

Transportation Impact Study

PROPOSED MIXED-USE DEVELOPMENT

3005 Sheppard Avenue East/1800 Pharmacy Avenue
Scarborough, Ontario

September 12, 2019
Project No: NT-18-195

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NextEng Consulting Group Inc.

September 12, 2019

Cope Project Management Corporation
457A Danforth Avenue
Toronto, ON M4K 1P1

**Re: Transportation Impact Study for Proposed Mixed-Use Development
3005 Sheppard Avenue East/1800 Pharmacy Avenue, Scarborough
Our Project No. NT-18-195**

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 an Official Plan Amendment, Site Plan, and Zoning By-law Amendment applications.

The subject site is located at the southwest corner of Sheppard Avenue East and Pharmacy Avenue in the City of Toronto (Scarborough). The subject site is currently occupied by two (2) commercial buildings. Based on the site plan prepared by Kirkor Architects and Planners, dated July 29, 2019, the development proposal is to redevelop the existing 6,583.0 m² site to include a 21-storey mixed-use building consisting of 433 residential units and 1,340.0 m² of commercial space. Vehicular access to the site is proposed via a full movement driveway located on Pharmacy Avenue.

The study concludes that the development proposal can adequately be accommodated by the existing transportation network with manageable 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

A Division of NextEng Consulting Group Inc.

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EXECUTIVE SUMMARY

NexTrans Consulting Engineers was retained by Cope Project Management Corp. (the 'Client') to undertake a Transportation Impact Study for an Official Plan Amendment and Zoning By-law Amendment applications in support of a proposed mixed-use development, in the City of Toronto, Ontario. The subject property is located at the southwest corner of Sheppard Avenue East and Pharmacy Avenue.

Development Proposal

The development proposal is to develop the existing 6,583.0 m² site to include a 21-storey mixed-use building consisting of 433 residential units and 1,340.0 m² of commercial space. Vehicular access to the site is proposed via a full movement driveway located on Pharmacy Avenue.

Traffic Analysis

The proposed development is anticipated to generate 146 two-way auto trips (41 inbound and 105 outbound) during the weekday AM peak hours and 208 two-way auto trips (119 inbound and 89 outbound) during the weekday PM peak hours.

The intersection capacity analysis results (based on the methodology and procedures outlined in the Highway Capacity Manual, HCM 2000, published by the Transportation Research Board) indicate that the study area intersections and proposed vehicular access are expected to operate with acceptable levels of service with the recommended optimized signal timings provided for the study area intersections.

Access/Parking Review

It is recommended that appropriate signage consisting of a STOP sign (Ra-1) and STOP bar be provided on both the parking garage and site access egress driveways.

Based on City of Toronto Zoning By-law 569-2013, a total of 445 parking spaces will be required for the proposed mixed-use development. The preliminary site plan provides for a total of 339, one (1) of which is a dedicated car share space. It is our opinion that the parking spaces provided by the proposed development is reasonable and justified for the following reasons:

- The proposed site is located along the future Sheppard LRT line, with a transit stop located directly at the site. With this said, NexTrans believes that Policy Area 3 parking requirements better represent the future site and demographic.
- According to the 2016 TTS ward data, more than half of the households have no car or just one car (19% + 51% = 70%). There is a large percentage of non-single-occupant vehicle trips (approximately 37%) indicating that the residents in the area are taking alternative modes of transportation instead of driving private automobiles.
- The proposed site is well-served by the existing transit network and in close proximity to the following TTC transit routes: 85, 167, 324, 385, and 985, two of which are blue night service routes.
- Bicycle parking spaces are also being provided, 296 long-term and 36 short-term residential and retail combined, promoting cycling as an alternative mode of transportation.

Vehicle Maneuverability Review

AutoTURN software was used to generate vehicular turning templates to confirm and demonstrate the accessibility of a Type "G" vehicle (Garbage TO2 R) and passenger vehicle (P TAC-2017) through the proposed loading space and surface parking spaces, respectively.

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1.0 INTRODUCTION

NexTrans Consulting Engineers was retained by Cope Project Management Corp. (the 'Client') to undertake a Transportation Impact Study for an Official Plan Amendment and Zoning By-law Amendment applications in support of a proposed mixed-use development, in the City of Toronto, Ontario. The subject property is located at the southwest corner of Sheppard Avenue East and Pharmacy Avenue. This transportation impact study conforms to the City of Toronto requirements, see **Appendix A** for the established terms of reference.

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

Figure 1-1 – Site Location

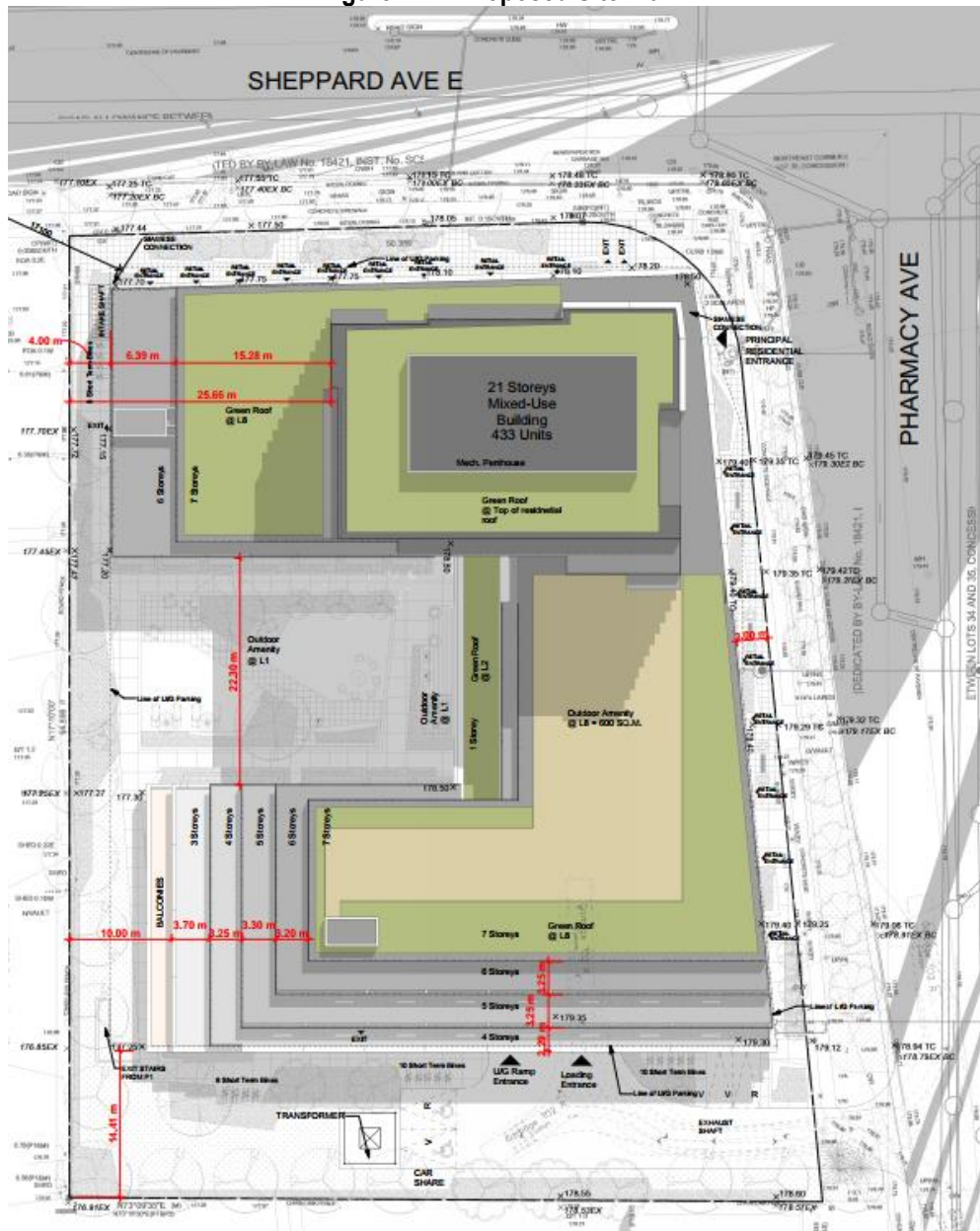


The subject property is currently occupied by two (2) commercial buildings. Based on the site plan prepared by Kirkor Architects and Planners, dated July 29, 2019, the development proposal is to redevelop the existing 6,583.0 m² site to include a 21-storey mixed-use building consisting of 433 residential units and 1,340.0 m² of commercial space. Vehicular access to the site is proposed via a full movement driveway located on Pharmacy Avenue. The preliminary site plan is provided in **Figure 1-2**; **Appendix B** also provides a larger scale version of the proposed site plan.

The preliminary site plan provides for a total of 339 parking spaces.

Given the residential nature of the development proposal, the analysis will include the weekday morning and afternoon peak periods for traffic assessment purposes.

Figure 1-2 – Proposed Site Plan



2.0 EXISTING TRAFFIC CONDITIONS

2.1. Existing Road Network

The existing subject lands are located south of Sheppard Avenue East and west of Pharmacy Avenue in the City of Toronto. The existing road network is described as follows:

Pharmacy Avenue: is classified as a north-south collector road under the jurisdiction of the City of Toronto. In the study area, it has a posted speed limit of 50 km/h and an existing two-lane cross section south of the site and four-lane cross section north of the site. Pharmacy Avenue is signalized at Sheppard Avenue East and provides an ancillary left-turn lane in both directions.

Sheppard Avenue East: is classified as an east-west major arterial road under the jurisdiction of the City of Toronto. In the study area, it has an existing six-lane cross section with a TWLT lane in the center and posted speed limit of 60 km/h. Sheppard Avenue East is signalized at Pharmacy Avenue and provides an ancillary left-turn lane in both directions.

2.2. Existing Active Transportation Network

Sidewalks

The area surrounding the proposed development is serviced with dedicated sidewalks. Currently, sidewalks are available on both sides of Pharmacy Avenue and Sheppard Avenue East. Pedestrian connectivity is available from the major road to the site. The proposed internal network is also serviced with a pathway connecting pedestrians to the residential development.

Bicycle Lanes

There are no dedicated bicycle lanes within the vicinity of the subject site however, there is a high density of amenities indicating many necessities are within walking distance. The Van Horne and Collingsbrook cycling route is located just north of the site along Huntingwood Drive. According to the *City of Toronto 10 Year Cycling Network*, Sheppard Avenue East is anticipated to have designated bike lanes and boulevard trails running in the north-south direction between Pharmacy Avenue and Warden Avenue.

2.3. Existing Traffic Volumes

Existing traffic volumes were undertaken by Spectrum Traffic on behalf of NexTrans Consulting Engineers on Thursday, February 7, 2019, during the morning (7:00 a.m. to 10:00 a.m.) and afternoon (4:00 p.m. to 7:00 p.m.) peak periods, at the following study area intersections:

1. Sheppard Avenue East and Victoria Park Avenue (signalized);
2. Sheppard Avenue East and Pharmacy Avenue (signalized); and
3. Sheppard Avenue East and Warden Avenue (signalized).

Detailed traffic data sheets are provided in **Appendix C**.

2.4. Existing Traffic Assessment

The existing volumes are illustrated in **Figure 2-1** and were analyzed using Synchro 10 software and SimTraffic simulations for queue assessment. The methodology of the software follows the procedures described and outlined in the Highway Capacity Manual, HCM 2000, published by the Transportation Research Board. The detailed results are provided in **Appendix D** and summarized in **Table 2.1**.

Figure 2-1 – Existing Traffic Volumes

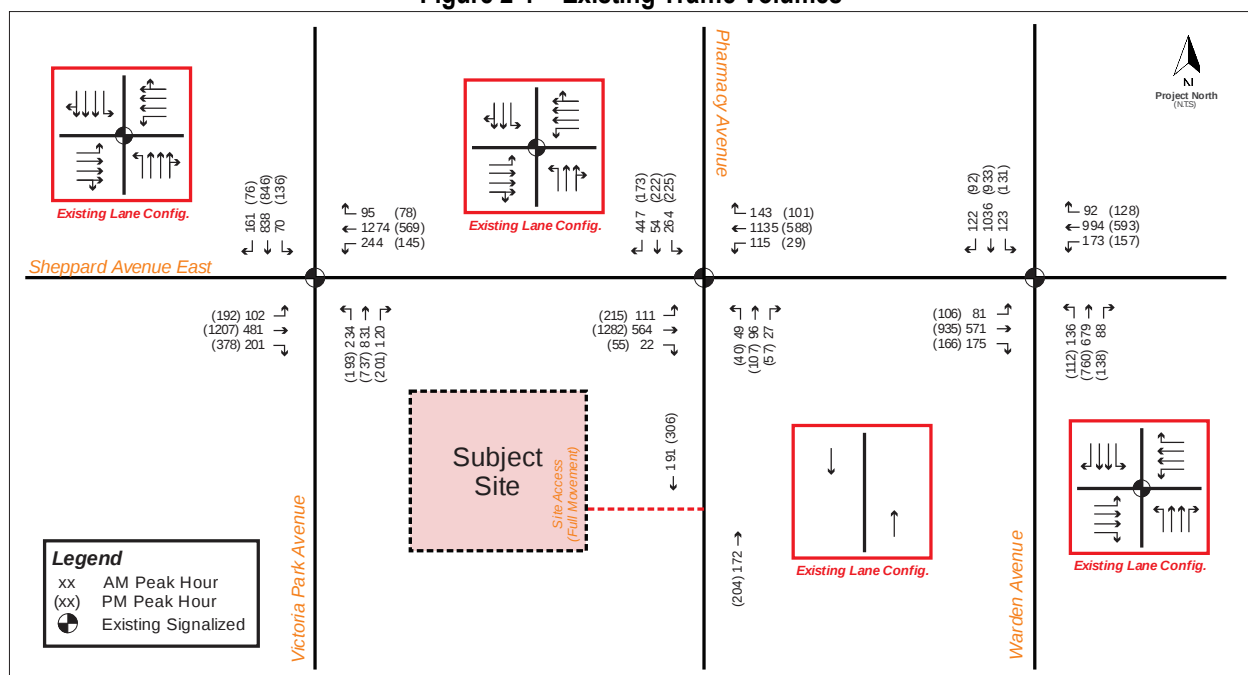


Table 2.1 – Existing Traffic Assessments

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		LOS (v/c)	Delay (s)	Queue (95 th m)	LOS (v/c)	Delay (s)	Queue (95 th m)
Sheppard Avenue East and Victoria Park Avenue (Signalized)	OVERALL	D (1.04)	44.7	–	D (1.01)	47.7	–
	EBL	C (0.66)	31.7	31.9	B (0.52)	19.9	86.9
	EBTR	C (0.45)	29.2	45.8	D (0.88)	41.1	128.0
	WBL	D (0.85)	46.7	41.4	F (1.06)	117.1	40.3
	WBTR	D (0.91)	46.7	125.0	C (0.39)	30.8	69.7
	NBL	F (1.17)	144.9	69.0	F (1.02)	101.3	73.0
	NBTR	C (0.54)	27.9	68.0	D (0.83)	51.2	81.6
	SBL	E (0.66)	60.6	50.9	E (0.84)	57.3	54.0
	SBTR	D (0.84)	46.4	86.7	D (0.75)	47.4	84.4
Sheppard Avenue East and Pharmacy Avenue (Signalized)	OVERALL	C (0.77)	28.1	–	C (0.66)	20.4	–
	EBL	D (0.75)	35.2	40.1	B (0.63)	17.1	52.0
	EBTR	B (0.26)	16.0	53.6	B (0.56)	17.1	99.9
	WBL	C (0.67)	34.7	52.3	C (0.31)	21.5	27.6
	WBTR	C (0.72)	29.7	101.3	B (0.40)	14.8	28.3
	NBL	C (0.30)	27.7	21.9	C (0.24)	28.4	19.1
	NBTR	C (0.14)	22.4	17.6	C (0.17)	26.0	25.4
	SBL	D (0.75)	41.0	75.3	D (0.66)	39.8	68.2
	SBTR	C (0.53)	28.1	78.2	C (0.31)	27.7	54.0
Sheppard Avenue East and Warden Avenue (Signalized)	OVERALL	D (0.93)	42.0	–	D (0.92)	35.3	–
	EBL	D (0.64)	46.2	39.4	C (0.43)	22.8	49.0
	EBT	D (0.65)	36.6	191.7	C (0.80)	28.2	91.9
	EBR	D (0.25)	35.1	46.5	B (0.23)	14.6	45.6
	WBL	C (0.69)	30.3	44.5	E (0.89)	58.1	43.4
	WBT	E (0.98)	59.6	183.8	B (0.39)	19.5	87.8
	WBR	C (0.12)	27.1	43.3	B (0.12)	16.6	32.0
	NBL	D (0.82)	50.2	52.4	D (0.68)	37.1	55.4
	NBT	C (0.61)	32.2	88.3	D (0.75)	39.8	105.7
	NBR	C (0.12)	25.1	37.7	C (0.32)	31.9	43.3
	SBL	C (0.52)	22.6	47.8	C (0.63)	31.2	48.7
	SBT	D (0.91)	44.9	227.4	D (0.94)	54.9	252.7
	SBR	C (0.16)	25.0	33.9	C (0.08)	28.0	32.6

As summarized in **Table 2.1**, under existing conditions the study area intersections are operating at acceptable levels of service during the peak hour time periods. However, the northbound left turning movement during the AM and the westbound and northbound left turning movements during the PM peak hour at the Sheppard Avenue East and Victoria Park Avenue intersection are experiencing a failing level of service. On this basis, the signal timings were optimized while maintaining the existing 120-second cycle length to ensure all movements are operating below v/c ratio of 1.00. Only the total splits were adjusted while the rest of the time parameters remain unchanged from existing conditions; the optimized timings are summarized in **Table 2.2**.

Table 2.2 – Recommended Optimized Signal Timing for Peak Hour Periods

Intersection	Movement	AM PEAK Total Split (s)		PM PEAK Total Split (s)	
		Existing	Optimized	Existing	Optimized
Sheppard Avenue East and Victoria Park Avenue (Signalized)	EBL	20.0	12.0	27.0	20.0
	EBTR	52.0	44.0	61.0	56.0
	WBL	12.0	17.0	12.0	15.0
	WBTR	44.0	49.0	46.0	51.0
	NBL	14.0	17.0	15.0	18.0
	NBTR	56.0	59.0	42.0	43.0
	SBL	NA	42.0	15.0	16.0
	SBTR	42.0	42.0	42.0	41.0
Cycle Length (s)		120.0	120.0	130.0	130.0

The optimized results are also provided in **Table 2.3** and detailed output analysis sheets can be found in **Appendix D**.

Table 2.3 – Optimized Level of Service – Existing Traffic Assessment

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		LOS (v/c)	Delay (s)	Queue (95 th m)	LOS (v/c)	Delay (s)	Queue (95 th m)
Sheppard Avenue East and Victoria Park Avenue (Signalized)	OVERALL	D (0.97)	41.8	–	D (0.94)	48.0	–
	EBL	E (0.86)	61.4	42.3	C (0.54)	22.0	105.5
	EBTR	D (0.55)	36.0	49.7	D (0.96)	54.2	141.4
	WBL	C (0.79)	34.3	40.6	E (0.86)	59.5	41.5
	WBTR	D (0.90)	45.1	135.7	C (0.41)	32.1	70.2
	NBL	E (0.97)	78.4	66.4	E (0.89)	59.2	68.1
	NBTR	C (0.50)	25.5	63.6	D (0.80)	48.7	80.9
	SBL	E (0.66)	60.6	52.5	D (0.79)	49.4	53.6
	SBTR	D (0.84)	46.4	79.3	D (0.76)	48.6	79.4

Consequently, with the signal timing improvements noted above, the intersection operates at acceptable levels of service during the weekday peak hours.

On this basis, the optimized signal timings will be carried forward to future background and future total analysis during both the morning and afternoon peak hours.

3.0 FUTURE BACKGROUND CONDITIONS

For the purposes of this assessment, it is anticipated that the proposed development will be completed and fully occupied by 2024. A five-year horizon (2029) after the build out period of the proposed development is selected for the analysis.

3.1. Background Development

A review of the active developments within the study area was conducted based on the information extracted from the City of Toronto's Development Portal. The following applications will be considered:

- 3105 Sheppard Avenue East (approved) – A proposed 18-storey mixed-use building containing 264 dwelling units and at-grade commercial space.
- 2933 Sheppard Avenue East (under review) – A proposed 18-storey mixed-use building containing 170 residential units and 299 m² of ground floor retail.
- 3260 Sheppard Avenue East (under review) – Two proposed towers containing a total of 805 residential units.

The forecasted site traffic calculated by Lea Consulting for the proposed developments located at 2933 and 3260 Sheppard Avenue East, as well as, the site traffic calculated by NexTrans Consulting for the proposed development at 3105 Sheppard Avenue East will be considered in our own future background analysis, see **Appendix E** for the forecasted site traffic at the abovementioned sites.

Turning movement counts at the Sheppard Avenue East and Pharmacy Avenue intersection from year 2008, 2014, and 2019 were assessed for future growth rate. Since the movements did not experience growth, an applied growth rate of 0.5% is considered to account for any further developments in the area. The 2008 and 2014 turning movement counts are provided in **Appendix F**.

The future (2029) background traffic volumes are provided in **Figure 3-1**. **Table 3.1** summarizes the level of service at the given intersections under future background traffic conditions with the recommended optimizing timings in **Table 2.2**. Detailed output analysis can be found in **Appendix G**.

Figure 3-1 – Future (2029) Background Traffic Volumes



Table 3.1 – Future (2029) Background Traffic Assessments

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		LOS (v/c)	Delay (s)	Queue (95 th m)	LOS (v/c)	Delay (s)	Queue (95 th m)
Sheppard Avenue East and Victoria Park Avenue (Signalized)	OVERALL	D (0.99)	44.5	–	D (0.98)	53.3	–
	EBL	E (0.86)	61.9	40.3	C (0.57)	22.7	112.5
	EBTR	D (0.57)	36.6	58.0	E (1.01)	65.4	148.6
	WBL	D (0.84)	40.7	40.5	E (0.89)	68.3	41.7
	WBTR	D (0.95)	50.5	131.5	C (0.44)	32.6	70.1
	NBL	E (0.97)	78.6	69.4	E (0.91)	67.5	68.6
	NBTR	C (0.53)	26.0	69.6	D (0.85)	51.0	83.0
	SBL	E (0.70)	66.8	49.8	D (0.82)	53.9	56.2
Sheppard Avenue East and Pharmacy Avenue (Signalized)	OVERALL	C (0.81)	29.5	–	C (0.72)	22.2	–
	EBL	D (0.76)	38.3	40.8	B (0.67)	19.0	55.3
	EBTR	B (0.28)	16.3	58.0	B (0.62)	18.3	124.9
	WBL	D (0.77)	40.7	54.1	D (0.60)	43.5	53.8
	WBTR	C (0.77)	30.8	106.6	B (0.45)	16.8	131.7
	NBL	D (0.54)	36.6	24.6	C (0.40)	32.7	24.3
	NBTR	C (0.19)	22.9	24.3	C (0.20)	26.4	28.6
	SBL	D (0.81)	47.0	70.1	D (0.73)	44.0	67.4
Sheppard Avenue East and Warden Avenue (Signalized)	OVERALL	D (0.98)	48.0	–	D (1.01)	41.2	–
	EBL	E (0.78)	58.7	47.7	C (0.50)	24.4	54.9
	EBT	D (0.69)	38.8	101.6	C (0.85)	29.6	134.1
	EBR	D (0.38)	38.0	45.5	B (0.29)	13.5	47.9
	WBL	C (0.73)	33.3	45.2	F (0.97)	81.0	42.7
	WBT	E (1.03)	72.7	187.2	B (0.42)	20.0	93.3
	WBR	C (0.12)	27.1	41.7	B (0.13)	16.7	37.5
	NBL	E (0.92)	69.6	57.6	E (0.89)	66.0	57.7
	NBT	C (0.65)	32.9	88.6	D (0.79)	41.5	123.8
	NBR	C (0.12)	25.1	37.7	C (0.32)	31.9	42.7
	SBL	C (0.55)	23.3	50.3	D (0.78)	43.3	48.8
	SBT	D (0.95)	51.2	360.8	E (1.01)	69.9	427.9
	SBR	C (0.19)	25.4	35.8	C (0.14)	28.9	33.5

As summarized in **Table 3.1**, it is shown that during future background traffic conditions the subject study area intersections continue to operate at acceptable levels of service with no changes to expected operations. During future background traffic conditions, the westbound left turning movement at the Sheppard Avenue East and Warden Avenue intersection operates at a failing level of service during the weekday PM peak hour period. Thus, the signal timing was optimized to ensure all movements experience an acceptable level of service. In addition, the Sheppard Avenue East and Pharmacy Avenue intersection was optimized to support greater westbound left turning movement during the PM peak hour period to service vehicle trips accessing the proposed 3105 Sheppard Avenue East development as well as, our proposed site at 3005 Sheppard Avenue/1800 Pharmacy Avenue.

The optimized and recommended signal timings maintain the existing cycle lengths. Only the total splits were adjusted while the rest of the time parameters remain unchanged from existing conditions; the optimized timings are summarized in **Table 3.2**.

