TRAFFIC IMPACT STUDY

Proposed Residential Development
2935 & 2955 Mississauga Road
City of Mississauga, ON

February 2021

Prepared for
590816 Ontario Inc.

c/o Harper Dell & Associates Inc.

TRANS-PLAN
Transportation Engineering

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February 8, 2021

590816 Ontario Inc.

c/o Mr. Nicholas Dell, BA.H
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Mississauga, ON L5G 3H4

Re: 2935 & 2955 Mississauga Road, Mississauga, Ontario, Proposed Residential Development, Traffic Impact Study

TRANS-PLAN is pleased to submit this Traffic Impact Study, which includes a review of existing and future traffic in the study area, and a Transportation Demand Management strategy for the proposed development. This report has been prepared in support of the proposed residential development located at 2935 and 2955 Mississauga Road in the City of Mississauga.

Our traffic impact study findings indicate that the proposed full-moves access can support the proposed development and no other roadway improvements are required to support the subject site within the study area.

The site access is expected to operate well and will have sufficient sight distance for safe turning manoeuvres. The access properly allows the circulation of design vehicles without conflict.

The Transportation Demand Strategy discusses existing and future alternative modes of travel within the study area and recommendations to inform residents of the alternative options available to them.

Sincerely,

Anil Seegobin, P.Eng.
Partner, Engineer

Trans-Plan Transportation Inc.
Transportation Consultants

Charles Chung, EIT
Traffic Analyst

Table of Contents

List of Tables

List of Figures

1. INTRODUCTION

Trans-Plan has been retained by 590816 Ontario Inc. to provide traffic consulting services for a proposed residential development located at 2935 & 2955 Mississauga Road, in the City of Mississauga. This report includes the following study components:

Traffic Impact Study

- a review and assessment of the existing road network
- an assessment of future background conditions based on anticipated traffic growth, area developments and planned transportation improvements in the study area
- an assessment of the impact of site-generated traffic on the study area intersections and proposed boundary roadway connections under future traffic conditions
- recommendations of roadway and intersection improvements, as required, to accommodate the proposed development and mitigate any identified traffic impacts on the boundary roadways

Site Plan Review

- a site access review was completed to discuss the access design, location and grading for the proposed development
- a sight distance review was conducted at the proposed site access, based on TAC 2017 guidelines, for vehicles exiting the access onto Mississauga Road
- a review of the internal layout and the circulation for passenger vehicles, loading and waste collection vehicles on the site plan

Transportation Demand Management Strategy

- A review of existing and future TDM opportunities near the study area
- Recommendations of various TDM measures for the site to encourage a reduction in single-occupant auto vehicle trips and auto parking demands

Prior to commencing this study, Transportation staff at the City of Mississauga were provided a study Terms of Reference and contacted to further discuss our scope and methodology (see Appendix A).

2. SITE LOCATION

The site location, shown in Figure 1, is municipally known as 2935 & 2955 Mississauga Road, in the City of Mississauga. The site is located on the southeast quadrant of the Dundas Street West and Mississauga Road intersection. The subject land is currently vacant and consists of green space.

Surrounding land uses in the study area are mainly residential areas consisting of single-detached homes. North of the subject site is the University of Toronto Mississauga (UTM) campus.

3. PROPOSED DEVELOPMENT

A site plan of the proposed residential development, prepared by Caricari Lee Architects, is provided in Figure 2. The proposed development includes a 12-storey condominium building, with 187 residential

units, and a 3-storey stacked townhouse dwelling, with 20 units, for a total of 207 residential units for the development.

Parking is provided on site, via three levels of underground parking (P1, P2, and P3) for a total of 312 parking spaces for the development.

Access to the site is proposed through a full-moves access on Mississauga Road, with an internal cul-de-sac leading to the underground parking garage entrance, drop-off / pick-up area, and loading area.

4. EXISTING CONDITIONS

4.1 Road Network

The boundary roadways located in the study area are described as follows:

Dundas Street West is a major arterial road under the jurisdiction of the City of Mississauga. The roadway generally runs in an east-west direction, with five travel lanes: two per direction and a centre turn lane. The posted speed limit is 60km/h within the vicinity of the site.

Mississauga Road is a major collector road under the jurisdiction of the City of Mississauga. The roadway generally runs in a north-south direction, with two travel lanes: one per each direction. The speed limit is 50km/h within the vicinity of the site.

Dundas Street West forms a signalized intersection with Mississauga Road, with auxiliary turn lanes provided on all approaches and a channelized westbound right turn lane.

The existing roadway configuration, used for the traffic analysis, is shown in Figure 3.

4.2 Traffic Counts

To determine existing operating conditions in the study area, Trans-Plan conducted a site visit and obtained Turning Movement Counts (TMCs) where counts were not readily available or current from the City of Mississauga.

A summary of the count date, count hours and peak hours obtained for each intersection counted is shown in Table 1. Detailed TMC data, obtained from Spectrum Traffic Data, and current signal timing plans, provided by the City, are provided in Appendix B. Peak hour factors (PHF) for the local road network were obtained by calculating from the hourly traffic count data. The PHF is calculated by dividing the peak hour volume with the maximum 15-minute volume (within the peak hour) multiplied by 4.

Table 1 – Intersection Turning Movement Count Details

Intersection	Count Date	Count Hours	Peak Hours
Mississauga Road & Dundas Street West	Wednesday February 5, 2020	7:00am – 10:00am 4:00pm – 7:00pm	8:00am – 9:00am 4:45pm – 5:45pm

The existing traffic volumes for the weekday AM and PM peak hour are shown in Figure 4.

4.3 Transit Service

The site is served by MiWay Transit, connecting transit riders to major locations and transit connections within the City and to the Toronto Transit Committee (TTC). MiWay Transit operates the following bus routes within the study area:

MiWay Route 1/1C, Dundas is mainly an east-west transit route operating along Dundas Street, between the Islington TTC Subway Station and Winston Churchill Boulevard. Route 1C connects riders to the UTM campus. The route operates continuously, with peak frequencies of 20 minutes during peak weekday periods. The nearest eastbound stop is located along Dundas Street West, approximately 100m west of Mississauga Road.

MiWay Express Route 101/101A, Dundas operates similarly to Route 1/1C, travelling east-west along Dundas Street, between the Islington TTC Subway Station and Winston Churchill Boulevard. Route 101 connects riders to the UTM campus while Route 101A continues along Dundas Street to Winston Churchill Boulevard. The route operates with peak frequencies of approximately 10 minutes during peak weekday periods. However, the nearest bus stop for this route is located at UTM or at the Erin Mills Parkway intersection to the west of the subject site, both of which are an approximate 1km walk from the subject site. If residents are willing to travel further to these locations, additional transit connections are provided to connect throughout the City.

Details for the transit routes and nearest bus stops to the site are shown in Table 2. Figure 5 shows the transit provided within the study area.

Table 2 – Transit Service in the Study Area

Route	No.	Nearest Bus Stop to the Site	Approximate Service Times	Approximate Peak Service Frequency (min)	
			Weekdays	AM	PM
Dundas	1/1C	Dundas Street & Mississauga Road	4:00am – 3:23am	20	20
Dundas Express	101/ 101A	University of Toronto Mississauga Campus	4:42am – 9:48pm	10	10

Source: MiWay Transit Schedules and Maps

5. FUTURE BACKGROUND CONDITIONS

Future background traffic volumes were determined based on a review of planned developments, road improvements and future traffic volume growth in the study area.

5.1 Background Growth Rate

Through correspondence with the City of Mississauga, the following growth rates were provided for the use in this study. The provided rates incorporate background developments and is projected for a five-year horizon (TMC year 2020 to 2025).

Table 3 – Compounded Annual Roadway Growth Rates

Study Roadway	Travel Direction	AM Peak Hour	PM Peak Hour
Mississauga Road	Northbound	0.0%	1.0%
	Southbound	0.5%	0.5%
Dundas Street West	Eastbound	0.0%	1.0%
	Westbound	0.5%	1.0%

The future five-year horizon background traffic volumes, for the weekday AM and PM peak hours are provided in Figure 6.

5.2 Planned Roadway and Transit Improvements

Based on the City of Mississauga roadway / sidewalk works, Dundas Street West, east of Mississauga Road, is to undergo road rehabilitation for the cycling program in 2024. This is in part of the City's Cycling Master Plan which has proposed a cycling connection along Dundas Street West.

The Dundas Connects Master Plan is a long-term project along the entirety of Dundas Street throughout the City of Mississauga. Dundas Street is identified as a major arterial and an intensification corridor. The Dundas Connects project is envisioned to provide higher order transit through a bus rapid transit (BRT) corridor and improved pedestrian and cyclist connections. The right-of-way along Dundas Street has been widened to protect for the future roadway improvements while redevelopment of properties occurs. Dundas Street is envisioned to remain as a four-lane roadway for vehicles.

6. SITE TRAFFIC

6.1 Trip Generation

Site trips for the proposed residential and retail components of the site were generated using the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition. The ITE Land Use Code (LUC) 221 for Multifamily Housing (Mid-Rise) was utilized for trip rates. The site trip generation for the subject site is shown in Table 4.

Table 4 – Site Trip Generation

Land Use		Weekday AM Peak Hour			Weekday PM Peak Hour		
		In	Out	Total	In	Out	Total
Residential Condominium	Units: 207						
ITE Code 221	Distribution	26%	74%	100%	61%	39%	100%
Multifamily Housing	Equation	Ln(T)= 0.98Ln(X)-0.98			Ln(T)= 0.96Ln(X)-0.63		
(Mid-Rise)	Rate	0.09	0.25	0.34	0.26	0.17	0.43
	Trips	**18**	**52**	**70**	**54**	**35**	**89**

The subject site is expected to generate 70 and 89 new two-way trips in the weekday AM and PM peak hour, respectively.

6.2 Trip Distribution and Assignment

Site trips for the proposed development (residential uses) were distributed to / from the site and the boundary roadways using 2016 TTS data and existing travel patterns. Details are provided in Appendix C.

The resulting trip distribution for auto driver trips travelling from the City of Mississauga, 2006 GTA Zone 3650, to surrounding municipalities in the morning and returning in the evening peak periods is shown below in Table 5.

Table 5 – Site Trip Distribution

		North 31%		
West	18%		37%	East
		14% South		

Based on the TTS data, the majority of trips within the ward travel north or east, going to other locations within Mississauga or the City of Toronto. Major travel routes such as the Queen Elizabeth Way ramps were considered, with the closest ramp connections to the subject site are south along Mississauga Road. Although most trips expected to travel further from Mississauga are expected to use these ramps, the majority of site trips were assigned to travel along Dundas Street West as the major arterial road within this study.

The site traffic assignment for the weekday AM and PM peak hours are shown in Figure 7.

7. FUTURE TOTAL TRAFFIC CONDITIONS

Site traffic volumes were added to the future background traffic volumes to obtain future total traffic volumes for the weekday AM and PM peak hours, which are shown in Figure 8.

8. CAPACITY ANALYSIS

A capacity analysis was performed for the study area roadways using Synchro analysis software. The capacity analysis results of the weekday AM and PM peak hours are shown in Table 6. Capacity Analysis Sheets and Level of Service (LOS) Definitions are provided in Appendix D and Appendix E, respectively.

According to the City of Mississauga Traffic Impact Study guidelines, a volume-to-capacity (v/c) ratio of 0.85 or less is considered acceptable for signalized intersections, and a v/c of 0.90 or less is acceptable for exclusive turning movements.

Dundas Street West & Mississauga Road

Under existing conditions, during the weekday AM peak hour, the intersection operates at an overall acceptable LOS of D and a v/c ratio of 0.81 with average delays of 50 seconds. The southbound left movement operates overcapacity with a v/c of 1.45 and an LOS of F. All other movements operate with reserve capacity, with a v/c of 0.88 or less. During the weekday PM peak hour, the intersection operates at an overall acceptable LOS of D and a v/c ratio of 0.69 with average delays of 36 seconds. Similar to the AM peak hour, the southbound left movement operates overcapacity with a v/c of 1.01 and an LOS of F.

All other movements operate with reserve capacity. Traffic observations at the intersection noted that it took more than one signal cycle for vehicles to make southbound left turning manoueuvres.

Under future conditions, during the weekday AM peak hour, the intersection is expected to continue to operate at an overall acceptable LOS of D and a v/c ratio of 0.97 with average delays of 52 seconds. The southbound left movement is expected to continue to operate overcapacity with a v/c of 1.50 and an LOS of F. All other movements operate with reserve capacity, with a v/c of 0.90 or less. During the weekday PM peak hour, the intersection is expected to continue to operate at an overall acceptable LOS of D and a v/c ratio of 0.77 with average delays of 40 seconds. The southbound left movement is expected to continue to operate overcapacity with a v/c of 1.08 and an LOS of F. All other movements operate with reserve capacity, with a v/c of 0.90 or less.

Due to the similar operating capacities between the existing and future conditions, the subject site is not expected to create any significant traffic impacts on the study area roadways. Additionally, site traffic would not directly add any additional vehicular traffic to the critical southbound left movement.

Through the City's Dundas Connects project, higher level studies could be completed to consider options to improve traffic operations at this intersection, along with increasing alternative modes of travel usage. With improved transit infrastructure along Dundas Street, transit ridership would increase and assist in alleviating vehicular traffic within the study area. While the number of vehicle lanes is expected to remain the same, signal timing optimizations can be considered to provide further green time for southbound left turning vehicles. Due to the high v/c ratio for the southbound turning movement during the weekday AM peak hour, it may be expected for vehicles to continue to wait additional signal cycles prior to making the turning movement.

Mississauga Road & Proposed Site Access

Under future conditions, the exiting traffic at the proposed site access is expected to operate well, with an acceptable LOS of C and delays of 20 seconds. Trans-Plan has no concerns with the traffic operations of the proposed site access location on Mississauga Road.

Table 6 - Capacity Analysis Results

Intersection	Existing Traffic Conditions						Future Background Traffic Conditions						Future Total Traffic Conditions					
Movement	AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
Dundas Street West & Mississauga Road	**0.81**	**50**	**D**	**0.69**	**36**	**D**	**0.82**	**50**	**D**	**0.73**	**39**	**D**	**0.97**	**52**	**D**	**0.77**	**40**	**D**
Eastbound Left	0.78	25	C	0.74	31	C	0.79	27	C	0.82	48	D	0.80	27	C	0.79	47	D
Eastbound Through	0.88	35	C	0.68	25	C	0.88	35	C	0.72	26	C	0.90	36	D	0.73	27	C
Eastbound Right	0.06	15	B	0.06	15	B	0.06	15	B	0.06	15	B	0.07	16	B	0.07	16	B
Westbound Left	0.47	29	C	0.39	19	B	0.48	29	C	0.44	21	C	0.49	29	C	0.57	24	C
Westbound Through	0.48	24	C	0.68	27	C	0.49	25	C	0.73	30	C	0.49	24	C	0.75	31	C
Westbound Right	0.27	22	C	0.45	23	C	0.28	22	C	0.48	25	C	0.28	21	C	0.49	26	C
Northbound Left	0.26	36	D	0.29	38	D	0.28	37	D	0.30	38	D	0.32	37	D	0.33	38	D
Northbound Through	0.76	57	E	0.59	50	D	0.76	57	E	0.61	50	D	0.79	58	E	0.61	50	D
Northbound Right	0.19	42	D	0.16	43	D	0.19	42	D	0.17	43	D	0.25	43	D	0.20	43	D
Southbound Left	**1.45**	**273**	**F**	**1.01**	**108**	**F**	**1.45**	**273**	**F**	**1.08**	**129**	**F**	**1.50**	**296**	**F**	**1.08**	**129**	**F**
Southbound Through	0.66	52	D	0.72	56	E	0.67	52	D	0.73	56	E	0.73	56	E	0.78	61	E
Southbound Right	0.13	42	D	0.46	48	D	0.14	42	D	0.51	48	D	0.14	44	D	0.54	50	D
Mississauga Road & Proposed Site Access																		
Westbound Left														19	C		20	C
Westbound Right														12	B		11	B
Northbound Through / Right														0	A		0	A
Southbound Left / Through														1	A		1	A

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9. SITE PLAN REVIEW

9.1 Site Access Review

The proposed site access is located approximately 210m south from the Dundas Street West and Mississauga Road intersection. Mississauga Road currently provides a continuous guard rail fronting the subject site. The proposed access provides one inbound lane and two outbound lanes which are separated by a median, with the lanes connecting to the internal cul-de-sac. Table 7 provides the access dimensions.

Table 7 – Site Access Geometrics

Inbound Width	Outbound Width	Median Width	Curb Radii	Sidewalk Width	Access Width at Property Line	Access Width at Road Connection
6m	7m (Two 3.5m lanes)	2.5m	9m	2m	20m	38m (guard rail adjustment)

Although the inbound access width is larger than a typical driveway access, the proposed width allows for a good connection to the proposed internal one-way cul-de-sac. The cul-de-sac is necessary to provide for safe vehicular circulation and safe pedestrian connectivity to the stacked townhouses on the south side of the property.

The 9m curb radii allows for a wider width at the road connection to allow for safe turning movements of large vehicles and allows a longer sight distance as there would be less obstructions between vehicles travelling along Mississauga Road and at the site access.

The existing guard rail would be required to be readjusted to provide for the proposed site access. Approximately 38m of the guard rail would be required to be removed along the site access.

Based off the City of Mississauga Engineering and Works Department, drawing C-21165 from 1985 was referred to review the elevations along Mississauga Road (see Appendix F). The subject site access is approximately between Stations 0+200 to 0+220, resulting in a grade of 2.5%, which meets the City guidelines for a stop intersection for a local residential road.

The following sections discuss in further detail the available sight distances at the access location and the site circulation of vehicles along the driveway and internal cul-de-sac.

9.2 Sight Distance Review

A driver sight distance review was conducted to measure the available sight distance for the proposed driveway at Mississauga Road. A field visit and driver sight distance measurements were conducted by Trans-Plan staff.

