paradigm
TRANSPORTATION SOLUTIONS LIMITED

Retirement Facility- 2132 Dundas Street West Transportation Impact Study

Paradigm Transportation Solutions Limited

December 2016

Project Summary

Project Number
162410S

December 2016

Client
Mr. Mark Sinden
Sifton Properties Limited
195 Dufferin Avenue
London, ON N6A 1K7

Client Contact
Mark Sinden
Sifton Properties Limited

Consultant Project Team
Stewart Elkins, BES, MITE
Shanthi Sambasivam, P.Eng

Paradigm Transportation Solutions Limited
22 King Street South Suite 300
Waterloo ON N2J 1N8
p: 519.896.3163
www.ptsl.com

Retirement Facility – 2132 Dundas Street West
Transportation Impact Study

List of Revisions

Version	Date	Description
1	December 2016	Draft to Client
2		

Signature

Disclaimer

This document has been prepared for the titled project or named part thereof and should not be relied upon or used for any other project without an independent check being carried out as to its suitability and prior written authorization of Paradigm Transportation Solutions Limited being obtained. Paradigm Transportation Solutions Limited accepts no responsibility or liability for the consequence of this document being used for a purpose other than the purposes for which it was commissioned. Any person using or relying on the document for such other purpose agrees, and will by such use or reliance be taken to confirm their agreement to indemnify Paradigm Transportation Solutions Limited for all loss or damage resulting there from. Paradigm Transportation Solutions Limited accepts no responsibility or liability for this document to any party other than the person by whom it was commissioned.

To the extent that this report is based on information supplied by other parties, Paradigm Transportation Solutions Limited accepts no liability for any loss or damage suffered by the client, whether through contract or tort, stemming from any conclusions based on data supplied by parties other than Paradigm Transportation Solutions Limited and used by Paradigm Transportation Solutions Limited in preparing this report.

Executive Summary

Content

Sifton Properties Limited retained Paradigm Transportation Solutions Limited to undertake a transportation impact study and TDM options report for the proposed redevelopment of retirement facility located at 2132 Dundas Street West in the City of Mississauga, Region of Peel.

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

Conclusions

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

- **Proposed Development**: The proposed development is located on the south west quadrant of Dundas Street West and Fifth Line West. The subject site includes an existing 3-storey long-term care and retirement facility. It consists of 159 units with 88 long-tern care units and 71 retirement units.

  The site plan application proposes a redevelopment of the site with a 5-storey building consisting of 144 retirement dwelling units. The current version of the site plan depicts vehicular access to the site via the two (2) existing driveway connections. The driveway on Fifth Line West will be moved south to provide approximately 90 metres of corner clearance from Dundas Street West as per the City of Mississauga access guidelines. The final siting and configuration of the driveway connections will be subject to approval by City of Mississauga.

  The site plan denotes a total of 70 parking spaces which includes 33 surface level parking spaces and 37 underground garage parking spaces to serve the development.

- **Development Generated Traffic**: The subject site is estimated to generate approximately 53 total vehicle trips during the AM peak hour and approximately 49 total vehicle trips during the PM peak hour. A 5 percent reduction in residential trip generation has been applied to account for transit trips. (Actual additional new trips generated on the roadways is estimated to be about 21 vehicle trips during both the AM and PM peak hours.)

- **Existing Traffic Conditions**: The Erin Mills Parkway and Dundas Street West intersection and the Dundas Street West and Glen Erin Drive/Liruma Road intersection generally defines the study area.

  - The intersection of Erin Mills Parkway and Dundas Street West currently experiences high delays during both AM and

PM peak hours with several movements exceeding available capacity.

- The intersection of Dundas Street West and Fifth Line currently operates within acceptable levels during the AM and PM peak hours, with the exception of the eastbound left turn movement, which experiences slight delays during the PM peak hour.
- The intersection of Dundas Street West and Glen Erin Drive / Liruma Road currently operates within acceptable levels during the AM and PM peak hours, with the exception of the eastbound left turn movement, which experiences slight delays during the PM peak hour.
- The existing Driveways on Dundas Street West and Fifth Line currently operate within acceptable levels of service during both AM and PM peak hours.

- **Forecast Background Traffic**: The forecast background traffic volumes in the vicinity of the subject site have been assessed for a five-year horizon, Year 2021. There are no in-stream or recently approved development applications within the study area. The forecast traffic volumes are estimated to consist of a generalized growth rate of 1.0 percent per annum on Dundas Street West and 1.5 percent per annum on Erin Mills Parkway.
- **Background Traffic Conditions**:
  - The intersection of Erin Mills Parkway and Dundas Street West is forecast to continue to operate with high delays during both the AM and PM peak hours with several movements exceeding available capacity.
  - The intersection of Dundas Street West and Fifth Line West is forecast to operate within acceptable levels during the AM and PM peak hours, with the exception of the eastbound left turn movement, which will experience slight delays during the PM peak hour.
  - The intersection of Dundas Street West and Glen Erin Drive/ Liruma Road is forecast to operate within acceptable levels during the AM and PM peak hours, with the exception of the eastbound left turn movement, which will continue to experience slight delays during the PM peak hour.
  - The Site Driveways on Dundas Street West and Fifth Line West are forecast to operate within acceptable levels of service during both the AM and PM peak hours.
- **Total Traffic Conditions**:
  - The intersection of Erin Mills Parkway and Dundas Street West is forecast to continue operate with high delays during

both the AM and PM peak hours with several movements exceeding available capacity.

- The intersection of Dundas Street West and Fifth Line West is forecast to operate within acceptable levels during the AM and PM peak hours, with the exception of the eastbound left turn movement, which will experience slight delays during the PM peak hour.
- The intersection of Dundas Street West and Glen Erin Drive/ Liruma Road is forecast to operate within acceptable levels during the AM and PM peak hours, with the exception of the eastbound left turn movement, which will continue to experience slight delays during the PM peak hour.
- The Site Driveways on Dundas Street West and Fifth Line West are forecast to operate within acceptable levels of service during both AM and PM peak hours.

Recommendations

Based on the findings of this study, the following is recommended with respect to the subject site:

- The proposed site driveway connections to Dundas Street West and Fifth Line operate under stop control. A stop sign (Ra-1) should be installed on the driveway approaches in accordance with the Ontario Traffic Manual Book 5.

No other roadway or traffic control improvements are required or recommended at this time to accommodate the future traffic within the study area.

Table of Contents

Appendices

Figures

Tables

1 Introduction

1.1 Overview

Sifton Properties Limited retained Paradigm Transportation Solutions Limited to undertake a transportation impact study and TDM options report for the proposed redevelopment of retirement facility located at 2132 Dundas Street West in the City of Mississauga, Region of Peel.

The purpose of this study is to determine the impacts of the development traffic on the surrounding road network and identify any improvements necessary to accommodate this traffic. The scope of the study includes determination of:

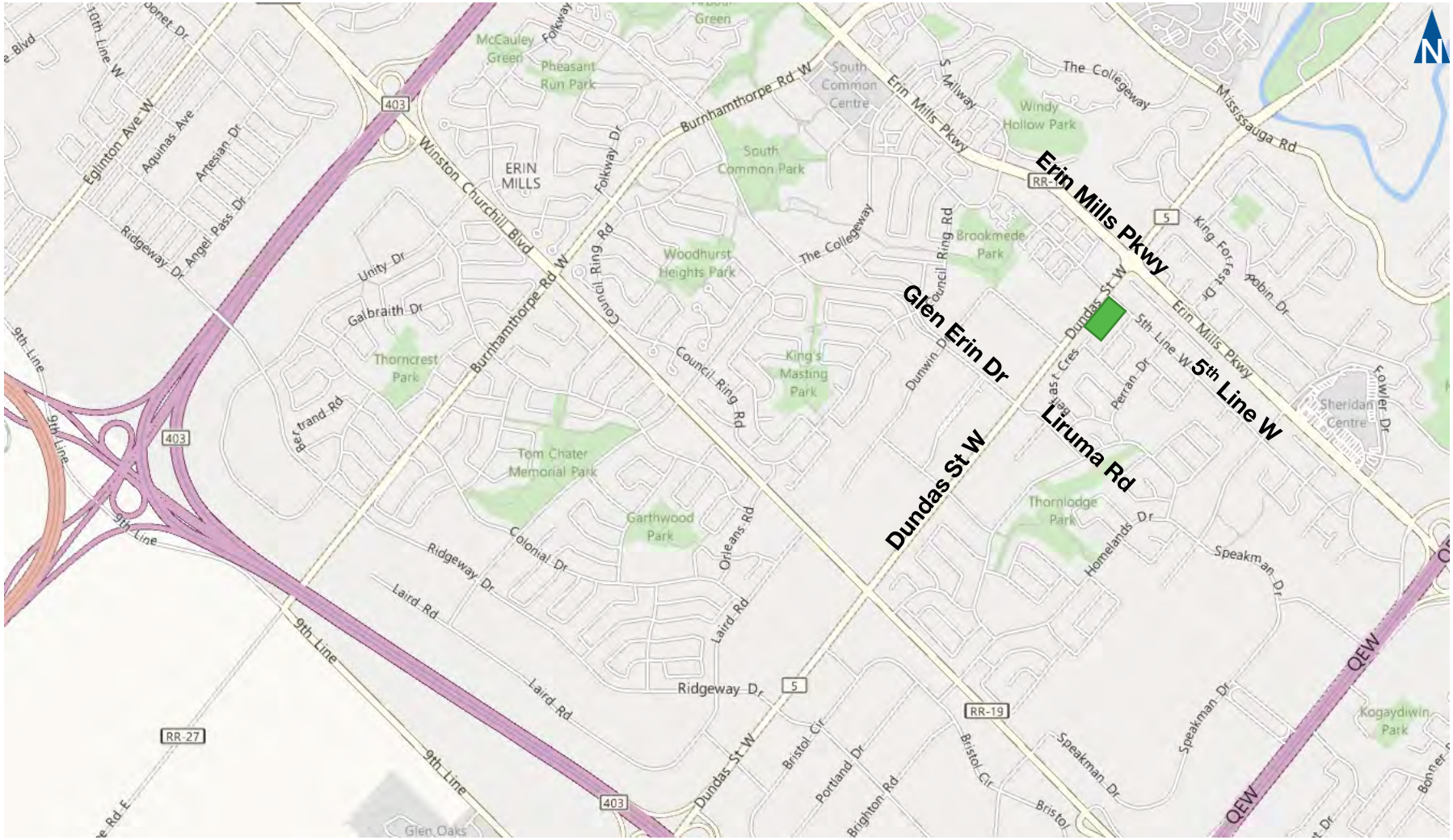
- The current traffic and site conditions in the vicinity of the development;
- Estimates of background traffic growth in the area;
- Estimates of the additional traffic that will be generated by the development;
- The impact of the traffic at build-out of the lands; and
- Recommendations on the remedial measures necessary to accommodate the future traffic in a satisfactory manner.

