

Transportation Impact Study

PROPOSED RESIDENTIAL DEVELOPMENT

129 Collier Street
City of Barrie, Ontario

February 2021
Project No: NT-19-203

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NextEng Consulting Group Inc.

February 18, 2022

129 Collier LP.

**Re: Transportation Impact Study
 Proposed Residential Development
 129 Collier Street, City of Barrie
 Our Project No. NT-19-203**

Nexttrans Consulting Engineers (a Division of NextEng Consulting Group Inc.) is pleased to present the enclosed Transportation Impact Study for the above noted site in support of Official Plan and Rezoning applications.

The subject property is located at 129 Collier Street, in the City of Barrie. The site is currently vacant. The redevelopment is proposing two twelve-storey buildings with total of 293 dwelling units. The proposed development will provide a total of 249 parking spaces and 206 bicycle parking spaces.

The transportation study concludes that the proposed development can adequately be accommodated by the existing transportation network, excellent existing Barrie Transit, as well as the recommended Transportation Demand Management measures and incentives recommended in this report.

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

Yours truly,

Nexttrans Consulting Engineers
A Division of NextEng Consulting Group Inc.

Prepared by:

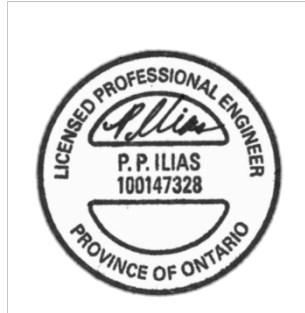


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Report Submission Record

Identification	Date	Description of issued and/or revision
Final Report	February 18, 2022	For Client Submission

EXECUTIVE SUMMARY

Nextrans Consulting Engineers (A Division of NextEng Consulting Group Inc.) was retained by 129 Collier Limited Partnership (the 'Client') to undertake a Transportation Impact Study in support of Official Plan and Rezoning applications for a development of two (2) twelve-storey residential buildings with a total of 293 dwelling units. The subject property is located at 129 Collier Street, and currently vacant, in the city of Barrie.

Proposed Development Access

The proposed development will provide a full movement entrance via Collier Street.

Capacity Analysis

The proposed development is expected to generate:

- 62 total new two-way trips (7 inbound and 55 outbound) during the weekday morning and 56 total new two-way trips (39 inbound and 17 outbound) during the afternoon peak hours, respectively;
- 15 total new two-way non-auto trips (2 inbound and 13 outbound) during the weekday morning and 11 total new two-way non-auto trips (8 inbound and 3 outbound) during the afternoon peak hours, respectively;
- 47 total new two-way auto trips (5 inbound and 42 outbound) during the weekday morning and 45 total new two-way auto trips (31 inbound and 14 outbound) during the afternoon peak hours, respectively;

Auto Mode Assessment

Under the existing, future background and future total conditions, the intersection operation capacity analysis indicates that all intersections considered are expected to operate at acceptable levels of service. No improvements are required under these horizon years.

The analysis indicates that the proposed access onto Collier Street is expected to operate at acceptable levels of service with minimal delays or queues. No improvement to the existing Collier Street is required to accommodate the proposed development.

Active Transportation Mode Assessment

Sidewalk

Currently, there are sidewalks located on both sides of Collier Street, Poyntz Street, Mulcaster Street and Dunlop Street East in the vicinity of the proposed development. Therefore, no improvements are necessary to accommodate the proposed development.

Bicycle Facility

Currently, there is no dedicated bicycle lane Collier Street, Dunlop Street E, Mulcaster Street, in the vicinity of the proposed development. There are only some local trails that connecting through the Heritage Park and Barrie North Shore Trail to the south of the site.

The proposed development will provide pedestrian/ cyclist connections from buildings to Collier Street and Dunlop Street East, to support the active transportation activities.

Vehicle Parking Review

Based on the City's Zoning By-Law, a total of 293 parking spaces are required for the proposed development. It is our understanding that the proposed development provides 249 vehicle parking spaces consists of 235 spaces for resident, and 14 spaces for visitor. It is our understanding that the proposed development presents a technical shortfall of total 44 parking spaces for two buildings (15% reduction).

The proposed development will provide 206 bicycle parking spaces (including short-term and long-term parking) in order to support the residents and visitors and help reducing the auto trip to and from the proposed development.

Transportation Demand Management Measures and Incentives

The TDM measures and incentives related to the proposed development have been assessed and recommended in Section 9 of this report to support active transportation and transit, to meet the objectives and requirements of the City of Barrie's transportation policies.

Loading Requirement

Based on the current City's Zoning By-law, there is no loading requirement for the residential, however the proposed development will provide 1 loading space with the dimensions 3m W x 9m L x 4m (vertical clearance) in the Collier tower.

AutoTURN software was used (Barrie Garbage Truck specifications) to generate vehicular turning templates to confirm and demonstrate the proposed loading space dimensions and space requirements.

Study Conclusions and Recommendations

Based on the assessment, our report recommends that:

- The proposed development implements the TDM measures and incentives identified in this report to support active transportation and transit and to reduce the numbers of single-occupant-vehicle trips to and from the proposed development;
- The proposed development provides direct shared pedestrian and cycling connections from the proposed development building entrances directly to Collier Street and Dunlop Street E, where appropriate;
- The proposed parking rate should be reduced to support the non-auto mode transportation.
- No additional physical improvements are needed for the study area under the future background and future total conditions.

TABLE OF CONTENTS

1.0	INTRODUCTION	1
2.0	EXISTING TRAFFIC CONDITIONS	3
2.1.	Existing Road Network	3
2.2.	Existing Active Transportation Network	3
2.3.	Existing Active Transportation Assessment	4
2.4.	Existing Barrie Transit System	4
2.3.	Existing Traffic Volumes	5
2.4.	Existing Traffic Assessment	6
3.0	TRANSPORTATION PLANNING CONTEXT IN THE AREA	7
3.1.	Land Use Context	7
3.2.	Transportation Planning Context	7
3.3.	Urban Growth Centre	8
4.0	FUTURE BACKGROUND CONDITIONS	8
4.1.	Analysis Horizon	8
4.2.	Future Background Corridor Growth	8
4.3.	Background Development Applications	8
4.4.	Future Background Traffic Assessment	9
5.0	SITE TRAFFIC	10
5.1.	Proposed Development	10
5.2.	Modes of Travel Assessment in the Area	10
5.3.	Site Trip Generation	10
5.4.	Site Trip Distribution and Assignment	11
6.0	FUTURE TOTAL TRAFFIC CONDITIONS	12
6.1.	Active Transportation Mode Assessment	14
7.0	SITE PLAN REVIEW	14
7.1.	Loading Requirement	14
7.2.	Driveway Location and Configuration	14
7.3.	Signage and Pavement Marking Plan	14
8.0	PARKING ASSESSMENT	15
8.1.	Vehicle Parking Requirement	15
8.1.1.	Parking Recommendation for the Proposed Development	15
8.1.2.	Development Proposal Context	16
8.1.3.	Existing Mode Share	16
8.1.4.	Household Demographic and Car Ownership	16
8.1.5.	Available On-Street Paid Parking in the Area	17
8.1.6.	City of Barrie Official Plan (2018)	17
8.1.7.	Transit Service	18
8.1.8.	Neighborhood Context	18
8.1.9.	Ontario's Five-Year Climate Change Action Plan	19
8.1.10.	City of Barrie Approved/Proposed Development Parking Rate	20
8.1.11.	Observed Demand at Comparable Sites	21
8.1.12.	Mobility as a Service (MaaS)	22
8.1.13.	Parking and Affordability	23
8.1.14.	Transportation Planning Context	23
8.1.15.	Transportation Demand Management Measures	23

	8.2. Bicycle Parking	24
9.0	TRANSPORTATION DEMAND MANAGEMENT	24
10.0	CONCLUSIONS / FINDINGS	24
	10.1. Study Conclusions.....	24
	10.2. Study Recommendations	25

LIST OF FIGURES

Figure 1 – Proposed Development Location
Figure 2 – Proposed Concept Site Plan
Figure 3 – Existing Lane Configuration and Traffic Control
Figure 4 – Existing Active Transportation Network in the Study Area
Figure 5 – Existing Transit Network in the Area
Figure 6 – Existing Traffic Volumes
Figure 7 – 2028 Future Background Traffic Volumes
Figure 8 – Site Traffic Volumes
Figure 9 – 2028 Future Total Traffic Volumes
Figure 10 – AutoTURN Analysis (Barrie Garbage Truck)
Figure 11 - Signage and Pavement Marking Plan
Figure 12 – Available On-Street Parking and Paid Parking Lots
Figure 13 – Available Amenities in the Area Within Walking Distance

LIST OF TABLES

Table 1 – Existing Levels of Service for Signalized Intersections
Table 2 – 2028 Future Background Levels of Service
Table 3 – Modes of Travel based on 2016 TTS Data for Traffic Zones 8501,8505,8506
Table 4 – Site Total Trip Generation for Current Development Proposal
Table 5 – Trip Distribution for Residential Component
Table 6 – Site Trip Distribution
Table 7 – 2028 Future Total Levels of Service
Table 8 - City of Barrie Zoning By-law No. 2009-141 Loading Requirements
Table 9 – City of Barrie Zoning By-law No. 2009-141 Vehicle Parking Requirements
Table 10 - Proposed Parking Rate
Table 11 – Modes of Travel based on 2016 TTS Data for Traffic Zones 8501,8505,8506
Table 12 – Vehicle Ownership for Ward 23 Based on 2016 TTS Data (City of Barrie)
Table 13 – Proxy Apartment Parking Demand Studies
Table 14 – Proposed Bicycle Parking

APPENDICES

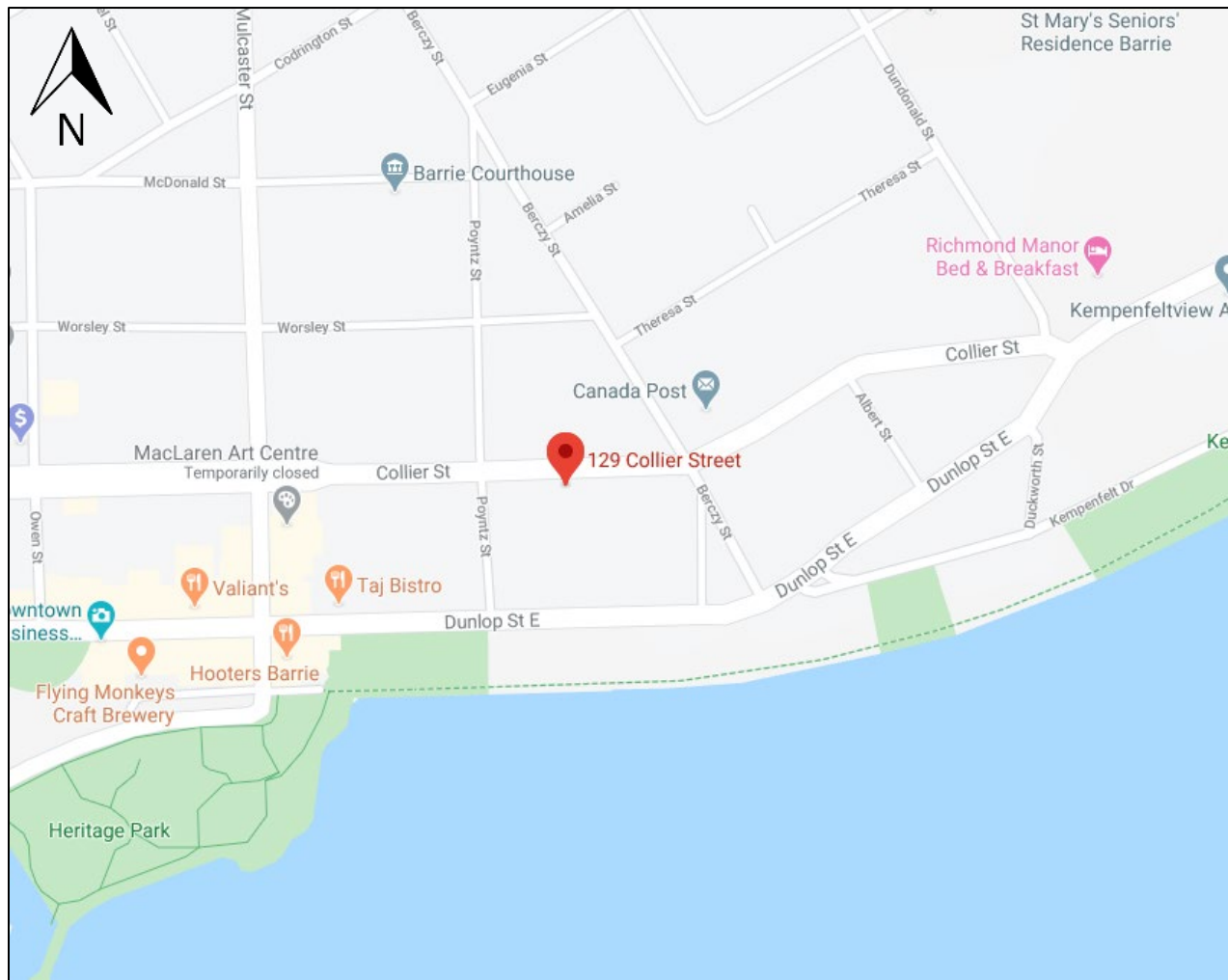
Appendix A – Existing Traffic Data
Appendix B – Existing Traffic Level of Service Calculations
Appendix C – Historical Traffic Count Analysis
Appendix D – Background Developments
Appendix E – Future Background Traffic Level of Service Calculations
Appendix F – 2016 TTS Data Extraction
Appendix G – Future Total Traffic Level of Service Calculations
Appendix H – Proxy Parking Demand Studies

1.0 INTRODUCTION

NexTrans Consulting Engineers (A Division of NextEng Consulting Group Inc.) was retained by 129 Collier Limited Partnership (the 'Client') to undertake a Transportation Impact Study in support of Official Plan and Rezoning applications for a development of two (2) twelve-storey buildings with a total of 293 dwelling unit. The subject property is located at 129 Collier Street, City of Barrie.

The location of the proposed development is illustrated in **Figure 1**.

Figure 1 – Proposed Development Location



Source: Google Map

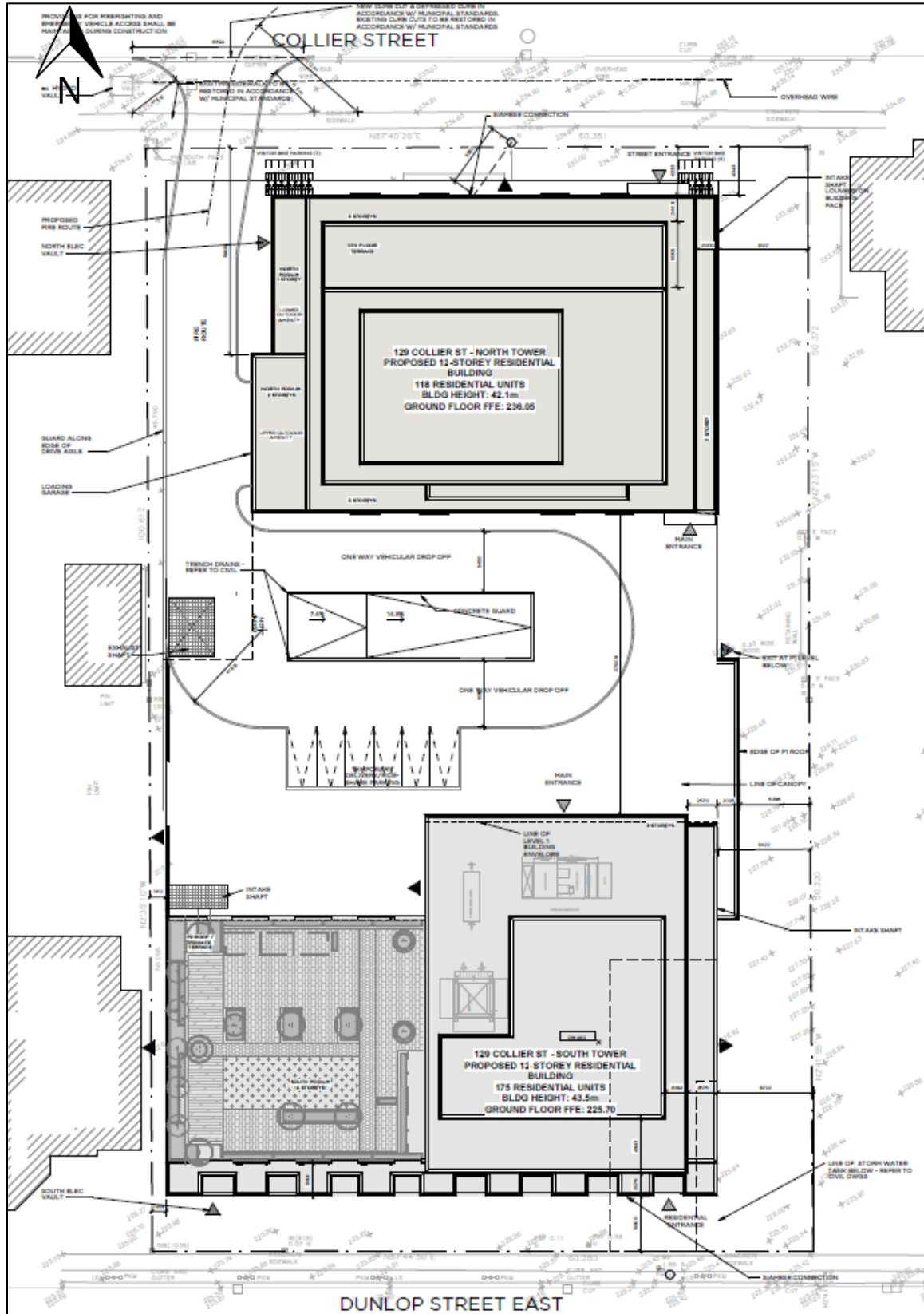
The site is currently vacant. The redevelopment is proposing two residential buildings consists of total 293 dwelling units:

- North Building: twelve- storey residential building with 118 dwelling units
- South Building: twelve- storey mix-used building with 175 dwelling units
- The proposed development will provide a total of 249 vehicle parking spaces and 206 bicycle parking spaces.

The proposed full movement entrance will be provided via Collier Street.

Figure 2 illustrates the proposed development site plan.

Figure 2 – Proposed Concept Site Plan



2.0 EXISTING TRAFFIC CONDITIONS

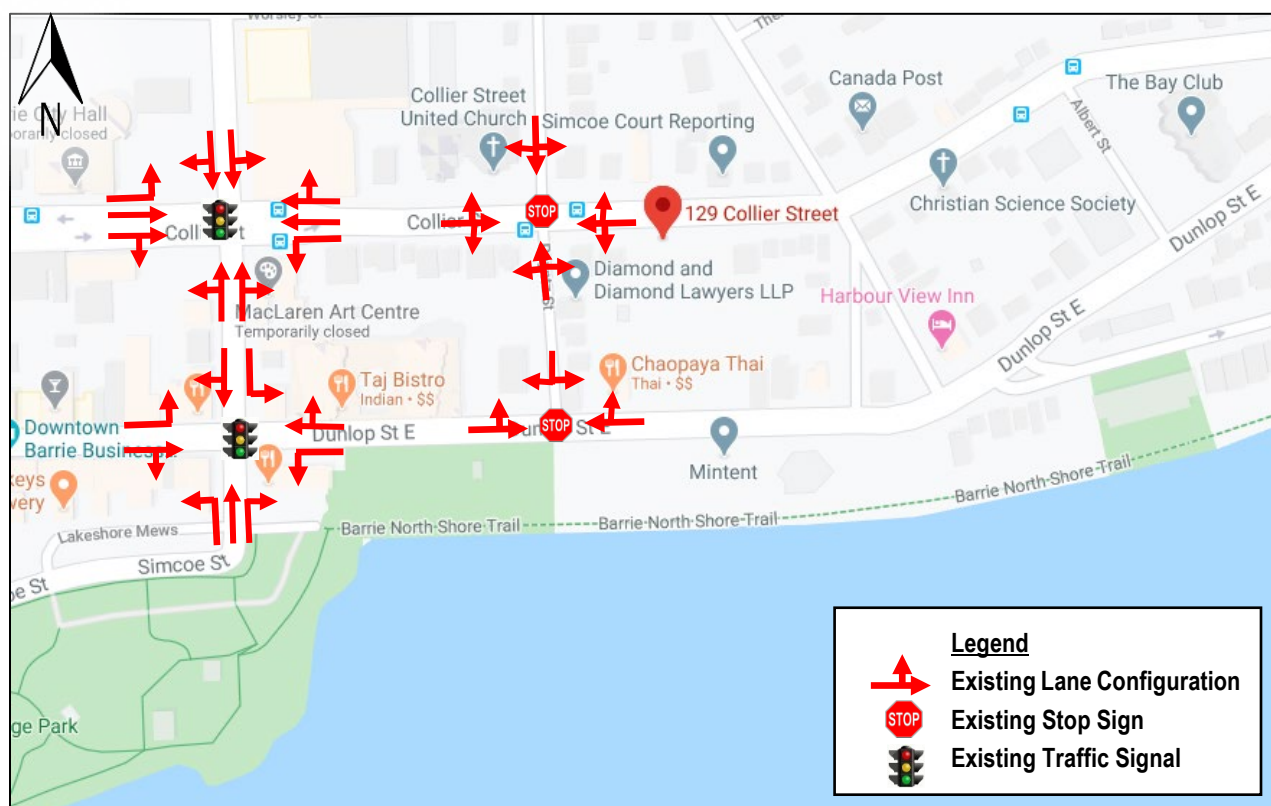
2.1. Existing Road Network

The subject property is located at 129 Collier Street, north of Collier Street, in the City of Barrie. The road network is described as follows:

- **Collier Street:** is an east-west local road under the jurisdiction of City of Barrie. It has a two-lane cross-section and maintains an unposted speed limit of 40 km/h near the subject site.
- **Poyntz Street:** is a north-south local road under the jurisdiction of City of Barrie. It has a two-lane cross-section and it maintains an unposted speed limit of 40 km/h near the subject site.
- **Berczy Street:** is a north-south local road under the jurisdiction of City of Barrie. It has a two-lane cross section and it maintains an unposted speed limit of 40 km/h near the subject site.
- **Dunlop Street East:** is an east-west collector road under the jurisdiction of City of Barrie. It has two-lane cross-section and maintains an unposted speed limit of 60 km/h near the subject site.
- **Mulcaster Street:** is a north-south collector road under the jurisdiction of City of Barrie. It has two-lane cross section and maintains an unposted speed limit of 60 km/h near the subject site.

Figure 3 illustrates the existing lane configuration and traffic control.

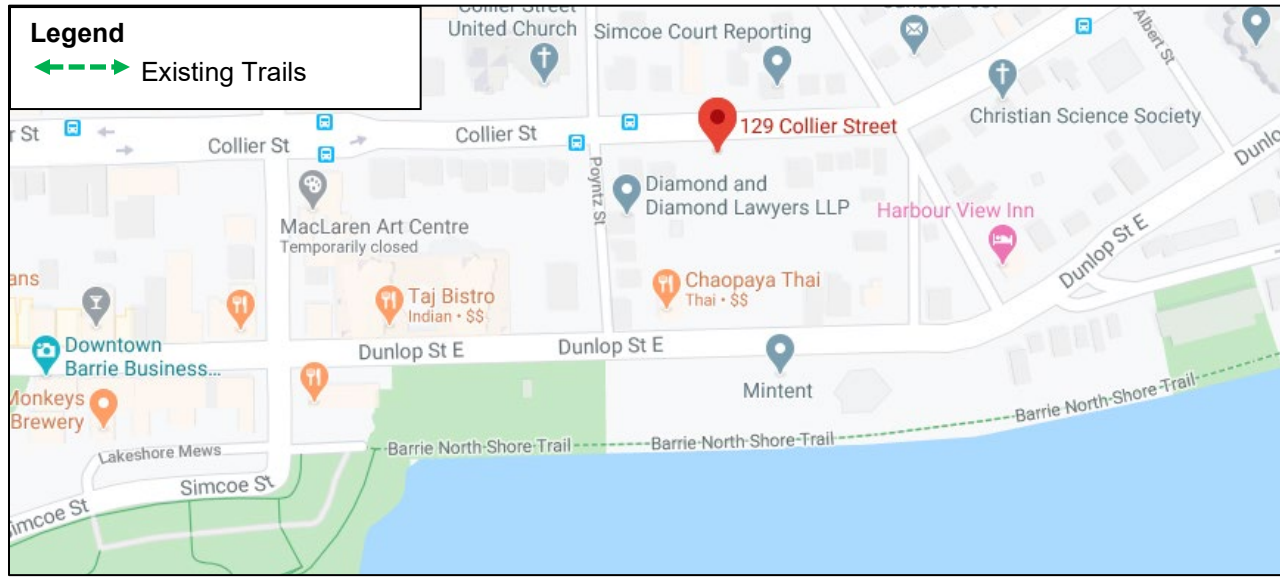
Figure 3 – Existing Lane Configuration and Traffic Control



Source: Google Map

2.2. Existing Active Transportation Network

Figure 4 illustrates the existing active transportation network in the study area.

