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15728 Airport Road
Town of Caledon
Transportation Impact Study

ptsl.com

February 2021
Project No. 200052

Project Summary

Project Number
200052

February 2021

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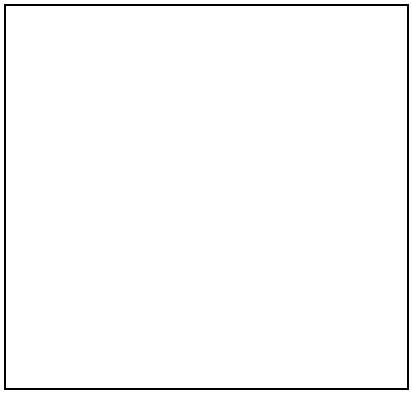
15728 Airport Road
Town of Caledon
Transportation Impact Study



Signing Engineer, P.Eng.

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Executive Summary

Content

Wyndham Holdings has retained Paradigm Transportation Solutions Limited (Paradigm) to conduct this Transportation Impact Study (TIS) for a proposed retirement home located at 15728 Airport Road in the Town of Caledon.

This study determines the impacts of the development traffic on the surrounding road network, identifies the recommended improvements to accommodate the site generated traffic, and recommends Transportation Demand Management (TDM) measures to mitigate the subject site's transportation and parking impacts.

Development Concept

The subject site is located at 15728 Airport Road in the Town of Caledon. The proposed Retirement Home is expected to consist of up to 150 beds in 127 units. Build-out is anticipated to occur by the end of Year 2026.

Vehicle access to the site is proposed by a single right-in, right-out, and left-in driveway to Airport Road located approximately 80 metres south of the Caledon East Public School Driveway.

Conclusions

The main findings and conclusions of this study are as follows:

- **Existing Traffic**: The study area intersections are operating with acceptable levels of service during the weekday AM and PM peak hours. No critical movements are occurring at the study area intersections.
- **Planned Improvements**: The Region of Peel is currently undertaking an Environmental Assessment (EA) for Airport Road. At the time of writing, the EA is not yet finalized. For analysis purposes, geometric and traffic control improvements are assumed to be in place for the study area intersections.
- **Trip Generation**: The site's net trip generation is estimated to be approximately 29 AM peak hour vehicle trips and 39 PM peak hour vehicle trips. Vehicle access to the site is proposed by a driveway connection to Airport Road and left-turns out of the driveway are assumed to be restricted by a raised centre median on Airport Road.

- **Heavy Vehicle Circulation**: Pending the final lane configuration from the Airport Road EA, modifications to the curb radii and/or entrance width may be required to accommodate the design vehicle to enter and exit the site without impacting the opposing travel lane.

  The reversing maneuvers into the site's loading zone should ideally be assisted by a traffic control person.

- **Background Traffic**: The study area intersections are generally operating with acceptable levels of service, with the exception of the westbound movement at the Airport Road and Cranston Drive intersection which is forecast to operate at LOS E with a v/c < 0.50 during the AM peak hour in the 10-year horizon.

- **Total Traffic**: The study area intersections are forecast to operate with similar levels of service as the background traffic conditions. No additional critical movements are noted at the study area intersections over background conditions. The site driveway is forecast to operate with delays in the LOS A to B range with v/c ratios of less than 0.05.

- **Remedial Measures**: No changes to the existing lane configurations are warranted or required. It is noted that the Airport Road EA may recommend changes in intersection traffic control that is not discussed in this study.

- **Transportation Demand Management**: Enhancements to the on-site pedestrian realm, inclusion of bicycle parking and preferential carpool parking will help promote sustainable modes of travel and further mitigate the site's transportation impacts.

Recommendations

Based on the findings of this study, it is recommended that:

- The Region of Peel monitor the outcome of the Airport Road EA to determine if modifications to the curb radii and/or entrance width are required to the proposed driveway; and

- The site operator manages deliveries and waste collection to minimize on-site disruptions. Reversing maneuvers into the site's loading zone should ideally be assisted by a traffic control person.

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1 Introduction

1.1 Overview

Wyndham Holdings has retained Paradigm Transportation Solutions Limited (Paradigm) to conduct this Transportation Impact Study (TIS) for a proposed retirement home located at 15728 Airport Road in the Town of Caledon. **Figure 1.1** illustrates the location of the subject site.

The scope of the study includes:

- Determine and assess the current study area traffic conditions;
- Forecast the additional traffic generated by the proposed development;
- Assess the site's circulation of delivery and waste collection vehicles;
- Analyze the impacts of the additional traffic on the study area street network;
- Review Transportation Demand Management (TDM) strategies; and
- Recommend any necessary remedial measures to mitigate the traffic impacts.

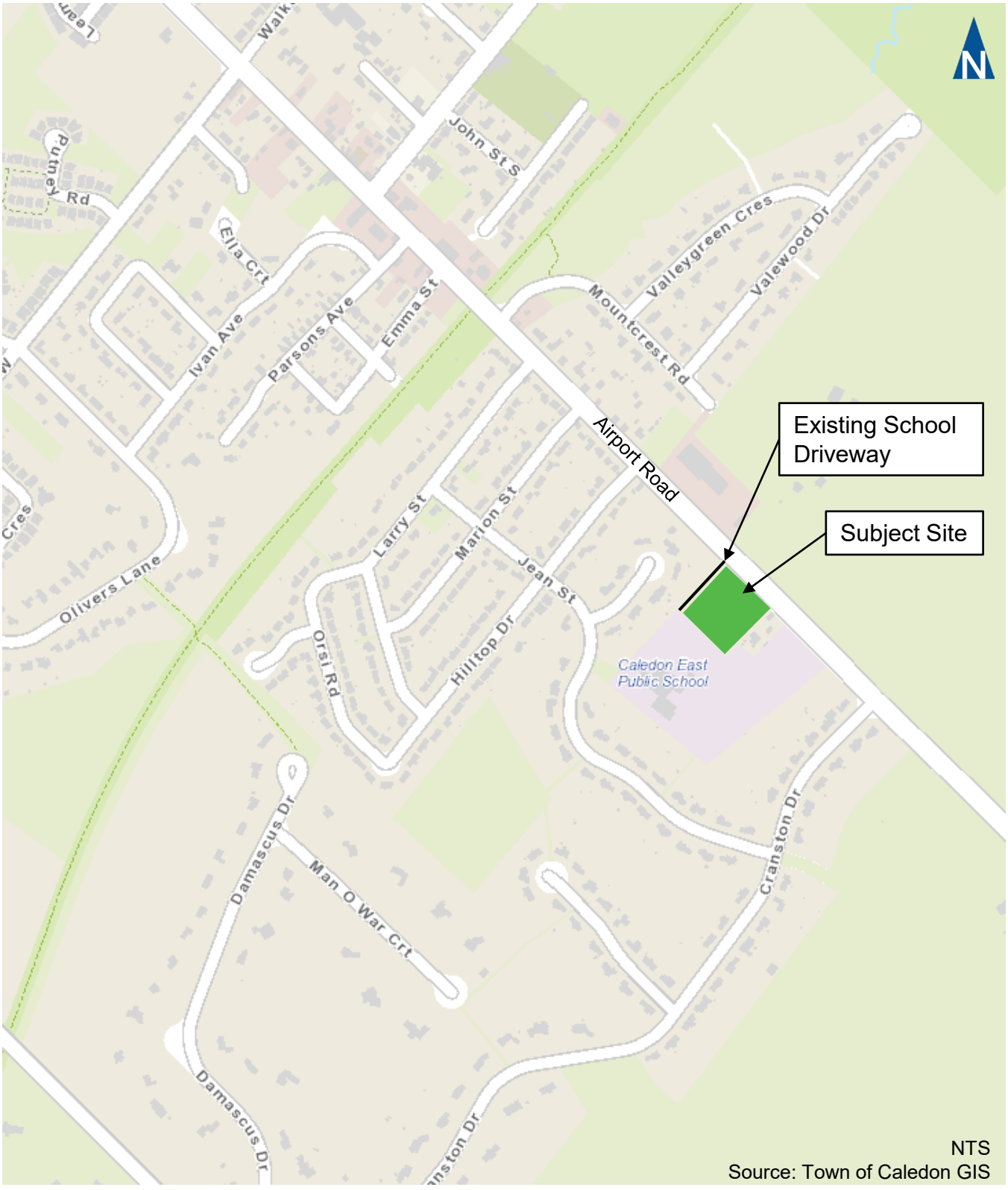
The study scope was developed in consultation with the Region of Peel in February 2020. **Appendix A** contains the pre-study consultation material. This study has been prepared in accordance with the Region's Traffic Impact Study Guidelines[1].

1.2 Study Area

The study area intersections assessed in this study include:

- Airport Road (Regional Road 7) & Caledon East Public School Driveway (unsignalized);
- Airport Road & Cranston Drive (unsignalized); and
- The proposed site driveway to Airport Road.

[1] *Transportation Impact Study,* Region of Peel, *https://www.peelregion.ca/pw/transportation/business/traffic-impact-study.asp*



NTS
Source: Town of Caledon GIS

Study Area and Subject Site Location

15728 Airport Rd TIS
200052

Figure 1.1

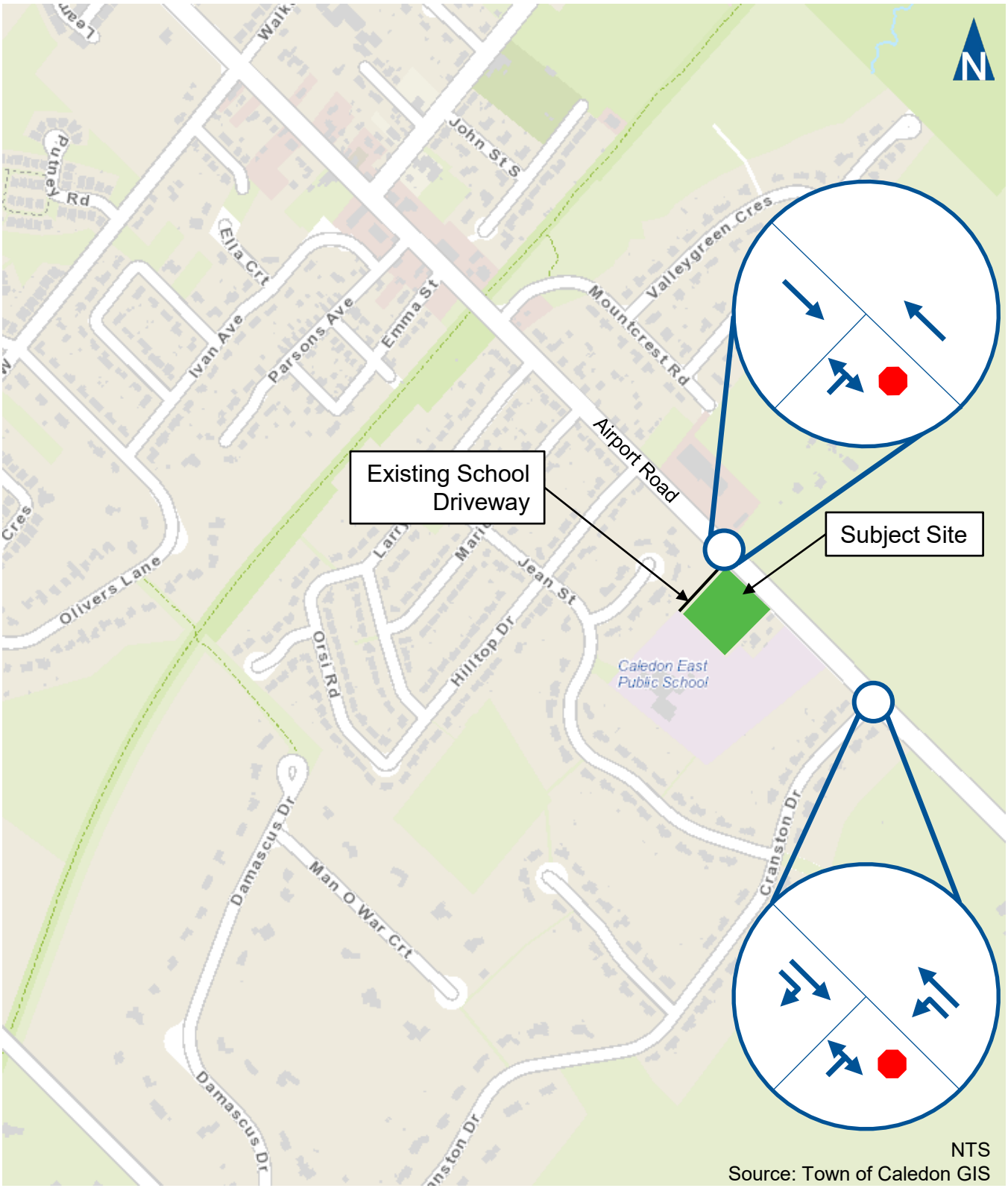
2 Existing Conditions

2.1 Road Network

The roadways of interest within the study area include:

- **Airport Road** is a north/south regional roadway under the jurisdiction of the Region of Peel. The road has a two-lane urban/rural cross-section and a posted speed limit of 60 km/h south of the subject site. The posted speed limit transitions to 50 km/h near the south limits of the subject site. Sidewalks are provided on the west side of the roadway to the north of the Caledon East Public School Driveway.
- **Cranston Drive**, an east/west local road under the jurisdiction of the Town of Caledon. The road has a two-lane urban cross-section, a sidewalk on the north side of the road, and a posted speed limit of 40 km/h within the study area. The approach to Airport Road operates under stop control; and
- **Caledon East Public School Driveway**, a private driveway serving the Caledon East Public School. The driveway has a two-lane rural cross-section and an assumed speed limit of 50 km/h south of the subject site. The driveway operates as a one-way eastbound connection to Airport Road. Sidewalks are present on the north side of the driveway. No sidewalks are provided along the driveway. The approach to Airport Road operates under stop control.

Figure 2.1 illustrates the existing lane configuration and traffic control at the study area intersections.



NTS
Source: Town of Caledon GIS

Existing Traffic Control and Lane Configuration

2.2 Cycling Network

Cycling infrastructure typically consists of on-street and off-street facilities. On-street facilities comprise of cycling lanes, signed cycling routes, and paved shoulders. Off-street facilities are in the form of multi-use or informal trails.

No on-street cycling facilities are present within 500 m of the subject site. The Trans Canada Trail[2] is an off-street trail which can be accessed via Airport Road approximately 550 m north of the subject site.

2.3 Transit Service

There is currently no transit service available within the Town of Caledon.

2.4 Traffic Volumes

Figure 2.2 illustrates the existing AM and PM weekday peak hour turning movement traffic volumes collected by Paradigm in February 2020. **Appendix B** contains the turning movement data.

[2] *https://maps.caledon.ca/h5/index.html?viewer=Trails.Trails*

Existing Traffic Volumes

2.5 Traffic Operations

Intersection level of service (LOS) is a recognized method of quantifying the efficiency of traffic flow at intersections. It is based on the delay experienced by individual vehicles executing the various movements. The delay is related to the number of vehicles wanting to make a movement, compared to the estimated capacity for that movement. The capacity is based on several criteria related to the opposing traffic flows. The highest possible rating is LOS A, under which the average total delay is equal or less than 10.0 seconds per vehicle. When the average delay exceeds 80 seconds at signalized intersections (50 seconds at unsignalized), the movement is considered to have a LOS F and remedial measures are usually implemented if they are feasible.

The operations of the intersections in the study area were evaluated using the existing lane configuration, signal timings, and traffic control along with the existing traffic volumes. The intersection analysis considered three separate measures of performance:

- The LOS for each turning movement;
- The volume to capacity ratio (v/c) for each movement; and
- The 95th percentile queue lengths using Synchro 9 and Synchro 10.

Under the Region's TIS Guidelines, the operational analysis must include identification of signalized and unsignalized intersections where:

- Volume to Capacity ratios (v/c) for overall intersection operations, through movements, or shared through / turning movements increase to 0.90 or above;
- V/C ratios for exclusive turning movements that will exceed 1.00;
- Queues for an individual movement are projected to exceed available turning lane storage; and
- LOS, based on average delay per vehicle on individual movements, exceeds LOS D for unsignalized intersections.

The operations of the intersections in the study area were evaluated with the existing turning movement volumes using Synchro 9. The key parameters used in the analysis as indicated in the include:

- Existing lane configurations;
- Heavy vehicle percentages derived from existing traffic counts;
- Ideal saturation flow rate of 1,900 vehicles per hour per lane (vphpl), as specified in the Region's Synchro Guidelines[3];
- Lane widths of 3.7 m and 3.5 m for through and auxiliary turn lanes, respectively, as specified in the Region's guidelines;
- Posted speed limits;
- Peak Hour Factor (PHF) of 1.00 for all movements; and
- Synchro default values for all other inputs.

Table 2.1 summarizes the level of service conditions at the study area intersections. No critical movements are noted to be occurring at the study area intersections.

Appendix C contains the detailed Synchro 9 reports.

[3] *Regional Guidelines for Using Synchro*, Region of Peel, December 2010.

TABLE 2.1: EXISTING TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																OVERALL
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Airport Road & Caledon East Public School Driveway	TWSC	LOS	C	-	>	**C**					-	A	-	**A**	-	A	-	**A**	
			Delay	16	-	>	**16**					-	0	-	**0**	-	0	-	**0**	
			V/C	0.04	-	>						-	0.11	-		-	0.45	-		
			95th	1	-	>						-	0	-		-	0	-		
	Airport Road & Cranston Drive	TWSC	LOS	C	-	>	**C**					A	A	-	**A**	-	A	A	**A**	
			Delay	16	-	>	**16**					9	0	-	**0**	-	0	0	**0**	
			V/C	0.06	-	>						0.00	0.11	-		-	0.45	0.00		
			95th	2	-	>						0	0	-		-	0	0		
			Storage	-	-	>						45	-	-		-	-	45		
			Avail.	-	-	>						45	-	-		-	-	45		
PM Peak Hour	Airport Road & Caledon East Public School Driveway	TWSC	LOS	C	-	>	**C**					-	A	-	**A**	-	A	-	**A**	
			Delay	21	-	>	**21**					-	0	-	**0**	-	0	-	**0**	
			V/C	0.06	-	>						-	0.45	-		-	0.22	-		
			95th	2	-	>						-	0	-		-	0	-		
	Airport Road & Cranston Drive	TWSC	LOS	C	-	>	**C**					A	A	-	**A**	-	A	A	**A**	
			Delay	18	-	>	**18**					8	0	-	**0**	-	0	0	**0**	
			V/C	0.07	-	>						0.01	0.44	-		-	0.21	0.01		
			95th	2	-	>						0	0	-		-	0	0		
			Storage	-	-	>						45	-	-		-	-	45		
			Avail.	-	-	>						45	-	-		-	-	45		

TWSC - Two-Way Stop Control
TCS - Traffic Control Signal
MOE - Measure of Effectiveness
LOS - Level of Service
V/C - Volume to Capacity Ratio
95th - 95th Percentile Queue Length
Storage - Existing Storage (m)
Avail. - Available Storage (m)
> - Shared Right-Turn Lane
< - Shared Left-Turn Lane

3 Site Concept

3.1 Description

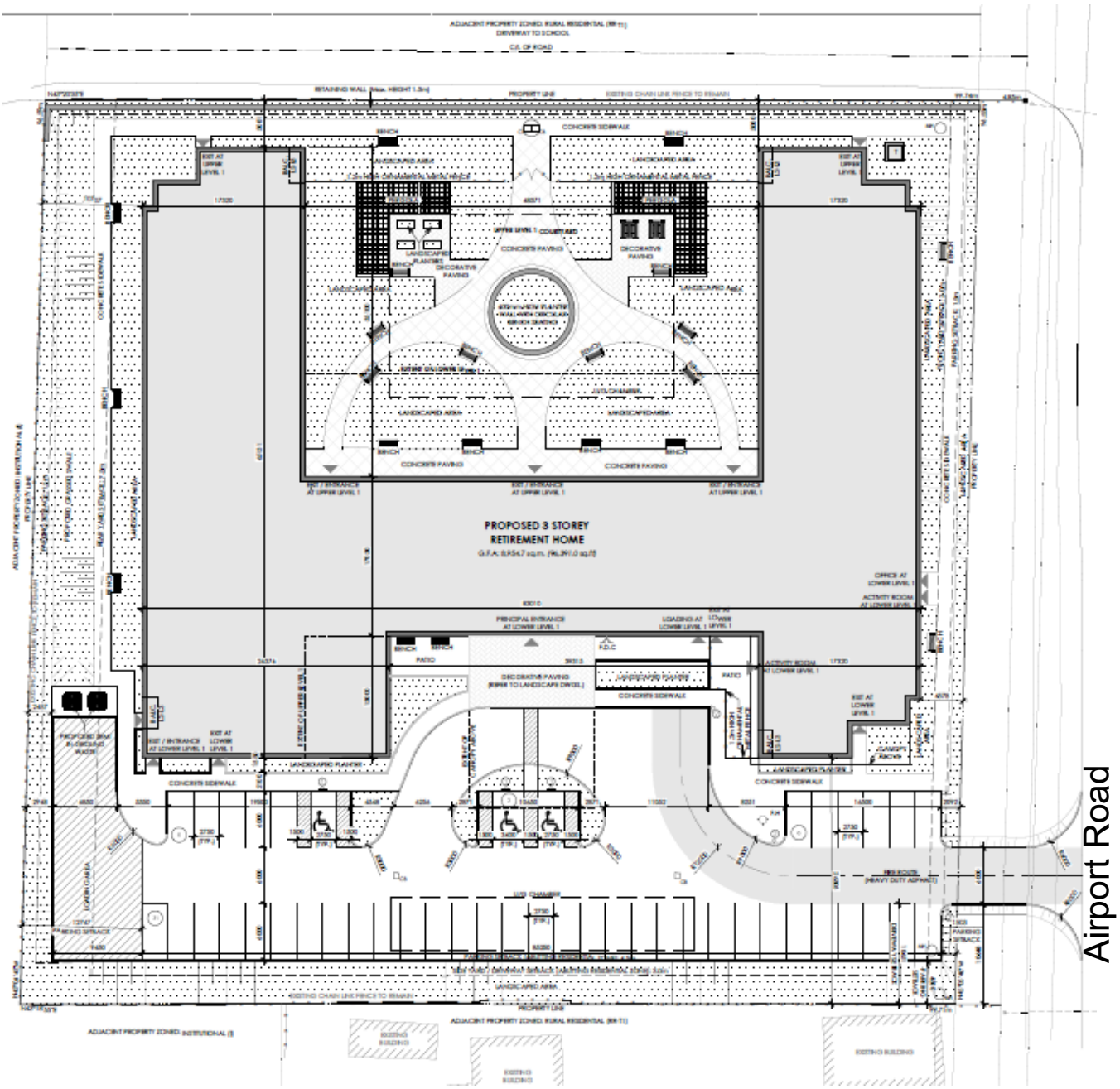
The subject site is located at 15728 Airport Road in the Town of Caledon. The proposed Retirement Home is expected to consist of up to 150 beds in 127 units. Build-out is anticipated to occur by the end of Year 2026.

Vehicle access to the site is proposed by a single driveway connection to Airport Road located approximately 80 metres south of the Caledon East Public School Driveway. Left-turns out of the driveway are assumed to be restricted by a raised centre median on Airport Road.

The site provides direct sidewalk connections to Airport Road and the Caledon Public School East Driveway. Sidewalks are provided along the perimeter of the proposed building which also provides access to the internal courtyard area. The sites parking supply consists of 45 spaces of which three are designed as accessible.

The site's loading zone is east of the main entrance and the waste collection area is on the end of the parking lot drive aisle. **Section 3.3** reviews heavy vehicle movements to/from the loading zone.

Figure 3.1 illustrates the proposed site plan.



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Site Concept Plan

15728 Airport Rd TIS
200052

Figure 3.1

3.2 Trip Generation

The Institute of Transportation Engineers (ITE) Trip Generation[4] methods are used to estimate the site trip generation. Land Use Code (LUC) 254 (Assisted Living) was used to estimate the site trip generation. Average rates were used as the regression equation was unavailable for this LUC.

The subject site is forecast to generate approximately 29 vehicle trips during the AM peak hour and approximately 39 vehicle trips during the PM peak hour. **Table 3.1** summarizes the estimated trip generation. To remain conservative, a mode share reduction was not applied to this development.

TABLE 3.1: SITE GENERATED TRAFFIC

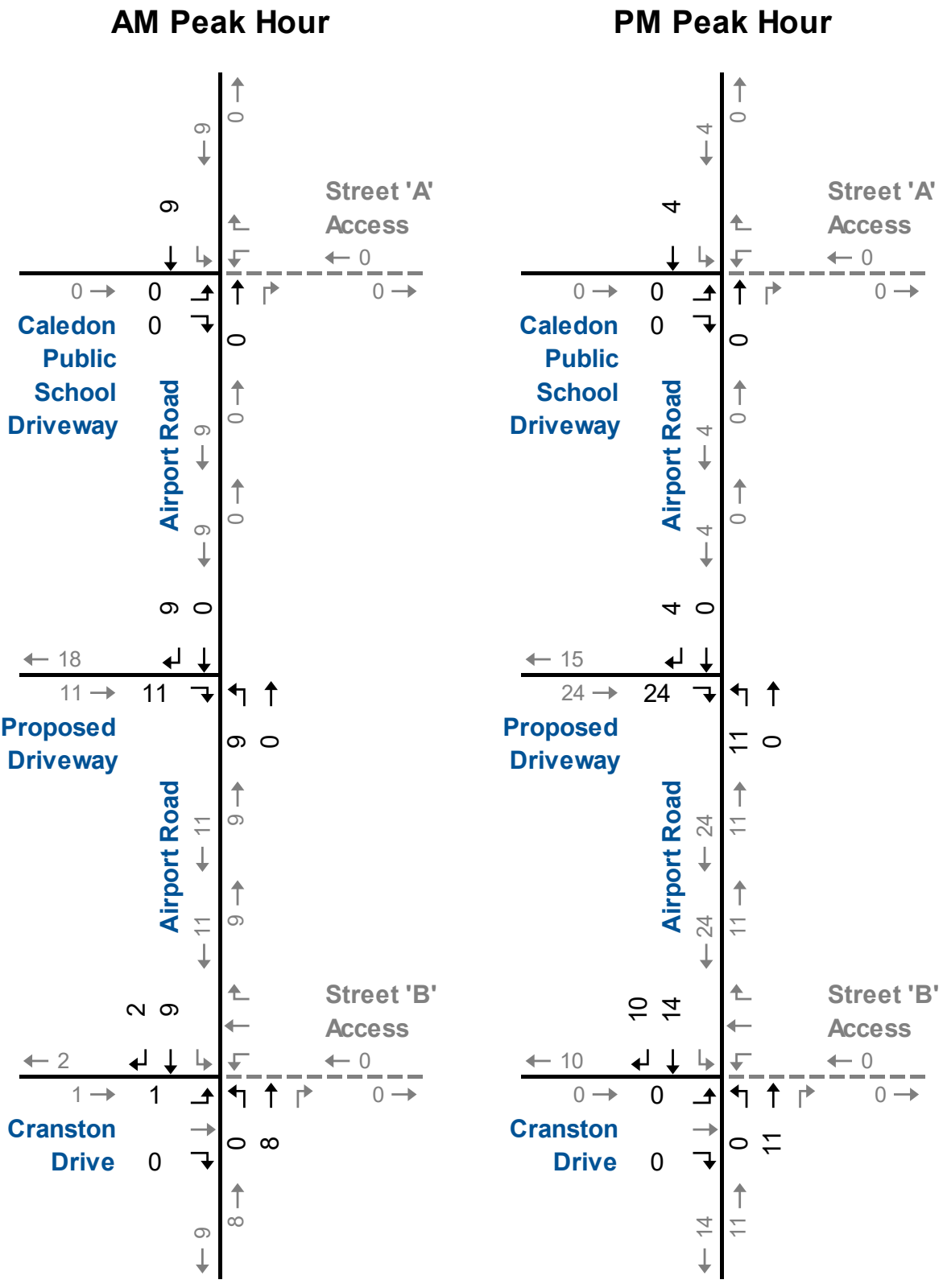
Land Use Code	AM Peak Hour				PM Peak Hour			
	Rate	In	Out	Sum	Rate	In	Out	Sum
254: Assisted Living (150 Beds) Average Rates	0.19	18	11	**29**	0.26	15	24	**39**
Total New Trips		**18**	**11**	**29**		**15**	**24**	**39**

Table 3.2 summarizes the estimated trip distribution for site generated traffic. The residential distribution was developed using the Transportation Tomorrow Survey[5] (TTS) data for the zone containing the subject site. **Appendix B** contains the TTS survey data. **Figure 3.2** illustrates site-generated traffic volumes.