A preliminary site concept plan has been prepared for the proposed development. **Figure 1.1** illustrates the general location of the subject site.

1.2 Study Area

The following intersections have been analyzed in this report to examine the impacts of additional traffic due to the development of the subject site:

- Dundas Street West & and Erin Mills Parkway;
- Dundas Street West and Fifth Line West;
- Dundas Street West and Glen Erin Drive/Liruma Road; and
- The existing site driveway connections to Dundas Street West and Fifth Line West.



paradigm TRANSPORTATION SOLUTIONS LIMITED

Location of Subject Site

2 Existing Conditions

This section of the report provides an overview of the existing conditions on the roadways in the study area. The roadways of interest include Erin Mills Parkway, Dundas Street West, Fifth Line West, Glen Erin Drive and Liruma Road.

2.1 Existing Roadways

The characteristics of the main roadways in the vicinity of the subject site that have been considered in assessing the traffic impacts of the development are as follows:

- **Erin Mills Parkway (Regional Road 1)** is a six-lane north south arterial roadway under the jurisdiction of Region of Peel. Erin Mills Parkway provides a connection to Highway 403 to the north and to Queen Elizabeth Way (QEW) to the south. In the vicinity of the development, the road provides three through lanes with exclusive turning lanes in each direction, and has a maximum posted speed limit of 70 km/h. The Erin Mills Parkway intersection with Dundas Street West operates under traffic signal control. Sidewalk facilities are present on both sides of the roadway. Regular transit service is provided along this road.
- **Dundas Street West** is a four-lane east west arterial roadway under the jurisdiction of the City of Mississauga. Dundas Street West connects to Highway 427 to the east and Highway 403 to the west. The road provides two through lanes with exclusive left turn lanes. Dundas Street West has a maximum posted speed limit of 60 km/h. Sidewalk facilities are present on both sides of the roadway. The Dundas Street West intersections with Fifth Line West and Glen Erin Drive/Liruma Road operate under traffic signal control. Regular transit service is provided along this road.
- **Fifth Line West** is a north south local roadway with a basic two-lane urban cross-section and a posted speed limit of 50 km/h. Sidewalk facilities and delineated cycling lanes are provided on both sides of this roadway. Parking restrictions are clearly signed along both sides of Fifth Line West in the vicinity of the site.
- **Glen Erin Drive** is a north south roadway north of Dundas Street West. South of Dundas Street West the road is known as Liruma Road. The roadway has a four-lane urban cross section with no posted speed limit signage noted within the study area; therefore, the statutory limit of 50 km/h is assumed to govern. Sidewalk facilities are present on both sides of this roadway. Regular transit service is provided along this road. Parking restrictions are clearly signed along both sides of Glen Erin Drive in vicinity of Dundas Street West.
- **Liruma Road** is a short north south local roadway south of Dundas Street West. North of Dundas Street west the road is known as Glen

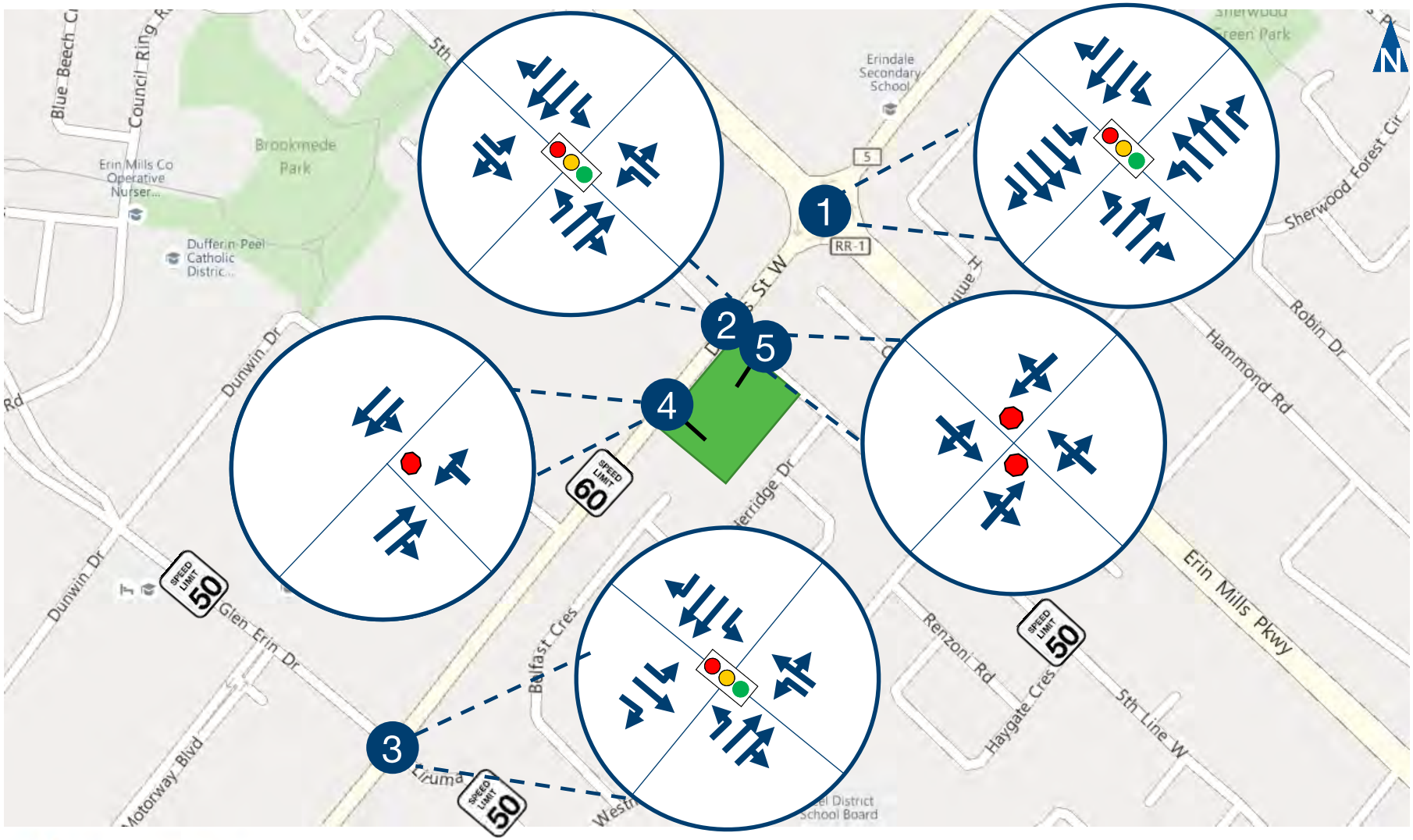
Erin Drive. The roadway has a basic two-lane urban cross-section with no posted speed limit signage noted within the study area; therefore, the statutory limit of 50 km/h is assumed to govern. Sidewalk facilities are present on east side of this roadway. Parking restrictions are not posted; therefore, parking on this street is limited to three hours as per City of Mississauga parking regulations.

Access to the existing development at 2132 Dundas Street West is provided via two (2) all movements entrances (denoted as Driveway 1 on Dundas Street West and Driveway 2 on Fifth Line West).

The existing intersections that could potentially be impacted by the development of the subject site include the following:

- Erin Mills Parkway and Dundas Street West (signalized);
- Dundas Street West and Fifth Line West (signalized);
- Dundas Street West and Glen Erin Drive/Liruma Road;
- Dundas Street West and Site Driveway 1; and
- Fifth Line and Site Driveway 2.

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



Existing Lane Configuration & Traffic Control

2.2 Existing Transit Service

2.2.1 City of Mississauga Transit Service

Mississauga Transit operates Route 1 Dundas (Islington Subway – Laird Road) along Dundas Street West immediately adjacent to the subject site. **Figure 2.2** illustrates the layout of the Mississauga Transit routes and the general schedule. The transit routes provide opportunities for users to transfer to and from inter-regional GO Transit service and other inter-city routes at various locations. Mississauga Transit stops are located along Dundas Street West at the Fifth Line West intersection.

Route 1 provides service seven (7) days a week along Dundas Street West between Islington Subway and Laird Road with 20-minute service headways during peak hours.