Figure 4 – Existing Active Transportation Network in the Study Area

Source: Google Map

2.3. Existing Active Transportation Assessment

Sidewalk

Currently, there are sidewalks located on both sides of Collier Street, Poyntz Street, Mulcaster Street and Dunlop Street East in the vicinity of the proposed development.

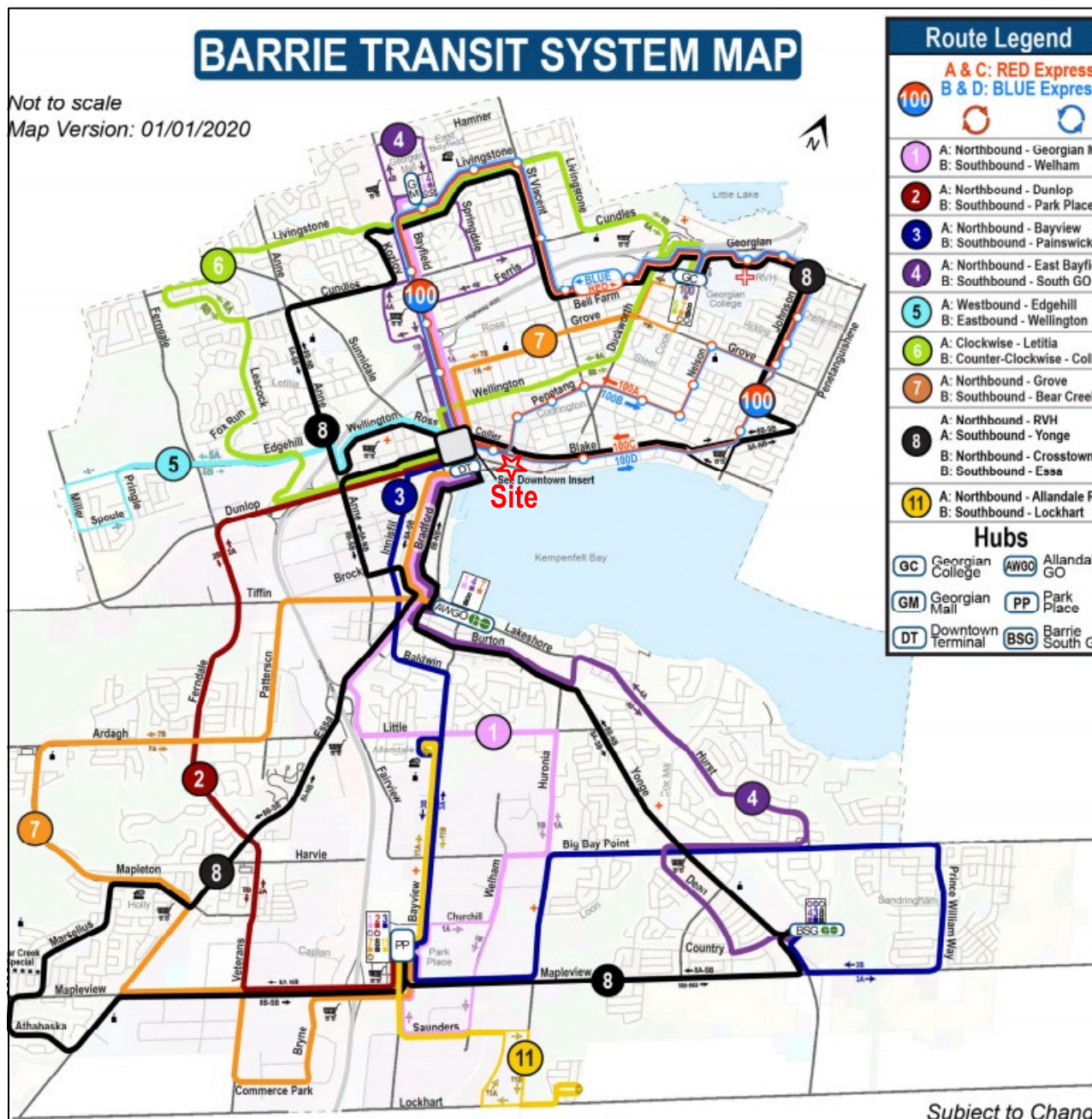
Bicycle Facility

Currently, there is no dedicated bicycle lane on Collier Street, Dunlop Street E, Mulcaster Street, in the vicinity of the proposed development. There are only some local trails that connecting through the Heritage Park and Barrie North Shore Trail, located to the south of the site.

2.4. Existing Barrie Transit System

The proposed development is located adjacent to Barrie Bus Route 8B stops at Collier Street and Poyntz Street intersection. The existing transit network in the area is illustrated in **Figure 5**.

Figure 5 – Existing Transit Network in the Area



Source: Barrie website

Barrie Bus Route descriptions:

- **Barrie Bus Route 8B Crosstown/ESSA**- The Route 8B Crosstown/ESSA generally operates in an east-west direction, between Park Place and Georgian College. The route also serves Barrie South GO and Allandale GO station. The route operates 16 minutes or better, all day, everyday.

2.3. Existing Traffic Volumes

Existing traffic volumes at the study area intersections were undertaken by City of Barrie, detail as following:

- Mulcaster Street & Collier Street – Wednesday June 1, 2016

- Dunlop Street East & Mulcaster Street: Tuesday March 19, 2019

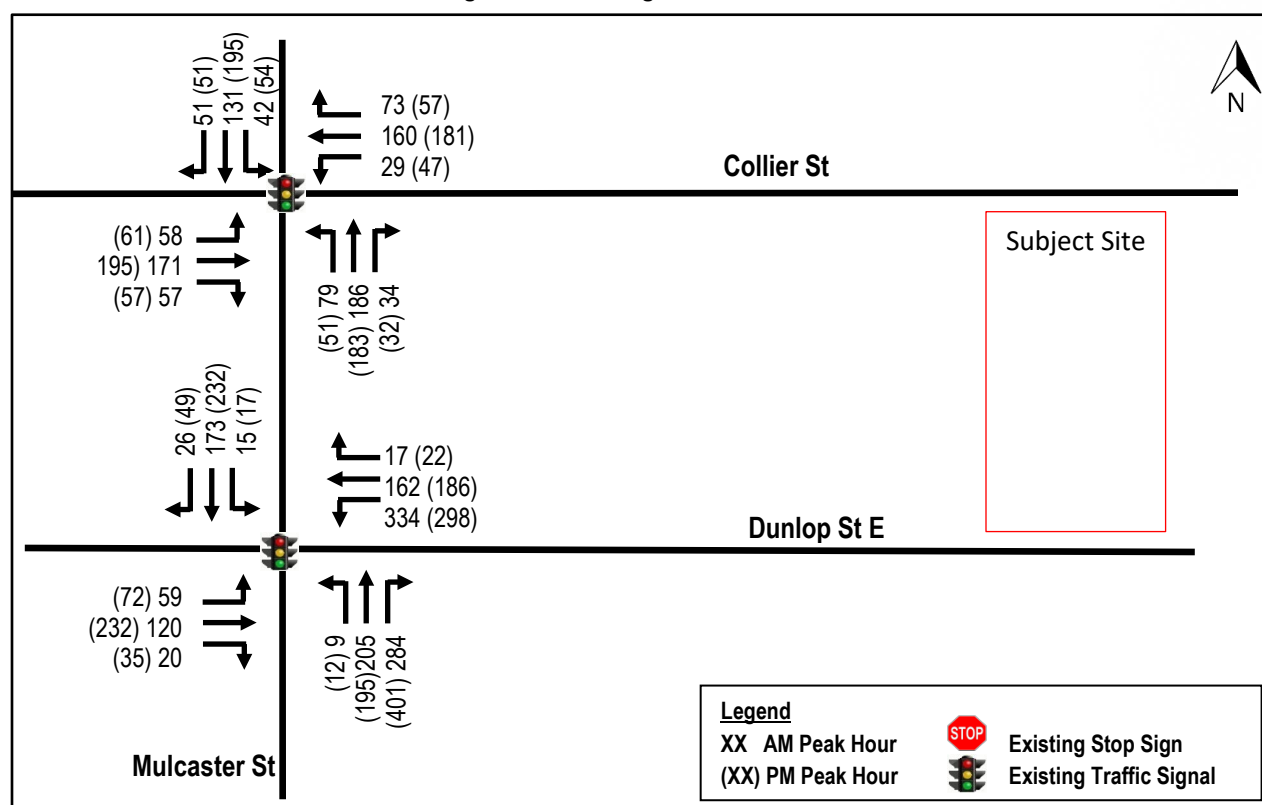
Turning movement counts are summarized in **Appendix A**.

In light of the COVID-19 pandemic, there are some speculations and expectations that the traffic counts could not be undertaken because many offices and employer allowed staff working from home. There is also a number of students learning online instead of attending classes. Therefore, the growth rate has been applied to through volumes to prorate the outdated data for study intersections. This growth rates have been used in the background development studies, therefore, to be conservative and consistent with background development studies in the area, the following growth rates has been used to prorate the outdated count. The historical traffic count analysis is summarized in **Appendix C**.

- 4% per annum – Dunlop Street
- 2% per annum – Collier Street and Mulcaster Street

The existing volumes are illustrated in **Figure 6**.

Figure 6 – Existing Traffic Volumes



2.4. Existing Traffic Assessment

The existing volumes in **Figure 6** were analyzed using Synchro Version 9 software. The methodology of the software follows the procedures described and outlined in the Highway Capacity Manual, HCM 2000, published by the Transportation Research Board. The detailed results are provided in **Appendix B** and summarized in **Table 1**.

Table 1 – Existing Levels of Service for Signalized Intersections

Intersection	Key Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		LOS (v/c)	Delay (s)	95 TH Queue	LOS (v/c)	Delay (s)	95 TH Queue
Dunlop Street East and Mulcaster Street (signalized)	Overall	B (0.53)	11.9		B (0.58)	13.2	
	EBL	B (0.14)	11.2	11.4	B (0.17)	11.9	13.6
	EBTR	B (0.20)	11.4	20.3	B (0.40)	13.8	38.6
	WBL	A (0.48)	6.0	33.6	A (0.50)	6.6	29.6
	WBTR	A (0.16)	5.0	16.9	A (0.19)	5.5	19.4
	NBL	B (0.03)	14.9	3.1	B (0.06)	14.8	3.9
	NBT	B (0.48)	17.4	31.0	B (0.43)	16.8	29.6
	NBR	B (0.18)	15.6	13.3	B (0.26)	15.8	15.6
	SBL	B (0.06)	15.1	4.5	B (0.06)	14.8	4.9
	SBTR	B (0.45)	17.2	28.8	B (0.61)	19.3	40.5
Collier Street and Mulcaster Street (signalized)	Overall	A (0.35)	9.3		A (0.32)	8.9	
	EBL	A (0.11)	5.8	8.2	A (0.11)	5.4	7.9
	EBTR	A (0.12)	5.9	9.5	A (0.13)	5.5	9.6
	WBL	A (0.05)	5.9	5.7	A (0.09)	5.5	7.5
	WBTR	A (0.12)	5.9	10.6	A (0.12)	5.5	10.7
	NBLT	B (0.59)	14.5	33.8	B (0.54)	13.8	29.7
	NBR	B (0.02)	10.4	3.9	B (0.02)	10.7	3.9
	SBLTR	B (0.23)	1.1	11.2	B (0.33)	11.9	14.7

The intersection operation capacity analysis indicates that the intersection considered is current operating at acceptable levels of service.

3.0 TRANSPORTATION PLANNING CONTEXT IN THE AREA

3.1. Land Use Context

Based on Nextrans comprehensive review of the study area, it is evident that there is a wide range of different types of land uses currently exist in this area within 2 to 10 minutes walking distance such as:

- Medical centre/office and pharmacy;
- Financial institutions;
- Retail/commercial along Collier Street, Dunlop St E and Mulcaster Street;
- Institutions (elementary schools and churches); and
- High quality sit-down restaurants and fast-food restaurants

3.2. Transportation Planning Context

As indicated, the subject property is currently vacant. The proposed development is located adjacent to Barrie Bus Route 8B stops at Collier Street and Poyntz Street intersection.

From this perspective, it is Nextrans' opinion that the proposed development represents good transportation and land use planning since it promotes the future residents to walk, cycle and take transit instead of driving, as the area is well-served by Barrie Bus service.

3.3. Urban Growth Centre

The proposed development is located in the Downtown Barrie Urban Growth Centre which the City has established new Mixed-Use zoning categories in order to support the combination of various residential and commercial uses within a higher-density urban environment. Mixed-use zoning will help the city achieve the density targets set by the province and will contribute towards a more pedestrian-friendly public realm where residents can take advantage of living, working, shopping, and leisure opportunity within their own neighbourhoods. As such, the proposed development is accommodated the scope of the City Plan.

4.0 FUTURE BACKGROUND CONDITIONS

4.1. Analysis Horizon

For the purposes of this assessment, it is assumed that the proposed development will be fully built-out by 2023. As such, a five-year horizon (2028) after the entire building process of the proposed development has been carried out for the study analysis.

4.2. Future Background Corridor Growth

In order to be consistent with background development traffic study, the below growth rate has been applied to the through volumes:

- 4% per annum – Dunlop Street
- 2% per annum – Collier Street and Mulcaster Street

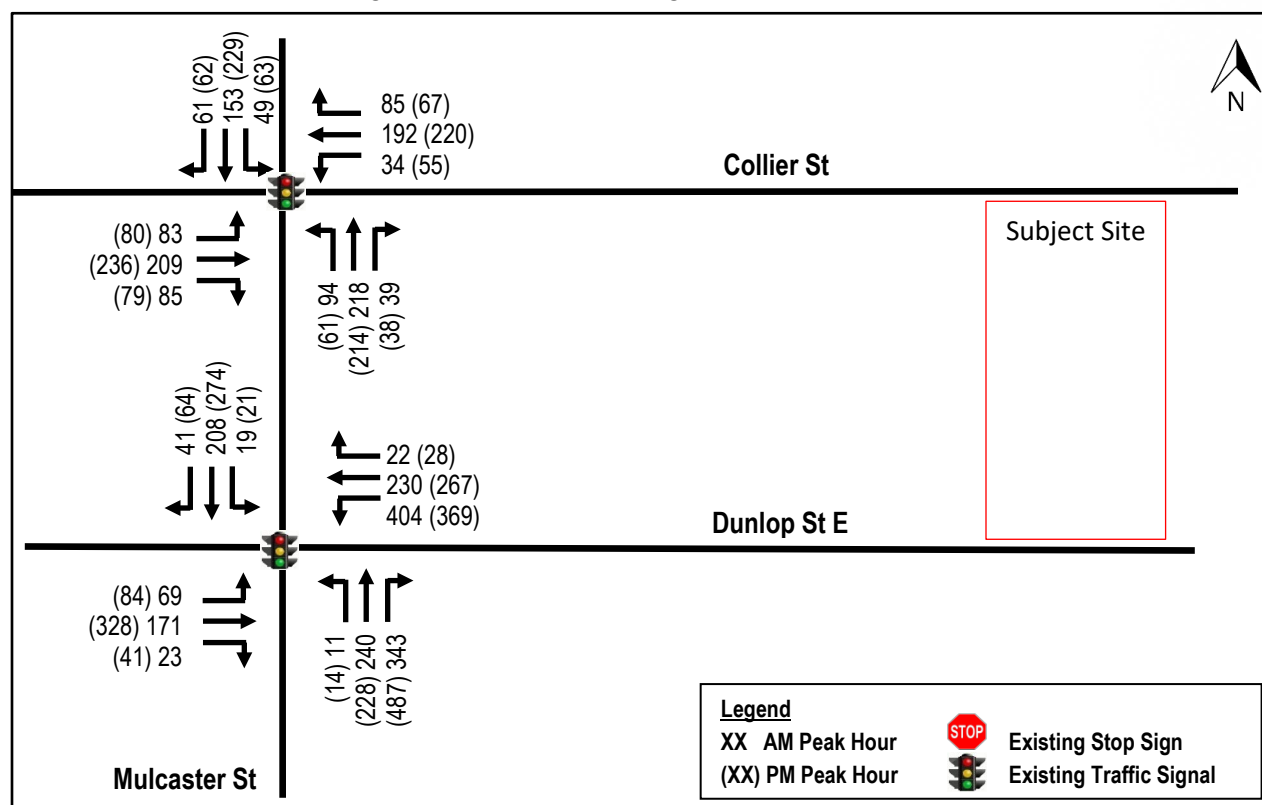
4.3. Background Development Applications

A full review of active developments within the study area was conducted based on the information from the City of Barrie's Development Portal. Recently, there are background developments in the study area:

- 185-205 Dunlop Street East- a mixed-use, 10-storey building with 178 residential condominium and 1,764.0 m² of ground floor commercial area;
- 217 Dunlop Street East: 15 storey residential building, 41 dwelling units;
- 157 Dunlop Street East: a mixed-use, 500 m² commercial area, 130 hotel rooms and 136 residential condominium unit;
- Bayside Apartment – 79 Collier Street: 126 residential dwelling units;
- 47, 49, 51 and 53 Collier Street: 16 -storey building, 290 retirement residence units.

For this reason, the 2028 future background development is layering of existing traffic volumes, background development site traffic and applied growth rate. The background development site traffic details in **Appendix D**. Figure 7 illustrates the 2028 Future Background Traffic Volumes.

Figure 7 – 2028 Future Background Traffic Volumes



4.4. Future Background Traffic Assessment

The estimated 2028 future background traffic volumes are illustrated in Figure 8, and were analyzed using Synchro Version 9 software. The detailed calculations are provided in Appendix E and summarized in Table 2.

Table 2 – 2028 Future Background Levels of Service

Intersection	Key Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		LOS (v/c)	Delay (s)	95 TH Queue	LOS (v/c)	Delay (s)	95 TH Queue
Dunlop Street East and Mulcaster Street (signalized)	Overall	B (0.64)	12.6		B (0.80)	15.4	
	EBL	B (0.18)	12.2	13.2	B (0.23)	13.3	15.5
	EBTR	B (0.29)	12.8	28.1	B (0.57)	17.3	55.3
	WBL	A (0.62)	8.1	42.1	A (0.77)	14.6	52.7
	WBTR	A (0.23)	5.9	23.6	A (0.28)	6.6	27.8
	NBL	B (0.05)	14.7	3.8	B (0.08)	14.6	4.4
	NBT	B (0.52)	17.5	36.1	B (0.46)	16.7	34.4
	NBR	B (0.22)	15.5	14.6	B (0.35)	16.0	19.4
	SBL	B (0.08)	14.8	5.2	B (0.08)	14.5	5.6
Collier Street and Mulcaster Street (signalized)	Overall	A (0.35)	9.7		A (0.38)	9.3	
	EBL	A (0.11)	7.0	12.8	A (0.16)	6.2	10.9
	EBTR	A (0.12)	7.0	13.1	A (0.17)	6.3	12.5
	WBL	A (0.05)	6.8	7.3	A (0.11)	6.3	9.4
	WBTR	A (0.12)	7.0	14.0	A (0.16)	6.2	13.6
	NBLT	B (0.59)	14.9	39.8	B (0.59)	14.4	34.7
	NBR	B (0.02)	9.9	4.0	B (0.02)	10.3	4.1
	SBLTR	B (0.23)	10.7	12.0	B (0.36)	11.7	16.7

Under the future background conditions, similar to the existing conditions, the intersection operation capacity analysis indicates that all intersections considered are expected to operate at acceptable levels of service. It is NexTrans' opinion that no improvements are required under this horizon year.

5.0 SITE TRAFFIC

5.1. Proposed Development

As indicated, the redevelopment proposal consists of total 293 dwelling units.

The 2016 Transportation Tomorrow Survey (TTS), and the *Trip Generation Manual, 10th Edition* published by the Institute of Transportation Engineers (ITE) information was reviewed to estimate the modal split, trip distribution and trip generation for the proposed development.

5.2. Modes of Travel Assessment in the Area

Table 3 summarizes the travel mode split information, based on the review of the 2016 Transportation Tomorrow Survey data, for traffic zones 8501,8505,8506. The detailed analysis and TTS data extraction are included in **Appendix F**.

Table 3 – Modes of Travel based on 2016 TTS Data for Traffic Zones 8501,8505,8506

Time	Trips Made by Traffic Zones 8501, 8505, 8506					
	Auto Driver	Auto Passenger	Taxi/Paid Ride Share	Transit	Cycle	Walk
AM Peak Period (6:00-9:00 AM)	76%	11%	0%	3%	1%	6%
PM Peak Period (4:00-7:00 PM)	80%	10%	0%	2%	3%	4%

Based on the information outlines in the table above, the predominant mode of travel to and from the area are auto driving with 76% during the morning and 80% during the afternoon peak periods, respectively.

5.3. Site Trip Generation

For the purposes of this assessment, the *Trip Generation Manual, 10th Edition* published by the Institute of Transportation Engineers (ITE) was reviewed to estimate the site generated trips. Based on our review, the selected corresponding land use codes are "Multifamily Housing – High-rise" Land Use Code (LUC) 222 and Shopping Centre Land Use Code (LUC) 820. **Table 4** summarizes the site trip generation estimate for the current development proposal based on the ITE trip fitted curve equations, where appropriate.

Table 4 – Site Total Trip Generation for Current Development Proposal

ITE Land Use	Magnitude (unit/sqft)	Parameter	Modal Split		Morning Peak			Afternoon Peak		
			AM	PM	In	Out	Total	In	Out	Total
Multifamily Housing (High-rise) (LUC 222)	293	Total Trips	100%	100%	7	55	62	39	17	56
		Non-Auto Trips	24%	20%	2	13	15	8	3	11
		Auto Trips	76%	80%	5	42	47	31	14	45

The proposed development is expected to generate:

- 62 total new two-way trips (7 inbound and 55 outbound) during the weekday morning and 56 total new two-way trips (39 inbound and 17 outbound) during the afternoon peak hours, respectively;
- 15 total new two-way non-auto trips (2 inbound and 13 outbound) during the weekday morning and 11 total new two-way non-auto trips (8 inbound and 3 outbound) during the afternoon peak hours, respectively;
- 47 total new two-way auto trips (5 inbound and 42 outbound) during the weekday morning and 45 total new two-way auto trips (31 inbound and 14 outbound) during the afternoon peak hours, respectively;

5.4. Site Trip Distribution and Assignment

The 2016 Transportation Tomorrow Survey (TTS) data was reviewed for traffic zones 8501, 8505, 8506 in order to estimate the general trip distribution for the proposed development. **Table 5** summarizes the planning district/traffic zones distribution based on the 2016 TTS data.

