Loon Call Meaford

Municipality of Meaford
County of Grey

Traffic Impact Study for

LC Development Group Inc.

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John Northcote, P.Eng.
Professional License #: 100124071

ENGINEERING

JD Northcote Engineering Inc.
86 Cumberland Street
Barrie, ON
705.725.4035
www.JDEngineering.ca

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Executive Summary

This report summarizes the traffic impact study for the proposed residential development located north of Highway 26, west of Algonquin Drive in the Municipality of Meaford [Municipality], County of Grey [County]. The report assesses the impact of traffic related to the development on the adjacent roadway and provides recommendations to accommodate this traffic in a safe and efficient manner.

The final breakdown of units for the proposed development has not yet been finalized, however it is anticipated to consist of a total of 225 units, that will include 113 single-detached units and 112 townhouse units.

The proposed development will include one full-movement access driveways [Site Access] onto Highway 26 and an emergency access driveway onto Highway 26 [Emergency Access].

The scope of this analysis a review of the the Highway 26 / Site Access intersection:

Summary

1. The proposed development is expected to generate 140 AM and 181 PM new peak hour trips in the study area.
2. Automatic traffic recorder [ATR] counts were commissioned by JD Engineering along Highway 26 west of Ridge Road, completed on Thursday, December 5th, 2019.
3. An estimate of the amount of traffic that would be generated by the Subject Site was prepared and assigned to the study area streets and intersection.
4. An intersection operation analysis was completed under total (2023, 2028 and 2033) traffic volumes with the proposed development operational at the study area intersections. The following improvements are recommended:

   Highway 26 / Site Access & Future Driveway

   Opening Day (2023) traffic volumes

   - Eastbound left-turn lane on Highway 26 with an 85 metre parallel length and a 105 metre taper length.
   - Westbound left turn lane on Highway 26 with a 95 metre parallel length and a 105 metre taper length.
   - It is recommended that the constriction cost for the above-noted improvements is split between LC Development Group Inc. and the owners of the Meaford Haven development.
5. The Site Access will operate efficiently as a full-movement access, with southbound stop control. A single lane for ingress and egress movements at the Site Access driveway will provide the necessary capacity to convey the traffic volume generated by the proposed development.
6. There are no issues with the sight distance available for the proposed Site Access.
7. Assuming there is no occupancy in the Meaford Heaven development prior to 2028; the construction of a left turn lane on Highway 26 is required prior to occupancy of the 101st unit in the subject site.
8. In summary the proposed development will not cause any operational issues and will not add significant delay or congestion to the local roadway network.

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1 Introduction

1.1 Background

LC Development Group Inc. [the Client] is proposing a residential development located north of Highway 26, west of Algonquin Drive in the Municipality of Meaford [Municipality], County of Grey [County]. The final breakdown of units for the proposed development has not yet been finalized, however it is anticipated to consist of a total of 225 units, that will include 113 single-detached units and 112 townhouse units.

The proposed development will include one full-movement access driveways [Site Access] onto Highway 26 and an emergency access driveway onto Highway 26 [Emergency Access]. The Site Access will be located across a future driveway for Meaford Haven noted in Section 2.4.

The Client has retained **JD Engineering Inc.** [JD Engineering] to prepare this traffic impact study in support of the proposed development.

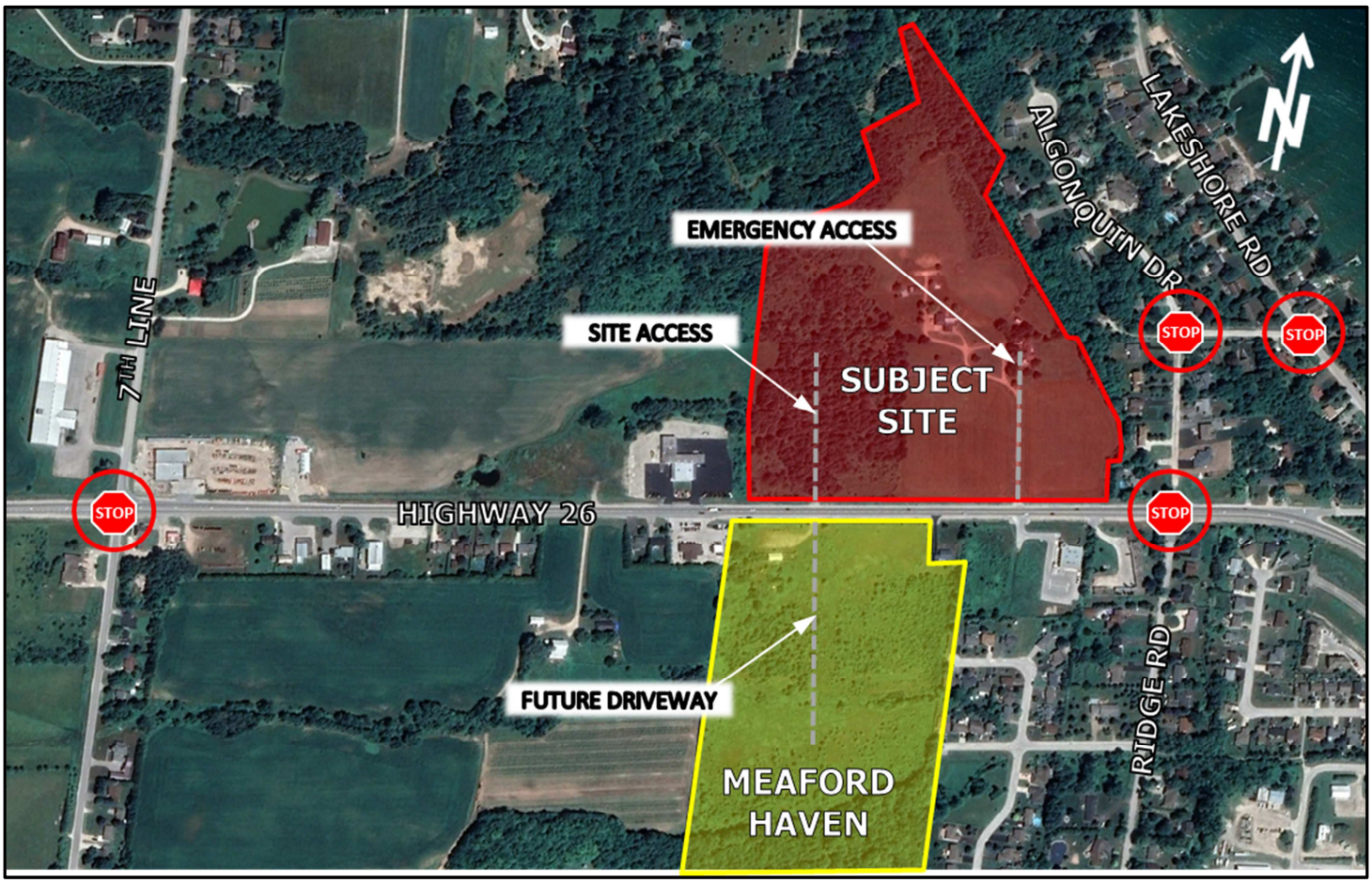
1.2 Study Area

Figure 1 illustrates the location of the subject site and study area intersections, in relation to the surrounding area. The site plan provided by the Pinestone Engineering Limited is included in **Appendix A.**

The subject site is bound by Highway 26 to the south, existing residential lands to the east, existing car dealership and agricultural lands to the west and environmental protection lands to the north.

Through consultation with the Ontario Ministry of Transportation [MTO] and the Municipality, the Highway 26 / Site Access intersection will be analysed as part of the study.

Figure 1 – Proposed Site Location and Study Area



1.3 Study Scope and Objectives

The purpose of this study is to identify the potential impacts to traffic flow at the site access and on the surrounding roadway network. The study analysis includes the following tasks:

- Determine existing traffic volumes and circulation patterns;
- Estimate future traffic volumes if the proposed development was not constructed, including the impact of additional proposed developments in the area;
- Estimate the amount of traffic that would be generated by the proposed development and assign to the roadway network;
- Complete LOS analysis of horizon year (with the proposed development) traffic conditions and identify additional operational deficiencies;
- Identify improvement options to address operational deficiencies;
- Review the proposed configuration of the site access driveways; and
- Document findings and recommendations in a final report.

1.4 Horizon Year and Analysis Periods

Traffic scenarios for the build-out horizon year (2023), five-year post build-out horizon year (2028) and ten-year post build-out horizon year (2033) were selected for analysis of traffic operations in the

study area. The weekday morning [AM] and weekday afternoon [PM] peak hours have been selected as the analysis periods for this study.

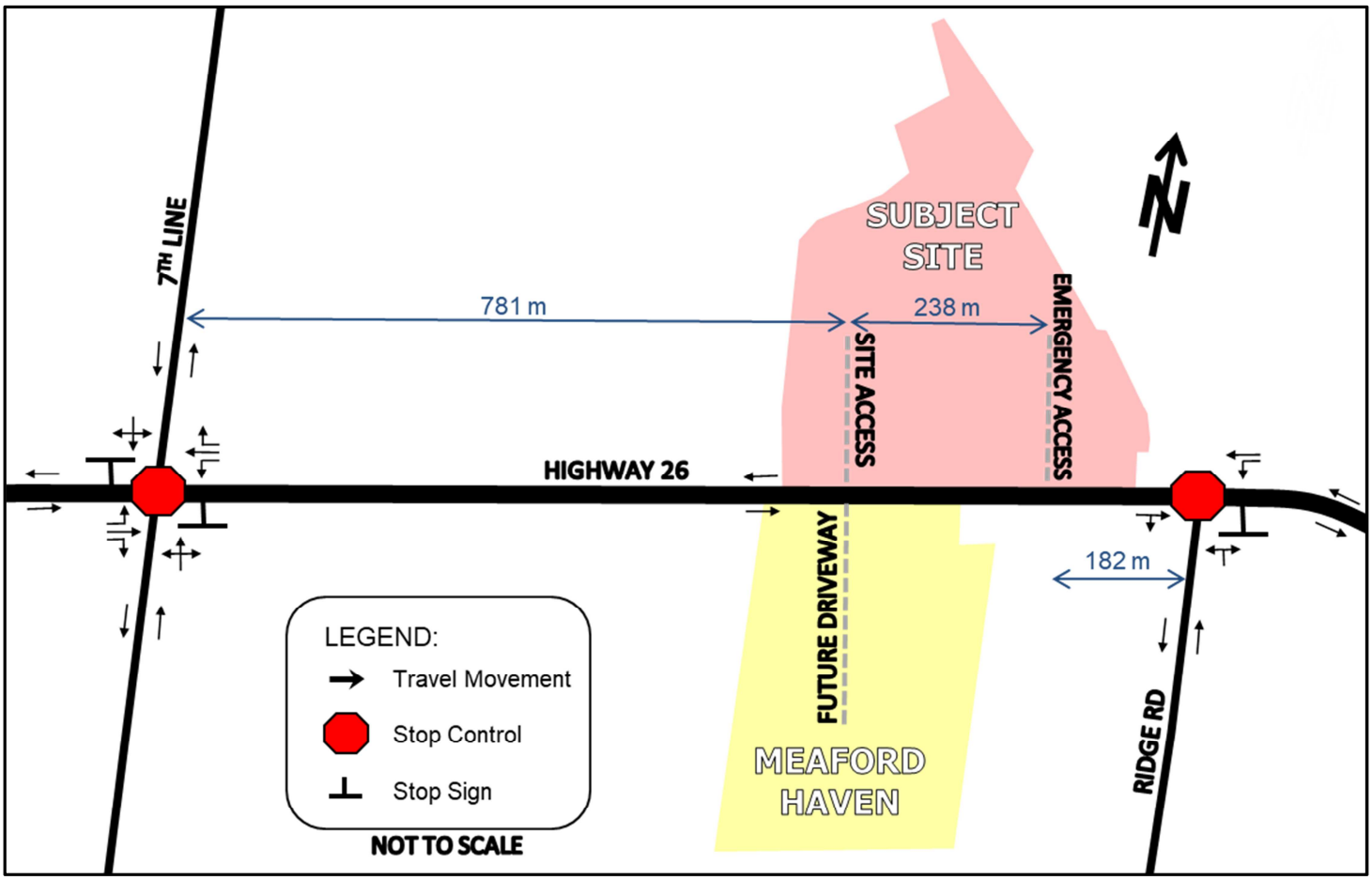
2 Information Gathering

2.1 Street and Intersection Characteristics

Highway 26 is a two-lane Class 2B arterial provincial highway with a rural cross-section and gravel shoulders and no sidewalk. Highway 26 is under jurisdiction of the MTO and has a posted speed limit of 70km/h in the study area.

The existing intersection spacing and lane configuration within the study area is illustrated in **Figure 2.**

Figure 2 - Existing Intersection Spacing and Lane Configuration within Study Area



2.2 Local Transportation Infrastructure Improvements

Based on a review of the MTO's active infrastructure plan (outlined on MTO's interactive infrastructure map) there are no planned infrastructure improvements in the local area that would have a notable impact on traffic circulation patterns in the study area.

The traffic impact study [TIS] completed for Meaford Haven by C.F. Croziers & Associates (dated February 2011) [Meaford Haven TIS] noted recommendations to widen Highway 26 at the Site Access, to add a westbound left-turn lane with a 50 metre storage length, 60 metre parallel length and 145 metre taper length (preliminary design from the Meaford Haven TIS are provided in **Appendix B**). As noted in Section 2.4 the Meaford Haven TIS will need to be updated; however, for the purposes of this study, we have assumed this road improvement will not be completed prior to occupancy of the subject site.

2.3 Transit Access

The study area is serviced by Meaford Moves+, a bus service that provides bus service for residents that have a disability and would be going to work, shopping and other recreation. Meaford Moves+ operates door-to-door within the Municipality between 08:00 – 16:00 and requires a pre-booking application.

2.4 Other Developments within Study Area

Based on discussions with the Municipality of Meaford and County of Grey, Meaford Haven is the only active development in the surrounding area that will have a notable impact on the local traffic volumes in the study area.