TABLE 3.2: ESTIMATED TRIP DISTRIBUTION

Origin / Destination	AM Peak Hour		PM Peak Hour	
	In	Out	In	Out
North via Airport Road	50%	20%	25%	40%
West via Cranston Drive	5%	0%	0%	0%
South via Airport Road	45%	80%	75%	60%
Total	**100%**	**100%**	**100%**	**100%**

[4] *Trip Generation Tenth Edition*, Institute of Transportation Engineers, Washington D.C., 2017
[5] *Transportation Tomorrow Survey 2016*, University of Toronto Data Management Group. Zone 3197



Forecast Site Traffic

15728 Airport Rd TIS
200052

Figure 3.2

3.3 Heavy Vehicle Circulation

Heavy vehicle circulation for the loading and waste collection area has been assessed using AutoTURN swept path analysis software. Two design vehicles were used in the analysis:

- Delivery Truck – Transportation Association of Canada (TAC) Heavy Single Unit (HSU)[6]; and
- Waste collection – The Peel Region Front Loader[7].

Figure 3.3 illustrates the on-site circulation of the TAC HSU and the following is noted:

- The design vehicle will enter the site via Airport Road and reverse into the loading area. The design vehicle will require the entire driveway width to enter; and
- To exit the site in a forward movement the design vehicle will require the entire width of the driveway.

Figure 3.4 illustrates the on-site circulation of the Peel Region Front Loader and the following is noted:

- The design vehicle will enter the site via Airport Road and front into the waste collection area. The design vehicle will require the entire driveway width to enter the site; and
- To exit the site, the design vehicle will reverse approximately 55 m into the loading area then exit in a forward movement. The design vehicle will require the entire width of the driveway to exit.

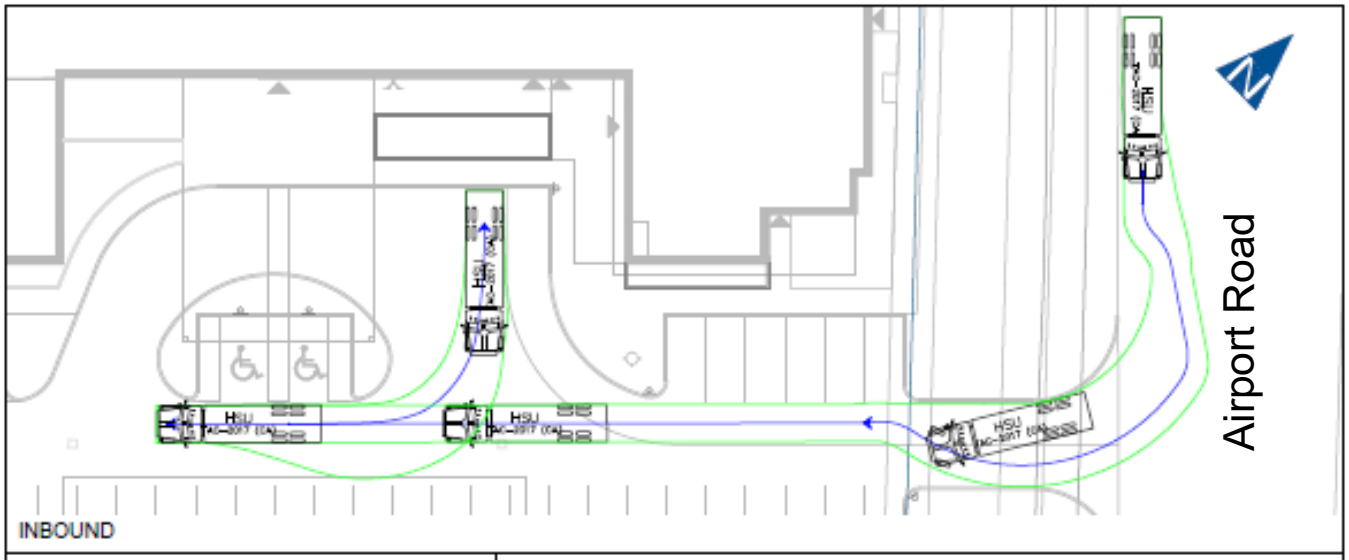
When exiting the site, the design vehicles must encroach into two lanes of traffic to travel southbound. However, the future lane configuration at the time of this study is not confirmed as there is currently an Environmental Assessment (EA) underway for planned improvements to Airport Road.

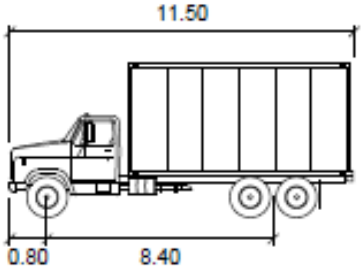
If the final design for Airport Road includes two southbound lanes at the site access, the design vehicles can wait for a gap in southbound traffic and safely use both lanes when exiting the site. However, if there is one southbound lane and the adjacent lane facilitates opposing traffic, modifications to the proposed driveway curb radii are

[6] *2.4 – Design Vehicles*, Geometric Design Guide for Canadian Roads, Transportation Association of Canada, June 2017.
[7] *Appendix 1 – Waste Collection Design Standards Manual*, Region of Peel.

required to permit the design vehicles to enter and exit the site without impacting the opposing travel lane.

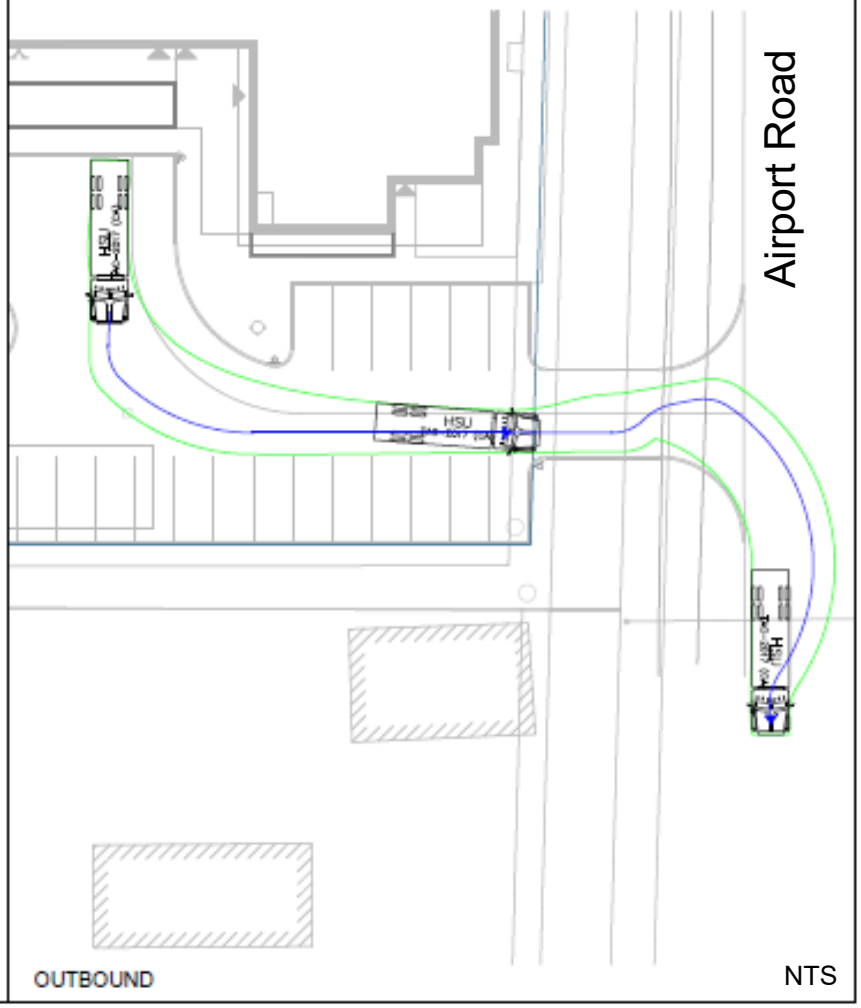
The frequency of delivery vehicles and waste collection vehicles is expected to be low with loading and waste collection times managed by the site operator. The level of conflict between the design vehicles and traffic using Airport Road is expected to be low. The reversing maneuvers into the site's loading zone should ideally be assisted by a traffic control person.





HSU

	meters
Width	: 2.60
Track	: 2.60
Lock to Lock Time	: 6.0
Steering Angle	: 40.0



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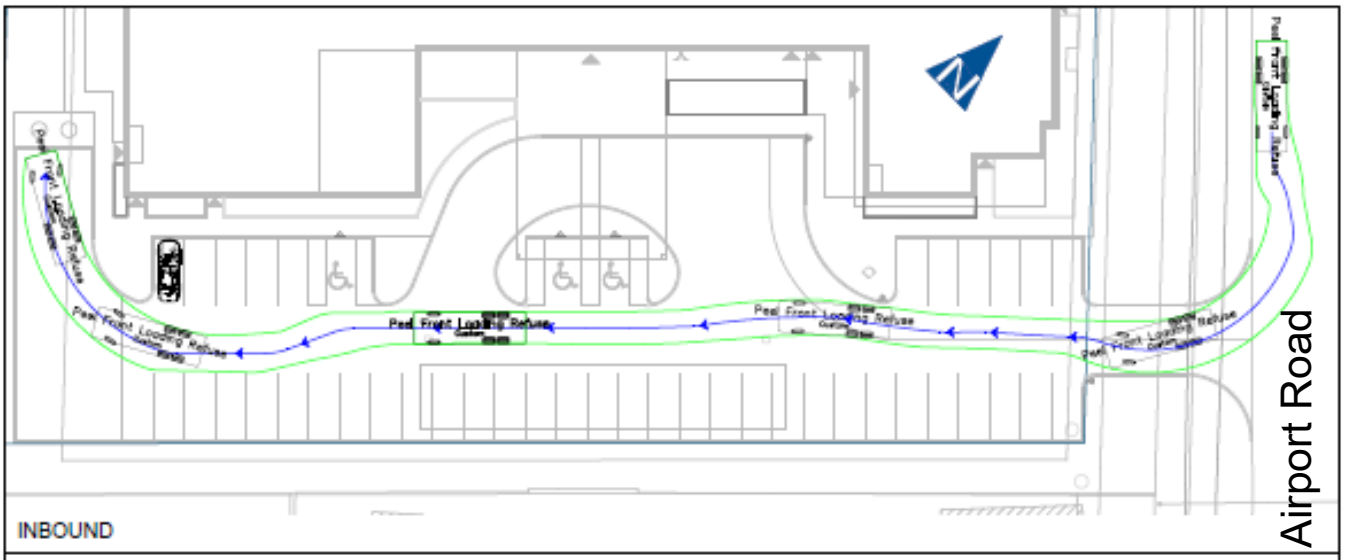
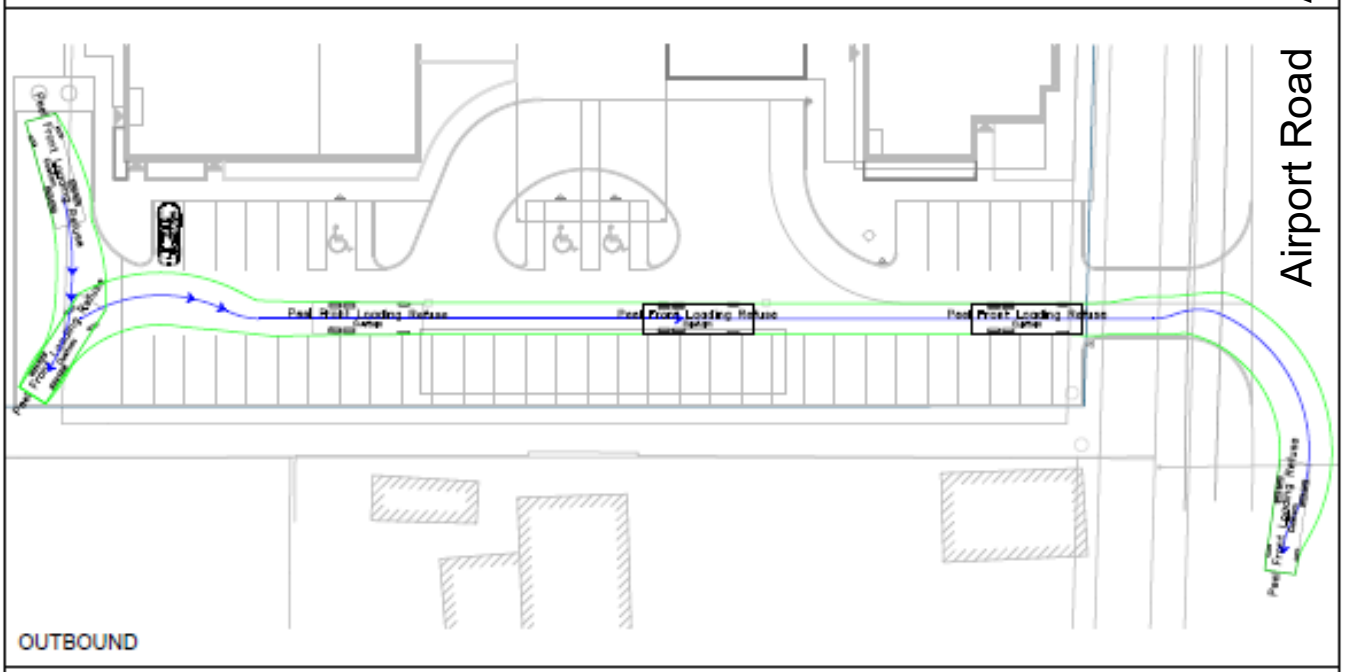
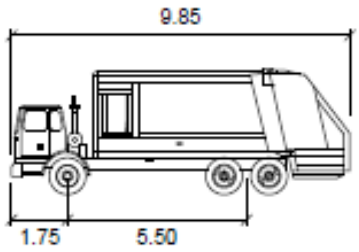
Swept Path Analysis Delivery Vehicle







	meters
Width	: 2.77
Track	: 2.77
Lock to Lock Time	: 6.0
Steering Angle	: 25.0

PEEL FRONT LOADING WASTE COLLECTION VEHICLE

NTS

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Swept Path Analysis
Waste Collection Vehicle

4 Future Traffic Conditions

The assessment of future conditions in this section includes the following components necessary to assess the site traffic implications on the adjacent road network:

- Future background traffic estimates;
- Level of service analysis for background traffic (pre-development);
- Future total traffic estimates; and
- Level of service analysis for total traffic (post-development).

4.1 Forecast Traffic

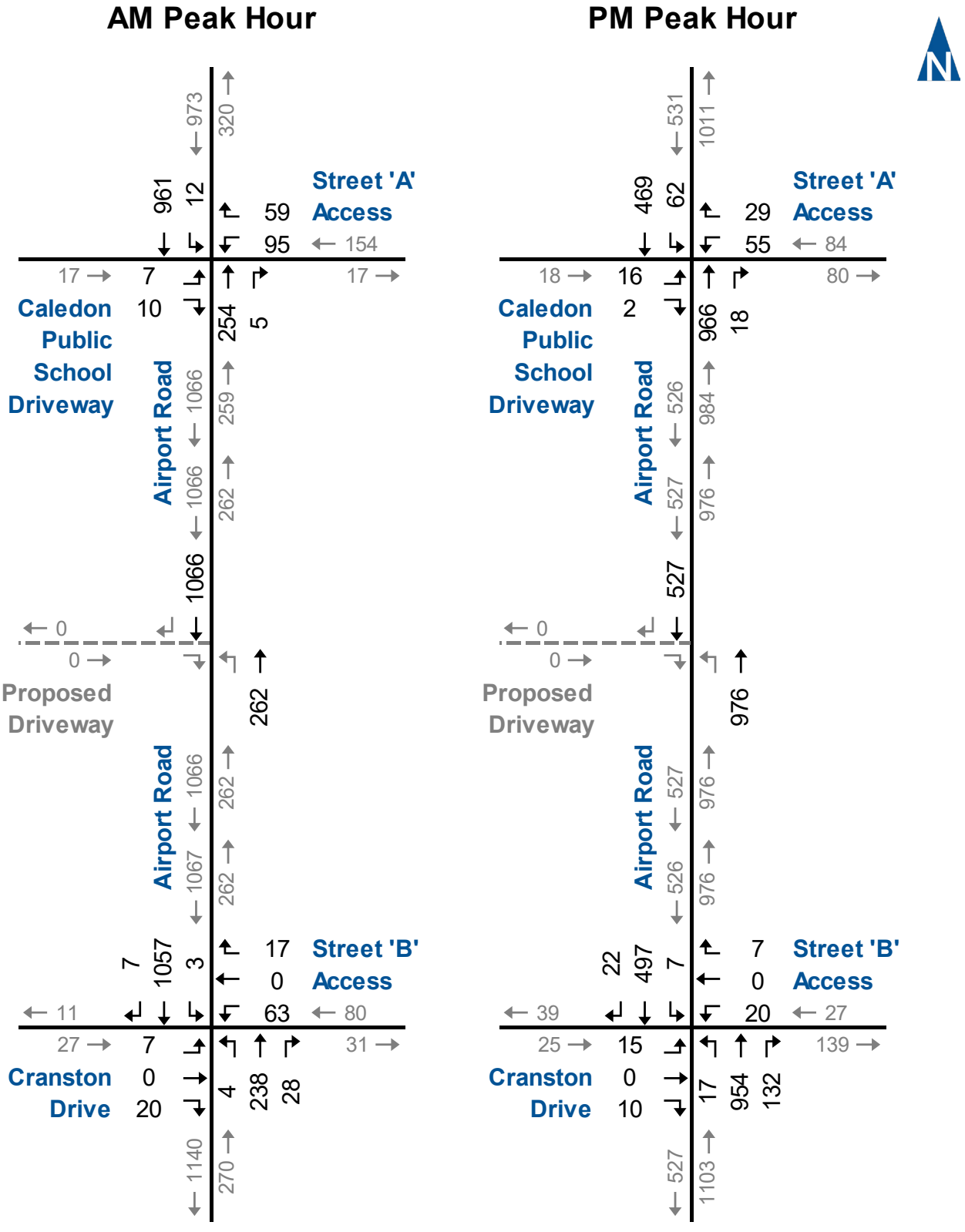
As directed by Peel Region staff, a five-year and ten-year horizon from the year of expected build-out (2031 & 2036) has been assessed. The likely future traffic volumes near the subject site are estimated to consist of:

- Increased non-site traffic (generalized background traffic growth);
- Traffic generated by the development of 15717 Airport Road[8]. This proposed development includes approximately 641 townhouse units and 30 Senior Adult Housing units. Vehicle access is proposed by two new roadways to Airport Road. Street 'A' is proposed to form the fourth leg to the Caledon Public School Driveway intersection. The Street 'A' intersection is proposed to operate with traffic control signals. Street 'B' is proposed to form the fourth leg to the Cranston Drive intersection. The Street 'B' intersection is proposed to operate with stop control on Cranston Drive and Street 'B'; and
- Traffic generated by the subject site.

The generalized background traffic growth forecast assumes an annual growth rate of 2.0% per annum and is consistent with the traffic study prepared for the adjacent development applications. **Appendix D** contains the detailed traffic forecast for the adjacent development applications.

[8] *15717 Airport Road, Town of Caledon TIS*, Cole Engineering Group LTD, August 2018.

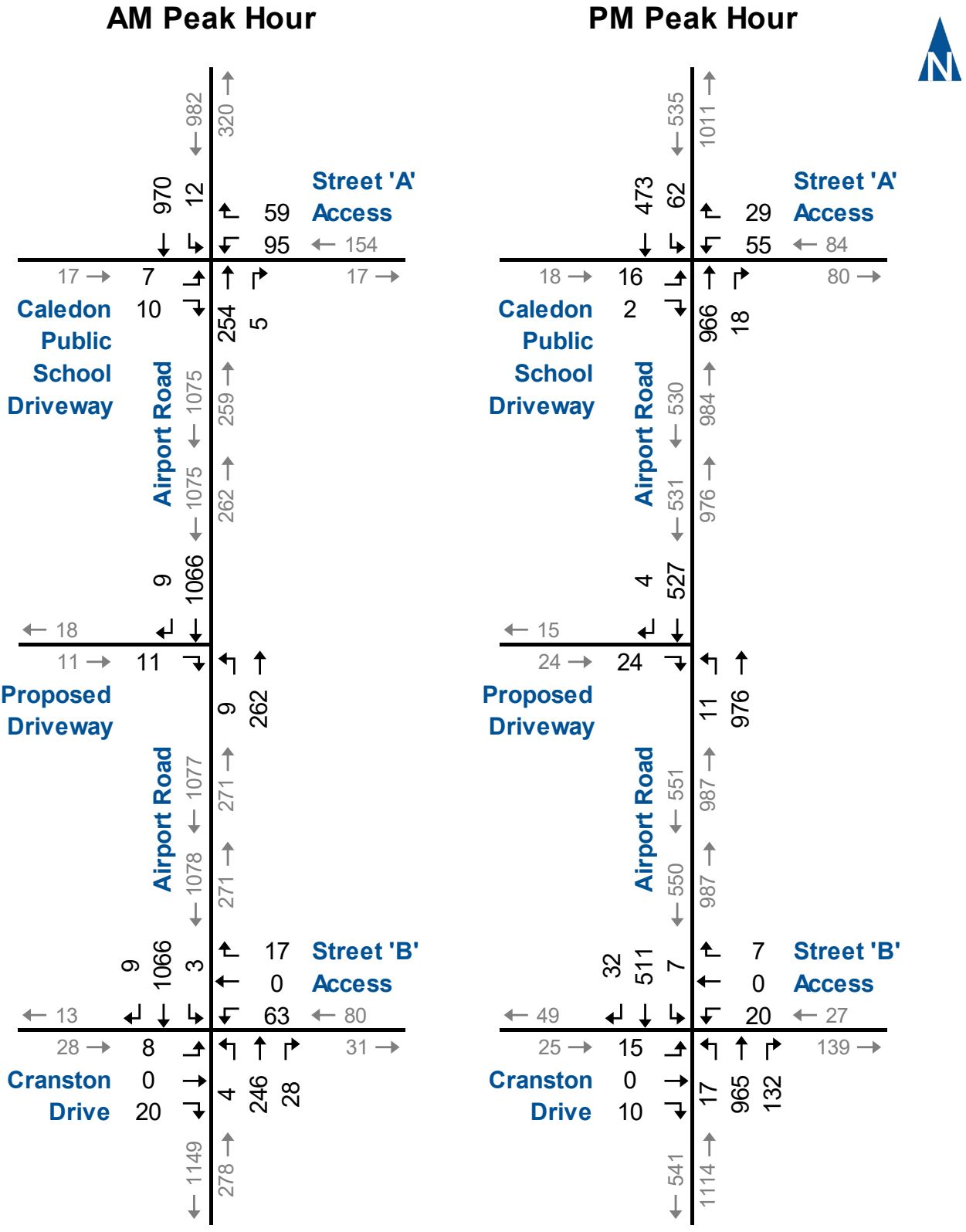
Figure 4.1 illustrates the forecast 5-year (2031) background forecasts which include the generalized growth and in-stream development. **Figure 4.2** illustrates the forecast 5-Year (2031) total (with development) traffic volumes. **Figure 4.3** illustrates the forecast 10-year (2036) background forecasts which include the generalized growth and in-stream development. **Figure 4.4** illustrates the forecast 10-Year (2036) total (with development) traffic volumes.