Table 5 – Trip Distribution for Residential Component

Mode	City of Toronto	York Region	Peel Region and West	Simcoe County	Total
Auto	2%	7%	0%	91%	100%

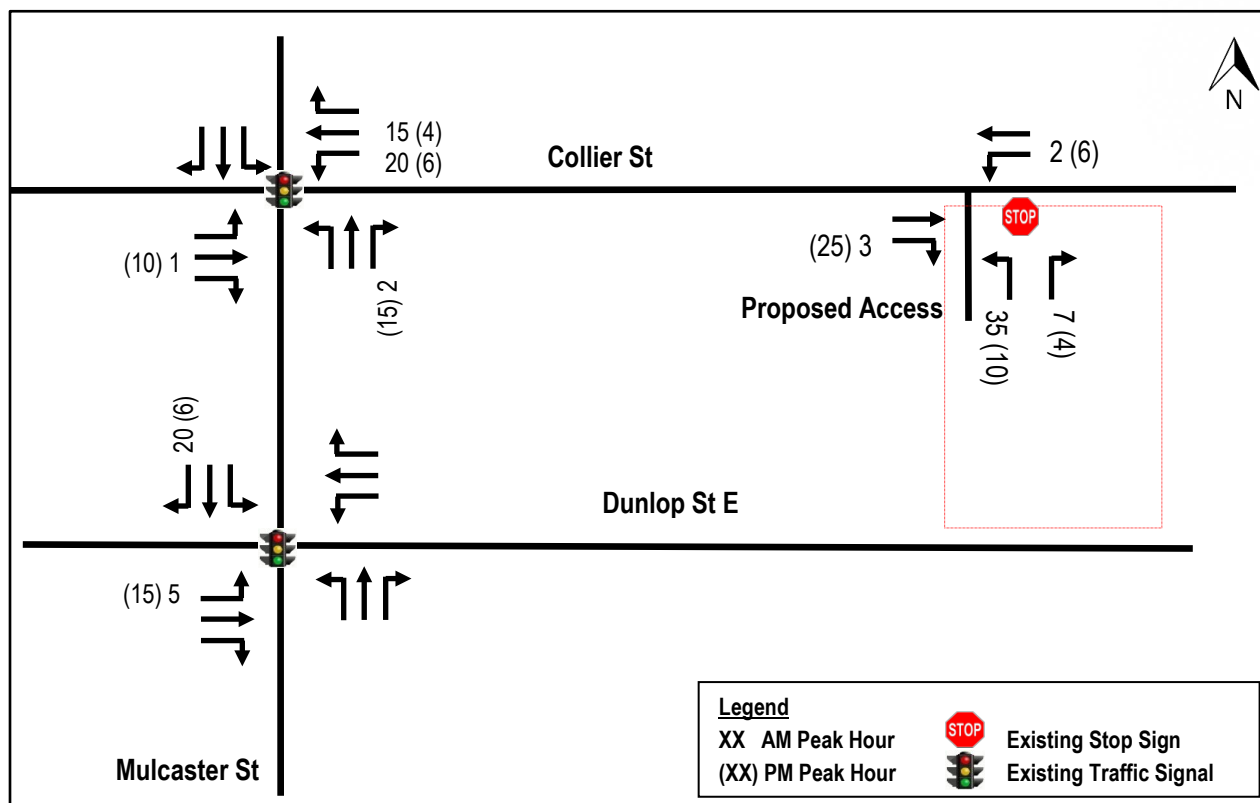
Table 6 summarizes the site trip assignment based on the 2016 TTS and existing transportation network in the area for the residential component of proposed development.

Table 6 – Site Trip Distribution

General Direction of Travel (To/From)	Auto
North	22%
South	51%
East	13%
West	14%
Total	100%

Figure 7 illustrates the proposed development generated traffic volumes. It should be noted that the auto site trip distribution and assignment have been taken into consideration the TTS information, existing turning restrictions, as well as existing intersection operations and capacity constraints.

Figure 7 – Site Traffic Volumes



6.0 FUTURE TOTAL TRAFFIC CONDITIONS

The estimated future total traffic volumes are illustrated in **Figure 9**, and were analyzed using Synchro Version 9 software. The detailed calculations are provided in **Appendix G** and summarized in **Table 7**.

Figure 9 –2028 Future Total Traffic Volumes

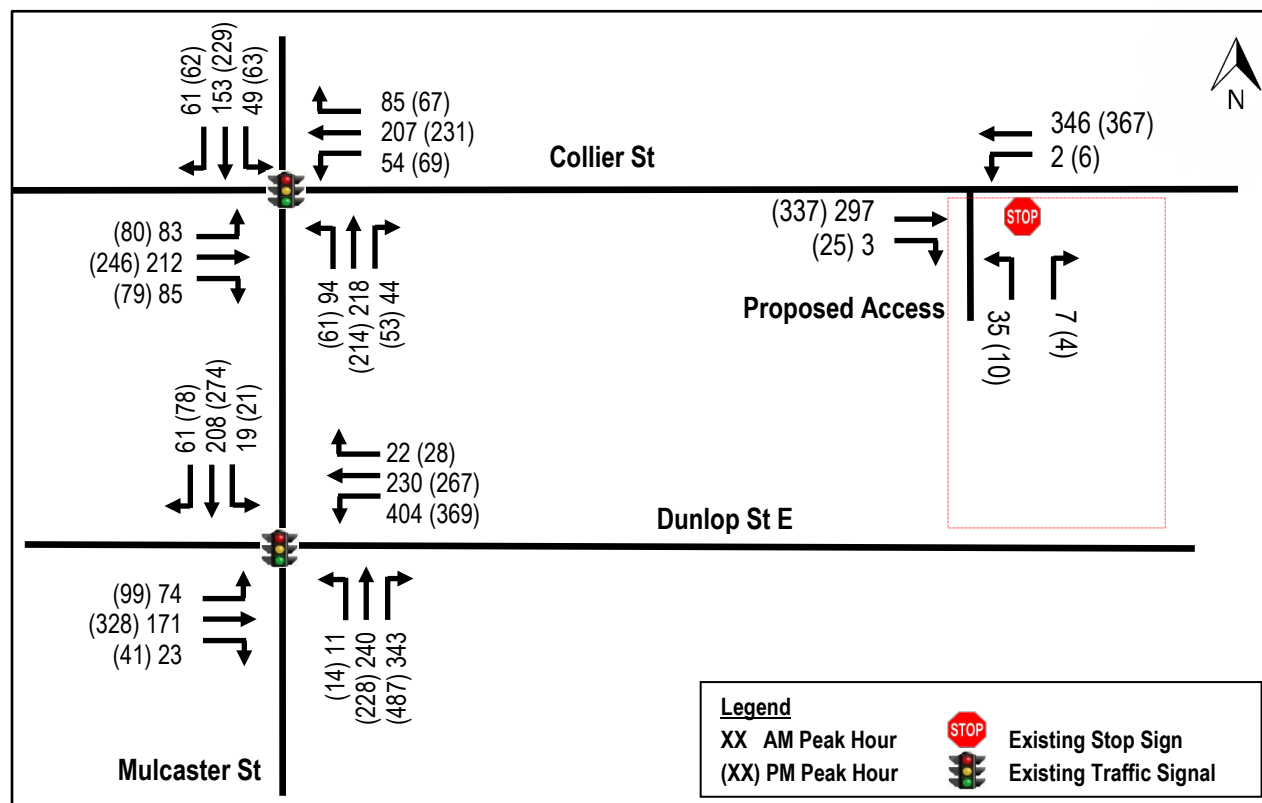


Table 7 – 2028 Future Total Levels of Service

Intersection	Key Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		LOS (v/c)	Delay (s)	95 TH Queue	LOS (v/c)	Delay (s)	95 TH Queue
Dunlop Street East and Mulcaster Street (signalized)	Overall	B (0.66)	12.7		B (0.81)	15.6	
	EBL	B (0.18)	12.2	13.2	B (0.27)	14.0	15.5
	EBTR	B (0.29)	12.8	28.1	B (0.57)	17.4	55.3
	WBL	A (0.62)	8.1	42.1	A (0.77)	15.0	52.8
	WBTR	A (0.23)	5.9	23.6	A (0.28)	6.7	27.8
	NBL	B (0.05)	14.7	3.8	B (0.09)	14.6	4.4
	NBT	B (0.52)	17.5	36.1	B (0.46)	16.6	34.4
	NBR	B (0.22)	15.5	14.6	B (0.35)	16.0	19.4
	SBL	B (0.08)	14.8	5.2	B (0.08)	14.4	5.6
Collier Street and Mulcaster Street (signalized)	SBTR	B (0.56)	18.2	38.0	B (0.69)	21.3	51.5
	Overall	A (0.42)	9.7		A (0.38)	9.3	
	EBL	A (0.17)	7.0	12.8	A (0.16)	6.3	11.3
	EBTR	A (0.16)	7.0	13.3	A (0.17)	6.4	13.6
	WBL	A (0.11)	7.1	10.3	A (0.11)	6.7	11.6
	WBTR	A (0.16)	7.0	14.8	A (0.16)	6.4	14.8
	NBLT	B (0.63)	14.9	39.8	B (0.59)	14.1	34.6
	NBR	B (0.03)	9.9	4.2	B (0.02)	10.3	4.8
Collier Street and Proposed access (unsignalized)	SBLTR	B (0.23)	10.7	12.0	B (0.36)	11.6	16.6
	WBLR	A (0.00)	0.1	0.0	A (0.01)	0.2	0.1
	NBLR	B (0.10)	14.0	2.5	C (0.08)	13.9	0.8

Under the 2028 future total conditions, the intersection operation capacity analysis indicates that all intersections considered are expected to operate at acceptable levels of service. The intersection operation capacity analysis also indicates that the proposed development access and Collier Street is expected to operate acceptable levels of service. Therefore, no improvement to the existing Collier Street is required to accommodate the proposed development. It should be noted that the proposed development contributes negligible delays and queue to the transportation networks in the area.

6.1. Active Transportation Mode Assessment

Sidewalk

Currently, there are sidewalks located on both sides of Collier Street, Poyntz Street, Mulcaster Street and Dunlop Street East in the vicinity of the proposed development. Therefore, no improvements are necessary to accommodate the proposed development. the proposed development will provide pedestrian connection to Collier Street and Dunlop Street East.

Bicycle Facility

Currently, there is no dedicated bicycle lane Collier Street, Dunlop Street E, Mulcaster Street, in the vicinity of the proposed development. There are only some local trails that connecting through the Heritage Park and Barrie North Shore Trail to the west of the site.

The proposed development will provide cyclist connections from buildings to Collier Street and Dunlop Street East, to support the active transportation activities.

7.0 SITE PLAN REVIEW

7.1. Loading Requirement

As indicated, the proposed development consists of two residential building with total 293 dwelling units.

The City of Barrie consolidated By-Law was reviewed to determine the loading requirement for the proposed development. Based on the current City's Zoning By-law, there is no loading requirement for the residential, however, the proposed development will provide the loading space with the dimensions 3m W x 9m L x 4m (vertical clearance) in Collier Tower.

AutoTURN software was used (Barrie Garbage Truck specifications) to generate vehicular turning templates to confirm and demonstrate the proposed loading space dimensions and space requirements.

Figure 10 illustrates the turning movement templates for passenger vehicles and City of Barrie Garbage truck.

7.2. Driveway Location and Configuration

As part of the proposed development, a full moves access will be provided onto Collier Street, located approximately 70 m east of the Collier Street/ Poyntz Street intersection. The analysis indicates that the proposed access onto Collier Street is expected to operate at acceptable levels of service with minimal delays or queues.

7.3. Signage and Pavement Marking Plan

In accordance with Ontario Traffic Manual (OTM) Book 5, we recommend appropriate signage consisting of a STOP sign (Ra-1) and STOP bar be provided on egress driveway, as well as, a Disable Parking Permit Sign (Rb-93) at the barrier-free parking spaces. The detail of plan is illustrated in **Figure 11**.

8.0 PARKING ASSESSMENT

8.1. Vehicle Parking Requirement

City of Barrie Zoning By-Law 2009-141 is applied to the proposed development. The parking requirement and supply for the proposed development is summarized in **Table 8**.

Table 8 – City of Barrie 2009-141 Vehicle Parking Requirements

Type	No. of Unit	Parking Rates	Parking Requirement	Parking Provide	Difference
Residential	293 units	1 space/unit	293	249	-44

Based on the City's Zoning By-Law, a total of 293 parking spaces are required for the proposed development. It is our understanding that the proposed development provides 249 vehicle parking spaces consists of 235 spaces for resident, and 14 spaces for visitor. It is our understanding that the proposed development presents a technical shortfall of total 44 parking spaces for two buildings (15% reduction).

8.2. Parking Recommendation for the Proposed Development

The proposed development provides total of 249 vehicle parking spaces (including 235 spaces for resident and 14 spaces for visitor). **Table 9** summarizes the proposed parking rate:

Table 9 – Proposed Parking Rate

Type	No. of Unit	Parking Rates	Parking Provide
Residential	293 units	0.80 space/unit	235
Visitor		0.05 space/unit	14

As indicated, based on the findings of this Study, NexTrans recommends the reduced parking rate for the proposed development. Given that the proposed development will be serviced by existing Barrie service, active transportation network, neighbourhood context and recommended TDM measures and incentives, it is NexTrans opinion that vehicle parking should be reduction. The reduced parking rate for the resident is required to support alternative and sustainable modes of transportation. The following justifications are provided to support the reduction of parking rate for the proposed development:

1. Proposed development context
2. Existing Mode Share;
3. Household demographic and car ownership in the area;
4. Available on-street paid parking in the area;
5. City of Barrie Official Plan (2015);
6. Existing Barrie Transit Service.
7. Neighbourhood Context; and
8. Ontario's Five-Year Climate Change Action Plan
9. Observed Demand at Comparable Sites
10. City of Barrie Approved and Proposed Applicant Parking Rate
11. Mobility as a Service

12. Parking and Affordability

13. Transportation Demand Management

The details are provided below:

8.2.1. Development Proposal Context

As indicated, the existing site is currently vacant. The redevelopment proposal includes two (2) twelve-storey building with total of 293 dwelling units:

- North Building consists of 118 apartments.
- South Building consists of 175 apartments units.

Given that these units will be rented by young professionals or small families, who are starting their career or family, and are not required to own a car to work or other activities given the proximity to the existing Barrie Transit service.

Based on NexTrans comprehensive review of the study area, it is evident that there is a wide range of different types of land uses currently existing in this area such as mid-rise and high-rise residential, grocery store, medical office and pharmacies, schools, churches, employment, banks, restaurant, and retail/commercial.

8.2.2. Existing Mode Share

NexTrans has conducted a review of the existing mode share for the City of Barrie Traffic Zones 8501,8505,8506. **Table 10** summarizes the vehicle ownership based on the 2016 Transportation Tomorrow Survey data, while the detailed 2016 TTS data extraction is included in **Appendix A**.

Table 10 – Modes of Travel based on 2016 TTS Data for Traffic Zones 8501,8505,8506

Time	Trips Made by Traffic Zones 8501, 8505, 8506					
	Auto Driver	Auto Passenger	Taxi/Paid Ride Share	Transit	Cycle	Walk
AM Peak Period (6:00-9:00 AM)	76%	11%	0%	3%	1%	6%
PM Peak Period (4:00-7:00 PM)	80%	10%	0%	2%	3%	4%

Based on the information outlined in the table above, the predominant mode of travel to and from the area are auto driving with 76% during the morning and 80% during the afternoon peak periods, respectively.

8.2.3. Household Demographic and Car Ownership

NexTrans also reviewed the vehicle ownership for the City of Barrie. **Table 11** summarizes the vehicle ownership based on the 2016 Transportation Tomorrow Survey data, while the detailed 2016 TTS data extraction is included in **Appendix F**.

Table 11 – Vehicle Ownership for Ward 23 Based on 2016 TTS Data (City of Barrie)

Household Type			Household Size					Number of Available Vehicles				
House	Townhouse	Apartment	1	2	3	4	5+	0	1	2	3	4
64%	11%	25%	23%	32%	18%	17%	10%	0%	36%	41%	12%	4%

As indicated in **Table 12** above, there is a large percentage of house household in the area (64%), about 23% of the single household with a single person, and 0% of households not own a car.

Parking management could help increase the number of households that does not own a car as parking management is the best Transportation Demand Management measure that helps reducing the number single-occupant-vehicle trips to and from the proposed development, which is consistent with the City of Barrie Official Plan policies and sustainability objectives (indicated below).

8.2.4. Available On-Street Paid Parking in the Area

Currently, there are on-street parking along Poyntz Street and Collier Street within a few minutes' walk to the proposed development. It is NexTrans' opinion that this provides some options for visitors. **Figure 12** illustrates the existing on-street and paid parking lots in the area.

There are approximately:

- 25 spaces along the west side of Poyntz Street between Collier Street and Dunlop Street East;
- 22 spaces along the north side of Collier Street between Mulcaster Street and Poyntz Street;
- 9 spaces along the south side of Collier Street between Mulcaster Street and Poyntz Street;

Figure 12 – Available On-Street Parking and Paid Parking Lots



Source: Google Map

8.2.5. City of Barrie Official Plan (2018)

Over the last several decades, the City of Barrie growth has relied on the public transit system such as Barrie, GO Transit and other modes of transportation. The integration of transportation and land use planning allows the city to enjoy its success today without widening or building more roads to accommodate population growth.

As indicated in Section 4.0 Land Use Policies of the Official Plan, future growth within Barrie will be focused in the areas which are well served by the existing public transit system, the existing road network and that have a number of properties with redevelopment potential. The growths areas are generally the locations where good transit access can be provided along bus route.

The Official Plan also indicates that: *“(c) To promote a distribution of commercial facilities that provide a high level of convenience and accessibility for residents and limit the need for travelling extensive distances for minor purchases and local service facilities.*

(d) To minimize the impacts of retail and other service development on adjacent land uses and, on the traffic, carrying capacity of area roads.”

In addition, Section 8.6.3.4 Travel Demand Management also indicated that: *“(a) The City recognizes the potential role that Travel Demand Management can plan on promoting the efficient use of transportation infrastructure, making the use of private vehicles more sustainable and encouraging increased transit use. The City shall encourage businesses and other organizations to develop transportation demand management strategies including staggered work hours, carpooling, priority parking for car pool vehicles and energy efficient vehicles.*

(b) The City will consider reduced minimum parking standards for developments which develop a travel demand management plan, and also for high density mixed-use developments.”

Our review of the Official Plan Transportation Policies and directions indicate that there is a need to reduce automobile trips by managing parking in the City in order to reduce single-occupant-vehicle trips and to support other modes of transportation such as public transit and active transportation.

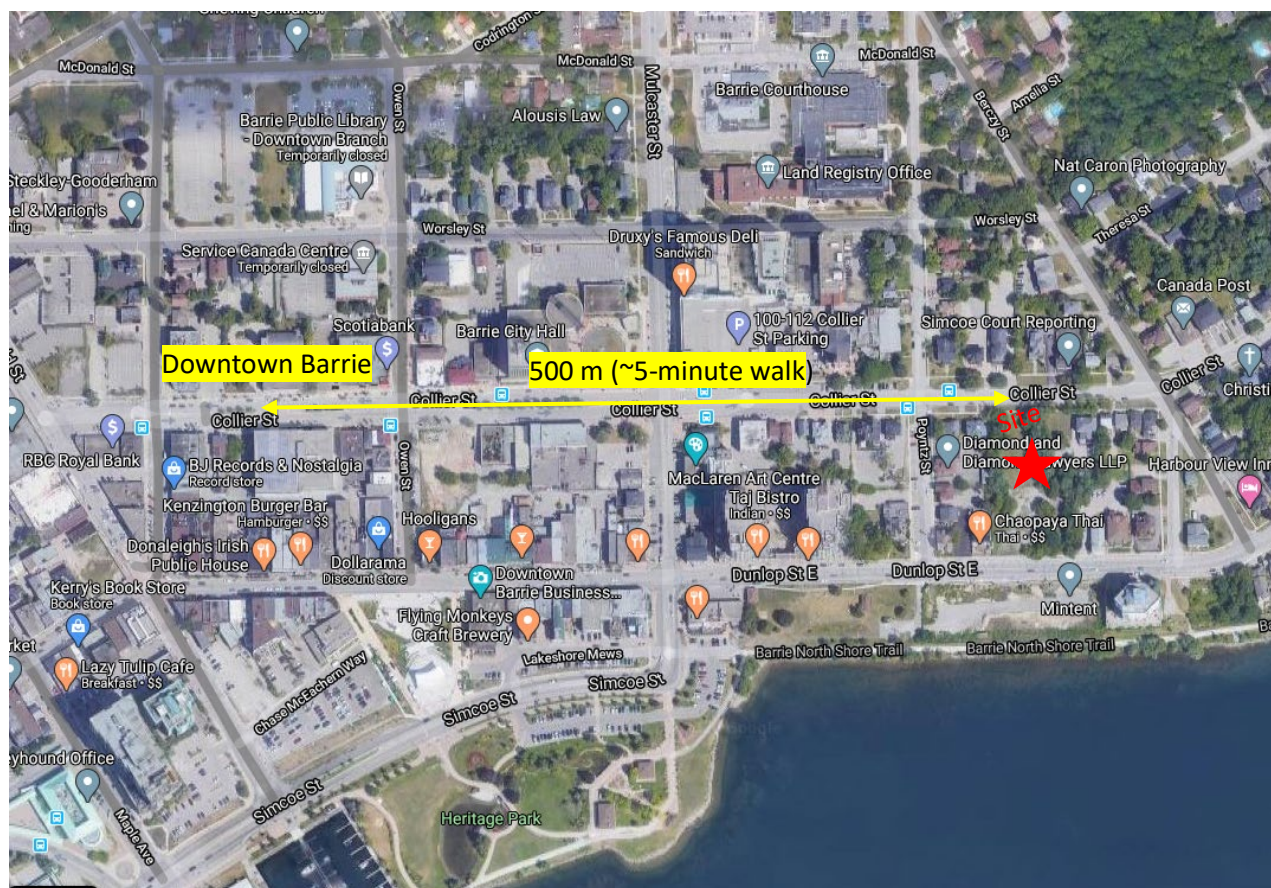
8.2.6. Transit Service

The proposed development is located adjacent to the Barrie Bus 8A. It is NexTrans' opinion that the reduction of parking rate is reasonable, and this provision is necessary to support transit and TDM measures in order to eliminate the numbers of single-occupant-vehicle trips to and from the proposed development.

8.2.7. Neighborhood Context

Based on NexTrans comprehensive review of the study area, it is evident that there is a wide range of different types of land uses currently exist in this area such as mid-rise and high-rise residential, grocery stores, medical offices and pharmacies, schools, churches, employment, banks, restaurant and retail/commercial. **Figure 13** illustrates the approximate walking distance (approximately 15 minute-walk or less) to/from the proposed development

Figure 13 – Available Amenities in the Area Within Walking Distance



Source: Google Map

8.2.8. Ontario's Five-Year Climate Change Action Plan

A reduced minimum residential parking supply requirement for the proposed development would be in conformance with the Ontario's Five-Year Climate Change Action Plan that was announced in June 2016.

While the Plan was released under a previous government, these policies nevertheless provide guidance on applicable policy actions to address climate change. Some of the key transportation/land-use planning actions outlined in the Plan are as follows:

- Support cycling and walking: Commuter cycling networks will be established across Ontario, targeting routes with high-commuting volumes such as between residential communities, major transit stations and employment areas. There will be more cycling facilities in urban areas, including grade-separated routes and cycling signals. There will be more bicycle parking at transit stations and provincially owned, publicly accessible facilities. Ontario will revise provincial road and highway standards to require commuter cycling infrastructure be considered for all road and highway construction projects where it is safe and feasible.
- Reduce single-passenger vehicle trips: Ontario would provide grants to municipalities and large private employers to implement Transportation Demand Management (TDM) Plans. The plans will be designed to help increase walking, cycling, carpooling, telecommuting and flex-work schedules, thereby reducing fossil fuel consumption, traffic congestion and transportation emissions.
- Eliminate minimum parking requirements: Minimum parking requirements would be eliminated over the next five years for municipal zoning by-laws, especially in transit corridors and other high-density, highly walkable

communities. Minimum requirements are a barrier to creating complete, compact and mixed-use communities. Instead, by-laws will encourage bike lanes, larger sidewalks.

The idea of eliminating minimum parking requirements in transit accessible areas, particularly for apartment buildings, is not a new phenomenon in North America. Developments proposing “zero” resident parking are being promoted, approved and developed all over North America including Toronto, Calgary, Vancouver, Portland, and Boston. Some cities are going as far as eliminating minimum residential parking requirements in downtown/core areas, including the City of London and City of Ottawa, which is currently in the process of recommending the elimination of parking requirements for new residential developments located in the downtown or transit corridor.

The increasing number of residential buildings with reduced parking standards relative to the zoning by-law requirements and the provision of “zero” residential parking spaces is becoming a new norm as population in urban areas continue to grow, transit expands across the City, and auto-ownership declines.