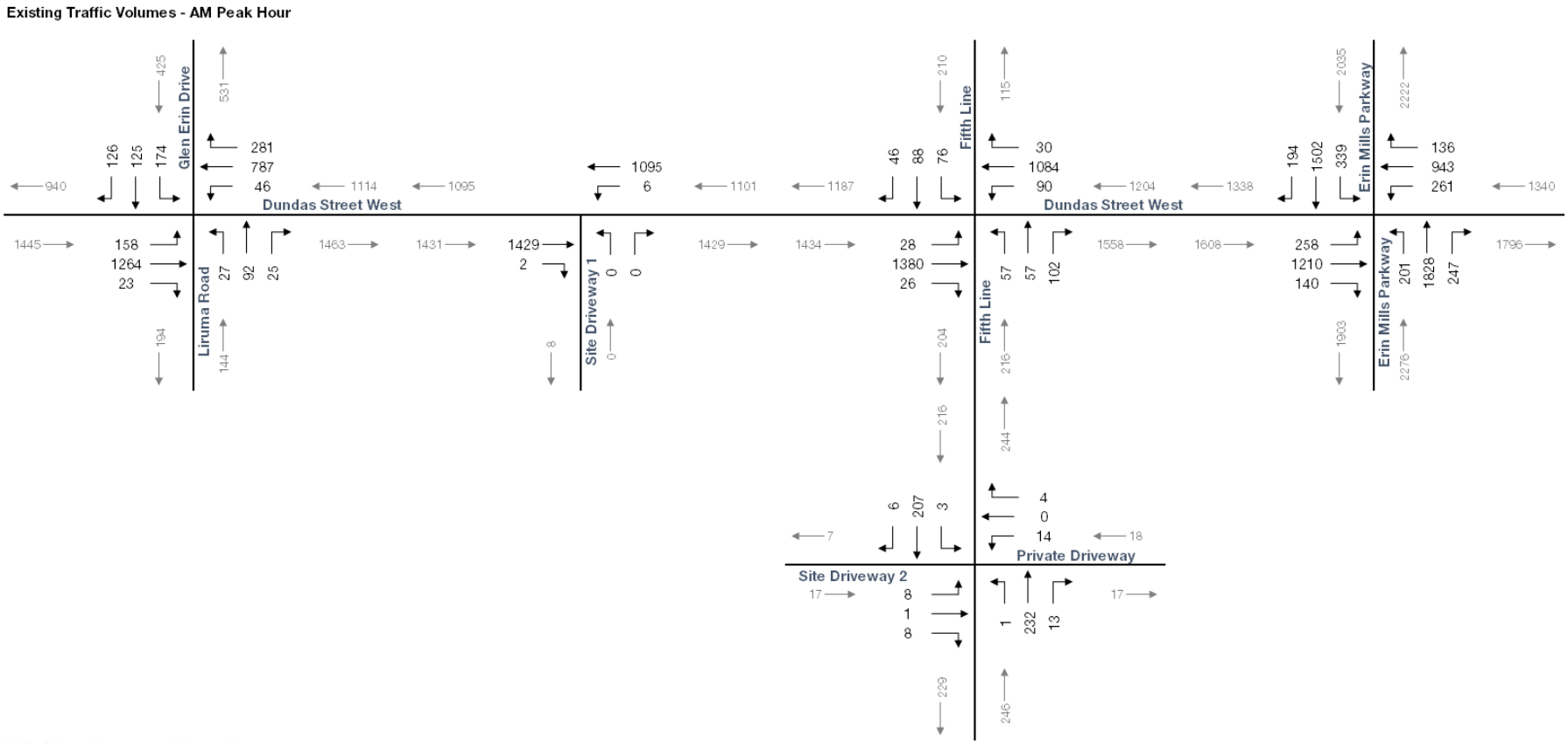
2.3 Existing Cycling Facilities

In the vicinity of the subject lands, dedicated delineated bike lanes are provided on both sides of Fifth Line West.

The City of Mississauga has a Bike & Ride initiative designed to encourage riders to combine two modes of environmentally-friendly transportation: cycling and public transit. The City of Mississauga Cycling Master Plan does not indicate any future plans for cycling facilities along Dundas Street West within the study area over the next five (5) years.

Existing Transit Service

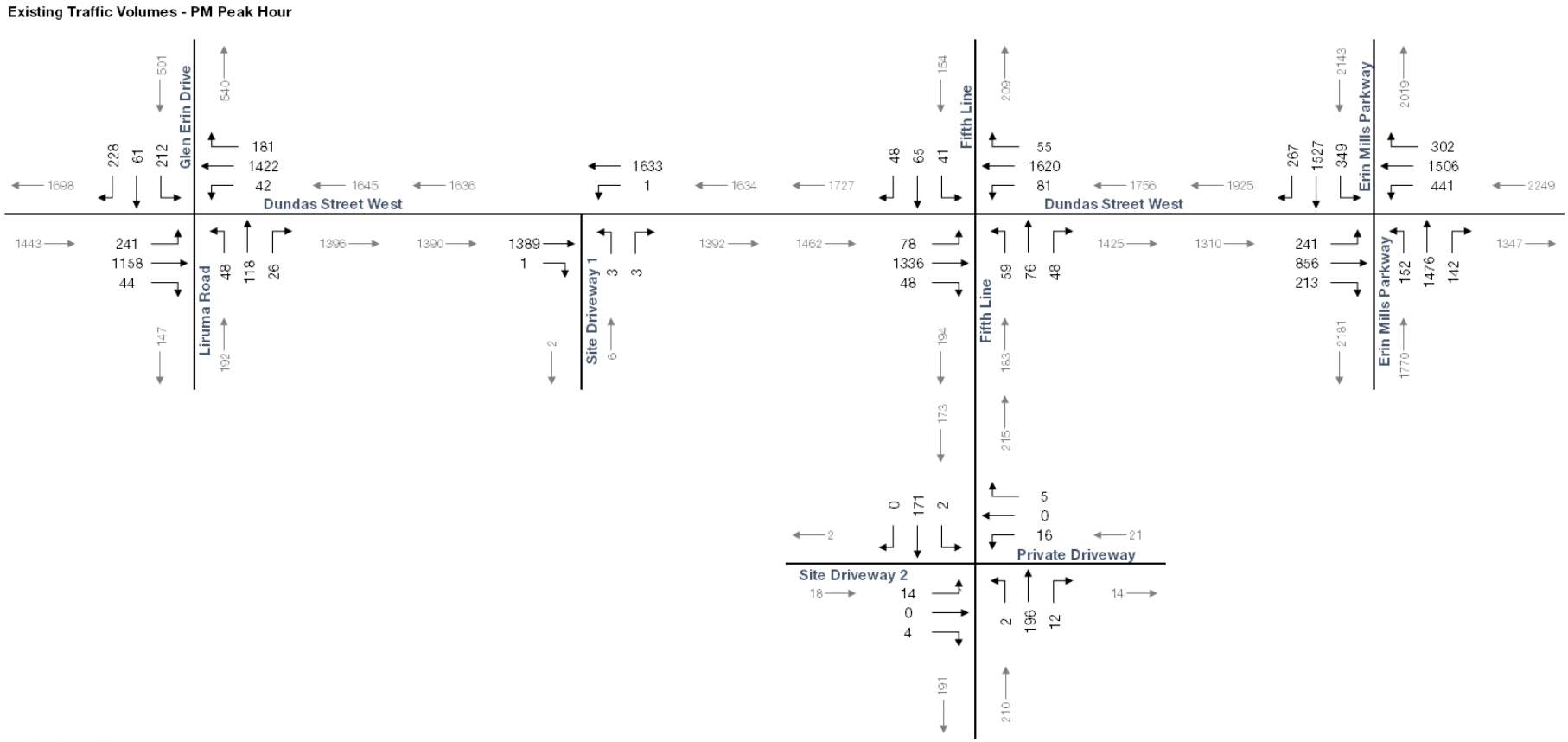
Figure 2.2



paradigm TRANSPORTATION SOLUTIONS LIMITED

Existing Traffic – AM Peak Hour

Figure 2.3a: Existing Traffic – AM Peak Hour



Existing Traffic – PM Peak Hour

Figure 2.3b

2.5 Existing Traffic Operations

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

The operation of the intersections in the study area were evaluated using the existing lane geometry and traffic control along with the existing peak hour traffic. The findings are summarized in **Table 2.1**. The intersection analysis considered three separate measures of performance:

- The level of service (LOS) for each turning movement; and
- The volume to capacity (v/c) ratio for each turning movement.

The level of service conditions on the existing road network have been assessed using Synchro 9.0 with HCM 2000 procedures. Movements are considered critical under the following conditions:

- Volume to capacity ratios for through movements or shared through/turning movements are greater than or equal to 0.85;
- Volume to capacity ratios for exclusive turning movements are greater than or equal to 0.95; and
- Queue lengths for individual movements that are projected to exceed the available turning lane storage.

Based on the above criteria, the resulting level of service conditions are summarized in **Table 2.1** and the following is noted:

- The intersection of Erin Mills Parkway and Dundas Street West currently experiences high delays during both AM and PM peak hours with several movements exceeding available capacity.
- The intersection of Dundas Street West and Fifth Line West currently operates within acceptable levels during the AM and PM peak hours, with the exception of the eastbound left turn movement, which experiences slight delays during the PM peak hour.
- -The intersection of Dundas Street West and Glen Erin Drive/Liruma Road currently operates within acceptable levels during the AM and PM peak hours, with the exception of the eastbound left turn movement, which experiences slight delays during the PM peak hour.

- The existing Driveways on Dundas Street West and Fifth Line currently operate within acceptable levels of service during both AM and PM peak hours.

Appendix B provides the detailed Synchro 9.0 operations reports.

TABLE 2.2: EXISTING TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	1 - Dundas Street West & Erin Mills Parkway	TCS	LOS	F	F	C	F	F	D	A	D	E	F	B	F	F	E	A	F	F
			Delay	224	166	20	163	93	51	8	55	71	153	14	131	236	74	8	94	114
			V/C	1.37	1.25	0.30		0.98	0.80	0.23		0.85	1.23	0.43		1.39	0.99	0.34		
			Q	159	333	37		142	190	20		99	328	44		216	239	24		
	2 - Dundas Street West & Fifth Line	TCS	LOS	A	A		A	D	A	A	A	C	C		C	C	C		C	B
			Delay	7	10		10	36	8	2	10	31	35		34	34	27		30	13
			V/C	0.12	0.66			0.66	0.51	0.03		0.30	0.60			0.40	0.48			
			Q	6	101			39	66	3		19	40			24	32			
	3 - Dundas Street West & Glen Erin Drive/Liruma Road	TCS	LOS	A	B		B	A	B	A	B	C	D		D	D	C	B	C	B
			Delay	9	19		18	8	15	2	12	31	48		44	40	34	12	30	18
			V/C	0.42	0.71			0.21	0.46	0.31		0.10	0.57			0.60	0.33	0.46		
			Q	22	149			8	74	13		12	41			52	40	17		
	4 - Dundas Street West & Site Driveway 1	TWSC	LOS				A	B	A		A	A			A					0
			Delay				0	14	0		0	0			0					
			V/C					0.02												
			Q					0												
	5 - Fifth Line & Site Driveway 2	TWSC	LOS		B		B		B		B	A	A		A	A	A		A	1
			Delay		11		11		12		12	8	0		0	8	0		0	
			V/C		0.03				0.04			0.00				0.00				
			Q		0				0			0				0				
PM Peak Hour	1 - Dundas Street West & Erin Mills Parkway	TCS	LOS	F	E	B	F	F	F	B	F	D	E	A	E	F	E	B	F	F
			Delay	287	70	19	102	331	165	19	178	54	76	9	69	256	68	15	92	114
			V/C	1.51	0.89	0.42		1.63	1.26	0.48		0.72	1.00	0.26		1.44	0.97	0.45		
			Q	165	189	48		289	404	66		63	234	22		226	246	51		
	2 - Dundas Street West & Fifth Line	TCS	LOS	E	A		B	C	B	A	B	C	C		C	C	C		C	B
			Delay	61	8		11	21	10	2	10	34	32		32	31	34		33	13
			V/C	0.79	0.63			0.52	0.73	0.06		0.36	0.51			0.25	0.49			
			Q	23	84			30	114	4		20	32			15	31			
	3 - Dundas Street West & Glen Erin Drive/Liruma Road	TCS	LOS	F	B		D	A	C	A	C	C	D		D	D	C	B	C	C
			Delay	196	17		47	8	24	3	21	31	50		45	49	31	16	32	34
			V/C	1.32	0.64			0.17	0.82	0.22		0.17	0.62			0.76	0.15	0.64		
			Q	112	137			8	182	11		19	49			62	22	30		
	4 - Dundas Street West & Site Driveway 1	TWSC	LOS				A	B	A		A	D			D					0
			Delay				0	13	0		0	27			27					
			V/C					0.00				0.04								
			Q					0				0								
	5 - Fifth Line & Site Driveway 2	TWSC	LOS		B		B		B		B	A	A		A	A	A		A	1
			Delay		11		11		11		11	8	0		0	8	0		0	
			V/C		0.03				0.04			0.00				0.00				
			Q		0				0			0				0				