Background Traffic Volumes
5-Year Horizon

15728 Airport Rd TIS
200052

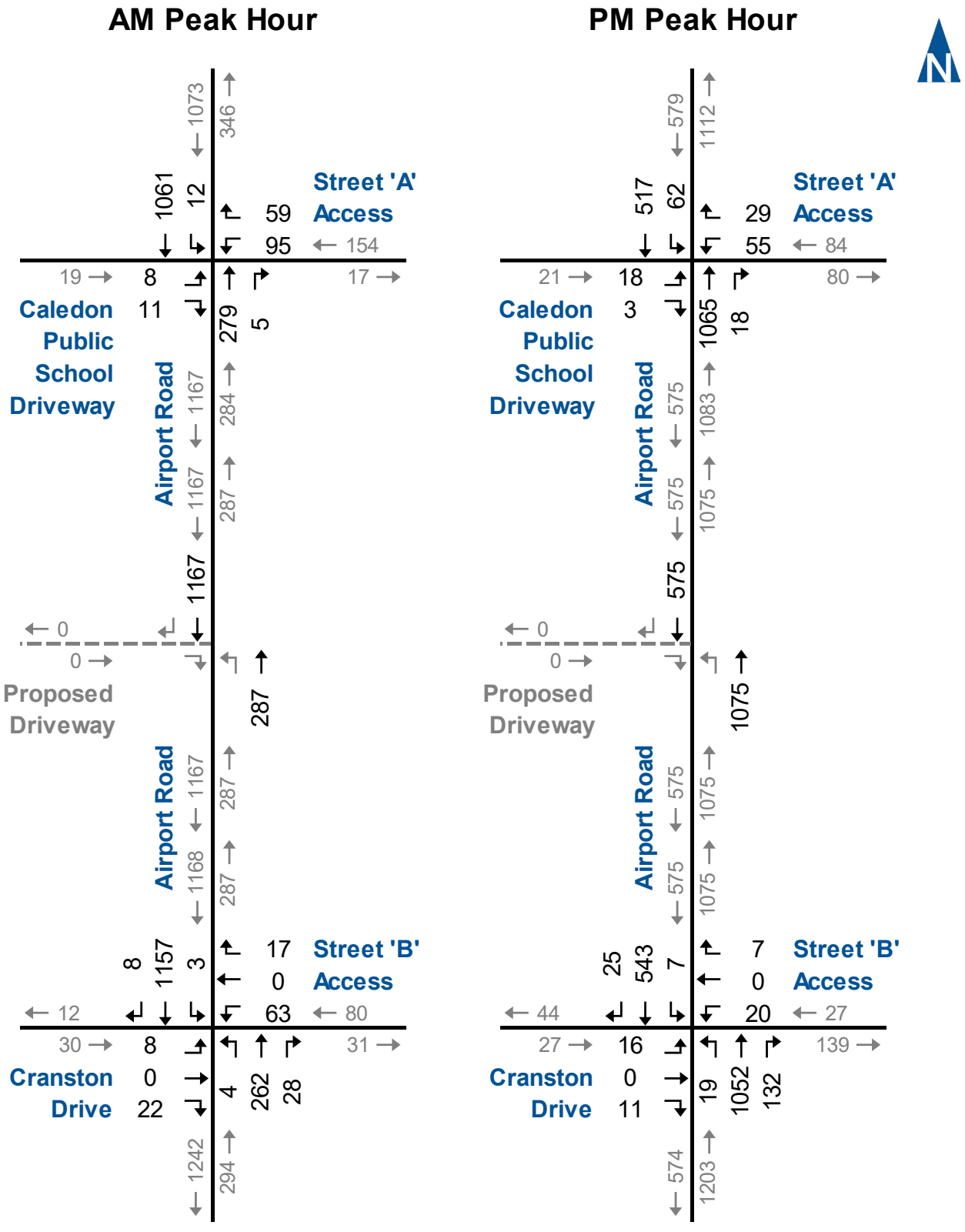
Figure 4.1



Total Traffic Volumes
5-Year Horizon

15728 Airport Rd TIS
200052

Figure 4.2

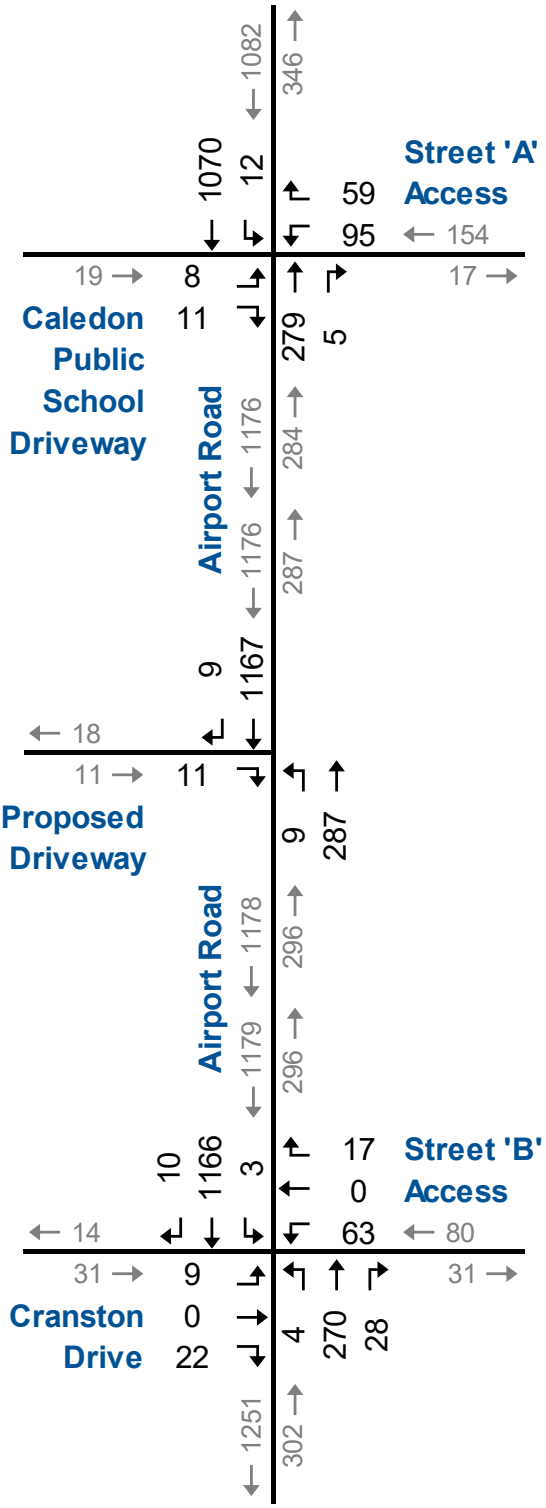


Background Traffic Volumes
10-Year Horizon

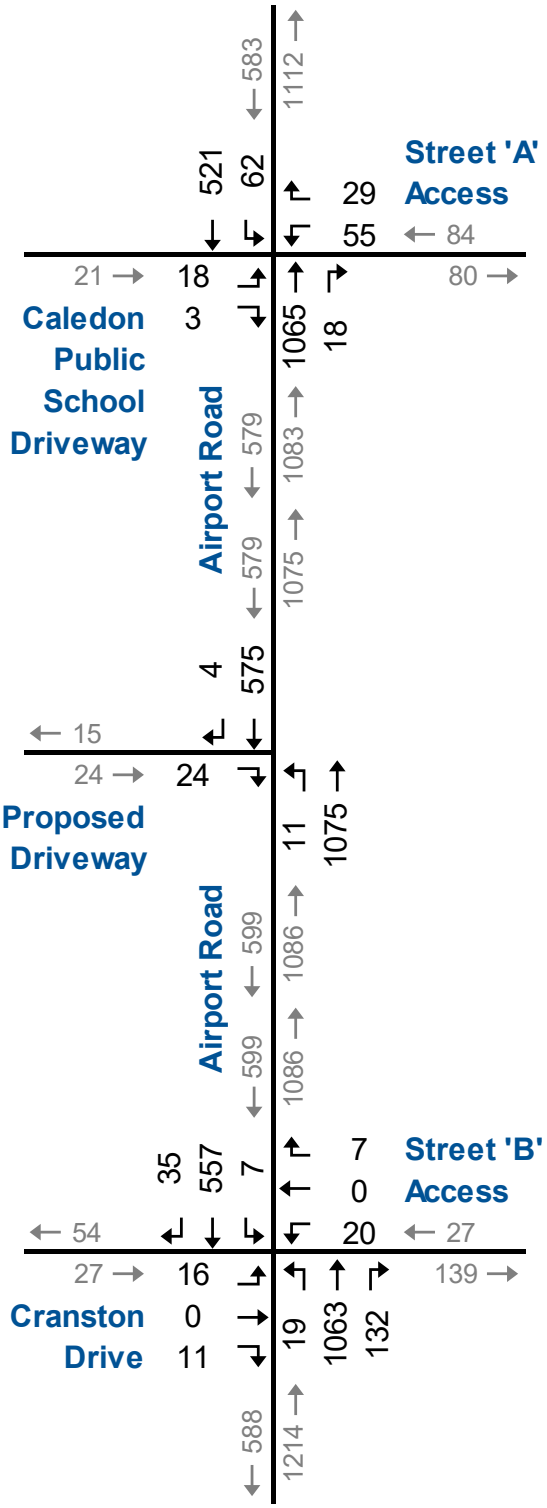
15728 Airport Rd TIS
200052

Figure 4.3

AM Peak Hour



PM Peak Hour



Total Traffic Volumes
10-Year Horizon

4.2 Planned Improvements

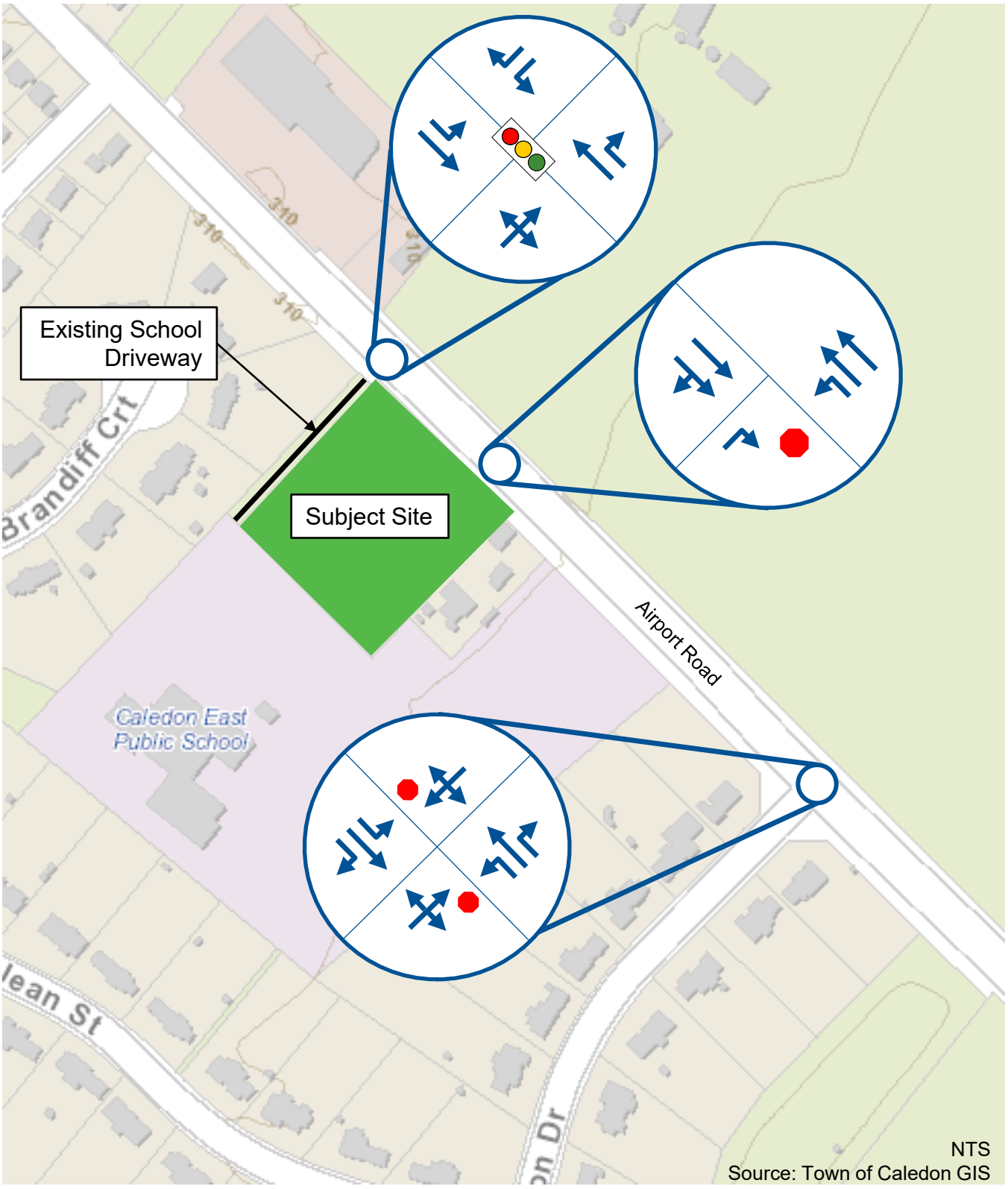
The Region of Peel is currently undertaking an Environmental Assessment (EA) for planned improvements to the Airport Road corridor from 100 metres north of King Street to 300 metres north of Huntsmill Drive[9]. At time of writing, the EA is not yet finalized.

For analysis purposes, the improvements to Airport Road within the study area were assumed to align with the improvements identified in the 15717 Airport Road TIS[10]. These include:

- Airport Road at Caledon Public School Driveway / Street 'A';
  - Traffic control signal;
  - The new Street 'A' connection with separate eastbound left-turn and right-turn lanes.
  - Northbound right-turn lane;
  - Southbound left-turn
- Airport Road at Cranston Drive / Street 'B'
  - The new Street 'B' connection, single lane approach.
  - Northbound right-turn lane;
  - Southbound left-turn.
- Two-Way Left-Turn Lanes (TWLTL) on Airport Road between the Caledon Public School Driveway and Cranston Drive.

Figure 4.5 illustrates the future lane configuration.

[9] *https://www.peelregion.ca/pw/transportation/environ-assess/airport-road-improvements.htm*
[10] *Figure 5-1 – Future Lane Configuration*, 15717 Airport Road TIS.



Future Lane Configuration

4.3 Five-Year Horizon

4.3.1 Background Traffic Operations

The study area intersection operations analyses followed the same methodology used for existing traffic conditions. The geometric and traffic control improvements outlined in **Section 4.2** are assumed to be in place. Signal timings have been optimized to help ensure reasonable levels of service.

Table 4.1 summarizes the level of service conditions. No critical movements are noted to be occurring at the study area intersections.

Appendix E contains the detailed Synchro 10 reports.

4.3.2 Total Traffic Operations

The study area intersection operations analyses followed the same methodology as the background conditions. Signal timings have been optimized to help ensure reasonable levels of service.

Table 4.2 summarizes the level of service conditions at the study area intersections. The total traffic operations are forecast to operate with similar levels of service as the background operations with no additional critical movements noted.

The site driveway is forecast to operate with delays in the LOS A to B range with v/c ratios of less than 0.05.

The 95th percentile queue length on the northbound approach of Airport Road at the Caledon East Public School Driveway intersection is forecast to extend into the operational area of the proposed site driveway during the PM peak hour. The 50th percentile queue length is not forecast to reach the site driveway, which suggests the site driveway will be blocked for less than half of the peak hour and will continue to operate with acceptable levels of service.

Appendix F contains the detailed Synchro 10 reports.

TABLE 4.1: BACKGROUND TRAFFIC OPERATIONS – 5-YEAR HORIZON

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				OVERALL
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Airport Road & Caledon East Public School Driveway	TCS	LOS	<	C	>	**C**	C	-	C	**C**	-	A	A	**A**	A	A	-	**A**	**A**
			Delay	<	22	>	**22**	26	-	22	**25**	-	3	3	**3**	3	8	-	**8**	**9**
			V/C	<	0.01	>		0.52	-	0.04		-	0.20	0.00		0.02	0.75	-		**0.71**
			95th	<	3	>		20	-	7		-	19	0		2	152	-		
	Airport Road & Cranston Drive	TWSC	LOS	<	C	>	**C**	<	D	>	**D**	B	A	A	**A**	A	A	A	**A**	
			Delay	<	22	>	**22**	<	28	>	**28**	12	0	0	**0**	8	0	0	**0**	
			V/C	<	0.11	>		<	0.34	>		0.01	0.14	0.02		0.00	0.62	0.00		
			95th	<	3	>		<	11	>		0	0	0		0	0	0		
			Storage	<	-	>		<	-	>		45	-	-		-	-	45		
			Avail.	<	-	>		<	-	>		45	-	-		-	-	45		
PM Peak Hour	Airport Road & Caledon East Public School Driveway	TCS	LOS	<	C	>	**C**	C	-	C	**C**	-	A	A	**A**	A	A	-	**A**	**A**
			Delay	<	24	>	**24**	27	-	24	**26**	-	6	2	**6**	3	3	-	**3**	**6**
			V/C	<	0.01	>		0.42	-	0.02		-	0.70	0.01		0.21	0.37	-		**0.67**
			95th	<	3	>		13	-	5		-	117	1		7	33	-		
	Airport Road & Cranston Drive	TWSC	LOS	<	C	>	**C**	<	C	>	**C**	A	A	A	**A**	B	A	A	**A**	
			Delay	<	17	>	**17**	<	20	>	**20**	9	0	0	**0**	11	0	0	**0**	
			V/C	<	0.07	>		<	0.10	>		0.02	0.56	0.08		0.01	0.29	0.01		
			95th	<	2	>		<	3	>		0	0	0		0	0	0		
			Storage	<	-	>		<	-	>		45	-	-		-	-	45		
			Avail.	<	-	>		<	-	>		45	-	-		-	-	45		

TWSC - Two-Way Stop Control
TCS - Traffic Control Signal
MOE - Measure of Effectiveness
LOS - Level of Service
V/C - Volume to Capacity Ratio
95th - 95th Percentile Queue Length
Storage - Existing Storage (m)
Avail. - Available Storage (m)
> - Shared Right-Turn Lane
< - Shared Left-Turn Lane

TABLE 4.2: TOTAL TRAFFIC OPERATIONS – 5-YEAR HORIZON

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				OVERALL
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Airport Road & Caledon East Public School Driveway	TCS	LOS	<	C	>	**C**	C	-	C	**C**	-	A	A	**A**	A	A	-	**A**	**A**
			Delay	<	22	>	**22**	26	-	23	**25**	-	3	3	**3**	3	8	-	**8**	**9**
			V/C	<	0.01	>		0.52	-	0.04		-	0.20	0.00		0.02	0.75	-		**0.71**
			95th	<	3	>		20	-	7		-	19	0		2	155	-		
	Airport Road & Cranston Drive	TWSC	LOS	<	C	>	**C**	<	D	>	**D**	B	A	A	**A**	A	A	A	**A**	
			Delay	<	22	>	**22**	<	29	>	**29**	13	0	0	**0**	8	0	0	**0**	
			V/C	<	0.11	>		<	0.35	>		0.01	0.14	0.02		0.00	0.63	0.01		
			95th	<	3	>		<	11	>		0	0	0		0	0	0		
			Storage	<	-	>		<	-	>		45	-	-		-	-	45		
			Avail.	<	-	>		<	-	>		45	-	-		-	-	45		
	Airport Road & Proposed Driveway	TWSC	LOS	-	-	B	**B**					B	A	-	**A**	-	A	A	**A**	
			Delay	-	-	13	**13**					11	0	-	**0**	-	0	0	**0**	
			V/C	-	-	0.02						0.01	0.08	-		-	0.42	0.21		
			95th	-	-	1						0	0	-		-	0	0		
PM Peak Hour	Airport Road & Caledon East Public School Driveway	TCS	LOS	<	C	>	**C**	C	-	C	**C**	-	A	A	**A**	A	A	-	**A**	**A**
			Delay	<	24	>	**24**	27	-	24	**26**	-	6	2	**6**	3	3	-	**3**	**6**
			V/C	<	0.01	>		0.42	-	0.02		-	0.70	0.01		0.21	0.37	-		**0.67**
			95th	<	3	>		13	-	5		-	117	1		7	34	-		
	Airport Road & Cranston Drive	TWSC	LOS	<	C	>	**C**	<	C	>	**C**	A	A	A	**A**	B	A	A	**A**	
			Delay	<	18	>	**18**	<	20	>	**20**	9	0	0	**0**	11	0	0	**0**	
			V/C	<	0.07	>		<	0.10	>		0.02	0.57	0.08		0.01	0.30	0.02		
			95th	<	2	>		<	3	>		0	0	0		0	0	0		
			Storage	<	-	>		<	-	>		45	-	-		-	-	45		
			Avail.	<	-	>		<	-	>		45	-	-		-	-	45		
	Airport Road & Proposed Driveway	TWSC	LOS	-	-	B	**B**					A	A	-	**A**	-	A	A	**A**	
			Delay	-	-	10	**10**					9	0	-	**0**	-	0	0	**0**	
			V/C	-	-	0.03						0.01	0.29	-		-	0.21	0.11		
			95th	-	-	1						0	0	-		-	0	0		

TWSC - Two-Way Stop Control
TCS - Traffic Control Signal
MOE - Measure of Effectiveness
LOS - Level of Service
V/C - Volume to Capacity Ratio
95th - 95th Percentile Queue Length
Storage - Existing Storage (m)
Avail. - Available Storage (m)
> - Shared Right-Turn Lane
< - Shared Left-Turn Lane

4.4 Ten-Year Horizon

4.4.1 Background Traffic Operations

The study area intersection operations analyses followed the same methodology used for five-year background conditions. The geometric and traffic control improvements outlined in **Section 4.2** are assumed to be in place. Signal timings have been optimized to help ensure reasonable levels of service.

Table 4.3 summarizes the level of service conditions. Study area intersections are generally operating with acceptable levels of service, with the exception of the westbound movement at the Airport Road and Cranston Drive intersection which is forecast to operate at LOS E with a v/c < 0.50 during the AM peak hour.

Appendix G contains the detailed Synchro 10 reports.

4.4.2 Total Traffic Operations

The study area intersection operations analyses followed the same methodology as the background conditions. Signal timings have been optimized to help ensure reasonable levels of service.

Table 4.4 summarizes the level of service conditions at the study area intersections. The total traffic operations are forecast to operate with similar levels of service as the background operations with no additional critical movements noted.

The site driveway is forecast to operate with delays in the LOS A to B range with v/c ratios of less than 0.05.

The 95th percentile queue length on the northbound approach of Airport Road at the Caledon East Public School Driveway intersection is forecast to extend into the operational area of the proposed site driveway during the PM peak hour. The 50th percentile queue length is not forecast to reach the site driveway, which suggests the site driveway will be blocked for less than half of the peak hour and will continue to operate with acceptable levels of service.

Appendix H contains the detailed Synchro 10 reports.

TABLE 4.3: BACKGROUND TRAFFIC OPERATIONS – 10-YEAR HORIZON

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				OVERALL
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Airport Road & Caledon East Public School Driveway	TCS	LOS	<	C	>	**C**	C	-	C	**C**	-	A	A	**A**	A	B	-	**B**	**B**
			Delay	<	23	>	**23**	27	-	23	**26**	-	3	3	**3**	3	11	-	**11**	**11**
			V/C	<	0.01	>		0.51	-	0.04		-	0.22	0.00		0.02	0.82	-		**0.77**
			95th	<	3	>		20	-	7		-	21	0		2	178	-		
	Airport Road & Cranston Drive	TWSC	LOS	<	D	>	**D**	<	E	>	**E**	B	A	A	**A**	A	A	A	**A**	
			Delay	<	28	>	**28**	<	42	>	**42**	14	0	0	**0**	8	0	0	**0**	
			V/C	<	0.16	>		<	0.46	>		0.01	0.15	0.02		0.00	0.68	0.00		
			95th	<	4	>		<	16	>		0	0	0		0	0	0		
			Storage	<	-	>		<	-	>		45	-	-		-	-	45		
			Avail.	<	-	>		<	-	>		45	-	-		-	-	45		
PM Peak Hour	Airport Road & Caledon East Public School Driveway	TCS	LOS	<	C	>	**C**	C	-	C	**C**	-	A	A	**A**	A	A	-	**A**	**A**
			Delay	<	25	>	**25**	29	-	25	**28**	-	7	2	**7**	3	3	-	**3**	**7**
			V/C	<	0.01	>		0.45	-	0.02		-	0.76	0.01		0.26	0.40	-		**0.73**
			95th	<	3	>		13	-	5		-	165	1		8	38	-		
	Airport Road & Cranston Drive	TWSC	LOS	<	C	>	**C**	<	C	>	**C**	A	A	A	**A**	B	A	A	**A**	
			Delay	<	19	>	**19**	<	22	>	**22**	9	0	0	**0**	11	0	0	**0**	
			V/C	<	0.09	>		<	0.11	>		0.02	0.62	0.08		0.01	0.32	0.01		
			95th	<	2	>		<	3	>		0	0	0		0	0	0		
			Storage	<	-	>		<	-	>		45	-	-		-	-	45		
			Avail.	<	-	>		<	-	>		45	-	-		-	-	45		

TWSC - Two-Way Stop Control
TCS - Traffic Control Signal
MOE - Measure of Effectiveness
LOS - Level of Service
V/C - Volume to Capacity Ratio
95th - 95th Percentile Queue Length
Storage - Existing Storage (m)
Avail. - Available Storage (m)
> - Shared Right-Turn Lane
< - Shared Left-Turn Lane

TABLE 4.4: TOTAL TRAFFIC OPERATIONS – 10-YEAR HORIZON

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				OVERALL
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Airport Road & Caledon East Public School Driveway	TCS	LOS	<	C	>	**C**	C	-	C	**C**	-	A	A	**A**	A	B	-	**B**	**B**
			Delay	<	23	>	**23**	27	-	23	**26**	-	3	3	**3**	3	11	-	**11**	**11**
			V/C	<	0.01	>		0.51	-	0.04		-	0.22	0.00		0.02	0.83	-		**0.77**
			95th	<	3	>		20	-	7		-	21	0		2	180	-		
	Airport Road & Cranston Drive	TWSC	LOS	<	D	>	**D**	<	E	>	**E**	C	A	A	**A**	A	A	A	**A**	
			Delay	<	29	>	**29**	<	46	>	**46**	15	0	0	**0**	8	0	0	**0**	
			V/C	<	0.17	>		<	0.48	>		0.01	0.16	0.02		0.00	0.69	0.01		
			95th	<	4	>		<	17	>		0	0	0		0	0	0		
			Storage	<	-	>		<	-	>		45	-	-		-	-	45		
			Avail.	<	-	>		<	-	>		45	-	-		-	-	45		
	Airport Road & Proposed Driveway	TWSC	LOS	-	-	B	**B**					B	A	-	**A**	-	A	A	**A**	
			Delay	-	-	13	**13**					11	0	-	**0**	-	0	0	**0**	
			V/C	-	-	0.02						0.02	0.08	-		-	0.46	0.23		
			95th	-	-	1						0	0	-		-	0	0		
PM Peak Hour	Airport Road & Caledon East Public School Driveway	TCS	LOS	<	C	>	**C**	C	-	C	**C**	-	A	A	**A**	A	A	-	**A**	**A**
			Delay	<	25	>	**25**	29	-	25	**28**	-	7	2	**7**	3	3	-	**3**	**7**
			V/C	<	0.01	>		0.45	-	0.02		-	0.76	0.01		0.26	0.40	-		**0.73**
			95th	<	3	>		13	-	5		-	165	1		8	38	-		
	Airport Road & Cranston Drive	TWSC	LOS	<	C	>	**C**	<	C	>	**C**	A	A	A	**A**	B	A	A	**A**	
			Delay	<	20	>	**20**	<	22	>	**22**	9	0	0	**0**	11	0	0	**0**	
			V/C	<	0.10	>		<	0.11	>		0.02	0.62	0.08		0.01	0.33	0.02		
			95th	<	2	>		<	3	>		0	0	0		0	0	0		
			Storage	<	-	>		<	-	>		45	-	-		-	-	45		
			Avail.	<	-	>		<	-	>		45	-	-		-	-	45		
	Airport Road & Proposed Driveway	TWSC	LOS	-	-	B	**B**					A	A	-	**A**	-	A	A	**A**	
			Delay	-	-	10	**10**					9	0	-	**0**	-	0	0	**0**	
			V/C	-	-	0.03						0.01	0.32	-		-	0.23	0.12		
			95th	-	-	1						0	0	-		-	0	0		

TWSC - Two-Way Stop Control
TCS - Traffic Control Signal
MOE - Measure of Effectiveness
LOS - Level of Service
V/C - Volume to Capacity Ratio
95th - 95th Percentile Queue Length
Storage - Existing Storage (m)
Avail. - Available Storage (m)
> - Shared Right-Turn Lane
< - Shared Left-Turn Lane

5 Remedial Measures

5.1 Signal Warrants

The intersection of Airport Road and Cranston Drive/Street B was assessed using the Ontario Traffic Manual (OTM Book 12 – Justification 7) signal warrant[11] procedures. **Appendix I** contains the warrant analysis. **Table 5.1** summarizes the warrant analysis.

TABLE 5.1: OTM SIGNAL WARRANT ANALYSIS – SUMMARY

Intersection	Warrant	Percent Fulfilled	Overall Percentage
Ten-Year Total Traffic Airport Rd and Cranston Dr / Street 'B'	1A	120%	**24%**
	1B	24%	
	2A	114%	**36%**
	2B	36%	

Based on the warrant analysis, the criteria necessary to warrant the installation of a traffic control signal is technically not satisfied. No changes to the existing form of traffic control is recommended. It is noted that the Airport Road EA may recommend changes in intersection traffic control that is not discussed in this study.

[11] *Ontario Traffic Manual Book 12*, Ministry of Transportation of Ontario, July 2001.

6 Transportation Demand Management

Transportation Demand Management (TDM) programs consider how choice of travel mode is affected by land use patterns, development design, parking availability, parking cost, and the relative cost, convenience, and availability of alternative modes of travel.

Various TDM strategies are used to influence those factors so that the alternatives to single occupant vehicle travel, such as transit or carpooling, are more accessible.

6.1 Proposed TDM Measures

The site provides direct sidewalk connections to Airport Road and the Caledon Public School East Driveway. Sidewalks are provided along the perimeter of the proposed building which also provides access to the internal courtyard area.

6.2 Potential TDM Measures

To promote sustainable modes of travel and to further mitigate the site's transportation impacts, the following TDM measures could be considered:

- **Walking** - Pedestrian amenities including benches, lighting and weather protection be considered for the site's landscaping plan. The on-site pedestrian realm should be designed to provide a safe and attractive environment for employees, residents, and visitors to the site;
- **Cycling** - Bicycle parking could be provided in convenient and readily accessible locations near the main entrances. End of trip amenities such as secure bike parking and shower/change facilities for employees would enhance the appeal for cycling to work; and
- **Carpool** - Consider providing preferential carpool parking spaces for employees.

The TDM program should be monitored and adjust as needed by the property manager or an assigned TDM coordinator.