Minimum stopping and intersection sight distance requirements were obtained from the Table 9.9.4 & Table 9.9.6, Transportation Association of Canada (TAC) Manual, based on a design speed of 60 km/h for Mississauga Road (based off the speed limit of 50km/h). Details of the review are summarized in Table 8. Photographs taken from the proposed driveway location are provided in Appendix G, with measurements obtained from 1m behind from the Mississauga Road roadway.

Table 8 – Sight Distance Review Summary

Location	Direction	Available Sight Distance (m)	Criteria	Required Sight Distance (m)	Requirement Met?
Proposed Mississauga Road Driveway (1m behind roadway)	North	~120	SSD	85	No
			Design	130	
	South	~135	SSD	85	Yes
			Design	130	

Source: TAC 2017 Table 9.9.4 & Table 9.9.6

The available sight distance looking north and south along Mississauga Road is approximately 120m and 135m, respectively, with no obstructions blocking the view until the adjacent intersections.

Although the available sight distance of 120m looking north is slightly below the required 130m, this is mainly due to the road curvature and existing vegetation at the subject site. As the property develops and vegetation is removed, vehicles exiting the site and southbound vehicles are expected to have clear sight of each other to meet safe sight distance requirements, especially as vehicles at the access inch closer towards the roadway. As discussed, the wider access would also allow for less obstructions for improved vehicle sight lines.

9.3 Site Circulation Review

A site circulation review was completed using AutoTurn vehicle turning template software to demonstrate design vehicles properly entering and exiting the site, and utilizing the proposed loading area.

Figure 9 demonstrates a 10.2m waste collection vehicle entering the site, circulating the cul-de-sac, reversing into the loading area, and exiting the site. During waste collection pick-up, it is expected that management staff would ensure the safe reversing manoeuvre of the waste collection vehicle for passenger vehicles and pedestrians utilizing the cul-de-sac.

Figure 10 demonstrates a loading vehicle, represented by a TAC medium single-unit (MSU) vehicle, performing similar manoeuvres as the waste collection vehicle. The loading vehicle circulates the cul-de-sac and reverses into the loading area without conflict. A management staff member / flag person is recommended to ensure the safe reversing manoeuvre when entering the loading area.

Figure 11 demonstrates 5.2m passenger vehicles utilizing the access to the underground parking garages. The figure demonstrates that two-way traffic for vehicles entering and exiting the ramp can operate without conflict.

In addition to the recommended flag person for safe vehicle circulation on-site, it is recommended that loading and waste collection activities are scheduled during off-peak hours and on separate days to reduce conflict at the loading area and within the site.

Based on our review of the site access design and traffic impacts, Trans-Plan is of the opinion that the proposed site access location and dimensions are appropriate to provide for the 207-unit residential development.

10. TRANSPORTATION DEMAND MANAGEMENT PLAN

A Transportation Demand Management (TDM) Plan is provided as part of this report in an effort to minimize parking demands, traffic congestion, improve air quality, reduce greenhouse gas emissions, and improve public health in the long-term within the City of Mississauga. The plan will help provide the public greater choice, incentives and opportunities to choose travel modes other than single-occupant vehicles. Our proposed TDM plan for the site is outlined as follows:

Transit Services

As discussed in Section 4.3, the subject site is well served by Miway Route 1/1C, with all day service along Dundas Street with peak headways of 20 minutes. The bus stop is located at the adjacent Dundas Street West and Mississauga Road intersection, connected with existing pedestrian sidewalks. The long-term Dundas Connects project would further improve transit infrastructure along Dundas Street through bus rapid transit.

Increasing public transit use has many benefits such as protecting the environment, reducing traffic congestion on Regional roads, providing convenience, saving energy, strengthening communities, and improving liveability. To encourage travel by transit, transit information packages containing route maps, schedules and other useful information should be readily available for tenants within an accessible location, such as the entrance lobby. Additionally, pre-loaded PRESTO cards may be considered to be provided so tenants may grow accustomed to travel by transit to and from the subject site.

Cycling / Walking

Existing pedestrian sidewalks are provided on both sides of Dundas Street West and the west side of Mississauga Road. Dedicated cycle lanes are currently provided on both sides of Mississauga Road. The City's 2018 Mississauga Cycling Master Plan proposes bicycle lanes along Dundas Street West, and facility upgrades along Mississauga Road. The City's roadway works indicates that construction for the bicycle lanes on the north side of Dundas Street West is to commence in 2024.

Encouraging more people to cycle, especially for utilitarian purposes, would result in taking more cars off the road during peak hours, helping to reduce traffic congestion, and is more environmentally friendly. While the City of Mississauga currently does not enforce bicycle parking requirements within its zoning by-law, the subject site is proposing 76 long-term bicycle parking spaces on the ground floor of the 187-unit condominium.

A pedestrian connection is provided within the site, circulating the cul-de-sac and providing access to the condominium and townhouses. The subject site provides a pedestrian connection to Mississauga Road.

Communication Strategy

To inform residents and visitors of the subject site of the alternative modes of travel available within the area, information packages should be provided and available at the lobby area. The information packages can include the following:

- City of Mississauga Cycling Map
- Miway Transit Map and Route Schedules

This information package will inform residents of the alternative modes of travel available in the study area.

11. CONCLUSIONS AND RECOMMENDATIONS

This Traffic Impact Study for the proposed residential development located at 2935 & 2955 Mississauga Road in the City of Mississauga is summarized as follows:

Traffic Impact Study

- The proposed development includes a 12-storey condominium building, with 187 residential units, and a 3-storey stacked townhouse dwelling, with 20 units, for a total of 207 residential units for the development. 312 parking spaces are provided through three levels of underground parking. Access to the site is proposed through a full-moves access along Mississauga Road.
- Although there are no roadway improvements proposed, Dundas Connects is a long-term project that envisions to improve transit infrastructure with bus rapid transit and improve pedestrian and cycling connectivity along Dundas Street.
- Based on the ITE Trip Generation Manual, 10th Edition, the 207-unit residential development is expected to generate 70 and 89 new two-way trips during the weekday AM and PM peak hour.
- The traffic analysis demonstrates that the Dundas Street West and Mississauga Road intersection is expected to continue to operate with reserve capacity and an acceptable LOS of D under future conditions. The southbound left movement is expected to operate overcapacity during the weekday AM and PM peak hour, which is an existing condition as well.
- Trans-Plan's opinion is that the proposed development and site access location is appropriate due to the minimal site traffic generated and does not directly impact the critical southbound turning movement. The subject site is not expected to significantly impact the roadway traffic volumes.

Site Plan Review

- A review of the site access dimensions was completed, with the review indicating that the proposed access widths and location are appropriate to support the 207-unit residential development. The lane widths connect to the internal cul-de-sac to allow for safe turning manoeuvres within the development. Approximately 38m of the continuous guard rail along Mississauga Road must be adjusted to allow for the site access.
- A sight distance review was conducted at the proposed access location along Mississauga Road. While there is sufficient sight distance looking south from the site access, the road curvature and existing vegetation hinder the sight looking north. Once the site is developed and the vegetation at the site access location is removed, sufficient sight is expected to be provided between the southbound vehicles and exiting vehicles.
- A site circulation review was completed, demonstrating the proper circulation and use of the loading area for a waste collection vehicle and loading vehicle. It is recommended that a trained staff member / flag person is on-site to ensure safe reversing manoeuvres and loading and waste collection should be scheduled during the off-peak and separate times to ensure minimal conflict.

- Passenger vehicles have also been shown utilizing the underground ramp, demonstrating that two-way traffic at the underground access operates without conflict.

Transportation Demand Management Plan

- The subject site is well served by transit, and the Dundas Connects project is to further improve transit infrastructure and pedestrian / cycling connections along Dundas Street.
- Sidewalks are provided throughout the study area, with existing cycle lanes along Mississauga Road. Pedestrian connections are to be provided within the site to connect with Mississauga Road and the building entrances.
- To encourage cycling, 76 long-term bicycle parking spaces are proposed on the ground floor of the condominium.
- To introduce residents at the site to travel by alternative modes of travel, information packages containing transit and cycling maps should be provided at the entrance lobby.

In conclusion, the subject site is expected to cause minimal impact to the traffic operations of the surrounding study area intersections due to the minimal traffic expected. The proposed site access is expected to operate well, with safe sight distance once existing vegetation is removed as development occurs. The proposed cul-de-sac is designed to properly accommodate turning movements of larger vehicles and the loading area can be properly utilized.

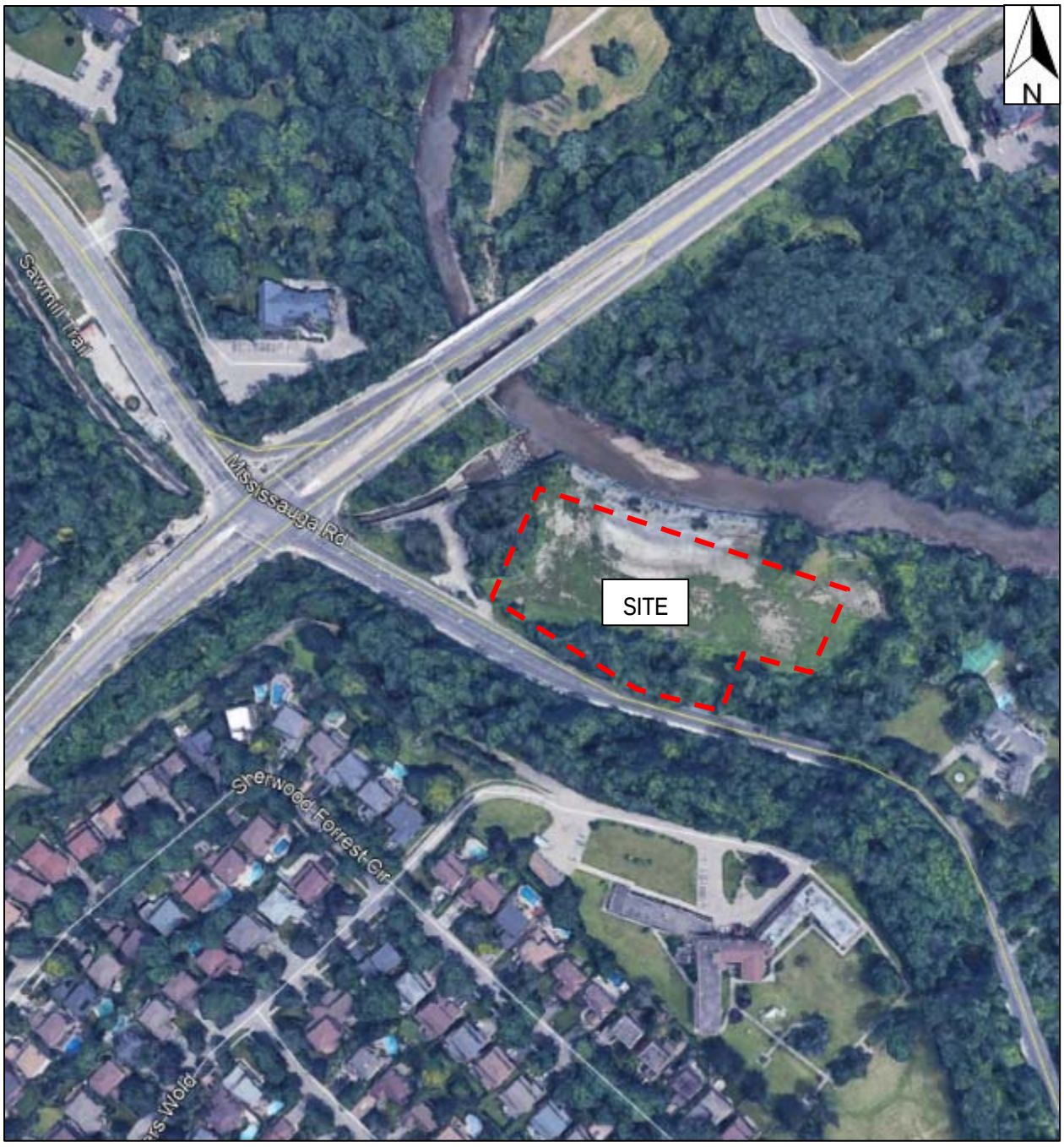
Respectfully submitted,

Anil Seegobin, P.Eng.
Partner, Engineer

Charles Chung, EIT
Traffic Analyst

Trans-Plan Transportation Inc.
Transportation Consultants

Figure 1 – Site Location



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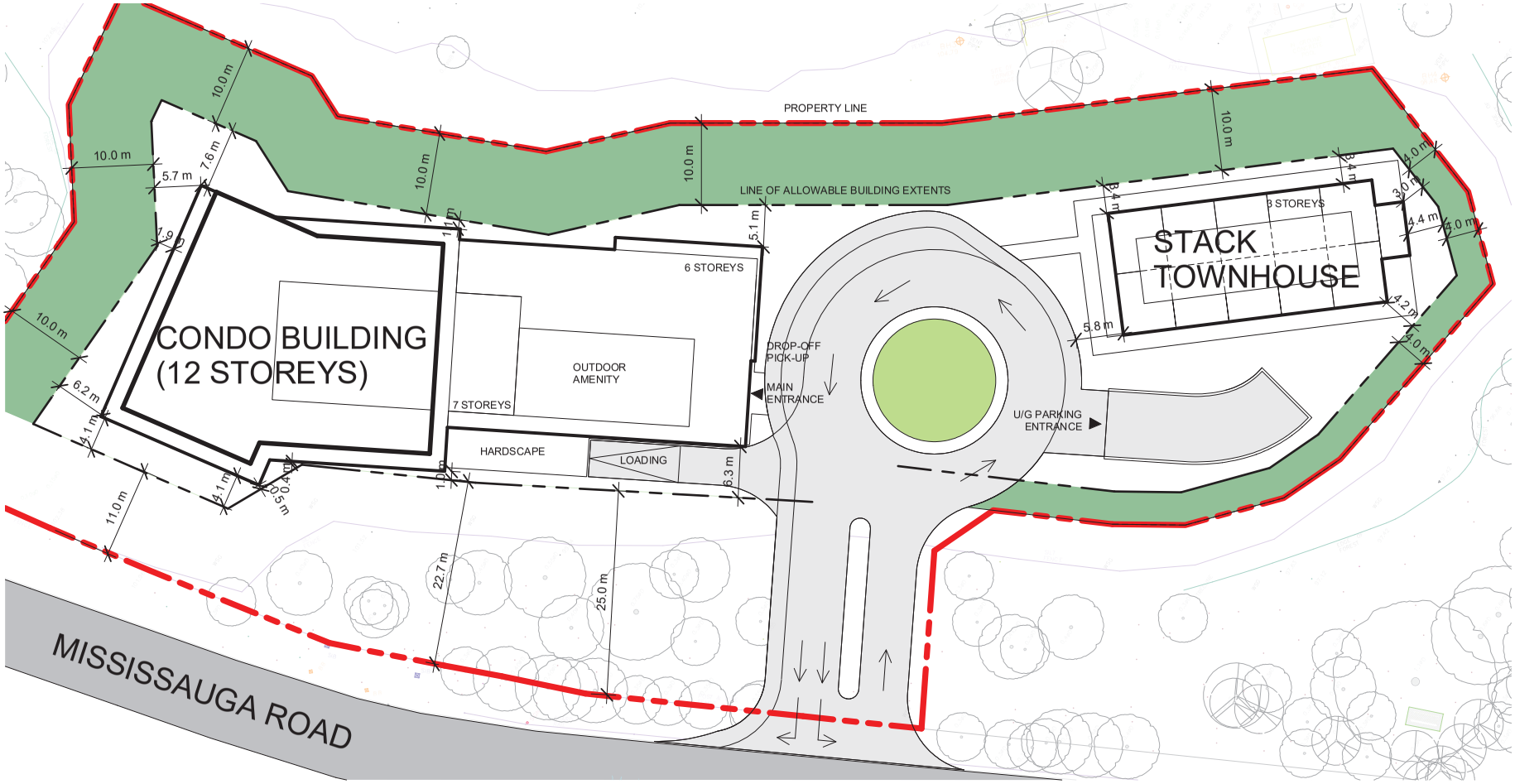

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PROPOSED MIXED-USE RESIDENTIAL

