩	
Traffic Volume (veh/h)	6	168	112	2	4	4
Future Volume (Veh/h)	6	168	112	2	4	4
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	7	193	129	2	5	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	131				337	130
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	131				337	130
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				99	99
cM capacity (veh/h)	1454				655	920
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	200	131	10			
Volume Left	7	0	5			
Volume Right	0	2	5			
cSH	1454	1700	765			
Volume to Capacity	0.00	0.08	0.01			
Queue Length 95th (m)	0.1	0.0	0.3			
Control Delay (s)	0.3	0.0	9.8			
Lane LOS	A		A			
Approach Delay (s)	0.3	0.0	9.8			
Approach LOS			A			
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			23.7%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

5: Miller St & Pearson St

2033 Total Conditions
AM Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	70	12	93	115	22	49
Future Volume (Veh/h)	70	12	93	115	22	49
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	13	101	125	24	53
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		5				
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	264	164			226	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	264	164			226	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	89	99			98	
cM capacity (veh/h)	712	881			1342	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	89	226	24	53		
Volume Left	76	0	24	0		
Volume Right	13	125	0	0		
cSH	833	1700	1342	1700		
Volume to Capacity	0.11	0.13	0.02	0.03		
Queue Length 95th (m)	2.7	0.0	0.4	0.0		
Control Delay (s)	10.4	0.0	7.7	0.0		
Lane LOS	B		A			
Approach Delay (s)	10.4	0.0	2.4			
Approach LOS	B					
Intersection Summary						
Average Delay			2.8			
Intersection Capacity Utilization			28.8%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

6: Pearson St & Nelson St W

2033 Total Conditions
AM Peak

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	37	27	24	87	38	27
Future Volume (Veh/h)	37	27	24	87	38	27
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	43	31	28	100	44	31
Pedestrians					1	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	216	60	75			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	216	60	75			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	97	98			
cM capacity (veh/h)	757	1006	1524			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	74	28	100	75		
Volume Left	43	28	0	0		
Volume Right	31	0	0	31		
cSH	844	1524	1700	1700		
Volume to Capacity	0.09	0.02	0.06	0.04		
Queue Length 95th (m)	2.2	0.4	0.0	0.0		
Control Delay (s)	9.7	7.4	0.0	0.0		
Lane LOS	A	A				
Approach Delay (s)	9.7	1.6		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			3.3			
Intersection Capacity Utilization			18.4%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection Sign configuration not allowed in HCM analysis.

7: Pearson St & Nelson St W Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Total Del/Veh (s)	3.1	1.9	0.2	0.5	4.8	2.7	2.7

HCM Unsignalized Intersection Capacity Analysis

2033 Total Conditions

3: Miller St & Site Access

PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↩	↩		↩	
Traffic Volume (veh/h)	10	151	196	41	28	7
Future Volume (Veh/h)	10	151	196	41	28	7
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)	11	164	213	45	30	8
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	258				422	236
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	258				422	236
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				95	99
cM capacity (veh/h)	1307				584	804
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	175	258	38			
Volume Left	11	0	30			
Volume Right	0	45	8			
cSH	1307	1700	619			
Volume to Capacity	0.01	0.15	0.06			
Queue Length 95th (m)	0.2	0.0	1.5			
Control Delay (s)	0.6	0.0	11.2			
Lane LOS	A		B			
Approach Delay (s)	0.6	0.0	11.2			
Approach LOS			B			
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization		26.2%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

2033 Total Conditions

4: Miller St & Gardiner St

PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	159	212	3	2	7
Future Volume (Veh/h)	7	159	212	3	2	7
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	8	183	244	3	2	8
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	247				444	246
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	247				444	246
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)	1319				568	793
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	191	247	10			
Volume Left	8	0	2			
Volume Right	0	3	8			
cSH	1319	1700	735			
Volume to Capacity	0.01	0.15	0.01			
Queue Length 95th (m)	0.1	0.0	0.3			
Control Delay (s)	0.4	0.0	10.0			
Lane LOS	A		A			
Approach Delay (s)	0.4	0.0	10.0			
Approach LOS			A			
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization		24.1%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