7 Conclusions and Recommendations

7.1 Conclusions

The main findings and conclusions of this study are as follows:

- **Existing Traffic**: The study area intersections are operating with acceptable levels of service during the weekday AM and PM peak hours. No critical movements are occurring at the study area intersections.
- **Planned Improvements**: The Region of Peel is currently undertaking an Environmental Assessment (EA) for Airport Road. At the time of writing, the EA is not yet finalized. For analysis purposes, geometric and traffic control improvements are assumed to be in place for the study area intersections.
- **Trip Generation**: The site's net trip generation is estimated to be approximately 29 AM peak hour vehicle trips and 39 PM peak hour vehicle trips. Vehicle access to the site is proposed by a driveway connection to Airport Road and left-turns out of the driveway are assumed to be restricted by a raised centre median on Airport Road.
- **Heavy Vehicle Circulation**: Pending the final lane configuration from the Airport Road EA, modifications to the curb radii and/or entrance width may be required to accommodate the design vehicle to enter and exit the site without impacting the opposing travel lane.

  The reversing maneuvers into the site's loading zone should ideally be assisted by a traffic control person.
- **Background Traffic**: The study area intersections are generally operating with acceptable levels of service, with the exception of the westbound movement at the Airport Road and Cranston Drive intersection which is forecast to operate at LOS E with a v/c < 0.50 during the AM peak hour in the 10-year horizon.
- **Total Traffic**: The study area intersections are forecast to operate with similar levels of service as the background traffic conditions. No additional critical movements are noted at the study area intersections over background conditions. The site driveway is forecast to operate with delays in the LOS A to B range with v/c ratios of less than 0.05.
- **Remedial Measures**: No changes to the existing lane configurations are warranted or required. It is noted that the

Airport Road EA may recommend changes in intersection traffic control that is not discussed in this study.

- **Transportation Demand Management**: Enhancements to the on-site pedestrian realm, inclusion of bicycle parking and preferential carpool parking will help promote sustainable modes of travel and further mitigate the site's transportation impacts.

7.2 Recommendations

Based on the findings of this study, it is recommended that:

- The Region of Peel monitor the outcome of the Airport Road EA to determine if modifications to the curb radii and/or entrance width are required to the proposed driveway; and
- The site operator manages deliveries and waste collection to minimize on-site disruptions. Reversing maneuvers into the site's loading zone should ideally be assisted by a traffic control person.

Appendix A

Pre-Study Consultation

Stefan Hajgato

From: Kol, Rani <rani.kol@peelregion.ca>
Sent: February 14, 2020 10:03 AM
To: Stefan Hajgato
Cc: Carrick, Sean; Hamdani, Hashim; Casey Blakely; Scott Catton
Subject: Traffic Engineering Comments - Terms of Reference - Wyndham Retirement Home - 15728 Airport Road - our file D-00728880W
Attachments: FW: Seniors site - 15728 Airport Road

Hi Stefan,

The Traffic Engineering section has reviewed the proposed Terms of Reference for 15728 Airport Road and wishes to provide the following responses in red;

==========

We've been retained to complete a Transportation Impact Study (TIS) for a proposed Retirement Residence located at 15728 Airport Road in Caledon. The preliminary development plan (attached) includes 144 beds in 140 units with an expected trip generation of approximately 27 AM and 37 PM peak hour vehicle trips. We are proposing the following scope:

- **Study Area:**
  - Airport Road (RR7) & Cranston Drive;
  - Airport Road (RR7) & Caledon East Public School Driveway; and
  - One all-moves access onto Airport Road (RR7). Previous discussions took place regarding the type of access that would be permitted and considered to the lands. See attached correspondence which outlines the details. It has been noted in the past that the Region would support a right in/right out access to the site. Consideration for a left-in movement can be made, subject to the surrounding existing and proposed developments being incorporated into the analysis.
  - Proposed residential development at 15717 Airport Road: Please work with the Developer with regards to incorporating the access design of the northerly restricted access to their site into your proposed study analysis.
- **Horizon Years:**
  - Existing (Year 2020); and
  - Five years from Build-Out (date TBD).
  - Ten years from Build-Out
- **Analysis Periods**: Weekday AM & PM peak hours.
- **Trip Generation:** ITE LUC 254 (Assisted Living)
- **Background Growth:**
  - General Background Growth Rate: 2.0% compounded per annum. The TIS for the neighboring development located at 15717 Airport Road (attached) indicated a 2% growth rate was used to forecast 2021-2031 background conditions in the Airport Road EA; and we support this growth rate.
  - Other Approved and Pending Developments: 15717 Airport Road site generated trips.
- **Trip Distribution:** 2016 TTS Survey, which is consistent with the 15717 Airport Road TIS.

Could you please provide: The Airport Road EA for use in determining planned geometric improvements and confirming the background growth rate. Please contact Sonya Bubas (ext. 7801, sonya.bubas@peelregion.ca), the Project Manager for the Airport Road EA (#16-4360) to obtain the most up to date material.

==========

Also, for your use please see the below standard Terms of Reference outline;

Full Description

The study must provide a full description of the proposed development. This includes, but is not limited to:

- 1. Municipal address.
- 2. Existing land uses that are permitted and use provisions in an Official Plan Amendment, Zoning By-law, etc.
- 3. Proposed land uses.
- 4. Floor space, including a summary of each type of use and/or number of residential units (where applicable).
- 5. Anticipated date of occupancy.
- 6. Approximate hour of operation.
- 7. Planned phasing of the development.
- 8. Nearby Regional intersections and access to adjacent developments, including type of control (signalized or unsignalized).
- 9. Number of lanes, width and configuration:
  - The requirements for auxiliary turn lanes shall be reviewed. Adequate spacing must be provided between access points in accordance with the Region of Peel's current Controlled Access By-law, as amended. All design standards must be in accordance with those outlined in the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads and the Ministry of Transportation, Ontario (MTO) Geometric Design Standards for Ontario Highways.
- 10. Proposed access points and type of access:
  - When determining the location of an access, consideration should be given to how the access will affect the surrounding road network, area residents and area businesses. All proposed site access points on Regional roads should be evaluated for capacity, safety and adequacy of queue storage capacity. Approval of the proposed access will be evaluated using the Region of Peel's current Controlled Access By-law, as amended and sound engineering judgement.
- 11. Nearby transit facilities/stops.
- 12. Bike paths.
- 13. A combination of maps and other documentation, which will identify all relevant information.

Traffic Volume Analysis

A traffic volume analysis must include:

- 1. Horizon years of 5 and 10 and 20 depending on full build-out, or as advised by Regional staff.
- 2. AM and PM peak periods at a minimum. Commercial development requires Saturday analysis - note that the analysis of turning movement counts (TMCs) for a Saturday of a holiday weekend will not be accepted except when directed by Regional staff.
- 3. Background, site-generated and total traffic volumes.
- 4. "Worst case" combination of site-related and background traffic.
  - Please contact Roman Kuczynski, Supervisor, Transportation Planning at extension 4381 to obtain the Growth Rates along Airport Road;
  - Please contact Damian Jamroz, Supervisor, Traffic Operations at extension 7856 for most recent average annual daily traffic (AADT) and TMCs required for the study; and
  - Please contact Rick Laing, Supervisor, Traffic Signals and Streetlighting at extension 7859 for the most up-to-date Traffic Signal Timing Parameters and ensure that the information includes the appropriate walk/don't walk splits, recall modes and offsets.
  - Please contact Development Services Planning staff to obtain details on surrounding developments in the area that would affect traffic capacity in the planning horizon year(s).

Trip Generation and Distribution

A trip distribution and trip generation analysis must include:

- 1. Trip generation surveys from similar developments in the Region which have similar operating characteristics as the proposed development.

- 2. Latest edition of the Institute of Transportation Engineers (ITE) trip generation rates are acceptable (use the greater of the average rate method or the fitted line equation).
- 3. A table summarizing your findings.
- 4. Trip distribution assumptions must be supported by one or more of the following:
  - Transportation Tomorrow Survey
  - Origin-destination surveys
  - Comprehensive travel surveys
  - Existing/anticipated travel patterns
  - Output from the Region of Peel Travel Demand Forecasting Model
  - Market studies

Capacity Analysis

The report must include capacity analysis completed in Synchro (version 7.0 preferred, but version 8.0 will be accepted as per the Highway Capacity Manual (HCM) 2000 standards and not the new HCM 2010 module). Unsignalized analysis can be completed in either Synchro or CCG Intercalc (2008 version at a minimum).

The following parameters must be used in either software:

- Saturation flow rate of 1,900 vehicles per hour
- 3.7 metre lane width on Regional roads; and
- 3.5 metre lane width on the intersecting street(s) and/or access(es)

For Synchro analysis, see Regional Guidelines for Using Synchro 7.0 for other individual parameters. For CCG Intercalc analysis, saturation adjustments should include a complete breakdown of vehicle types by percentage (based on available data) and is to be documented in a table in the report.

The analysis must also include the identification of signalized intersections, unsignalized intersections and unsignalized accesses where:

- 1. Volume/capacity (V/C) ratios for overall intersection operations, through movements or shared through/turning movements increased to 0.90 or above.
- 2. V/C ratios for exclusive movements that will exceed 1.00.
- 3. 95th percentile queue lengths for individual movements and do they exceed available lane storage.

All intersections that are modelled as signalized intersections (other than existing signalized intersections) must be supported by an Ontario Traffic Manual (OTM) Book 12 traffic control signals warrant, each one required to be included in the appendix of the TIS.

If traffic control signals are found to be warranted at a particular intersection in an earlier horizon year (e.g. 5 year horizon), a warrant is not required for the subsequent horizon year (e.g. 10 year horizon). The horizon year in which a particular intersection is warranted for traffic control signals must be documented in the text of the TIS. A roundabout feasibility analysis may also be required at the direction of Regional staff.

In Synchro unsignalized intersection analysis, if an unacceptable LOS ("E" or higher) and v/c ratio results on the minor approach in existing conditions analysis, the consultant shall conduct a gap study to establish an average value for gaps accepted (in seconds) and override the resultant value for the HCM-calculated critical gap in the Signing window.

For horizon year analysis with an existing two- lane road, if the road is forecasted to be widened to four lanes by the respective horizon year, the consultant shall override the resultant value for the HCM-calculated critical gap in the Signing window by inputting recommended values for critical gap of left-turning and right-turning movements onto a four-lane road as identified in the Ministry of Transportation, Ontario (MTO) Geometric Design Standards for Ontario Highways.

Sight Distance Evaluation

A review and analysis of the sight distance availability for all proposed accesses or roads is required. The sight distance requirements must be determined based on the most current standards and guidelines used by the Region of Peel. Available sight distance should be taken from actual field measurements to ensure accurate conditions.

Assess the sightlines based on the Region of Peel's standard practice, eye height and object height of 1.05 metres and 0.38 metres above road surface, respectively. The Region requires the access to meet the following sightline requirements:

1. Stopping sight distance; and
2. Turning sight distance.

Sight distances must be in accordance with the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads methodology. Folded full size and to scale drawings of the sightline analysis are required for our review and comment.

Safety

Identification of potential safety or operational issues must be reviewed that are associated with:

- weaving
- merging
- corner clearances
- sight distances
- vehicle/pedestrian conflicts
- traffic infiltration
- access conflicts
- cyclist movements
- heavy truck movement conflicts

In addition, should the development be determined by Regional staff to be adjacent to a Regional intersection or road segment with significant collision history, most recent five-year collision data for the intersection(s) and/or road segment (s) must be reviewed and an assessment of the impact of the proposed development provided. Such information may be helpful to minimize any additional problems through the design or location of access points along the subject Regional road(s). Please contact William Toy, Supervisor, Traffic Safety at extension 7869 for collision information.

Functional Design

A functional design detailing a recommended access configuration and/or proposed intersection geometrics may be required at the discretion of Regional staff.

Final Report

The following study structure is suggested:

- 1. Site/development description
- 2. Study area, including map
- 3. Existing conditions - exhibit required
- 4. Analysis periods
- 5. Background, existing, future background and future total traffic demand - exhibit required
- 6. Site generated traffic - exhibit required
- 7. Improvement alternatives
- 8. Traffic impacts for future background and total traffic with and without mitigation (tabular summaries)
- 9. Access considerations
- 10. Recommendations

The TIS should consist of a main document, supplemented by technical appendices containing detailed analyses as required.

The Region of Peel will require 1 copy to be in electronic format and 1 hard copy complete with the appropriate supporting documentation. This shall be submitted to the Traffic Engineering section of Public Works for our review, comment and approval.

All information submitted to Regional staff in connection with any Traffic Impact Study will be considered to be in the public domain.

Appendix

The appendix must include:

- 1. Turning movement counts (include date counted) with breakdown of heavy vehicle counts;
- 2. Signal timing plan(s) for signalized intersections; and
- 3. For submissions using Synchro, generated Synchro reports showing HCM 2000 results and queuing, as well as electronic Synchro files (CD copy or sent concurrently with the TIS via email); or
- 4. For submissions using CCG Intercalc, a CCG Intercalc summary report.

Study Updates

From the date of submission, the Traffic Impact Study will have a "shelf life" of 5 years.
Where timing of subsequent development approvals exceeds 5 years, a new study will be required at the discretion of the Region of Peel.

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Should you have any questions or concerns please do not hesitate to contact me.

Regards,

Rani Kol
Specialist
Traffic Development & Permits
Region of Peel
10 Peel Centre Drive, Suite B, 4th Floor
Brampton, ON L6T 4B9
(905) 791-7800 ext. 7858

Region of Peel
working with you

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From: Hamdani, Hashim <hashimali.hamdani@peelregion.ca>
Sent: February 13, 2020 2:18 PM
To: Stefan Hajgato <shajgato@ptsl.com>; Carrick, Sean <sean.carrick@peelregion.ca>; casey.blakely@caledon.ca
Cc: Scott Catton <scatton@ptsl.com>; Kol, Rani <rani.kol@peelregion.ca>
Subject: RE: (200052: Wyndham Retirement Home) Terms of Reference

Hi Stefan,

Please be advised that Rani from our group will review the TOR and get back to you soon.

Should you have any questions, please feel free to contact us.

Thanks,

Hashim Ali Hamdani

Supervisor, Traffic Development & Permits
Traffic Engineering
Region of Peel
10 Peel Centre Drive Suite B, 4th Floor
Brampton, ON L6T 4B9
905 791-7800 Ext. 7852

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From: Stefan Hajgato <shajgato@ptsl.com>
Sent: February 13, 2020 2:03 PM
To: Carrick, Sean <sean.carrick@peelregion.ca>; casey.blakely@caledon.ca
Cc: Scott Catton <scatton@ptsl.com>; Hamdani, Hashim <hashimali.hamdani@peelregion.ca>; Kol, Rani <rani.kol@peelregion.ca>
Subject: RE: (200052: Wyndham Retirement Home) Terms of Reference

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Thanks for the update Sean.

We spoke with the client and they have not made a planning application to the Town.

Regards,

Stefan Hajgato, E.I.T.
Transportation Consultant

Paradigm Transportation Solutions Limited
p: 519.896.3163 x209

From: Carrick, Sean <sean.carrick@peelregion.ca>
Sent: February 13, 2020 9:42 AM
To: Stefan Hajgato <shajgato@ptsl.com>; casey.blakely@caledon.ca
Cc: Scott Catton <scatton@ptsl.com>; Hamdani, Hashim <hashimali.hamdani@peelregion.ca>; Kol, Rani <rani.kol@peelregion.ca>
Subject: RE: (200052: Wyndham Retirement Home) Terms of Reference

Hi Stefan,

I just got back to the office from vacation and am catching up on emails. I've just passed this onto Hashim's team to review and provide comments on the TOR. For our records, has a planning application been made to the Town?

Thanks,

Sean

Sean Carrick, C.E.T.
Manager
Traffic Engineering
Region of Peel
10 Peel Centre Drive Suite B, 4th Floor
Brampton, ON L6T 4B9
905 791-7800 Ext. 7868

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From: Stefan Hajgato <shajgato@ptsl.com>
Sent: February 11, 2020 9:06 AM
To: Carrick, Sean <sean.carrick@peelregion.ca>; casey.blakely@caledon.ca
Cc: Scott Catton <scatton@ptsl.com>
Subject: RE: (200052: Wyndham Retirement Home) Terms of Reference

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Hi Sean and Casey,

Just checking in. Have you had a chance to review our proposed scope of work for the Wyndham Retirement Home TIS? If not, can you indicate to us when we might expect to receive comment so we can advise our client?

Thanks,

Stefan Hajgato, E.I.T.
Transportation Consultant

Paradigm Transportation Solutions Limited
p: 519.896.3163 x209

From: Stefan Hajgato
Sent: February 3, 2020 9:35 AM
To: Carrick, Sean <sean.carrick@peelregion.ca>; mary.nordstrom@caledon.ca; casey.blakely@caledon.ca
Cc: Scott Catton <scatton@ptsl.com>
Subject: (200052: Wyndham Retirement Home) Terms of Reference

Good morning Sean, Mary, and Casey,

We've been retained to complete a Transportation Impact Study (TIS) for a proposed Retirement Residence located at 15728 Airport Road in Caledon. The preliminary development plan (attached) includes 144 beds in 140 units with an expected trip generation of approximately 27 AM and 37 PM peak hour vehicle trips. We are proposing the following scope:

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  - Other Approved and Pending Developments: 15717 Airport Road site generated trips.
- **Trip Distribution:** 2016 TTS Survey, which is consistent with the 15717 Airport Road TIS.

Could you please provide: The Airport Road EA for use in determining planned geometric improvements and confirming the background growth rate.

Please let me know if you have any questions or comments.

Best regards,

Stefan Hajgato, E.I.T.
Transportation Consultant

Paradigm Transportation Solutions Limited
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Appendix B

Existing Data

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Airport Road & Caledon East Public School Driveway
Site Code:
Start Date: 02/05/2020

Turning Movement Data

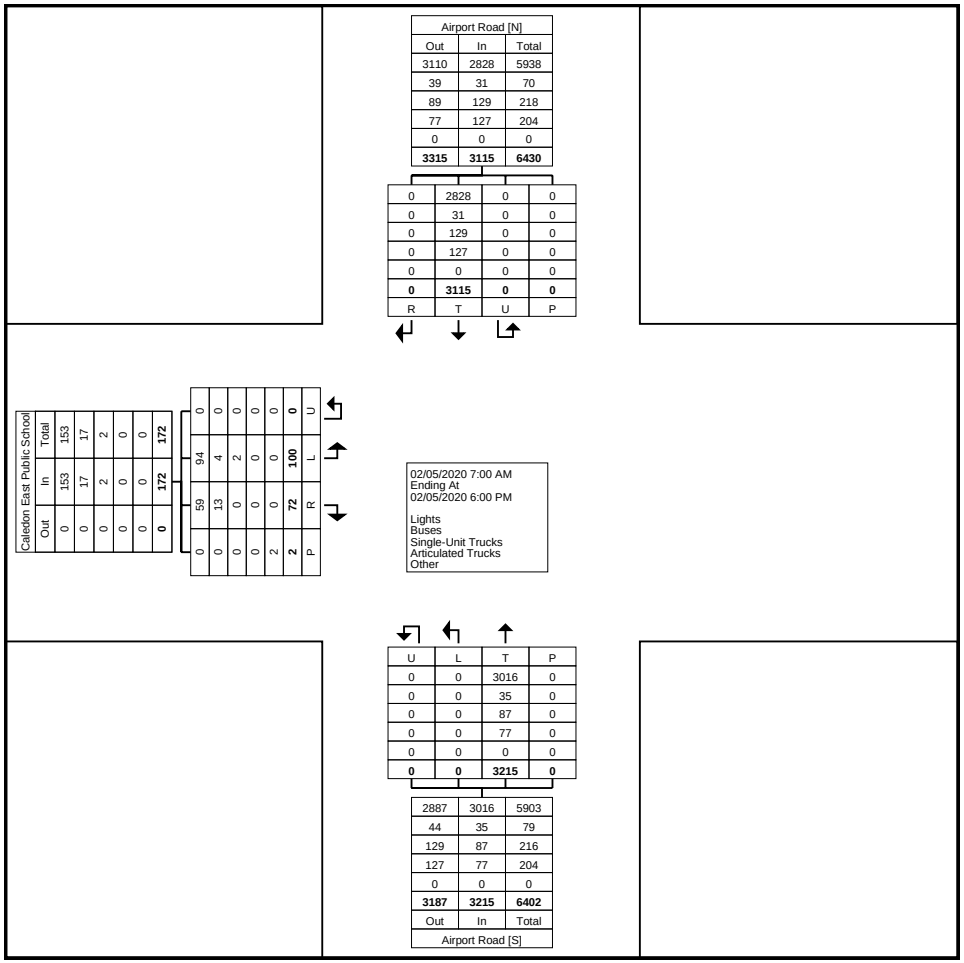
Start Time	Caledon East Public School Driveway Eastbound					Airport Road Northbound					Airport Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
7:00 AM	1	2	0	0	3	0	36	0	0	36	172	0	0	0	172	211
7:15 AM	0	0	0	0	0	0	45	0	0	45	202	0	0	0	202	247
7:30 AM	1	1	0	0	2	0	47	0	0	47	215	0	0	0	215	264
7:45 AM	4	5	0	0	9	0	63	0	0	63	181	0	0	0	181	253
Hourly Total	6	8	0	0	14	0	191	0	0	191	770	0	0	0	770	975
8:00 AM	1	2	0	0	3	0	66	0	0	66	136	0	0	0	136	205
8:15 AM	0	7	0	0	7	0	54	0	0	54	143	0	0	0	143	204
8:30 AM	1	0	0	0	1	0	67	0	0	67	112	0	0	0	112	180
8:45 AM	8	10	0	0	18	0	70	0	0	70	112	0	0	0	112	200
Hourly Total	10	19	0	0	29	0	257	0	0	257	503	0	0	0	503	789
9:00 AM	14	16	0	0	30	0	67	0	0	67	91	0	0	0	91	188
9:15 AM	2	1	0	0	3	0	61	0	0	61	100	0	0	0	100	164
9:30 AM	0	0	0	0	0	0	67	0	0	67	75	0	0	0	75	142
9:45 AM	1	0	0	0	1	0	46	0	0	46	88	0	0	0	88	135
Hourly Total	17	17	0	0	34	0	241	0	0	241	354	0	0	0	354	629
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:30 AM	1	0	0	0	1	0	47	0	0	47	66	0	0	0	66	114
11:45 AM	1	0	0	0	1	0	59	0	0	59	72	0	0	0	72	132
Hourly Total	2	0	0	0	2	0	106	0	0	106	138	0	0	0	138	246
12:00 PM	1	0	0	0	1	0	67	0	0	67	64	0	0	0	64	132
12:15 PM	1	0	0	0	1	0	68	0	0	68	60	0	0	0	60	129
12:30 PM	5	1	0	0	6	0	50	0	0	50	55	0	0	0	55	111
12:45 PM	1	0	0	0	1	0	77	0	0	77	68	0	0	0	68	146
Hourly Total	8	1	0	0	9	0	262	0	0	262	247	0	0	0	247	518
1:00 PM	1	0	0	0	1	0	54	0	0	54	56	0	0	0	56	111
1:15 PM	0	0	0	0	0	0	62	0	0	62	63	0	0	0	63	125
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	1	0	0	0	1	0	116	0	0	116	119	0	0	0	119	236
3:00 PM	1	1	0	0	2	0	124	0	0	124	76	0	0	0	76	202
3:15 PM	0	0	0	0	0	0	146	0	0	146	76	0	0	0	76	222
3:30 PM	21	12	0	1	33	0	154	0	0	154	76	0	0	0	76	263
3:45 PM	13	8	0	1	21	0	149	0	0	149	81	0	0	0	81	251
Hourly Total	35	21	0	2	56	0	573	0	0	573	309	0	0	0	309	938
4:00 PM	1	1	0	0	2	0	163	0	0	163	80	0	0	0	80	245
4:15 PM	5	1	0	0	6	0	205	0	0	205	110	0	0	0	110	321
4:30 PM	0	0	0	0	0	0	173	0	0	173	107	0	0	0	107	280

4:45 PM	3	1	0	0	4	0	196	0	0	196	73	0	0	0	73	273
Hourly Total	9	3	0	0	12	0	737	0	0	737	370	0	0	0	370	1119
5:00 PM	5	0	0	0	5	0	197	0	0	197	81	0	0	0	81	283
5:15 PM	2	0	0	0	2	0	196	0	0	196	83	0	0	0	83	281
5:30 PM	2	0	0	0	2	0	163	0	0	163	62	0	0	0	62	227
5:45 PM	3	3	0	0	6	0	176	0	0	176	79	0	0	0	79	261
Hourly Total	12	3	0	0	15	0	732	0	0	732	305	0	0	0	305	1052
Grand Total	100	72	0	2	172	0	3215	0	0	3215	3115	0	0	0	3115	6502
Approach %	58.1	41.9	0.0	-	-	0.0	100.0	0.0	-	-	100.0	0.0	0.0	-	-	-
Total %	1.5	1.1	0.0	-	2.6	0.0	49.4	0.0	-	49.4	47.9	0.0	0.0	-	47.9	-
Lights	94	59	0	-	153	0	3016	0	-	3016	2828	0	0	-	2828	5997
% Lights	94.0	81.9	-	-	89.0	-	93.8	-	-	93.8	90.8	-	-	-	90.8	92.2
Buses	4	13	0	-	17	0	35	0	-	35	31	0	0	-	31	83
% Buses	4.0	18.1	-	-	9.9	-	1.1	-	-	1.1	1.0	-	-	-	1.0	1.3
Single-Unit Trucks	2	0	0	-	2	0	87	0	-	87	129	0	0	-	129	218
% Single-Unit Trucks	2.0	0.0	-	-	1.2	-	2.7	-	-	2.7	4.1	-	-	-	4.1	3.4
Articulated Trucks	0	0	0	-	0	0	77	0	-	77	127	0	0	-	127	204
% Articulated Trucks	0.0	0.0	-	-	0.0	-	2.4	-	-	2.4	4.1	-	-	-	4.1	3.1
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	-	0.0	-	-	0.0	0.0	-	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	2	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Airport Road & Caledon East Public School Driveway
Site Code:
Start Date: 02/05/2020



Turning Movement Data Plot

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Airport Road & Caledon East Public School Driveway
Site Code:
Start Date: 02/05/2020

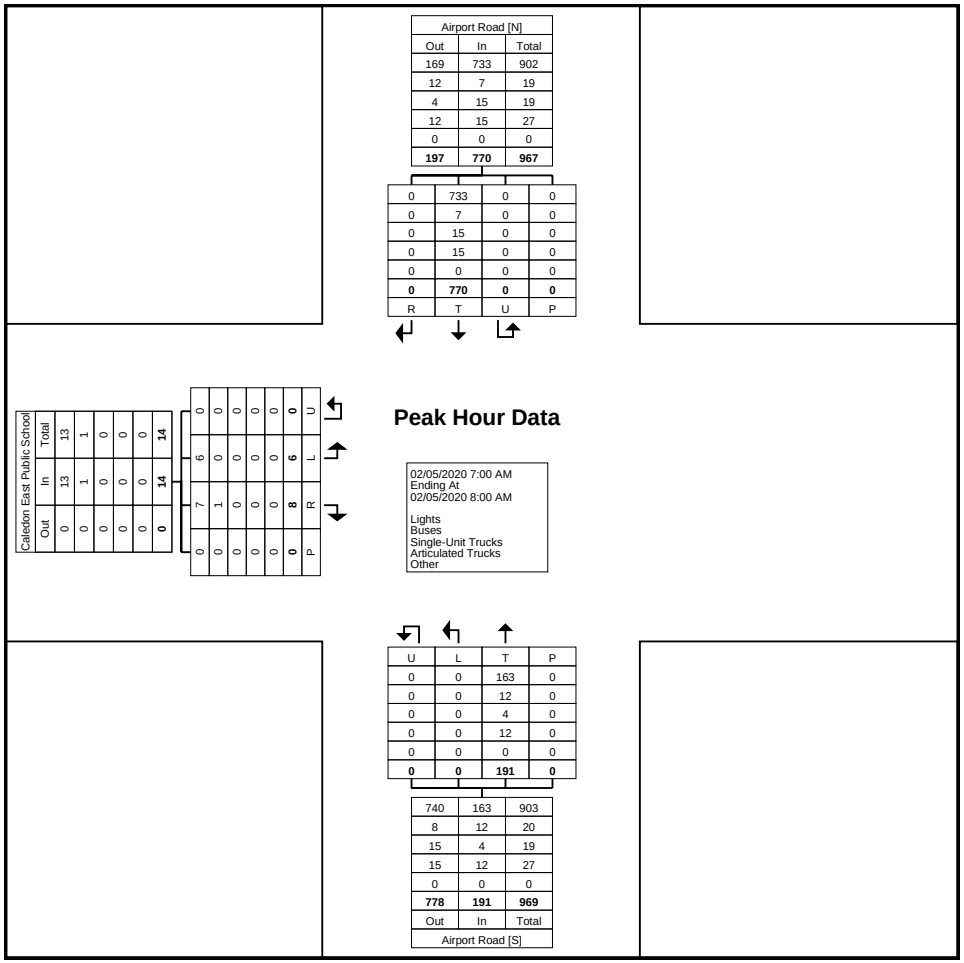
Turning Movement Peak Hour Data (7:00 AM)