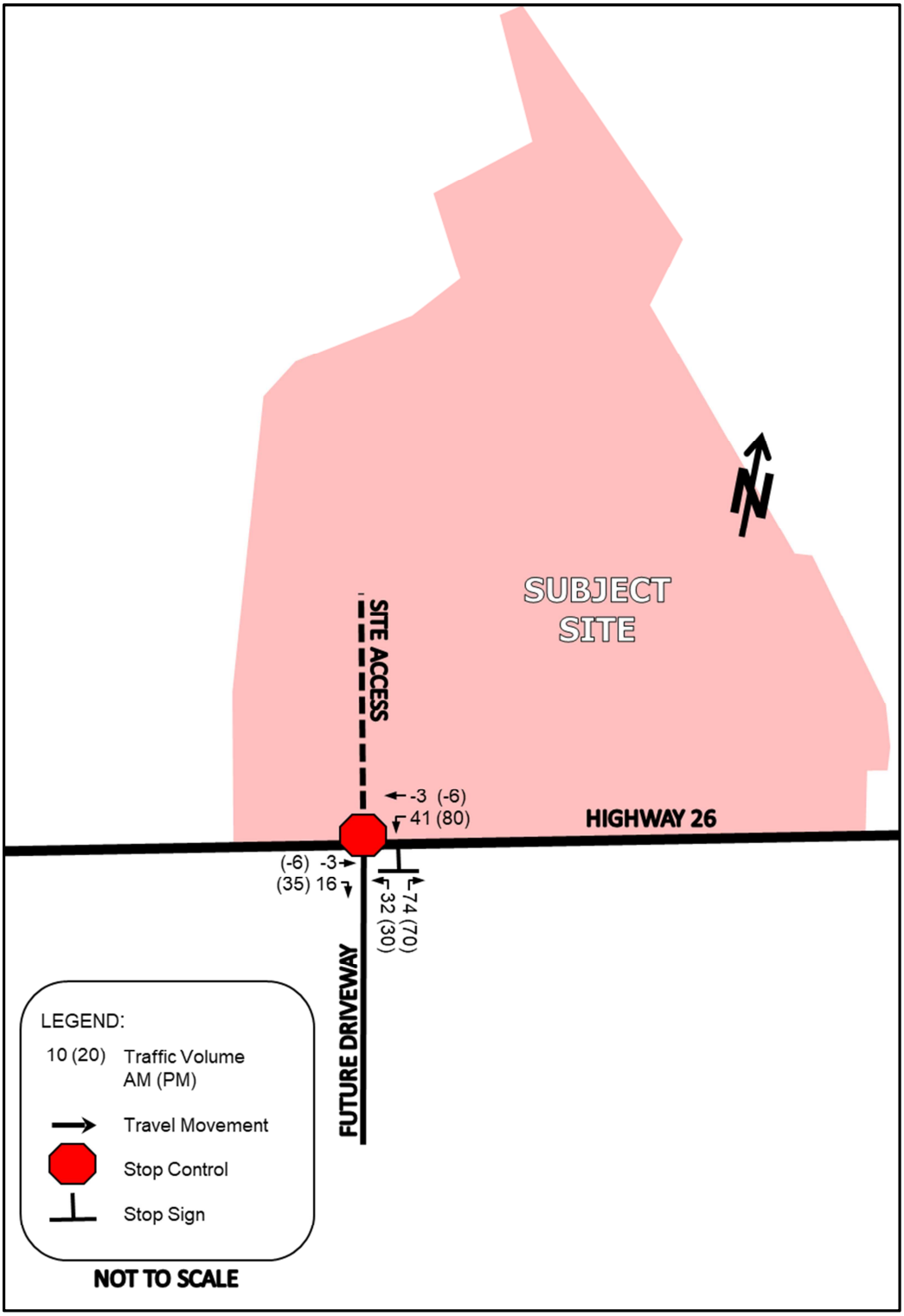
Meaford Haven is a mixed-use development, within a site municipally known as 848 Sykes Street North, located on the south side of Highway 26, directly across from the proposed development. Meaford Haven is expected to include 400 residential units and future non-residential blocks. A breakdown of the residential unit types and specifics for the non-residential blocks are not available at this time. The Meaford Haven TIS provided different statistics for Meaford Haven at the time the report was completed[1]. Meaford Haven will have an access onto Highway 26, directly across from the Site Access [Future Driveway]. A TIS update will be required prior to final approval of the development. Meaford Haven is draft plan approved; however, there is currently no timeline for construction of the Meaford Haven development. For the purpose of this report, we have assumed the development will be fully built-out and occupied by 2023, in order to be conservative.

The total number of units have been updated since the Meaford Haven TIS, however, the updated statistics do not provide a breakdown of the residential units and details of the non-residential blocks; consequently, we have assumed the traffic generation and traffic assignment from the Meaford Haven TIS for the purposes of this report (excerpts provided in **Appendix B**).

Figure 3 illustrates the traffic assignment during the AM and PM peak hour for Meaford Haven.

[1] The proposed statistics in the Meaford Haven TIS for Meaford Haven consisted of a total of 378 residential units (18 single-family detached units, 60 senior apartment units, 96 condo apartments and 204 townhouse units), medical offices (6,500 sq.ft.) and a pharmacy (5,500 sq.ft.).

Figure 3 – Meaford Haven Build-out Traffic Assignment (2023)



2.5 Background Traffic Growth

Based on the correspondence with the MTO, a background traffic growth rate of 1% was assumed along Highway 26.

2.6 Traffic Counts

Automatic traffic recorder [ATR] counts were commissioned by JD Engineering along Highway 26.

Table 1 summarizes the traffic count data collection information.

Table 1 - Traffic Count Data

Roadway	Count Date	AM Peak Hour	PM Peak Hour	Source
Highway 26 (west of Ridge Road)	Thursday, December 5th 2019	07:45 – 08:45	15:30 – 16:30	JD Eng.*

*Traffic counts were completed by Ontario Traffic Inc. on behalf of JD Engineering.

Detailed traffic count data can be found in **Appendix C**. The peak hours of traffic generation for the study area intersections generally aligned with the anticipated peak hour of traffic generation by the proposed development.

Heavy vehicle percentages and pedestrian crossings from the traffic count data have also been included in the Synchro analysis.

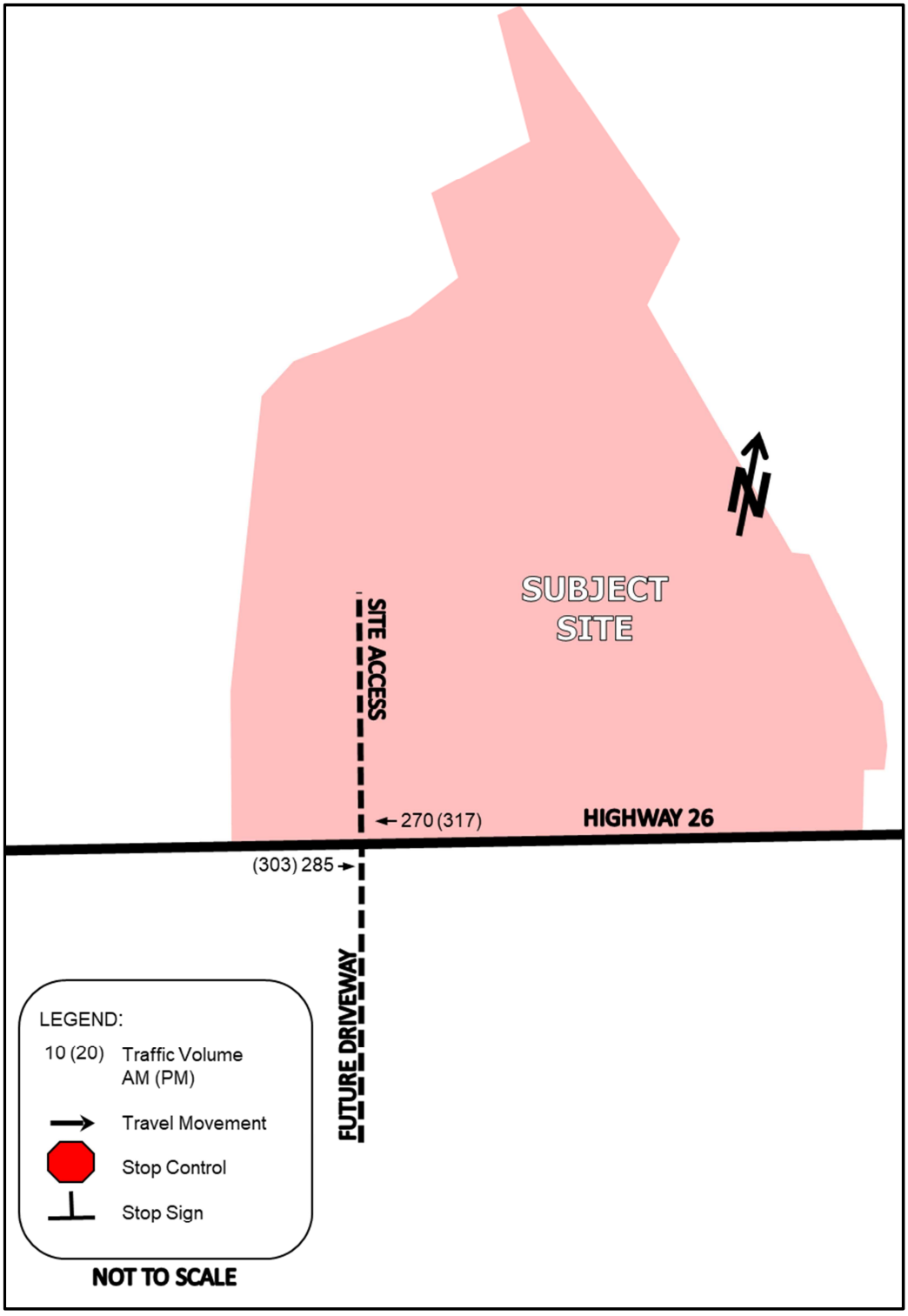
The traffic counts have been factored by the road specific background traffic growth rates noted in Section 2.4 to estimate the existing (2020) traffic volumes.

The traffic counts at both intersections have been adjusted to account for seasonal variation, specifically in the summer months were the Municipality experiences a large increase in traffic. A seasonal traffic factor of 14%[2] has been applied to the traffic count data to estimate summertime traffic conditions.

Figure 4 illustrates the existing AM and PM peak hour traffic volumes in the study area.

[2] Based on a comparison of average weekday daily traffic (AWD) completed in August (Summer) and October (Fall) of 2014.

Figure 4 – Existing Traffic Volumes



3 Proposed Development Traffic Generation and Assignment

3.1 Traffic Generation

The traffic generation for the subject site has been based on the ITE *Trip Generation* data. The following ITE land uses have been applied to estimate the traffic from the proposed development:

- ITE land use 210 (Single-Family Detached Housing) – General Urban/Suburban Setting
- ITE land use 221 (Multifamily Housing (Low-Rise)) – General Urban/Suburban Setting

The estimated trip generation for the proposed development is illustrated below in **Table 2.** The AM and PM peak traffic generation for the proposed development is not expected to exactly align with the AM and PM peak hour in the traffic counts; consequently, we have applied the peak hour of adjacent street traffic values provided in the ITE Trip Generation Manual.

Table 2 – Estimated Traffic Generation of Proposed Development

Land Use	Size	AM Peak Hour			PM Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Single-Family Detached Housing ITE Land Use: 210	113 units	22	64	86	72	43	115
Multifamily Housing (Low-Rise) ITE Land Use: 221	112 units	12	42	54	42	24	66
TOTAL TRIP GENERATION		**34**	**106**	**140**	**114**	**67**	**181**

3.2 Traffic Assignment

For the purposes of this study, it has been assumed that all traffic generated by the proposed development will be new traffic and would not be in the study area if the development was not constructed.

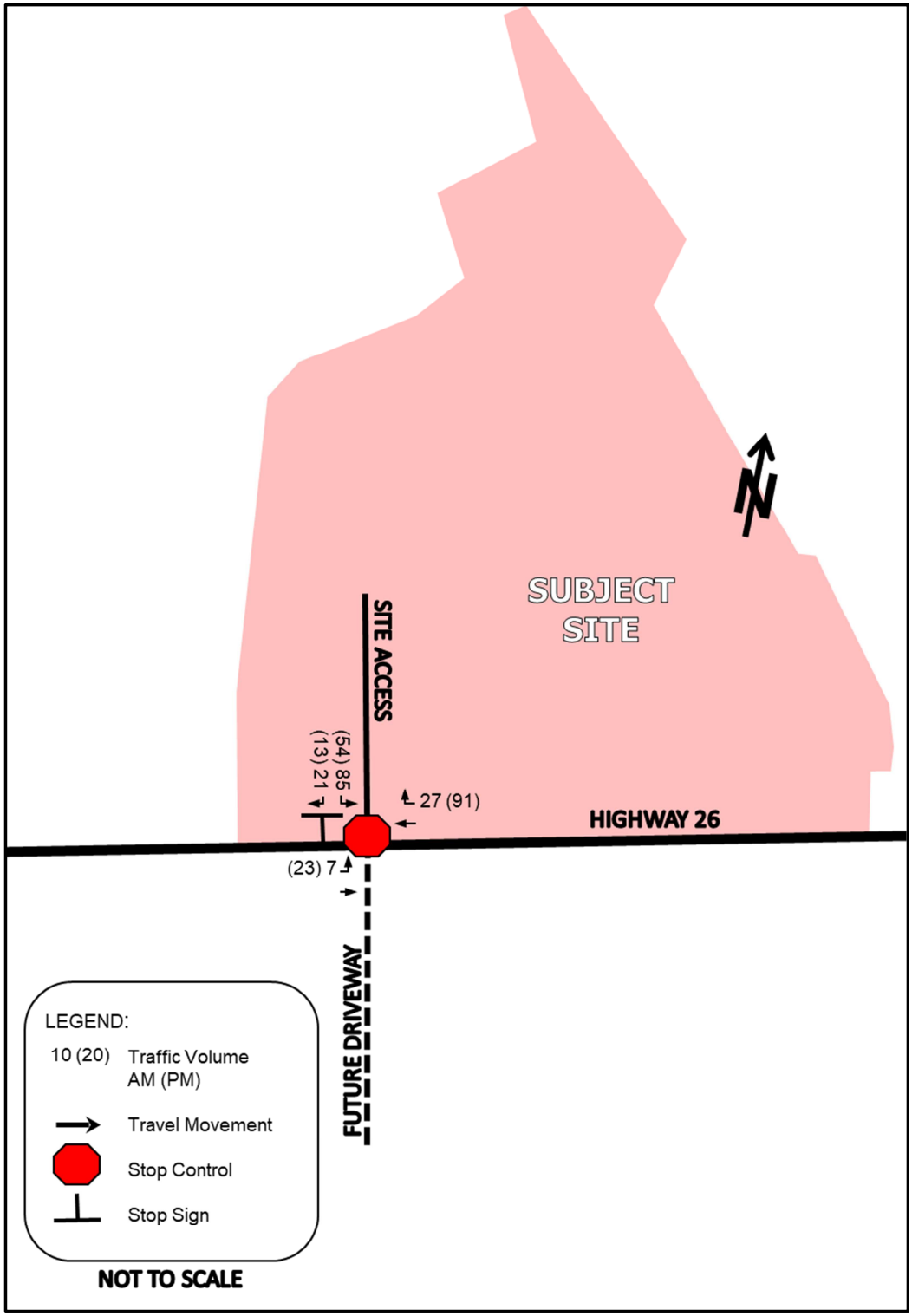
The distribution of site traffic is Meaford Haven TIS for the residential component of Meaford Haven (excerpts provided in **Appendix B**). **Table 3** illustrates the estimated distribution traffic for the proposed development, based on the above-noted assumptions.

Table 3 – Proposed Development Traffic Distribution Summary

Travel Direction (to/from)	Percentage of Total Traffic Generation
East via Highway 26	80%
West via Highway 26	20%
Total	**100%**

Using the traffic distribution patterns noted above, the proposed development traffic assignment was calculated for the AM and PM peak hour and is illustrated in **Figure 5.**

Figure 5 – Proposed Development Traffic Assignment



3.3 Total Horizon Year Traffic Volumes with the Proposed Development

For the total (2023, 2028 & 2033) horizon year traffic volumes, the proposed development traffic (outlined in Section 3.2), the adjacent development traffic volumes (outlined in Section 2.4) and the background traffic growth rate discussed in Section 2.5 has been applied to the existing traffic volumes to estimate the total (2023, 2028 & 2033) horizon year traffic volumes.