Table 3.2 – Recommended Optimized Signal Timing for PM Peak Hour Period

Intersection	Movement	Total Split (s)		Cycle Length (s)	
		Existing	Optimized	Existing	Optimized
Sheppard Avenue East and Pharmacy Avenue (Signalized)	EBL	20.0	10.0	110.0	110.0
	EBTR	66.0	60.0		
	WBL	–	10.0		
	WBTR	46.0	60.0		
	NBL	–	–		
	NBTR	44.0	40.0		
	SBL	–	–		
	SBTR	44.0	40.0		
Sheppard Avenue East and Warden Avenue (Signalized)	EBL	–	–	110.0	110.0
	EBT	48.0	46.0		
	EBR	–	–		
	WBL	11.0	12.0		
	WBT	59.0	58.0		
	WBR	–	–		
	NBL	11.0	13.0		
	NBT	40.0	39.0		
	NBR	–	–		
	SBL	11.0	13.0		
	SBT	40.0	39.0		
	SBR	–	–		

It shall be noted that the turn type for the westbound left turn movement at Sheppard Avenue East and Pharmacy Avenue was adjusted to be permitted and protected whereas in existing it is just permitted. The optimized results at the following intersection during the weekday PM peak hour are provided in **Table 3.3** and detailed output analysis sheets can be found in **Appendix G**.

Table 3.3 – Optimized Level of Service – Future (2029) Background Traffic Assessment

Intersection	Movement	Optimized Weekday PM Peak Hour		
		LOS (v/c)	Delay (s)	Queue (95 th m)
Sheppard Avenue East and Pharmacy Avenue (Signalized)	OVERALL	D (0.80)	24.5	–
	EBL	C (0.76)	25.2	54.2
	EBTR	C (0.68)	22.2	122.1
	WBL	C (0.37)	23.2	25.2
	WBTR	B (0.35)	11.9	29.9
	NBL	D (0.47)	38.6	25.7
	NBTR	C (0.18)	28.8	28.1
	SBL	E (0.82)	55.5	78.4
	SBTR	C (0.39)	31.7	68.3
Sheppard Avenue East and Warden Avenue (Signalized)	OVERALL	D (0.95)	39.4	–
	EBL	C (0.53)	22.1	55.1
	EBT	C (0.89)	27.7	170.6
	EBR	A (0.30)	8.3	48.6
	WBL	E (0.89)	58.4	42.8
	WBT	C (0.43)	20.7	89.6
	WBR	B (0.13)	17.3	36.2
	NBL	D (0.76)	42.5	57.0
	NBT	D (0.81)	42.6	103.7
	NBR	C (0.32)	32.4	42.2
	SBL	C (0.60)	29.9	49.2
	SBT	E (1.02)	72.7	483.7
	SBR	C (0.10)	29.0	35.2

In summary, with the signal timing improvements noted above, the intersections operate at acceptable levels of service during the weekday PM peak hour. On this basis, the optimized signal timings will be carried forward to the future total analysis during the afternoon peak hour.

4.0 SITE TRAFFIC

The development proposal is to construct a 21-storey mixed-use building consisting 433 residential units and 1,340.0 m² (14,424 ft²) gross floor area of commercial space. Trip rates and site generated trips were derived from the information contained in the *Trip Generation Manual, 10th Edition* published by the Institute of Transportation Engineers (ITE) for "High-Rise Residential" (LUC 222) and "Shopping Center" (LUC 820). The trip generation summary is shown in **Table 4.1**.

Table 4.1 – Site Traffic Trip Generation (Based on ITE)

ITE Land Use	Parameter	Morning Peak Hour			Afternoon Peak Hour		
		In	Out	Total	In	Out	Total
Multifamily Housing (High-Rise) (LUC 222) 433 units	Gross Auto Trips	32	102	134	95	61	156
	Trip Rate	0.07	0.24	0.31	0.22	0.14	0.36
Shopping Center (LUC 820) 14,424 ft ²	Gross Auto Trips	9	5	14	26	29	55
	Trip Rate	0.62	0.35	0.97	1.80	2.01	3.81
Total	Total New Auto Trips	41	107	148	120	91	211

The proposed development is anticipated to generate 148 two-way auto trips (41 inbound and 107 outbound) during the weekday AM peak hours and 211 two-way auto trips (120 inbound and 91 outbound) during the weekday PM peak hours.

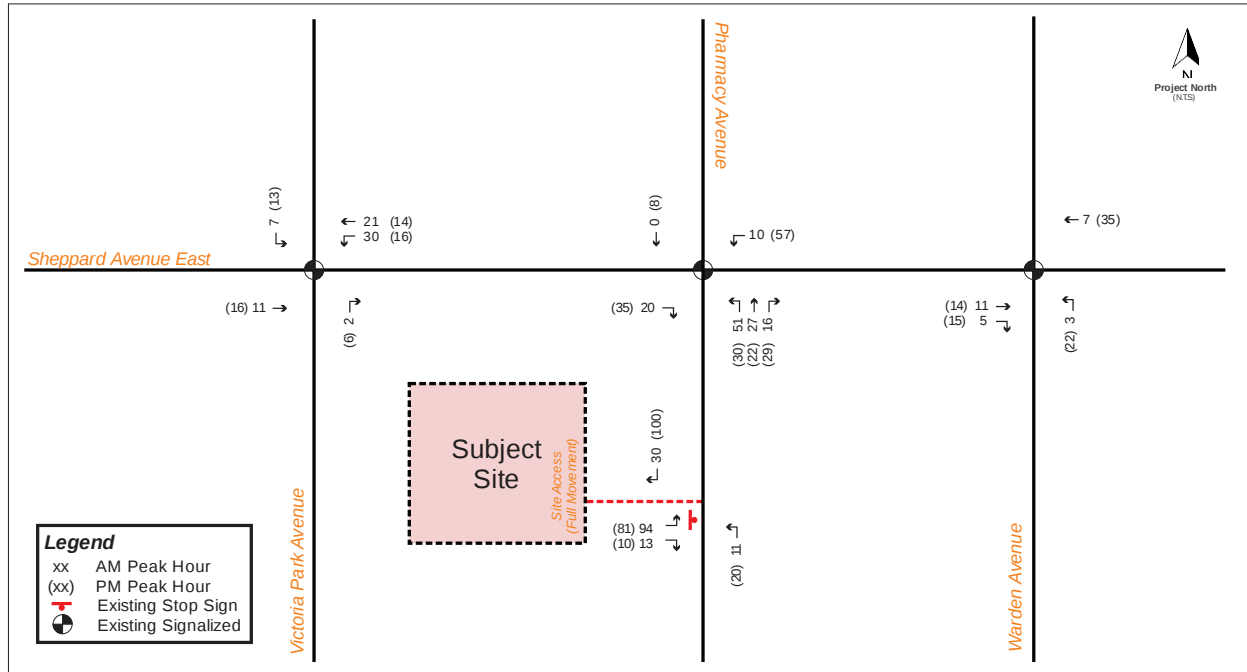
It shall be noted that the average trip rate presented by ITE for the Shopping Center was utilized, versus the fitted curve equation, as it better represented the expected trip generation for the proposed commercial space.

4.1. Site Trip Distribution and Assignment

The assumptions for the trip distribution rates are based on the information extracted from the 2016 Transportation Tomorrow Survey (TTS), see **Appendix H**, existing traffic patterns and routes that drivers would likely take to access the subject site, and engineering judgement based on ease of site access. As a result, site auto trip distributions are summarized in **Table 4.2** with the trip assignment illustrated in **Figure 4-1**.

Table 4.2 – Site Traffic Trip Distribution

Direction	Via	AM Peak Hour		PM Peak Hour	
		Inbound	Outbound	Inbound	Outbound
North	Pharmacy Avenue	0%	25%	7%	24%
	Victoria Park Avenue	17%	0%	10%	0%
South	Pharmacy Avenue	27%	12%	17%	11%
	Victoria Park Avenue	4%	28%	5%	18%
	Warden Avenue	7%	4%	18%	17%
East	Sheppard Avenue East	19%	11%	29%	15%
West	Sheppard Avenue East	26%	20%	14%	15%
Total		100%	100%	100%	100%

Figure 4-1 – Site Generated Traffic Volumes


5.0 FUTURE TOTAL TRAFFIC CONDITIONS

The forecasted 2029 future total traffic volumes (future background traffic volumes plus site generated traffic volumes) are illustrated in **Figure 5-1** and were analyzed using Synchro 10 software and SimTraffic simulations for queue assessment with the recommended optimized timings outlined in the above sections. The detailed calculations are provided in **Appendix I** and summarized in **Table 5.1**.

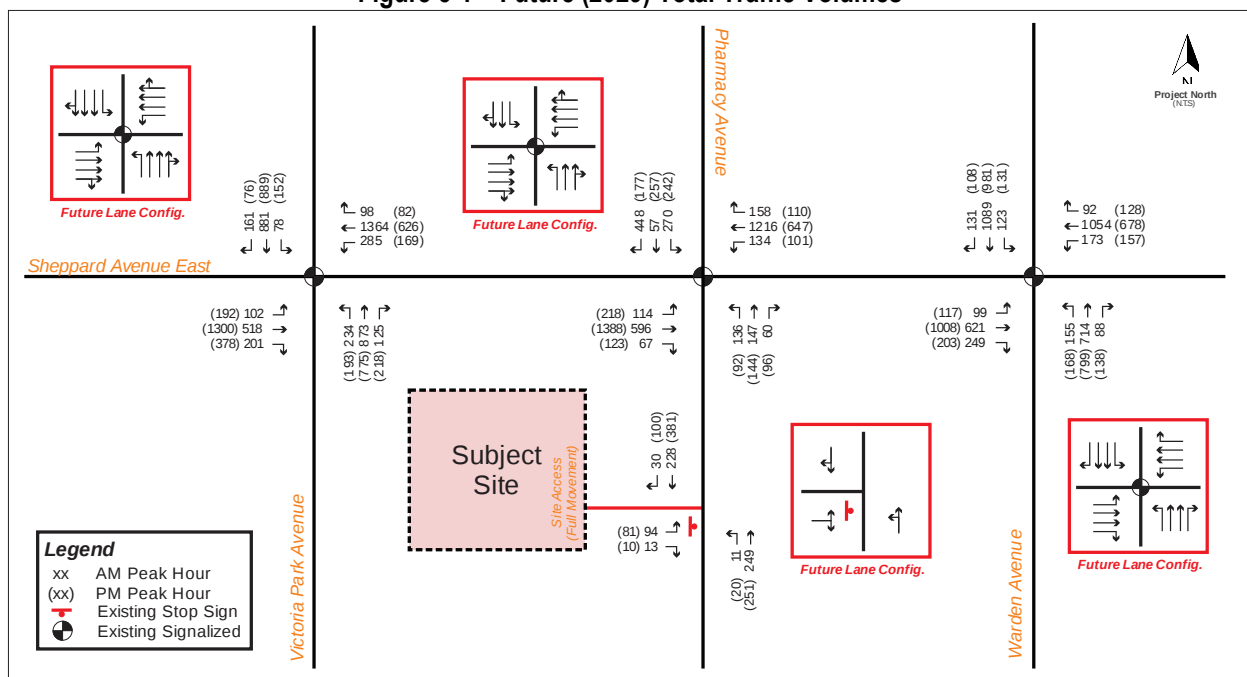
Figure 5-1 – Future (2029) Total Traffic Volumes


Table 5.1 – Future (2029) Total Traffic Assessments

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		LOS (v/c)	Delay (s)	Queue (95 th m)	LOS (v/c)	Delay (s)	Queue (95 th m)
Sheppard Avenue East and Victoria Park Avenue (Signalized)	OVERALL	D (1.01)	46.4	–	D (0.98)	54.7	–
	EBL	E (0.86)	62.1	41.6	C (0.57)	22.9	116.6
	EBTR	D (0.59)	36.9	71.9	E (1.02)	68.0	180.5
	WBL	E (0.94)	60.1	39.4	E (0.90)	69.3	40.8
	WBTR	D (0.96)	52.6	186.6	C (0.45)	32.8	77.2
	NBL	E (0.97)	78.6	68.1	E (0.91)	67.4	68.1
	NBTR	C (0.53)	26.0	64.5	D (0.86)	52.1	82.9
	SBL	E (0.78)	76.6	52.2	E (0.87)	61.8	54.2
Sheppard Avenue East and Pharmacy Avenue (Signalized)	OVERALL	C (0.87)	32.3	–	C (0.81)	27.5	–
	EBL	D (0.79)	41.1	35.6	C (0.76)	25.6	56.5
	EBTR	B (0.30)	16.5	50.3	C (0.72)	23.8	135.9
	WBL	D (0.86)	52.0	53.6	D (0.75)	51.2	40.9
	WBTR	C (0.77)	31.0	105.9	B (0.35)	12.3	28.4
	NBL	E (0.84)	65.9	39.5	D (0.71)	52.8	47.0
	NBTR	C (0.24)	23.6	27.4	C (0.22)	29.4	38.2
	SBL	E (0.88)	56.8	77.8	E (0.88)	65.2	76.7
Sheppard Avenue East and Warden Avenue (Signalized)	OVERALL	D (0.96)	45.4	–	D (0.96)	40.6	–
	EBL	E (0.78)	56.0	47.5	C (0.55)	23.4	56.3
	EBT	D (0.71)	38.9	105.2	C (0.90)	28.3	277.3
	EBR	D (0.40)	37.7	44.9	B (0.34)	10.7	48.4
	WBL	C (0.74)	34.3	44.3	E (0.89)	64.2	43.2
	WBT	E (0.98)	61.0	177.1	C (0.46)	21.0	101.9
	WBR	C (0.12)	27.1	40.2	B (0.14)	17.3	36.5
	NBL	E (0.93)	74.0	56.2	E (0.87)	63.6	58.8
	NBT	C (0.65)	32.9	85.1	D (0.81)	42.6	116.5
	NBR	C (0.12)	25.1	40.5	C (0.32)	32.4	43.1
	SBL	C (0.55)	23.3	48.6	C (0.60)	30.0	48.1
	SBT	D (0.95)	51.2	372.4	E (1.02)	73.6	487.5
Pharmacy Avenue and Site Access (Unsignalized)	OVERALL	C (0.19)	25.4	35.1	C (0.10)	29.0	34.2
	EBLR	B (0.22)	14.2	20.3	C (0.26)	18.0	23.0
	NBLT	A (0.01)	0.4	5.8	A (0.02)	0.8	15.0

Under future total traffic conditions, the study area intersections and proposed site access are expected to operate at acceptable levels of service during both peak study time periods.

6.0 PARKING ASSESSMENT

The City-wide Zoning By-law No. 569-2013 has been adopted by the City of Toronto Council and it was enacted on May 9, 2013. The Zoning By-law is a comprehensive By-law covering the entire amalgamated City of Toronto, and it is a replacement to the previously repealed City-wide Zoning By-law No. 1156-2010 which was enacted and ultimately repealed in 2010. Based on the information contained in the new City-wide Zoning By-law, the subject site is located in 'Policy Area 4'.

The proposed development is implementing car share spaces which in turn reduces the total parking requirement. The car share parking reduction ratio as outlined in the *Parking Standards Review submitted to the City of Toronto by IBI Group* is calculated as follows:

For each dedicated car share stall, the minimum parking requirement should be reduced by up to four (4) parking spaces. One four-space reduction is allowed for every 60 units.

$$\begin{aligned}
 \text{Size of Development} &= 433 \text{ units} \\
 \text{Maximum Allowable Reduction} &= 4 * (\text{Total number of units} / 60) \\
 &= 4 * (433/60) \\
 &= 28 \text{ spaces} = 25 \text{ spaces (maximum)} \\
 \text{Car Share Spaces Required} &= 7 \quad (\text{Exhibit 21, Parking Standard Review})
 \end{aligned}$$

Based on the above calculations the proposed development is allowed up to seven (7) car share spaces. The site plan proposed one (1) car share space thus, reducing the total residential requirement by four (4) spaces. The technical parking requirement for the proposed development is detailed in **Table 6.1**.

Table 6.1 – Vehicle Parking Requirements (ZBL 569-2013 Policy Area 4)

Use	GFA/Units	Rate	Parking Requirement	Parking Provided	Difference
Apartment Building	245 1-bedroom 160 2-bedroom 28 3-bedroom	0.8 spaces per 1-bedroom	196	256	-111
		0.9 spaces per 2-bedroom	144		
		1.1 spaces per 3-bedroom	31		
		Car Share Reduction (1 space)	- 4		
Visitor – Apartment Building	433 units	0.15 spaces per unit	65	64	-1
Retail	1,340.0 m ²	1 space per 100 m ²	13	19	+6
Total			445	339	-106

Based on the City of Toronto Zoning By-law 569-2013, a total of 445 parking spaces will be required for the proposed mixed-use development. The preliminary site plan provides for a total of 339 parking spaces, one (1) of which is a dedicated car share space.

NexTrans proposes that 'Policy Area 3' parking requirements be considered since the proposed development will be located along the Sheppard Avenue East LRT corridor. Similar to areas like Yonge Street between Donwoods Drive and Briar Hill Avenue, Eglinton Avenue East and Kennedy Road, and Danforth Avenue between Broadview Avenue and Pharmacy Avenue which are all considered as 'Policy Area 3'.

The land use characteristics of Policy Area 3 compare to our proposed development as such:

- Areas are predominantly residential with commercial uses and locally oriented retail,
- Well serviced by and in walking distance to transit stops i.e. TTC buses and rapid transit,
- Located outside of the downtown core, and
- Pedestrian facilities are provided throughout ensuring a complete pedestrian supportive network.

Based on the information contained in By-law 569-2013, the parking requirements for 'Policy Area 3' with our proposed development are detailed in **Table 6.2**.

Table 6.2 – Recommended Vehicle Parking Requirements (ZBL 569-2013 Policy Area 3)

Use	GFA/Units	Rate	Parking Requirement	Parking Provided	Difference
Apartment Building	245 1-bedroom 160 2-bedroom 28 3-bedroom	0.7 spaces per 1-bedroom	172	256	-84
		0.9 spaces per 2-bedroom	144		
		1.0 spaces per 3-bedroom	28		
		Car Share Reduction (1 space)	- 4		
Visitor – Apartment Building	433 units	0.1 spaces per unit	43	64	+21
Retail	1,340.0 m ²	1 space per 100 m ²	13	19	+6
Total			396	339	-57

As summarized above, with the Policy Area 3 parking rates a total of 396 parking spaces will be required for the proposed development. The proposed plan provides for a total of 339 parking spaces, one (1) of which is a dedicated car share space.

It shall be noted that as a TDM measure, the residential units will be marketed with unbundling of parking to reduce tenant parking demand. Moreover, the resident visitor and retail parking requirement continue to meet and exceed Policy Area 4 requirements ensuring there will be no spilling of vehicles onto neighborhood and major streets.

6.1. Existing Household Demographic and Car Ownership

NexTrans reviewed the 2016 Transportation Tomorrow Survey (TTS) data for the demographic information in the City of Toronto Ward 40, as classified by TTS. **Table 6.3** summarizes the demographic information based on the 2016 TTS data, while the detailed data summary is included in **Appendix H**.

Table 6.3 – Demographic Information for the City of Toronto Ward 40 based on 2016 TTS Data

Household Type			Household Size					Number of Available Vehicles				
House	Townhouse	Apartment	1	2	3	4	5+	0	1	2	3	4+
27%	11%	62%	26%	30%	19%	15%	11%	19%	51%	25%	3%	1%

As indicated in **Table 6.3**, there is a large percentage of single person households in Ward 40 (26%), and more than half of the households have no car or just one car (19% + 51% = 70%).

Based on this finding, it is our opinion that the proposed parking rate reduction of 14% is reasonable given that 19% of households in Ward 40 have no car and more than half (51%) of the households have one car.

6.2. Mode Share Based on 2016 TTS Data

Table 6.4 summarizes the travel mode split information based on the review of the 2016 TTS data for the City of Toronto Ward 40, as classified by TTS.

Table 6.4 – Modal Split based on 2016 TTS Data for the City of Toronto Ward 40

Trips	Time Period	Auto Driver	Auto Passenger	Transit	Walk & Cycle	Total Non-SOV
Trips made by Residents of City of Toronto	6-9 AM	54%	12%	25%	7%	44%
	24 Hours	55%	13%	24%	7%	44%
Trips to City of Toronto	6-9 AM	60%	11%	14%	12%	37%
	24 Hours	58%	14%	19%	8%	41%

Based on the information outlined in **Table 6.4**, there is a large percentage of non-single-occupant vehicle trips (approximately 37%). This indicates that the residents in the area are taking alternative modes of transportation instead of driving private automobiles. Similarly, the modal split retrieved from TTS for the specific study area, traffic zone 585, and more specifically in an apartment dwelling unit, shows a total of 58% of trips being non-auto modes, see **Table 6.5** for a summary of results.

Table 6.5 – Recorded Rates based on 2016 TTS Data and Area Context

Mode of Travel	Trips	Percentage of Total Trips	Total Non-Auto Trips
Auto Driver	1491	37%	58%
Auto Passenger	181	5%	
Transit	1604	40%	
Walk	700	18%	
Total	3976	100%	

Given that NexTrans recommends a 14% parking reduction for the proposed development, subject to 'Policy Area 3' parking rates, it is our opinion that with the existing mode share can be improved in Ward 40 with the provision of reduced parking supply. However, in the specific TTS zone 585 the total non-auto trips is substantial which in itself supports reduce parking. Based on our experience working on similar projects, parking rate reduction is the best Transportation Demand Management measure that helps in reducing the number of single-occupant-vehicle trips to and from the proposed development.

6.3. Bicycle Parking

The subject site is located within 'Bicycle Zone 2' of the City of Toronto Zoning By-law 569-2013, and the applicable bicycle parking rates are summarized below in **Table 6.6**.

Table 6.6 – Bicycle Parking Requirements (ZBL 569-2013)

Land Use	GFA/Units	Rates	Spaces Required	Spaces Provided
Apartment Building	433 units	0.68 long-term spaces per unit	294	294
		0.07 short-term spaces per unit	30	30
Retail	1,340.0 m ²	0.13 per 100 m ² long-term spaces	2	2
		3 plus 0.25 per 100 m ² short-term spaces	6	6
Total Long-Term Spaces			296	296
Total Short-Term Spaces			36	36

The proposed mixed-use development will require 294 long-term and 30 short-term bicycle parking spaces for residential use and two (2) long-term and six (6) short-term bicycle parking spaces for retail use. The site plan is providing the minimum bicycle parking requirements outlined in the Zoning By-Law 569-2013.

6.4. Low Emission Transportation

As part of the City of Toronto initiative for sustainable building design for new developments, the proposed development falls under the 'Toronto Green Standard for Mid to High-Rise Residential Development'. The site plan abides by the Tier 1 Air Quality measure and provides strategies and TDM measures to reduce at auto vehicle trips by at least 15%. As well as, provide 68 parking spaces designed to permit electric vehicle supply equipment installation (20% of the total parking spaces) and one (1) dedicated low-emitting vehicle parking space where there is surplus in retail spaces.

6.5. Accessible Parking Requirements

Since the proposed development is mixed-use, Accessible parking spaces shall be required for the non-residential uses and visitor parking spaces. The applicable accessible parking spaces rate is summarized below in **Table 6.7**.

Table 6.7 – Accessible Parking Requirements (ZBL 569-2013)

Total Parking Spaces Provided	Minimum Rate of Accessible Parking Spaces	Accessible Spaces Required	Accessible Spaces Provided
339	4 parking spaces plus 1 for every 50 parking spaces in excess of 100 excess spaces	8	8

The proposed mixed-use development will require eight (8) accessible parking spaces. The site plan meets the minimum requirement outline in the City of Toronto Zoning By-law 569-2013.

7.0 SITE PLAN REVIEW

7.1. Site Access

According to the site plan provided, access to the site is provided through one (1) full movement driveways located on Sheppard Avenue East. In accordance with Ontario Traffic Manual (OTM) Book 5, we recommend appropriate signage consisting of a STOP sign (Ra-1) and STOP bar be provided on both the parking garage and site access egress driveways.

7.2. Loading Requirement and Vehicle Maneuverability Assessment

The proposed development proposal is to construct a 21-storey mixed-use development consisting of 433 residential units and ground floor commercial. The City of Toronto consolidated By-Law No. 569-2013 loading requirement is summarized in **Table 7.1**.

Table 7.1 – City of Toronto Loading Requirements (ZBL 569-2013)

Land Use	Units	Loading Spaces Rate	Loading Spaces Provided
Building Containing Dwelling Units	433	1 Type “G” and 1-Type “C” for 400+ units	1 Type “G”

The proposed development is providing one (1) Type “G”.

AutoTURN software was used to generate a vehicular turning template to confirm and demonstrate the accessibility of the proposed loading space and surface parking. As illustrated in **Figure 7-1** and **Figure 7-2**, the AutoTURN analysis demonstrates that a City of Toronto “Type G” Truck (Garbage TO2 R) can effectively maneuver through the loading space and a passenger vehicle (P TAC-2017) can maneuver through the provided surface parking spaces.

8.0 TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management (TDM) refers to variety of strategies to reduce congestion, minimize the number of single-occupant vehicles, encourage non-auto modes of travel, and reduce vehicle dependency to create a sustainable transportation system. Typically, TDM strategies are for residential and office developments where large quantities of people congregate in one origin or destination.

Based on our experience, excessive parking supply imposes environmental costs, contradicts community development objectives for more livable and walkable communities, and tends to increase driving and discourage the use of alternative mode of travel. It is anticipated that the combination of reduced parking supply and an efficient public transit system will encourage the use of alternative modes of travel.

Active Transportation

Pedestrian sidewalks are provided on both sides of the roadways, and sidewalk connectivity is provided throughout the proposed municipal road to ensure a complete sidewalk network. According to the *Ten-Year Cycling Network Plan*, bicycle lanes are proposed along Sheppard Avenue East and a boulevard trail is proposed just east of Pharmacy Avenue.

Transit Service

Metrolinx has undertaken the Toronto rapid transit projects part of The Big Move. The Sheppard East light rail transit (LRT) is a planned transit line along Sheppard Avenue providing underground connection from Don Mills subway station to east of Morningside Avenue. The Sheppard East LRT will provide service directly at our proposed site with a station located at Sheppard Avenue East and Pharmacy Avenue.

Currently the nearest transit stop is located at the site and around the Sheppard Avenue East and Pharmacy Avenue intersection. The farthest bus stop is a 3-minute walk (250 metres) or 1-minute bike-ride at Chichester Place and Sheppard Avenue East.