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds
Q - 95th Percentile Queue Length
TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control
RBT - Roundabout

3 Development Concept

3.1 Site Description

The proposed development is located on the south side of Dundas Street West, west of Fifth Line West. The subject site currently contains an existing 3-storey long-term care and retirement facility. It consists of 159 units with 88 long-term care units and 71 retirement units.

The site plan proposes redevelopment of the site with a 5-storey building consisting of 144 retirement dwelling units. **Figure 3.1** shows the current version of the site plan. It depicts vehicular access to the site via the existing two (2) driveway connections. The driveway on Fifth Line West will be moved south to provide approximately 90 metres of corner clearance from Dundas Street West as per the City of Mississauga access guidelines. The final siting and configuration of the driveway connections will be subject to approval by City of Mississauga.

The site plan denotes a total of 70 parking spaces which includes 33 surface level parking spaces and 37 underground garage parking spaces to serve the development.

paradigm TRANSPORTATION SOLUTIONS LIMITED

Proposed Site Plan

3.2 Site Traffic Estimates

Trip generation rates provided in the institute of Transportation Engineers (ITE) Trip Generation[1] were used to estimate the peak hour traffic volumes generated by the development. The following land use code was applied:

- **LUC 252 (Senior Adult Housing (Attached))**: Senior adult housing consists of attached independent living developments, including retirement communities, age-restricted housing and active adult communities. These developments may include limited social or recreational services. However, they generally lack centralized dining and on-site medical facilities. Residents in these communities live independently, are typically active (requiring little to no medical supervision) and may or may not be retired.

The peak hour of the generator typically did not coincide with the peak hour of the adjacent street traffic. The AM peak hour of the generator typically ranged from 08:30 to 12:00 and the PM peak period of the generator typically ranged from 13:00 to 18:00. To remain conservative in the trip generation estimation, it is assumed that the site's peak hour coincides with the peak hour of the adjacent street.

The rates contained in the ITE Trip Generation are based primarily on traffic surveys conducted at suburban locations with limited to no access to public transportation. Given the proximity and frequency of local transit service, and the location of the study area within a built-out precinct of the City, it is reasonable to assume that a percentage of the new trips generated by the proposed development will use alternative modes including public transit, cycling or walking for trip making purposes.

Appendix C summarizes mode choice data from the 2011 Transportation Tomorrow Survey (TTS) for the southwest quadrant of the Dundas Street West and Fifth Line West intersection (Zone 3650). The data show that on average about four (4) percent of the individuals living in the study area currently travel by transit during a typical weekday. Considering the demograpics, the development plans to cater to, and the non-auto modal percentage in the development area, vehicle trip estimates were reduced by five (5) percent to account for transit use.

Table 3.1 summarizes the estimated trip generation for the proposed development. The table shows that the subject site is estimated to have a net trip generation of approximately 53 vehicle trips during the AM peak hour and approximately 49 vehicle trips during the PM peak hour. The existing traffic counts indicate that the site generates about 32 vehicle trips during the AM peak hour and approximately 28 vehicle trips during the PM peak hour. Therefore, the actual additional new trips estimated to be on the roadway is about 21 vehicles during both the AM and PM peak hours.

[1] Trip Generation Manual 9th Edition Institute of Transportation Engineers Washington DC 2012

TABLE 3.1: ESTIMATED TRIP GENERATION

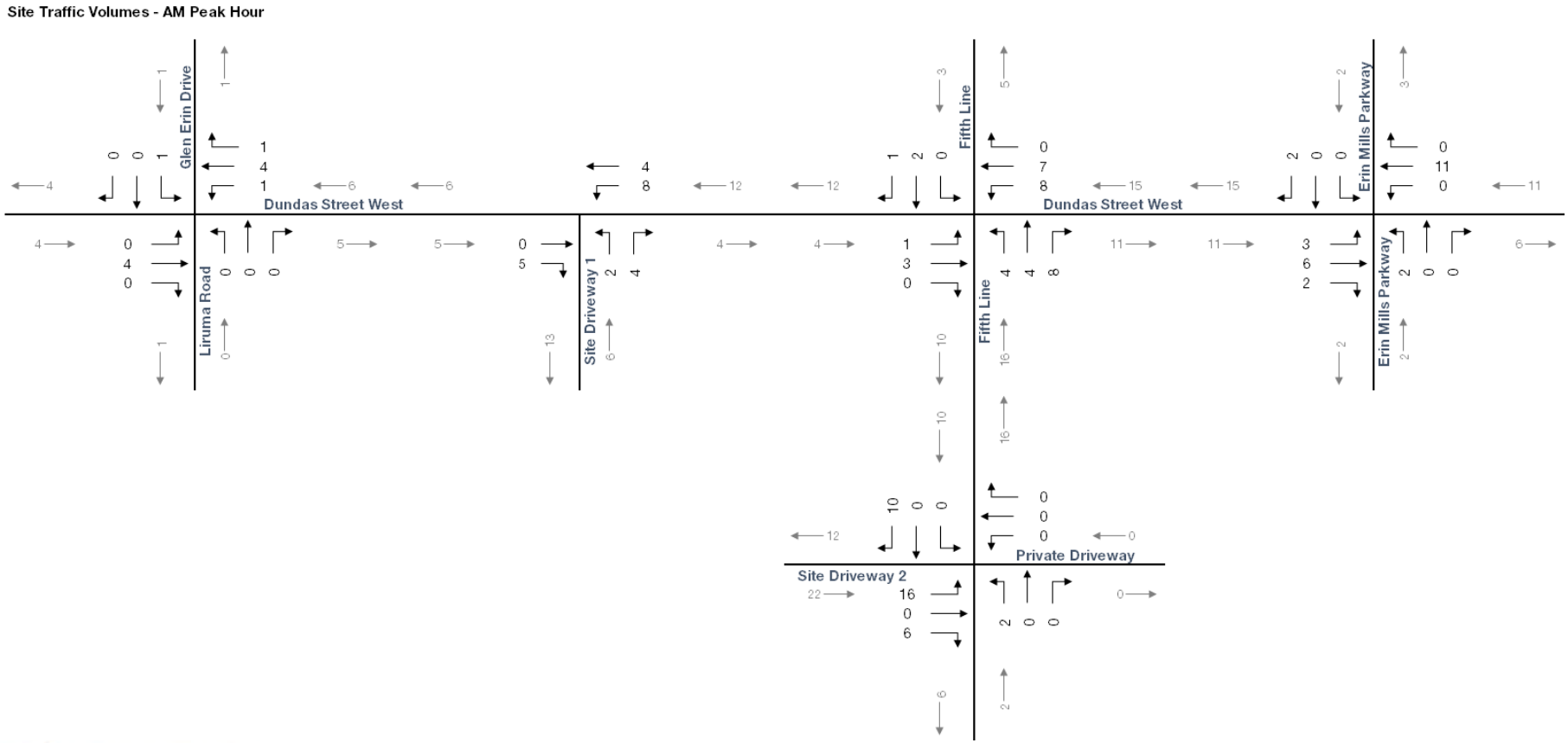
Land Use Code	Units	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
252 Senior Adult Housing (Attached)	144	26	30	56	28	23	51
5% adjustment for Transit		*1*	*2*	*3*	*1*	*1*	*2*
Total New Trips		**25**	**28**	**53**	**27**	**22**	**49**

The estimated trip generation was assigned to the road network based on the observed local trip patterns documented in the existing conditions (**Figure 2.3a** and **Figure 2.3b**). **Table 3.2** summarizes the trip distribution.