SITE PLAN

2935 & 2955 Mississauga Road, Mississauga

April 7, 2020

A1.1

Figure 3: Existing Study Area Roadway Characteristics

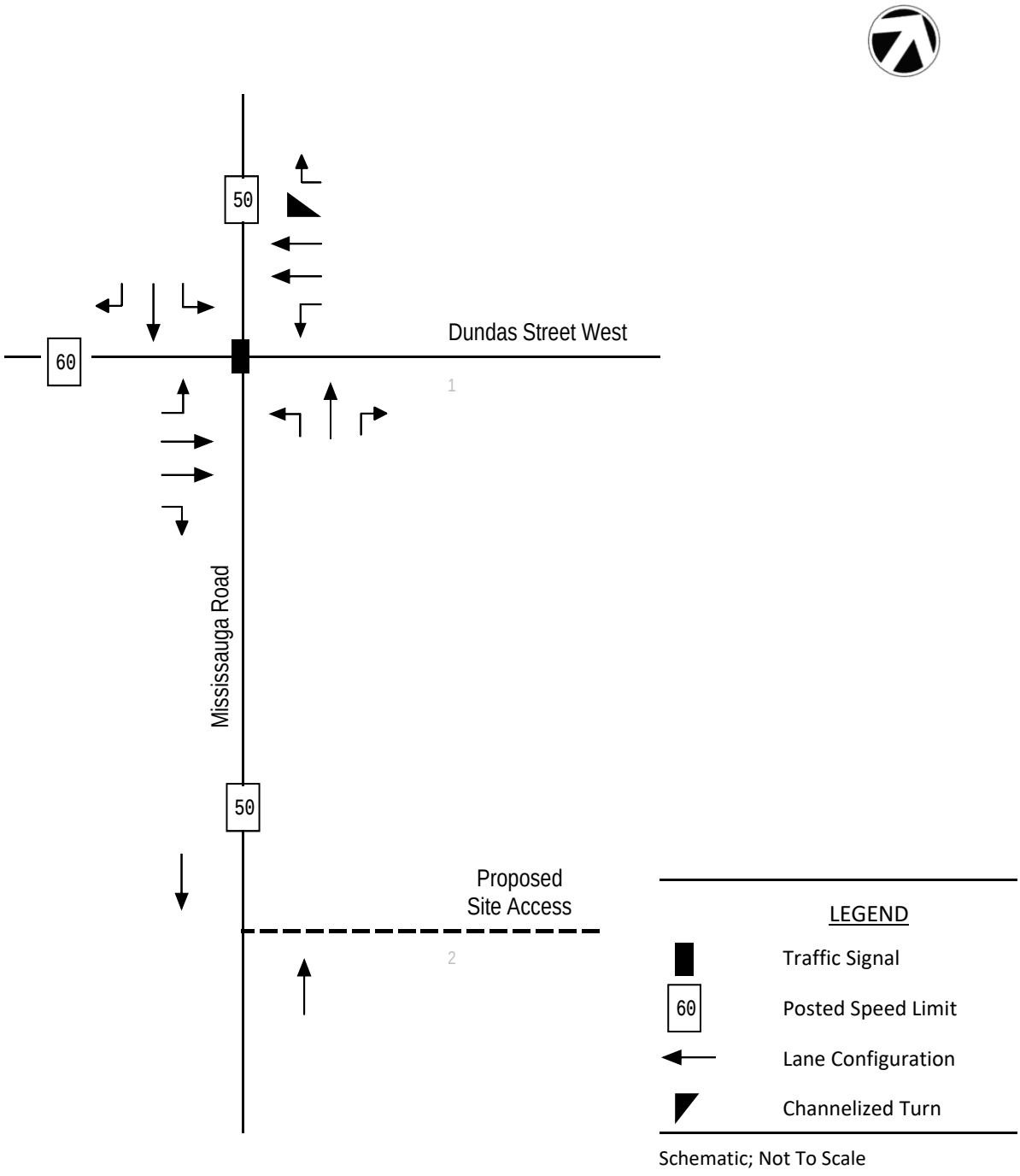


Figure 4: Existing Traffic Volumes, Weekday AM and PM Peak Hours

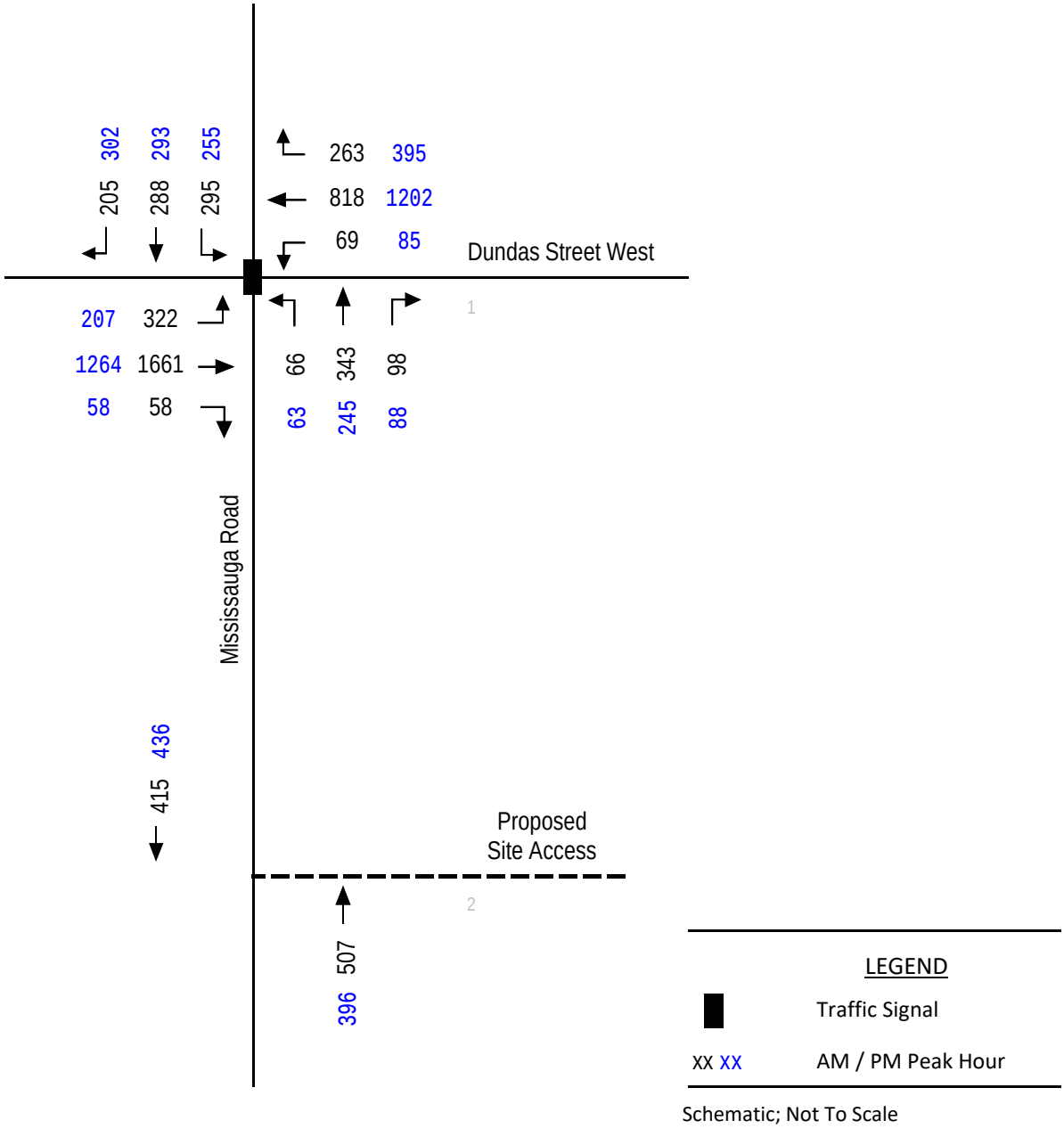
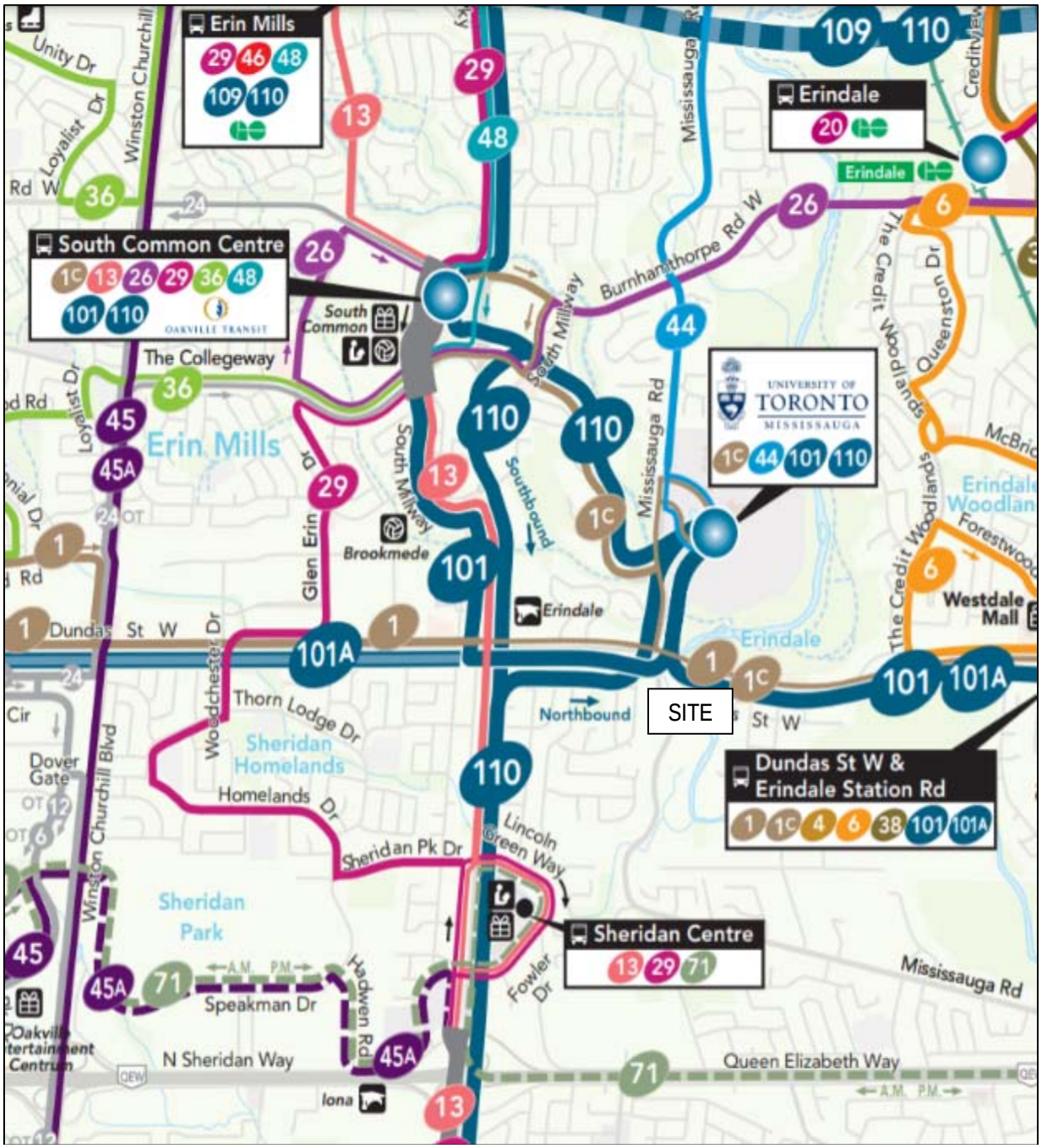


Figure 5 – Study Area Transit Service



Source: MiWay Transit System Map

Figure 6: Future Background Traffic Volumes, Weekday AM and PM Peak Hours

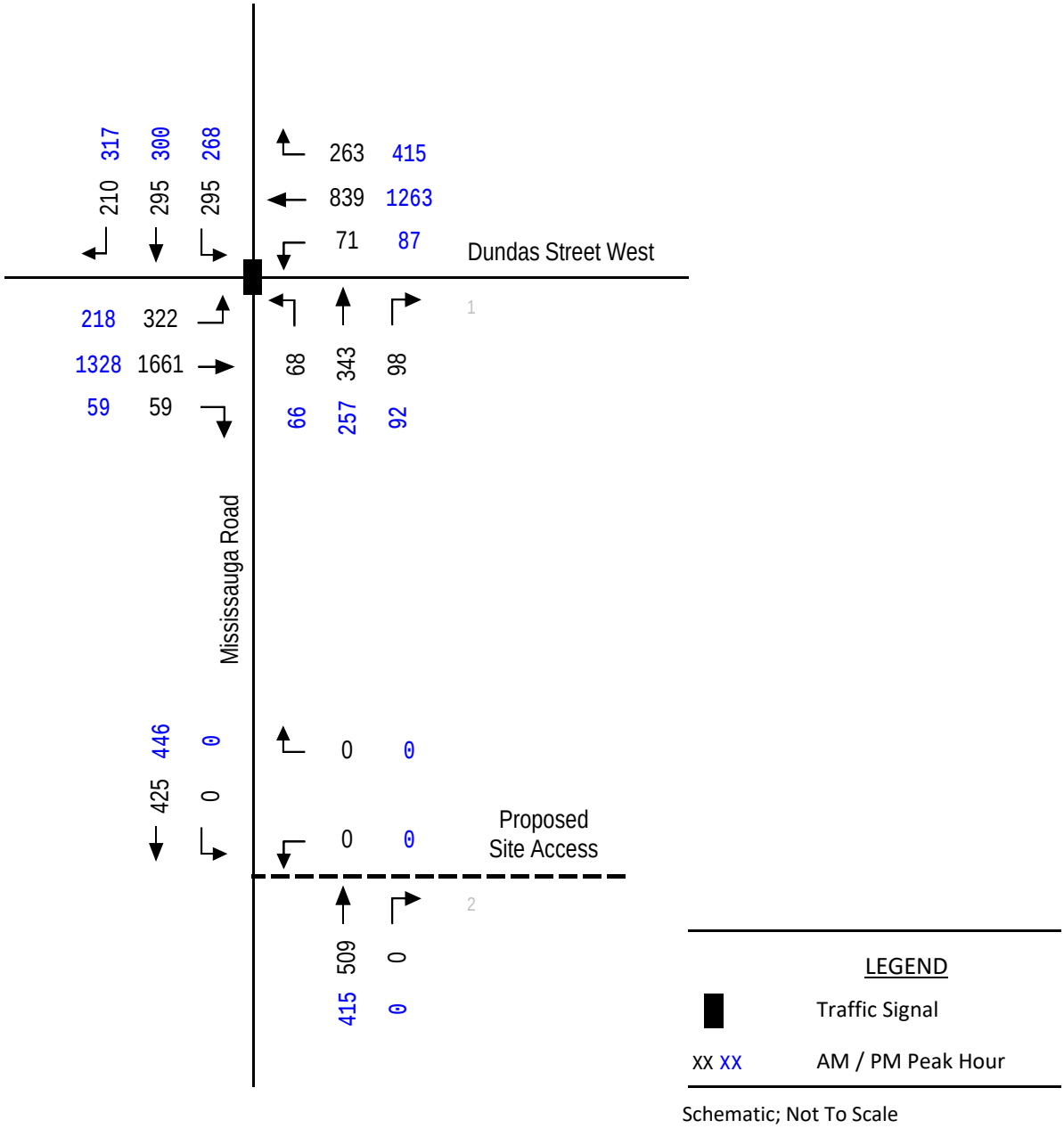
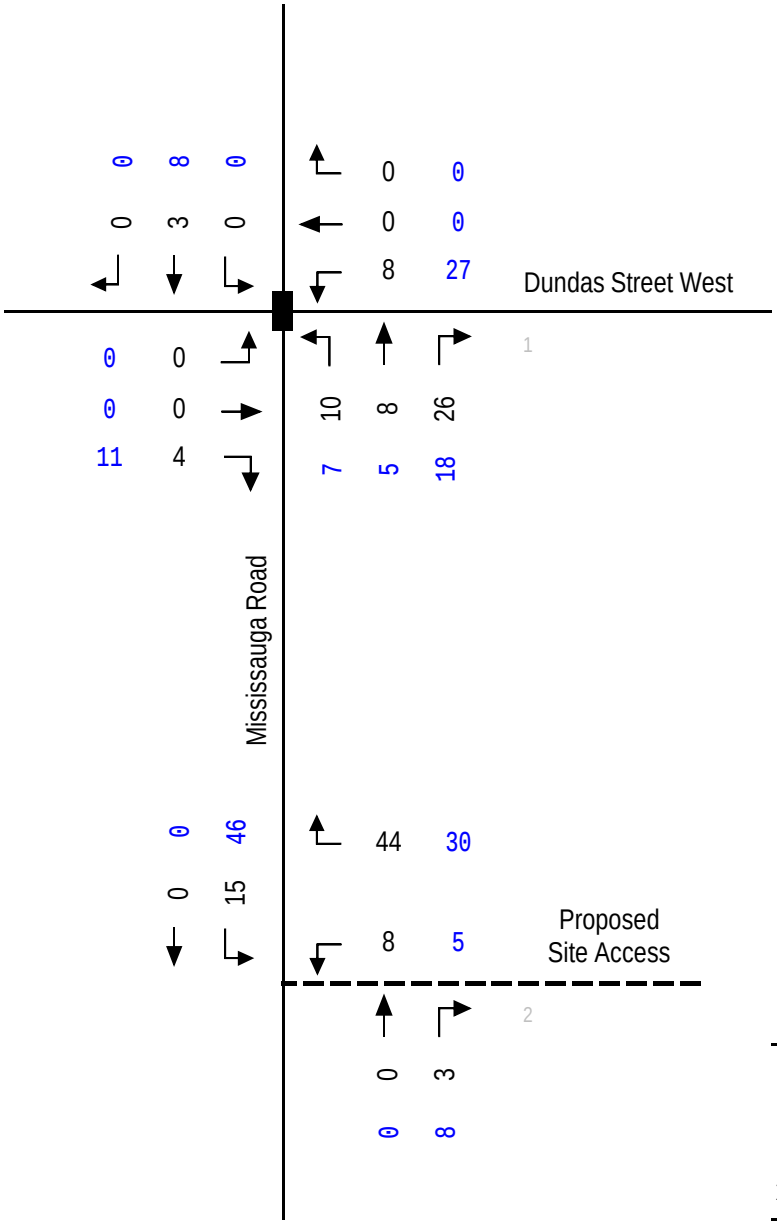
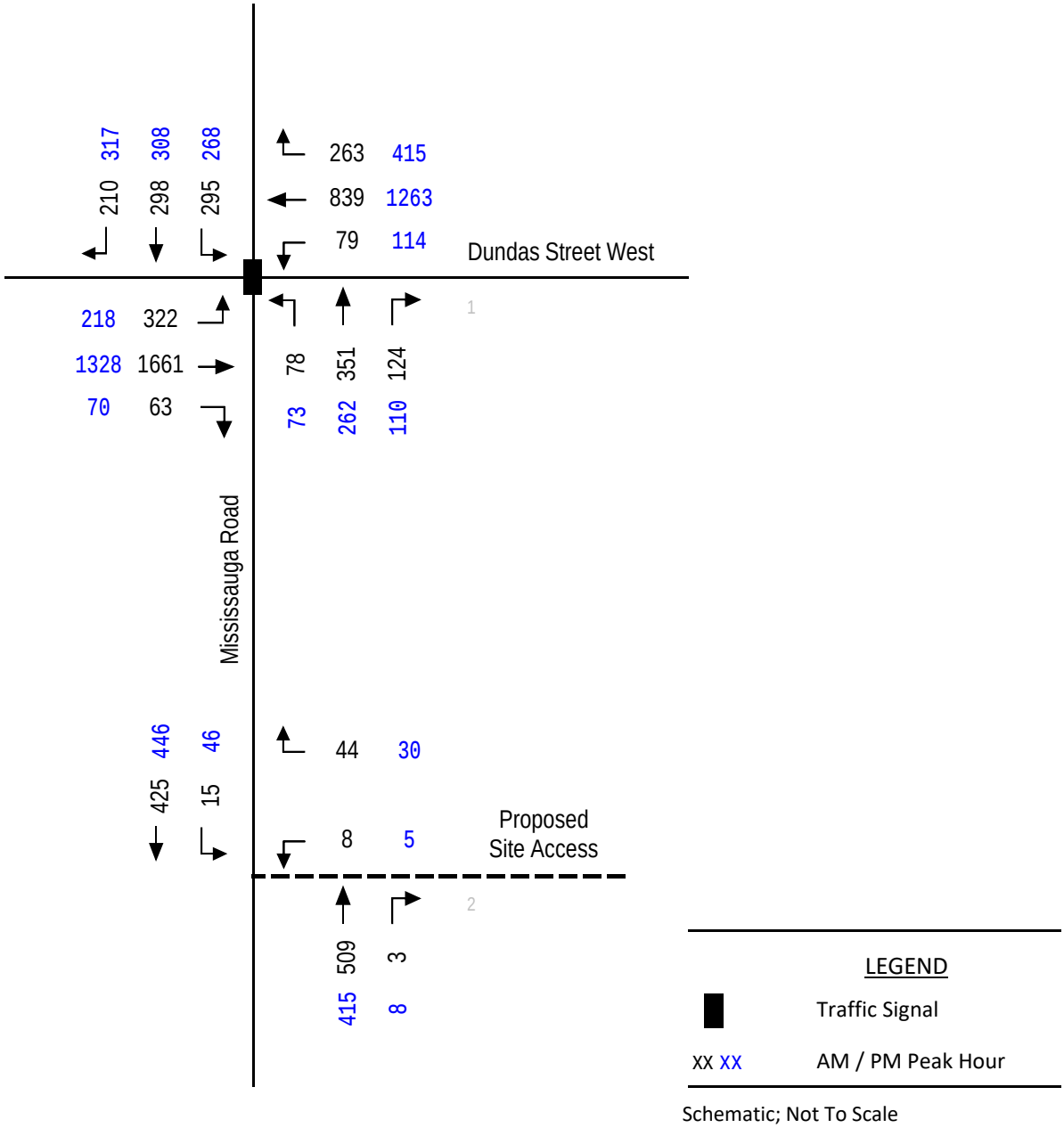