5: Miller St & Pearson St

2033 Total Conditions
PM Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	138	33	74	93	19	99
Future Volume (Veh/h)	138	33	74	93	19	99
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	150	36	80	101	21	108
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		5				
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	280	130			181	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	280	130			181	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	79	96			98	
cM capacity (veh/h)	699	919			1394	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	186	181	21	108		
Volume Left	150	0	21	0		
Volume Right	36	101	0	0		
cSH	866	1700	1394	1700		
Volume to Capacity	0.21	0.11	0.02	0.06		
Queue Length 95th (m)	6.2	0.0	0.3	0.0		
Control Delay (s)	11.1	0.0	7.6	0.0		
Lane LOS	B		A			
Approach Delay (s)	11.1	0.0	1.2			
Approach LOS	B					
Intersection Summary						
Average Delay			4.5			
Intersection Capacity Utilization			30.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

2033 Total Conditions

6: Pearson St & Nelson St W

PM Peak

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	24	37	38	72	82	42
Future Volume (Veh/h)	24	37	38	72	82	42
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	28	43	44	83	94	48
Pedestrians					1	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	290	118	142			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	290	118	142			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	95	97			
cM capacity (veh/h)	679	934	1441			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	71	44	83	142		
Volume Left	28	44	0	0		
Volume Right	43	0	0	48		
cSH	813	1441	1700	1700		
Volume to Capacity	0.09	0.03	0.05	0.08		
Queue Length 95th (m)	2.2	0.7	0.0	0.0		
Control Delay (s)	9.8	7.6	0.0	0.0		
Lane LOS	A	A				
Approach Delay (s)	9.8	2.6		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay				3.0		
Intersection Capacity Utilization				23.8%	ICU Level of Service	A
Analysis Period (min)				15		

Intersection Sign configuration not allowed in HCM analysis.

7: Pearson St & Nelson St W Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.2	0.1	0.1
Total Del/Veh (s)	5.0	1.9	0.3	0.5	4.7	2.8	2.2

HCM Unsignalized Intersection Capacity Analysis

2038 Total Conditions

3: Miller St & Site Access

AM Peak



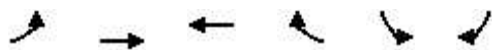
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	177	107	16	43	11
Future Volume (Veh/h)	4	177	107	16	43	11
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	192	116	17	47	12
Pedestrians						
Lane 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	133				324	124
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	133				324	124
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				93	99
cM capacity (veh/h)	1452				668	926
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	196	133	59			
Volume Left	4	0	47			
Volume Right	0	17	12			
cSH	1452	1700	708			
Volume to Capacity	0.00	0.08	0.08			
Queue Length 95th (m)	0.1	0.0	2.1			
Control Delay (s)	0.2	0.0	10.5			
Lane LOS	A		B			
Approach Delay (s)	0.2	0.0	10.5			
Approach LOS			B			
Intersection Summary						
Average Delay			1.7			
Intersection Capacity Utilization			22.5%		ICU Level of Service	
Analysis Period (min)			15		A	

HCM Unsignalized Intersection Capacity Analysis

2038 Total Conditions

4: Miller St & Gardiner St

AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	176	117	2	5	5
Future Volume (Veh/h)	6	176	117	2	5	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	7	202	134	2	6	6
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	136				351	135
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	136				351	135
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				99	99
cM capacity (veh/h)	1448				643	914
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	209	136	12			
Volume Left	7	0	6			
Volume Right	0	2	6			
cSH	1448	1700	755			
Volume to Capacity	0.00	0.08	0.02			
Queue Length 95th (m)	0.1	0.0	0.4			
Control Delay (s)	0.3	0.0	9.8			
Lane LOS	A		A			
Approach Delay (s)	0.3	0.0	9.8			
Approach LOS			A			
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			24.1%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