Start Time	Caledon East Public School Driveway Eastbound					Airport Road Northbound					Airport Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
7:00 AM	1	2	0	0	3	0	36	0	0	36	172	0	0	0	172	211
7:15 AM	0	0	0	0	0	0	45	0	0	45	202	0	0	0	202	247
7:30 AM	1	1	0	0	2	0	47	0	0	47	215	0	0	0	215	264
7:45 AM	4	5	0	0	9	0	63	0	0	63	181	0	0	0	181	253
Total	6	8	0	0	14	0	191	0	0	191	770	0	0	0	770	975
Approach %	42.9	57.1	0.0	-	-	0.0	100.0	0.0	-	-	100.0	0.0	0.0	-	-	-
Total %	0.6	0.8	0.0	-	1.4	0.0	19.6	0.0	-	19.6	79.0	0.0	0.0	-	79.0	-
PHF	0.375	0.400	0.000	-	0.389	0.000	0.758	0.000	-	0.758	0.895	0.000	0.000	-	0.895	0.923
Lights	6	7	0	-	13	0	163	0	-	163	733	0	0	-	733	909
% Lights	100.0	87.5	-	-	92.9	-	85.3	-	-	85.3	95.2	-	-	-	95.2	93.2
Buses	0	1	0	-	1	0	12	0	-	12	7	0	0	-	7	20
% Buses	0.0	12.5	-	-	7.1	-	6.3	-	-	6.3	0.9	-	-	-	0.9	2.1
Single-Unit Trucks	0	0	0	-	0	0	4	0	-	4	15	0	0	-	15	19
% Single-Unit Trucks	0.0	0.0	-	-	0.0	-	2.1	-	-	2.1	1.9	-	-	-	1.9	1.9
Articulated Trucks	0	0	0	-	0	0	12	0	-	12	15	0	0	-	15	27
% Articulated Trucks	0.0	0.0	-	-	0.0	-	6.3	-	-	6.3	1.9	-	-	-	1.9	2.8
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	-	0.0	-	-	0.0	0.0	-	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Airport Road & Caledon East Public School Driveway
Site Code:
Start Date: 02/05/2020



Turning Movement Peak Hour Data Plot (7:00 AM)

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Airport Road & Caledon East Public School Driveway
Site Code:
Start Date: 02/05/2020

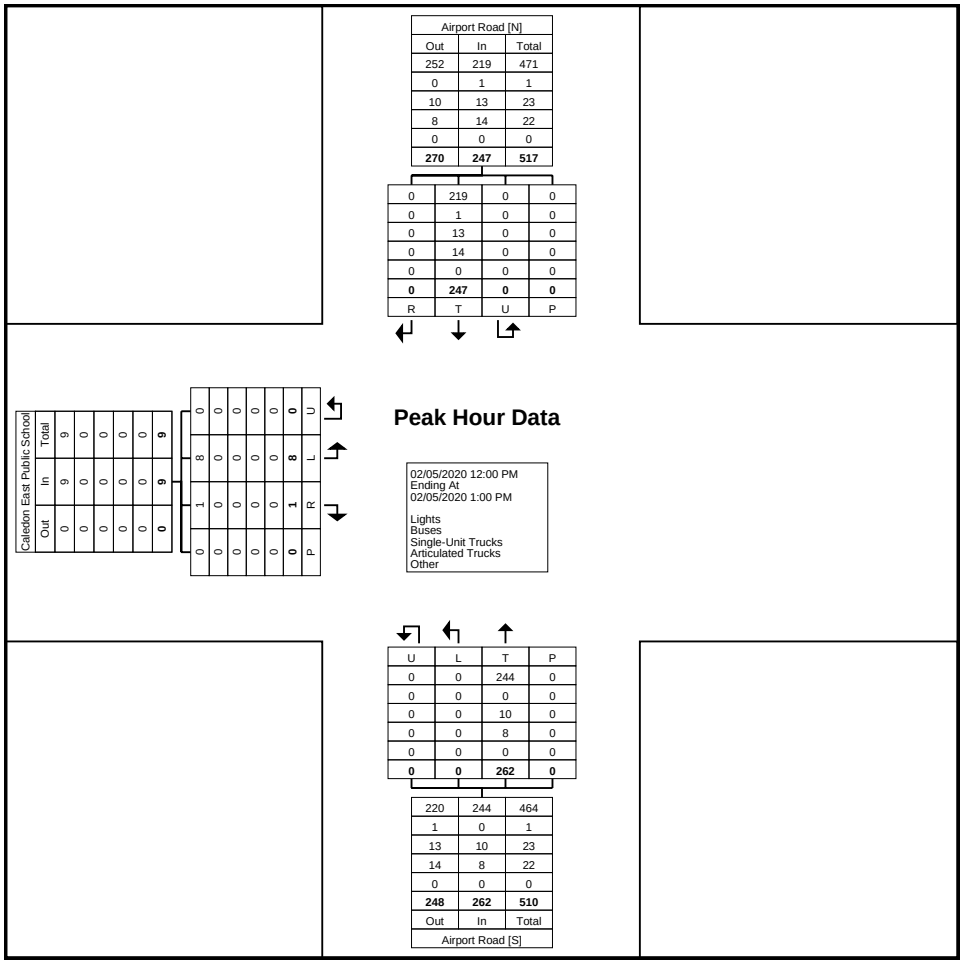
Turning Movement Peak Hour Data (12:00 PM)

Start Time	Caledon East Public School Driveway Eastbound					Airport Road Northbound					Airport Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
12:00 PM	1	0	0	0	1	0	67	0	0	67	64	0	0	0	64	132
12:15 PM	1	0	0	0	1	0	68	0	0	68	60	0	0	0	60	129
12:30 PM	5	1	0	0	6	0	50	0	0	50	55	0	0	0	55	111
12:45 PM	1	0	0	0	1	0	77	0	0	77	68	0	0	0	68	146
Total	8	1	0	0	9	0	262	0	0	262	247	0	0	0	247	518
Approach %	88.9	11.1	0.0	-	-	0.0	100.0	0.0	-	-	100.0	0.0	0.0	-	-	-
Total %	1.5	0.2	0.0	-	1.7	0.0	50.6	0.0	-	50.6	47.7	0.0	0.0	-	47.7	-
PHF	0.400	0.250	0.000	-	0.375	0.000	0.851	0.000	-	0.851	0.908	0.000	0.000	-	0.908	0.887
Lights	8	1	0	-	9	0	244	0	-	244	219	0	0	-	219	472
% Lights	100.0	100.0	-	-	100.0	-	93.1	-	-	93.1	88.7	-	-	-	88.7	91.1
Buses	0	0	0	-	0	0	0	0	-	0	1	0	0	-	1	1
% Buses	0.0	0.0	-	-	0.0	-	0.0	-	-	0.0	0.4	-	-	-	0.4	0.2
Single-Unit Trucks	0	0	0	-	0	0	10	0	-	10	13	0	0	-	13	23
% Single-Unit Trucks	0.0	0.0	-	-	0.0	-	3.8	-	-	3.8	5.3	-	-	-	5.3	4.4
Articulated Trucks	0	0	0	-	0	0	8	0	-	8	14	0	0	-	14	22
% Articulated Trucks	0.0	0.0	-	-	0.0	-	3.1	-	-	3.1	5.7	-	-	-	5.7	4.2
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	-	0.0	-	-	0.0	0.0	-	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Airport Road & Caledon East Public School Driveway
Site Code:
Start Date: 02/05/2020



Turning Movement Peak Hour Data Plot (12:00 PM)

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Airport Road & Caledon East Public School Driveway
Site Code:
Start Date: 02/05/2020

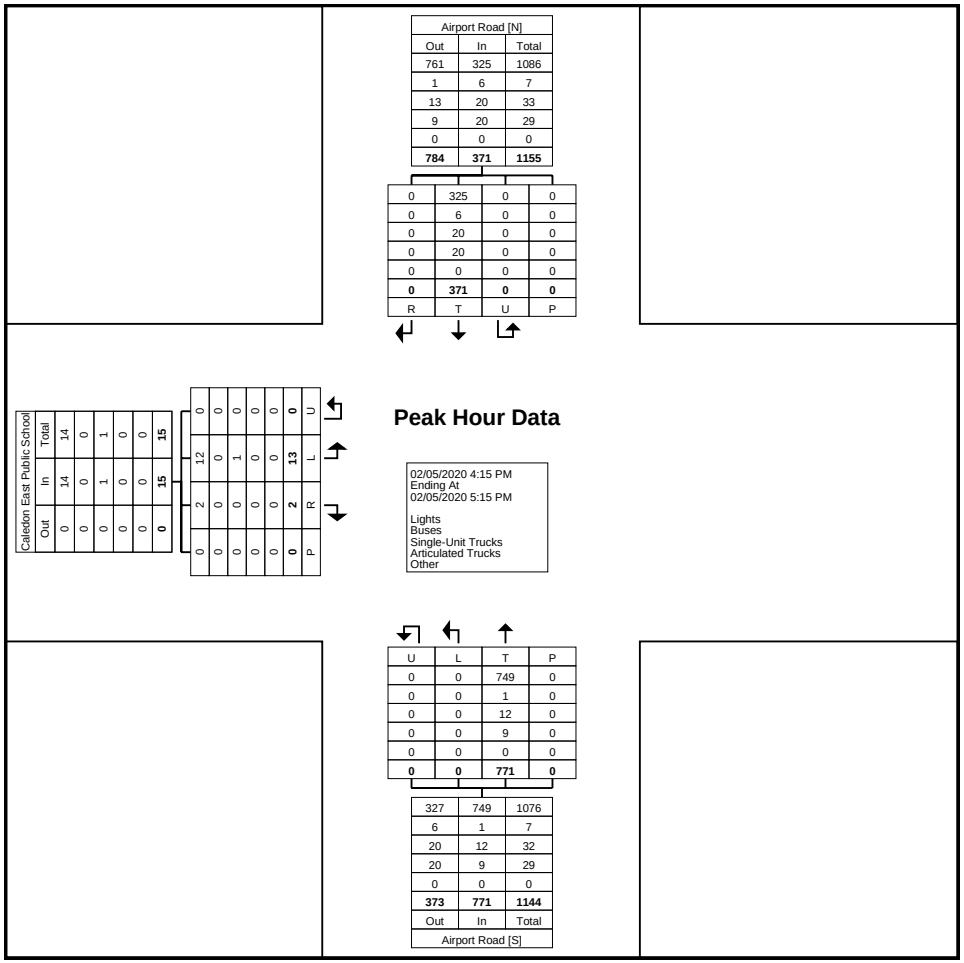
Turning Movement Peak Hour Data (4:15 PM)

Start Time	Caledon East Public School Driveway Eastbound					Airport Road Northbound					Airport Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
4:15 PM	5	1	0	0	6	0	205	0	0	205	110	0	0	0	110	321
4:30 PM	0	0	0	0	0	0	173	0	0	173	107	0	0	0	107	280
4:45 PM	3	1	0	0	4	0	196	0	0	196	73	0	0	0	73	273
5:00 PM	5	0	0	0	5	0	197	0	0	197	81	0	0	0	81	283
Total	13	2	0	0	15	0	771	0	0	771	371	0	0	0	371	1157
Approach %	86.7	13.3	0.0	-	-	0.0	100.0	0.0	-	-	100.0	0.0	0.0	-	-	-
Total %	1.1	0.2	0.0	-	1.3	0.0	66.6	0.0	-	66.6	32.1	0.0	0.0	-	32.1	-
PHF	0.650	0.500	0.000	-	0.625	0.000	0.940	0.000	-	0.940	0.843	0.000	0.000	-	0.843	0.901
Lights	12	2	0	-	14	0	749	0	-	749	325	0	0	-	325	1088
% Lights	92.3	100.0	-	-	93.3	-	97.1	-	-	97.1	87.6	-	-	-	87.6	94.0
Buses	0	0	0	-	0	0	1	0	-	1	6	0	0	-	6	7
% Buses	0.0	0.0	-	-	0.0	-	0.1	-	-	0.1	1.6	-	-	-	1.6	0.6
Single-Unit Trucks	1	0	0	-	1	0	12	0	-	12	20	0	0	-	20	33
% Single-Unit Trucks	7.7	0.0	-	-	6.7	-	1.6	-	-	1.6	5.4	-	-	-	5.4	2.9
Articulated Trucks	0	0	0	-	0	0	9	0	-	9	20	0	0	-	20	29
% Articulated Trucks	0.0	0.0	-	-	0.0	-	1.2	-	-	1.2	5.4	-	-	-	5.4	2.5
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	-	0.0	-	-	0.0	0.0	-	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Airport Road & Caledon East Public School Driveway
Site Code:
Start Date: 02/05/2020



Turning Movement Peak Hour Data Plot (4:15 PM)

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Airport Road & Caledon East Public School Driveway
Site Code:
Start Date: 02/05/2020

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Airport Road & Cranston Drive
Site Code:
Start Date: 02/05/2020

Turning Movement Data

Start Time	Cranston Drive Eastbound					Airport Road Northbound					Airport Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
7:00 AM	0	4	0	0	4	0	38	0	0	38	179	0	0	0	179	221
7:15 AM	0	4	0	0	4	2	43	0	0	45	197	3	0	0	200	249
7:30 AM	4	4	0	0	8	1	43	0	0	44	218	1	0	0	219	271
7:45 AM	2	4	0	0	6	0	63	0	0	63	179	2	0	0	181	250
Hourly Total	6	16	0	0	22	3	187	0	0	190	773	6	0	0	779	991
8:00 AM	1	6	0	0	7	3	64	0	0	67	136	1	0	0	137	211
8:15 AM	3	5	0	0	8	1	52	0	0	53	148	3	0	0	151	212
8:30 AM	4	6	0	0	10	5	60	0	0	65	112	2	0	0	114	189
8:45 AM	1	7	0	0	8	9	69	0	0	78	117	3	0	0	120	206
Hourly Total	9	24	0	0	33	18	245	0	0	263	513	9	0	0	522	818
9:00 AM	4	2	0	0	6	2	63	0	0	65	107	0	0	0	107	178
9:15 AM	3	2	0	0	5	2	56	0	0	58	98	1	0	0	99	162
9:30 AM	3	2	0	0	5	0	64	0	0	64	76	1	0	0	77	146
9:45 AM	1	0	0	0	1	1	45	0	0	46	85	3	0	0	88	135
Hourly Total	11	6	0	0	17	5	228	0	0	233	366	5	0	0	371	621
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:30 AM	2	1	0	0	3	0	45	0	0	45	64	2	0	0	66	114
11:45 AM	2	1	0	0	3	1	58	0	0	59	68	5	0	0	73	135
Hourly Total	4	2	0	0	6	1	103	0	0	104	132	7	0	0	139	249
12:00 PM	0	2	0	0	2	3	65	0	0	68	59	2	0	0	61	131
12:15 PM	0	3	0	0	3	0	68	0	0	68	56	0	0	0	56	127
12:30 PM	1	1	0	0	2	1	51	0	0	52	61	0	1	0	62	116
12:45 PM	3	0	0	0	3	2	73	0	0	75	63	4	0	0	67	145
Hourly Total	4	6	0	0	10	6	257	0	0	263	239	6	1	0	246	519
1:00 PM	0	0	0	0	0	3	54	0	0	57	53	2	0	0	55	112
1:15 PM	1	1	0	0	2	0	60	0	0	60	63	0	0	0	63	125
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	1	1	0	0	2	3	114	0	0	117	116	2	0	0	118	237
3:00 PM	0	0	0	0	0	6	120	0	0	126	73	3	0	0	76	202
3:15 PM	2	1	0	0	3	7	146	0	0	153	71	5	0	0	76	232
3:30 PM	3	1	0	0	4	10	150	0	0	160	80	5	0	0	85	249
3:45 PM	4	3	0	0	7	4	144	0	0	148	89	2	0	0	91	246
Hourly Total	9	5	0	0	14	27	560	0	0	587	313	15	0	0	328	929
4:00 PM	1	0	0	0	1	5	171	1	0	177	75	3	0	0	78	256
4:15 PM	7	1	0	0	8	2	196	0	0	198	103	5	0	0	108	314
4:30 PM	3	1	0	0	4	4	167	0	0	171	105	5	0	0	110	285

4:45 PM	2	4	0	0	6	4	190	0	0	194	70	4	0	0	74	274
Hourly Total	13	6	0	0	19	15	724	1	0	740	353	17	0	0	370	1129
5:00 PM	0	2	0	0	2	4	200	0	0	204	77	4	0	0	81	287
5:15 PM	1	2	0	0	3	9	196	0	0	205	80	6	0	0	86	294
5:30 PM	3	7	0	0	10	1	164	0	0	165	60	1	0	0	61	236
5:45 PM	2	0	0	0	2	1	166	0	0	167	81	5	0	0	86	255
Hourly Total	6	11	0	0	17	15	726	0	0	741	298	16	0	0	314	1072
Grand Total	63	77	0	0	140	93	3144	1	0	3238	3103	83	1	0	3187	6565
Approach %	45.0	55.0	0.0	-	-	2.9	97.1	0.0	-	-	97.4	2.6	0.0	-	-	-
Total %	1.0	1.2	0.0	-	2.1	1.4	47.9	0.0	-	49.3	47.3	1.3	0.0	-	48.5	-
Lights	60	76	0	-	136	84	2936	1	-	3021	2814	75	1	-	2890	6047
% Lights	95.2	98.7	-	-	97.1	90.3	93.4	100.0	-	93.3	90.7	90.4	100.0	-	90.7	92.1
Buses	1	1	0	-	2	8	32	0	-	40	35	5	0	-	40	82
% Buses	1.6	1.3	-	-	1.4	8.6	1.0	0.0	-	1.2	1.1	6.0	0.0	-	1.3	1.2
Single-Unit Trucks	2	0	0	-	2	0	95	0	-	95	123	2	0	-	125	222
% Single-Unit Trucks	3.2	0.0	-	-	1.4	0.0	3.0	0.0	-	2.9	4.0	2.4	0.0	-	3.9	3.4
Articulated Trucks	0	0	0	-	0	1	80	0	-	81	131	1	0	-	132	213
% Articulated Trucks	0.0	0.0	-	-	0.0	1.1	2.5	0.0	-	2.5	4.2	1.2	0.0	-	4.1	3.2
Bicycles on Road	0	0	0	-	0	0	1	0	-	1	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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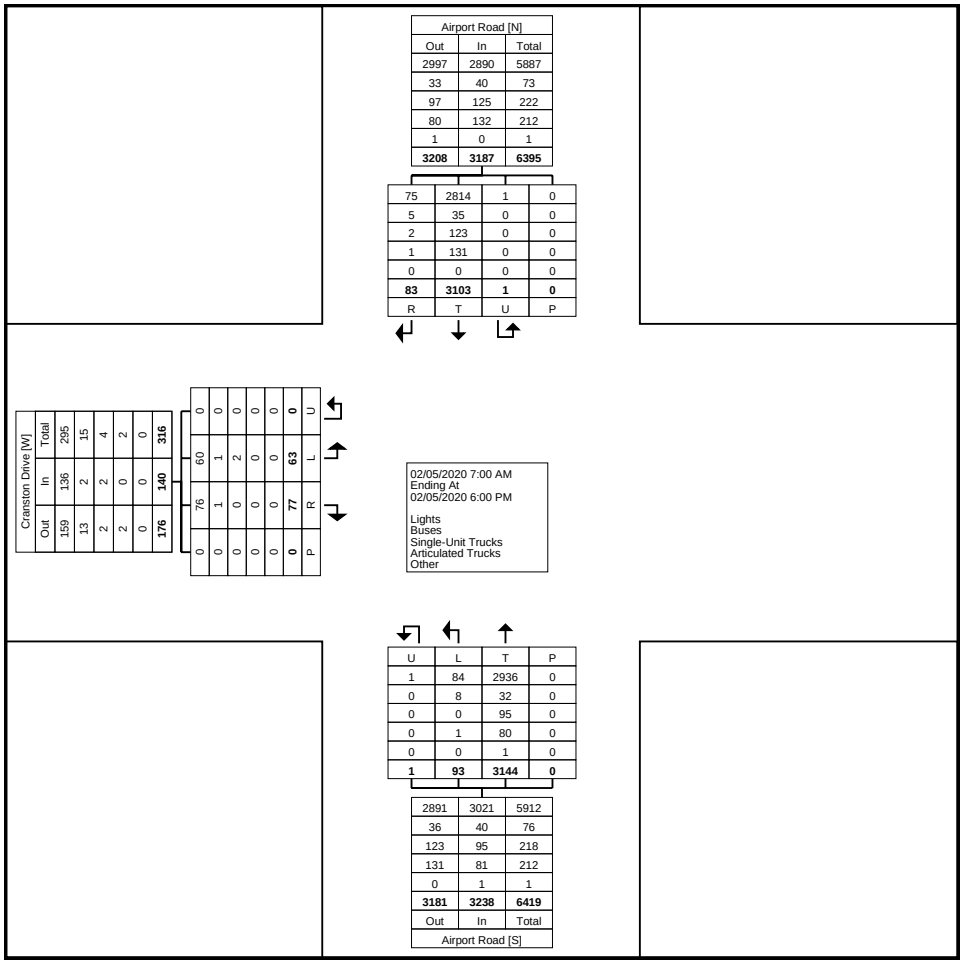
Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Airport Road & Cranston Drive
Site Code:
Start Date: 02/05/2020



Turning Movement Data Plot

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Airport Road & Cranston Drive
Site Code:
Start Date: 02/05/2020

Turning Movement Peak Hour Data (7:00 AM)

Start Time	Cranston Drive Eastbound					Airport Road Northbound					Airport Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
7:00 AM	0	4	0	0	4	0	38	0	0	38	179	0	0	0	179	221
7:15 AM	0	4	0	0	4	2	43	0	0	45	197	3	0	0	200	249
7:30 AM	4	4	0	0	8	1	43	0	0	44	218	1	0	0	219	271
7:45 AM	2	4	0	0	6	0	63	0	0	63	179	2	0	0	181	250
Total	6	16	0	0	22	3	187	0	0	190	773	6	0	0	779	991
Approach %	27.3	72.7	0.0	-	-	1.6	98.4	0.0	-	-	99.2	0.8	0.0	-	-	-
Total %	0.6	1.6	0.0	-	2.2	0.3	18.9	0.0	-	19.2	78.0	0.6	0.0	-	78.6	-
PHF	0.375	1.000	0.000	-	0.688	0.375	0.742	0.000	-	0.754	0.886	0.500	0.000	-	0.889	0.914
Lights	5	16	0	-	21	3	158	0	-	161	741	5	0	-	746	928
% Lights	83.3	100.0	-	-	95.5	100.0	84.5	-	-	84.7	95.9	83.3	-	-	95.8	93.6
Buses	1	0	0	-	1	0	10	0	-	10	4	1	0	-	5	16
% Buses	16.7	0.0	-	-	4.5	0.0	5.3	-	-	5.3	0.5	16.7	-	-	0.6	1.6
Single-Unit Trucks	0	0	0	-	0	0	5	0	-	5	14	0	0	-	14	19
% Single-Unit Trucks	0.0	0.0	-	-	0.0	0.0	2.7	-	-	2.6	1.8	0.0	-	-	1.8	1.9
Articulated Trucks	0	0	0	-	0	0	14	0	-	14	14	0	0	-	14	28
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	7.5	-	-	7.4	1.8	0.0	-	-	1.8	2.8
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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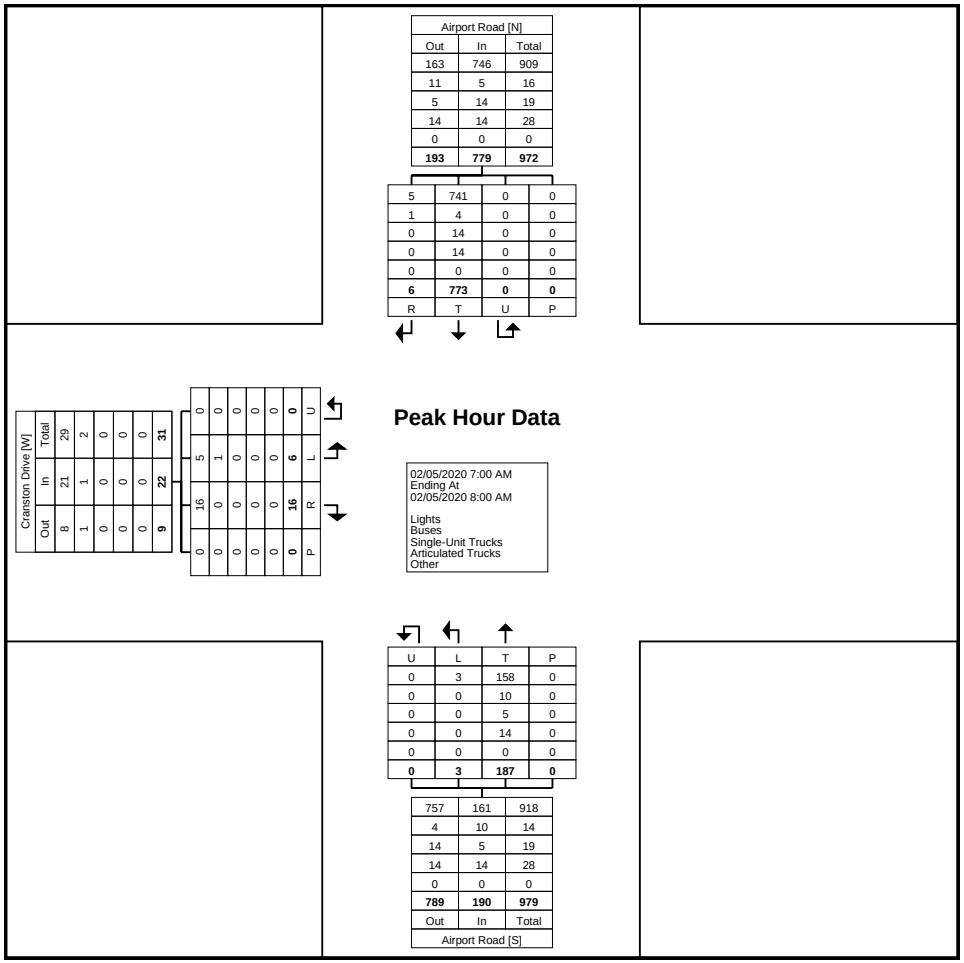
Site Code:
Start Date: 02/05/2020



Turning Movement Peak Hour Data Plot (7:00 AM)