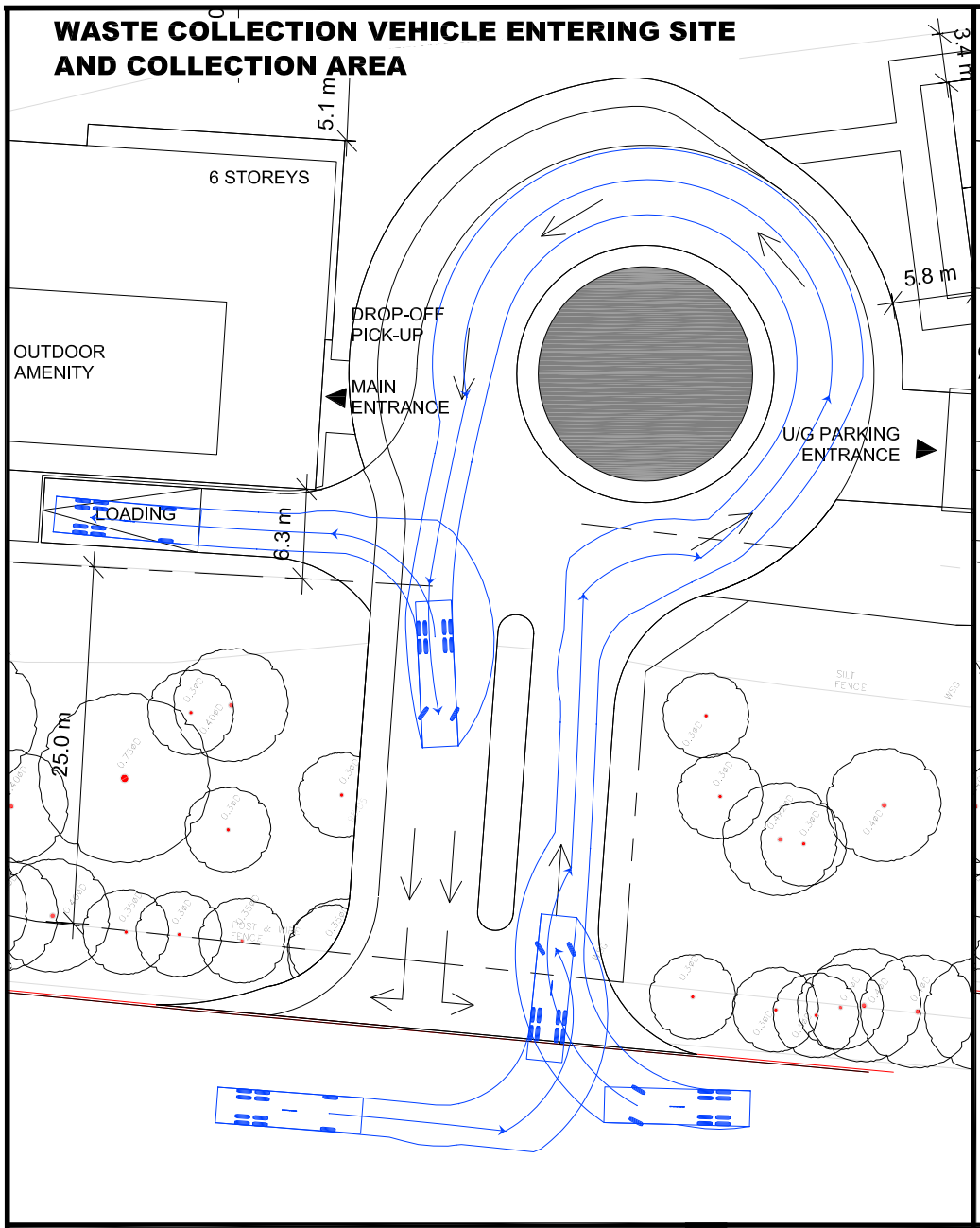
Figure 7: Site Traffic Assignment, Weekday AM and PM Peak Hours



Schematic; Not To Scale

Figure 8: Future Total Traffic Volumes, Weekday AM and PM Peak Hours





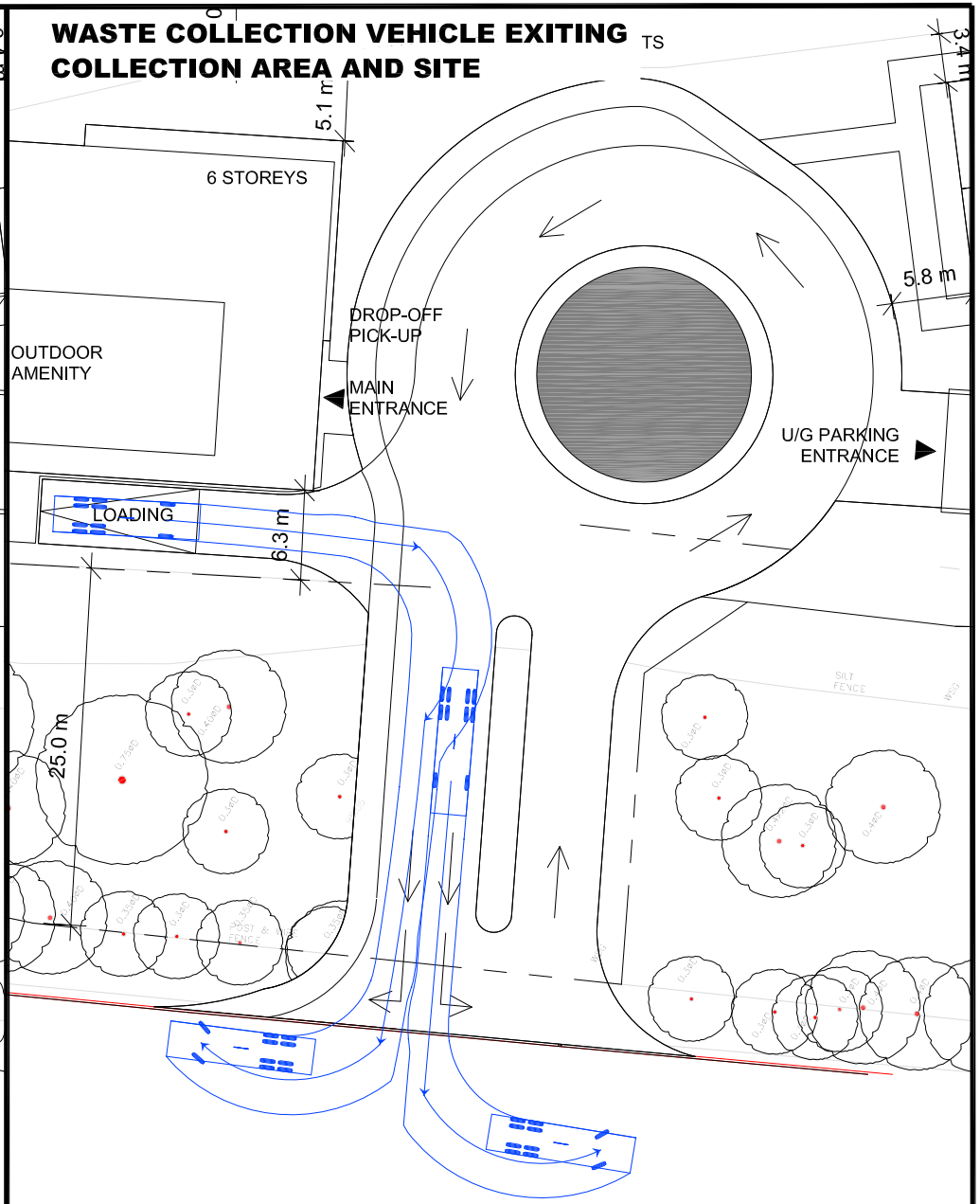
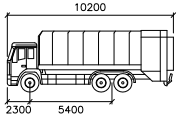


Figure 9 - Waste Collection Vehicle Site Circulation

Proposed Residential Development
2935 & 2955 Mississauga Road
City of Mississauga, Ontario



Garbage Truck mm

Width	: 2500
Track	: 2500
Lock to Lock Time	: 6.0
Steering Angle	: 40.0

CONSTRUCTION NORTH

TRUE NORTH

Source: Site Plan by Caricari Lee Architects, dated April 2020

SCALE: 1:500 UNITS: mm

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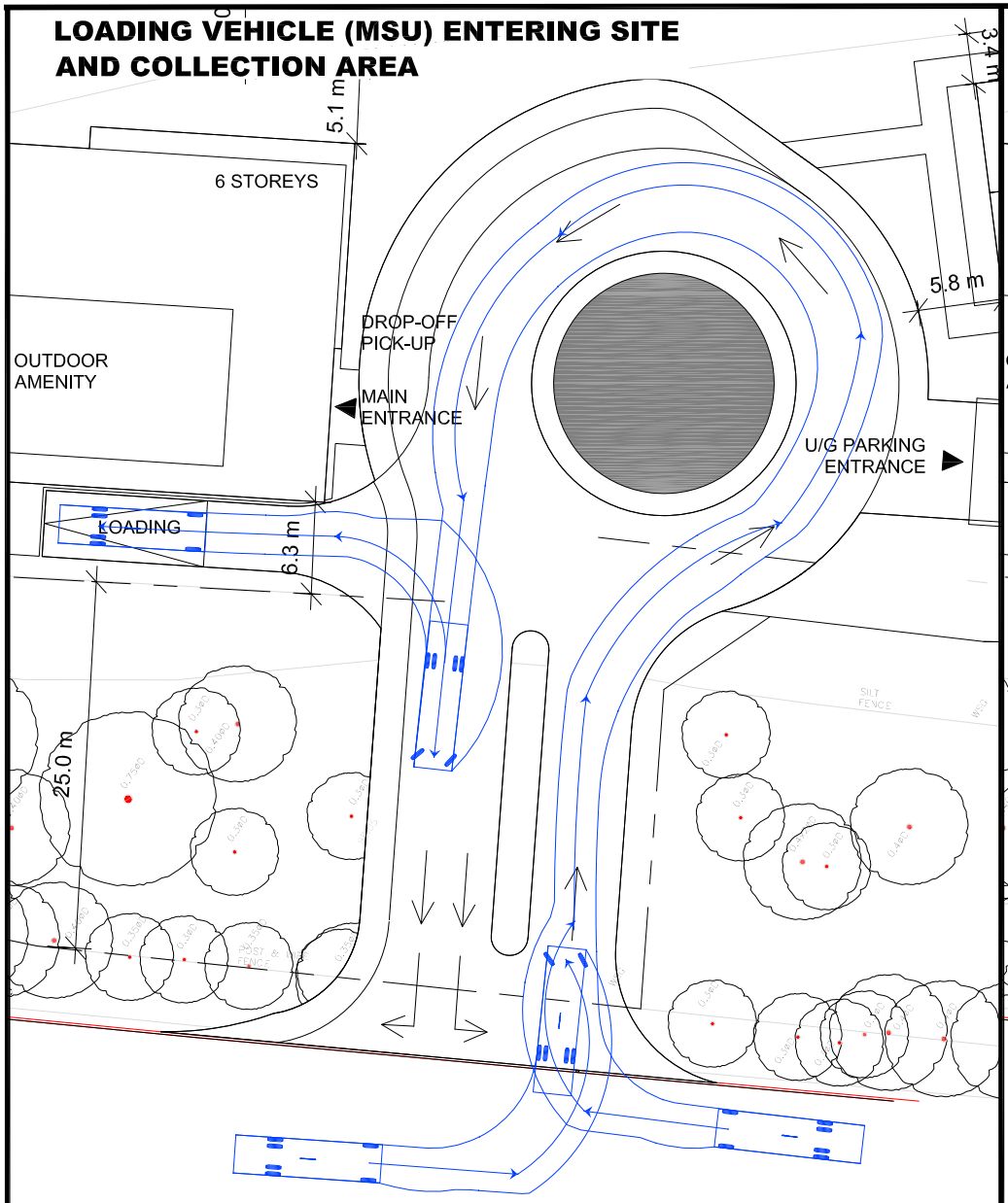
transportation engineering consultants

785 Dundas Street West, Toronto, Ontario, M6J 1V2
tel: (647) 931-7383
website: www.trans-plan.com



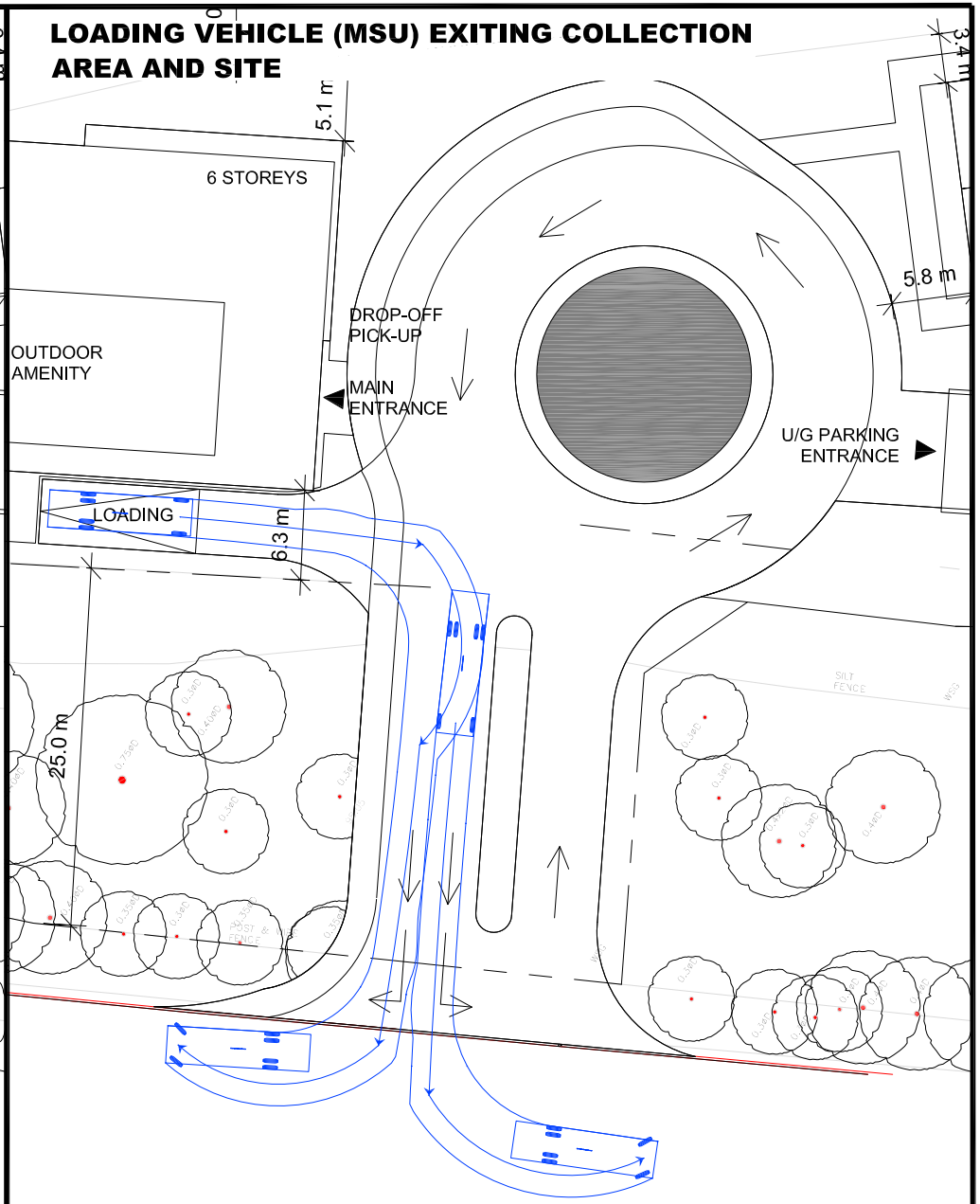
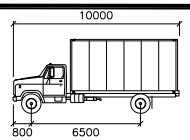