5: Miller St & Pearson St

2038 Total Conditions
AM Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	73	12	96	119	23	51
Future Volume (Veh/h)	73	12	96	119	23	51
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	79	13	104	129	25	55
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		5				
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	274	168			233	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	274	168			233	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	89	99			98	
cM capacity (veh/h)	703	876			1335	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	92	233	25	55		
Volume Left	79	0	25	0		
Volume Right	13	129	0	0		
cSH	818	1700	1335	1700		
Volume to Capacity	0.11	0.14	0.02	0.03		
Queue Length 95th (m)	2.9	0.0	0.4	0.0		
Control Delay (s)	10.5	0.0	7.7	0.0		
Lane LOS	B		A			
Approach Delay (s)	10.5	0.0	2.4			
Approach LOS	B					
Intersection Summary						
Average Delay			2.9			
Intersection Capacity Utilization			29.7%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

6: Pearson St & Nelson St W

2038 Total Conditions

AM Peak

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	38	28	25	90	39	29
Future Volume (Veh/h)	38	28	25	90	39	29
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	44	32	29	103	45	33
Pedestrians					1	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	224	62	78			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	224	62	78			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	97	98			
cM capacity (veh/h)	749	1004	1520			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	76	29	103	78		
Volume Left	44	29	0	0		
Volume Right	32	0	0	33		
cSH	839	1520	1700	1700		
Volume to Capacity	0.09	0.02	0.06	0.05		
Queue Length 95th (m)	2.3	0.4	0.0	0.0		
Control Delay (s)	9.7	7.4	0.0	0.0		
Lane LOS	A	A				
Approach Delay (s)	9.7	1.6		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			3.3			
Intersection Capacity Utilization			18.5%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection Sign configuration not allowed in HCM analysis.

7: Pearson St & Nelson St W Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Total Del/Veh (s)	2.3	1.9	0.2	0.5	4.6	2.5	2.5

HCM Unsignalized Intersection Capacity Analysis

2038 Total Conditions

3: Miller St & Site Access

PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	159	206	41	28	7
Future Volume (Veh/h)	10	159	206	41	28	7
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)	11	173	224	45	30	8
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	269				442	246
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	269				442	246
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				95	99
cM capacity (veh/h)	1295				568	792
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	184	269	38			
Volume Left	11	0	30			
Volume Right	0	45	8			
cSH	1295	1700	604			
Volume to Capacity	0.01	0.16	0.06			
Queue Length 95th (m)	0.2	0.0	1.5			
Control Delay (s)	0.5	0.0	11.4			
Lane LOS	A		B			
Approach Delay (s)	0.5	0.0	11.4			
Approach LOS			B			
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization		26.6%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

2038 Total Conditions

4: Miller St & Gardiner St

PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↩	↩		↩	
Traffic Volume (veh/h)	7	167	222	3	2	7
Future Volume (Veh/h)	7	167	222	3	2	7
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	8	192	255	3	2	8
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	258				464	256
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	258				464	256
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)	1307				553	782
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	200	258	10			
Volume Left	8	0	2			
Volume Right	0	3	8			
cSH	1307	1700	722			
Volume to Capacity	0.01	0.15	0.01			
Queue Length 95th (m)	0.1	0.0	0.3			
Control Delay (s)	0.4	0.0	10.1			
Lane LOS	A		B			
Approach Delay (s)	0.4	0.0	10.1			
Approach LOS			B			
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			24.5%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

5: Miller St & Pearson St

2038 Total Conditions

PM Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	144	34	77	97	20	103
Future Volume (Veh/h)	144	34	77	97	20	103
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	157	37	84	105	22	112
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		5				
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	292	136			189	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	292	136			189	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	77	96			98	
cM capacity (veh/h)	687	912			1385	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	194	189	22	112		
Volume Left	157	0	22	0		
Volume Right	37	105	0	0		
cSH	849	1700	1385	1700		
Volume to Capacity	0.23	0.11	0.02	0.07		
Queue Length 95th (m)	6.7	0.0	0.4	0.0		
Control Delay (s)	11.3	0.0	7.6	0.0		
Lane LOS	B		A			
Approach Delay (s)	11.3	0.0	1.3			
Approach LOS	B					
Intersection Summary						
Average Delay			4.6			
Intersection Capacity Utilization		31.3%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

