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Transportation Impact Study

PROPOSED MIXED-USE RESIDENTIAL DEVELOPMENT

5688 Main Street
Town of Whitchurch-Stouffville

October 4, 2024
Project No: NT-23-239
City File No: PRE22.099

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nexTrans CONSULTING ENGINEERS
NextEng Consulting Group Inc.

October 4, 2024

Hyson Properties Inc.
9210 Leslie Street, Unit 102
Richmond Hill, ON L4B 3J9

Attention: **Tom Zheng**

Re: **Engineering Service – Transportation Impact Study**
Proposed Mixed-Use Residential Development
5688 Main Street, Town of Whitchurch-Stouffville
Our Project No. NT-23-239

NexTrans Consulting Engineers (a Division of NextEng Consulting Group Inc.) is pleased to present the enclosed Transportation Impact Study in support of an Official Plan Amendment and Zoning By-Law Amendment application for a proposed mixed-use residential development at the above noted property.

The development proposal is to redevelop the existing subject lands to construct a 13-storey residential building with 254 dwelling units and 610.92 m^2 GFA dedicated to commercial land uses at-grade. A total of 286 vehicle parking spaces are provided on-site. Vehicular access to the development is proposed via a full movement driveway onto Palmwood Gate.

The study concludes that the proposed development can adequately be accommodated by the existing transportation network with a negligible traffic impact to the adjacent public roadways. We trust the enclosed sufficiently addresses your needs. Should you have any questions, please do not hesitate to contact the undersigned.

Yours truly,

NEXTRANS CONSULTING ENGINEERS

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Principal

Issues and Revisions Registry

Identification	Date	Description of issued and/or revision
Final Report	October 4, 2024	For Client submission

EXECUTIVE SUMMARY

NexTrans Consulting Engineers (A Division of NextEng Consulting Group Ltd.) was retained by Hyson Properties Inc., (the 'Client') to undertake a Transportation Impact Study for a mixed-use residential development. The subject property is located at the northwest corner of the Main Street and Palmwood Gate intersection and is municipally addressed as 5688 Main Street (herein referred to as the "subject site") in the Town of Whitchurch-Stouffville, within the Region of York.

Development Proposal

The development proposal is to redevelop the existing subject lands to construct a 13-storey residential building with 254 dwelling units and 610.92 m^2 GFA dedicated to commercial land uses at-grade. A total of 286 vehicle parking spaces are provided on-site. Vehicular access to the development is proposed via a full movement driveway onto Palmwood Gate.

Capacity Analysis

Based on the trip generation calculations, the proposed development is projected to generate a total of 86 new two-way trips (32 inbound and 54 outbound) and 123 new two-way trips (67 inbound and 56 outbound) during the weekday AM peak hour and PM peak hour.

Based on the capacity analysis of existing traffic conditions, all study area intersections are currently operating with residual capacity, with acceptable levels of service, and with manageable delays and queues lengths during weekday AM and PM peak hours.

Based on the results of the capacity analysis under 2032 future background traffic conditions, all study area intersections are projected to operate with residual capacity, with acceptable levels of service, and with manageable delays and queue lengths during weekday AM and PM peak hours, with the exception of the westbound left movement at the Palmwood Gate/ Mostar Street/ Main Street intersection during PM peak hour.

Based on the results of the capacity analysis under 2032 future total traffic conditions, all study area intersections and the proposed full movement site access are projected to operate with residual capacity, with acceptable levels of service, and with manageable delays and queue lengths during weekday AM and PM peak hours, with the exception of the westbound left movement at the Palmwood Gate/ Mostar Street/ Main Street intersection during PM peak hour, which was initially identified as a critical movement under future background traffic conditions.

To demonstrate that the projected operational deficiencies can be mitigated, signal timings were optimized until acceptable v/c ratios were achieved. When optimizing, the existing cycle length was maintained but the total splits were adjusted. The analysis conducted using optimized signal timings indicates that the projected operational deficiencies can be mitigated for the previously identified westbound left movement at the Palmwood Gate/ Mostar Street/ Main Street intersection during PM peak hour.

It is our recommendation that the Town and Region continue to monitor the movements of this intersection as developments within the area are built out.

Parking Review

Based on Town of Whitchurch-Stouffville's Zoning By-law 2010-001-ZO, a total of 401 vehicle parking spaces are required (318 resident spaces, 64 visitor spaces and 19 retail spaces). In comparing the technical parking requirement with the proposed parking supply of 286 spaces, there is an overall technical shortfall of 115 parking spaces (29% reduction).

In accordance with the Town's Zoning By-law requirements for barrier free parking, a total of 10 spaces are required. Further to the Zoning By-law requirements, five (5) spaces should be Type A and five (5) should be Type B spaces.

Based on the rates prescribed in Markham's Zoning By-law for bicycle parking, a total of 155 bicycle parking spaces (127 long-term and 28 short-term) are required for all proposed land uses on-site.

Several justifications are provided to support the proposed parking reduction in comparison to the Zoning By-law requirements such as proxy site parking utilization rates, recent provincial policies, the review of projected parking demands as per ITE Parking Generation Manual, the review of the Town's Draft Official Plan Policies, neighbourhood context and transportation demand management measures.

It is our opinion that the proposed development provides an adequate number of parking spaces to accommodate the projected demand given the justifications provided in this study.

It is our opinion that the implementation of the proposed TDM measures will work synergistically to reduce parking demand as well as to encourage other modes of travel, which is in accordance with the goals of the Town's Official Plan policies.

Loading Review

AutoTURN software was used to generate a vehicular turning template to confirm and demonstrate the accessibility of the proposed study area. The AutoTURN analysis confirms that the intended design vehicles can effectively maneuver within the site.

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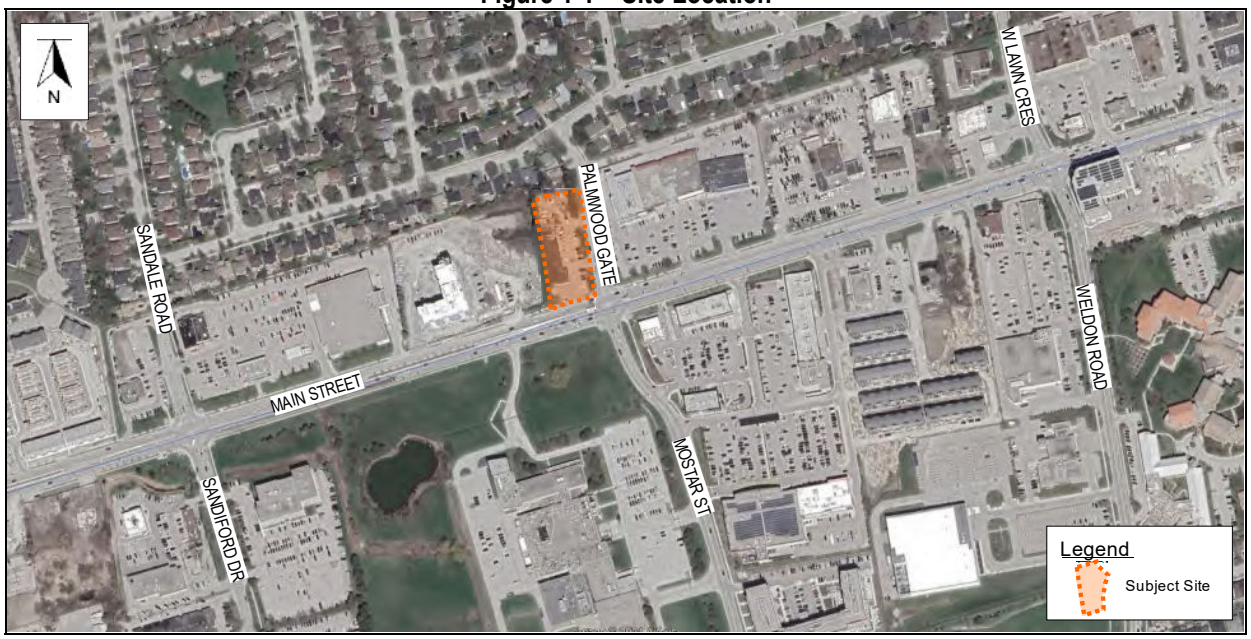
1.0 INTRODUCTION

NexTrans Consulting Engineers (A Division of NextEng Consulting Group Ltd.) was retained by Hyson Properties Inc., (the 'Client') to undertake a Transportation Impact Study for a mixed-use residential development. The subject property is located at the northwest corner of the intersection of Main Street and Palmwood Gate and is municipally addressed as 5688 Main Street (herein referred to as the "subject site") in the Town of Whitchurch-Stouffville, within the Region of York.

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

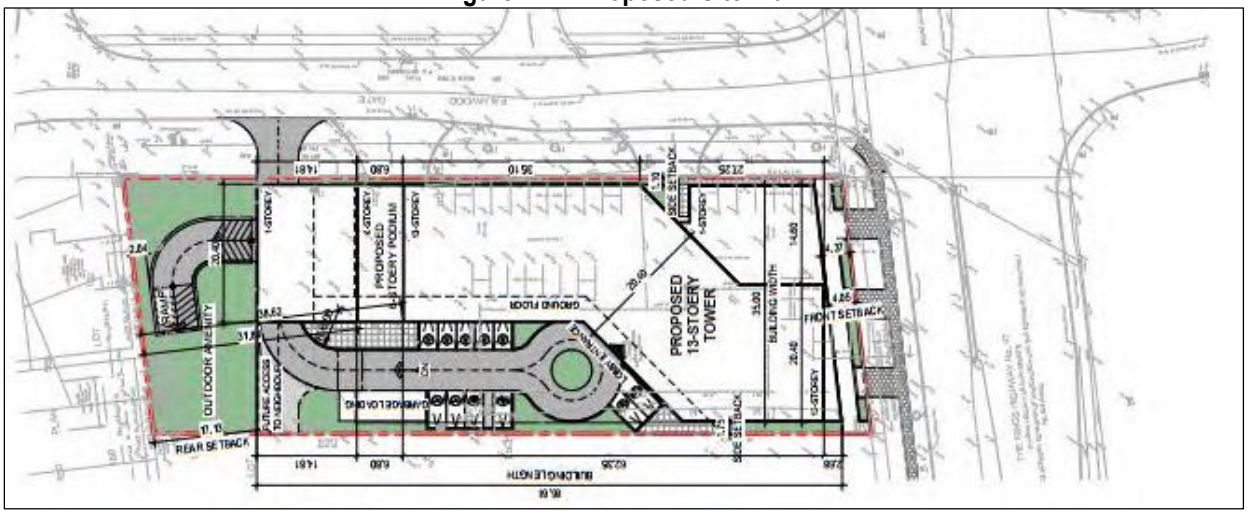
Figure 1-1 – Site Location



The subject lands are currently occupied by an existing commercial establishment. Based on the site plan prepared by TAES Architects Inc, the development proposal is to redevelop the existing subject lands to construct a 13-storey residential building with 254 dwelling units and 610.92S m^2 GFA dedicated to commercial uses at-grade. A total of 286 vehicle parking spaces are proposed on-site. Vehicular access to the development is proposed via a full movement driveway onto Palmwood Gate.

The site plan is illustrated in **Figure 1-2** and is enclosed in full detail in **Appendix A**.

Figure 1-2 – Proposed Site Plan



1.1. Study Approach

The weekday morning (AM) and weekday afternoon (PM) peak traffic study periods were assessed. A baseline year of 2024 was considered for existing conditions. A Terms of Reference (TOR) was established with the Town of Whitchurch-Stouffville and with York Region. The TOR proposed a 2029 horizon year; however, the Region suggested that this horizon year would be unrealistic and as such, a 2032 horizon year was analyzed instead (assuming a 2027 opening year).

The TOR and the comments provided by reviewing agencies are enclosed in **Appendix B**.

2.0 EXISTING TRAFFIC CONDITIONS

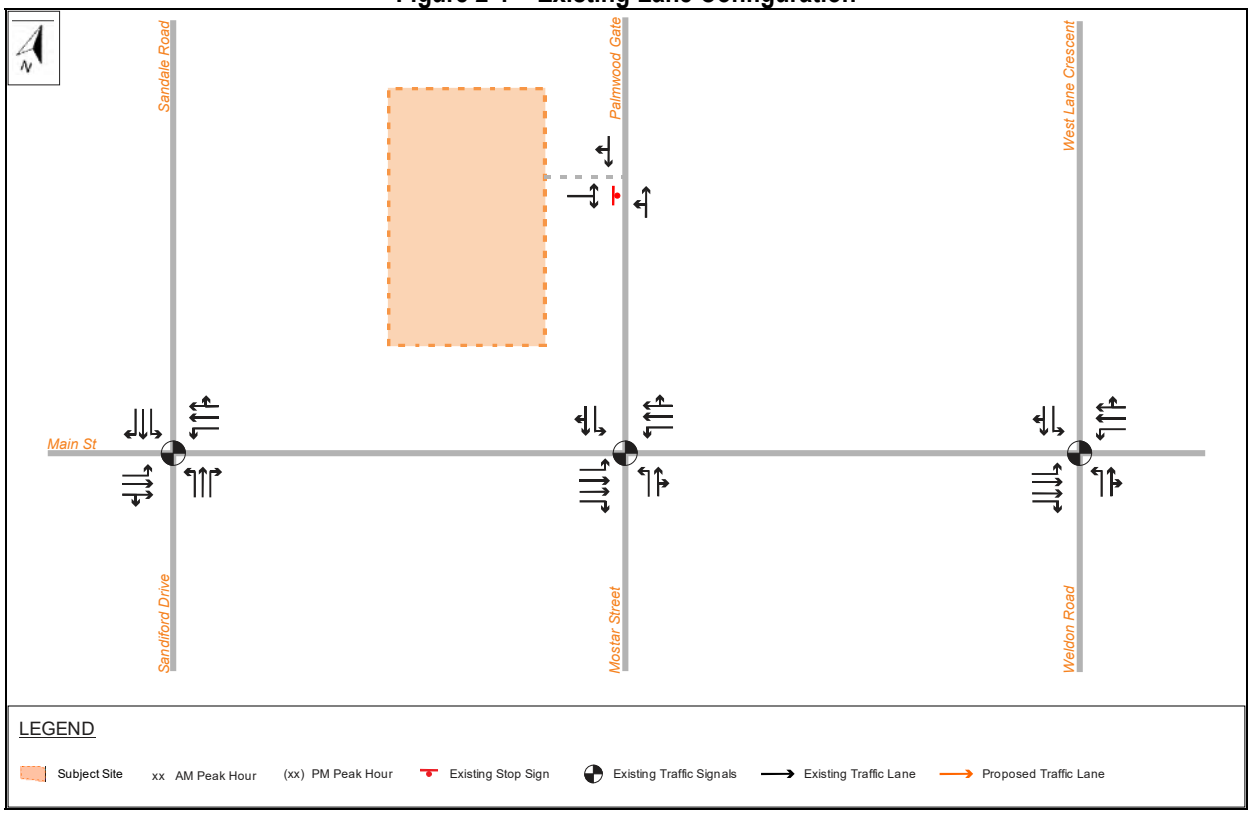
2.1. Existing Road Network

The subject lands are located at the northwest corner of the intersection of Main Street and Palmwood Gate, municipally addressed as 5688 Main Street, in the Town of Whitchurch-Stouffville, within the Region of York. The existing road network, lane configuration and existing traffic control for the study area are illustrated in **Figure 2-1** and described as follows:

- **Main Street** is an east-west urban arterial road under the jurisdiction of the Town of Whitchurch-Stouffville. Main Street has an existing two (2) lane cross-section (one (1) travel lane per direction), east of the intersection of Main Street and Ninth Line and four (4) lane cross-section (two (2) travel lanes per direction). Within the area of the subject site, Main Street has a posted speed limit of 50 km/h, west of the intersection of Main Street and Ninth Line and a posted speed limit of 40 km/h, east of the intersection of Main Street and Ninth Line.
- **Sandale Road** is a local road under the jurisdiction of the Town of Whitchurch-Stouffville that generally runs in the north south directions. Sandale road has an existing two (2) lane cross-section (one (1) travel lane per direction) and maintains an assumed unposted speed limit of 50km/h.

- **Sandiford Drive** is a collector road under the jurisdiction of the Town of Whitchurch-Stouffville that runs in the north south directions. Sandiford Drive has an existing two (2) lane cross-section (one (1) travel lane per direction) and maintains an assumed unposted speed limit of 50km/h.
- **West Lawn Crescent** is a local road under the jurisdiction of the Town of Whitchurch-Stouffville that generally runs in the north south directions. West Lawn Crescent has an existing two (2) lane cross-section (one (1) travel lane per direction) and maintains a posted speed limit of 40 km/h near the subject site.
- **Weldon Road** is a collector road under the jurisdiction of the Town of Whitchurch-Stouffville that generally runs in the north south directions. Weldon Road has an existing two (2) lane cross-section (one (1) travel lane per direction) and maintains a posted speed limit of 40 km/h near the subject site.

Figure 2-1 – Existing Lane Configuration



2.2. Existing Transit Infrastructure

Based on the study prepared by the Ministry of transportation of Ontario (MTO) entitled: 'Transit Supportive Guidelines', dated January 2012, transit users are generally willing to walk 400 meters to a local stop or 800 meters to a transit station. The subject site is located within an area with limited transit availability. There are multiple bus routes as well as a nearby GO station providing transit service near the subject site and is described below.

- **Stouffville Line**: generally, a north-south GO train line that operates between Union Station in downtown Toronto to Old Elm station in the Town of Whitchurch-Stouffville. The Main Street at Edward Street (Stouffville GO) station is located approximately 600 m east from the subject site. The Stouffville line operates with a headway frequency of one (1) hour.

- **YRT Bus Route 9** travels generally in the north / south directions from 5:45 AM – 8:15 PM on weekdays. The 9-bus line operates from the area of Hoover Park Drive and Highway 48 to the north and the area of Box Grove Bypass and Oakborough Drive to the south. The 70-bus line operates with a headway frequency of approximately 35 minutes. The closest bus stop is at the intersection of Ninth Line and Main Street which is a one (1) minute walk (approximately 50 m) from the subject site.
- **GO Bus Line 70** travels generally in the north / south directions from 5:45 AM – 11:30 PM Monday to Friday, and from 7:45 AM – 11:30 PM Saturday and Sunday. The 70-bus line operates from Uxbridge to the north and Union Station in Downtown Toronto to the south and provides direct connection to the GO Station. The 70-bus line operates with a headway frequency of approximately 30 minutes. The closest bus stop is at the intersection of West Line Crescent / Weldon Road and Main Street which is a three (3) minute walk (approximately 250 m) from the subject site.

2.3. Existing Active Transportation Infrastructure

Sidewalks

Under existing conditions, sidewalks are available as follows:

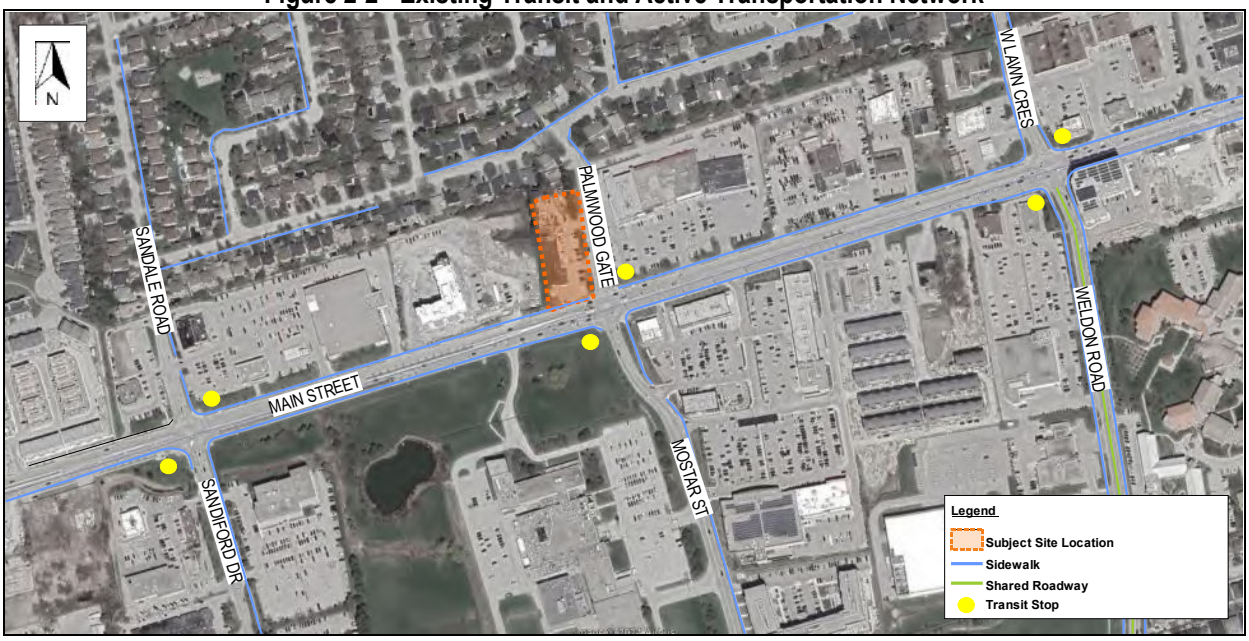
- Both sides of Main Street
- East side of Sandale Road
- East side of Sandiford Road
- East side of Palmwood Gate
- East side of Mostar Street
- Both sides of Weldon Road
- Both sides of West Lawn Crescent

Cycling

The York Region Interactive Cycling Map identifies that within the study area, Weldon Road is designated as a shared roadway and also provides a shared pathway within the boulevard.

Figure 2-2 illustrates active transportation provisions and transit facilities within the subject site.

Figure 2-2 - Existing Transit and Active Transportation Network



2.4. Transit Mode Assessment

The subject site is located in a transit-supportive area with two (2) transit stops located within a 400-meter radius (five (5) minute walk). In addition, it is important to note that the subject site is located under 1.5 km away from the Stouffville GO station. Intersection approach LOS was taken from the critical peak period from the existing traffic analysis. The transit level of service is summarized in **Table 2.1**.

Table 2.1 – Existing Transit Level of Service

Intersection	Direction	Access to Transit Stops	Transit Headways	Intersection Approach
		LOS	LOS	LOS
Palmwood Gate/Mostar Street and Main Street	NB	A	F	C
	SB	A	F	D
	EB	A	F	C
	WB	A	F	C

The results of the transit level of service assessment indicate that the intersection of Ninth Line & Main Street provide acceptable transit facilities, with excellent access to transit stops. It is noted that the transit services within the area operate with a 50-minute headway, resulting in a failing level of service. Given the subject site's proximity to the Stouffville GO station, there is the availability of higher-order transit; however, improved bus facilities along Main Street would greatly improve the connectivity of the study area.

2.5. Pedestrian Mode Assessment

It is noted that there is an extensive sidewalk network under existing conditions, and the Town's Transportation Master Plan identifies that it is the Town's goal to accommodate pedestrian improvements within the Town of Whitchurch-Stouffville. **Table 2.2** summarizes the pedestrian level of service within the area based on the criteria detailed in the Transportation Mobility Plan Guidelines.

Table 2.2 – Pedestrian Level of Service

Intersection	Direction	Segment		Intersection
		Description	LOS	LOS
Sandale Road/Sandiford Drive & Main Street	NB	Sandiford Road	B	B
	SB	Sandale Drive	B	B
	EB	Main Street	B	B
	WB	Main Street	B	B
Mostar Street/Palmwood Gate & Main Street	NB	Mostar Street	B	B
	SB	Palmwood Gate	F	B
	EB	Main Street	B	B
	WB	Main Street	B	B
Weldon Road / W Lawn Crescent & Main Street	NB	Weldon Road	B	B
	SB	W Lawn Crescent	B	B
	EB	Main Street	B	B
	WB	Main Street	C	C

The results of the pedestrian level of service assessment indicate that there is excellent sidewalk infrastructure within the study area.

2.6. Cycling Mode Assessment

As previously indicated in this study, there is a dedicated cycling lane along Ninth Line and a shared roadway along Weldon Road. As noted in Section 3.2 of this study, the Town plans to implement bike lanes along Ninth Line and paved shoulders along Main Street for cyclists. The cycling mode assessment is provided in **Table 2.3**.

Table 2.3 – Cycling Level of Service

Intersection	Direction	Segment		Intersection
		Description	LOS	LOS
Sandale Road/Sandiford Drive & Main Street	NB	Sandiford Road	F	F
	SB	Sandale Drive	F	F
	EB	Main Street	F	F
	WB	Main Street	F	F
Mostar Street/Palmwood Gate & Main Street	NB	Mostar Street	F	F
	SB	Palmwood Gate	F	F
	EB	Main Street	F	F
	WB	Main Street	F	F
Weldon Road / W Lawn Crescent & Main Street	NB	Weldon Road	F	F
	SB	W Lawn Crescent	E	E
	EB	Main Street	F	F
	WB	Main Street	F	F

The results of the cycling level of service assessment indicate that there is limited cycling infrastructure availability within the study area. There are planned cycling infrastructure improvements that will provide cyclists with improved connectivity to the proposed development – namely the proposed in-boulevard facilities envisioned along Main Street.

2.7. Existing Traffic Volumes

Weekday morning and afternoon peak period turning movement counts (TMC) were undertaken by Spectrum Traffic for all study area intersection during the weekday AM and PM peak periods. Existing traffic data, including TMC data and signal timing plans provided by the Region, are enclosed in **Appendix C**. A summary of traffic data collection is provided in **Table 2.4**.

Table 2.4: Traffic Data Collection Summary

Intersection	Source	Survey Date
Sandale Road/Sandiford Drive & Main Street	Spectrum Traffic Inc.	February 14, 2024
Palmwood Gate/Mostar Street & Main Street	Spectrum Traffic Inc.	February 14, 2024
West Lawn Crescent/Weldon Road & Main Street	Spectrum Traffic Inc.	February 14, 2024

2.8. Existing Traffic Assessment

The existing traffic volumes are illustrated in **Figure 2-3** and were analyzed using Synchro 10 software. The methodology of the software follows the procedures described and outlined in the highway capacity manual, HCM 2000, published by the Transportation Research Board.

It is noted that the peak hour factor (PHF) was calculated for each of the study area intersections for both AM and PM peak hours. The calculated PHF was carried forward in all future scenarios as well.

Peak hour factors were calculated and applied per intersection using the following equation:

$$PHF = \frac{total\ peak\ hour\ volume}{4 * peak\ 15\ minute\ volume}$$

The detailed results are provided in **Appendix D** and summarized in **Table 2.5**.

Table 2.5: Level of Service – Existing Traffic Assessments

Intersection	Movement	Weekday AM Peak Hour					Weekday PM Peak Hour				
		v/c	Delay (s)	LOS	Queue		v/c	Delay (s)	LOS	Queue	
					50th	95th				50th	95th
Signalized Intersections											
Sandale Road/Sandiford Drive & Main Street	**Overall**	**0.43**	**20.5**	**C**	**-**	**-**	**0.62**	**24.3**	**C**	**-**	**-**
	EBL	0.18	18.1	B	7.9	16.8	0.48	25.0	C	23.9	44.5
	EBT	0.45	20.9	C	56.2	72.2	0.65	24.4	C	100.6	123.1
	WBL	0.46	13.0	B	17.1	27.3	0.43	15.7	B	10.2	17.7
	WBT	0.33	12.4	B	37.1	48.1	0.37	12.8	B	46.5	58.7
	NBL	0.33	37.1	D	21.0	37.4	0.59	44.5	D	43.3	69.2
	NBT	0.11	33.0	C	10.4	20.9	0.21	34.4	C	20.3	35.3
	NBR	0.06	32.4	C	0.0	12.9	0.09	32.8	C	0.0	15.0
	SBL	0.22	33.9	C	14.9	28.4	0.36	35.6	D	24.1	41.9
	SBT	0.18	33.4	C	17.3	31.1	0.14	32.9	C	13.2	25.3
	SBR	0.04	32.0	C	0.0	7.0	0.07	32.3	C	0.0	13.7
Mostar Street/Palmwood Gate & Main Street	**Overall**	**0.40**	**18.9**	**B**	-	-	**0.75**	**24.0**	**C**	-	-
	EBL	0.12	17.5	B	4.6	10.8	0.22	18.6	B	9.2	19.4
	EBT	0.36	19.7	B	45.2	56.8	0.61	23.6	C	93.2	114.2
	EBR	0.10	17.1	B	0.0	10.1	0.15	17.6	B	6.3	18.6
	WBL	0.44	13.2	B	19.8	30.1	0.80	31.5	C	22.5	43.7
	WBT	0.40	14.4	B	51.7	62.9	0.40	14.4	B	52.7	66.1
	NBL	0.31	34.8	C	21.3	36.5	0.59	42.5	D	46.2	72.9
	NBT	0.13	31.4	C	6.5	19.7	0.39	35.9	D	35.2	58.5
	SBL	0.04	30.1	C	2.5	7.5	0.11	31.0	C	5.7	13.9
	SBT	0.15	31.2	C	11.4	23.6	0.18	31.6	C	16.4	30.7

Table 2.5: Level of Service – Existing Traffic Assessments (Continued)

Intersection	Movement	Weekday AM Peak Hour					Weekday PM Peak Hour				
		v/c	Delay (s)	LOS	Queue		v/c	Delay (s)	LOS	Queue	
					50th	95th				50th	95th
Signalized Intersections											
Weldon Road / W Lawn Crescent & Main Street	**Overall**	**0.53**	**27.3**	**C**	-	-	**0.48**	**27.2**	**C**	-	-
	EBL	0.28	21.4	C	6.5	12.4	0.41	19.9	B	13.2	23.0
	EBT	0.46	26.6	C	57.6	67.5	0.65	28.4	C	100.5	123.6
	EBR	0.09	27.2	C	1.8	12.2	0.08	20.4	C	1.2	11.7
	WBL	0.56	21.3	C	23.4	34.1	0.41	21.9	C	10.1	18.7
	WBT	0.63	29.8	C	90.9	102.1	0.58	28.7	C	81.4	101.4
	NBL	0.23	22.0	C	12.5	21.4	0.24	23.0	C	16.9	29.3
	NBT	0.21	22.5	C	19.8	32.6	0.24	24.1	C	23.3	40.1
	SBL	0.11	27.4	C	7.2	15.0	0.18	30.6	C	11.6	23.1
	SBT	0.42	31.1	C	45.0	63.5	0.20	30.7	C	15.2	31.4

Based on the capacity analysis of existing traffic conditions, all study area intersections are currently operating with residual capacity, with acceptable levels of service, and with manageable delays and queues lengths during weekday AM and PM peak hours.

3.0 FUTURE BACKGROUND CONDITIONS

3.1. Future Corridor Growth

Background developments in the study area were reviewed to determine an appropriate growth rate to apply to the existing turning movement counts to project future corridor growth. Nextrans' review of background developments determined that a 2% growth rate per annum was appropriate and was used to project the baseline future background traffic volumes. The baseline future background traffic volumes are illustrated in **Figure 3-1**.

3.2. Planned Transportation Road Network Improvements

The Whitchurch-Stouffville Transportation Master Plan, 2017 was reviewed to determine planned transportation infrastructure improvements within the study area. Our review of the Town's Transportation Master Plan (TMP) indicates that there are no roadway improvements along Main Street nor along any of the intersecting streets that form the study area for this TIS.

In reviewing the Town's TMP for planned active transportation facilities improvements, it is to be noted that along Main Street, in-boulevard cycling facilities are envisioned between Highway 48 and Ninth Line.

3.3. Background Developments

A comprehensive review of background developments in the subject area was conducted to identify future traffic contributors within the study area. The background developments incorporated in this study are summarized in **Table 3.1**. Excerpts of the traffic studies prepared in support of the reviewed background developments are enclosed in **Appendix E**.

Table 3.1: Background Developments

Development Applications	Description	Study Source
5531 Main Street	• 319 unit residential building • 732.35m² retail GFA	LEA Consulting Ltd. March 8th, 2023
5676 Main Street	• 97 unit affordable housing development • 184m² retail GFA	Tatham Engineering June 23, 2020
185-195 Mostar Street	• 3 single-storey industrial buildings with a total GFA of 7,014.09m²	Nextrans Consulting Engineers March 13, 2023
5945 Main Street	• 10-storey residential building with 166 dwelling units • 720m² retail GFA	WSP March 23, 2022
5472 Main Street	• 147 townhouse units • 31 units will be live/work units with approximately 16.3m² GFA of commercial space at grade	AECOM January 2019
5505 Main Street	• Existing 1-storey building to remain and converted to convenience store with 125.59m² GFA • 4 pump gas bar canopy • 500 gallon propane tank refill station	n Engineering Inc. April 27, 2023
5262, 5270, 5286 and 5318 Main Street and 12371 Highway 48	• Tower B – 20-storey residential building with 185 dwelling units • Tower C – 16-storey residential building with 155 dwelling units • Tower A – 20-storey residential tower with 150 dwelling units and 5,000ft² GFA • Tower D – 10-storey residential building with 160 dwelling units • Tower E – 10-storey residential building with 150 dwelling units	Trans-Plan May 2022

The cumulative background development site traffic generated by the proposed development is illustrated in **Figure 3-2**.

3.4. Future Background Traffic Assessment

A full build-out year of 2027 was assumed, and a five (5)-year horizon from the assumed build-out year was analyzed (2032). The estimated 2032 future background total traffic volumes are illustrated in **Figure 3-3** (i.e., future background base traffic volumes + background development site traffic volumes). The detailed calculations are provided in **Appendix F** and **Table 3.2** summarizes the level of service at the study area intersections under future background traffic conditions.

Table 3.2: Level of Service – Future Background Traffic Assessments

Intersection	Movement	Weekday AM Peak Hour					Weekday PM Peak Hour				
		v/c	Delay (s)	LOS	Queue 50th	Queue 95th	v/c	Delay (s)	LOS	Queue 50th	Queue 95th
Signalized Intersections											
Sandale Road/Sandiford Drive & Main Street	**Overall**	**0.52**	**21.4**	**C**	**-**	**-**	**0.73**	**26.9**	**C**	**-**	**-**
	EBL	0.21	19.0	B	8.3	17.7	0.62	32.5	C	27.0	54.2
	EBT	0.56	22.8	C	76.6	96.2	0.80	29.6	C	141.3	171.3
	WBL	0.58	16.3	B	17.7	28.2	0.62	26.6	C	10.7	27.7
	WBT	0.40	13.3	B	50.1	63.1	0.47	14.2	B	65.1	80.3
	NBL	0.35	37.7	D	22.7	40.0	0.63	46.3	D	47.0	74.5
	NBT	0.11	33.0	C	10.4	20.9	0.21	34.4	C	20.3	35.3
	NBR	0.06	32.4	C	0.0	12.9	0.09	32.8	C	0.0	15.0
	SBL	0.22	33.9	C	14.9	28.4	0.36	35.6	D	24.1	41.9
	SBT	0.18	33.4	C	17.3	31.1	0.14	32.9	C	13.2	25.3
	SBR	0.04	32.0	C	0.0	7.6	0.09	32.4	C	1.2	15.4
Mostar Street/Palmwood Gate & Main Street	**Overall**	**0.50**	**19.8**	**B**	-	-	**1.01**	**34.1**	**C**	-	-
	EBL	0.15	17.8	B	4.6	11.2	0.29	19.6	B	9.6	21.0
	EBT	0.46	21.1	C	63.0	77.0	0.75	27.4	C	128.1	155.0
	EBR	0.10	17.2	B	0.6	10.7	0.17	17.8	B	9.6	22.7
	WBL	0.57	15.6	B	21.3	32.0	1.19	151.5	F	46.7	98.6
	WBT	0.49	15.6	B	68.4	81.5	0.50	15.9	B	72.5	88.9
	NBL	0.31	34.9	C	21.7	37.1	0.60	42.7	D	46.9	74.2
	NBT	0.13	31.5	C	6.4	20.1	0.40	36.0	D	35.9	59.5
	SBL	0.04	30.1	C	2.5	7.5	0.11	31.0	C	5.7	13.9
	SBT	0.15	31.2	C	11.4	23.6	0.18	31.6	C	16.4	30.7
Weldon Road / W Lawn Crescent & Main Street	**Overall**	**0.61**	**30.3**	**C**	-	-	**0.57**	**32.3**	**C**	-	-
	EBL	0.38	24.4	C	6.5	12.4	0.56	25.6	C	13.2	23.0
	EBT	0.59	28.7	C	78.4	89.2	0.84	36.1	D	137.8	167.1
	EBR	0.08	22.3	C	1.5	10.3	0.08	21.4	C	1.2	11.7
	WBL	0.74	31.8	C	24.9	37.5	0.54	27.2	C	11.1	22.9
	WBT	0.78	34.2	C	120.8	132.4	0.74	33.0	C	112.1	137.2
	NBL	0.23	22.0	C	12.5	21.4	0.24	22.6	C	16.9	29.3
	NBT	0.22	22.6	C	19.9	32.9	0.25	23.9	C	24.4	41.8
	SBL	0.11	27.5	C	7.6	15.4	0.19	30.3	C	12.0	23.8
	SBT	0.42	31.1	C	45.0	63.5	0.20	30.3	C	15.2	31.4

Based on the results of the capacity analysis under 2032 future background traffic conditions, all study area intersections are expected to operate with residual capacity, with acceptable levels of service, and with manageable delays and queue lengths during weekday AM and PM peak hours, with the exception of the westbound left movement at the Mostar Street/Palmwood Gate & Main Street intersection during PM peak hour, which is identified as a critical movement. The critical movement identified is projected to operate with a volume to capacity (v/c) ratio of 1.19, with a failing level of service and with extensive delay and queue lengths.

It is to be noted that the critical westbound left movement identified at the intersection of Mostar Street/Palmwood Gate & Main Street is triggered as a result of the significant increase in opposing eastbound through traffic volumes that are projected as a result of corridor growth and background development site traffic volumes. **On this basis, it is our recommendation that York Region and the Town of Whitchurch-Stouffville continue to monitor the movements of the Mostar Street/Palmwood Gate & Main Street intersection as developments within the area are completed to explore opportunities for improvement.**

4.0 SITE TRAFFIC

4.1. Trip Generation

As previously identified, the development proposal is to redevelop the existing subject lands to construct a 13-storey residential building with 254 dwelling units and 610.92S m^2 GFA dedicated to commercial uses at-grade. Trip rates and site generated trips were derived from the information contained in the *Trip Generation Manual, 11th Edition* published by the Institute of Transportation Engineers (ITE) for "Multifamily Housing (High-Rise) Close to Rail Transit" (LUC 222) and "Strip Retail Plaza" (LUC 822).

It is noted that there is no specific land use code for mixed-use high-rise developments in the Trip Generation Manual and as such, it was deemed that a combination of the two aforementioned land use codes would be appropriate. Furthermore, the *ITE Trip Generation Handbook, 3rd Edition* does not provide pass-by trip information for the proposed retail land use and as such, no pass-by trips were considered. It is noted that the omission of pass-by trips provides a conservative approach. The trip generation summary is detailed in **Table 4.1**.

Table 4.1 – Site Traffic Trip Generation

ITE Land Use	Parameter	Morning Peak Hour			Afternoon Peak Hour		
		In	Out	Total	In	Out	Total
Multifamily Housing (High-Rise) Not Close to Rail Transit	Auto Trips	25	50	75	50	39	89
Shopping Plaza 40-150k	Auto Trips	7	4	11	17	17	34
Total Gross Trips		**32**	**54**	**86**	**67**	**56**	**123**

Based on the trip generation calculations, the proposed development is projected to generate a total of 86 new two-way trips (32 inbound and 54 outbound) and 123 new two-way trips (67 inbound and 56 outbound) during the weekday AM peak hour and PM peak hour.

4.2. Site Trip Distribution and Assignment

4.2.1. Residential Trip Distribution

The distribution of residential site-generated traffic was estimated using data extracted from the 2016 Transportation Tomorrow Survey (TTS) for traffic zone 2708. as well as assumptions based on existing road configuration and routes that travellers would be likely to take when accessing the subject site. Trip distribution is summarized in **Table 4.2** and TTS data extraction is provided in **Appendix G**.

Table 4.2 – Residential Site Traffic Trip Distribution

Corridor	Direction	AM		PM	
		Inbound	Outbound	Inbound	Outbound
Main Street	East	28%	5%	29%	22%
	West	52%	85%	49%	45%
Sandale Road	North	0%	0%	0%	0%
Sandiford Drive	South	0%	7%	0%	0%
Palmwood Gate	North	14%	3%	15%	33%
Mostar Street	South	5%	0%	7%	0%
West Lawn Crescent	North	0%	0%	0%	0%
Weldon Road	South	0%	0%	0%	0%
Total		**100%**	**100%**	**100%**	**100%**

4.2.2. Retail Trip Distribution

The distribution of retail site-generated traffic was estimated using existing traffic data splits, as well as assumptions based on existing road configuration and routes that travelers would likely take when accessing the subject site. Trip distribution is summarized in **Table 4.3** and existing TMC data splits are enclosed in **Appendix H**. For the purposes of this analysis, it was assumed that any inbound/outbound trips traveling eastbound/westbound on Main Street were assumed to continue travelling east/west on Main Street through the adjacent study area intersections.

Table 4.3 – Retail Site Traffic Trip Distribution

Corridor	Direction	AM		PM	
		Inbound	Outbound	Inbound	Outbound
Palmwood Gate/Mostar Street & Main Street					
Main Street	E	17%	14%	18%	23%
	W	41%	33%	32%	19%
Mostar Street	S	42%	53%	50%	58%
Total		**100%**	**100%**	**100%**	**100%**

Trip assignment for all site generated traffic is illustrated in **Figure 4-1**.

5.0 FUTURE TOTAL TRAFFIC CONDITIONS

5.1. Future Total Conditions

The forecasted future total traffic volumes (2032 future background traffic volumes plus site generated traffic volumes) are illustrated in **Figure 5-1** and were analyzed using Synchro 10 software. It is noted that the future total calculations account for the total site trips generated by both the west and east parcels. The detailed calculations are provided in **Appendix I** and are summarized in **Table 5.1**.

Table 5.1: Level of Service – Future Total Traffic Assessments

Intersection	Movement	Weekday AM Peak Hour					Weekday PM Peak Hour				
		v/c	Delay (s)	LOS	Queue		v/c	Delay (s)	LOS	Queue	
					50th	95th				50th	95th
Signalized Intersections											
Sandale Road/Sandiford Drive & Main Street	**Overall**	**0.54**	**21.5**	**C**	**-**	**-**	**0.75**	**28.4**	**C**	**-**	**-**
	EBL	0.22	19.2	B	8.4	17.9	0.78	46.1	D	36.6	79.7
	EBT	0.57	23.1	C	79.0	98.8	0.83	31.0	C	150.8	182.5
	WBL	0.60	17.1	B	18.0	28.5	0.65	29.5	C	10.7	32.7
	WBT	0.43	13.5	B	53.9	67.6	0.49	14.4	B	68.4	84.2
	NBL	0.35	37.7	D	22.7	40.0	0.63	46.3	D	47.0	74.5
	NBT	0.11	33.0	C	10.4	20.9	0.21	34.4	C	20.3	35.3
	NBR	0.06	32.4	C	0.0	12.9	0.09	32.8	C	0.0	15.0
	SBL	0.22	33.9	C	14.9	28.4	0.36	35.6	D	24.1	41.9
	SBT	0.18	33.4	C	17.3	31.1	0.14	32.9	C	13.2	25.3
	SBR	0.04	32.0	C	0.0	7.6	0.12	32.7	C	4.0	18.5

Table 5.1: Level of Service – Future Total Traffic Assessments (Continued)

Intersection	Movement	Weekday AM Peak Hour					Weekday PM Peak Hour				
		v/c	Delay (s)	LOS	Queue		v/c	Delay (s)	LOS	Queue	
					50th	95th				50th	95th
Signalized Intersections											
Mostar Street/Palmwood Gate & Main Street	**Overall**	**0.50**	**20.1**	**C**	-	-	**1.04**	**35.2**	**D**	-	-
	EBL	0.23	18.8	B	7.4	16.2	0.44	22.0	C	15.3	32.4
	EBT	0.46	21.1	C	63.0	77.0	0.77	27.8	C	131.6	159.0
	EBR	0.10	17.2	B	0.6	10.7	0.17	17.8	B	9.8	23.1
	WBL	0.57	15.6	B	21.3	32.0	1.23	166.7	F	50.0	101.9
	WBT	0.49	15.7	B	69.3	82.5	0.52	16.1	B	75.5	92.6
	NBL	0.33	35.3	D	21.9	37.5	0.61	43.6	D	47.2	74.9
	NBT	0.14	31.6	C	7.2	20.8	0.43	36.6	D	39.5	64.1
	SBL	0.05	30.2	C	3.0	8.4	0.17	31.6	C	8.0	17.7
	SBT	0.21	32.0	C	14.3	30.1	0.22	32.1	C	19.6	36.0
Weldon Road / W Lawn Crescent & Main Street	**Overall**	**0.62**	**30.5**	**C**	-	-	**0.58**	**32.7**	**C**	-	-
	EBL	0.39	24.7	C	6.5	12.4	0.58	26.5	C	13.2	23.5
	EBT	0.59	28.8	C	78.8	89.5	0.85	36.8	D	140.3	170.0
	EBR	0.08	22.3	C	1.5	10.3	0.08	21.4	C	1.2	11.7
	WBL	0.74	32.0	C	24.9	37.9	0.54	27.4	C	11.1	22.9
	WBT	0.78	34.5	C	122.2	134.0	0.75	33.5	C	115.3	141.1
	NBL	0.23	22.0	C	12.5	21.4	0.24	22.6	C	16.9	29.3
	NBT	0.22	22.6	C	19.9	32.9	0.25	23.9	C	24.4	41.8
	SBL	0.11	27.5	C	7.6	15.4	0.19	30.3	C	12.0	23.8
	SBT	0.42	31.1	C	45.0	63.5	0.20	30.3	C	15.2	31.4
Signalized Intersections											
Palmwood Gate & Site Access	EBL	0.00	8.8	A	-	0.1	0.02	10.0	A	-	0.5
	NBL	0.02	2.0	A	-	0.5	0.04	1.9	A	-	1.0

Based on the results of the capacity analysis under 2032 future total traffic conditions, all study area intersections, as well as the proposed full movement site access onto Palmwood Gate are projected to operate with residual capacity, with acceptable levels of service, and with manageable delays and queue lengths during weekday AM and PM peak hours, with the exception of the previously identified westbound left movement at the intersection of Mostar Street/Palmwood Gate & Main Street during PM peak hour.

In comparing the results of the future total analysis with the results of the future background analysis, specifically of the critical westbound left movement identified, it is to be noted that there are minor increases to the v/c, delay and queue lengths between future total and future background traffic conditions. In comparing the change in v/c, delay and queue lengths between existing conditions to future background conditions, it is to be noted that there is a greater delta than between future background and future total conditions. The delta between these scenarios is compared in **Table 5.2**.

Table 5.2 – Comparison of Westbound Left Movement at Mostar Street/ Palmwood Gate/ Main Street

Traffic Scenario	Movement	Weekday PM Peak Hour				
		v/c	Delay (s)	LOS	Queue	
					50th	95th
Existing Traffic Conditions	WBL	0.80	31.5	C	22.5	43.7
Future Background Traffic Conditions	WBL	1.19	151.5	F	46.7	98.6
Future Total Traffic Conditions	WBL	1.23	166.7	F	50.0	101.9

In comparing the v/c between existing traffic conditions and future background traffic conditions, it is noted that there is an increase of 0.39, whereas the increase between future background and future total traffic conditions is 0.04. Similarly, there is a significant 120s increase in delay, from existing traffic conditions to future background traffic conditions, whereas the increase in delay from future background traffic conditions to future total traffic conditions is 15s. The increase in 95th percentile queue lengths between existing and future background traffic conditions is 54.9m (i.e., the equivalent of approximately eight (8) car lengths, accounting for a 1m gap between queued vehicles), whereas the increase in 95th percentile queue lengths between future background and future total traffic conditions is 3.3m.

On this basis, the site traffic generated by the proposed development will have a negligible impact on the surrounding road network in comparison to the cumulative impact of the corridor growth and background development site traffic.

While the site traffic generated by the proposed development is projected to have a negligible impact to the surrounding road network, mitigative measures were explored for the critical westbound left movement at the intersection of Mostar Street/Palmwood Gate & Main Street during PM peak hour in the following subsection.

5.2. Mitigative Measures

To mitigate the projected operational deficiencies that are expected to occur as a result of the background traffic added to the road network, signal timings were optimized until acceptable v/c ratios were achieved. When optimizing, the existing cycle length was maintained but the total splits were adjusted. The optimized signal timings are compared to the existing signal timings in **Table 5.3** below.

Table 5.3 – Signal Timing Plan Optimization

Intersection	Movement	Total Split		
		Existing (s)	Optimized (s)	Difference (s)
PM Peak Hour				
Mostar Street/Palmwood Gate & Main Street	EBL	65.0	56.5	-8.5
	EBT	65.0	56.5	-8.5
	EBR	65.0	56.5	-8.5
	WBL	12.0	22.0	+10.0
	WBTR	77.0	78.5	+1.5
	NBL	43.0	41.5	-1.5
	NBTR	43.0	41.5	-1.5
	SBL	43.0	41.5	-1.5
	SBTR	43.0	41.5	-1.5

The results of the analysis using the optimized signal timings are summarized in **Table 5.4** below, and the full results are enclosed in **Appendix J**, along with the optimized signal timing details.