Figure 10 - Loading Vehicle Site Circulation

Proposed Residential Development
2935 & 2955 Mississauga Road
City of Mississauga, Ontario



MSU	mm
Width	: 2600
Track	: 2600
Lock to Lock Time	: 6.0
Steering Angle	: 40.1

CONSTRUCTION NORTH

TRUE NORTH

Source: Site Plan by Caricari Lee Architects, dated April 2020

SCALE: 1:500 UNITS: mm

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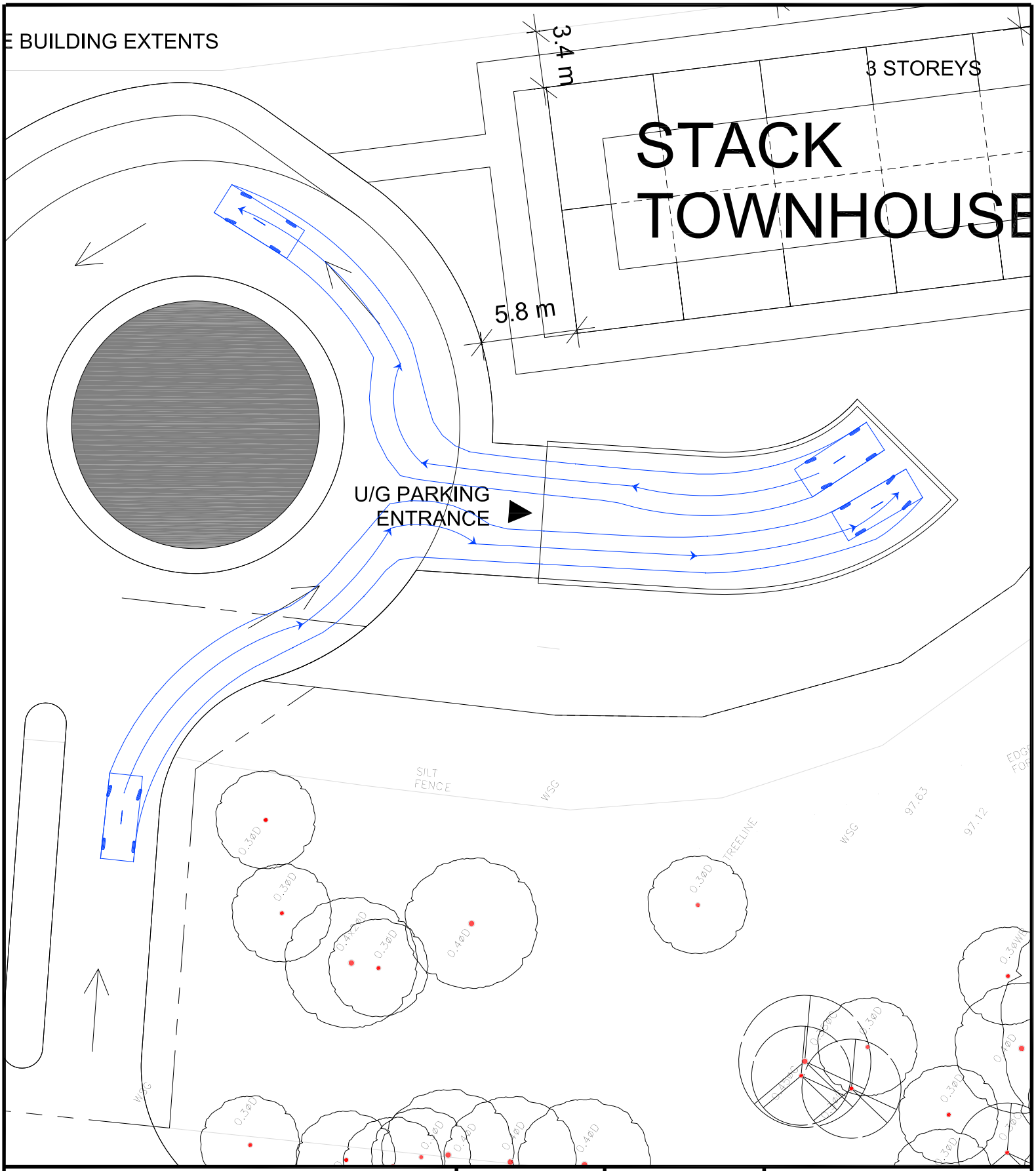
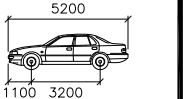


Figure 11 - Passenger Vehicle Site Circulation

Proposed Residential Development
2935 & 2955 Mississauga Road
City of Mississauga, Ontario



Passenger Vehicle

mm

Width	: 2000
Track	: 2000
Lock to Lock Time	: 6.0
Steering Angle	: 36.2

CONSTRUCTION NORTH

TRUE NORTH

SCALE: 1:300 UNITS: mm

Source: Site Plan by Caricari Lee Architects, dated April 2020

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APPENDICES

Appendix A – City Correspondence

Appendix B – Turning Movement Counts and Signal Timing Plans

Appendix C – Transportation Tomorrow Survey Data

Appendix D – Capacity Analysis Sheets

Appendix E – Level of Service Definitions

Appendix F – Mississauga Road Elevation

Appendix G – Sight Line Review

APPENDIX A

City Correspondence

TOR 2935 Mississauga Road - Traffic Study

Kate Vassilyev <Kate.Vassilyev@mississauga.ca>

Mon 2020-09-21 4:21 PM

To: Charles Chung <charleschung@trans-plan.com>
Cc: Ryan Au <Ryan.Au@mississauga.ca>

[EXTERNAL]

Good afternoon Charles,

Please find below comments and references in green. If you have any questions please feel free to contact me.

Re: Transportation Study Terms of Reference, Proposed Residential Development, 2935 & 2955 Mississauga Road, Mississauga, ON

TRANS-PLAN has been retained to complete a transportation study for a proposed residential development located at 2935 & 2955 Mississauga Road, Mississauga. Could you please provide the following data to assist in the study? I have provided a brief outline / terms of reference for our work for your review, enclosed herein.

Data Request

- Are there any other planned roadway and/or transit improvements for the study area intersections and roadways (Mississauga Road and / or Dundas Street W) Please follow the link to see the planned roadway/sidewalk works https://drive.google.com/open?id=1v9_x7WAi5KK12mrbiiyjZT_ZhCt8pXoX&usp=sharing
- The Owner is advised that Dundas Street is a major east-west arterial road in Mississauga and is identified in the City's Official Plan as an intensification corridor. The City of Mississauga has completed a master plan study of Dundas Street through the Dundas Connects project. This study explores ways to incorporate higher order transit on Dundas Street and investigate opportunities for associated transit-orientated development. The Owner is also advised to review project details as there will may be impacts to this site, such as future right-of-way widening and restricted access. Project details can be found at: https://www.dundasconnects.ca/
- Any other planned background developments in the study area (planned, approved or under construction) to include in our analysis? Please follow the link http://www.mississauga.ca/portal/residents/development-applications
- Any insight into growth rates for traffic for the study area roadways? Please see below.
- Intersection turning movement counts (TMCs) for the study area. The historical AADT data , Growth rate and Turning Movement Count can be obtained from Tyler Xuereb, Transportation Planning Analyst (tyler.xuereb@mississauga.ca, Ext. 4783). If the data is older than 2 years, than consultant is responsible to conduct the latest counts.

Transportation Study

The proposed development includes a 12-storey condominium building, with 187 residential units, and a 3-storey stacked townhouse dwelling, with 20 units, for a total of 207 residential units for the development. Parking is provided on site, via three levels of underground parking (P1, P2, and P3) for a total of 312 parking spaces for the development. Access to the site is proposed off of Mississauga Road, with an internal roundabout leading to the underground parking garage entrance.

Analysis Time Periods / Roadway Traffic Count Times:

- Contact Region staff to request recent and historical traffic counts within the study area
- Conduct TMCs during weekday AM (7:00am to 9:30pm) and PM (4:00pm – 6:30pm) for traffic data not obtained from the Region. The historical AADT data and Turning Movement Count can be obtained from Tyler Xuereb, Transportation Planning Analyst (tyler.xuereb@mississauga.ca, Ext. 4783). If the data is older than 2 years, than consultant is responsible to conduct the latest counts.

- Establish Weekday AM and PM peak hours from TMCs

Study Area Intersections:

- Dundas Street West & Mississauga Road
- Mississauga Road & Proposed Site Access

Trip Generation, Distribution and Assignment:

- Generate trips for the proposed land use using provided rates from the Institute of Transportation Engineering manuals, 10th Edition
- Distribute and assign site trips based on traffic patterns from intersection counts, land use characteristics, and / or Transportation Tomorrow Survey traffic data

Future total traffic volumes are obtained from adding the future background volumes and the site trips generated.

Technical Analysis:

- Analyze existing and future total conditions for vehicular traffic using Synchro software. Analysis will include a review of traffic operations, including capacity, level of service and vehicle delay

The report will provide recommendations for roadway infrastructure improvements, as necessary. As well as confirming that the proposed site access location is acceptable.

Sight Line Review

Conduct a sight line review, measuring the available sight distance looking upstream and downstream along Mississauga Drive at the site access locations. Note physical obstructions (natural features / foliage) and limiting factors, such as horizontal and vertical bends along the roadway.

Based on our sight line measurements, confirm the feasibility of the site accesses as per the TAC requirements. If sightlines are not sufficient, determine alternative access locations / arrangements and / or mitigation measures for the study area roadway to accommodate the access points.

Transportation Demand Management (TDM) Strategy

Our TDM Strategy will include a review of existing and future transit and alternative modes of travel services in and around the site, and an evaluation of TDM measures for implementation, proposed measures, costs, and Owner responsibilities. The objective is to make residents and visitors more aware of various travel options and to promote alternative modes of travel.

- Review existing TDM opportunities near the development and planned infrastructure improvements in the study area for transit, walking and cycling. Review connectivity of the site to adjacent developments and to the study area.
- Review how TDM measures could be applied to the site. For each measure that could be reasonably implemented on the site, provide relevant materials such as maps, schedule, program information, and so forth, as part of our report documentation. Measures could include:
  - Pedestrian walkways / connectivity to sidewalks and to nearby transit stops
  - Cycle routes and bicycle parking supply
  - Transit routes / bus stop enhancements
  - Presto pass / transit pass discounts
  - Wayfinding and trip planning

Best regards,

Kate (Jekaterina) Vassilyev
Traffic Planning Technologist
T 905-615-3200 ext.8171
kate.vassilyev@mississauga.ca

City of Mississauga | Corporate Services Department,
Business Services Division

Please consider the environment before printing.

From: Charles Chung <charleschung@trans-plan.com>
Sent: September 17, 2020 2:37 PM
To: Greg Borys <Gregory.Borys@mississauga.ca>
Subject: 2935 Mississauga Road - Traffic Study TOR

Hi Gregory,

Trans-Plan has been retained to provide traffic consulting services for the proposed residential development at 2935 & 2955 Mississauga Road, Mississauga, site plan attached for your reference.

I have attached our Terms of Reference for a Traffic Impact Study and TDM Strategy, and I was hoping you would be able to review and provide any comments on it. I have also reached out to the Region for their comments as well.

Thank you,

Charles Chung
Traffic Analyst | TRANS-PLAN
Transportation Engineering

Toll Free: +1 (877) 668-8784 (TPTI)
Office/Fax: +1 (647) 931-7383 Ext:115
Cell: (647) 302-8923
Email: charleschung@trans-plan.com
W: www.trans-plan.com
Head Office: 785 Dundas Street West, Toronto, Ontario, M6J 1V2

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APPENDIX B

Turning Movement Counts & Signal Timing Plans

Spectrum

Turning Movement Count
Location Name: DUNDAS ST & MISSISSAUGA RD
Date: Wed, Feb 05, 2020 Deployment Lead: Theo Daglis

Peak Hour: 08:00 AM - 09:00 AM Weather: Broken Clouds (-5.99 °C)

Start Time	N Approach MISSISSAUGA RD						E Approach DUNDAS ST						S Approach MISSISSAUGA RD						W Approach DUNDAS ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:00:00	54	97	82	0	0	233	51	196	16	0	0	263	24	79	27	0	1	130	12	391	50	0	0	453	1079
08:15:00	57	76	72	0	0	205	49	225	13	0	0	287	28	86	12	0	0	126	18	433	74	0	0	525	1143
08:30:00	54	57	79	0	0	190	65	197	14	0	0	276	27	91	17	0	0	135	6	419	102	0	0	527	1128
08:45:00	40	58	62	0	3	160	98	200	26	0	0	324	19	87	10	0	0	116	22	418	96	1	3	537	1137
Grand Total	205	288	295	0	3	788	263	818	69	0	0	1150	98	343	66	0	1	507	58	1661	322	1	3	2042	**4487**
Approach%	26%	36.5%	37.4%	0%		-	22.9%	71.1%	6%	0%		-	19.3%	67.7%	13%	0%		-	2.8%	81.3%	15.8%	0%		-	**-**
Totals %	4.6%	6.4%	6.6%	0%		17.6%	5.9%	18.2%	1.5%	0%		25.6%	2.2%	7.6%	1.5%	0%		11.3%	1.3%	37%	7.2%	0%		45.5%	**-**
PHF	0.9	0.74	0.9	0		0.85	0.67	0.91	0.66	0		0.89	0.88	0.94	0.61	0		0.94	0.66	0.96	0.79	0.25		0.95	**-**
Heavy	0	0	0	0		0	0	4	0	0		4	0	0	0	0		0	0	9	1	0		10	**-**
Heavy %	0%	0%	0%	0%		0%	0%	0.5%	0%	0%		0.3%	0%	0%	0%	0%		0%	0%	0.5%	0.3%	0%		0.5%	**-**
Lights	192	282	286	0		760	247	788	67	0		1102	92	335	65	0		492	55	1618	309	1		1983	**-**
Lights %	93.7%	97.9%	96.9%	0%		96.4%	93.9%	96.3%	97.1%	0%		95.8%	93.9%	97.7%	98.5%	0%		97%	94.8%	97.4%	96%	100%		97.1%	**-**
Mediums	13	6	9	0		28	16	26	2	0		44	6	8	1	0		15	3	34	12	0		49	**-**
Mediums %	6.3%	2.1%	3.1%	0%		3.6%	6.1%	3.2%	2.9%	0%		3.8%	6.1%	2.3%	1.5%	0%		3%	5.2%	2%	3.7%	0%		2.4%	**-**
Articulated Trucks	0	0	0	0		0	0	4	0	0		4	0	0	0	0		0	0	9	1	0		10	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.5%	0%	0%		0.3%	0%	0%	0%	0%		0%	0%	0.5%	0.3%	0%		0.5%	**-**
Pedestrians	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	3	-	**-**
Pedestrians%	-	-	-	-	42.9%		-	-	-	-	0%		-	-	-	-	14.3%		-	-	-	-	42.9%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Spectrum

Turning Movement Count
Location Name: DUNDAS ST & MISSISSAUGA RD
Date: Wed, Feb 05, 2020 Deployment Lead: Theo Daglis

Peak Hour: 04:45 PM - 05:45 PM Weather: Broken Clouds (-3.61 °C)

Start Time	N Approach MISSISSAUGA RD						E Approach DUNDAS ST						S Approach MISSISSAUGA RD						W Approach DUNDAS ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:45:00	53	55	48	0	1	156	93	316	18	0	0	427	27	56	12	0	0	95	12	323	56	0	1	391	1069
17:00:00	80	72	60	0	2	212	97	305	25	0	0	427	24	73	17	0	0	114	15	276	45	0	2	336	1089
17:15:00	95	91	78	0	0	264	104	295	23	1	0	423	25	51	13	0	0	89	13	325	44	0	0	382	1158
17:30:00	74	75	69	0	4	218	101	286	19	0	0	406	12	65	21	0	0	98	18	340	62	0	2	420	1142
Grand Total	302	293	255	0	7	850	395	1202	85	1	0	1683	88	245	63	0	0	396	58	1264	207	0	5	1529	**4458**
Approach%	35.5%	34.5%	30%	0%		-	23.5%	71.4%	5.1%	0.1%		-	22.2%	61.9%	15.9%	0%		-	3.8%	82.7%	13.5%	0%		-	**-**
Totals %	6.8%	6.6%	5.7%	0%		19.1%	8.9%	27%	1.9%	0%		37.8%	2%	5.5%	1.4%	0%		8.9%	1.3%	28.4%	4.6%	0%		34.3%	**-**
PHF	0.79	0.8	0.82	0		0.8	0.95	0.95	0.85	0.25		0.99	0.81	0.84	0.75	0		0.87	0.81	0.93	0.83	0		0.91	**-**
Heavy	0	0	0	0		0	0	2	0	0		2	0	0	0	0		0	0	2	0	0		2	**-**
Heavy %	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.1%	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.1%	**-**
Lights	296	288	244	0		828	387	1185	84	1		1657	87	242	63	0		392	56	1251	198	0		1505	**-**
Lights %	98%	98.3%	95.7%	0%		97.4%	98%	98.6%	98.8%	100%		98.5%	98.9%	98.8%	100%	0%		99%	96.6%	99%	95.7%	0%		98.4%	**-**
Mediums	6	5	11	0		22	8	15	1	0		24	1	3	0	0		4	2	11	9	0		22	**-**
Mediums %	2%	1.7%	4.3%	0%		2.6%	2%	1.2%	1.2%	0%		1.4%	1.1%	1.2%	0%	0%		1%	3.4%	0.9%	4.3%	0%		1.4%	**-**
Articulated Trucks	0	0	0	0		0	0	2	0	0		2	0	0	0	0		0	0	2	0	0		2	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.1%	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.1%	**-**
Pedestrians	-	-	-	-	7	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	5	-	**-**
Pedestrians%	-	-	-	-	58.3%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	41.7%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Signal Timing Report

