



Traffic Impact Study 217 Dunlop St. East Condominium Development

PBM Realty Holdings Inc.

P/N 20-3315 | December 17, 2020

City of Barrie
217 Dunlop Street East

SBA Skelton Brumwell
& Associates Inc.

ENGINEERING PLANNING ENVIRONMENTAL CONSULTANTS

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Traffic Impact Study
217 Dunlop Street East Condominium Development
City of Barrie

P/N 20-3315

December 17, 2020

1.0 Introduction

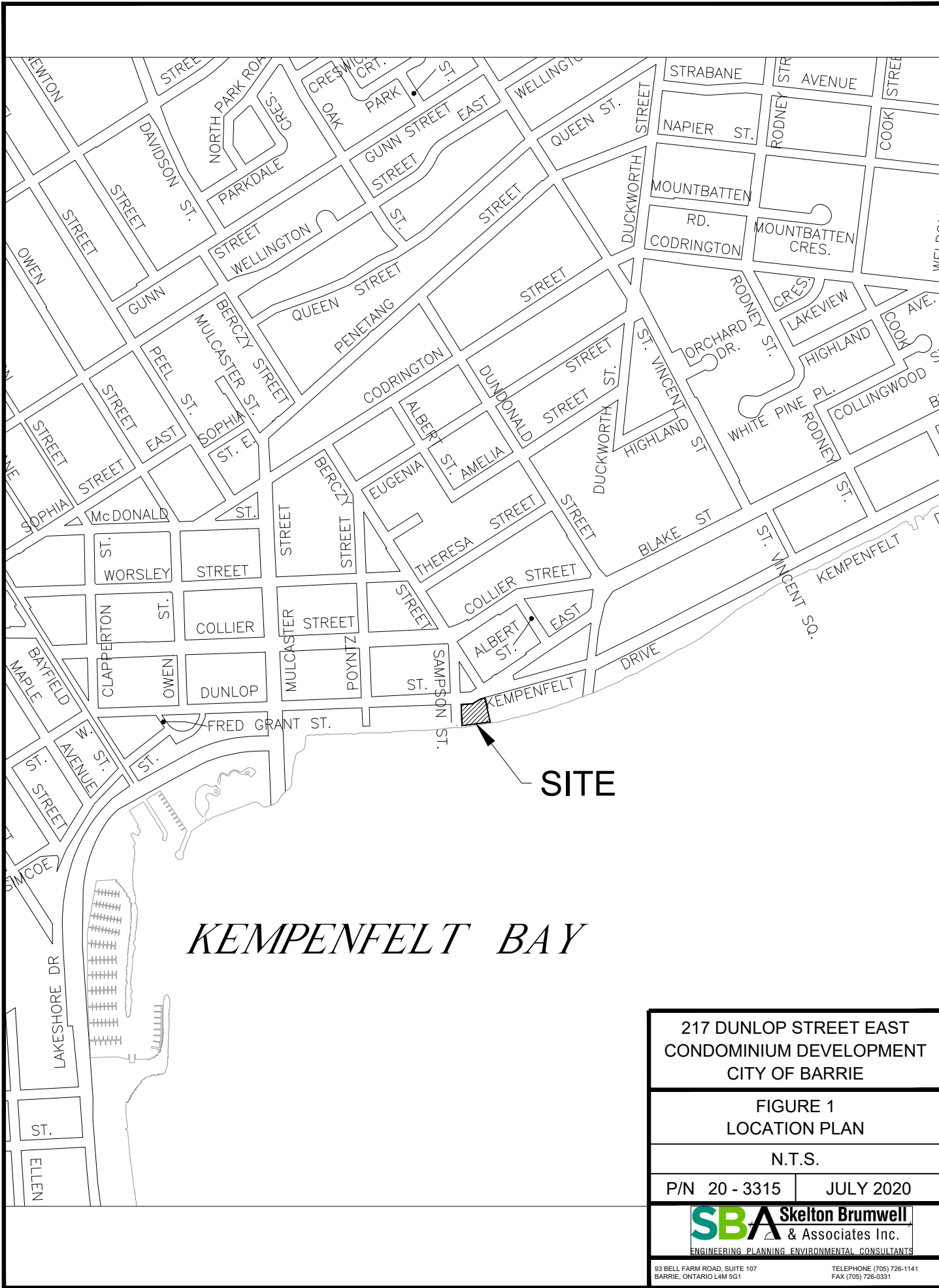
Skelton, Brumwell & Associates Inc. (SBA) was retained by Salter Pilon Architecture to provide engineering services relative to a proposed fifteen (15) storey, 41 unit condominium development located at 217 Dunlop Street East in the City of Barrie. The proposed building will have three (3) levels of parking and twelve (12) floors of apartment units. The site is on the south side of Dunlop Street just east of Sampson Street, as shown on Figure 1 – Site Location. Figure 2 shows the proposed Site Plan.

The property is the former site of Cotty's Cleaners which was closed and demolished some time after 2002 is currently vacant and partially treed. The 0.201 hectare (0.5 acre) site fronts on Dunlop Street while the rear of the property abuts the North Shore Recreational Trail which is adjacent to Kempenfelt Bay. To the east there is an existing residence, and to the west lies the eight storey Flamenco Condominium (Simcoe Condominium #100).

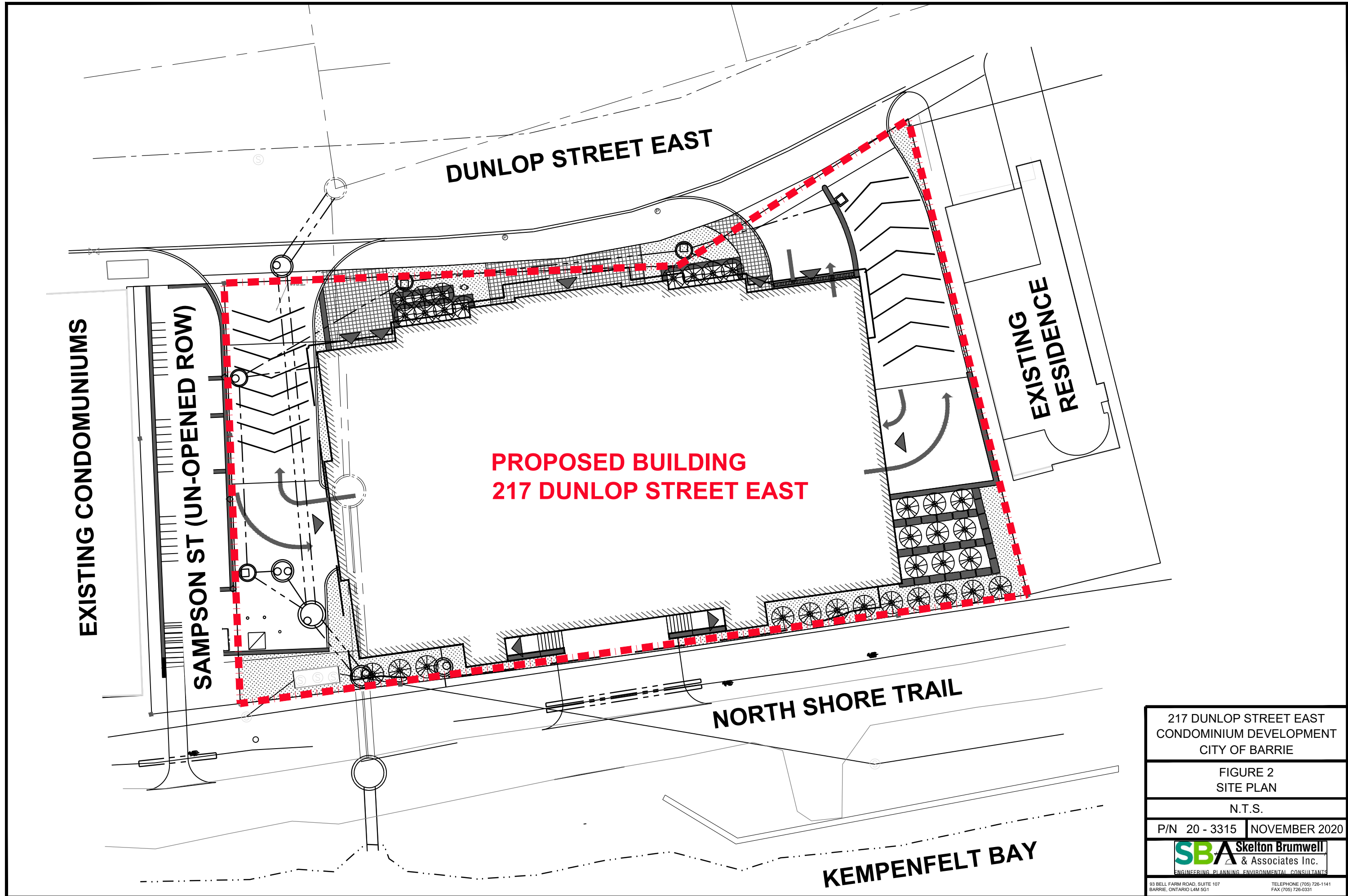
Pre-Application Review comments were issued by the City of Barrie Planning and Building Departments on May 21, 2019. The comments included a requirement to prepare a Traffic Brief to examine the level of service at the proposed site accesses. This report has been prepared in accordance with City of Barrie Engineering Standards and best management practices to address that requirement.

2.0 Context

The subject property has 58.5 metres of frontage on Dunlop Street East which is designated as an Arterial Road in the City's Official Plan. Dunlop Street at this location has a right-of-way width of 20 metres, and the curb and guttered asphalt surface is about 13.5 metres wide. There are single travelled lanes in each direction with four (4) paid parallel parking spaces provided on the south side of the road across the property frontage. West of Sampson Street there is paid parking on both sides of the road extending towards Mulcaster Street. The speed limit on Dunlop Street is 50 km/hr. Traffic signals are located at the intersection with Mulcaster Street to the west and at the Collier / Blake intersection to the east.