Table 5.4: Level of Service – Optimized Future Total Traffic Assessments

Intersection	Movement	Weekday AM Peak Hour					Weekday PM Peak Hour				
		v/c	Delay (s)	LOS	Queue		v/c	Delay (s)	LOS	Queue	
					50th	95th				50th	95th
Signalized Intersections											
Weldon Road / W Lawn Crescent & Main Street	**Overall**						**0.80**	**30.2**	**C**	-	-
	EBL						0.46	25.8	C	17.1	35.8
	EBT						0.84	34.7	C	145.8	178.2
	EBR						0.19	21.4	C	12.8	28.7
	WBL						0.85	53.9	D	40.3	75.1
	WBT						0.50	15.1	B	71.6	88.0
	NBL						0.64	46.1	D	48.1	76.3
	NBT						0.45	38.2	D	40.2	65.3
	SBL						0.18	32.8	C	8.2	18.1
	SBT						0.23	33.2	C	20.2	37.0

The results of the analysis of future total traffic conditions under the optimized signal timing plan during PM peak hour indicate that all movements of the Mostar Street/Palmwood Gate & Main Street intersection are projected to operate with residual capacity, with acceptable levels of service and with manageable delay and queue lengths.

As previously indicated in this study, the critical westbound left movement identified under future background traffic conditions is a result of the cumulative corridor growth and background development site traffic. The results of the future total traffic analysis indicate that the proposed development will have a negligible impact on the surrounding road network in comparison to the background traffic expected. As such, it is Nextrans' recommendation that York Region and the Town of Whitchurch-Stouffville continue to monitor the movements of the Mostar Street/Palmwood Gate & Main Street intersection as background developments are built out, and to explore opportunities for improvement, noting that the optimization of signal timings is an effective measure to mitigate the projected operational deficiencies.

6.0 PARKING ASSESSMENT

6.1. Parking Requirements

6.1.1. Vehicle Parking Requirements

The Zoning By-law No. 2010-001-ZO has been adopted by the Town of Whitchurch-Stouffville and it was enacted on January 13, 2011. The Zoning By-law is a comprehensive By-law covering the entire amalgamated Town of Whitchurch-Stouffville, and it is a replacement to the previously repealed Town-wide Zoning By-law 87-34.

The subject site is located in zone CM2, and the parking standards stipulated in Table 3.23.1 of the Town's comprehensive Zoning By-law for "Dwelling Units over Commercial Uses" and "Retail Store" were used in determining the minimum parking requirement on-site. The technical parking requirement for the proposed development is detailed in **Table 6.1**.

Table 6.1: Vehicle Parking Requirements

Land Use	Parameter	No. of Units / GFA (m^2)	Minimum Rate	Parking Requirement
Dwelling Units over Commercial Uses	Resident	254 units	1.25 spaces / unit	318 spaces
	Visitor		0.25 spaces / unit	64 spaces
Retail Store	-	610.92m^2	3 spaces / 100m^2	19 spaces
Total Parking Requirement				**401 spaces**
Parking Supply				**286 spaces**
Difference				**-115 spaces**

Based on Town of Whitchurch-Stouffville's Zoning By-law 2010-001-ZO, a total of 401 vehicle parking spaces are required (318 resident spaces, 64 visitor spaces and 19 retail spaces). In comparing the technical parking requirement with the proposed parking supply of 286 spaces, there is an overall technical shortfall of 115 parking spaces (29% reduction).

6.1.2. Barrier Free Parking Requirements

Section 3.23.2 of the Town's Zoning By-law 2010-001-ZO details barrier free parking requirements, which are detailed in **Table 6.2**.

Table 6.2: Barrier Free Parking Requirements

Total Parking Spaces Req'd	Barrier Free Parking Rate	Barrier Free Parking Requirement
401	2 spaces + 2% of total req'd parking	10

In accordance with the Town's Zoning By-law requirements for barrier free parking, a total of 10 spaces are required. Further to the Zoning By-law requirements, five (5) spaces should be Type A and five (5) should be Type B spaces.

6.1.3. Bicycle Parking Requirements

It is to be noted that the Town of Whitchurch-Stouffville's Zoning By-law does not prescribe rates for bicycle parking spaces for residential buildings. As such, the City of Markham's bicycle parking standards in Zoning By-law 2024-19 are used instead. The number of bicycle parking spaces required for this development are calculated in **Table 6.3**.

Table 6.3: Bicycle Parking Requirements

Land Use	No. of Units or GFA	Rate		Minimum Spaces Required
Building containing dwelling units	254 units	Long-term	1 spaces/2 dwelling units	127
		Short-term	1 space/10 dwelling units or 3 spaces	25
Retail Stores	610.92m^2	Short-term	1 space/1000m2 or 3 spaces*	3
Total				**155**

*Whichever is greater

Based on the rates prescribed in Markham's Zoning By-law for bicycle parking, a total of 155 bicycle parking spaces (127 long-term and 28 short-term) are required for all proposed land uses on-site.

6.2. Parking Justification

The following justifications are provided to support the proposed parking reduction in comparison to the Zoning By-law requirements:

1. Proxy Site Parking Utilization Survey Rates
2. Provincial Policies
3. ITE Parking Generation Manual (5th Edition);
4. Town of Whitchurch-Stouffville Draft Official Plan, June 2022;
5. Neighbourhood Context; and,
6. Transportation Demand Management.

6.2.1. Proxy Site Parking Utilization Rates

A review of our in-house database was conducted to provide empirical data to support the proposed parking reduction on-site. It is to be noted that there are no existing land uses within the Town of Whitchurch-Stouffville that are comparable to the proposed development (i.e., mid to high-rise mixed-used residential buildings with ground floor retail). As such, Nextrans opted to rely on parking utilization surveys at proxy sites surveyed previously in other municipalities, with the exception of one (1) site within the Town.

Information and characteristics of the proxy sites are detailed in **Table 6.4**.

Table 6.4: Details of Additional Proxy Sites Surveyed

Location	Site Description	Distance to Rail Transit	Survey Dates and Times
9500 & 9506 Markham Road, Markham	434 dwelling units 1,338 m² GFA for commercial uses	Approximately 600m walk	2017/11/18 10:00-14:00 2017/11/21 16:00-23:00 2017/11/22 12:00-6:00
2025 Maria Street, Burlington	154 dwelling units Commercial at-grade 17- storeys 175 vehicle parking spaces*	2.1km	2024/01/16 20:00 – 23:00 2024/01/18 20:00 – 23:00 2024/01/20 20:00 – 23:00
7 Albert Street. Whitchurch-Stouffville	63 dwelling units 81 parking spaces	250m	2024/03/20 18:00 – 23:00 2024/03/23 18:00 – 23:00
1015 Roosevelt & 1020 Shaw, Mississauga	152 dwelling units 8- storeys 86 tenant spaces 14 visitor spaces	1.4km	2023/02/24 18:00 – 00:00 2023/02/25 18:00 – 00:00 2023/02/26 18:00 – 00:00
1051-1061 Seneca Avenue, Mississauga	180 dwelling units 7- storeys 197 tenant spaces 15 visitor spaces	1.25km	2023/02/24 18:00 – 00:00 2023/02/25 18:00 – 00:00 2023/02/26 18:00 – 00:00
111 Civic Square Gate, Aurora	157 dwelling units 7 storeys	1.45km	2023/03/24 18:00 – 00:00 2023/03/25 18:00 – 00:00 2023/03/26 18:00 – 00:00
14924 Yonge Street, Aurora	150 dwelling units 6-storeys	1.4km	2023/03/24 18:00 – 00:00 2023/03/25 18:00 – 00:00 2023/03/26 18:00 – 00:00

*No designated visitor parking spaces on-site

It is to be noted that the proxy sites selected are not exact comparables of the proposed development; however, the proxy sites selected are similar in that they are higher density buildings that located in areas that are walking distance from a diverse number of land uses and points of interest and are relatively nearby rail transit.

Full excerpts of the parking data collected are enclosed in **Appendix K** and the peak rates observed are summarized in **Table 6.5**.

Table 6.5: Peak Parking Utilization Survey Results

Type	Resident	Visitor	Commercial
9500 & 9506 Markham Road	0.88 spaces/unit	0.12 spaces/unit	0.76 spaces/30m^2
2025 Maria Street	0.75 spaces/unit	N/A	N/A
7 Albert Street	0.90 spaces/unit	0.03 spaces/unit	N/A
1015 Roosevelt & 1020 Shaw	0.36 spaces/unit	0.04 spaces/unit	N/A
1051-1061 Seneca Avenue	0.58 spaces/unit	0.04 spaces/unit	N/A
111 Civic Square Gate	0.60 spaces/unit	0.05 spaces/unit	N/A
14924 Yonge Street	0.46 spaces/unit	0.10 spaces/unit	N/A

Based on our review of parking survey data previously collected, it is noted that the peak resident rate observed at the Markham Road site was 0.88 spaces/unit, whereas the peak visitor rate observed was 0.12 spaces/unit and the commercial rate observed was 0.76 spaces/30m^2. For the Maria Street site, a peak utilization rate of 0.75 spaces/unit was observed for residents.

As previously noted, the proxy sites selected are not exact comparables of the proposed development; however, the results of the survey data demonstrate that higher density housing generates lower parking demands than what is required by the governing Zoning By-law of the Town of Whitchurch-Stouffville. The proposed development is located along the main street of the Town, and there are a number of key destinations that are less than a 5-minute walk away from the subject site. The proximity of the subject site to points of interest such as grocery stores, pharmacies, take-out restaurants, etc., which are all accessible via the existing sidewalk network, will allow for future residents to rely on alternative modes of transportation other than personal vehicles. Given that residents in the area have voiced their concerns of traffic congestion within the Town via community consultation meetings, there needs to be a greater reliance on active transportation and transit. Parking reductions for new developments will assist in reducing traffic impacts as vehicle ownership will influence the type of buyers that are interested in purchasing a unit of the proposed development.

In conjunction with the other justifications noted in this study, as well as the TDM measures proposed in the following section, it is our opinion that a reduced parking demand can be achieved. **On this basis, Nextrans supports the proposed parking supply on-site as it is our opinion that the proposed supply will be sufficient to accommodate the projected vehicle parking demands on-site.**

6.2.2. Provincial Policies

At the time that this report was prepared, it is to be noted that the Province of Ontario introduced a new legislative proposal named Bill 185, Cutting Red Tape to Build More Homes Act, 2024. Bill 185 would prohibit minimum parking standards around major transit stations and an excerpt from the bill proposes the following:

> *"No official plan may contain any policy that has the effect of requiring an owner or occupant of a building or structure to provide and maintain parking facilities, other than parking facilities for bicycles, on land that is not part of a highway and this is located within,"*

As of June 6th, 2024, Bill 185 received Royal Assent and includes amendments to s.34 of the Planning Act to add a new subsection (1.1) as follows:

(1.1) Despite paragraph 6 of subsection (1), a zoning by-law may not require an owner or occupant of a building or structure to provide and maintain parking facilities, other than parking facilities for bicycles, on land that is not part of a highway and that is located within,

(a) A protected major transit station identified in accordance with subsection 16(15) or (16)

(b) An area delineated in the official plan of the municipality surrounding and including an existing or planned higher order transit station or stop, within which area the official plan policies identify the minimum number of residents and jobs, collectively, per hectare that are planned to be accommodated, but only if those policies are required to be included in the official plan to conform with a provincial plan or be consistent with a policy statement under subsection 3(1); or

(c) Any other area prescribed for the purposes of clause 16(22)(c)

While the subject site is not located within MTSA designated lands according to the Official Plan, the subject lands are located 1km west of the MTSA around the Stouffville GO Station. In addition to the subject site, there are a number of other proposed developments, as well as developments that are under construction, within the vicinity of the MTSA. As such, the reduced parking standards proposed on-site are compliant with the goals of Bill 185 and will assist in the encouragement of alternative modes of transportation.

6.2.3. ITE Parking Generation Manual (5th Edition)

The ITE Parking Generation Manual (5th Edition), published by the Institute of Transportation Engineers (ITE) was reviewed to justify the parking supply of the proposed development. It is noted that the Parking Generation Manual does not contain information for mixed-use high-rise buildings; however, to quantify the expected parking demand that the proposed development is expected to generate based, information for "Multifamily Housing (High-Rise)" (LUC 222) and "Shopping Centre" (LUC 820) were used.

It is noted that no information is available for the "General Urban / Suburban" setting within ½ mile of rail transit so the rates for "not within ½ mile of rail transit" was used instead for the residential land use. The time period for the residential land use noted in the Parking Generation Manual is 10:00 PM – 5:00 AM. Information for the Shopping Center land use in the Parking Generation Manual is provided for weekdays and time periods. For the purposes of this assessment, the rates provided for Saturday peak period (11:00 AM – 5:00 PM) were used as a conservative approach. Given that the retail uses at-grade are ancillary to the residential land use, the average rate was used.

The parking expected parking demand based on the Parking Generation Manual rates is summarized in **Table 6.6**.

Table 6.6: ITE Parking Generation Manual Parking Demand

Land Use	No. of Units or 1000ft² GFA	Parameter	Rate	Parking Demand
High-Rise	254	Avg Rate	0.98	249
Shopping Center (Non-December) Saturday	6.576	Avg Rate	2.91	19
Total				**268**

Based on empirical data contained in the ITE Parking Generation Manual, the total parking demand that the site is projected to generate is 268 parking spaces occupied. In comparison to the proposed parking supply of 286 spaces, a minimum surplus of 18 parking spaces is projected. It is critical to note that the parking demands generated using information contained in the Parking Generation Manual represent the peak demands during the specified time periods. Although the parking demands calculated in **Table 6.6** were added to determine a total peak demand for the site, the peak demands generated by each land do not coincide as the residential land use generates a peak demand during an overnight period whereas the retail land use generates its peak demand during a midday period. **On this basis, it is our opinion that the parking supply of 216 spaces is adequate to accommodate the parking demand that is expected to be generated by the proposed land uses**.

6.2.4. Town of Whitchurch-Stouffville Draft Official Plan (June 2022) Review

Between the years 2021 and 2051, the Town of Whitchurch-Stouffville is expected to experience an annual population growth of 1.8% per annum in accordance with York Region growth trends. The subject site is located within the Community of Stouffville, which is where the highest concentration of growth is planned to occur and will play a critical role in the Town's growth management framework, namely the capitalization of existing infrastructure and active transportation and existing / planned transit services.

According to the Town's Draft Official Plan "*A major focus of future growth in the Community of Stouffville be the lands within the Major Transit Station Areas (Stouffville GO and Old Elm GO) and the integration of the surrounding community to promote a compact and dynamic urban form. Major Transit Station Areas are show on Schedule D – Stouffville Land Use Designations and are defined in the Region's Official Plan as the area around high-order transit stations and stops within settlement areas. These areas provide opportunities for focusing intensity=intensification and higher-density residential, commercial and employment uses that will contribute to the viability of transit services and the creation of complete communities by providing housing diversity, convenient access to jobs, local services and public transportation.*"

Our review of the Town's Official Plan policies indicates that it is the Town's goal to increase its reliance on higher-order transit facilities as the population within the Town continues to grow. With the projected growth within the Town, there needs to be a reduced dependence in single-occupant-vehicle trips and an increased usage of the alternative transportation modes available within the Town, such as public transit and active transportation. Parking management is an effective Transportation Demand Management measure that assist in the reduction of single-occupant-vehicle trips.

6.2.5. Neighbourhood Context

Based on our review of the study area, it is evident that there are a wide variety of land uses within a one (1) kilometer radius of the subject site, which include the following:

- Educational institutions;
- Grocery stores;
- Places of worship;
- Medical offices;
- Take-out and sit-down eating establishments;
- Personal service shops;
- Retail stores; and,
- Athletic clubs.

With the current availability of sidewalk, cycling and transit infrastructure in the area, future residents of the proposed development will have access to a wide variety of key destinations within the Town without the need to travel using a personal vehicle.

6.2.6. Transportation Demand Management

The main objective of Transportation Demand Management (TDM) is to encourage residents to take alternative modes of transportation, such as public transit, walking, cycling and carpooling. Based on Nextrans' experience in conducting justification studies in various jurisdictions in the Greater Toronto and Hamilton Area (GTHA), parking management is the best TDM measure that helps ensure the reduction of single-occupant vehicle (SOV) trips to and from proposed developments, which is consistent with the Town's Official Plan policies. Nextrans provides additional recommendations for TDM measures in Section 8 of this study to support the proposed parking reduction for this development.

7.0 SITE PLAN REVIEW

7.1. Vehicle Maneuverability Assessment

AutoTURN software was used to generate a vehicular turning template to confirm and demonstrate the accessibility of the proposed study area. The AutoTURN analysis demonstrates that a front-loading waste collection truck (10.0-meter medium single unit (MSU TAC-2017)) can access the loading space without conflict. The AutoTURN analysis is provided in **Figure 7-1**.

8.0 Transportation Demand Management

The primary objectives of this TDM plan are as follows:

- Provision of facilities / operations to promote behavioural change for reduced automobile uses and encourage the use of alternative sustainable transportation modes aside from single-occupancy vehicle (SOV).
- Maximize average auto occupancies, with the intent of a net minimization of site-related auto trips.
- Create and support opportunities for an inclusive transportation system to accommodate and facilitate all potential road users in a safe and efficient manner.

TDM refers to a variety of strategies to reduce congestion, minimize the number of single-occupant vehicle trips, encourage non-auto modes of travel, and reduce vehicle dependency to create a sustainable transportation system. In short, TDM works to change how, when, where, and why people travel.

TDM strategies have multiple benefits including the following:

- Reduced auto-related emissions to improve air quality.
- Decreased traffic congestion to reduce travel time.
- Increased travel options.
- Reduced personal transportation costs and energy consumption.
- Support Provincial smart growth objectives.

8.1. TDM Strategies

Based on our review, the following TDM measures are recommended for the proposed development:

Transit:

Public transit includes various services using shared vehicles to provide mobility to the public, these generally include:

- Heavy rail – relatively large, higher-speed trains, operating entirely on separate rights-of-way, with infrequent stops, providing service between communities;
- Light Rail Transit – moderate size, medium-speed trains, operating mainly on separate rights-of-way, with variable distances between stations, providing service between urban neighborhoods and commercial centers;
- Streetcars – relatively small, lower-speed trains, operating primarily on urban streets, with frequent stops which provide service along major urban corridors;
- Conventional bus transit - full-size buses on fixed routes and schedules;
- Bus Rapid Transit – premium quality bus service with features that typically include grade separation, frequent service, attractive stations, quick loading, and attractive vehicles; and,
- Express commuter bus – direct bus service from residential to employment areas.

The subject site is currently located in an area serviced by a YRT route, as well as being located approximately less than 1.5km west of the Stouffville GO station.

To encourage transit usage, it is recommended that a welcome package be provided for residents which includes transit service information (i.e., transit system maps and service / schedule times) to assist residents in planning their trips (i.e., to / from work / school). In addition, it is our recommendation that the Region of York consider the provision of one-time preloaded PRESTO cards on a demand basis for new residents.

Walkability:

Walkability reflects overall walking conditions in an area. It considers the quality of pedestrian facilities, roadway conditions, land use patterns, community support, security and comfort for walking.

Generally, walkability can be evaluated at various scales:

- Site scale – affected by the quality of pathways, building accessways and related facilities;
- Street or neighborhood level – affected by the existence of sidewalks and crosswalks, and roadway conditions (road widths, traffic volumes and speeds); and,

- Community level – affected by land use accessibility, such as the relative location of common destinations and the quality of connections between them.

Pedestrian pathway is incorporated into the site design providing a safe and convenient connections to the adjacent public sidewalk system.

Cycling:

There are many specific ways to improve bicycle transportation, including the following:

- Improving paths and bike lanes;
- Correcting specific roadway hazards (potholes, cracks, narrow lanes, etc.);
- Improving road, road shoulder and path management and maintenance;
- Improving bicycling parking facilities;
- Develop a more connected street network and clustered development;
- Establish public bike systems that provide convenient rental bicycles for short utilitarian trips;
- Safety education, law enforcement and encouragement programs; and,
- Integration with transit.

We have also reviewed the Bicycle Parking Guidelines, 2nd Edition, published by the Association of Pedestrian & Bicycle Professionals (APBP) and the following should be considered:

Short-term and Long-term Bicycle Parking:

- "Short-term parking usually consists of bicycle racks located on the sidewalk or street in front of a building or destination. The site planning focus is on convenience, utility, and the attempt to improve security for the rack and the parked bicycle; and,
- Long-term parking uses a wider variety of fixture types and site plan layouts. It includes racks in cages and bicycle rooms, as well as lockers located in a variety of different settings, indoors and outdoors. Because long-term parking areas are frequently located in low pedestrian traffic areas or out-of-the-way locations, site design focus is on ensuring the safety of users while maintaining exclusive access to these areas."

Bicycle Rack:

- "Supports the bicycle in at least two places, preventing it from falling over;
- Allows locking of the frame and one or both wheels with a U-lock;
- Is securely anchored to ground; and,
- Resists cutting, rusting and bending or deformation."

As noted previously in this Study, the Town's Zoning By-law does not prescribe general requirements for bicycle parking; however, it is our opinion that the provision of bicycle parking would be an effective means to reduce single-occupant vehicle trips and would be a means to reduce the minimum vehicle parking requirement. As such, it is our recommendation that bicycle parking be considered in accordance with the requirements stipulated in the City of Markham's Zoning By-law 2024-19, as calculated in section 6.1.3 of this Study.

8.2. TDM Checklist

A TDM checklist has been prepared in correspondence with the measures outlined in the Transportation Demand Management Checklist detailed in York Region's Transportation Mobility Plan Guidelines. The proposed TDM measures are summarized in **Table 8.2**.

Table 8.2: TDM Checklist

TDM Measure	Responsibility	Estimated Cost
Transit Incentives (i.e., Pre-loaded Presto Cards)	York Region to Consider	TBD
TDM information package (i.e., YRT maps, GO schedules, Cycling maps, etc.)	York Region to Consider	TBD
Communications strategy and physical location to deliver Presto Cards and Information Packages	York Region to Consider	$1,500
Pedestrian Connections	Applicant	The associated cost is included in the site plan agreement
Internal ped/cycling circulation	Applicant	The associated cost is included in the site plan agreement
Cycling Connections	Applicant	The associated cost is included in the site plan agreement
Bicycle Parking	Applicant	The associated cost is included in the site plan agreement

9.0 CONCLUSION / FINDINGS

9.1. Study Findings

The findings of our analysis are as follows:

- The development proposal is to redevelop the existing subject lands to construct a 13-storey residential building with 254 dwelling units and 610.92S m^2 GFA dedicated to commercial uses at-grade. A total of 286 vehicle parking spaces are proposed on-site. Vehicular access to the development is proposed via a full movement driveway onto Palmwood Gate.
- In accordance with the Region's LOS criteria outlined in the Transportation Mobility Plan Guidelines, the study area has excellent access to transit stops but existing transit services in the area are limited.
- In accordance with the Region's LOS criteria outlined in the Transportation Mobility Plan Guidelines, the study area is currently well serviced by the existing sidewalk infrastructure.
- In accordance with the Region's LOS criteria outlined in the Transportation Mobility Plan Guidelines, the study area has limited cycling facilities.
- Based on the capacity analysis of existing traffic conditions, all study area intersections are currently operating with residual capacity, with acceptable levels of service, and with manageable delays and queues lengths during weekday AM and PM peak hours.
- Based on the results of the capacity analysis under 2032 future background traffic conditions, all study area intersections are projected to operate with residual capacity, with acceptable levels of service, and with manageable delays and queue lengths during weekday AM and PM peak hours, with the exception of the

westbound left movement at the Palmwood Gate/ Mostar Street/ Main Street intersection during PM peak hour.

- It was determined that the critical level of service identified occurred as a result of the projected corridor growth and background site traffic volumes projected on the road network under future conditions.
- Based on the trip generation calculations, the proposed development is projected to generate a total of 86 new two-way trips (32 inbound and 54 outbound) and 123 new two-way trips (67 inbound and 56 outbound) during the weekday AM peak hour and PM peak hour.
- Based on the results of the capacity analysis under 2032 future total traffic conditions, all study area intersections and the proposed full movement site access are projected to operate with residual capacity, with acceptable levels of service, and with manageable delays and queue lengths during weekday AM and PM peak hours, with the exception of the westbound left movement at the Palmwood Gate/ Mostar Street/ Main Street intersection during PM peak hour, which was initially identified as a critical movement under future background traffic conditions.
- In comparing the traffic operations between existing traffic conditions and future background traffic conditions, and between future background and future total traffic conditions, it is noted that the site traffic generated by the proposed development will have a negligible impact on the surrounding road network in comparison to the cumulative impact of the projected corridor growth and background development site traffic.
- To demonstrate that the projected operational deficiencies can be mitigated, signal timings were optimized until acceptable v/c ratios were achieved. When optimizing, the existing cycle length was maintained but the total splits were adjusted. The analysis conducted using optimized signal timings indicates that the projected operational deficiencies can be mitigated for the previously identified westbound left movement at the Palmwood Gate/ Mostar Street/ Main Street intersection during PM peak hour.
- Based on Town of Whitchurch-Stouffville's Zoning By-law 2010-001-ZO, a total of 401 vehicle parking spaces are required (318 resident spaces, 64 visitor spaces and 19 retail spaces). In comparing the technical parking requirement with the proposed parking supply of 286 spaces, there is an overall technical shortfall of 115 parking spaces (29% reduction).
- In accordance with the Town's Zoning By-law requirements for barrier free parking, a total of 10 spaces are required. Further to the Zoning By-law requirements, five (5) spaces should be Type A and five (5) should be Type B spaces.
- Based on the rates prescribed in Markham's Zoning By-law for bicycle parking, a total of 155 bicycle parking spaces (127 long-term and 28 short-term) are required for all proposed land uses on-site.
- Several justifications are provided to support the proposed parking reduction in comparison to the Zoning By-law requirements such as proxy site parking utilization rates, recent provincial policies, the review of projected parking demands as per ITE Parking Generation Manual, the review of the Town's Draft Official Plan Policies, neighbourhood context and transportation demand management measures.
- AutoTURN assessments confirm that the intended design vehicles can effectively maneuver within the site.
- The following TDM measures are proposed to further assist the reduction of vehicle parking demand and to reduce the traffic impact of the proposed development:
    - Transit incentives (pre-loaded Presto cards)
    - TDM information package (YRT maps, GO schedules, cycling maps, etc.)
    - Communications strategy and physical location to deliver Presto cards and information packages
    - Pedestrian and cycling connections
    - Bicycle parking

9.2. Study Conclusions & Recommendations

Based on the findings of this study, our report concludes and / or recommends the following:

- The proposed development is projected to have a negligible traffic impact on the surrounding road network.
- The optimization of signal timings at the Palmwood Gate/ Mostar Street/ Main Street intersection demonstrate that the operational deficiencies projected under future traffic conditions can be mitigated; however, it is Nextrans' recommendation that York Region and the Town of Whitchurch-Stouffville continue to monitor the movements of this intersection, and to explore opportunities for improvement as developments within the area are constructed.
- It is our opinion that the proposed development provides an adequate number of parking spaces to accommodate the projected demand given the justifications provided in this study.
- It is our opinion that the site is accessible for the loading vehicles.
- It is our recommendation that York Region consider the provision of welcome packages and one-time preloaded Presto cards on a demand basis for new residents to encourage transit and active transportation usage and to reduce auto dependency.
- It is our opinion that the implementation of the proposed TDM measures will work synergistically to reduce parking demand as well as to encourage other modes of travel, which is in accordance with the goals of the Town's Official Plan policies.

Figure 2-3: Existing Traffic Volumes

LEGEND

Subject Site | xx AM Peak Hour | (xx) PM Peak Hour | Existing Stop Sign | Existing Traffic Signals

Figure 3-1: Future Background Base Traffic Volumes

LEGEND

Subject Site xx AM Peak Hour (xx) PM Peak Hour Existing Stop Sign Existing Traffic Signals

Figure 3-2: Background Development Traffic Volumes

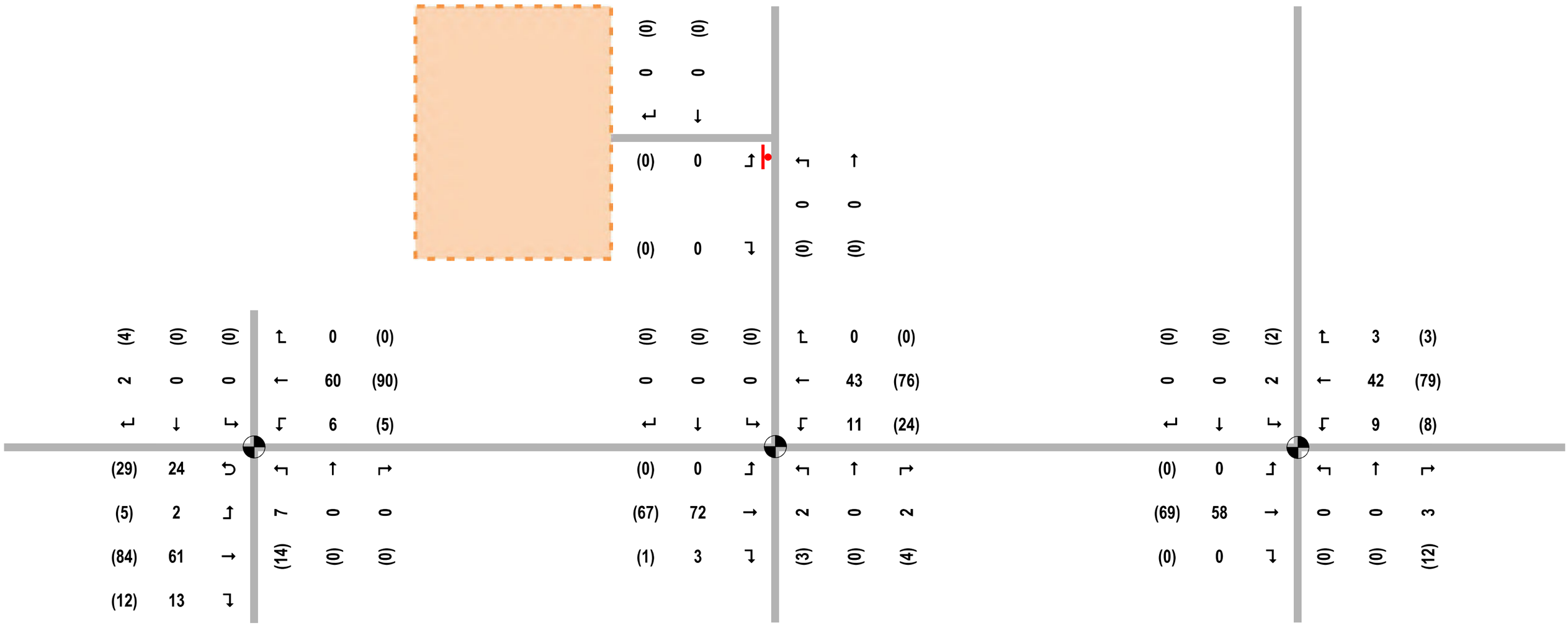
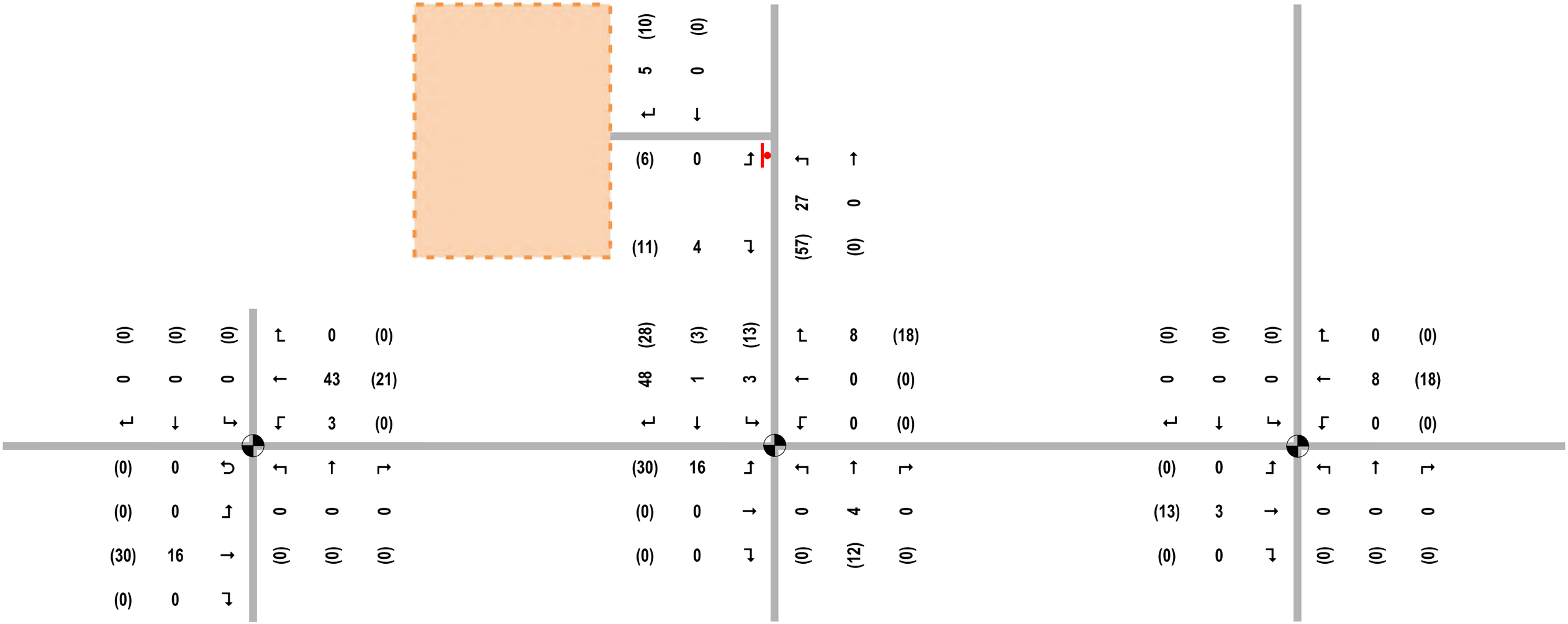


Figure 3-3: Future Background Total Traffic Volumes

LEGEND

Subject Site xx AM Peak Hour (xx) PM Peak Hour Existing Stop Sign Existing Traffic Signals

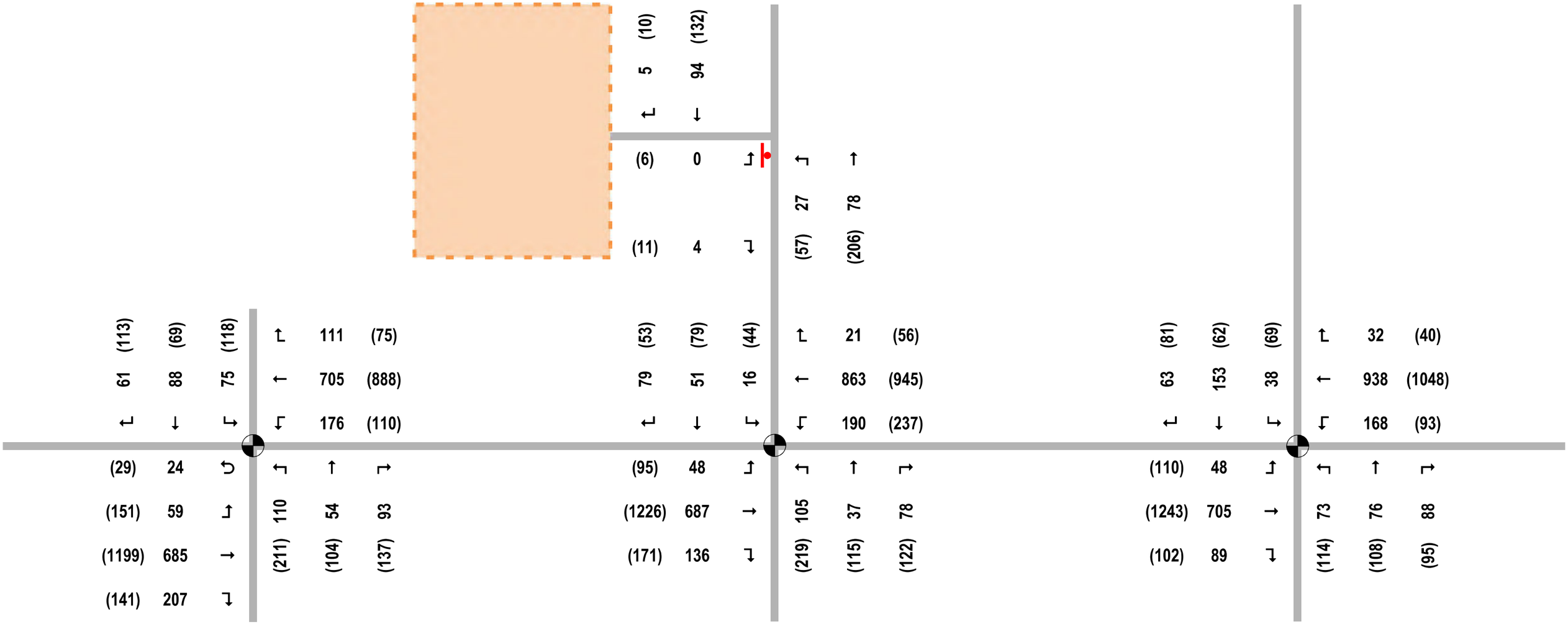
Figure 4-1: Site Traffic Volumes



LEGEND

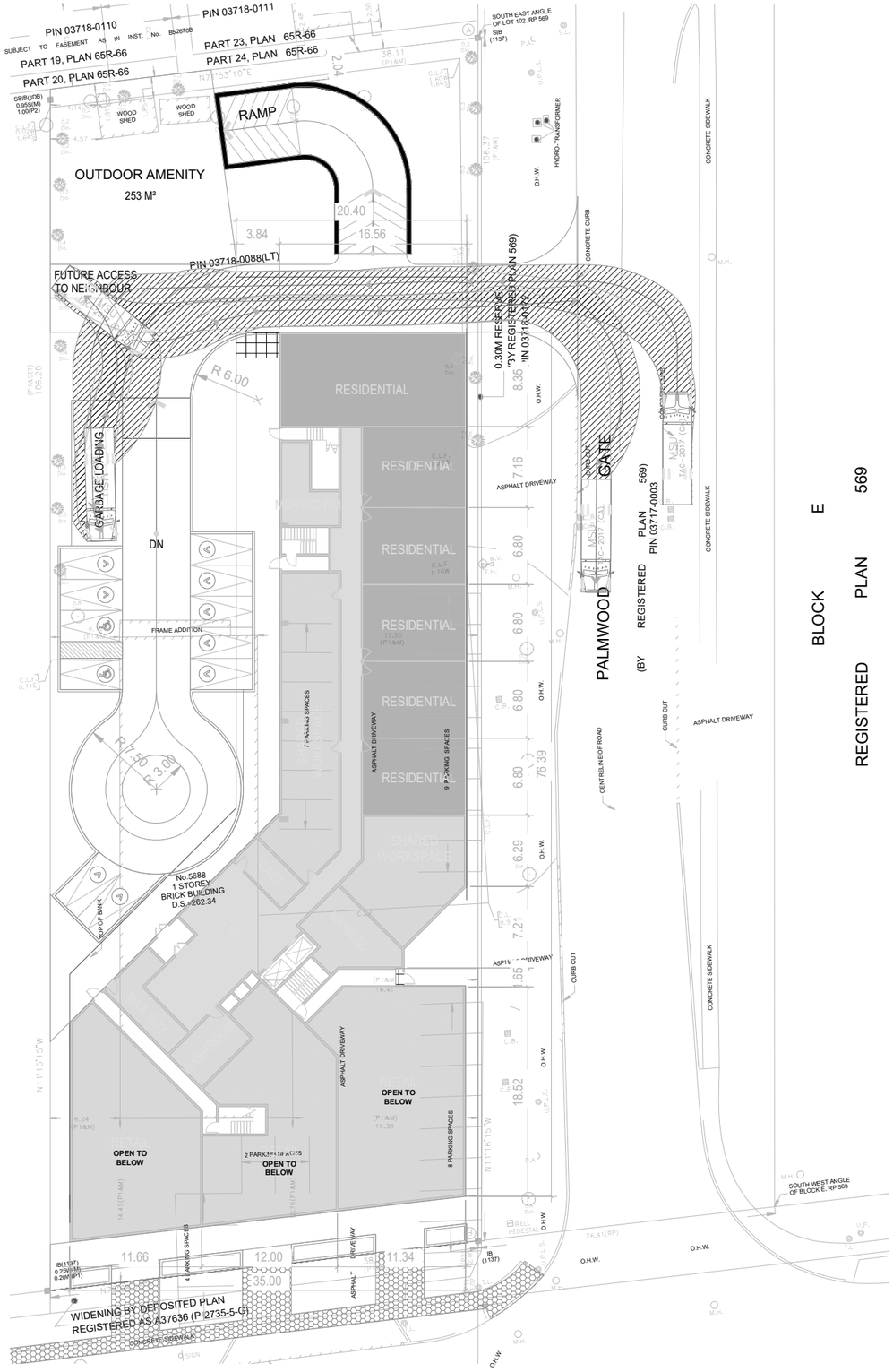
Subject Site | xx AM Peak Hour | (xx) PM Peak Hour | Existing Stop Sign | Existing Traffic Signals

Figure 5-1: Future Total Traffic Volumes



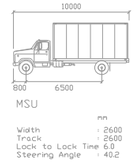
LEGEND

Subject Site xx AM Peak Hour (xx) PM Peak Hour Existing Stop Sign Existing Traffic Signals



BLOCK E

REGISTERED PLAN 569



KEY PLAN

BENCHMARK

REVISIONS

NO.	REVISION	DATE	BY

STAMP

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

PROJECT NAME:
Residential Mixed-Use Development
5688 Main Street
Town of Whitchurch-Stouffville

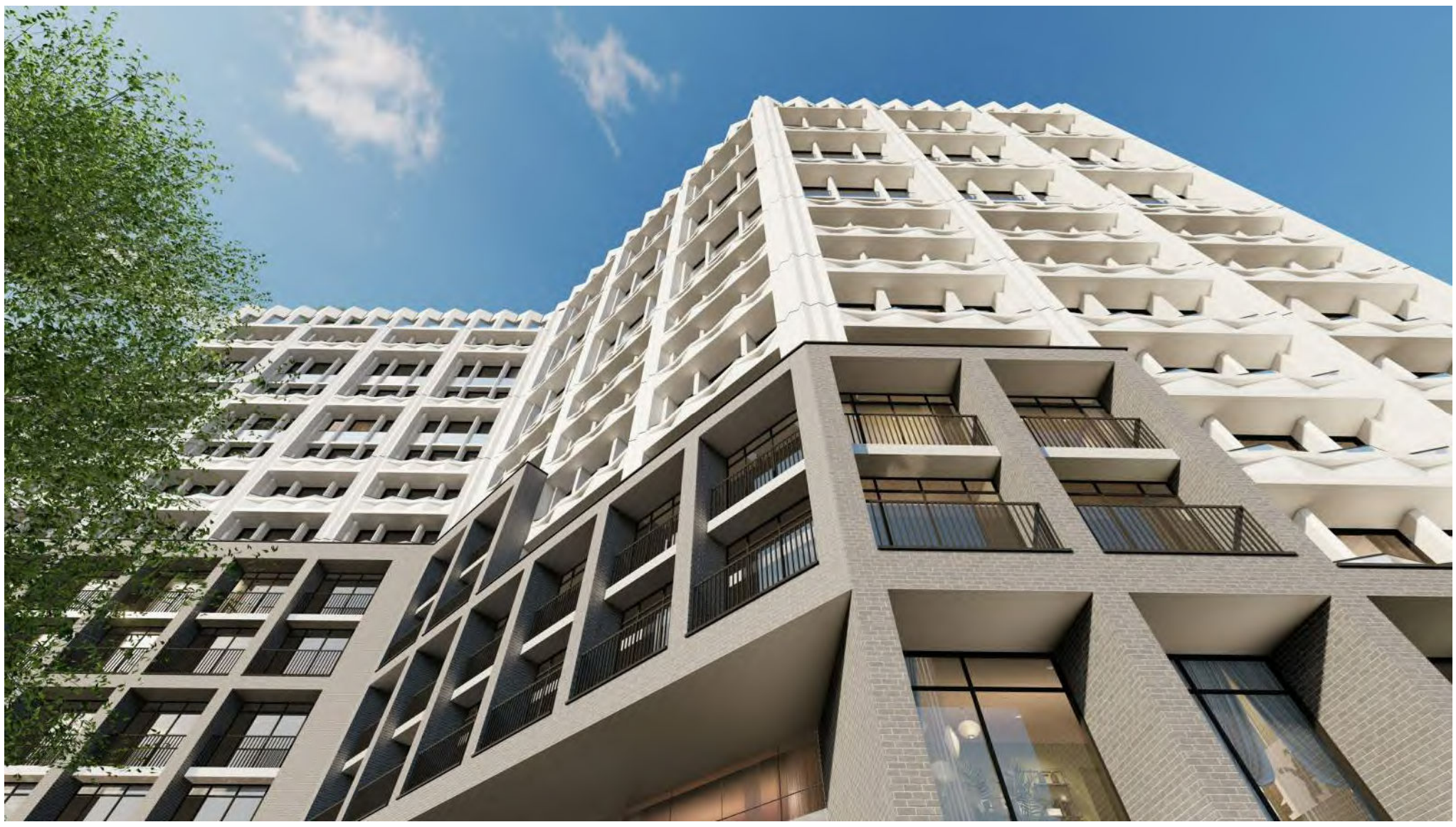
DRAWING TITLE:
AutoTURN Analysis
MSU TAC-2017

DESIGN BY: K.A.	DATE: March 8, 2023
CHECKED BY: R.P.	PROJECT NO. NT-23-239
DRAWN BY: K.A.	
SCALE: NTS	DRAWING NO. Figure 7-1

Appendix A – Proposed Site Plan

NEW CONDO DEVELOPMENT OF 5688 MAIN ST.

WITCHURCH-STOUFFVILLE, ONTARIO



Drawing No.

A- 000

COVER PAGE

Date	Issue Date	Checked
Scale	1 : 1	Drawn
Project No.		T2022062

CONDOMINIUM

5688 MAIN STREET

Whitchurch-Stouffville, ON

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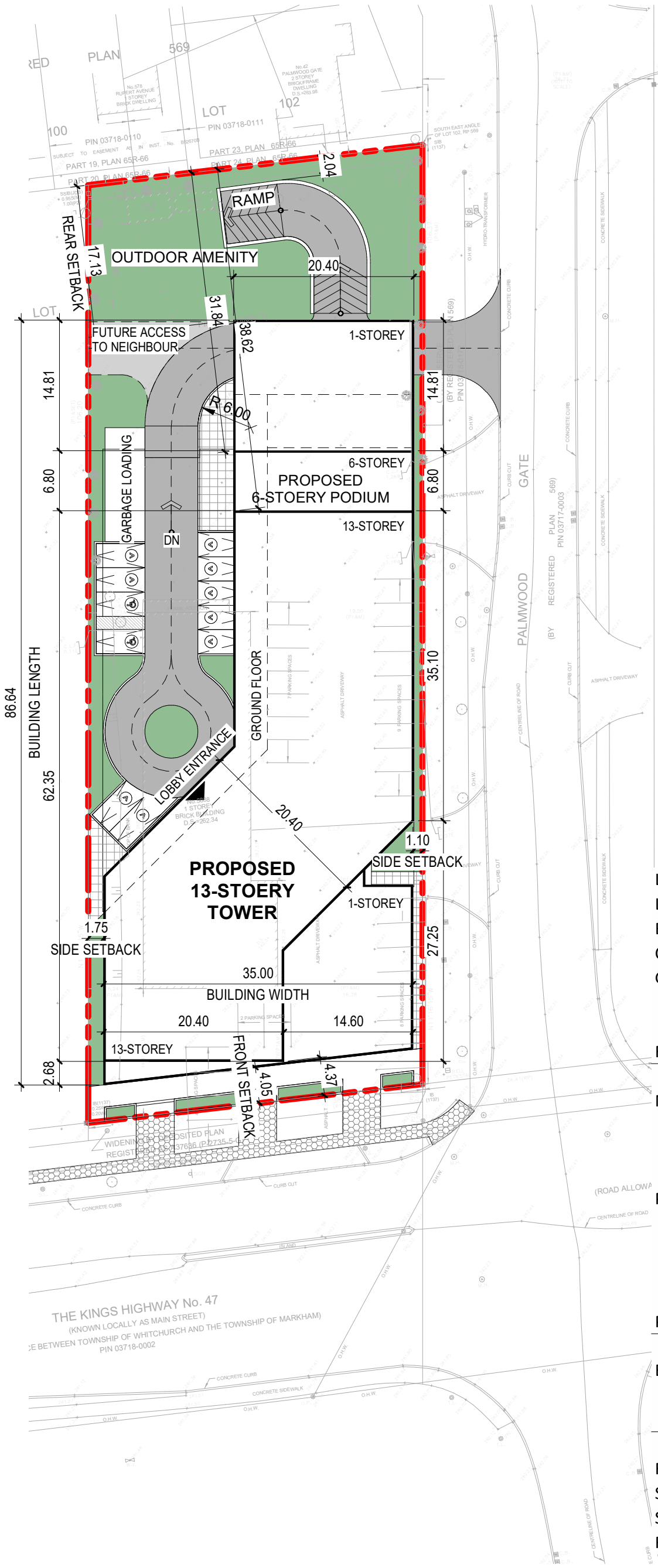

SITE STATISTICS

LOT AREA:	4,021.77 M²	(0.99 Acres)
LOT FRONTAGE:	37.85 M	
BUILDING AREA:	2,098.42 M²	(22,587.94 F²)
COVERAGE:	52.18%	
GFA(GLOSS FLOOR AREA):	20,276.10 M²	(218,257.25 F²)
COMMERCIAL AREA:	610.92 M²	(6,576.10 F²)
RESIDENTIAL AREA:	19,665.18 M²	(211,681.15 F²)
FSI:	5.04	
NUMBER OF RESIDENTIAL UNITS:	254	
1 BEDROOM UNITS:	68	(26.77%)
2 BEDROOM UNITS:	150	(59.06%)
3 BEDROOM UNITS:	36	(14.17%)
PARKING SPACE NUMBER:	286	
SURFACE:	11	
MEZZANINE:	65	
UNDERGROUND P1:	103	
UNDERGROUND P2:	107	
PARKING...	1.13	(PARKING/UNIT)
BUILDING HEIGHT:	45.00 M	(13 STOREYS)
PODIUM:	6	STOREYS
MID-RISE:	7	STOREYS
FRONT SETBACK:	4.05 M	
SIDE SETBACK (EAST):	1.10 M	
SIDE SETBACK (WEST):	1.75 M	
REAR SETBACK:	17.44 M	

Drawing No.