8.1. TDM Implementation

The owner is committed to promote sustainable transportation systems. Based on the review of the context of the proposed development in relation to the TDM requirements in the City's Transportation Impact Study Guidelines (2013), the following TDM measures and incentives will be provided for the proposed development:

- Adopt a blended parking rate of 0.60 spaces per unit for residential and 0.14 spaces per unit for visitor.
- Direct shared pedestrian and cycling connections from the proposed development to Sheppard Avenue East and Pharmacy Avenue via a connecting boulevard and having the main building entrances directly on the major road.
- Provide information package for new residents. The information package includes TTC schedules, community and cycling maps, where appropriate. The Information Package can be distributed at the sale office.
- Unbundling of parking to reduce the resident parking demand.
- Provide one-time pre-loaded PRESTO Cards with the starting value of \$25 (inclusive of the registration fee) for each residential unit on demand basis. This will help the future residents to consider taking TTC service as an alternative mode of transportation. The pre-loaded PRESTO Cards can be distributed in conjunction with the Information Package at the time of purchase or at occupancy.

8.2. Transit and Active Transportation Mode Assessment

The proposed development is situated in a transit supportive neighbourhood with bus stops located at the subject site and the farthest located approximately 3-minutes to the subject site within comfortable walking distance. The route services are illustrated in **Appendix J**. The route services in the immediate area are described below:

- **85 Sheppard East:** The 85 Sheppard East bus route operates approximately every 10 minutes westbound to Sheppard-Yonge Subway Station and eastbound to Rouge Hill GO Station. This route also provides service along the subway station on line 4. The 85 Sheppard East bus route provides service 7 days a week. Weekend service operates every 15 minutes. Accessible service and bike racks are provided on the route.
- **167 Pharmacy North:** The 167 Pharmacy North bus route operates approximately every 30 minutes between Steeles Avenue East and Don Mills Subway Station, generally in a north-south direction. The 167 Pharmacy North bus route provides service on evenings and Saturdays. Weekend service operates every 30 minutes. Accessible service and bike racks are provided on the route.

- **324 Victoria Park:** The 324 Victoria Park bus route is part of the blue night service and operates approximately every 30 minutes northbound to Steeles Avenue East via Sheppard and Warden Avenue and southbound to Kingston Road. This route also stops at Victoria Park Subway Station. The 324 Victoria Park bus route provides service 7 days a week during the overnight period. Accessible service and bike racks are available on this route.
- **385 Sheppard East:** The 385 Sheppard East bus route is part of the blue night service and operates approximately every 20 minutes westbound to Sheppard-Yonge Subway Station and eastbound to Meadowvale Road. The 385 Sheppard East blue night service is provided 7 days a week during the overnight period. Accessible service is provided on this route.
- **985 Sheppard East Express:** The 985 Sheppard East Express bus route operates approximately every 10 minutes westbound on Don Mills Subway Station and eastbound to Sheppard Avenue East and Meadowvale Loop. This route provides connections to Scarborough Centre Station and numerous transit routes. Two branches are provided on this route, 985A operates 7 days a week and 985B operates during peak periods from Monday to Friday. The 985A travels eastbound to Scarborough Centre Station only, and the 985B travels eastbound to Sheppard Avenue East and Meadowvale Loop. Weekend service for the 985A branch operates every 20 minutes. Accessible service and bike racks are available on this route.

Based on the study prepared by the Ministry of Transportation Ontario titled: 'Transit Supportive Guidelines', dated January 2012, transit users are generally willing to walk 400 meters to a local stop or 800 meters to a rapid transit station. The farthest Sheppard Avenue East and Pharmacy Avenue bus stop is approximately 150 meters from the proposed subject site.

Existing Amenities and Commercial Establishments

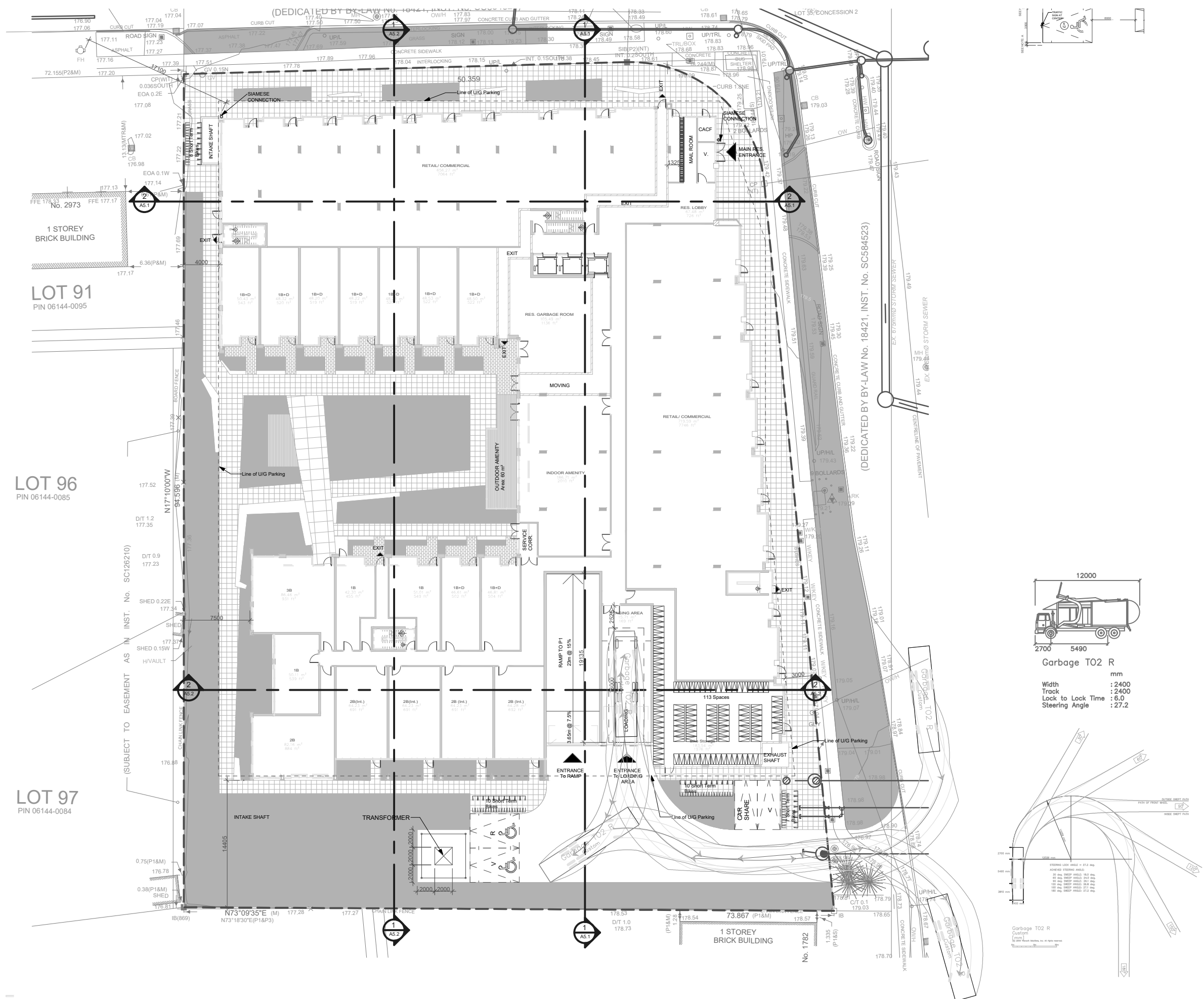
The review of the area surrounding the proposed development indicates numerous recreational facilities, houses of worship, and schools, many of which can be easily reached by pedestrian traffic and non-auto options such as, Wishing Well Park, Vradenburg Junior Public School, Bridlewood Junior Public School, Holy Spirit Roman Catholic Church, etc.

In addition, there are numerous retail, food, and service establishments, many of which are located along Sheppard Avenue East and can be easily reached by pedestrian traffic and non-auto options. A commercial plaza is approximately 850 metres away (about an 11-minute walk or 4-minute bike ride) located at the intersection of Sheppard Avenue East and Victoria Park Avenue.

9.0 CONCLUSION

The findings and conclusions of our analysis are as follows:

- The development proposal is to develop the existing 6,583.0 m² site to include a 21-storey mixed-use building consisting of 433 residential units and 1,340.0 m² of commercial space. Vehicular access to the site is proposed via a full movement driveway located on Pharmacy Avenue.
- The proposed development is anticipated to generate 146 two-way auto trips (41 inbound and 105 outbound) during the weekday AM peak hours and 208 two-way auto trips (119 inbound and 89 outbound) during the weekday PM peak hours.
- The intersection capacity analysis results (based on the methodology and procedures outlined in the Highway Capacity Manual, HCM 2000, published by the Transportation Research Board) indicate that the study intersection and access are expected to operate with acceptable levels of service with the recommended optimized signal timings provided for the study area intersections.
- To ensure safe traffic operation in the area, it is recommended that a STOP sign (Ra-1) and STOP bar be provided on both the parking garage and site access egress driveways.
- Based on City of Toronto Zoning By-law 569-2013, a total of 445 parking spaces will be required for the proposed mixed-use development. The preliminary site plan provides for a total of 339, one (1) of which is a dedicated car share space. It is our opinion that the parking spaces provided by the proposed development is reasonable and justified for the following reasons:
 - The proposed site is located along the future Sheppard LRT line, with a transit stop located directly at the site. With this said, NexTrans believes that Policy Area 3 parking requirements better represent the future site and demographic.
 - According to the 2016 TTS ward data, more than half of the households have no car or just one car (19% + 51% = 70%). There is a large percentage of non-single-occupant vehicle trips (approximately 37%) indicating that the residents in the area are taking alternative modes of transportation instead of driving private automobiles.
 - The proposed site is well-served by the existing transit network and in close proximity to the following TTC transit routes: 85, 167, 324, 385, and 985, two of which are blue night service routes.
 - Bicycle parking spaces are also being provided, 296 long-term and 36 short-term residential and retail combined, promoting cycling as an alternative mode of transportation.
- AutoTURN software was used to confirm that a Type “G” vehicle (Garbage TO2 R) and passenger vehicle (P TAC-2017) can effectively maneuver through the proposed loading space and parking spaces, respectively.



BENCHMARK

REVISIONS

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NO	REVISION	DATE	BY
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STAMP



PROJECT NAME:

MIXED USE DEVELOPMENT

50 & 52 Finch Ave E
(CITY OF TORONTO)

DRAWING TITLE:

AutoTURN Analysis (Garbage T02 R)

DESIGN BY: A.S.

DATE: June 27, 2019

CHECKED BY: R.P.

PROJECT NO.

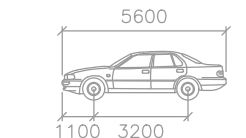
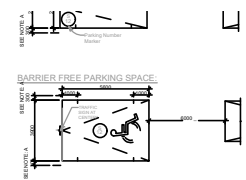
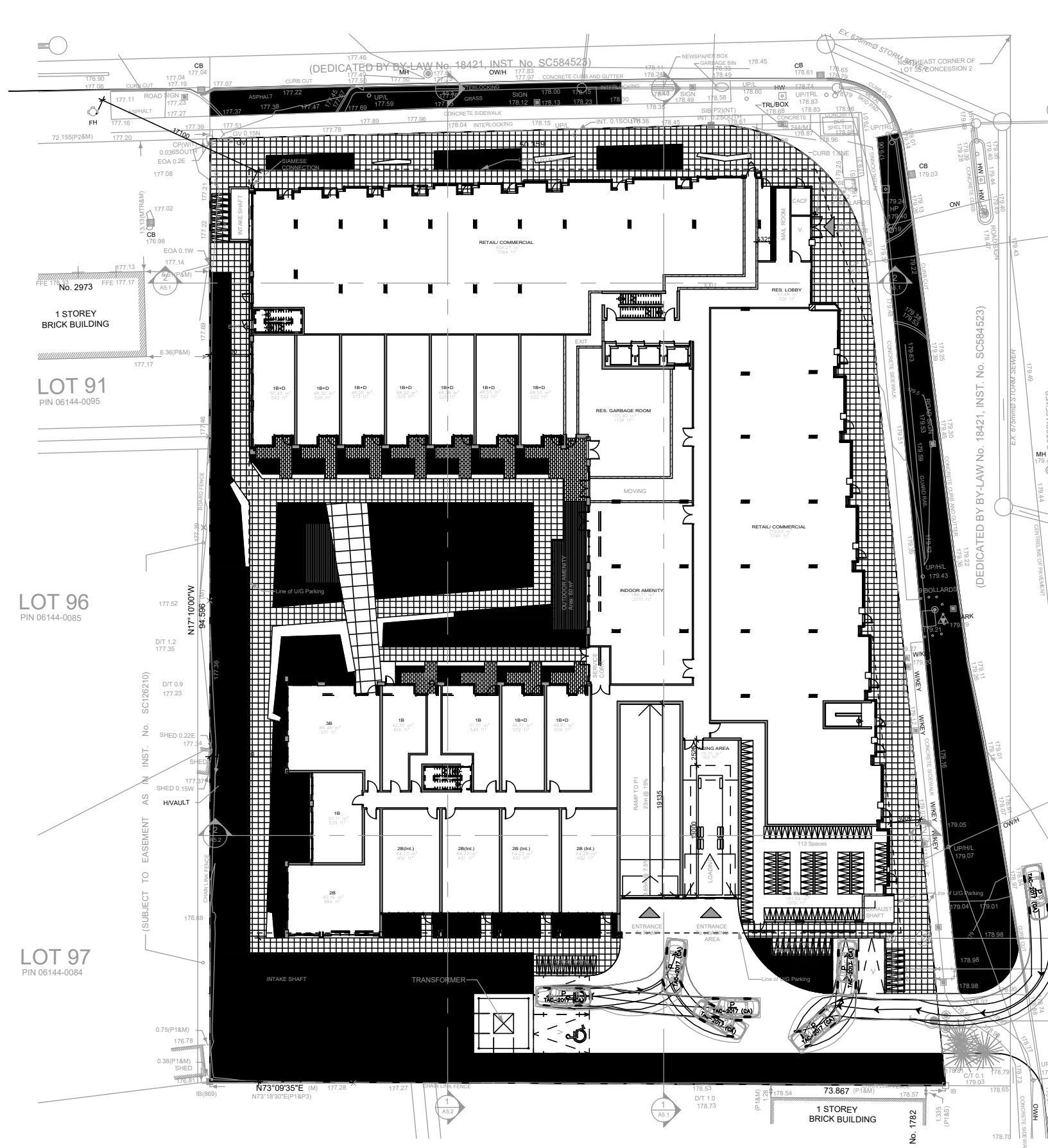
DRAWN BY: A.S.

NT-15-087

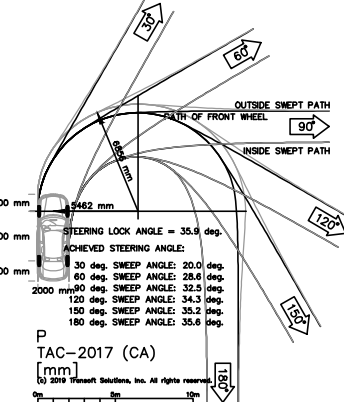
SCALE: NTS

DRAWING NO.

Figure 7-1



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Width : 2000 mm
Track : 2000 mm
Lock to Lock Time : 6.0
Steering Angle : 35.9



BENCHMARK

REVISIONS

NO.	REVISION	DATE	BY

STAMP

nexTrans
CONSULTING ENGINEERS
520 Industrial Parkway South, Suite 201
Aurora, Ontario L4G 6W8
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www.nextrans.ca

PROJECT NAME:
MIXED USE DEVELOPMENT
3005 Sheppard Ave E
& 1800 Pharmacy Ave
(CITY OF TORONTO)

DRAWING TITLE:
AutoTURN Analysis
(P TAC-2017)

DESIGN BY: A.S.	DATE: June 27, 2019
CHECKED BY: R.P.	PROJECT NO: NT-18-195
DRAWN BY: A.S.	DRAWING NO: Figure 7-2
SCALE: NTS	

Appendix A – Terms of Reference

Madeleine Catz

From: Nima Arbabi <Nima.Arbabi@toronto.ca>
Sent: February-01-19 1:54 PM
To: Madeleine Catz
Subject: RE: Terms of Reference for Proposed Mixed-Use Development

Hi Madeleine,

Thank you for submitting your Terms of Reference (ToR).

The submitted ToR is acceptable.

Please note that upon reviewing the Transportation Study, Transportation Services may require additional information or analysis.

Regards,

Nima Arbabi, M.A.Sc., P.Eng.
Acting Transportation Engineering Coordinator
Transportation Services
Scarborough District
P: 416-396-5662
E: nima.arbabi@toronto.ca

From: Madeleine Catz [mailto:madeleine@nextrans.ca]
Sent: January-30-19 1:55 PM
To: Nima Arbabi <Nima.Arbabi@toronto.ca>
Subject: Terms of Reference for Proposed Mixed-Use Development

Good afternoon Nima,

I am working on a Transportation Impact Study for a proposed mixed-use development located at the southwest corner of Sheppard Avenue East and Pharmacy Avenue. I would like to establish a terms of reference for the study, please see attached.

I look forward to receiving your comments. I have also attached the draft site plan for your reference.

Sincerely,

Madeleine Catz, B.Eng., EIT
Transportation Analyst

o: 905-503-2563 ext. 207
c: 647-893-1640
e: madeleine@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

Terms of Reference

To: Nima Arbabi, Acting Transportation Engineering Coordinator, Scarborough District
From: Madeleine Catz, Transportation Analyst, Nextrans Consulting Engineers
Date: January 25, 2019
Re: 3005 Sheppard Avenue East/1800 Pharmacy Avenue, Proposed Mixed-Use Development – TOR for Transportation Impact Study

These terms of reference have been prepared to outline (for the City's review and approval) the intended scope of work for a transportation impact study for the proposed mixed-use development located at the southwest corner of Sheppard Avenue East and Pharmacy Avenue in the City of Toronto. The development proposal includes an 18-storey high-rise building containing ground floor retail space and 321 residential units.

Introduction

The report introduction will include:

1. Description of site location
2. Description of nature of application
3. Description of proposed development and land use
4. Proposed study area

Based on the preliminary site plan, access is provided via a full movement driveway located on Pharmacy Avenue.

Existing Traffic Assessment

The existing conditions within the study area will be summarized and documented. This will include, but not limited to:

- A description of key roads and intersections (lanes, speed limits)
- Identifying forms of traffic control, lane configurations, turning restrictions
- Identifying pedestrian and cycling facilities
- Noting the location of adjacent driveways and access points
- Identifying other traffic generators in the vicinity of the site

Turning movement counts will be collected during weekday AM (7am-10am), weekday PM (4pm-7pm) peak periods at the following study area intersections:

- Sheppard Avenue East and Victoria Park Avenue (signalized);
- Sheppard Avenue East and Pharmacy Avenue (signalized); and
- Sheppard Avenue East and Warden Avenue (signalized).

Once existing traffic volumes have been collected, we will prepare a baseline model of existing traffic operations at the study area intersections using Synchro v.10 and SimTraffic for the identified critical time periods (weekday AM and PM peak hours). The existing analysis will include levels of service, volume to capacity ratios, and queuing at the key study intersections.

Future Background Traffic Assessment

Future Background consists of background growth and other background development traffic. We will obtain historic AADT records and estimate a background growth rate for the assumed 5-year time horizon period.

We do understand that there is and may be further redevelopment applications, as such the following developments will be considered:

- 3105 Sheppard Avenue East (approved), 18-storey mixed-use consisting of 264 residential units
- 2933 Sheppard Avenue East (under review), 18-storey mixed-use consisting of 170 residential units.
- 3260 Sheppard Avenue East (under review), two towers consisting of a total of 805 residential units.

Trip generation associated with the above developments will be included in our analysis to reflect our horizon year assessment (5 years after the anticipated full build-out year).

Operational deficiencies as a result of future forecasted traffic volumes will be identified and mitigative measures will be proposed and documented in the final report.

Site Traffic Assessment

The weekday AM and PM peak hour traffic to be generated by the proposed development will be estimated based on information published in the *Trip Generation, 10th Edition*, by the Institute of Transportation Engineers (ITE).

The directional distribution of traffic approaching and departing the site will be determined based upon existing traffic data and Transportation Tomorrow Survey (TTS) 2016 data.

Future Total Traffic Assessment

Future total traffic consists of future background plus site traffic. Operational deficiencies as a result of site traffic will be identified and mitigative measures will be proposed and documented in the final report. We will develop and recommend appropriate intersection controls and geometric improvements for all key intersections as well as determine the appropriateness of the proposed site access location(s) and the lane requirements at these new locations.

Parking and Site Access Review

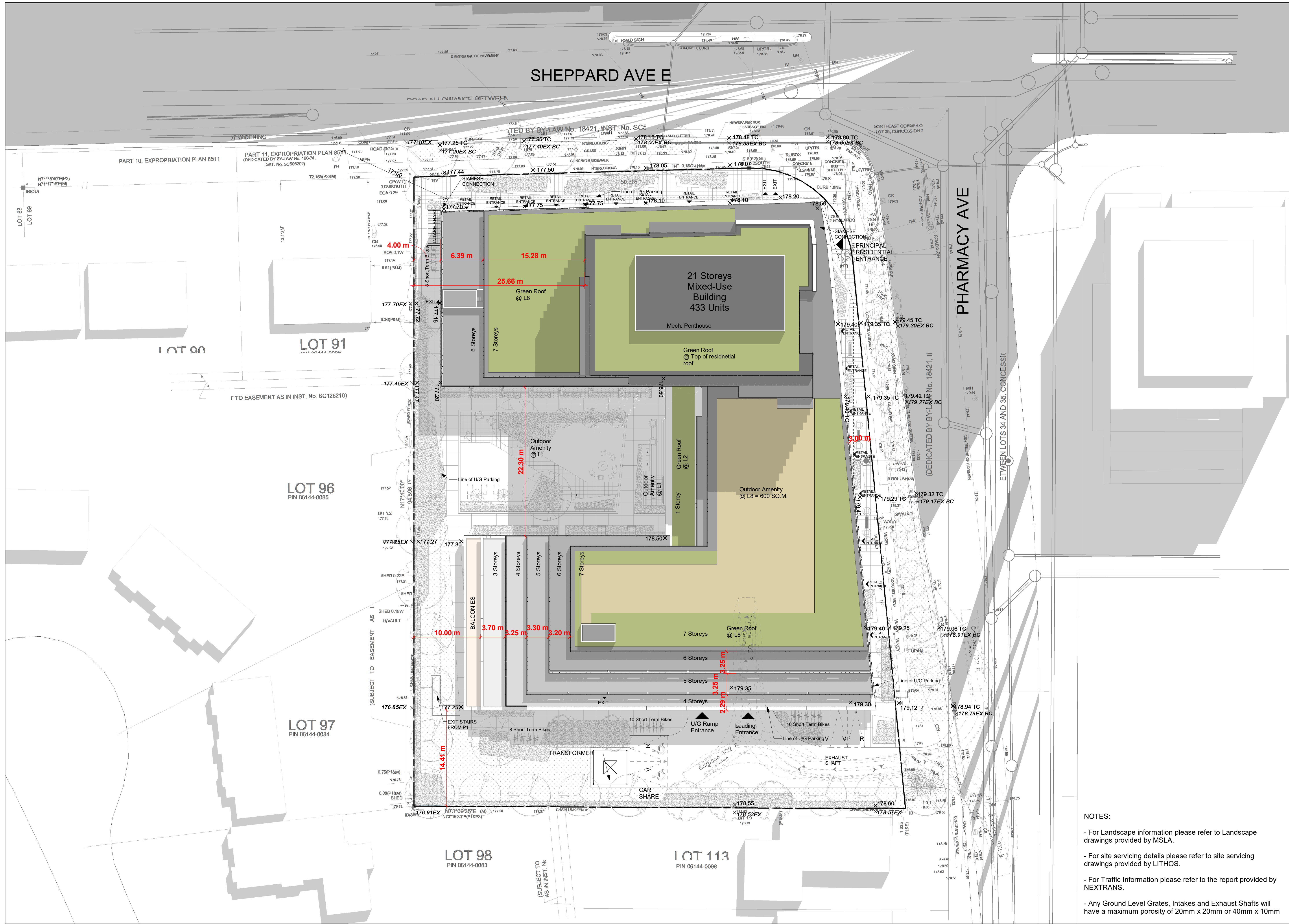
- Review the available parking to determine whether the proposed parking supply is sufficient to accommodate the parking demand of the proposed site and meets current and City-wide by-law requirements.
- We will review and provide comment on the most recent site plan with respect to the functionality of the internal vehicular circulation to facilitate vehicle maneuvering, loading, servicing, parking and pick-up/drop-off activities.
- Using Auto TURN, we will confirm the turning radius requirements and site circulation for passenger and heavy vehicles.
- Determine the appropriateness of access location and ensure adequate connections to main corridors are provided.
- Determine if the site access locations confirm to City standards vis-a-vis spacing, clear throat, sight lines and setback minimum criteria.
- Prepare an internal signage plan depicting location of all regulatory signage as well as location of all convex mirror and pavement markings.

Transit and Transportation Demand Management (TDM) Plan

An TDM plan will be undertaken detailing specific measures that could reduce single occupant trips to the site, this includes but not limited to, Carpooling, Auto Share, bike racks, parking management strategies, etc.

A review of the existing and future transit availability in the area and recommendations shall be made in relation to the City's TDM requirements to ensure acceptable walking distances are proposed to the subject lands.