TABLE 3.2: ESTIMATED TRIP DISTRIBUTION

To/From	Streets	Percent Trips			
		AM		PM	
		In	Out	In	Out
East	Dundas Street West	42%	23%	25%	19%
West	Dundas Street West	17%	13%	26%	29%
North	Erin Mills Parkway	9%	9%	8%	5%
	Fifth Line	13%	17%	5%	20%
	Glen Erin Drive	2%	5%	4%	4%
South	Erin Mills Parkway	9%	7%	7%	5%
	Fifth Line	7%	21%	20%	17%
	Glen Erin Drive	1%	5%	5%	1%
Total		**100%**	**100%**	**100%**	**100%**

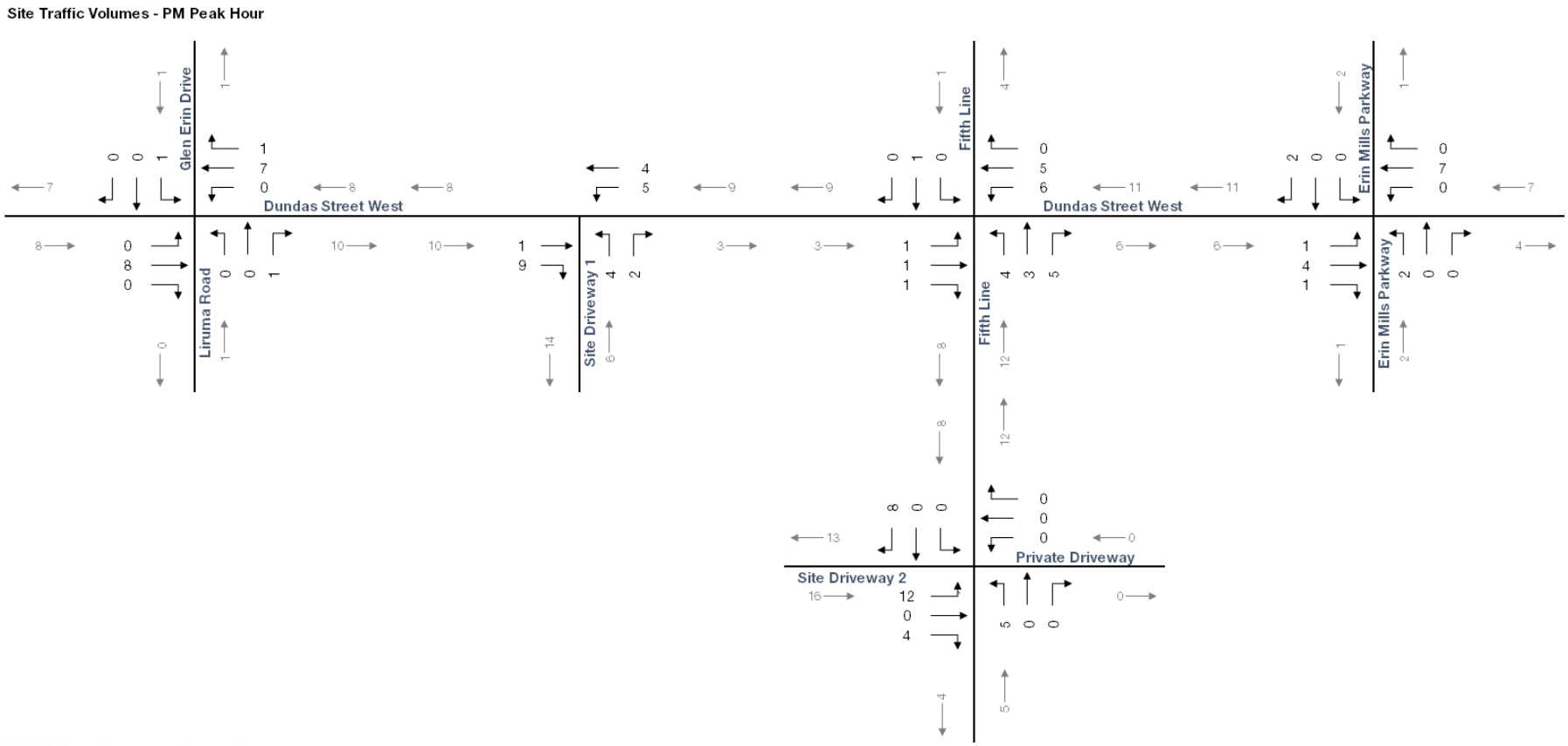
Figure 3.2a and **Figure 3.2b** show the resulting weekday AM and PM peak hour site traffic assignments, respectively, for the proposed development.



Estimated Site Generated Traffic – AM Peak Hour

Retirement Facility – 2132 Dundas St W TIS
162410

Figure 3.2a



Estimated Site Generated Traffic – PM Peak Hour

4 Future Traffic Conditions

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

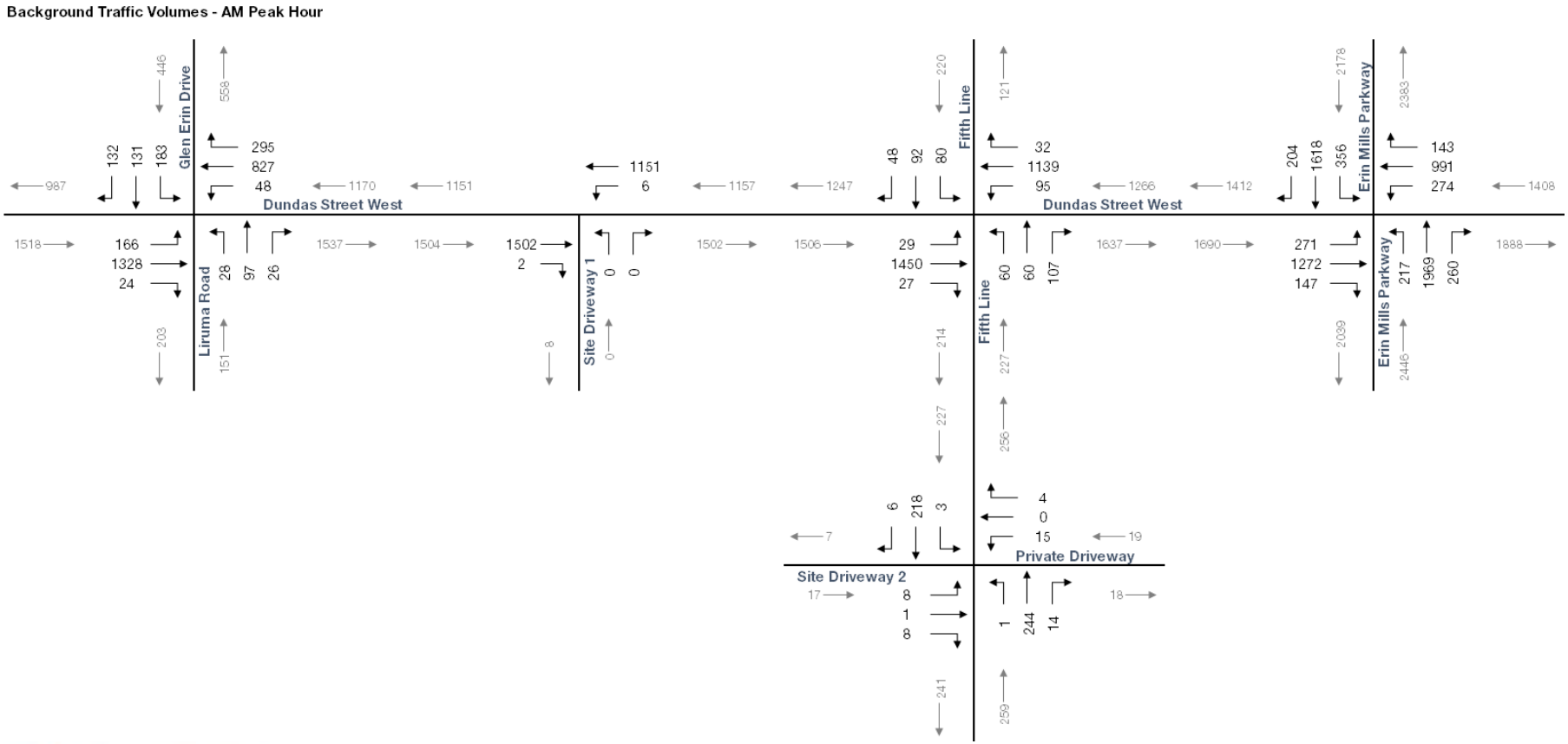
- Future background traffic estimates;
- Level of service analysis for background traffic (pre-development); and
- Level of service analysis for background traffic plus the additional traffic generated by the build-out of the subject site (post-development).

4.1 Background Traffic Forecast

The non-site traffic increase is composed of generalized background traffic growth in the vicinity of the subject lands and trips generated by other planned developments in the study area. The City of Mississauga advised that there are no major developments planned in the vicinity of the subject site that would impact traffic volumes at the study area intersections.

The background traffic volumes were determined by applying a growth rate of 1.0 percent per annum to existing traffic volumes on Dundas Street West and 1.5 percent per annum to existing traffic volumes on Erin Mills Parkway. Region of Peel staff provided the growth rate.

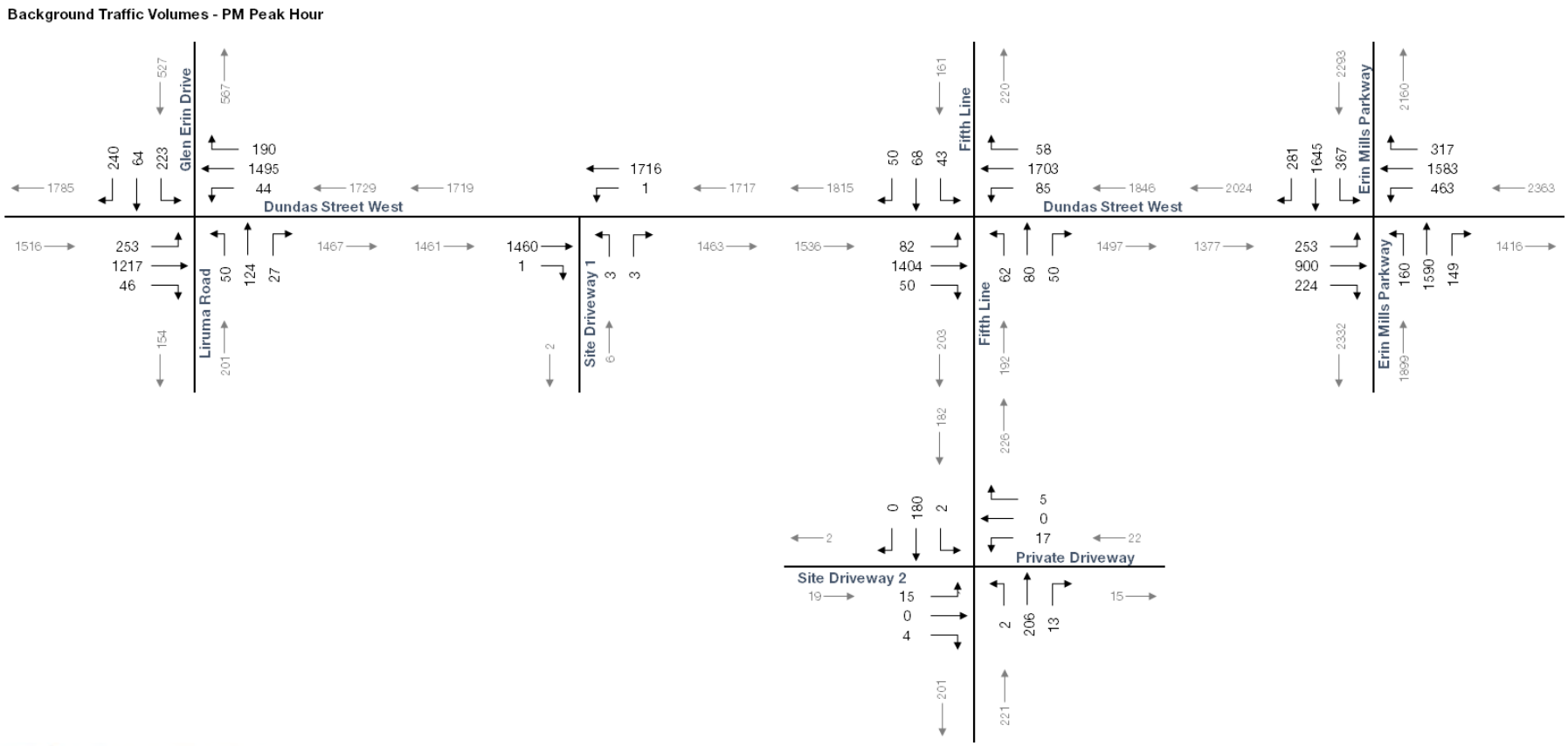
Figure 4.1a and **Figure 4.1b** show the future background traffic estimates for the weekday AM and PM peak hours for the horizon year 2021, representing a period of five (5) years from assumed build-out and full occupancy.