217 DUNLOP STREET EAST CONDOMINIUM DEVELOPMENT CITY OF BARRIE	
FIGURE 1 LOCATION PLAN	
N.T.S.	
P/N 20 - 3315	JULY 2020
SBA Skelton Brumwell & Associates Inc. ENGINEERING PLANNING ENVIRONMENTAL CONSULTANTS	
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217 DUNLOP STREET EAST CONDOMINIUM DEVELOPMENT CITY OF BARRIE	
FIGURE 2 SITE PLAN	
N.T.S.	
P/N 20 - 3315	NOVEMBER 2020
 ENGINEERING PLANNING ENVIRONMENTAL CONSULTANTS	
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The development proposal includes three entrances from Dunlop Street, two at the east side of the property which are directly beside each other and the third at the west side. The westerly driveway will provide access to the underground parking level (L0) with 48 parking spaces (23 standard; 25 tandem or stacked). The westerly east driveway will access parking level L1 which will have 26 parking spaces (13 standard; 13 stacked). The most easterly entrance will access the L2 parking level with 35 parking spaces (15 standard; 20 tandem or stacked). There will be a total of 113 parking spaces with 48 (44%) being accessed from the west driveway and 61 (56%) accessed from the two east entrances.

For analysis purposes, the two easterly driveways have been analyzed together as one driveway.

Although the property is located on the outside of the apex of a horizontal curve on Dunlop Street, the sight distance to and from the site is good in both directions. From the west, the site can be seen at least from the Mulcaster Street intersection, about 370 metres away. From the east the property is visible from the next horizontal curve, a distance of about 290 metres.

Existing land uses in the immediate vicinity of the property are a mixture of low density and high density residential. In addition to the adjacent Flamenco Condominium there is the three-storey Portage Place building at 21 Kempenfelt Drive, another three-story apartment building at 24 Kempenfelt Drive, the six-storey Albert Terrace at the north-west corner of Albert and Dunlop Streets and the fifteen-story Bayclub on the north-east corner. To the west the fifteen storey Bayshore Landing is situated on the north side of Dunlop between Poyntz and Mulcaster, which includes some commercial uses on the first floor. West of Mulcaster Street is the Downtown Barrie commercial district.

3.0 Travel Demand

3.1 Horizon Year and Time Period of Analysis

It is expected that units in the condominium development will be occupied in 2022. A study horizon of 10 years to 2032 was therefore considered in this analysis.

3.2 Historical Traffic Volumes

The City of Barrie provided traffic count data from March 19, 2019 for the intersection of Dunlop and Mulcaster Streets which can be found in Appendix A. The traffic volumes measured on Dunlop Street east of Mulcaster were as follows:

A.M. Peak Hour:	865 vehicles (500 westbound, 365 eastbound)
P.M. Peak Hour:	1,049 vehicles (454 westbound, 595 eastbound)

The 1999 City of Barrie Transportation Study showed a 1997 Average Annual Daily Traffic (AADT) volume of 11,000 vehicles on Dunlop Street at Mulcaster. From the City's Open Data GIS information, the following AADT counts were obtained:

2011	12,511 (0.9% increase from 1997)
2013	12,289 (0.7% increase from 1997)
2013	15,188 (2.0% increase from 1997)
2014	14,155 (1.5% increase from 1997)
2017	13,878 (1.2% increase from 1997)

The percentage increase from 1999 to these years averages out to 1.26%.

3.3 Other Developments

According to information from the City of Barrie's website, Aalto Developments Inc. is proposing a ten-storey residential condominium which includes a ground floor commercial area at 185 – 205 Dunlop Street East, which is immediately west of the Flamenco Condominium. The proposal is for 178 residential units and about 1,764 sq.m. of commercial space. The project was the subject of a Traffic Impact Study prepared by JD Engineering Inc. in December of 2017 and subsequent addendums produced in June and October of 2019. The text from the October 31, 2019 addendum is included in Appendix B for reference.

The study for Aalto Developments also accounts for another development that is proposed to be located on the south side of Dunlop between that building and Mulcaster Street. Although not shown on the City of Barrie's website, that development proposes 130 hotel rooms, 136 condominium units and 500 sq.m. of commercial space.

3.4 Future Background Traffic Volumes

Staff from the City of Barrie have advised that based on projections contained with the City's Transportation Master Plan, the increase in traffic volumes in this area from 2016 to 2041 is expected to be about 1% per year. This compares to the historical AADT volume increases from 1999 to 2017 which averaged 1.26%.

In consideration of the 1.26% average annual increase in the AADT from 1999 to 2017, a background growth factor of 1.3% per year was assumed and applied to the City's traffic count data from 2019. For the 13 years from 2019 to 2032, the total increase would be 18.3%, so the 2032 volumes on Dunlop east of Mulcaster would be as follows:

A.M. Peak Hour:	1,023 vehicles (591 westbound, 432 eastbound)
P.M. Peak Hour:	1,241 vehicles (537 westbound, 704 eastbound)

3.4.1 Site Traffic Volumes

Traffic volumes for the proposed apartment were estimated using data from the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition.

For the subject site the applicable land use from the Trip Generation Manual is Multifamily Housing (High Rise) which includes apartments, townhouses and condominiums having more than 10 floors. Traffic data is provided for a number of independent variables, the most appropriate being Vehicle Trips per Dwelling Unit. For the Peak Hour of the Generator, the rates are 0.34 trips per unit in the a.m. peak hour, and 0.39 trips per unit in the p.m. peak hour. Fitted curve data is also available which results in the traffic generation rates being a bit higher than for the average rates so that data has been used in the analysis to be conservative.

Table 3 shows the expected traffic volumes based on these rates. The ITE trip generation data can be found in Appendix C.

Table 1 – Site Generated Traffic Volumes

Land Use	Units	A.M. Peak Hour			P.M. Peak Hour		
		Trips	In	out	Trips	In	Out
Apartment (High - Rise)	41	26	5 (21%)	21 (79%)	30	19 (62%)	11 (38%)

3.4.2 Directional Distribution of Site Traffic

As noted in Section 2.0, the east driveways will provide access to 61 parking spaces on Levels L1 and L2, while the west driveway will access the 52 underground parking spaces on Level L0. Based on this breakdown, it is assumed that 56% of the vehicle trips (61 divided by 109) would be into and out of the east entrances while 44% of the trips (48 divided by 109) would be at the west entrance. Therefore, in the A.M. Peak Hour, there would be 15 vehicles using the east driveways (3 in, 12 out) while 11 vehicles would use the west driveway (2 in, 9 out). Similarly, in the P.M. Peak Hour, 17 trips would be at the east driveways (11 in, 6 out), with 13 at the west driveway (8 in, 5 out).

For the purpose of this study, the level of service for only the east driveways was analyzed as it will be carrying a higher traffic volume than the west driveway and therefore represents the worst case.

Given the development's location on the east side of the downtown core, and being east of the main access routes to Highway 400 and the commercial areas on Bayfield Street and at the south end of Barrie, it is likely that a higher percentage of the site traffic will be going to and

coming from the west. For the purpose of this analysis, it was assumed that 2/3 of the traffic would be going to and coming from the west, while 1/3 would be to and from the east.

Table 2 shows the directional distribution of the site generated traffic at the east driveway.

Table 2 – Directional Distribution of Site Traffic

Peak Hour	Traffic Exiting		Traffic Entering		Total Vehicles
	To west	To east	From west	From east	
A.M.	8	4	2	1	15
P.M.	4	2	7	4	17

Figures 3Aa and 3B included in Appendix D show the turning movements and background traffic.

3.4.3 Traffic Volumes from other Developments

The report by J.D. Engineering noted in Section 3.3 provides an estimation of the traffic generation from both the Aalto Development site at 185 – 205 Dunlop Street East and the other condominium / hotel development proposed just east of Mulcaster. This information is shown in Figures 1 to 4 of the October 31, 2019 addendum letter and is included in Appendix B. In total, the traffic from these developments on Dunlop Street East of Poyntz Street is estimated to be 63 vehicles in the A.M. Peak Hour (31 westbound, 32 eastbound) and 104 vehicles in the P.M. Peak Hour (51 westbound, 53 eastbound). Including the traffic from these developments, the total background traffic on Dunlop Street in 2032 at the subject development location would be as follows:

A.M. Peak Hour: 1,086 vehicles (622 westbound, 464 eastbound)
P.M. Peak Hour: 1,345 vehicles (588 westbound, 757 eastbound)

4.0 Evaluation of Impacts

4.1 Methodology

The operation of the intersections formed by the new driveway entrances and Dunlop Street was evaluated using the methods described in the Highway Capacity Manual 2010¹ in order to determine the expected Level of Service for both the future 2032 horizon year for both the A.M. and P.M. weekday peak hour traffic conditions. The Level of Service definitions are included in Appendix E. The traffic software program “HCS7” by McTrans was used to carry out the calculations.

¹ Highway Capacity Manual 2010 - Transportation Research Board, National Research Council, Washington, D.C., 2010.

The objective of the analysis is to identify "problem" intersections and traffic movements. For urban areas, "problem" intersections and movements are typically defined as those where a Level of Service "E" is incurred, meaning that motorists attempting to turn at intersections would experience very long delays.

Generally, traffic impacts should be mitigated when site generated traffic creates or worsens a "problem" situation.

Although the analysis was completed for the A.M. and P.M. peak hour traffic volumes which is normal practice, it should be noted that the westbound traffic volume on Dunlop Street is often very heavy on Sunday afternoons and evenings in the summer months. This is a result of drivers returning to the GTA from cottage areas north of Barrie and wanting to avoid heavy traffic on Highway 400. This condition was not analyzed as part of this report and may result in higher delays to traffic trying to turn left out of this development during those periods.

4.2 Analysis

The calculation sheets for the HCM 2010 analysis based on the 2032 A.M. and P.M. peak hours can be found in Appendix F. Table 3 shows the results of the analysis.