Appendix B – Proposed Site Plan



- NOTES:
- For Landscape information please refer to Landscape drawings provided by MSLA.
 - For site servicing details please refer to site servicing drawings provided by LITHOS.
 - For Traffic Information please refer to the report provided by NEXTRANS.
 - Any Ground Level Grates, Intakes and Exhaust Shafts will have a maximum porosity of 20mm x 20mm or 40mm x 10mm

Site Plan
Scale: 1:250

1
A1.2

Contractor Must Check And Verify All Dimensions On The Job.
Do Not Scale The Drawings.
All Drawings, Specifications And Related Documents Are The Copyright Of The Architect And Must Be Returned Upon Request.
Reproduction Of Drawings, Specifications And Related Documents In Part Or Whole Is Forbidden Without The Architects Written Permission.
This Drawing Is Not To Be Used For Construction Until Signed By The Architect.
Date:



KIRKOR ARCHITECTS + PLANNERS
20 De Boers Dr. # 400 Toronto ON M3J 0H1
TEL 416 665 6060 kirkorarchitects.com
No.: Revision: Date:

01	ZBA/OPA	Sep 10, 2019
No:	Issued For:	Date:

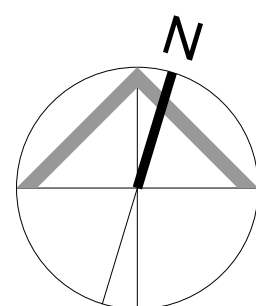
Drawing Title:

Site Plan

Project:
Sheppard Pharmacy GP Inc.

SHEPPARD & PHARMACY

Enter address	Scale:
1 : 250	Drawn by:
Author	Checked by:
Checker	Project No.:
17-119	Date:
Sep 10, 2019	Drawing No.:



A1.2

Appendix C – Existing Traffic Data



Turning Movement Count (1 . SHEPPARD AVE E & VICTORIA PARK AVE)

Start Time	N Approach VICTORIA PARK AVE						E Approach SHEPPARD AVE E						S Approach VICTORIA PARK AVE						W Approach SHEPPARD AVE E						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total			
07:00:00	8	157	5	0	18	170	7	181	51	0	8	239	23	66	36	0	7	125	32	58	7	0	9	97	631		
07:15:00	28	171	5	0	23	204	11	264	56	0	18	331	8	103	41	0	16	152	28	75	10	0	10	113	800		
07:30:00	32	231	12	0	24	275	20	239	78	0	30	337	22	161	61	0	11	244	39	73	13	0	10	125	981		
07:45:00	28	195	7	0	30	230	26	308	66	0	31	400	22	149	58	0	30	230	46	86	20	0	20	152	1012	3424	
08:00:00	37	232	19	0	26	288	19	274	53	0	37	346	28	170	58	0	17	256	40	85	15	0	25	140	1030	3823	
08:15:00	30	194	17	0	36	241	23	357	58	0	34	438	27	184	54	0	69	265	45	110	25	0	58	180	1124	4147	
08:30:00	51	203	21	0	28	275	20	273	65	0	35	358	35	206	62	0	37	303	51	108	23	0	35	182	1118	4284	
08:45:00	45	196	17	0	41	258	32	349	63	0	41	444	28	231	58	0	46	317	55	147	36	0	24	238	1257	4529	
09:00:00	35	245	15	0	25	295	20	295	58	0	36	373	30	210	60	0	30	300	50	116	18	1	33	185	1153	4652	
09:15:00	36	174	10	0	22	220	19	254	51	0	30	324	39	148	61	1	29	249	60	129	22	0	29	211	1004	4532	
09:30:00	38	186	18	0	29	242	18	250	67	0	44	335	35	119	60	0	26	214	45	100	7	0	9	152	943	4357	
09:45:00	23	161	25	0	14	209	25	207	43	1	22	276	24	117	62	1	24	204	57	130	20	0	17	207	896	3996	
BREAK																											
16:00:00	17	164	30	0	52	211	29	148	31	0	54	208	50	204	53	0	32	307	93	231	38	0	57	362	1088		
16:15:00	15	252	26	0	28	293	20	160	44	0	57	224	53	220	47	2	38	322	105	212	29	0	47	346	1185		
16:30:00	18	216	25	0	26	259	12	167	42	2	32	223	53	214	49	2	54	318	100	258	44	0	50	402	1202		
16:45:00	18	179	20	0	25	217	15	157	35	1	38	208	45	215	56	1	41	317	80	277	46	0	47	403	1145	4620	
17:00:00	17	219	35	0	31	271	23	144	44	0	44	211	58	178	48	1	61	285	93	288	46	0	59	427	1194	4726	
17:15:00	20	228	42	0	40	290	17	125	32	0	37	174	50	176	43	0	34	269	96	326	51	0	42	473	1206	4747	
17:30:00	21	220	39	0	28	280	23	143	34	0	49	200	48	168	46	0	38	262	109	316	49	0	39	474	1216	4761	
17:45:00	19	219	23	0	38	261	22	138	44	0	45	204	52	173	43	0	35	268	93	260	45	1	41	399	1132	4748	
18:00:00	23	191	31	0	19	245	22	131	36	1	41	190	57	175	46	0	23	278	82	295	33	0	34	410	1123	4677	
18:15:00	24	209	31	0	22	264	21	125	47	0	29	193	46	188	45	3	29	282	95	259	46	0	31	400	1139	4610	
18:30:00	18	186	22	0	11	226	24	122	49	0	37	195	57	146	42	1	26	246	70	241	35	0	26	346	1013	4407	
18:45:00	20	142	22	0	19	184	19	129	51	0	38	199	51	136	41	1	26	229	68	221	32	0	26	321	933	4208	
Grand Total	621	4770	517	0	655	5908	487	4940	1198	5	867	6630	941	4057	1230	13	780	6242	1632	4401	710	2	778	6745	25525	-	
Approach%	10.5%	80.7%	8.8%	0%	-	-	7.3%	74.5%	18.1%	0.1%	-	-	15.1%	65%	19.7%	0.2%	-	-	24.2%	65.2%	10.5%	0%	-	-	-	-	
Totals %	2.4%	18.7%	2%	0%	-	23.1%	1.9%	19.4%	4.7%	0%	-	26%	3.7%	15.9%	4.8%	0.1%	-	24.5%	6.4%	17.2%	2.8%	0%	-	26.4%	-	-	
Heavy	44	169	22	0	-	-	14	227	21	0	-	-	27	168	23	0	-	-	42	211	43	0	-	-	-	-	
Heavy %	7.1%	3.5%	4.3%	0%	-	-	2.9%	4.6%	1.8%	0%	-	-	2.9%	4.1%	1.9%	0%	-	-	2.6%	4.8%	6.1%	0%	-	-	-	-	
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Turning Movement Count
Location Name: SHEPPARD AVE E & VICTORIA PARK AVE
Date: Thu, Feb 07, 2019 Deployment Lead: David Chu

NexTrans

, ,



Peak Hour: 08:15 AM - 09:15 AM Weather: Mist (-3 °C)

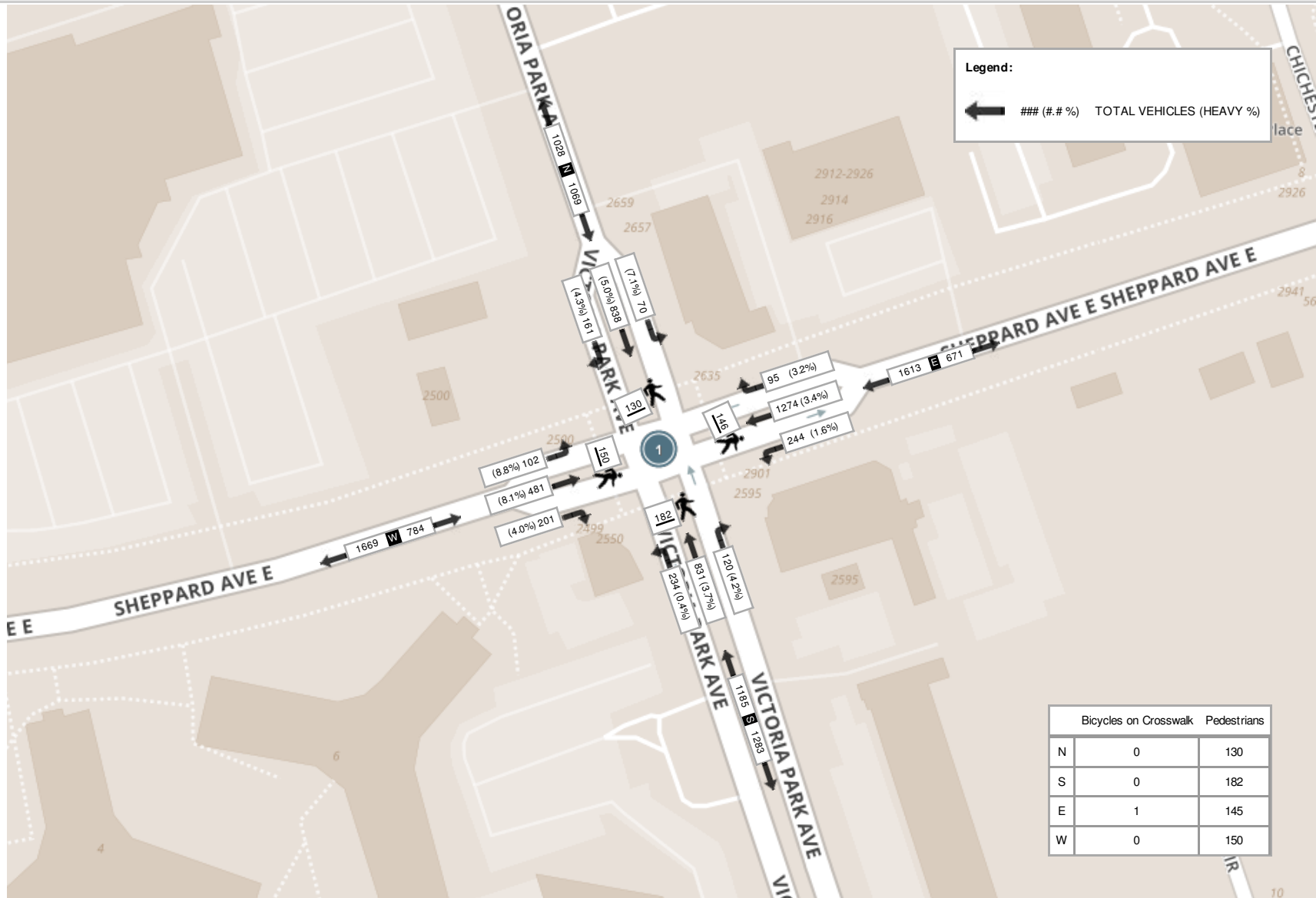
Start Time	N Approach VICTORIA PARK AVE						E Approach SHEPPARD AVE E						S Approach VICTORIA PARK AVE						W Approach SHEPPARD AVE E						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:15:00	30	194	17	0	36	241	23	357	58	0	34	438	27	184	54	0	69	265	45	110	25	0	58	180	1124
08:30:00	51	203	21	0	28	275	20	273	65	0	35	358	35	206	62	0	37	303	51	108	23	0	35	182	1118
08:45:00	45	196	17	0	41	258	32	349	63	0	41	444	28	231	58	0	46	317	55	147	36	0	24	238	1257
09:00:00	35	245	15	0	25	295	20	295	58	0	36	373	30	210	60	0	30	300	50	116	18	1	33	185	1153
Grand Total	161	838	70	0	130	1069	95	1274	244	0	146	1613	120	831	234	0	182	1185	201	481	102	1	150	785	4652
Approach%	15.1%	78.4%	6.5%	0%	-	-	5.9%	79%	15.1%	0%	-	-	10.1%	70.1%	19.7%	0%	-	-	25.6%	61.3%	13%	0.1%	-	-	-
Totals %	3.5%	18%	1.5%	0%	23%	2%	27.4%	5.2%	0%	34.7%	2.6%	17.9%	5%	0%	25.5%	4.3%	10.3%	2.2%	0%	16.9%	-	-	-	-	
PHF	0.79	0.86	0.83	0	0.91	0.74	0.89	0.94	0	0.91	0.86	0.9	0.94	0	0.93	0.91	0.82	0.71	0.25	0.82	-	-	-	-	
Heavy	7	42	5	0	54	3	43	4	0	50	5	31	1	0	37	8	39	9	0	56	-	-	-	-	
Heavy %	4.3%	5%	7.1%	0%	5.1%	3.2%	3.4%	1.6%	0%	3.1%	4.2%	3.7%	0.4%	0%	3.1%	4%	8.1%	8.8%	0%	7.1%	-	-	-	-	
Lights	154	796	65	0	1015	92	1231	240	0	1563	115	800	233	0	1148	193	442	93	1	729	-	-	-	-	
Lights %	95.7%	95%	92.9%	0%	94.9%	96.8%	96.6%	98.4%	0%	96.9%	95.8%	96.3%	99.6%	0%	96.9%	96%	91.9%	91.2%	100%	92.9%	-	-	-	-	
Single-Unit Trucks	1	21	2	0	24	0	14	2	0	16	2	4	1	0	7	4	8	1	0	13	-	-	-	-	
Single-Unit Trucks %	0.6%	2.5%	2.9%	0%	2.2%	0%	1.1%	0.8%	0%	1%	1.7%	0.5%	0.4%	0%	0.6%	2%	1.7%	1%	0%	1.7%	-	-	-	-	
Buses	6	15	3	0	24	3	28	2	0	33	3	25	0	0	28	4	30	8	0	42	-	-	-	-	
Buses %	3.7%	1.8%	4.3%	0%	2.2%	3.2%	2.2%	0.8%	0%	2%	2.5%	3%	0%	0%	2.4%	2%	6.2%	7.8%	0%	5.4%	-	-	-	-	
Articulated Trucks	0	6	0	0	6	0	1	0	0	1	0	2	0	0	2	0	1	0	0	1	-	-	-	-	
Articulated Trucks %	0%	0.7%	0%	0%	0.6%	0%	0.1%	0%	0%	0.1%	0%	0.2%	0%	0%	0.2%	0%	0.2%	0%	0%	0.1%	-	-	-	-	
Pedestrians	-	-	-	-	130	-	-	-	-	145	-	-	-	-	182	-	-	-	-	150	-	-	-	-	
Pedestrians%	-	-	-	-	21.4%	-	-	-	-	23.8%	-	-	-	-	29.9%	-	-	-	-	24.7%	-	-	-	-	
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-	-	-	
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	0.2%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	



Peak Hour: 04:45 PM - 05:45 PM Weather: Mist (-1.23 °C)

Start Time	N Approach VICTORIA PARK AVE						E Approach SHEPPARD AVE E						S Approach VICTORIA PARK AVE						W Approach SHEPPARD AVE E						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:45:00	18	179	20	0	25	217	15	157	35	1	38	208	45	215	56	1	41	317	80	277	46	0	47	403	1145
17:00:00	17	219	35	0	31	271	23	144	44	0	44	211	58	178	48	1	61	285	93	288	46	0	59	427	1194
17:15:00	20	228	42	0	40	290	17	125	32	0	37	174	50	176	43	0	34	269	96	326	51	0	42	473	1206
17:30:00	21	220	39	0	28	280	23	143	34	0	49	200	48	168	46	0	38	262	109	316	49	0	39	474	1216
Grand Total	76	846	136	0	124	1058	78	569	145	1	168	793	201	737	193	2	174	1133	378	1207	192	0	187	1777	4761
Approach%	7.2%	80%	12.9%	0%	-	-	9.8%	71.8%	18.3%	0.1%	-	-	17.7%	65%	17%	0.2%	-	-	21.3%	67.9%	10.8%	0%	-	-	-
Totals %	1.6%	17.8%	2.9%	0%	22.2%	22.2%	1.6%	12%	3%	0%	16.7%	16.7%	4.2%	15.5%	4.1%	0%	23.8%	23.8%	7.9%	25.4%	4%	0%	37.3%	37.3%	-
PHF	0.9	0.93	0.81	0	0.91	0.91	0.85	0.91	0.82	0.25	0.94	0.94	0.87	0.86	0.86	0.5	0.89	0.89	0.87	0.93	0.94	0	0.94	0.94	-
Heavy	6	17	6	0	29	29	1	25	2	0	28	28	4	20	4	0	28	28	6	35	9	0	50	50	-
Heavy %	7.9%	2%	4.4%	0%	2.7%	2.7%	1.3%	4.4%	1.4%	0%	3.5%	3.5%	2%	2.7%	2.1%	0%	2.5%	2.5%	1.6%	2.9%	4.7%	0%	2.8%	2.8%	-
Lights	70	829	130	0	1029	1029	77	544	143	1	765	765	197	717	189	2	1105	1105	372	1172	183	0	1727	1727	-
Lights %	92.1%	98%	95.6%	0%	97.3%	97.3%	98.7%	95.6%	98.6%	100%	96.5%	96.5%	98%	97.3%	97.9%	100%	97.5%	97.5%	98.4%	97.1%	95.3%	0%	97.2%	97.2%	-
Single-Unit Trucks	0	4	3	0	7	7	1	3	1	0	5	5	4	5	3	0	12	12	3	7	4	0	14	14	-
Single-Unit Trucks %	0%	0.5%	2.2%	0%	0.7%	0.7%	1.3%	0.5%	0.7%	0%	0.6%	0.6%	2%	0.7%	1.6%	0%	1.1%	1.1%	0.8%	0.6%	2.1%	0%	0.8%	0.8%	-
Buses	6	12	1	0	19	19	0	22	0	0	22	22	0	14	1	0	15	15	3	27	5	0	35	35	-
Buses %	7.9%	1.4%	0.7%	0%	1.8%	1.8%	0%	3.9%	0%	0%	2.8%	2.8%	0%	1.9%	0.5%	0%	1.3%	1.3%	0.8%	2.2%	2.6%	0%	2%	2%	-
Articulated Trucks	0	1	2	0	3	3	0	0	1	0	1	1	0	1	0	0	1	1	0	1	0	0	1	1	-
Articulated Trucks %	0%	0.1%	1.5%	0%	0.3%	0.3%	0%	0%	0.7%	0%	0.1%	0.1%	0%	0.1%	0%	0%	0.1%	0.1%	0%	0.1%	0%	0%	0.1%	0.1%	-
Pedestrians	-	-	-	-	124	-	-	-	-	-	168	-	-	-	-	-	174	-	-	-	-	-	187	-	-
Pedestrians%	-	-	-	-	19%	-	-	-	-	-	25.7%	-	-	-	-	-	26.6%	-	-	-	-	-	28.6%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-

Peak Hour: 08:15 AM - 09:15 AM Weather: Mist (-3 °C)





Turning Movement Count (3 . SHEPPARD AVE E & WARDEN AVE)

Start Time	N Approach WARDEN AVE						E Approach SHEPPARD AVE E						S Approach WARDEN AVE						W Approach SHEPPARD AVE E						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total			
07:00:00	19	202	12	0	12	233	9	184	46	0	15	239	6	79	11	0	8	96	16	66	4	0	8	86	654		
07:15:00	27	239	12	0	14	278	19	192	35	0	14	246	19	80	25	0	11	124	19	71	15	0	16	105	753		
07:30:00	24	213	17	0	21	254	23	203	40	0	27	266	13	122	34	0	11	169	28	71	10	0	12	109	798		
07:45:00	28	258	18	0	19	304	19	230	55	0	26	304	19	140	26	0	18	185	26	107	22	0	20	155	948	3153	
08:00:00	24	266	19	0	22	309	27	246	33	0	52	306	22	142	28	0	26	192	39	111	22	0	18	172	979	3478	
08:15:00	26	268	34	0	30	328	32	267	32	1	21	332	18	148	37	0	24	203	45	128	18	0	17	191	1054	3779	
08:30:00	24	282	37	0	26	343	17	254	47	0	24	318	33	173	37	0	11	243	44	147	18	0	18	209	1113	4094	
08:45:00	39	274	32	0	16	345	18	250	48	0	17	316	18	184	28	0	20	230	44	166	17	0	17	227	1118	4264	
09:00:00	33	212	20	0	20	265	25	223	46	0	21	294	19	174	34	0	10	227	42	130	28	0	12	200	986	4271	
09:15:00	15	234	26	0	25	275	25	216	41	0	25	282	14	136	30	0	16	180	25	128	13	0	17	166	903	4120	
09:30:00	36	210	12	0	16	258	29	226	54	1	18	310	19	114	34	0	20	167	32	138	7	0	20	177	912	3919	
09:45:00	25	196	19	0	19	240	21	188	42	0	10	251	32	93	26	0	12	151	36	135	14	1	12	186	828	3629	
BREAK																											
16:00:00	16	191	30	0	10	237	34	127	39	0	22	200	36	196	34	1	28	267	34	220	32	0	26	286	990		
16:15:00	22	237	32	0	14	291	31	136	42	0	26	209	52	198	24	0	36	274	38	223	23	0	25	284	1058		
16:30:00	24	248	33	0	13	305	28	149	36	0	9	213	29	198	29	0	21	256	43	220	25	0	32	288	1062		
16:45:00	20	239	34	0	19	293	34	150	35	0	22	219	28	178	28	0	32	234	45	232	29	0	25	306	1052	4162	
17:00:00	26	209	32	0	22	267	35	158	44	0	32	237	29	186	31	0	37	246	40	260	29	1	19	330	1080	4252	
17:15:00	25	229	33	0	7	287	24	122	45	0	27	191	33	185	21	0	41	239	48	256	24	0	23	328	1045	4239	
17:30:00	20	243	32	0	25	295	27	150	36	0	37	213	29	184	28	0	32	241	28	259	30	1	45	318	1067	4244	
17:45:00	29	233	27	0	7	289	27	122	36	0	27	185	32	189	35	0	31	256	26	250	36	0	20	312	1042	4234	
18:00:00	24	219	37	0	12	280	33	126	50	0	18	209	32	141	32	0	35	205	35	220	23	0	39	278	972	4126	
18:15:00	17	205	33	0	14	255	37	147	43	0	15	227	28	164	18	0	32	210	42	249	20	0	28	311	1003	4084	
18:30:00	23	214	32	1	2	270	34	128	31	0	30	193	34	179	23	0	28	236	30	262	37	0	17	329	1028	4045	
18:45:00	17	177	22	0	2	216	20	119	41	0	17	180	30	209	43	0	20	282	38	198	26	0	20	262	940	3943	
Grand Total	583	5498	635	1	387	6717	628	4313	997	2	552	5940	624	3792	696	1	560	5113	843	4247	522	3	506	5615	23385	-	
Approach%	8.7%	81.9%	9.5%	0%		-	10.6%	72.6%	16.8%	0%		-	12.2%	74.2%	13.6%	0%		-	15%	75.6%	9.3%	0.1%		-	-	-	
Totals %	2.5%	23.5%	2.7%	0%		28.7%	2.7%	18.4%	4.3%	0%		25.4%	2.7%	16.2%	3%	0%		21.9%	3.6%	18.2%	2.2%	0%		24%	-	-	
Heavy	12	165	11	0		-	13	232	26	0		-	22	123	11	0		-	32	200	13	0		-	-	-	
Heavy %	2.1%	3%	1.7%	0%		-	2.1%	5.4%	2.6%	0%		-	3.5%	3.2%	1.6%	0%		-	3.8%	4.7%	2.5%	0%		-	-	-	
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	



Turning Movement Count
Location Name: SHEPPARD AVE E & WARDEN AVE
Date: Thu, Feb 07, 2019 Deployment Lead: David Chu

NexTrans

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Peak Hour: 08:15 AM - 09:15 AM Weather: Mist (-3 °C)

Start Time	N Approach WARDEN AVE						E Approach SHEPPARD AVE E						S Approach WARDEN AVE						W Approach SHEPPARD AVE E						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:15:00	26	268	34	0	30	328	32	267	32	1	21	332	18	148	37	0	24	203	45	128	18	0	17	191	1054
08:30:00	24	282	37	0	26	343	17	254	47	0	24	318	33	173	37	0	11	243	44	147	18	0	18	209	1113
08:45:00	39	274	32	0	16	345	18	250	48	0	17	316	18	184	28	0	20	230	44	166	17	0	17	227	1118
09:00:00	33	212	20	0	20	265	25	223	46	0	21	294	19	174	34	0	10	227	42	130	28	0	12	200	986
Grand Total	122	1036	123	0	92	1281	92	994	173	1	83	1260	88	679	136	0	65	903	175	571	81	0	64	827	4271
Approach%	9.5%	80.9%	9.6%	0%	-	-	7.3%	78.9%	13.7%	0.1%	-	-	9.7%	75.2%	15.1%	0%	-	-	21.2%	69%	9.8%	0%	-	-	-
Totals %	2.9%	24.3%	2.9%	0%	-	30%	2.2%	23.3%	4.1%	0%	-	29.5%	2.1%	15.9%	3.2%	0%	-	21.1%	4.1%	13.4%	1.9%	0%	-	19.4%	-
PHF	0.78	0.92	0.83	0	-	0.93	0.72	0.93	0.9	0.25	-	0.95	0.67	0.92	0.92	0	-	0.93	0.97	0.86	0.72	0	-	0.91	-
Heavy	2	33	3	0	-	38	4	48	9	0	-	61	7	25	3	0	-	35	12	37	3	0	-	52	-
Heavy %	1.6%	3.2%	2.4%	0%	-	3%	4.3%	4.8%	5.2%	0%	-	4.8%	8%	3.7%	2.2%	0%	-	3.9%	6.9%	6.5%	3.7%	0%	-	6.3%	-
Lights	120	1003	120	0	-	1243	88	946	164	1	-	1199	81	654	133	0	-	868	163	534	78	0	-	775	-
Lights %	98.4%	96.8%	97.6%	0%	-	97%	95.7%	95.2%	94.8%	100%	-	95.2%	92%	96.3%	97.8%	0%	-	96.1%	93.1%	93.5%	96.3%	0%	-	93.7%	-
Single-Unit Trucks	1	17	2	0	-	20	1	16	4	0	-	21	3	6	1	0	-	10	4	9	1	0	-	14	-
Single-Unit Trucks %	0.8%	1.6%	1.6%	0%	-	1.6%	1.1%	1.6%	2.3%	0%	-	1.7%	3.4%	0.9%	0.7%	0%	-	1.1%	2.3%	1.6%	1.2%	0%	-	1.7%	-
Buses	1	15	1	0	-	17	3	29	5	0	-	37	4	16	2	0	-	22	8	27	2	0	-	37	-
Buses %	0.8%	1.4%	0.8%	0%	-	1.3%	3.3%	2.9%	2.9%	0%	-	2.9%	4.5%	2.4%	1.5%	0%	-	2.4%	4.6%	4.7%	2.5%	0%	-	4.5%	-
Articulated Trucks	0	1	0	0	-	1	0	3	0	0	-	3	0	3	0	0	-	3	0	1	0	0	-	1	-
Articulated Trucks %	0%	0.1%	0%	0%	-	0.1%	0%	0.3%	0%	0%	-	0.2%	0%	0.4%	0%	0%	-	0.3%	0%	0.2%	0%	0%	-	0.1%	-
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	-
Bicycles on Road %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	-
Pedestrians	-	-	-	-	92	-	-	-	-	-	83	-	-	-	-	-	64	-	-	-	-	-	64	-	-
Pedestrians%	-	-	-	-	30.3%	-	-	-	-	-	27.3%	-	-	-	-	-	21.1%	-	-	-	-	-	21.1%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0.3%	-	-	-	-	-	0%	-	-