Runtime: 2020-10-02 11:54:51

Device: 1703

Region: Mississauga **Signal ID:** 1703 **Location:** DUNDAS STREET E at Mississauga Road

Phase	Units	1	2	3	4	5	6	7	8
Walk	Sec	0	12	0	0	0	12	0	14
Ped Clear	Sec	0	23	0	0	0	23	0	23
Min Green	Sec	5	8	5	12	5	8	5	12
Passage	Sec	2.0	3.0	2.0	3.0	2.0	3.0	3.0	3.0
Maximum 1	Sec	10	27	10	39	14	27	14	39
Maximum 2	Sec	10	27	10	39	14	27	14	39
Yellow Change	Sec	3.0	5.0	3.0	4.0	3.0	5.0	3.0	4.0
Red Clearance	Sec	0.0	3.0	0.0	4.0	0.0	3.0	0.0	4.0
Red Revert	Sec	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Added Initial	Sec	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Initial	Sec	0	0	0	0	0	0	0	0
Time Before	Sec	0	0	0	0	0	0	0	0
Cars Before	Veh	0	0	0	0	0	0	0	0
Time To Reduce	Sec	0	0	0	0	0	0	0	0
Reduce By	Sec	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Min Gap	Sec	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dynamic Max Limit	Sec	0	0	0	0	0	0	0	0
Dynamic Max Step	Sec	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
[P2] Start Up	Enum	phaseNotOn	redClear	phaseNotOn	phaseNotOn	phaseNotOn	redClear	phaseNotOn	phaseNotOn
[P2] Options	Bit	Enabled Non Lock Det	Enabled Non-Actuated 1 Max Veh Recall Ped Recall Dual Entry Act Rest In Walk	Enabled Non Lock Det	Enabled Non Lock Det Dual Entry	Enabled Non Lock Det	Enabled Non-Actuated 1 Max Veh Recall Ped Recall Dual Entry Act Rest In Walk	Enabled Non Lock Det	Enabled Non Lock Det Dual Entry
[P2] Ring	Ring	1	1	1	1	2	2	2	2
[P2] Concurrency	Phase (,)	(5,6)	(5,6)	(7,8)	(7,8)	(1,2)	(1,2)	(3,4)	(3,4)

Coord Pattern	Units	1	2	3	4	5	6	7	8
Cycle Time	Sec	140	140	140	140	0	0	0	0
Offset	Sec	49	92	116	106	0	0	0	0
Split	Split	1	2	3	4	0	0	0	0
Sequence	Sequence	1	1	1	1	0	0	0	0

Coord Split	Units	1	2	3	4	5	6	7	8
Split 1 - Mode	Enum	none	none	none	none	none	none	none	none
Split 1 - Time	Sec	10	71	21	38	23	58	10	49
Split 1 - Coord	Enum	false	true	false	false	false	true	false	false
Split 2 - Mode	Enum	none	none	none	none	none	none	none	none
Split 2 - Time	Sec	10	75	12	43	13	72	10	45
Split 2 - Coord	Enum	false	true	false	false	false	true	false	false
Split 3 - Mode	Enum	none	none	none	none	none	none	none	none
Split 3 - Time	Sec	10	75	17	38	13	72	10	45
Split 3 - Coord	Enum	false	true	false	false	false	true	false	false
Split 4 - Mode	Enum	none	none	none	none	none	none	none	none
Split 4 - Time	Sec	0	75	13	52	10	65	10	55
Split 4 - Coord	Enum	false	true	false	false	false	true	false	false

TB Dayplan	Units	1	2	3	4	5	6	7	8
Plan 1 Hour	Hour	0	3	6	9	15	19	0	0
Plan 1 Minute	Min	0	0	0	30	0	30	0	0
Plan 1 Action	Number	8	7	1	2	3	2	0	0
Plan 2 Hour	Hour	0	3	7	0	0	0	0	0
Plan 2 Minute	Min	0	0	0	0	0	0	0	0
Plan 2 Action	Number	8	7	4	0	0	0	0	0
Plan 3 Hour	Hour	0	3	8	23	0	0	0	0
Plan 3 Minute	Min	0	0	0	0	0	0	0	0
Plan 3 Action	Number	8	7	4	8	0	0	0	0

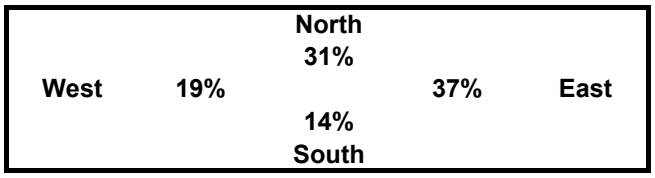
TB Action	Units	1	2	3	4	5	6	7	8
Pattern	Enum	Pattern 1	Pattern 2	Pattern 3	Pattern 4	Pattern 5	Pattern 6	Free	Free
Aux. Functions	Bit	0	0	0	0	0	0	0	0
Spec. Functions	Bit	0	0	0	0	0	0	0	0

APPENDIX C

Transportation Tomorrow Survey Data

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of destination - pd_dest
Column: 2006 GTA zone of origin - gta06_orig
Table: Primary travel mode of trip - mode_prime
Filters:
(2006 GTA zone of origin - gta06_orig In 3650
Primary travel mode of trip - mode_prime In D
Start time of trip - start_time In 600-900)



Destination Zone	No. of Trips from City of Mississauga 2006 GTA Zone 3650	Percent of Trips from City of Mississauga 2006 GTA Zone 3650	Location respect to site
PD 1 of Toronto	121	5%	E
PD 2 of Toronto	10	0%	E
PD 3 of Toronto	10	0%	E
PD 4 of Toronto	20	1%	E
PD 6 of Toronto	15	1%	E
PD 8 of Toronto	217	9%	E
PD 9 of Toronto	85	4%	E
PD 10 of Toronto	30	1%	E
PD 13 of Toronto	5	0%	E
PD 16 of Toronto	45	2%	E
Vaughan	58	2%	E
Caledon	7	0%	N
Brampton	56	2%	N
Mississauga			
136	141	6%	E
137	341	14%	S
138	33	1%	E
139	94	4%	E
140	384	16%	N
141	61	3%	N
142	44	2%	N
143	491	-	Internal
144	165	7%	N
146	15	1%	N
Halton Hills	7	0%	N
Oakville	283	12%	W
Burlington	60	2%	W
Hamilton	94	4%	W
Cambridge	16	1%	W
Total	**2417**	**100%**	

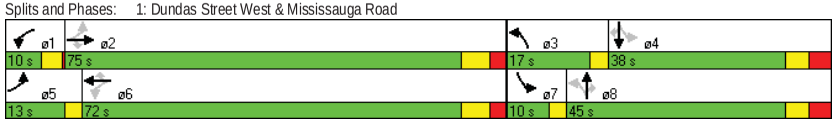
APPENDIX D

Capacity Analysis Sheets

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	322	1661	58	69	818	263	66	343	98	295	288	205
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	4.0	8.0	8.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	9.0	43.0	43.0	8.0	43.0	43.0	9.0	45.0	45.0	9.0	38.0	38.0
Total Split (s)	13.0	75.0	75.0	10.0	72.0	72.0	17.0	45.0	45.0	10.0	38.0	38.0
Total Split (%)	9.3%	53.6%	53.6%	7.1%	51.4%	51.4%	12.1%	32.1%	32.1%	7.1%	27.1%	27.1%
Yellow Time (s)	3.0	5.0	5.0	3.5	5.0	5.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	0.5	3.0	3.0	0.0	4.0	4.0	0.0	4.0	4.0
Lost Time Adjust (s)	-2.0	-3.0	-3.0	-2.0	-3.0	-3.0	-2.0	-3.0	-3.0	-2.0	-3.0	-3.0
Total Lost Time (s)	1.0	5.0	5.0	2.0	5.0	5.0	1.0	5.0	5.0	1.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	90.2	77.3	77.3	81.6	69.8	69.8	47.4	33.8	33.8	44.8	33.6	33.6
Actuated g/C Ratio	0.64	0.55	0.55	0.58	0.50	0.50	0.34	0.24	0.24	0.32	0.24	0.24
v/c Ratio	0.75	0.87	0.07	0.41	0.47	0.32	0.24	0.78	0.25	1.39	0.66	0.39
Control Delay	25.3	34.4	13.1	22.2	24.7	13.2	32.0	61.7	28.0	231.7	55.9	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.3	34.4	13.1	22.2	24.7	13.2	32.0	61.7	28.0	231.7	55.9	7.4
LOS	C	C	B	C	C	B	C	E	C	F	E	A
Approach Delay		32.4			21.9			51.3			109.1	
Approach LOS		C			C			D			F	

Intersection Summary			
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 116 (83%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.39			
Intersection Signal Delay: 45.3		Intersection LOS: D	
Intersection Capacity Utilization 100.3%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 1: Dundas Street West & Mississauga Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	322	1661	58	69	818	263	66	343	98	295	288	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	1.0	5.0	5.0	2.0	5.0	5.0	1.0	5.0	5.0	1.0	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1769	3539	1549	1770	3539	1542	1770	1863	1559	1769	1863	1583
Flt Permitted	0.25	1.00	1.00	0.06	1.00	1.00	0.29	1.00	1.00	0.22	1.00	1.00
Satd. Flow (perm)	457	3539	1549	109	3539	1542	545	1863	1559	407	1863	1583
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	329	1695	59	70	835	268	67	350	100	301	294	209
RTOR Reduction (vph)	0	0	8	0	0	59	0	0	26	0	0	159
Lane Group Flow (vph)	329	1695	51	70	835	209	67	350	74	301	294	50
Confl. Peds. (#/hr)	3		1	1		3			3	3		
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	82.6	72.9	72.9	71.8	66.1	66.1	39.2	31.4	31.4	37.6	30.6	30.6
Effective Green, g (s)	84.6	75.9	75.9	75.8	69.1	69.1	43.2	34.4	34.4	41.6	33.6	33.6
Actuated g/C Ratio	0.60	0.54	0.54	0.54	0.49	0.49	0.31	0.25	0.25	0.30	0.24	0.24
Clearance Time (s)	3.0	8.0	8.0	4.0	8.0	8.0	3.0	8.0	8.0	3.0	8.0	8.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	421	1919	840	150	1747	761	254	458	383	208	447	380
v/s Ratio Prot	c0.09	c0.48		0.03	0.24		c0.02	c0.19		c0.09	0.16	
v/s Ratio Perm	0.39		0.03	0.23		0.14	0.06		0.05	0.34		0.03
v/c Ratio	0.78	0.88	0.06	0.47	0.48	0.27	0.26	0.76	0.19	1.45	0.66	0.13
Uniform Delay, d1	16.1	28.2	15.2	26.5	23.5	20.8	35.8	49.0	41.8	46.8	48.0	41.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.1	6.3	0.1	2.3	0.9	0.9	0.6	7.4	0.2	226.1	3.5	0.2
Delay (s)	25.3	34.5	15.3	28.7	24.4	21.7	36.4	56.5	42.1	272.9	51.5	41.9
Level of Service	C	C	B	C	C	C	D	E	D	F	D	D
Approach Delay (s)		32.5			24.1			51.1			131.9	
Approach LOS		C			C			D			F	

Intersection Summary					
HCM Average Control Delay	49.9	HCM Level of Service		D	
HCM Volume to Capacity ratio	0.81				
Actuated Cycle Length (s)	140.0	Sum of lost time (s)		3.0	
Intersection Capacity Utilization	100.3%	ICU Level of Service		G	
Analysis Period (min)	15				

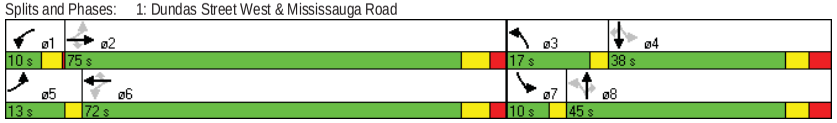
c Critical Lane Group

Timings <Existing> Weekday PM Peak Hour
1: Dundas Street West & Mississauga Road 2020-12-02

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	207	1264	58	85	1202	395	63	245	88	255	293	302
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	4.0	8.0	8.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	9.0	43.0	43.0	8.0	43.0	43.0	9.0	45.0	45.0	9.0	38.0	38.0
Total Split (s)	13.0	75.0	75.0	10.0	72.0	72.0	17.0	45.0	45.0	10.0	38.0	38.0
Total Split (%)	9.3%	53.6%	53.6%	7.1%	51.4%	51.4%	12.1%	32.1%	32.1%	7.1%	27.1%	27.1%
Yellow Time (s)	3.0	5.0	5.0	3.5	5.0	5.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	0.5	3.0	3.0	0.0	4.0	4.0	0.0	4.0	4.0
Lost Time Adjust (s)	-2.0	-3.0	-3.0	-2.0	-3.0	-3.0	-2.0	-3.0	-3.0	-2.0	-3.0	-3.0
Total Lost Time (s)	1.0	5.0	5.0	2.0	5.0	5.0	1.0	5.0	5.0	1.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	92.1	77.1	77.1	84.9	72.8	72.8	45.5	31.9	31.9	42.9	31.7	31.7
Actuated g/C Ratio	0.66	0.55	0.55	0.61	0.52	0.52	0.32	0.23	0.23	0.31	0.23	0.23
v/c Ratio	0.72	0.68	0.07	0.38	0.68	0.48	0.26	0.60	0.23	0.95	0.72	0.62
Control Delay	31.0	26.0	11.9	15.4	28.6	18.1	33.1	53.4	23.8	85.3	60.3	22.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.0	26.0	11.9	15.4	28.6	18.1	33.1	53.4	23.8	85.3	60.3	22.7
LOS	C	C	B	B	C	B	C	D	C	F	E	C
Approach Delay		26.2			25.4			43.5			54.5	
Approach LOS		C			C			D			D	

Intersection Summary			
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 116 (83%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.95			
Intersection Signal Delay: 32.8		Intersection LOS: C	
Intersection Capacity Utilization 86.7%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 1: Dundas Street West & Mississauga Road



HCM Signalized Intersection Capacity Analysis <Existing> Weekday PM Peak Hour
1: Dundas Street West & Mississauga Road 2020-12-02

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	207	1264	58	85	1202	395	63	245	88	255	293	302
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	1.0	5.0	5.0	2.0	5.0	5.0	1.0	5.0	5.0	1.0	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1530	1770	1863	1583	1770	1863	1554
Flt Permitted	0.11	1.00	1.00	0.12	1.00	1.00	0.25	1.00	1.00	0.37	1.00	1.00
Satd. Flow (perm)	214	3539	1583	222	3539	1530	464	1863	1583	680	1863	1554
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	216	1317	60	89	1252	411	66	255	92	266	305	315
RTOR Reduction (vph)	0	0	10	0	0	58	0	0	33	0	0	154
Lane Group Flow (vph)	216	1317	50	89	1252	353	66	255	59	266	305	161
Confl. Peds. (#/hr)	7					7	5					5
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	84.6	73.5	73.5	76.4	69.3	69.3	37.1	29.4	29.4	35.7	28.7	28.7
Effective Green, g (s)	86.6	76.5	76.5	80.4	72.3	72.3	41.1	32.4	32.4	39.7	31.7	31.7
Actuated g/C Ratio	0.62	0.55	0.55	0.57	0.52	0.52	0.29	0.23	0.23	0.28	0.23	0.23
Clearance Time (s)	3.0	8.0	8.0	4.0	8.0	8.0	3.0	8.0	8.0	3.0	8.0	8.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	291	1934	865	228	1828	790	227	431	366	263	422	352
v/s Ratio Prot	c0.08	c0.37		0.03	0.35		c0.02	0.14		c0.07	c0.16	
v/s Ratio Perm	0.38		0.03	0.20		0.23	0.07		0.04	0.22		0.10
v/c Ratio	0.74	0.68	0.06	0.39	0.68	0.45	0.29	0.59	0.16	1.01	0.72	0.46
Uniform Delay, d1	21.1	22.9	14.9	17.7	25.3	21.3	37.5	47.9	43.0	49.5	50.1	46.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.8	2.0	0.1	1.1	2.1	1.8	0.7	2.2	0.2	58.4	6.0	0.9
Delay (s)	30.9	24.9	15.0	18.8	27.4	23.1	38.2	50.1	43.2	107.9	56.1	47.7
Level of Service	C	C	B	B	C	C	D	D	D	F	E	D
Approach Delay (s)		25.3			26.0			46.6			68.7	
Approach LOS		C			C			D			E	

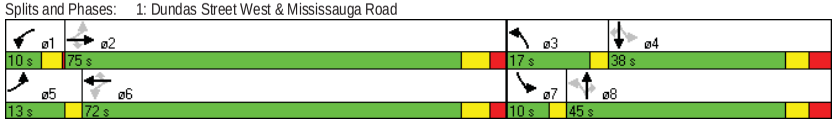
Intersection Summary					
HCM Average Control Delay		35.7	HCM Level of Service		D
HCM Volume to Capacity ratio		0.69			
Actuated Cycle Length (s)		140.0	Sum of lost time (s)		8.0
Intersection Capacity Utilization		86.7%	ICU Level of Service		E
Analysis Period (min)		15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	322	1661	59	71	839	263	68	343	98	295	295	210
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	4.0	8.0	8.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	9.0	43.0	43.0	8.0	43.0	43.0	9.0	45.0	45.0	9.0	38.0	38.0
Total Split (s)	13.0	75.0	75.0	10.0	72.0	72.0	17.0	45.0	45.0	10.0	38.0	38.0
Total Split (%)	9.3%	53.6%	53.6%	7.1%	51.4%	51.4%	12.1%	32.1%	32.1%	7.1%	27.1%	27.1%
Yellow Time (s)	3.0	5.0	5.0	3.5	5.0	5.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	0.5	3.0	3.0	0.0	4.0	4.0	0.0	4.0	4.0
Lost Time Adjust (s)	-2.0	-3.0	-3.0	-2.0	-3.0	-3.0	-2.0	-3.0	-3.0	-2.0	-3.0	-3.0
Total Lost Time (s)	1.0	5.0	5.0	2.0	5.0	5.0	1.0	5.0	5.0	1.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	90.2	77.3	77.3	81.4	69.6	69.6	47.4	33.8	33.8	44.7	33.5	33.5
Actuated g/C Ratio	0.64	0.55	0.55	0.58	0.50	0.50	0.34	0.24	0.24	0.32	0.24	0.24
v/c Ratio	0.76	0.87	0.07	0.43	0.49	0.33	0.25	0.78	0.25	1.39	0.67	0.40
Control Delay	26.2	34.4	13.1	23.0	25.1	13.5	32.3	61.7	28.0	231.7	56.9	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.2	34.4	13.1	23.0	25.1	13.5	32.3	61.7	28.0	231.7	56.9	7.4
LOS	C	C	B	C	C	B	C	E	C	F	E	A
Approach Delay		32.5			22.3			51.3			108.4	
Approach LOS		C			C			D			F	