Table 3 – Level of Service at East Driveway

Peak Hour	Westbound - Left Turn		Northbound - All Turns	
	Control Delay (seconds)	Level of Service	Control Delay (seconds)	Level of Service
A.M.	8.4	A	21.2	C
P.M.	9.5	A	30.1	D

From Table 3 it can be seen that the westbound traffic turning left into the driveway will be subject to short delays, operating at Level of Service A which is good. Westbound through traffic will also be subject to the same short delays as vehicles have to wait for site traffic to turn left in front of them. Traffic exiting the driveway will be subject to longer delays, with a Level of Service C in the A.M. Peak Hour and Level of Service D in the P.M. peak hour. Since this is better than Level of Service E, the delay is acceptable and mitigating measures are not required to improve the situation.

With lower traffic volumes at the west driveway, the delays will be shorter and the Level of Service will be better.

During high traffic periods on Sundays in the summer months, the presence of the stop lights at Collier Street should help to provide breaks in the traffic flow to facilitate left turns from the

site. Also, if there is a long queue from the signalized Mulcaster Street intersection, drivers on Dunlop Street will sometimes let drivers exiting the site into the queue. To save time vehicles leaving the site would also have the option of turning right and travelling to Collier Street, where they can then turn left at the traffic signals and continue in a westerly direction on Collier.

4.3 Kempenfelt Drive Impact

During the Neighbourhood Meeting Presentation which took place on October 23, 2020, several local residents raised a concern about the impact this development will have on the safety of the Dunlop Street / Kempenfelt Drive intersection. More specifically, the problem relates to vehicles travelling eastbound traffic on Dunlop Street and turning right onto Kempenfelt Drive where they can impede residents as they attempt to exit their driveways. The problem is compounded at this location because the intersection geometry allows vehicles to turn at a higher rate of speed than if it was a 90 degree turn.

In our opinion, the existing traffic movement challenges will not be made any worse by the proposed development. The reasons for this are as follows:

- As noted in Section 3.4.2, it is our opinion that the majority of the traffic from this site will be going to and coming from the west. In the analysis, it was estimated that there may be only 4 vehicles going east in the A.M. peak hour and 2 vehicles in the P.M. peak hour. The impact on the Kempenfelt Drive intersection will therefore be minimal.
- It is expected that the majority of vehicles making the right turn onto Kempenfelt Drive would be either residents who live on the street, or people who wish to park on Kempenfelt Drive to use Kempenfelt Park or to access the North Shore Trail. Therefore, it is our opinion that there would generally be no reason for residents from the proposed apartment building to be using Kempenfelt Drive.
- If a vehicle from the proposed development does turn onto Kempenfelt Drive, it would be doing so at a lower speed than other vehicles on Dunlop Street since it would have just exited one the site driveways and would not yet have got up to speed.

In our opinion, the situation could be mitigated by introducing some form of traffic calming measure such as a speed hump at the point where vehicles make the turn onto Kempenfelt Drive from Dunlop Street.

5.0 Public Transit and Bicycle Use

The closest bus routes are on Collier Street, with Route 8A (RVH / Yonge) running eastbound and Route 8B (Crosstown / Essa) going westbound. Bus stops are located at the intersection of Collier and Poyntz Streets and at Collier and Albert Streets. Both locations are about a 300 to 350 metre walk from the site.

The site is well suited for residents with bicycles as it is immediately adjacent to the City's North Shore Recreational Trail. A dedicated bicycle storage area is to be provided on parking level L2. Residents can also store their bikes in the individual storage areas located in front of their assigned parking spaces.

6.0 Construction Staging and Parking

It is expected that during the building construction, the four on-street parking spaces in front of the site will need to be closed so they can be used for deliveries of construction materials. This could necessitate the closure of the sidewalk when some deliveries are taking place. There may also be the ability to have some deliveries at the east and west sides of the building during various phases of construction.

With limited room on site, it is expected that most of the construction workers will need to park elsewhere. Monthly parking passes can be purchased for on-street parking on Poyntz Street south of Collier, and on Collier Street east of Mulcaster, so those could be viable options. Monthly permits can also be purchased for the city-owned lots off of Simcoe Street at Heritage Park which is another option. There could also be an opportunity for the contractor to enter into an agreement with the owner of a vacant parcel of land at 129 Collier Street, which is adjacent to the Chaopaya Thai restaurant, to allow workers to park there.

7.0 Conclusions

Based on our research and analysis, we conclude the following:

- The proposed 41 unit condominium development at 217 Dunlop Street East is expected to generate about 26 vehicle trips in the a.m. peak hour and 30 trips in the p.m. peak hour.
- During peak hours, it was estimated that about two-thirds of the traffic generated by the site would be going to and from the west on Dunlop Street, with one-third going to and from the east. It is also estimated that about 60% of the site traffic will enter and leave by the east driveway, with 40% using the west driveway.
- Traffic turning into and out of the site during peak hours is expected to be able to do so at an acceptable Level of Service in the future 2032 horizon year. There will be some delay for traffic

exiting the driveways during peak periods, and more so in the P.M. peak hour, but the Level of Service will be acceptable. The development is expected to have very little impact on the existing and forecasted future background traffic conditions.

- No measures are required or recommended to mitigate e increased traffic from the proposed condominium at 217 Dunlop Street East.
- Traffic movement challenges being experienced by local residents at Kempenfelt Drive should not be made any worse by the additional traffic generated by this development.
- It is expected that parking for construction workers can be adequately provided at various nearby municipal street parking spaces or off-street parking lots. The four on-street parking spaces in front of the site may need to be closed through much of the construction period.

8.0 Disclaimer of Responsibilities to Third Parties

This report was prepared by Skelton, Brumwell & Associates Inc. for the account of Salter Pilon Architecture and PBM Realty Holdings Inc.

The material in it reflects Skelton, Brumwell & Associates Inc.'s best judgement in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties.

Skelton, Brumwell & Associates Inc. accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or actions based on this report.

All of which is respectfully submitted,
SKELTON, BRUMWELL & ASSOCIATES INC.

per:

Scott W. Brumwell, P.Eng.
President



Appendix A

City of Barrie Traffic Counts

Turning Movement Count Diagram

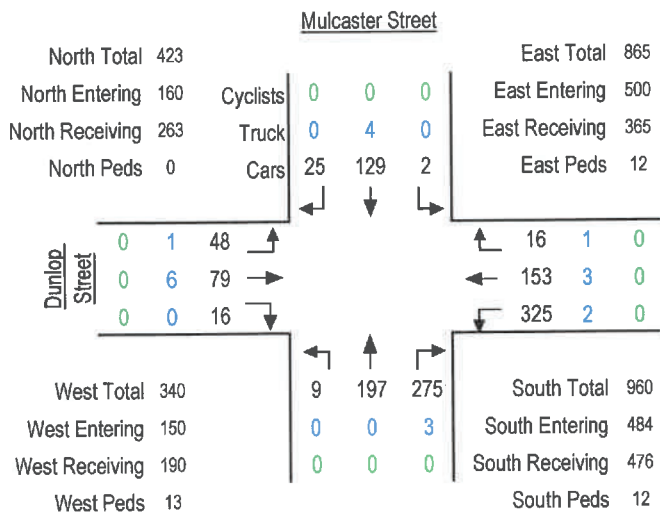
Intersection: Dunlop Street & Mulcaster Street

Municipality: Barrie, Ontario

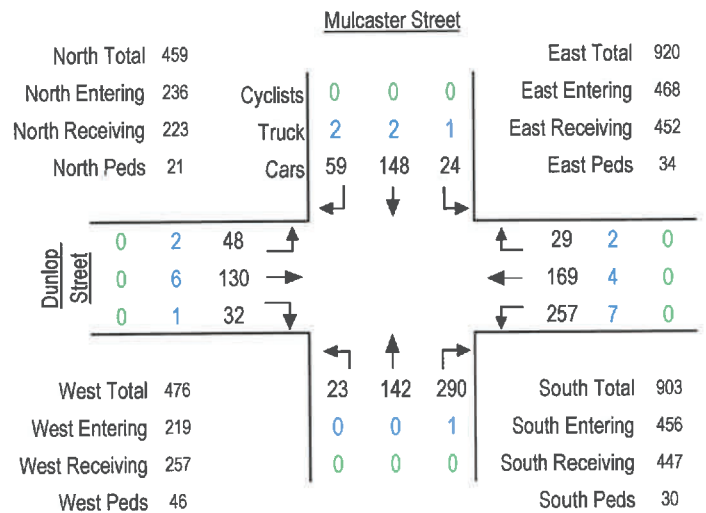
Intersection ID:

Date: Tuesday March 19, 2019

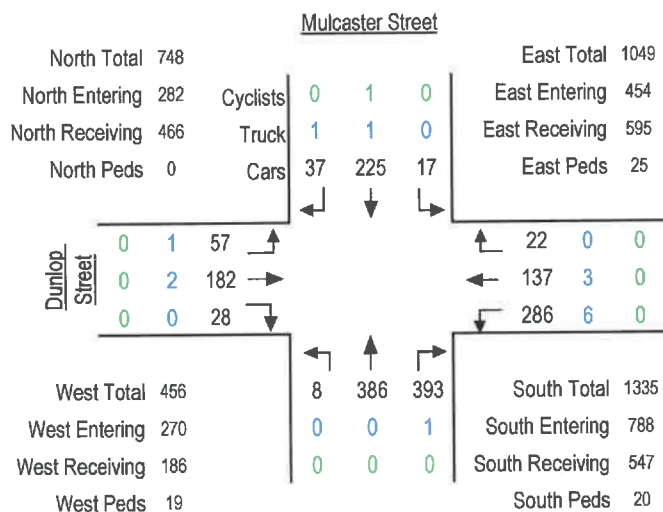
AM Peak Hour: 7:30 to 8:30



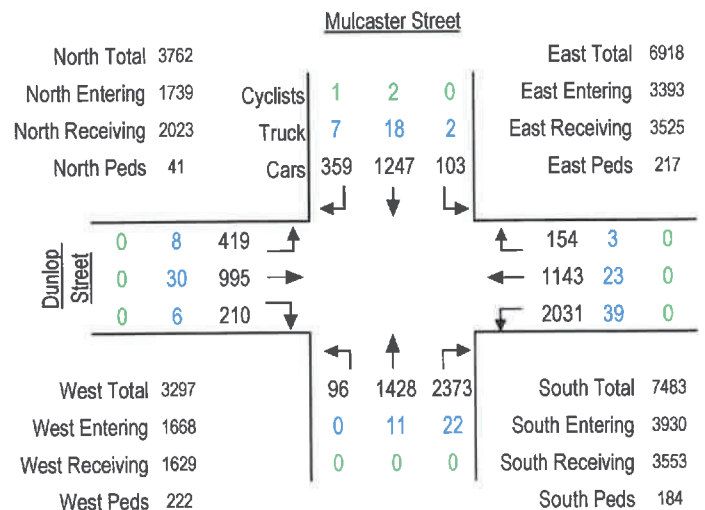
MD Peak Hour: 12:30 to 13:30



PM Peak Hour: 16:00 to 17:00



Total 8-Hour Count



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						EAST APPROACH						SOUTH APPROACH						WEST APPROACH						Total	Grants Total								
	CAR			TRUCKS			CYCLISTS			Peds	CAR			TRUCKS			CYCLISTS			Total	Peds													
	L	T	R	L	T	R	L	T	R		L	T	R	L	T	R	L	T	R			L	T	R										
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15:45	3	52	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	143	16	28	9	0	2	1	0	0	8	64	393	
16:00	5	54	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	366	10	49	10	0	1	0	0	0	2	72	630	
16:15	3	53	6	0	1	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0	0	0	4	140	12	37	5	1	0	0	0	0	5	60	387	
16:45	5	61	11	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	172	21	51	7	0	0	0	0	0	4	83	448	
17:00	5	59	14	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	186	19	36	5	0	0	0	0	0	5	65	439	
17:15	2	49	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	152	6	43	10	0	1	0	0	0	6	66	387	
17:30	5	43	8	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0	0	0	10	142	12	37	5	0	0	0	0	0	4	58	340	

Appendix B

185 Dunlop Street – TIS Addendum



October 31st, 2019

JDE Project 17124

Aalto Developments Inc.
190 Dunlop Street East
Barrie, ON L4M 1B3

RE: Traffic Impact Study – Revised Addendum
185 Dunlop Street, City of Barrie

This letter was prepared by **JD Northcote Engineering Inc.** [JD Engineering] for the account of the **AALTO Developments Inc.** [The Developer].

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. JD Engineering accept no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this project.

1.0 BACKGROUND

JD Engineering prepared a traffic impact study for the proposed 185 Dunlop Street mixed-use development [Subject Site], located in the City of Barrie [City] (dated December 21, 2017) [TIS]. The above noted TIS assessed the traffic-related impact of the proposed development on the adjacent roadway and provided recommendations to accommodate this traffic in a safe and efficient manner.

A development proposal is now underway for the property located directly west of the Subject Site [New Adjacent Development]. The New Adjacent Development extends from Dunlop Street East to the lake, between Mulcaster Street and the Subject Site. The New Adjacent Development will include one access onto Mulcaster Street [Mulcaster Access] and one access onto a proposed extension of Poyntz Street, south of Dunlop Street East [Adjacent Development Access], directly across from the proposed access for the Subject Site [West P1 Access]. To accommodate the New Adjacent Development, the proposed extension of Poyntz Street has been redesigned to accommodate traffic from the New Adjacent Development. The City has requested an update letter to the TIS to review the impact of the additional traffic volumes from the New Adjacent Development at the future Poyntz Street / Dunlop Street East intersection.

Furthermore, following the completion of the TIS, the Site Plan for the Subject Site has been revised to include 178 residential units and approximately 1,764 sq.m. commercial space (site plan provided in the **Appendix**). Included in the 1,764 sq.m. of commercial space will be a 5,600 sq.ft. health and fitness club.

This revised addendum also addresses Item #2 from the City Traffic and Parking Services' Comments from July 31, 2019 (Excerpt in **Appendix**).



JD Engineering Inc.
Phone: 705.725.4035
Email: Info@JDEngineering.ca

2.0 PROPOSED DEVELOPMENT – REVISED TRAFFIC GENERATION

The revised traffic generation for the Subject Site has been based on the Institute of Transportation Engineers [ITE] *Trip Generation Manual* (10th Edition) [ITE Trip Generation Manual]. The following ITE land use has been applied to estimate the revised traffic from the proposed development:

- ITE land use 231 (Mid-Rise Residential with 1st-Floor Commercial)
 - Dense Multi-Use Urban Setting
- ITE land use 492 (Health/Fitness Club)
 - General Urban / Suburban Setting

The estimated trip generation for the proposed development is illustrated below in **Table 1**. The AM and PM peak traffic generation for the proposed development is not anticipated to exactly align with the AM and PM peak hour in the traffic counts; consequently, we have applied the peak hour of adjacent street traffic values provided in the ITE Trip Generation Manual.

Table 1 – Estimated Traffic Generation of Proposed Development

Land Use	Size	AM Peak Hour			PM Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Mid-Rise Residential with 1 st -Floor Commercial ITE Land Use: 231	178 units	23	32	55	37	47	84
Health/Fitness Club ITE Land Use: 492	5,600 sq.ft.	4	3	7	11	8	19
TOTAL TRIP GENERATION		27	35	62	48	55	103
Internal Capture		0	0	0	-3	-3	-6
NET TRIP GENERATION		27	35	62	45	52	97

It is noted that ITE land use 231 accounts for commercial space within a mixed-use building; however, we have accounted for additional traffic for the Health and Fitness Club as the commercial space in ITE land use 231 is typically considered to be retail.

No transportation modal split has been applied to the above-noted traffic generation calculation.

3.0 PROPOSED DEVELOPMENT – REVISED TRAFFIC ASSIGNMENT

The distribution of residential traffic for the proposed development is assumed to follow the trip distribution calculated for residential traffic as illustrated in Table 10 in Section 4.2 in the TIS.

The distribution of health and fitness club traffic for the proposed development is assumed to follow the existing trip distribution in the study area as illustrated in Table 11 in Section 4.2 in the TIS.

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.

LEGEND:

- 20 (10) Traffic Volume AM (PM)
- Travel Movement
- Traffic Signal
- Stop Control
- Stop Sign

NOT TO SCALE

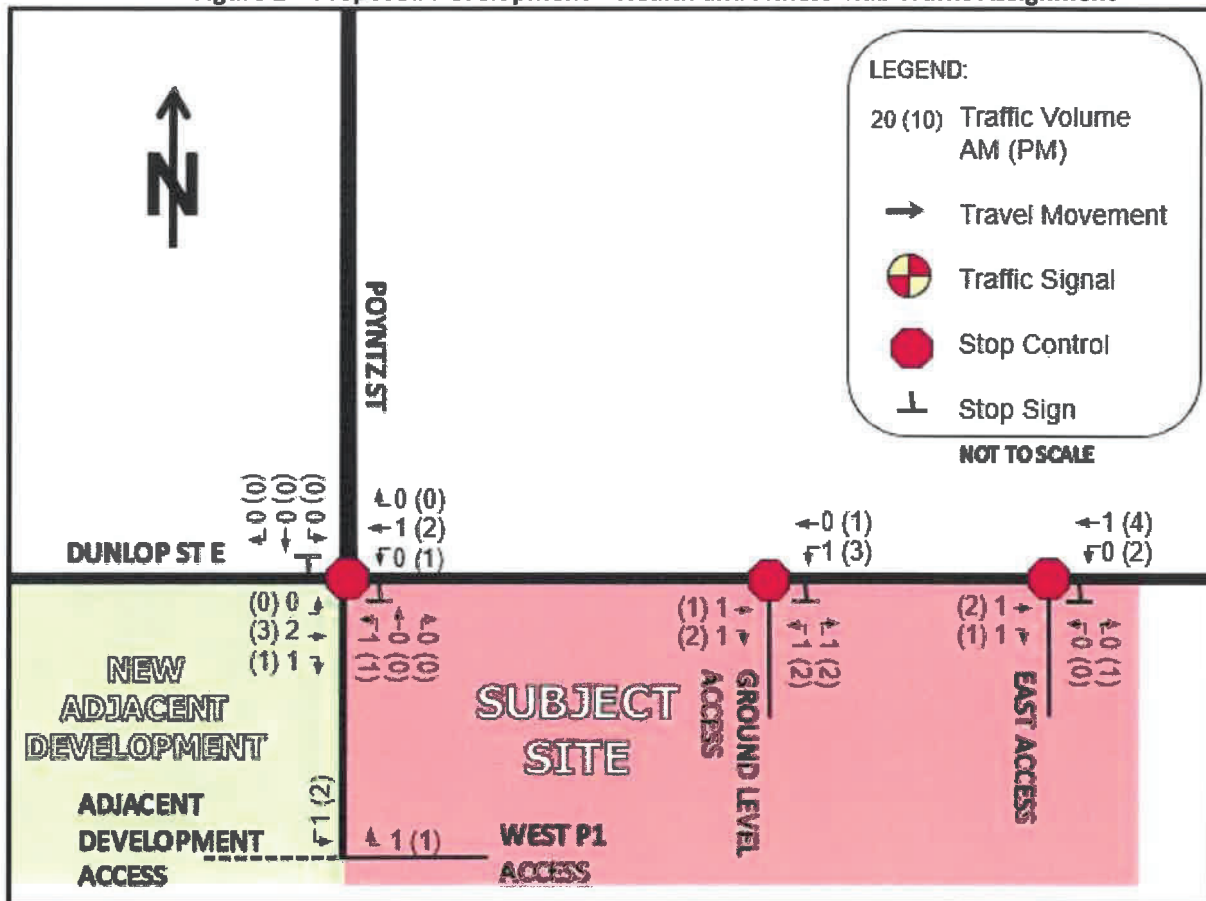
Map Labels:

- POYNTZ ST** (Vertical Street)
- DUNLOP ST E** (Horizontal Street)
- NEW ADJACENT DEVELOPMENT** (Green Area)
- ADJACENT DEVELOPMENT ACCESS** (Green Area)
- SUBJECT SITE** (Pink Area)
- GROUND LEVEL ACCESS** (Yellow Area)
- EAST ACCESS** (Pink Area)
- WEST P1 ACCESS** (Pink Area)

Traffic Volumes (AM / PM):

- POYNTZ ST (Northbound):** 0 (0), 12 (18), 3 (5)
- POYNTZ ST (Southbound):** 0 (0), 0 (0), 0 (0)
- DUNLOP ST E (Westbound):** 10 (15), 2 (3), 5 (8), 3 (4)
- DUNLOP ST E (Eastbound):** 14 (10), 6 (4), 11 (8), 7 (5), 3 (5), 7 (10)
- ADJACENT DEVELOPMENT ACCESS (Northbound):** 0 (0), 9 (4), 6 (4)
- ADJACENT DEVELOPMENT ACCESS (Southbound):** 5 (1), 6 (4)
- GROUND LEVEL ACCESS (Northbound):** 4 (5), 0 (0), 9 (12)
- GROUND LEVEL ACCESS (Southbound):** 14 (19)

Figure 2 – Proposed Development – Health and Fitness Club Traffic Assignment



4.0 NEW ADJACENT DEVELOPMENT TRAFFIC GENERATION

The New Adjacent Development includes 130 hotel rooms, 136 condominium units and 500 sq.m. of commercial space. It has been assumed that this development will be occupied prior to the 2027 horizon year.

A traffic impact study is not available for the New Adjacent Development. The traffic generation for the New Adjacent Development has been calculated based on the data provided in the ITE Trip Generation Manual. The following ITE land uses have been applied to estimate the traffic from the New Adjacent Development:

- ITE land use 231 (Mid-Rise Residential with 1st-Floor Commercial) –
 - Dense Multi-Use Urban Setting
- ITE land use 310 (Hotel) – General Urban/Suburban Setting

The AM and PM peak hour traffic generation for the New Adjacent Development does not exactly align with the AM and PM peak hour in the traffic counts; consequently, we have applied the peak hour of adjacent street traffic values provided in the ITE Trip Generation Manual.

The estimated trip generation of the New Adjacent Development is illustrated below in **Table 2**.

Table 2 – Estimated Traffic Generation for the New Adjacent Development

Land Use	Size	AM Peak Hour			PM Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Mid-Rise Residential with 1 st -Floor Commercial ITE Land Use: 231	136 units	17	25	42	28	36	64
Hotel ITE Land Use: 310	130 units	36	25	61	40	38	78
TOTAL TRIP GENERATION		53	50	103	68	74	142

No transportation modal split has been applied to the above-noted traffic generation calculation.

5.0 NEW ADJACENT DEVELOPMENT TRAFFIC ASSIGNMENT

The distribution of residential traffic for the New Adjacent Development is assumed to follow the trip distribution calculated for residential traffic as illustrated in Table 10 in Section 4.2 in the TIS.

The distribution of hotel traffic for the New Adjacent Development is assumed to follow the existing trip distribution in the study area traffic as illustrated in Table 11 in Section 4.2 in the TIS.

The distribution of traffic entering at each access driveway for the New Adjacent Development 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 hotel traffic assignments for the New Adjacent Development was calculated for the AM and PM peak hour within the study area and is illustrated in **Figures 3 and 4**, respectively. It is noted that some of the New Adjacent Development traffic will not be within the study area due to the use of the Mulcaster Access.

Figure 3 – New Adjacent Development – Residential Traffic Assignment

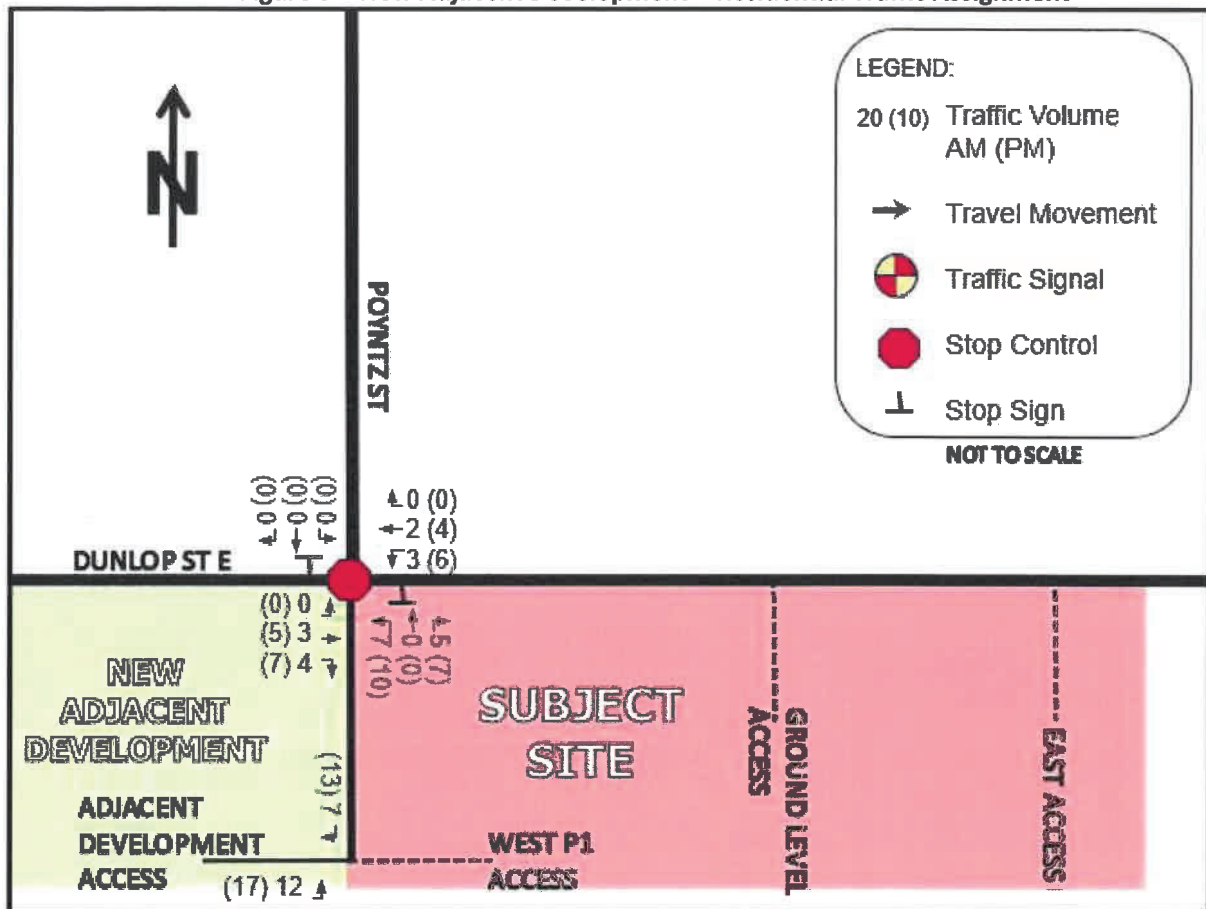
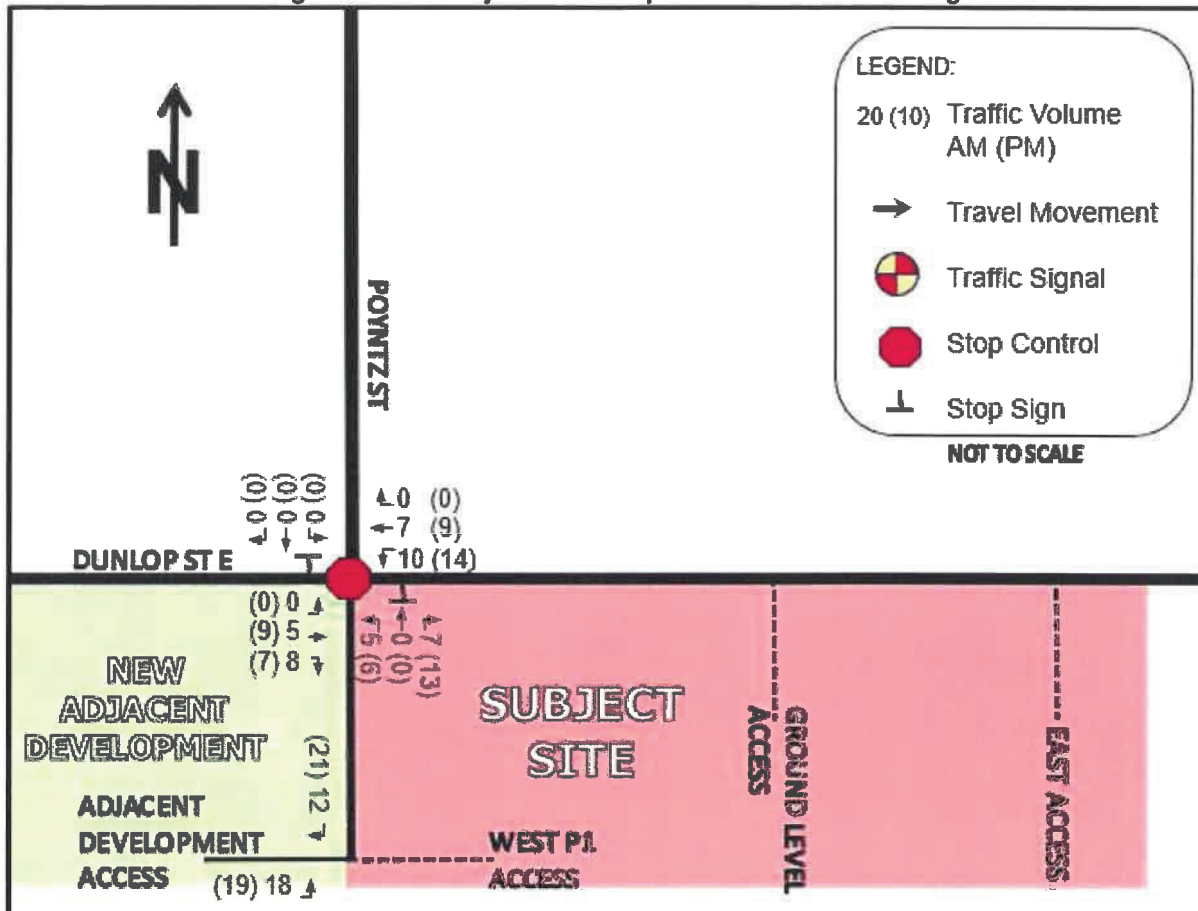