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Airport Road & Cranston Drive
Site Code:
Start Date: 02/05/2020

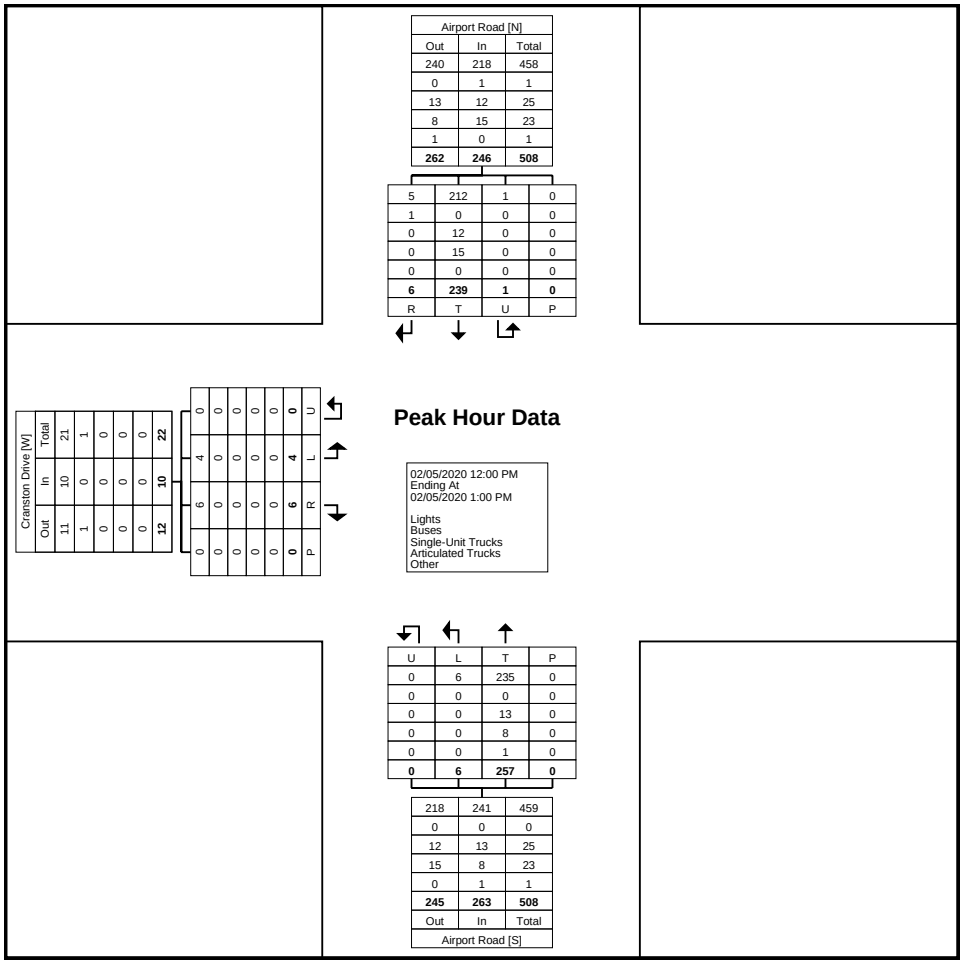
Turning Movement Peak Hour Data (12:00 PM)

Start Time	Cranston Drive Eastbound					Airport Road Northbound					Airport Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
12:00 PM	0	2	0	0	2	3	65	0	0	68	59	2	0	0	61	131
12:15 PM	0	3	0	0	3	0	68	0	0	68	56	0	0	0	56	127
12:30 PM	1	1	0	0	2	1	51	0	0	52	61	0	1	0	62	116
12:45 PM	3	0	0	0	3	2	73	0	0	75	63	4	0	0	67	145
Total	4	6	0	0	10	6	257	0	0	263	239	6	1	0	246	519
Approach %	40.0	60.0	0.0	-	-	2.3	97.7	0.0	-	-	97.2	2.4	0.4	-	-	-
Total %	0.8	1.2	0.0	-	1.9	1.2	49.5	0.0	-	50.7	46.1	1.2	0.2	-	47.4	-
PHF	0.333	0.500	0.000	-	0.833	0.500	0.880	0.000	-	0.877	0.948	0.375	0.250	-	0.918	0.895
Lights	4	6	0	-	10	6	235	0	-	241	212	5	1	-	218	469
% Lights	100.0	100.0	-	-	100.0	100.0	91.4	-	-	91.6	88.7	83.3	100.0	-	88.6	90.4
Buses	0	0	0	-	0	0	0	0	-	0	0	1	0	-	1	1
% Buses	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	16.7	0.0	-	0.4	0.2
Single-Unit Trucks	0	0	0	-	0	0	13	0	-	13	12	0	0	-	12	25
% Single-Unit Trucks	0.0	0.0	-	-	0.0	0.0	5.1	-	-	4.9	5.0	0.0	0.0	-	4.9	4.8
Articulated Trucks	0	0	0	-	0	0	8	0	-	8	15	0	0	-	15	23
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	3.1	-	-	3.0	6.3	0.0	0.0	-	6.1	4.4
Bicycles on Road	0	0	0	-	0	0	1	0	-	1	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.4	-	-	0.4	0.0	0.0	0.0	-	0.0	0.2
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Airport Road & Cranston Drive
Site Code:
Start Date: 02/05/2020



Turning Movement Peak Hour Data Plot (12:00 PM)

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Airport Road & Cranston Drive
Site Code:
Start Date: 02/05/2020

Turning Movement Peak Hour Data (4:15 PM)

Start Time	Cranston Drive Eastbound					Airport Road Northbound					Airport Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
4:15 PM	7	1	0	0	8	2	196	0	0	198	103	5	0	0	108	314
4:30 PM	3	1	0	0	4	4	167	0	0	171	105	5	0	0	110	285
4:45 PM	2	4	0	0	6	4	190	0	0	194	70	4	0	0	74	274
5:00 PM	0	2	0	0	2	4	200	0	0	204	77	4	0	0	81	287
Total	12	8	0	0	20	14	753	0	0	767	355	18	0	0	373	1160
Approach %	60.0	40.0	0.0	-	-	1.8	98.2	0.0	-	-	95.2	4.8	0.0	-	-	-
Total %	1.0	0.7	0.0	-	1.7	1.2	64.9	0.0	-	66.1	30.6	1.6	0.0	-	32.2	-
PHF	0.429	0.500	0.000	-	0.625	0.875	0.941	0.000	-	0.940	0.845	0.900	0.000	-	0.848	0.924
Lights	11	8	0	-	19	14	727	0	-	741	310	17	0	-	327	1087
% Lights	91.7	100.0	-	-	95.0	100.0	96.5	-	-	96.6	87.3	94.4	-	-	87.7	93.7
Buses	0	0	0	-	0	0	2	0	-	2	6	0	0	-	6	8
% Buses	0.0	0.0	-	-	0.0	0.0	0.3	-	-	0.3	1.7	0.0	-	-	1.6	0.7
Single-Unit Trucks	1	0	0	-	1	0	14	0	-	14	18	1	0	-	19	34
% Single-Unit Trucks	8.3	0.0	-	-	5.0	0.0	1.9	-	-	1.8	5.1	5.6	-	-	5.1	2.9
Articulated Trucks	0	0	0	-	0	0	10	0	-	10	21	0	0	-	21	31
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	1.3	-	-	1.3	5.9	0.0	-	-	5.6	2.7
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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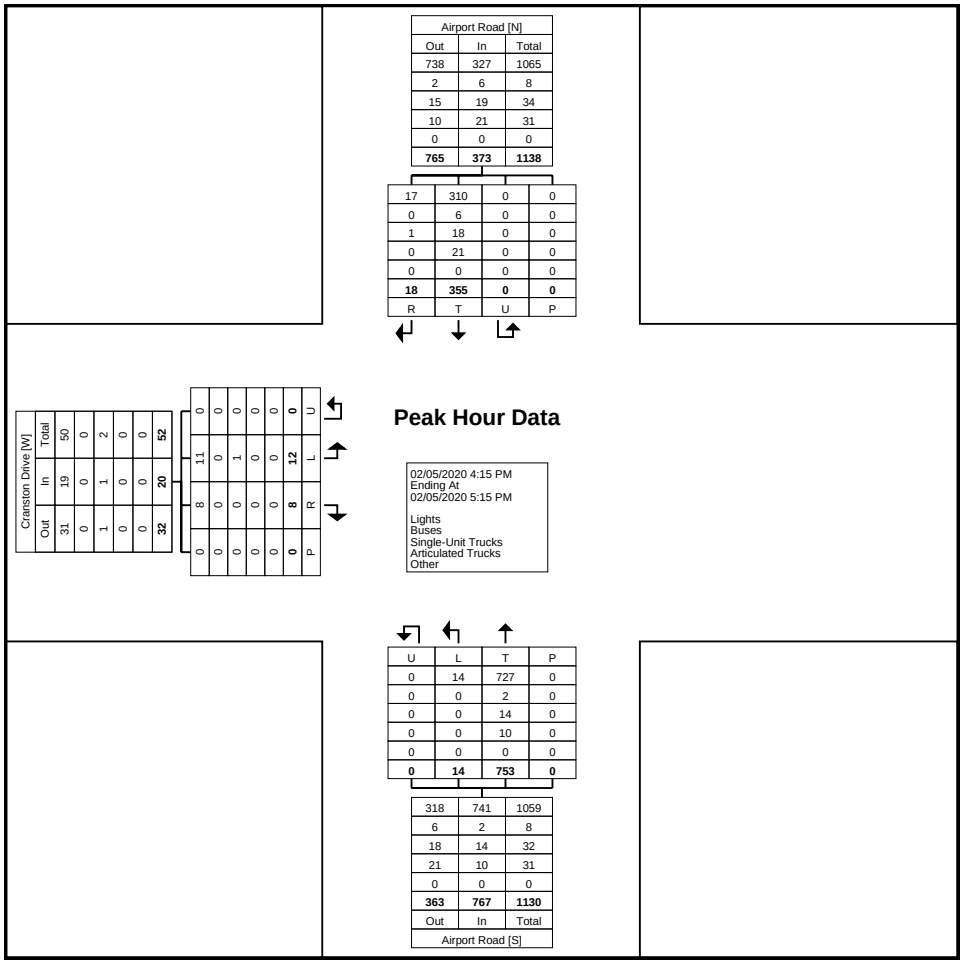


Turning Movement Peak Hour Data Plot (4:15 PM)

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Airport Road & Cranston Drive
Site Code:
Start Date: 02/05/2020

Zone	Trips	Hour	Direct	Region	Route
38	15	PM	In	Toronto	SW via Olde Base Line
90	41	PM	In	Toronto	SW via Olde Base Line
101	10	PM	In	Toronto	SW via Olde Base Line
107	5	AM	In	Toronto	SW via Olde Base Line
107	5	PM	Out	Toronto	SW via Olde Base Line
184	22	PM	In	Toronto	SW via Olde Base Line
211	41	AM	Out	Toronto	SW via Olde Base Line
211	41	PM	In	Toronto	SW via Olde Base Line
236	15	AM	Out	Toronto	SW via Olde Base Line
236	15	PM	In	Toronto	SW via Olde Base Line
292	26	PM	In	Toronto	SW via Olde Base Line
323	26	PM	In	Toronto	SW via Olde Base Line
330	18	AM	In	Toronto	SW via Olde Base Line
337	15	AM	Out	Toronto	SW via Olde Base Line
337	15	PM	In	Toronto	SW via Olde Base Line
349	25	PM	Out	Toronto	SW via Olde Base Line
358	33	AM	Out	Toronto	SW via Olde Base Line
415	26	AM	In	Toronto	SW via Olde Base Line
415	13	PM	In	Toronto	SW via Olde Base Line
497	25	PM	Out	Toronto	SW via Olde Base Line
600	23	PM	Out	Toronto	SW via Olde Base Line
2006	7	AM	Out	York	SW via Olde Base Line
2016	10	PM	Out	York	SW via Olde Base Line
2055	41	PM	Out	York	SW via Olde Base Line
2055	41	PM	In	York	SW via Olde Base Line
2063	38	AM	Out	York	SW via Olde Base Line
2065	25	AM	In	York	SW via Olde Base Line
2066	19	AM	Out	York	SW via Olde Base Line
2066	19	PM	In	York	SW via Olde Base Line
2097	16	AM	Out	York	SW via Olde Base Line
2097	16	PM	In	York	SW via Olde Base Line
2101	50	AM	Out	York	SW via Olde Base Line
2399	26	AM	Out	York	SW via Olde Base Line
2399	26	PM	Out	York	SW via Olde Base Line
2609	15	PM	In	York	N via Airport Rd
2778	41	AM	Out	York	N via Airport Rd
2778	41	PM	In	York	N via Airport Rd
3002	33	AM	In	Peel	S via Airport Road
3002	33	PM	Out	Peel	S via Airport Road
3007	59	AM	In	Peel	S via Airport Road
3007	22	PM	Out	Peel	S via Airport Road
3008	19	AM	In	Peel	S via Airport Road
3100	16	AM	In	Peel	N via Airport Rd
3100	39	PM	Out	Peel	N via Airport Rd
3100	39	PM	In	Peel	N via Airport Rd
3101	107	AM	In	Peel	N via Airport Rd
3102	74	PM	In	Peel	N via Airport Rd
3108	13	AM	In	Peel	N via Airport Rd
3108	13	PM	Out	Peel	N via Airport Rd
3151	28	AM	In	Peel	SW via Olde Base Line
3151	13	AM	Out	Peel	SW via Olde Base Line
3151	11	PM	Out	Peel	SW via Olde Base Line
3152	52	AM	In	Peel	West via Cranston
3153	22	AM	In	Peel	S via Airport Road
3153	22	PM	Out	Peel	S via Airport Road
3189	13	PM	Out	Peel	S via Airport Road
3191	10	PM	Out	Peel	S via Airport Road
3191	7	PM	In	Peel	S via Airport Road
3193	41	AM	In	Peel	S via Airport Road
3193	71	AM	Out	Peel	S via Airport Road
3193	80	PM	Out	Peel	S via Airport Road
3193	106	PM	In	Peel	S via Airport Road
3194	13	PM	In	Peel	S via Airport Road
3195	27	AM	In	Peel	N via Airport Rd
3195	13	PM	In	Peel	N via Airport Rd
3197	221	AM	In	Peel	N via Airport Rd
3197	221	AM	Out	Peel	N via Airport Rd
3197	103	PM	Out	Peel	N via Airport Rd
3197	103	PM	In	Peel	N via Airport Rd
3199	48	AM	In	Peel	N via Airport Rd
3328	7	AM	Out	Peel	S via Airport Road
3332	39	AM	Out	Peel	S via Airport Road
3332	39	PM	In	Peel	S via Airport Road
3333	9	AM	Out	Peel	S via Airport Road
3333	9	PM	In	Peel	S via Airport Road
3335	26	AM	Out	Peel	S via Airport Road
3335	26	PM	In	Peel	S via Airport Road
3336	19	AM	Out	Peel	S via Airport Road
3336	19	PM	In	Peel	S via Airport Road
3337	14	AM	In	Peel	S via Airport Road
3337	17	PM	In	Peel	S via Airport Road
3343	9	AM	Out	Peel	S via Airport Road
3343	9	PM	In	Peel	S via Airport Road
3350	39	AM	Out	Peel	S via Airport Road
3351	4	AM	Out	Peel	S via Airport Road
3357	33	PM	Out	Peel	S via Airport Road
3364	24	AM	In	Peel	S via Airport Road
3364	10	AM	Out	Peel	S via Airport Road
3370	47	PM	Out	Peel	S via Airport Road
3371	35	AM	Out	Peel	S via Airport Road
3371	35	PM	In	Peel	S via Airport Road
3375	15	PM	Out	Peel	S via Airport Road
3378	35	AM	Out	Peel	S via Airport Road
3378	35	PM	In	Peel	S via Airport Road
3380	33	AM	In	Peel	S via Airport Road
3386	16	AM	Out	Peel	S via Airport Road
3419	95	AM	Out	Peel	S via Airport Road
3421	55	AM	Out	Peel	S via Airport Road
3421	55	PM	In	Peel	S via Airport Road
3422	7	PM	In	Peel	S via Airport Road
3423	48	AM	Out	Peel	S via Airport Road
3423	48	PM	In	Peel	S via Airport Road
3459	29	AM	In	Peel	S via Airport Road
3462	51	AM	Out	Peel	S via Airport Road
3462	51	PM	In	Peel	S via Airport Road
3466	14	PM	Out	Peel	S via Airport Road
3467	47	AM	In	Peel	S via Airport Road
3468	12	AM	Out	Peel	S via Airport Road
3468	12	PM	In	Peel	S via Airport Road
3501	20	PM	In	Peel	S via Airport Road
3506	11	AM	In	Peel	S via Airport Road
3506	11	PM	Out	Peel	S via Airport Road
3519	36	AM	In	Peel	S via Airport Road
3605	16	AM	Out	Peel	S via Airport Road
3605	16	PM	In	Peel	S via Airport Road
3620	9	PM	In	Peel	S via Airport Road
3650	7	AM	In	Peel	S via Airport Road
3674	15	AM	Out	Peel	S via Airport Road
3674	15	PM	In	Peel	S via Airport Road
3701	63	AM	Out	Peel	S via Airport Road
3701	63	PM	In	Peel	S via Airport Road
3703	16	AM	Out	Peel	S via Airport Road
3703	16	PM	In	Peel	S via Airport Road
3707	33	PM	In	Peel	S via Airport Road
3877	7	PM	In	Peel	S via Airport Road
4023	55	AM	Out	Halton	SW via Olde Base Line
4023	55	PM	In	Halton	SW via Olde Base Line
4029	18	AM	Out	Halton	SW via Olde Base Line
4160	36	AM	In	Halton	SW via Olde Base Line
4166	44	PM	In	Halton	SW via Olde Base Line
4193	16	PM	Out	Halton	SW via Olde Base Line
4195	7	AM	In	Halton	SW via Olde Base Line
5226	31	PM	In	Hamilton	SW via Olde Base Line
6275	50	AM	Out	Niagara	SW via Olde Base Line
6275	50	PM	In	Niagara	SW via Olde Base Line
8401	7	AM	In	Orangeville	N via Airport Rd
8401	7	PM	Out	Orangeville	N via Airport Rd
8403	50	AM	In	Orangeville	N via Airport Rd
8403	32	PM	Out	Orangeville	N via Airport Rd
8404	51	PM	Out	Orangeville	N via Airport Rd
8405	36	AM	In	Orangeville	N via Airport Rd
8405	32	PM	In	Orangeville	N via Airport Rd
8412	16	AM	In	Dufferin	N via Airport Rd
8415	35	AM	In	Dufferin	N via Airport Rd
8415	13	PM	Out	Dufferin	N via Airport Rd
8415	4	PM	In	Dufferin	N via Airport Rd
8521	50	AM	Out	Barrie	N via Airport Rd
8521	50	PM	In	Simcoe County	N via Airport Rd
8556	37	PM	Out	Simcoe County	N via Airport Rd
8585	45	AM	In	Simcoe County	N via Airport Rd
8585	23	PM	Out	Simcoe County	N via Airport Rd
8592	32	PM	Out	Simcoe County	N via Airport Rd

Appendix C

Base Year Traffic Operations Reports

HCM Unsignalized Intersection Capacity Analysis 200052
1: Airport Rd & Caledon PS Driveway Existing AM

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	8	0	191	770	0
Future Volume (Veh/h)	6	8	0	191	770	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	6	8	0	191	770	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	961	770	770			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	961	770	770			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	98	100			
cM capacity (veh/h)	287	404	854			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	14	191	770
Volume Left	6	0	0
Volume Right	8	0	0
cSH	344	1700	1700
Volume to Capacity	0.04	0.11	0.45
Queue Length 95th (m)	1.0	0.0	0.0
Control Delay (s)	15.9	0.0	0.0
Lane LOS	C		
Approach Delay (s)	15.9	0.0	0.0
Approach LOS	C		

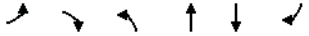
Intersection Summary				
Average Delay		0.2		
Intersection Capacity Utilization		50.5%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis 200052
2: Airport Rd & Cranston Dr Existing AM

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	16	3	187	773	6
Future Volume (Veh/h)	6	16	3	187	773	6
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	6	16	3	187	773	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	966	773	779			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	966	773	779			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	96	100			
cM capacity (veh/h)	284	402	847			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	22	3	187	773	6
Volume Left	6	3	0	0	0
Volume Right	16	0	0	0	6
cSH	361	847	1700	1700	1700
Volume to Capacity	0.06	0.00	0.11	0.45	0.00
Queue Length 95th (m)	1.5	0.1	0.0	0.0	0.0
Control Delay (s)	15.6	9.3	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	15.6	0.1		0.0	
Approach LOS	C				

Intersection Summary				
Average Delay		0.4		
Intersection Capacity Utilization		50.7%	ICU Level of Service	A
Analysis Period (min)		15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	2	0	771	371	0
Future Volume (Veh/h)	13	2	0	771	371	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	13	2	0	771	371	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				315		
pX, platoon unblocked						
vC, conflicting volume	1142	371	371			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1142	371	371			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	94	100	100			
cM capacity (veh/h)	216	679	1199			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	15	771	371
Volume Left	13	0	0
Volume Right	2	0	0
cSH	237	1700	1700
Volume to Capacity	0.06	0.45	0.22
Queue Length 95th (m)	1.5	0.0	0.0
Control Delay (s)	21.2	0.0	0.0
Lane LOS	C		
Approach Delay (s)	21.2	0.0	0.0
Approach LOS	C		

Intersection Summary				
Average Delay		0.3		
Intersection Capacity Utilization		50.6%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	12	8	14	753	355	18
Future Volume (Veh/h)	12	8	14	753	355	18
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	12	8	14	753	355	18
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	1136	355	373			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1136	355	373			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	94	99	99			
cM capacity (veh/h)	215	693	1197			

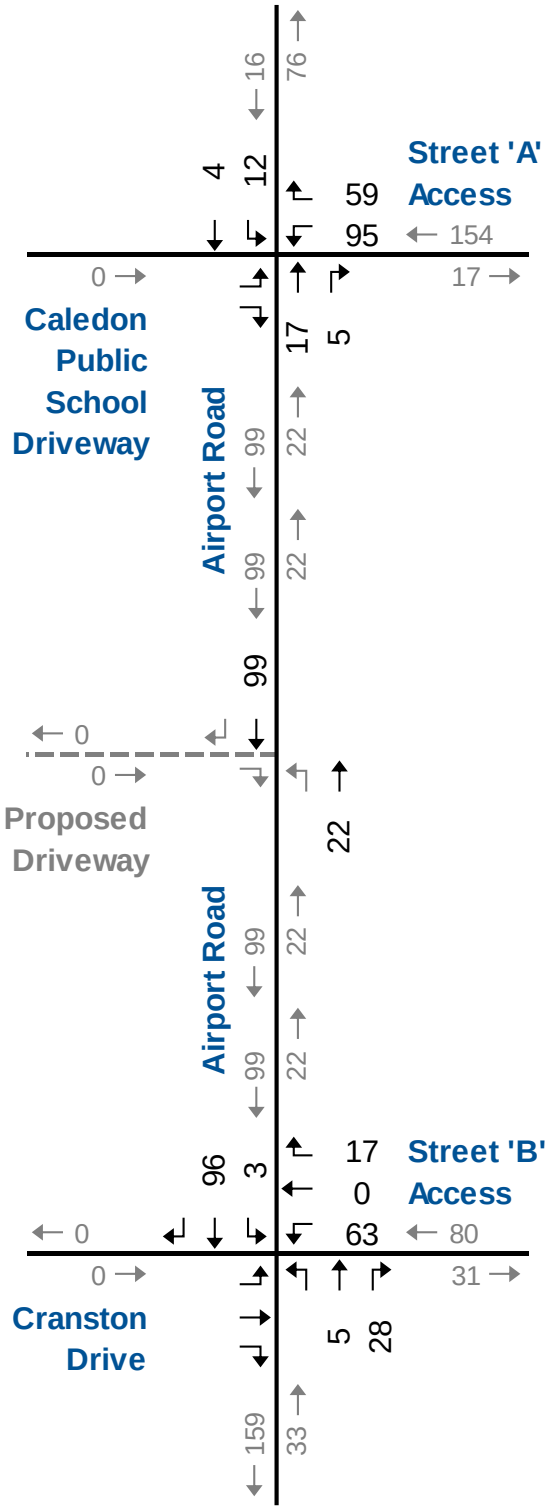
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	20	14	753	355	18
Volume Left	12	14	0	0	0
Volume Right	8	0	0	0	18
cSH	297	1197	1700	1700	1700
Volume to Capacity	0.07	0.01	0.44	0.21	0.01
Queue Length 95th (m)	1.6	0.3	0.0	0.0	0.0
Control Delay (s)	18.0	8.0	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	18.0	0.1		0.0	
Approach LOS	C				

Intersection Summary				
Average Delay		0.4		
Intersection Capacity Utilization		49.6%	ICU Level of Service	A
Analysis Period (min)		15		

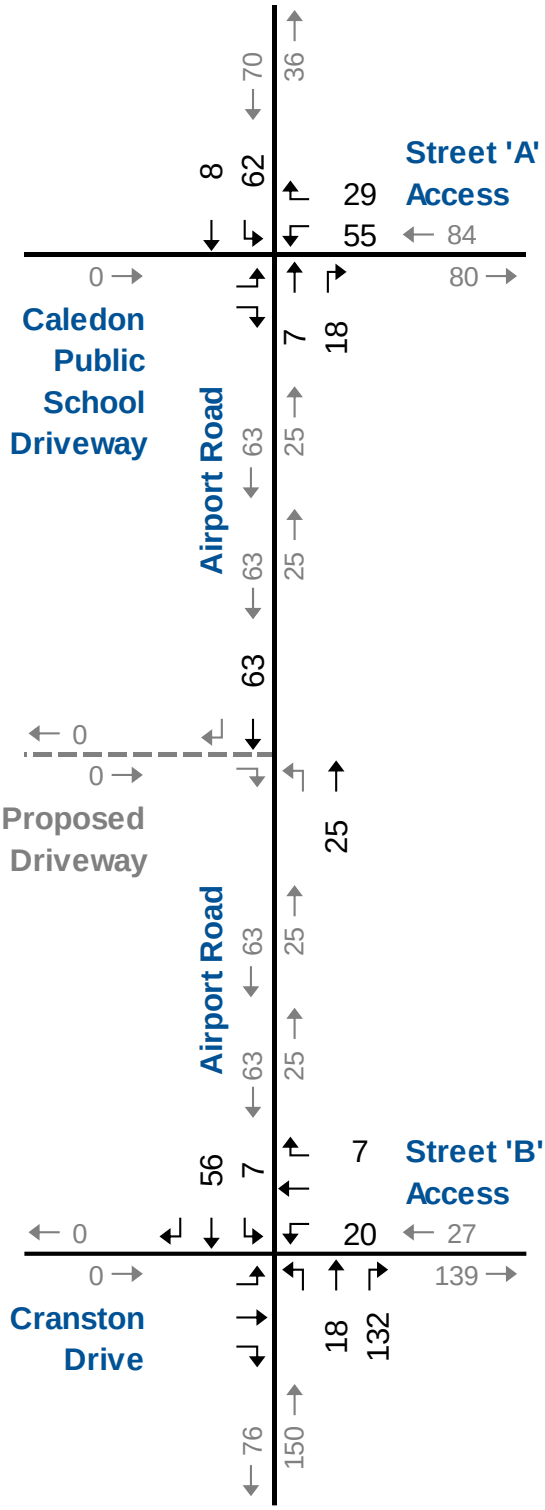
Appendix D

Background Development Traffic Forecasts

AM Peak Hour



PM Peak Hour



Background Development Traffic Forecast 15717 Airport Road

Appendix E

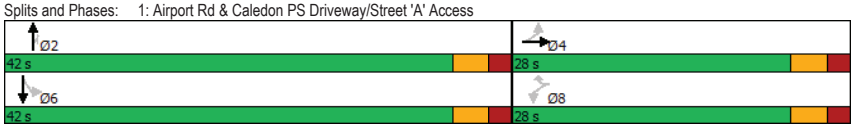
5-Year Horizon Background Traffic Operations Reports