Forecast Background Traffic – AM Peak Hour

Retirement Facility – 2132 Dundas St W TIS
162410

Figure 4.1a



Forecast Background Traffic – PM Peak Hour

Figure 4.1b

4.2 Background Traffic Operations

The operations of the intersections under the future background traffic conditions were evaluated using the same analytical approach that was used for the existing traffic operations along with the background traffic forecast volumes (**Figure 4.1a** and **Figure 4.1b**). No improvements to the road network are assumed to be in place. Existing signal timings have been used.

Table 4.1 summarizes resulting level of service conditions for the background traffic horizon year and the following is noted:

- The intersection of Erin Mills Parkway and Dundas Street West is forecast to continue to operate with high delays during both the AM and PM peak hours with several movements exceeding available capacity.
- The intersection of Dundas Street West and Fifth Line West is forecast to operate within acceptable levels during the AM and PM peak hours, with the exception of the eastbound left turn movement, which will continue to experience slight delays during the PM peak hour.
- The intersection of Dundas Street West and Glen Erin Drive/Liruma Road is forecast to operate within acceptable levels during the AM and PM peak hours, with the exception of the eastbound left turn movement, which will continue to experience slight delays during the PM peak hour.
- The Site Driveways on Dundas Street West and Fifth Line West are forecast to operate within acceptable levels of service during both the AM and PM peak hours.

Appendix D provides the detailed Synchro 9.0 operations reports.

TABLE 4.1: BACKGROUND TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	1 - Dundas Street West & Erin Mills Parkway	TCS	LOS	F	F	C	F	F	D	A	E	E	F	B	F	F	F	B	F	F
			Delay	305	192	22	195	105	53	9	59	80	191	16	163	264	97	10	117	138
			V/C	1.56	1.31	0.30		1.02	0.84	0.24		0.91	1.32	0.45		1.47	1.08	0.37		
			Q	181	358	40		153	203	22		113	366	51		231	271	31		
	2 - Dundas Street West & Fifth Line	TCS	LOS	A	B		B	E	A	A	B	C	D		C	D	C		C	B
			Delay	8	11		11	60	8	2	12	31	36		34	35	27		30	14
			V/C	0.14	0.70			0.80	0.54	0.04		0.31	0.62			0.45	0.48			
			Q	6	114			27	73	3		19	43			25	33			
	3 - Dundas Street West & Glen Erin Drive/Liruma Road	TCS	LOS	B	C		B	A	B	A	B	C	D		D	D	C	B	C	B
			Delay	10	20		19	9	15	2	12	31	48		45	41	34	12	31	19
			V/C	0.46	0.75			0.24	0.49	0.33		0.11	0.59			0.64	0.34	0.47		
			Q	23	163			8	80	13		12	43			54	41	17		
	4 - Dundas Street West & Site Driveway 1	TWSC	LOS				A	B	A		A	A			A					0
			Delay				0	14	0		1	0			0					
			V/C					0.02												
			Q					0												
	5 - Fifth Line & Site Driveway 2	TWSC	LOS		B		B		B		B	A	A		A	A	A		A	1
			Delay		12		12		13		13	8	0		0	8	0		0	
			V/C		0.03				0.04			0.00				0.00				
			Q		0				0			0				0				
PM Peak Hour	1 - Dundas Street West & Erin Mills Parkway	TCS	LOS	F	F	B	F	F	F	C	F	E	F	B	F	F	F	B	F	F
			Delay	317	82	20	115	365	191	20	202	57	97	10	87	285	88	17	111	133
			V/C	1.58	0.94	0.44		1.71	1.32	0.51		0.75	1.08	0.28		1.52	1.05	0.48		
			Q	176	211	53		306	435	73		67	265	25		241	278	58		
	2 - Dundas Street West & Fifth Line	TCS	LOS	F	A		B	C	B	A	B	C	C		C	C	C		C	B
			Delay	85	9		13	32	12	2	12	34	33		33	31	34		33	14
			V/C	0.89	0.66			0.62	0.77	0.06		0.37	0.53			0.26	0.50			
			Q	27	95			36	130	5		20	33			15	32			
	3 - Dundas Street West & Glen Erin Drive/Liruma Road	TCS	LOS	F	B		D	A	C	A	C	C	D		D	D	C	B	C	D
			Delay	222	20		53	9	27	3	23	31	50		45	54	31	18	35	38
			V/C	1.38	0.70			0.20	0.87	0.23		0.17	0.64			0.81	0.16	0.67		
			Q	119	150			8	210	11		19	52			69	23	35		
	4 - Dundas Street West & Site Driveway 1	TWSC	LOS				A	B	A		A	D			D					0
			Delay				0	14	0		0	29			29					
			V/C					0.00				0.04								
			Q					0				0								
	5 - Fifth Line & Site Driveway 2	TWSC	LOS		B		B		B		B	A	A		A	A	A		A	1
			Delay		12		12		12		12	8	0		0	8	0		0	
			V/C		0.04				0.04			0.00				0.00				
			Q		0				0			0				0				

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds
Q - 95th Percentile Queue Length
TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control
RBT - Roundabout

4.3 Future Total Traffic

The future total traffic volumes anticipated to occur in this study include the future background traffic volumes (**Figure 4.1a** and **Figure 4.1b**) and the site generated traffic volumes (**Figure 3.2a** and **Figure 3.2b**). Existing site trips from the existing counts at the site driveways were deducted to reflect the estimated new trips.

Figure 4.2a and **Figure 4.2b** show the future total traffic volumes expected within the study area for the weekday AM and PM peak hours, respectively.

4.4 Future Total Traffic Operations

The operations of the study area intersections under the future total traffic conditions were evaluated using the same analytical approach that was used for the background traffic operations along with the total traffic forecast volumes (**Figure 4.2a** and **Figure 4.2b**). No improvements to the road network have been assumed to be in place and existing signal timings have been used.

Table 4.2 summarizes resulting level of service conditions for the total traffic conditions and the following is noted

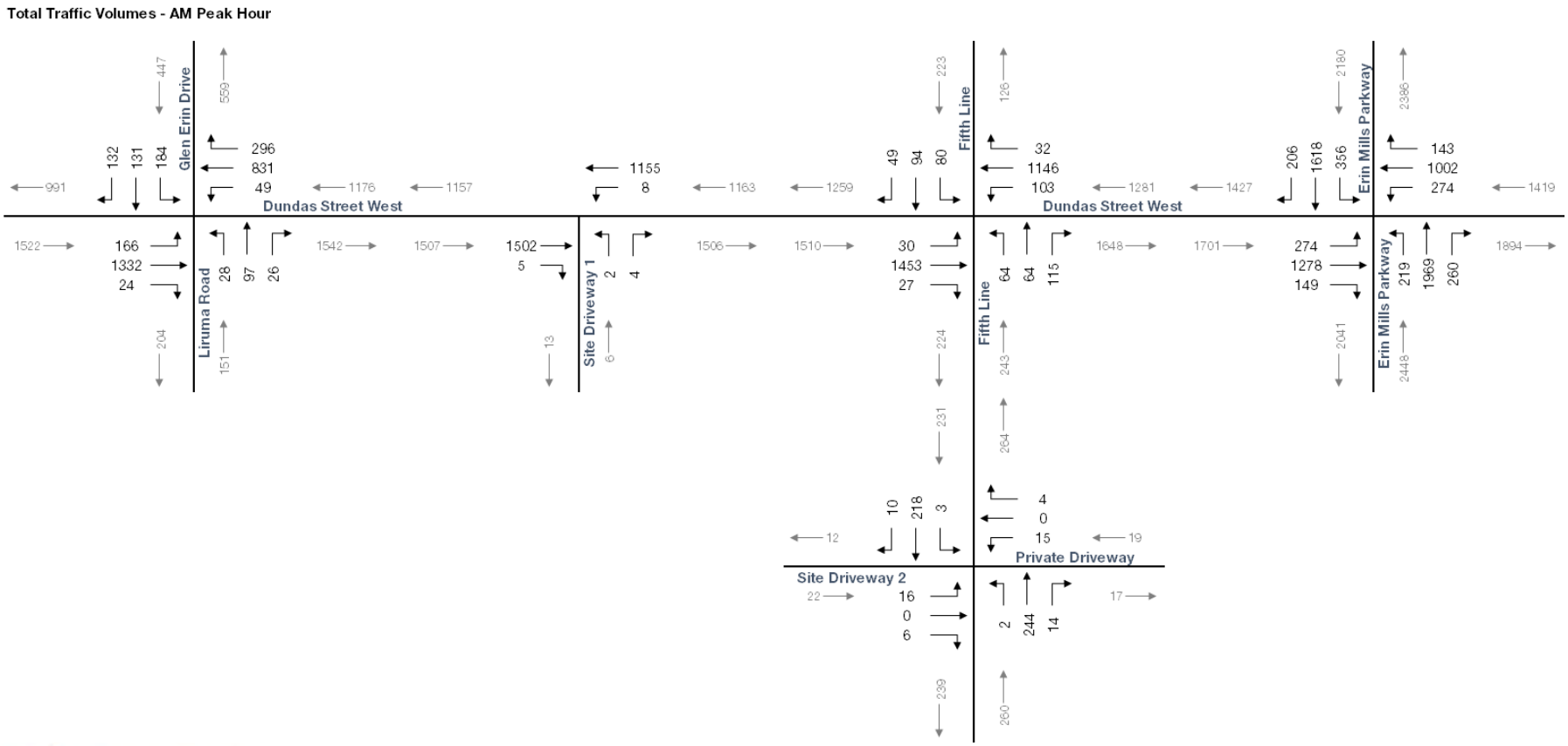
- The intersection of Erin Mills Parkway and Dundas Street West is forecast to continue to operate with high delays during both the AM and PM peak hours with several movements exceeding available capacity.
- The intersection of Dundas Street West and Fifth Line West is forecast to operate within acceptable levels during the AM and PM peak hours, with the exception of the eastbound left turn movement, which will experience slight delays during the PM peak hour.
- The intersection of Dundas Street West and Glen Erin Drive/Liruma Road is forecast to operate within acceptable levels during the AM and PM peak hours, with the exception of the eastbound left turn movement, which will continue to experience slight delays during the PM peak hour.
- The Site Driveways on Dundas Street West and Fifth Line are forecast to operate within acceptable levels of service during both the AM and PM peak hours.