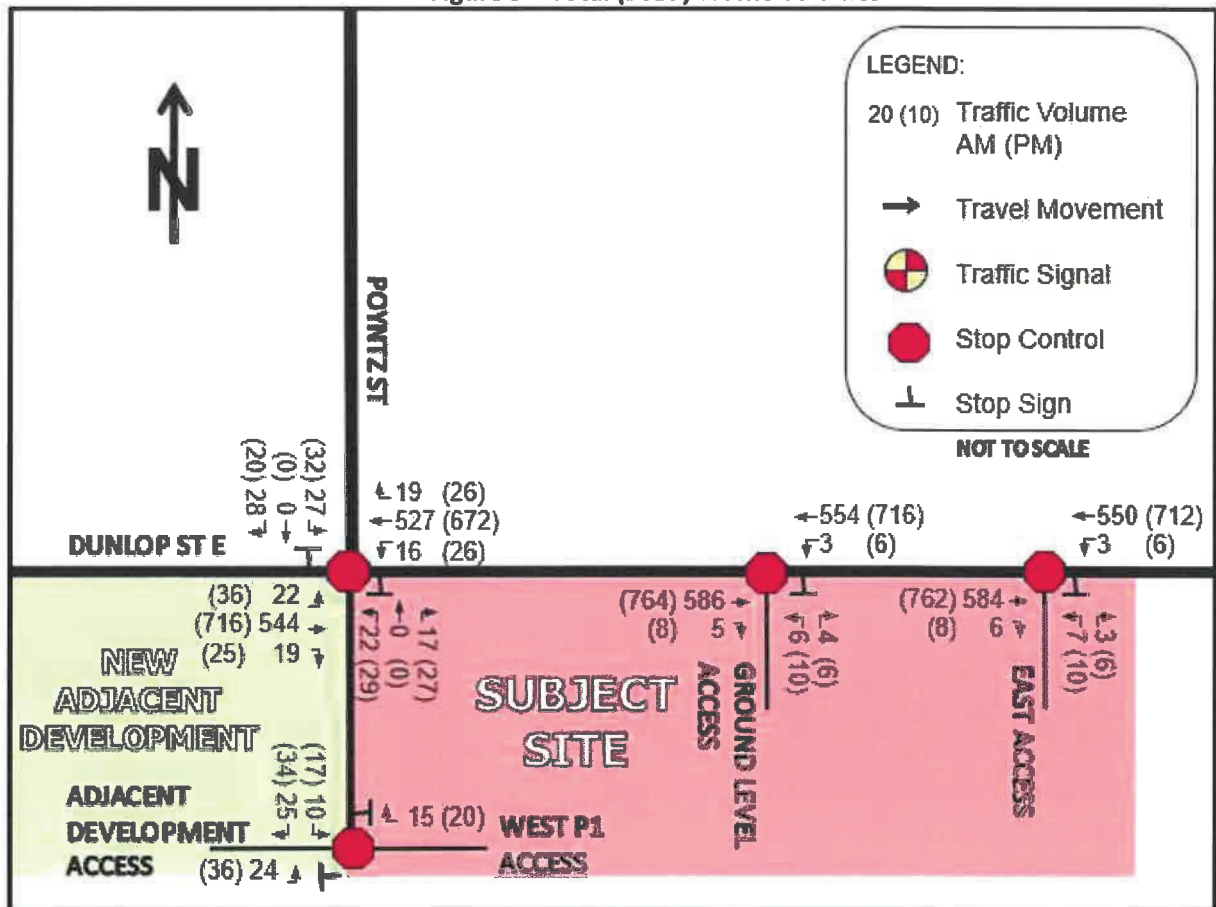
Figure 4 – New Adjacent Development – Hotel Traffic Assignment



6.0 TOTAL HORIZON YEAR TRAFFIC VOLUMES WITH THE PROPOSED DEVELOPMENT

For the revised total (2027) horizon year traffic volumes, the revised proposed development traffic and New Adjacent Development traffic was added to the background (2027) traffic volumes from the TIS. The resulting total (2027) horizon year traffic volumes for the AM and PM peak hour are illustrated in Figure 5.

Figure 5 – Total (2027) Traffic Volumes



7.0 TOTAL (2027) INTERSECTION OPERATION

The results of the LOS analysis under total (2027) traffic volumes during the AM and PM peak hour can be found below in **Table 3**. Existing intersection geometry and traffic control have been utilized for this scenario. Detailed output of the Synchro analysis can be found in the **Appendix**.

Table 3 – Total (2027) LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour			Weekday PM Peak Hour		
	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Poyntz Street / Dunlop Street East (unsignalized)	-	2.9	A	-	5.1	C
NB	0.25	32.4	D	0.46	56.3	F
SB	0.31	30.9	D	0.50	67.0	F
Ground Level Access / Dunlop Street East (unsignalized)	-	0.2	A	-	0.4	A
NB	0.05	21.3	C	0.09	28.6	D
East Access / Dunlop Street East (unsignalized)	-	0.2	A	-	0.4	A
NB	0.05	22.4	C	0.09	28.4	D

The results of the LOS analysis indicate that the northbound and southbound movements of the Poyntz Street / Dunlop Street East intersection are operating marginally outside the typical design limits noted in Section 3.1 of the TIS, during the PM peak hour; however, no infrastructure improvements are recommended as the delay is not significantly outside the design limits. Furthermore, the northbound movements are exclusively from the proposed development and the adjacent new development, both of which have alternate accesses, and the southbound movements onto Dunlop Street also have various alternate routes (eg. Mulcaster Street, Owen Street, Simpson Street). It is our expectation that some drivers will utilize the alternate routes available as the delay for the northbound and southbound movements of the Poyntz Street / Dunlop Street East intersection increases.

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

A review of the need for additional auxiliary right turn lanes at all unsignalized intersections was completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all movements; consequently, additional auxiliary right turn lanes are not recommended.

An analysis was completed for left turn movements at unsignalized intersections within the study area, based on the criteria outlined in Appendix 9A of the MTO Design Supplement for TAC Geometric Design Guide for Canadian Roads [MTO DS]. Based on the low volume of left turn movements from Dunlop Street East at the Ground Level Access and East Access, a left turn lane is not recommended at these locations. Based on the above noted criteria, a left turn lane is warranted for the westbound and eastbound movements at the Poyntz Street / Dunlop Street East intersection (results are provided in the **Appendix**); however, a left turn lane is not recommended as the left turn traffic volume accounts for less than 5% of the advancing traffic volume.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at any of the unsignalized study area intersections (results are provided in the **Appendix**).

No additional improvements are recommended within the study area.

8.0 SITE ACCESS

The Ground Level Access and East Access will operate efficiently as a full-movement access, with one-way stop control for the northbound movements. No lane improvements are recommended on Dunlop Street East at the Ground Level Access and East Access. A single northbound and southbound lane at the Ground Level Access and East Access driveways will provide the necessary capacity to service the proposed development.

The Poyntz Street extension will operate efficiently as a full-movement intersection, with two-way stop control for the northbound and southbound movements. . A single northbound and southbound lane on the Pointz Street extension will provide the necessary capacity to service the proposed developments. No lane improvements are recommended on Dunlop Street East at Poyntz Street.

The West P1 Access driveway and New Development Access driveway will operate efficiently as full-movement access driveways, with one-way stop control for the westbound and eastbound movements, respectively. A single eastbound and westbound lane for the West P1 Access driveway and New Development Access driveway will provide the necessary capacity to service the proposed developments.

9.0 PARKING REVIEW

The revised parking supply for the subject site meets the parking requirements specified in the City Zoning By-law 2009-141. Accessible parking for the subject site is provided according to the City Zoning By-law 2009-141. The proposed parking breakdown is provided in **Table 4**.

Table 4 – Parking Statistics

Category	Zoning By-Law Section	Parking Standard	Parking	
			Required	Provided
Residential	4.6.1	1 space per dwelling unit	178 Spaces	247 spaces
Commercial	4.6.3.1	No parking required within C1 Zone	0 Spaces	
Total			178 spaces	287 spaces
Barrier Free Parking	4.64	3% of required parking	6 Spaces	6 Spaces

10.0 CONSTRUCTION PARKING / STAGING

The parking of construction vehicles and vehicles owned by staff and subcontractors employed by the Developer will be formally directed (in writing where possible) to avoid parking on municipal streets surrounding the subject site and avoid parking within private parking lots surrounding the subject site, without consent from the owner of the parking lots.

We trust that you find this letter satisfies your requirements.

Yours truly,
JD Northcote Engineering Inc.

A handwritten signature in blue ink, appearing to read 'JL Northcote', is positioned above the printed name.