Figure 6 to **8** illustrate the background (2023, 2028 & 2033) for the AM and PM peak hour traffic volumes in the study area respectively.

Figure 6 – Total (2023) Traffic Volumes

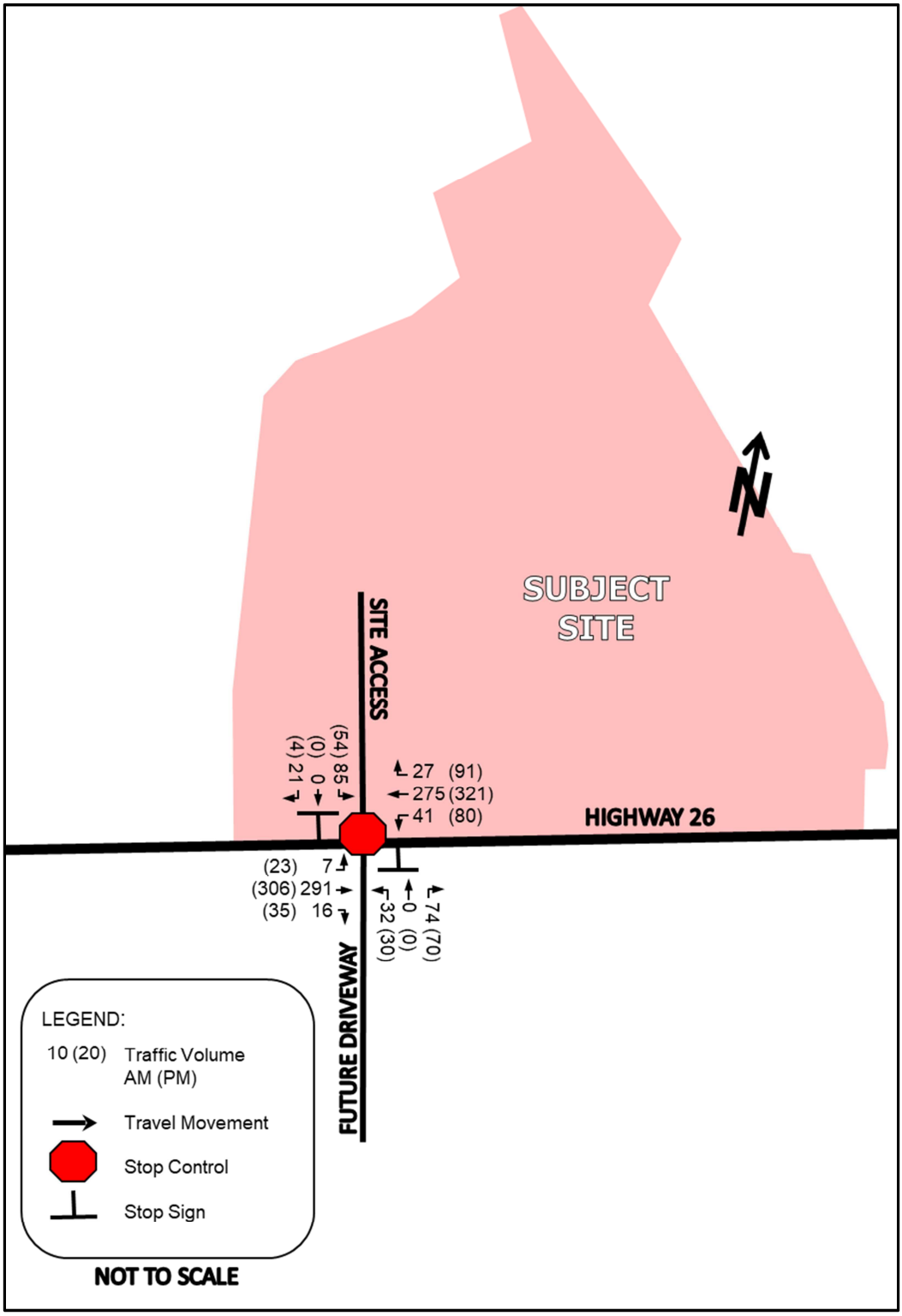


Figure 7 – Total (2028) Traffic Volumes

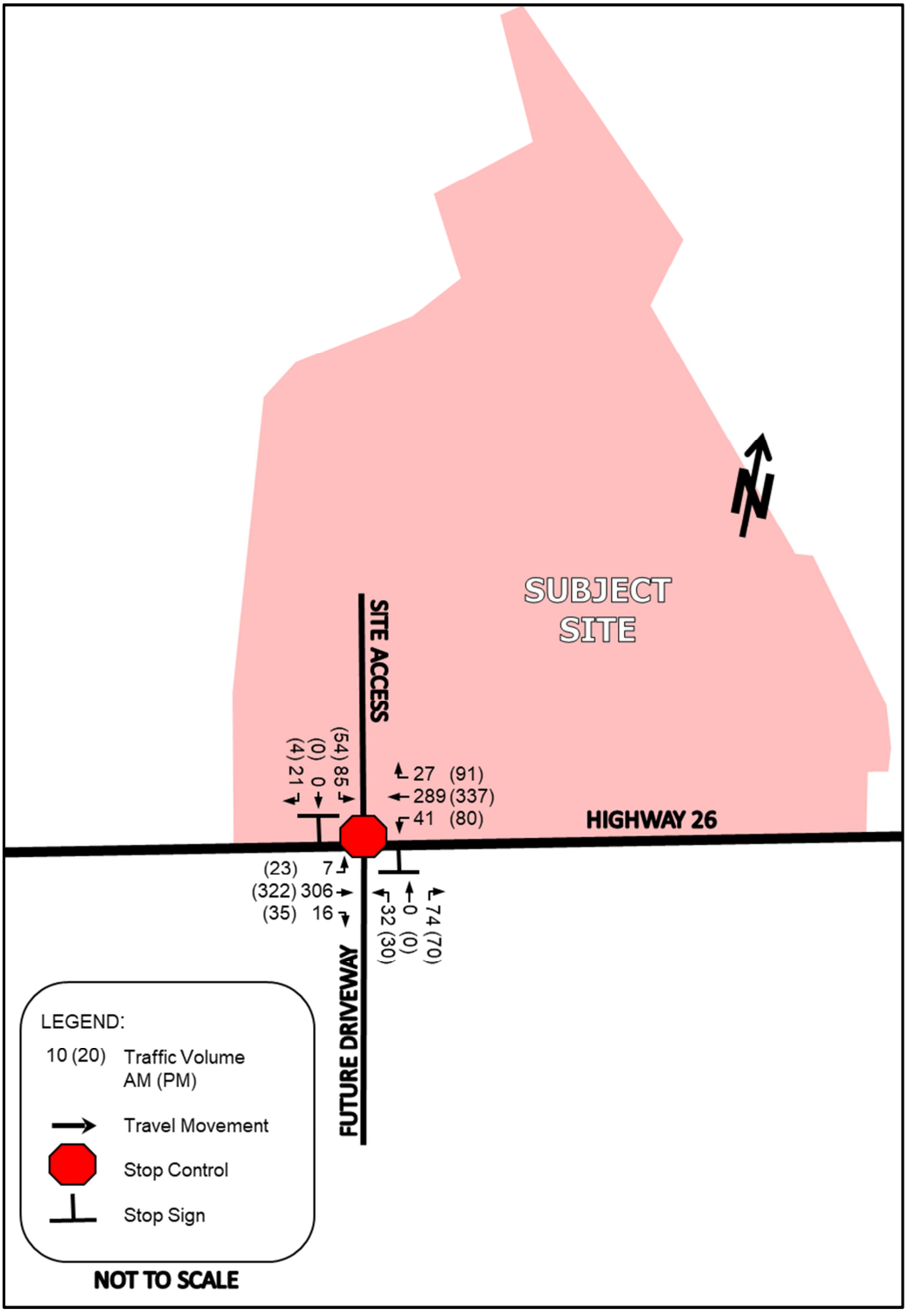
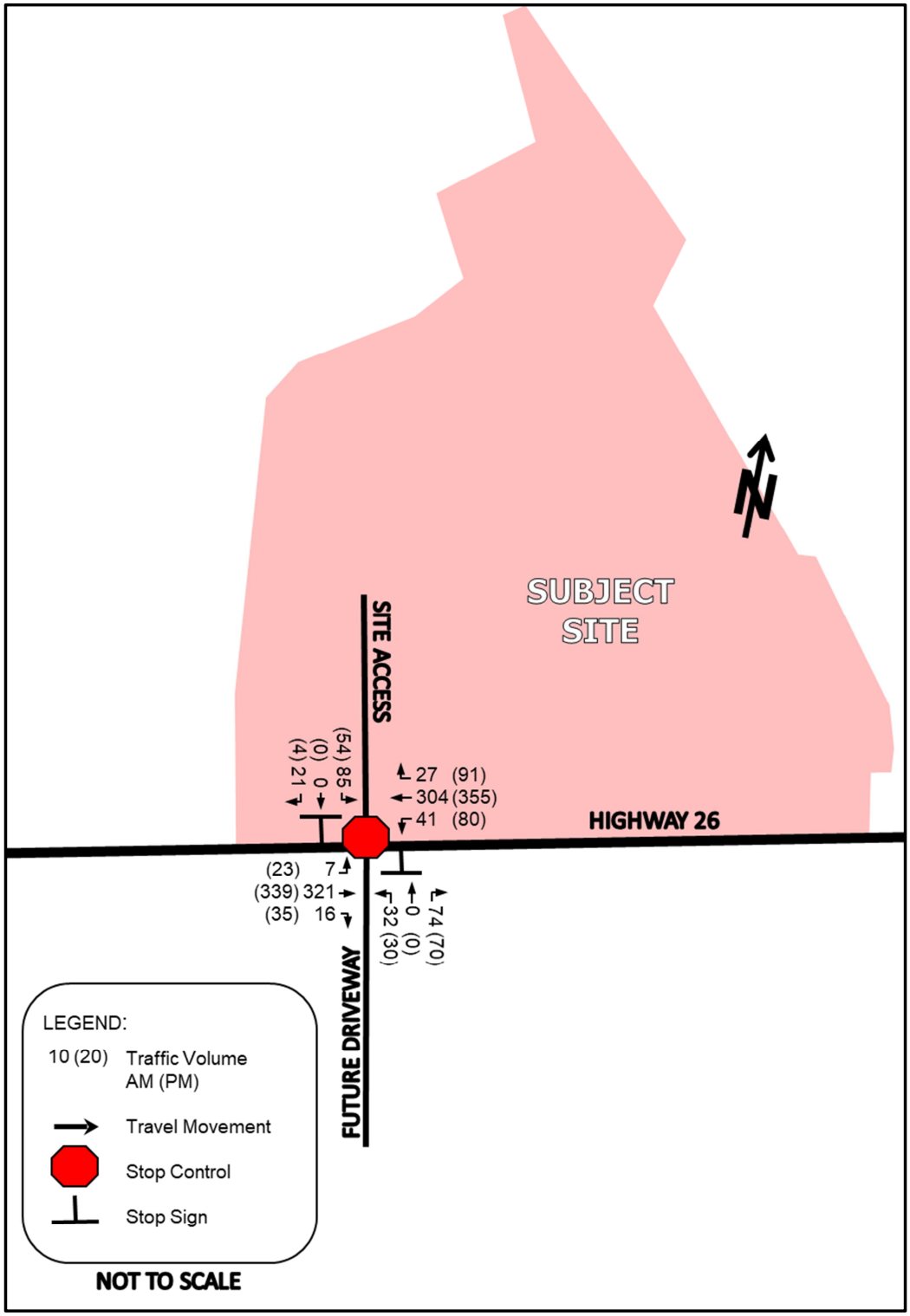


Figure 8 – Total (2033) Traffic Volumes



4 Intersection Operation with Proposed Development

4.1 Intersection Capacity Analysis Criteria

Intersection performance was measured using the traffic analysis software, Synchro 10, a deterministic model that employs Highway Capacity Manual and Intersection Capacity Utilization methodologies for analysing intersection operations. These procedures are accepted by provincial and municipal agencies throughout North America.

Synchro 10 enables the study area to be graphically defined in terms of streets and intersections, along with their geometric and traffic control characteristics. The user is able to evaluate both signalized and unsignalized intersections in relation to each other, thus not only providing level of service for the individual intersections, but also enabling an assessment of the impact the various intersections in a network have on each other in terms of spacing, traffic congestion, delay, and queuing.

Individual turning movements with a volume-to-capacity [V/C] ratio of 0.85 or greater are considered to be critical movements and have been highlighted in the LOS tables.

The intersection operations were also evaluated in terms of the LOS. LOS is a common measure of the quality of performance at an intersection and is defined in terms of vehicular delay. This delay includes deceleration delay, queue move-up time, stopped delay, and acceleration delay. LOS is expressed on a scale of A through F, where LOS A represents very little delay (i.e. less than 10 seconds per vehicle) and LOS F represents very high delay (i.e. greater than 50 seconds per vehicle for a stop sign controlled intersection and greater than 80 seconds per vehicle for a signalized intersection).

The LOS criteria for signalized and stop sign controlled intersections are shown in **Table 4.** A description of traffic performance characteristics is included for each LOS.

Table 4 – Level of Service Criteria for Intersections

LOS	LOS Description	Control Delay (seconds per vehicle)	
		Signalized Intersections	**Stop Controlled Intersections**
A	Very low delay; most vehicles do not stop (**Excellent**)	less than 10.0	less than 10.0
B	Higher delay; more vehicles stop (**Very Good**)	between 10.0 and 20.0	between 10.0 and 15.0
C	Higher level of congestion; number of vehicles stopping is significant, although many still pass through intersection without stopping **(Good**)	between 20.0 and 35.0	between 15.0 and 25.0
D	Congestion becomes noticeable; vehicles must sometimes wait through more than one red light; many vehicles stop (**Satisfactory**)	between 35.0 and 55.0	between 25.0 and 35.0
E	Vehicles must often wait through more than one red light; considered by many agencies to be the limit of **acceptable** delay	between 55.0 and 80.0	between 35.0 and 50.0
F	This level is considered to be unacceptable to most drivers; occurs when arrival flow rates exceed the capacity of the intersection (**Unacceptable**)	greater than 80.0	greater than 50.0

4.2 Total (2023) Intersection Operation

The results of the LOS analysis under total (2023) traffic volumes during the AM and PM peak hours can be found below in **Table 5**. The proposed improvements noted in Section 2.2 and existing traffic control have been utilized for the scenario.

An analysis was completed for left turn movements at the Highway 26 / Site Access & Future Driveway intersection, based on the criteria outlined in Appendix 9A of the Ontario Ministry of Transportation Design Supplement for TAC Geometric Design Guide for Canadian Roads June 2017 [MTO DS]. Based on the above noted criteria an eastbound and westbound left-turn lane is warranted on Highway 26 (results provided in **Appendix E**). The following improvements are recommended at the Highway 26 / Site Access & Future Driveway intersection prior to occupancy of the proposed development:

- Construct an eastbound left turn lane on Highway 26 with an 85 metre parallel length and 105 metre taper length.
- Construct a westbound left turn lane on Highway 26 with a 95 metre parallel length and 105 metre taper length.