Although the applicant is not requesting “zero” parking for the proposed development, but this shift away from providing excess residential parking highlights a changing perspective toward auto-ownership and travel behavior. It is our opinion that the proposed 15% vehicle parking reduction is reasonable and required for the proposed development to minimize single-occupant-vehicle trips.

8.2.9. City of Barrie Approved/Proposed Development Parking Rate

NexTrans has reviewed the approved/proposed parking rates for various developments in the City of Barrie that has similar context and size. The parking rates and site statistic that were approved/ proposed by the city for residential building are summarized below:

79 Collier St: SPA under review

Unit breakdown

Unit Type	Unit Count
Studio	7
1B	78
2B	51

Parking data

Unit Type	Unit Count	Parking provided	Parking Rate
Market Rental	108	95	0.88
Affordable Housing	28	17	0.60
Total	136	112	0.82

51-57 Bradford St: OPA approved, ZBA approved, SPC under review

No unit breakdown

Site stats available

	Residential Units	Hotel Units	Retail (m2)
Tower 1	332	152	0
Tower 2	1004	0	2370
Tower 3		0	
Tower 4	464	0	1001
Total	1900	152	3371

Residential Parking

Use	Units	By-law rate	By-law req.	Proposed Rate	Proposed Count	Difference
residential	1900	1.0	1900	0.75	1425	-475
Visitor	0	0	0	0.15	285	+285
Total	1900	1900		0.90	1710	-190

136 Bayfield Street: ZBA under review

Unit breakdown for apartment/condo

Unit Type	Unit Count
1B + D	301
2B	151
2B + D	9
3B	6

Parking Data

	units		By-law req.	By-law Rate	By-law req. for Urban Growth centre	Urban Growth Centre Rate	Recommended Parking	Recommended Rate
Condo	472	Residential	720	1.5 spaces / unit	480	1.0 spaces/unit	384	0.8 spaces/unit
Townhouses	8							
Total	480		720		480		384	

39-67 Dunlop Street West & 35-37 Mary Street (apartment): ZBA approved, SPC under review

No unit breakdown provided

	units	Parking Required/Provided	Rate
By-law requirement	108	108	1.0 / unit
Proposed Parking		96	0.89 / unit
Deficiency		12	

8.2.10. Observed Demand at Comparable Sites

Table 13 summarizes the findings of apartment resident parking demand surveys at proxy sites undertaken by NexTrans in the City of Hamilton, City of Mississauga and City of Toronto that are similar in context to the proposed development. Resident parking demand studies were undertaken in evening on Friday and Saturday, when resident and visitor vehicles are most likely to be parked. Detail of each survey are summarized in **Appendix H**.

Table 13 – Proxy Apartment Parking Demand Studies

Location	Land Use	Date	# Unit	Parking Supply	Parking Demand
168 Clonmore Drive, City of Toronto	Apartment - 100% occupied	Friday, March 20, 2015	128 units	150 parking spaces	0.44 spaces/ unit (tenants)
		Saturday, March 21, 2015			0.2 spaces/ unit (visitor)
155 Balliol Street, City of Toronto	Condo – 100% occupied	Friday, January 19, 2018	572 Apt Units 10 townhouses 135 sq.m of daycare	424 parking spaces	0.46 spaces/ unit (tenants)
		Saturday, January 20, 2018			0.04 spaces/ unit (visitor)
25 Fisherville Road, City of Toronto	Apartment - 100% occupied	Saturday, September 30 th , 2017	214 units	273 parking spaces	0.54 spaces/ unit (tenants)
					0.02 spaces/ unit (visitor)
3480 Havenwood-Williamsport, City of Mississauga	Apartment – 100% occupied	Friday, April 21, 2017	264 units	295 parking spaces	0.54 spaces/ unit (tenants)
		Sunday, April 23, 2017			0.02 spaces/ unit (visitor)
3122 Hurontario St, City of Mississauga	Apartment – 90% Occupied	Friday, September 14, 2018	89 units	69 parking spaces	0.64 spaces/ unit (tenants)
		Saturday, September 15, 2018			0.05 spaces/ unit (visitor)
150 Main Street West, City of Hamilton	Condo – 100% occupied	Friday, September 20, 2019	150 units	82 parking spaces	0.35 spaces/ unit
		Saturday, Sept 21, 2019			

Observed parking demand at apartment building in the above-noted proxy locations with access to frequent surface transit range from 0.46-0.64 spaces/ unit. Notably, the observed demands at these buildings are all significantly lower than the zoning by law standards that apply for these sites, and also significantly lower than the in-force City of Barrie Zoning By-law that applied to the subject site.

The proposed residential and visitor parking standard (0.80 space per unit for residential, and 0.05 space per unit for visitor) is comparable to and exceeds the range observed at the proxy sites noted above.

8.2.11. Mobility as a Service (MaaS)

Mobility as a Service is a disruptive innovation that is playing an increasingly important role in reducing private car ownership. MaaS is a concept that represents a shift away from personally-owned modes of transportation towards transportation solutions that are consumed as a service. MaaS aims to seamlessly combine multi-modal transport options to handle everything from travel planning to payment via a single platform.

The growth of MaaS is supported by a number of innovative service providers such as ride-sharing services (e.g., Uber and Lyft), bike-sharing programs (e.g., Bike Share) and car-share services. The MaaS concept also anticipates the future introduction of self-driving cars, which will further decrease the need for personal car ownership in favour of on-demand car services, which are expected to become more affordable with self-driving cars. MaaS aims to seamlessly integrate transit services into the trip chain, with benefits for both transit ridership and overall travel efficiency.

The increasing role played by MaaS providers today, as well as significant growth in the MaaS market that is anticipated in the future, will further reduce the need for private car ownership and parking.

Therefore, it is our opinion that with MaaS and future self-driving car technology, the need for private parking space will no longer be there. The proposed parking reduction is reasonable and shape the resident behaviours to adapt to the future trend.

8.2.12. Parking and Affordability

The City is facing a housing shortage and affordability crisis. The reason of the housing shortage and not affordable is the parking requirement for the proposed development. The cost of providing one parking spaces could be in the range of \$100,000 per spaces or more due to the land costs, constructability, site constraints and other factors. Therefore, the more parking spaces that a development has to provide, the more expensive the maintenance costs will be for the owners. Monthly maintenance cost for a parking space could be \$100 per month, on top of the capital costs of a parking space. This means that the less parking is provided, the less maintenance fees the owners will have to carry monthly. Given that the proposed development is well-served by existing active transportation and transit network, these transportation options are much more cost effective and sustainable compared to driving private vehicles. Therefore, based on this reason alone, it is NexTrans' opinion that the parking rate should be reduced for the proposed development.

The City of Barrie Official Plan also speaks to the requirement for sustainable development where vehicle trips should be minimized to reduce congestions, pollutions and encourage residents to use more sustainable modes of transportation. The sustainable requirements outlined in the City's Official Plan are provided above.

Therefore, it is our opinion that the proposed 15% vehicle parking reduction is reasonable and required for the proposed development to minimize single-occupant-vehicle trips to meet the city sustainability requirements and affordability. In addition, the proposed development will provide bicycle parking spaces as per the Zoning By-law requirements to accommodate and encourage residents to cycle more to and from the proposed development for all types of trips such as work, school, and discretionary trips.

8.2.13. Transportation Planning Context

From a transportation planning perspective, two important aspects are:

- Residents can and do live in the transit-accessible areas of the City without owning a private vehicle. A myriad of traditional transportation choices are available to residents, including public transit, taxis, walking and cycling in addition to the more recent options including car share and ride share services. A number of zoning bylaws in the City recognize this, by setting minimum parking standards for most unit types at well less than one space per unit. A reduction from the bylaw simply increases the numbers of residents who will not have a private parking space.
- Providing less parking helps encourage sustainable transportation and reduces peak period automobile travel. Providing parking encourages travel by private automobile. By simply, residents who have a choice between sustainable travel modes and a private automobile may choose to drive whereas residents without parking will travel by other modes.

8.2.14. Transportation Demand Management Measures

The main objectives of the Transportation Demand Management (TDM) are to encourage residents to take alternative modes of transportation such as public transit, cycling and carpooling. Based on NexTrans' experience in conducting transportation impact studies in various jurisdictions, parking management is the best Transportation Demand Management measure that helps reducing the number single-occupant-vehicle trips to and from the proposed development, which is consistent with the City of Barrie Official Plan policies and sustainability objectives. NexTrans provides additional recommendations for the TDM measures in Section 3 of this Study, to support the recommended parking rates reduction for the proposed development.

8.3. Bicycle Parking

The proposed development will provide 206 bicycle parking spaces (including short-term and long-term parking) in order to support the residents and visitors and help reducing the auto trip to and from the proposed development.

Table 14 – Proposed Bicycle Parking

Land Use	No. of Unit	Short Term		Long Term		Total
		Rates	Spaces	Rates	Spaces	
Residential	293 units	0.10 spaces/unit	29	0.6 spaces/unit	176	206

9.0 TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management (TDM) is a co-ordinated series of actions aimed at maximizing the people moving capability of the transportation system. It is intended help reduce single-occupant auto use. Potential TDM measures may include but not limited to: TDM supportive land use, bicycle and pedestrian programs and facilities, public transit improvements, preferential treatments for buses and high occupancy vehicles (if applicable), ridesharing, and employee incentives.

Based on the review of the context of the proposed development, the following TDM measures and incentives are recommended for the proposed development:

- Reduce parking rates – to reduce the numbers of single-occupant vehicle trips to and from the proposed development for both land use scenarios;
- Unbundle vehicle space from unit rent;
- Provide direct shared pedestrian and cycling connections from the proposed development to Collier Street and Dunlop St E, where appropriate.
- Provide information package for new residents and employees in the proposed development. The information package can be a letter that includes all the links, or includes hard copies of Barrie Transit schedules, community and cycling maps, where appropriate. The Information Package can be distributed at the sale office or the property management office.

It is our opinion that these incentives will help future residents making the smart travel choices that are healthier and better for the environment. It also helps increase in transit ridership in the area and consistent with the City's Traffic Impact Study Guidelines on TDM requirements and Official Plan transportation policies. It is our opinion that reduced parking rate is the best TDM measure that helps encourage resident to take non-auto modes of transportation instead of driving.

10.0 CONCLUSIONS / FINDINGS

10.1. Study Conclusions

The findings and conclusions of the analysis are as follows:

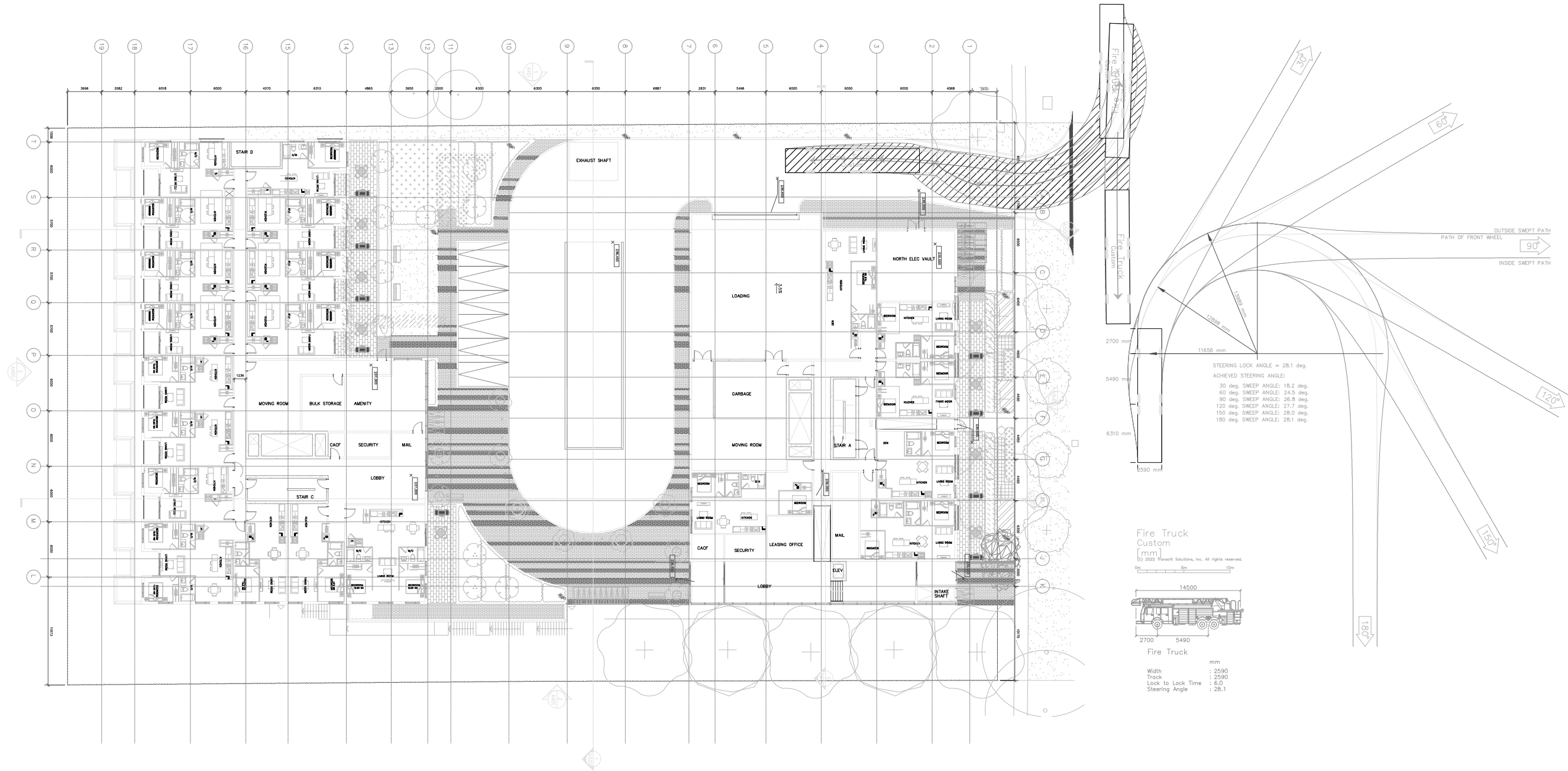
- The proposed development is expected to generate:
 - 62 total new two-way trips (7 inbound and 55 outbound) during the weekday morning and 56 total new two-way trips (39 inbound and 17 outbound) during the afternoon peak hours, respectively;

- 15 total new two-way non-auto trips (2 inbound and 13 outbound) during the weekday morning and 11 total new two-way non-auto trips (8 inbound and 3 outbound) during the afternoon peak hours, respectively;
- 47 total new two-way auto trips (5 inbound and 42 outbound) during the weekday morning and 45 total new two-way auto trips (31 inbound and 14 outbound) during the afternoon peak hours, respectively;
- Under the existing, future background and future total conditions, the intersection operation capacity analysis indicates that all intersections considered are expected to operate at acceptable levels of service. No improvements are required under these horizon years.
- The analysis indicates that the proposed access onto Collier Street is expected to operate at acceptable levels of service with minimal delays or queues. No improvement to the existing Collier Street is required to accommodate the proposed development.
- For the reasons noted above, it is our opinion that the existing transportation network is adequate and Nextrans does not recommend any additional physical improvements for the area at this time under the future total conditions.
- Based on the City's Zoning By-Law, a total of 293 parking spaces are required for the proposed development. It is our understanding that the proposed development provides 249 vehicle parking spaces consists of 235 spaces for resident, and 14 spaces for visitor. It is our understanding that the proposed development presents a technical shortfall of total 44 parking spaces for two buildings (15% reduction).
- The proposed development will provide 188 bicycle parking spaces (including short-term and long-term parking) in order to support the residents and visitors and help reducing the auto trip to and from the proposed development.
- Based on the current City's Zoning By-law, there is no loading requirement for the residential, however, the proposed development will provide the loading space with the dimensions 3m W x 9m L x 4m (vertical clearance) in the Collier tower. AutoTURN software was used (Barrie Garbage Truck specifications) to generate vehicular turning templates to confirm and demonstrate the proposed loading space dimensions and space requirements.

10.2. Study Recommendations

Based on the assessment, our report recommends that:

- The proposed development implements the TDM measures and incentives identified in this report to support active transportation and transit and to reduce the numbers of single-occupant-vehicle trips to and from the proposed development;
- The proposed development provides direct shared pedestrian and cycling connections from the proposed development building entrances directly to Collier Street, Dunlop Street E, where appropriate;
- The proposed parking rate should be reduced to support the non-auto mode transportation.
- No additional physical improvements are needed for the study area under the future background and future total conditions.



KEY PLAN

BENCHMARK

REVISIONS

NO	REVISION	DATE	BY

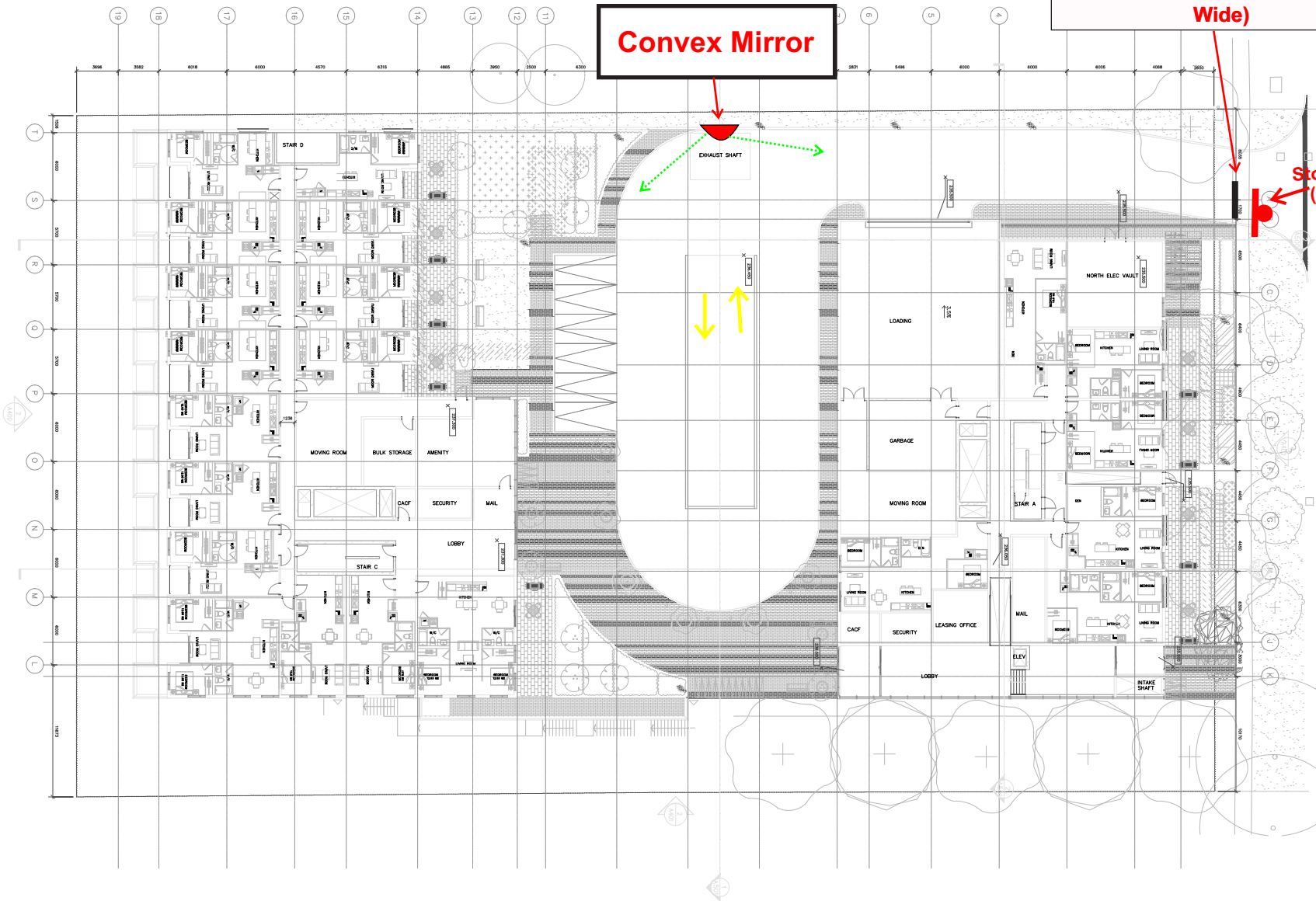
STAMP

nextrans
CONSULTING ENGINEERS
Suite 201, 520 Industrial Parkway South
Aurora ON L4G 6W8
Tel: 905-503-2563
Web: www.nextrans.ca

PROJECT NAME:
RESIDENTIAL DEVELOPMENT
129 Collier Street
(City of Barrie)

DRAWING TITLE:
AutoTURN Analysis
(Fire Truck)

DESIGN BY: K.A.	DATE: February 16, 2022
CHECKED BY: R.P.	PROJECT NO.
DRAWN BY: K.A.	NT-17-139
SCALE: NTS	DRAWING NO.