2038 Total Conditions

6: Pearson St & Nelson St W

PM Peak

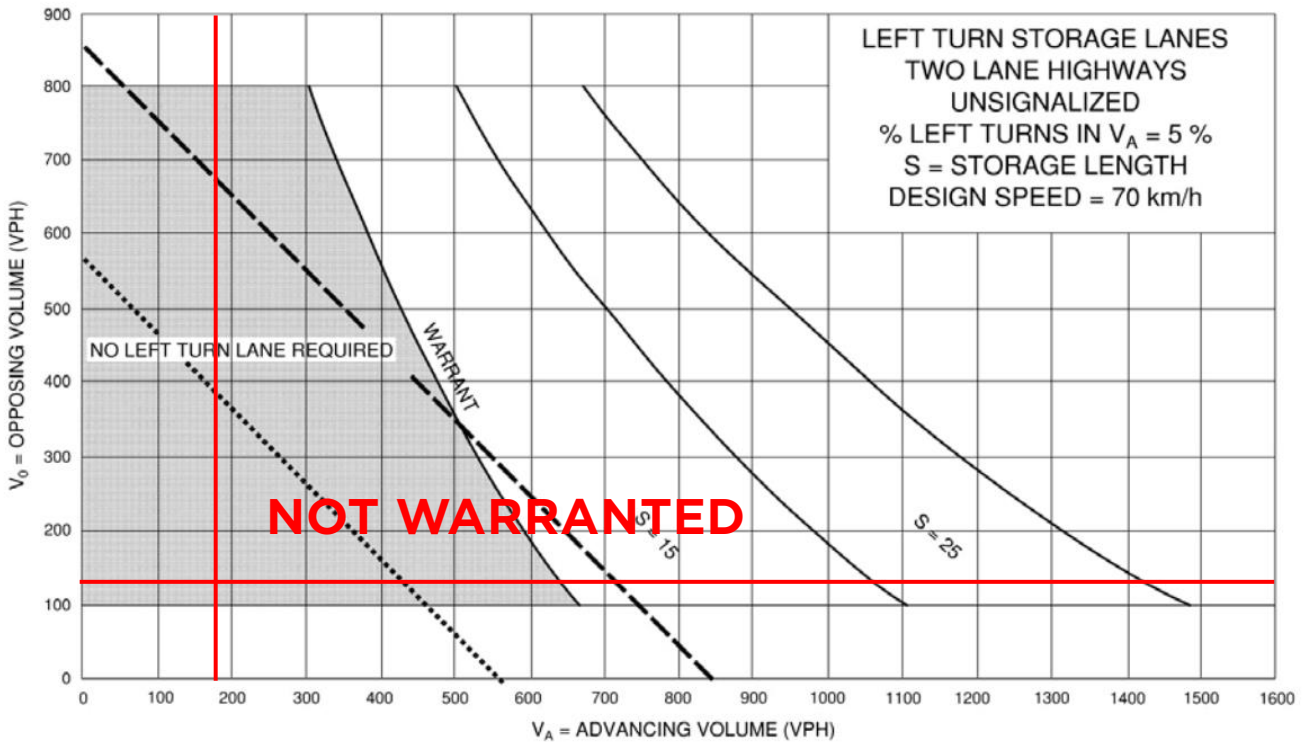
						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	39	39	76	86	44
Future Volume (Veh/h)	25	39	39	76	86	44
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	29	45	45	87	99	51
Pedestrians					1	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	302	124	150			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	302	124	150			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	95	97			
cM capacity (veh/h)	667	926	1431			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	74	45	87	150		
Volume Left	29	45	0	0		
Volume Right	45	0	0	51		
cSH	804	1431	1700	1700		
Volume to Capacity	0.09	0.03	0.05	0.09		
Queue Length 95th (m)	2.3	0.7	0.0	0.0		
Control Delay (s)	9.9	7.6	0.0	0.0		
Lane LOS	A	A				
Approach Delay (s)	9.9	2.6		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization			24.3%		ICU Level of Service	A
Analysis Period (min)			15			

Intersection Sign configuration not allowed in HCM analysis.