A- 001

SITE PLAN

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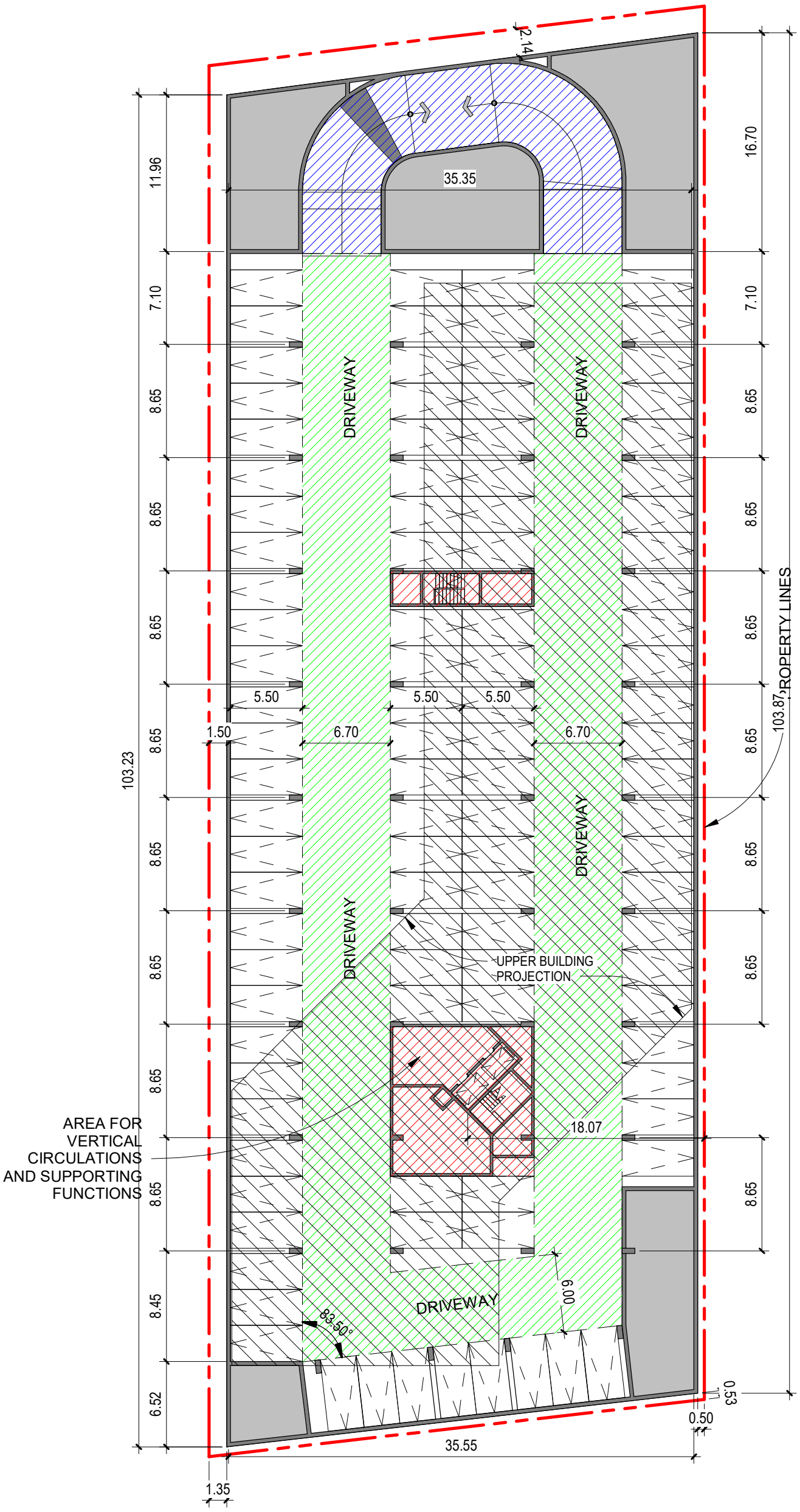

P1: 103 PARKING SPACES
P2: 109 PARKING SPACES

*** SUBSEQUENT MEP REQUIREMENTS WILL LOSE SOME PARKING SPACES.**

Drawing No.

A- 101

UNDERGROUND P1

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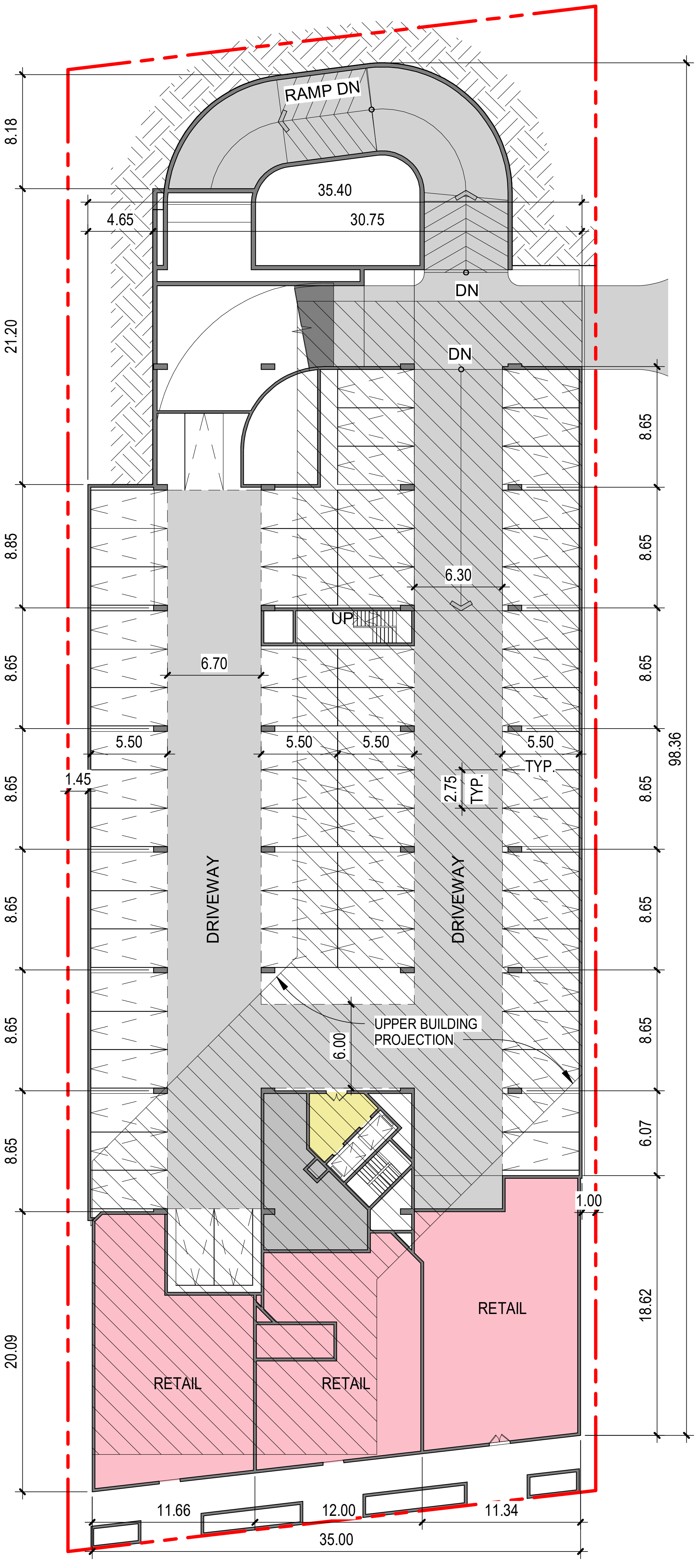

MEZZANINE: 65 PARKING SPACES

*** SUBSEQUENT MEP REQUIREMENTS WILL LOSE SOME PARKING SPACES.**

Drawing No.

A- 102

MEZZANINE PLAN

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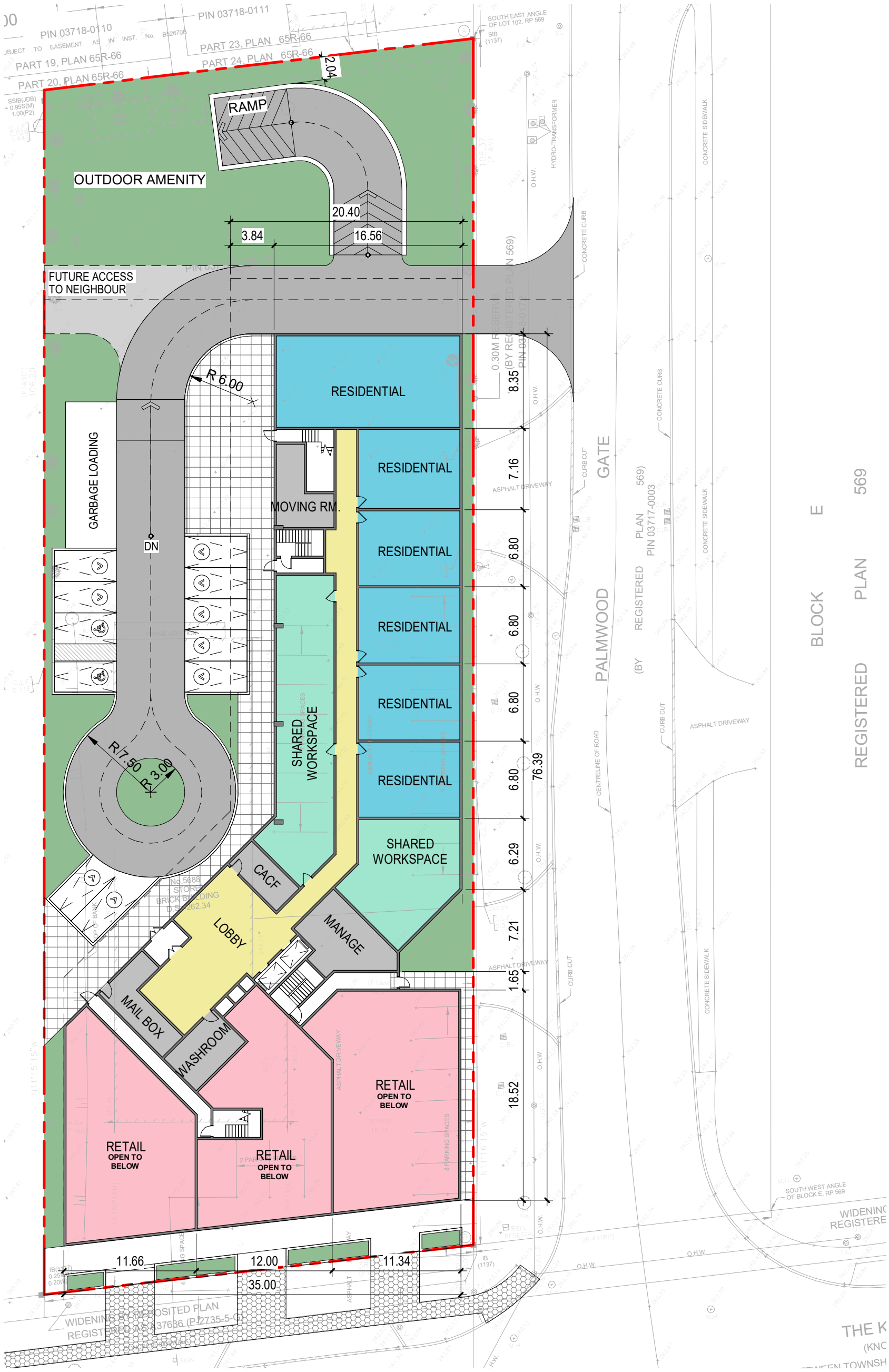

GROUND: 11 PARKING SPACES

Drawing No.

A- 103

GROUND FLOOR

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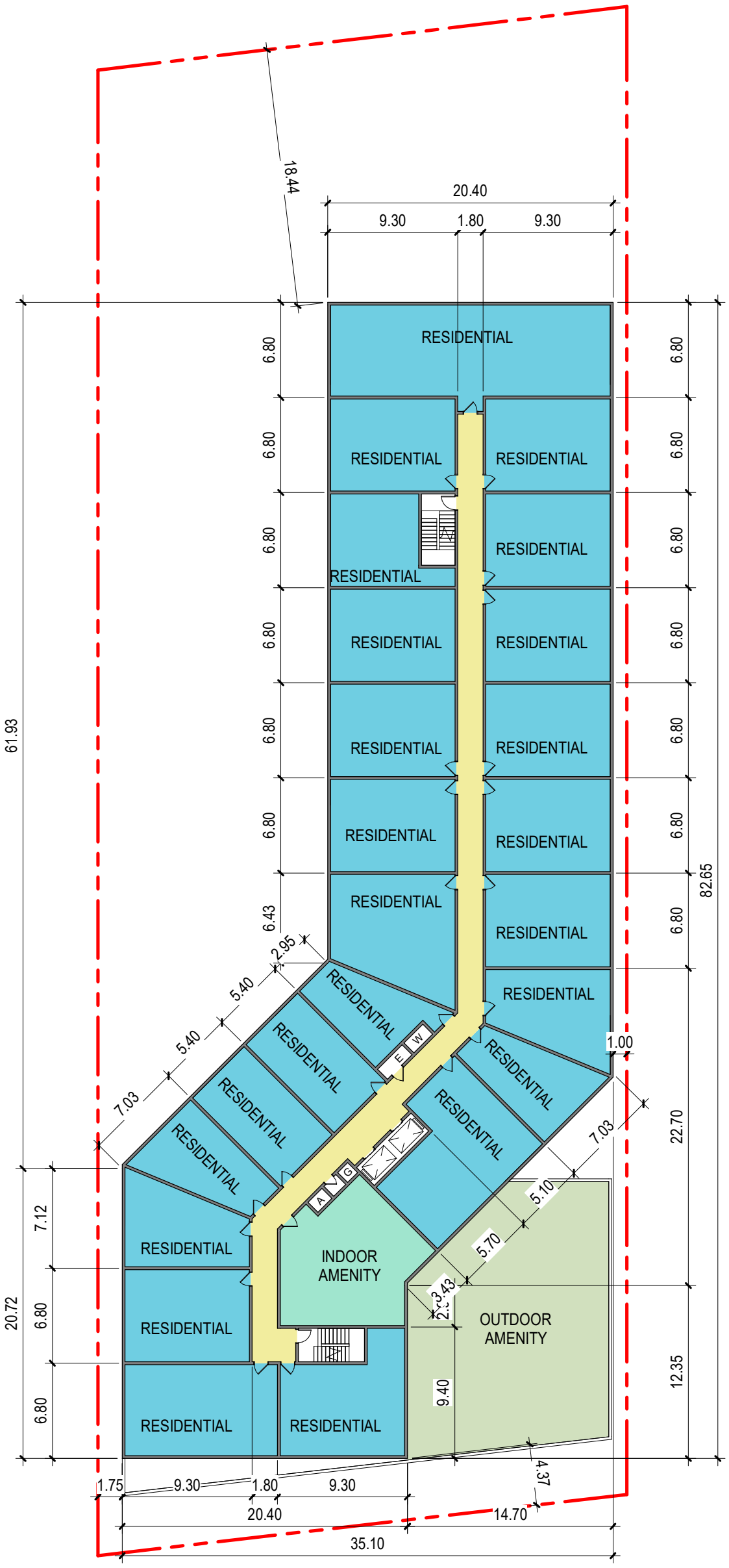

Drawing No.

A- 104

SECOND FLOOR

Date	Issue Date	Checked
Scale	1 : 350	Drawn
Project No.		T2022062

CONDOMINIUM

5688 MAIN STREET

Whitchurch-Stouffville, ON

TAES Architects Inc.
98 SCARSDALE ROAD,
TORONTO, ONTARIO, M3B 2R7
T: 416 800 3284
F:416 800 3485

No.	Issues	Date	By
1	Pre-Consultation	2022-12-15	

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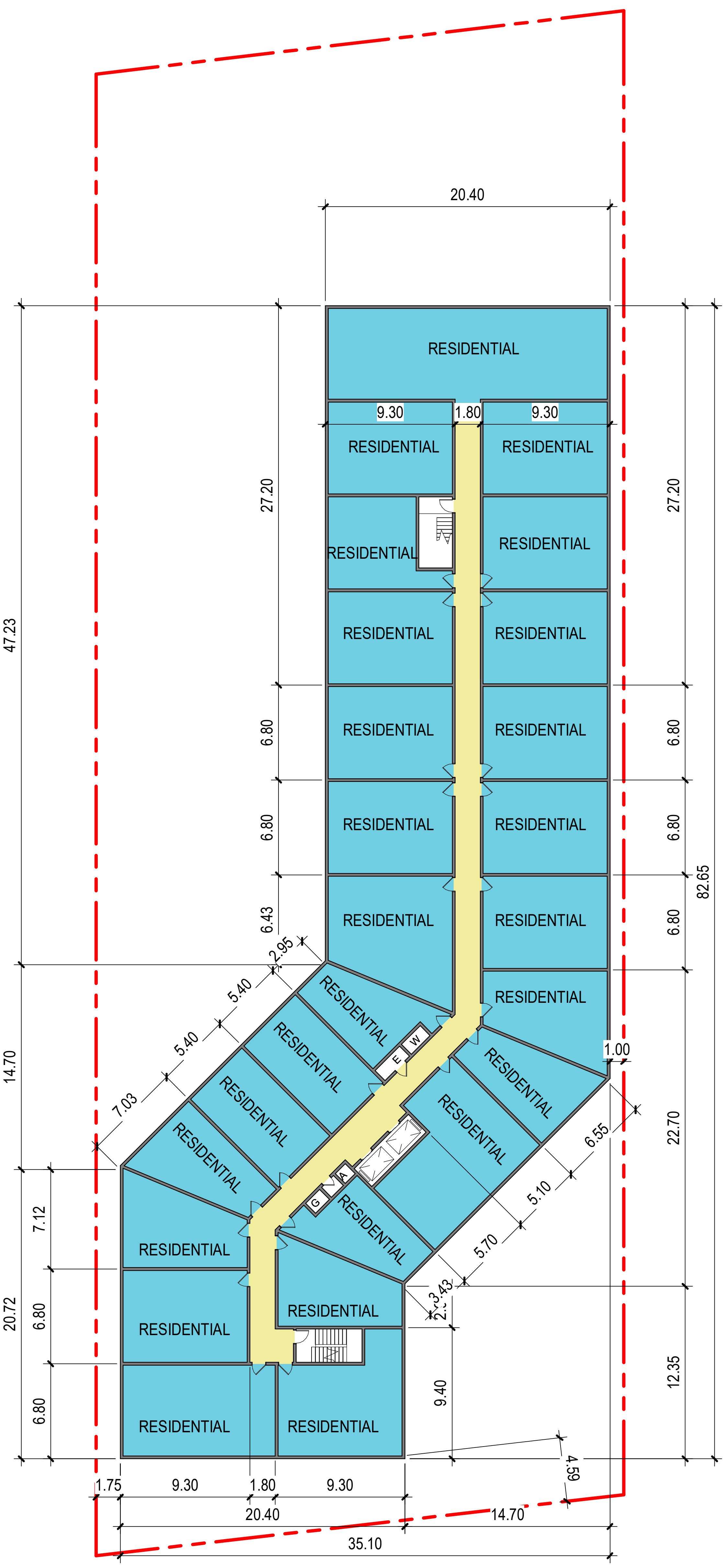

Drawing No.

LOWER FLOOR TYPICAL LAYOUT

Date	Issue Date	Checked
Scale	1 : 350	Drawn
Project No.		T2022062

A- 105

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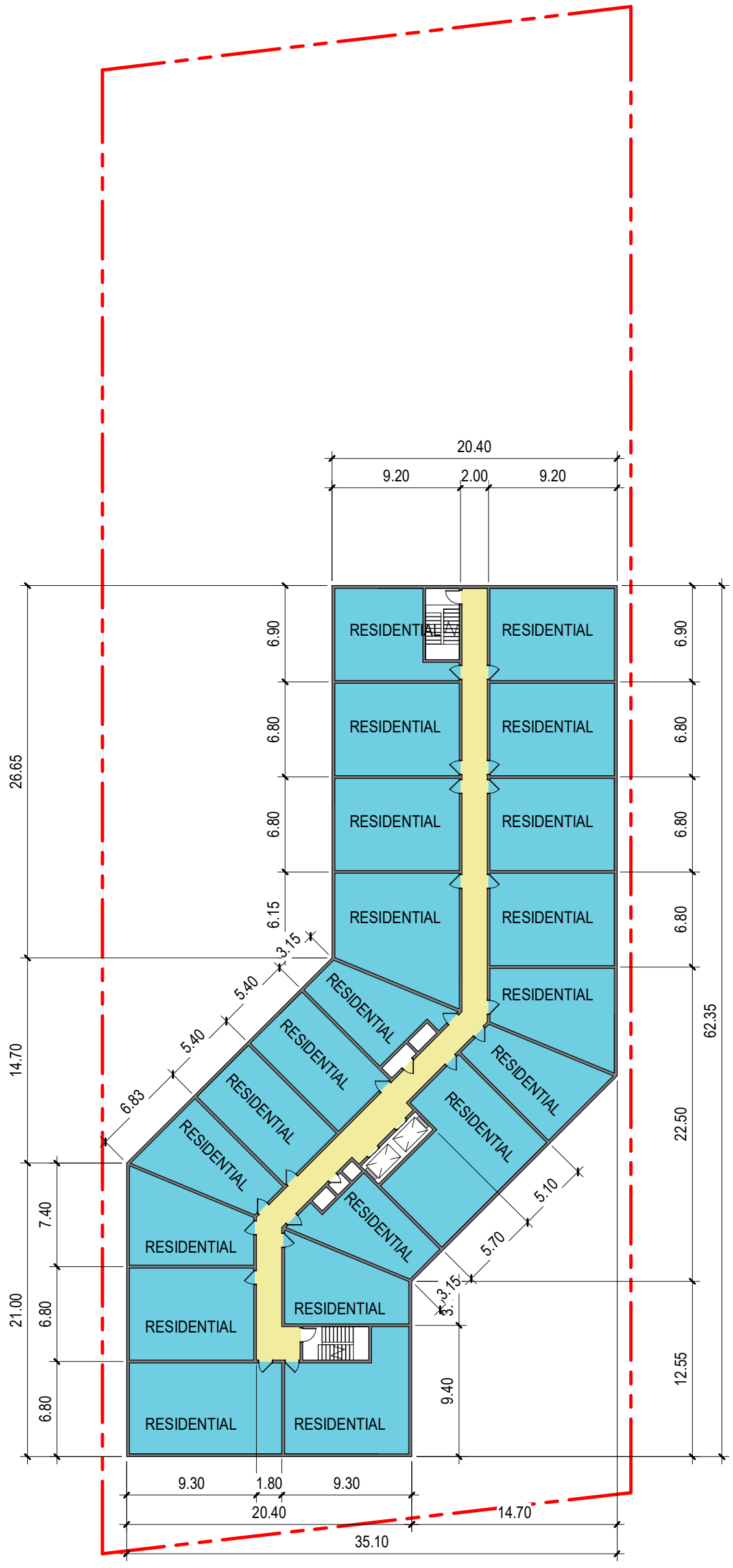

8TH FLOOR

Drawing No.

A- 106

UPPER FLOOR TYPICAL LAYOUT

Date	Issue Date	Checked
Scale	1 : 350	Drawn
Project No.		T2022062

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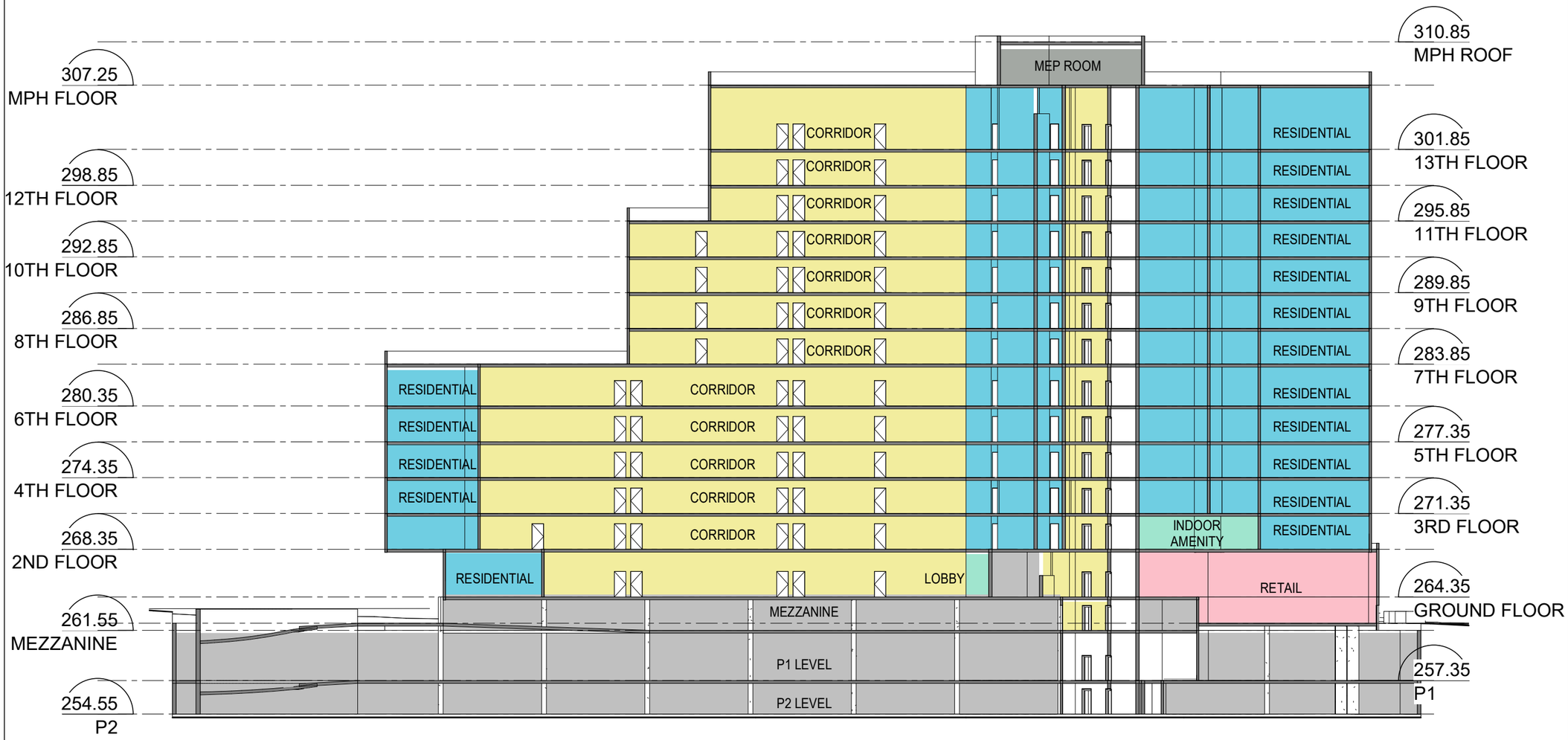

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SECTION 1

Date	Issue Date
Scale	1 : 350
Project No.	T2022062
Drawn	
Checked	

Drawing No. A- 301

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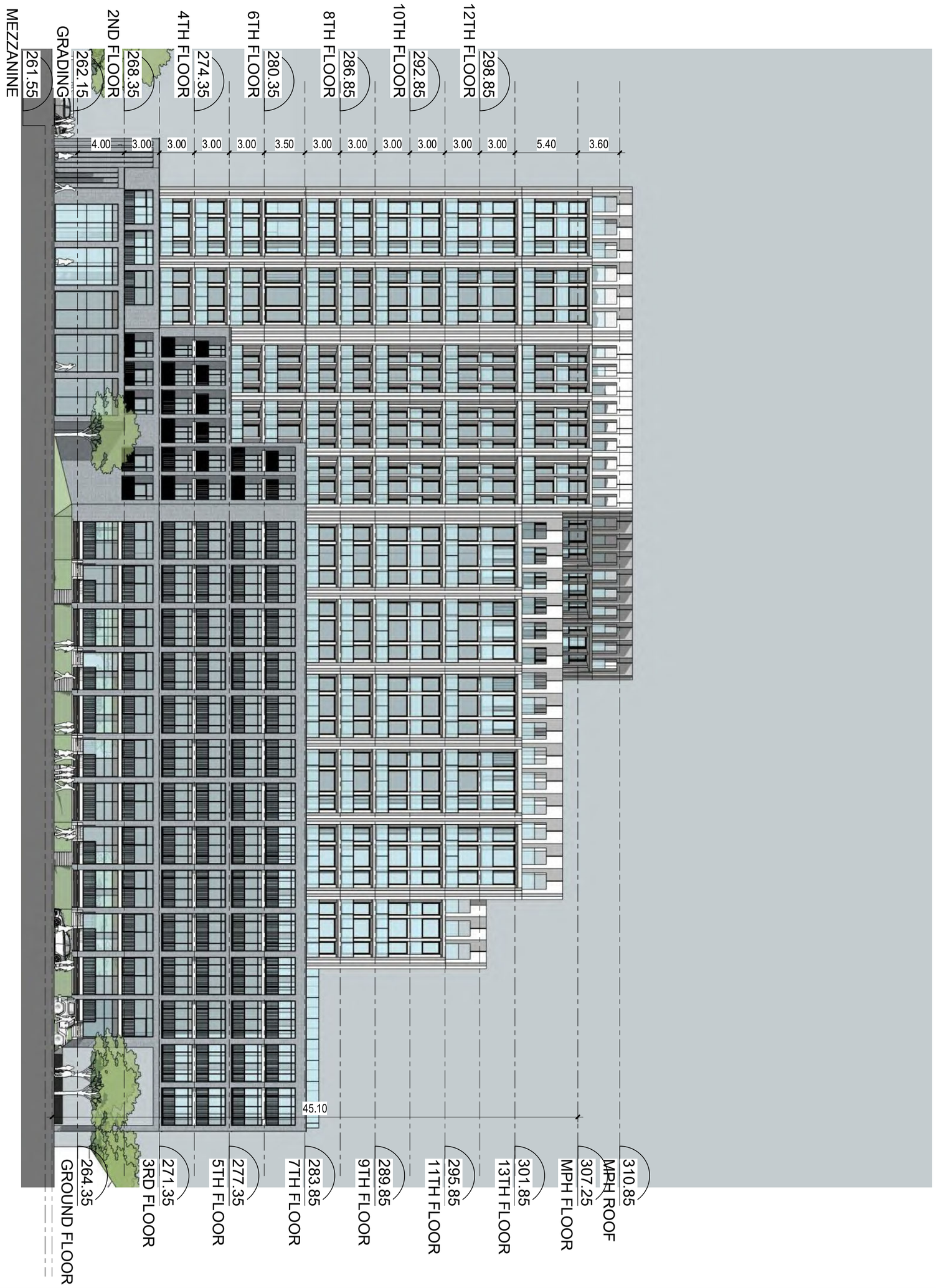

Drawing No.

A- 200

EAST ELEVATION

Date	Issue Date	Checked
Scale	1 : 300	Drawn
Project No.		T2022062

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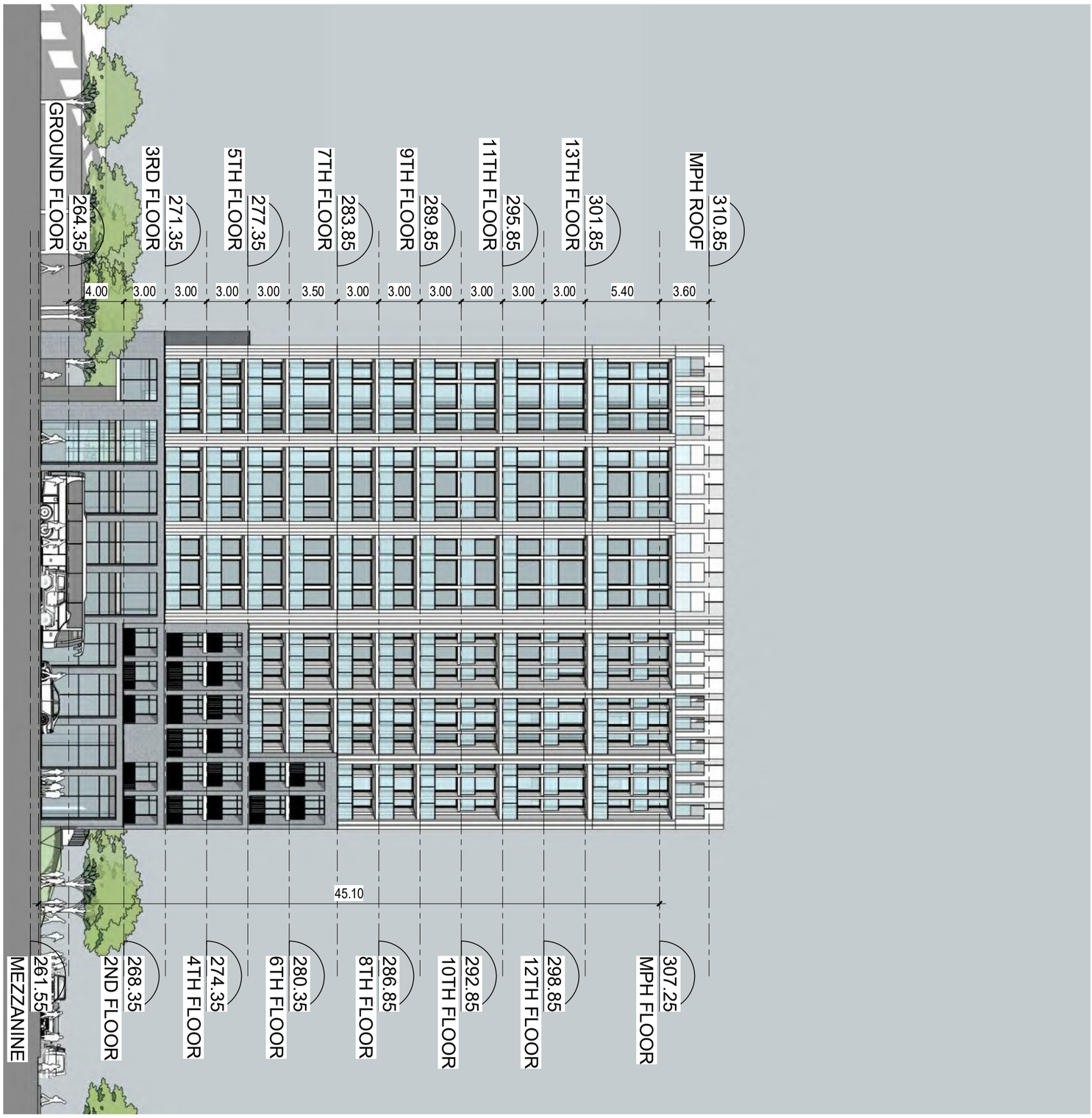

Drawing No.

A- 201

SOUTH ELEVATION

Date	Issue Date	Checked
Scale	1 : 300	Drawn
Project No.		T2022062

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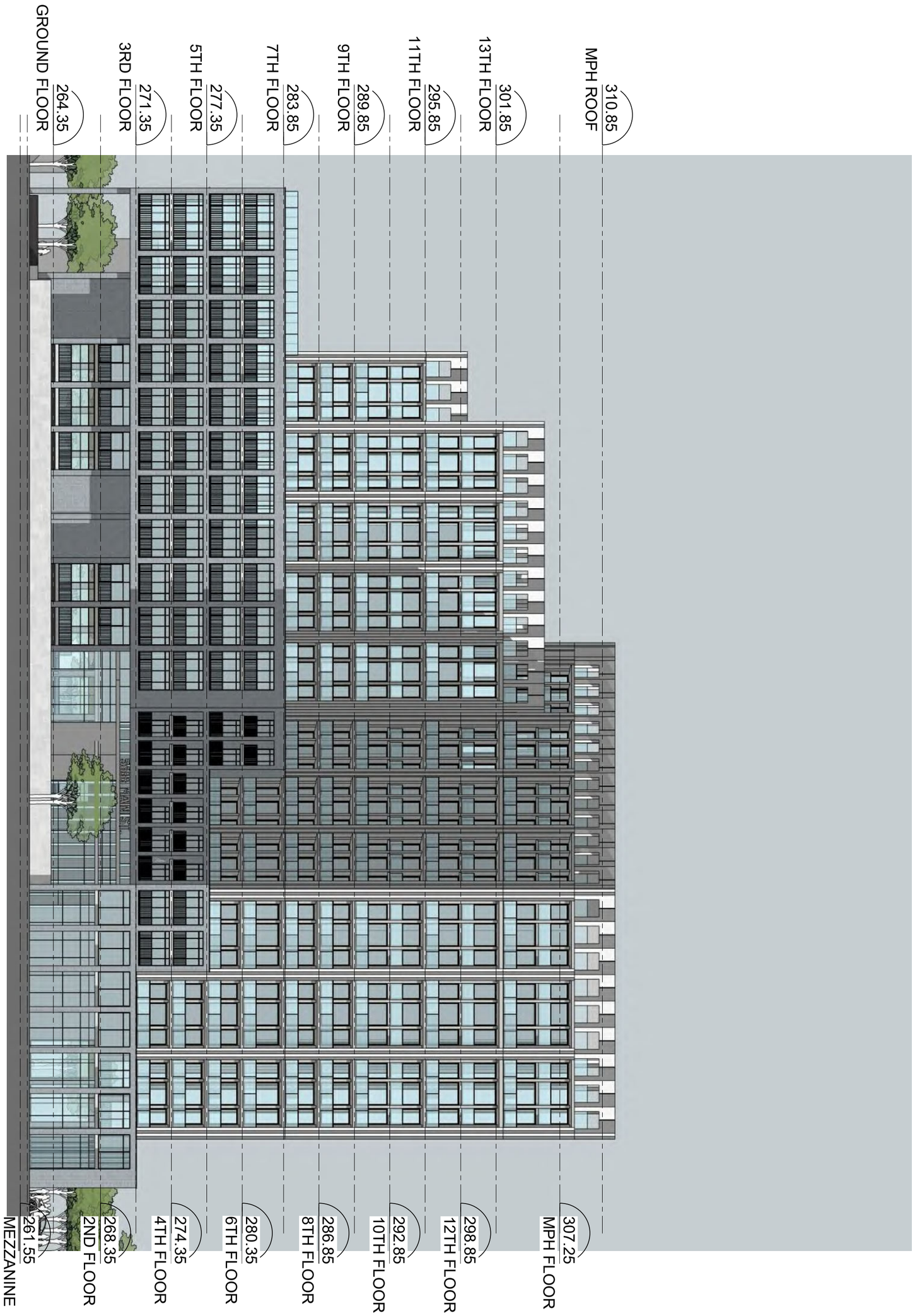

Drawing No.

A- 202

WEST ELEVATION

Date	Issue Date	Checked
Scale	1 : 300	Drawn
Project No.		T2022062

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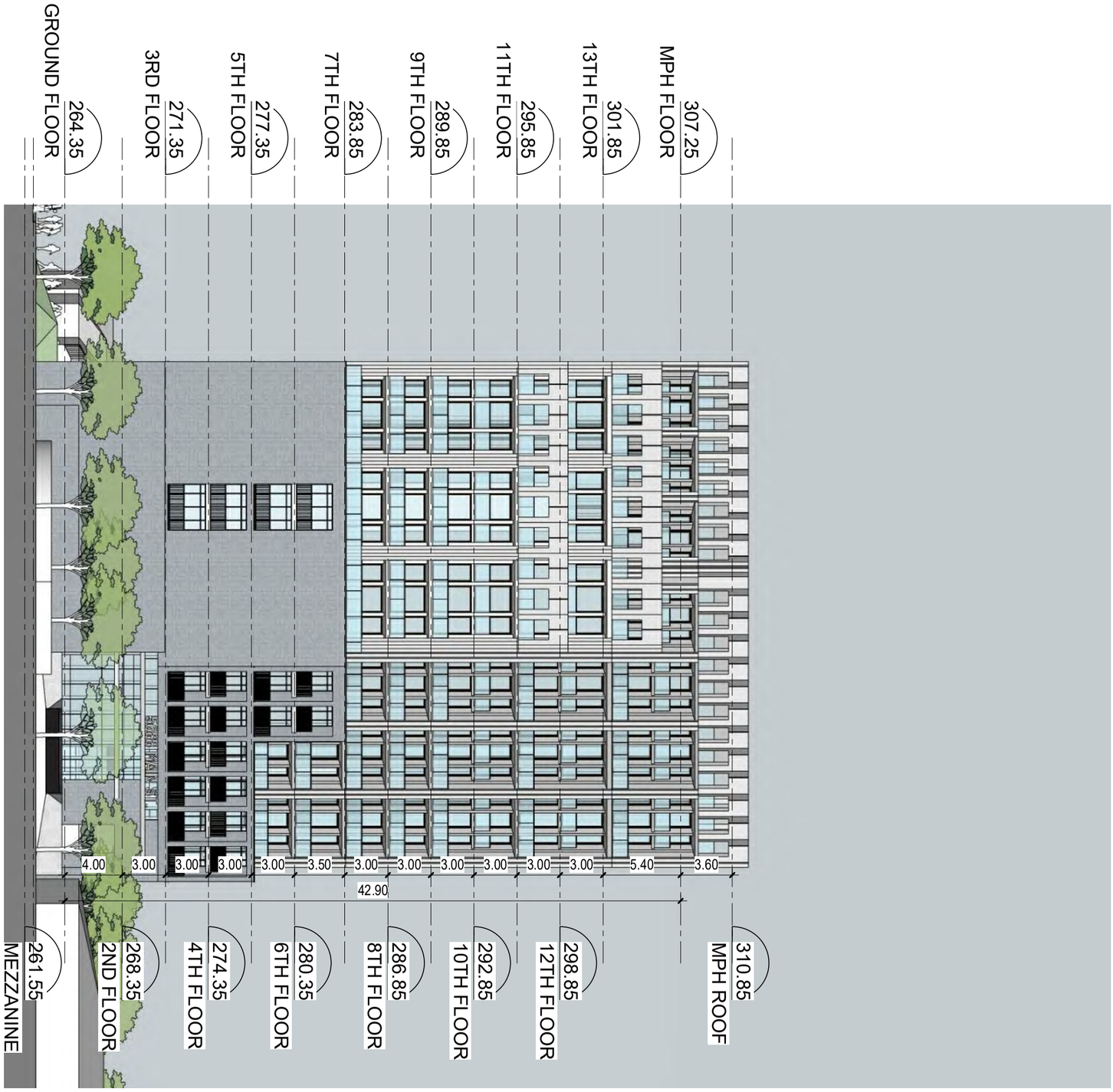

Drawing No.

A- 203

NORTH ELEVATION

Date	Issue Date	Checked
Scale	1 : 300	Drawn
Project No.		T2022062

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A- 901

PERSPECTIVE

Date	Issue Date	Checked
Scale		Drawn
Project No.		T2022062

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Drawing No.

A- 902

PERSPECTIVE

Date	Issue Date	Checked
Scale		Drawn
Project No.		T2022062

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A- 903

PERSPECTIVE

Date	Issue Date	Checked
Scale		Drawn
Project No.		T2022062

CONDOMINIUM

5688 MAIN STREET

Whitchurch-Stouffville, ON

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Appendix B – Terms of Reference

520 Industrial Parkway South, Suite 201
Aurora, Ontario L4G 6W8

Phone: 905-503-2563
www.nextrans.ca

nexTrans CONSULTING ENGINEERS
NextEng Consulting Group Inc.

To: Monika Dhungana, Town of Whitchurch-Stouffville
David Schleihauf, York Region

From: Kristian Aviles, Nextrans Consulting Engineers

Date: January 31, 2024

Re: **Terms of Reference – Transportation Impact Study**
Proposed Residential Development
5688 Main Street, Town of Whitchurch-Stouffville
Our Project No. NT-23-251

INTRODUCTION

We wish to confirm the following work plan for a Transportation Impact Study for a proposed mixed-use residential development located on the northwest corner of the intersection of Main Street and Palmwood Gate, (herein referred to as the "subject site"), in the Town of Whitchurch-Stouffville. The subject lands are currently occupied by an existing commercial building. **Figure 1** illustrates the location of the subject site.

Figure 1: Subject Site Location

Based on the site plan provided, the development proposal is to redevelop the subject lands to construct a 13-storey residential building with a total of 260 dwelling units and retail uses at grade that will front Main Street. A total of 220 vehicle parking spaces will be provided on-site and vehicular access will be provided via two full movement driveways onto Palmwood Gate.

The following outlines the proposed Terms of Reference for our study.

STUDY AREA

Nextrans proposes to collect turning movement count (TMC) data at the following study area intersections during AM (7:00 AM – 10:00 AM) and PM (4:00 PM – 7:00 PM) peak periods:

1. Palmwood Gate and the existing site access / 5710 Main Street access (unsignalized);
2. Palmwood Gate and Main Street (signalized).

The study will also include the analysis of the proposed driveways onto Palmwood Gate.

TRAFFIC ASSESSMENT

The study will focus on weekday AM and PM peak hour traffic operations. Synchro version 10 will be used to assess intersection operations during the peak hours.

BACKGROUND TRAFFIC

General Corridor Growth Rate – Historical intersection TMC data will be reviewed to establish corridor growth rates.

Road Network Improvements – Nextrans will note any road network improvements identified within the study area and account for any traffic diversions associated with these improvements within in our analysis.

Background Development Traffic – Nextrans will consult with the Town of Whitchurch Stouffville for any relevant background developments to be considered within the study. Nextrans requests that all relevant background traffic documents be made available.

TRIP GENERATION, DISTRIBUTION, & ASSIGNMENT

Nextrans proposes to use the Institute of Transportation Engineers (ITE) Trip Generation Manual 11th Edition to determine the site traffic and newly added trips of the proposed development on the surrounding road network. The general trip distribution will be based on a review of 2016 Transportation Tomorrow Survey (TTS) data. Trip assignment will be completed accordingly to reflect the configuration of the proposed site accesses, turning restrictions, and logical routings.

FUTURE TRAFFIC SCENARIOS

Future background and future total analyses for the study area intersections will be conducted over a five (5)-year horizon from present year, for a future analysis year of 2029.

REMEDIAL MEASURES

Under future total conditions, any through or shared through/turning movements at the studied intersections that exceed a V/C ratio of 0.90 or exclusive movements that exceed a V/C ratio of 1.00 will be identified. If remedial actions such as signal optimization are unsuccessful this will also be identified. If remedial measures are to be employed, a scenario will be provided demonstrating the change in intersection operations.

PARKING & LOADING

The site is currently subject to Town of Whitchurch-Stouffville 2010-001-ZO, which will be reviewed for parking and loading requirements.

TRANSPORTATION DEMAND MANAGEMENT

A review of existing nearby transportation facilities and possible initiatives and policies to promote and encourage modes of transportation in lieu of single occupant vehicle (SOV) trips will be made to influence the travel behaviour of residents and visitors to reduce travel demand and create a more efficient transportation network.

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

Yours truly,

NEXTRANS CONSULTING ENGINEERS

Kristian Aviles, B.Eng
Transportation Analyst

Kristian Aviles

From: Schleihauf, David <David.Schleihauf@york.ca>
Sent: February 6, 2024 8:53 AM
To: Kristian Aviles
Cc: Monika Dhungana; Bui, Vi
Subject: RE: Terms of Reference for a Transportation Impact Study - 5688 Main Street, Town of Whitchurch-Stouffville

Follow Up Flag: Follow up
Flag Status: Flagged

Hello Kristian,

Please find our comments below regarding the terms of reference.