STOP BAR
(Solid White Retro-Reflective
Line between 30cm and 60 cm
Wide)

Convex Mirror

**Stop Sign
(R-1)**

KEY PLAN

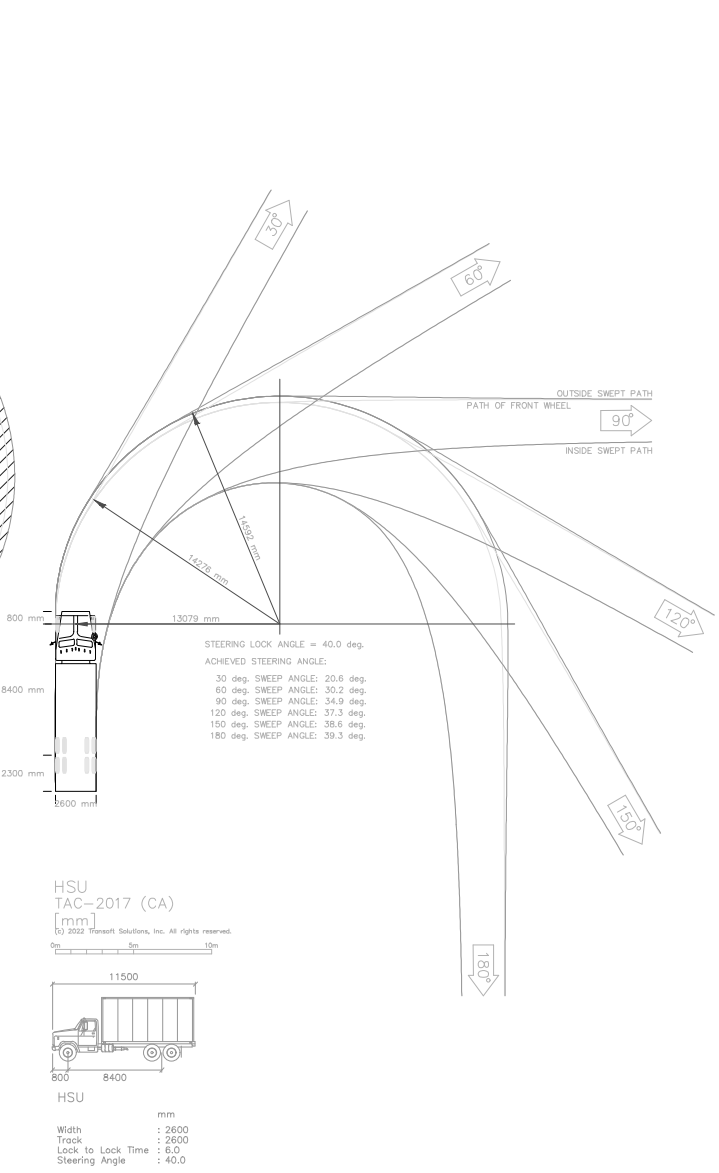
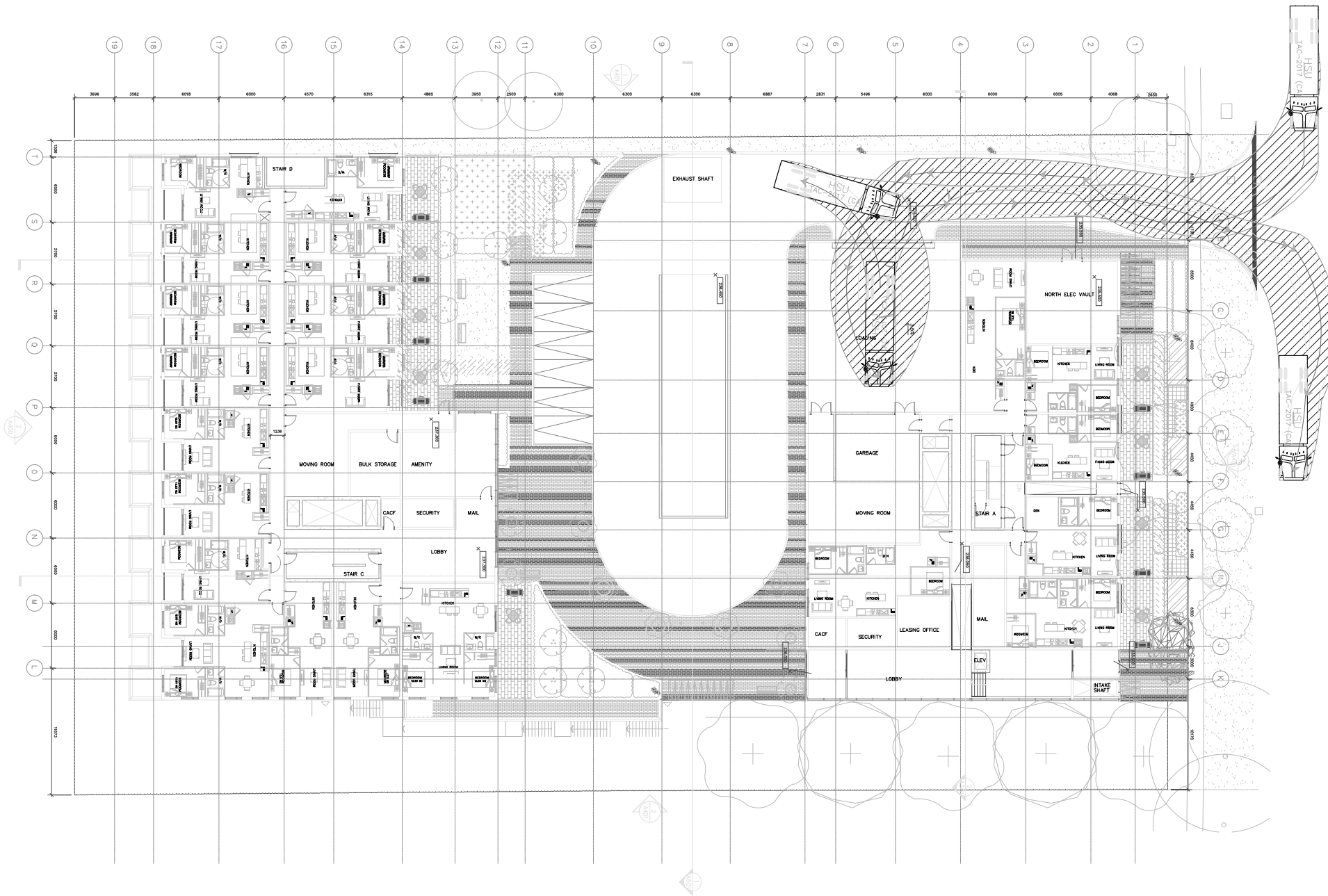
NO.	REVISION	DATE

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CONSULTING ENGINEERS
Suite 201, 520 Industrial Parkway South
Aurora, ON L4R 1B8
Tel: 905-603-2563
Web: www.nextrans.ca

RESIDENTIAL DEVELOPMENT
129 Collier Street
(City of Barrie)

Signage Plan

DESIGNED BY: K.A.	DATE: February 16, 2022
CHECKED BY: R.P.	PROJECT NO: NT-19-203
DRAWN BY: K.A.	DRAWING NO:
SCALE: NTS	



KEY PLAN

BENCHMARK

REVISIONS

NO.	REVISION	DATE	BY

STAMP



nextrans
CONSULTING ENGINEERS
Suite 201, 520 Industrial Parkway South
Aurora ON L4G 6W8
Tel: 905-503-2563
Web: www.nextrans.ca

PROJECT NAME:
RESIDENTIAL DEVELOPMENT
129 Collier Street
(City of Barrie)

DRAWING TITLE:
AutoTURN Analysis
(HSU TAC-2017)

DESIGN BY: K.A.	DATE: February 16, 2022
CHECKED BY: R.P.	PROJECT NO. NT-17-139
DRAWN BY: K.A.	DRAWING NO.
SCALE: NTS	

Appendix A – Existing Traffic Data

July 29, 2021

File: T07-SI

Sam (Trang) Nguyen
NexTrans Consulting Engineers
520 Industrial Parkway South, Suite 201
Aurora, ON L4G 6W8

Dear Ms. Nguyen,

RE: **Traffic Signal Timings**

With respect to your inquiry on July 20, 2021, attached are the Signal Timings for the following intersections:

- Dunlop Street @ Mulcaster Street
- Mulcaster Street @ Collier Street

Signalized Intersections within the City of Barrie function as a semi-actuated; meaning the signals remain green on the major road/ main street until a vehicle is detected on the minor road/ side street or a pedestrian pushes the pushbutton to activate the pedestrian phase.

Vehicles on the minor road/side street are detected by electromagnetic wires, which are embedded in the pavement on the side street near the painted stop bar. Vehicle presence only on the side street would result in a possible green time of between the minimum and maximum times, as noted, depending on vehicle demand detected.

Pedestrians must push the pedestrian push button to be detected. Pedestrian "Walk" and "Flashing Don't Walk" times on the side street, as noted, would be used in the event that the pedestrian push button was activated.

If you require any further information please feel free to contact me at (705) 739-4220 ext. 4937.

Sincerely,

A handwritten signature in blue ink, reading "Stephen Salis".

Stephen Salis, C.E.T.
Transportation Systems Technologist

Dunlop Street @ Mulcaster Steet – FREE PLAN (NO COORDINATION)

Roadway	Direction	Vehicular Indications				Pedestrian Indications	
		Minimum Green	Maximum Green	Amber	All Red	Walk	Flashing Don't Walk
Dunlop Street (main street)	Advanced Eastbound Left Turn	N/A	N/A	N/A	N/A	N/A	N/A
Dunlop Street (main street)	Advanced Westbound Left Turn	7	12	3	1	N/A	N/A
Dunlop Street (main street)	Eastbound	40	40	4	2	10	15
Dunlop Street (main street)	Westbound	40	40	4	2	10	15
Mulcaster Street (side street)	Northbound	12	30	4	2	12	16
Mulcaster Street (side street)	Southbound	12	30	4	2	12	16

NOTE: All times are recorded in seconds, based on full demand.

Mulcaster Street @ Collier Street – FREE PLAN (NO COORDINATION)

Roadway	Direction	Vehicular Indications				Pedestrian Indications	
		Minimum Green	Maximum Green	Amber	All Red	Walk	Flashing Don't Walk
Collier Street (main street)	Advanced Eastbound Left Turn	7	7	3	1	N/A	N/A
Collier Street (main street)	Eastbound	30	30	4	2	14	16
Collier Street (main street)	Westbound	30	30	4	2	14	16
Mulcaster Street (side street)	Advanced Northbound Left Turn	7	7	3	1	N/A	N/A
Mulcaster Street (side street)	Northbound	10	30	4	2	14	16
Mulcaster Street (side street)	Southbound	10	30	4	2	14	16

NOTE: All times are recorded in seconds, based on full demand.

Accu-Traffic Inc.

Morning Peak Diagram	Specified Period From: 7:00:00 To: 9:00:00	One Hour Peak From: 8:00:00 To: 9:00:00
Municipality: Barrie Site #: 1600200002 Intersection: Mulcaster St & Collier St TFR File #: 1 Count date: 1-Jun-16	Weather conditions: Person counted: Person prepared: Person checked:	
** Signalized Intersection **		Major Road: Mulcaster St runs N/S

North Leg Total: 564 North Entering: 257 North Peds: 20 Peds Cross:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Cyclists</td> <td style="text-align: right;">0</td> <td style="text-align: right;">3</td> <td style="text-align: right;">0</td> <td style="text-align: right;">3</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">2</td> <td style="text-align: right;">4</td> <td style="text-align: right;">1</td> <td style="text-align: right;">7</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">42</td> <td style="text-align: right;">166</td> <td style="text-align: right;">39</td> <td style="text-align: right;">247</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">44</td> <td style="text-align: right;">173</td> <td style="text-align: right;">40</td> <td style="text-align: right;">257</td> </tr> </table>	Cyclists	0	3	0	3	Trucks	2	4	1	7	Cars	42	166	39	247	Totals	44	173	40	257	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Cyclists</td> <td style="text-align: right;">0</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">10</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">297</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">307</td> </tr> </table>	Cyclists	0	Trucks	10	Cars	297	Totals	307	East Leg Total: 388 East Entering: 210 East Peds: 16 Peds Cross:
Cyclists	0	3	0	3																											
Trucks	2	4	1	7																											
Cars	42	166	39	247																											
Totals	44	173	40	257																											
Cyclists	0																														
Trucks	10																														
Cars	297																														
Totals	307																														

Cyclists	Trucks	Cars	Totals
1	11	200	212

Mulcaster St

Cars	Trucks	Cyclists	Totals
52	2	0	54
124	8	1	133
22	1	0	23
198	11	1	

Collier St

Mulcaster St

Collier St

Cars	Trucks	Cyclists	Totals
170	6	2	178

Cyclists	Trucks	Cars	Totals
0	4	33	37
2	5	101	108
0	1	30	31
2	10	164	

Mulcaster St

Collier St

Cars	Trucks	Cyclists	Totals
218	6	3	227

Peds Cross:
 West Peds: 16
 West Entering: 176
 West Leg Total: 388

Cars	218
Trucks	6
Cyclists	3
Totals	227

Cars	34	212	30	276
Trucks	1	4	0	5
Cyclists	0	0	0	0
Totals	35	216	30	276

Cars	Trucks	Cyclists	Totals
170	6	2	178

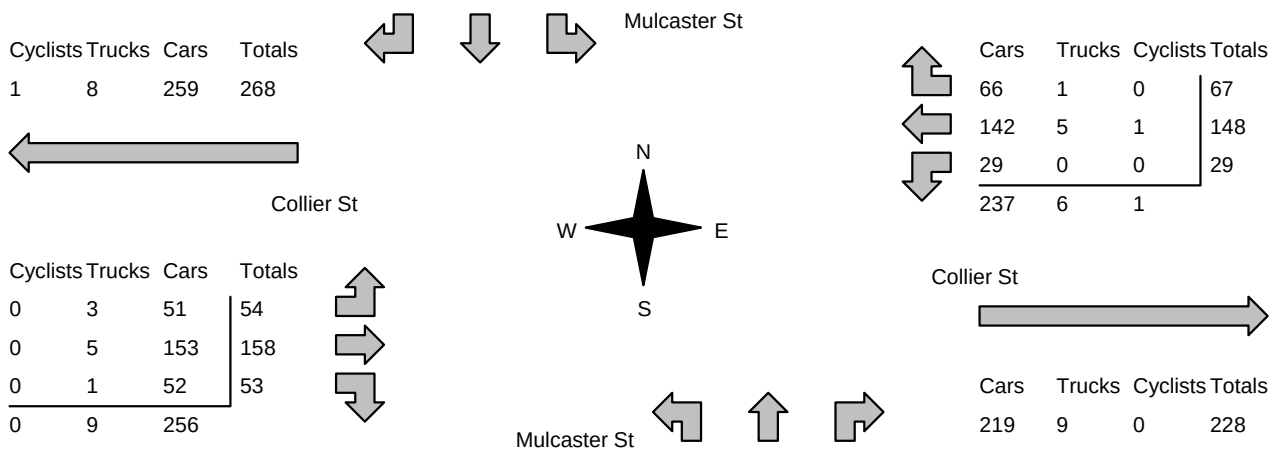
Peds Cross:
 South Peds: 24
 South Entering: 281
 South Leg Total: 508

Comments

Accu-Traffic Inc.

Mid-day Peak Diagram	Specified Period From: 11:00:00 To: 14:00:00	One Hour Peak From: 12:30:00 To: 13:30:00
Municipality: Barrie Site #: 1600200002 Intersection: Mulcaster St & Collier St TFR File #: 1 Count date: 1-Jun-16	Weather conditions: Person counted: Person prepared: Person checked:	
** Signalized Intersection **	Major Road: Mulcaster St runs N/S	

North Leg Total: 507 North Entering: 214 North Peds: 55 Peds Cross:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Cyclists</td> <td>0</td> <td>0</td> <td>0</td> <td style="border-left: 1px solid black;">0</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td>1</td> <td>2</td> <td>3</td> <td style="border-left: 1px solid black;">6</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td>46</td> <td>126</td> <td>36</td> <td style="border-left: 1px solid black;">208</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td>47</td> <td>128</td> <td>39</td> <td style="border-left: 1px solid black;"></td> </tr> </table>	Cyclists	0	0	0	0	Trucks	1	2	3	6	Cars	46	126	36	208	Totals	47	128	39		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Cyclists</td> <td>1</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td>6</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td>286</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td>293</td> </tr> </table>	Cyclists	1	Trucks	6	Cars	286	Totals	293	East Leg Total: 472 East Entering: 244 East Peds: 60 Peds Cross:
Cyclists	0	0	0	0																											
Trucks	1	2	3	6																											
Cars	46	126	36	208																											
Totals	47	128	39																												
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<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Cyclists</td> <td>1</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td>8</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td>259</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td>268</td> </tr> </table>	Cyclists	1	Trucks	8	Cars	259	Totals	268	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Cyclists</td> <td>0</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td>3</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td>51</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td>54</td> </tr> <tr> <td style="text-align: right;">Cyclists</td> <td>0</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td>5</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td>153</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td>158</td> </tr> <tr> <td style="text-align: right;">Cyclists</td> <td>0</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td>1</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td>52</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td>53</td> </tr> <tr> <td style="text-align: right;">Cyclists</td> <td>0</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td>9</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td>256</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td></td> </tr> </table>	Cyclists	0	Trucks	3	Cars	51	Totals	54	Cyclists	0	Trucks	5	Cars	153	Totals	158	Cyclists	0	Trucks	1	Cars	52	Totals	53	Cyclists	0	Trucks	9	Cars	256	Totals		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Cars</td> <td>66</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td>1</td> </tr> <tr> <td style="text-align: right;">Cyclists</td> <td>0</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td>67</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td>142</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td>5</td> </tr> <tr> <td style="text-align: right;">Cyclists</td> <td>1</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td>148</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td>29</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td>0</td> </tr> <tr> <td style="text-align: right;">Cyclists</td> <td>0</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td>29</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td>237</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td>6</td> </tr> <tr> <td style="text-align: right;">Cyclists</td> <td>1</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td></td> </tr> </table>	Cars	66	Trucks	1	Cyclists	0	Totals	67	Cars	142	Trucks	5	Cyclists	1	Totals	148	Cars	29	Trucks	0	Cyclists	0	Totals	29	Cars	237	Trucks	6	Cyclists	1	Totals		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Cars</td> <td>219</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td>9</td> </tr> <tr> <td style="text-align: right;">Cyclists</td> <td>0</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td>228</td> </tr> </table>	Cars	219	Trucks	9	Cyclists	0	Totals	228
Cyclists	1																																																																																		
Trucks	8																																																																																		
Cars	259																																																																																		
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Totals	228																																																																																		

Peds Cross: West Peds: 55 West Entering: 265 West Leg Total: 533	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Cars</td> <td>207</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td>3</td> </tr> <tr> <td style="text-align: right;">Cyclists</td> <td>0</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td>210</td> </tr> </table>	Cars	207	Trucks	3	Cyclists	0	Totals	210	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Cars</td> <td>71</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td>2</td> </tr> <tr> <td style="text-align: right;">Cyclists</td> <td>0</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td>73</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td>169</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td>2</td> </tr> <tr> <td style="text-align: right;">Cyclists</td> <td>1</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td>172</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td>30</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td>1</td> </tr> <tr> <td style="text-align: right;">Cyclists</td> <td>0</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td>31</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td>270</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td>5</td> </tr> <tr> <td style="text-align: right;">Cyclists</td> <td>1</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td></td> </tr> </table>	Cars	71	Trucks	2	Cyclists	0	Totals	73	Cars	169	Trucks	2	Cyclists	1	Totals	172	Cars	30	Trucks	1	Cyclists	0	Totals	31	Cars	270	Trucks	5	Cyclists	1	Totals		Peds Cross: South Peds: 45 South Entering: 276 South Leg Total: 486
Cars	207																																										
Trucks	3																																										
Cyclists	0																																										
Totals	210																																										
Cars	71																																										
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Cyclists	0																																										
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Cars	169																																										
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Cyclists	1																																										
Totals	172																																										
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Cyclists	0																																										
Totals	31																																										
Cars	270																																										
Trucks	5																																										
Cyclists	1																																										
Totals																																											

Comments

Accu-Traffic Inc.

Afternoon Peak Diagram	Specified Period From: 15:00:00 To: 18:00:00	One Hour Peak From: 16:30:00 To: 17:30:00
Municipality: Barrie Site #: 1600200002 Intersection: Mulcaster St & Collier St TFR File #: 1 Count date: 1-Jun-16	Weather conditions: Person counted: Person prepared: Person checked:	
** Signalized Intersection **		Major Road: Mulcaster St runs N/S

North Leg Total: 608 North Entering: 330 North Peds: 25 Peds Cross:	<table style="margin: auto;"> <tr><td>Cyclists</td><td>0</td><td>6</td><td>0</td><td>6</td></tr> <tr><td>Trucks</td><td>1</td><td>3</td><td>1</td><td>5</td></tr> <tr><td>Cars</td><td>46</td><td>224</td><td>49</td><td>319</td></tr> <tr><td>Totals</td><td>47</td><td>233</td><td>50</td><td></td></tr> </table>	Cyclists	0	6	0	6	Trucks	1	3	1	5	Cars	46	224	49	319	Totals	47	233	50		<table style="margin: auto;"> <tr><td>Cyclists</td><td>4</td></tr> <tr><td>Trucks</td><td>4</td></tr> <tr><td>Cars</td><td>270</td></tr> <tr><td>Totals</td><td>278</td></tr> </table>	Cyclists	4	Trucks	4	Cars	270	Totals	278	East Leg Total: 527 East Entering: 267 East Peds: 23 Peds Cross:
Cyclists	0	6	0	6																											
Trucks	1	3	1	5																											
Cars	46	224	49	319																											
Totals	47	233	50																												
Cyclists	4																														
Trucks	4																														
Cars	270																														
Totals	278																														

Cyclists	Trucks	Cars	Totals
3	4	254	261

Collier St

N
S
E
W

Cars	Trucks	Cyclists	Totals
53	0	0	53
161	3	3	167
45	1	1	47
259	4	4	

Collier St

Cyclists	Trucks	Cars	Totals
0	1	55	56
1	2	177	180
0	0	53	53
1	3	285	

Mulcaster St

Cars	47	162	30	239
Trucks	0	3	0	3
Cyclists	0	4	0	4
Totals	47	169	30	

Cars	Trucks	Cyclists	Totals
256	3	1	260

Peds Cross: West Peds: 43 West Entering: 289 West Leg Total: 550	<table style="margin: auto;"> <tr><td>Cars</td><td>322</td></tr> <tr><td>Trucks</td><td>4</td></tr> <tr><td>Cyclists</td><td>7</td></tr> <tr><td>Totals</td><td>333</td></tr> </table>	Cars	322	Trucks	4	Cyclists	7	Totals	333		Peds Cross: South Peds: 24 South Entering: 246 South Leg Total: 579
Cars	322										
Trucks	4										
Cyclists	7										
Totals	333										

Comments

Accu-Traffic Inc.

Total Count Diagram

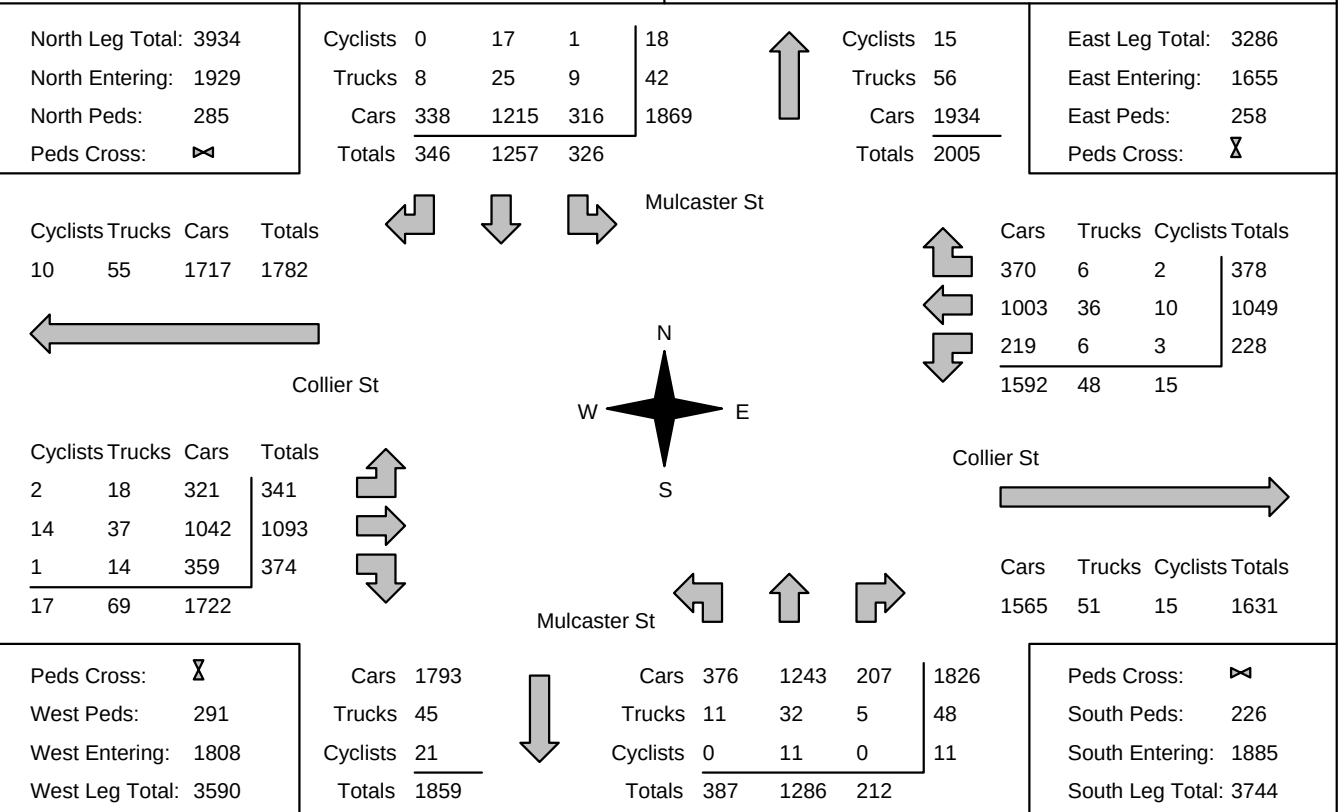
Municipality: Barrie
Site #: 1600200002
Intersection: Mulcaster St & Collier St
TFR File #: 1
Count date: 1-Jun-16

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Signalized Intersection ****

Major Road: Mulcaster St runs N/S



Comments

Accu-Traffic Inc.