It is recommended that the constriction cost for the above-noted improvements is split between LC Development Group Inc. and the owners of the Meaford Haven development.

Detailed output of the Synchro analysis can be found in **Appendix D**.

Table 5 - Total (2023) LOS

Location (E-W Street / N-S Street	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Queue	Storage				Queue	Storage
Highway 26 / Site Access & Future Driveway (unsignalized)	-	6.2	A	-	-	-	4.3	A	-	-
NB	0.27	15.3	C	-	-	0.24	15.9	C	-	-
SB	0.49	31.5	D	20	-	0.33	29.8	D	11	-

The results of the LOS analysis indicate that all study area intersections are operating within the typical design limits noted in Section 3.1.

The anticipated 95th percentile queue for southbound movements at the Highway 26 / Site Access & Future Driveway intersection will be 20 metre in the critical AM peak hour. The distance between the proposed stop bar on Highway 26 and the first internal road is greater than 45 metres. Consequently, the queuing for southbound movements at Highway 26 will not impact traffic operations at the first internal intersection of the proposed development.

There are no issues with the anticipated queuing at the Highway 26 / Site Access & Future Driveway intersection.

A review of the need for additional auxiliary right turn lanes at the Highway 26 / Site Access & Future Driveway intersection were completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all movements; consequently, additional auxiliary right turn lanes are not recommended.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at the Highway 26 / Site Access & Future Driveway intersection (results are provided in **Appendix F**).

No other improvements are recommended within the study area.

4.3 Total (2028) Intersection Operation

The results of the LOS analysis under total (2028) traffic volumes during the AM and PM peak hours can be found below in **Table 6**. Existing intersection geometry and traffic control have been utilized for this scenario. Detailed output of the Synchro analysis can be found in **Appendix D**.

Table 6 - Total (2028) LOS

Location (E-W Street / N-S Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Queue	Storage				Queue	Storage
Highway 26 / Site Access & Future Driveway (unsignalized)	-	6.4	A	-	-	-	4.4	A	-	-
NB	0.28	15.9	C	-	-	0.25	16.5	C	-	-
SB	0.52	34.5	D	22	-	0.35	32.0	D	12	-

The results of the LOS analysis indicate that all study area intersections are operating within the typical design limits noted in Section 3.1.

The anticipated 95th percentile queue for southbound movements at the Highway 26 / Site Access & Future Driveway intersection will be 22 metre in the critical AM peak hour. The distance between the proposed stop bar on Highway 26 and the first internal road is greater than 45 metres. Consequently, the queuing for southbound movements at Highway 26 will not impact traffic operations at the first internal intersection of the proposed development.

There are no issues with the anticipated queuing at the Highway 26 / Site Access & Future Driveway intersection.

A review of the need for additional auxiliary right turn lanes at the Highway 26 / Site Access & Future Driveway intersection were completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all movements; consequently, additional auxiliary right turn lanes are not recommended.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at the Highway 26 / Site Access & Future Driveway intersection (results are provided in **Appendix F**).

No other improvements are recommended within the study area.

4.4 Total (2033) Intersection Operation

The results of the LOS analysis under total (2033) traffic volumes during the AM and PM peak hours can be found below in **Table 7**. Existing intersection geometry and traffic control have been utilized for this scenario. Detailed output of the Synchro analysis can be found in **Appendix D**.

Table 7 - Total (2033) LOS

Location (E-W Street / N-S Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Queue	Storage				Queue	Storage
Highway 26 / Site Access & Future Driveway (unsignalized)	-	6.6	A	-	-	-	4.5	A	-	-
NB	0.29	16.5	C	-	-	0.27	17.6	C	-	-
SB	0.55	38.0	E	24	-	0.38	36.0	E	14	-

The results of the LOS analysis indicate that all study area intersections are operating within the typical design limits noted in Section 3.1.

The anticipated 95th percentile queue for southbound movements at the Highway 26 / Site Access & Future Driveway intersection will be 24 metre in the critical AM peak hour. The distance between the proposed stop bar on Highway 26 and the first internal road is greater than 45 metres. Consequently, the queuing for southbound movements at Highway 26 will not impact traffic operations at the first internal intersection of the proposed development.

There are no issues with the anticipated queuing at the Highway 26 / Site Access & Future Driveway intersection.

A review of the need for additional auxiliary right turn lanes at the Highway 26 / Site Access & Future Driveway intersection were completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all movements; consequently, additional auxiliary right turn lanes are not recommended.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at the Highway 26 / Site Access & Future Driveway intersection (results are provided in **Appendix F**).

No other improvements are recommended within the study area.

4.5 Site Access

The Site Access will operate efficiently as a full-movement access, with southbound stop control for the Site Access and future northbound stop control for the Meaford Haven Future Driveway. A single ingress and egress lane for the Site Access will provide the necessary capacity to service the proposed development.

The proposed spacing between the Site Access and 7th Line and between the Site Access and Ridge Road (measured centre of driveway to centre of roadway) is less than the desirable spacing requirements as identified in the MTO Highway Corridor Management Manual [MTO HCMM] – Table 4.6.1 (Spacing and density of various access connection types) – 800 metres for a Class 2B MTO highway; however, as noted in Section 4.4 there are no issues with the anticipated queuing eastbound and westbound at the Highway 26 / Site Access intersection and the intersection is operating within typical design limits as noted in Section 4.1.

As noted in Section 4.4, there are no issues with the anticipated queuing for southbound vehicles at the Highway 26 / Site Access intersection in relation to the proposed internal roadway network.

According to the County's Official Plan, new developments with greater than 150 residential units are required to have two or more full-movement accesses. As noted in Section 4.3 there are no safety or operational issues with the single public access onto Highway 26. The traffic operations at the Highway 26 / Site Access & Future Driveway intersection are expected to be within the typical design

limits noted in Section 3.1. With respect to emergency access, the National Fire Protection Agency [NFPA] 1141 Guidelines (2017) Table 5.1.4.1 (a) identifies a need for two access routes (with one of the means of access restricted for emergency use only) for a residential subdivision between 101 units and 600 units. Furthermore, Highway 26 is under the jurisdiction of MTO and their preference is to include a secondary emergency access rather than a secondary public access. Consequently, the proposed configuration of the Site Access and Emergency Access is acceptable for the intended use.

4.6 Sight Distance Review

A review of the sight distance on North Access and South Access was completed as part of this analysis

The sight distance west of the Site Access on Highway 26 (178 metres) is greater than the minimum stopping sight distance requirements as identified in the TAC Guidelines for a design speed of 70km/h (165 metres).

The sight distance east of the Site Access on Highway 26 (230 metres) is significantly greater than the minimum stopping sight distance requirements as identified in the TAC Guidelines for a design speed of 70km/h (165 metres).

Consequently, there are no issues with the sight distance available for the proposed Site Access.

4.7 Sensitivity Analysis - Left Turn Lane Warrant Trigger

The following additional review was completed to assess the development trigger for the construction of the auxiliary left turn lanes recommended in Section 4.2. For the purpose of this supplemental analysis, we have assumed that the proposed development will proceed ahead of the Meaford Haven development on the south side of Highway 26. We have assumed that 100 units (50 single detached units and 50 townhouse units) will be developed in the initial phase(s) of the proposed development and used 2025 as the future horizon year. Applying these parametres would result in an advancing (eastbound) traffic volume of 339 vehicles, and opposing (westbound) traffic volume of 385 vehicles and a 3% left turns in volume advancing. Based on the MTO DS criteria, an eastbound left-turn lane is not warranted on Highway 26 for this scenario (results provided in **Appendix E**).

Consequently, the construction of a left turn lane on Highway 26 is required prior to occupancy of the 101st unit in the subject site or 2025, assuming there is no development in the Meaford Heaven development.

5 Summary

LC Development Group Inc. retained **JD Engineering** to prepare this traffic impact study in support of the proposed residential development located north of Highway 26, west of Algonquin Drive in the Municipality of Meaford, County of Grey. The site plan provided by the Developer is included in **Appendix A.** This chapter summarizes the methodology, conclusions and recommendations from the study.

The proposed development is anticipated to consist of a total of 225 units, that will include 113 single-detached units and 112 townhouse units

1. The proposed development is expected to generate 140 AM and 181 PM new peak hour trips in the study area.

2. Automatic traffic recorder [ATR] counts were commissioned by JD Engineering along Highway 26 west of Ridge Road, completed on Thursday, December 5th, 2019.
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4. An intersection operation analysis was completed under total (2023, 2028 and 2033) traffic volumes with the proposed development operational at the study area intersections. The following improvements are recommended:

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   - Eastbound left-turn lane on Highway 26 with an 85 metre parallel length and a 105 metre taper length.
   - Westbound left turn lane on Highway 26 with a 95 metre parallel length and a 105 metre taper length.
   - It is recommended that the constriction cost for the above-noted improvements is split between LC Development Group Inc. and the owners of the Meaford Haven development.
5. The Site Access will operate efficiently as a full-movement access, with southbound stop control. A single lane for ingress and egress movements at the Site Access driveway will provide the necessary capacity to convey the traffic volume generated by the proposed development.
6. There are no issues with the sight distance available for the proposed Site Access.
7. Assuming there is no occupancy in the Meaford Heaven development prior to 2028; the construction of a left turn lane on Highway 26 is required prior to occupancy of the 101st unit in the subject site.
8. In summary the proposed development will not cause any operational issues and will not add significant delay or congestion to the local roadway network.

Appendix A – Site Plan

APPROXIMATE EDGE OF EXISTING STREAM

REMNANT LOT = 1.77ha

30m SETBACK FROM APPROXIMATE EDGE OF EXISTING STREAM

STORMWATER MANAGEMENT FACILITY BLOCK 0.60ha±

6m SWM FACILITY ACCESS

10m DRIVEWAY TO REMNANT LOT

6m SWM POND OUTLET EASMENT

ONTARIO REGULATION 151/06 (APPROX.)

NATURAL HAZARD (APPROX.)

14m MTO SETBACK

HIGHWAY 26

EMERGENCY ACCESS

PEL
PINESTONE ENGINEERING LIMITED | www.pel.ca

CLIENT/PROJECT

LOON CALL
MEAFORD PROPERTY - M-1

DRAWING TITLE

LOT CONCEPT SKETCH

SEAL

NORTH ARROW

KEY MAP

PROJECT NO.	19-11471-M
DRAWING NO.	SP-1
DESIGN BY:	T.H.
DRAWN BY:	G.N.
CHECKED	T.H.
DATE:	FEBRUARY 2020
SCALE:	1:800

NOTES

1. LEGAL INFORMATION FROM REGISTERED PLANS 16R-5037 AND 16R-10913
2. AERIAL PHOTO INFORMATION FROM COUNTY OF GREY-BRUCE GIS. LOCATION AND SCALE OF PHOTO IS APPROXIMATE. YEAR OF IMAGE IS 2015.

Appendix B –
Meaford Haven TIS Excerpts

TRAFFIC IMPACT STUDY

7109 MAIN STREET, STAYNER

DUO INVESTEMENTS INC.

PREPARED BY:

C.F. CROZIER & ASSOCIATES INC.
110 PINE STREET
COLLINGWOOD, ONTARIO
L9Y 2N9

FEBRUARY 2011

CFCA FILE NO. 446-3026

approximately at the east boundary of the subject property. At the intersection of Highway 26 and Ford Avenue, 150 metres east of Ridge Road, the highway is under the jurisdiction of the Municipality of Meaford through the connecting links program.

7th Line is a two lane north-south rural roadway under the jurisdiction of the Municipality of Meaford. The roadway is designated a local roadway within the Meaford Official Plan. The speed limit is not posted and is therefore 80 km/h per municipal regulation. The roadway is approximately 800 metres west of the subject lands.

Ridge Road is a two-lane north-south rural roadway under the jurisdiction of the Municipality of Meaford. The roadway is designated a local roadway with the Meaford Official Plan. The speed limit is not posted and is therefore 50 km/h per municipal regulation. The roadway is approximately 400 metres east of the subject lands.

St. Andrews Drive is a two-lane east-west urban roadway under the jurisdiction of the Municipality of Meaford. The roadway is not identified in the Municipality of Meaford Official Plan as the roadway has been recently constructed as part of a subdivision development. The speed limit is not posted and is therefore 50 km/h per municipal regulation.

The four-legged intersection of Highway 26 (east and west approaches) and 7th Line (north and south approaches) is unsignalized. The west approach (Highway 26) has no restriction to free-flow and consists of a shared through/left-turn lane and a right-turn taper. The east approach (Highway 26) has no restriction to free-flow and consists of a shared through/left-turn lane and a right-turn lane. The north and south approaches (7th Line) are stop-controlled with no exclusive turn lanes.

The three-legged intersection of Highway 26 (east and west approaches) and Ridge Road (south approach) is unsignalized. The west approach (Highway 26) has no restriction to free-flow and consists of a through lane and a right turn taper. The east approach (Highway 26) has no restriction to free-flow and consists of a shared through/left-turn lane. The south approach (Ridge Road) is stop controlled and consists of a shared right/left-turn lane. No north approach exists at the intersection.

The three-legged intersection of Ridge Road (north and south approaches) and St. Andrews Drive (east approach) is unsignalized. The north approach (Ridge Road) has no restriction to free-flow and consists of a shared through/left-turn lane. The south approach (Ridge Road) has no restriction to free-flow and consists of a shared through/right-turn lane. The east approach (St. Andrews Drive) is stop-controlled and consists of a shared right/left-turn lane. No west approach exists at the intersection.

3.4 Development Proposal

The proposed development is to consist of mixed commercial and residential uses. The commercial use will consist of a 12,000 square foot gross floor area contained within a single building in the northeast area of the property. All remaining areas will contain a variety of residential dwelling unit types. In addition, a private community centre will be provided for the residents. Table 1 provides information on the various uses and the corresponding Institute of Transportation Engineers (ITE) land use codes used for trip generation. Since the time of analysis, a reduction of five residential units has occurred. Table 1 reflects the penultimate concept plan.

Table 1
Development Components

Type	Units	ITE Code	ITE Category
Single Family Lots	18	210	Single-Family Detached Housing
Seniors Apartments	60	252	Senior Adult Housing – Attached
Condo Apartments	96	232	High-Rise Residential Condominium/Townhouse
Bungalows	192	231	Low-Rise Residential Condominium/Townhouse
Above-Commercial Condo	12	231	Low-Rise Residential Condominium/Townhouse
Medical Offices	6,500 ft²	720	Medical-Dental Office Building
Pharmacy	5,500 ft²	880	Pharmacy/Drugstore without Drive-Through Window

The tenure of the proposed development is to be primarily condominium with private roadways. Access to Highway 26 will be through a public roadway which will terminate at a gate facility 130 metres south of the Highway 26 right-of-way. A private road connection secured by a gate facility will be made to the termini of Fairway Avenue.