1. It should be noted that this section of Main Street is under the jurisdiction of the Town of Whitchurch Stouffville. Based on Map 11 in The Regional Municipality of York Official Plan, the Region requests that all building setbacks, above and below ground and private utilities be located a minimum of 18 metres from the centerline of construction of Main Street.
2. The transportation study shall be consistent with the Region's Transportation Mobility Plan Guidelines (November 2016).
3. Future horizon years should include five-years post build-out, 2029 may not be realistic.

Please note, this is not an approval, the Region will provide additional detailed comments when a study is submitted for review.

Regards,

Our working hours may be different. Please do not feel obligated to reply outside of your scheduled working hours. Let's work together to help foster healthy work-life boundaries.

David Schleihauf, P.Eng. | Senior Transportation Planner, Transportation Development Planning, Transportation & Infrastructure Planning Branch, Public Works Department

---

1-877-464-9675 ext. 77857

Our Mission: **Working together to serve our thriving communities – today and tomorrow**

From: Kristian Aviles <kristian@nextrans.ca>
Sent: Wednesday, January 31, 2024 4:43 PM
To: Monika Dhungana <monika.dhungana@townofws.ca>; Schleihauf, David <David.Schleihauf@york.ca>
Subject: Terms of Reference for a Transportation Impact Study - 5688 Main Street, Town of Whitchurch-Stouffville

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Good afternoon Monika and David,

Nextrans has been retained to prepare a Transportation Impact Study for a proposed development located at the northwest corner of the intersection of Palmwood Gate and Main Street, in the Town of Whitchurch Stouffville.

Please see the attached TIS terms of reference for your review and commentary. We are hoping to get confirmation that the proposed study area is acceptable ASAP so that we can deploy traffic data collection.

Regards,

Kristian Aviles, B.Eng.
Transportation Analyst

o: 905-503-2563 ext. 206
e: kristian@nextrans.ca
w: www.nextrans.ca

NexTrans Consulting Engineers
A Division of NextEng Consulting Group Inc.
520 Industrial Parkway South, Suite 201
Aurora ON L4G 6W8

Kristian Aviles

From: Monika Dhungana <monika.dhungana@townofws.ca>
Sent: February 6, 2024 9:51 AM
To: Schleihauf, David; Kristian Aviles
Cc: Bui, Vi
Subject: RE: Terms of Reference for a Transportation Impact Study - 5688 Main Street, Town of Whitchurch-Stouffville
Attachments: Terms of Reference - 5688 Main Street- WS comments.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Kristen
Please find attached file with town's markup comments. Few things that I want to highlight here-

1. Send a separate email request for Background data, based on Development Activity Map.
2. The TIS will be reviewed by the Town's peer review consultant.
3. Review of TOR is not an approval of the TIS and its detail content.

Have a great day.

Monika

Stouffville

MONIKA DHUNGANA, M. Sc., P. Eng.
Senior Development Engineer| Engineering and Public Works
111 Sandiford Drive, Stouffville, Ontario L4A 0Z8
t: 905-640-1900 ext. 2291 | **tf:** 855-642-TOWN | townofws.ca

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From: Schleihauf, David <David.Schleihauf@york.ca>
Sent: Tuesday, February 6, 2024 8:53 AM
To: kristian@nextrans.ca
Cc: Monika Dhungana <monika.dhungana@townofws.ca>; Bui, Vi <Vi.Bui@york.ca>
Subject: RE: Terms of Reference for a Transportation Impact Study - 5688 Main Street, Town of Whitchurch-Stouffville

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David Schleihauf, P.Eng. | Senior Transportation Planner, Transportation Development Planning, Transportation & Infrastructure Planning Branch, Public Works Department

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To: Monika Dhungana <monika.dhungana@townofws.ca>; Schleihauf, David <David.Schleihauf@york.ca>
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Transportation Analyst

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David Schleihauf, York Region

From: Kristian Aviles, Nextrans Consulting Engineers

Date: January 31, 2024

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1. Palmwood Gate and the existing site access / 5710 Main Street access (unsignalized);
2. Palmwood Gate and Main Street (signalized).

Consider other intersections, Main and Sandale; Main and West Lawn

The study will also include the analysis of the proposed driveways onto Palmwood Gat

TRAFFIC ASSESSMENT

The study will focus on weekday AM and PM peak hour traffic operations. Synchro version 10 will be used to assess intersection operations during the peak hours.

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General Corridor Growth Rate – Historical intersection TMC data will be reviewed to establish corridor growth rates.

Road Network Improvements – Nextrans will note any road network improvements identified within the study area and account for any traffic diversions associated with these improvements within in our analysis.

Background Development Traffic – Nextrans will consult with the Town of Whitchurch Stouffville for any relevant background developments to be considered within the study. Nextrans requests that all relevant background traffic documents be made available.

Developments within 1km radius needs to be accounted for Background Traffic. Refer to Development activity map in our website and reach out to developmenthelp@townofws.ca with a list.

TRIP GENERATION, DIST

Nextrans proposes to use the Institute of Transportation Engineers (ITE) Trip Generation Manual 11th Edition to determine the site traffic and newly added trips of the proposed development on the surrounding road network. The general trip distribution will be based on a review of 2016 Transportation Tomorrow Survey (TTS) data. Trip assignment will be completed accordingly to reflect the configuration of the proposed site accesses, turning restrictions, and logical routings.

FUTURE TRAFFIC SCENARIOS

Future background and future total analyses for the study area intersections will be conducted over a five (5)-year horizon from present year, for a future analysis year of 2029.

REMEDIAL MEASURES

Under future total conditions, any through or shared through/turning movements at the studied intersections that exceed a V/C ratio of 0.90 or exclusive movements that exceed a V/C ratio of 1.00 will be identified. If remedial actions such as signal optimization are unsuccessful this will also be identified. If remedial measures are to be employed, a scenario will be provided demonstrating the change in intersection operations.

PARKING & LOADING

The site is currently subject to Town of Whitchurch-Stouffville 2010-001-ZO, which will be reviewed for parking and loading requirements.

TRANSPORTATION DEMAND MANAGEMENT

A review of existing nearby transportation facilities and possible initiatives and policies to promote and encourage modes of transportation in lieu of single occupant vehicle (SOV) trips will be made to influence the travel behaviour of residents and visitors to reduce travel demand and create a more efficient transportation network.

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

Yours truly,

NEXTRANS CONSULTING ENGINEERS

Kristian Aviles, B.Eng
Transportation Analyst

Appendix C – Traffic Data

Spectrum

Turning Movement Count
Location Name: SANDALE RD / SANDIFORD DR & MAIN ST
Date: Wed, Feb 14, 2024 Deployment Lead: David Chu

NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Turning Movement Count (1 . SANDALE RD / SANDIFORD DR & MAIN ST)

Start Time	Southbound SANDALE RD						Westbound MAIN ST						Northbound SANDIFORD DR						Eastbound MAIN ST						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	12	3	6	0	2	21	19	109	10	0	1	138	9	1	24	0	0	34	12	66	10	0	0	88	281	
07:15:00	14	8	10	0	0	32	20	136	13	0	0	169	14	1	27	0	1	42	15	77	6	0	1	98	341	
07:30:00	14	8	13	0	2	35	18	144	17	0	0	179	13	4	19	0	3	36	24	70	17	0	0	111	361	
07:45:00	11	9	18	0	1	38	21	118	24	0	1	163	15	9	13	0	0	37	33	99	10	0	1	142	380	1363
08:00:00	12	11	17	0	3	40	26	137	23	0	1	186	16	11	18	0	0	45	26	116	15	0	3	157	428	1510
08:15:00	8	25	19	0	2	52	22	158	38	0	1	218	14	6	20	0	0	40	32	112	13	0	0	157	467	1636
08:30:00	21	27	22	0	2	70	24	99	52	0	1	175	15	8	19	0	3	42	70	128	18	0	2	216	503	1778
08:45:00	11	23	18	0	1	52	29	116	36	0	0	181	36	22	40	0	3	98	56	148	16	0	2	220	551	1949
09:00:00	19	13	16	0	2	48	36	141	41	0	0	218	28	18	24	0	2	70	36	131	10	0	0	177	513	2034
09:15:00	17	21	20	0	1	58	28	94	34	0	1	156	21	16	35	0	3	72	26	97	25	0	0	148	434	2001
09:30:00	17	29	20	0	2	66	23	106	34	0	0	163	28	9	25	0	3	62	24	98	20	0	0	142	433	1931
09:45:00	21	17	30	0	7	68	32	108	35	0	3	175	35	18	19	0	1	72	29	108	13	0	5	150	465	1845
BREAK																										
16:00:00	29	9	26	0	6	64	19	173	25	0	1	217	45	25	35	0	0	105	28	186	34	0	0	248	634	
16:15:00	21	15	29	0	8	65	18	149	35	0	2	202	29	23	41	0	4	93	20	216	26	0	1	262	622	
16:30:00	16	16	18	0	4	50	21	163	27	0	0	211	36	24	42	0	1	102	37	209	45	0	0	291	654	
16:45:00	29	19	28	0	5	76	22	168	31	0	0	221	34	28	51	0	0	113	31	209	33	1	3	274	684	2594
17:00:00	24	21	24	0	9	69	17	163	21	0	5	201	35	28	59	0	2	122	44	265	42	1	1	352	744	2704
17:15:00	34	16	32	0	5	82	13	149	30	0	1	192	40	28	46	0	2	114	23	210	40	0	1	273	661	2743
17:30:00	22	13	34	0	4	69	23	183	23	0	1	229	28	20	41	0	1	89	31	242	31	0	0	304	691	2780
17:45:00	25	24	42	0	7	91	18	141	17	0	0	176	23	21	41	0	4	85	43	188	29	0	0	260	612	2708
18:00:00	17	19	24	0	0	60	18	135	33	0	1	186	30	37	30	0	0	97	20	199	28	1	0	248	591	2555
18:15:00	18	16	34	0	3	68	22	129	34	0	0	185	31	20	46	0	1	97	22	142	29	0	1	193	543	2437
18:30:00	15	16	30	0	0	61	13	113	20	0	5	146	33	18	42	0	3	93	37	190	25	0	0	252	552	2298
18:45:00	17	14	24	0	0	55	14	118	22	0	0	154	26	20	40	0	1	86	32	168	26	0	0	226	521	2207
Grand Total	444	392	554	0	76	1390	516	3250	675	0	25	4441	634	415	797	0	38	1846	751	3674	561	3	21	4989	**12666**	-
Approach%	31.9%	28.2%	39.9%	0%		-	11.6%	73.2%	15.2%	0%		-	34.3%	22.5%	43.2%	0%		-	15.1%	73.6%	11.2%	0.1%		-	-	-
Totals %	3.5%	3.1%	4.4%	0%		11%	4.1%	25.7%	5.3%	0%		35.1%	5%	3.3%	6.3%	0%		14.6%	5.9%	29%	4.4%	0%		39.4%	-	-
Heavy	8	1	3	0		-	6	80	3	0		-	1	2	4	0		-	8	80	10	0		-	-	-
Heavy %	1.8%	0.3%	0.5%	0%		-	1.2%	2.5%	0.4%	0%		-	0.2%	0.5%	0.5%	0%		-	1.1%	2.2%	1.8%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

Peak Hour: 08:15 AM - 09:15 AM Weather: Clear Sky (-9.32 °C)

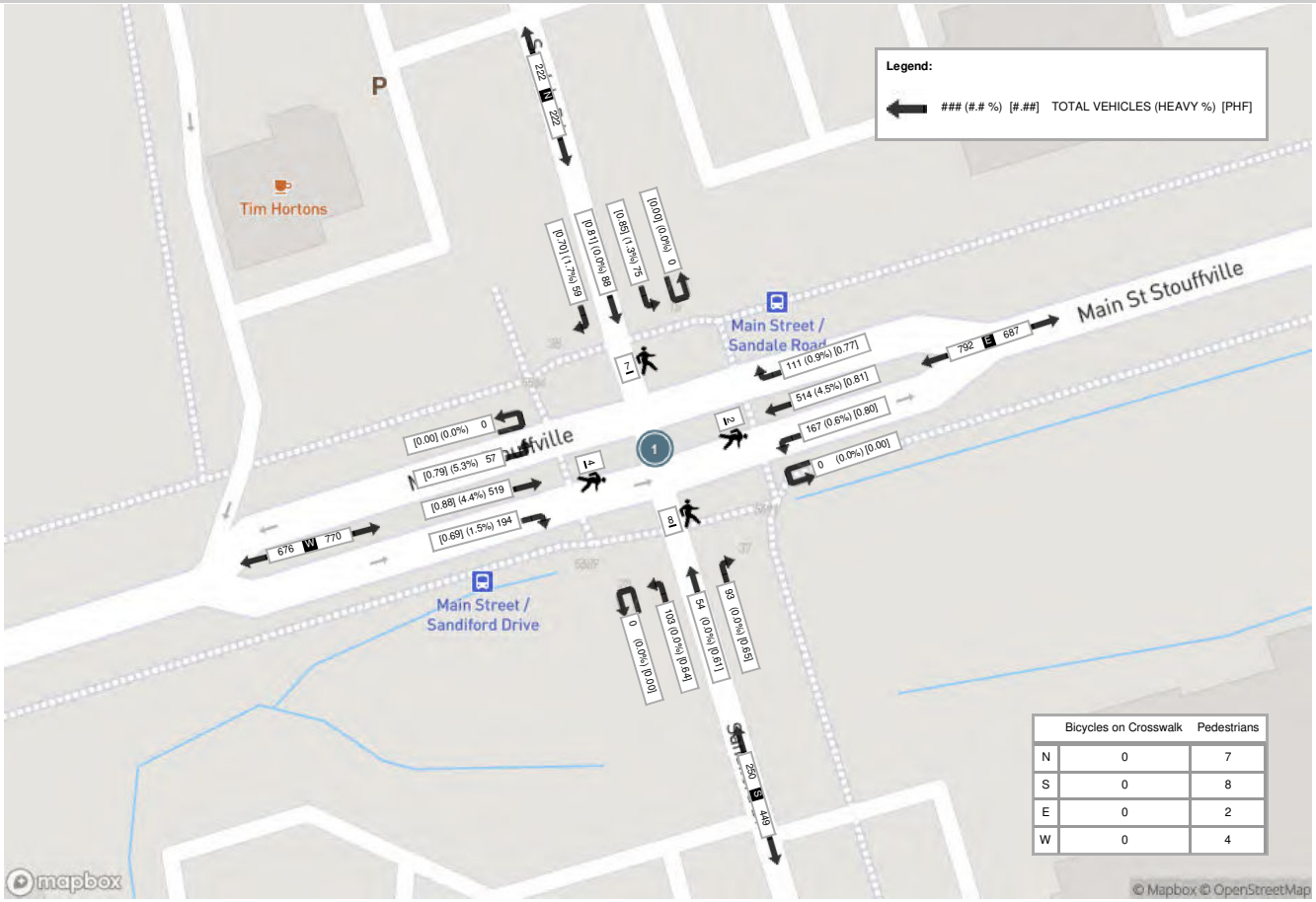
Start Time	Southbound SANDALE RD						Westbound MAIN ST						Northbound SANDIFORD DR						Eastbound MAIN ST						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:15:00	8	25	19	0	2	52	22	158	38	0	1	218	14	6	20	0	0	40	32	112	13	0	0	157	467
08:30:00	21	27	22	0	2	70	24	99	52	0	1	175	15	8	19	0	3	42	70	128	18	0	2	216	503
08:45:00	11	23	18	0	1	52	29	116	36	0	0	181	36	22	40	0	3	98	56	148	16	0	2	220	551
09:00:00	19	13	16	0	2	48	36	141	41	0	0	218	28	18	24	0	2	70	36	131	10	0	0	177	513
Grand Total	59	88	75	0	7	222	111	514	167	0	2	792	93	54	103	0	8	250	194	519	57	0	4	770	**2034**
Approach%	26.6%	39.6%	33.8%	0%		-	14%	64.9%	21.1%	0%		-	37.2%	21.6%	41.2%	0%		-	25.2%	67.4%	7.4%	0%		-	**-**
Totals %	2.9%	4.3%	3.7%	0%		10.9%	5.5%	25.3%	8.2%	0%		38.9%	4.6%	2.7%	5.1%	0%		12.3%	9.5%	25.5%	2.8%	0%		37.9%	**-**
PHF	0.7	0.81	0.85	0		0.79	0.77	0.81	0.8	0		0.91	0.65	0.61	0.64	0		0.64	0.69	0.88	0.79	0		0.88	**-**
Heavy	1	0	1	0		2	1	23	1	0		25	0	0	0	0		0	3	23	3	0		29	**-**
Heavy %	1.7%	0%	1.3%	0%		0.9%	0.9%	4.5%	0.6%	0%		3.2%	0%	0%	0%	0%		0%	1.5%	4.4%	5.3%	0%		3.8%	**-**
Lights	58	88	74	0		220	110	491	166	0		767	93	54	103	0		250	191	496	54	0		741	**-**
Lights %	98.3%	100%	98.7%	0%		99.1%	99.1%	95.5%	99.4%	0%		96.8%	100%	100%	100%	0%		100%	98.5%	95.6%	94.7%	0%		96.2%	**-**
Single-Unit Trucks	0	0	1	0		1	1	8	1	0		10	0	0	0	0		0	0	10	2	0		12	**-**
Single-Unit Trucks %	0%	0%	1.3%	0%		0.5%	0.9%	1.6%	0.6%	0%		1.3%	0%	0%	0%	0%		0%	0%	1.9%	3.5%	0%		1.6%	**-**
Buses	1	0	0	0		1	0	10	0	0		10	0	0	0	0		0	3	10	1	0		14	**-**
Buses %	1.7%	0%	0%	0%		0.5%	0%	1.9%	0%	0%		1.3%	0%	0%	0%	0%		0%	1.5%	1.9%	1.8%	0%		1.8%	**-**
Articulated Trucks	0	0	0	0		0	0	5	0	0		5	0	0	0	0		0	0	3	0	0		3	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	1%	0%	0%		0.6%	0%	0%	0%	0%		0%	0%	0.6%	0%	0%		0.4%	**-**
Pedestrians	-	-	-	-	7	-	-	-	-	-	2	-	-	-	-	-	8	-	-	-	-	-	4	-	**-**
Pedestrians%	-	-	-	-	33.3%		-	-	-	-	9.5%		-	-	-	-	38.1%		-	-	-	-	19%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Peak Hour: 04:45 PM - 05:45 PM Weather: Broken Clouds (-2.85 °C)

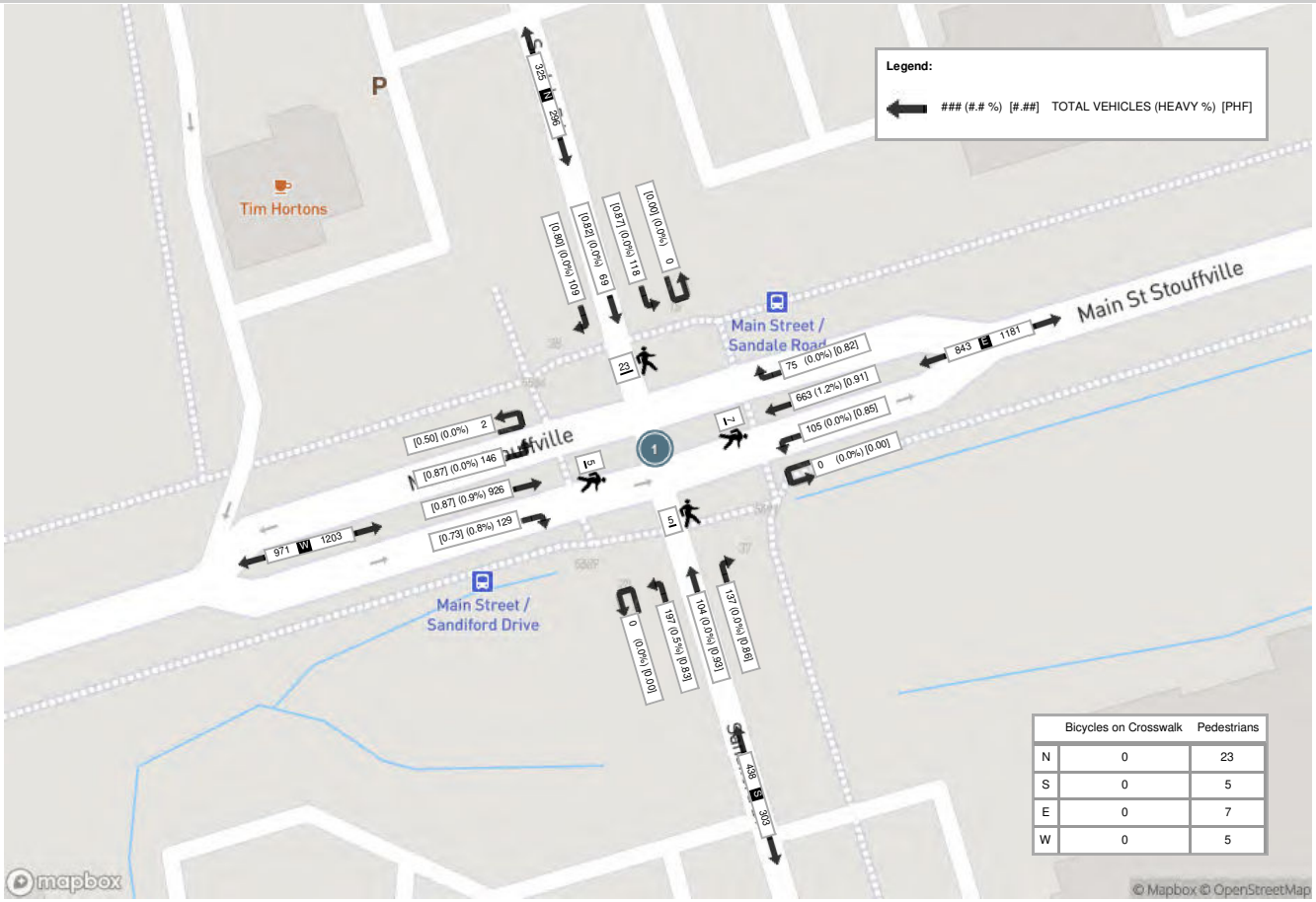
Start Time	Southbound SANDALE RD						Westbound MAIN ST						Northbound SANDIFORD DR						Eastbound MAIN ST						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:45:00	29	19	28	0	5	76	22	168	31	0	0	221	34	28	51	0	0	113	31	209	33	1	3	274	684
17:00:00	24	21	24	0	9	69	17	163	21	0	5	201	35	28	59	0	2	122	44	265	42	1	1	352	744
17:15:00	34	16	32	0	5	82	13	149	30	0	1	192	40	28	46	0	2	114	23	210	40	0	1	273	661
17:30:00	22	13	34	0	4	69	23	183	23	0	1	229	28	20	41	0	1	89	31	242	31	0	0	304	691
Grand Total	109	69	118	0	23	296	75	663	105	0	7	843	137	104	197	0	5	438	129	926	146	2	5	1203	**2780**
Approach%	36.8%	23.3%	39.9%	0%		-	8.9%	78.6%	12.5%	0%		-	31.3%	23.7%	45%	0%		-	10.7%	77%	12.1%	0.2%		-	**-**
Totals %	3.9%	2.5%	4.2%	0%		10.6%	2.7%	23.8%	3.8%	0%		30.3%	4.9%	3.7%	7.1%	0%		15.8%	4.6%	33.3%	5.3%	0.1%		43.3%	**-**
PHF	0.8	0.82	0.87	0		0.9	0.82	0.91	0.85	0		0.92	0.86	0.93	0.83	0		0.9	0.73	0.87	0.87	0.5		0.85	**-**
Heavy	0	0	0	0		0	0	8	0	0		8	0	0	1	0		1	1	8	0	0		9	**-**
Heavy %	0%	0%	0%	0%		0%	0%	1.2%	0%	0%		0.9%	0%	0%	0.5%	0%		0.2%	0.8%	0.9%	0%	0%		0.7%	**-**
Lights	109	69	118	0		296	75	655	105	0		835	137	104	196	0		437	128	918	146	2		1194	**-**
Lights %	100%	100%	100%	0%		100%	100%	98.8%	100%	0%		99.1%	100%	100%	99.5%	0%		99.8%	99.2%	99.1%	100%	100%		99.3%	**-**
Single-Unit Trucks	0	0	0	0		0	0	6	0	0		6	0	0	1	0		1	1	4	0	0		5	**-**
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0.9%	0%	0%		0.7%	0%	0%	0.5%	0%		0.2%	0.8%	0.4%	0%	0%		0.4%	**-**
Buses	0	0	0	0		0	0	2	0	0		2	0	0	0	0		0	0	4	0	0		4	**-**
Buses %	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.2%	0%	0%	0%	0%		0%	0%	0.4%	0%	0%		0.3%	**-**
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	23	-	-	-	-	-	7	-	-	-	-	-	5	-	-	-	-	-	5	-	**-**
Pedestrians%	-	-	-	-	57.5%		-	-	-	-	17.5%		-	-	-	-	12.5%		-	-	-	-	12.5%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Peak Hour: 08:15 AM - 09:15 AM **Weather: Clear Sky (-9.32 °C)**



Peak Hour: 04:45 PM - 05:45 PM **Weather: Broken Clouds (-2.85 °C)**



	Bicycles on Crosswalk	Pedestrians
N	0	23
S	0	5
E	0	7
W	0	5

NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Turning Movement Count (3 . W LAWN CRES / WELDON RD & MAIN ST)

Start Time	Southbound W LAWN CRESCENT						Westbound MAIN ST						Northbound WELDON RD						Eastbound MAIN ST						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	6	4	0	0	0	10	3	128	4	0	0	135	4	3	6	0	0	13	3	66	3	0	1	72	230	
07:15:00	13	0	0	0	1	13	2	161	4	0	0	167	5	1	3	0	0	9	3	68	9	0	0	80	269	
07:30:00	15	5	5	0	0	25	3	147	3	1	0	154	2	4	11	0	0	17	5	67	18	0	0	90	286	
07:45:00	9	11	9	0	0	29	4	152	6	0	0	162	8	4	12	0	0	24	6	85	10	0	0	101	316	1101
08:00:00	24	14	16	0	0	54	7	179	7	0	2	193	10	12	8	0	2	30	12	108	15	0	2	135	412	1283
08:15:00	27	17	18	0	0	62	8	192	23	0	0	223	12	3	17	0	0	32	10	113	8	1	8	132	449	1463
08:30:00	16	12	14	0	2	42	6	191	27	0	0	224	11	9	15	0	1	35	18	118	3	0	4	139	440	1617
08:45:00	16	33	8	0	2	57	9	190	26	0	0	225	14	4	14	0	3	32	26	161	20	0	4	207	521	1822
09:00:00	13	59	7	0	4	79	10	225	63	0	3	298	27	31	19	0	1	77	29	134	10	0	27	173	627	2037
09:15:00	18	49	7	0	5	74	4	152	43	0	1	199	33	32	25	0	3	90	16	137	15	0	4	168	531	2119
09:30:00	16	10	3	0	1	29	7	143	13	0	0	163	10	9	13	0	2	32	14	105	17	0	1	136	360	2039
09:45:00	29	12	4	0	0	45	5	142	11	0	0	158	12	10	19	0	2	41	12	140	10	0	3	162	406	1924
BREAK																										
16:00:00	15	18	11	0	3	44	8	176	26	0	6	210	44	25	23	0	9	92	26	201	32	0	6	259	605	
16:15:00	12	15	11	0	4	38	21	193	23	1	2	238	13	29	24	0	5	66	18	235	43	0	7	296	638	
16:30:00	18	18	10	0	2	46	6	207	25	1	2	239	18	27	29	0	4	74	19	231	23	0	1	273	632	
16:45:00	27	27	9	0	5	63	11	184	21	0	3	216	20	20	20	0	9	60	25	218	23	0	3	266	605	2480
17:00:00	18	17	16	0	1	51	10	204	14	0	2	228	30	27	24	0	3	81	27	252	23	0	8	302	662	2537
17:15:00	14	25	17	0	3	56	10	201	18	0	0	229	17	31	32	0	0	80	25	252	32	0	4	309	674	2573
17:30:00	24	8	16	0	2	48	7	214	26	0	0	247	19	27	32	0	3	78	27	239	30	0	0	296	669	2610
17:45:00	25	12	18	0	3	55	10	193	27	0	3	230	17	23	26	0	8	66	23	248	25	0	1	296	647	2652
18:00:00	27	15	7	0	0	49	11	193	20	0	1	224	24	19	21	0	3	64	27	227	28	0	0	282	619	2609
18:15:00	22	17	9	0	1	48	9	202	24	0	4	235	20	8	18	0	3	46	12	210	27	0	2	249	578	2513
18:30:00	14	10	21	0	0	45	11	151	18	0	1	180	12	14	18	0	3	44	16	236	29	0	1	281	550	2394
18:45:00	16	14	10	0	2	40	14	167	28	0	0	209	12	10	17	0	0	39	15	179	22	0	0	216	504	2251
Grand Total	434	422	246	0	41	1102	196	4287	500	3	30	4986	394	382	446	0	64	1222	414	4030	475	1	87	4920	**12230**	-
Approach%	39.4%	38.3%	22.3%	0%		-	3.9%	86%	10%	0.1%		-	32.2%	31.3%	36.5%	0%		-	8.4%	81.9%	9.7%	0%		-	-	-
Totals %	3.5%	3.5%	2%	0%		9%	1.6%	35.1%	4.1%	0%		40.8%	3.2%	3.1%	3.6%	0%		10%	3.4%	33%	3.9%	0%		40.2%	-	-
Heavy	6	5	3	0		-	3	77	2	0		-	2	2	9	0		-	12	58	7	0		-	-	-
Heavy %	1.4%	1.2%	1.2%	0%		-	1.5%	1.8%	0.4%	0%		-	0.5%	0.5%	2%	0%		-	2.9%	1.4%	1.5%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

Peak Hour: 08:30 AM - 09:30 AM Weather: Clear Sky (-9.32 °C)

Start Time	Southbound W LAWN CRESCENT						Westbound MAIN ST						Northbound WELDON RD						Eastbound MAIN ST						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:30:00	16	12	14	0	2	42	6	191	27	0	0	224	11	9	15	0	1	35	18	118	3	0	4	139	440
08:45:00	16	33	8	0	2	57	9	190	26	0	0	225	14	4	14	0	3	32	26	161	20	0	4	207	521
09:00:00	13	59	7	0	4	79	10	225	63	0	3	298	27	31	19	0	1	77	29	134	10	0	27	173	627
09:15:00	18	49	7	0	5	74	4	152	43	0	1	199	33	32	25	0	3	90	16	137	15	0	4	168	531
Grand Total	63	153	36	0	13	252	29	758	159	0	4	946	85	76	73	0	8	234	89	550	48	0	39	687	**2119**
Approach%	25%	60.7%	14.3%	0%		-	3.1%	80.1%	16.8%	0%		-	36.3%	32.5%	31.2%	0%		-	13%	80.1%	7%	0%		-	**-**
Totals %	3%	7.2%	1.7%	0%		11.9%	1.4%	35.8%	7.5%	0%		44.6%	4%	3.6%	3.4%	0%		11%	4.2%	26%	2.3%	0%		32.4%	**-**
PHF	0.88	0.65	0.64	0		0.8	0.73	0.84	0.63	0		0.79	0.64	0.59	0.73	0		0.65	0.77	0.85	0.6	0		0.83	**-**
Heavy	1	3	1	0		5	1	15	2	0		18	0	1	3	0		4	5	19	5	0		29	**-**
Heavy %	1.6%	2%	2.8%	0%		2%	3.4%	2%	1.3%	0%		1.9%	0%	1.3%	4.1%	0%		1.7%	5.6%	3.5%	10.4%	0%		4.2%	**-**
Lights	62	150	35	0		247	28	743	157	0		928	85	75	70	0		230	84	531	43	0		658	**-**
Lights %	98.4%	98%	97.2%	0%		98%	96.6%	98%	98.7%	0%		98.1%	100%	98.7%	95.9%	0%		98.3%	94.4%	96.5%	89.6%	0%		95.8%	**-**
Single-Unit Trucks	0	0	1	0		1	0	6	0	0		6	0	0	2	0		2	2	9	3	0		14	**-**
Single-Unit Trucks %	0%	0%	2.8%	0%		0.4%	0%	0.8%	0%	0%		0.6%	0%	0%	2.7%	0%		0.9%	2.2%	1.6%	6.3%	0%		2%	**-**
Buses	1	3	0	0		4	1	9	2	0		12	0	1	0	0		1	3	7	2	0		12	**-**
Buses %	1.6%	2%	0%	0%		1.6%	3.4%	1.2%	1.3%	0%		1.3%	0%	1.3%	0%	0%		0.4%	3.4%	1.3%	4.2%	0%		1.7%	**-**
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	1	0		1	0	3	0	0		3	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	1.4%	0%		0.4%	0%	0.5%	0%	0%		0.4%	**-**
Pedestrians	-	-	-	-	13	-	-	-	-	-	3	-	-	-	-	-	8	-	-	-	-	-	38	-	**-**
Pedestrians%	-	-	-	-	20.3%		-	-	-	-	4.7%		-	-	-	-	12.5%		-	-	-	-	59.4%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	1	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	1.6%		-	-	-	-	0%		-	-	-	-	1.6%		**-**

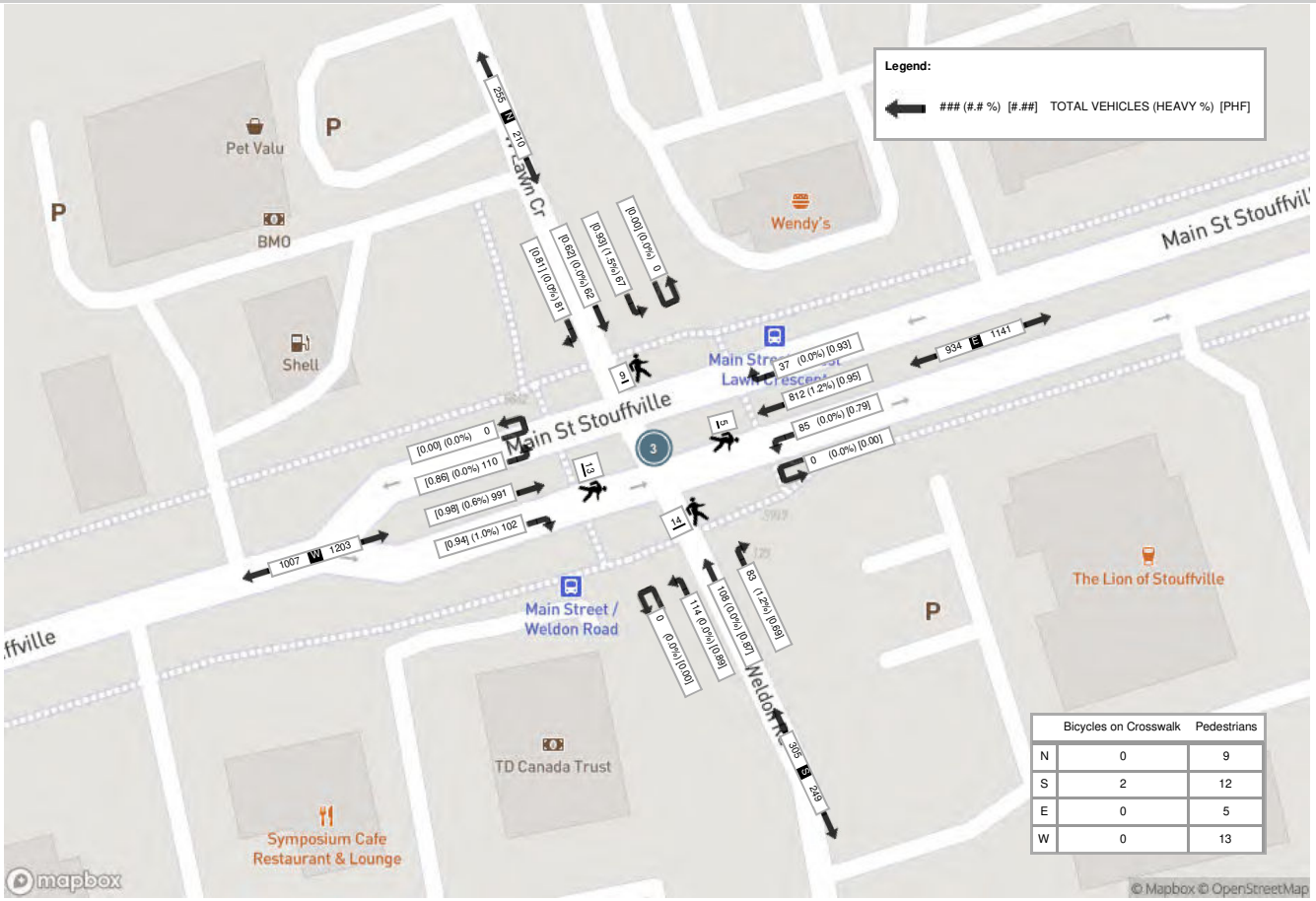
Peak Hour: 05:00 PM - 06:00 PM Weather: Broken Clouds (-2.85 °C)

Start Time	Southbound W LAWN CRESCENT						Westbound MAIN ST						Northbound WELDON RD						Eastbound MAIN ST						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
17:00:00	18	17	16	0	1	51	10	204	14	0	2	228	30	27	24	0	3	81	27	252	23	0	8	302	662
17:15:00	14	25	17	0	3	56	10	201	18	0	0	229	17	31	32	0	0	80	25	252	32	0	4	309	674
17:30:00	24	8	16	0	2	48	7	214	26	0	0	247	19	27	32	0	3	78	27	239	30	0	0	296	669
17:45:00	25	12	18	0	3	55	10	193	27	0	3	230	17	23	26	0	8	66	23	248	25	0	1	296	647
Grand Total	81	62	67	0	9	210	37	812	85	0	5	934	83	108	114	0	14	305	102	991	110	0	13	1203	**2652**
Approach%	38.6%	29.5%	31.9%	0%		-	4%	86.9%	9.1%	0%		-	27.2%	35.4%	37.4%	0%		-	8.5%	82.4%	9.1%	0%		-	-
Totals %	3.1%	2.3%	2.5%	0%		7.9%	1.4%	30.6%	3.2%	0%		35.2%	3.1%	4.1%	4.3%	0%		11.5%	3.8%	37.4%	4.1%	0%		45.4%	-
PHF	0.81	0.62	0.93	0		0.94	0.93	0.95	0.79	0		0.95	0.69	0.87	0.89	0		0.94	0.94	0.98	0.86	0		0.97	-
Heavy	0	0	1	0		1	0	10	0	0		10	1	0	0	0		1	1	6	0	0		7	-
Heavy %	0%	0%	1.5%	0%		0.5%	0%	1.2%	0%	0%		1.1%	1.2%	0%	0%	0%		0.3%	1%	0.6%	0%	0%		0.6%	-
Lights	81	62	66	0		209	37	802	85	0		924	82	108	114	0		304	101	985	110	0		1196	-
Lights %	100%	100%	98.5%	0%		99.5%	100%	98.8%	100%	0%		98.9%	98.8%	100%	100%	0%		99.7%	99%	99.4%	100%	0%		99.4%	-
Single-Unit Trucks	0	0	0	0		0	0	8	0	0		8	1	0	0	0		1	1	2	0	0		3	-
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	1%	0%	0%		0.9%	1.2%	0%	0%	0%		0.3%	1%	0.2%	0%	0%		0.2%	-
Buses	0	0	1	0		1	0	2	0	0		2	0	0	0	0		0	0	4	0	0		4	-
Buses %	0%	0%	1.5%	0%		0.5%	0%	0.2%	0%	0%		0.2%	0%	0%	0%	0%		0%	0%	0.4%	0%	0%		0.3%	-
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	9	-	-	-	-	-	5	-	-	-	-	-	12	-	-	-	-	-	13	-	-
Pedestrians%	-	-	-	-	22%		-	-	-	-	12.2%		-	-	-	-	29.3%		-	-	-	-	31.7%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	4.9%		-	-	-	-	0%		-

Peak Hour: 08:30 AM - 09:30 AM Weather: Clear Sky (-9.32 °C)

	Bicycles on Crosswalk	Pedestrians
N	0	13
S	0	8
E	1	3
W	1	38

Peak Hour: 05:00 PM - 06:00 PM **Weather: Broken Clouds (-2.85 °C)**



	Bicycles on Crosswalk	Pedestrians
N	0	9
S	2	12
E	0	5
W	0	13

NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Turning Movement Count (2 . PALMWOOD GATE / MOSTAR ST & MAIN ST)

Start Time	Southbound PALMWOOD GATE						Westbound MAIN ST						Northbound MOSTAR ST						Eastbound MAIN ST						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	6	4	2	0	1	12	1	134	9	0	0	144	9	1	9	0	1	19	17	63	5	0	0	85	260	
07:15:00	5	5	1	0	0	11	0	154	14	0	0	168	4	1	17	0	0	22	11	82	3	1	0	97	298	
07:30:00	14	2	1	0	1	17	3	153	12	0	0	168	4	4	18	0	0	26	15	78	5	0	0	98	309	
07:45:00	10	5	2	0	0	17	3	140	14	0	0	157	7	5	18	0	2	30	18	100	7	0	0	125	329	1196
08:00:00	6	11	5	0	1	22	8	170	32	0	0	210	5	2	15	0	0	22	18	124	6	0	2	148	402	1338
08:15:00	12	11	0	0	1	23	1	190	38	2	0	231	8	4	22	0	0	34	26	96	12	0	0	134	422	1462
08:30:00	7	10	6	0	2	23	6	158	51	0	2	215	16	6	15	0	1	37	33	124	3	0	1	160	435	1588
08:45:00	7	12	3	0	0	22	4	149	38	0	1	191	24	13	35	0	4	72	39	164	8	0	1	211	496	1755
09:00:00	5	17	4	0	1	26	2	203	52	0	2	257	28	10	31	0	3	69	35	141	9	0	0	185	537	1890
09:15:00	7	12	3	0	2	22	5	134	34	0	2	173	25	18	30	0	3	73	16	115	8	0	1	139	407	1875
09:30:00	6	5	3	0	3	14	7	145	36	0	3	188	14	5	31	0	0	50	16	114	7	2	0	139	391	1831
09:45:00	8	3	9	0	7	20	3	136	32	0	4	171	17	12	28	0	2	57	26	129	8	1	1	164	412	1747
BREAK																										
16:00:00	10	12	7	0	2	29	3	167	46	0	5	216	26	29	55	0	1	110	31	202	19	1	2	253	608	
16:15:00	6	18	10	0	1	34	5	190	42	0	3	237	33	32	43	0	8	108	51	205	13	1	2	270	649	
16:30:00	9	17	11	0	2	37	10	182	55	0	2	247	26	19	49	0	5	94	46	215	19	0	0	280	658	
16:45:00	6	20	11	0	3	37	6	166	51	0	12	223	21	27	69	0	1	117	41	219	16	0	0	276	653	2568
17:00:00	4	28	6	0	1	38	14	186	55	0	3	255	43	33	44	0	6	120	51	262	15	0	0	328	741	2701
17:15:00	7	15	5	0	1	27	13	178	55	0	2	246	36	22	48	0	3	106	40	236	20	0	0	296	675	2727
17:30:00	8	13	9	0	2	30	5	212	52	1	2	270	18	21	55	0	1	94	38	272	14	0	0	324	718	2787
17:45:00	8	31	8	0	5	47	7	159	69	0	0	235	25	19	37	0	0	81	37	217	11	0	0	265	628	2762
18:00:00	5	10	12	0	0	27	11	168	64	1	0	244	21	15	31	0	0	67	38	207	12	0	0	257	595	2616
18:15:00	7	21	7	0	3	35	5	157	41	0	0	203	23	18	46	0	2	87	27	178	11	0	0	216	541	2482
18:30:00	7	11	7	0	0	25	6	131	45	0	0	182	31	14	28	0	1	73	25	221	14	1	0	261	541	2305
18:45:00	8	6	4	0	0	18	10	140	48	0	0	198	19	18	36	0	0	73	32	191	12	0	0	235	524	2201
Grand Total	178	299	136	0	39	613	138	3902	985	4	43	5029	483	348	810	0	44	1641	727	3955	257	7	10	4946	**12229**	-
Approach%	29%	48.8%	22.2%	0%		-	2.7%	77.6%	19.6%	0.1%		-	29.4%	21.2%	49.4%	0%		-	14.7%	80%	5.2%	0.1%		-	**-**	-
Totals %	1.5%	2.4%	1.1%	0%		5%	1.1%	31.9%	8.1%	0%		41.1%	3.9%	2.8%	6.6%	0%		13.4%	5.9%	32.3%	2.1%	0.1%		40.4%	**-**	-
Heavy	5	3	0	0		-	3	78	6	0		-	1	1	11	0		-	9	79	4	0		-	**-**	-
Heavy %	2.8%	1%	0%	0%		-	2.2%	2%	0.6%	0%		-	0.2%	0.3%	1.4%	0%		-	1.2%	2%	1.6%	0%		-	**-**	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	**-**	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	**-**	-

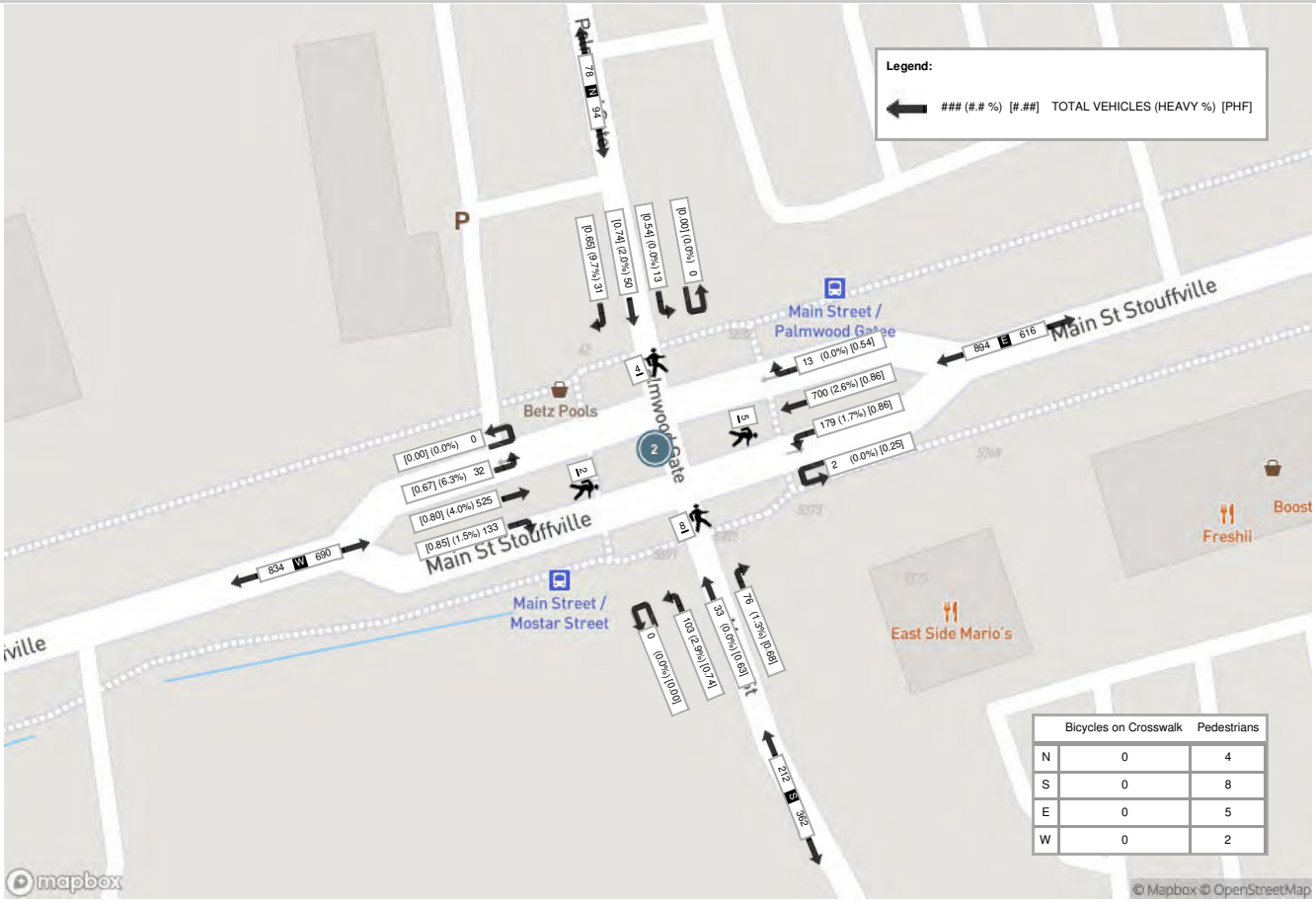
Peak Hour: 08:15 AM - 09:15 AM Weather: Clear Sky (-9.32 °C)