Traffic Count Summary

Intersection: Mulcaster St & Collier St					Count Date: 1-Jun-16		Municipality: Barrie					
North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Cyclists				Total Peds		Hour Ending	Includes Cars, Trucks, & Cyclists				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	24	113	12	149	8	326	8:00:00	21	138	18	177	7
9:00:00	40	173	44	257	20	538	9:00:00	35	216	30	281	24
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	43	153	64	260	46	467	12:00:00	48	135	24	207	33
13:00:00	38	123	40	201	56	447	13:00:00	61	162	23	246	58
14:00:00	49	133	55	237	66	503	14:00:00	68	162	36	266	35
15:00:00	0	0	0	0	0	1	15:00:00	0	1	0	1	0
16:00:00	53	163	52	268	48	516	16:00:00	56	163	29	248	27
17:00:00	49	221	47	317	23	563	17:00:00	53	165	28	246	25
18:00:00	30	178	32	240	18	453	18:00:00	45	144	24	213	17
Totals:	326	1257	346	1929	285	3814	S Totals:	387	1286	212	1885	226
East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Cyclists				Total Peds		Hour Ending	Includes Cars, Trucks, & Cyclists				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	11	86	34	131	9	215	8:00:00	20	53	11	84	8
9:00:00	23	133	54	210	16	386	9:00:00	37	108	31	176	16
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	34	134	57	225	44	468	12:00:00	49	135	59	243	29
13:00:00	26	141	50	217	53	462	13:00:00	45	138	62	245	64
14:00:00	38	135	60	233	58	474	14:00:00	48	142	51	241	50
15:00:00	0	0	0	0	0	1	15:00:00	0	0	1	1	0
16:00:00	31	129	44	204	34	483	16:00:00	48	180	51	279	57
17:00:00	36	157	43	236	28	520	17:00:00	51	175	58	284	34
18:00:00	29	134	35	198	16	453	18:00:00	43	162	50	255	33
Totals:	228	1049	377	1654	258	3462	W Totals:	341	1093	374	1808	291
Calculated Values for Traffic Crossing Major Street												
Hours Ending:	8:00	9:00	12:00	13:00			14:00	16:00	17:00	18:00		
Crossing Values:	132	237	297	326			329	334	310	269		

Accu-Traffic Inc.

Count Date: 1-Jun-16 Site #: 1600200002

Interval Time	Passenger Cars - North Approach						Trucks - North Approach						Cyclists - North Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		North Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	2	2	26	26	1	1	0	0	0	0	0	0	0	0	0	0	0	0	4	4
7:30:00	9	7	45	19	3	2	0	0	1	1	0	0	0	0	0	0	0	0	6	2
7:45:00	13	4	72	27	6	3	1	1	1	0	0	0	0	0	1	1	0	0	7	1
8:00:00	23	10	109	37	12	6	1	0	2	1	0	0	0	0	2	1	0	0	8	1
8:15:00	31	8	147	38	17	5	1	0	2	0	1	1	0	0	3	1	0	0	13	5
8:30:00	45	14	189	42	28	11	1	0	2	0	1	0	0	0	3	0	0	0	16	3
8:45:00	50	5	226	37	33	5	2	1	3	1	1	0	0	0	4	1	0	0	22	6
9:00:00	62	12	275	49	54	21	2	0	6	3	2	1	0	0	5	1	0	0	28	6
9:15:00	62	0	275	0	54	0	2	0	6	0	2	0	0	0	5	0	0	0	28	0
11:00:00	62	0	275	0	54	0	2	0	6	0	2	0	0	0	5	0	0	0	28	0
11:15:00	72	10	315	40	68	14	2	0	7	1	2	0	0	0	5	0	0	0	37	9
11:30:00	80	8	354	39	84	16	2	0	7	0	2	0	0	0	8	3	0	0	53	16
11:45:00	91	11	388	34	107	23	2	0	8	1	2	0	1	1	8	0	0	0	61	8
12:00:00	104	13	422	34	118	11	2	0	9	1	2	0	1	0	8	0	0	0	74	13
12:15:00	114	10	442	20	126	8	2	0	10	1	3	1	1	0	8	0	0	0	85	11
12:30:00	124	10	484	42	136	10	2	0	11	1	3	0	1	0	8	0	0	0	100	15
12:45:00	135	11	507	23	145	9	2	0	11	0	3	0	1	0	8	0	0	0	115	15
13:00:00	142	7	542	35	157	12	2	0	12	1	3	0	1	0	8	0	0	0	130	15
13:15:00	152	10	572	30	170	13	4	2	12	0	3	0	1	0	8	0	0	0	146	16
13:30:00	160	8	610	38	182	12	5	1	13	1	4	1	1	0	8	0	0	0	155	9
13:45:00	172	12	638	28	197	15	5	0	13	0	5	1	1	0	8	0	0	0	176	21
14:00:00	188	16	674	36	210	13	5	0	13	0	5	0	1	0	8	0	0	0	196	20
14:15:00	188	0	674	0	210	0	5	0	13	0	5	0	1	0	8	0	0	0	196	0
15:00:00	188	0	674	0	210	0	5	0	13	0	5	0	1	0	8	0	0	0	196	0
15:15:00	199	11	716	42	221	11	6	1	14	1	5	0	1	0	9	1	0	0	208	12
15:30:00	215	16	749	33	233	12	6	0	16	2	5	0	1	0	9	0	0	0	226	18
15:45:00	225	10	785	36	245	12	7	1	17	1	6	1	1	0	9	0	0	0	232	6
16:00:00	239	14	830	45	261	16	7	0	18	1	6	0	1	0	10	1	0	0	244	12
16:15:00	249	10	880	50	274	13	8	1	21	3	7	1	1	0	11	1	0	0	253	9
16:30:00	255	6	928	48	281	7	8	0	22	1	7	0	1	0	11	0	0	0	254	1
16:45:00	268	13	983	55	295	14	9	1	22	0	7	0	1	0	11	0	0	0	261	7
17:00:00	286	18	1043	60	306	11	9	0	23	1	8	1	1	0	13	2	0	0	267	6
17:15:00	297	11	1115	72	313	7	9	0	24	1	8	0	1	0	16	3	0	0	276	9
17:30:00	304	7	1152	37	327	14	9	0	25	1	8	0	1	0	17	1	0	0	279	3
17:45:00	310	6	1186	34	336	9	9	0	25	0	8	0	1	0	17	0	0	0	285	6
18:00:00	316	6	1215	29	338	2	9	0	25	0	8	0	1	0	17	0	0	0	285	0
18:15:00	316	0	1215	0	338	0	9	0	25	0	8	0	1	0	17	0	0	0	285	0
18:15:15	316	0	1215	0	338	0	9	0	25	0	8	0	1	0	17	0	0	0	285	0

Accu-Traffic Inc.

Count Date: 1-Jun-16 Site #: 1600200002

Interval Time	Passenger Cars - East Approach						Trucks - East Approach						Cyclists - East Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		East Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	3	3	24	24	5	5	0	0	1	1	0	0	0	0	0	0	0	0	2	2
7:30:00	4	1	41	17	11	6	0	0	1	0	0	0	0	0	0	0	0	0	3	1
7:45:00	7	3	60	19	22	11	0	0	2	1	0	0	0	0	0	0	0	0	6	3
8:00:00	11	4	83	23	34	12	0	0	2	0	0	0	0	0	1	1	0	0	9	3
8:15:00	14	3	103	20	49	15	0	0	3	1	0	0	0	0	1	0	0	0	13	4
8:30:00	23	9	132	29	59	10	1	1	5	2	2	2	0	0	2	1	0	0	16	3
8:45:00	28	5	170	38	70	11	1	0	6	1	2	0	0	0	2	0	0	0	22	6
9:00:00	33	5	207	37	86	16	1	0	10	4	2	0	0	0	2	0	0	0	25	3
9:15:00	33	0	207	0	86	0	1	0	10	0	2	0	0	0	2	0	0	0	25	0
11:00:00	33	0	207	0	86	0	1	0	10	0	2	0	0	0	2	0	0	0	25	0
11:15:00	36	3	243	36	100	14	2	1	10	0	2	0	0	0	2	0	1	1	35	10
11:30:00	47	11	273	30	113	13	2	0	12	2	2	0	0	0	2	0	1	0	45	10
11:45:00	54	7	301	28	124	11	3	1	15	3	2	0	0	0	2	0	1	0	53	8
12:00:00	65	11	334	33	141	17	3	0	17	2	2	0	0	0	2	0	2	1	69	16
12:15:00	67	2	363	29	147	6	3	0	18	1	2	0	0	0	2	0	2	0	79	10
12:30:00	77	10	401	38	162	15	3	0	19	1	3	1	0	0	3	1	2	0	92	13
12:45:00	83	6	441	40	174	12	3	0	22	3	4	1	0	0	3	0	2	0	111	19
13:00:00	91	8	468	27	189	15	3	0	22	0	4	0	0	0	4	1	2	0	122	11
13:15:00	97	6	503	35	205	16	3	0	23	1	4	0	0	0	4	0	2	0	139	17
13:30:00	106	9	543	40	228	23	3	0	24	1	4	0	0	0	4	0	2	0	152	13
13:45:00	117	11	569	26	243	15	3	0	25	1	4	0	1	1	5	1	2	0	161	9
14:00:00	128	11	597	28	249	6	3	0	27	2	4	0	1	0	5	0	2	0	180	19
14:15:00	128	0	597	0	249	0	3	0	27	0	4	0	1	0	5	0	2	0	180	0
15:00:00	128	0	597	0	249	0	3	0	27	0	4	0	1	0	5	0	2	0	180	0
15:15:00	132	4	625	28	264	15	3	0	28	1	4	0	1	0	6	1	2	0	194	14
15:30:00	139	7	667	42	272	8	3	0	28	0	4	0	1	0	6	0	2	0	199	5
15:45:00	144	5	695	28	282	10	5	2	28	0	6	2	2	1	6	0	2	0	204	5
16:00:00	156	12	723	28	291	9	5	0	29	1	6	0	2	0	6	0	2	0	214	10
16:15:00	160	4	754	31	301	10	5	0	31	2	6	0	2	0	6	0	2	0	224	10
16:30:00	165	5	787	33	309	8	5	0	32	1	6	0	2	0	7	1	2	0	228	4
16:45:00	178	13	824	37	324	15	5	0	34	2	6	0	3	1	8	1	2	0	235	7
17:00:00	191	13	873	49	334	10	5	0	34	0	6	0	3	0	8	0	2	0	242	7
17:15:00	202	11	914	41	351	17	6	1	34	0	6	0	3	0	8	0	2	0	248	6
17:30:00	210	8	948	34	362	11	6	0	35	1	6	0	3	0	10	2	2	0	251	3
17:45:00	214	4	977	29	367	5	6	0	36	1	6	0	3	0	10	0	2	0	253	2
18:00:00	219	5	1003	26	369	2	6	0	36	0	6	0	3	0	10	0	2	0	258	5
18:15:00	219	0	1003	0	370	1	6	0	36	0	6	0	3	0	10	0	2	0	258	0
18:15:15	219	0	1003	0	370	0	6	0	36	0	6	0	3	0	10	0	2	0	258	0

Accu-Traffic Inc.

Count Date: 1-Jun-16 Site #: 1600200002

Interval Time	Passenger Cars - South Approach						Trucks - South Approach						Cyclists - South Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		South Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	5	5	28	28	1	1	2	2	0	0	0	0	0	0	1	1	0	0	0	0
7:30:00	10	5	64	36	8	7	3	1	1	1	0	0	0	0	2	1	0	0	2	2
7:45:00	14	4	97	33	11	3	3	0	1	0	0	0	0	0	2	0	0	0	5	3
8:00:00	18	4	134	37	18	7	3	0	2	1	0	0	0	0	2	0	0	0	7	2
8:15:00	20	2	191	57	21	3	3	0	2	0	0	0	0	0	2	0	0	0	13	6
8:30:00	27	7	247	56	31	10	3	0	4	2	0	0	0	0	2	0	0	0	18	5
8:45:00	38	11	295	48	35	4	4	1	6	2	0	0	0	0	2	0	0	0	26	8
9:00:00	52	14	346	51	48	13	4	0	6	0	0	0	0	0	2	0	0	0	31	5
9:15:00	52	0	346	0	48	0	4	0	6	0	0	0	0	0	2	0	0	0	31	0
11:00:00	52	0	346	0	48	0	4	0	6	0	0	0	0	0	2	0	0	0	31	0
11:15:00	60	8	382	36	54	6	4	0	6	0	0	0	0	0	2	0	0	0	39	8
11:30:00	78	18	408	26	56	2	5	1	8	2	0	0	0	0	2	0	0	0	45	6
11:45:00	87	9	443	35	60	4	5	0	9	1	1	1	0	0	2	0	0	0	54	9
12:00:00	98	11	477	34	71	11	6	1	10	1	1	0	0	0	2	0	0	0	64	10
12:15:00	105	7	510	33	76	5	7	1	12	2	1	0	0	0	2	0	0	0	76	12
12:30:00	117	12	539	29	81	5	8	1	15	3	1	0	0	0	2	0	0	0	97	21
12:45:00	133	16	587	48	86	5	10	2	16	1	1	0	0	0	2	0	0	0	109	12
13:00:00	155	22	632	45	94	8	10	0	16	0	1	0	0	0	3	1	0	0	122	13
13:15:00	176	21	674	42	105	11	10	0	16	0	1	0	0	0	3	0	0	0	134	12
13:30:00	188	12	708	34	111	6	10	0	17	1	2	1	0	0	3	0	0	0	142	8
13:45:00	203	15	735	27	121	10	10	0	20	3	3	1	0	0	4	1	0	0	148	6
14:00:00	223	20	789	54	126	5	10	0	20	0	5	2	0	0	4	0	0	0	157	9
14:15:00	223	0	790	1	126	0	10	0	20	0	5	0	0	0	4	0	0	0	157	0
15:00:00	223	0	790	0	126	0	10	0	20	0	5	0	0	0	4	0	0	0	157	0
15:15:00	235	12	823	33	130	4	10	0	23	3	5	0	0	0	4	0	0	0	164	7
15:30:00	246	11	859	36	140	10	11	1	24	1	5	0	0	0	4	0	0	0	173	9
15:45:00	257	11	898	39	149	9	11	0	25	1	5	0	0	0	6	2	0	0	177	4
16:00:00	278	21	944	46	155	6	11	0	27	2	5	0	0	0	6	0	0	0	184	7
16:15:00	289	11	984	40	167	12	11	0	28	1	5	0	0	0	6	0	0	0	192	8
16:30:00	307	18	1020	36	170	3	11	0	28	0	5	0	0	0	6	0	0	0	197	5
16:45:00	323	16	1063	43	175	5	11	0	28	0	5	0	0	0	6	0	0	0	200	3
17:00:00	331	8	1106	43	183	8	11	0	30	2	5	0	0	0	6	0	0	0	209	9
17:15:00	342	11	1143	37	194	11	11	0	31	1	5	0	0	0	7	1	0	0	213	4
17:30:00	354	12	1182	39	200	6	11	0	31	0	5	0	0	0	10	3	0	0	221	8
17:45:00	367	13	1220	38	205	5	11	0	31	0	5	0	0	0	11	1	0	0	226	5
18:00:00	376	9	1243	23	207	2	11	0	32	1	5	0	0	0	11	0	0	0	226	0
18:15:00	376	0	1243	0	207	0	11	0	32	0	5	0	0	0	11	0	0	0	226	0
18:15:15	376	0	1243	0	207	0	11	0	32	0	5	0	0	0	11	0	0	0	226	0

Accu-Traffic Inc.

Count Date: 1-Jun-16 Site #: 1600200002

Interval Time	Passenger Cars - West Approach						Trucks - West Approach						Cyclists - West Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		West Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	6	6	7	7	1	1	0	0	0	0	2	2	0	0	0	0	0	0	4	4
7:30:00	11	5	21	14	4	3	1	1	2	2	3	1	0	0	0	0	0	0	4	0
7:45:00	14	3	33	12	5	1	1	0	2	0	3	0	0	0	0	0	0	0	6	2
8:00:00	18	4	48	15	8	3	2	1	4	2	3	0	0	0	1	1	0	0	8	2
8:15:00	29	11	67	19	15	7	3	1	4	0	3	0	0	0	1	0	0	0	11	3
8:30:00	33	4	93	26	21	6	5	2	6	2	3	0	0	0	1	0	0	0	19	8
8:45:00	40	7	120	27	29	8	6	1	7	1	4	1	0	0	2	1	0	0	20	1
9:00:00	51	11	149	29	38	9	6	0	9	2	4	0	0	0	3	1	0	0	24	4
9:15:00	51	0	149	0	38	0	6	0	9	0	4	0	0	0	3	0	0	0	24	0
11:00:00	51	0	149	0	38	0	6	0	9	0	4	0	0	0	3	0	0	0	24	0
11:15:00	60	9	181	32	52	14	7	1	9	0	4	0	0	0	4	1	0	0	28	4
11:30:00	70	10	209	28	65	13	7	0	11	2	7	3	0	0	4	0	0	0	36	8
11:45:00	86	16	242	33	75	10	9	2	11	0	7	0	0	0	4	0	0	0	45	9
12:00:00	96	10	279	37	92	17	9	0	13	2	9	2	1	1	4	0	0	0	53	8
12:15:00	105	9	303	24	111	19	9	0	13	0	10	1	1	0	4	0	0	0	55	2
12:30:00	112	7	338	35	124	13	10	1	15	2	10	0	1	0	4	0	0	0	83	28
12:45:00	127	15	374	36	134	10	10	0	16	1	10	0	1	0	4	0	0	0	100	17
13:00:00	139	12	413	39	152	18	11	1	17	1	11	1	1	0	4	0	0	0	117	17
13:15:00	152	13	456	43	160	8	12	1	18	1	11	0	1	0	4	0	0	0	132	15
13:30:00	163	11	491	35	176	16	13	1	20	2	11	0	1	0	4	0	0	0	138	6
13:45:00	173	10	519	28	188	12	13	0	21	1	11	0	2	1	5	1	0	0	153	15
14:00:00	183	10	548	29	200	12	14	1	23	2	14	3	2	0	5	0	0	0	167	14
14:15:00	183	0	548	0	201	1	14	0	23	0	14	0	2	0	5	0	0	0	167	0
15:00:00	183	0	548	0	201	0	14	0	23	0	14	0	2	0	5	0	0	0	167	0
15:15:00	191	8	587	39	214	13	15	1	23	0	14	0	2	0	7	2	0	0	181	14
15:30:00	202	11	624	37	230	16	16	1	25	2	14	0	2	0	9	2	0	0	201	20
15:45:00	216	14	677	53	242	12	16	0	26	1	14	0	2	0	9	0	0	0	213	12
16:00:00	229	13	716	39	252	10	16	0	30	4	14	0	2	0	10	1	0	0	224	11
16:15:00	239	10	757	41	273	21	16	0	31	1	14	0	2	0	10	0	0	0	233	9
16:30:00	248	9	795	38	282	9	16	0	33	2	14	0	2	0	11	1	1	1	237	4
16:45:00	266	18	838	43	288	6	16	0	33	0	14	0	2	0	12	1	1	0	241	4
17:00:00	280	14	886	48	309	21	16	0	33	0	14	0	2	0	12	0	1	0	258	17
17:15:00	294	14	930	44	320	11	17	1	34	1	14	0	2	0	12	0	1	0	273	15
17:30:00	303	9	972	42	335	15	17	0	35	1	14	0	2	0	12	0	1	0	280	7
17:45:00	314	11	1006	34	352	17	18	1	36	1	14	0	2	0	14	2	1	0	287	7
18:00:00	321	7	1042	36	359	7	18	0	37	1	14	0	2	0	14	0	1	0	291	4
18:15:00	321	0	1042	0	359	0	18	0	37	0	14	0	2	0	14	0	1	0	291	0
18:15:15	321	0	1042	0	359	0	18	0	37	0	14	0	2	0	14	0	1	0	291	0

Trans-Plan Transportation Inc.

Site ID Code:
Intersection Location:
Municipality:
Count Date:
Weather and Temperature:
Surveyor:

Dunlop Street & Mulcaster Street
Barrie, Ontario
Tuesday March 19, 2019
Partly Sunny, 4 Degrees
TP

AM	NORTH APPROACH										Total	EAST APPROACH										Total	SOUTH APPROACH										Total	WEST APPROACH										Total	Grand Total
	CAR			TRUCKS			CYCLISTS			Peds		CAR			TRUCKS			CYCLISTS			Peds		CAR			TRUCKS			CYCLISTS			Peds													
	L	T	R	L	T	R	L	T	R			L	T	R	L	T	R	L	T	R			L	T	R	L	T	R	L	T	R														
7:00	2	18	7	0	0	0	0	0	0	0	27	48	30	3	1	0	0	0	0	0	0	82	0	11	16	0	0	0	0	0	0	2	29	6	11	0	0	0	0	0	0	17	155		
7:15	1	19	7	0	0	0	0	1	0	0	28	47	34	5	1	0	0	0	0	0	1	88	0	46	54	0	1	1	0	0	0	3	105	8	13	1	0	0	0	0	0	1	23	244	
7:30	1	33	3	0	3	0	0	0	0	0	40	70	50	7	1	0	1	0	0	0	2	131	1	44	74	0	0	0	0	0	0	1	120	6	13	4	0	1	0	0	0	2	26	317	
7:45	0	34	5	0	0	0	0	0	0	0	39	88	27	1	0	1	0	0	0	0	5	122	2	49	62	0	0	1	0	0	0	1	115	9	20	2	0	2	0	0	0	2	35	311	
8:00	0	34	6	0	0	0	0	0	0	0	40	84	37	3	1	2	0	0	0	0	2	129	1	42	54	0	0	2	0	0	0	5	104	16	23	8	0	2	0	0	0	5	54	327	
8:15	1	28	11	0	1	0	0	0	0	0	41	83	39	5	0	0	0	0	0	0	3	130	5	62	85	0	0	0	0	0	0	5	157	17	23	2	1	1	0	0	0	4	48	376	
8:30	1	27	8	0	1	0	0	0	0	0	37	70	40	3	1	0	0	0	0	0	4	118	1	36	71	0	3	2	0	0	0	4	117	10	12	6	0	0	1	0	0	1	30	302	
8:45	0	26	8	1	1	0	0	0	0	0	36	75	22	5	0	3	0	0	0	0	2	107	0	55	72	0	0	0	0	0	0	4	131	10	22	7	0	2	0	0	0	5	46	320	
MD																																													
11:00	1	35	9	0	0	0	0	0	0	0	45	47	30	2	4	1	0	0	0	0	6	90	0	28	52	0	2	0	0	0	0	6	88	8	29	7	1	3	1	0	0	0	8	57	280
11:15	3	31	13	0	1	0	0	0	0	0	48	37	33	5	0	1	0	0	0	0	9	85	5	25	63	0	0	2	0	0	0	8	103	16	37	7	1	0	0	0	0	5	66	302	
11:30	7	25	14	0	0	1	0	0	0	0	47	55	32	9	3	2	0	0	0	0	11	112	2	16	53	0	1	0	0	0	0	3	75	9	29	11	0	0	0	0	0	12	61	295	
11:45	0	36	12	0	3	0	0	0	0	0	51	60	34	3	1	1	0	0	0	0	10	109	4	33	62	0	0	0	0	0	0	8	107	14	38	11	0	0	0	0	0	19	82	349	
12:00	2	47	21	0	0	0	0	0	0	11	81	67	29	9	1	0	0	0	0	0	9	115	5	30	63	0	2	1	0	0	0	5	106	18	27	9	1	0	0	0	0	11	66	368	
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12:30	8	35	11	1	0	0	0	0	0	8	63	58	36	6	1	1	1	0	0	0	7	110	7	44	70	0	0	0	0	0	0	7	128	11	30	7	0	1	0	0	0	13	62	363	
12:45	5	40	19	0	0	0	0	0	0	13	77	68	57	8	2	1	0	0	0	0	10	146	7	32	76	0	0	0	0	0	0	8	123	9	28	9	0	3	0	0	0	20	69	415	
13:00	9	33	17	0	1	1	0	0	0	0	61	59	33	8	2	0	1	0	0	0	7	110	6	30	71	0	0	0	0	0	0	7	114	15	35	7	1	0	0	0	0	6	64	349	
13:15	2	40	12	0	1	1	0	0	0	0	56	72	43	7	2	2	0	0	0	0	10	136	3	36	73	0	0	1	0	0	0	8	121	13	37	9	1	2	1	0	0	7	70	383	
13:30	6	28	13	0	1	1	0	0	0	0	49	53	44	7	2	0	0	0	0	0	7	113	4	43	52	0	2	1	0	0	0	8	110	18	24	6	0	1	1	0	0	11	61	333	
13:45	3	35	19	0	0	0	0	0	0	0	57	60	40	6	1	1	0	0	0	0	10	118	4	35	73	0	0	1	0	0	0	13	126	16	42	4	1	1	0	0	0	8	72	373	
PM																																													
15:00	3	38	13	0	1	2	0	0	0	0	57	54	42	3	1	1	0	0	0	0	7	108	5	35	78	0	0	0	0	0	0	9	127	18	33	9	0	3	0	0	0	11	74	366	
15:15	3	44	13	0	1	0	0	0	0	0	61	76	39	3	1	1	0	0	0	0	8	128	2	35	79	0	0	0	0	0	0	4	120	15	41	4	0	0	0	0	0	8	68	377	
15:30	6	49	11	0	1	0	0	0	0	0	67	74	30	5	1	0	0	0	0	0	5	115	1	30	72	0	0	2	0	0	0	2	107	22	38	6	0	0	1	0	0	6	73	362	
15:45	3	52	17	0	0	0	0	0	0	0	72	67	33	2	3	0	0	0	0	0	9	114	6	35	94	0	0	0	0	0	0	8	143	16	28	9	0	2	1	0	0	8	64	393	
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16:15	3	53	6	0	1	0	0	0	0	0	63	75	37	5	3	0	0	0	0	0	6	126	3	47	77	0	0	0	0	0	0	3	130	14	45	6	0	1	0	0	0	8	74	393	
16:30	4	57	7	0	0	0	0	0	0	0	68	79	31	5	1	2	0	0	0	0	1	119	1	33	102	0	0	0	0	0	0	4	140	12	37	5	1	0	0	0	0	5	60	387	
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17:30	5	43	8	0	0	0	0	0	0	0	56	60	28	5	1	1	0	0	0	0	6	101	3	37	103	0	0	0	0	0	0	5	148	11	31	6	0	0	0	0	0	3	51	356	
17:45	2	43	5	0	0	0	0	0	0	0	50	49	34	3	0	0	0	0	0	0	4	90	1	38	93	0	0	0	0	0	0	10	142	12	37	5	0	0	0	0	0	4	58	340	