Refer to Figure 2 for the concept plan prepared by Hensel Design Group, January, 2011.

3.5 Traffic Data

Turning movement counts at the intersections of Highway 26 and 7th Line, Highway 26 and Ridge Road, and Ridge Road and St. Andrews Drive were undertaken by C. F. Crozier & Associates staff from 7:00 to 9:00 a.m. and from 4:00 to 6:00 p.m. on Friday, November 19, 2010. A Friday was selected to capture both commuter and weekend recreational traffic in the Georgian Triangle Area.

The intersection of Highway 26 and the site entrance will operate at a Level of Service "C" and "D" during the 2030 a.m. and p.m. peak hours, respectively. The entrance will have a maximum volume-to-capacity ratio of 0.46, indicating significant reserve capacity should there be an increase in site generated traffic volumes. The maximum 95th percentile queue length will be 17.0 metres, equivalent to three vehicles. As such, there will be no interference between exiting vehicles and the entry gatehouse to the private roadway areas of the development.

6.5 Local Road Affects

The proposed development will result in the addition of traffic volumes to local roads east of the site. During the critical Friday p.m. peak hour, this addition in both directions will total of 76 vehicles, which equates to 1.3 vehicles per minute, or one vehicle every 47 seconds. This additional traffic will not materially alter the urban local nature of the roadway, which is described by the Transportation Association of Canada as a roadway experiencing fewer than one thousand vehicles per day.

Two-way traffic volumes on St. Andrews Drive will increase by a total of 39 vehicles during the critical Friday p.m. peak hour. This volume equates to 0.65 vehicles per minute, or one vehicle every 92 seconds. As before, this additional traffic will not materially alter the urban local roadway.

7.0 Conclusions and Recommendations

Turning movement counts undertaken on Friday, November 19, 2010 were scaled by a factor of 1.34 to reflect traffic volumes during the peak summer driving season.

Intersection analyses of existing traffic volumes indicate that the intersections of Highway 26 with 7th Line and Ridge Street operate at a LOS "C" in the critical Friday p.m. peak hour. The intersection of Ridge Road and St. Andrews Drive operates at a LOS "A" during both the Friday a.m. and p.m. peak hours.

Intersection analyses of the 2020, 2025 and 2030 future background traffic volumes indicate that the intersections of Highway 26 with 7th Line and Ridge Road are expected to operate at a LOS "C" during the Friday a.m. peak hours and LOS "D" (Ridge Road) and LOS "F" (7th Line) or better during the Friday p.m. peak hour. The decrease in Level of Service is a result of general traffic growth over the 20 year horizon.

The proposed development is expected to add 192 and 223 residential trips to the boundary road system in the a.m. and p.m. peak hours, respectively. In addition, 23 and 44 primary commercial trips are expected in the a.m. and p.m. peak hours, respectively.

A left-turn lane analysis was undertaken for the intersection of Highway 26 and the site entrance. It was concluded that a westbound left turn lane is warranted. It is recommended that a westbound left turn lane be implemented at the site entrance consisting of 50 metres of storage length, 60 metres of parallel lane length, and 145 metres of taper length.

Intersection analysis of the 2020, 2025 and 2030 total background traffic volumes indicate that the intersections of Highway 26 with 7th Line and Ridge Road will experience greater delay and culminate in a LOS "F" at 7th Line during the 2030 p.m. peak hour. It is recommended that the intersection of Highway 26 and 7th Line be monitored in the 20 year horizon to determine if traffic volumes outside of the critical Friday

p.m. peak hour are sufficient to trigger a signal warrant.

The analysis undertaken within was prepared using the most recent draft plan. Any minor changes to the plan will not materially affect the conclusions and recommendations contained within this report.

It is concluded that the traffic affects associated with the proposed development can be mitigated through the implementation of a westbound left-turn lane at the site entrance.

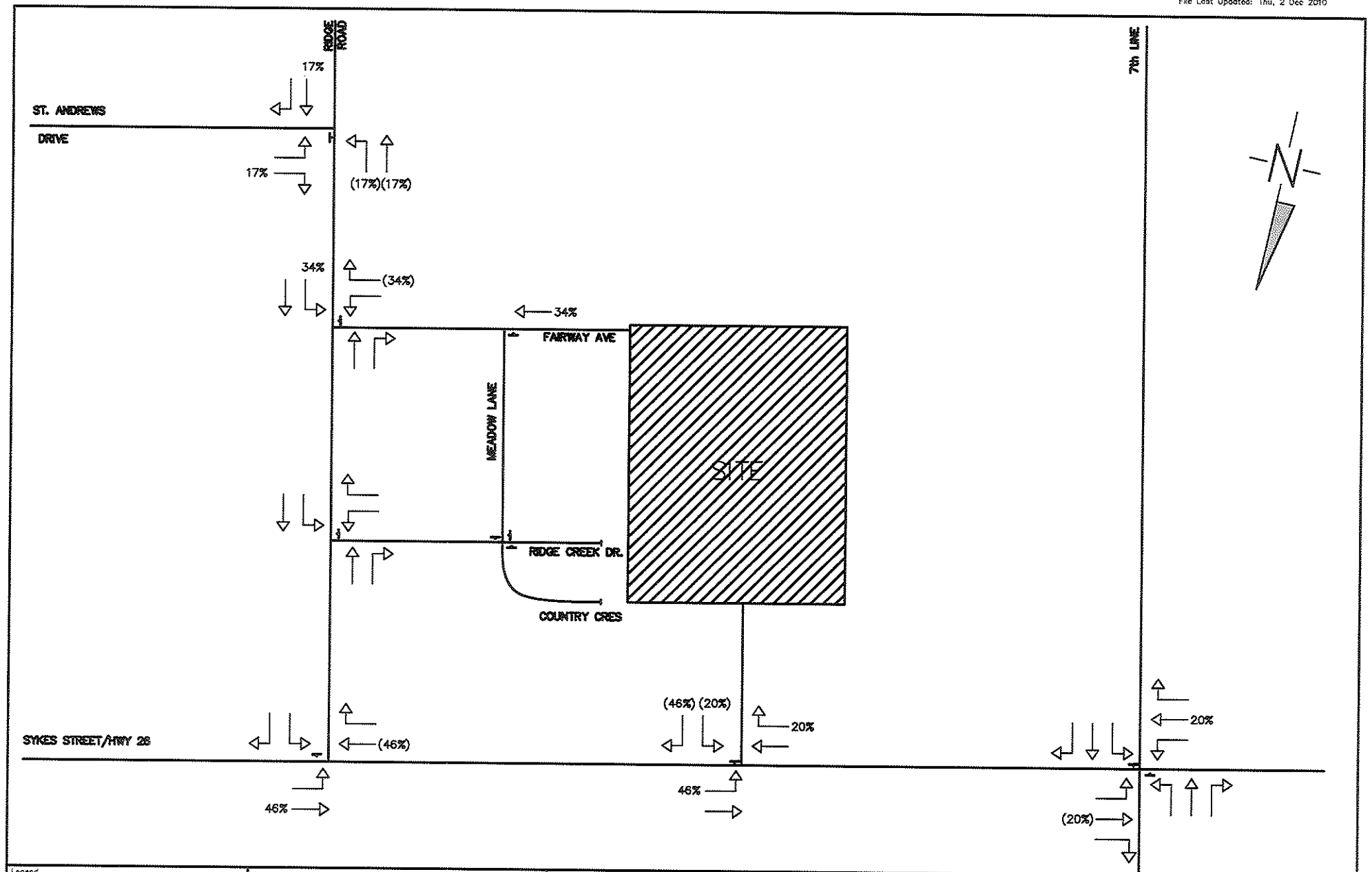
Prepared by,

C.F. CROZIER & ASSOCIATES INC.:

LICENSED PROFESSIONAL ENGINEER
A. J. W. FLEMING
100012282
PROVINCE OF ONTARIO

Alexander J. W. Fleming, MBA, P.Eng., PTOE

J:\400\446 - Pierre Boiron\3026 - Meaford West Property\Traffic\Meaford West TIS.doc



Legend

STOP CONTROL

XX(YY) INBOUND (OUTBOUND)

NOTE:
THIS FIGURE IS FOR SCHEMATIC PURPOSES ONLY & IS NOT TO BE SCALED.

Project
MEAFORD WEST
TOWN OF MEAFORD

Drawing
RESIDENTIAL TRIP DISTRIBUTION

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705 446-3520 F
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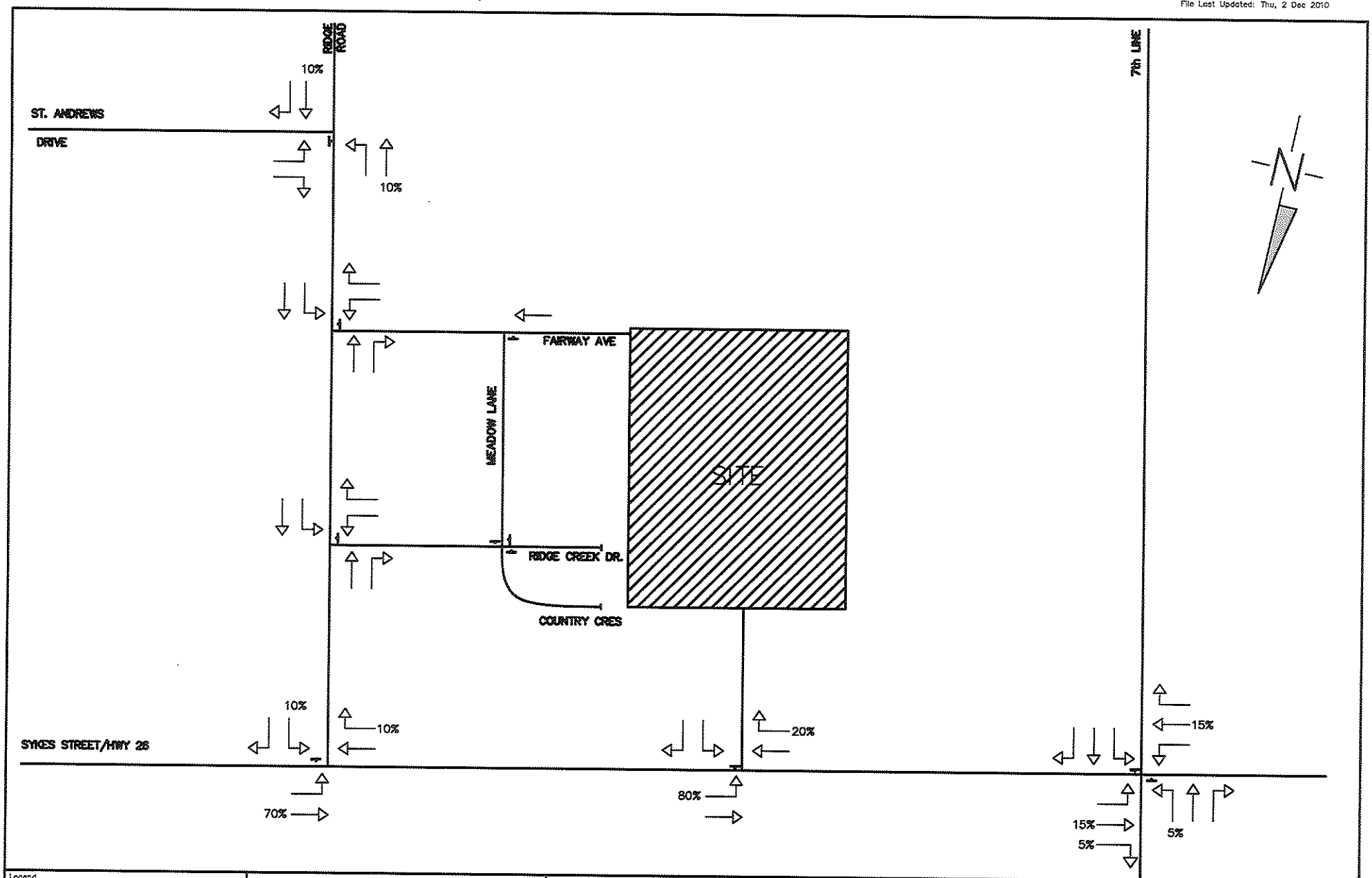
INFO@CFCROZIER.CA

Drawn By	R.F.	Check By	A.J.F.	Project No.	446-3026
Scale	N.T.S.	Date	12/1/2010	Drawing No.	FIG. 7



Legend

STOP CONTROL

XX(YY) INBOUND (OUTBOUND)

NOTE:
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Project
MEAFORD WEST
TOWN OF MEAFORD

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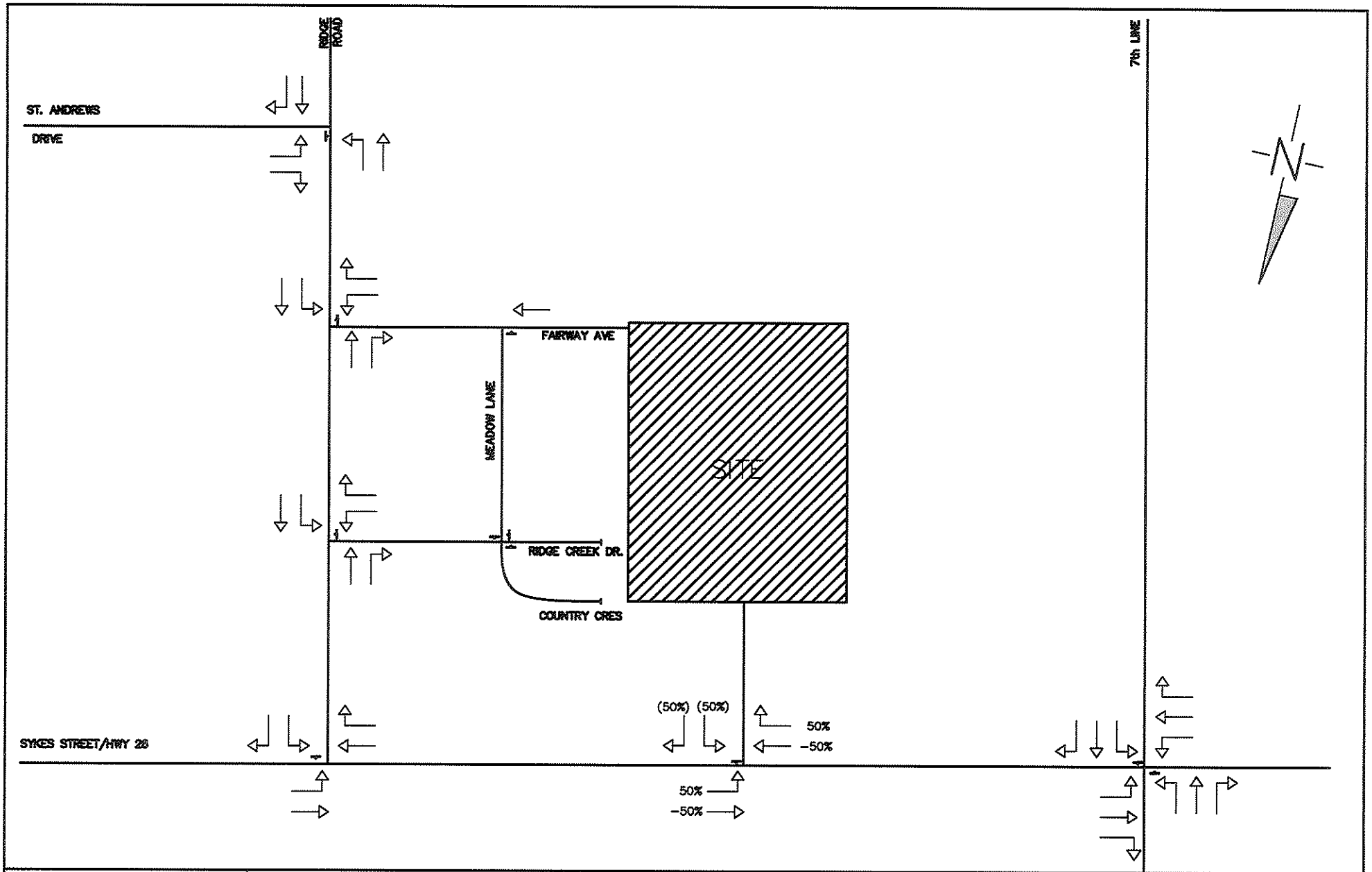
INFO@CFCROZIER.CA