Appendix E provides the detailed Synchro 9.0 operations reports.

TABLE 4.2: TOTAL TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	1 - Dundas Street West & Erin Mills Parkway	TCS	LOS	F	F	C	F	F	D	A	E	F	F	B	F	F	F	B	F	F
			Delay	323	195	22	200	105	54	9	59	81	191	16	163	264	98	11	117	139
			V/C	1.60	1.32	0.32		1.02	0.85	0.24		0.91	1.32	0.45		1.47	1.08	0.37		
			Q	186	360	40		153	206	22		115	366	51		231	271	32		
	2 - Dundas Street West & Fifth Line	TCS	LOS	A	B		B	F	A	A	B	C	D		C	D	C		C	B
			Delay	8	11		11	83	9	2	15	31	36		35	35	27		30	16
			V/C	0.15	0.71			0.91	0.55	0.04		0.32	0.64			0.45	0.47			
			Q	7	119			33	77	3		21	46			25	34			
	3 - Dundas Street West & Glen Erin Drive/Liruma Road	TCS	LOS	B	C		B	A	B	A	B	C	D		D	D	C	B	C	B
			Delay	10	20		19	9	15	2	12	31	48		45	41	34	12	31	19
			V/C	0.46	0.75			0.24	0.49	0.33		0.11	0.59			0.64	0.34	0.47		
			Q	23	164			8	80	13		12	43			54	41	17		
	4 - Dundas Street West & Site Driveway 1	TWSC	LOS				A	B	A		A	C			C					0
			Delay				0	14	1		1	24			24					
			V/C					0.02				0.03								
			Q					0				0								
	5 - Fifth Line & Site Driveway 2	TWSC	LOS		B		B					A	A		A				A	1
			Delay		12		12					8	0		0				0	
			V/C		0.04							0.00								
			Q		0							0								
PM Peak Hour	1 - Dundas Street West & Erin Mills Parkway	TCS	LOS	F	F	B	F	F	F	C	F	E	F	B	F	F	F	B	F	F
			Delay	317	82	20	115	365	191	20	202	57	97	10	87	285	88	17	111	133
			V/C	1.58	0.94	0.44		1.71	1.32	0.51		0.75	1.08	0.28		1.52	1.05	0.48		
			Q	176	211	53		306	435	73		67	265	25		241	278	58		
	2 - Dundas Street West & Fifth Line	TCS	LOS	F	A		B	D	B	A	B	C	C		C	C	C		C	B
			Delay	87	9		13	39	12	3	13	34	33		33	30	34		33	15
			V/C	0.89	0.67			0.69	0.78	0.06		0.38	0.54			0.25	0.49			
			Q	28	97			40	135	5		21	35			15	32			
	3 - Dundas Street West & Glen Erin Drive/Liruma Road	TCS	LOS	F	B		D	A	C	A	C	C	D		D	D	C	B	D	D
			Delay	222	20		53	9	27	3	24	31	50		45	54	31	18	35	38
			V/C	1.38	0.70			0.21	0.87	0.23		0.17	0.64			0.81	0.16	0.67		
			Q	119	151			8	221	11		19	52			70	23	35		
	4 - Dundas Street West & Site Driveway 1	TWSC	LOS				A	B	A		A	D			D					0
			Delay				0	14	0		0	33			33					
			V/C					0.01				0.05								
			Q					0				0								
	5 - Fifth Line & Site Driveway 2	TWSC	LOS		B		B					A	A		A				A	1
			Delay		11		11					8	0		0				0	
			V/C		0.03							0.00								
			Q		0							0								

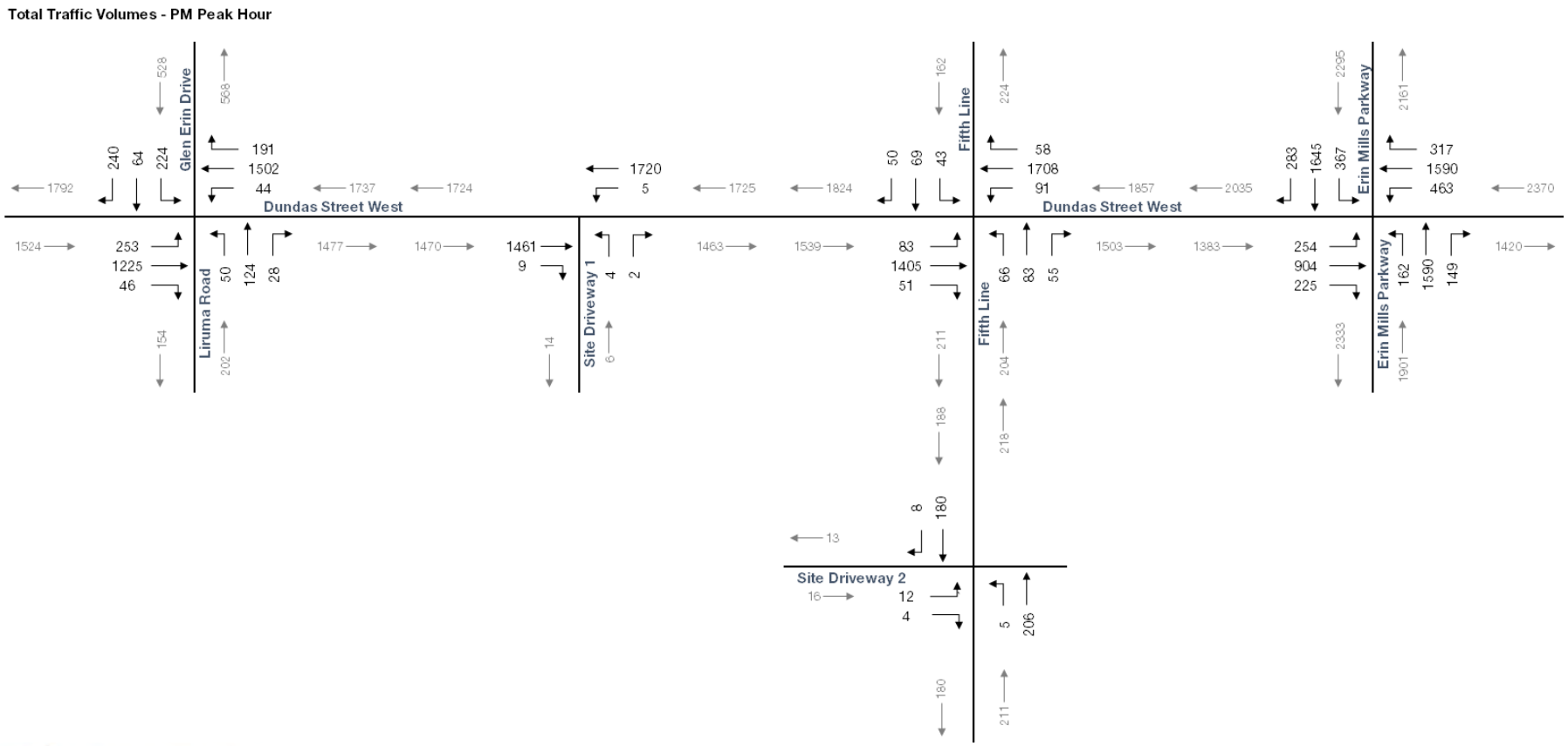
MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds
Q - 95th Percentile Queue Length
TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control
RBT - Roundabout



Forecast Total Traffic – AM Peak Hour

Retirement Facility – 2132 Dundas St W TIS
162410

Figure 4.2a



Forecast Total Traffic – PM Peak Hour

Retirement Facility – 2132 Dundas St W TIS
162410

Figure 4.2b

5 Remedial Measures

The following section examines potential remedial measures, if any, that should be implemented to mitigate the increases in delay resulting from the proposed development of the site.

5.1 Study Area Roads and Intersections

5.1.1 Erin Mills Parkway and Dundas Street West Intersection

The existing conditions analysis in Section 2.3 indicates that several movements at the intersection of Erin Mills Parkway and Dundas Street West are currently experiencing high delays. The high left turning traffic volumes, eastbound through and northbound and southbound through traffic are the primary causes of congestion at this intersection during the AM peak hour. The high left turning traffic volumes, westbound through and northbound and southbound through traffic are the primary causes of congestion at this intersection during the PM peak hour.

The future background conditions analysis in Section 4.2 notes that the Erin Mills Parkway and Dundas Street West intersection is expected to continue to experience significant delays during peak periods under future background conditions. This intersection and/or the area road network will require improvements to accommodate future traffic, even without the site traffic, at an acceptable level of service. Adding the site generated traffic will only increase delay slightly, as shown in Section 4.3. The site traffic will add less than one (1) percent to the total traffic at this intersection. Given that the forecasted site -generated traffic volume is small, this study has not considered remedial measures for the Erin Mills Parkway and Dundas Street West intersection. It is recommended that Region of Peel further monitor this intersection.