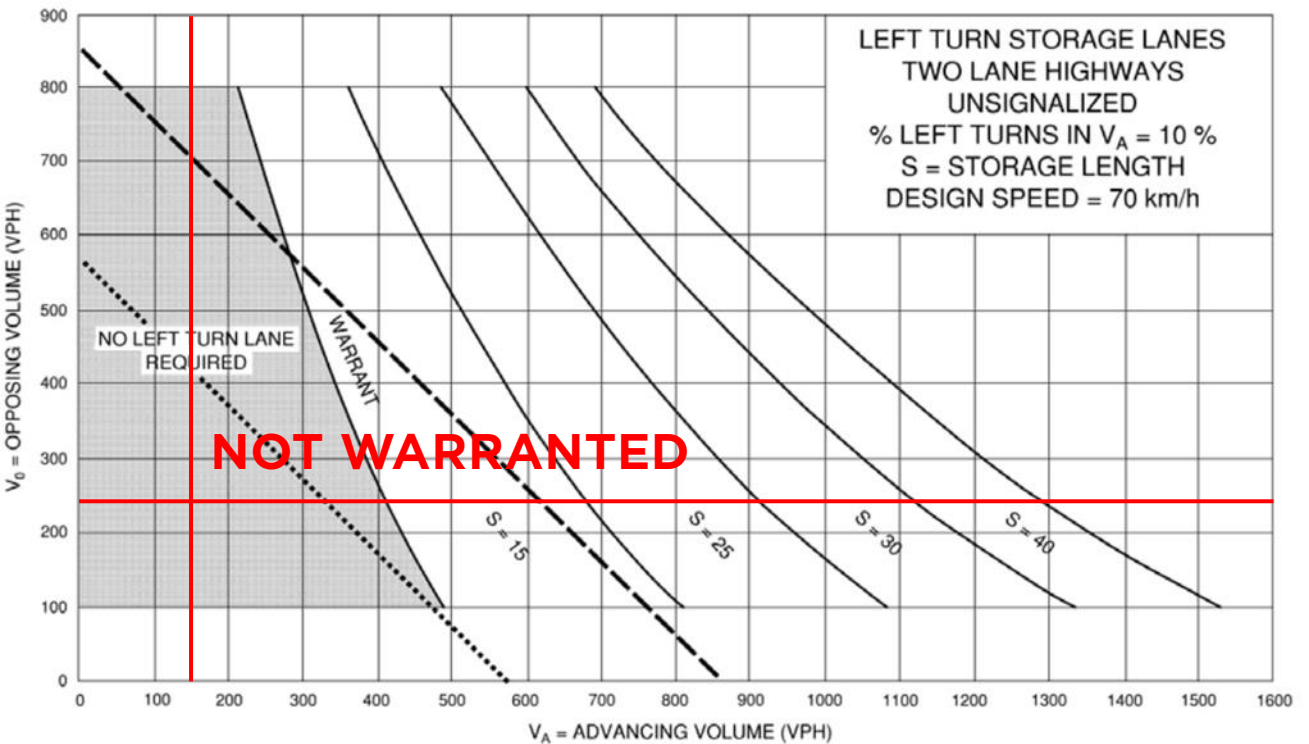
7: Pearson St & Nelson St W Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Total Del/Veh (s)	4.2	2.0	0.2	0.5	4.7	3.7	2.2

Appendix G: Left Turn Warrants



2038 Total Traffic AM Peak



2038 Total Traffic PM Peak

412 MILLER STREET

AppendixG: Left Turn Warrants