Drawn By	R.F.	Check By	A.J.F.	Project No.	446-3026
Scale	N.T.S.	Date	12/1/2010	Drawing No.	FIG. 8



Legend

STOP CONTROL

XX(YY) INBOUND (OUTBOUND)

NOTE:
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Project

MEAFORD WEST
TOWN OF MEAFORD

Drawing

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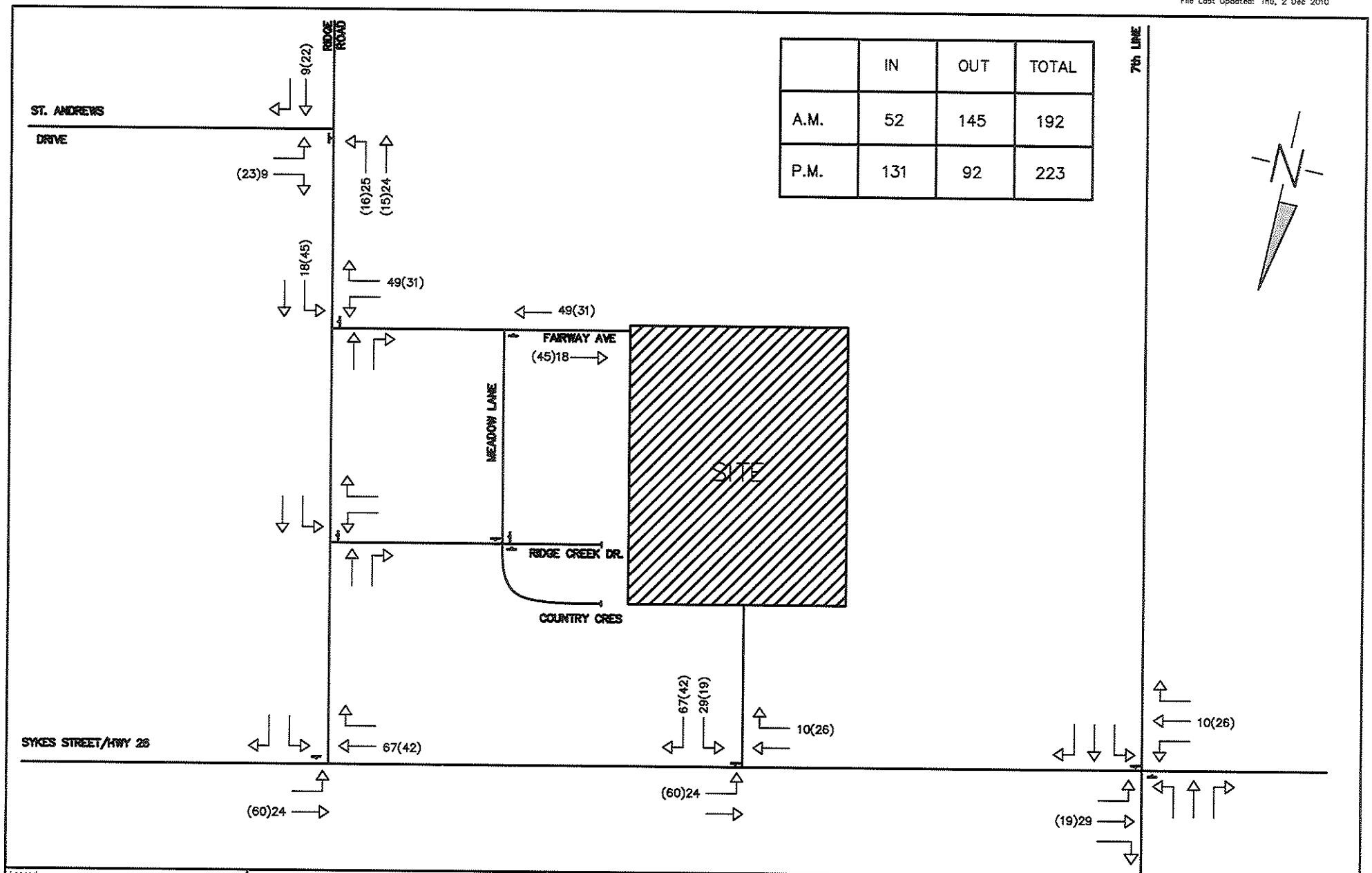
705 446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By	R.F.	Check By	A.J.F.	Project No.	446-3026
Scale	N.T.S.	Date	12/1/2010	Drawing No.	FIG. 9



	IN	OUT	TOTAL
A.M.	52	145	192
P.M.	131	92	223

Legend

STOP CONTROL

XX(YY) A.M. (P.M.) PEAK HOUR TRAFFIC VOLUMES

NOTE:
THIS FIGURE IS FOR SCHEMATIC PURPOSES ONLY & IS NOT TO BE SCALED.

Project
MEAFORD WEST
TOWN OF MEAFORD

Drawing
RESIDENTIAL TRIP ASSIGNMENT

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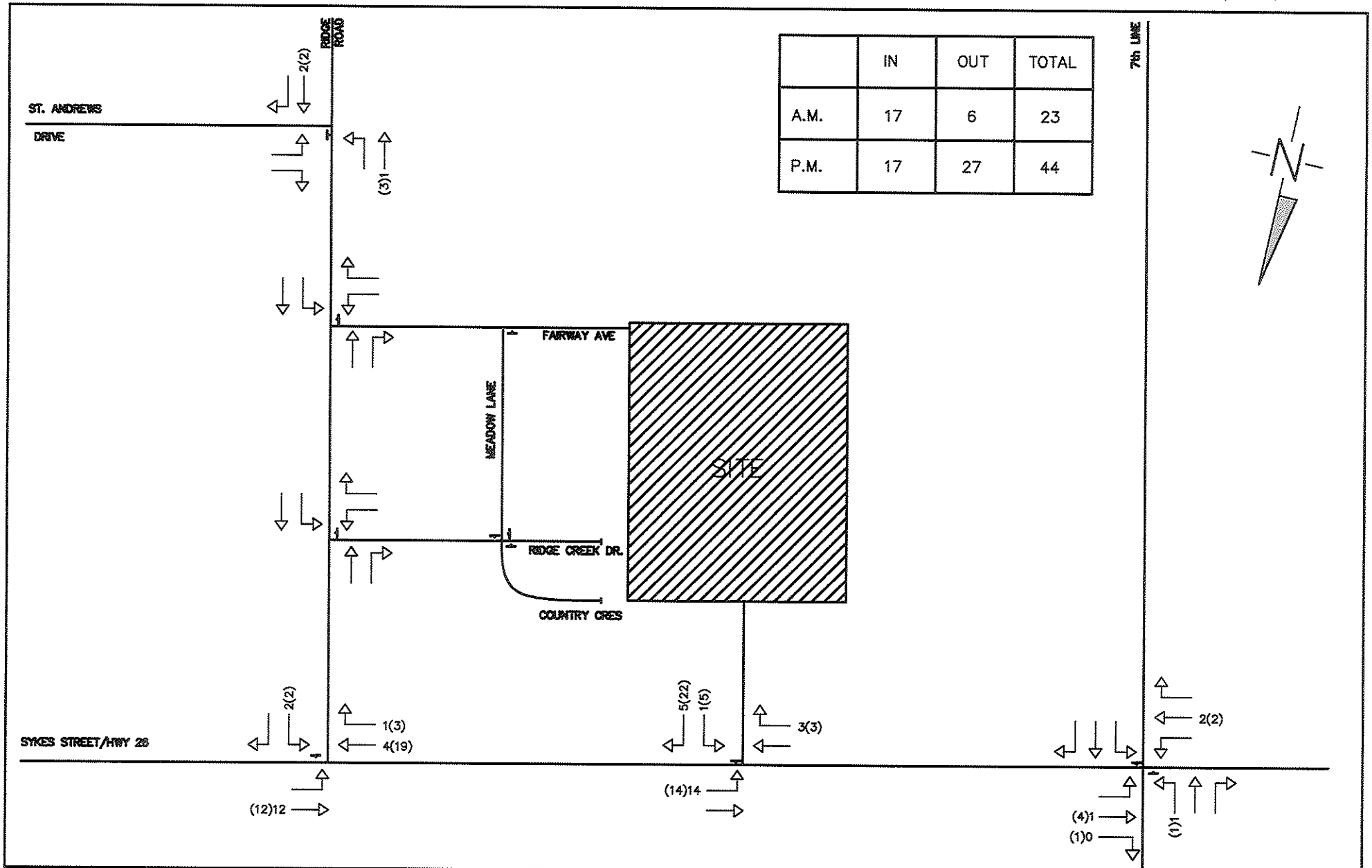
COLLINGWOOD, ON L9Y 2N9
705 446-3510 T
705 446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By	Check By	Project No.
R.F.	A.J.F.	446-3026
Scale	Date	Drawing No.
N.T.S.	12/1/2010	FIG. 10



	IN	OUT	TOTAL
A.M.	17	6	23
P.M.	17	27	44

Legend

STOP CONTROL

XX(YY) A.M. (P.M.) PEAK HOUR TRAFFIC VOLUMES

NOTE:
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Project
MEAFORD WEST
TOWN OF MEAFORD

Drawing
COMMERCIAL (MEDICAL/PHARMACY)
PRIMARY TRIP ASSIGNMENT

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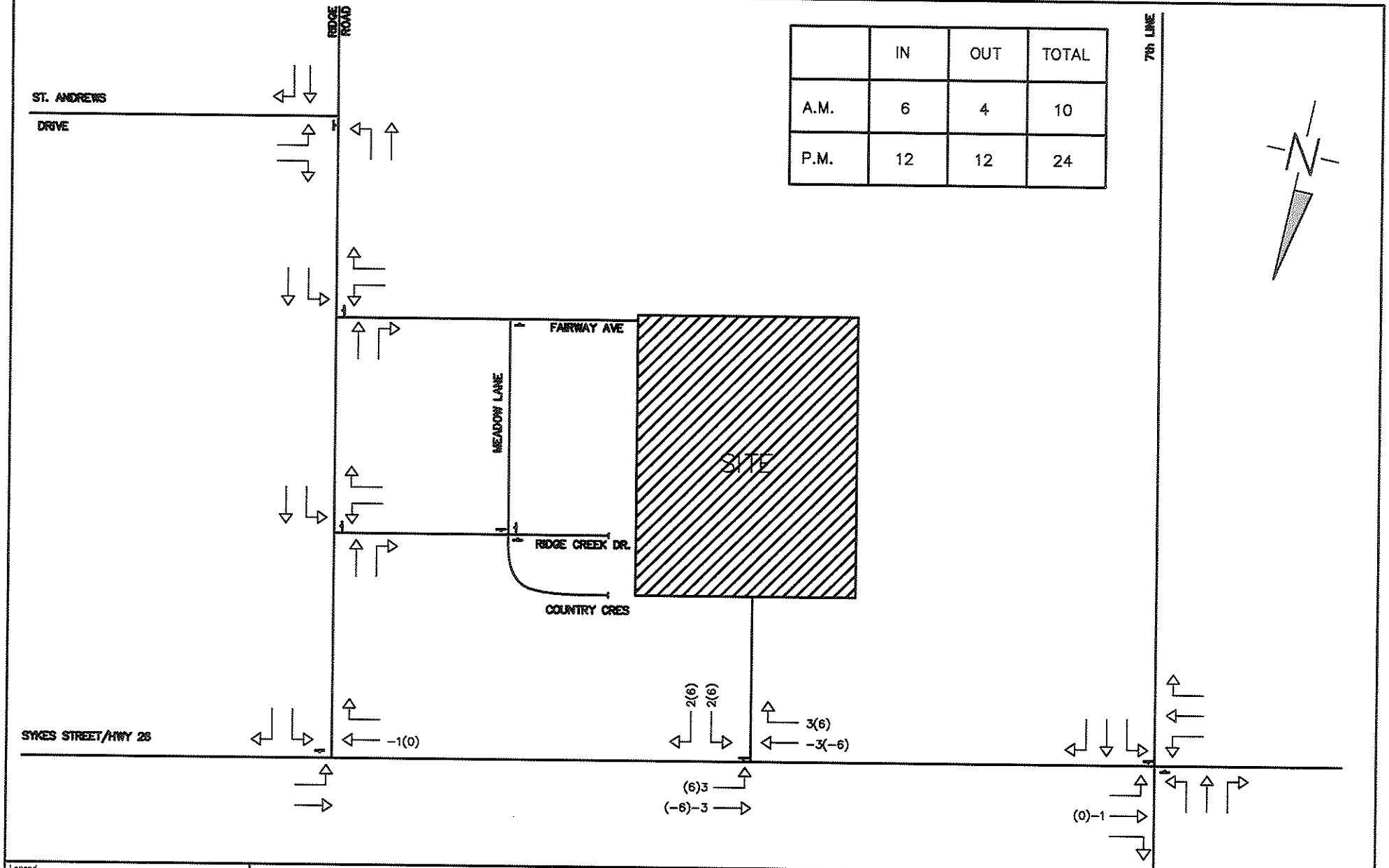
110 PINE STREET,
COLLINGWOOD, ON L9Y 2N9
705 446-3510 T
705 446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By R.F.	Check By A.J.F.	Project No.	446-3026
Scale N.T.S.	Date 12/1/2010	Drawing No.	FIG. 11



	IN	OUT	TOTAL
A.M.	6	4	10
P.M.	12	12	24

Legend

STOP CONTROL

XX(YY) A.M (P.M.) PEAK HOUR TRAFFIC VOLUMES

NOTE:
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Project
MEAFORD WEST
TOWN OF MEAFORD