Start Time	Southbound PALMWOOD GATE						Westbound MAIN ST						Northbound MOSTAR ST						Eastbound MAIN ST						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:15:00	12	11	0	0	1	23	1	190	38	2	0	231	8	4	22	0	0	34	26	96	12	0	0	134	422
08:30:00	7	10	6	0	2	23	6	158	51	0	2	215	16	6	15	0	1	37	33	124	3	0	1	160	435
08:45:00	7	12	3	0	0	22	4	149	38	0	1	191	24	13	35	0	4	72	39	164	8	0	1	211	496
09:00:00	5	17	4	0	1	26	2	203	52	0	2	257	28	10	31	0	3	69	35	141	9	0	0	185	537
Grand Total	31	50	13	0	4	94	13	700	179	2	5	894	76	33	103	0	8	212	133	525	32	0	2	690	**1890**
Approach%	33%	53.2%	13.8%	0%		-	1.5%	78.3%	20%	0.2%		-	35.8%	15.6%	48.6%	0%		-	19.3%	76.1%	4.6%	0%		-	**-**
Totals %	1.6%	2.6%	0.7%	0%		5%	0.7%	37%	9.5%	0.1%		47.3%	4%	1.7%	5.4%	0%		11.2%	7%	27.8%	1.7%	0%		36.5%	**-**
PHF	0.65	0.74	0.54	0		0.9	0.54	0.86	0.86	0.25		0.87	0.68	0.63	0.74	0		0.74	0.85	0.8	0.67	0		0.82	**-**
Heavy	3	1	0	0		4	0	18	3	0		21	1	0	3	0		4	2	21	2	0		25	**-**
Heavy %	9.7%	2%	0%	0%		4.3%	0%	2.6%	1.7%	0%		2.3%	1.3%	0%	2.9%	0%		1.9%	1.5%	4%	6.3%	0%		3.6%	**-**
Lights	28	49	13	0		90	13	682	176	2		873	75	33	100	0		208	131	504	30	0		665	**-**
Lights %	90.3%	98%	100%	0%		95.7%	100%	97.4%	98.3%	100%		97.7%	98.7%	100%	97.1%	0%		98.1%	98.5%	96%	93.8%	0%		96.4%	**-**
Single-Unit Trucks	2	1	0	0		3	0	8	3	0		11	0	0	2	0		2	1	11	1	0		13	**-**
Single-Unit Trucks %	6.5%	2%	0%	0%		3.2%	0%	1.1%	1.7%	0%		1.2%	0%	0%	1.9%	0%		0.9%	0.8%	2.1%	3.1%	0%		1.9%	**-**
Buses	0	0	0	0		0	0	8	0	0		8	1	0	1	0		2	0	9	0	0		9	**-**
Buses %	0%	0%	0%	0%		0%	0%	1.1%	0%	0%		0.9%	1.3%	0%	1%	0%		0.9%	0%	1.7%	0%	0%		1.3%	**-**
Articulated Trucks	1	0	0	0		1	0	2	0	0		2	0	0	0	0		0	1	1	1	0		3	**-**
Articulated Trucks %	3.2%	0%	0%	0%		1.1%	0%	0.3%	0%	0%		0.2%	0%	0%	0%	0%		0%	0.8%	0.2%	3.1%	0%		0.4%	**-**
Pedestrians	-	-	-	-	4	-	-	-	-	-	5	-	-	-	-	-	8	-	-	-	-	-	2	-	**-**
Pedestrians%	-	-	-	-	21.1%		-	-	-	-	26.3%		-	-	-	-	42.1%		-	-	-	-	10.5%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Peak Hour: 04:45 PM - 05:45 PM Weather: Broken Clouds (-2.85 °C)

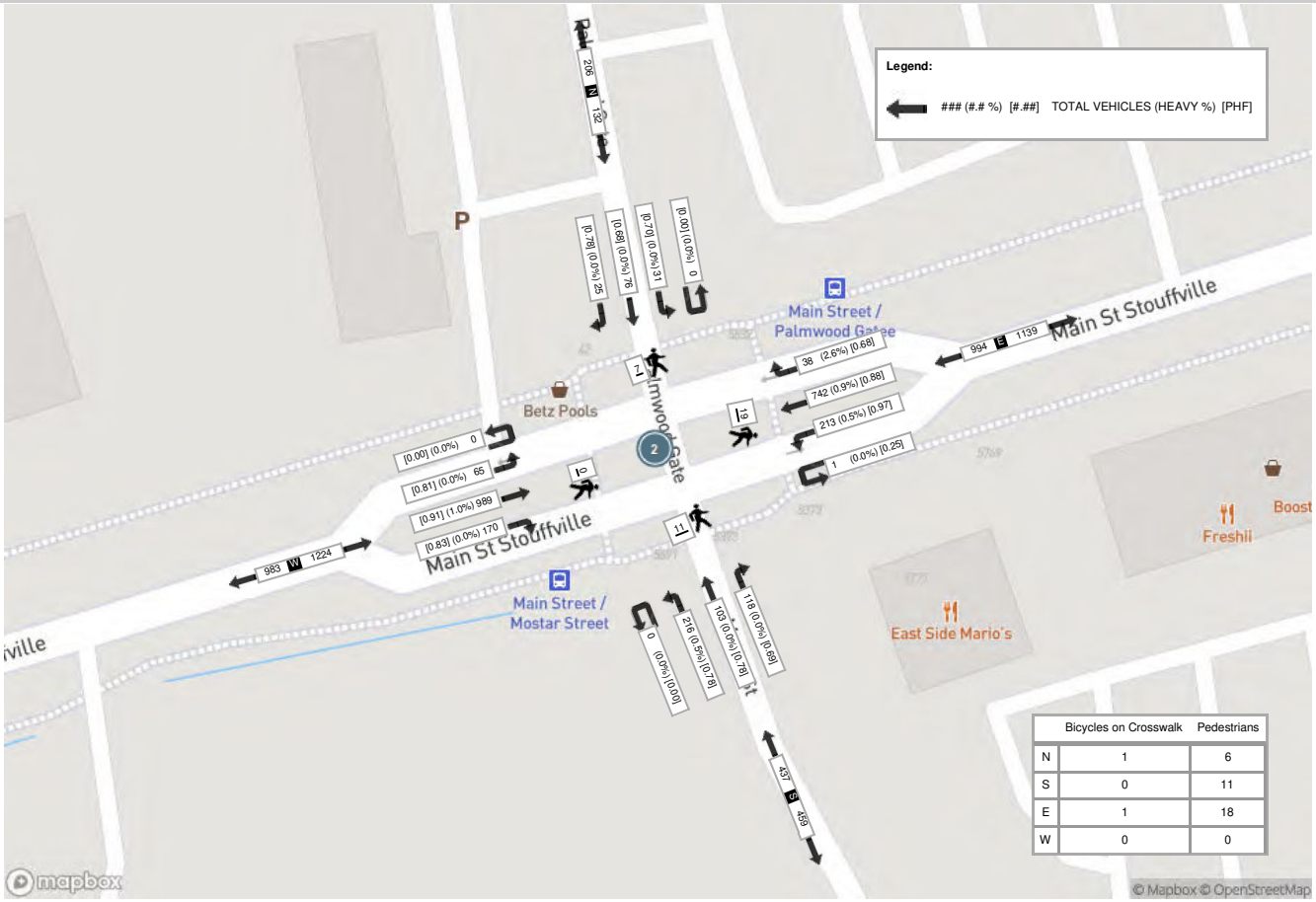
Start Time	Southbound PALMWOOD GATE						Westbound MAIN ST						Northbound MOSTAR ST						Eastbound MAIN ST						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:45:00	6	20	11	0	3	37	6	166	51	0	12	223	21	27	69	0	1	117	41	219	16	0	0	276	653
17:00:00	4	28	6	0	1	38	14	186	55	0	3	255	43	33	44	0	6	120	51	262	15	0	0	328	741
17:15:00	7	15	5	0	1	27	13	178	55	0	2	246	36	22	48	0	3	106	40	236	20	0	0	296	675
17:30:00	8	13	9	0	2	30	5	212	52	1	2	270	18	21	55	0	1	94	38	272	14	0	0	324	718
Grand Total	25	76	31	0	7	132	38	742	213	1	19	994	118	103	216	0	11	437	170	989	65	0	0	1224	**2787**
Approach%	18.9%	57.6%	23.5%	0%		-	3.8%	74.6%	21.4%	0.1%		-	27%	23.6%	49.4%	0%		-	13.9%	80.8%	5.3%	0%		-	**-**
Totals %	0.9%	2.7%	1.1%	0%		4.7%	1.4%	26.6%	7.6%	0%		35.7%	4.2%	3.7%	7.8%	0%		15.7%	6.1%	35.5%	2.3%	0%		43.9%	**-**
PHF	0.78	0.68	0.7	0		0.87	0.68	0.88	0.97	0.25		0.92	0.69	0.78	0.78	0		0.91	0.83	0.91	0.81	0		0.93	**-**
Heavy	0	0	0	0		0	1	7	1	0		9	0	0	1	0		1	0	10	0	0		10	**-**
Heavy %	0%	0%	0%	0%		0%	2.6%	0.9%	0.5%	0%		0.9%	0%	0%	0.5%	0%		0.2%	0%	1%	0%	0%		0.8%	**-**
Lights	25	76	31	0		132	37	735	212	1		985	118	103	215	0		436	170	979	65	0		1214	**-**
Lights %	100%	100%	100%	0%		100%	97.4%	99.1%	99.5%	100%		99.1%	100%	100%	99.5%	0%		99.8%	100%	99%	100%	0%		99.2%	**-**
Single-Unit Trucks	0	0	0	0		0	1	5	1	0		7	0	0	1	0		1	0	5	0	0		5	**-**
Single-Unit Trucks %	0%	0%	0%	0%		0%	2.6%	0.7%	0.5%	0%		0.7%	0%	0%	0.5%	0%		0.2%	0%	0.5%	0%	0%		0.4%	**-**
Buses	0	0	0	0		0	0	2	0	0		2	0	0	0	0		0	0	5	0	0		5	**-**
Buses %	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.2%	0%	0%	0%	0%		0%	0%	0.5%	0%	0%		0.4%	**-**
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	6	-	-	-	-	-	18	-	-	-	-	-	11	-	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	-	16.2%		-	-	-	-	48.6%		-	-	-	-	29.7%		-	-	-	-	0%		**-**
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	2.7%		-	-	-	-	2.7%		-	-	-	-	0%		-	-	-	-	0%		**-**

Peak Hour: 08:15 AM - 09:15 AM **Weather: Clear Sky (-9.32 °C)**



	Bicycles on Crosswalk	Pedestrians
N	0	4
S	0	8
E	0	5
W	0	2

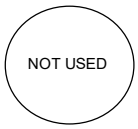
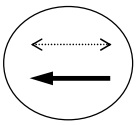
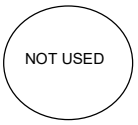
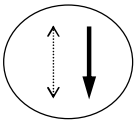
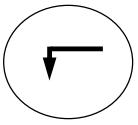
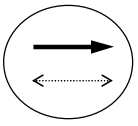
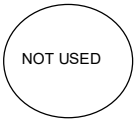
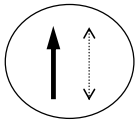
Peak Hour: 04:45 PM - 05:45 PM **Weather: Broken Clouds (-2.85 °C)**



	Bicycles on Crosswalk	Pedestrians
N	1	6
S	0	11
E	1	18
W	0	0

LOCATION:	**Main St & Sandale Rd / Sandiford Dr**	*MUNICIPALITY:*	**Town of Whitchurch-Stouffville**
CTCS:	**868**	*COMPUTER SYSTEM:*	**Centracs**
MODE/COMMENT:	**SA**	*CONTROLLER/CABINET TYPE:*	**Econolite Cobalt / TS2T1**
PREPARED/CHECKED BY:	**JS**	*CONFLICT FLASH:*	**Red & Red**
PREPARATION DATE:	**February 19, 2021**	*DESIGN WALK SPEED:*	**1.0 m/s (FDW based on full crossing at 1.0 m/s)**
IMPLEMENTATION DATE:	**March 8, 2021**	*CHANNEL/DROP:*	

N

NEMA Phase (York)		AM 6:30-9:30 M-F	PM 15:00-20:00 M-F	OFF 9:30-15:00 20:00-22:00 M-F 7:00-20:00 Sat & Sun	Free 22:00-6:30 M-F 20:00-7:00 Sat & Sun	Phase Mode (Fixed/Demanded/Callable)	Remarks
	Local Plan	Pattern 1	Pattern 2	Pattern 3	Pattern 99		
	System Plan	Plan 1	Plan 2	Plan 3	Plan 99		
1.  NOT USED	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT						Pedestrian Minimums: EWWK = 7 sec., EWFD = 24 sec. NSWK = 7 sec., NSFD = 25 sec.
2. Westbound  Main St	WLK 7 FDW 24 MIN 31 EXT 0 MAX1 31 MAX2 0 AMB 4.0 ALR 3.0 SPLIT	**79**	**79**	**59**	**0**	Fixed	**Emergency vehicle pre-emption 3:** Serve EWG/EWDW min 20 secs and up to 100 secs if there are continuous emergency calls in EW direction. NS phase is callable by vehicle or pedestrian actuation. If a vehicle call is received, the minimum NSG is served. If ongoing vehicle demand exists on the stopbar loop, the NSG is capable of providing vehicle extensions up to the maximum green split during coordinated operation or serves MAX1 during Free operation. If a pedestrian call is received, the pedestrian minimum will be served. The NSWK & NSFD are only displayed on the pedestrian signal heads if a pedestrian call is received. Extension time is based on vehicle demand. Unused extension time is given to the EWG.
3.  NOT USED	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT						During coordinated operation, the signal constantly cycles through main street FDW to improve response time to side street vehicle and pedestrian demand. During free plan, signal rests in EWWK and does not cycle through EWFD unless there is side street vehicle or pedestrian demand. EWFD reverts to EWWK if there is no side street demand at the end of the EWFD.
4. Southbound  Sandale Rd	WLK 7 FDW 25 MIN 10 EXT 3 MAX1 25 MAX2 0 AMB 3.5 ALR 4.5 SPLIT	**41**	**41**	**41**	**0**	Callable by stopbar loop and/or pushbutton; Extendable by stopbar loop.	
5. W/B Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 7 MAX2 0 AMB 3 ALR 2 SPLIT	**13**	**13**	**13**	**0**	Callable/Extendable by Setback Loop	
6. Eastbound  Main St	WLK 7 FDW 24 MIN 31 EXT 0 MAX1 31 MAX2 0 AMB 4.0 ALR 3.0 SPLIT	**66**	**66**	**46**	**0**	Fixed	
7.  NOT USED	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT						
8. Northbound  Sandiford Dr	WLK 7 FDW 25 MIN 10 EXT 3 MAX1 25 MAX2 0 AMB 3.5 ALR 4.5 SPLIT	**41**	**41**	**41**	**0**	Callable by stopbar loop and/or pushbutton; Extendable by stopbar loop.	
	CL OF VP	**120** **0** 24	**120** **0** 24	**100** **0** 24	**0 (FREE)** **0 (FREE)** 0 (FREE)		

LEGEND:

SA - Semi-Actuated signal
WLK - Walk time
FDW - Flashing Don't Walk time
MIN - Minimum green time
EXT - Extension time
MAX1 - Maximum green time 1
MAX2 - Maximum green time 2
AMB - Amber
ALR -All Red
CL - Cycle Length
OF - Offset
VP - Vehicle Permissive
NSWK - North/South Walk
EWWK - East/West Walk
NSG - North/South Green
EWG - East/West Green
NSFD - North/South Flashing Don't Walk
EWFD - East/West Flashing Don't Walk
TSP - Transit Priority
APS - Audible Pedestrian Signal
RLC - Red Light Camera

NOTES:

LOCATION:	**Main St & Weldon Rd / W Lawn Cres**	*MUNICIPALITY:*	**Town of Whitchurch-Stouffville**
CTCS:	**870**	*COMPUTER SYSTEM:*	**Centracs**
MODE/COMMENT:	**SA with APS**	*CONTROLLER/CABINET TYPE:*	**Econolite Cobalt / TS2T1**
PREPARED/CHECKED BY:	**MA**	*CONFLICT FLASH:*	**Red & Red**
PREPARATION DATE:	**October 20, 2023**	*DESIGN WALK SPEED:*	**1.0 m/s (FDW based on full crossing at 1.0 m/s)**
IMPLEMENTATION DATE:	**November 15, 2023**	*CHANNEL/DROP:*	

NEMA Phase (York)		AM 6:30-9:30 M-F	PM 15:00-20:00 M-F	OFF 9:30-15:00 20:00-22:00 M-F 7:00-20:00 Sat & Sun	Free 22:00-6:30 M-F 20:00-7:00 Sat & Sun	Phase Mode (Fixed/Demanded/Callable)	Remarks
	Local Plan	Pattern 1	Pattern 2	Pattern 3	Pattern 99		
	System Plan	Plan 1	Plan 2	Plan 3	Plan 99		
1. E/B Left Turn Arrow	WLK					Callable/Extendable by Setback Loop	Pedestrian Minimums: EWWK = 7 sec., EWFD = 20 sec. NSWK = 7 sec., NSFD = 26 sec.
	FDW						
	MIN 7						**Emergency vehicle pre-emption 3:**
	EXT 3						Serve EWG/EWDW min 20 secs and up to 100 secs if there are continuous emergency calls in EW direction.
	MAX1 7						
	MAX2 0						**Emergency vehicle pre-emption 4:**
	AMB 3						Serve NSG/NSDW min 20 secs and up to 100 secs if there are continuous emergency calls in NS direction.
	ALR 1						
	SPLIT	12	12	12	0		
2. Westbound	WLK 7					Fixed	NS phase is callable by vehicle or pedestrian actuation. If a vehicle call is received, the minimum NSG is served. If ongoing vehicle demand exists on the stopbar loop, the NSG is capable of providing vehicle extensions up to the maximum green split during coordinated operation or serves MAX1 during Free operation. If a pedestrian call is received, the pedestrian minimum will be served. The NSWK & NSFD are only displayed on the pedestrian signal heads if a pedestrian call is received. Extension time is based on vehicle demand. Unused extension time is given to the EWG.
	FDW 20						
	MIN 30						
	EXT 0						
	MAX1 30						
	MAX2 0						
	AMB 4.0						
Main St	ALR 3.0						
	SPLIT	54	54	54	0		
3. N/B Left Turn Arrow	WLK					Callable/Extendable by Setback Loop	During coordinated operation, the signal constantly cycles through main street FDW to improve response time to side street vehicle and pedestrian demand.
	FDW						
	MIN 7						
	EXT 3						
	MAX1 7						
	MAX2 0						
	AMB 3						
	ALR 1						
	SPLIT	12	12	12	0		
4. Southbound	WLK 7					Callable by stopbar loop and/or pushbutton; Extendable by stopbar loop.	During free plan, signal rests in EWWK and does not cycle through EWFD unless there is side street vehicle or pedestrian demand.
	FDW 26						
	MIN 10						EWFD reverts to EWWK if there is no side street demand at the end of the EWFD.
	EXT 3						
	MAX1 30						APS Extended Push Activation = 3 sec
	MAX2 0						
	AMB 3.5						When activated, APS is on for 7 seconds.
W Lawn Cres	ALR 4.5						
	SPLIT	42	42	42	0		**Signal Timing Adjustments:** • New phases 1 (EBLA) & 5 (WBLA) activated • Phases 1 (EBLA), & 5 (WBLA) callable/extendable by Setback Detection Loops • Adjusted splits, and offsets accordingly, during all coordination plans
5. W/B Left Turn Arrow	WLK					Callable/Extendable by Setback Loop	
	FDW						
	MIN 7						
	EXT 3						
	MAX1 7						
	MAX2 0						
	AMB 3						
	ALR 1						
	SPLIT	12	12	12	0		
6. Eastbound	WLK 7					Fixed	
	FDW 20						
	MIN 30						
	EXT 0						
	MAX1 30						
	MAX2 0						
	AMB 4.0						
Main St	ALR 3.0						
	SPLIT	54	54	54	0		
7. NOT USED	WLK						**LEGEND:** SA - Semi-Actuated signal WLK - Walk time FDW - Flashing Don't Walk time MIN - Minimum green time EXT - Extension time MAX1 - Maximum green time 1 MAX2 - Maximum green time 2 AMB - Amber ALR -All Red CL - Cycle Length OF - Offset VP - Vehicle Permissive NSWK - North/South Walk EWWK - East/West Walk NSG - North/South Green EWG - East/West Green NSFD - North/South Flashing Don't Walk EWFD - East/West Flashing Don't Walk TSP - Transit Priority APS - Audible Pedestrian Signal RLC - Red Light Camera
	FDW						
	MIN						
	EXT						
	MAX1						
	MAX2						
	AMB						
	ALR						
	SPLIT						
8. Northbound	WLK 7					Callable by stopbar loop and/or pushbutton; Extendable by stopbar loop.	
	FDW 26						
	MIN 10						
	EXT 3						
	MAX1 30						
	MAX2 0						
	AMB 3.5						
Weldon Rd	ALR 4.5						
	SPLIT	54	54	54	0		
	CL	120	120	120	0 (FREE)		
	OF	103	114	0	0 (FREE)		
	VP	20	20	20	0 (FREE)		

NOTES:

LOCATION:	**Main St & Mostar St / Palmwood Gt**	*MUNICIPALITY:*	**Town of Whitchurch-Stouffville**
CTCS:	**869**	*COMPUTER SYSTEM:*	**Centracs**
MODE/COMMENT:	**SA**	*CONTROLLER/CABINET TYPE:*	**Econolite Cobalt / TS2T1**
PREPARED/CHECKED BY:	**JS**	*CONFLICT FLASH:*	**Red & Red**
PREPARATION DATE:	**June 13, 2019**	*DESIGN WALK SPEED:*	**1.0 m/s (FDW based on full crossing at 1.0 m/s)**
IMPLEMENTATION DATE:	**June 20, 2019**	*CHANNEL/DROP:*	

N

NEMA Phase (York)		AM 6:00-9:30 M-F	PM 15:00-20:00 M-F	OFF 9:30-15:00 20:00-22:00 M-F 7:00-20:00 Sat & Sun	Free 22:00-6:00 M-F 20:00-7:00 Sat & Sun	Phase Mode (Fixed/Demanded/Callable)	Remarks
	Local Plan	Pattern 1	Pattern 2	Pattern 3	Pattern 99		
	System Plan	Plan 1	Plan 2	Plan 3	Plan 99		
1. NOT USED	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT						Pedestrian Minimums: EWWK = 7 sec., EWFD = 24 sec. NSWK = 7 sec., NSFD = 27 sec. **Emergency vehicle pre-emption 3:** Serve EWG/EWDW min 20 secs and up to 100 secs if there are continuous emergency calls in EW direction.
2. Westbound Main St	WLK 7 FDW 24 MIN 40 EXT 0 MAX1 40 MAX2 0 AMB 4.0 ALR 3.5 SPLIT	**77**	**77**	**57**	**0**	Fixed	NS phase is callable by vehicle or pedestrian actuation. If a vehicle call is received, the minimum NSG is served. If ongoing vehicle demand exists on the stopbar loop, the NSG is capable of providing vehicle extensions up to the maximum green split during coordinated operation or serves MAX1 during Free operation. If a pedestrian call is received, the pedestrian minimum will be served. The NSWK & NSFD are only displayed on the pedestrian signal heads if a pedestrian call is received. Extension time is based on vehicle demand. Unused extension time is given to the EWG.
3. NOT USED	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT						
4. Southbound Palmwood Gt	WLK 7 FDW 27 MIN 10 EXT 3 MAX1 30 MAX2 0 AMB 3.5 ALR 4.0 SPLIT	**43**	**43**	**43**	**0**	Callable by stopbar loop and/or pushbutton; Extendable by stopbar loop.	During coordinated operation, the signal constantly cycles through main street FDW to improve response time to side street vehicle and pedestrian demand. During free plan, signal rests in EWWK and does not cycle through EWFD unless there is side street vehicle or pedestrian demand. EWFD reverts to EWWK if there is no side street demand at the end of the EWFD.
5. W/B Left Turn Arrow	WLK FDW MIN 7 EXT 3 MAX1 7 MAX2 0 AMB 3 ALR 1 SPLIT	**12**	**12**	**12**	**0**	Callable/Extendable by Setback Loop	**Signal Mod** • New WBLA (phase 5) • Revised FDW based on full crossing @ 1.0 m/s • Increased EWFD from 14 to 24 secs • Increased NSFD from 18 to 27 secs • Revised amber/all-red clearances to 4.0/3.5 secs on phase 2 & 6 (EW) • Revised amber/all-red clearances to 3.5/4.0 secs on phase 4 & 8 (NS) • Revised MIN/MAX1 to 40 secs on phase 2 & 6 (EW) • New AM/PM/OFF peak plans
6. Eastbound Main St	WLK 7 FDW 24 MIN 40 EXT 0 MAX1 40 MAX2 0 AMB 4.0 ALR 3.5 SPLIT	**65**	**65**	**45**	**0**	Fixed	
7. NOT USED	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT						**LEGEND:** SA - Semi-Actuated signal WLK - Walk time FDW - Flashing Don't Walk time MIN - Minimum green time EXT - Extension time MAX1 - Maximum green time 1 MAX2 - Maximum green time 2 AMB - Amber ALR -All Red CL - Cycle Length OF - Offset VP - Vehicle Permissive NSWK - North/South Walk EWWK - East/West Walk NSG - North/South Green EWG - East/West Green NSFD - North/South Flashing Don't Walk EWFD - East/West Flashing Don't Walk TSP - Transit Priority APS - Audible Pedestrian Signal RLC - Red Light Camera
8. Northbound Mostar St	WLK 7 FDW 27 MIN 10 EXT 3 MAX1 30 MAX2 0 AMB 3.5 ALR 4.0 SPLIT	**43**	**43**	**43**	**0**	Callable by stopbar loop and/or pushbutton; Extendable by stopbar loop.	
	CL OF VP	**120** **0** 24	**120** **0** 24	**100** **0** 24	**0 (FREE)** **0 (FREE)** 0 (FREE)		

NOTES:

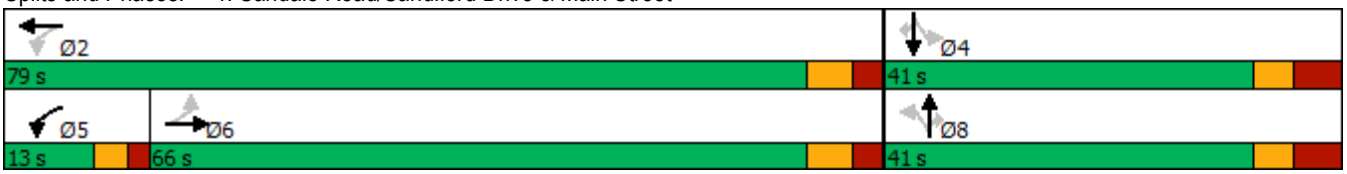
Appendix D – Existing Traffic Assessment

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	146	926	105	663	197	104	137	118	69	109
Future Volume (vph)	146	926	105	663	197	104	137	118	69	109
Lane Group Flow (vph)	157	1135	113	794	212	112	147	127	74	117
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		6	5	2		8			4	
Permitted Phases	6		2		8		8	4		4
Detector Phase	6	6	5	2	8	8	8	4	4	4
Switch Phase										
Minimum Initial (s)	31.0	31.0	7.0	31.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	38.0	38.0	12.0	38.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (s)	66.0	66.0	13.0	79.0	41.0	41.0	41.0	41.0	41.0	41.0
Total Split (%)	55.0%	55.0%	10.8%	65.8%	34.2%	34.2%	34.2%	34.2%	34.2%	34.2%
Yellow Time (s)	4.0	4.0	3.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	3.0	3.0	2.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	5.0	7.0	8.0	8.0	8.0	8.0	8.0	8.0
Lead/Lag	Lag	Lag	Lead							
Lead-Lag Optimize?	Yes	Yes	Yes							
Recall Mode	Max	Max	None	Max	Max	Max	Max	None	None	None
v/c Ratio	0.48	0.65	0.42	0.37	0.59	0.21	0.27	0.36	0.14	0.23
Control Delay	26.4	24.4	14.4	12.7	45.4	34.8	6.6	38.4	33.8	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.4	24.4	14.4	12.7	45.4	34.8	6.6	38.4	33.8	7.1
Queue Length 50th (m)	23.9	100.6	10.2	46.5	43.3	20.3	0.0	24.1	13.2	0.0
Queue Length 95th (m)	44.5	123.1	17.7	58.7	69.2	35.3	15.0	41.9	25.3	13.7
Internal Link Dist (m)		1629.1		390.8		261.2			146.8	
Turn Bay Length (m)	55.0		40.0		65.0		65.0	15.0		40.0
Base Capacity (vph)	328	1750	270	2132	360	528	543	357	528	515
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.65	0.42	0.37	0.59	0.21	0.27	0.36	0.14	0.23

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 90
Control Type: Semi Act-Uncoord

Splits and Phases: 1: Sandale Road/Sandiford Drive & Main Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	146	926	129	105	663	75	197	104	137	118	69	109
Future Volume (vph)	146	926	129	105	663	75	197	104	137	118	69	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		5.0	7.0		8.0	8.0	8.0	8.0	8.0	8.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	0.97	1.00	1.00	0.96
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.97	1.00	1.00	0.99	1.00	1.00
Frt	1.00	0.98		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1800	3524		1824	3541		1757	1921	1590	1802	1921	1565
Flt Permitted	0.35	1.00		0.14	1.00		0.71	1.00	1.00	0.68	1.00	1.00
Satd. Flow (perm)	666	3524		270	3541		1311	1921	1590	1299	1921	1565
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	157	996	139	113	713	81	212	112	147	127	74	117
RTOR Reduction (vph)	0	9	0	0	7	0	0	0	107	0	0	85
Lane Group Flow (vph)	157	1126	0	113	787	0	212	112	40	127	74	32
Confl. Peds. (#/hr)	21		18	18		21	27		13	13		27
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	1%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		6		5	2			8			4	
Permitted Phases	6			2			8		8	4		4
Actuated Green, G (s)	59.3	59.3		72.0	72.0		33.0	33.0	33.0	33.0	33.0	33.0
Effective Green, g (s)	59.3	59.3		72.0	72.0		33.0	33.0	33.0	33.0	33.0	33.0
Actuated g/C Ratio	0.49	0.49		0.60	0.60		0.28	0.28	0.28	0.28	0.28	0.28
Clearance Time (s)	7.0	7.0		5.0	7.0		8.0	8.0	8.0	8.0	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
Lane Grp Cap (vph)	329	1741		261	2124		360	528	437	357	528	430
v/s Ratio Prot		c0.32		0.03	c0.22			0.06			0.04	
v/s Ratio Perm	0.24			0.23			c0.16		0.03	0.10		0.02
v/c Ratio	0.48	0.65		0.43	0.37		0.59	0.21	0.09	0.36	0.14	0.07
Uniform Delay, d1	20.1	22.6		14.5	12.3		37.6	33.5	32.4	35.0	32.8	32.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.9	1.9		1.2	0.5		6.9	0.9	0.4	0.6	0.1	0.1
Delay (s)	25.0	24.4		15.7	12.8		44.5	34.4	32.8	35.6	32.9	32.3
Level of Service	C	C		B	B		D	C	C	D	C	C
Approach Delay (s)		24.5			13.2			38.5			33.7	
Approach LOS		C			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	24.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	96.7%	ICU Level of Service	F
Analysis Period (min)	15		

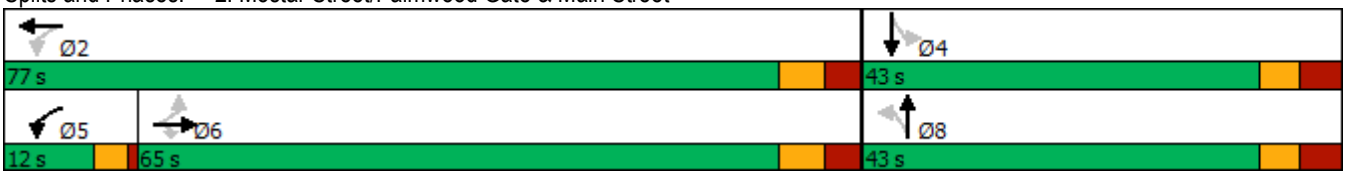
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	65	989	170	213	742	216	103	31	76
Future Volume (vph)	65	989	170	213	742	216	103	31	76
Lane Group Flow (vph)	69	1052	181	227	829	230	236	33	108
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		6		5	2		8		4
Permitted Phases	6		6	2		8		4	
Detector Phase	6	6	6	5	2	8	8	4	4
Switch Phase									
Minimum Initial (s)	40.0	40.0	40.0	7.0	40.0	10.0	10.0	10.0	10.0
Minimum Split (s)	47.5	47.5	47.5	11.5	47.5	41.5	41.5	41.5	41.5
Total Split (s)	65.0	65.0	65.0	12.0	77.0	43.0	43.0	43.0	43.0
Total Split (%)	54.2%	54.2%	54.2%	10.0%	64.2%	35.8%	35.8%	35.8%	35.8%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	3.5	3.5	3.5	3.5
All-Red Time (s)	3.5	3.5	3.5	1.0	3.5	4.0	4.0	4.0	4.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Lead/Lag	Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	Max	Max	Max	None	None
v/c Ratio	0.22	0.61	0.22	0.78	0.40	0.59	0.43	0.11	0.19
Control Delay	20.6	24.8	6.4	30.9	14.4	43.3	29.5	32.2	28.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.6	24.8	6.4	30.9	14.4	43.3	29.5	32.2	28.5
Queue Length 50th (m)	9.2	93.2	6.3	22.5	52.7	46.2	35.2	5.7	16.4
Queue Length 95th (m)	19.4	114.2	18.6	#43.7	66.1	72.9	58.5	13.9	30.7
Internal Link Dist (m)		390.8			413.7		335.1		61.1
Turn Bay Length (m)	37.0		45.0	35.0		40.0		35.0	
Base Capacity (vph)	311	1731	818	292	2075	390	548	292	556
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.61	0.22	0.78	0.40	0.59	0.43	0.11	0.19

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 105
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Mostar Street/Palmwood Gate & Main Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	989	170	213	742	38	216	103	118	31	76	25
Future Volume (vph)	65	989	170	213	742	38	216	103	118	31	76	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5	7.5	4.0	7.5		7.5	7.5		7.5	7.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.92		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1817	3614	1566	1824	3579		1825	1737		1801	1849	
Flt Permitted	0.34	1.00	1.00	0.16	1.00		0.69	1.00		0.52	1.00	
Satd. Flow (perm)	649	3614	1566	316	3579		1320	1737		988	1849	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	69	1052	181	227	789	40	230	110	126	33	81	27
RTOR Reduction (vph)	0	0	68	0	3	0	0	35	0	0	10	0
Lane Group Flow (vph)	69	1052	113	227	826	0	230	201	0	33	98	0
Confl. Peds. (#/hr)	7		11	11		7			19	19		
Heavy Vehicles (%)	0%	1%	0%	0%	1%	3%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		6		5	2			8			4	
Permitted Phases	6		6	2			8			4		
Actuated Green, G (s)	57.5	57.5	57.5	69.5	69.5		35.5	35.5		35.5	35.5	
Effective Green, g (s)	57.5	57.5	57.5	69.5	69.5		35.5	35.5		35.5	35.5	
Actuated g/C Ratio	0.48	0.48	0.48	0.58	0.58		0.30	0.30		0.30	0.30	
Clearance Time (s)	7.5	7.5	7.5	4.0	7.5		7.5	7.5		7.5	7.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	310	1731	750	283	2072		390	513		292	546	
v/s Ratio Prot		0.29		c0.05	0.23			0.12			0.05	
v/s Ratio Perm	0.11		0.07	c0.41			c0.17			0.03		
v/c Ratio	0.22	0.61	0.15	0.80	0.40		0.59	0.39		0.11	0.18	
Uniform Delay, d1	18.2	23.0	17.5	16.5	13.8		36.0	33.7		30.8	31.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.6	0.1	15.0	0.6		6.4	2.3		0.2	0.2	
Delay (s)	18.6	23.6	17.6	31.5	14.4		42.5	35.9		31.0	31.6	
Level of Service	B	C	B	C	B		D	D		C	C	
Approach Delay (s)		22.5			18.1			39.1			31.4	
Approach LOS		C			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	24.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	113.8%	ICU Level of Service	H
Analysis Period (min)	15		

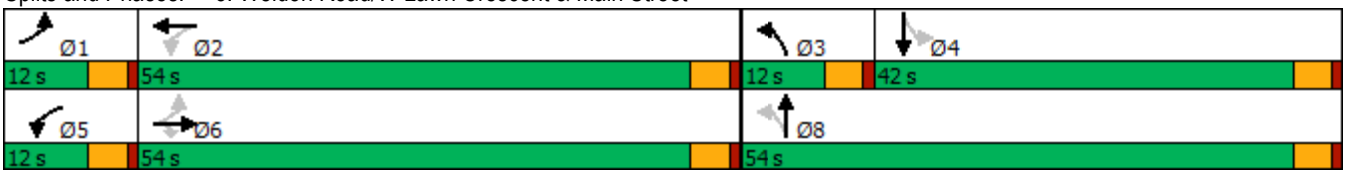
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	110	991	102	85	812	114	108	67	62
Future Volume (vph)	110	991	102	85	812	114	108	67	62
Lane Group Flow (vph)	112	1011	104	87	867	116	195	68	146
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm	NA
Protected Phases	1	6		5	2	3	8		4
Permitted Phases	6		6	2		8		4	
Detector Phase	1	6	6	5	2	3	8	4	4
Switch Phase									
Minimum Initial (s)	7.0	30.0	30.0	7.0	30.0	7.0	10.0	10.0	10.0
Minimum Split (s)	11.5	34.5	34.5	11.5	34.5	11.5	22.5	22.5	22.5
Total Split (s)	12.0	54.0	54.0	12.0	54.0	12.0	54.0	42.0	42.0
Total Split (%)	10.0%	45.0%	45.0%	10.0%	45.0%	10.0%	45.0%	35.0%	35.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	Max	None	Max	None	None
v/c Ratio	0.41	0.65	0.15	0.37	0.59	0.24	0.26	0.18	0.25
Control Delay	20.1	29.9	5.8	19.8	29.1	23.6	19.4	31.7	19.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.1	29.9	5.8	19.8	29.1	23.6	19.4	31.7	19.8
Queue Length 50th (m)	13.2	100.5	1.2	10.1	81.4	16.9	23.3	11.6	15.2
Queue Length 95th (m)	23.0	123.6	11.7	18.7	101.4	29.3	40.1	23.1	31.4
Internal Link Dist (m)		413.7			784.4		271.2		166.6
Turn Bay Length (m)	30.0		30.0	30.0		40.0		15.0	
Base Capacity (vph)	272	1561	707	236	1481	476	754	375	578
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.65	0.15	0.37	0.59	0.24	0.26	0.18	0.25

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 119.9
Natural Cycle: 80
Control Type: Semi Act-Uncoord

Splits and Phases: 3: Weldon Road/W Lawn Crescent & Main Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	991	102	85	812	37	114	108	83	67	62	81
Future Volume (vph)	110	991	102	85	812	37	114	108	83	67	62	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.93	1.00	1.00		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.93		1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	3614	1510	1825	3584		1809	1771		1793	1720	
Flt Permitted	0.20	1.00	1.00	0.15	1.00		0.55	1.00		0.64	1.00	
Satd. Flow (perm)	376	3614	1510	295	3584		1044	1771		1199	1720	
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)	112	1011	104	87	829	38	116	110	85	68	63	83
RTOR Reduction (vph)	0	0	54	0	3	0	0	23	0	0	39	0
Lane Group Flow (vph)	112	1011	50	87	864	0	116	172	0	68	107	0
Confl. Peds. (#/hr)	9		14	14		9	13		5	5		13
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	0%	0%	1%	1%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases	1	6		5	2		3	8			4	
Permitted Phases	6		6	2			8			4		
Actuated Green, G (s)	59.2	51.8	51.8	56.4	50.4		49.5	49.5		37.6	37.6	
Effective Green, g (s)	59.2	51.8	51.8	56.4	50.4		49.5	49.5		37.6	37.6	
Actuated g/C Ratio	0.49	0.43	0.43	0.47	0.42		0.41	0.41		0.31	0.31	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	273	1549	647	213	1495		474	725		373	535	
v/s Ratio Prot	c0.03	c0.28		0.02	0.24		0.01	c0.10			0.06	
v/s Ratio Perm	0.18		0.03	0.17			c0.09			0.06		
v/c Ratio	0.41	0.65	0.08	0.41	0.58		0.24	0.24		0.18	0.20	
Uniform Delay, d1	18.9	27.4	20.4	20.6	27.0		22.7	23.3		30.4	30.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	1.0	0.1	1.3	1.6		0.3	0.8		0.2	0.2	
Delay (s)	19.9	28.4	20.4	21.9	28.7		23.0	24.1		30.6	30.7	
Level of Service	B	C	C	C	C		C	C		C	C	
Approach Delay (s)		26.9			28.1			23.7			30.7	
Approach LOS		C			C			C			C	

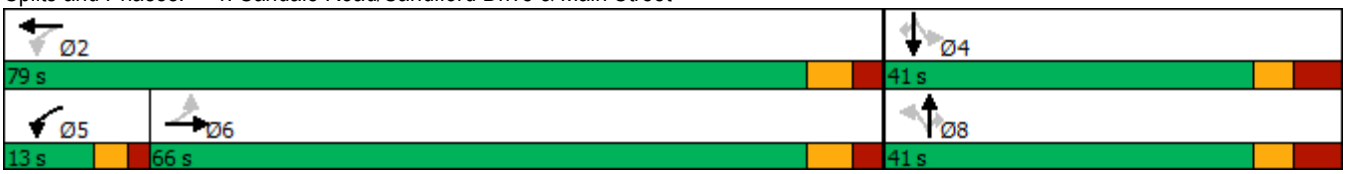
Intersection Summary			
HCM 2000 Control Delay	27.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	120.8	Sum of lost time (s)	18.0
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	146	926	105	663	197	104	137	118	69	109
Future Volume (vph)	146	926	105	663	197	104	137	118	69	109
Lane Group Flow (vph)	157	1135	113	794	212	112	147	127	74	117
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		6	5	2		8			4	
Permitted Phases	6		2		8		8	4		4
Detector Phase	6	6	5	2	8	8	8	4	4	4
Switch Phase										
Minimum Initial (s)	31.0	31.0	7.0	31.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	38.0	38.0	12.0	38.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (s)	66.0	66.0	13.0	79.0	41.0	41.0	41.0	41.0	41.0	41.0
Total Split (%)	55.0%	55.0%	10.8%	65.8%	34.2%	34.2%	34.2%	34.2%	34.2%	34.2%
Yellow Time (s)	4.0	4.0	3.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	3.0	3.0	2.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	5.0	7.0	8.0	8.0	8.0	8.0	8.0	8.0
Lead/Lag	Lag	Lag	Lead							
Lead-Lag Optimize?	Yes	Yes	Yes							
Recall Mode	Max	Max	None	Max	Max	Max	Max	None	None	None
v/c Ratio	0.48	0.65	0.42	0.37	0.59	0.21	0.27	0.36	0.14	0.23
Control Delay	26.4	24.4	14.4	12.7	45.4	34.8	6.6	38.4	33.8	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.4	24.4	14.4	12.7	45.4	34.8	6.6	38.4	33.8	7.1
Queue Length 50th (m)	23.9	100.6	10.2	46.5	43.3	20.3	0.0	24.1	13.2	0.0
Queue Length 95th (m)	44.5	123.1	17.7	58.7	69.2	35.3	15.0	41.9	25.3	13.7
Internal Link Dist (m)		1629.1		390.8		261.2			146.8	
Turn Bay Length (m)	55.0		40.0		65.0		65.0	15.0		40.0
Base Capacity (vph)	328	1750	270	2132	360	528	543	357	528	515
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.65	0.42	0.37	0.59	0.21	0.27	0.36	0.14	0.23

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 90
Control Type: Semi Act-Uncoord

Splits and Phases: 1: Sandale Road/Sandiford Drive & Main Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	146	926	129	105	663	75	197	104	137	118	69	109
Future Volume (vph)	146	926	129	105	663	75	197	104	137	118	69	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		5.0	7.0		8.0	8.0	8.0	8.0	8.0	8.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	0.97	1.00	1.00	0.96
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.97	1.00	1.00	0.99	1.00	1.00
Frt	1.00	0.98		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1800	3524		1824	3541		1757	1921	1590	1802	1921	1565
Flt Permitted	0.35	1.00		0.14	1.00		0.71	1.00	1.00	0.68	1.00	1.00
Satd. Flow (perm)	666	3524		270	3541		1311	1921	1590	1299	1921	1565
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	157	996	139	113	713	81	212	112	147	127	74	117
RTOR Reduction (vph)	0	9	0	0	7	0	0	0	107	0	0	85
Lane Group Flow (vph)	157	1126	0	113	787	0	212	112	40	127	74	32
Confl. Peds. (#/hr)	21		18	18		21	27		13	13		27
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	1%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		6		5	2			8			4	
Permitted Phases	6			2			8		8	4		4
Actuated Green, G (s)	59.3	59.3		72.0	72.0		33.0	33.0	33.0	33.0	33.0	33.0
Effective Green, g (s)	59.3	59.3		72.0	72.0		33.0	33.0	33.0	33.0	33.0	33.0
Actuated g/C Ratio	0.49	0.49		0.60	0.60		0.28	0.28	0.28	0.28	0.28	0.28
Clearance Time (s)	7.0	7.0		5.0	7.0		8.0	8.0	8.0	8.0	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
Lane Grp Cap (vph)	329	1741		261	2124		360	528	437	357	528	430
v/s Ratio Prot		c0.32		0.03	c0.22			0.06			0.04	
v/s Ratio Perm	0.24			0.23			c0.16		0.03	0.10		0.02
v/c Ratio	0.48	0.65		0.43	0.37		0.59	0.21	0.09	0.36	0.14	0.07
Uniform Delay, d1	20.1	22.6		14.5	12.3		37.6	33.5	32.4	35.0	32.8	32.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.9	1.9		1.2	0.5		6.9	0.9	0.4	0.6	0.1	0.1
Delay (s)	25.0	24.4		15.7	12.8		44.5	34.4	32.8	35.6	32.9	32.3
Level of Service	C	C		B	B		D	C	C	D	C	C
Approach Delay (s)		24.5			13.2			38.5			33.7	
Approach LOS		C			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	24.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	96.7%	ICU Level of Service	F
Analysis Period (min)	15		

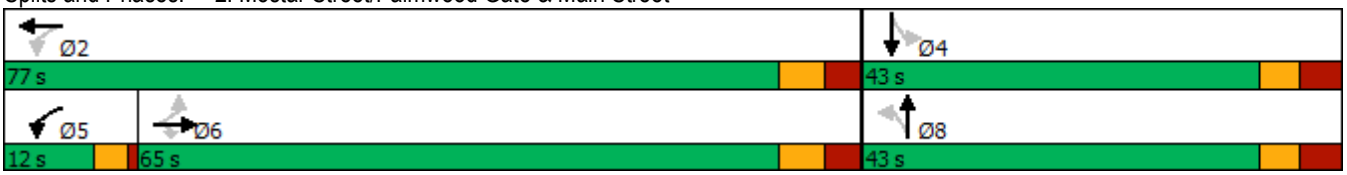
c Critical Lane Group

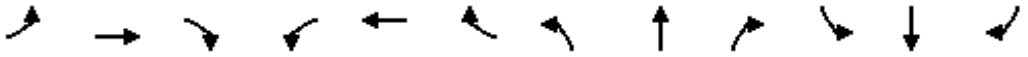
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	65	989	170	213	742	216	103	31	76
Future Volume (vph)	65	989	170	213	742	216	103	31	76
Lane Group Flow (vph)	69	1052	181	227	829	230	236	33	108
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		6		5	2		8		4
Permitted Phases	6		6	2		8		4	
Detector Phase	6	6	6	5	2	8	8	4	4
Switch Phase									
Minimum Initial (s)	40.0	40.0	40.0	7.0	40.0	10.0	10.0	10.0	10.0
Minimum Split (s)	47.5	47.5	47.5	11.5	47.5	41.5	41.5	41.5	41.5
Total Split (s)	65.0	65.0	65.0	12.0	77.0	43.0	43.0	43.0	43.0
Total Split (%)	54.2%	54.2%	54.2%	10.0%	64.2%	35.8%	35.8%	35.8%	35.8%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	3.5	3.5	3.5	3.5
All-Red Time (s)	3.5	3.5	3.5	1.0	3.5	4.0	4.0	4.0	4.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Lead/Lag	Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	Max	Max	Max	None	None
v/c Ratio	0.22	0.61	0.22	0.78	0.40	0.59	0.43	0.11	0.19
Control Delay	20.6	24.8	6.4	30.9	14.4	43.3	29.5	32.2	28.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.6	24.8	6.4	30.9	14.4	43.3	29.5	32.2	28.5
Queue Length 50th (m)	9.2	93.2	6.3	22.5	52.7	46.2	35.2	5.7	16.4
Queue Length 95th (m)	19.4	114.2	18.6	#43.7	66.1	72.9	58.5	13.9	30.7
Internal Link Dist (m)		390.8			413.7		335.1		61.1
Turn Bay Length (m)	37.0		45.0	35.0		40.0		35.0	
Base Capacity (vph)	311	1731	818	292	2075	390	548	292	556
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.61	0.22	0.78	0.40	0.59	0.43	0.11	0.19

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 105
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Mostar Street/Palmwood Gate & Main Street