Peak Hour: 04:15 PM - 05:15 PM Weather: Mist (-1.23 °C)

Start Time	N Approach WARDEN AVE						E Approach SHEPPARD AVE E						S Approach WARDEN AVE						W Approach SHEPPARD AVE E						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:15:00	22	237	32	0	14	291	31	136	42	0	26	209	52	198	24	0	36	274	38	223	23	0	25	284	1058
16:30:00	24	248	33	0	13	305	28	149	36	0	9	213	29	198	29	0	21	256	43	220	25	0	32	288	1062
16:45:00	20	239	34	0	19	293	34	150	35	0	22	219	28	178	28	0	32	234	45	232	29	0	25	306	1052
17:00:00	26	209	32	0	22	267	35	158	44	0	32	237	29	186	31	0	37	246	40	260	29	1	19	330	1080
Grand Total	92	933	131	0	68	1156	128	593	157	0	89	878	138	760	112	0	126	1010	166	935	106	1	101	1208	4252
Approach%	8%	80.7%	11.3%	0%		-	14.6%	67.5%	17.9%	0%		-	13.7%	75.2%	11.1%	0%		-	13.7%	77.4%	8.8%	0.1%		-	-
Totals %	2.2%	21.9%	3.1%	0%		27.2%	3%	13.9%	3.7%	0%		20.6%	3.2%	17.9%	2.6%	0%		23.8%	3.9%	22%	2.5%	0%		28.4%	-
PHF	0.88	0.94	0.96	0		0.95	0.91	0.94	0.89	0		0.93	0.66	0.96	0.9	0		0.92	0.92	0.9	0.91	0.25		0.92	-
Heavy	0	24	0	0		24	1	36	1	0		38	2	20	1	0		23	4	32	3	0		39	-
Heavy %	0%	2.6%	0%	0%		2.1%	0.8%	6.1%	0.6%	0%		4.3%	1.4%	2.6%	0.9%	0%		2.3%	2.4%	3.4%	2.8%	0%		3.2%	-
Lights	92	909	131	0		1132	127	557	156	0		840	136	740	111	0		987	162	903	103	1		1169	-
Lights %	100%	97.4%	100%	0%		97.9%	99.2%	93.9%	99.4%	0%		95.7%	98.6%	97.4%	99.1%	0%		97.7%	97.6%	96.6%	97.2%	100%		96.8%	-
Single-Unit Trucks	0	7	0	0		7	0	9	1	0		10	0	6	0	0		6	1	6	0	0		7	-
Single-Unit Trucks %	0%	0.8%	0%	0%		0.6%	0%	1.5%	0.6%	0%		1.1%	0%	0.8%	0%	0%		0.6%	0.6%	0.6%	0%	0%		0.6%	-
Buses	0	12	0	0		12	0	26	0	0		26	2	12	0	0		14	2	25	3	0		30	-
Buses %	0%	1.3%	0%	0%		1%	0%	4.4%	0%	0%		3%	1.4%	1.6%	0%	0%		1.4%	1.2%	2.7%	2.8%	0%		2.5%	-
Articulated Trucks	0	5	0	0		5	1	1	0	0		2	0	2	1	0		3	1	1	0	0		2	-
Articulated Trucks %	0%	0.5%	0%	0%		0.4%	0.8%	0.2%	0%	0%		0.2%	0%	0.3%	0.9%	0%		0.3%	0.6%	0.1%	0%	0%		0.2%	-
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	67	-	-	-	-	-	89	-	-	-	-	-	126	-	-	-	-	-	100	-	-
Pedestrians%	-	-	-	-	17.4%	-	-	-	-	-	23.2%	-	-	-	-	-	32.8%	-	-	-	-	-	26%	-	-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	-	0.3%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0.3%	-	-

Peak Hour: 08:15 AM - 09:15 AM Weather: Mist (-3 °C)



Peak Hour: 04:15 PM - 05:15 PM Weather: Mist (-1.23 °C)





Turning Movement Count (2 . SHEPPARD AVENUE E & PHARMACY AVE)

Start Time	N Approach PHARMACY AVE						E Approach SHEPPARD AVENUE E						S Approach PHARMACY AVE						W Approach SHEPPARD AVENUE E						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total			
07:00:00	45	3	22	0	5	70	13	201	9	0	5	223	4	5	5	0	1	14	8	58	8	0	7	74	381		
07:15:00	67	1	25	0	4	93	16	234	19	0	2	269	2	8	10	0	2	20	5	81	14	0	3	100	482		
07:30:00	102	4	28	0	9	134	23	247	14	0	12	284	5	16	10	0	3	31	4	85	17	0	5	106	555		
07:45:00	90	0	43	0	6	133	17	282	20	0	12	319	7	13	13	0	3	33	5	91	11	0	8	107	592	2010	
08:00:00	90	3	61	0	6	154	29	276	24	0	12	329	6	9	13	0	1	28	6	115	16	0	6	137	648	2277	
08:15:00	110	0	70	0	14	180	45	288	24	0	18	357	11	25	13	0	7	49	6	137	25	0	7	168	754	2549	
08:30:00	114	4	64	0	9	182	50	283	48	1	12	382	4	40	12	0	3	56	8	137	27	0	6	172	792	2786	
08:45:00	141	13	80	0	4	234	25	301	33	0	10	359	9	13	9	0	9	31	6	147	33	0	6	186	810	3004	
09:00:00	82	37	50	0	6	169	23	263	10	0	5	296	3	18	15	0	4	36	2	143	26	0	3	171	672	3028	
09:15:00	66	25	28	0	6	119	26	254	11	0	1	291	3	7	8	0	6	18	6	127	18	0	7	151	579	2853	
09:30:00	57	15	27	0	0	99	14	264	9	0	2	287	4	7	8	0	1	19	5	154	11	0	3	170	575	2636	
09:45:00	42	18	27	0	1	87	18	234	4	1	8	257	3	8	5	0	6	16	3	158	20	0	5	181	541	2367	
BREAK																											
16:00:00	22	24	49	0	7	95	21	154	4	0	9	179	5	14	11	0	5	30	8	256	38	0	2	302	606		
16:15:00	38	24	54	0	6	116	32	170	9	0	8	211	8	26	12	0	7	46	11	244	45	0	9	300	673		
16:30:00	36	43	44	0	8	123	22	177	7	0	5	206	17	19	7	0	4	43	14	286	42	0	9	342	714		
16:45:00	47	57	54	0	5	158	22	144	4	0	3	170	11	20	9	0	2	40	18	287	48	0	11	353	721	2714	
17:00:00	40	61	60	0	8	161	28	156	9	0	8	193	11	11	12	0	5	34	19	285	48	0	3	352	740	2848	
17:15:00	35	62	57	0	10	154	23	147	6	0	5	176	8	28	3	0	7	39	11	356	67	0	21	434	803	2978	
17:30:00	52	47	64	0	4	163	34	150	6	0	13	190	15	21	11	0	11	47	23	343	55	0	7	421	821	3085	
17:45:00	41	48	46	0	5	135	23	161	8	0	9	192	15	25	16	0	10	56	16	277	46	0	2	339	722	3086	
18:00:00	45	65	58	0	5	168	21	130	9	0	4	160	19	33	10	0	3	62	5	306	47	1	7	359	749	3095	
18:15:00	35	37	40	0	7	112	24	148	10	0	5	182	15	20	10	0	6	45	13	288	44	0	13	345	684	2976	
18:30:00	37	24	23	0	5	84	28	148	8	0	5	184	10	21	12	0	9	43	12	279	38	0	5	329	640	2795	
18:45:00	40	22	33	0	1	95	24	157	5	1	2	187	10	14	5	0	1	29	9	255	32	0	7	296	607	2680	
Grand Total	1474	637	1107	0	141	3218	601	4969	310	3	175	5883	205	421	239	0	116	865	223	4895	776	1	162	5895	15861	-	
Approach%	45.8%	19.8%	34.4%	0%		-	10.2%	84.5%	5.3%	0.1%		-	23.7%	48.7%	27.6%	0%		-	3.8%	83%	13.2%	0%		-	-	-	
Totals %	9.3%	4%	7%	0%		20.3%	3.8%	31.3%	2%	0%		37.1%	1.3%	2.7%	1.5%	0%		5.5%	1.4%	30.9%	4.9%	0%		37.2%	-	-	
Heavy	35	5	21	0		-	18	226	14	0		-	4	3	6	0		-	3	225	34	0		-	-	-	
Heavy %	2.4%	0.8%	1.9%	0%		-	3%	4.5%	4.5%	0%		-	2%	0.7%	2.5%	0%		-	1.3%	4.6%	4.4%	0%		-	-	-	
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	



Turning Movement Count
Location Name: SHEPPARD AVENUE E & PHARMACY AVE
Date: Thu, Feb 07, 2019 Deployment Lead: David Chu

NexTrans

, ,



Peak Hour: 08:15 AM - 09:15 AM Weather: Mist (-3 °C)

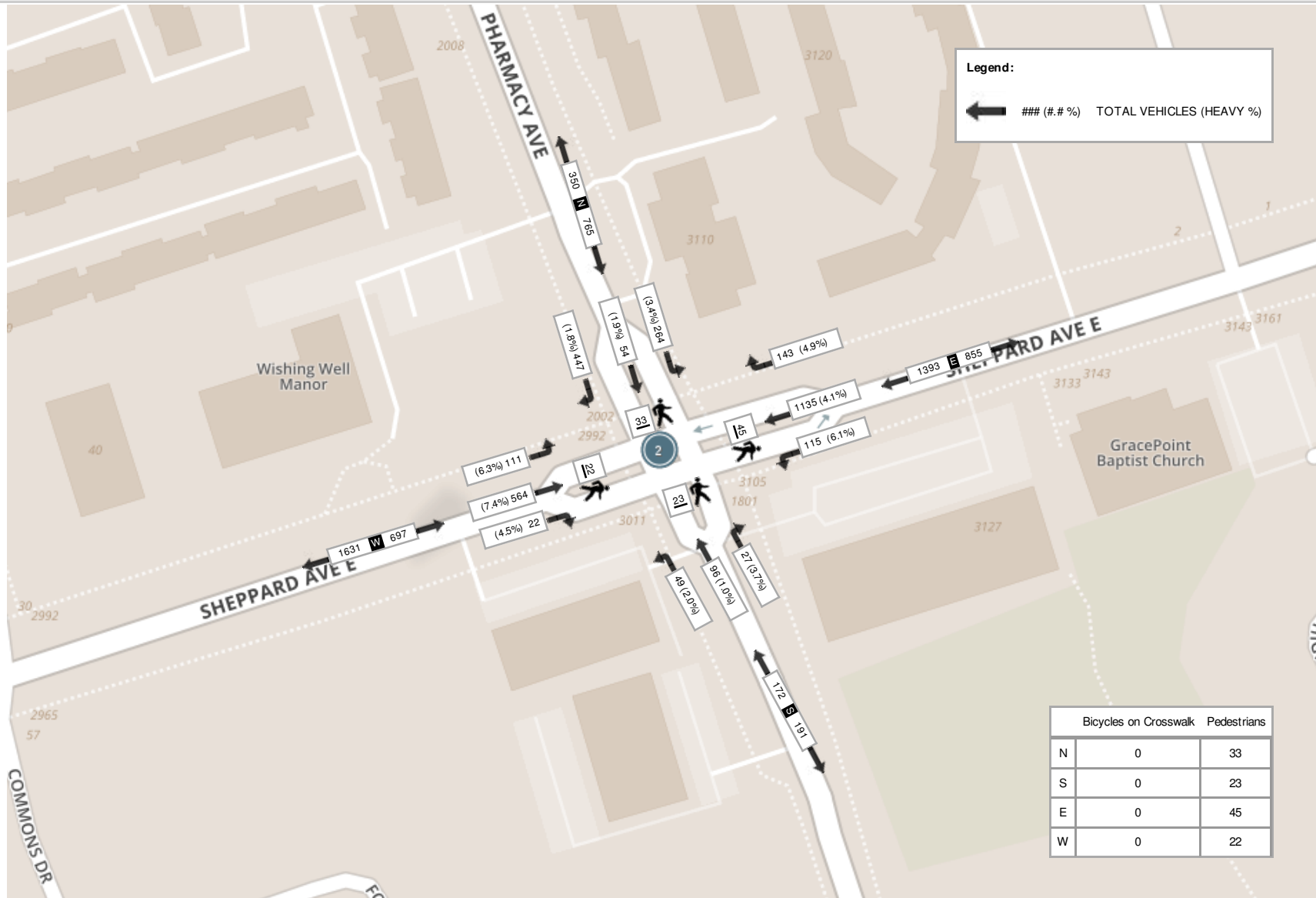
Start Time	N Approach PHARMACY AVE						E Approach SHEPPARD AVENUE E						S Approach PHARMACY AVE						W Approach SHEPPARD AVENUE E						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:15:00	110	0	70	0	14	180	45	288	24	0	18	357	11	25	13	0	7	49	6	137	25	0	7	168	754
08:30:00	114	4	64	0	9	182	50	283	48	1	12	382	4	40	12	0	3	56	8	137	27	0	6	172	792
08:45:00	141	13	80	0	4	234	25	301	33	0	10	359	9	13	9	0	9	31	6	147	33	0	6	186	810
09:00:00	82	37	50	0	6	169	23	263	10	0	5	296	3	18	15	0	4	36	2	143	26	0	3	171	672
Grand Total	447	54	264	0	33	765	143	1135	115	1	45	1394	27	96	49	0	23	172	22	564	111	0	22	697	3028
Approach%	58.4%	7.1%	34.5%	0%	-	-	10.3%	81.4%	8.2%	0.1%	-	-	15.7%	55.8%	28.5%	0%	-	-	3.2%	80.9%	15.9%	0%	-	-	-
Totals %	14.8%	1.8%	8.7%	0%	-	25.3%	4.7%	37.5%	3.8%	0%	-	46%	0.9%	3.2%	1.6%	0%	-	5.7%	0.7%	18.6%	3.7%	0%	-	23%	-
PHF	0.79	0.36	0.83	0	-	0.82	0.72	0.94	0.6	0.25	-	0.91	0.61	0.6	0.82	0	-	0.77	0.69	0.96	0.84	0	-	0.94	-
Heavy	8	1	9	0	-	18	7	46	7	0	-	60	1	1	1	0	-	3	1	42	7	0	-	50	-
Heavy %	1.8%	1.9%	3.4%	0%	-	2.4%	4.9%	4.1%	6.1%	0%	-	4.3%	3.7%	1%	2%	0%	-	1.7%	4.5%	7.4%	6.3%	0%	-	7.2%	-
Lights	439	53	255	0	-	747	136	1089	108	1	-	1334	26	95	48	0	-	169	21	522	104	0	-	647	-
Lights %	98.2%	98.1%	96.6%	0%	-	97.6%	95.1%	95.9%	93.9%	100%	-	95.7%	96.3%	99%	98%	0%	-	98.3%	95.5%	92.6%	93.7%	0%	-	92.8%	-
Single-Unit Trucks	3	1	4	0	-	8	3	18	1	0	-	22	1	0	0	0	-	1	0	11	2	0	-	13	-
Single-Unit Trucks %	0.7%	1.9%	1.5%	0%	-	1%	2.1%	1.6%	0.9%	0%	-	1.6%	3.7%	0%	0%	0%	-	0.6%	0%	2%	1.8%	0%	-	1.9%	-
Buses	5	0	5	0	-	10	4	26	6	0	-	36	0	1	1	0	-	2	1	30	5	0	-	36	-
Buses %	1.1%	0%	1.9%	0%	-	1.3%	2.8%	2.3%	5.2%	0%	-	2.6%	0%	1%	2%	0%	-	1.2%	4.5%	5.3%	4.5%	0%	-	5.2%	-
Articulated Trucks	0	0	0	0	-	0	0	2	0	0	-	2	0	0	0	0	-	0	0	1	0	0	-	1	-
Articulated Trucks %	0%	0%	0%	0%	-	0%	0%	0.2%	0%	0%	-	0.1%	0%	0%	0%	0%	-	0%	0%	0.2%	0%	0%	-	0.1%	-
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	-
Bicycles on Road %	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	-
Pedestrians	-	-	-	-	33	-	-	-	-	-	45	-	-	-	-	-	23	-	-	-	-	-	22	-	-
Pedestrians%	-	-	-	-	26.8%	-	-	-	-	-	36.6%	-	-	-	-	-	18.7%	-	-	-	-	-	17.9%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-



Peak Hour: 05:15 PM - 06:15 PM Weather: Mist (-1.23 °C)

Start Time	N Approach PHARMACY AVE						E Approach SHEPPARD AVENUE E						S Approach PHARMACY AVE						W Approach SHEPPARD AVENUE E						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
17:15:00	35	62	57	0	10	154	23	147	6	0	5	176	8	28	3	0	7	39	11	356	67	0	21	434	803
17:30:00	52	47	64	0	4	163	34	150	6	0	13	190	15	21	11	0	11	47	23	343	55	0	7	421	821
17:45:00	41	48	46	0	5	135	23	161	8	0	9	192	15	25	16	0	10	56	16	277	46	0	2	339	722
18:00:00	45	65	58	0	5	168	21	130	9	0	4	160	19	33	10	0	3	62	5	306	47	1	7	359	749
Grand Total	173	222	225	0	24	620	101	588	29	0	31	718	57	107	40	0	31	204	55	1282	215	1	37	1553	3095
Approach%	27.9%	35.8%	36.3%	0%	-	-	14.1%	81.9%	4%	0%	-	-	27.9%	52.5%	19.6%	0%	-	-	3.5%	82.5%	13.8%	0.1%	-	-	-
Totals %	5.6%	7.2%	7.3%	0%	20%	-	3.3%	19%	0.9%	0%	23.2%	-	1.8%	3.5%	1.3%	0%	6.6%	-	1.8%	41.4%	6.9%	0%	50.2%	-	-
PHF	0.83	0.85	0.88	0	0.92	-	0.74	0.91	0.81	0	0.93	-	0.75	0.81	0.63	0	0.82	-	0.6	0.9	0.8	0.25	0.89	-	-
Heavy	3	0	1	0	4	-	1	24	0	0	25	-	0	0	0	0	0	-	0	37	2	0	39	-	-
Heavy %	1.7%	0%	0.4%	0%	0.6%	-	1%	4.1%	0%	0%	3.5%	-	0%	0%	0%	0%	0%	-	0%	2.9%	0.9%	0%	2.5%	-	-
Lights	170	222	224	0	616	-	100	564	29	0	693	-	57	107	40	0	204	-	55	1245	213	1	1514	-	-
Lights %	98.3%	100%	99.6%	0%	99.4%	-	99%	95.9%	100%	0%	96.5%	-	100%	100%	100%	0%	100%	-	100%	97.1%	99.1%	100%	97.5%	-	-
Single-Unit Trucks	0	0	1	0	1	-	0	4	0	0	4	-	0	0	0	0	0	-	0	12	0	0	12	-	-
Single-Unit Trucks %	0%	0%	0.4%	0%	0.2%	-	0%	0.7%	0%	0%	0.6%	-	0%	0%	0%	0%	0%	-	0%	0.9%	0%	0%	0.8%	-	-
Buses	3	0	0	0	3	-	1	20	0	0	21	-	0	0	0	0	0	-	0	22	2	0	24	-	-
Buses %	1.7%	0%	0%	0%	0.5%	-	1%	3.4%	0%	0%	2.9%	-	0%	0%	0%	0%	0%	-	0%	1.7%	0.9%	0%	1.5%	-	-
Articulated Trucks	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	3	0	0	3	-	-
Articulated Trucks %	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0.2%	0%	0%	0.2%	-	-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road %	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	-
Pedestrians	-	-	-	-	24	-	-	-	-	30	-	-	-	-	-	31	-	-	-	-	-	-	37	-	-
Pedestrians%	-	-	-	-	19.5%	-	-	-	-	24.4%	-	-	-	-	-	25.2%	-	-	-	-	-	-	30.1%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	0.8%	-	-	-	-	-	0%	-	-	-	-	-	-	0%	-	-

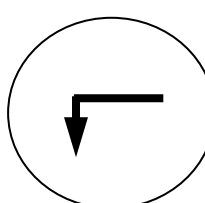
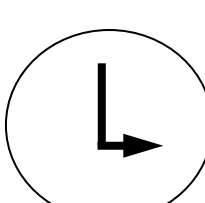
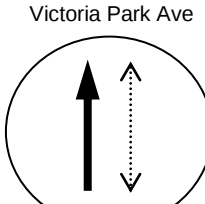
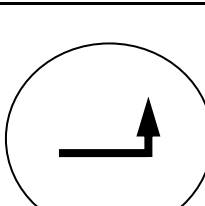
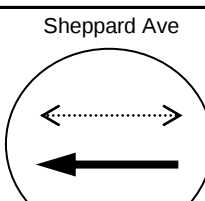
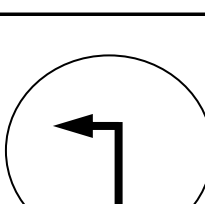
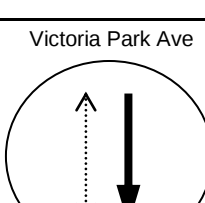
Peak Hour: 08:15 AM - 09:15 AM Weather: Mist (-3 °C)



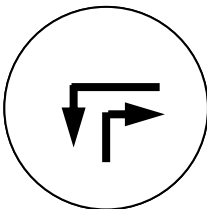
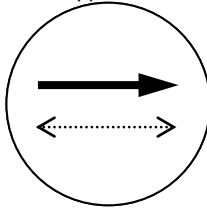
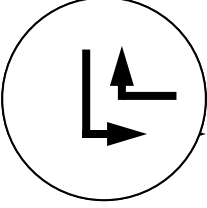
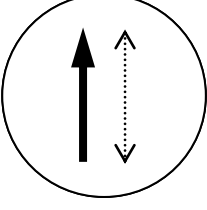
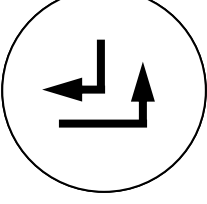
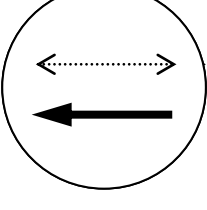
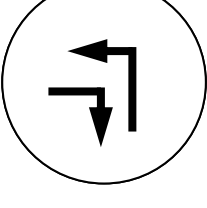
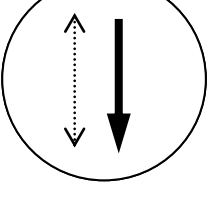
Peak Hour: 05:15 PM - 06:15 PM Weather: Mist (-1.23 °C)



LOCATION:		Sheppard Av & Victoria Park Av				DISTRICT: Scarborough	
TCS:		748				COMPUTER SYSTEM: TransSuite	
MODE/COMMENT:		FXT with 2-wire Polara APS & TSP				CONTROLLER/CABINET TYPE: Peek ATC 1000/TS2T1	
PREPARED/CHECKED BY:		SQ/HL				CONFLICT FLASH: Red & Red	
PREPARATION DATE:		December 31, 2015				DESIGN WALK SPEED: 1.0 m/s (FDW based on full crossing at 1.2 m/s)	
IMPLEMENTATION DATE:		March 21, 2016				CHANNEL/DROP: 4039/50	
CONTROLLER FIRMWARE: 3.018.1.2976							

