Traffic+ Engineering Ltd.

336 Kings Ridge Inc.

Traffic Impact Study

Proposed Residential Development King Street East, Town of Caledon

Prepared by: Traffic+ Engineering Ltd.
Prepared for: Kings Ridge Inc.

August 20, 2018

Traffic+ Engineering Ltd.

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Email: Nabil@TrafficPlus.ca
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Report

Date
August 20, 2018

Our Reference:
TI-201801001

Client
336 Kings Ridge Inc.

Client Contact
336 Kings Ridge Inc.
2 County Court Blvd., 4th Floor, Brampton, Ontario L6W 3W8

Re: Traffic Impact Study
Proposed Low Density Residential – Townhouses Development
336 King Street East, Town of Caledon

EXECUTIVE SUMMARY

Content

336 Kings Ridge Inc. is submitting an OPA / ZBA / Subdivision Plan application for rezoning approval related to the proposed new townhouse residential development to be located along King Street East in the Town of Caledon. The site is approximately situated in the southwest quadrant of the intersection of King Street East and Farmers Lane.

The proposed development will consist of 16 townhouses which will be built on a lot where currently a single detached house is located. The approximate Total Gross Floor Area (GFA) of land is equal to 2,810 m² (30,210 ft²).

The purpose of this study is to determine the traffic impacts of the proposed residential development on the surrounding road network and identify any improvements necessary to accommodate this added traffic, if necessary.

Findings

The key conclusions and findings of the review are outlined herein:

The findings and conclusions of our study are as follows:

- **Development:** The proposed development will consist of 16 townhouses which will be built on land that is currently occupied by a single detached home. The approximate Total Gross Floor Area (GFA) is equal to 2,810 m² (30,210 ft²).

- **Intersection Sight Distance:**

Field sight distances were measured from the approximate location of the proposed Access Driveway. The following was found:

- sight distance on the left of the proposed access driveway (looking West) along King Street East is equal to approximately 135 metres, whereas the minimum required sight distance is 177 metres, and
- sight distance on the right of the proposed access driveway (looking East) along King Street East is found to equal to approximately 170 metres, whereas the minimum required sight distance is 140 metres.

Although the sight distance measured on the left of the access driveway is lesser than the required minimum distance set by MTO guideline, it is still acceptable as it exceeds the TAC distance. However, MTO guideline was set for high traffic volumes roadways which does not reflect King Street East. Finally, the site is currently occupied by a single detached house where the existing driveway operates satisfactorily.

- **Trip Generation:**

The development is estimated to generate approximately 11 trips in the AM peak hour and 12 trips in the PM peak hour;

In summary, the proposed development is anticipated to have a very minimal impact on traffic operations within the study area.

We trust the enclosed sufficiently addresses your needs. Should you have any questions, please do not hesitate to contact the undersigned.

Yours truly,

Mr. Nabil Ghariani, P.Eng., PTOE, M.S.C.E.
President and CEO

Traffic+ Engineering Ltd.

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1.0 Introduction

1.1 Study Overview

Traffic+ Engineering Ltd. was retained by 336 Kings Ridge Inc. to undertake a Traffic Impact Study in support of a proposed residential development to be located in the Town of Bolton.

The purpose of this study is to determine the impacts of the additional traffic generated from the proposed development on the surrounding road network and the improvements, if necessary, to accommodate this future traffic. Based on lengthy discussions with staff at the Regional Municipality of Peel, it was agreed that the scope of the study to only focus on estimating future trip generation of the proposed development during A.M. and P.M. peak hours, and provide traffic assignments at the access driveway located along King Street East during each peak hour.

A new residential development is proposed along King Street East and bounded from the East by Evans Ridge and from the West by Old King Road in the Town of Caledon. The proposed development will consist of 16 townhouses which will be built on a land that is currently occupied by a detached house. The Total Gross Floor Area (GFA) of land is approximately 2,810 m^2 (30,210 ft^2).

1.2 Study Area and Proposed Site Plan

The approximate location of the subject site is illustrated in Figure 1. The community surrounding the subject site is comprised of low density residential area. Based on multiple conversations with staff from the Region of Peel and Town of Caledon, it was agreed that the traffic study will only focus on estimating the total trips generated from the proposed development and providing traffic assignment at the access driveway during A.M. and P.M. peak hours. This reduced scope of work is primarily due to the small scale of the proposed residential development as well as it is located on a relatively less congested corridor in the Town of Caledon.