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	989	170	213	742	38	216	103	118	31	76	25
Future Volume (vph)	65	989	170	213	742	38	216	103	118	31	76	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5	7.5	4.0	7.5		7.5	7.5		7.5	7.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.92		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1817	3614	1566	1824	3579		1825	1737		1801	1849	
Flt Permitted	0.34	1.00	1.00	0.16	1.00		0.69	1.00		0.52	1.00	
Satd. Flow (perm)	649	3614	1566	316	3579		1320	1737		988	1849	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	69	1052	181	227	789	40	230	110	126	33	81	27
RTOR Reduction (vph)	0	0	68	0	3	0	0	35	0	0	10	0
Lane Group Flow (vph)	69	1052	113	227	826	0	230	201	0	33	98	0
Confl. Peds. (#/hr)	7		11	11		7			19	19		
Heavy Vehicles (%)	0%	1%	0%	0%	1%	3%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		6		5	2			8			4	
Permitted Phases	6		6	2			8			4		
Actuated Green, G (s)	57.5	57.5	57.5	69.5	69.5		35.5	35.5		35.5	35.5	
Effective Green, g (s)	57.5	57.5	57.5	69.5	69.5		35.5	35.5		35.5	35.5	
Actuated g/C Ratio	0.48	0.48	0.48	0.58	0.58		0.30	0.30		0.30	0.30	
Clearance Time (s)	7.5	7.5	7.5	4.0	7.5		7.5	7.5		7.5	7.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	310	1731	750	283	2072		390	513		292	546	
v/s Ratio Prot		0.29		c0.05	0.23			0.12			0.05	
v/s Ratio Perm	0.11		0.07	c0.41			c0.17			0.03		
v/c Ratio	0.22	0.61	0.15	0.80	0.40		0.59	0.39		0.11	0.18	
Uniform Delay, d1	18.2	23.0	17.5	16.5	13.8		36.0	33.7		30.8	31.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.6	0.1	15.0	0.6		6.4	2.3		0.2	0.2	
Delay (s)	18.6	23.6	17.6	31.5	14.4		42.5	35.9		31.0	31.6	
Level of Service	B	C	B	C	B		D	D		C	C	
Approach Delay (s)		22.5			18.1			39.1			31.4	
Approach LOS		C			B			D			C	

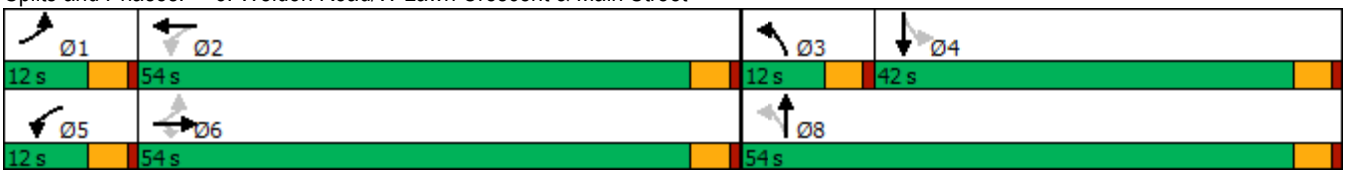
Intersection Summary			
HCM 2000 Control Delay	24.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	113.8%	ICU Level of Service	H
Analysis Period (min)	15		

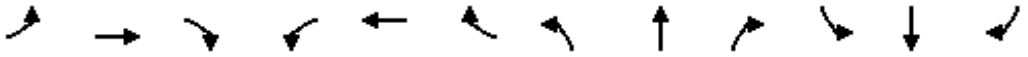
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	110	991	102	85	812	114	108	67	62
Future Volume (vph)	110	991	102	85	812	114	108	67	62
Lane Group Flow (vph)	112	1011	104	87	867	116	195	68	146
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm	NA
Protected Phases	1	6		5	2	3	8		4
Permitted Phases	6		6	2		8		4	
Detector Phase	1	6	6	5	2	3	8	4	4
Switch Phase									
Minimum Initial (s)	7.0	30.0	30.0	7.0	30.0	7.0	10.0	10.0	10.0
Minimum Split (s)	11.5	34.5	34.5	11.5	34.5	11.5	22.5	22.5	22.5
Total Split (s)	12.0	54.0	54.0	12.0	54.0	12.0	54.0	42.0	42.0
Total Split (%)	10.0%	45.0%	45.0%	10.0%	45.0%	10.0%	45.0%	35.0%	35.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	Max	None	Max	None	None
v/c Ratio	0.41	0.65	0.15	0.37	0.59	0.24	0.26	0.18	0.25
Control Delay	20.1	29.9	5.8	19.8	29.1	23.6	19.4	31.7	19.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.1	29.9	5.8	19.8	29.1	23.6	19.4	31.7	19.8
Queue Length 50th (m)	13.2	100.5	1.2	10.1	81.4	16.9	23.3	11.6	15.2
Queue Length 95th (m)	23.0	123.6	11.7	18.7	101.4	29.3	40.1	23.1	31.4
Internal Link Dist (m)		413.7			784.4		271.2		166.6
Turn Bay Length (m)	30.0		30.0	30.0		40.0		15.0	
Base Capacity (vph)	272	1561	707	236	1481	476	754	375	578
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.65	0.15	0.37	0.59	0.24	0.26	0.18	0.25

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 119.9
Natural Cycle: 80
Control Type: Semi Act-Uncoord

Splits and Phases: 3: Weldon Road/W Lawn Crescent & Main Street





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	991	102	85	812	37	114	108	83	67	62	81
Future Volume (vph)	110	991	102	85	812	37	114	108	83	67	62	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.93	1.00	1.00		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.93		1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	3614	1510	1825	3584		1809	1771		1793	1720	
Flt Permitted	0.20	1.00	1.00	0.15	1.00		0.55	1.00		0.64	1.00	
Satd. Flow (perm)	376	3614	1510	295	3584		1044	1771		1199	1720	
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)	112	1011	104	87	829	38	116	110	85	68	63	83
RTOR Reduction (vph)	0	0	54	0	3	0	0	23	0	0	39	0
Lane Group Flow (vph)	112	1011	50	87	864	0	116	172	0	68	107	0
Confl. Peds. (#/hr)	9		14	14		9	13		5	5		13
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	0%	0%	1%	1%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases	1	6		5	2		3	8			4	
Permitted Phases	6		6	2			8			4		
Actuated Green, G (s)	59.2	51.8	51.8	56.4	50.4		49.5	49.5		37.6	37.6	
Effective Green, g (s)	59.2	51.8	51.8	56.4	50.4		49.5	49.5		37.6	37.6	
Actuated g/C Ratio	0.49	0.43	0.43	0.47	0.42		0.41	0.41		0.31	0.31	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	273	1549	647	213	1495		474	725		373	535	
v/s Ratio Prot	c0.03	c0.28		0.02	0.24		0.01	c0.10			0.06	
v/s Ratio Perm	0.18		0.03	0.17			c0.09			0.06		
v/c Ratio	0.41	0.65	0.08	0.41	0.58		0.24	0.24		0.18	0.20	
Uniform Delay, d1	18.9	27.4	20.4	20.6	27.0		22.7	23.3		30.4	30.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	1.0	0.1	1.3	1.6		0.3	0.8		0.2	0.2	
Delay (s)	19.9	28.4	20.4	21.9	28.7		23.0	24.1		30.6	30.7	
Level of Service	B	C	C	C	C		C	C		C	C	
Approach Delay (s)		26.9			28.1			23.7			30.7	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	120.8	Sum of lost time (s)	18.0
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Appendix E – Background Development Excerpts

Executive Summary

AECOM was retained by Norstar Baker Hill Inc. to provide traffic engineering services with respect to the proposed residential development in the north-east quadrant of the intersection of Main Street and Baker Hill Boulevard/Ringwood Drive in the Town of Whitchurch-Stouffville. The proposed residential development is planned to consist of 147 townhouse units. The 31 townhouse units fronting Main Street are configured as live-work units. Each unit has approximately 16.3 m^2 (175 ft^2) commercial space on the ground floor. Site accesses are proposed on the south side of the property on Main Street with Right-In-Right-Out (RIRO) only and the northwest side of the site at the Rowbotham Gate/Wilmather Lane intersection.

Traffic operations were evaluated using Synchro 9.2 software using the Highway Capacity Manual (HCM) 2000 methodology. Overall the study area intersections operate satisfactorily with level-of-service (LOS) C or better during existing conditions. The NBL movement at the Main Street / Sandiford Drive intersection is noted to be critical and the traffic queue exceeds the available storage during the PM peak hour only. Existing transit LOS for intersection approach and access to transit stops meet region targets, however, the transit headways are large (LOS F). Pedestrian LOS was found to be acceptable for the road segments but falls short of the target for intersection LOS at the Baker Hill / Rowbotham Gate & Milt Storey Lane intersection (LOS E). There are no cycling facilities in the study area (LOS F).

Future transportation improvements for the study area include the assumed extension of Ringwood Drive and provision of new cycling facilities including separated bike facilities along Main Street and shared bike routes on Baker Hill Boulevard/Ringwood and Sandale/Sandiford.

The future background traffic growth was determined for the opening horizon year 2019 and the 5-year horizon (2024). A 2% annual growth rate was determined to be a conservative rate for the for Main Street corridor growth in accordance with the screenline volumes from the regional EMME model in the Town's Transportation Master Plan (TMP). The Town of Whitchurch-Stouffville was contacted to obtain information regarding developments in the area to be incorporated into the analysis. Review of the Town and Region's TMPs and available York Region Transit reports the transit growth is anticipated to be marginal and the growth in active transportation modes is expected to be low but may depend on the facilities provided and public acceptance.

With signal optimization the study area intersections operate satisfactorily with LOS C or better for both horizon years with future background traffic. The 95th percentile queues are not anticipated to exceed available storage or back up into upstream intersections with the exception of the NBL movement at the two signalized intersections. However, turning lane storage is not clearly delineated and will only impact minor commercial driveways.

Automobile trip generation for the development was determined based on rates from the Trip Generation Manual, 9th Edition published by the Institute of Transportation Engineers (ITE). After the review of permitted uses within the commercial space, a single land use was selected for both simplicity and providing a conservative trip generation estimate for commercial trips. The land uses that were utilized in this study are ITE Code 230 (Condominium/Townhouse) and ITE Code 820 (Shopping Centre). It was determined that 13% of trips would be internally captured during the PM peak hour given commercial and residential uses. The development is expect to generate 98 vehicle trips (29 inbound and 69 outbound) in the weekday AM peak hour and 147 trips (84 inbound and 63 outbound) during the weekday PM peak hour. The generated volumes are based on full build-out and full occupancy, and therefore are not expected to change between the 2019 and 2024 horizon years.

The site trip modal split was determined using Transportation Tomorrow Survey (TTS) data from 2011. The modal split was found to be heavily private auto (90%) with 6% transit trips, 1% cycling trips and 3% walking trips. The total number of person-trips for the site was determined to be 104 and 115 for the AM

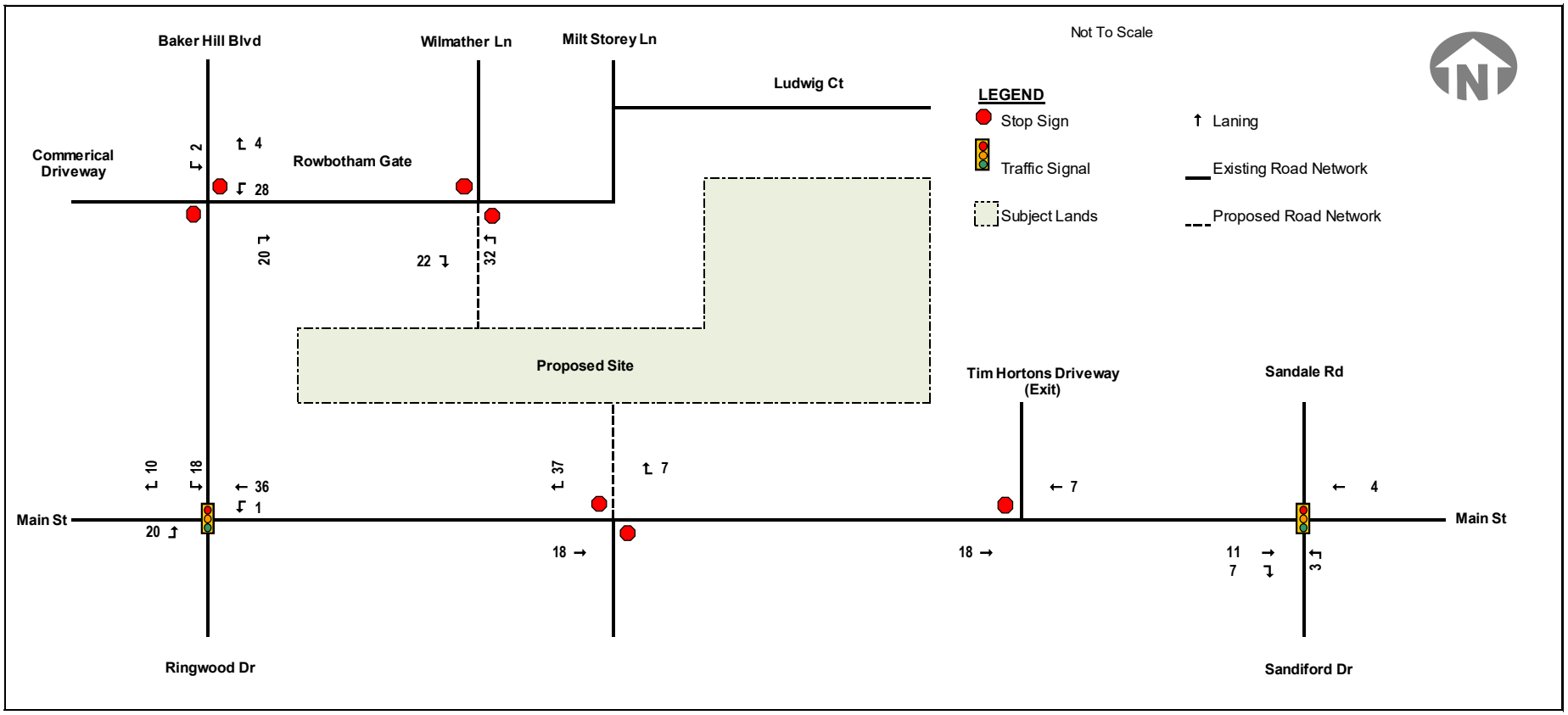


Figure 6-4: Site Traffic AM Peak Hour

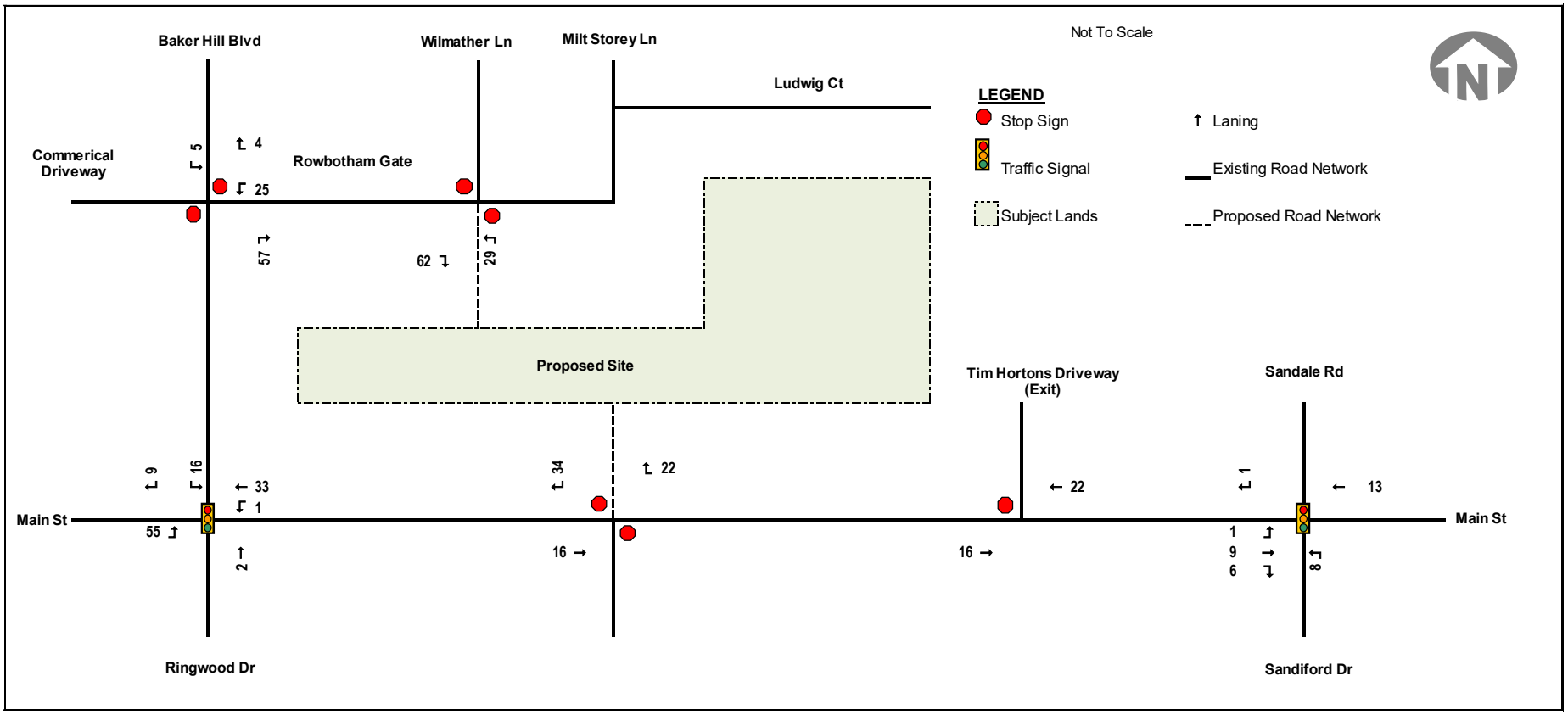


Figure 6-5: Site Traffic PM Peak Hour

1 Introduction

n Engineering Inc. (n Engineering) has been retained to provide traffic consulting services in support of the proposed commercial development. The subject site is located at 5505 Main St, Whitchurch-Stouffville, Ontario. The location is illustrated in Figure 1.

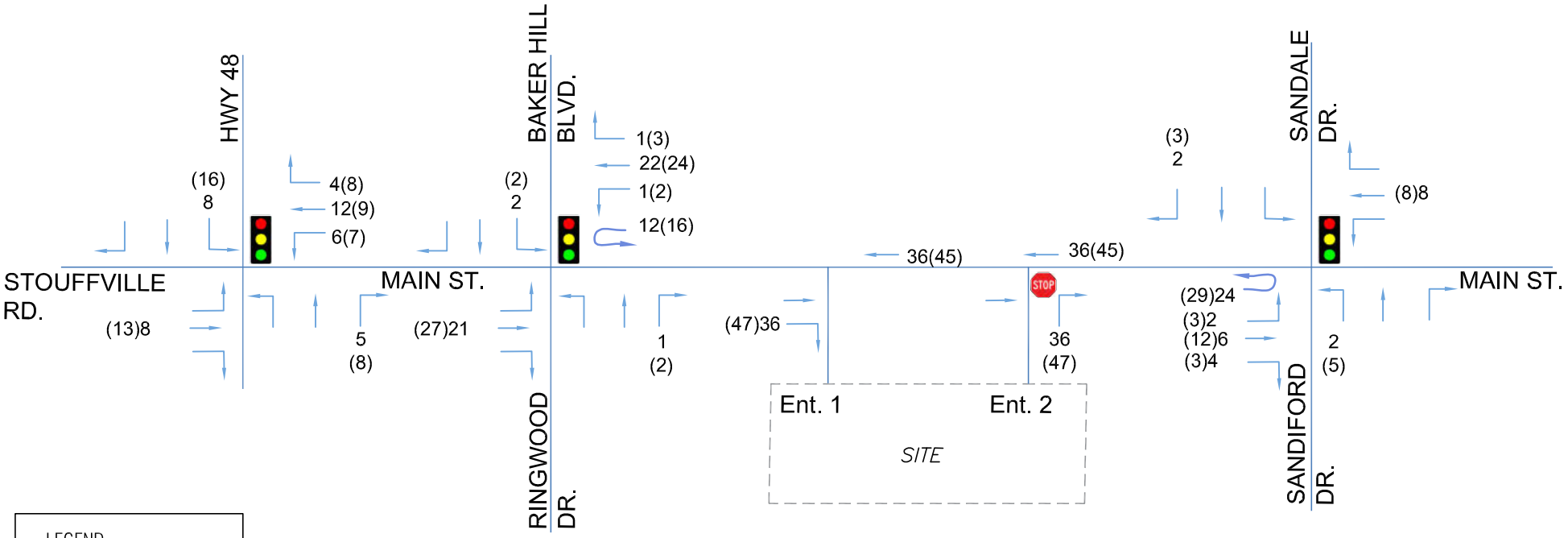
Figure 1 - Site Location

2 Proposed Development

As per the site plan provided by n Architecture Inc. (refer Appendix B), the details of the proposed development are below:

- An existing 1-Storey building to remain and be converted to a C-Store – 125.59 m^2 of GFA;
- 4 Pump Gas Bar Canopy;
- 500-Gallon Propane Tank Refill Station;
- Proposed parking of 11 spaces (incl. 1 barrier free).

The site is accessible via two entrances both of which come off of Main St. The Entrance 1 is site entrance only and Entrance 2 is exit only. The zoning category for the site area is Commercial



LEGEND

100	WEEKDAY AM
(100)	WEEKDAY PM
	SIGNALIZED INTERSECTIONS
STOP	STOP CONTROL
	PROPOSED DEVELOPMENT

n Engineering Inc
9120 Leslie Street, Suite-208
Richmond Hill, Ontario L4B 3J9
T: 416.258.9741
E: info@narchitecture.com
www.narchitecture.com

PROJECT:

GAS STATION AT 5505 MAIN ST., WHITCHURCH-STOUFFVILLE,ON.

DRAWING TITLE:

SITE GENERATED TRIPS

DRAWN BY: SA	DATE: 27 APRIL 2023
CHECKED BY: AZ	SCALE: NTS
PROJECT NO.: **21-66**	DRAWING NO.: **FIG-8**

N (GEODETIC NORTH)
PROJECT NORTH

The development is located in the Gateway Area, which a Background Transportation Conditions Report, dated May 24, 2016, and a Gateway Preferred Transportation Concept Confirmation Memo, dated February 6, 2018, has been completed. The studies have provided a conceptual plan of the proposed network for the Gateway Area and also recommends potential jurisdictional changes to Highway 48.

4. SITE LOCATION

The site, shown in Figure 1, is located at the northeast quadrant of Main Street and Highway 48. The site is mainly open lands with vegetation. Little Rouge Creek is located just east of the property and generally runs in a north – south direction. There are currently four existing residential dwellings on the south limit of the property (fronting on the north side of Main Street) that are planned to be demolished as part of the development proposal. There is an interior street just west of the proposed site, known as Fockler Lane, which generally runs north – south and intersects with Main Street. Fockler Lane provides access for the low-density residential dwellings along the east side of Highway 48.

The site is located west of the Stouffville Community downtown area. Main Street has a mix of low density residential, retail and commercial uses on the east side of Highway 48. Main Street (becomes Stouffville Road) west of Highway 48 includes land uses such as the Spring Lakes Golf Club, farmlands, and low-density residential dwellings.

5. PROPOSED DEVELOPMENT

The development is planned to be constructed in three phases. The site plan, prepared by Caricari Lee Architects, is shown in Figure 2. Table 1 provides a summary of the site statistics of land uses planned for each phase of the development. For the purpose of this study, the Construction Phase 2 and 3 has been combined to be Phase 2 for the traffic analysis, since the construction of the buildings would likely be completed within the 10-year horizon, further discussion is provided in Section 7.1.

Table 1 – Site Statistics

Construction Phase	Analysis Phase	Block #	Land Use	No. of Storeys	Units	Parking Supply (spaces)	
						Residential	Visitor
1	1	2	Apartment (Residential Tower B)	20	185	425	68
			Apartment (Residential Tower C)	16	155		
2	2	3	Apartment (Mixed Use Tower A) (Commercial – 5,000 sq.ft. GFA)	20	150	TBD	TBD
3		1	Apartment (Residential Tower D)	10	160	TBD	TBD
			Apartment (Residential Tower E)	10	150	TBD	TBD

In Phase 1, when Block 2 is developed within an approximate five-year timeframe, the layout of the local roadway (Street 'A'), to provide access to the Residential Towers B & C, includes an intersection at Main Street, approximately 175m east of Highway 48, and an intersection at Highway 48. Street 'A' would

terminate as a cul-de-sac to the north boundary of the development lands. The access onto Main Street would have a full-moves configuration and the access onto Highway 48 would have a right-in/ right-out configuration. Additional information regarding the road extensions is discussed in Section 7.4.

In Phase 2, occurring within an approximate 10-year timeframe, Mixed Use Tower A and Residential Towers D and E are expected to be constructed. The mixed-use tower will include a small commercial area (5,000 sq.ft. of GFA) that will be mainly used by residents of the building. The proposed roadway layout is expected to remain similar to Phase 1. A dedicated left turn lane along the Street 'A' is to be completed for the Mixed Use Tower A access. A private laneway is proposed to connect to Street 'A' to provide access to Residential Tower D and E.

6. EXISTING CONDITIONS

6.1 Road Network

The study area roadways in the immediate vicinity of the site can be described as follows:

Highway 48 is an arterial road that generally runs in a north-south direction. The roadway is under the jurisdiction of the Ministry of Transportation, Ontario (MTO). Highway 48 consists of four travel lanes: two in each direction. The posted speed limit on Highway 48 is 80 km/h in the vicinity of the site. Highway 48 forms signalized intersections with Main Street, Millard Street and Hoover Park Drive in the study area.

Stouffville Road / Main Street is an arterial road that generally runs east and west. Stouffville Road is under the jurisdiction of York Region and Main Street is under the jurisdiction of the Town of Whitchurch-Stouffville. Main Street consist of four travel lanes; two per direction. A centre left turn lane is provided on both Stouffville Road and on Main Street. The posted speed limit on Stouffville Road is 60 km/h and is 50 km/hr on Main Street. Stouffville Road / Main Street forms signalized intersections with Highway 48 and with Ringwood Drive / Baker Hill Boulevard in the study area.

Spring Lake Golf Country Club Access / Millard Street generally runs in an east-west direction and intersects Highway 48 at a point about 600 meters north of Main Street. The west side of Highway 48 is the access of Spring Lake Golf Country Club and on the east is a local road, Milliard Street, which is under the jurisdiction of Whitchurch-Stouffville. Milliard Street consists of two travel lanes: one per direction. The posted speed limit on Millard Street is 50 km/h.

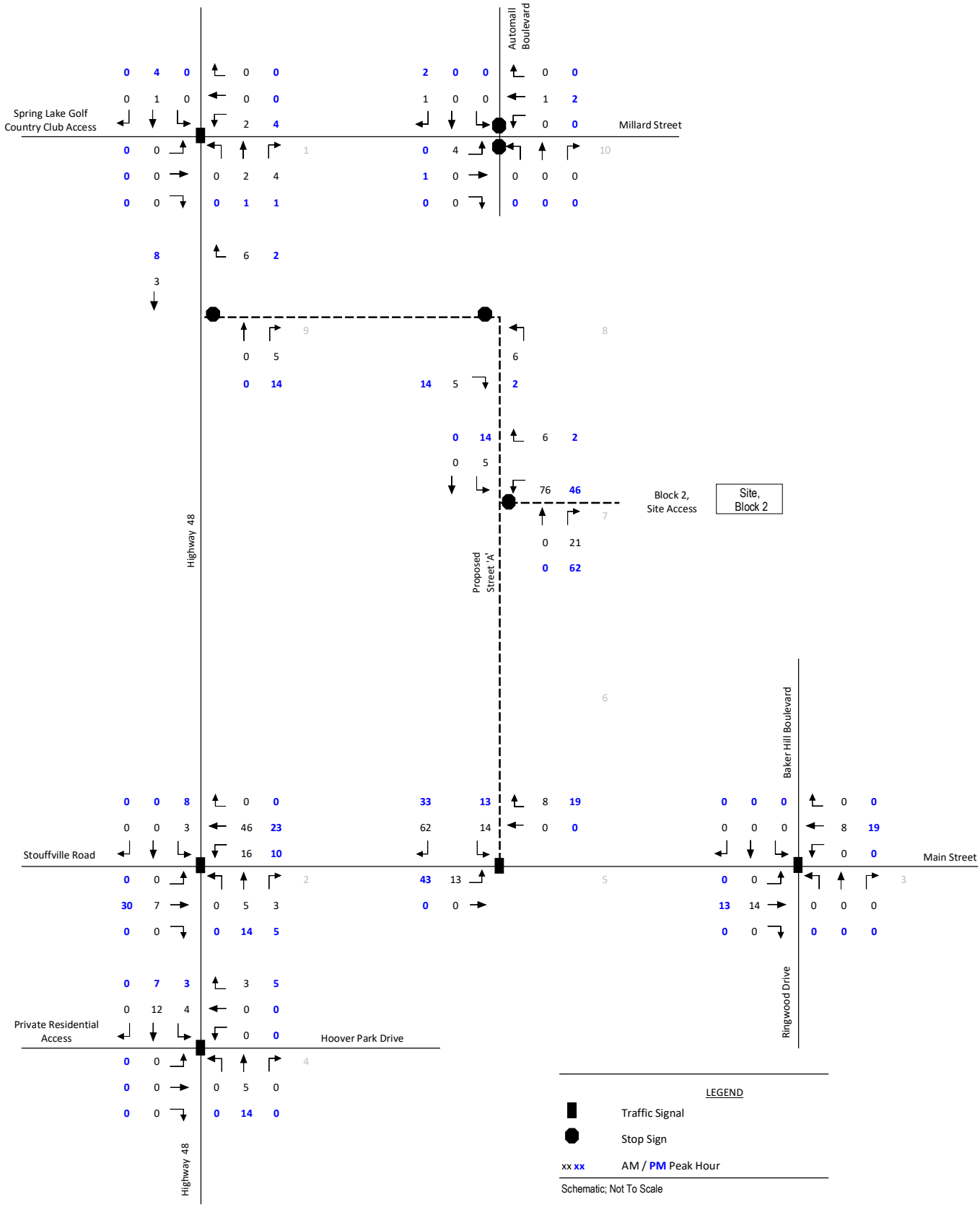
Hoover Park Drive is a collector road under the jurisdiction of the Town of Whitchurch-Stouffville. Hoover Park Drive generally runs east-west, approximately 800m south of Main Street and terminates at Highway 48, where a private residential access is located on the west leg. Hoover Park Drive consists of four lanes; two per direction. The posted speed limit along Hoover Park Drive is 50 km/h.

Ringwood Drive / Baker Hill Boulevard are local roads under the jurisdiction of the Town of Whitchurch-Stouffville that generally run in a north-south direction. The roadways consist of two travel lanes: one per direction. The assumed speed limit on Ringwood Drive / Baker Hill Boulevard is 40 km/h.

Automall Boulevard is a local road under the jurisdiction of the Town of Whitchurch-Stouffville that generally run in a north-south direction. The roadways consist of two travel lanes: one per direction. The assumed speed limit on Automall Boulevard is 40 km/h.

The study area roadway characteristics and lane configurations are shown in Figure 3.

Figure 10: 2027 Site Trip Assignment, Weekday AM and PM Peak Hours



LEA Consulting Ltd.
425 University Ave, Suite 400
Toronto, ON, M5G 1T6 Canada
T | 905 470 0015 F | 905 470 0030
WWW.LEA.CA

March 8th, 2023

Reference Number: 19347

Thomas Yeung
Senior Project Director
TopFar Developments
50 Acadia Avenue, Suite 100
Markham, ON L3R 0B3

Dear Mr. Yeung,

RE: 5531 Main Street Transportation Mobility Plan (TMP) – SPA Resubmission Letter

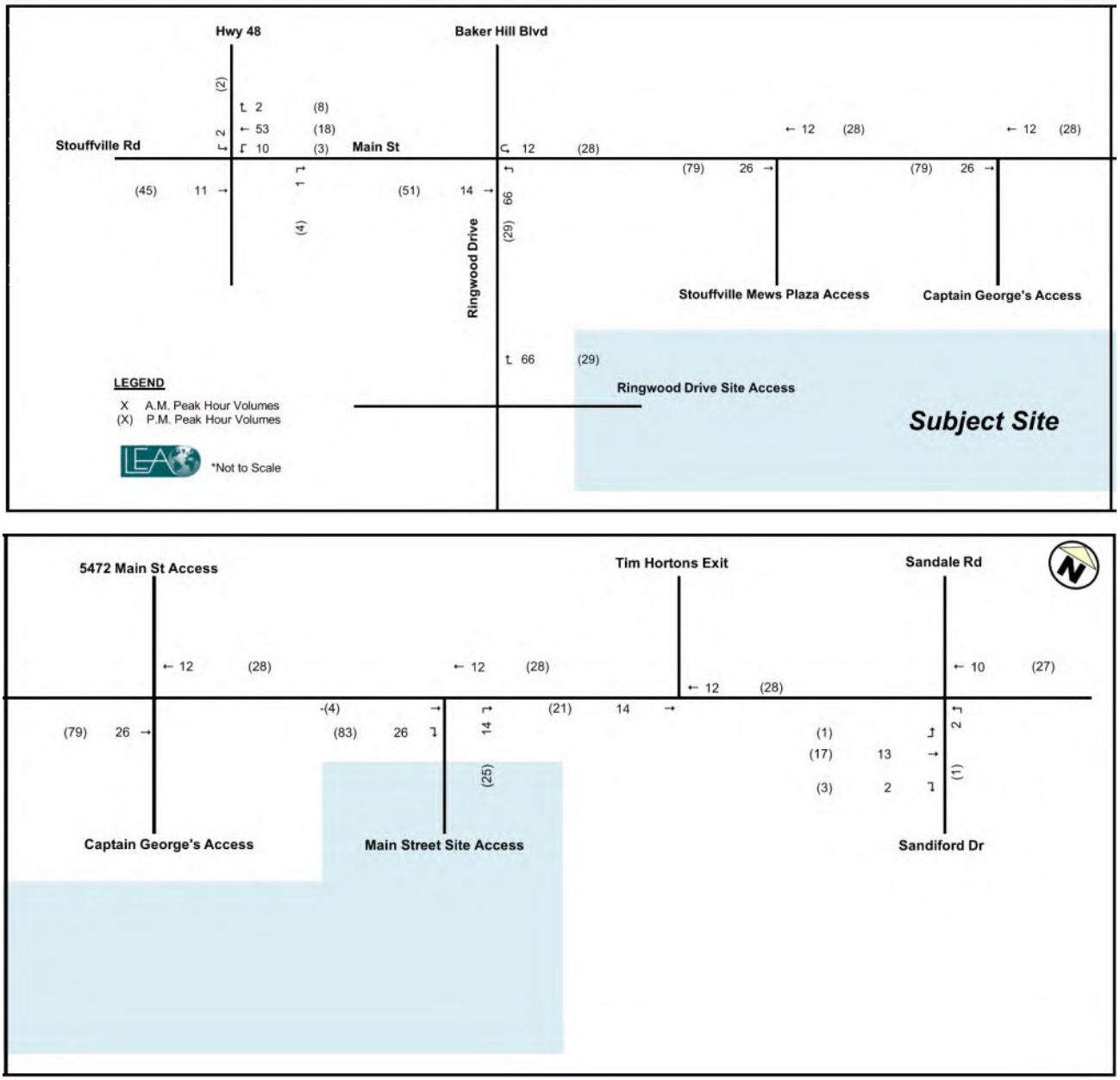
LEA Consulting Ltd. (LEA) is pleased to submit this TMP SPA letter for the proposed development at 5531 Main Street in Whitchurch-Stouffville, Ontario. By way of background, LEA prepared a TMP dated October 2019, as well as updated TMP reports in July 2020, December 2020, October 2021, and March 2022 in response to comments received from the Town and peer reviewers. A June 2022 resubmission letter was also provided to support a rezoning submission. The following letter provides a response to the peer reviewer comments received on the March 2022 TIS resubmission.

Since March 2022, the development proposal has been slightly revised. A comparison of the site statistics between the previous and current proposals is provided below in **Table 1-1.**

Table 1-1: Site Statistics Comparison

Land Use	Previous Statistics (March 2022)	Current Statistics (March 2023)	Difference
Residential	309 units	319 units	+10 units
Retail GFA	814.17 sq. m.	732.35 sq. m.	-81.82 sq.m.
Vehicular Parking	329 Residential (1.06 per unit) 25 Retail (3 per 100 sq. m.) 78 Visitor (0.25 per unit)	330 Residential (1.03 per unit) 22 Retail (3 per 100 sq. m.) 80 Visitor (0.25 per unit)	+1 Residential -3 Retail +2 Visitor

Figure 2-3: Site Traffic – Weekday AM (PM) Peak Hour



4 Proposed Development

This chapter will provide additional details with respect to the proposed development, including its location, the projected site generated traffic volumes and the assignment of such to the adjacent road network.

4.1 SITE LOCATION

As illustrated in Figure 1, the proposed development is to be located on the north side of Main Street, east of the existing Metro grocery store.

4.2 PROPOSED LAND-USE & PHASING

The proposed development will consist of a 97-unit affordable housing building with 184 m^2 (1,981 ft^2) of ground floor commercial space. The commercial space will also have a 9m^2 (97 ft^2) vestibule. It has been assumed that the commercial use will be retail in nature.

A site plan is provided in Figure 7. A single 3-year phase has been considered with full build-out and occupancy by 2022. While the site plan indicates future development on the east portion of the site, this is for illustrative purposes only. It is noted that there are no plans to develop the east portion of the site at this time. While development of this parcel may occur in the future, such is not anticipated within the study horizon considered in this assessment (i.e. development of the east parcel, if such occurs, will be beyond the 2027 horizon). As such, future development of the east parcel has not been considered in this study.

4.3 SITE ACCESS & ON-SITE CIRCULATION

The site will be served by a single right-in/right-out access on Main Street (the right-in/right-out restriction is enforced by the existing raised centre median on Main Street). It is noted that the existing median on Main Street will be extended to the east to the intersection of Main Street with Palmwood Gate/Mostar Street. Furthermore, "No U-Turn" signage will be placed at the west limit of the existing median to prohibit mid-block u-turns. U-turns will only be permitted at the signalized intersections of Main Street with Sandiford Road/Sandale Road and Palmwood Gate/Mostar Street.

The access will provide two-way operations with a 7.5 metre throat width and 9.0 metre curb radii, thus satisfying the guidelines provided in the Town's *Design Guidelines and Standard Drawings*[5]. As noted, the west access curb terminates at the sidewalk, thus creating a shared apron with the Metro access, south of the sidewalk. While typically the curb would continue to

[5] *The Town of Whitchurch-Stouffville Design Guidelines and Standard Drawings.* September 2019.

5676 MAIN STREET

Figure 8: Site Generated Traffic Volumes

520 Industrial Parkway South, Suite 201
Aurora ON L4G 6W8

Phone: 905-503-2563
www.nextrans.ca

nextrans
CONSULTING ENGINEERS

NextEng Consulting Group Inc.

March 13, 2023

2556583 Ontario Inc.

Attention: Emanuel Eba

Re: Transportation Impact Study
Proposed Industrial Development
195 Mostar Street, Town of Whitchurch-Stouffville
Our Project No. NT-22-107

Nextrans Consulting Engineers- (a Division of NextEng Consulting Group Inc.) is pleased to present the enclosed Transportation Impact Study for the above noted site in support of a Official Plan Amendment and Zoning By-law Amendment Application for an industrial development.

The subject lands are located at the northeast conner of Mostar Street and Hoover Park Drive, in the Town of Whitchurch-Stouffville (The 'Town'). The development proposal is to construct an industrial development. The development will consist of three (3) single-storey industrial buildings, with a proposed GFA of 7,014.09 m^2. Site access will be provided two full movement driveways onto Mostar Street, and one (1) site access via a full movement driveway onto Hoover Park Drive.

The transportation study concludes that the proposed development can adequately be accommodated by the existing transportation network.

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

Yours truly,

Nextrans Consulting Engineers
A Division of NextEng Consulting Group Inc.

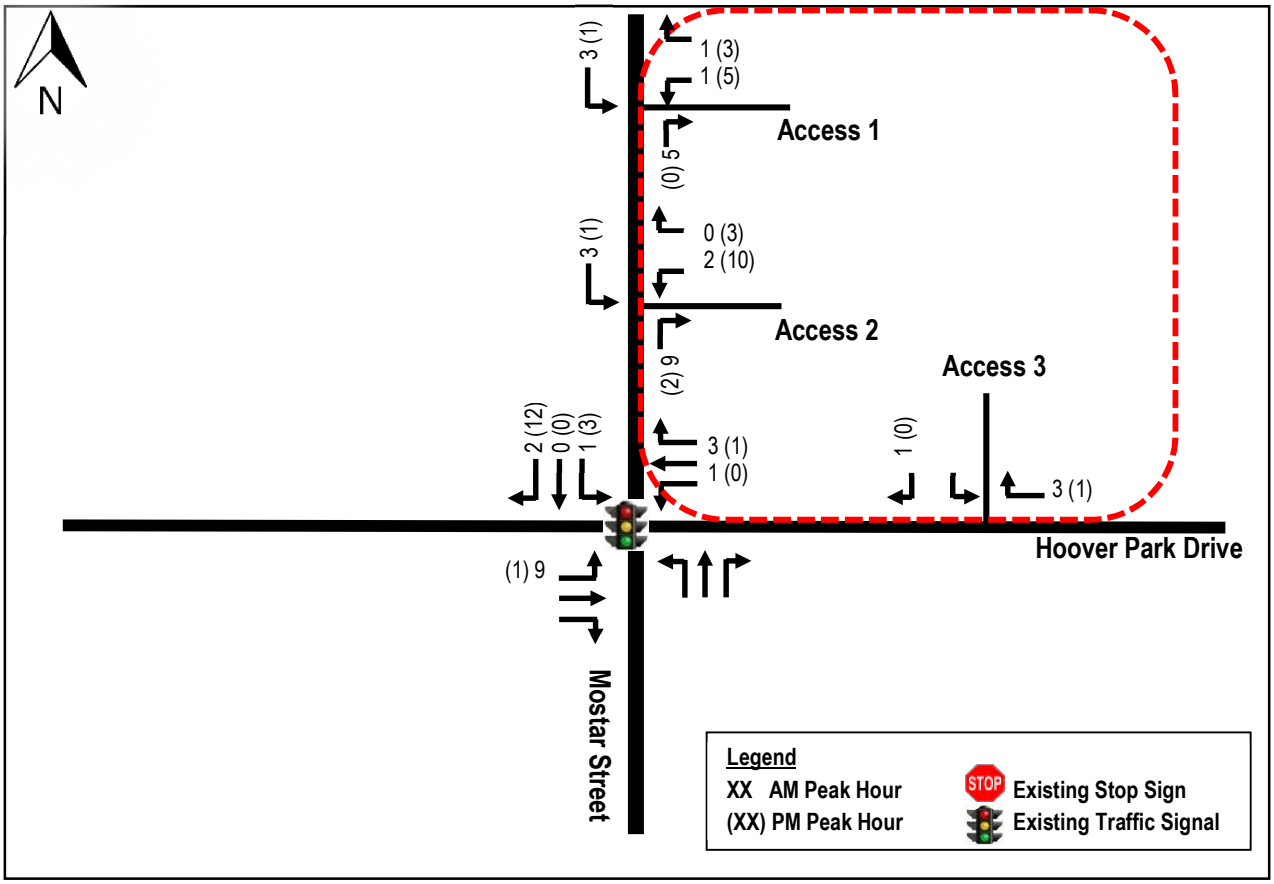
Prepared by:

Sam Nguyen, Dipl.
Transportation Analyst

Approved by:

Richard Pernicky, MITE
Principal

Figure 8 – Site Traffic Volumes



5.0 FUTURE TOTAL TRAFFIC CONDITIONS

5.1. Future Total Traffic Assessment for Auto Mode

The future total traffic volumes for 2030 horizon are provided in **Figures 9**. These traffic volumes were analyzed using Synchro Version 11 software. The detailed calculations are provided in **Appendix F** and summarized in **Table 7**.

1 INTRODUCTION

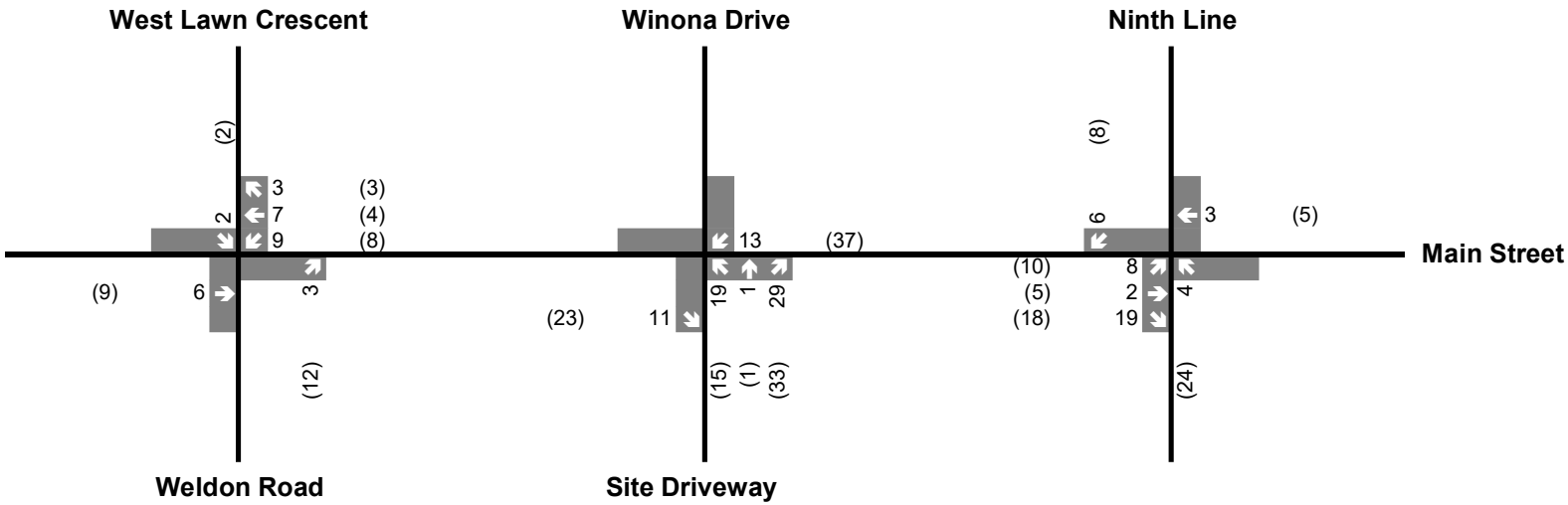
WSP was retained by Ledgemark Homes Inc. (LivGreen Main St. Inc.) to prepare a Traffic Impact Study (TIS) for the mixed-use development located at 5945 Main Street in the Town of Whitchurch-Stouffville. The site location and study area are shown in **Figure 1.1**.

The subject site is currently vacant. The proposed development will feature a 10-storey residential building consisting of 166 residential units, as well as two separate freestanding commercial buildings with a total of 720 m^2 retail space. The development will be served by one existing full-moves vehicular access onto Main Street. The current draft site plan proposes the provision of 271 residential and visitors parking spaces and 8 accessible parking spaces. The site plan is shown in **Figure 1.2**.

The main objective of this study is to evaluate if there are any adverse impacts on the local transportation network related to the proposed development and to evaluate the proposed parking and loading arrangements, in support of a development application to the Town of Whitchurch-Stouffville.

A terms of reference (TOR) was established with the Town of Whitchurch-Stouffville and Region of York with consideration of the York Region Transportation Mobility Plan Guidelines for development applications, dated November 2016. The TOR is provided in **Appendix A**.

Our study approach and findings are documented herein.