Turning Movement Count Diagram

Intersection: Dunlop Street & Mulcaster Street

Municipality: Barrie, Ontario

Intersection ID:

Date: Tuesday March 19, 2019

AM Peak Hour: 7:30 to 8:30

MD Peak Hour: 12:30 to 13:30

Mulcaster Street									
North Total 423						East Total 865			
North Entering 160	Cyclists	0	0	0		East Entering 500			
North Receiving 263	Truck	0	4	0		East Receiving 365			
North Peds 0	Cars	25	129	2		East Peds 12			
		←	↓	→					
Dunlop Street	0	1	48	↑		↑	16	1	0
	0	6	79	→		←	153	3	0
	0	0	16	↓		↓	325	2	0
		←	↑	→					
West Total 340		9	197	275		South Total 960			
West Entering 150		0	0	3		South Entering 484			
West Receiving 190		0	0	0		South Receiving 476			
West Peds 13						South Peds 12			

Mulcaster Street									
North Total 459						East Total 920			
North Entering 236	Cyclists	0	0	0		East Entering 468			
North Receiving 223	Truck	2	2	1		East Receiving 452			
North Peds 21	Cars	59	148	24		East Peds 34			
					←	↓	↘		
Dunlop Street	0	2	48	↗		↗	29	2	0
	0	6	130	→		←	169	4	0
	0	1	32	↘		↘	257	7	0
					←	↑	↗		
West Total 476			23	142	290	South Total 903			
West Entering 219		0	0	1		South Entering 456			
West Receiving 257		0	0	0		South Receiving 447			
West Peds 46						South Peds 30			

PM Peak Hour: 16:00 to 17:00

Total 8-Hour Count

Mulcaster Street									
North Total 748				East Total 1049					
North Entering 282	Cyclists	0	1	0	East Entering 454				
North Receiving 466	Truck	1	1	0	East Receiving 595				
North Peds 0	Cars	37	225	17	East Peds 25				
				⬅	⬇	➡			
Dunlop Street	0	1	57	⬆	⬆		22	0	0
	0	2	182	➡	⬅		137	3	0
	0	0	28	⬇	⬇		286	6	0
				⬅	⬆	➡			
West Total 456				8	386	393	South Total 1335		
West Entering 270				0	0	1	South Entering 788		
West Receiving 186				0	0	0	South Receiving 547		
West Peds 19							South Peds 20		

Mulcaster Street											
North Total 3762						East Total 6918					
North Entering 1739		Cyclists	1	2	0	East Entering 3393					
North Receiving 2023		Truck	7	18	2	East Receiving 3525					
North Peds 41		Cars	359	1247	103	East Peds 217					
			⬅	⬇	➡						
Dunlop Street	0	8	419	⬆	⬆ 154					3	0
	0	30	995	➡	⬅ 1143					23	0
	0	6	210	⬇	⬇ 2031					39	0
			⬅	⬆	➡						
West Total 3297				96	1428	2373	South Total 7483				
West Entering 1668				0	11	22	South Entering 3930				
West Receiving 1629				0	0	0	South Receiving 3553				
West Peds 222				South Peds 184							

Appendix B – Existing Traffic Level of Service Calculations

HCM Unsignalized Intersection Capacity Analysis

3: Dunlop St E & Mulcaster St

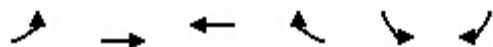
6/23/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	48	79	16	325	153	16	9	197	275	2	129	25
Future Volume (vph)	48	79	16	325	153	16	9	197	275	2	129	25
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	51	83	17	342	161	17	9	207	289	2	136	26
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	151	520	505	164								
Volume Left (vph)	51	342	9	2								
Volume Right (vph)	17	17	289	26								
Hadj (s)	0.03	0.11	-0.31	-0.06								
Departure Headway (s)	7.8	6.8	6.5	7.7								
Degree Utilization, x	0.33	0.98	0.91	0.35								
Capacity (veh/h)	437	520	542	449								
Control Delay (s)	14.6	60.1	44.7	14.8								
Approach Delay (s)	14.6	60.1	44.7	14.8								
Approach LOS	B	F	E	B								
Intersection Summary												
Delay				43.6								
Level of Service				E								
Intersection Capacity Utilization				70.3%	ICU Level of Service	C						
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

7: Dunlop St E & Poyntz St

6/23/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	21	363	432	3	0	17
Future Volume (vph)	21	363	432	3	0	17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	22	382	455	3	0	18
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total (vph)	404	458	18			
Volume Left (vph)	22	0	0			
Volume Right (vph)	0	3	18			
Hadj (s)	0.04	0.03	-0.57			
Departure Headway (s)	4.5	4.4	5.2			
Degree Utilization, x	0.50	0.56	0.03			
Capacity (veh/h)	794	804	586			
Control Delay (s)	11.8	12.8	8.3			
Approach Delay (s)	11.8	12.8	8.3			
Approach LOS	B	B	A			
Intersection Summary						
Delay			12.3			
Level of Service			B			
Intersection Capacity Utilization			44.5%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Dunlop St E & Mulcaster St

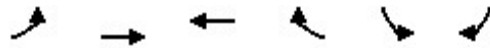
6/23/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	57	128	28	286	137	22	8	286	393	17	225	129
Future Volume (vph)	57	128	28	286	137	22	8	286	393	17	225	129
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	60	135	29	301	144	23	8	301	414	18	237	136
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	224	468	723	391								
Volume Left (vph)	60	301	8	18								
Volume Right (vph)	29	23	414	136								
Hadj (s)	0.01	0.13	-0.31	-0.17								
Departure Headway (s)	9.3	8.4	8.0	8.3								
Degree Utilization, x	0.58	1.00	1.00	0.90								
Capacity (veh/h)	368	468	723	423								
Control Delay (s)	24.4	72.9	70.9	51.4								
Approach Delay (s)	24.4	72.9	70.9	51.4								
Approach LOS	C	F	F	F								
Intersection Summary												
Delay				61.4								
Level of Service				F								
Intersection Capacity Utilization				84.1%	ICU Level of Service	E						
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

7: Dunlop St E & Poyntz St

6/23/2020



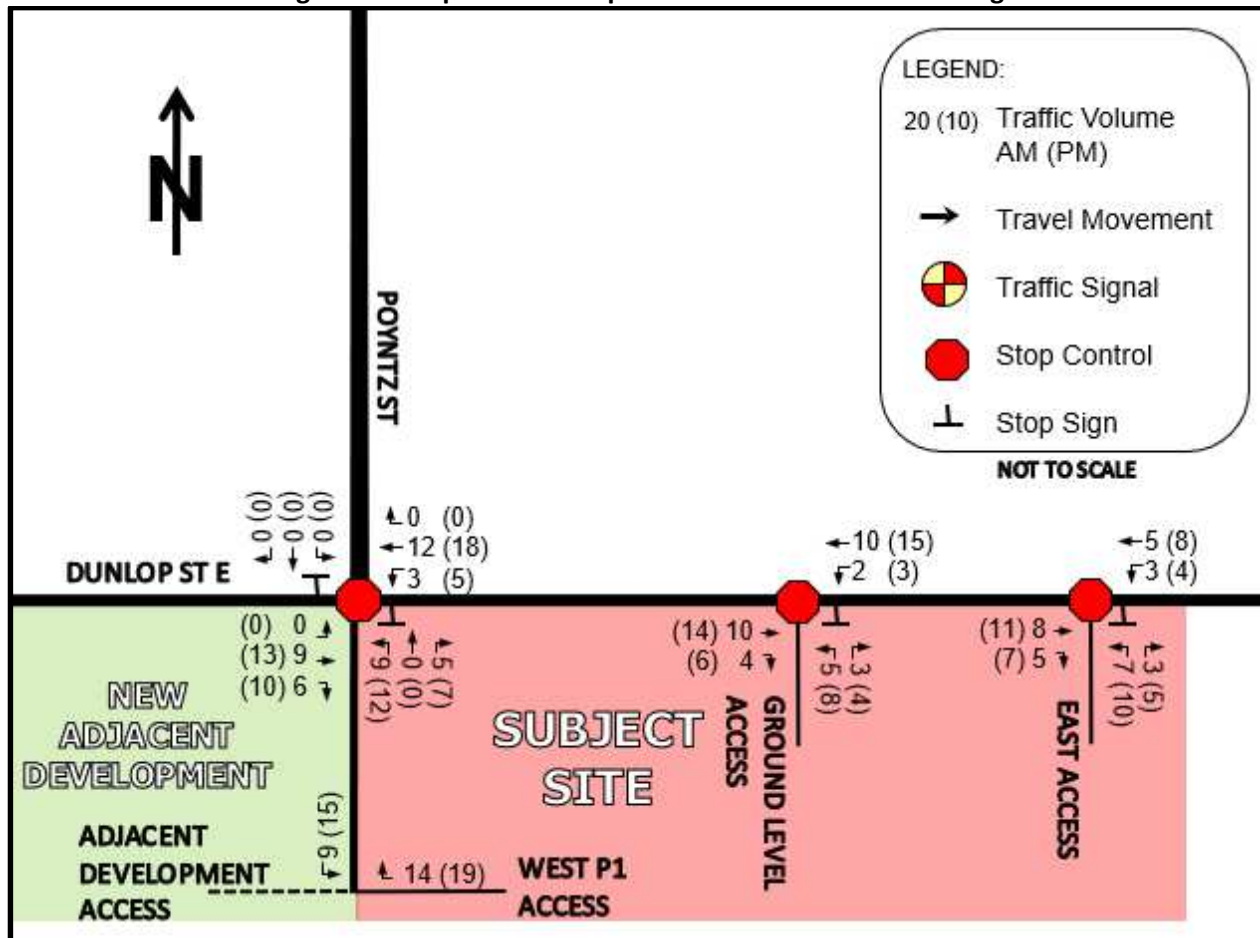
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	3	551	396	0	2	36
Future Volume (vph)	3	551	396	0	2	36
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	3	580	417	0	2	38
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total (vph)	583	417	40			
Volume Left (vph)	3	0	2			
Volume Right (vph)	0	0	38			
Hadj (s)	0.04	0.03	-0.53			
Departure Headway (s)	4.5	4.7	5.5			
Degree Utilization, x	0.73	0.54	0.06			
Capacity (veh/h)	583	755	573			
Control Delay (s)	18.7	13.0	8.9			
Approach Delay (s)	18.7	13.0	8.9			
Approach LOS	C	B	A			
Intersection Summary						
Delay			16.1			
Level of Service			C			
Intersection Capacity Utilization			39.8%	ICU Level of Service	A	
Analysis Period (min)			15			

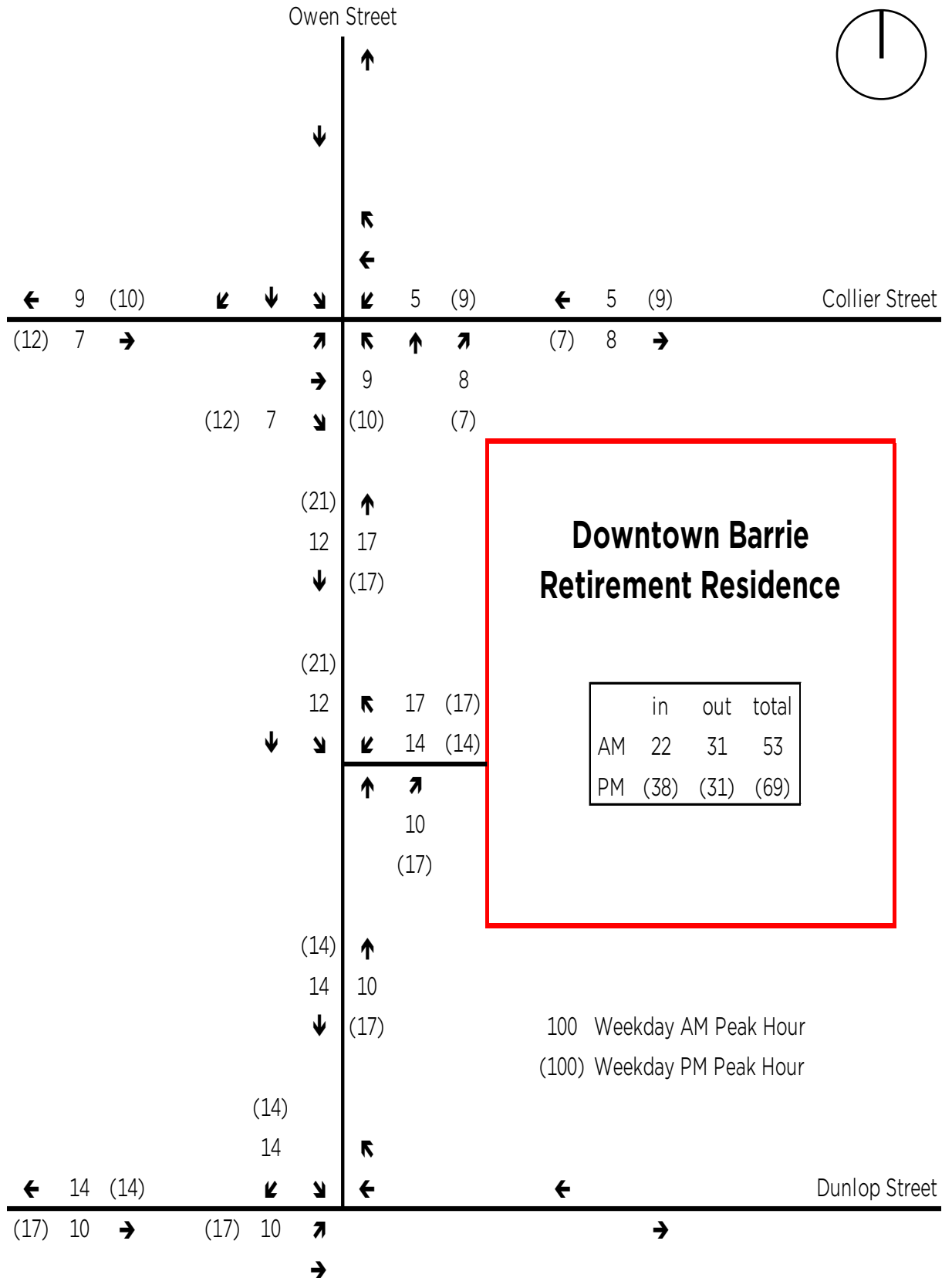
Appendix D – Background Developments

The distribution of traffic entering at each site access driveway is based on our review of the internal parking and building layout, in conjunction with the external traffic distribution.

Using the traffic distribution patterns noted above, the residential and health and fitness club traffic assignments for the proposed development was calculated for the AM and PM peak hour and is illustrated in **Figures 1 and 2**, respectively.

Figure 1 – Proposed Development – Residential Traffic Assignment





Downtown Barrie Retirement Residence

Figure 8: Site Traffic



Appendix E – Future Background Traffic Level of Service Calculations

HCM Unsignalized Intersection Capacity Analysis

3: Dunlop St E & Mulcaster St

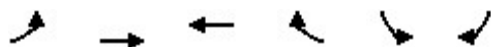
6/23/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	48	81	16	325	158	16	9	203	275	2	133	25
Future Volume (vph)	48	81	16	325	158	16	9	203	275	2	133	25
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	51	85	17	342	166	17	9	214	289	2	140	26
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	153	525	512	168								
Volume Left (vph)	51	342	9	2								
Volume Right (vph)	17	17	289	26								
Hadj (s)	0.03	0.11	-0.30	-0.06								
Departure Headway (s)	7.9	6.9	6.6	7.8								
Degree Utilization, x	0.34	1.00	0.94	0.36								
Capacity (veh/h)	435	525	551	448								
Control Delay (s)	14.9	65.5	49.6	15.2								
Approach Delay (s)	14.9	65.5	49.6	15.2								
Approach LOS	B	F	E	C								
Intersection Summary												
Delay			47.6									
Level of Service			E									
Intersection Capacity Utilization			70.8%	ICU Level of Service					C			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

7: Dunlop St E & Poyntz St

6/23/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	21	374	445	3	0	17
Future Volume (vph)	21	374	445	3	0	17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	22	394	468	3	0	18
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total (vph)	416	471	18			
Volume Left (vph)	22	0	0			
Volume Right (vph)	0	3	18			
Hadj (s)	0.04	0.03	-0.57			
Departure Headway (s)	4.5	4.4	5.2			
Degree Utilization, x	0.52	0.58	0.03			
Capacity (veh/h)	791	802	579			
Control Delay (s)	12.2	13.3	8.4			
Approach Delay (s)	12.2	13.3	8.4			
Approach LOS	B	B	A			
Intersection Summary						
Delay			12.7			
Level of Service			B			
Intersection Capacity Utilization			45.0%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Dunlop St E & Mulcaster St

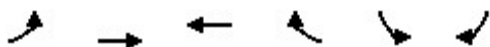
6/23/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	57	132	28	286	141	22	8	295	393	17	232	129
Future Volume (vph)	57	132	28	286	141	22	8	295	393	17	232	129
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	60	139	29	301	148	23	8	311	414	18	244	136
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	228	472	733	398								
Volume Left (vph)	60	301	8	18								
Volume Right (vph)	29	23	414	136								
Hadj (s)	0.01	0.13	-0.30	-0.16								
Departure Headway (s)	9.4	8.5	8.1	8.3								
Degree Utilization, x	0.59	1.00	1.00	0.92								
Capacity (veh/h)	367	472	733	423								
Control Delay (s)	25.1	73.3	71.2	55.4								
Approach Delay (s)	25.1	73.3	71.2	55.4								
Approach LOS	D	F	F	F								
Intersection Summary												
Delay				62.6								
Level of Service				F								
Intersection Capacity Utilization				85.0%	ICU Level of Service				E			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

7: Dunlop St E & Poyntz St

6/23/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	3	568	408	0	2	36
Future Volume (vph)	3	568	408	0	2	36
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	3	598	429	0	2	38
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total (vph)	601	429	40			
Volume Left (vph)	3	0	2			
Volume Right (vph)	0	0	38			
Hadj (s)	0.03	0.03	-0.53			
Departure Headway (s)	4.5	4.7	5.6			
Degree Utilization, x	0.76	0.56	0.06			
Capacity (veh/h)	601	751	571			
Control Delay (s)	20.1	13.5	9.0			
Approach Delay (s)	20.1	13.5	9.0			
Approach LOS	C	B	A			
Intersection Summary						
Delay			17.0			
Level of Service			C			
Intersection Capacity Utilization			40.7%	ICU Level of Service	A	
Analysis Period (min)			15			

Appendix F – 2016 TTS Data Extraction

Wed Apr 29 2020 15:15:01 GMT-0400 (Eastern Daylight Time) - Run Time: 2252ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig

Column: Primary travel mode of trip - mode_prime

Filters:

2006 GTA zone of origin 8505 8506

and

Start time of trip - start_time In 600-900

and

Primary travel mode of trip a g j m p t u w d

Trip 2016

Table:

	Transit exc Cycle	Auto driver	GO rail only	Joint GO rail	Motorcycle	Auto passe	Walk	
8501	7	0	1260	19	4	20	259	0
8505	94	71	1408	63	0	0	173	192
8506	29	0	941	0	0	0	108	90
	130	71	3609	82	4	20	540	282
	3%	1%	76%	2%	0%	0%	11%	6%
								4738

Wed Apr 29 2020 15:13:36 GMT-0400 (Eastern Daylight Time) - Run Time: 2189ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig

Column: Primary travel mode of trip - mode_prime

Filters:

2006 GTA zone of origin 8505 8506

and

Start time of trip - start_time In 1500-1800

and

Primary travel mode of trip a g j m p t u w d

Trip 2016

Table:

	Transit exc Cycle	Auto driver	Auto passe	Taxi passer	Walk	
8501	174	101	5231	622	20	128
8505	0	107	895	83	0	190
8506	0	45	842	198	8	38
	174	253	6968	903	28	356
	2%	3%	80%	10%	0%	4%
						8682

Appendix G – Future Total Traffic Level of Service Calculations

Queues

3: Dunlop St E & Mulcaster St

2/18/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	73	204	425	265	12	253	361	20	283
Act Effect Green (s)	18.4	18.4	29.5	29.5	13.1	13.1	13.1	13.1	13.1
Actuated g/C Ratio	0.36	0.36	0.57	0.57	0.25	0.25	0.25	0.25	0.25
v/c Ratio	0.18	0.30	0.62	0.24	0.05	0.52	0.53	0.08	0.57
Control Delay	14.3	13.7	12.5	6.7	14.3	20.2	5.2	14.6	19.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.3	13.7	12.5	6.7	14.3	20.2	5.2	14.6	19.8
LOS	B	B	B	A	B	C	A	B	B
Approach Delay		13.9		10.3		11.4			19.4
Approach LOS		B		B		B			B
Queue Length 50th (m)	4.5	12.4	19.3	10.2	0.8	19.8	0.0	1.4	20.2
Queue Length 95th (m)	13.2	28.1	#42.1	23.6	3.8	36.1	14.6	5.2	38.0
Internal Link Dist (m)		75.2		173.6		86.0			107.5
Turn Bay Length (m)									
Base Capacity (vph)	412	687	684	1121	316	680	812	353	675
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.30	0.62	0.24	0.04	0.37	0.44	0.06	0.42

Intersection Summary

Cycle Length: 56.3

Actuated Cycle Length: 51.6

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 12.7

Intersection LOS: B

Intersection Capacity Utilization 57.4%

ICU Level of Service B

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

3: Dunlop St E & Mulcaster St

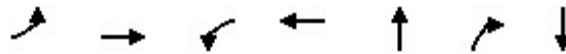
2/18/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	69	171	23	404	230	22	11	240	343	19	208	61
Future Volume (vph)	69	171	23	404	230	22	11	240	343	19	208	61
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1842	1905		1879	1952		1842	1939	1648	1842	1873	
Flt Permitted	0.60	1.00		0.51	1.00		0.47	1.00	1.00	0.52	1.00	
Satd. Flow (perm)	1155	1905		1002	1952		902	1939	1648	1007	1873	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	73	180	24	425	242	23	12	253	361	20	219	64
RTOR Reduction (vph)	0	8	0	0	6	0	0	0	270	0	20	0
Lane Group Flow (vph)	73	196	0	425	259	0	12	253	91	20	263	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	18.5	18.5		29.5	29.5		13.0	13.0	13.0	13.0	13.0	
Effective Green, g (s)	18.5	18.5		29.5	29.5		13.0	13.0	13.0	13.0	13.0	
Actuated g/C Ratio	0.36	0.36		0.57	0.57		0.25	0.25	0.25	0.25	0.25	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	414	684		684	1118		227	489	416	254	472	
v/s Ratio Prot		0.10		c0.08	0.13			0.13			c0.14	
v/s Ratio Perm	0.06			c0.28			0.01		0.06	0.02		
v/c Ratio	0.18	0.29		0.62	0.23		0.05	0.52	0.22	0.08	0.56	
Uniform Delay, d1	11.3	11.8		6.4	5.4		14.6	16.6	15.2	14.7	16.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.9	1.1		1.8	0.5		0.1	0.9	0.3	0.1	1.4	
Delay (s)	12.2	12.8		8.1	5.9		14.7	17.5	15.5	14.8	18.2	
Level of Service	B	B		A	A		B	B	B	B	B	
Approach Delay (s)		12.7			7.3			16.3			17.9	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			12.7			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			51.5			Sum of lost time (s)			13.5			
Intersection Capacity Utilization			57.4%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