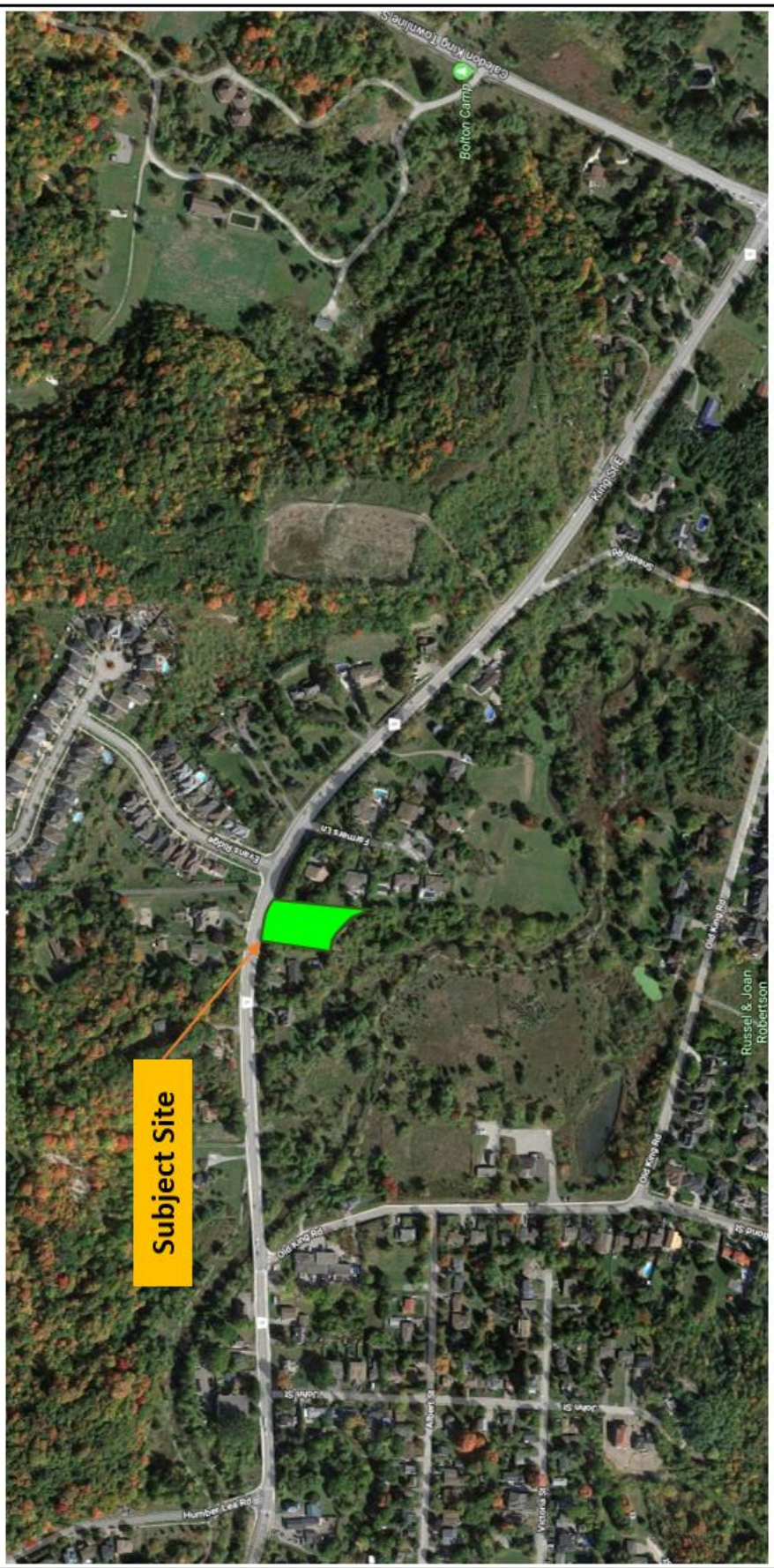

Figure 1:
Approximate Site Location

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2.0 Existing Conditions

The subject property where the proposed development is being proposed has a single detached house located along King Street East. Based on the updated site plan entitled "Concept Site Plan, 336 Kings Ridge Inc., Proposed Residential Development" prepared by Kirkor Architects + Planners dated August 7, 2018, as shown in Figure 2, the proposed development will consist of 16 residential townhouses. Site access will be accommodated by a single full movement driveway located off on King Street East.

2.1 Nearby Amenities

The proposed residential development will be within short distance from numerous amenities which are located at the major intersection of King Street East/West and Highway 50/Queen Street North. These amenities consist of the following:

- Numerous restaurants such as:
  - Tim Hortons
  - Mr. Sub
  - Luna restaurant and Lounge
  - UME Sushi
- TD Canada Trust
- CIBC
- Convenience Store

And many more.

2.2 Existing Road Network within the Study Area

The main roadway in the vicinity of the subject site which is being considered in assessing the traffic impacts of the proposed development is described as follows:

- **King Street East:** is an east-west arterial as per the Region of Peel Road Classification System. It has two (2) lanes with dedicated left turn lane and right turn lane at the intersection on eastbound and westbound approaches at the intersection of King Street East and Evans Ridge, and on-street parking is not permitted at all time. In addition, there are continuous sidewalks on both sides of King Street within the vicinity of the development. The posted speed limit is 50 km/h in the vicinity of the proposed development.