Lane Group	EBT	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	0	95	59	254	5	12	961
Future Volume (vph)	0	95	59	254	5	12	961
Turn Type	NA	Perm	Perm	NA	Perm	Perm	NA
Protected Phases	4			2			6
Permitted Phases		8	8		2	6	
Detector Phase	4	8	8	2	2	6	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	28.0	28.0	28.0	24.0	24.0	24.0	24.0
Total Split (s)	28.0	28.0	28.0	42.0	42.0	42.0	42.0
Total Split (%)	40.0%	40.0%	40.0%	60.0%	60.0%	60.0%	60.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	10.0	10.0	10.0	42.5	42.5	42.5	42.5
Actuated g/C Ratio	0.17	0.17	0.17	0.73	0.73	0.73	0.73
v/c Ratio	0.05	0.40	0.19	0.20	0.00	0.01	0.71
Control Delay	5.1	27.3	7.9	4.6	0.0	4.2	11.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.1	27.3	7.9	4.6	0.0	4.2	11.8
LOS	A	C	A	A	A	A	B
Approach Delay	5.1			4.5			11.7
Approach LOS	A			A			B

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 58.1
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 11.2 — Intersection LOS: B
Intersection Capacity Utilization 68.5% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1: Airport Rd & Caledon PS Driveway/Street 'A' Access



Lane Group	EBT	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	16	95	59	254	5	12	961
v/c Ratio	0.05	0.40	0.19	0.20	0.00	0.01	0.71
Control Delay	5.1	27.3	7.9	4.6	0.0	4.2	11.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.1	27.3	7.9	4.6	0.0	4.2	11.8
Queue Length 50th (m)	0.0	8.9	0.0	8.1	0.0	0.3	55.4
Queue Length 95th (m)	2.5	19.7	7.4	19.1	0.0	1.9	#152.4
Internal Link Dist (m)	88.8			63.0			79.3
Turn Bay Length (m)							
Base Capacity (vph)	719	554	666	1301	1154	811	1351
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.17	0.09	0.20	0.00	0.01	0.71

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
1: Airport Rd & Caledon PS Driveway/Street 'A' Access

200052
2031 Background AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	0	9	95	0	59	0	254	5	12	961	0
Future Volume (vph)	7	0	9	95	0	59	0	254	5	12	961	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.5	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)		5.0		5.0		5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor		1.00		1.00		1.00		1.00	1.00	1.00	1.00	
Frt		0.92		1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected		0.98		0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1737		1750		1566		1779	1566	1750	1847	
Flt Permitted		0.98		0.75		1.00		1.00	1.00	0.60	1.00	
Satd. Flow (perm)		1737		1376		1566		1779	1566	1109	1847	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	7	0	9	95	0	59	0	254	5	12	961	0
RTOR Reduction (vph)	0	14	0	0	0	51	0	0	2	0	0	0
Lane Group Flow (vph)	0	2	0	95	0	8	0	254	3	12	961	0
Heavy Vehicles (%)	0%	2%	0%	2%	2%	2%	0%	8%	2%	2%	4%	0%
Turn Type	Perm	NA		Perm		Perm		NA	Perm	Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4			8		8			2	6		
Actuated Green, G (s)		7.9		7.9		7.9		41.2	41.2	41.2	41.2	
Effective Green, g (s)		7.9		7.9		7.9		41.2	41.2	41.2	41.2	
Actuated g/C Ratio		0.13		0.13		0.13		0.70	0.70	0.70	0.70	
Clearance Time (s)		5.0		5.0		5.0		5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		232		183		209		1240	1091	773	1287	
v/s Ratio Prot								0.14			c0.52	
v/s Ratio Perm		0.00		c0.07		0.01			0.00	0.01		
v/c Ratio		0.01		0.52		0.04		0.20	0.00	0.02	0.75	
Uniform Delay, d1		22.2		23.8		22.3		3.2	2.7	2.7	5.7	
Progression Factor		1.00		1.00		1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.0		2.5		0.1		0.1	0.0	0.0	2.4	
Delay (s)		22.2		26.3		22.4		3.2	2.7	2.7	8.1	
Level of Service		C		C		C		A	A	A	A	
Approach Delay (s)		22.2			24.8			3.2			8.0	
Approach LOS		C			C			A			A	

Intersection Summary				
HCM 2000 Control Delay	9.1	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.71			
Actuated Cycle Length (s)	59.1	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	68.5%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: Airport Rd & Cranston Dr/Street 'B' Access

200052
2031 Background AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	0	19	63	0	17	3	237	28	3	1057	7
Future Volume (Veh/h)	7	0	19	63	0	17	3	237	28	3	1057	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	7	0	19	63	0	17	3	237	28	3	1057	7
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (m)											315	
pX, platoon unblocked	0.54	0.54	0.54	0.54	0.54		0.54					
vC, conflicting volume	1323	1334	1057	1325	1313	237	1064			265		
vC1, stage 1 conf vol	1063	1063		243	243							
vC2, stage 2 conf vol	260	271		1082	1070							
vCu, unblocked vol	1170	1190	673	1173	1151	237	686			265		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	100	92	68	100	98	99			100		
cM capacity (veh/h)	225	228	246	196	223	802	491			1299		

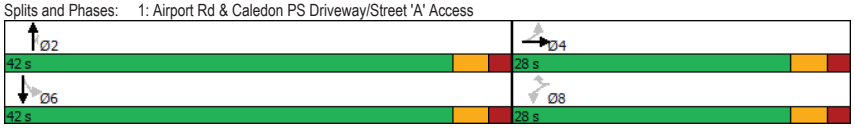
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	26	80	3	237	28	3	1057	7
Volume Left	7	63	3	0	0	3	0	0
Volume Right	19	17	0	0	28	0	0	7
cSH	240	233	491	1700	1700	1299	1700	1700
Volume to Capacity	0.11	0.34	0.01	0.14	0.02	0.00	0.62	0.00
Queue Length 95th (m)	2.7	10.9	0.1	0.0	0.0	0.1	0.0	0.0
Control Delay (s)	21.8	28.3	12.4	0.0	0.0	7.8	0.0	0.0
Lane LOS	C	D	B			A		
Approach Delay (s)	21.8	28.3	0.1			0.0		
Approach LOS	C	D						

Intersection Summary				
Average Delay	2.0			
Intersection Capacity Utilization	73.5%	ICU Level of Service	D	
Analysis Period (min)	15			

Lane Group	EBT	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	0	55	29	965	18	62	469
Future Volume (vph)	0	55	29	965	18	62	469
Turn Type	NA	Perm	Perm	NA	Perm	Perm	NA
Protected Phases	4			2			6
Permitted Phases		8	8		2	6	
Detector Phase	4	8	8	2	2	6	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	28.0	28.0	28.0	24.0	24.0	24.0	24.0
Total Split (s)	28.0	28.0	28.0	42.0	42.0	42.0	42.0
Total Split (%)	40.0%	40.0%	40.0%	60.0%	60.0%	60.0%	60.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	8.7	8.7	8.7	43.9	43.9	43.9	43.9
Actuated g/C Ratio	0.16	0.16	0.16	0.81	0.81	0.81	0.81
v/c Ratio	0.06	0.23	0.10	0.64	0.01	0.19	0.34
Control Delay	6.3	24.1	9.6	8.4	1.1	5.4	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.3	24.1	9.6	8.4	1.1	5.4	4.2
LOS	A	C	A	A	A	A	A
Approach Delay	6.3			8.2			4.4
Approach LOS	A			A			A

Intersection Summary		
Cycle Length: 70		
Actuated Cycle Length: 54.3		
Natural Cycle: 75		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.64		
Intersection Signal Delay: 7.5	Intersection LOS: A	
Intersection Capacity Utilization 76.6%	ICU Level of Service D	
Analysis Period (min) 15		

Splits and Phases: 1: Airport Rd & Caledon PS Driveway/Street 'A' Access



Lane Group	EBT	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	18	55	29	965	18	62	469
v/c Ratio	0.06	0.23	0.10	0.64	0.01	0.19	0.34
Control Delay	6.3	24.1	9.6	8.4	1.1	5.4	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.3	24.1	9.6	8.4	1.1	5.4	4.2
Queue Length 50th (m)	0.0	6.2	0.0	50.2	0.0	1.8	16.1
Queue Length 95th (m)	3.1	12.9	5.2	#116.8	1.1	7.0	33.2
Internal Link Dist (m)	88.8			63.0			79.3
Turn Bay Length (m)							
Base Capacity (vph)	800	649	694	1507	1272	327	1399
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.08	0.04	0.64	0.01	0.19	0.34

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

HCM Signalized Intersection Capacity Analysis
1: Airport Rd & Caledon PS Driveway/Street 'A' Access

200052
2031 Background PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	0	2	55	0	29	0	965	18	62	469	0
Future Volume (vph)	16	0	2	55	0	29	0	965	18	62	469	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.5	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)		5.0		5.0		5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor		1.00		1.00		1.00		1.00	1.00	1.00	1.00	
Frt		0.98		1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected		0.96		0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1812		1750		1566		1865	1566	1750	1731	
Flt Permitted		0.96		0.82		1.00		1.00	1.00	0.22	1.00	
Satd. Flow (perm)		1812		1504		1566		1865	1566	405	1731	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	16	0	2	55	0	29	0	965	18	62	469	0
RTOR Reduction (vph)	0	16	0	0	0	26	0	0	5	0	0	0
Lane Group Flow (vph)	0	2	0	55	0	3	0	965	13	62	469	0
Heavy Vehicles (%)	0%	8%	0%	2%	2%	2%	0%	3%	2%	2%	11%	0%
Turn Type	Perm	NA		Perm		Perm		NA	Perm	Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4			8		8			2	6		
Actuated Green, G (s)		4.9		4.9		4.9		41.5	41.5	41.5	41.5	
Effective Green, g (s)		4.9		4.9		4.9		41.5	41.5	41.5	41.5	
Actuated g/C Ratio		0.09		0.09		0.09		0.74	0.74	0.74	0.74	
Clearance Time (s)		5.0		5.0		5.0		5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		157		130		136		1372	1152	298	1273	
v/s Ratio Prot								c0.52			0.27	
v/s Ratio Perm		0.00		c0.04		0.00			0.01	0.15		
v/c Ratio		0.01		0.42		0.02		0.70	0.01	0.21	0.37	
Uniform Delay, d1		23.5		24.4		23.6		4.1	2.0	2.3	2.7	
Progression Factor		1.00		1.00		1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.0		2.2		0.1		1.7	0.0	0.3	0.2	
Delay (s)		23.6		26.6		23.6		5.7	2.0	2.7	2.9	
Level of Service		C		C		C		A	A	A	A	
Approach Delay (s)		23.6			25.6			5.7			2.9	
Approach LOS		C			C			A			A	

Intersection Summary				
HCM 2000 Control Delay	6.0	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.67			
Actuated Cycle Length (s)	56.4	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	76.6%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: Airport Rd & Cranston Dr/Street 'B' Access

200052
2031 Background PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	0	9	20	0	7	17	954	132	7	497	22
Future Volume (Veh/h)	14	0	9	20	0	7	17	954	132	7	497	22
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	14	0	9	20	0	7	17	954	132	7	497	22
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (m)											315	
pX, platoon unblocked												
vC, conflicting volume	1506	1631	497	1508	1521	954	519			1086		
vC1, stage 1 conf vol	511	511		988	988							
vC2, stage 2 conf vol	995	1120		520	533							
vCu, unblocked vol	1506	1631	497	1508	1521	954	519			1086		
tC, single (s)	7.2	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.2	5.5		6.1	5.5							
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	100	98	92	100	98	98			99		
cM capacity (veh/h)	245	247	577	260	281	314	1057			642		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	23	27	17	954	132	7	497	22
Volume Left	14	20	17	0	0	7	0	0
Volume Right	9	7	0	0	132	0	0	22
cSH	316	272	1057	1700	1700	642	1700	1700
Volume to Capacity	0.07	0.10	0.02	0.56	0.08	0.01	0.29	0.01
Queue Length 95th (m)	1.8	2.5	0.4	0.0	0.0	0.2	0.0	0.0
Control Delay (s)	17.3	19.7	8.5	0.0	0.0	10.7	0.0	0.0
Lane LOS	C	C	A			B		
Approach Delay (s)	17.3	19.7	0.1			0.1		
Approach LOS	C	C						

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	60.2%	ICU Level of Service	B	
Analysis Period (min)	15			

Appendix F

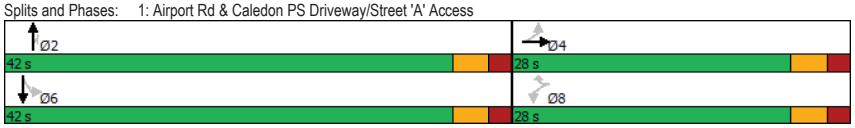
5-Year Horizon Total Traffic Operations Reports

Lane Group	EBT	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	0	95	59	254	5	12	970
Future Volume (vph)	0	95	59	254	5	12	970
Turn Type	NA	Perm	Perm	NA	Perm	Perm	NA
Protected Phases	4			2			6
Permitted Phases		8	8		2	6	
Detector Phase	4	8	8	2	2	6	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	28.0	28.0	28.0	24.0	24.0	24.0	24.0
Total Split (s)	28.0	28.0	28.0	42.0	42.0	42.0	42.0
Total Split (%)	40.0%	40.0%	40.0%	60.0%	60.0%	60.0%	60.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	10.0	10.0	10.0	42.9	42.9	42.9	42.9
Actuated g/C Ratio	0.17	0.17	0.17	0.73	0.73	0.73	0.73
v/c Ratio	0.05	0.41	0.19	0.20	0.00	0.01	0.72
Control Delay	5.1	27.4	8.0	4.5	0.0	4.2	12.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.1	27.4	8.0	4.5	0.0	4.2	12.0
LOS	A	C	A	A	A	A	B
Approach Delay	5.1			4.5			11.9
Approach LOS	A			A			B

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 58.6
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 11.4 — Intersection LOS: B
Intersection Capacity Utilization 69.0% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1: Airport Rd & Caledon PS Driveway/Street 'A' Access



Lane Group	EBT	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	16	95	59	254	5	12	970
v/c Ratio	0.05	0.41	0.19	0.20	0.00	0.01	0.72
Control Delay	5.1	27.4	8.0	4.5	0.0	4.2	12.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.1	27.4	8.0	4.5	0.0	4.2	12.0
Queue Length 50th (m)	0.0	8.9	0.0	8.1	0.0	0.3	56.5
Queue Length 95th (m)	2.5	19.7	7.4	19.1	0.0	1.9	#154.8
Internal Link Dist (m)	88.8			63.0			79.3
Turn Bay Length (m)							
Base Capacity (vph)	710	547	658	1301	1154	811	1351
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.17	0.09	0.20	0.00	0.01	0.72

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
1: Airport Rd & Caledon PS Driveway/Street 'A' Access

200052
2031 Total AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	0	9	95	0	59	0	254	5	12	970	0
Future Volume (vph)	7	0	9	95	0	59	0	254	5	12	970	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.5	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)		5.0		5.0		5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor		1.00		1.00		1.00		1.00	1.00	1.00	1.00	
Frt		0.92		1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected		0.98		0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1737		1750		1566		1779	1566	1750	1847	
Flt Permitted		0.98		0.75		1.00		1.00	1.00	0.60	1.00	
Satd. Flow (perm)		1737		1376		1566		1779	1566	1109	1847	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	7	0	9	95	0	59	0	254	5	12	970	0
RTOR Reduction (vph)	0	14	0	0	0	51	0	0	2	0	0	0
Lane Group Flow (vph)	0	2	0	95	0	8	0	254	3	12	970	0
Heavy Vehicles (%)	0%	2%	0%	2%	2%	2%	0%	8%	2%	2%	4%	0%
Turn Type	Perm	NA		Perm		Perm		NA	Perm	Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4			8		8			2	6		
Actuated Green, G (s)		8.0		8.0		8.0		41.6	41.6	41.6	41.6	
Effective Green, g (s)		8.0		8.0		8.0		41.6	41.6	41.6	41.6	
Actuated g/C Ratio		0.13		0.13		0.13		0.70	0.70	0.70	0.70	
Clearance Time (s)		5.0		5.0		5.0		5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		233		184		210		1241	1093	774	1289	
v/s Ratio Prot								0.14			c0.53	
v/s Ratio Perm		0.00		c0.07		0.01			0.00	0.01		
v/c Ratio		0.01		0.52		0.04		0.20	0.00	0.02	0.75	
Uniform Delay, d1		22.4		24.0		22.5		3.2	2.7	2.7	5.7	
Progression Factor		1.00		1.00		1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.0		2.4		0.1		0.1	0.0	0.0	2.5	
Delay (s)		22.4		26.4		22.5		3.3	2.7	2.8	8.3	
Level of Service		C		C		C		A	A	A	A	
Approach Delay (s)		22.4			24.9			3.2			8.2	
Approach LOS		C			C			A			A	

Intersection Summary				
HCM 2000 Control Delay	9.3	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.71			
Actuated Cycle Length (s)	59.6	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	69.0%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: Airport Rd & Cranston Dr/Street 'B' Access

200052
2031 Total AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	0	19	63	0	17	3	245	28	3	1066	9
Future Volume (Veh/h)	8	0	19	63	0	17	3	245	28	3	1066	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	8	0	19	63	0	17	3	245	28	3	1066	9
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (m)											315	
pX, platoon unblocked	0.44	0.44	0.44	0.44	0.44		0.44					
vC, conflicting volume	1340	1351	1066	1342	1332	245	1075			273		
vC1, stage 1 conf vol	1072	1072		251	251							
vC2, stage 2 conf vol	268	279		1091	1081							
vCu, unblocked vol	1136	1161	512	1140	1118	245	533			273		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	100	92	67	100	98	99			100		
cM capacity (veh/h)	223	219	249	194	214	794	459			1290		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	27	80	3	245	28	3	1066	9
Volume Left	8	63	3	0	0	3	0	0
Volume Right	19	17	0	0	28	0	0	9
cSH	241	231	459	1700	1700	1290	1700	1700
Volume to Capacity	0.11	0.35	0.01	0.14	0.02	0.00	0.63	0.01
Queue Length 95th (m)	2.8	11.1	0.1	0.0	0.0	0.1	0.0	0.0
Control Delay (s)	21.9	28.7	12.9	0.0	0.0	7.8	0.0	0.0
Lane LOS	C	D	B			A		
Approach Delay (s)	21.9	28.7	0.1			0.0		
Approach LOS	C	D						

Intersection Summary				
Average Delay	2.0			
Intersection Capacity Utilization	73.2%	ICU Level of Service	D	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	11	9	261	1066	9
Future Volume (Veh/h)	0	11	9	261	1066	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	11	9	261	1066	9
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	None	
Median storage veh)				2		
Upstream signal (m)					87	
pX, platoon unblocked						
vC, conflicting volume	1219	538	1075			
vC1, stage 1 conf vol	1070					
vC2, stage 2 conf vol	148					
vCu, unblocked vol	1219	538	1075			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	99			
cM capacity (veh/h)	281	488	644			

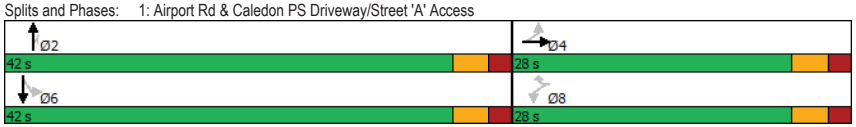
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	11	9	130	130	711	364
Volume Left	0	9	0	0	0	0
Volume Right	11	0	0	0	0	9
cSH	488	644	1700	1700	1700	1700
Volume to Capacity	0.02	0.01	0.08	0.08	0.42	0.21
Queue Length 95th (m)	0.5	0.3	0.0	0.0	0.0	0.0
Control Delay (s)	12.5	10.7	0.0	0.0	0.0	0.0
Lane LOS	B	B				
Approach Delay (s)	12.5	0.4			0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	0	55	29	965	18	62	473
Future Volume (vph)	0	55	29	965	18	62	473
Turn Type	NA	Perm	Perm	NA	Perm	Perm	NA
Protected Phases	4			2			6
Permitted Phases		8	8		2	6	
Detector Phase	4	8	8	2	2	6	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	28.0	28.0	28.0	24.0	24.0	24.0	24.0
Total Split (s)	28.0	28.0	28.0	42.0	42.0	42.0	42.0
Total Split (%)	40.0%	40.0%	40.0%	60.0%	60.0%	60.0%	60.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	8.7	8.7	8.7	43.9	43.9	43.9	43.9
Actuated g/C Ratio	0.16	0.16	0.16	0.81	0.81	0.81	0.81
v/c Ratio	0.06	0.23	0.10	0.64	0.01	0.19	0.34
Control Delay	6.3	24.1	9.6	8.4	1.1	5.4	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.3	24.1	9.6	8.4	1.1	5.4	4.2
LOS	A	C	A	A	A	A	A
Approach Delay	6.3			8.2			4.4
Approach LOS	A			A			A

Intersection Summary			
Cycle Length: 70			
Actuated Cycle Length: 54.3			
Natural Cycle: 75			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.64			
Intersection Signal Delay: 7.5		Intersection LOS: A	
Intersection Capacity Utilization 76.6%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Airport Rd & Caledon PS Driveway/Street 'A' Access



Lane Group	EBT	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	18	55	29	965	18	62	473
v/c Ratio	0.06	0.23	0.10	0.64	0.01	0.19	0.34
Control Delay	6.3	24.1	9.6	8.4	1.1	5.4	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.3	24.1	9.6	8.4	1.1	5.4	4.2
Queue Length 50th (m)	0.0	6.2	0.0	50.2	0.0	1.8	16.3
Queue Length 95th (m)	3.1	12.9	5.2	#116.8	1.1	7.0	33.6
Internal Link Dist (m)	88.8			63.0			79.3
Turn Bay Length (m)							
Base Capacity (vph)	800	649	694	1507	1272	327	1399
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.08	0.04	0.64	0.01	0.19	0.34

Intersection Summary

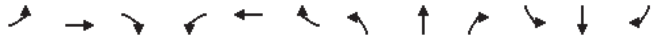
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	0	2	55	0	29	0	965	18	62	473	0
Future Volume (vph)	16	0	2	55	0	29	0	965	18	62	473	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.5	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)		5.0		5.0		5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor		1.00		1.00		1.00		1.00	1.00	1.00	1.00	
Frt		0.98		1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected		0.96		0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1812		1750		1566		1865	1566	1750	1731	
Flt Permitted		0.96		0.82		1.00		1.00	1.00	0.22	1.00	
Satd. Flow (perm)		1812		1504		1566		1865	1566	405	1731	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	16	0	2	55	0	29	0	965	18	62	473	0
RTOR Reduction (vph)	0	16	0	0	0	26	0	0	5	0	0	0
Lane Group Flow (vph)	0	2	0	55	0	3	0	965	13	62	473	0
Heavy Vehicles (%)	0%	8%	0%	2%	2%	2%	0%	3%	2%	2%	11%	0%
Turn Type	Perm	NA		Perm		Perm		NA	Perm	Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4			8		8			2	6		
Actuated Green, G (s)		4.9		4.9		4.9		41.5	41.5	41.5	41.5	
Effective Green, g (s)		4.9		4.9		4.9		41.5	41.5	41.5	41.5	
Actuated g/C Ratio		0.09		0.09		0.09		0.74	0.74	0.74	0.74	
Clearance Time (s)		5.0		5.0		5.0		5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		157		130		136		1372	1152	298	1273	
v/s Ratio Prot								c0.52			0.27	
v/s Ratio Perm		0.00		c0.04		0.00			0.01	0.15		
v/c Ratio		0.01		0.42		0.02		0.70	0.01	0.21	0.37	
Uniform Delay, d1		23.5		24.4		23.6		4.1	2.0	2.3	2.7	
Progression Factor		1.00		1.00		1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.0		2.2		0.1		1.7	0.0	0.3	0.2	
Delay (s)		23.6		26.6		23.6		5.7	2.0	2.7	2.9	
Level of Service		C		C		C		A	A	A	A	
Approach Delay (s)		23.6			25.6			5.7			2.9	
Approach LOS		C			C			A			A	

Intersection Summary

HCM 2000 Control Delay	6.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	56.4	Sum of lost time (s)	10.0
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	0	9	20	0	7	17	965	132	7	511	32
Future Volume (Veh/h)	14	0	9	20	0	7	17	965	132	7	511	32
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	14	0	9	20	0	7	17	965	132	7	511	32
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (m)											315	
pX, platoon unblocked												
vC, conflicting volume	1531	1656	511	1533	1556	965	543			1097		
vC1, stage 1 conf vol	525	525		999	999							
vC2, stage 2 conf vol	1006	1131		534	557							
vCu, unblocked vol	1531	1656	511	1533	1556	965	543			1097		
tC, single (s)	7.2	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.2	5.5		6.1	5.5							
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	100	98	92	100	98	98			99		
cM capacity (veh/h)	241	243	567	255	276	309	1036			636		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	23	27	17	965	132	7	511	32
Volume Left	14	20	17	0	0	7	0	0
Volume Right	9	7	0	0	132	0	0	32
cSH	311	268	1036	1700	1700	636	1700	1700
Volume to Capacity	0.07	0.10	0.02	0.57	0.08	0.01	0.30	0.02
Queue Length 95th (m)	1.8	2.5	0.4	0.0	0.0	0.3	0.0	0.0
Control Delay (s)	17.5	20.0	8.5	0.0	0.0	10.7	0.0	0.0
Lane LOS	C	C	A			B		
Approach Delay (s)	17.5	20.0	0.1			0.1		
Approach LOS	C	C						

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	60.8%	ICU Level of Service	B	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	24	11	976	526	4
Future Volume (Veh/h)	0	24	11	976	526	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	24	11	976	526	4
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	None	
Median storage veh)				2		
Upstream signal (m)					87	
pX, platoon unblocked						
vC, conflicting volume	1038	265	530			
vC1, stage 1 conf vol	528					
vC2, stage 2 conf vol	510					
vCu, unblocked vol	1038	265	530			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	97	99			
cM capacity (veh/h)	437	733	1033			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	24	11	488	488	351	179
Volume Left	0	11	0	0	0	0
Volume Right	24	0	0	0	0	4
cSH	733	1033	1700	1700	1700	1700
Volume to Capacity	0.03	0.01	0.29	0.29	0.21	0.11
Queue Length 95th (m)	0.8	0.2	0.0	0.0	0.0	0.0
Control Delay (s)	10.1	8.5	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	10.1	0.1			0.0	
Approach LOS	B					

Intersection Summary				
Average Delay	0.2			
Intersection Capacity Utilization	30.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Appendix G

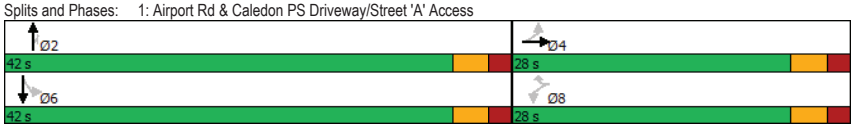
10-Year Horizon Background Traffic Operations Reports