Intersection Summary			
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 116 (83%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.39			
Intersection Signal Delay: 45.4		Intersection LOS: D	
Intersection Capacity Utilization 100.5%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 1: Dundas Street West & Mississauga Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	322	1661	59	71	839	263	68	343	98	295	295	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	1.0	5.0	5.0	2.0	5.0	5.0	1.0	5.0	5.0	1.0	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1769	3539	1549	1770	3539	1542	1770	1863	1559	1769	1863	1583
Flt Permitted	0.24	1.00	1.00	0.06	1.00	1.00	0.28	1.00	1.00	0.22	1.00	1.00
Satd. Flow (perm)	439	3539	1549	110	3539	1542	518	1863	1559	408	1863	1583
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	329	1695	60	72	856	268	69	350	100	301	301	214
RTOR Reduction (vph)	0	0	8	0	0	57	0	0	26	0	0	163
Lane Group Flow (vph)	329	1695	52	72	856	211	69	350	74	301	301	51
Confl. Peds. (#/hr)	3		1	1		3			3	3		
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	82.6	72.9	72.9	71.6	65.9	65.9	39.3	31.4	31.4	37.5	30.5	30.5
Effective Green, g (s)	84.6	75.9	75.9	75.6	68.9	68.9	43.3	34.4	34.4	41.5	33.5	33.5
Actuated g/C Ratio	0.60	0.54	0.54	0.54	0.49	0.49	0.31	0.25	0.25	0.30	0.24	0.24
Clearance Time (s)	3.0	8.0	8.0	4.0	8.0	8.0	3.0	8.0	8.0	3.0	8.0	8.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	414	1919	840	151	1742	759	249	458	383	208	446	379
v/s Ratio Prot	c0.09	c0.48		0.03	0.24		c0.02	c0.19		c0.09	0.16	
v/s Ratio Perm	0.39		0.03	0.23		0.14	0.07		0.05	0.34		0.03
v/c Ratio	0.79	0.88	0.06	0.48	0.49	0.28	0.28	0.76	0.19	1.45	0.67	0.14
Uniform Delay, d1	16.5	28.2	15.2	26.5	23.8	20.9	35.9	49.0	41.8	46.8	48.3	41.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.1	6.3	0.1	2.4	1.0	0.9	0.6	7.4	0.2	226.1	4.0	0.2
Delay (s)	26.6	34.5	15.3	28.9	24.8	21.8	36.5	56.5	42.1	273.0	52.3	42.0
Level of Service	C	C	B	C	C	C	D	E	D	F	D	D
Approach Delay (s)		32.7			24.4			51.0			131.0	
Approach LOS		C			C			D			F	

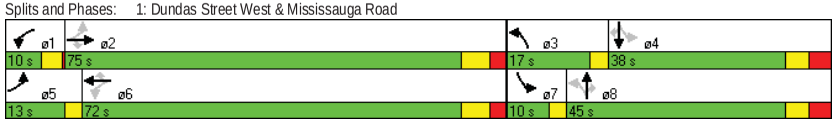
Intersection Summary					
HCM Average Control Delay	50.0	HCM Level of Service		D	
HCM Volume to Capacity ratio	0.82				
Actuated Cycle Length (s)	140.0	Sum of lost time (s)		3.0	
Intersection Capacity Utilization	100.5%	ICU Level of Service		G	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	218	1328	59	87	1263	415	66	257	92	268	300	317
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	4.0	8.0	8.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	9.0	43.0	43.0	8.0	43.0	43.0	9.0	45.0	45.0	9.0	38.0	38.0
Total Split (s)	13.0	75.0	75.0	10.0	72.0	72.0	17.0	45.0	45.0	10.0	38.0	38.0
Total Split (%)	9.3%	53.6%	53.6%	7.1%	51.4%	51.4%	12.1%	32.1%	32.1%	7.1%	27.1%	27.1%
Yellow Time (s)	3.0	5.0	5.0	3.5	5.0	5.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	0.5	3.0	3.0	0.0	4.0	4.0	0.0	4.0	4.0
Lost Time Adjust (s)	-2.0	-3.0	-3.0	-2.0	-3.0	-3.0	-2.0	-3.0	-3.0	-2.0	-3.0	-3.0
Total Lost Time (s)	1.0	5.0	5.0	2.0	5.0	5.0	1.0	5.0	5.0	1.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	91.6	76.6	76.6	83.6	71.7	71.7	46.1	32.4	32.4	43.3	32.1	32.1
Actuated g/C Ratio	0.65	0.55	0.55	0.60	0.51	0.51	0.33	0.23	0.23	0.31	0.23	0.23
v/c Ratio	0.80	0.71	0.07	0.42	0.73	0.51	0.27	0.62	0.24	1.02	0.73	0.65
Control Delay	44.5	27.4	12.0	17.1	30.6	19.3	33.1	53.8	24.7	101.6	60.5	26.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.5	27.4	12.0	17.1	30.6	19.3	33.1	53.8	24.7	101.6	60.5	26.1
LOS	D	C	B	B	C	B	C	D	C	F	E	C
Approach Delay		29.2			27.3			44.1			60.7	
Approach LOS		C			C			D			E	

Intersection Summary			
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 116 (83%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.02			
Intersection Signal Delay: 35.7		Intersection LOS: D	
Intersection Capacity Utilization 90.4%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 1: Dundas Street West & Mississauga Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	218	1328	59	87	1263	415	66	257	92	268	300	317
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	1.0	5.0	5.0	2.0	5.0	5.0	1.0	5.0	5.0	1.0	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1530	1770	1863	1583	1770	1863	1554
Flt Permitted	0.09	1.00	1.00	0.10	1.00	1.00	0.24	1.00	1.00	0.35	1.00	1.00
Satd. Flow (perm)	175	3539	1583	190	3539	1530	448	1863	1583	651	1863	1554
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	227	1383	61	91	1316	432	69	268	96	279	312	330
RTOR Reduction (vph)	0	0	10	0	0	59	0	0	32	0	0	148
Lane Group Flow (vph)	227	1383	51	91	1316	373	69	268	64	279	312	182
Confl. Peds. (#/hr)	7					7	5					5
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	84.0	73.0	73.0	75.1	68.1	68.1	37.9	30.0	30.0	36.1	29.1	29.1
Effective Green, g (s)	86.0	76.0	76.0	79.1	71.1	71.1	41.9	33.0	33.0	40.1	32.1	32.1
Actuated g/C Ratio	0.61	0.54	0.54	0.56	0.51	0.51	0.30	0.24	0.24	0.29	0.23	0.23
Clearance Time (s)	3.0	8.0	8.0	4.0	8.0	8.0	3.0	8.0	8.0	3.0	8.0	8.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	277	1921	859	209	1797	777	228	439	373	258	427	356
v/s Ratio Prot	c0.09	c0.39		0.03	0.37		c0.02	0.14		c0.07	c0.17	
v/s Ratio Perm	0.42		0.03	0.22		0.24	0.07		0.04	0.24		0.12
v/c Ratio	0.82	0.72	0.06	0.44	0.73	0.48	0.30	0.61	0.17	1.08	0.73	0.51
Uniform Delay, d1	31.1	24.0	15.1	19.3	27.0	22.4	37.1	47.8	42.6	49.2	49.9	47.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	17.0	2.4	0.1	1.5	2.7	2.1	0.8	2.5	0.2	79.4	6.3	1.2
Delay (s)	48.0	26.4	15.2	20.8	29.7	24.6	37.8	50.3	42.8	128.6	56.3	48.3
Level of Service	D	C	B	C	C	C	D	D	D	F	E	D
Approach Delay (s)		28.9			28.0			46.6			75.3	
Approach LOS		C			C			D			E	

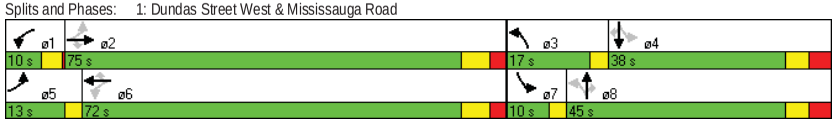
Intersection Summary					
HCM Average Control Delay	38.9	HCM Level of Service		D	
HCM Volume to Capacity ratio	0.73				
Actuated Cycle Length (s)	140.0	Sum of lost time (s)		8.0	
Intersection Capacity Utilization	90.4%	ICU Level of Service		E	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	322	1661	63	79	839	263	78	351	124	295	298	210
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	4.0	8.0	8.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	9.0	43.0	43.0	8.0	43.0	43.0	9.0	45.0	45.0	9.0	38.0	38.0
Total Split (s)	13.0	75.0	75.0	10.0	72.0	72.0	17.0	45.0	45.0	10.0	38.0	38.0
Total Split (%)	9.3%	53.6%	53.6%	7.1%	51.4%	51.4%	12.1%	32.1%	32.1%	7.1%	27.1%	27.1%
Yellow Time (s)	3.0	5.0	5.0	3.5	5.0	5.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	0.5	3.0	3.0	0.0	4.0	4.0	0.0	4.0	4.0
Lost Time Adjust (s)	-2.0	-3.0	-3.0	-2.0	-3.0	-3.0	-2.0	-3.0	-3.0	-2.0	-3.0	-3.0
Total Lost Time (s)	1.0	5.0	5.0	2.0	5.0	5.0	1.0	5.0	5.0	1.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	89.8	74.9	74.9	81.5	69.6	69.6	48.0	34.2	34.2	44.5	31.5	31.5
Actuated g/C Ratio	0.64	0.54	0.54	0.58	0.50	0.50	0.34	0.24	0.24	0.32	0.22	0.22
v/c Ratio	0.77	0.90	0.08	0.48	0.49	0.33	0.30	0.79	0.31	1.40	0.73	0.41
Control Delay	27.0	37.4	13.2	27.2	25.0	13.5	33.1	61.9	29.3	238.0	60.7	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.0	37.4	13.2	27.2	25.0	13.5	33.1	61.9	29.3	238.0	60.7	7.7
LOS	C	D	B	C	C	B	C	E	C	F	E	A
Approach Delay		35.0			22.6			50.5			112.0	
Approach LOS		C			C			D			F	

Intersection Summary			
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 116 (83%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.40			
Intersection Signal Delay: 47.2		Intersection LOS: D	
Intersection Capacity Utilization 101.3%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 1: Dundas Street West & Mississauga Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	322	1661	63	79	839	263	78	351	124	295	298	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	1.0	5.0	5.0	2.0	5.0	5.0	1.0	5.0	5.0	1.0	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1769	3539	1549	1770	3539	1542	1770	1863	1559	1769	1863	1583
Flt Permitted	0.24	1.00	1.00	0.06	1.00	1.00	0.25	1.00	1.00	0.21	1.00	1.00
Satd. Flow (perm)	443	3539	1549	109	3539	1542	457	1863	1559	399	1863	1583
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	329	1695	64	81	856	268	80	358	127	301	304	214
RTOR Reduction (vph)	0	0	8	0	0	57	0	0	32	0	0	166
Lane Group Flow (vph)	329	1695	56	81	856	211	80	358	95	301	304	48
Confl. Peds. (#/hr)	3		1	1		3			3	3		
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	82.8	71.9	71.9	73.5	66.6	66.6	40.9	31.2	31.2	35.5	28.5	28.5
Effective Green, g (s)	84.8	74.9	74.9	77.5	69.6	69.6	43.2	34.2	34.2	39.5	31.5	31.5
Actuated g/C Ratio	0.61	0.54	0.54	0.55	0.50	0.50	0.31	0.24	0.24	0.28	0.22	0.22
Clearance Time (s)	3.0	8.0	8.0	4.0	8.0	8.0	3.0	8.0	8.0	3.0	8.0	8.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	412	1893	829	166	1759	767	251	455	381	201	419	356
v/s Ratio Prot	c0.09	c0.48		0.03	0.24		c0.03	0.19		c0.10	0.16	
v/s Ratio Perm	0.40		0.04	0.24		0.14	0.07		0.06	c0.33		0.03
v/c Ratio	0.80	0.90	0.07	0.49	0.49	0.28	0.32	0.79	0.25	1.50	0.73	0.14
Uniform Delay, d1	16.3	29.1	15.7	26.9	23.3	20.5	36.3	49.5	42.6	47.6	50.2	43.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.4	7.1	0.2	2.3	1.0	0.9	0.7	8.7	0.3	248.2	6.1	0.2
Delay (s)	26.6	36.1	15.9	29.2	24.3	21.4	37.0	58.2	42.9	295.8	56.4	43.5
Level of Service	C	D	B	C	C	C	D	E	D	F	E	D
Approach Delay (s)		34.0			24.0			51.8			141.0	
Approach LOS		C			C			D			F	

Intersection Summary					
HCM Average Control Delay	52.3	HCM Level of Service		D	
HCM Volume to Capacity ratio	0.97				
Actuated Cycle Length (s)	140.0	Sum of lost time (s)		3.0	
Intersection Capacity Utilization	101.3%	ICU Level of Service		G	
Analysis Period (min)	15				

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	8	44	509	3	15	425
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	8	45	519	3	15	434
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						234
pX, platoon unblocked	0.85					
vC, conflicting volume	985	521			522	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	894	521			522	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	92			99	
cM capacity (veh/h)	261	555			1044	

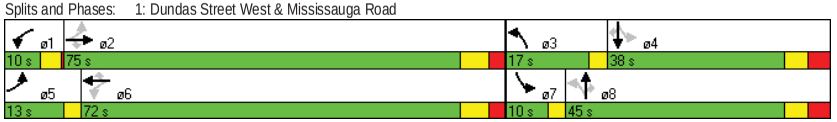
Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	8	45	522	449
Volume Left	8	0	0	15
Volume Right	0	45	3	0
cSH	261	555	1700	1044
Volume to Capacity	0.03	0.08	0.31	0.01
Queue Length 95th (m)	0.7	1.8	0.0	0.3
Control Delay (s)	19.2	12.1	0.0	0.5
Lane LOS	C	B		A
Approach Delay (s)	13.2		0.0	0.5
Approach LOS	B			

Intersection Summary			
Average Delay		0.9	
Intersection Capacity Utilization		44.5%	ICU Level of Service A
Analysis Period (min)		15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	218	1328	70	114	1263	415	73	262	110	268	308	317
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	4.0	8.0	8.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	9.0	43.0	43.0	8.0	43.0	43.0	9.0	45.0	45.0	9.0	38.0	38.0
Total Split (s)	13.0	75.0	75.0	10.0	72.0	72.0	17.0	45.0	45.0	10.0	38.0	38.0
Total Split (%)	9.3%	53.6%	53.6%	7.1%	51.4%	51.4%	12.1%	32.1%	32.1%	7.1%	27.1%	27.1%
Yellow Time (s)	3.0	5.0	5.0	3.5	5.0	5.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	0.5	3.0	3.0	0.0	4.0	4.0	0.0	4.0	4.0
Lost Time Adjust (s)	-2.0	-3.0	-3.0	-2.0	-3.0	-3.0	-2.0	-3.0	-3.0	-2.0	-3.0	-3.0
Total Lost Time (s)	1.0	5.0	5.0	2.0	5.0	5.0	1.0	5.0	5.0	1.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	90.6	75.2	75.2	81.7	69.3	69.3	47.2	33.4	33.4	43.9	30.9	30.9
Actuated g/C Ratio	0.65	0.54	0.54	0.58	0.50	0.50	0.34	0.24	0.24	0.31	0.22	0.22
v/c Ratio	0.78	0.73	0.08	0.56	0.75	0.53	0.31	0.61	0.28	0.99	0.78	0.68
Control Delay	44.4	28.5	12.1	23.3	32.4	20.2	33.5	52.8	24.5	92.1	64.6	28.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.4	28.5	12.1	23.3	32.4	20.2	33.5	52.8	24.5	92.1	64.6	28.1
LOS	D	C	B	C	C	C	C	D	C	F	E	C
Approach Delay		29.9			29.0			42.6			59.9	
Approach LOS		C			C			D			E	