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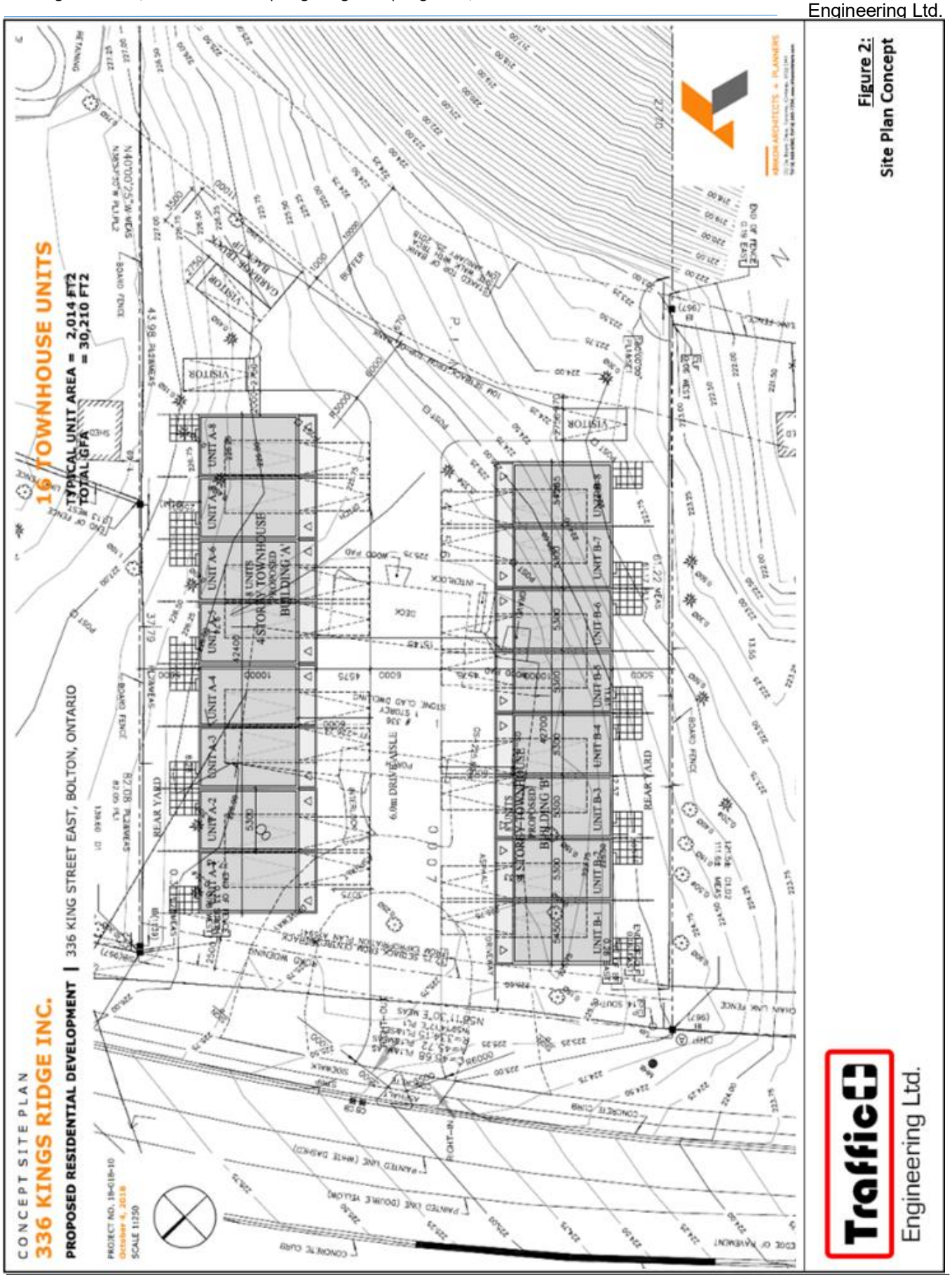

Figure 2:
Site Plan Concept

2.3 Existing Transit Operations

The area within the proposed development is currently serviced by transit. At present time, GO Transit buses are operating in the near vicinity of the development. There are, however, plans to expand a local transit to nearby municipalities such as City of Brampton and City of Mississauga, but no definite and detail plans have been set at the moment.

GO Bus Transit routes are illustrated in **Figure 3**, and described as follows:

GO Bus# 38 and 38A: These GO Transit buses operate as intercity services where Route 38 operates from Queen Street North / Columbia Way in the Town of Caledon to Malton GO Train station in the City of Mississauga. This route operates under a specific schedule without a fixed headway during weekdays, where during A.M. peak it operates on a southbound route only from 6:00 A.M. to 1:32 P.M, and during P.M. peak it operates on a northbound route only from 10:27 A.M. to 8:03 P.M. with no services during weekends and holidays.

For Route 38A, the GO bus operates from Albion Vaughan Road / King Vaughan Road in the Town of Caledon to York Mills Bus Terminal in the City of Toronto via City of Vaughan. This route operates under a specific schedule without a fixed headway during weekdays, where during A.M. peak it operates only twice on a southbound route at 5:46 A.M. and 6:29 A.M, similarly, during P.M. peak it operates only twice on a northbound route at 4:20 P.M. and 5: 20 P.M. with no services during weekends and holidays.