Lane Group	EBT	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	0	95	59	279	5	12	1061
Future Volume (vph)	0	95	59	279	5	12	1061
Turn Type	NA	Perm	Perm	NA	Perm	Perm	NA
Protected Phases	4			2			6
Permitted Phases		8	8		2	6	
Detector Phase	4	8	8	2	2	6	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	28.0	28.0	28.0	24.0	24.0	24.0	24.0
Total Split (s)	28.0	28.0	28.0	42.0	42.0	42.0	42.0
Total Split (%)	40.0%	40.0%	40.0%	60.0%	60.0%	60.0%	60.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	10.0	10.0	10.0	44.1	44.1	44.1	44.1
Actuated g/C Ratio	0.17	0.17	0.17	0.73	0.73	0.73	0.73
v/c Ratio	0.06	0.42	0.19	0.21	0.00	0.02	0.79
Control Delay	5.8	27.8	8.0	4.6	0.0	4.2	14.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.8	27.8	8.0	4.6	0.0	4.2	14.8
LOS	A	C	A	A	A	A	B
Approach Delay	5.8			4.5			14.7
Approach LOS	A			A			B

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 60.3
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 13.2 — Intersection LOS: B
Intersection Capacity Utilization 73.6% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1: Airport Rd & Caledon PS Driveway/Street 'A' Access



Lane Group	EBT	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	18	95	59	279	5	12	1061
v/c Ratio	0.06	0.42	0.19	0.21	0.00	0.02	0.79
Control Delay	5.8	27.8	8.0	4.6	0.0	4.2	14.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.8	27.8	8.0	4.6	0.0	4.2	14.8
Queue Length 50th (m)	0.0	8.9	0.0	9.1	0.0	0.3	68.9
Queue Length 95th (m)	3.0	19.7	7.4	21.0	0.0	1.9	#178.2
Internal Link Dist (m)	88.8			63.0			79.3
Turn Bay Length (m)							
Base Capacity (vph)	686	527	637	1300	1153	791	1350
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.18	0.09	0.21	0.00	0.02	0.79

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
1: Airport Rd & Caledon PS Driveway/Street 'A' Access

200052
2036 Background AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	0	10	95	0	59	0	279	5	12	1061	0
Future Volume (vph)	8	0	10	95	0	59	0	279	5	12	1061	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.5	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)		5.0		5.0		5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor		1.00		1.00		1.00		1.00	1.00	1.00	1.00	
Frt		0.93		1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected		0.98		0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1738		1750		1566		1779	1566	1750	1847	
Flt Permitted		0.98		0.75		1.00		1.00	1.00	0.59	1.00	
Satd. Flow (perm)		1738		1374		1566		1779	1566	1084	1847	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	8	0	10	95	0	59	0	279	5	12	1061	0
RTOR Reduction (vph)	0	16	0	0	0	51	0	0	1	0	0	0
Lane Group Flow (vph)	0	2	0	95	0	8	0	279	4	12	1061	0
Heavy Vehicles (%)	0%	2%	0%	2%	2%	2%	0%	8%	2%	2%	4%	0%
Turn Type	Perm	NA		Perm		Perm		NA	Perm	Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4			8		8			2	6		
Actuated Green, G (s)		8.3		8.3		8.3		43.0	43.0	43.0	43.0	
Effective Green, g (s)		8.3		8.3		8.3		43.0	43.0	43.0	43.0	
Actuated g/C Ratio		0.14		0.14		0.14		0.70	0.70	0.70	0.70	
Clearance Time (s)		5.0		5.0		5.0		5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		235		186		212		1247	1098	760	1295	
v/s Ratio Prot								0.16			c0.57	
v/s Ratio Perm		0.00		c0.07		0.01			0.00	0.01		
v/c Ratio		0.01		0.51		0.04		0.22	0.00	0.02	0.82	
Uniform Delay, d1		22.9		24.6		23.0		3.2	2.7	2.8	6.4	
Progression Factor		1.00		1.00		1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.0		2.4		0.1		0.1	0.0	0.0	4.2	
Delay (s)		23.0		27.0		23.1		3.3	2.7	2.8	10.6	
Level of Service		C		C		C		A	A	A	B	
Approach Delay (s)		23.0			25.5			3.3			10.5	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	61.3	Sum of lost time (s)	10.0
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: Airport Rd & Cranston Dr/Street 'B' Access

200052
2036 Background AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	0	21	63	0	17	4	261	28	3	1157	8
Future Volume (Veh/h)	8	0	21	63	0	17	4	261	28	3	1157	8
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	8	0	21	63	0	17	4	261	28	3	1157	8
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (m)											315	
pX, platoon unblocked	0.49	0.49	0.49	0.49	0.49		0.49					
vC, conflicting volume	1449	1460	1157	1453	1440	261	1165			289		
vC1, stage 1 conf vol	1163	1163		269	269							
vC2, stage 2 conf vol	286	297		1184	1171							
vCu, unblocked vol	1396	1418	798	1404	1377	261	815			289		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	100	89	56	100	98	99			100		
cM capacity (veh/h)	175	183	190	144	177	778	402			1273		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	29	80	4	261	28	3	1157	8
Volume Left	8	63	4	0	0	3	0	0
Volume Right	21	17	0	0	28	0	0	8
cSH	186	174	402	1700	1700	1273	1700	1700
Volume to Capacity	0.16	0.46	0.01	0.15	0.02	0.00	0.68	0.00
Queue Length 95th (m)	4.0	16.1	0.2	0.0	0.0	0.1	0.0	0.0
Control Delay (s)	27.9	42.1	14.1	0.0	0.0	7.8	0.0	0.0
Lane LOS	D	E	B			A		
Approach Delay (s)	27.9	42.1	0.2			0.0		
Approach LOS	D	E						

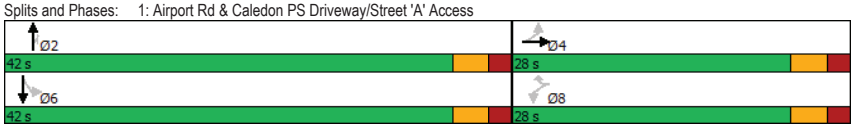
Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	78.6%	ICU Level of Service	D
Analysis Period (min)	15		

Lane Group	EBT	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	0	55	29	1065	18	62	517
Future Volume (vph)	0	55	29	1065	18	62	517
Turn Type	NA	Perm	Perm	NA	Perm	Perm	NA
Protected Phases	4			2			6
Permitted Phases		8	8		2	6	
Detector Phase	4	8	8	2	2	6	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	28.0	28.0	28.0	24.0	24.0	24.0	24.0
Total Split (s)	28.0	28.0	28.0	42.0	42.0	42.0	42.0
Total Split (%)	40.0%	40.0%	40.0%	60.0%	60.0%	60.0%	60.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	8.6	8.6	8.6	47.4	47.4	47.4	47.4
Actuated g/C Ratio	0.15	0.15	0.15	0.81	0.81	0.81	0.81
v/c Ratio	0.06	0.27	0.11	0.71	0.01	0.24	0.37
Control Delay	6.7	25.5	9.6	10.4	1.1	6.7	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.7	25.5	9.6	10.4	1.1	6.7	4.4
LOS	A	C	A	B	A	A	A
Approach Delay	6.7			10.2			4.7
Approach LOS	A			B			A

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 58.7
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 8.8 — Intersection LOS: A
Intersection Capacity Utilization 81.9% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1: Airport Rd & Caledon PS Driveway/Street 'A' Access



Lane Group	EBT	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	19	55	29	1065	18	62	517
v/c Ratio	0.06	0.27	0.11	0.71	0.01	0.24	0.37
Control Delay	6.7	25.5	9.6	10.4	1.1	6.7	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.7	25.5	9.6	10.4	1.1	6.7	4.4
Queue Length 50th (m)	0.0	6.1	0.0	62.5	0.0	1.9	18.5
Queue Length 95th (m)	3.2	13.0	5.2	#164.5	1.1	8.2	37.9
Internal Link Dist (m)	88.8			63.0			79.3
Turn Bay Length (m)							
Base Capacity (vph)	731	547	634	1507	1271	262	1398
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.10	0.05	0.71	0.01	0.24	0.37

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
1: Airport Rd & Caledon PS Driveway/Street 'A' Access

200052
2036 Background PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	0	2	55	0	29	0	1065	18	62	517	0
Future Volume (vph)	17	0	2	55	0	29	0	1065	18	62	517	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.5	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)		5.0		5.0		5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor		1.00		1.00		1.00		1.00	1.00	1.00	1.00	
Frt		0.99		1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected		0.96		0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1813		1750		1566		1865	1566	1750	1731	
Flt Permitted		0.96		0.75		1.00		1.00	1.00	0.18	1.00	
Satd. Flow (perm)		1813		1390		1566		1865	1566	324	1731	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	17	0	2	55	0	29	0	1065	18	62	517	0
RTOR Reduction (vph)	0	17	0	0	0	26	0	0	5	0	0	0
Lane Group Flow (vph)	0	2	0	55	0	3	0	1065	13	62	517	0
Heavy Vehicles (%)	0%	8%	0%	2%	2%	2%	0%	3%	2%	2%	11%	0%
Turn Type	Perm	NA		Perm		Perm		NA	Perm	Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4			8		8			2	6		
Actuated Green, G (s)		5.3		5.3		5.3		45.3	45.3	45.3	45.3	
Effective Green, g (s)		5.3		5.3		5.3		45.3	45.3	45.3	45.3	
Actuated g/C Ratio		0.09		0.09		0.09		0.75	0.75	0.75	0.75	
Clearance Time (s)		5.0		5.0		5.0		5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		158		121		136		1394	1170	242	1293	
v/s Ratio Prot								c0.57			0.30	
v/s Ratio Perm		0.00		c0.04		0.00			0.01	0.19		
v/c Ratio		0.01		0.45		0.02		0.76	0.01	0.26	0.40	
Uniform Delay, d1		25.3		26.3		25.3		4.5	1.9	2.4	2.8	
Progression Factor		1.00		1.00		1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.0		2.7		0.1		2.5	0.0	0.6	0.2	
Delay (s)		25.3		29.0		25.3		7.1	2.0	3.0	3.0	
Level of Service		C		C		C		A	A	A	A	
Approach Delay (s)		25.3			27.7			7.0			3.0	
Approach LOS		C			C			A			A	

Intersection Summary				
HCM 2000 Control Delay	6.8	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.73			
Actuated Cycle Length (s)	60.6	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	81.9%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: Airport Rd & Cranston Dr/Street 'B' Access

200052
2036 Background PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	0	10	20	0	7	19	1051	132	7	543	24
Future Volume (Veh/h)	16	0	10	20	0	7	19	1051	132	7	543	24
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	16	0	10	20	0	7	19	1051	132	7	543	24
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (m)											315	
pX, platoon unblocked												
vC, conflicting volume	1653	1778	543	1656	1670	1051	567			1183		
vC1, stage 1 conf vol	557	557		1089	1089							
vC2, stage 2 conf vol	1096	1221		567	581							
vCu, unblocked vol	1653	1778	543	1656	1670	1051	567			1183		
tC, single (s)	7.2	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.2	5.5		6.1	5.5							
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	93	100	98	91	100	97	98			99		
cM capacity (veh/h)	213	220	544	228	252	276	1015			590		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	26	27	19	1051	132	7	543	24
Volume Left	16	20	19	0	0	7	0	0
Volume Right	10	7	0	0	132	0	0	24
cSH	278	239	1015	1700	1700	590	1700	1700
Volume to Capacity	0.09	0.11	0.02	0.62	0.08	0.01	0.32	0.01
Queue Length 95th (m)	2.3	2.8	0.4	0.0	0.0	0.3	0.0	0.0
Control Delay (s)	19.3	22.0	8.6	0.0	0.0	11.2	0.0	0.0
Lane LOS	C	C	A			B		
Approach Delay (s)	19.3	22.0	0.1			0.1		
Approach LOS	C	C						

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	65.3%	ICU Level of Service	C	
Analysis Period (min)	15			

Appendix H

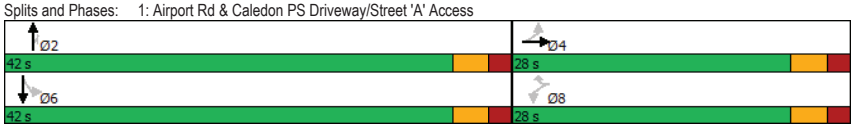
10-Year Horizon Total Traffic Operations Reports

Lane Group	EBT	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	0	95	59	279	5	12	1070
Future Volume (vph)	0	95	59	279	5	12	1070
Turn Type	NA	Perm	Perm	NA	Perm	Perm	NA
Protected Phases	4			2			6
Permitted Phases		8	8		2	6	
Detector Phase	4	8	8	2	2	6	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	28.0	28.0	28.0	24.0	24.0	24.0	24.0
Total Split (s)	28.0	28.0	28.0	42.0	42.0	42.0	42.0
Total Split (%)	40.0%	40.0%	40.0%	60.0%	60.0%	60.0%	60.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	10.0	10.0	10.0	44.1	44.1	44.1	44.1
Actuated g/C Ratio	0.17	0.17	0.17	0.73	0.73	0.73	0.73
v/c Ratio	0.06	0.42	0.19	0.21	0.00	0.02	0.79
Control Delay	5.8	27.8	8.0	4.6	0.0	4.2	15.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.8	27.8	8.0	4.6	0.0	4.2	15.1
LOS	A	C	A	A	A	A	B
Approach Delay	5.8			4.5			15.0
Approach LOS	A			A			B

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 60.3
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 13.5 — Intersection LOS: B
Intersection Capacity Utilization 74.1% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1: Airport Rd & Caledon PS Driveway/Street 'A' Access



Lane Group	EBT	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	18	95	59	279	5	12	1070
v/c Ratio	0.06	0.42	0.19	0.21	0.00	0.02	0.79
Control Delay	5.8	27.8	8.0	4.6	0.0	4.2	15.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.8	27.8	8.0	4.6	0.0	4.2	15.1
Queue Length 50th (m)	0.0	8.9	0.0	9.1	0.0	0.3	70.3
Queue Length 95th (m)	3.0	19.7	7.4	21.0	0.0	1.9	#180.3
Internal Link Dist (m)	88.8			63.0			79.3
Turn Bay Length (m)							
Base Capacity (vph)	686	527	637	1300	1153	791	1350
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.18	0.09	0.21	0.00	0.02	0.79

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
1: Airport Rd & Caledon PS Driveway/Street 'A' Access

200052
2036 Total AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	0	10	95	0	59	0	279	5	12	1070	0
Future Volume (vph)	8	0	10	95	0	59	0	279	5	12	1070	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.5	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)		5.0		5.0		5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor		1.00		1.00		1.00		1.00	1.00	1.00	1.00	
Frt		0.93		1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected		0.98		0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1738		1750		1566		1779	1566	1750	1847	
Flt Permitted		0.98		0.75		1.00		1.00	1.00	0.59	1.00	
Satd. Flow (perm)		1738		1374		1566		1779	1566	1084	1847	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	8	0	10	95	0	59	0	279	5	12	1070	0
RTOR Reduction (vph)	0	16	0	0	0	51	0	0	1	0	0	0
Lane Group Flow (vph)	0	2	0	95	0	8	0	279	4	12	1070	0
Heavy Vehicles (%)	0%	2%	0%	2%	2%	2%	0%	8%	2%	2%	4%	0%
Turn Type	Perm	NA		Perm		Perm		NA	Perm	Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4			8		8			2	6		
Actuated Green, G (s)		8.3		8.3		8.3		43.0	43.0	43.0	43.0	
Effective Green, g (s)		8.3		8.3		8.3		43.0	43.0	43.0	43.0	
Actuated g/C Ratio		0.14		0.14		0.14		0.70	0.70	0.70	0.70	
Clearance Time (s)		5.0		5.0		5.0		5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		235		186		212		1247	1098	760	1295	
v/s Ratio Prot								0.16			c0.58	
v/s Ratio Perm		0.00		c0.07		0.01			0.00	0.01		
v/c Ratio		0.01		0.51		0.04		0.22	0.00	0.02	0.83	
Uniform Delay, d1		22.9		24.6		23.0		3.2	2.7	2.8	6.5	
Progression Factor		1.00		1.00		1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.0		2.4		0.1		0.1	0.0	0.0	4.5	
Delay (s)		23.0		27.0		23.1		3.3	2.7	2.8	11.0	
Level of Service		C		C		C		A	A	A	B	
Approach Delay (s)		23.0			25.5			3.3			10.9	
Approach LOS		C			C			A			B	

Intersection Summary				
HCM 2000 Control Delay	11.1	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.77			
Actuated Cycle Length (s)	61.3	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	74.1%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: Airport Rd & Cranston Dr/Street 'B' Access

200052
2036 Total AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	0	21	63	0	17	4	269	28	3	1166	10
Future Volume (Veh/h)	9	0	21	63	0	17	4	269	28	3	1166	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	9	0	21	63	0	17	4	269	28	3	1166	10
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (m)											315	
pX, platoon unblocked	0.38	0.38	0.38	0.38	0.38		0.38					
vC, conflicting volume	1466	1477	1166	1470	1459	269	1176			297		
vC1, stage 1 conf vol	1172	1172		277	277							
vC2, stage 2 conf vol	294	305		1193	1182							
vCu, unblocked vol	1410	1439	617	1421	1392	269	644			297		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	100	89	54	100	98	99			100		
cM capacity (veh/h)	169	170	187	137	162	770	360			1264		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	30	80	4	269	28	3	1166	10
Volume Left	9	63	4	0	0	3	0	0
Volume Right	21	17	0	0	28	0	0	10
cSH	181	166	360	1700	1700	1264	1700	1700
Volume to Capacity	0.17	0.48	0.01	0.16	0.02	0.00	0.69	0.01
Queue Length 95th (m)	4.3	17.3	0.3	0.0	0.0	0.1	0.0	0.0
Control Delay (s)	28.8	45.5	15.1	0.0	0.0	7.9	0.0	0.0
Lane LOS	D	E	C			A		
Approach Delay (s)	28.8	45.5	0.2			0.0		
Approach LOS	D	E						

Intersection Summary				
Average Delay	2.9			
Intersection Capacity Utilization	78.4%	ICU Level of Service	D	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	11	9	286	1167	9
Future Volume (Veh/h)	0	11	9	286	1167	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	11	9	286	1167	9
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	None	
Median storage veh)				2		
Upstream signal (m)					87	
pX, platoon unblocked						
vC, conflicting volume	1332	588	1176			
vC1, stage 1 conf vol	1172					
vC2, stage 2 conf vol	161					
vCu, unblocked vol	1332	588	1176			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	98			
cM capacity (veh/h)	248	452	590			

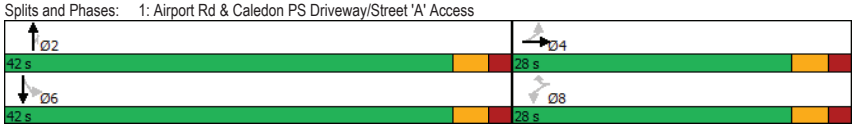
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	11	9	143	143	778	398
Volume Left	0	9	0	0	0	0
Volume Right	11	0	0	0	0	9
cSH	452	590	1700	1700	1700	1700
Volume to Capacity	0.02	0.02	0.08	0.08	0.46	0.23
Queue Length 95th (m)	0.6	0.3	0.0	0.0	0.0	0.0
Control Delay (s)	13.2	11.2	0.0	0.0	0.0	0.0
Lane LOS	B	B				
Approach Delay (s)	13.2	0.3			0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	42.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	0	55	29	1065	18	62	521
Future Volume (vph)	0	55	29	1065	18	62	521
Turn Type	NA	Perm	Perm	NA	Perm	Perm	NA
Protected Phases	4			2			6
Permitted Phases		8	8		2	6	
Detector Phase	4	8	8	2	2	6	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	28.0	28.0	28.0	24.0	24.0	24.0	24.0
Total Split (s)	28.0	28.0	28.0	42.0	42.0	42.0	42.0
Total Split (%)	40.0%	40.0%	40.0%	60.0%	60.0%	60.0%	60.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	8.6	8.6	8.6	47.4	47.4	47.4	47.4
Actuated g/C Ratio	0.15	0.15	0.15	0.81	0.81	0.81	0.81
v/c Ratio	0.06	0.27	0.11	0.71	0.01	0.24	0.37
Control Delay	6.7	25.5	9.6	10.4	1.1	6.7	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.7	25.5	9.6	10.4	1.1	6.7	4.4
LOS	A	C	A	B	A	A	A
Approach Delay	6.7			10.2			4.7
Approach LOS	A			B			A

Intersection Summary			
Cycle Length: 70			
Actuated Cycle Length: 58.7			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 8.8		Intersection LOS: A	
Intersection Capacity Utilization 81.9%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Airport Rd & Caledon PS Driveway/Street 'A' Access



Lane Group	EBT	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	19	55	29	1065	18	62	521
v/c Ratio	0.06	0.27	0.11	0.71	0.01	0.24	0.37
Control Delay	6.7	25.5	9.6	10.4	1.1	6.7	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.7	25.5	9.6	10.4	1.1	6.7	4.4
Queue Length 50th (m)	0.0	6.1	0.0	62.5	0.0	1.9	18.6
Queue Length 95th (m)	3.2	13.0	5.2	#164.5	1.1	8.2	38.3
Internal Link Dist (m)	88.8			63.0			79.3
Turn Bay Length (m)							
Base Capacity (vph)	731	547	634	1507	1271	262	1398
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.10	0.05	0.71	0.01	0.24	0.37

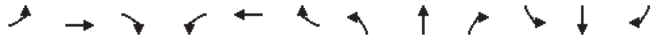
Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	0	2	55	0	29	0	1065	18	62	521	0
Future Volume (vph)	17	0	2	55	0	29	0	1065	18	62	521	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.5	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)		5.0		5.0		5.0		5.0	5.0	5.0	5.0	
Lane Util. Factor		1.00		1.00		1.00		1.00	1.00	1.00	1.00	
Frt		0.99		1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected		0.96		0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1813		1750		1566		1865	1566	1750	1731	
Flt Permitted		0.96		0.75		1.00		1.00	1.00	0.18	1.00	
Satd. Flow (perm)		1813		1390		1566		1865	1566	324	1731	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	17	0	2	55	0	29	0	1065	18	62	521	0
RTOR Reduction (vph)	0	17	0	0	0	26	0	0	5	0	0	0
Lane Group Flow (vph)	0	2	0	55	0	3	0	1065	13	62	521	0
Heavy Vehicles (%)	0%	8%	0%	2%	2%	2%	0%	3%	2%	2%	11%	0%
Turn Type	Perm	NA		Perm		Perm		NA	Perm	Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4			8		8			2	6		
Actuated Green, G (s)		5.3		5.3		5.3		45.3	45.3	45.3	45.3	
Effective Green, g (s)		5.3		5.3		5.3		45.3	45.3	45.3	45.3	
Actuated g/C Ratio		0.09		0.09		0.09		0.75	0.75	0.75	0.75	
Clearance Time (s)		5.0		5.0		5.0		5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		158		121		136		1394	1170	242	1293	
v/s Ratio Prot								c0.57			0.30	
v/s Ratio Perm		0.00		c0.04		0.00			0.01	0.19		
v/c Ratio		0.01		0.45		0.02		0.76	0.01	0.26	0.40	
Uniform Delay, d1		25.3		26.3		25.3		4.5	1.9	2.4	2.8	
Progression Factor		1.00		1.00		1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.0		2.7		0.1		2.5	0.0	0.6	0.2	
Delay (s)		25.3		29.0		25.3		7.1	2.0	3.0	3.0	
Level of Service		C		C		C		A	A	A	A	
Approach Delay (s)		25.3			27.7			7.0			3.0	
Approach LOS		C			C			A			A	

Intersection Summary					
HCM 2000 Control Delay	6.8	HCM 2000 Level of Service	A		
HCM 2000 Volume to Capacity ratio	0.73				
Actuated Cycle Length (s)	60.6	Sum of lost time (s)	10.0		
Intersection Capacity Utilization	81.9%	ICU Level of Service	D		
Analysis Period (min)	15				

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	0	10	20	0	7	19	1062	132	7	557	34
Future Volume (Veh/h)	16	0	10	20	0	7	19	1062	132	7	557	34
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	16	0	10	20	0	7	19	1062	132	7	557	34
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (m)											315	
pX, platoon unblocked												
vC, conflicting volume	1678	1803	557	1681	1705	1062	591			1194		
vC1, stage 1 conf vol	571	571		1100	1100							
vC2, stage 2 conf vol	1107	1232		581	605							
vCu, unblocked vol	1678	1803	557	1681	1705	1062	591			1194		
tC, single (s)	7.2	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.2	5.5		6.1	5.5							
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	92	100	98	91	100	97	98			99		
cM capacity (veh/h)	210	217	534	224	247	272	995			585		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	26	27	19	1062	132	7	557	34
Volume Left	16	20	19	0	0	7	0	0
Volume Right	10	7	0	0	132	0	0	34
cSH	274	235	995	1700	1700	585	1700	1700
Volume to Capacity	0.10	0.11	0.02	0.62	0.08	0.01	0.33	0.02
Queue Length 95th (m)	2.3	2.9	0.4	0.0	0.0	0.3	0.0	0.0
Control Delay (s)	19.5	22.3	8.7	0.0	0.0	11.2	0.0	0.0
Lane LOS	C	C	A			B		
Approach Delay (s)	19.5	22.3	0.1			0.1		
Approach LOS	C	C						

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	65.9%	ICU Level of Service	C	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	24	11	1075	575	4
Future Volume (Veh/h)	0	24	11	1075	575	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	24	11	1075	575	4
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	None	
Median storage veh)				2		
Upstream signal (m)					87	
pX, platoon unblocked						
vC, conflicting volume	1136	290	579			
vC1, stage 1 conf vol	577					
vC2, stage 2 conf vol	560					
vCu, unblocked vol	1136	290	579			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	97	99			
cM capacity (veh/h)	406	707	991			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	24	11	538	538	383	196
Volume Left	0	11	0	0	0	0
Volume Right	24	0	0	0	0	4
cSH	707	991	1700	1700	1700	1700
Volume to Capacity	0.03	0.01	0.32	0.32	0.23	0.12
Queue Length 95th (m)	0.8	0.3	0.0	0.0	0.0	0.0
Control Delay (s)	10.3	8.7	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	10.3	0.1			0.0	
Approach LOS	B					

Intersection Summary				
Average Delay	0.2			
Intersection Capacity Utilization	33.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Appendix I

Signal Warrant

(OTM Book 12 - Justification 7)

Horizon Year: 2036 Total
Region/City/Township: Caledon East

Major Street: Airport Road
Minor Street: Cranston Dr/Street 'B' Access

North/South?: Y

Number of Approach Lanes: 1
Tee Intersection? N
Flow Conditions: Restricted

PM Forecast Only? N

Warrant Results		
150% Satisfied	No	Justification for new intersections with forecast traffic
120% Satisfied	No	Justification for existing intersections with forecast traffic

	Major Street						Minor Street						
	Airport Road						Cranston Dr/Street 'B' Access						
	Northbound			Southbound			Eastbound			Westbound			Peds Crossing
Time Period	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	Main Road
AM Peak Hour	4.1183571	269.71093	28	3	1166.1634	10.236714	9.2367142	0	21.964571	63	0	17	0
PM Peak Hour	19.219	1062.7076	132	7	557.33893	34.710143	16.473428	0	10.982286	20	0	7	0
Average Hourly Volume	6	333	40	3	431	11	6	0	8	21	0	6	0

Warrant	AHV
1A - All	865
1B - Minor	41
2A - Major	824
2B - Cross	27

Warrant 1 - Minimum Vehicular Volume

1A	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
			X			
	All Approaches	480	720	600	900	865
					% Fulfilled	120.1%

1B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
			X			
	Minor Street Approaches	120	170	120	170	41
					% Fulfilled	24.4%

Warrant 2 - Delay To Cross Traffic

2A	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
			X			
	Major Street Approaches	480	720	600	900	824
					% Fulfilled	114.4%

2B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
			X			
	Traffic Crossing Major Street	50	75	50	75	27
					% Fulfilled	36.2%