NEMA Phase		OFF All Other Times	AM 06:45- 10:00 M-F	PM 15:15- 19:30 M-F	DVP	Phase Mode (Fixed/Demanded/Callable)	Remarks
	Local Plan	Pattern 1	Pattern 2	Pattern 3	Pattern 4		
	Split Table	Split 1	Split 2	Split 3	Split 4		
1 	WLK FDW MIN 6 MAX1 6 AMB 3 ALR 1 SPLIT					Callable/Extendable by 9m set-back loop	Pedestrian Minimums: EWWK = 7 sec, EWFD = 29 sec NSWK = 7 sec, NSFD = 27 sec Left-Turn Passage Time = 2 sec Actuated APS during WALK periods when no arrows are displayed. Extended Push Activation = 3 secs
2 Sheppard Ave 	WLK 7 FDW 29 MIN 36 MAX1 36 AMB 4 ALR 3 SPLIT					Fixed	12 system loops equipped, 3 located on north leg exit lanes for NB traffic, 3 located on east leg exit lanes for EB traffic, 3 located on south leg exit lanes for SB traffic & 3 located on west leg exit lanes for WB traffic. Two transit request loops can call and extend EBLA until transit vehicle drives over cancel loop or up to the green split.
3 	WLK FDW MIN 6 MAX1 6 AMB 3 ALR 1 SPLIT					Callable/Extendable by 5m set-back loop	During AM & PM plans when both EBLT setback and transit request loops can call and extend the EBLA: - EBLT setback loop calls and extends EBLA. - EBLT transit request loops call and extend EBLA until cancel loop is active. - EBLT setback loop can call phase and setback loop can extend phase.
4 Victoria Park Ave 	WLK 7 FDW 27 MIN 34 MAX1 34 AMB 4 ALR 3 SPLIT					Fixed	- EB transit loops can call phase and setback loop can extend phase. - Cancel loop does not cancel extensions if there is ongoing setback loop demand. EBLT transit request loops are monitored on local det 4 and call disappears when cancel loop is activated.
5 	WLK FDW MIN 6 MAX1 6 AMB 3 ALR 1 SPLIT					Callable and Extendable during AM and PM periods by 9m setback loop; Callable and Extendable 24 hours by transit loop.	Two EBLT transit request loops located 85 m and 60 m from stopbar.
6 Sheppard Ave 	WLK 7 FDW 29 MIN 36 MAX1 36 AMB 4 ALR 3 SPLIT					Fixed	
7 	WLK FDW MIN 6 MAX1 6 AMB 3 ALR 1 SPLIT					Callable/Extendable by 9m set-back loop	
8 Victoria Park Ave 	WLK 7 FDW 27 MIN 34 MAX1 34 AMB 4 ALR 3 SPLIT					Fixed	
	CL OF	120 1	120 61	130 1	130 1		

NOTES: Picked up under TransSuite on March 21, 2016 at approximately 1:32 PM

LOCATION: Sheppard Ave E & Warden Ave		DISTRICT: Scarborough						
TCS: 750		COMPUTER SYSTEM: TransSuite						
MODE/COMMENT: FXT with 2 Wire Polara APS		CONTROLLER/CABINET TYPE: PEEK ATC1000 / TS2T1						
PREPARED/CHECKED BY: TZ/AD		CONFLICT FLASH: Red & Red						
PREPARATION DATE: November 28, 2017		DESIGN WALK SPEED: 1.0 m/s (FDW based on full crossing @ 1.2m/s)						
IMPLEMENTATION DATE: September 27, 2018		CHANNEL/DROP: 4073/25						
		FIRMWARE VERSION: 3.018.1.2976						
NEMA Phase		OFF All Other Times	AM 06:30-09:15 M-F	PM 15:00-19:00 M-F	NIGHT 22:00 - 06:30 Daily	WKND 10:00 - 18:15 SAT/SUN	Phase Mode (Fixed/Demanded/Callable)	Remarks
	Local Plan	Pattern 1	Pattern 2	Pattern 3	Pattern 4	Pattern 5		
	Split Table	Split 1	Split 2	Split 3	Split 4	Split 5		
1 	WLK FDW MIN 6 MAX 1 7 AMB 3 ALR 1 SPLIT						Callable/Extendable by Wavetronix detector	Pedestrian Minimums: EWWK = 7 sec, EWFD = 24 sec NSWK = 7 sec, NSFD = 24 sec Left-Turn Passage Time = 2 sec
								WBLA and NBRA are displayed simultaneously.
								NBLA and EBRA are displayed simultaneously.
2 Sheppard Ave 	WLK 7 FDW 24 MIN 31 MAX 1 32 AMB 4 ALR 3 SPLIT						Fixed	SBLA and WBRA are displayed simultaneously.
								EBLA and SBRA are displayed simultaneously.
								APS on during FULL WALK of NSWK and EWWK when activated by APS pushbuttons and no arrows are displayed
								Extended Push Activation = 3 secs
3 	WLK FDW MIN 6 MAX 1 7 AMB 3 ALR 1 SPLIT						Callable/Extendable by Wavetronix detector	
4 Warden Ave 	WLK 7 FDW 24 MIN 31 MAX 1 43 AMB 4 ALR 3 SPLIT						Fixed	
5 	WLK FDW MIN 6 MAX 1 7 AMB 3 ALR 1 SPLIT						Callable/Extendable by Wavetronix detector	
6 Sheppard Ave 	WLK 7 FDW 24 MIN 31 MAX 1 43 AMB 4 ALR 3 SPLIT						Fixed	
7 	WLK FDW MIN 6 MAX 1 7 AMB 3 ALR 1 SPLIT						Callable/Extendable by Wavetronix detector	
8 Warden Ave 	WLK 7 FDW 24 MIN 31 MAX 1 32 AMB 4 ALR 3 SPLIT						Fixed	
	CL OF	100 2	110 90	110 16	90 22	100 2		

NOTES:

LOCATION:

MODE/COMMENT:

TCS:

PREPARED/CHECKED BY:

PREPARATION DATE:

DATE IMPLEMENTED:

Sheppard Ave E & Pharmacy Ave

FXT with 2-wire Polara APS

749

HDR / SQ / IA

September 6, 2018

October 18, 2018

DISTRICT:

COMPUTER SYSTEM:

CONTROLLER/CABINET TYPE:

CONFLICT FLASH:

DESIGN WALK SPEED:

CHANNEL/DROP:

CONTROLLER FIRMWARE:

Scarborough

TransSuite

Econolite ASC/3-2100 / TS2T1

Red & Red

1.0 m/s (FDW based on full crossing at 1.2m/s)

4039/28

2.47.10



NEMA Phase		OFF All Other Times	AM 06:30-09:15 M-F	PM 15:00-19:00 M-F	NIGHT 22:00-06:30 Daily	Weekend 10:00-19:00 Sat & Sun	Phase Mode (Fixed/Demanded/Callable)	Remarks
	Local Plan	Pattern 1	Pattern 2	Pattern 3	Pattern 4	Pattern 5		
	System Plan	Plan 1	Plan 2	Plan 3	Plan 4	Plan 5		
1	NOT USED	WLK FDW MIN MAX AMB ALR SPLIT						Pedestrian Minimums: EWVK = 7 sec., EWFD = 23 sec. NSWK = 7 sec., NSFD = 26 sec. Left-Turn passage = 2 sec. APS on during FULL WALK period when actuated by push button and no arrows are displayed Extended Push Activation = 3 sec
2	Sheppard Ave E	WLK 7 FDW 23 MIN 30 MAX 46 AMB 4 ALR 2 SPLIT					Fixed	
3	NOT USED	WLK FDW MIN MAX AMB ALR SPLIT						
4	Pharmacy Ave	WLK 7 FDW 26 MIN 33 MAX 41 AMB 4 ALR 3 SPLIT					Fixed	
5		WLK FDW MIN 6 MAX 7 AMB 3 ALR 1 SPLIT					Callable/Extendable by setback loop	
6	Sheppard Ave E	WLK 7 FDW 23 MIN 30 MAX 46 AMB 4 ALR 2 SPLIT					Fixed	
7	NOT USED	WLK FDW MIN MAX AMB ALR SPLIT						
8	Pharmacy Ave	WLK 7 FDW 26 MIN 33 MAX 41 AMB 4 ALR 3 SPLIT					Fixed	
		CL OF VP	100 53	110 10	110 69	90 66	100 53	

NOTES:

Appendix D – Existing Traffic Level of Service Calculations

Timings

3: Victoria Park Avenue & Sheppard Avenue East

02/21/2019



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↰↰↰	↰	↰↰↰	↰	↰↰↰	↰	↰↰↰
Traffic Volume (vph)	102	481	244	1274	234	831	70	838
Future Volume (vph)	102	481	244	1274	234	831	70	838
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	NA
Protected Phases	5	2	1	6	3	8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	3	8	4	4
Switch Phase								
Minimum Initial (s)	6.0	36.0	6.0	36.0	6.0	34.0	34.0	34.0
Minimum Split (s)	10.0	43.0	10.0	43.0	10.0	41.0	41.0	41.0
Total Split (s)	20.0	52.0	12.0	44.0	14.0	56.0	42.0	42.0
Total Split (%)	16.7%	43.3%	10.0%	36.7%	11.7%	46.7%	35.0%	35.0%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	1.0	3.0	1.0	3.0	1.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	4.0	7.0	4.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	Max	Max	Max
Act Effect Green (s)	58.5	45.0	52.4	41.4	52.0	49.0	35.0	35.0
Actuated g/C Ratio	0.49	0.38	0.44	0.34	0.43	0.41	0.29	0.29
v/c Ratio	0.66	0.47	0.83	0.91	1.15	0.54	0.66	0.85
Control Delay	35.8	26.1	46.2	46.9	134.3	27.4	63.4	45.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.8	26.1	46.2	46.9	134.3	27.4	63.4	45.5
LOS	D	C	D	D	F	C	E	D
Approach Delay		27.6		46.8		47.7		46.7
Approach LOS		C		D		D		D

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 3 (3%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 105

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.15

Intersection Signal Delay: 43.6

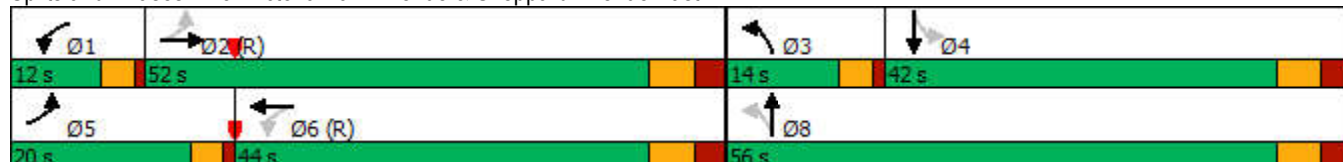
Intersection LOS: D

Intersection Capacity Utilization 121.0%

ICU Level of Service H

Analysis Period (min) 15

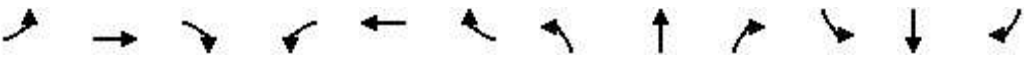
Splits and Phases: 3: Victoria Park Avenue & Sheppard Avenue East



HCM Signalized Intersection Capacity Analysis

3: Victoria Park Avenue & Sheppard Avenue East

02/21/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	102	481	201	244	1274	95	234	831	120	70	838	161
Future Volume (vph)	102	481	201	244	1274	95	234	831	120	70	838	161
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		4.0	7.0		4.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.95		1.00	0.99		1.00	0.98		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		1.00	1.00		0.96	1.00	
Frt	1.00	0.96		1.00	0.99		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1655	4411		1743	4917		1803	4784		1627	4680	
Flt Permitted	0.09	1.00		0.30	1.00		0.10	1.00		0.26	1.00	
Satd. Flow (perm)	155	4411		553	4917		195	4784		440	4680	
Peak-hour factor, PHF	0.71	0.82	0.91	0.94	0.89	0.74	0.94	0.90	0.86	0.83	0.86	0.79
Adj. Flow (vph)	144	587	221	260	1431	128	249	923	140	84	974	204
RTOR Reduction (vph)	0	57	0	0	9	0	0	17	0	0	27	0
Lane Group Flow (vph)	144	751	0	260	1550	0	249	1046	0	84	1151	0
Confl. Peds. (#/hr)	130		182	182		130	150		146	146		150
Heavy Vehicles (%)	9%	8%	4%	2%	3%	3%	0%	4%	4%	7%	5%	4%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	56.6	45.0		49.4	41.4		49.0	49.0		35.0	35.0	
Effective Green, g (s)	56.6	45.0		49.4	41.4		49.0	49.0		35.0	35.0	
Actuated g/C Ratio	0.47	0.38		0.41	0.34		0.41	0.41		0.29	0.29	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	218	1654		306	1696		213	1953		128	1365	
v/s Ratio Prot	c0.06	0.17		c0.06	c0.32		c0.10	0.22			0.25	
v/s Ratio Perm	0.25			0.29			c0.38			0.19		
v/c Ratio	0.66	0.45		0.85	0.91		1.17	0.54		0.66	0.84	
Uniform Delay, d1	24.4	28.2		27.5	37.6		30.2	26.9		37.2	39.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.3	0.9		19.3	9.1		114.8	1.1		23.3	6.5	
Delay (s)	31.7	29.2		46.7	46.7		144.9	27.9		60.6	46.4	
Level of Service	C	C		D	D		F	C		E	D	
Approach Delay (s)		29.5			46.7			50.1			47.4	
Approach LOS		C			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			44.7			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)			22.0			
Intersection Capacity Utilization			121.0%			ICU Level of Service			H			
Analysis Period (min)			15									
c Critical Lane Group												

Timings

6: Pharmacy Avenue & Sheppard Avenue East

02/21/2019



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	←	↑↑↑	←	↑↑↑	←	↑↑	←	↑↑
Traffic Volume (vph)	111	564	115	1135	49	96	264	54
Future Volume (vph)	111	564	115	1135	49	96	264	54
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	6.0	30.0	5.0	5.0	33.0	33.0	5.0	5.0
Minimum Split (s)	10.0	36.0	36.0	36.0	40.0	40.0	40.0	40.0
Total Split (s)	11.0	61.0	50.0	50.0	49.0	49.0	49.0	49.0
Total Split (%)	10.0%	55.5%	45.5%	45.5%	44.5%	44.5%	44.5%	44.5%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	6.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	Max	Max	Max	Max
Act Effect Green (s)	57.0	55.0	44.0	44.0	42.0	42.0	42.0	42.0
Actuated g/C Ratio	0.52	0.50	0.40	0.40	0.38	0.38	0.38	0.38
v/c Ratio	0.74	0.26	0.67	0.72	0.30	0.15	0.75	0.57
Control Delay	41.9	15.8	36.5	29.3	29.2	18.5	42.4	22.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.9	15.8	36.5	29.3	29.2	18.5	42.4	22.4
LOS	D	B	D	C	C	B	D	C
Approach Delay		20.4		30.2		21.0		28.5
Approach LOS		C		C		C		C

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 70 (64%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 27.0

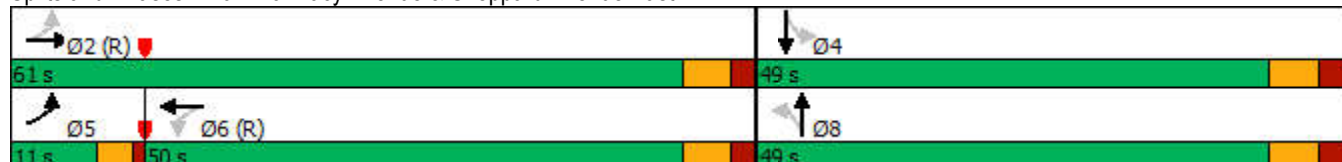
Intersection LOS: C

Intersection Capacity Utilization 108.0%

ICU Level of Service G

Analysis Period (min) 15

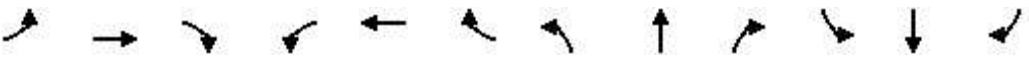
Splits and Phases: 6: Pharmacy Avenue & Sheppard Avenue East



HCM Signalized Intersection Capacity Analysis

6: Pharmacy Avenue & Sheppard Avenue East

02/21/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰ ↱ ↲	↱ ↲	↰ ↱ ↲	↰ ↱ ↲	↱ ↲	↰ ↱ ↲	↰ ↱ ↲	↱ ↲	↰ ↱ ↲	↰ ↱ ↲	↱ ↲	↰ ↱ ↲
Traffic Volume (vph)	111	564	22	115	1135	143	49	96	27	264	54	447
Future Volume (vph)	111	564	22	115	1135	143	49	96	27	264	54	447
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00		0.97	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.97		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1703	4808		1685	4842		1758	3395		1693	3037	
Flt Permitted	0.09	1.00		0.41	1.00		0.28	1.00		0.62	1.00	
Satd. Flow (perm)	158	4808		720	4842		518	3395		1112	3037	
Peak-hour factor, PHF	0.84	0.96	0.69	0.60	0.94	0.72	0.82	0.60	0.61	0.83	0.36	0.79
Adj. Flow (vph)	132	588	32	192	1207	199	60	160	44	318	150	566
RTOR Reduction (vph)	0	6	0	0	20	0	0	23	0	0	100	0
Lane Group Flow (vph)	132	615	0	192	1386	0	60	181	0	318	616	0
Confl. Peds. (#/hr)	33		23	23		33	22		45	45		22
Heavy Vehicles (%)	6%	7%	4%	6%	4%	5%	2%	1%	4%	3%	2%	2%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	55.0	55.0		44.0	44.0		42.0	42.0		42.0	42.0	
Effective Green, g (s)	55.0	55.0		44.0	44.0		42.0	42.0		42.0	42.0	
Actuated g/C Ratio	0.50	0.50		0.40	0.40		0.38	0.38		0.38	0.38	
Clearance Time (s)	4.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	177	2404		288	1936		197	1296		424	1159	
v/s Ratio Prot	c0.05	0.13			0.29			0.05			0.20	
v/s Ratio Perm	c0.33			0.27			0.12			c0.29		
v/c Ratio	0.75	0.26		0.67	0.72		0.30	0.14		0.75	0.53	
Uniform Delay, d1	19.5	15.8		27.0	27.7		23.8	22.2		29.5	26.4	
Progression Factor	1.00	1.00		1.00	1.02		1.00	1.00		1.00	1.00	
Incremental Delay, d2	15.6	0.3		7.6	1.5		4.0	0.2		11.6	1.7	
Delay (s)	35.2	16.0		34.7	29.7		27.7	22.4		41.0	28.1	
Level of Service	D	B		C	C		C	C		D	C	
Approach Delay (s)		19.4			30.3			23.6			32.1	
Approach LOS		B			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			28.1			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			110.0			Sum of lost time (s)				17.0		
Intersection Capacity Utilization			108.0%			ICU Level of Service				G		
Analysis Period (min)			15									
c Critical Lane Group												

Timings

9: Warden Avenue & Sheppard Avenue East

02/21/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	81	571	175	173	994	92	136	679	88	123	1036	122
Future Volume (vph)	81	571	175	173	994	92	136	679	88	123	1036	122
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	6.0	31.0	31.0	6.0	31.0	31.0	6.0	31.0	31.0	6.0	31.0	31.0
Minimum Split (s)	10.0	38.0	38.0	10.0	38.0	38.0	10.0	38.0	38.0	10.0	38.0	38.0
Total Split (s)	11.0	40.0	40.0	13.0	42.0	42.0	11.0	45.0	45.0	12.0	46.0	46.0
Total Split (%)	10.0%	36.4%	36.4%	11.8%	38.2%	38.2%	10.0%	40.9%	40.9%	10.9%	41.8%	41.8%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Max	Max	None	Max	Max
Act Effect Green (s)	43.0	33.0	33.0	47.0	35.0	35.0	48.1	38.1	38.1	49.9	39.0	39.0
Actuated g/C Ratio	0.39	0.30	0.30	0.43	0.32	0.32	0.44	0.35	0.35	0.45	0.35	0.35
v/c Ratio	0.62	0.65	0.38	0.66	0.98	0.26	0.80	0.61	0.26	0.51	0.91	0.28
Control Delay	41.8	37.0	15.3	32.1	60.0	7.4	50.1	32.5	7.1	22.8	45.4	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.8	37.0	15.3	32.1	60.0	7.4	50.1	32.5	7.1	22.8	45.4	8.9
LOS	D	D	B	C	E	A	D	C	A	C	D	A
Approach Delay		33.4			51.3			31.8			39.1	
Approach LOS		C			D			C			D	

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 90 (82%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.98

Intersection Signal Delay: 40.0

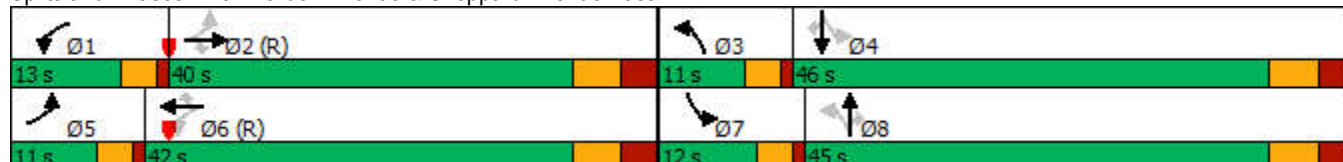
Intersection LOS: D

Intersection Capacity Utilization 89.9%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 9: Warden Avenue & Sheppard Avenue East



HCM Signalized Intersection Capacity Analysis

9: Warden Avenue & Sheppard Avenue East

02/21/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	81	571	175	173	994	92	136	679	88	123	1036	122
Future Volume (vph)	81	571	175	173	994	92	136	679	88	123	1036	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.87	1.00	1.00	0.82	1.00	1.00	0.84	1.00	1.00	0.87
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1736	3406	1315	1709	3438	1278	1770	3471	1254	1758	3505	1382
Flt Permitted	0.12	1.00	1.00	0.24	1.00	1.00	0.10	1.00	1.00	0.24	1.00	1.00
Satd. Flow (perm)	221	3406	1315	440	3438	1278	196	3471	1254	446	3505	1382
Peak-hour factor, PHF	0.72	0.86	0.97	0.90	0.93	0.72	0.92	0.92	0.67	0.83	0.92	0.78
Adj. Flow (vph)	112	664	180	192	1069	128	148	738	131	148	1126	156
RTOR Reduction (vph)	0	0	83	0	0	81	0	0	78	0	0	77
Lane Group Flow (vph)	113	664	97	192	1069	47	148	738	53	148	1126	79
Confl. Peds. (#/hr)	92		65	65		92	64		83	83		64
Heavy Vehicles (%)	4%	6%	7%	5%	5%	4%	2%	4%	8%	2%	3%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	40.0	33.0	33.0	44.0	35.0	35.0	45.1	38.1	38.1	46.9	39.0	39.0
Effective Green, g (s)	40.0	33.0	33.0	44.0	35.0	35.0	45.1	38.1	38.1	46.9	39.0	39.0
Actuated g/C Ratio	0.36	0.30	0.30	0.40	0.32	0.32	0.41	0.35	0.35	0.43	0.35	0.35
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	176	1021	394	279	1093	406	180	1202	434	284	1242	489
v/s Ratio Prot	0.04	0.19		c0.06	c0.31		c0.05	0.21		0.04	c0.32	
v/s Ratio Perm	0.19		0.07	0.22		0.04	0.28		0.04	0.18		0.06
v/c Ratio	0.64	0.65	0.25	0.69	0.98	0.12	0.82	0.61	0.12	0.52	0.91	0.16
Uniform Delay, d1	27.1	33.5	29.1	23.4	37.1	26.5	25.1	29.8	24.5	20.8	33.8	24.3
Progression Factor	1.44	1.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.2	3.0	1.4	6.9	22.4	0.6	25.1	2.4	0.6	1.7	11.1	0.7
Delay (s)	46.2	36.6	35.1	30.3	59.6	27.1	50.2	32.2	25.1	22.6	44.9	25.0
Level of Service	D	D	D	C	E	C	D	C	C	C	D	C
Approach Delay (s)		37.5			52.5			33.9			40.4	
Approach LOS		D			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			42.0									
HCM 2000 Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			110.0									
Intersection Capacity Utilization			89.9%									
Analysis Period (min)			15									
c Critical Lane Group												

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	8:05	8:05	8:05	8:05	8:05	8:05
End Time	9:15	9:15	9:15	9:15	9:15	9:15
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	7550	7544	7624	7534	7619	7575
Vehs Exited	7538	7528	7563	7491	7580	7538
Starting Vehs	300	320	319	283	284	302
Ending Vehs	312	336	380	326	323	337
Travel Distance (km)	10140	10121	10118	9990	10240	10122
Travel Time (hr)	373.4	325.7	330.2	338.7	342.1	342.0
Total Delay (hr)	183.1	135.6	140.5	151.0	150.0	152.0
Total Stops	10832	9910	10093	9649	10448	10188
Fuel Used (l)	921.0	873.4	879.0	876.7	895.7	889.2

Interval #0 Information Seeding

Start Time	8:05
End Time	8:15
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	8:15
End Time	9:15
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	7550	7544	7624	7534	7619	7575
Vehs Exited	7538	7528	7563	7491	7580	7538
Starting Vehs	300	320	319	283	284	302
Ending Vehs	312	336	380	326	323	337
Travel Distance (km)	10140	10121	10118	9990	10240	10122
Travel Time (hr)	373.4	325.7	330.2	338.7	342.1	342.0
Total Delay (hr)	183.1	135.6	140.5	151.0	150.0	152.0
Total Stops	10832	9910	10093	9649	10448	10188
Fuel Used (l)	921.0	873.4	879.0	876.7	895.7	889.2

Intersection: 3: Victoria Park Avenue & Sheppard Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	T	TR
Maximum Queue (m)	40.8	73.8	62.3	61.2	34.7	116.6	122.0	124.2	60.4	110.2	101.0	76.7
Average Queue (m)	18.8	43.9	31.0	23.6	32.0	80.0	84.5	89.0	48.2	60.4	54.5	42.3
95th Queue (m)	31.9	64.6	55.0	45.8	41.4	117.9	122.5	125.0	69.0	103.0	90.4	68.0
Link Distance (m)		258.4	258.4	258.4		498.9	498.9	498.9		650.9	650.9	650.9
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	88.9				27.3				53.0			
Storage Blk Time (%)		0			35	26			24	2		
Queuing Penalty (veh)		0			147	64			65	5		

Intersection: 3: Victoria Park Avenue & Sheppard Avenue East

Movement	SB	SB	SB	SB
Directions Served	L	T	T	TR
Maximum Queue (m)	43.6	118.8	106.9	101.2
Average Queue (m)	25.7	82.2	72.5	59.9
95th Queue (m)	50.9	110.5	98.9	86.7
Link Distance (m)		436.9	436.9	436.9
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	36.2			
Storage Blk Time (%)	7	42		
Queuing Penalty (veh)	20	29		