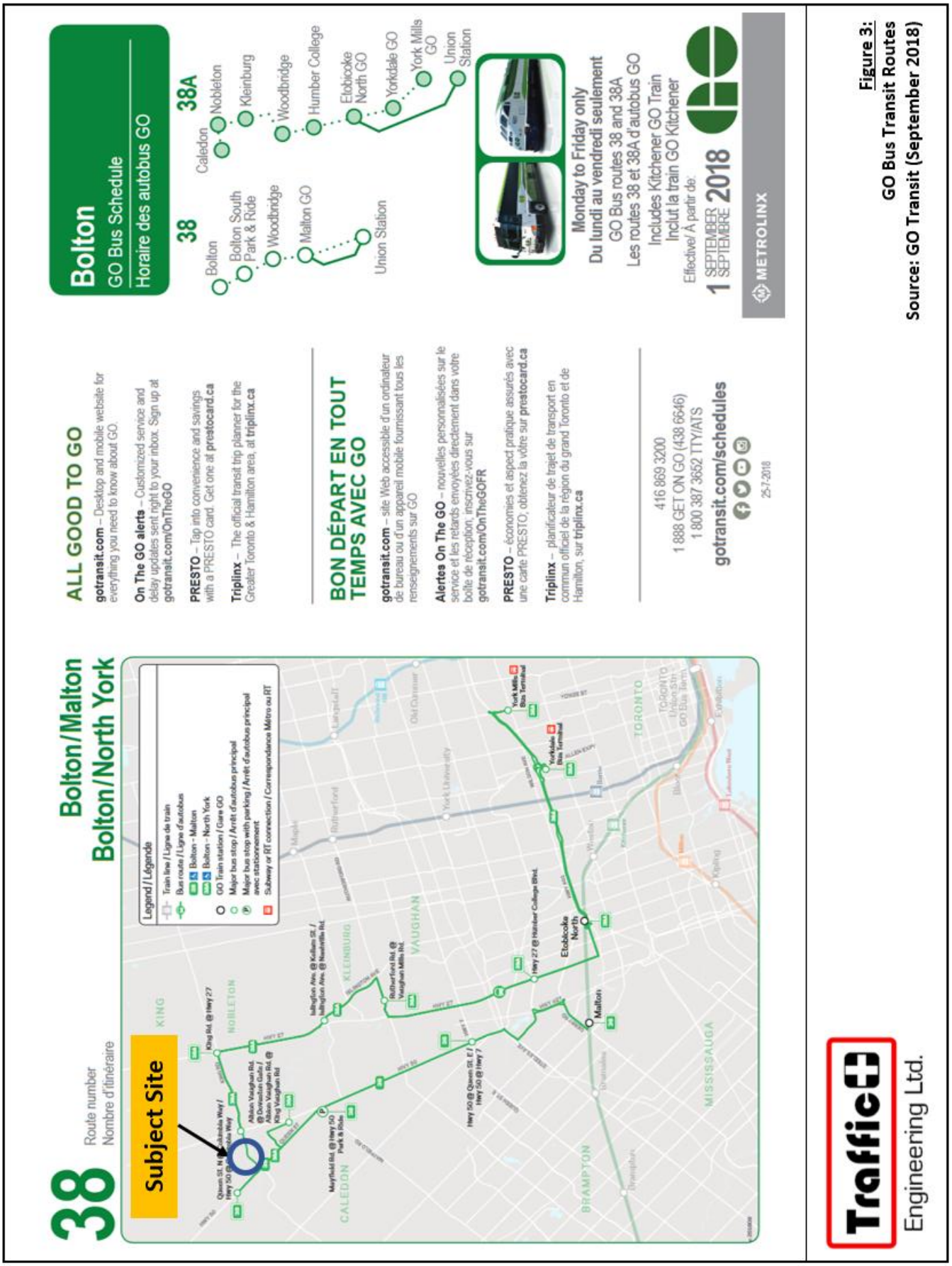

Figure 3:
GO Bus Transit Routes
Source: GO Transit (September 2018)

2.4 Active Transportation

In addition to transit, there are currently sidewalks on each side of King Street East from Caledon King Townline South to Emil Kolb Parkway / Coleraine Drive. This type of infrastructure will help and entice residents to use walking and cycling to get to Town of Caledon and reduce their vehicle dependency.

3.0 Other Proposed Developments in the Vicinity

Based on numerous discussions with Regional staff during pre-consultations phase, it was identified several proposed development planned in the vicinity of the proposed residential development. Given the fact that the proposed development is a low density residential townhouses with a total of 16 units, staff at the Region requested that the proposed proximate developments not to be taken as part of the traffic assessments. **Appendix A** shows the email copy with the Region of Peel staff.

4.0 Proposed Development

4.1 Site Characteristics

The proposed development will comprise of 16 townhouses which will be built on a mostly vacant land where currently there is a large house. The approximate Total Gross Floor Area of land is equal to 2,810 m^2 (30,210 ft^2).

4.2 Site Access

Access to the development is proposed via a single Right-In / Right-Out (RIRO) driveway to be located on King Street East. This access driveway connection to the subject site is assumed to operate under a stop control at the egress approach.

4.3 Design Speed

Currently, the posted speed along King Street East by the development's frontage is 50 km/h. Typically, the design speed of the main road is usually assumed to be 10 km/h over the posted speed limit for analysis purposes. In this case, the design speed of the frontage is 60 km/h.

4.4 Intersection Sight Distance

There are two sight distance assessments that have to be undertaken in order to conclude that the available sight distance at an intersection be deemed to be adequate, which are as follows:

- A test for vehicles that are required to depart an intersection safely; and
- A test to determine if the conditions of an approaching vehicle and driver on the side street can adequately see oncoming traffic as it approaches the intersection.

The various tests require a driver's eye height of 1.05 m above the pavement surface and an object height of 1.2 m, representing the assumed top of an approaching vehicle which is unlike the Decision Sight Distance which requires and object height of 0.45 m.

Departing Vehicles

According to the Transportation Association of Canada (TAC) and the Ministry of Transportation of Ontario (MTO), the requirements for sight distances and sight triangles for signalized intersections are the same as those applied for stop controlled intersections. According to TAC:

"*Since the intersecting traffic flows at signalized intersections move at separate times, theoretically, sight distance considering the cross-street traffic is not a requirement. However, due to numerous potential operating conditions associated with signalized intersections, the stop control sight distance is provided as a minimum. The signal operation conditions that support this practice include: signal malfunction, violation of the signal, right-turns permitted on red, and the use of the flashing red/yellow mode.*"

Based on the requirements outlined for stop controlled intersections, there are three components to be assessed:

- Crossing Sight Distance;
- Left-turn Sight Distance; and
- Right-turn Sight Distance

However in this study, the assessment will only be undertaken for the Left-turn Sight Distance and Right-turn Sight Distance as the configuration of the proposed intersection is a three legged intersection.