Legend

xx A.M. Peak Hour Traffic Volumes

(xx) P.M. Peak Hour Traffic Volumes

Figure 4.1

Site Generated Traffic Volumes

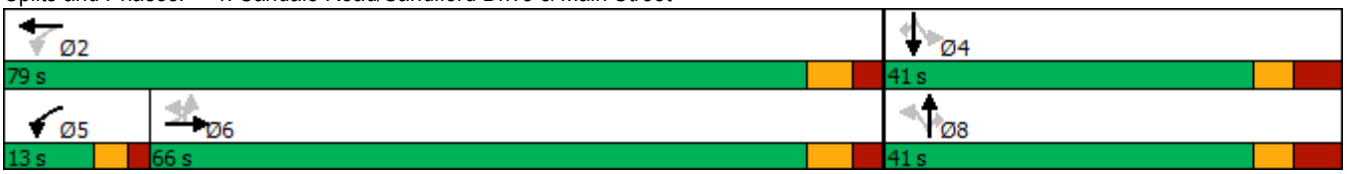
Appendix F – Future Background Traffic Assessment

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	59	669	173	662	110	54	93	75	88	61
Future Volume (vph)	59	669	173	662	110	54	93	75	88	61
Lane Group Flow (vph)	64	952	188	841	120	59	101	82	96	66
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		6	5	2		8			4	
Permitted Phases	6		2		8		8	4		4
Detector Phase	6	6	5	2	8	8	8	4	4	4
Switch Phase										
Minimum Initial (s)	31.0	31.0	7.0	31.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	38.0	38.0	12.0	38.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (s)	66.0	66.0	13.0	79.0	41.0	41.0	41.0	41.0	41.0	41.0
Total Split (%)	55.0%	55.0%	10.8%	65.8%	34.2%	34.2%	34.2%	34.2%	34.2%	34.2%
Yellow Time (s)	4.0	4.0	3.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	3.0	3.0	2.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	5.0	7.0	8.0	8.0	8.0	8.0	8.0	8.0
Lead/Lag	Lag	Lag	Lead							
Lead-Lag Optimize?	Yes	Yes	Yes							
Recall Mode	Max	Max	None	Max	Max	Max	Max	None	None	None
v/c Ratio	0.21	0.57	0.57	0.41	0.35	0.11	0.20	0.22	0.18	0.14
Control Delay	19.8	21.9	17.2	12.9	38.4	33.4	7.4	35.5	34.4	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.8	21.9	17.2	12.9	38.4	33.4	7.4	35.5	34.4	5.4
Queue Length 50th (m)	8.3	76.6	17.7	50.1	22.7	10.4	0.0	14.9	17.3	0.0
Queue Length 95th (m)	17.7	96.2	28.2	63.1	40.0	20.9	12.9	28.4	31.1	7.6
Internal Link Dist (m)		1629.1		390.8		261.2			146.8	
Turn Bay Length (m)	55.0		40.0		65.0		65.0	15.0		40.0
Base Capacity (vph)	299	1674	327	2066	344	528	513	373	528	463
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.57	0.57	0.41	0.35	0.11	0.20	0.22	0.18	0.14

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 90
Control Type: Semi Act-Uncoord

Splits and Phases: 1: Sandale Road/Sandiford Drive & Main Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	669	207	173	662	111	110	54	93	75	88	61
Future Volume (vph)	59	669	207	173	662	111	110	54	93	75	88	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		5.0	7.0		8.0	8.0	8.0	8.0	8.0	8.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	0.98	1.00	1.00	0.92
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.94	1.00	1.00	0.99	1.00	1.00
Frt	1.00	0.96		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1725	3353		1805	3426		1712	1921	1601	1794	1921	1471
Flt Permitted	0.34	1.00		0.20	1.00		0.69	1.00	1.00	0.72	1.00	1.00
Satd. Flow (perm)	609	3353		379	3426		1252	1921	1601	1357	1921	1471
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	64	727	225	188	720	121	120	59	101	82	96	66
RTOR Reduction (vph)	0	24	0	0	11	0	0	0	73	0	0	48
Lane Group Flow (vph)	64	928	0	188	830	0	120	59	28	82	96	18
Confl. Peds. (#/hr)	13		21	21		13	63		7	7		63
Heavy Vehicles (%)	5%	4%	2%	1%	4%	1%	0%	0%	0%	1%	0%	2%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		6		5	2			8			4	
Permitted Phases	6			2			8		8	4		4
Actuated Green, G (s)	59.0	59.0		72.0	72.0		33.0	33.0	33.0	33.0	33.0	33.0
Effective Green, g (s)	59.0	59.0		72.0	72.0		33.0	33.0	33.0	33.0	33.0	33.0
Actuated g/C Ratio	0.49	0.49		0.60	0.60		0.28	0.28	0.28	0.28	0.28	0.28
Clearance Time (s)	7.0	7.0		5.0	7.0		8.0	8.0	8.0	8.0	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
Lane Grp Cap (vph)	299	1648		322	2055		344	528	440	373	528	404
v/s Ratio Prot		0.28		c0.04	0.24			0.03			0.05	
v/s Ratio Perm	0.11			c0.31			c0.10		0.02	0.06		0.01
v/c Ratio	0.21	0.56		0.58	0.40		0.35	0.11	0.06	0.22	0.18	0.04
Uniform Delay, d1	17.3	21.4		13.6	12.7		34.9	32.5	32.1	33.6	33.2	31.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	1.4		2.7	0.6		2.8	0.4	0.3	0.3	0.2	0.0
Delay (s)	19.0	22.8		16.3	13.3		37.7	33.0	32.4	33.9	33.4	32.0
Level of Service	B	C		B	B		D	C	C	C	C	C
Approach Delay (s)		22.6			13.8			34.8			33.2	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	21.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	109.4%	ICU Level of Service	H
Analysis Period (min)	15		

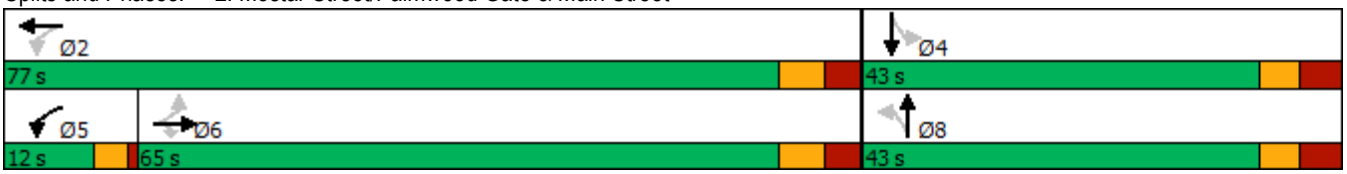
c Critical Lane Group

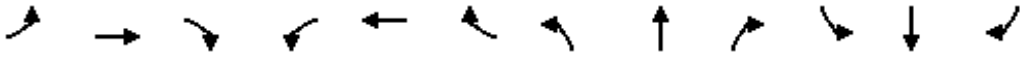
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	32	687	136	190	863	105	33	13	50
Future Volume (vph)	32	687	136	190	863	105	33	13	50
Lane Group Flow (vph)	36	781	155	216	996	119	127	15	92
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		6		5	2		8		4
Permitted Phases	6		6	2		8		4	
Detector Phase	6	6	6	5	2	8	8	4	4
Switch Phase									
Minimum Initial (s)	40.0	40.0	40.0	7.0	40.0	10.0	10.0	10.0	10.0
Minimum Split (s)	47.5	47.5	47.5	11.5	47.5	41.5	41.5	41.5	41.5
Total Split (s)	65.0	65.0	65.0	12.0	77.0	43.0	43.0	43.0	43.0
Total Split (%)	54.2%	54.2%	54.2%	10.0%	64.2%	35.8%	35.8%	35.8%	35.8%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	3.5	3.5	3.5	3.5
All-Red Time (s)	3.5	3.5	3.5	1.0	3.5	4.0	4.0	4.0	4.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Lead/Lag	Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	Max	Max	Max	None	None
v/c Ratio	0.15	0.46	0.19	0.55	0.49	0.31	0.23	0.04	0.18
Control Delay	19.6	22.1	3.6	16.3	15.8	35.6	12.4	30.6	23.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.6	22.1	3.6	16.3	15.8	35.6	12.4	30.6	23.4
Queue Length 50th (m)	4.6	63.0	0.6	21.3	68.4	21.7	6.4	2.5	11.4
Queue Length 95th (m)	11.2	77.0	10.7	32.0	81.5	37.1	20.1	7.5	23.6
Internal Link Dist (m)		390.8			413.7		335.1		61.1
Turn Bay Length (m)	37.0		45.0	35.0		40.0		35.0	
Base Capacity (vph)	243	1681	818	392	2049	383	561	382	525
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.46	0.19	0.55	0.49	0.31	0.23	0.04	0.18

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 105
Control Type: Semi Act-Uncoord

Splits and Phases: 2: Mostar Street/Palmwood Gate & Main Street





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	687	136	190	863	13	105	33	78	13	50	31
Future Volume (vph)	32	687	136	190	863	13	105	33	78	13	50	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5	7.5	4.0	7.5		7.5	7.5		7.5	7.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	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		1.00	0.89		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1718	3510	1545	1788	3536		1769	1687		1817	1715	
Flt Permitted	0.28	1.00	1.00	0.27	1.00		0.70	1.00		0.68	1.00	
Satd. Flow (perm)	509	3510	1545	506	3536		1298	1687		1292	1715	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	36	781	155	216	981	15	119	38	89	15	57	35
RTOR Reduction (vph)	0	0	78	0	1	0	0	63	0	0	18	0
Lane Group Flow (vph)	36	781	77	216	995	0	119	64	0	15	74	0
Confl. Peds. (#/hr)	4		8	8		4	2		5	5		2
Heavy Vehicles (%)	6%	4%	2%	2%	3%	0%	3%	0%	1%	0%	2%	10%
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		6		5	2			8			4	
Permitted Phases	6		6	2			8			4		
Actuated Green, G (s)	57.5	57.5	57.5	69.5	69.5		35.5	35.5		35.5	35.5	
Effective Green, g (s)	57.5	57.5	57.5	69.5	69.5		35.5	35.5		35.5	35.5	
Actuated g/C Ratio	0.48	0.48	0.48	0.58	0.58		0.30	0.30		0.30	0.30	
Clearance Time (s)	7.5	7.5	7.5	4.0	7.5		7.5	7.5		7.5	7.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	243	1681	740	378	2047		383	499		382	507	
v/s Ratio Prot		0.22		c0.04	0.28			0.04			0.04	
v/s Ratio Perm	0.07		0.05	c0.29			c0.09			0.01		
v/c Ratio	0.15	0.46	0.10	0.57	0.49		0.31	0.13		0.04	0.15	
Uniform Delay, d1	17.5	20.9	17.1	13.5	14.8		32.8	30.9		30.1	31.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2	0.1	2.1	0.8		2.1	0.5		0.0	0.1	
Delay (s)	17.8	21.1	17.2	15.6	15.6		34.9	31.5		30.1	31.2	
Level of Service	B	C	B	B	B		C	C		C	C	
Approach Delay (s)		20.4			15.6			33.1			31.1	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	19.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	113.8%	ICU Level of Service	H
Analysis Period (min)	15		

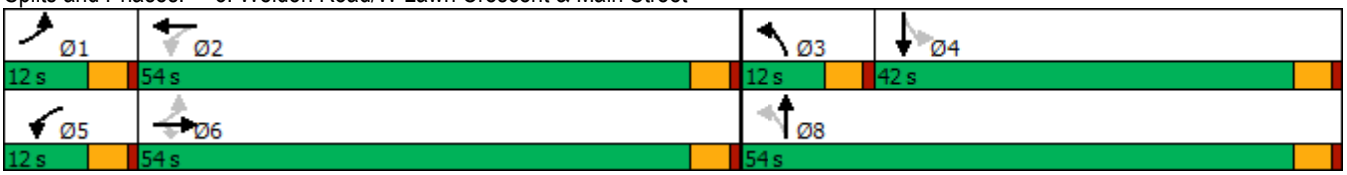
c Critical Lane Group

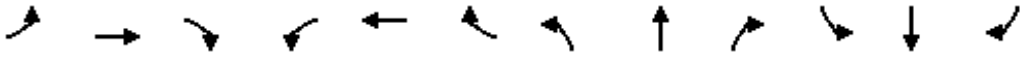
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	48	702	89	168	930	73	76	38	153
Future Volume (vph)	48	702	89	168	930	73	76	38	153
Lane Group Flow (vph)	57	836	106	200	1145	87	195	45	257
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm	NA
Protected Phases	1	6		5	2	3	8		4
Permitted Phases	6		6	2		8		4	
Detector Phase	1	6	6	5	2	3	8	4	4
Switch Phase									
Minimum Initial (s)	7.0	30.0	30.0	7.0	30.0	7.0	10.0	10.0	10.0
Minimum Split (s)	11.5	34.5	34.5	11.5	34.5	11.5	22.5	22.5	22.5
Total Split (s)	12.0	54.0	54.0	12.0	54.0	12.0	54.0	42.0	42.0
Total Split (%)	10.0%	45.0%	45.0%	10.0%	45.0%	10.0%	45.0%	35.0%	35.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	Max	None	Max	None	None
v/c Ratio	0.33	0.59	0.16	0.74	0.76	0.23	0.25	0.11	0.42
Control Delay	20.4	29.6	6.1	36.1	33.5	23.2	16.5	30.6	32.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.4	29.6	6.1	36.1	33.5	23.2	16.5	30.6	32.0
Queue Length 50th (m)	6.5	78.4	1.5	24.9	120.8	12.5	19.9	7.6	45.0
Queue Length 95th (m)	12.4	89.2	10.3	#37.5	132.4	21.4	32.9	15.4	63.5
Internal Link Dist (m)		413.7			784.4		271.2		166.6
Turn Bay Length (m)	30.0		30.0	30.0		40.0		15.0	
Base Capacity (vph)	174	1495	674	270	1500	382	768	402	611
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.56	0.16	0.74	0.76	0.23	0.25	0.11	0.42

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 117.5
Natural Cycle: 80
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Weldon Road/W Lawn Crescent & Main Street





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	48	702	89	168	930	32	73	76	88	38	153	63
Future Volume (vph)	48	702	89	168	930	32	73	76	88	38	153	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00		1.00	0.99		1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.92		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1659	3544	1470	1807	3552		1731	1739		1761	1755	
Flt Permitted	0.10	1.00	1.00	0.20	1.00		0.42	1.00		0.64	1.00	
Satd. Flow (perm)	171	3544	1470	378	3552		771	1739		1177	1755	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	57	836	106	200	1107	38	87	90	105	45	182	75
RTOR Reduction (vph)	0	0	57	0	2	0	0	35	0	0	12	0
Lane Group Flow (vph)	57	836	49	200	1143	0	87	160	0	45	245	0
Confl. Peds. (#/hr)	13		8	8		13	39		4	4		39
Heavy Vehicles (%)	10%	3%	6%	1%	2%	3%	4%	1%	0%	3%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases	1	6		5	2		3	8			4	
Permitted Phases	6		6	2			8			4		
Actuated Green, G (s)	53.7	47.9	47.9	57.1	49.6		50.6	50.6		40.2	40.2	
Effective Green, g (s)	53.7	47.9	47.9	57.1	49.6		50.6	50.6		40.2	40.2	
Actuated g/C Ratio	0.45	0.40	0.40	0.48	0.42		0.42	0.42		0.34	0.34	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	149	1420	589	270	1474		373	736		395	590	
v/s Ratio Prot	0.02	0.24		c0.05	c0.32		0.01	c0.09			c0.14	
v/s Ratio Perm	0.15		0.03	0.31			0.09			0.04		
v/c Ratio	0.38	0.59	0.08	0.74	0.78		0.23	0.22		0.11	0.42	
Uniform Delay, d1	22.8	28.1	22.2	21.4	30.1		21.7	21.9		27.4	30.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	0.6	0.1	10.4	4.1		0.3	0.7		0.1	0.5	
Delay (s)	24.4	28.7	22.3	31.8	34.2		22.0	22.6		27.5	31.1	
Level of Service	C	C	C	C	C		C	C		C	C	
Approach Delay (s)		27.8			33.8			22.4			30.5	
Approach LOS		C			C			C			C	

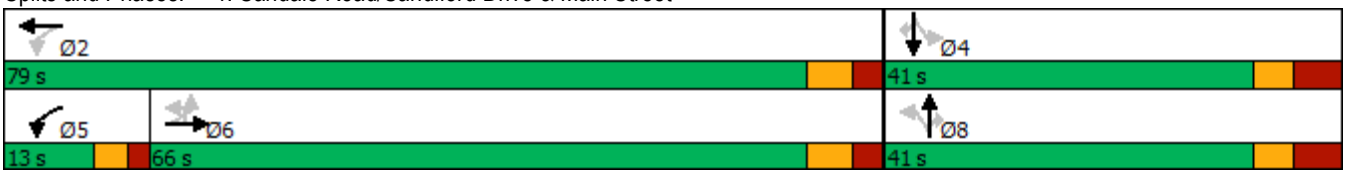
Intersection Summary			
HCM 2000 Control Delay	30.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	119.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	151	1169	110	867	211	104	137	118	69	113
Future Volume (vph)	151	1169	110	867	211	104	137	118	69	113
Lane Group Flow (vph)	162	1409	118	1013	227	112	147	127	74	122
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		6	5	2		8			4	
Permitted Phases	6		2		8		8	4		4
Detector Phase	6	6	5	2	8	8	8	4	4	4
Switch Phase										
Minimum Initial (s)	31.0	31.0	7.0	31.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	38.0	38.0	12.0	38.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (s)	66.0	66.0	13.0	79.0	41.0	41.0	41.0	41.0	41.0	41.0
Total Split (%)	55.0%	55.0%	10.8%	65.8%	34.2%	34.2%	34.2%	34.2%	34.2%	34.2%
Yellow Time (s)	4.0	4.0	3.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	3.0	3.0	2.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	5.0	7.0	8.0	8.0	8.0	8.0	8.0	8.0
Lead/Lag	Lag	Lag	Lead							
Lead-Lag Optimize?	Yes	Yes	Yes							
Recall Mode	Max	Max	None	Max	Max	Max	Max	None	None	None
v/c Ratio	0.62	0.80	0.61	0.47	0.63	0.21	0.27	0.36	0.14	0.24
Control Delay	34.6	29.7	29.4	14.1	47.2	34.8	6.6	38.4	33.8	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.6	29.7	29.4	14.1	47.2	34.8	6.6	38.4	33.8	8.2
Queue Length 50th (m)	27.0	141.3	10.7	65.1	47.0	20.3	0.0	24.1	13.2	1.2
Queue Length 95th (m)	54.2	171.3	27.7	80.3	74.5	35.3	15.0	41.9	25.3	15.4
Internal Link Dist (m)		1629.1		390.8		261.2			146.8	
Turn Bay Length (m)	55.0		40.0		65.0		65.0	15.0		40.0
Base Capacity (vph)	263	1752	195	2138	360	528	543	357	528	513
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.80	0.61	0.47	0.63	0.21	0.27	0.36	0.14	0.24

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 90
Control Type: Semi Act-Uncoord

Splits and Phases: 1: Sandale Road/Sandiford Drive & Main Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	151	1169	141	110	867	75	211	104	137	118	69	113
Future Volume (vph)	151	1169	141	110	867	75	211	104	137	118	69	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		5.0	7.0		8.0	8.0	8.0	8.0	8.0	8.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.97	1.00	1.00	0.96
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.97	1.00	1.00	0.99	1.00	1.00
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1807	3535		1825	3556		1757	1921	1590	1802	1921	1565
Flt Permitted	0.28	1.00		0.07	1.00		0.71	1.00	1.00	0.68	1.00	1.00
Satd. Flow (perm)	534	3535		134	3556		1311	1921	1590	1299	1921	1565
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	162	1257	152	118	932	81	227	112	147	127	74	122
RTOR Reduction (vph)	0	8	0	0	5	0	0	0	107	0	0	83
Lane Group Flow (vph)	162	1401	0	118	1008	0	227	112	40	127	74	39
Confl. Peds. (#/hr)	21		18	18		21	27		13	13		27
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	1%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		6		5	2			8			4	
Permitted Phases	6			2			8		8	4		4
Actuated Green, G (s)	59.2	59.2		72.0	72.0		33.0	33.0	33.0	33.0	33.0	33.0
Effective Green, g (s)	59.2	59.2		72.0	72.0		33.0	33.0	33.0	33.0	33.0	33.0
Actuated g/C Ratio	0.49	0.49		0.60	0.60		0.28	0.28	0.28	0.28	0.28	0.28
Clearance Time (s)	7.0	7.0		5.0	7.0		8.0	8.0	8.0	8.0	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
Lane Grp Cap (vph)	263	1743		190	2133		360	528	437	357	528	430
v/s Ratio Prot		c0.40		c0.04	0.28			0.06			0.04	
v/s Ratio Perm	0.30			0.33			c0.17		0.03	0.10		0.02
v/c Ratio	0.62	0.80		0.62	0.47		0.63	0.21	0.09	0.36	0.14	0.09
Uniform Delay, d1	22.1	25.5		20.4	13.4		38.2	33.5	32.4	35.0	32.8	32.3
Progression Factor	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	4.1		6.2	0.8		8.1	0.9	0.4	0.6	0.1	0.1
Delay (s)	32.5	29.6		26.6	14.2		46.3	34.4	32.8	35.6	32.9	32.4
Level of Service	C	C		C	B		D	C	C	D	C	C
Approach Delay (s)		29.9			15.4			39.5			33.8	
Approach LOS		C			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	26.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	108.7%	ICU Level of Service	G
Analysis Period (min)	15		

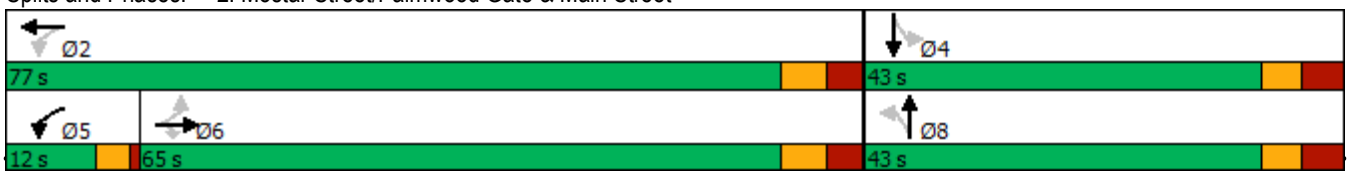
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	65	1226	171	237	945	219	103	31	76
Future Volume (vph)	65	1226	171	237	945	219	103	31	76
Lane Group Flow (vph)	69	1304	182	252	1045	233	240	33	108
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		6		5	2		8		4
Permitted Phases	6		6	2		8		4	
Detector Phase	6	6	6	5	2	8	8	4	4
Switch Phase									
Minimum Initial (s)	40.0	40.0	40.0	7.0	40.0	10.0	10.0	10.0	10.0
Minimum Split (s)	47.5	47.5	47.5	11.5	47.5	41.5	41.5	41.5	41.5
Total Split (s)	65.0	65.0	65.0	12.0	77.0	43.0	43.0	43.0	43.0
Total Split (%)	54.2%	54.2%	54.2%	10.0%	64.2%	35.8%	35.8%	35.8%	35.8%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	3.5	3.5	3.5	3.5
All-Red Time (s)	3.5	3.5	3.5	1.0	3.5	4.0	4.0	4.0	4.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Lead/Lag	Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	Max	Max	Max	None	None
v/c Ratio	0.29	0.75	0.23	1.17	0.50	0.60	0.44	0.11	0.19
Control Delay	23.1	28.9	8.5	136.3	15.9	43.7	29.7	32.3	28.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.1	28.9	8.5	136.3	15.9	43.7	29.7	32.3	28.5
Queue Length 50th (m)	9.6	128.1	9.6	~46.7	72.5	46.9	35.9	5.7	16.4
Queue Length 95th (m)	21.0	155.0	22.7	#98.6	88.9	74.2	59.5	13.9	30.7
Internal Link Dist (m)		390.8			413.7		335.1		61.1
Turn Bay Length (m)	37.0		45.0	35.0		40.0		35.0	
Base Capacity (vph)	239	1731	805	216	2078	390	548	288	556
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.75	0.23	1.17	0.50	0.60	0.44	0.11	0.19

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 105
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Mostar Street/Palmwood Gate & Main Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	1226	171	237	945	38	219	103	122	31	76	25
Future Volume (vph)	65	1226	171	237	945	38	219	103	122	31	76	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5	7.5	4.0	7.5		7.5	7.5		7.5	7.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.92		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1820	3614	1566	1825	3586		1825	1735		1801	1849	
Flt Permitted	0.26	1.00	1.00	0.09	1.00		0.69	1.00		0.52	1.00	
Satd. Flow (perm)	500	3614	1566	175	3586		1320	1735		976	1849	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	69	1304	182	252	1005	40	233	110	130	33	81	27
RTOR Reduction (vph)	0	0	55	0	3	0	0	35	0	0	10	0
Lane Group Flow (vph)	69	1304	127	252	1042	0	233	205	0	33	98	0
Confl. Peds. (#/hr)	7		11	11		7			19	19		
Heavy Vehicles (%)	0%	1%	0%	0%	1%	3%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		6		5	2			8			4	
Permitted Phases	6		6	2			8			4		
Actuated Green, G (s)	57.5	57.5	57.5	69.5	69.5		35.5	35.5		35.5	35.5	
Effective Green, g (s)	57.5	57.5	57.5	69.5	69.5		35.5	35.5		35.5	35.5	
Actuated g/C Ratio	0.48	0.48	0.48	0.58	0.58		0.30	0.30		0.30	0.30	
Clearance Time (s)	7.5	7.5	7.5	4.0	7.5		7.5	7.5		7.5	7.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	239	1731	750	211	2076		390	513		288	546	
v/s Ratio Prot		0.36		c0.08	0.29			0.12			0.05	
v/s Ratio Perm	0.14		0.08	c0.61			c0.18			0.03		
v/c Ratio	0.29	0.75	0.17	1.19	0.50		0.60	0.40		0.11	0.18	
Uniform Delay, d1	18.9	25.5	17.7	27.2	15.0		36.1	33.7		30.8	31.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	1.9	0.1	124.3	0.9		6.6	2.3		0.2	0.2	
Delay (s)	19.6	27.4	17.8	151.5	15.9		42.7	36.0		31.0	31.6	
Level of Service	B	C	B	F	B		D	D		C	C	
Approach Delay (s)		25.9			42.2			39.3			31.4	
Approach LOS		C			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	34.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	113.8%	ICU Level of Service	H
Analysis Period (min)	15		

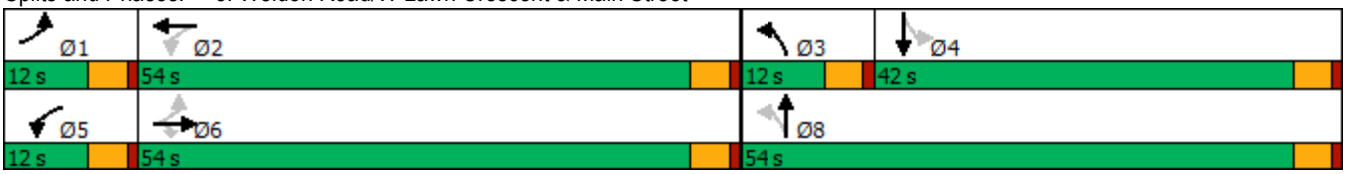
c Critical Lane Group

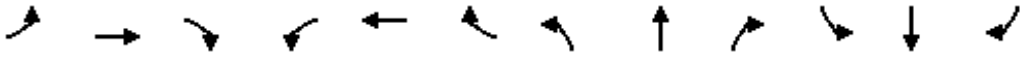
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	110	1230	102	93	1030	114	108	69	62
Future Volume (vph)	110	1230	102	93	1030	114	108	69	62
Lane Group Flow (vph)	112	1255	104	95	1092	116	207	70	146
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm	NA
Protected Phases	1	6		5	2	3	8		4
Permitted Phases	6		6	2		8		4	
Detector Phase	1	6	6	5	2	3	8	4	4
Switch Phase									
Minimum Initial (s)	7.0	30.0	30.0	7.0	30.0	7.0	10.0	10.0	10.0
Minimum Split (s)	11.5	34.5	34.5	11.5	34.5	11.5	22.5	22.5	22.5
Total Split (s)	12.0	54.0	54.0	12.0	54.0	12.0	54.0	42.0	42.0
Total Split (%)	10.0%	45.0%	45.0%	10.0%	45.0%	10.0%	45.0%	35.0%	35.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	Max	None	Max	None	None
v/c Ratio	0.56	0.84	0.15	0.54	0.74	0.24	0.27	0.19	0.25
Control Delay	26.6	38.1	5.8	28.7	33.3	23.6	19.2	31.9	19.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.6	38.1	5.8	28.7	33.3	23.6	19.2	31.9	19.8
Queue Length 50th (m)	13.2	137.8	1.2	11.1	112.1	16.9	24.4	12.0	15.2
Queue Length 95th (m)	23.0	167.1	11.7	22.9	137.2	29.3	41.8	23.8	31.4
Internal Link Dist (m)		413.7			784.4		271.2		166.6
Turn Bay Length (m)	30.0		30.0	30.0		40.0		15.0	
Base Capacity (vph)	201	1491	679	178	1482	477	753	371	578
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.84	0.15	0.53	0.74	0.24	0.27	0.19	0.25

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 119.9
Natural Cycle: 80
Control Type: Semi Act-Uncoord

Splits and Phases: 3: Weldon Road/W Lawn Crescent & Main Street





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	1230	102	93	1030	40	114	108	95	69	62	81
Future Volume (vph)	110	1230	102	93	1030	40	114	108	95	69	62	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.93	1.00	1.00		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.93		1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	3614	1511	1825	3588		1809	1760		1793	1720	
Flt Permitted	0.11	1.00	1.00	0.08	1.00		0.55	1.00		0.63	1.00	
Satd. Flow (perm)	213	3614	1511	155	3588		1046	1760		1186	1720	
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)	112	1255	104	95	1051	41	116	110	97	70	63	83
RTOR Reduction (vph)	0	0	56	0	2	0	0	26	0	0	39	0
Lane Group Flow (vph)	112	1255	48	95	1090	0	116	181	0	70	107	0
Confl. Peds. (#/hr)	9		14	14		9	13		5	5		13
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	0%	0%	1%	1%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases	1	6		5	2		3	8			4	
Permitted Phases	6		6	2			8			4		
Actuated Green, G (s)	56.9	49.5	49.5	56.9	49.5		49.5	49.5		37.6	37.6	
Effective Green, g (s)	56.9	49.5	49.5	56.9	49.5		49.5	49.5		37.6	37.6	
Actuated g/C Ratio	0.47	0.41	0.41	0.47	0.41		0.41	0.41		0.31	0.31	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	200	1492	623	176	1481		478	726		371	539	
v/s Ratio Prot	c0.03	c0.35		0.03	0.30		0.01	c0.10			0.06	
v/s Ratio Perm	0.23		0.03	0.22			0.09			0.06		
v/c Ratio	0.56	0.84	0.08	0.54	0.74		0.24	0.25		0.19	0.20	
Uniform Delay, d1	22.0	31.7	21.4	24.0	29.7		22.3	23.0		30.0	30.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.6	4.5	0.1	3.2	3.3		0.3	0.8		0.2	0.2	
Delay (s)	25.6	36.1	21.4	27.2	33.0		22.6	23.9		30.3	30.3	
Level of Service	C	D	C	C	C		C	C		C	C	
Approach Delay (s)		34.3			32.5			23.4			30.3	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	32.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	119.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Appendix G – 2016 TTS Data Extractions and Distribution Assumptions

AM inbound

Tue Nov 22 2022 15:57:03 GMT-0500 (Eastern Standard Time) - Run Time: 3123ms

Cross Tabulation Query Form - Trip - 2016 v1.1

t

Row: Planning district of origin - pd_orig
Column: 2006 GTA zone of destination - gta06_dest

RowG:
ColG:(2708)
TblG:
7X3
Filters:
Start time of trip - start_time In 700-1000
and
Trip purpose - trip_p 3
and
Planning district of origin - pd_orig Not In 30
and
2006 GTA zone of destination - gta06_dest In 2708
and
Primary travel mode

Trip 2016
Table:

	1
PD 1 of Toronto	13
PD 4 of Toronto	23
PD 11 of Toronto	14
PD 14 of Toronto	27
PD 16 of Toronto	24
Uxbridge	71
Whitby	21
Clarington	45
East Gwillimbury	22
Newmarket	27
Aurora	125
Richmond Hill	61
Markham	143
Bradford-West Gwill	22
Kawartha Lakes	11

TAZ/PD	Trips	Distribution	Via
PD 1 of Toronto	13	1%	MAIN EB
PD 4 of Toronto	23	2%	MAIN EB
PD 11 of Toronto	14	1%	MAIN EB
PD 14 of Toronto	27	2%	MAIN EB
PD 16 of Toronto	24	2%	NINTH NB
Uxbridge	71	6%	NINTH SB
Whitby	21	2%	NINTH NB
Clarington	45	4%	NINTH NB
East Gwillimbury	22	2%	MAIN EB
Newmarket	27	2%	MAIN EB
Aurora	125	11%	MAIN EB
Richmond Hill	61	5%	MAIN EB
Markham	143	13%	MAIN EB
Bradford-West Gwilli	22	2%	MAIN EB
Kawartha Lakes	11	1%	HWY 48 SB
2701	22	2%	MAIN EB
2702	7	1%	HWY 48 SB
2706	16	1%	MAIN EB
2709	59	5%	MOSTAR NB
2710	50	4%	MAIN WB
2,712	158	14%	PALMWOOD SB
2,715	106	9%	NINTH SB
2716	13	1%	HWY 48 SB
2717	34	3%	HWY 48 SB
2718	9	1%	HWY 48 SB
Total	1123	100%	

Row Labels	Sum of Distribution
HWY 48 SB	7%
MAIN EB	46%
MAIN WB	4%
MOSTAR NB	5%
NINTH NB	8%
NINTH SB	16%
PALMWOOD SB	14%
Grand Total	**100%**

Fri Nov 11 2022 02:40:00 GMT-0500 (Eastern Standard Time) - Run Time: 2531ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Tue Nov 22 2022 14:49:37 GMT-0500 (Eastern Standard Time) - Run Time: 287 1ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig
Column: 2006 GTA zone of destination - gta06_dest

RowG:
ColG:(2708)
TblG:

Filters:
Start time of trip - start_time In 700-1000
and
Trip purpose - trip_p 3
and
Planning district of origin - pd_orig In 30
and
2006 GTA zone of destination - gta06_dest In 2708
and
Primary travel mode

Trip 2016
Table:

	1
2701	22
2702	7
2706	16
2708	97
2709	59
2710	50
2,712	158
2,715	106
2716	13
2717	34
2718	9

PM inbound

Tue Nov 22 2022 14:48:00 GMT-0500 (Eastern Standard Time) - Run Time: 2813ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of origin - pd_orig
Column: 2006 GTA zone of destination - gta06_dest

RowG:
ColG:(2708)
TblG:

Filters:
Start time of trip - start_time In 1600-1900
and
Trip purpose - trip_p 3
and
Planning district of origin - pd_orig Not In 30
and
2006 GTA zone of destination - gta06_dest In 2708
and
Primary travel mode

Trip 2016
Table:

	1
PD 1 of Toronto	17
PD 8 of Toronto	30
PD 11 of Toronto	9
PD 13 of Toronto	92
PD 16 of Toronto	195
Pickering	53
East Gwillimbury	64
Newmarket	43
Aurora	91
Richmond Hill	43
Markham	527
Vaughan	45
Mississauga	20

TAZ/PD	Trips	Distribution	Via
PD 1 of Toronto	17	1%	NINTH NB
PD 8 of Toronto	30	2%	NINTH NB
PD 11 of Toronto	9	1%	NINTH NB
PD 13 of Toronto	92	5%	NINTH NB
PD 16 of Toronto	195	11%	NINTH NB
Pickering	53	3%	NINTH NB
East Gwillimbury	64	4%	MAIN EB
Newmarket	43	2%	MAIN EB
Aurora	91	5%	MAIN EB
Richmond Hill	43	2%	MAIN EB
Markham	527	30%	MAIN EB
Vaughan	45	3%	MAIN EB
Mississauga	20	1%	MAIN EB
2709	126	7%	MOSTAR NB
2710	36	2%	MAIN WB
2711	55	3%	PALMWOOD SB
2712	207	12%	PALMWOOD SB
2713	24	1%	MAIN WB
2714	57	3%	MAIN WB
2718	46	3%	HWY 48 SB
Total	1780	100%	

Row Labels	Sum of Distribution
HWY 48 SB	3%
MAIN EB	47%
MAIN WB	7%
MOSTAR NB	7%
NINTH NB	22%
PALMWOOD SB	15%
Grand Total	**100%**

Tue Nov 22 2022 14:51:28 GMT-0500 (Eastern Standard Time) - Run Time: 2640ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig
Column: 2006 GTA zone of destination - gta06_dest

RowG:
ColG:(2708)
TblG:

Filters:
Start time of trip - start_time In 1600-1900
and
Trip purpose - trip_p 3
and
Planning district of origin - pd_orig In 30
and
2006 GTA zone of destination - gta06_dest In 2708
and
Primary travel mode

Trip 2016
Table:

	1
2708	250
2709	126
2710	36
2711	55
2712	207
2713	24
2714	57
2718	46

AM OUTBOUND

Tue Nov 22 2022 15:02:22 GMT-0500 (Eastern Standard Time) - Run Time: 2706ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of destination - pd_dest
Column: 2006 GTA zone of origin - gta06_orig

RowG:
ColG:(2708)
TblG:

Filters:
Start time of trip - start_time In 700-1000
and
Trip purpose - trip_p 3
and
Planning district of destination - pd_dest Not In 30
and
2006 GTA zone of origin - gta06_orig In 2708
and
Primary travel mode

Trip 2016
Table:

	1
PD 1 of Toronto	59
PD 4 of Toronto	23
PD 11 of Toronto	87
PD 13 of Toronto	105
PD 16 of Toronto	271
Ajax	27
Whitby	7
Aurora	78
Richmond Hill	149
Markham	617
Vaughan	13

Tue Nov 22 2022 15:04:01 GMT-0500 (Eastern Standard Time) - Run Time: 2778ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest
Column: 2006 GTA zone of origin - gta06_orig

RowG:
ColG:(2708)
TblG:

Filters:
Start time of trip - start_time In 700-1000
and
Trip purpose - trip_p 3
and
Planning district of destination - pd_dest In 30
and
2006 GTA zone of origin - gta06_orig In 2708
and
Primary travel mode

Trip 2016
Table:

	1
2702	7
2708	97
2,709	116
2710	47
2712	58

TAZ/PD	Trips	Distribution	Via
PD 1 of Toronto	59	4%	MAIN WB
PD 4 of Toronto	23	1%	MAIN WB
PD 11 of Toronto	87	5%	MAIN WB
PD 13 of Toronto	105	6%	MAIN WB
PD 16 of Toronto	271	16%	MAIN WB
Ajax	27	2%	NINTH SB
Whitby	7	0%	NINTH SB
Aurora	78	5%	BAKER HILL NB
Richmond Hill	149	9%	MAIN WB
Markham	617	37%	MAIN WB
Vaughan	13	1%	MAIN WB
2702	7	0%	BAKER HILL NB
2,709	116	7%	SANDIFORD
2710	47	3%	MAIN EB
2712	58	3%	PALMWOOD NB
Total	1664	100%	

Row Labels	Sum of Distribution
BAKER HILL NB	5%
MAIN EB	3%
MAIN WB	80%
NINTH SB	2%
PALMWOOD NB	3%
SANDIFORD	7%
Grand Total	**100%**

PM OUTBOUND

Tue Nov 22 2022 15:02:49 GMT-0500 (Eastern Standard Time) - Run Time: 2637ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of destination - pd_dest
Column: 2006 GTA zone of origin - gta06_orig

RowG:
ColG:(2708)
TblG:

Filters:
Start time of trip - start_time In 1600-1900
and
Trip purpose - trip_p 3
and
Planning district of destination - pd_dest Not In 30
and
2006 GTA zone of origin - gta06_orig In 2708
and
Primary travel mode

Trip 2016
Table:

	1
PD 11 of Toronto	12
PD 13 of Toronto	51
PD 14 of Toronto	27
PD 16 of Toronto	24
Brock	21
Uxbridge	103
Pickering	42
Whitby	14
Clarington	45
Georgina	17
East Gwillimbury	11
Newmarket	4
Aurora	25
Richmond Hill	70
Markham	162
Vaughan	29
Wainfleet	14
Bradford-West Gwill	19
Kawartha Lakes	11
Grey	31

Tue Nov 22 2022 15:03:24 GMT-0500 (Eastern Standard Time) - Run Time: 2563ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest
Column: 2006 GTA zone of origin - gta06_orig

RowG:
ColG:(2708)
TblG:

Filters:
Start time of trip - start_time In 1600-1900
and
Trip purpose - trip_p 3
and
Planning district of destination - pd_dest In 30
and
2006 GTA zone of origin - gta06_orig In 2708
and
Primary travel mode

Trip 2016
Table:

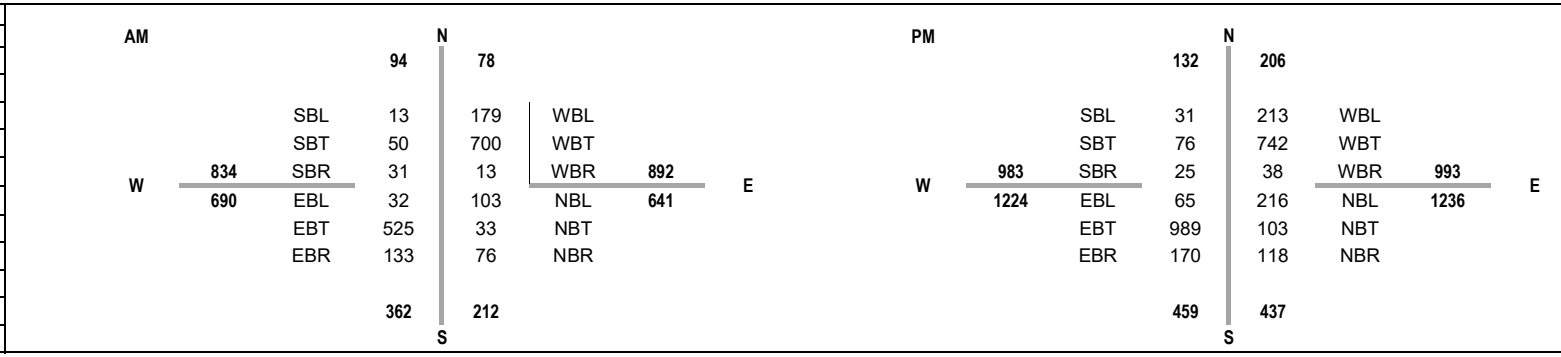
	1
2704	13
2,708	250
2709	70
2710	81
2711	96
2,712	146
2714	57
2716	13
2718	89

TAZ/PD	Trips	Distribution	Via
PD 11 of Toronto	12	1%	MAIN WB
PD 13 of Toronto	51	4%	NINTH SB
PD 14 of Toronto	27	2%	NINTH SB
PD 16 of Toronto	24	2%	NINTH SB
Brock	21	2%	PALMWOOD NB
Uxbridge	103	8%	PALMWOOD NB
Pickering	42	3%	NINTH SB
Whitby	14	1%	NINTH SB
Clarington	45	3%	NINTH SB
Georgina	17	1%	BAKER HILL NB
East Gwillimbury	11	1%	BAKER HILL NB
Newmarket	4	0%	BAKER HILL NB
Aurora	25	2%	BAKER HILL NB
Richmond Hill	70	5%	MAIN WB
Markham	162	12%	MAIN WB
Vaughan	29	2%	MAIN WB
Wainfleet	14	1%	MAIN WB
Bradford-West Gwill	19	1%	MAIN WB
Kawartha Lakes	11	1%	BAKER HILL NB
Grey	31	2%	MAIN WB
2704	13	1%	BAKER HILL NB
2709	70	5%	MAIN WB
2710	81	6%	MAIN EB
2711	96	7%	PALMWOOD NB
2,712	146	11%	PALMWOOD NB
2714	57	4%	PALMWOOD NB
2716	13	1%	BAKER HILL NB
2718	89	7%	BAKER HILL NB
Total	1297	100%	

Row Labels	Sum of Distribution
BAKER HILL NB	14%
MAIN EB	6%
MAIN WB	31%
NINTH SB	16%
PALMWOOD NB	33%
Grand Total	**100%**

Appendix H – Existing TMC Trip Distribution

	Lane	AM	PM
Palmwood Gate/Mostar Street & Main Street	NBL	103	216
	NBT	33	103
	NBR	76	118
	SBL	13	31
	SBT	50	76
	SBR	31	25
	EBL	32	65
	EBT	525	989
	EBR	133	170
	WBL	179	213
	WBT	700	742
	WBR	13	38



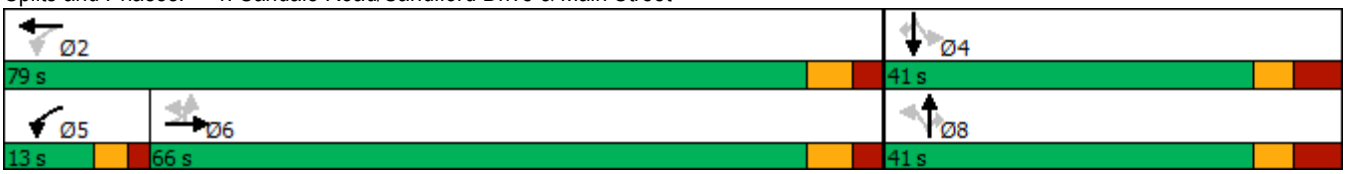
Corridor	Direction	AM		PM	
		Inbound	Outbound	Inbound	Outbound
Palmwood Gate/Mostar Street & Main Street					
Main Street	E	17%	14%	18%	23%
	W	41%	33%	32%	19%
Mostar Street	S	42%	53%	50%	58%
Total		100%	100%	100%	100%

Appendix I – Future Total Traffic Assessment

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	59	685	176	705	110	54	93	75	88	61
Future Volume (vph)	59	685	176	705	110	54	93	75	88	61
Lane Group Flow (vph)	64	970	191	887	120	59	101	82	96	66
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		6	5	2		8			4	
Permitted Phases	6		2		8		8	4		4
Detector Phase	6	6	5	2	8	8	8	4	4	4
Switch Phase										
Minimum Initial (s)	31.0	31.0	7.0	31.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	38.0	38.0	12.0	38.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (s)	66.0	66.0	13.0	79.0	41.0	41.0	41.0	41.0	41.0	41.0
Total Split (%)	55.0%	55.0%	10.8%	65.8%	34.2%	34.2%	34.2%	34.2%	34.2%	34.2%
Yellow Time (s)	4.0	4.0	3.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	3.0	3.0	2.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	5.0	7.0	8.0	8.0	8.0	8.0	8.0	8.0
Lead/Lag	Lag	Lag	Lead							
Lead-Lag Optimize?	Yes	Yes	Yes							
Recall Mode	Max	Max	None	Max	Max	Max	Max	None	None	None
v/c Ratio	0.22	0.58	0.60	0.43	0.35	0.11	0.20	0.22	0.18	0.14
Control Delay	20.1	22.2	18.0	13.3	38.4	33.4	7.4	35.5	34.4	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.1	22.2	18.0	13.3	38.4	33.4	7.4	35.5	34.4	5.4
Queue Length 50th (m)	8.4	79.0	18.0	53.9	22.7	10.4	0.0	14.9	17.3	0.0
Queue Length 95th (m)	17.9	98.8	28.5	67.6	40.0	20.9	12.9	28.4	31.1	7.6
Internal Link Dist (m)		1629.1		390.8		261.2			146.8	
Turn Bay Length (m)	55.0		40.0		65.0		65.0	15.0		40.0
Base Capacity (vph)	286	1672	321	2069	344	528	513	373	528	463
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.58	0.60	0.43	0.35	0.11	0.20	0.22	0.18	0.14

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 90
Control Type: Semi Act-Uncoord

Splits and Phases: 1: Sandale Road/Sandiford Drive & Main Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	685	207	176	705	111	110	54	93	75	88	61
Future Volume (vph)	59	685	207	176	705	111	110	54	93	75	88	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		5.0	7.0		8.0	8.0	8.0	8.0	8.0	8.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	0.98	1.00	1.00	0.92
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.94	1.00	1.00	0.99	1.00	1.00
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1725	3356		1805	3430		1712	1921	1601	1794	1921	1471
Flt Permitted	0.32	1.00		0.19	1.00		0.69	1.00	1.00	0.72	1.00	1.00
Satd. Flow (perm)	582	3356		367	3430		1252	1921	1601	1357	1921	1471
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	64	745	225	191	766	121	120	59	101	82	96	66
RTOR Reduction (vph)	0	23	0	0	10	0	0	0	73	0	0	48
Lane Group Flow (vph)	64	947	0	191	877	0	120	59	28	82	96	18
Confl. Peds. (#/hr)	13		21	21		13	63		7	7		63
Heavy Vehicles (%)	5%	4%	2%	1%	4%	1%	0%	0%	0%	1%	0%	2%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		6		5	2			8			4	
Permitted Phases	6			2			8		8	4		4
Actuated Green, G (s)	59.0	59.0		72.0	72.0		33.0	33.0	33.0	33.0	33.0	33.0
Effective Green, g (s)	59.0	59.0		72.0	72.0		33.0	33.0	33.0	33.0	33.0	33.0
Actuated g/C Ratio	0.49	0.49		0.60	0.60		0.28	0.28	0.28	0.28	0.28	0.28
Clearance Time (s)	7.0	7.0		5.0	7.0		8.0	8.0	8.0	8.0	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
Lane Grp Cap (vph)	286	1650		316	2058		344	528	440	373	528	404
v/s Ratio Prot		0.28		c0.04	0.26			0.03			0.05	
v/s Ratio Perm	0.11			c0.32			c0.10		0.02	0.06		0.01
v/c Ratio	0.22	0.57		0.60	0.43		0.35	0.11	0.06	0.22	0.18	0.04
Uniform Delay, d1	17.4	21.6		13.8	12.9		34.9	32.5	32.1	33.6	33.2	31.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.8	1.5		3.2	0.6		2.8	0.4	0.3	0.3	0.2	0.0
Delay (s)	19.2	23.1		17.1	13.5		37.7	33.0	32.4	33.9	33.4	32.0
Level of Service	B	C		B	B		D	C	C	C	C	C
Approach Delay (s)		22.8			14.2			34.8			33.2	
Approach LOS		C			B			C			C	