Queuing and Blocking Report

Baseline

02/21/2019

Intersection: 6: Pharmacy Avenue & Sheppard Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	TR	L
Maximum Queue (m)	43.8	60.0	59.1	61.9	44.5	101.4	100.0	104.9	23.9	18.1	23.1	76.9
Average Queue (m)	21.1	24.5	28.2	28.1	30.2	59.3	62.5	69.3	10.3	7.3	7.9	48.4
95th Queue (m)	40.1	50.4	52.9	53.6	52.3	94.0	94.6	101.3	21.9	14.7	17.6	75.3
Link Distance (m)		498.9	498.9	498.9		961.0	961.0	961.0		646.0	646.0	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	36.9				37.1				75.4			70.5
Storage Blk Time (%)	1	2			1	12						2
Queuing Penalty (veh)	2	2			6	13						1

Intersection: 6: Pharmacy Avenue & Sheppard Avenue East

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (m)	92.9	92.0
Average Queue (m)	12.3	45.3
95th Queue (m)	49.3	78.2
Link Distance (m)	420.4	420.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Queuing and Blocking Report

Baseline

02/21/2019

Intersection: 9: Warden Avenue & Sheppard Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (m)	47.0	81.4	273.9	36.0	35.9	169.8	169.0	34.9	48.3	100.0	103.9	33.0
Average Queue (m)	18.3	47.1	62.1	30.2	28.8	134.4	122.4	18.4	30.4	52.2	53.6	15.5
95th Queue (m)	39.4	75.0	191.7	46.5	44.5	189.0	183.8	43.3	52.4	87.1	88.3	37.7
Link Distance (m)		961.0	961.0			157.6	157.6			667.3	667.3	
Upstream Blk Time (%)			0			22	18					
Queuing Penalty (veh)			0			0	0					
Storage Bay Dist (m)	39.6			28.5	28.6			27.4	40.9			25.5
Storage Blk Time (%)	0	17	35	5	15	53	50	0	6	13	30	0
Queuing Penalty (veh)	1	14	61	16	73	92	46	2	19	18	27	1

Intersection: 9: Warden Avenue & Sheppard Avenue East

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (m)	39.6	217.2	203.7	27.8
Average Queue (m)	26.5	134.3	126.9	15.5
95th Queue (m)	47.8	235.6	227.4	33.9
Link Distance (m)		404.2	404.2	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	32.3			20.3
Storage Blk Time (%)	5	51	53	1
Queuing Penalty (veh)	24	63	65	4

Network Summary

Network wide Queuing Penalty: 880

Timings

3: Victoria Park Avenue & Sheppard Avenue East

02/21/2019



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	←	↑↑↑	←	↑↑↑	←	↑↑↑	←	↑↑↑
Traffic Volume (vph)	192	1207	145	569	193	737	136	846
Future Volume (vph)	192	1207	145	569	193	737	136	846
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2	1	6	3	8	7	4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	3	8	7	4
Switch Phase								
Minimum Initial (s)	6.0	36.0	6.0	36.0	6.0	34.0	6.0	34.0
Minimum Split (s)	10.0	43.0	10.0	43.0	10.0	41.0	10.0	41.0
Total Split (s)	27.0	61.0	12.0	46.0	15.0	42.0	15.0	42.0
Total Split (%)	20.8%	46.9%	9.2%	35.4%	11.5%	32.3%	11.5%	32.3%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	3.0	1.0	3.0	1.0	3.0	1.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	4.0	7.0	4.0	7.0	4.0	7.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	Max	None	Max
Act Effect Green (s)	68.5	54.0	59.2	48.2	49.1	35.1	48.9	35.0
Actuated g/C Ratio	0.53	0.42	0.46	0.37	0.38	0.27	0.38	0.27
v/c Ratio	0.52	0.88	1.04	0.40	1.00	0.84	0.82	0.75
Control Delay	21.3	39.8	111.1	30.5	91.7	49.4	59.6	47.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.3	39.8	111.1	30.5	91.7	49.4	59.6	47.2
LOS	C	D	F	C	F	D	E	D
Approach Delay		37.9		46.5		56.6		49.0
Approach LOS		D		D		E		D

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 1 (1%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 105

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.04

Intersection Signal Delay: 46.4

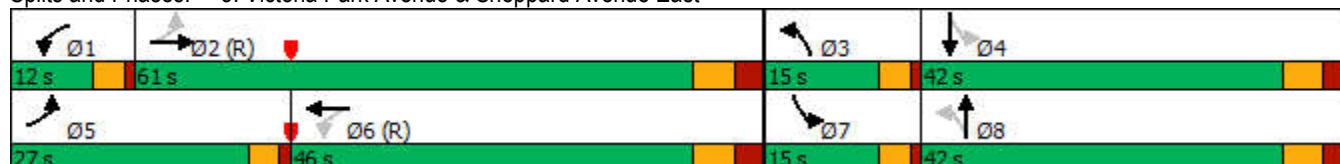
Intersection LOS: D

Intersection Capacity Utilization 98.9%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 3: Victoria Park Avenue & Sheppard Avenue East



HCM Signalized Intersection Capacity Analysis

3: Victoria Park Avenue & Sheppard Avenue East

02/21/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	192	1207	378	145	569	78	193	737	201	136	846	76
Future Volume (vph)	192	1207	378	145	569	78	193	737	201	136	846	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		4.0	7.0		4.0	7.0		4.0	7.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.95		1.00	0.98		1.00	0.96		1.00	0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1701	4619		1786	4819		1763	4677		1732	4902	
Flt Permitted	0.29	1.00		0.08	1.00		0.14	1.00		0.11	1.00	
Satd. Flow (perm)	520	4619		156	4819		261	4677		208	4902	
Peak-hour factor, PHF	0.94	0.93	0.87	0.82	0.91	0.85	0.86	0.86	0.87	0.81	0.93	0.90
Adj. Flow (vph)	204	1298	434	177	625	92	224	857	231	168	910	84
RTOR Reduction (vph)	0	46	0	0	13	0	0	37	0	0	8	0
Lane Group Flow (vph)	204	1686	0	177	704	0	224	1051	0	168	986	0
Confl. Peds. (#/hr)	124		174	174		124	187		168	168		187
Heavy Vehicles (%)	5%	3%	2%	1%	4%	1%	2%	3%	2%	4%	2%	8%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	66.0	54.0		56.2	48.2		46.1	35.1		45.9	35.0	
Effective Green, g (s)	66.0	54.0		56.2	48.2		46.1	35.1		45.9	35.0	
Actuated g/C Ratio	0.51	0.42		0.43	0.37		0.35	0.27		0.35	0.27	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	389	1918		167	1786		219	1262		201	1319	
v/s Ratio Prot	0.06	c0.36		c0.06	0.15		c0.09	0.22		0.07	0.20	
v/s Ratio Perm	0.21			c0.39			c0.27			0.22		
v/c Ratio	0.52	0.88		1.06	0.39		1.02	0.83		0.84	0.75	
Uniform Delay, d1	18.6	35.0		30.6	30.1		34.5	44.7		32.5	43.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.3	6.1		86.4	0.7		66.9	6.5		24.8	3.9	
Delay (s)	19.9	41.1		117.1	30.8		101.3	51.2		57.3	47.4	
Level of Service	B	D		F	C		F	D		E	D	
Approach Delay (s)		38.9			47.9			59.8			48.8	
Approach LOS		D			D			E			D	
Intersection Summary												
HCM 2000 Control Delay			47.7			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			1.01									
Actuated Cycle Length (s)			130.0			Sum of lost time (s)			22.0			
Intersection Capacity Utilization			98.9%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

Timings

6: Pharmacy Avenue & Sheppard Avenue East

02/21/2019



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↖↖↖	↖	↖↖↖	↖	↖↖	↖	↖↖
Traffic Volume (vph)	215	1282	29	588	40	107	225	222
Future Volume (vph)	215	1282	29	588	40	107	225	222
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	6.0	30.0	5.0	5.0	33.0	33.0	5.0	5.0
Minimum Split (s)	10.0	36.0	36.0	36.0	40.0	40.0	40.0	40.0
Total Split (s)	20.0	66.0	46.0	46.0	44.0	44.0	44.0	44.0
Total Split (%)	18.2%	60.0%	41.8%	41.8%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	6.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	Max	Max	Max	Max
Act Effect Green (s)	62.0	60.0	42.4	42.4	37.0	37.0	37.0	37.0
Actuated g/C Ratio	0.56	0.55	0.39	0.39	0.34	0.34	0.34	0.34
v/c Ratio	0.62	0.56	0.31	0.41	0.24	0.18	0.66	0.38
Control Delay	18.9	17.1	23.9	14.2	29.4	22.8	40.9	16.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.9	17.1	23.9	14.2	29.4	22.8	40.9	16.6
LOS	B	B	C	B	C	C	D	B
Approach Delay		17.4		14.6		24.4		25.1
Approach LOS		B		B		C		C

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 69 (63%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 18.8

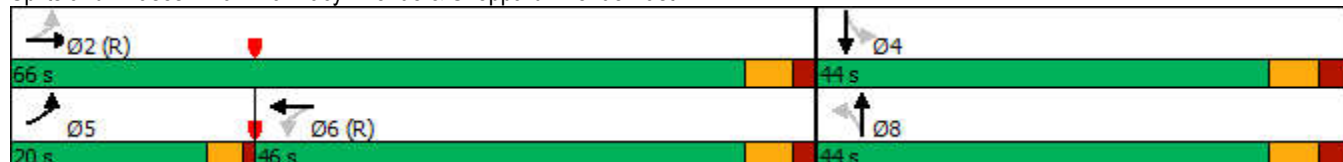
Intersection LOS: B

Intersection Capacity Utilization 111.9%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 6: Pharmacy Avenue & Sheppard Avenue East



HCM Signalized Intersection Capacity Analysis

6: Pharmacy Avenue & Sheppard Avenue East

02/21/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Traffic Volume (vph)	215	1282	55	29	588	101	40	107	57	225	222	173
Future Volume (vph)	215	1282	55	29	588	101	40	107	57	225	222	173
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.98		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.98	1.00		0.98	1.00	
Frt	1.00	0.99		1.00	0.97		1.00	0.95		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1784	4985		1798	4850		1773	3359		1763	3269	
Flt Permitted	0.26	1.00		0.16	1.00		0.42	1.00		0.62	1.00	
Satd. Flow (perm)	495	4985		302	4850		789	3359		1153	3269	
Peak-hour factor, PHF	0.80	0.90	0.60	0.81	0.91	0.74	0.63	0.81	0.75	0.88	0.85	0.83
Adj. Flow (vph)	269	1424	92	36	646	136	63	132	76	256	261	208
RTOR Reduction (vph)	0	6	0	0	29	0	0	18	0	0	131	0
Lane Group Flow (vph)	269	1510	0	36	753	0	63	190	0	256	338	0
Confl. Peds. (#/hr)	24		31	31		24	37		31	31		37
Heavy Vehicles (%)	1%	3%	0%	0%	4%	1%	0%	0%	0%	0%	0%	2%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	60.0	60.0		42.4	42.4		37.0	37.0		37.0	37.0	
Effective Green, g (s)	60.0	60.0		42.4	42.4		37.0	37.0		37.0	37.0	
Actuated g/C Ratio	0.55	0.55		0.39	0.39		0.34	0.34		0.34	0.34	
Clearance Time (s)	4.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	429	2719		116	1869		265	1129		387	1099	
v/s Ratio Prot	c0.08	0.30			0.16			0.06			0.10	
v/s Ratio Perm	c0.26			0.12			0.08			c0.22		
v/c Ratio	0.63	0.56		0.31	0.40		0.24	0.17		0.66	0.31	
Uniform Delay, d1	14.3	16.3		23.6	24.6		26.3	25.7		31.2	27.0	
Progression Factor	1.00	1.00		0.64	0.58		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.9	0.8		6.4	0.6		2.1	0.3		8.6	0.7	
Delay (s)	17.1	17.1		21.5	14.8		28.4	26.0		39.8	27.7	
Level of Service	B	B		C	B		C	C		D	C	
Approach Delay (s)		17.1			15.1			26.6			32.0	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay	20.4			HCM 2000 Level of Service			C					
HCM 2000 Volume to Capacity ratio	0.66											
Actuated Cycle Length (s)	110.0			Sum of lost time (s)			17.0					
Intersection Capacity Utilization	111.9%			ICU Level of Service			H					
Analysis Period (min)	15											
c Critical Lane Group												

Timings

9: Warden Avenue & Sheppard Avenue East

02/21/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	935	166	157	593	128	112	760	138	131	933	92
Future Volume (vph)	106	935	166	157	593	128	112	760	138	131	933	92
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	2	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	31.0	31.0	31.0	6.0	31.0	31.0	6.0	31.0	31.0	6.0	31.0	31.0
Minimum Split (s)	38.0	38.0	38.0	10.0	38.0	38.0	10.0	38.0	38.0	10.0	38.0	38.0
Total Split (s)	48.0	48.0	48.0	11.0	59.0	59.0	11.0	40.0	40.0	11.0	40.0	40.0
Total Split (%)	43.6%	43.6%	43.6%	10.0%	53.6%	53.6%	10.0%	36.4%	36.4%	10.0%	36.4%	36.4%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lead/Lag	Lag	Lag	Lag	Lead			Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Max	C-Max	C-Max	None	C-Max	C-Max	None	Max	Max	None	Max	Max
Act Effect Green (s)	41.0	41.0	41.0	55.0	52.0	52.0	43.0	33.0	33.0	43.0	33.0	33.0
Actuated g/C Ratio	0.37	0.37	0.37	0.50	0.47	0.47	0.39	0.30	0.30	0.39	0.30	0.30
v/c Ratio	0.43	0.80	0.34	0.86	0.39	0.20	0.66	0.75	0.44	0.61	0.94	0.22
Control Delay	23.7	28.5	6.8	54.7	19.7	5.1	38.0	40.2	16.5	32.9	55.5	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.7	28.5	6.8	54.7	19.7	5.1	38.0	40.2	16.5	32.9	55.5	5.3
LOS	C	C	A	D	B	A	D	D	B	C	E	A
Approach Delay		25.2			24.0			35.6			48.7	
Approach LOS		C			C			D			D	

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 16 (15%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.94

Intersection Signal Delay: 33.7

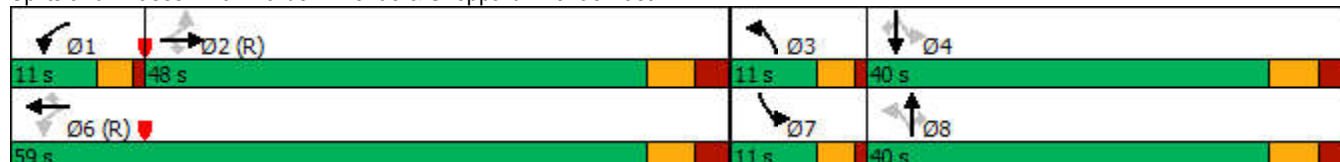
Intersection LOS: C

Intersection Capacity Utilization 105.6%

ICU Level of Service G

Analysis Period (min) 15

Splits and Phases: 9: Warden Avenue & Sheppard Avenue East



HCM Signalized Intersection Capacity Analysis

9: Warden Avenue & Sheppard Avenue East

02/21/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	935	166	157	593	128	112	760	138	131	933	92
Future Volume (vph)	106	935	166	157	593	128	112	760	138	131	933	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.76	1.00	1.00	0.87	1.00	1.00	0.83	1.00	1.00	0.81
Flpb, ped/bikes	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1661	3505	1206	1787	3406	1384	1787	3505	1324	1798	3505	1303
Flt Permitted	0.41	1.00	1.00	0.11	1.00	1.00	0.12	1.00	1.00	0.18	1.00	1.00
Satd. Flow (perm)	721	3505	1206	206	3406	1384	228	3505	1324	339	3505	1303
Peak-hour factor, PHF	0.91	0.90	0.92	0.89	0.94	0.91	0.90	0.96	0.66	0.96	0.94	0.88
Adj. Flow (vph)	116	1039	180	176	631	141	124	792	209	136	993	105
RTOR Reduction (vph)	0	0	75	0	0	62	0	0	83	0	0	74
Lane Group Flow (vph)	116	1039	105	176	631	79	124	792	126	136	993	32
Confl. Peds. (#/hr)	68		126	126		68	101		89	89		101
Heavy Vehicles (%)	3%	3%	2%	1%	6%	1%	1%	3%	1%	0%	3%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	41.0	41.0	41.0	52.0	52.0	52.0	40.0	33.0	33.0	40.0	33.0	33.0
Effective Green, g (s)	41.0	41.0	41.0	52.0	52.0	52.0	40.0	33.0	33.0	40.0	33.0	33.0
Actuated g/C Ratio	0.37	0.37	0.37	0.47	0.47	0.47	0.36	0.30	0.30	0.36	0.30	0.30
Clearance Time (s)	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	268	1306	449	197	1610	654	182	1051	397	216	1051	390
v/s Ratio Prot		0.30		c0.06	0.19		c0.04	0.23		0.04	c0.28	
v/s Ratio Perm	0.16		0.09	c0.36		0.06	0.20		0.09	0.19		0.02
v/c Ratio	0.43	0.80	0.23	0.89	0.39	0.12	0.68	0.75	0.32	0.63	0.94	0.08
Uniform Delay, d1	25.8	30.8	23.7	22.0	18.8	16.2	27.1	34.8	29.8	25.6	37.6	27.6
Progression Factor	0.72	0.78	0.57	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.2	4.3	1.0	36.0	0.7	0.4	10.0	5.0	2.1	5.6	17.3	0.4
Delay (s)	22.8	28.2	14.6	58.1	19.5	16.6	37.1	39.8	31.9	31.2	54.9	28.0
Level of Service	C	C	B	E	B	B	D	D	C	C	D	C
Approach Delay (s)		25.9			26.2			38.1			50.0	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			35.3									HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			110.0									Sum of lost time (s) 22.0
Intersection Capacity Utilization			105.6%									ICU Level of Service G
Analysis Period (min)			15									
c Critical Lane Group												

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	5:05	5:05	5:05	5:05	5:05	5:05
End Time	6:15	6:15	6:15	6:15	6:15	6:15
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	7871	8002	8055	7751	7833	7903
Vehs Exited	7804	7896	8075	7707	7807	7857
Starting Vehs	300	297	375	322	342	327
Ending Vehs	367	403	355	366	368	371
Travel Distance (km)	10274	10370	10510	10110	10189	10291
Travel Time (hr)	334.4	346.2	353.4	323.2	340.8	339.6
Total Delay (hr)	142.2	152.1	156.7	134.1	150.0	147.0
Total Stops	9613	9979	10250	9331	10050	9845
Fuel Used (l)	887.5	904.0	915.6	866.8	885.6	891.9

Interval #0 Information Seeding

Start Time	5:05
End Time	5:15
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	5:15
End Time	6:15
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	7871	8002	8055	7751	7833	7903
Vehs Exited	7804	7896	8075	7707	7807	7857
Starting Vehs	300	297	375	322	342	327
Ending Vehs	367	403	355	366	368	371
Travel Distance (km)	10274	10370	10510	10110	10189	10291
Travel Time (hr)	334.4	346.2	353.4	323.2	340.8	339.6
Total Delay (hr)	142.2	152.1	156.7	134.1	150.0	147.0
Total Stops	9613	9979	10250	9331	10050	9845
Fuel Used (l)	887.5	904.0	915.6	866.8	885.6	891.9

Intersection: 3: Victoria Park Avenue & Sheppard Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	T	TR
Maximum Queue (m)	96.2	132.2	120.2	133.7	34.7	86.3	74.0	73.6	60.4	120.6	112.5	89.2
Average Queue (m)	41.0	89.5	83.0	84.7	29.5	43.5	39.5	45.0	50.1	70.5	65.1	55.3
95th Queue (m)	89.6	123.0	114.5	128.0	40.3	88.1	69.1	69.7	73.0	111.9	100.7	81.6
Link Distance (m)		258.4	258.4	258.4		498.9	498.9	498.9		650.9	650.9	650.9
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	88.9				27.3				53.0			
Storage Blk Time (%)	0	7			42	8			29	7		
Queuing Penalty (veh)	0	13			80	11			71	13		

Intersection: 3: Victoria Park Avenue & Sheppard Avenue East

Movement	SB	SB	SB	SB
Directions Served	L	T	T	TR
Maximum Queue (m)	43.7	123.1	111.7	93.0
Average Queue (m)	34.9	82.6	73.8	56.4
95th Queue (m)	54.0	113.6	103.7	84.4
Link Distance (m)		436.9	436.9	436.9
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	36.2			
Storage Blk Time (%)	12	41		
Queuing Penalty (veh)	32	56		

Queuing and Blocking Report

Baseline

02/21/2019

Intersection: 6: Pharmacy Avenue & Sheppard Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	TR	L
Maximum Queue (m)	44.2	101.4	107.3	108.8	32.7	34.1	32.4	32.6	22.8	22.2	27.8	75.7
Average Queue (m)	33.0	52.1	58.4	60.2	11.3	13.9	11.9	15.5	8.6	9.8	12.1	43.2
95th Queue (m)	52.0	95.3	99.6	99.9	27.6	27.1	24.6	28.3	19.1	19.6	25.4	68.2
Link Distance (m)		498.9	498.9	498.9		961.0	961.0	961.0		646.0	646.0	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	36.9				37.1				75.4			70.5
Storage Blk Time (%)	5	11			1	0						1
Queuing Penalty (veh)	23	23			1	0						2

Intersection: 6: Pharmacy Avenue & Sheppard Avenue East

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (m)	74.9	64.9
Average Queue (m)	24.1	30.0
95th Queue (m)	47.2	54.0
Link Distance (m)	420.4	420.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report

Baseline

02/21/2019

Intersection: 9: Warden Avenue & Sheppard Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (m)	47.0	101.7	108.7	36.0	35.9	102.0	84.3	34.8	48.3	118.6	118.2	33.0
Average Queue (m)	23.7	53.4	58.3	22.9	27.2	51.1	35.7	14.0	29.7	69.2	71.3	22.6
95th Queue (m)	49.0	86.2	91.9	45.6	43.4	87.8	70.6	32.0	55.4	105.0	105.7	43.3
Link Distance (m)		961.0	961.0			157.6	157.6			667.3	667.3	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	39.6			28.5	28.6			27.4	40.9			25.5
Storage Blk Time (%)	1	13	26	1	14	18	6	0	1	27	42	2
Queuing Penalty (veh)	4	13	43	3	41	28	8	0	5	31	58	7

Intersection: 9: Warden Avenue & Sheppard Avenue East

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (m)	39.6	267.0	258.0	27.8
Average Queue (m)	30.2	155.8	146.9	13.9
95th Queue (m)	48.7	252.7	240.9	32.6
Link Distance (m)		404.2	404.2	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	32.3			20.3
Storage Blk Time (%)	8	59	62	1
Queuing Penalty (veh)	36	77	57	3

Network Summary

Network wide Queuing Penalty: 740

Optimized Existing Traffic Level of Service Calculations

HCM Signalized Intersection Capacity Analysis

3: Victoria Park Avenue & Sheppard Avenue East

02/21/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			  			  	
Traffic Volume (vph)	102	481	201	244	1274	95	234	831	120	70	838	161
Future Volume (vph)	102	481	201	244	1274	95	234	831	120	70	838	161
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		4.0	7.0		4.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.95		1.00	0.99		1.00	0.98		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		1.00	1.00		0.96	1.00	
Frt	1.00	0.96		1.00	0.99		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1655	4411		1754	4917		1803	4784		1627	4680	
Flt Permitted	0.11	1.00		0.23	1.00		0.10	1.00		0.26	1.00	
Satd. Flow (perm)	187	4411		418	4917		195	4784		440	4680	
Peak-hour factor, PHF	0.71	0.82	0.91	0.94	0.89	0.74	0.94	0.90	0.86	0.83	0.86	0.79
Adj. Flow (vph)	144	587	221	260	1431	128	249	923	140	84	974	204
RTOR Reduction (vph)	0	57	0	0	8	0	0	17	0	0	27	0
Lane Group Flow (vph)	144	751	0	260	1551	0	249	1046	0	84	1151	0
Confl. Peds. (#/hr)	130		182	182		130	150		146	146		150
Heavy Vehicles (%)	9%	8%	4%	2%	3%	3%	0%	4%	4%	7%	5%	4%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	45.2	37.2		54.0	42.0		52.0	52.0		35.0	35.0	
Effective Green, g (s)	45.2	37.2		54.0	42.0		52.0	52.0		35.0	35.0	
Actuated g/C Ratio	0.38	0.31		0.45	0.35		0.43	0.43		0.29	0.29	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	168	1367		330	1720		258	2073		128	1365	
v/s Ratio Prot	0.06	0.17		c0.08	c0.32		c0.10	0.22			0.25	
v/s Ratio Perm	0.26			0.27			c0.31			0.19		
v/c Ratio	0.86	0.55		0.79	0.90		0.97	0.50		0.66	0.84	
Uniform Delay, d1	28.9	34.4		22.6	37.0		32.4	24.7		37.2	39.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	32.5	1.6		11.8	8.1		46.0	0.9		23.3	6.5	
Delay (s)	61.4	36.0		34.3	45.1		78.4	25.5		60.6	46.4	
Level of Service	E	D		C	D		E	C		E	D	
Approach Delay (s)		39.9			43.6			35.6			47.4	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM 2000 Control Delay		41.8			HCM 2000 Level of Service			D				
HCM 2000 Volume to Capacity ratio		0.97										
Actuated Cycle Length (s)		120.0			Sum of lost time (s)			22.0				
Intersection Capacity Utilization		121.0%			ICU Level of Service			H				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