Figure 4 illustrates the components of stop control sight distance. The left turn sight distance requirement is based on the time required to start from a stopped position, clear the near side traffic stream and accelerate to normal operating speed without interfering with through traffic. The right-turn sight distance requirement is based on the time to start from a stopped position and accelerate to normal operating speed without interfering with through traffic travelling in the same direction. In this case, the governing condition is the distance required for either turning left, or turning right to access the main street from the side street.

The governing safe sight distance for turning movements at an intersection is the distance "*required for a left-turning vehicle to attain the assumed operating speed of the highway before being overtaken by an approaching vehicle travelling in the same direction at the design speed*" (as stated in the *"Geometric Design Standards for Ontario Highways, MTO, Section E.3.2.3.2, Page E3-5"*).

For a design speed of 60 km/h, the safe sight distance requirement for turning movements onto a main road from a side road is as follows:

- **Left-turn Sight Distances:** vehicles turning left from a minor road to the main road must have a minimum sight distance of 145 metres for vehicles approaching from the right, and a minimum of 177 metres for vehicles approaching from the left

- **Right-turn Sight Distances:** vehicles turning right from minor road to the main road must have a minimum sight distance of 177 metres for vehicles approaching from the left

The chart used to determine these distances is taken from the Geometric Design Standards Manual, and it is illustrated in **Figure 5**.

The TAC Manual provides a chart for vehicles turning left onto a four-lane roadway, illustrated in **Figure 6**. Based on the chart, it can be deduced that the minimum sight distance for a vehicle turning left onto a two-lane roadway is 118 metres.

Comparing MTO Geometric Design Standard Manual and TAC Manual, it can be deduced that the MTO's sight distance of 177 metres is conservative and will be used to assess the sight distance at the proposed access driveway and King Street East.

Field Measurements

A field measurement was conducted where sight distances were measured from the approximate proposed development access driveway location. It was found that the sight distance on the left of the access driveway (looking West) along King Street East is equal to approximately 135 metres, whereas the minimum required sight distance is 177 metres, and the sight distance on the right of the access driveway (looking East) along King Street East is found to equal to approximately 170 metres, whereas the minimum required sight distance is 145 metres.

Although the sight distance measured on the left of the access driveway is lesser than the required minimum distance set by MTO guideline, it is still acceptable as it exceeds the TAC distance. However, MTO guideline was set for high traffic volumes roadways which does not reflect King Street East. Finally, the site is currently occupied by a single detached house where the existing driveway operates satisfactorily.

Hence, the proposed location of the access driveway is adequate.

Figure 7 shows the photos taken during the field investigation.

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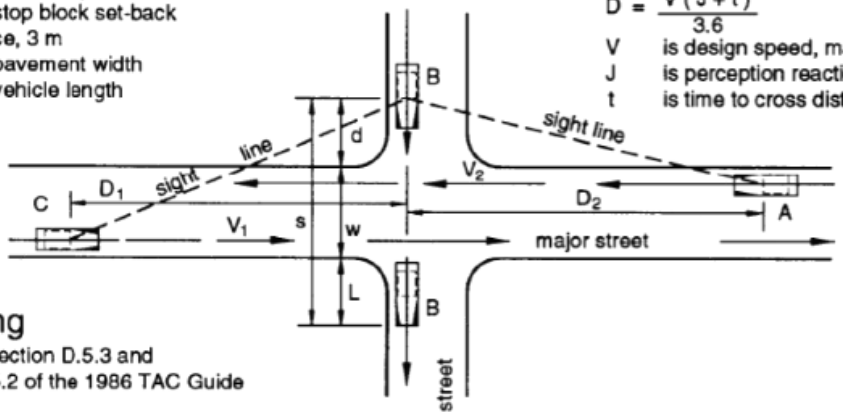
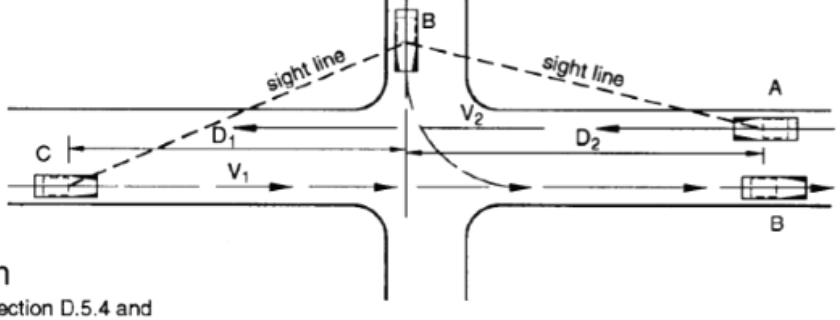
s = d + w + L
s is the distance travelled to cross the major street
d is the stop block set-back distance, 3 m
w is the pavement width
L is the vehicle length

D is the sight distance required (stopping sight distance min.)
V is the design speed
$D = \frac{V(J+t)}{3.6}$
V is design speed, major street
J is perception reaction time, 2 s
t is time to cross distance, s



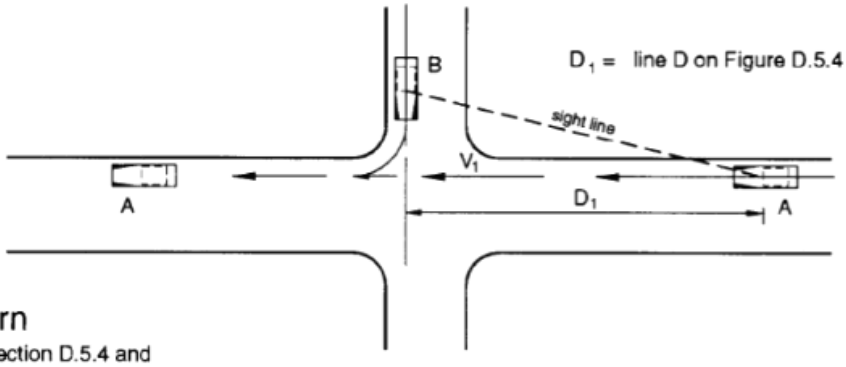
a. crossing
Refer to Section D.5.3 and Figure D.5.2 of the 1986 TAC Guide