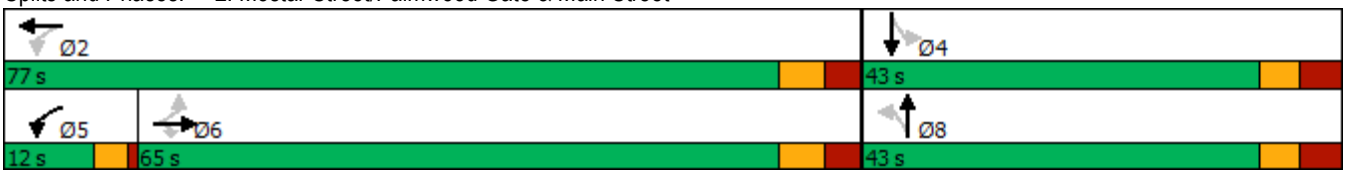
Intersection Summary			
HCM 2000 Control Delay	21.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	109.4%	ICU Level of Service	H
Analysis Period (min)	15		

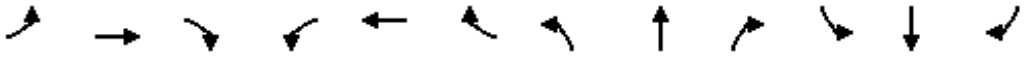
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	48	687	136	190	863	105	37	16	51
Future Volume (vph)	48	687	136	190	863	105	37	16	51
Lane Group Flow (vph)	55	781	155	216	1005	119	131	18	148
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		6		5	2		8		4
Permitted Phases	6		6	2		8		4	
Detector Phase	6	6	6	5	2	8	8	4	4
Switch Phase									
Minimum Initial (s)	40.0	40.0	40.0	7.0	40.0	10.0	10.0	10.0	10.0
Minimum Split (s)	47.5	47.5	47.5	11.5	47.5	41.5	41.5	41.5	41.5
Total Split (s)	65.0	65.0	65.0	12.0	77.0	43.0	43.0	43.0	43.0
Total Split (%)	54.2%	54.2%	54.2%	10.0%	64.2%	35.8%	35.8%	35.8%	35.8%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	3.5	3.5	3.5	3.5
All-Red Time (s)	3.5	3.5	3.5	1.0	3.5	4.0	4.0	4.0	4.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Lead/Lag	Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	Max	Max	Max	None	None
v/c Ratio	0.23	0.46	0.19	0.55	0.49	0.33	0.23	0.05	0.28
Control Delay	21.5	22.1	3.6	16.3	15.8	36.1	12.9	30.8	19.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.5	22.1	3.6	16.3	15.8	36.1	12.9	30.8	19.4
Queue Length 50th (m)	7.4	63.0	0.6	21.3	69.3	21.9	7.2	3.0	14.3
Queue Length 95th (m)	16.2	77.0	10.7	32.0	82.5	37.5	20.8	8.4	30.1
Internal Link Dist (m)		390.8			413.7		335.1		61.1
Turn Bay Length (m)	37.0		45.0	35.0		40.0		35.0	
Base Capacity (vph)	241	1681	818	392	2045	364	563	380	525
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.46	0.19	0.55	0.49	0.33	0.23	0.05	0.28

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 105
Control Type: Semi Act-Uncoord

Splits and Phases: 2: Mostar Street/Palmwood Gate & Main Street





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	48	687	136	190	863	21	105	37	78	16	51	79
Future Volume (vph)	48	687	136	190	863	21	105	37	78	16	51	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5	7.5	4.0	7.5		7.5	7.5		7.5	7.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	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		1.00	0.90		1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3510	1545	1788	3531		1769	1694		1817	1620	
Flt Permitted	0.28	1.00	1.00	0.27	1.00		0.66	1.00		0.67	1.00	
Satd. Flow (perm)	502	3510	1545	506	3531		1232	1694		1287	1620	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	55	781	155	216	981	24	119	42	89	18	58	90
RTOR Reduction (vph)	0	0	78	0	1	0	0	63	0	0	46	0
Lane Group Flow (vph)	55	781	77	216	1004	0	119	68	0	18	102	0
Confl. Peds. (#/hr)	4		8	8		4	2		5	5		2
Heavy Vehicles (%)	6%	4%	2%	2%	3%	0%	3%	0%	1%	0%	2%	10%
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		6		5	2			8			4	
Permitted Phases	6		6	2			8			4		
Actuated Green, G (s)	57.5	57.5	57.5	69.5	69.5		35.5	35.5		35.5	35.5	
Effective Green, g (s)	57.5	57.5	57.5	69.5	69.5		35.5	35.5		35.5	35.5	
Actuated g/C Ratio	0.48	0.48	0.48	0.58	0.58		0.30	0.30		0.30	0.30	
Clearance Time (s)	7.5	7.5	7.5	4.0	7.5		7.5	7.5		7.5	7.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	240	1681	740	378	2045		364	501		380	479	
v/s Ratio Prot		0.22		c0.04	0.28			0.04			0.06	
v/s Ratio Perm	0.11		0.05	c0.29			c0.10			0.01		
v/c Ratio	0.23	0.46	0.10	0.57	0.49		0.33	0.14		0.05	0.21	
Uniform Delay, d1	18.3	20.9	17.1	13.5	14.8		32.9	31.0		30.2	31.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.2	0.1	2.1	0.8		2.4	0.6		0.1	0.2	
Delay (s)	18.8	21.1	17.2	15.6	15.7		35.3	31.6		30.2	32.0	
Level of Service	B	C	B	B	B		D	C		C	C	
Approach Delay (s)		20.4			15.7			33.4			31.8	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	20.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	128.3%	ICU Level of Service	H
Analysis Period (min)	15		

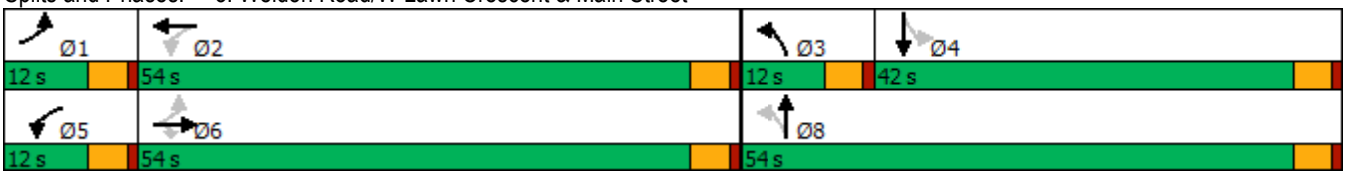
c Critical Lane Group

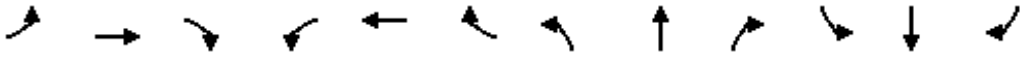
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	48	705	89	168	938	73	76	38	153
Future Volume (vph)	48	705	89	168	938	73	76	38	153
Lane Group Flow (vph)	57	839	106	200	1155	87	195	45	257
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm	NA
Protected Phases	1	6		5	2	3	8		4
Permitted Phases	6		6	2		8		4	
Detector Phase	1	6	6	5	2	3	8	4	4
Switch Phase									
Minimum Initial (s)	7.0	30.0	30.0	7.0	30.0	7.0	10.0	10.0	10.0
Minimum Split (s)	11.5	34.5	34.5	11.5	34.5	11.5	22.5	22.5	22.5
Total Split (s)	12.0	54.0	54.0	12.0	54.0	12.0	54.0	42.0	42.0
Total Split (%)	10.0%	45.0%	45.0%	10.0%	45.0%	10.0%	45.0%	35.0%	35.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	Max	None	Max	None	None
v/c Ratio	0.34	0.59	0.16	0.75	0.77	0.23	0.25	0.11	0.42
Control Delay	20.5	29.7	6.1	36.6	33.8	23.2	16.5	30.6	32.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.5	29.7	6.1	36.6	33.8	23.2	16.5	30.6	32.0
Queue Length 50th (m)	6.5	78.8	1.5	24.9	122.2	12.5	19.9	7.6	45.0
Queue Length 95th (m)	12.4	89.5	10.3	#37.9	134.0	21.4	32.9	15.4	63.5
Internal Link Dist (m)		413.7			784.4		271.2		166.6
Turn Bay Length (m)	30.0		30.0	30.0		40.0		15.0	
Base Capacity (vph)	172	1495	674	268	1500	382	768	402	611
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.56	0.16	0.75	0.77	0.23	0.25	0.11	0.42

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 117.5
Natural Cycle: 80
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Weldon Road/W Lawn Crescent & Main Street

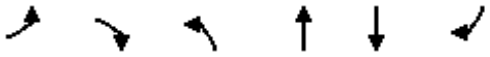




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	48	705	89	168	938	32	73	76	88	38	153	63
Future Volume (vph)	48	705	89	168	938	32	73	76	88	38	153	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00		1.00	0.99		1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.92		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1659	3544	1470	1807	3552		1731	1739		1761	1755	
Flt Permitted	0.09	1.00	1.00	0.20	1.00		0.42	1.00		0.64	1.00	
Satd. Flow (perm)	165	3544	1470	375	3552		771	1739		1177	1755	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	57	839	106	200	1117	38	87	90	105	45	182	75
RTOR Reduction (vph)	0	0	57	0	2	0	0	35	0	0	12	0
Lane Group Flow (vph)	57	839	49	200	1153	0	87	160	0	45	245	0
Confl. Peds. (#/hr)	13		8	8		13	39		4	4		39
Heavy Vehicles (%)	10%	3%	6%	1%	2%	3%	4%	1%	0%	3%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases	1	6		5	2		3	8			4	
Permitted Phases	6		6	2			8			4		
Actuated Green, G (s)	53.7	47.9	47.9	57.1	49.6		50.6	50.6		40.2	40.2	
Effective Green, g (s)	53.7	47.9	47.9	57.1	49.6		50.6	50.6		40.2	40.2	
Actuated g/C Ratio	0.45	0.40	0.40	0.48	0.42		0.42	0.42		0.34	0.34	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	146	1420	589	269	1474		373	736		395	590	
v/s Ratio Prot	0.02	0.24		c0.05	c0.32		0.01	c0.09			c0.14	
v/s Ratio Perm	0.16		0.03	0.31			0.09			0.04		
v/c Ratio	0.39	0.59	0.08	0.74	0.78		0.23	0.22		0.11	0.42	
Uniform Delay, d1	22.9	28.1	22.2	21.4	30.3		21.7	21.9		27.4	30.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.7	0.7	0.1	10.6	4.2		0.3	0.7		0.1	0.5	
Delay (s)	24.7	28.8	22.3	32.0	34.5		22.0	22.6		27.5	31.1	
Level of Service	C	C	C	C	C		C	C		C	C	
Approach Delay (s)		27.8			34.1			22.4			30.5	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	119.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	4	27	78	94	5
Future Volume (Veh/h)	0	4	27	78	94	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	4	29	85	102	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				85		
pX, platoon unblocked						
vC, conflicting volume	248	104	107			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	248	104	107			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	98			
cM capacity (veh/h)	731	956	1497			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	4	114	107
Volume Left	0	29	0
Volume Right	4	0	5
cSH	956	1497	1700
Volume to Capacity	0.00	0.02	0.06
Queue Length 95th (m)	0.1	0.5	0.0
Control Delay (s)	8.8	2.0	0.0
Lane LOS	A	A	
Approach Delay (s)	8.8	2.0	0.0
Approach LOS	A		

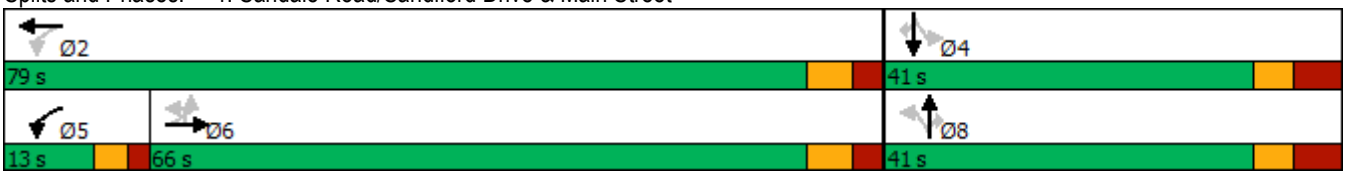
Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	22.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBU	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	29	151	1219	110	899	211	104	137	118	69	113
Future Volume (vph)	29	151	1219	110	899	211	104	137	118	69	113
Lane Group Flow (vph)	0	194	1463	118	1048	227	112	147	127	74	122
Turn Type	Perm	Perm	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases			6	5	2		8			4	
Permitted Phases	6	6		2		8		8	4		4
Detector Phase	6	6	6	5	2	8	8	8	4	4	4
Switch Phase											
Minimum Initial (s)	31.0	31.0	31.0	7.0	31.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	38.0	38.0	38.0	12.0	38.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (s)	66.0	66.0	66.0	13.0	79.0	41.0	41.0	41.0	41.0	41.0	41.0
Total Split (%)	55.0%	55.0%	55.0%	10.8%	65.8%	34.2%	34.2%	34.2%	34.2%	34.2%	34.2%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	3.0	3.0	3.0	2.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		7.0	7.0	5.0	7.0	8.0	8.0	8.0	8.0	8.0	8.0
Lead/Lag	Lag	Lag	Lag	Lead							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes							
Recall Mode	Max	Max	Max	None	Max	Max	Max	Max	None	None	None
v/c Ratio		0.78	0.84	0.64	0.49	0.63	0.21	0.27	0.36	0.14	0.24
Control Delay		48.8	31.3	33.9	14.4	47.2	34.8	6.6	38.4	33.8	10.9
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		48.8	31.3	33.9	14.4	47.2	34.8	6.6	38.4	33.8	10.9
Queue Length 50th (m)		36.6	150.8	10.7	68.4	47.0	20.3	0.0	24.1	13.2	4.0
Queue Length 95th (m)		#79.7	182.5	#32.7	84.2	74.5	35.3	15.0	41.9	25.3	18.5
Internal Link Dist (m)			1629.1		390.8		261.2			146.8	
Turn Bay Length (m)		55.0		40.0		65.0		65.0	15.0		40.0
Base Capacity (vph)		249	1752	187	2139	360	528	543	357	528	502
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.78	0.84	0.63	0.49	0.63	0.21	0.27	0.36	0.14	0.24

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 90
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Sandale Road/Sandiford Drive & Main Street



Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	29	151	1219	141	110	899	75	211	104	137	118	69
Future Volume (vph)	29	151	1219	141	110	899	75	211	104	137	118	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		5.0	7.0		8.0	8.0	8.0	8.0	8.0
Lane Util. Factor		1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.99		1.00	1.00		1.00	1.00	0.97	1.00	1.00
Flpb, ped/bikes		0.99	1.00		1.00	1.00		0.97	1.00	1.00	0.99	1.00
Frt		1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	1.00
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1802	3538		1825	3558		1757	1921	1590	1802	1921
Flt Permitted		0.27	1.00		0.06	1.00		0.71	1.00	1.00	0.68	1.00
Satd. Flow (perm)		506	3538		120	3558		1311	1921	1590	1299	1921
Peak-hour factor, PHF	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	32	162	1311	152	118	967	81	227	112	147	127	74
RTOR Reduction (vph)	0	0	8	0	0	5	0	0	0	107	0	0
Lane Group Flow (vph)	0	194	1455	0	118	1043	0	227	112	40	127	74
Confl. Peds. (#/hr)		21		18	18		21	27		13	13	
Heavy Vehicles (%)	2%	0%	1%	1%	0%	1%	0%	1%	0%	0%	0%	0%
Turn Type	Perm	Perm	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA
Protected Phases			6		5	2			8			4
Permitted Phases	6	6			2			8		8	4	
Actuated Green, G (s)		59.2	59.2		72.0	72.0		33.0	33.0	33.0	33.0	33.0
Effective Green, g (s)		59.2	59.2		72.0	72.0		33.0	33.0	33.0	33.0	33.0
Actuated g/C Ratio		0.49	0.49		0.60	0.60		0.28	0.28	0.28	0.28	0.28
Clearance Time (s)		7.0	7.0		5.0	7.0		8.0	8.0	8.0	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
Lane Grp Cap (vph)		249	1745		182	2134		360	528	437	357	528
v/s Ratio Prot			c0.41		c0.04	0.29			0.06			0.04
v/s Ratio Perm		0.38			0.35			c0.17		0.03	0.10	
v/c Ratio		0.78	0.83		0.65	0.49		0.63	0.21	0.09	0.36	0.14
Uniform Delay, d1		25.0	26.2		21.8	13.6		38.2	33.5	32.4	35.0	32.8
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		21.0	4.9		7.7	0.8		8.1	0.9	0.4	0.6	0.1
Delay (s)		46.1	31.0		29.5	14.4		46.3	34.4	32.8	35.6	32.9
Level of Service		D	C		C	B		D	C	C	D	C
Approach Delay (s)			32.8			15.9			39.5			33.9
Approach LOS			C			B			D			C

Intersection Summary			
HCM 2000 Control Delay	28.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	109.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	113
Future Volume (vph)	113
Ideal Flow (vphpl)	1900
Total Lost time (s)	8.0
Lane Util. Factor	1.00
Frpb, ped/bikes	0.96
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1565
Flt Permitted	1.00
Satd. Flow (perm)	1565
Peak-hour factor, PHF	0.93
Adj. Flow (vph)	122
RTOR Reduction (vph)	72
Lane Group Flow (vph)	50
Confl. Peds. (#/hr)	27
Heavy Vehicles (%)	0%
Turn Type	Perm
Protected Phases	
Permitted Phases	4
Actuated Green, G (s)	33.0
Effective Green, g (s)	33.0
Actuated g/C Ratio	0.28
Clearance Time (s)	8.0
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	430
v/s Ratio Prot	
v/s Ratio Perm	0.03
v/c Ratio	0.12
Uniform Delay, d1	32.6
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	32.7
Level of Service	C
Approach Delay (s)	
Approach LOS	

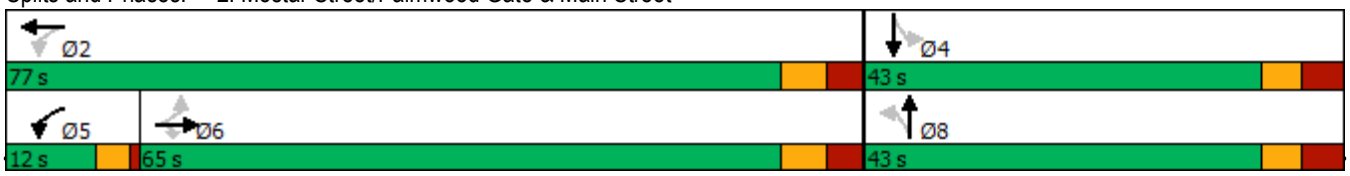
Intersection Summary

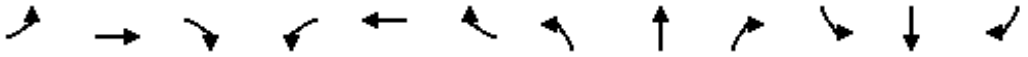
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	95	1246	171	237	956	219	115	43	79
Future Volume (vph)	95	1246	171	237	956	219	115	43	79
Lane Group Flow (vph)	101	1326	182	252	1076	233	252	46	139
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		6		5	2		8		4
Permitted Phases	6		6	2		8		4	
Detector Phase	6	6	6	5	2	8	8	4	4
Switch Phase									
Minimum Initial (s)	40.0	40.0	40.0	7.0	40.0	10.0	10.0	10.0	10.0
Minimum Split (s)	47.5	47.5	47.5	11.5	47.5	41.5	41.5	41.5	41.5
Total Split (s)	65.0	65.0	65.0	12.0	77.0	43.0	43.0	43.0	43.0
Total Split (%)	54.2%	54.2%	54.2%	10.0%	64.2%	35.8%	35.8%	35.8%	35.8%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	3.5	3.5	3.5	3.5
All-Red Time (s)	3.5	3.5	3.5	1.0	3.5	4.0	4.0	4.0	4.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Lead/Lag	Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	Max	Max	Max	None	None
v/c Ratio	0.44	0.77	0.23	1.21	0.52	0.61	0.46	0.17	0.25
Control Delay	28.4	29.4	8.6	152.3	16.2	44.6	31.2	33.4	26.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.4	29.4	8.6	152.3	16.2	44.6	31.2	33.4	26.9
Queue Length 50th (m)	15.3	131.6	9.8	~50.0	75.5	47.2	39.5	8.0	19.6
Queue Length 95th (m)	32.4	159.0	23.1	#101.9	92.6	74.9	64.1	17.7	36.0
Internal Link Dist (m)		390.8			413.7		335.1		61.1
Turn Bay Length (m)	37.0		45.0	35.0		40.0		35.0	
Base Capacity (vph)	228	1731	804	209	2073	379	547	278	554
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.77	0.23	1.21	0.52	0.61	0.46	0.17	0.25

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 105
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Mostar Street/Palmwood Gate & Main Street





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	1246	171	237	956	55	219	115	122	43	79	52
Future Volume (vph)	95	1246	171	237	956	55	219	115	122	43	79	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5	7.5	4.0	7.5		7.5	7.5		7.5	7.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.92		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1820	3614	1566	1825	3574		1825	1743		1802	1807	
Flt Permitted	0.25	1.00	1.00	0.09	1.00		0.67	1.00		0.50	1.00	
Satd. Flow (perm)	476	3614	1566	164	3574		1284	1743		942	1807	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	101	1326	182	252	1017	59	233	122	130	46	84	55
RTOR Reduction (vph)	0	0	54	0	3	0	0	32	0	0	20	0
Lane Group Flow (vph)	101	1326	128	252	1073	0	233	220	0	46	119	0
Confl. Peds. (#/hr)	7		11	11		7			19	19		
Heavy Vehicles (%)	0%	1%	0%	0%	1%	3%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		6		5	2			8			4	
Permitted Phases	6		6	2			8			4		
Actuated Green, G (s)	57.5	57.5	57.5	69.5	69.5		35.5	35.5		35.5	35.5	
Effective Green, g (s)	57.5	57.5	57.5	69.5	69.5		35.5	35.5		35.5	35.5	
Actuated g/C Ratio	0.48	0.48	0.48	0.58	0.58		0.30	0.30		0.30	0.30	
Clearance Time (s)	7.5	7.5	7.5	4.0	7.5		7.5	7.5		7.5	7.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	228	1731	750	205	2069		379	515		278	534	
v/s Ratio Prot		0.37		c0.08	0.30			0.13			0.07	
v/s Ratio Perm	0.21		0.08	c0.63			c0.18			0.05		
v/c Ratio	0.44	0.77	0.17	1.23	0.52		0.61	0.43		0.17	0.22	
Uniform Delay, d1	20.7	25.7	17.7	28.4	15.2		36.4	34.1		31.3	31.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.4	2.1	0.1	138.3	0.9		7.3	2.6		0.3	0.2	
Delay (s)	22.0	27.8	17.8	166.7	16.1		43.6	36.6		31.6	32.1	
Level of Service	C	C	B	F	B		D	D		C	C	
Approach Delay (s)		26.3			44.7			40.0			31.9	
Approach LOS		C			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	35.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	128.3%	ICU Level of Service	H
Analysis Period (min)	15		

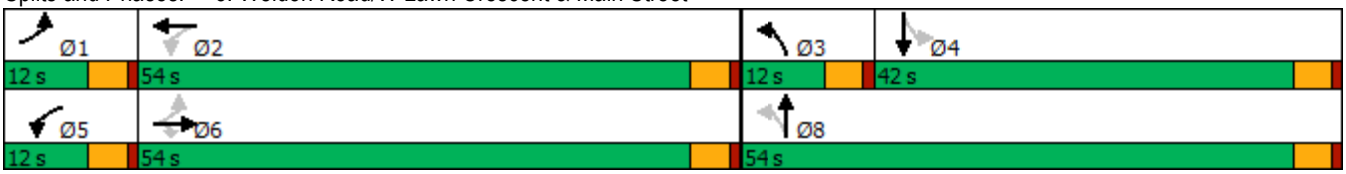
c Critical Lane Group

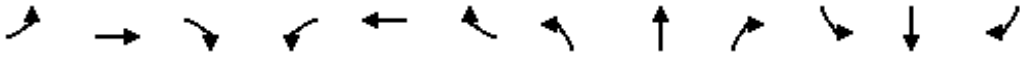
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	110	1245	102	93	1052	114	108	69	62
Future Volume (vph)	110	1245	102	93	1052	114	108	69	62
Lane Group Flow (vph)	112	1270	104	95	1114	116	207	70	146
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm	NA
Protected Phases	1	6		5	2	3	8		4
Permitted Phases	6		6	2		8		4	
Detector Phase	1	6	6	5	2	3	8	4	4
Switch Phase									
Minimum Initial (s)	7.0	30.0	30.0	7.0	30.0	7.0	10.0	10.0	10.0
Minimum Split (s)	11.5	34.5	34.5	11.5	34.5	11.5	22.5	22.5	22.5
Total Split (s)	12.0	54.0	54.0	12.0	54.0	12.0	54.0	42.0	42.0
Total Split (%)	10.0%	45.0%	45.0%	10.0%	45.0%	10.0%	45.0%	35.0%	35.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	Max	None	Max	None	None
v/c Ratio	0.58	0.85	0.15	0.54	0.75	0.24	0.27	0.19	0.25
Control Delay	28.2	38.7	5.8	28.7	33.8	23.6	19.2	31.9	19.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.2	38.7	5.8	28.7	33.8	23.6	19.2	31.9	19.8
Queue Length 50th (m)	13.2	140.3	1.2	11.1	115.3	16.9	24.4	12.0	15.2
Queue Length 95th (m)	23.5	170.0	11.7	22.9	141.1	29.3	41.8	23.8	31.4
Internal Link Dist (m)		413.7			784.4		271.2		166.6
Turn Bay Length (m)	30.0		30.0	30.0		40.0		15.0	
Base Capacity (vph)	195	1491	679	178	1482	477	753	371	578
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.85	0.15	0.53	0.75	0.24	0.27	0.19	0.25

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 119.9
Natural Cycle: 80
Control Type: Semi Act-Uncoord

Splits and Phases: 3: Weldon Road/W Lawn Crescent & Main Street

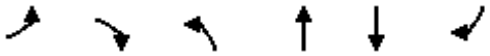




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	1245	102	93	1052	40	114	108	95	69	62	81
Future Volume (vph)	110	1245	102	93	1052	40	114	108	95	69	62	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.93	1.00	1.00		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.93		1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	3614	1511	1825	3589		1809	1760		1793	1720	
Flt Permitted	0.10	1.00	1.00	0.08	1.00		0.55	1.00		0.63	1.00	
Satd. Flow (perm)	198	3614	1511	155	3589		1046	1760		1186	1720	
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)	112	1270	104	95	1073	41	116	110	97	70	63	83
RTOR Reduction (vph)	0	0	56	0	2	0	0	26	0	0	39	0
Lane Group Flow (vph)	112	1270	48	95	1112	0	116	181	0	70	107	0
Confl. Peds. (#/hr)	9		14	14		9	13		5	5		13
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	0%	0%	1%	1%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases	1	6		5	2		3	8			4	
Permitted Phases	6		6	2			8			4		
Actuated Green, G (s)	56.9	49.5	49.5	56.9	49.5		49.5	49.5		37.6	37.6	
Effective Green, g (s)	56.9	49.5	49.5	56.9	49.5		49.5	49.5		37.6	37.6	
Actuated g/C Ratio	0.47	0.41	0.41	0.47	0.41		0.41	0.41		0.31	0.31	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	194	1492	623	176	1481		478	726		371	539	
v/s Ratio Prot	c0.04	c0.35		0.03	0.31		0.01	c0.10			0.06	
v/s Ratio Perm	0.24		0.03	0.22			0.09			0.06		
v/c Ratio	0.58	0.85	0.08	0.54	0.75		0.24	0.25		0.19	0.20	
Uniform Delay, d1	22.3	31.9	21.4	24.2	29.9		22.3	23.0		30.0	30.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.1	4.9	0.1	3.2	3.5		0.3	0.8		0.2	0.2	
Delay (s)	26.5	36.8	21.4	27.4	33.5		22.6	23.9		30.3	30.3	
Level of Service	C	D	C	C	C		C	C		C	C	
Approach Delay (s)		34.9			33.0			23.4			30.3	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	32.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	119.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	78.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	11	57	206	132	9
Future Volume (Veh/h)	5	11	57	206	132	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	12	62	224	143	10
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				85		
pX, platoon unblocked	0.98					
vC, conflicting volume	496	148	153			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	472	148	153			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	96			
cM capacity (veh/h)	518	904	1440			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	17	286	153
Volume Left	5	62	0
Volume Right	12	0	10
cSH	741	1440	1700
Volume to Capacity	0.02	0.04	0.09
Queue Length 95th (m)	0.5	1.0	0.0
Control Delay (s)	10.0	1.9	0.0
Lane LOS	A	A	
Approach Delay (s)	10.0	1.9	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	34.8%	ICU Level of Service	A
Analysis Period (min)	15		

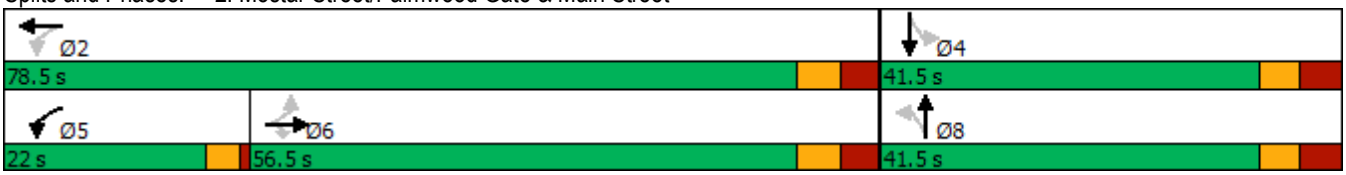
Appendix J – Future Total Optimized Traffic Assessment & Signal Timings

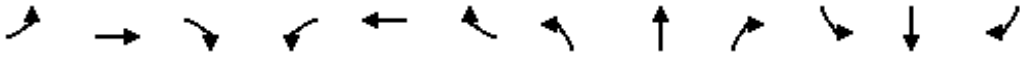
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	95	1226	171	237	945	219	115	43	79
Future Volume (vph)	95	1226	171	237	945	219	115	43	79
Lane Group Flow (vph)	101	1304	182	252	1064	233	252	46	139
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		6		5	2		8		4
Permitted Phases	6		6	2		8		4	
Detector Phase	6	6	6	5	2	8	8	4	4
Switch Phase									
Minimum Initial (s)	40.0	40.0	40.0	7.0	40.0	10.0	10.0	10.0	10.0
Minimum Split (s)	47.5	47.5	47.5	11.5	47.5	41.5	41.5	41.5	41.5
Total Split (s)	56.5	56.5	56.5	22.0	78.5	41.5	41.5	41.5	41.5
Total Split (%)	47.1%	47.1%	47.1%	18.3%	65.4%	34.6%	34.6%	34.6%	34.6%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	3.5	3.5	3.5	3.5
All-Red Time (s)	3.5	3.5	3.5	1.0	3.5	4.0	4.0	4.0	4.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Lead/Lag	Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	Max	Max	Max	None	None
v/c Ratio	0.46	0.84	0.25	0.83	0.50	0.64	0.48	0.18	0.26
Control Delay	33.9	37.2	12.1	51.8	15.1	47.1	32.5	34.8	28.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.9	37.2	12.1	51.8	15.1	47.1	32.5	34.8	28.2
Queue Length 50th (m)	17.1	145.8	12.8	40.3	71.6	48.1	40.2	8.2	20.2
Queue Length 95th (m)	35.8	178.2	28.7	#75.1	88.0	76.3	65.3	18.1	37.0
Internal Link Dist (m)		390.8			413.7		335.1		61.1
Turn Bay Length (m)	37.0		45.0	35.0		40.0		35.0	
Base Capacity (vph)	221	1553	726	338	2118	363	526	262	531
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.84	0.25	0.75	0.50	0.64	0.48	0.18	0.26

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 105
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Mostar Street/Palmwood Gate & Main Street





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	1226	171	237	945	55	219	115	122	43	79	52
Future Volume (vph)	95	1226	171	237	945	55	219	115	122	43	79	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5	7.5	4.0	7.5		7.5	7.5		7.5	7.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.92		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1819	3614	1566	1825	3573		1825	1743		1802	1807	
Flt Permitted	0.27	1.00	1.00	0.07	1.00		0.67	1.00		0.49	1.00	
Satd. Flow (perm)	515	3614	1566	138	3573		1284	1743		925	1807	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	101	1304	182	252	1005	59	233	122	130	46	84	55
RTOR Reduction (vph)	0	0	53	0	4	0	0	32	0	0	19	0
Lane Group Flow (vph)	101	1304	129	252	1060	0	233	220	0	46	120	0
Confl. Peds. (#/hr)	7		11	11		7			19	19		
Heavy Vehicles (%)	0%	1%	0%	0%	1%	3%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		6		5	2			8			4	
Permitted Phases	6		6	2			8			4		
Actuated Green, G (s)	51.6	51.6	51.6	71.0	71.0		34.0	34.0		34.0	34.0	
Effective Green, g (s)	51.6	51.6	51.6	71.0	71.0		34.0	34.0		34.0	34.0	
Actuated g/C Ratio	0.43	0.43	0.43	0.59	0.59		0.28	0.28		0.28	0.28	
Clearance Time (s)	7.5	7.5	7.5	4.0	7.5		7.5	7.5		7.5	7.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	221	1554	673	298	2114		363	493		262	511	
v/s Ratio Prot		0.36		c0.11	0.30			0.13			0.07	
v/s Ratio Perm	0.20		0.08	c0.39			c0.18			0.05		
v/c Ratio	0.46	0.84	0.19	0.85	0.50		0.64	0.45		0.18	0.23	
Uniform Delay, d1	24.3	30.5	21.2	34.6	14.2		37.7	35.3		32.4	33.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	4.2	0.1	19.3	0.9		8.4	2.9		0.3	0.2	
Delay (s)	25.8	34.7	21.4	53.9	15.1		46.1	38.2		32.8	33.2	
Level of Service	C	C	C	D	B		D	D		C	C	
Approach Delay (s)		32.6			22.5			42.0			33.1	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	30.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	128.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Saturday, November 18, 2017
Parking Utilization Survey
Location: 9500 & 9506 Markham Road
Land Use: Residential (434 Units) & Commerical (1,338.42m2)
Time: 10am-2pm

Time	Visitors	Commercial
10:00 AM	43	24
10:30 AM	44	22
11:00 AM	44	28
11:30 AM	43	29
12:00 PM	45	32
12:30 PM	47	34
1:00 PM	46	33
1:30 PM	48	32
2:00 PM	50	31
2:30 PM	47	30
3:00 PM	45	26
3:30 PM	44	20
MAX	50	34
PARKING RATE	0.12 spaces / unit	0.76 spaces / 30m2

Tuesday, November 21, 2017
Parking Utilization Survey
Location: 9500 & 9506 Markham Road
Land Use: Residential (434 Units) & Commerical (1,338.42m2)
Time: 4pm-11pm & 12am-6am

Time	Visitor	Commerical
4:00 PM	39	17
4:30 PM	38	15
5:00 PM	39	18
5:30 PM	39	17
6:00 PM	35	20
6:30 PM	37	21
7:00 PM	33	16
7:30 PM	34	12
8:00 PM	33	12
8:30 PM	30	13
9:00 PM	31	11
9:30 PM	29	10
10:00 PM	25	6
10:30 PM	26	4
11:00 PM	26	4
MAX	39	21
PARKING RATE	0.09 spaces / unit	0.47 spaces / 30m2

Time	TENANT
12:00 AM	360
12:30 AM	360
1:00 AM	367
1:30 AM	365
2:00 AM	376
2:30 AM	382
3:00 AM	384
3:30 AM	381
4:00 AM	381
4:30 AM	378
5:00 AM	369
5:30 AM	366
6:00 AM	363
MAX	384
PARKING RATE	0.88 spaces / unit

Use	MIN PARKING REQUIREMENT
Tenant	0.88 spaces / unit
Visitor	0.12 spaces / unit
Commercial	0.76 spaces / 30m2

Appendix K – Proxy Site Parking Utilization Survey Excerpts

	Survey Location	2025 Maria Street								
Time Period	Survey Date	16-Jan-24		18-Jan-24				20-Jan-24		
	Resident	Visitor	Total	Time	Resident	Visitor	Total	Time	Resident	Visitor	Total
8:00 PM	113		113	8:00 PM	100		100	8:00 PM	108		108
8:30 PM	113		113	8:30 PM	100		100	8:30 PM	109		109
9:00 PM	113		113	9:00 PM	102		102	9:00 PM	109		109
9:30 PM	115		115	9:30 PM	104		104	9:30 PM	110		110
10:00 PM	115		115	10:00 PM	106		106	10:00 PM	111		111
10:30 PM	116		116	10:30 PM	108		108	10:30 PM	111		111
11:00 PM	**116**		**116**	**11:00 PM**	**109**		**109**	**11:00 PM**	**112**		**112**
Peak Utilization	**0.75**	**0.00**	**0.75**	**Peak Utilization**	**0.71**	**0.00**	**0.71**	**Peak Utilization**	**0.73**	**0.00**	**0.73**
Notes	No on-site visitor parking but there is street parking and a paid municipal lot nearby			**Notes**				**Notes**			

Table 3.1 – Parking Utilization Survey Results (Wednesday, March 20, 2024)

Time Period (Starting)	7 Albert Street Residential Demand	7 Albert Street Visitor Demand	7 Albert Street Total Demand	Total Utilization Rate (spaces per unit)
Parking Supply	**81 spaces**			
Existing Unit Count	**63 units**			
6:00 PM	56	1	57	0.90
6:30 PM	55	1	56	0.89
7:00 PM	55	0	55	0.87
7:30 PM	55	0	55	0.87
8:00 PM	56	0	56	0.89
8:30 PM	56	0	56	0.89
9:00 PM	56	0	56	0.89
9:30 PM	56	0	56	0.89
10:00 PM	56	0	56	0.89
10:30 PM	57	0	57	0.90
11:00 PM	57	0	57	0.90
Peak	**57**	**1**	**57**	**Total - 0.90 spaces per unit Res – 0.90 spaces per unit Vis – 0.02 spaces per unit**

Table 3.2 – Parking Utilization Survey Results (Saturday, March 23, 2024)

Time Period (Starting)	7 Albert Street Residential Demand	7 Albert Street Visitor Demand	7 Albert Street Total Demand	Total Utilization Rate (spaces per unit)
Parking Supply	**81 spaces**			
Existing Unit Count	**63 units**			
6:00 PM	49	0	49	0.78
6:30 PM	49	0	49	0.78
7:00 PM	51	0	51	0.81
7:30 PM	52	0	52	0.83
8:00 PM	52	2	54	0.86
8:30 PM	54	1	55	0.87
9:00 PM	54	0	54	0.86
9:30 PM	55	0	55	0.87
10:00 PM	55	0	55	0.87
10:30 PM	55	0	55	0.87
11:00 PM	55	0	55	0.87
Peak	**55**	**2**	**55**	**Total - 0.87 spaces per unit Res – 0.87 spaces per unit Vis – 0.03 spaces per unit**

1015 Roosevelt & 1020 Shaw

total : 152 units, 8 stories (each building has 76 units)
total : 86 spaces for tenant. 14 spaces for visitor

Friday, February 24th, 2023

Time	Resident	Visitor	Resident R	Visitor Rate
6:00:00 PM	36	4	0.24	0.03
6:30:00 PM	38	4	0.25	0.03
7:00:00 PM	39	4	0.26	0.03
7:30:00 PM	41	4	0.27	0.03
8:00:00 PM	43	4	0.28	0.03
8:30:00 PM	46	3	0.30	0.02
9:00:00 PM	46	3	0.30	0.02
9:30:00 PM	45	3	0.30	0.02
10:00:00 PM	47	4	0.31	0.03
10:30:00 PM	50	3	0.33	0.02
11:00:00 PM	52	2	0.34	0.01
11:30:00 PM	55	1	0.36	0.01
12:00:00 AM	55	1	0.36	0.01
Max	**55**	**4**	**0.36**	**0.03**

Saturday, February 25th, 2023

Time	Resident	Visitor	Resident R	Visitor Rate
6:00:00 PM	30	5	0.20	0.03
6:30:00 PM	32	5	0.21	0.03
7:00:00 PM	35	4	0.23	0.03
7:30:00 PM	35	5	0.23	0.03
8:00:00 PM	36	4	0.24	0.03
8:30:00 PM	40	4	0.26	0.03
9:00:00 PM	42	4	0.28	0.03
9:30:00 PM	46	4	0.30	0.03
10:00:00 PM	45	3	0.30	0.02
10:30:00 PM	49	2	0.32	0.01
11:00:00 PM	50	2	0.33	0.01
11:30:00 PM	50	2	0.33	0.01
12:00:00 AM	51	2	0.34	0.01
Max	**51**	**5**	**0.34**	**0.03**

Sunday, February 26th, 2023

Time	Resident	Visitor	Resident R	Visitor Rate
3:00:00 PM	52	3	0.34	0.02
3:30:00 AM	52	4	0.34	0.03
4:00:00 PM	51	4	0.34	0.03
4:30:00 AM	48	4	0.32	0.03
5:00:00 PM	43	4	0.28	0.03
5:30:00 AM	40	5	0.26	0.03
6:00:00 PM	38	5	0.25	0.03
6:30:00 AM	38	6	0.25	0.04
7:00:00 PM	35	5	0.23	0.03
7:30:00 AM	32	6	0.21	0.04
8:00:00 PM	32	6	0.21	0.04
8:30:00 AM	31	6	0.20	0.04
9:00:00 PM	28	6	0.18	0.04
Max	**52**	**6**	**0.34**	**0.04**

1051-1061 Seneca Avenue

total : 180 unit, 7 stories
total : 197 spaces for tenant. 15 spaces for visitor

Friday, February 24th, 2023

			197	15
Time	Resident	Visitor	Resident Ra	Visitor Rate
6:00:00 PM	102	3	0.57	0.02
6:30:00 PM	101	2	0.56	0.01
7:00:00 PM	105	3	0.58	0.02
7:30:00 PM	104	3	0.58	0.02
8:00:00 PM	99	3	0.55	0.02
8:30:00 PM	94	3	0.52	0.02
9:00:00 PM	103	2	0.57	0.01
9:30:00 PM	100	3	0.56	0.02
10:00:00 PM	101	2	0.56	0.01
10:30:00 PM	100	2	0.56	0.01
11:00:00 PM	105	2	0.58	0.01
11:30:00 PM	105	0	0.58	0.00
12:00:00 AM	105	0	0.58	0.00
Max	**105**	**3**	**0.58**	**0.02**

Saturday, February 25th, 2023

Time	Resident	Visitor	Resident Ra	Visitor Rate
6:00:00 PM	98	2	0.54	0.01
6:30:00 PM	98	1	0.54	0.01
7:00:00 PM	101	1	0.56	0.01
7:30:00 PM	105	1	0.58	0.01
8:00:00 PM	104	1	0.58	0.01
8:30:00 PM	100	2	0.56	0.01
9:00:00 PM	99	3	0.55	0.02
9:30:00 PM	102	3	0.57	0.02
10:00:00 PM	101	3	0.56	0.02
10:30:00 PM	97	3	0.54	0.02
11:00:00 PM	103	2	0.57	0.01
11:30:00 PM	105	1	0.58	0.01
12:00:00 AM	104	1	0.58	0.01
Max	**105**	**3**	**0.58**	**0.02**

Sunday, February 26th, 2023

Time	Resident	Visitor	Resident Ra	Visitor Rate
3:00:00 PM	80	5	0.44	0.03
3:30:00 AM	85	6	0.47	0.03
4:00:00 PM	87	6	0.48	0.03
4:30:00 AM	95	6	0.53	0.03
5:00:00 PM	97	8	0.54	0.04
5:30:00 AM	100	6	0.56	0.03
6:00:00 PM	100	7	0.56	0.04
6:30:00 AM	103	8	0.57	0.04
7:00:00 PM	104	8	0.58	0.04
7:30:00 AM	105	8	0.58	0.04
8:00:00 PM	102	8	0.57	0.04
8:30:00 AM	101	8	0.56	0.04
9:00:00 PM	98	7	0.54	0.04
Max	**105**	**8**	**0.58**	**0.04**

Friday, November 18th, 2022 Kaneff building has 282 units, 366 parking for resident and 56

Time	Resident	Resident Rate	Visitor	Visitor Rate
6:00:00 PM	220	0.78	25	0.09
6:30:00 PM	213	0.76	24	0.09
7:00:00 PM	228	0.81	28	0.10
7:30:00 PM	224	0.79	30	0.11
8:00:00 PM	218	0.77	30	0.11
8:30:00 PM	217	0.77	31	0.11
9:00:00 PM	236	0.84	29	0.10
9:30:00 PM	228	0.81	25	0.09
10:00:00 PM	231	0.82	19	0.07
10:30:00 PM	236	0.84	15	0.05
11:00:00 PM	240	0.85	18	0.06
11:30:00 PM	242	0.86	16	0.06
12:00:00 AM	244	0.87	12	0.04
MAX	**244**	**0.87**	**31**	**0.11**

Saturday, November 19th, 2022

Time	Resident	Resident Rate	Visitor	Visitor Rate
6:00:00 PM	216	0.77	35	0.12
6:30:00 PM	219	0.78	37	0.13
7:00:00 PM	214	0.76	29	0.10
7:30:00 PM	209	0.74	25	0.09
8:00:00 PM	210	0.74	30	0.11
8:30:00 PM	214	0.76	32	0.11
9:00:00 PM	218	0.77	34	0.12
9:30:00 PM	215	0.76	31	0.11
10:00:00 PM	216	0.77	28	0.10
10:30:00 PM	220	0.78	26	0.09
11:00:00 PM	223	0.79	25	0.09
11:30:00 PM	227	0.80	25	0.09
12:00:00 AM	226	0.80	23	0.08
MAX	**227**	**0.80**	**37**	**0.13**

Sunday, November 20th, 2022

Time	Resident	Resident Rate	Visitor	Visitor Rate
3:00:00 PM	146	0.52	46	0.16
3:30:00 PM	149	0.53	38	0.13
4:00:00 PM	160	0.57	36	0.13
4:30:00 PM	168	0.60	35	0.12
5:00:00 PM	173	0.61	30	0.11
5:30:00 PM	179	0.63	31	0.11
6:00:00 PM	210	0.74	28	0.10
6:30:00 PM	213	0.76	24	0.09
7:00:00 PM	224	0.79	29	0.10
7:30:00 PM	219	0.78	25	0.09
8:00:00 PM	236	0.84	23	0.08
8:30:00 PM	241	0.85	19	0.07
9:00:00 PM	241	0.85	16	0.06
MAX	**241**	**0.85**	**46**	**0.16**

Friday, March 24th, 2023 total : 150 units

Time	Resident	Visitor	Resident Ra	Visitor Rate
6:00:00 PM	56	10	0.37	0.07
6:30:00 PM	59	13	0.39	0.09
7:00:00 PM	58	12	0.39	0.08
7:30:00 PM	59	15	0.39	0.10
8:00:00 PM	57	13	0.38	0.09
8:30:00 PM	56	10	0.37	0.07
9:00:00 PM	55	11	0.37	0.07
9:30:00 PM	59	9	0.39	0.06
10:00:00 PM	58	8	0.39	0.05
10:30:00 PM	50	8	0.33	0.05
11:00:00 PM	52	6	0.35	0.04
11:30:00 PM	55	7	0.37	0.05
12:00:00 AM	55	6	0.37	0.04
MAX	**59**	**15**	**0.39**	**0.10**

Saturday, March 25th, 2023

Time	Resident	Visitor	Resident Ra	Visitor Rate
6:00:00 PM	60	12	0.40	0.08
6:30:00 PM	62	10	0.41	0.07
7:00:00 PM	59	11	0.39	0.07
7:30:00 PM	56	12	0.37	0.08
8:00:00 PM	58	13	0.39	0.09
8:30:00 PM	57	8	0.38	0.05
9:00:00 PM	60	9	0.40	0.06
9:30:00 PM	61	6	0.41	0.04
10:00:00 PM	65	5	0.43	0.03
10:30:00 PM	66	7	0.44	0.05
11:00:00 PM	64	5	0.43	0.03
11:30:00 PM	68	4	0.45	0.03
12:00:00 AM	69	5	0.46	0.03
MAX	**69**	**13**	**0.46**	**0.09**

Sunday, March 26th, 2023

Time	Resident	Visitor	Resident Ra	Visitor Rate
3:00:00 PM	52	9	0.35	0.06
3:30:00 PM	52	7	0.35	0.05
4:00:00 PM	51	8	0.34	0.05
4:30:00 PM	55	10	0.37	0.07
5:00:00 PM	58	6	0.39	0.04
5:30:00 PM	56	8	0.37	0.05
6:00:00 PM	57	9	0.38	0.06
6:30:00 PM	60	7	0.40	0.05
7:00:00 PM	61	6	0.41	0.04
7:30:00 PM	62	5	0.41	0.03
8:00:00 PM	64	6	0.43	0.04
8:30:00 PM	66	6	0.44	0.04
9:00:00 PM	68	6	0.45	0.04
MAX	**68**	**10**	**0.45**	**0.07**