John Northcote, P.Eng.
President

Appendix C

ITE Trip Generation Data

Multifamily Housing (High-Rise) (222)

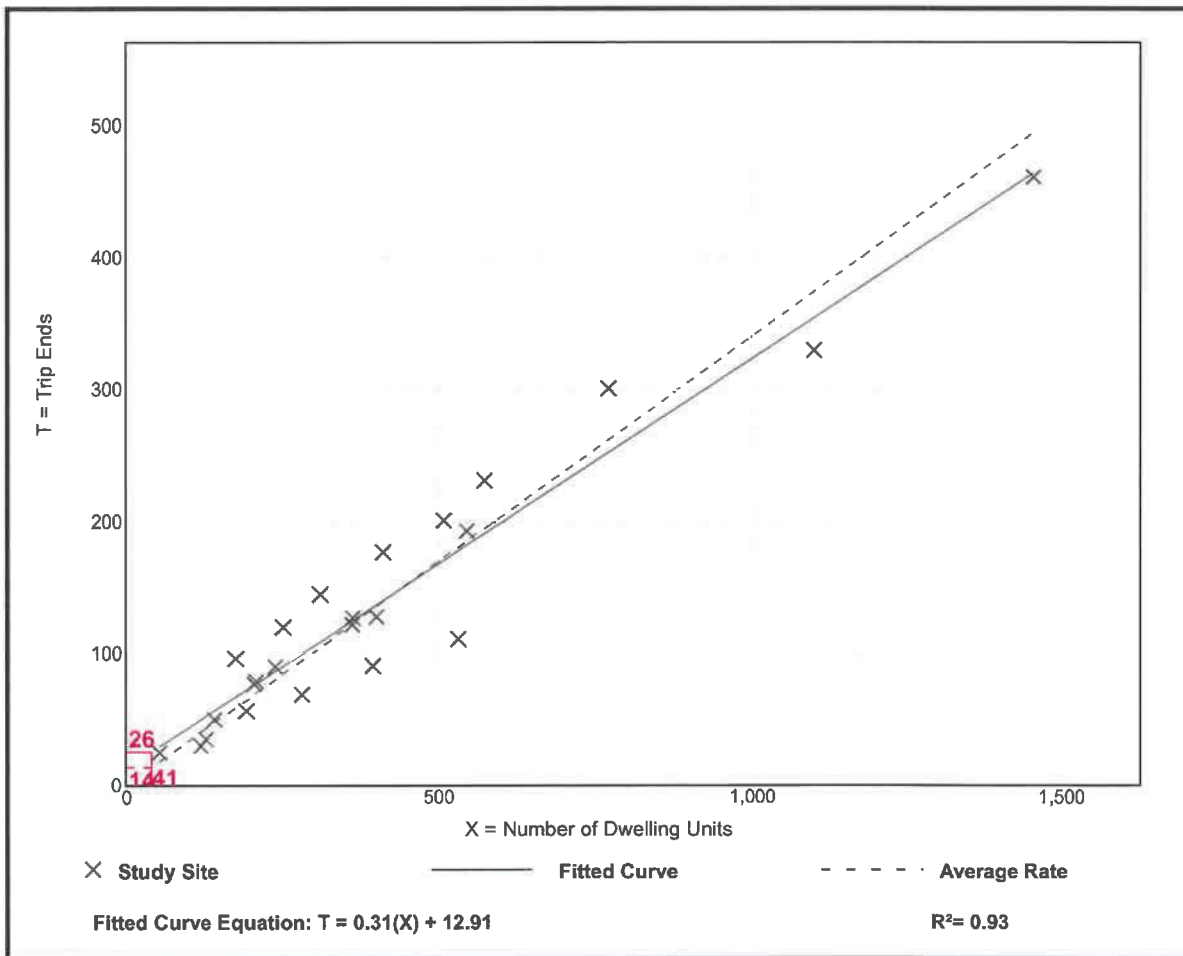
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
AM Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 24
Avg. Num. of Dwelling Units: 405
Directional Distribution: 21% entering, 79% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.34	0.21 - 0.55	0.07

Data Plot and Equation



Trip Gen Manual, 10th Edition • Institute of Transportation Engineers

Multifamily Housing (High-Rise) (222)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
PM Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 26

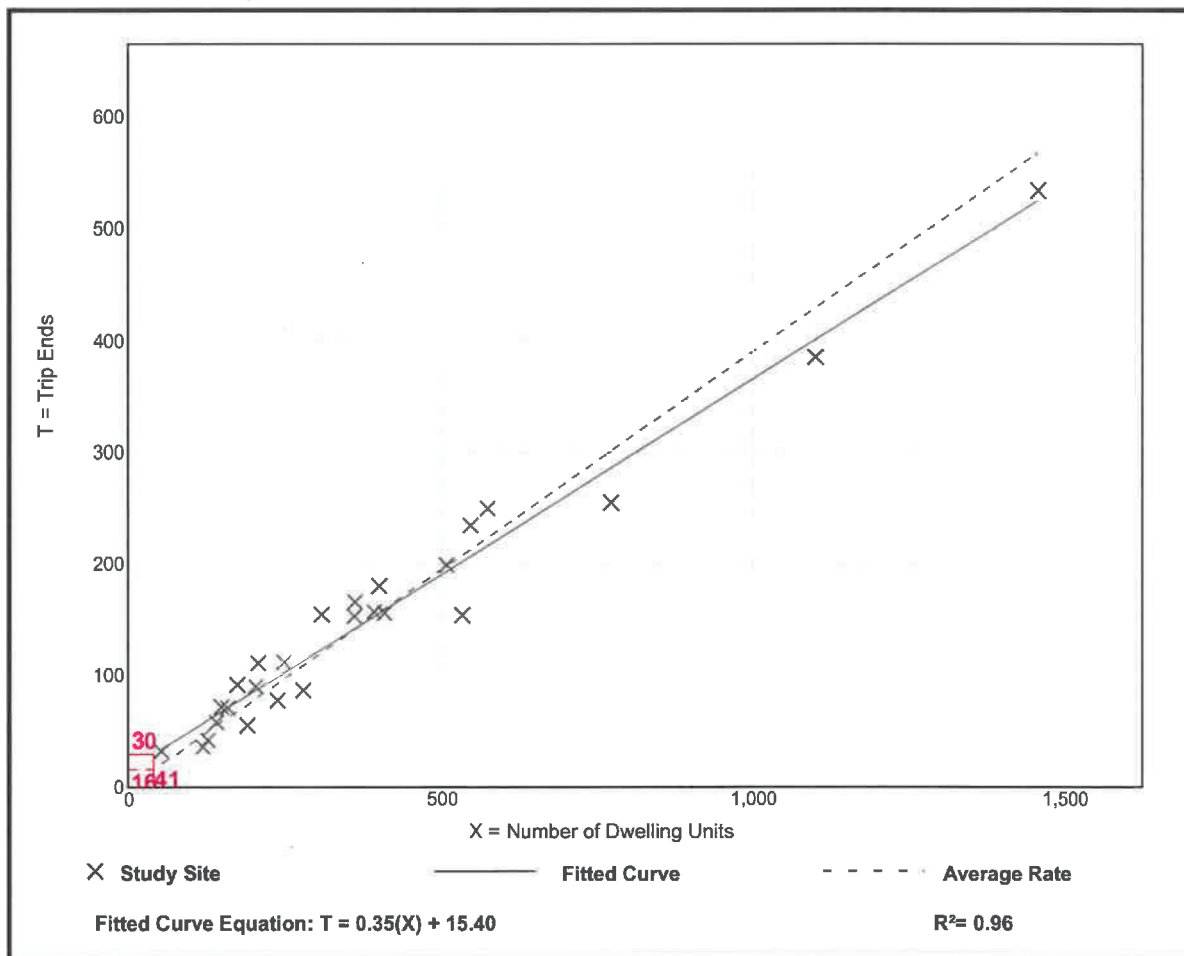
Avg. Num. of Dwelling Units: 385

Directional Distribution: 62% entering, 38% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.39	0.29 - 0.59	0.06