D_1 = line D on Figure D.5.4
D_2 = line C on Figure D.5.4



b. left turn
Refer to Section D.5.4 and Figure D.5.4 of the 1986 TAC Guide

D_1 = line D on Figure D.5.4



c. right turn
Refer to Section D.5.4 and Figure D.5.4 of the 1986 TAC Guide

Figure 4:
Turning Movement Sight Distance requirements
Source: MTO Geometric Design Standards

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A - Minimum Stopping Sight Distance, Table E3-1.
A_1 - Distance travelled in 3 s, Table E3-2.
B - Safe Sight Distance for P vehicle, crossing 2-lane highway from stop.
C - Safe Sight Distance for P vehicle, turning left into 2-lane highway across P vehicle approaching from left.
D - Safe Sight Distance for P vehicle to turn left into 2-lane highway and attain assumed operating speed before being overtaken by P vehicle approaching in same direction at design speed.
E - Safe Sight Distance for P vehicle to turn right into 2-lane highway and attain assumed operating speed before being overtaken by P vehicle approaching in same direction at design speed.

Intersection Sight Distances

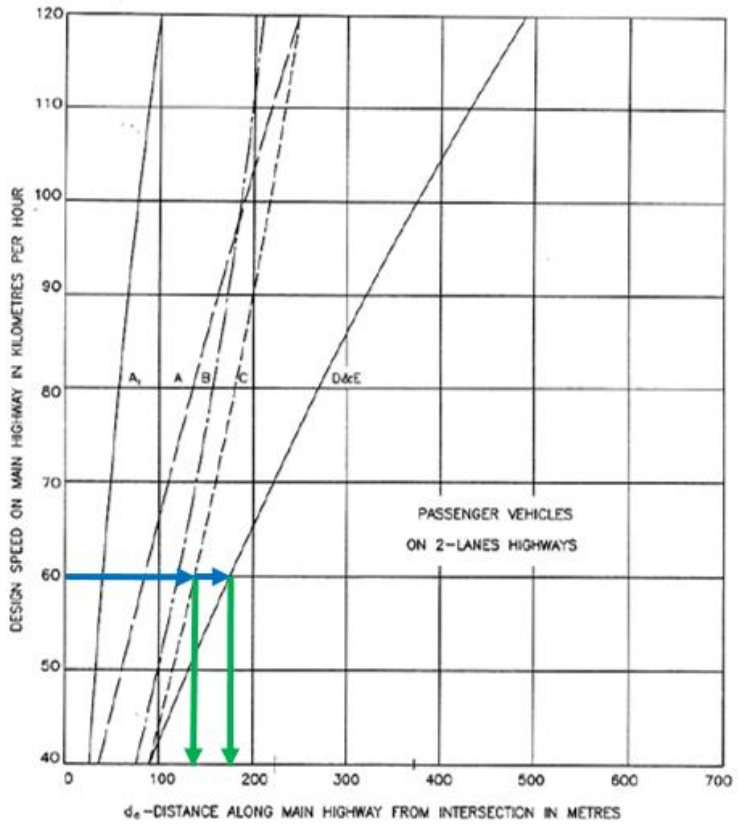

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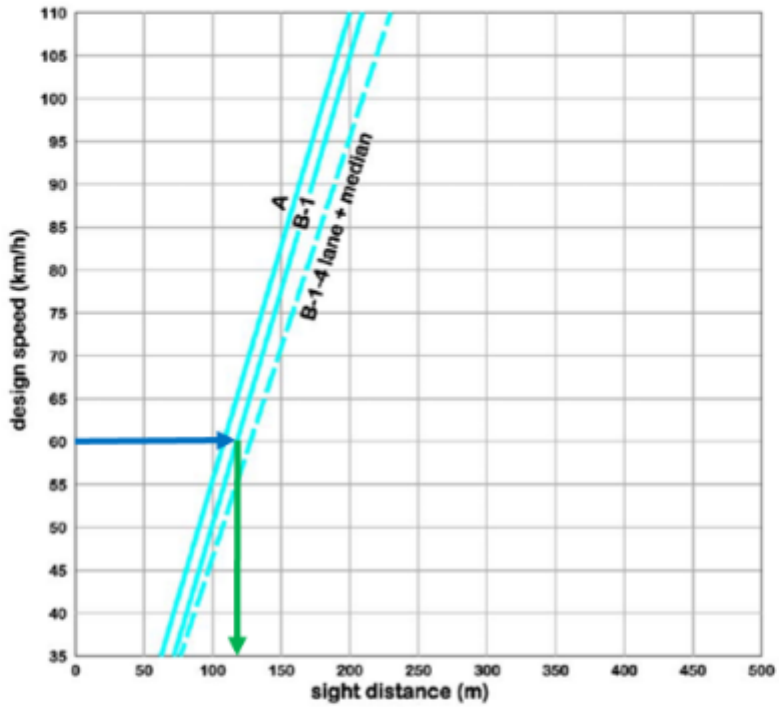
Figure 5:
Intersection Sight Distances
Source: MTO Geometric Design Standards

Figure 2.3.3.4a Sight Distance for Crossing Movements and Vehicles Turning Left across Passenger Vehicle approaching from the Left



A – sight distance for passenger vehicle crossing a two –lane roadway from stop.