5.1.2 Dundas Street West between Erin Mills Parkway and Glen Erin Drive

Typically, the capacity of a regional arterial road is approximately 800 to 900 vph per through lane. The existing conditions in Section 2.3 indicates that Dundas Street West is currently at capacity during the peak periods for the peak flow directions. The future background conditions analysis indicates that that the volume on Dundas Street West will continue to increase and this will further increase the delays to traffic on Dundas Street West. Site traffic will add less than one (1) percent to the estimated future traffic on Dundas Street West. Therefore, no remedial measures are recommended to accommodate the site generated traffic

Similarly, the Dundas Street West intersections with Fifth Line West and Glen Erin Drive/Liruma Road currently operates within acceptable level of service conditions with the exception of peak direction left bound movements at Fifth Line West. This is due to the high traffic volume on Dundas Street West. As the traffic volumes on Dundas Street West increase, the estimated delay

increases. Site generated traffic adds less than one (1) percent of traffic to the estimated future traffic. No improvements are required by the development at the Dundas Street West and Fifth Line West intersection to accommodate the site generated traffic.

5.2 Site Access Provisions

The level of service conditions outlined in Table 4.3 indicate that no intersection capacity-related improvements are necessary to accommodate the site driveway connections to either Dundas Street West or Fifth Line West.

It is recommended that the proposed site driveway connections to Dundas Street West and Fifth Line West operate under stop control. A stop sign (Ra-1) should be installed on the driveway approaches in accordance with the Ontario Traffic Manual Book 5.

5.3 Sight Distances

The site driveway locations currently provide good sight visibility in both directions as the road sections are relatively flat, with no horizontal curves. The center median left lane on Dundas Street West at the site driveway minimizes the conflict between the turning traffic and the through traffic.

6 Transportation Demand Management Plan

The City of Mississauga requests a Transportation Demand Management (TDM) Plan for developments within the City promote transit and active transportation use, and reduces vehicle dependency by encouraging people to take fewer and shorter trips by auto. The plan needs to outline TDM initiatives that that will be incorporated into the development project and proposed steps for future monitoring and evaluation.

6.1 Existing Environment for TDM

The proposed development benefits from several existing attributes and amenities conducive to TDM, including:

- The subject lands are located in a relatively built-out, mature community with access to regularly scheduled public transit and continuous sidewalks providing opportunities for travel by modes other than the automobile.
- A broad range of land uses exist in the immediate vicinity, supporting closer live-work and live-shop relationships conducive to the use of other travel modes.
- Residents of the existing development already tend to travel by modes other than the automobile based on TTS data and the traffic counts collected at the existing site driveways.
- Mississauga Transit provides regular bus service within the study area, with connections to major transit hubs. Bus stops are located within few minutes walking distance.
- Continuous sidewalks within the study area provide connections to the transit, as well as other amenities including the places of worship, Government services and commercial developments.

6.2 Proposed TDM Measures

TDM initiatives are aimed at influencing land use patterns, development design, parking availability and cost, and/or the relative cost, convenience and availability of other travel modes to reduce reliance on motor vehicles. These strategies can be divided into two categories:

- Pre-occupancy: Measures implemented in the design and construction of the development; and
- Post-occupancy: Measures implemented once the development is operating.

Actions taken pre-occupancy can influence how attractive, convenient, and safe travel by modes other than the single-occupant vehicle will be once the site is developed and occupied. At this stage, the site can be designed to better facilitate travel by walking, cycling and transit, while ensuring sufficient vehicle parking is provided to meet but not exceed demand. The City also has greater influence on their implementation than post-occupancy measures.

Offering incentives after the development is completed can influence travel behaviour, but will not be as effective if the site and its surroundings are oriented to travel by automobile. Incentives in this category include subsidies to use transit, provision of trip-end facilities like bicycle racks, and information about where and how to use different travel modes.

The following summarizes the proposed TDM measures for the site, categorized into pre-occupancy and post-occupancy initiatives.

6.2.1 Pre-Occupancy Initiatives

As detailed above, the proposal features a medium density active retirement development and a surrounding environment conducive to the application of TDM measures. The proposed site plan includes several measures designed to help reduce vehicular travel demand generated by the development, including:

- Provision of bicycle parking spaces in preferential locations, including bike racks near entrances;
- Supply 70 parking spaces, 2% less than required by the City's Zoning By-law (72 spaces); and
- Walkway connections to the existing sidewalk on Dundas Street West and Fifth Line West, which links to nearby bus stops and community amenities.

6.2.2 Post-Occupancy Initiatives

Potential measures to pursue post-occupancy include:

- Placement of a bulletin board near the building entrances to provide information about available transportation options. The site superintendent could also be training in this regard;
- Provision of additional weather protected transit shelters should be encouraged; and
- Consideration of arranging for car share vehicles on site to alleviate the need for some individuals to own automobiles.

6.3 Projected Trip Reduction

Section 3.1 summarizes the estimated vehicle trips generated by the proposed development. According to the ITE Trip Generation Manual, the new development is expected to generate an additional 24 trips during the AM peak hour and 23 trips during the PM peak hour. These values were reduced by 5% to reflect TDM measures, primarily for travel by transit, to 21 trips in the morning and afternoon.

Of all potential TDM measures, transit and active transportation represent the most likely opportunities for trip reduction for the proposed development given the proposed use, available transportation infrastructure and programs, and prevailing travel behaviour and culture. Achieving this projected trip reduction will be dependent on continued efforts by the City of Mississauga to invest in and expand these modes of transportation, and to promote a culture less focused on the automobile for travel through TDM initiatives and land use policy.

7 Conclusions & Recommendations

7.1 Conclusions

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

- **Proposed Development**: The proposed development is located on the south west quadrant of Dundas Street West and Fifth Line West. The subject site includes an existing 3-storey long-term care and retirement facility. It consists of 159 units with 88 long-tern care units and 71 retirement units.

  The site plan application proposes a redevelopment of the site with a 5-storey building consisting of 144 retirement dwelling units. The current version of the site plan depicts vehicular access to the site via the two (2) existing driveway connections. The driveway on Fifth Line West will be moved south to provide approximately 90 metres of corner clearance from Dundas Street West as per the City of Mississauga access guidelines. The final siting and configuration of the driveway connections will be subject to approval by City of Mississauga.

  The site plan denotes a total of 70 parking spaces which includes 33 surface level parking spaces and 37 underground garage parking spaces to serve the development.

- **Development Generated Traffic**: The subject site is estimated to generate approximately 53 total vehicle trips during the AM peak hour and approximately 49 total vehicle trips during the PM peak hour. A 5 percent reduction in residential trip generation has been applied to account for transit trips. (Actual additional new trips generated on the roadways is estimated to be about 21 vehicle trips during both the AM and PM peak hours.)

- **Existing Traffic Conditions**: The Erin Mills Parkway and Dundas Street West intersection and the Dundas Street West and Glen Erin Drive/Liruma Road intersection generally defines the study area.

  - The intersection of Erin Mills Parkway and Dundas Street West currently experiences high delays during both AM and PM peak hours with several movements exceeding available capacity.

  - The intersection of Dundas Street West and Fifth Line currently operates within acceptable levels during the AM and PM peak hours, with the exception of the eastbound left turn movement, which experiences slight delays during the PM peak hour.

  - The intersection of Dundas Street West and Glen Erin Drive / Liruma Road currently operates within acceptable levels during the AM and PM peak hours, with the exception of the

eastbound left turn movement, which experiences slight delays during the PM peak hour.

- The existing Driveways on Dundas Street West and Fifth Line currently operate within acceptable levels of service during both AM and PM peak hours.

- **Forecast Background Traffic**: The forecast background traffic volumes in the vicinity of the subject site have been assessed for a five-year horizon, Year 2021. There are no in-stream or recently approved development applications within the study area. The forecast traffic volumes are estimated to consist of a generalized growth rate of 1.0 percent per annum on Dundas Street West and 1.5 percent per annum on Erin Mills Parkway.
- **Background Traffic Conditions**:
  - The intersection of Erin Mills Parkway and Dundas Street West is forecast to continue to operate with high delays during both the AM and PM peak hours with several movements exceeding available capacity.
  - The intersection of Dundas Street West and Fifth Line West is forecast to operate within acceptable levels during the AM and PM peak hours, with the exception of the eastbound left turn movement, which will experience slight delays during the PM peak hour.
  - The intersection of Dundas Street West and Glen Erin Drive/ Liruma Road is forecast to operate within acceptable levels during the AM and PM peak hours, with the exception of the eastbound left turn movement, which will continue to experience slight delays during the PM peak hour.
  - The Site Driveways on Dundas Street West and Fifth Line West are forecast to operate within acceptable levels of service during both the AM and PM peak hours.
- **Total Traffic Conditions**:
  - The intersection of Erin Mills Parkway and Dundas Street West is forecast to continue operate with high delays during both the AM and PM peak hours with several movements exceeding available capacity.
  - The intersection of Dundas Street West and Fifth Line West is forecast to operate within acceptable levels during the AM and PM peak hours, with the exception of the eastbound left turn movement, which will experience slight delays during the PM peak hour.
  - The intersection of Dundas Street West and Glen Erin Drive/ Liruma Road is forecast to operate within acceptable levels during the AM and PM peak hours, with the exception of the

eastbound left turn movement, which will continue to experience slight delays during the PM peak hour.

- The Site Driveways on Dundas Street West and Fifth Line West are forecast to operate within acceptable levels of service during both AM and PM peak hours.

7.2 Recommendations

Based on the findings of this study, the following is recommended with respect to the subject site:

- The proposed site driveway connections to Dundas Street West and Fifth Line West are to operate under stop control. A stop sign (Ra-1) should be installed on the driveway approaches in accordance with the Ontario Traffic Manual Book 5.

No other roadway or traffic control improvements are required or recommended at this time to accommodate the future site traffic within the study area.

Appendix A

Existing Count Data

Appendix B

Existing Traffic Operational Conditions

Appendix C

TTC Mode of Choice Data for subject site

Appendix D

Background Traffic Operational Conditions

Appendix E

Total Traffic Operational Condition