Drawing
COMMERCIAL (PHARMACY) PASS-BY TRIP ASSIGNMENT

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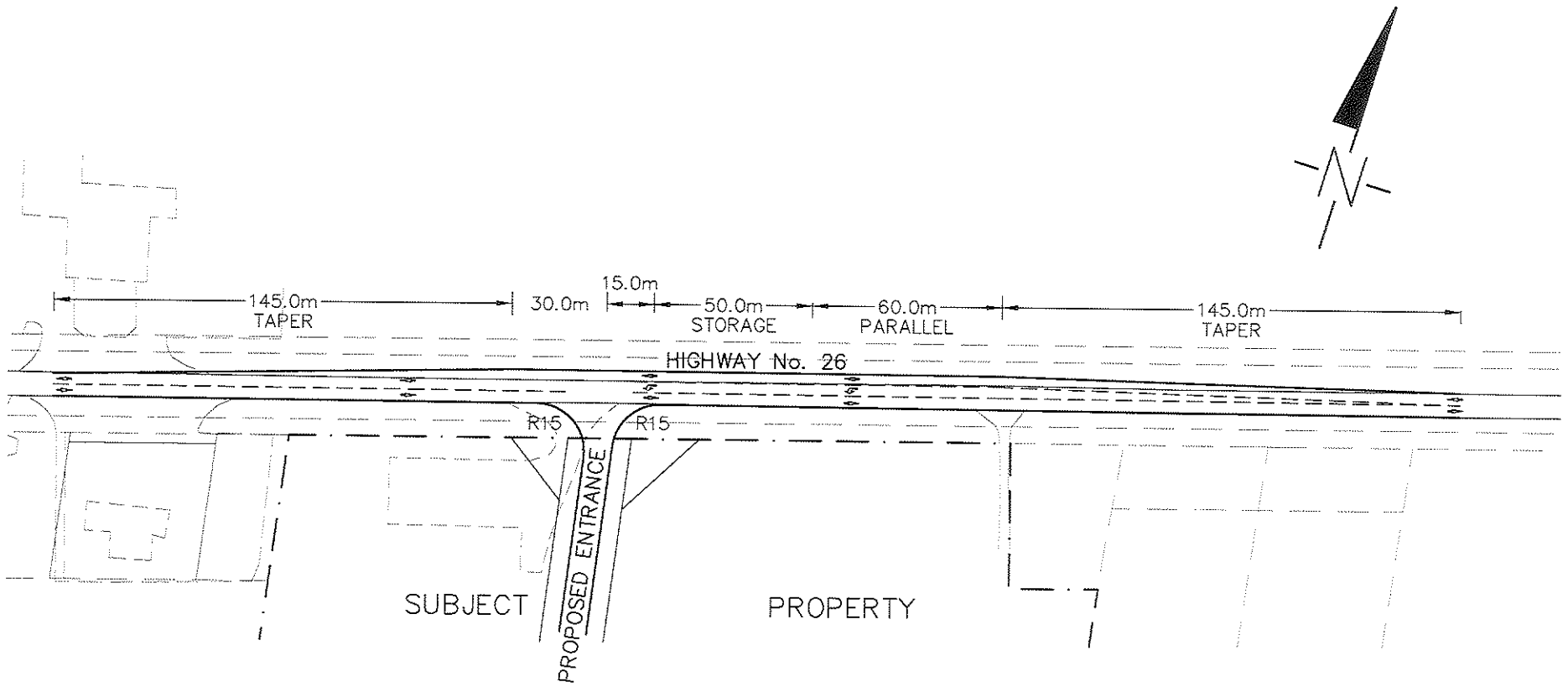
110 PINE STREET,
COLLINGWOOD, ON L9Y 2N9
705 446-3510 T
705 446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By R.F.	Check By A.J.F.	Project No.	446-3026
Scale N.T.S.	Date 12/1/2010	Drawing No.	FIG. 12



Project
MEAFORD HAVEN DEVELOPMENT
TOWN OF MEAFORD

Drawing
PRELIMINARY DESIGN
LEFT TURN LANE

CROZIER & ASSOCIATES
Consulting Engineers
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COLLINGWOOD, ON L9Y 2X9
705 446-3510 T
705 446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By	Design By	Project
J.O.	A.F.	446-3026
Scale	Date	Check By	Drawing
1:2000	02/07/11	A.F.	Fig. 16

Appendix C –
Traffic Count Data

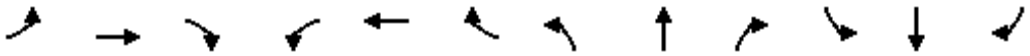
Ontario Traffic Inc

17705 Leslie Street, Unit 6
Newmarket, ON L3Y 3E3, Canada

Site Code:
Station ID:
Hwy 26 west of Ridge Rd

Start Time	05-Dec-19 Thu	Car (EB)	Truck (EB)	Car (WB)	Truck (WB)					Total
12:00 AM		0	0	0	0					0
01:00		0	0	0	0					0
02:00		0	0	0	0					0
03:00		0	0	0	0					0
04:00		0	0	0	0					0
05:00		0	0	0	0					0
06:00		0	0	0	0					0
07:00		160	18	209	8					395
08:00		**232**	**25**	**222**	**22**					**501**
09:00		0	0	0	0					0
10:00		0	0	0	0					0
11:00		186	24	177	22					409
12:00 PM		222	16	217	26					481
01:00		213	21	232	18					484
02:00		0	0	0	0					0
03:00		233	**27**	234	23					517
04:00		**236**	25	**242**	**33**					**536**
05:00		200	15	189	11					415
06:00		0	0	0	0					0
07:00		0	0	0	0					0
08:00		0	0	0	0					0
09:00		0	0	0	0					0
10:00		0	0	0	0					0
11:00		0	0	0	0					0
Total		1682	171	1722	163					3738
Percent		45.0%	4.6%	46.1%	4.4%					
AM Peak	-	08:00	08:00	08:00	08:00	-	-	-	-	08:00
Vol.	-	232	25	222	22	-	-	-	-	501
PM Peak	-	16:00	15:00	16:00	16:00	-	-	-	-	16:00
Vol.	-	236	27	242	33	-	-	-	-	536
Grand Total		1682	171	1722	163					3738
Percent		45.0%	4.6%	46.1%	4.4%					
ADT		ADT 3,738		AADT 3,738						

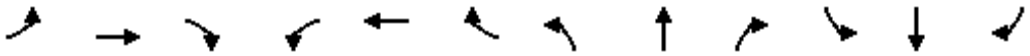
Appendix D –
Synchro Analysis Output –
Total Traffic Volumes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	291	16	41	275	27	32	0	74	85	0	21
Future Volume (Veh/h)	7	291	16	41	275	27	32	0	74	85	0	21
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	8	346	19	49	327	32	38	0	88	101	0	25
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	359			365			822	828	356	891	822	343
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	359			365			822	828	356	891	822	343
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			96			86	100	87	55	100	96
cM capacity (veh/h)	1211			1194			275	294	693	223	296	704

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	8	365	49	359	126	126
Volume Left	8	0	49	0	38	101
Volume Right	0	19	0	32	88	25
cSH	1211	1700	1194	1700	475	258
Volume to Capacity	0.01	0.21	0.04	0.21	0.27	0.49
Queue Length 95th (m)	0.2	0.0	1.0	0.0	8.5	19.9
Control Delay (s)	8.0	0.0	8.1	0.0	15.3	31.5
Lane LOS	A		A		C	D
Approach Delay (s)	0.2		1.0		15.3	31.5
Approach LOS					C	D

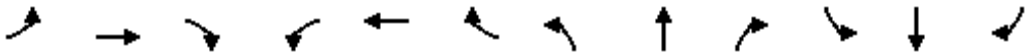
Intersection Summary				
Average Delay	6.2			
Intersection Capacity Utilization	42.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	306	35	80	321	91	30	0	70	54	0	13
Future Volume (Veh/h)	23	306	35	80	321	91	30	0	70	54	0	13
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	24	326	37	85	341	97	32	0	74	57	0	14
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	438			363			918	1000	344	1008	970	390
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	438			363			918	1000	344	1008	970	390
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			93			86	100	89	69	100	98
cM capacity (veh/h)	1133			1196			232	223	703	184	232	663

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	24	363	85	438	106	71
Volume Left	24	0	85	0	32	57
Volume Right	0	37	0	97	74	14
cSH	1133	1700	1196	1700	436	215
Volume to Capacity	0.02	0.21	0.07	0.26	0.24	0.33
Queue Length 95th (m)	0.5	0.0	1.8	0.0	7.5	11.0
Control Delay (s)	8.2	0.0	8.2	0.0	15.9	29.8
Lane LOS	A		A		C	D
Approach Delay (s)	0.5		1.3		15.9	29.8
Approach LOS					C	D

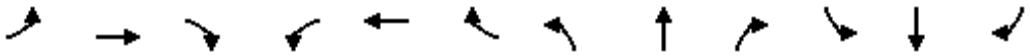
Intersection Summary				
Average Delay	4.3			
Intersection Capacity Utilization	44.5%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	306	16	41	289	27	32	0	74	85	0	21
Future Volume (Veh/h)	7	306	16	41	289	27	32	0	74	85	0	21
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	8	364	19	49	344	32	38	0	88	101	0	25
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	376			383			856	864	374	926	857	360
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	376			383			856	864	374	926	857	360
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			96			85	100	87	52	100	96
cM capacity (veh/h)	1194			1175			260	280	677	211	283	689

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	8	383	49	376	126	126
Volume Left	8	0	49	0	38	101
Volume Right	0	19	0	32	88	25
cSH	1194	1700	1175	1700	456	244
Volume to Capacity	0.01	0.23	0.04	0.22	0.28	0.52
Queue Length 95th (m)	0.2	0.0	1.0	0.0	8.9	21.6
Control Delay (s)	8.0	0.0	8.2	0.0	15.9	34.5
Lane LOS	A		A		C	D
Approach Delay (s)	0.2		0.9		15.9	34.5
Approach LOS					C	D

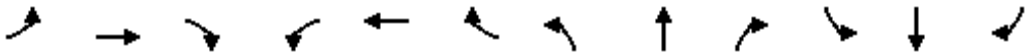
Intersection Summary				
Average Delay	6.4			
Intersection Capacity Utilization	43.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	322	35	80	337	91	30	0	70	54	0	13
Future Volume (Veh/h)	23	322	35	80	337	91	30	0	70	54	0	13
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	24	343	37	85	359	97	32	0	74	57	0	14
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	456			380			952	1036	362	1042	1006	408
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	456			380			952	1036	362	1042	1006	408
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			93			85	100	89	67	100	98
cM capacity (veh/h)	1115			1178			219	212	688	174	221	648

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	24	380	85	456	106	71
Volume Left	24	0	85	0	32	57
Volume Right	0	37	0	97	74	14
cSH	1115	1700	1178	1700	418	203
Volume to Capacity	0.02	0.22	0.07	0.27	0.25	0.35
Queue Length 95th (m)	0.5	0.0	1.9	0.0	8.0	11.8
Control Delay (s)	8.3	0.0	8.3	0.0	16.5	32.0
Lane LOS	A		A		C	D
Approach Delay (s)	0.5		1.3		16.5	32.0
Approach LOS					C	D

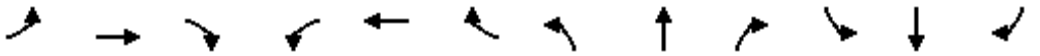
Intersection Summary				
Average Delay	4.4			
Intersection Capacity Utilization	45.4%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	321	16	41	304	27	32	0	74	85	0	21
Future Volume (Veh/h)	7	321	16	41	304	27	32	0	74	85	0	21
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	8	382	19	49	362	32	38	0	88	101	0	25
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	394			401			892	900	392	962	893	378
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	394			401			892	900	392	962	893	378
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			96			85	100	87	49	100	96
cM capacity (veh/h)	1176			1158			245	267	662	198	269	673

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	8	401	49	394	126	126
Volume Left	8	0	49	0	38	101
Volume Right	0	19	0	32	88	25
cSH	1176	1700	1158	1700	438	230
Volume to Capacity	0.01	0.24	0.04	0.23	0.29	0.55
Queue Length 95th (m)	0.2	0.0	1.1	0.0	9.4	23.6
Control Delay (s)	8.1	0.0	8.2	0.0	16.5	38.0
Lane LOS	A		A		C	E
Approach Delay (s)	0.2		0.9		16.5	38.0
Approach LOS					C	E

Intersection Summary				
Average Delay	6.6			
Intersection Capacity Utilization	43.9%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	349	35	80	364	91	30	0	70	54	0	13
Future Volume (Veh/h)	23	349	35	80	364	91	30	0	70	54	0	13
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	24	371	37	85	387	97	32	0	74	57	0	14
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	484			408			1008	1092	390	1098	1062	436
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	484			408			1008	1092	390	1098	1062	436
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			93			84	100	89	64	100	98
cM capacity (veh/h)	1089			1151			200	196	663	158	204	625

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	24	408	85	484	106	71
Volume Left	24	0	85	0	32	57
Volume Right	0	37	0	97	74	14
cSH	1089	1700	1151	1700	391	185
Volume to Capacity	0.02	0.24	0.07	0.28	0.27	0.38
Queue Length 95th (m)	0.5	0.0	1.9	0.0	8.7	13.3
Control Delay (s)	8.4	0.0	8.4	0.0	17.6	36.0
Lane LOS	A		A		C	E
Approach Delay (s)	0.5		1.3		17.6	36.0
Approach LOS					C	E

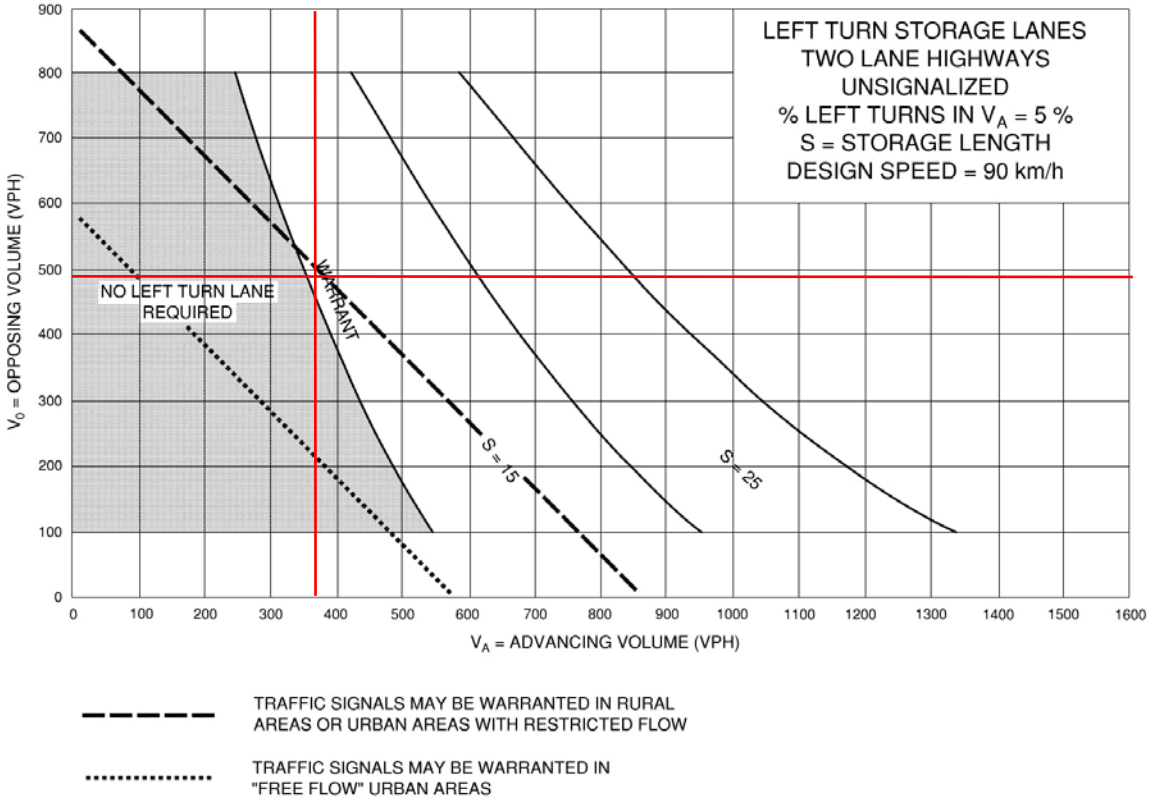
Intersection Summary				
Average Delay	4.5			
Intersection Capacity Utilization	46.8%	ICU Level of Service		A
Analysis Period (min)	15			