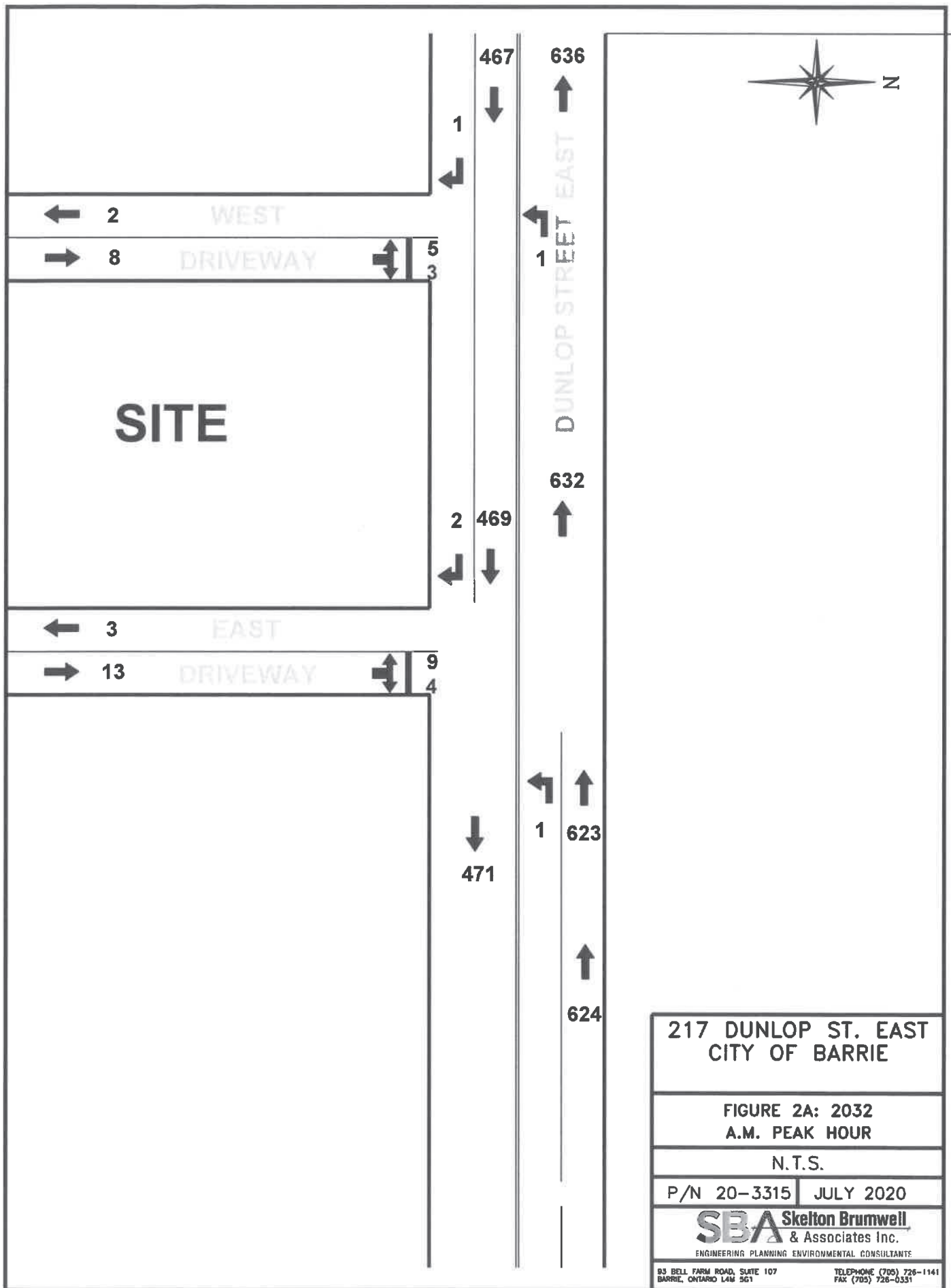
Data Plot and Equation

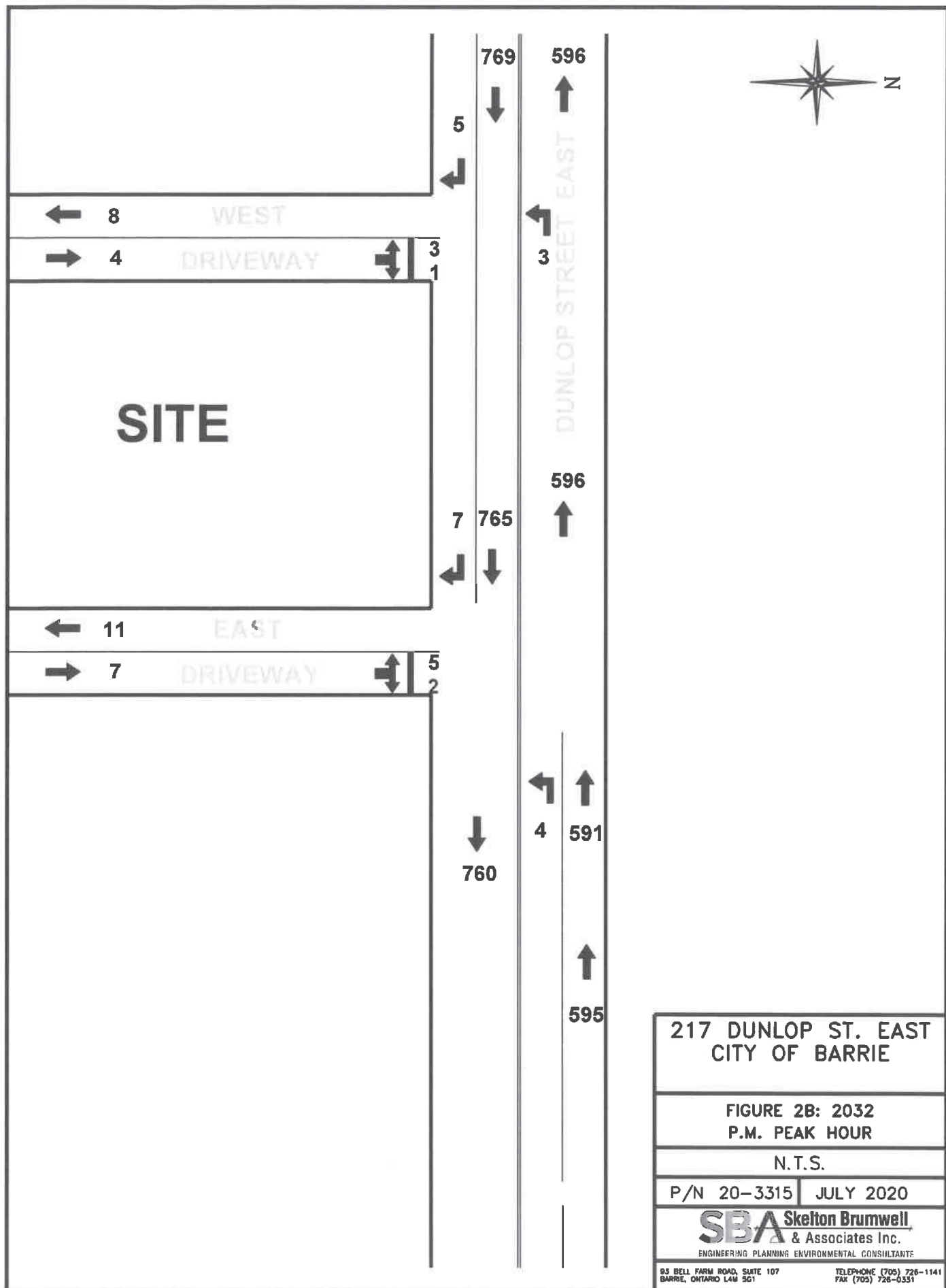


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Appendix D

Figures – 2032 Traffic Volumes





217 DUNLOP ST. EAST CITY OF BARRIE	
FIGURE 2B: 2032 P.M. PEAK HOUR	
N.T.S.	
P/N 20-3315	JULY 2020
SBA Skelton Brumwell & Associates Inc. ENGINEERING PLANNING ENVIRONMENTAL CONSULTANTS	
93 BELL FARM ROAD, SUITE 107 BARRIE, ONTARIO L4M 5G1	TELEPHONE (705) 728-1141 FAX (705) 728-0331

Appendix E

Level of Service Definition

LEVEL OF SERVICE AT UNSIGNALIZED INTERSECTIONS

The assessment of unsignalized intersections is based on the methods described in the "Highway Capacity Manual 2000", published in 2000 by the Transportation Research Board.

The term "Level of Service" is often used to assist in clarifying the arithmetic analysis associated with traffic engineering. "Level of Service" implies a qualitative measure of traffic flow at an intersection, and is dependent upon vehicle delay and vehicle queue lengths at the approaches. The Level of Service can be determined based on the ratio between traffic volumes and approach capacity or "V/C" ratio. The following table describes the characteristics of each level:

Level of Service	Description	Control Delay (sec)
A	Little or no traffic delay occurs. Approaches appear open, turning movements are easily made, and drivers have freedom of operation.	≤10
B	Short traffic delays occur. Many drivers begin to feel somewhat restricted in terms of freedom of operation.	10 to 15
C	Average traffic delays occur. Operations are generally stable, but drivers emerging from the minor street may experience difficulty in completing their movement. This may occasionally impact on the stability of flow on the major street.	15 to 25
D	Longer traffic delays occur. Motorists emerging from the minor street experience longer delays in making turns. Drivers on the major street will experience congestion and delay as drivers emerging from the minor street interfere with the major through movements.	25 to 35
E	Very long traffic delays occur. Operations approach the capacity of the intersection.	35 to 50
F	Saturation occurs, with vehicle demand exceeding the available capacity. Extremely long traffic delays occur.	>50

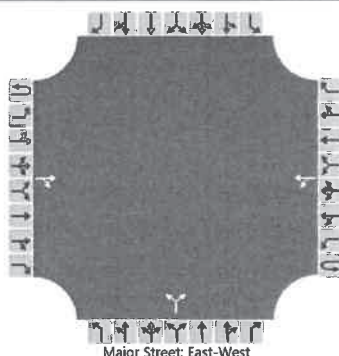
Appendix F

HCS 7 Intersection Analysis

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	S. Brumwell	Intersection	Dunlop St. & E. Driveway
Agency/Co.	Skelton, Brumwell & Assoc	Jurisdiction	City of Barrie
Date Performed	7/9/2020	East/West Street	Dunlop Street
Analysis Year	2032	North/South Street	
Time Analyzed	A.M. Peak Hour	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	217 Dunlop Street East		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			469	2		1	623			9		4				
Percent Heavy Vehicles (%)						0				0		0				
Proportion Time Blocked																
Percent Grade (%)									2							
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.10				6.80		6.40				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.20				3.50		3.30				

Delay, Queue Length, and Level of Service

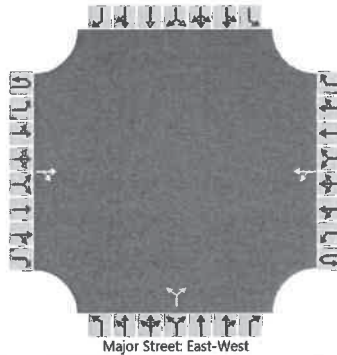
Flow Rate, v (veh/h)						1				14						
Capacity, c (veh/h)						1064				230						
v/c Ratio						0.00				0.06						
95% Queue Length, Q ₉₅ (veh)						0.0				0.2						
Control Delay (s/veh)						8.4				21.6						
Level of Service (LOS)						A				C						
Approach Delay (s/veh)					0.0				21.6							
Approach LOS									C							

HCS7 Two-Way Stop-Control Report

General Information

Analyst	S. Brumwell	Intersection	Dunlop St. & E. Driveway
Agency/Co.	Skelton, Brumwell & Assoc	Jurisdiction	City of Barrie
Date Performed	7/9/2020	East/West Street	Dunlop Street
Analysis Year	2032	North/South Street	
Time Analyzed	P.M. Peak Hour	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	217 Dunlop Street East		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			765	7		4	591			5		2				
Percent Heavy Vehicles (%)						0				0		0				
Proportion Time Blocked																
Percent Grade (%)									2							
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.10				6.80		6.40				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.20				3.50		3.30				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						4					8					
Capacity, c (veh/h)						804					144					
v/c Ratio						0.01					0.05					
95% Queue Length, Q ₉₅ (veh)						0.0					0.2					
Control Delay (s/veh)						9.5					31.4					
Level of Service (LOS)						A					D					
Approach Delay (s/veh)					0.1				31.4							
Approach LOS									D							