B-1 – sight distance for passenger vehicle turning left onto a two-lane roadway across passenger vehicle approaching from the left.

B-1-4 lane + median – sight distance for passenger vehicle turning left onto a four-lane roadway across passenger vehicle approaching from the left when median width is less than the vehicle length.

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Figure 6:
Intersection Sight Distances
Source: TAC - Geometric Design Guide for Canadian Roads (December 2011 Updates)

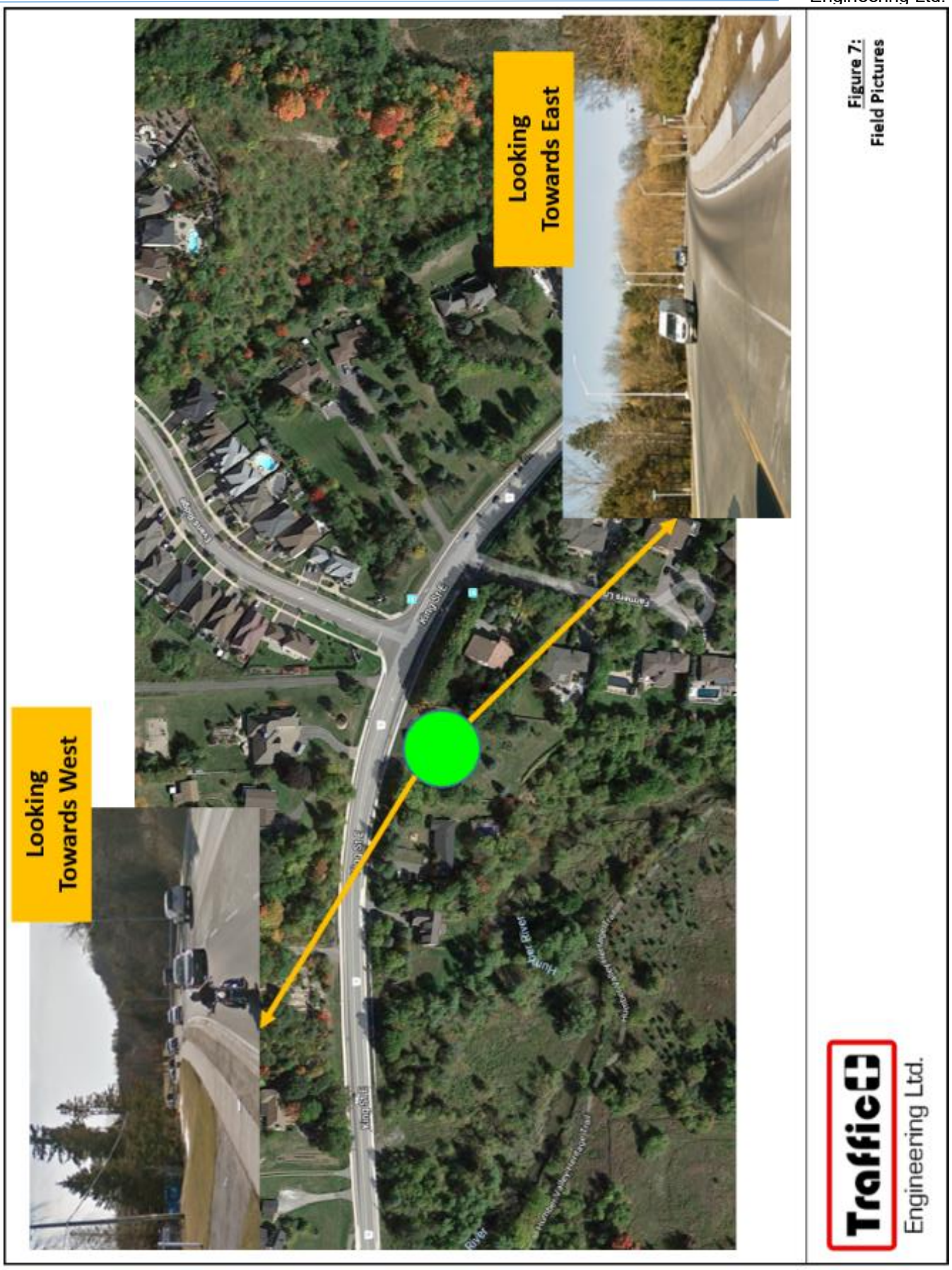

Figure 7:
Field Pictures

5.0 Trip Generation

As noted, the proposed development is comprised of 16 townhouses to be built on a site with a Total Gross Floor Area equal to approximately 2,810 m² (30,210 ft²).

The trip generation related to the proposed development was estimated using the trip generation rates provided in the ITE Trip Generation Manual (9th Edition) for the following land use:

- Land Use Category 231: Low-Rise Residential Condominium/Townhouse

Although the proposed development is located nearby a bus stop as well as King Street East is designated as a bike route with sidewalks located on both sides of King Street East, the adjustment to reflect the local modal split characteristics were not used to assess the trip generation under conservative scenario. **Table 1** identifies the trip generation for the proposed residential components

Table 1: Estimated Trip Generation Rates

	# of Units	AM - Average Rate	IN (Rate)	OUT (Rate)	IN Trips	OUT Trips	PM - Average Rate	IN	OUT	IN Trips	OUT Trips
Town Houses	16	0.67	0.25	0.75	3	8	0.78	0.58	0.42	7	5

Total AM Trips	11	Total PM Trips	12

5.1 Trip Distribution and Assignment

The distribution and assignment of the site-generated trips during AM and PM peak hours is not necessary because the site access driveway being designed as Right-In / Right-Out (RIRO).