6: Mulcaster St & Collier St

2/18/2022



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	87	312	57	307	328	46	277
Act Effect Green (s)	20.3	20.3	18.4	18.4	14.5	14.5	14.5
Actuated g/C Ratio	0.46	0.46	0.42	0.42	0.33	0.33	0.33
v/c Ratio	0.17	0.19	0.12	0.20	0.64	0.08	0.27
Control Delay	9.8	6.2	11.6	7.7	18.6	4.0	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.8	6.2	11.6	7.7	18.6	4.0	8.6
LOS	A	A	B	A	B	A	A
Approach Delay		7.0		8.3	16.8		8.6
Approach LOS		A		A	B		A
Queue Length 50th (m)	3.4	4.4	2.6	5.2	21.4	0.0	6.2
Queue Length 95th (m)	12.8	13.3	10.3	14.8	39.8	4.2	12.0
Internal Link Dist (m)		48.1		237.7	107.5		115.9
Turn Bay Length (m)							
Base Capacity (vph)	506	1676	456	1527	1037	1107	2024
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	0.17	0.19	0.13	0.20	0.32	0.04	0.14

Intersection Summary

Cycle Length: 54.4

Actuated Cycle Length: 44

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 10.2

Intersection LOS: B

Intersection Capacity Utilization 50.4%

ICU Level of Service A

Analysis Period (min) 15

HCM Signalized Intersection Capacity Analysis

6: Mulcaster St & Collier St

2/18/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	212	85	54	207	85	94	218	44	49	153	61
Future Volume (vph)	83	212	85	54	207	85	94	218	44	49	153	61
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		0.95	
Frt	1.00	0.96		1.00	0.96			1.00	0.85		0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00		0.99	
Satd. Flow (prot)	1842	3526		1842	3524			1910	1648		3523	
Flt Permitted	0.56	1.00		0.56	1.00			0.81	1.00		0.85	
Satd. Flow (perm)	1095	3526		1090	3524			1565	1648		3023	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	87	223	89	57	218	89	99	229	46	52	161	64
RTOR Reduction (vph)	0	48	0	0	48	0	0	0	31	0	43	0
Lane Group Flow (vph)	87	264	0	57	259	0	0	328	15	0	234	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	20.3	20.3		20.3	20.3			14.5	14.5		14.5	
Effective Green, g (s)	20.3	20.3		20.3	20.3			14.5	14.5		14.5	
Actuated g/C Ratio	0.46	0.46		0.46	0.46			0.33	0.33		0.33	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	507	1634		505	1633			518	545		1000	
v/s Ratio Prot		0.07			0.07							
v/s Ratio Perm	c0.08			0.05				c0.21	0.01		0.08	
v/c Ratio	0.17	0.16		0.11	0.16			0.63	0.03		0.23	
Uniform Delay, d1	6.8	6.8		6.7	6.8			12.4	9.9		10.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.2	0.2		0.5	0.2			2.5	0.0		0.1	
Delay (s)	7.0	7.0		7.1	7.0			14.9	9.9		10.7	
Level of Service	A	A		A	A			B	A		B	
Approach Delay (s)		7.0			7.0			14.3			10.7	
Approach LOS		A			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			9.7			HCM 2000 Level of Service				A		
HCM 2000 Volume to Capacity ratio			0.42									
Actuated Cycle Length (s)			43.8			Sum of lost time (s)			13.5			
Intersection Capacity Utilization			50.4%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

10: proposed access & collier st

2/18/2022

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	297	3	2	346	35	7
Future Volume (Veh/h)	297	3	2	346	35	7
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	313	3	2	364	37	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)	262					
pX, platoon unblocked						
vC, conflicting volume			316		682	314
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			316		682	314
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		91	99
cM capacity (veh/h)			1244		415	726
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	316	366	44			
Volume Left	0	2	37			
Volume Right	3	0	7			
cSH	1700	1244	445			
Volume to Capacity	0.19	0.00	0.10			
Queue Length 95th (m)	0.0	0.0	2.5			
Control Delay (s)	0.0	0.1	14.0			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.1	14.0			
Approach LOS			B			
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			28.8%	ICU Level of Service		A
Analysis Period (min)			15			

Queues

3: Dunlop St E & Mulcaster St

2/18/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	104	388	388	310	15	240	513	22	370
Act Effect Green (s)	18.4	18.4	29.5	29.5	14.2	14.2	14.2	14.2	14.2
Actuated g/C Ratio	0.35	0.35	0.56	0.56	0.27	0.27	0.27	0.27	0.27
v/c Ratio	0.27	0.58	0.77	0.28	0.09	0.46	0.64	0.08	0.71
Control Delay	16.0	18.6	22.2	7.4	15.0	18.8	6.4	14.4	23.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.0	18.6	22.2	7.4	15.0	18.8	6.4	14.4	23.9
LOS	B	B	C	A	B	B	A	B	C
Approach Delay		18.0		15.6		10.5			23.3
Approach LOS		B		B		B			C
Queue Length 50th (m)	6.9	28.4	18.3	13.0	1.0	18.7	1.7	1.5	28.7
Queue Length 95th (m)	17.9	55.3	#52.8	27.8	4.4	34.4	19.4	5.6	51.5
Internal Link Dist (m)		75.2		173.6		86.0			107.5
Turn Bay Length (m)									
Base Capacity (vph)	386	673	503	1096	222	665	886	365	661
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.58	0.77	0.28	0.07	0.36	0.58	0.06	0.56

Intersection Summary

Cycle Length: 56.3

Actuated Cycle Length: 52.7

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 15.7

Intersection LOS: B

Intersection Capacity Utilization 67.6%

ICU Level of Service C

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

3: Dunlop St E & Mulcaster St

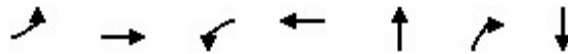
2/18/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	99	328	41	369	267	28	14	228	487	21	274	78
Future Volume (vph)	99	328	41	369	267	28	14	228	487	21	274	78
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1842	1907		1879	1950		1842	1939	1648	1842	1875	
Flt Permitted	0.57	1.00		0.31	1.00		0.33	1.00	1.00	0.55	1.00	
Satd. Flow (perm)	1109	1907		621	1950		648	1939	1648	1065	1875	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	104	345	43	388	281	29	15	240	513	22	288	82
RTOR Reduction (vph)	0	8	0	0	6	0	0	0	356	0	20	0
Lane Group Flow (vph)	104	380	0	388	304	0	15	240	157	22	350	0
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	18.4	18.4		29.4	29.4		14.2	14.2	14.2	14.2	14.2	
Effective Green, g (s)	18.4	18.4		29.4	29.4		14.2	14.2	14.2	14.2	14.2	
Actuated g/C Ratio	0.35	0.35		0.56	0.56		0.27	0.27	0.27	0.27	0.27	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	387	667		502	1089		174	523	444	287	506	
v/s Ratio Prot		0.20		c0.10	0.16			0.12			c0.19	
v/s Ratio Perm	0.09			c0.34			0.02		0.10	0.02		
v/c Ratio	0.27	0.57		0.77	0.28		0.09	0.46	0.35	0.08	0.69	
Uniform Delay, d1	12.3	13.9		7.8	6.1		14.4	16.0	15.5	14.3	17.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.7	3.5		7.3	0.6		0.2	0.6	0.5	0.1	4.1	
Delay (s)	14.0	17.4		15.0	6.7		14.6	16.6	16.0	14.4	21.3	
Level of Service	B	B		B	A		B	B	B	B	C	
Approach Delay (s)		16.7			11.3			16.2			20.9	
Approach LOS		B			B			B			C	
Intersection Summary												
HCM 2000 Control Delay			15.6			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			52.6			Sum of lost time (s)			13.5			
Intersection Capacity Utilization			67.6%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

6: Mulcaster St & Collier St

2/18/2022



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	84	342	73	314	289	56	372
Act Effect Green (s)	20.2	20.2	18.3	18.3	12.9	12.9	12.9
Actuated g/C Ratio	0.48	0.48	0.43	0.43	0.30	0.30	0.30
v/c Ratio	0.16	0.20	0.16	0.20	0.59	0.10	0.38
Control Delay	8.7	5.9	10.9	7.6	17.7	4.2	10.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.7	5.9	10.9	7.6	17.7	4.2	10.4
LOS	A	A	B	A	B	A	B
Approach Delay		6.5		8.2	15.5		10.4
Approach LOS		A		A	B		B
Queue Length 50th (m)	3.0	4.8	3.1	5.6	18.2	0.0	9.3
Queue Length 95th (m)	11.3	13.5	11.6	14.8	34.6	4.8	16.6
Internal Link Dist (m)		48.1		245.5	107.5		115.9
Turn Bay Length (m)							
Base Capacity (vph)	520	1742	458	1579	1112	1148	2112
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	0.16	0.20	0.16	0.20	0.26	0.05	0.18

Intersection Summary

Cycle Length: 54.4

Actuated Cycle Length: 42.3

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.59

Intersection Signal Delay: 9.9

Intersection LOS: A

Intersection Capacity Utilization 51.6%

ICU Level of Service A

Analysis Period (min) 15

HCM Signalized Intersection Capacity Analysis

6: Mulcaster St & Collier St

2/18/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	246	79	69	231	67	61	214	53	63	229	62
Future Volume (vph)	80	246	79	69	231	67	61	214	53	63	229	62
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		0.95	
Frt	1.00	0.96		1.00	0.97			1.00	0.85		0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00		0.99	
Satd. Flow (prot)	1842	3550		1842	3559			1918	1648		3556	
Flt Permitted	0.56	1.00		0.55	1.00			0.84	1.00		0.85	
Satd. Flow (perm)	1088	3550		1059	3559			1621	1648		3051	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	259	83	73	243	71	64	225	56	66	241	65
RTOR Reduction (vph)	0	43	0	0	34	0	0	0	39	0	45	0
Lane Group Flow (vph)	84	299	0	73	280	0	0	289	17	0	327	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	20.3	20.3		20.3	20.3			12.9	12.9		12.9	
Effective Green, g (s)	20.3	20.3		20.3	20.3			12.9	12.9		12.9	
Actuated g/C Ratio	0.48	0.48		0.48	0.48			0.31	0.31		0.31	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	523	1707		509	1712			495	503		932	
v/s Ratio Prot		c0.08			0.08							
v/s Ratio Perm	0.08			0.07				c0.18	0.01		0.11	
v/c Ratio	0.16	0.18		0.14	0.16			0.58	0.03		0.35	
Uniform Delay, d1	6.2	6.2		6.1	6.2			12.4	10.3		11.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.1	0.2		0.6	0.2			1.8	0.0		0.2	
Delay (s)	6.3	6.4		6.7	6.4			14.1	10.3		11.6	
Level of Service	A	A		A	A			B	B		B	
Approach Delay (s)		6.4			6.4			13.5			11.6	
Approach LOS		A			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			9.3			HCM 2000 Level of Service			A			
HCM 2000 Volume to Capacity ratio			0.39									
Actuated Cycle Length (s)			42.2			Sum of lost time (s)			13.5			
Intersection Capacity Utilization			51.6%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

10: proposed access & collier st

2/18/2022

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	337	25	6	367	10	4
Future Volume (Veh/h)	337	25	6	367	10	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	355	26	6	386	11	4
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh						
Upstream signal (m)	269					
pX, platoon unblocked						
vC, conflicting volume			381	766		368
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			381	766		368
tC, single (s)			4.1	6.4		6.2
tC, 2 stage (s)						
tF (s)			2.2	3.5		3.3
p0 queue free %			99	97		99
cM capacity (veh/h)			1177	369		677
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	381	392	15			
Volume Left	0	6	11			
Volume Right	26	0	4			
cSH	1700	1177	420			
Volume to Capacity	0.22	0.01	0.04			
Queue Length 95th (m)	0.0	0.1	0.8			
Control Delay (s)	0.0	0.2	13.9			
Lane LOS			A	B		
Approach Delay (s)	0.0	0.2	13.9			
Approach LOS			B			
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			32.9%	ICU Level of Service		A
Analysis Period (min)			15			

Appendix H – Proxy Parking Demand Studies

Back to Main Menu

PARKING UTILIZATION SURVEYS

In order to review the characteristics of the residential parking demand, proxy site surveys were undertaken by NexTrans Engineering on Friday March 20, 2015 and Saturday March 21, 2015 between 6:00 p.m. to 10:00 p.m. in 30 minute intervals. The selected proxy sites are located in close proximity to the subject property and have a similar land use. They are as follows:

- Proxy Site # 1: 60 Fairfax Crescent, 198 residential units
- Proxy Site # 2: 3520 Danforth Avenue, 72 residential units

The results of the parking surveys are provided in Table 1.

Table 1 – Parking Utilization Surveys

Time (Starting)	Proxy Site # 1 (60 Fairfax Crescent)		Proxy Site # 2 (3520 Danforth Avenue)			
	Fri March 20, 2015	Sat March 21, 2015	Fri March 20, 2015		Sat March 21, 2015	
	Visitor	Visitor	Visitor	Resident	Visitor	Resident
	198 units		72 units			
6:00 p.m.	20	40	10	20	6	18
6:30	22	39	9	21	6	19
7:00	22	38	6	20	8	19
7:30	23	30	7	20	8	19
8:00	19	32	9	29	7	23
8:30	20	23	12	29	6	24
9:00	19	21	14	29	8	27
9:30	16	16	14	30	5	28
10:00 p.m.	14	14	11	32	6	28
Max Demand	23	40	14	32	8	28
Max Rate (per unit)	0.12	0.20	0.19	0.44	0.11	0.39

As summarized in Table 1, the peak visitor parking demand ratio is 0.20 spaces per unit (occurred at Proxy Site # 1 at 6:00 p.m.) and the peak residential parking demand ratio is 0.44 spaces per unit (occurred at Proxy Site # 2 at 10:00 p.m.). Based on the parking ratios derived from the proxy surveys, the expected parking demand for the subject site is calculated below:

- Residential Demand:
 - Visitor: 128 units at 0.20 spaces per unit (from proxy survey) = 25 spaces
 - Resident: 190 units at 0.44 spaces per unit (from proxy survey) = 56 spaces
- Total Demand: 81 spaces

[Back to Main Menu](#)

Friday January 19, 2018

Time	Underground Parking (270 spaces)		Visitor Parking (15 spaces)		Tenant Utilization	Visitor Utilization
	Total Demand	Available Spaces	Total Demand	Available Spaces		
5:00 PM	119	151	8	7	44%	53%
5:30 PM	110	160	8	7	41%	53%
6:00 PM	102	168	9	6	38%	60%
6:30 PM	106	164	5	10	39%	33%
7:00 PM	108	162	5	10	40%	33%
7:30 PM	107	163	4	11	40%	27%
8:00 PM	106	164	5	10	39%	33%
8:30 PM	102	168	4	11	38%	27%
9:00 PM	102	168	4	11	38%	27%
9:30 PM	101	169	3	12	37%	20%
10:00 PM	107	163	4	11	40%	27%
10:30 PM	107	163	4	11	40%	27%
11:00 PM	107	163	4	11	40%	27%

Sunday January 21, 2018)

Time	Underground Parking (270 spaces)		Visitor Parking (15 spaces)		Tenant Utilization	Visitor Utilization
	Total Demand	Available Spaces	Total Demand	Available Spaces		
2:00 PM	95	175	7	8	35%	47%
2:30 PM	97	173	6	9	36%	40%
3:00 PM	97	173	7	8	36%	47%
3:30 PM	98	172	6	9	36%	40%
4:00 PM	97	173	4	11	36%	27%
4:30 PM	98	172	3	12	36%	20%
5:00 PM	100	170	4	11	37%	27%
5:30 PM	103	167	3	12	38%	20%
6:00 PM	106	164	5	10	39%	33%
6:30 PM	108	162	5	10	40%	33%
7:00 PM	107	163	5	10	40%	33%
7:30 PM	109	161	5	10	40%	33%
8:00 PM	109	161	5	10	40%	33%

[Back to Main Menu](#)

Friday, April 21, 2017 @ (5pm-10pm/12am)

Havenwood - TOTAL NUMBER OF PARKING SPACES PROVIDED: Visitor ___8___ Tenant___148___ TOTAL 156

Time	Surface		Underground	Surface
	No. Visitor	No. Tenant	No. Tenant	Trades
5:00 PM	2	26	31	2
5:30 PM	1	26	30	2
6:00 PM	1	27	36	2
6:30 PM	1	28	36	2
7:00 PM	1	29	36	2
7:30 PM	1	28	36	2
8:00 PM	1	28	36	2
8:30 PM	1	34	41	2
9:00 PM	0	38	45	2
9:30 PM	0	36	46	2
10:00 PM	0	37	44	2
10:30 PM				
11:00 PM				
11:30 PM				
12:00 PM				

Williamsport - TOTAL NUMBER OF PARKING SPACES PROVIDED: Visitor ___8___ Tenant___147___ TOTAL 155

Time	Surface		Underground	Surface
	No. Visitor	No. Tenant	No. Tenant	Trades
5:00 PM	2	33	27	2
5:30 PM	1	36	26	2
6:00 PM	3	40	31	2
6:30 PM	3	39	40	1
7:00 PM	3	35	36	1
7:30 PM	2	36	38	1
8:00 PM	2	37	41	1
8:30 PM	2	38	40	1
9:00 PM	4	34	39	2
9:30 PM	4	36	42	2
10:00 PM	3	37	40	2
10:30 PM				
11:00 PM				
11:30 PM				
12:00 PM				

Sunday, April 23, 2017 @ (2pm-8pm)

Havenwood - TOTAL NUMBER OF PARKING SPACES PROVIDED: Visitor ___8___ Tenant___148___ TOTAL 156

Time	Surface (approx. 64)		Underground (approx. 74)	Surface
	No. Visitor	No. Tenant	No. Tenant	Trades
2:00 PM	1	36	51	2
2:30 PM	0	36	50	1
3:00 PM	1	36	52	1
3:30 PM	0	36	48	1
4:00 PM	0	31	45	0
4:30 PM	0	34	49	0
5:00 PM	0	33	47	0
5:30 PM	0	35	44	0
6:00 PM	0	36	46	0
6:30 PM	0	35	47	2
7:00 PM	0	34	48	2
7:30 PM	0	35	49	1
8:00 PM	1	37	50	1

Williamsport - TOTAL NUMBER OF PARKING SPACES PROVIDED: Visitor ___8___ Tenant___147___ TOTAL 155

Time	Surface (approx. 87)		Underground (approx. 79)	Surface
	No. Visitor	No. Tenant	No. Tenant	Trades
2:00 PM	4	34	35	1
2:30 PM	4	34	38	1
3:00 PM	4	36	35	1
3:30 PM	3	34	37	1
4:00 PM	3	30	38	1
4:30 PM	3	33	37	1
5:00 PM	5	39	33	1
5:30 PM	4	37	35	1
6:00 PM	4	35	36	2
6:30 PM	4	35	34	1
7:00 PM	5	32	35	1
7:30 PM	4	35	36	1
8:00 PM	3	39	40	1

NOTES

Williamsport (79 above ground parking, 2 of which are for trades, and 76 underground parking)

Havenwood (80 above ground parking, 2 of which are for trades, and 78 underground parking)

3 visitor parking spots were taken by construction crews at Havenwood

[Back to Main Menu](#)

Time Period (starting)	Friday, September 14, 2018		
	Tenant Demand	Utilization Rate	Available Space
Existing Parking Supply	92 Spaces		
5:00 PM	43	47%	49
5:30 PM	40	43%	52
6:00 PM	38	41%	54
6:30 PM	41	45%	51
7:00 PM	42	46%	50
7:30 PM	44	48%	48
8:00 PM	45	49%	47
8:30 PM	48	52%	44
9:00 PM	50	54%	42
9:30 PM	52	57%	40
10:00 PM	53	58%	39
Maximum	53	58%	39

Time Period (starting)	Saturday, September 15, 2018		
	Tenant Demand	Utilization Rate	Available Space
Existing Parking Supply	92 Spaces		
2:00 PM	47	51%	45
2:30 PM	45	49%	47
3:00 PM	44	48%	48
3:30 PM	47	51%	45
4:00 PM	48	52%	44
4:30 PM	50	54%	42
5:00 PM	47	51%	45
5:30 PM	50	54%	42
6:00 PM	50	54%	42
6:30 PM	47	51%	45
7:00 PM	44	48%	48
7:30 PM	44	48%	48
8:00 PM	46	50%	46
8:30 PM	49	53%	43
9:00 PM	51	55%	41
9:30 PM	52	57%	40
10:00 PM	54	59%	38
10:30 PM	54	59%	38
Maximum	54	59%	38

Time Period (starting)	Friday, September 14, 2018		
	Visitor Demand	Utilization Rate	Available Space
Existing Parking Supply	10 Spaces		
5:00 PM	1	10%	9
5:30 PM	0	0%	10
6:00 PM	0	0%	10
6:30 PM	0	0%	10
7:00 PM	0	0%	10
7:30 PM	0	0%	10
8:00 PM	0	0%	10
8:30 PM	0	0%	10
9:00 PM	0	0%	10
9:30 PM	0	0%	10
10:00 PM	0	0%	10
Maximum	1	10%	9

Time Period (starting)	Saturday, September 15, 2018		
	Visitor Demand	Utilization Rate	Available Space
Existing Parking Supply	10 Spaces		
2:00 PM	1	10%	9
2:30 PM	2	20%	8
3:00 PM	1	10%	9
3:30 PM	1	10%	9
4:00 PM	0	0%	10
4:30 PM	0	0%	10
5:00 PM	0	0%	10
5:30 PM	0	0%	10
6:00 PM	0	0%	10
6:30 PM	0	0%	10
7:00 PM	0	0%	10
7:30 PM	0	0%	10
8:00 PM	1	10%	9
8:30 PM	3	30%	7
9:00 PM	4	40%	6
9:30 PM	3	30%	7
10:00 PM	2	20%	8
Maximum	4	40%	6

The survey was conducted on Saturday September the 30th, 2017 from 6:00 PM until 11:00 PM during peak parking periods. The parking demand survey results are summarized in **Table 3-1**.

Table 3-1 – Parking Demand Survey – 25 Fisherville Road

	Visitor Peak Parking	Visitor Parking Rate
6:00	17	0.079
6:30	20	0.093
7:00	19	0.089
7:30	19	0.089
8:00	16	0.075
8:30	18	0.084
9:00	18	0.084
9:30	18	0.084
10:00	19	0.089
10:30	18	0.084
11:00	19	0.089
Peak	20	0.093

As summarized above in **Table 3-1**, peak parking for visitors was 20 vehicle parking spaces, resulting in a visitor parking rate of 0.09 (0.093) spaces per unit. On this basis, the visitor parking requirements for the existing development are summarized in **Table 3-3**.

In order to determine the most accurate tenant parking rate, the owner provided the current master tenant parking occupancy list for the subject site. Consequently, **Table 3-2** summarizes the number of tenant occupied and vacant parking spaces based on the existing 248 tenant parking spaces at the proxy site.

Table 3-2 – Tenant Vacant and Occupied Parking Spaces

Location	Parking Spaces Provided	Occupied Spaces	Vacant Spaces
Surface/Outdoor	248	186	62

As summarized in **Table 3-2** above, the existing 214-unit rental building requires a total of 186 tenant parking spaces or a parking demand ratio of 0.9 (0.87) spaces / occupied unit.