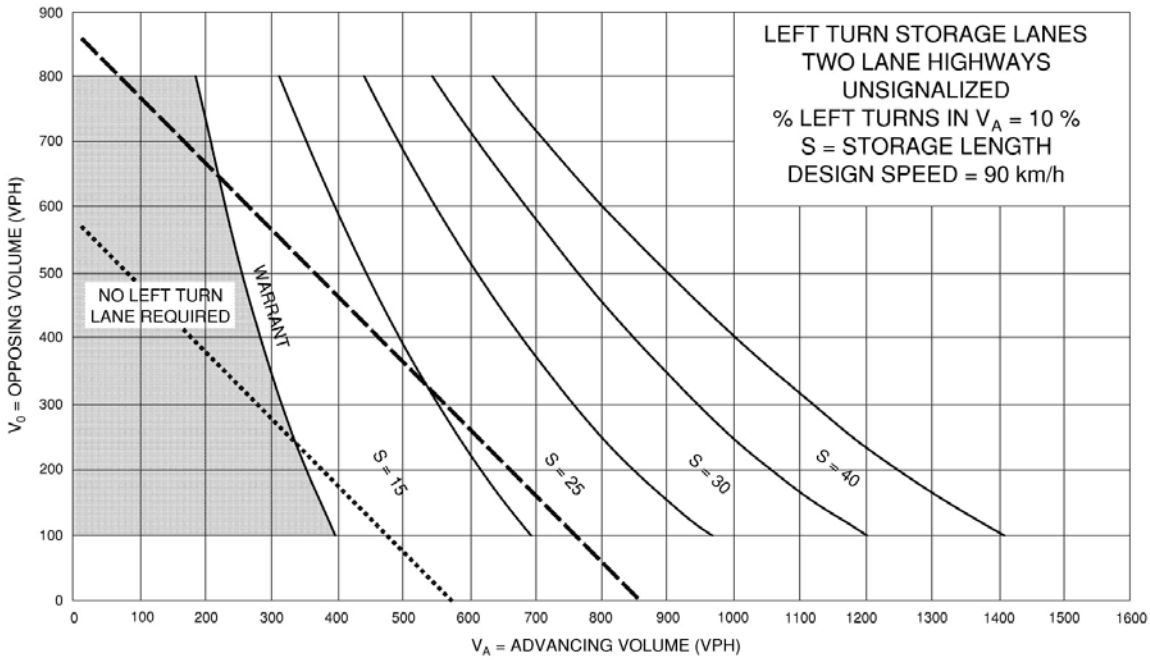
Appendix E –
MTO Left Turn Analysis

Highway 26 / Site Access & Future Driveway

2023 Total - Eastbound **Exhibit 9A-18**

Critical Case - PM Peak Hour

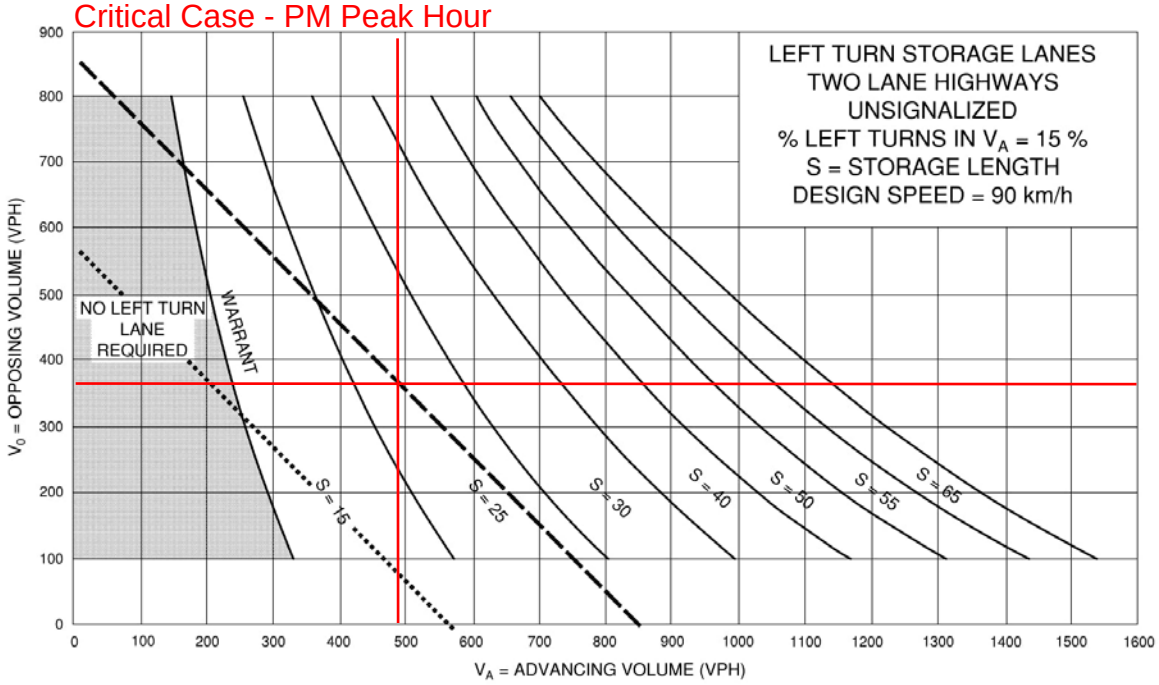




Highway 26 / Site Access & Future Driveway

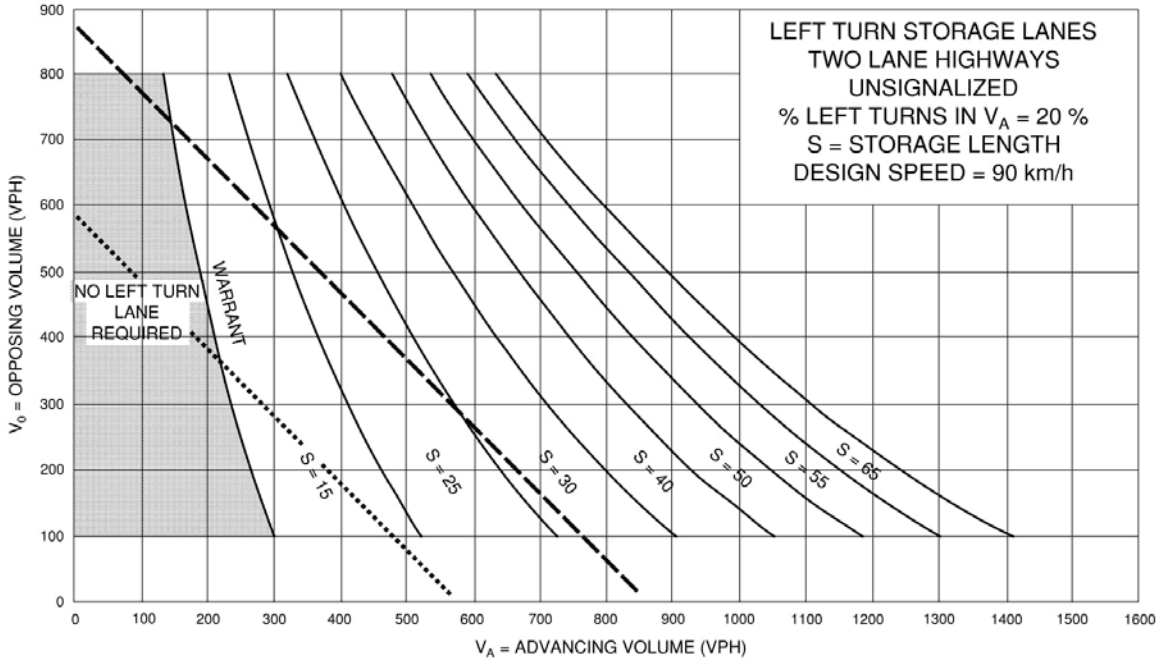
2023 Total - Westbound **Exhibit 9A-19**

Critical Case - PM Peak Hour



TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

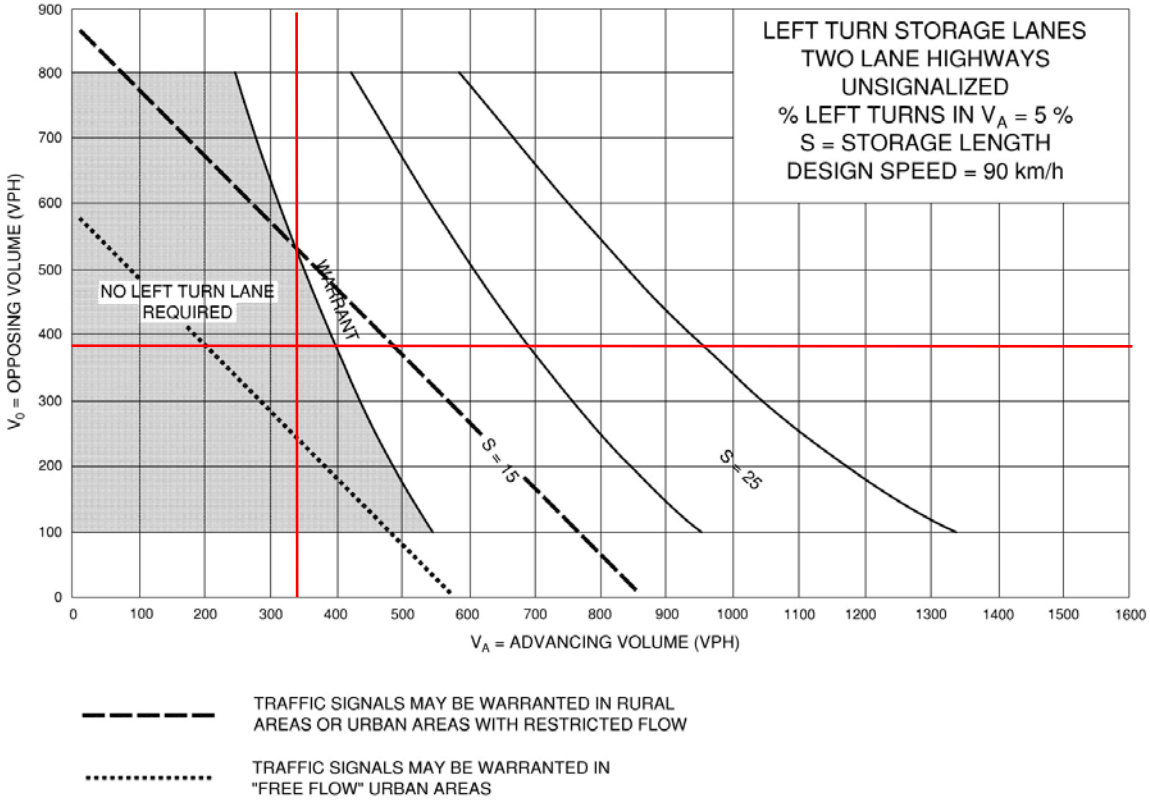
TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

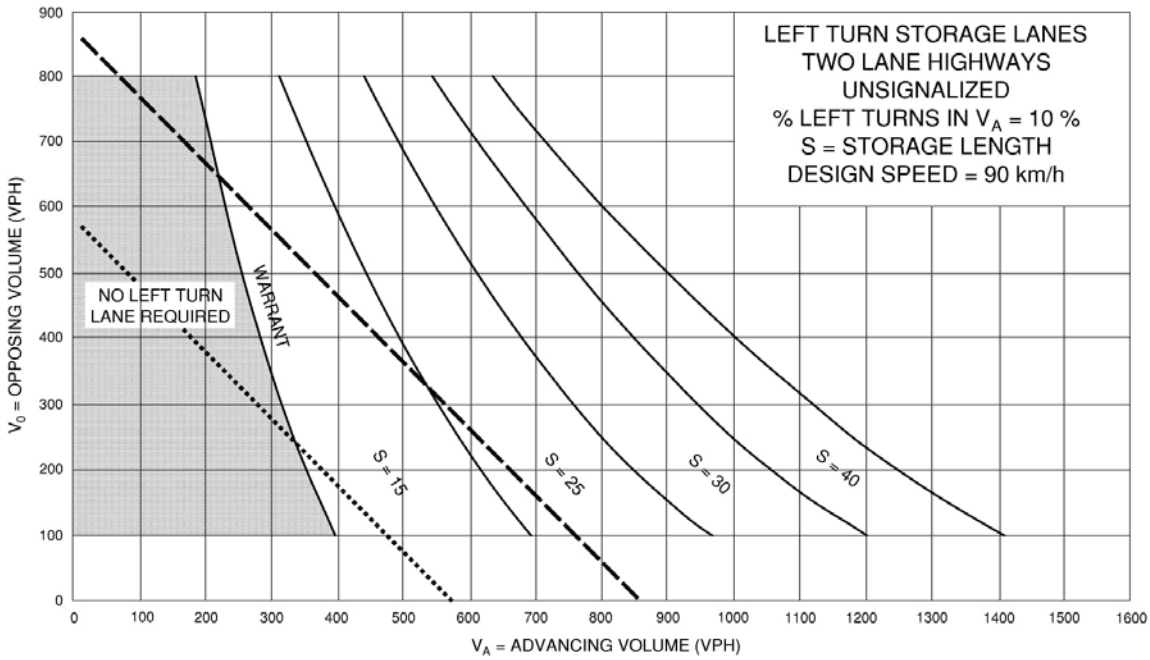


Sensitivity Analysis - Highway 26 / Site Access

2028 Total - Eastbound **Exhibit 9A-18**

Critical Case - PM Peak Hour





Appendix F –
OTM Signal Justification Sheets

Justification No. 7 - 2033 Total Traffic (Critical Case)

Highway 26 / Site Access & Future Driveway intersectior

Justification	Description		Compliance			Signal Warrant	Underground Provisions Warrant
			Sectional		Entire %		
		Free Flow	Numerical	%			
1. Minimum Vehicluar Volume	A. Vehicle volume, all aproaches (average hour)	480	505	105%	53%	NO	YES
	B. Vehicle volume, along minor streets (average hour)	120	95	79%		NO	NO
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	480	368	77%	51%	NO	NO
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	50	101%		NO	YES