Based on the site trip generation during AM and PM peak hours, it can be concluded that the added trips onto the adjacent road will be minimal and will not affect traffic operations along King Street East.

Figure 8:
Traffic Assignments at the Proposed Driveway – A.M. and P.M. Peak (NTS)

6.0 Garbage Collection

Given the access driveway design as well as the cul-de-sac length, it is proposed that garbage collection for each individual townhouse will be collected individually by the condominium maintenance employee to the curb along King Street East during the collection day set by the Region of Peel. Therefore, there will be no garbage truck entering the residential townhouse.

7.0 Fire Route

Based on discussions with the Town of Caledon Chief Fire Prevention Officer, it was indicated that if a cul-de-sac is less than 90.0 metres in length, there is no need to provide a turn around for fire trucks.

Appendix B provides email copy with the Town of Caledon Chief Fire Prevention Officer, as well as the Ontario Building Code.

8.0 Findings and Conclusions

The findings and conclusions of our study are as follows:

- **Development:** The proposed development will consist of 16 townhouses which will be built on land that is currently occupied by a single detached home. The approximate Total Gross Floor Area is equal to 2,810 m² (30,210 ft²).

- **Intersection Sight Distance:**

Field sight distances were measured from the approximate location of the proposed Access Driveway. The following was found:

- sight distance on the left of the proposed access driveway (looking West) along King Street East is equal to approximately 135 metres, whereas the minimum required sight distance is 177 metres, and
- sight distance on the right of the proposed access driveway (looking East) along King Street East is found to equal to approximately 170 metres, whereas the minimum required sight distance is 140 metres.

Although the sight distance measured on the left of the access driveway is lesser than the required minimum distance set by MTO guideline, it is still acceptable as it exceeds the TAC distance. However, MTO guideline was set for high traffic volumes roadways which does not reflect King Street East. Finally, the site is currently occupied by a single detached house where the existing driveway operates satisfactorily.

- **Trip Generation:**

The development is estimated to generate approximately 11 trips in the AM peak hour and 12 trips in the PM peak hour;
In summary, the proposed development is anticipated to have a very minimal impact on traffic operations within the study area.

APPENDIX A

Region of Peel Staff Email

From: Khan, Ayesha <ayesha.khan@peelregion.ca>
Sent: Friday, June 8, 2018 10:03:09 AM
To: Nabil Ghariani
Subject: RE: Terms of Reference for the proposed townhouses at 336 King Street E.-Bolton - (DART-18-008C) - Our File D-00901008S

Hi Nabil,
I apologize for missing your calls. I had been unexpectedly away from the office for the last few days. With regards to the TIS for this development, I will be satisfied with just a Trip Generation + Trip Distribution memo. Please disregard the request for including the nearby developments or a comprehensive full-blown TIS.

Thank you,

Ayesha Khan
Technical Analyst | Traffic Development & Permits
Transportation Division | Public Works
(905) 791 - 7800 ext. **7909**

Region of Peel
10 Peel Centre Drive,
Suite B, 4th Floor
Brampton ON

APPENDIX B

Town of Caledon Chief Fire Prevention Officer Email

From: Dave Pelayo <Dave.Pelayo@caledon.ca>
Date: June 6, 2018 at 1:12:15 PM EDT
To: Joe Costa <jcosta@avericalanddevelopment.com>
Subject: RE: 336 King St - Bolton - PRE 2017-0177

Good Afternoon Joe,

As per the Ontario Building Code the fire access route for your proposed townhouse development will need to meet the following requirements:

3.2.5.6. Access Route design

(1) A portion of a roadway or yard provided as a required access route for fire department use shall,

(a) have a clear width not less than 6 m, unless it can be shown that lesser widths are satisfactory,

(b) have a centreline radius not less than 12 m,

(c) have an overhead clearance not less than 5 m,

(d) have a change of gradient not more than 1 in 12.5 over a minimum distance of 15 m,

(e) be designed to support the expected loads imposed by firefighting equipment and be surfaced with concrete, asphalt or other material designed to permit accessibility under all climatic conditions,

(f) have turnaround facilities for any dead-end portion of the access route more than 90 m long, and

(g) be connected with a public thoroughfare.

If a turnaround facility is required, please find attached a copy of the Illustrated Fire Route Guideline from the Ontario Building Code. Our large apparatus has a length of 14 m.

Thanks,

Dave Pelayo
Chief Fire Prevention Officer
Community Services

T.905.584.2272 x. 4340
Email: dave.pelayo@caledon.ca

Town of Caledon | www.caledon.ca | www.visitcaledon.ca | Follow us @YourCaledon

3.2.5.6. ACCESS ROUTE DESIGN

Where access is required to a building for fire department vehicles and is provided by a roadway or yard the following criteria apply to the design and construction of the access route.

- Minimum width: 6 m
- Minimum centre line radius : 12 m
- Minimum overhead clearance: 5 m
- Maximum gradient change - 1:12.5 over at least 15 m
- Must support loads imposed by fire fighting equipment (i.e. surfaced with concrete, asphalt or other surface designed for year round accessibility)
- Provide turn around facilities if dead end exceeds 90 m
- Have direct connection to public thoroughfare