Intersection Summary			
Cycle Length: 140			
Actuated Cycle Length: 140			
Offset: 116 (83%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 36.4		Intersection LOS: D	
Intersection Capacity Utilization 90.6%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 1: Dundas Street West & Mississauga Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	218	1328	70	114	1263	415	73	262	110	268	308	317
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	1.0	5.0	5.0	2.0	5.0	5.0	1.0	5.0	5.0	1.0	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1530	1770	1863	1583	1770	1863	1554
Flt Permitted	0.09	1.00	1.00	0.10	1.00	1.00	0.21	1.00	1.00	0.36	1.00	1.00
Satd. Flow (perm)	164	3539	1583	187	3539	1530	383	1863	1583	676	1863	1554
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	227	1383	73	119	1316	432	76	273	115	279	321	330
RTOR Reduction (vph)	0	0	12	0	0	60	0	0	38	0	0	144
Lane Group Flow (vph)	227	1383	61	119	1316	372	76	273	77	279	321	186
Confl. Peds. (#/hr)	7					7	5					5
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	83.6	72.2	72.2	73.8	66.4	66.4	39.9	30.4	30.4	34.9	27.9	27.9
Effective Green, g (s)	85.6	75.2	75.2	77.8	69.4	69.4	42.4	33.4	33.4	38.9	30.9	30.9
Actuated g/C Ratio	0.61	0.54	0.54	0.56	0.50	0.50	0.30	0.24	0.24	0.28	0.22	0.22
Clearance Time (s)	3.0	8.0	8.0	4.0	8.0	8.0	3.0	8.0	8.0	3.0	8.0	8.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	286	1901	850	210	1754	758	230	444	378	258	411	343
v/s Ratio Prot	c0.09	c0.39		0.04	0.37		c0.03	0.15		c0.07	0.17	
v/s Ratio Perm	0.39		0.04	0.28		0.24	0.07		0.05	c0.23		0.12
v/c Ratio	0.79	0.73	0.07	0.57	0.75	0.49	0.33	0.61	0.20	1.08	0.78	0.54
Uniform Delay, d1	32.9	24.6	15.6	20.7	28.3	23.5	37.0	47.6	42.7	49.7	51.4	48.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.0	2.5	0.2	3.5	3.0	2.3	0.8	2.5	0.3	79.4	9.3	1.7
Delay (s)	46.9	27.1	15.8	24.1	31.3	25.8	37.9	50.1	42.9	129.1	60.7	50.0
Level of Service	D	C	B	C	C	C	D	D	D	F	E	D
Approach Delay (s)		29.3			29.6			46.3			77.4	
Approach LOS		C			C			D			E	

Intersection Summary				
HCM Average Control Delay	40.1	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.77			
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	3.0	
Intersection Capacity Utilization	90.6%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	5	30	415	8	46	446
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	5	31	432	8	48	465
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						229
pX, platoon unblocked	0.84					
vC, conflicting volume	997	436			441	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	899	436			441	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	95			96	
cM capacity (veh/h)	248	620			1119	

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	5	31	441	512
Volume Left	5	0	0	48
Volume Right	0	31	8	0
cSH	248	620	1700	1119
Volume to Capacity	0.02	0.05	0.26	0.04
Queue Length 95th (m)	0.4	1.1	0.0	0.9
Control Delay (s)	19.8	11.1	0.0	1.2
Lane LOS	C	B		A
Approach Delay (s)	12.4		0.0	1.2
Approach LOS	B			

Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	61.7%	ICU Level of Service	B	
Analysis Period (min)	15			

APPENDIX E

Level of Service Definitions

LEVEL OF SERVICE ANALYSIS AT SIGNALIZED INTERSECTIONS

To assist in clarifying the arithmetic analysis associated with traffic engineering, it is often useful to refer to "Level of Service". The term Level of Service implies a qualitative measure of traffic flow at an intersection. It is dependent upon vehicle delay and vehicle queue lengths at the approaches. Specifically, Level of Service criteria are stated in terms of the average stopped delay per vehicle for a 15-minute analysis period. The following table describes the characteristics of each level:

Level of Service	Features	Stopped Delay per Vehicle (sec)
A	At this level of service, almost no signal phase is fully utilized by traffic. Very seldom does a vehicle wait longer than one red indication. The approach appears open, turning movements are easily made and drivers have freedom of operation.	≤ 5.0
B	At this level, an occasional signal phase is fully utilized and many phases approach full use. Many drivers begin to feel somewhat restricted within platoons of vehicles approaching the intersection.	> 5.0 and ≤ 15.0
C	At this level, the operation is stable though with more frequent fully utilized signal phases. Drivers feel more restricted and occasionally may have to wait more than one red signal indication, and queues may develop behind turning vehicles. This level is normally employed in urban intersection design.	> 15.0 and ≤ 25.0
D	At this level, the motorist experiences increasing restriction and instability of flow. There are substantial delays to approaching vehicles during short peaks within the peak period, but there are enough cycles with lower demand to permit occasional clearance of developing queues and prevent excessive backups.	> 25.0 and ≤ 40.0
E	At this level, capacity is reached. There are long queues of vehicles waiting upstream of the intersection and delays to vehicles may extend to several signal cycles.	> 40.0 and ≤ 60.0
F	At this level, saturation occurs, with vehicle demand exceeding the available capacity.	> 60.0

LEVEL OF SERVICE ANALYSIS AT UNSIGNALIZED INTERSECTIONS[1]

The term "level of service" implies a qualitative measure of traffic flow at an intersection. It is dependent upon the vehicle delay and vehicle queue lengths at approaches. The level of service at unsignalized intersections is often related to the delay accumulated by flows on the minor streets, caused by all other conflicting movements. The following table describes the characteristics of each level.

Level of Service	Features
A	Little or no traffic delay occurs. Approaches appear open, turning movements are easily made, and drivers have freedom of operation.
B	Short traffic delays occur. Many drivers begin to feel somewhat restricted in terms of freedom of operation.
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.
D	Long traffic delays occur. Motorists emerging from the minor street experience significant restriction and frustration. Drivers on the major street will experience congestion and delay as drivers emerging from the minor street interfere with the major through movements.
E	Very long traffic delays occur. Operations approach the capacity of the intersection.
F	Saturation occurs, with vehicle demand exceeding the available capacity. Very long traffic delays occur.

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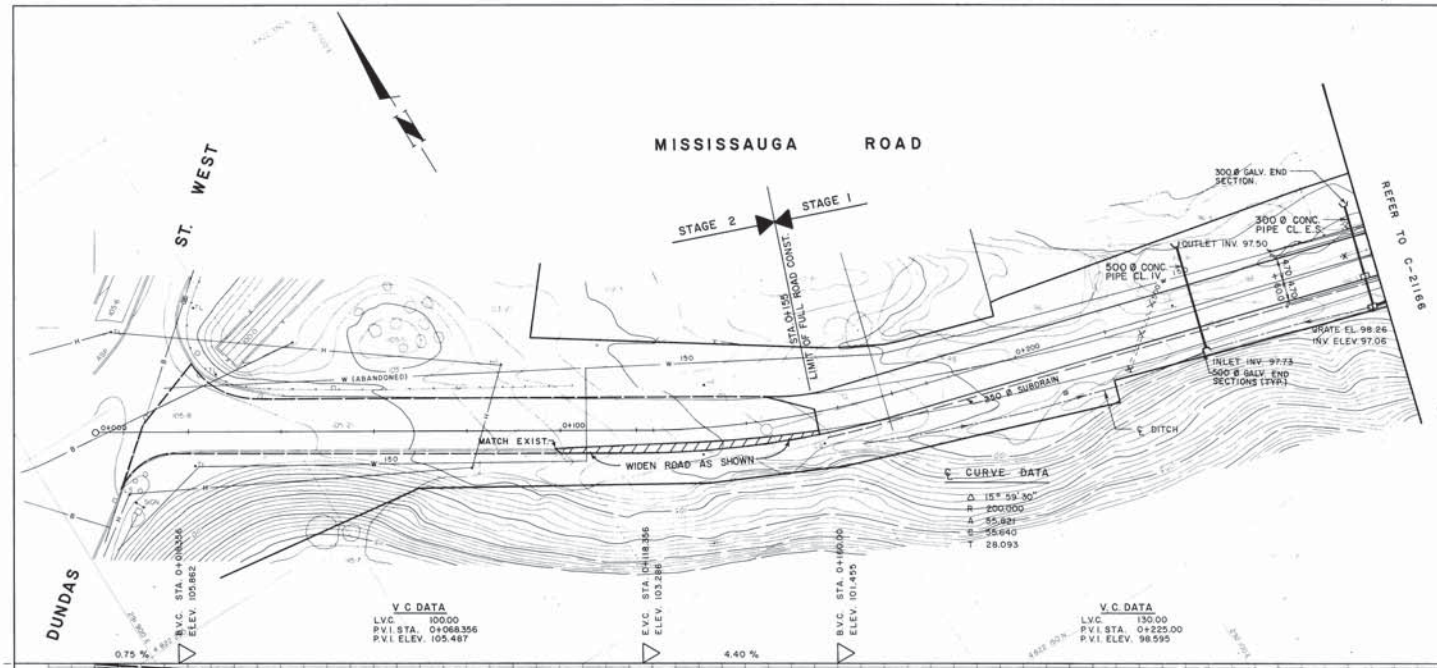
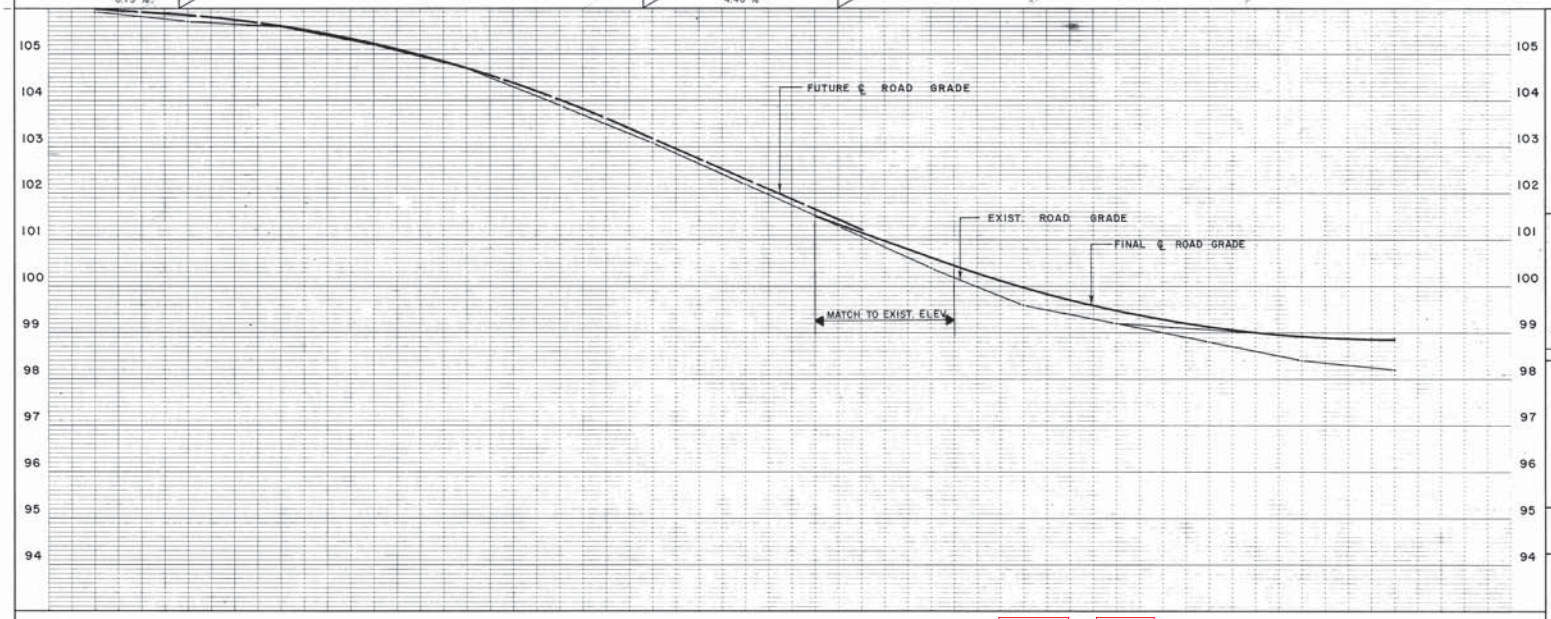
(1) Highway Capacity Manual - Special Report No. 209, Transportation Research Board, 1985.

APPENDIX F

Mississauga Road Elevation





106.000	105.849	105.614	105.233	104.706	104.033	103.215	102.335	101.455	100.650	99.997	99.493	99.141	98.940	98.889	FIN. RD. GR.
105.9	105.7	105.6	105.2	104.7	103.9	103.1	102.2	101.3	100.4	99.6	99.2	98.8	98.4	98.2	EX. RD. GR.
0+000	0+020	0+040	0+060	0+080	0+100	0+120	0+140	0+160	0+180	0+200	0+220	0+240	0+260	0+280	CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT	SERVICE	DATE	INIT
SAN. SEWERS	1985 05 09	T.J.	GAS MAINS	1985 05 09	T.J.
STORM SEWERS	1985 05 09	T.J.	BELL U/G CABLE	1985 05 09	T.J.
WATERMAINS	1985 05 09	T.J.	HYDRO U/G CABLE	1985 05 09	T.J.
M.O.E.	1985 05 09	T.J.			

REVISIONS

DATE	DETAILS	INIT

GENERAL NOTES

- ALL DRIVEWAYS ASPHALT UNLESS OTHERWISE NOTED.
- ALL SERVICE LOCATIONS ARE APPROXIMATE AND MUST BE LOCATED ACCURATELY IN FIELD.
- ● DENOTES BUILDING - NOT LOCATED.
- ■ DENOTES BUILDING - LOCATED.
- T.T.B.M No. ELEV.
- TEMP. BENCH MARK ELEV. DESCRIPTION.

E. BARONESE — DESIGNED BY — CHKD — APPROVED BY

CITY OF MISSISSAUGA
ENGINEERING AND WORKS DEPARTMENT

MISSISSAUGA ROAD
DUNDAS ST. WEST TO GLATT'S LANE
STN. 0+000 TO STN. 0+280

SCALE HOR. 1:500 VERT. 1:50	AREA Z-17	PROJECT No. 84-128
DRAWN BY T.J.	CHECKED BY	PLAN No. C-21165
DATE 1985 05 09	SHEET 1 OF 8	

C-21165

TAC; TRANSPORTATION ASSOCIATION OF CANADA
THE GEOMETRIC DESIGN GUIDE FOR CANADIAN ROADS
SEPTEMBER 1999

METRIC
ALL DIMENSIONS IN METRES

	LOCAL RESIDENTIAL ROADS	LOCAL INDUSTRIAL ROADS	MINOR RESIDENTIAL COLLECTOR ROADS	COLLECTOR ROADS	ARTERIAL ROADS
DESIGN SPEED	50 km/h	50 km/h	50/60 km/h	70 km/h	90 km/h
STOPPING SIGHT DISTANCE (TAC TABLE 2.1.3.2)	65 m	65 m	85 m SEE NOTE 7	110 m	170 m
STOPPING SIGHT DISTANCE (FOR CREST (VERTICAL CURVES)	65 m	65 m	90m SEE NOTE 7	120m	180m
MINIMUM RADIUS (C_L OF ROAD)	N/A	N/A	150m SEE NOTE 7	325m	580m
GRADE (MINIMUM) SEE NOTE 4	0.5%	0.5%	0.5%	0.5%	0.5%
GRADE (MAXIMUM)	7.0%	6.0%	6.0%	6.0%	6.0%
GRADE (MAXIMUM) THROUGH ROADS AT INTERSECTIONS	3.5%	3.0%	3.0%	3.0%	2.0%
GRADE (MAXIMUM) STOP ROADS AT INTERSECTIONS	2.5%	2.0%	2.0%	2.0%	1.0%
INTERSECTION ANGLE	70-90°	70-90°	70-90°	70-90°	80-90°
MINIMUM TANGENT LENGTH FOR INTERSECTION APPROACHES (FROM C_L)	40m	45m	45m	45m	75m

NOTES:

1. THIS STANDARD TO BE USED IN CONJUNCTION WITH CITY OF MISSISSAUGA STANDARDS (SECTION 2211 ROADWAYS)
2. CHANGES IN VERTICAL ALIGNMENT SHALL BE AS PER CITY OF MISSISSAUGA STANDARDS 2211.020 AND 2211.030
3. CHANNELIZATION WILL NORMALLY BE USED AT ARTERIAL TO ARTERIAL INTERSECTIONS. SEE CITY OF MISSISSAUGA STANDARD 2211.210
4. ON CUL-DE-SACS, THE CURB LINES OR EDGE OF PAVEMENT ARE TO MAINTAIN A MINIMUM GRADE OF 0.5%
5. STOPPING SIGHT DISTANCE REFER TO THE TAC MANUAL, TABLES 1.2.5.2 AND 1.2.5.3 DERIVED USING THE COEFFICIENT OF FRICTION FOR WET PAVEMENT.
6. MINIMUM RADII MAY BE REDUCED WITH THE USE OF SUPERELEVATION AS DIRECTED BY THE COMMISSIONER OF TRANSPORTATION AND WORKS. IF SUPERELEVATION IS USED, THE DESIGN IS TO ADHERE TO THE REQUIREMENTS OF TABLE 2.1.2.6 IN THE TAC MANUAL.
7. STOPPING SIGHT DISTANCES MEETS 60 km/h, MINIMUM RADIUS MEETS 50 km/h REQUIREMENTS.

MISSISSAUGA
Transportation and Works

STANDARD
GEOMETRIC DESIGN
STANDARDS FOR ROADS

EFF. DATE	2002-01-01	SCALE	N.T.S.
REV.		STANDARD No.	2211.010

APPENDIX G

Sight Line Review

SIGHT DISTANCE REVIEW STUDY

Trans-Plan Inc.

Location: 2935 Mississauga Road, Mississauga
Date: Thursday October 8, 2020
Time:
Weather: Sunny, 14ºC
Surveyors: Trans-Plan

Number of Lanes 2
Posted Speed Limit: 50 km/h
Design Speed: 60 km/h

Measured 1 Meter Back of Mississauga Road

Looking South (Left) on Driveway					Looking North (Right) on Driveway				
Available Sight Distance (m)	Reason	Criteria	Required Sight Distance (m)	Requirement Met? (Y / N)	Available Sight Distance (m)	Reason	Criteria	Required Sight Distance (m)	Requirement Met? (Y / N)
134	Horizontal Curve	SSD	85	Y	121	Horizontal Curve/Visual Obstruction (Trees)	SSD	85	Y
		ISD	130	Y			ISD	130	N

Note: Referenced Table 9.9.4 and Table 9.9.6 from TAC 2017 for sight distance requirements