6: Pharmacy Avenue & Sheppard Avenue East

02/21/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	111	564	22	115	1135	143	49	96	27	264	54	447
Future Volume (vph)	111	564	22	115	1135	143	49	96	27	264	54	447
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00		0.97	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.97		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1703	4808		1685	4842		1758	3395		1693	3037	
Flt Permitted	0.09	1.00		0.41	1.00		0.28	1.00		0.62	1.00	
Satd. Flow (perm)	158	4808		720	4842		518	3395		1112	3037	
Peak-hour factor, PHF	0.84	0.96	0.69	0.60	0.94	0.72	0.82	0.60	0.61	0.83	0.36	0.79
Adj. Flow (vph)	132	588	32	192	1207	199	60	160	44	318	150	566
RTOR Reduction (vph)	0	6	0	0	20	0	0	23	0	0	100	0
Lane Group Flow (vph)	132	615	0	192	1386	0	60	181	0	318	616	0
Confl. Peds. (#/hr)	33		23	23		33	22		45	45		22
Heavy Vehicles (%)	6%	7%	4%	6%	4%	5%	2%	1%	4%	3%	2%	2%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	55.0	55.0		44.0	44.0		42.0	42.0		42.0	42.0	
Effective Green, g (s)	55.0	55.0		44.0	44.0		42.0	42.0		42.0	42.0	
Actuated g/C Ratio	0.50	0.50		0.40	0.40		0.38	0.38		0.38	0.38	
Clearance Time (s)	4.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	177	2404		288	1936		197	1296		424	1159	
v/s Ratio Prot	c0.05	0.13			0.29			0.05			0.20	
v/s Ratio Perm	c0.33			0.27			0.12			c0.29		
v/c Ratio	0.75	0.26		0.67	0.72		0.30	0.14		0.75	0.53	
Uniform Delay, d1	19.5	15.8		27.0	27.7		23.8	22.2		29.5	26.4	
Progression Factor	1.00	1.00		1.00	1.02		1.00	1.00		1.00	1.00	
Incremental Delay, d2	15.6	0.3		7.6	1.5		4.0	0.2		11.6	1.7	
Delay (s)	35.2	16.0		34.7	29.7		27.7	22.4		41.0	28.1	
Level of Service	D	B		C	C		C	C		D	C	
Approach Delay (s)		19.4			30.3			23.6			32.1	
Approach LOS		B			C			C			C	
Intersection Summary												
HCM 2000 Control Delay	28.1			HCM 2000 Level of Service			C					
HCM 2000 Volume to Capacity ratio	0.77											
Actuated Cycle Length (s)	110.0			Sum of lost time (s)			17.0					
Intersection Capacity Utilization	108.0%			ICU Level of Service			G					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Warden Avenue & Sheppard Avenue East

02/21/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Traffic Volume (vph)	81	571	175	173	994	92	136	679	88	123	1036	122
Future Volume (vph)	81	571	175	173	994	92	136	679	88	123	1036	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.87	1.00	1.00	0.82	1.00	1.00	0.84	1.00	1.00	0.87
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1736	3406	1315	1709	3438	1278	1770	3471	1254	1758	3505	1382
Flt Permitted	0.12	1.00	1.00	0.24	1.00	1.00	0.10	1.00	1.00	0.24	1.00	1.00
Satd. Flow (perm)	221	3406	1315	440	3438	1278	196	3471	1254	446	3505	1382
Peak-hour factor, PHF	0.72	0.86	0.97	0.90	0.93	0.72	0.92	0.92	0.67	0.83	0.92	0.78
Adj. Flow (vph)	112	664	180	192	1069	128	148	738	131	148	1126	156
RTOR Reduction (vph)	0	0	83	0	0	81	0	0	78	0	0	77
Lane Group Flow (vph)	113	664	97	192	1069	47	148	738	53	148	1126	79
Confl. Peds. (#/hr)	92		65	65		92	64		83	83		64
Heavy Vehicles (%)	4%	6%	7%	5%	5%	4%	2%	4%	8%	2%	3%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	40.0	33.0	33.0	44.0	35.0	35.0	45.1	38.1	38.1	46.9	39.0	39.0
Effective Green, g (s)	40.0	33.0	33.0	44.0	35.0	35.0	45.1	38.1	38.1	46.9	39.0	39.0
Actuated g/C Ratio	0.36	0.30	0.30	0.40	0.32	0.32	0.41	0.35	0.35	0.43	0.35	0.35
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	176	1021	394	279	1093	406	180	1202	434	284	1242	489
v/s Ratio Prot	0.04	0.19		c0.06	c0.31		c0.05	0.21		0.04	c0.32	
v/s Ratio Perm	0.19		0.07	0.22		0.04	0.28		0.04	0.18		0.06
v/c Ratio	0.64	0.65	0.25	0.69	0.98	0.12	0.82	0.61	0.12	0.52	0.91	0.16
Uniform Delay, d1	27.1	33.5	29.1	23.4	37.1	26.5	25.1	29.8	24.5	20.8	33.8	24.3
Progression Factor	1.44	1.00	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.2	3.0	1.4	6.9	22.4	0.6	25.1	2.4	0.6	1.7	11.1	0.7
Delay (s)	46.2	36.6	35.1	30.3	59.6	27.1	50.2	32.2	25.1	22.6	44.9	25.0
Level of Service	D	D	D	C	E	C	D	C	C	C	D	C
Approach Delay (s)		37.5			52.5			33.9			40.4	
Approach LOS		D			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			42.0		HCM 2000 Level of Service					D		
HCM 2000 Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			110.0		Sum of lost time (s)					22.0		
Intersection Capacity Utilization			89.9%		ICU Level of Service					E		
Analysis Period (min)			15									
c Critical Lane Group												

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	8:05	8:05	8:05	8:05	8:05	8:05
End Time	9:15	9:15	9:15	9:15	9:15	9:15
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	7569	7492	7571	7539	7529	7540
Vehs Exited	7611	7507	7600	7553	7463	7546
Starting Vehs	331	334	345	348	296	331
Ending Vehs	289	319	316	334	362	324
Travel Distance (km)	10163	10006	10173	10081	9984	10082
Travel Time (hr)	333.1	320.9	365.8	323.8	323.4	333.4
Total Delay (hr)	142.3	132.7	174.8	134.9	135.7	144.1
Total Stops	10022	9572	10445	9811	9668	9901
Fuel Used (l)	883.4	861.0	914.5	869.7	863.4	878.4

Interval #0 Information Seeding

Start Time	8:05
End Time	8:15
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	8:15
End Time	9:15
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	7569	7492	7571	7539	7529	7540
Vehs Exited	7611	7507	7600	7553	7463	7546
Starting Vehs	331	334	345	348	296	331
Ending Vehs	289	319	316	334	362	324
Travel Distance (km)	10163	10006	10173	10081	9984	10082
Travel Time (hr)	333.1	320.9	365.8	323.8	323.4	333.4
Total Delay (hr)	142.3	132.7	174.8	134.9	135.7	144.1
Total Stops	10022	9572	10445	9811	9668	9901
Fuel Used (l)	883.4	861.0	914.5	869.7	863.4	878.4

Queuing and Blocking Report

Baseline

02/21/2019

Intersection: 3: Victoria Park Avenue & Sheppard Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	T	TR
Maximum Queue (m)	51.2	75.2	64.6	62.7	34.7	135.0	137.9	143.4	60.4	119.0	104.8	75.8
Average Queue (m)	22.1	47.6	34.1	26.5	31.8	84.8	88.6	93.5	41.4	54.5	53.1	42.3
95th Queue (m)	42.3	69.8	61.1	49.7	40.6	126.9	130.9	135.7	66.4	100.9	90.7	63.6
Link Distance (m)		258.4	258.4	258.4		498.9	498.9	498.9		650.9	650.9	650.9
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	88.9				27.3				53.0			
Storage Blk Time (%)		0			34	28			15	2		
Queuing Penalty (veh)		0			145	69			42	4		

Intersection: 3: Victoria Park Avenue & Sheppard Avenue East

Movement	SB	SB	SB	SB
Directions Served	L	T	T	TR
Maximum Queue (m)	43.6	109.1	100.0	86.0
Average Queue (m)	28.2	73.5	65.8	54.9
95th Queue (m)	52.5	100.3	90.8	79.3
Link Distance (m)		436.9	436.9	436.9
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	36.2			
Storage Blk Time (%)	4	39		
Queuing Penalty (veh)	12	27		

Intersection: 6: Pharmacy Avenue & Sheppard Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	TR	L
Maximum Queue (m)	43.5	65.1	66.9	60.3	44.5	105.0	101.3	110.5	24.5	18.3	18.6	75.1
Average Queue (m)	22.3	22.3	27.7	27.0	27.7	58.4	62.2	71.0	9.1	7.0	5.7	44.1
95th Queue (m)	40.9	48.7	56.0	52.2	52.2	93.3	92.7	99.2	20.3	14.6	13.8	70.0
Link Distance (m)		498.9	498.9	498.9		961.0	961.0	961.0		646.0	646.0	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	36.9				37.1				75.4			70.5
Storage Blk Time (%)	2	2			3	10						2
Queuing Penalty (veh)	3	2			11	12						1

Intersection: 6: Pharmacy Avenue & Sheppard Avenue East

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (m)	74.8	107.1
Average Queue (m)	11.9	48.3
95th Queue (m)	42.4	84.2
Link Distance (m)	420.4	420.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report

Baseline

02/21/2019

Intersection: 9: Warden Avenue & Sheppard Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (m)	46.9	89.4	95.4	36.0	35.9	169.9	171.0	34.9	48.3	85.6	93.4	33.0
Average Queue (m)	19.6	44.9	51.9	27.2	28.3	138.3	128.3	14.9	29.0	53.0	55.7	18.9
95th Queue (m)	42.8	73.6	82.4	46.1	44.6	191.4	186.9	39.1	51.3	80.4	83.8	41.1
Link Distance (m)		961.0	961.0			157.6	157.6			667.3	667.3	
Upstream Blk Time (%)						21	15					
Queuing Penalty (veh)						0	0					
Storage Bay Dist (m)	39.6			28.5	28.6			27.4	40.9			25.5
Storage Blk Time (%)	1	14	30	5	12	56	53	0	3	16	34	1
Queuing Penalty (veh)	3	11	53	14	62	96	49	1	10	21	30	2

Intersection: 9: Warden Avenue & Sheppard Avenue East

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (m)	39.6	160.6	155.5	27.8
Average Queue (m)	27.6	104.0	98.8	15.2
95th Queue (m)	48.1	150.5	141.8	33.2
Link Distance (m)		404.2	404.2	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	32.3			20.3
Storage Blk Time (%)	5	46	51	1
Queuing Penalty (veh)	25	57	62	6

Network Summary

Network wide Queuing Penalty: 830

HCM Signalized Intersection Capacity Analysis

3: Victoria Park Avenue & Sheppard Avenue East

02/21/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	192	1207	378	145	569	78	193	737	201	136	846	76
Future Volume (vph)	192	1207	378	145	569	78	193	737	201	136	846	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		4.0	7.0		4.0	7.0		4.0	7.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.95		1.00	0.98		1.00	0.96		1.00	0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1700	4619		1787	4819		1764	4677		1731	4902	
Flt Permitted	0.29	1.00		0.09	1.00		0.13	1.00		0.12	1.00	
Satd. Flow (perm)	525	4619		162	4819		238	4677		224	4902	
Peak-hour factor, PHF	0.94	0.93	0.87	0.82	0.91	0.85	0.86	0.86	0.87	0.81	0.93	0.90
Adj. Flow (vph)	204	1298	434	177	625	92	224	857	231	168	910	84
RTOR Reduction (vph)	0	46	0	0	15	0	0	37	0	0	8	0
Lane Group Flow (vph)	204	1686	0	177	702	0	224	1051	0	168	986	0
Confl. Peds. (#/hr)	124		174	174		124	187		168	168		187
Heavy Vehicles (%)	5%	3%	2%	1%	4%	1%	2%	3%	2%	4%	2%	8%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	62.7	49.2		57.3	46.5		50.2	36.4		45.8	34.2	
Effective Green, g (s)	62.7	49.2		57.3	46.5		50.2	36.4		45.8	34.2	
Actuated g/C Ratio	0.48	0.38		0.44	0.36		0.39	0.28		0.35	0.26	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	375	1748		206	1723		253	1309		213	1289	
v/s Ratio Prot	c0.06	c0.37		c0.07	0.15		c0.09	0.22		0.07	0.20	
v/s Ratio Perm	0.21			0.31			c0.25			0.21		
v/c Ratio	0.54	0.96		0.86	0.41		0.89	0.80		0.79	0.76	
Uniform Delay, d1	20.3	39.5		31.4	31.4		30.7	43.5		32.0	44.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	14.6		28.1	0.7		28.6	5.3		17.4	4.4	
Delay (s)	22.0	54.2		59.5	32.1		59.2	48.7		49.4	48.6	
Level of Service	C	D		E	C		E	D		D	D	
Approach Delay (s)		50.8			37.5			50.5			48.7	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			48.0			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.94									
Actuated Cycle Length (s)			130.0			Sum of lost time (s)			22.0			
Intersection Capacity Utilization			98.9%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

6: Pharmacy Avenue & Sheppard Avenue East

02/21/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			 			 	
Traffic Volume (vph)	215	1282	55	29	588	101	40	107	57	225	222	173
Future Volume (vph)	215	1282	55	29	588	101	40	107	57	225	222	173
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.98		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.98	1.00		0.98	1.00	
Frt	1.00	0.99		1.00	0.97		1.00	0.95		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1784	4985		1798	4850		1773	3359		1763	3269	
Flt Permitted	0.26	1.00		0.16	1.00		0.42	1.00		0.62	1.00	
Satd. Flow (perm)	495	4985		302	4850		789	3359		1153	3269	
Peak-hour factor, PHF	0.80	0.90	0.60	0.81	0.91	0.74	0.63	0.81	0.75	0.88	0.85	0.83
Adj. Flow (vph)	269	1424	92	36	646	136	63	132	76	256	261	208
RTOR Reduction (vph)	0	6	0	0	29	0	0	18	0	0	131	0
Lane Group Flow (vph)	269	1510	0	36	753	0	63	190	0	256	338	0
Confl. Peds. (#/hr)	24		31	31		24	37		31	31		37
Heavy Vehicles (%)	1%	3%	0%	0%	4%	1%	0%	0%	0%	0%	0%	2%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	60.0	60.0		42.4	42.4		37.0	37.0		37.0	37.0	
Effective Green, g (s)	60.0	60.0		42.4	42.4		37.0	37.0		37.0	37.0	
Actuated g/C Ratio	0.55	0.55		0.39	0.39		0.34	0.34		0.34	0.34	
Clearance Time (s)	4.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	429	2719		116	1869		265	1129		387	1099	
v/s Ratio Prot	c0.08	0.30			0.16			0.06			0.10	
v/s Ratio Perm	c0.26			0.12			0.08			c0.22		
v/c Ratio	0.63	0.56		0.31	0.40		0.24	0.17		0.66	0.31	
Uniform Delay, d1	14.3	16.3		23.6	24.6		26.3	25.7		31.2	27.0	
Progression Factor	1.00	1.00		0.64	0.58		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.9	0.8		6.4	0.6		2.1	0.3		8.6	0.7	
Delay (s)	17.1	17.1		21.5	14.8		28.4	26.0		39.8	27.7	
Level of Service	B	B		C	B		C	C		D	C	
Approach Delay (s)		17.1			15.1			26.6			32.0	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			20.4			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			110.0			Sum of lost time (s)				17.0		
Intersection Capacity Utilization			111.9%			ICU Level of Service				H		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Warden Avenue & Sheppard Avenue East

02/21/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	935	166	157	593	128	112	760	138	131	933	92
Future Volume (vph)	106	935	166	157	593	128	112	760	138	131	933	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.76	1.00	1.00	0.87	1.00	1.00	0.83	1.00	1.00	0.81
Flpb, ped/bikes	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1661	3505	1206	1787	3406	1384	1787	3505	1324	1798	3505	1303
Flt Permitted	0.41	1.00	1.00	0.11	1.00	1.00	0.12	1.00	1.00	0.18	1.00	1.00
Satd. Flow (perm)	721	3505	1206	206	3406	1384	228	3505	1324	339	3505	1303
Peak-hour factor, PHF	0.91	0.90	0.92	0.89	0.94	0.91	0.90	0.96	0.66	0.96	0.94	0.88
Adj. Flow (vph)	116	1039	180	176	631	141	124	792	209	136	993	105
RTOR Reduction (vph)	0	0	75	0	0	62	0	0	83	0	0	74
Lane Group Flow (vph)	116	1039	105	176	631	79	124	792	126	136	993	32
Confl. Peds. (#/hr)	68		126	126		68	101		89	89		101
Heavy Vehicles (%)	3%	3%	2%	1%	6%	1%	1%	3%	1%	0%	3%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	41.0	41.0	41.0	52.0	52.0	52.0	40.0	33.0	33.0	40.0	33.0	33.0
Effective Green, g (s)	41.0	41.0	41.0	52.0	52.0	52.0	40.0	33.0	33.0	40.0	33.0	33.0
Actuated g/C Ratio	0.37	0.37	0.37	0.47	0.47	0.47	0.36	0.30	0.30	0.36	0.30	0.30
Clearance Time (s)	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	268	1306	449	197	1610	654	182	1051	397	216	1051	390
v/s Ratio Prot		0.30		c0.06	0.19		c0.04	0.23		0.04	c0.28	
v/s Ratio Perm	0.16		0.09	c0.36		0.06	0.20		0.09	0.19		0.02
v/c Ratio	0.43	0.80	0.23	0.89	0.39	0.12	0.68	0.75	0.32	0.63	0.94	0.08
Uniform Delay, d1	25.8	30.8	23.7	22.0	18.8	16.2	27.1	34.8	29.8	25.6	37.6	27.6
Progression Factor	0.72	0.78	0.57	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.2	4.3	1.0	36.0	0.7	0.4	10.0	5.0	2.1	5.6	17.3	0.4
Delay (s)	22.8	28.2	14.6	58.1	19.5	16.6	37.1	39.8	31.9	31.2	54.9	28.0
Level of Service	C	C	B	E	B	B	D	D	C	C	D	C
Approach Delay (s)		25.9			26.2			38.1			50.0	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay	35.3			HCM 2000 Level of Service					D			
HCM 2000 Volume to Capacity ratio	0.92											
Actuated Cycle Length (s)	110.0			Sum of lost time (s)					22.0			
Intersection Capacity Utilization	105.6%			ICU Level of Service					G			
Analysis Period (min)	15											
c Critical Lane Group												

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	5:05	5:05	5:05	5:05	5:05	5:05
End Time	6:15	6:15	6:15	6:15	6:15	6:15
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	7891	7886	7745	7922	7738	7833
Vehs Exited	7864	7895	7707	7959	7760	7837
Starting Vehs	311	339	309	385	339	340
Ending Vehs	338	330	347	348	317	338
Travel Distance (km)	10313	10350	10115	10518	10175	10294
Travel Time (hr)	329.8	339.1	322.2	355.8	322.4	333.9
Total Delay (hr)	137.1	145.0	133.0	159.2	131.9	141.2
Total Stops	9461	9898	9350	10478	9338	9703
Fuel Used (l)	886.0	899.0	866.3	923.2	870.4	889.0

Interval #0 Information Seeding

Start Time	5:05
End Time	5:15
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	5:15
End Time	6:15
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	7891	7886	7745	7922	7738	7833
Vehs Exited	7864	7895	7707	7959	7760	7837
Starting Vehs	311	339	309	385	339	340
Ending Vehs	338	330	347	348	317	338
Travel Distance (km)	10313	10350	10115	10518	10175	10294
Travel Time (hr)	329.8	339.1	322.2	355.8	322.4	333.9
Total Delay (hr)	137.1	145.0	133.0	159.2	131.9	141.2
Total Stops	9461	9898	9350	10478	9338	9703
Fuel Used (l)	886.0	899.0	866.3	923.2	870.4	889.0

Queuing and Blocking Report

Baseline

02/21/2019

Intersection: 3: Victoria Park Avenue & Sheppard Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	T	TR
Maximum Queue (m)	96.3	158.1	151.6	157.9	34.7	77.0	64.4	71.6	60.4	93.6	89.8	87.0
Average Queue (m)	51.3	103.0	92.9	91.2	27.9	36.5	37.7	45.4	43.1	59.5	57.4	55.9
95th Queue (m)	105.5	152.4	138.0	141.4	41.5	70.2	62.4	70.2	68.1	84.6	79.7	80.9
Link Distance (m)		258.4	258.4	258.4		498.9	498.9	498.9		650.9	650.9	650.9
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	88.9				27.3				53.0			
Storage Blk Time (%)	0	12			32	6			5	10		
Queuing Penalty (veh)	0	24			60	9			13	19		

Intersection: 3: Victoria Park Avenue & Sheppard Avenue East

Movement	SB	SB	SB	SB
Directions Served	L	T	T	TR
Maximum Queue (m)	43.6	119.2	109.8	85.3
Average Queue (m)	33.3	79.1	69.1	54.7
95th Queue (m)	53.6	108.2	96.9	79.4
Link Distance (m)		436.9	436.9	436.9
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	36.2			
Storage Blk Time (%)	6	43		
Queuing Penalty (veh)	18	58		

Intersection: 6: Pharmacy Avenue & Sheppard Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	TR	L
Maximum Queue (m)	44.2	106.2	106.2	112.3	33.1	40.7	39.8	33.3	24.7	22.3	29.9	68.7
Average Queue (m)	33.8	56.6	63.3	66.6	17.3	17.8	13.9	17.2	8.3	9.3	12.2	38.3
95th Queue (m)	52.9	98.1	99.9	102.8	36.9	39.2	30.8	31.4	19.0	19.3	25.1	60.2
Link Distance (m)		498.9	498.9	498.9		961.0	961.0	961.0		646.0	646.0	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	36.9				37.1				75.4			70.5
Storage Blk Time (%)	5	13			6	0						0
Queuing Penalty (veh)	23	28			12	0						0

Intersection: 6: Pharmacy Avenue & Sheppard Avenue East

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (m)	50.5	63.1
Average Queue (m)	22.9	30.3
95th Queue (m)	41.0	53.2
Link Distance (m)	420.4	420.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Queuing and Blocking Report

Baseline

02/21/2019

Intersection: 9: Warden Avenue & Sheppard Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (m)	47.0	102.6	97.7	36.0	35.9	95.2	79.4	34.8	48.3	125.1	124.7	33.0
Average Queue (m)	22.8	52.8	57.5	23.6	28.1	48.4	34.7	13.1	30.6	68.5	71.5	21.2
95th Queue (m)	49.2	89.1	92.6	46.5	42.8	86.5	68.0	32.6	55.0	105.4	111.1	42.5
Link Distance (m)		961.0	961.0			157.6	157.6			667.3	667.3	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	39.6			28.5	28.6			27.4	40.9			25.5
Storage Blk Time (%)	2	12	26	1	16	15	6	0	2	27	41	1
Queuing Penalty (veh)	10	13	43	4	46	24	7	1	6	30	57	4

Intersection: 9: Warden Avenue & Sheppard Avenue East

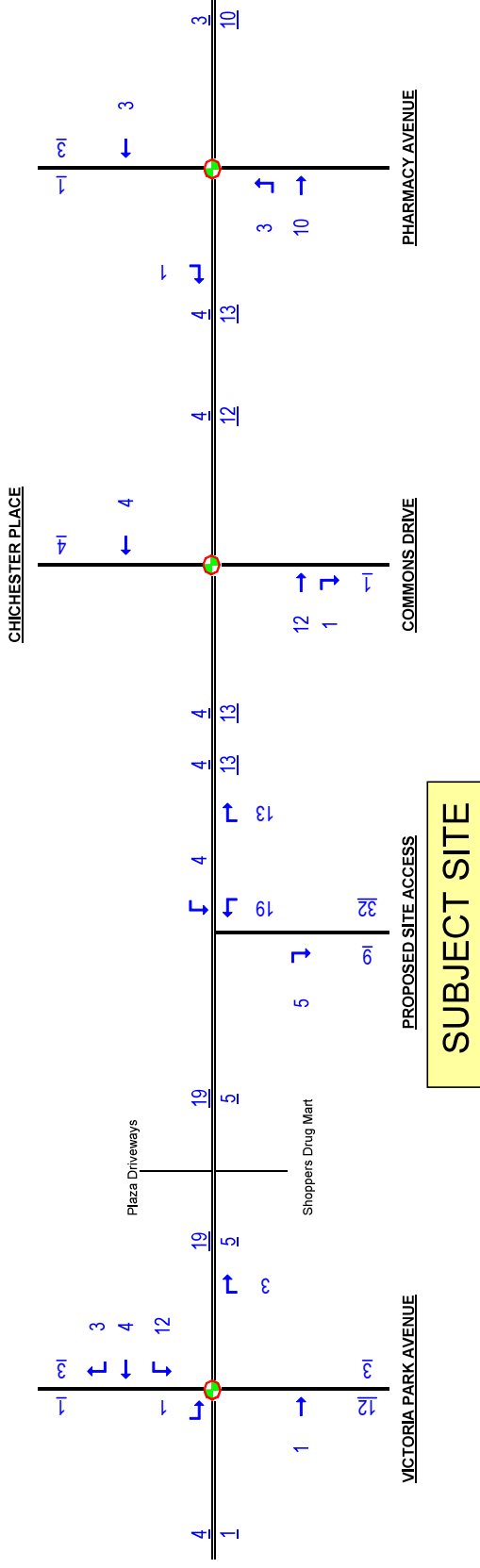
Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (m)	39.7	210.4	205.3	27.8
Average Queue (m)	31.4	127.1	119.6	13.7
95th Queue (m)	49.5	202.2	193.1	31.2
Link Distance (m)		404.2	404.2	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	32.3			20.3
Storage Blk Time (%)	9	56	58	1
Queuing Penalty (veh)	40	74	53	3

Network Summary

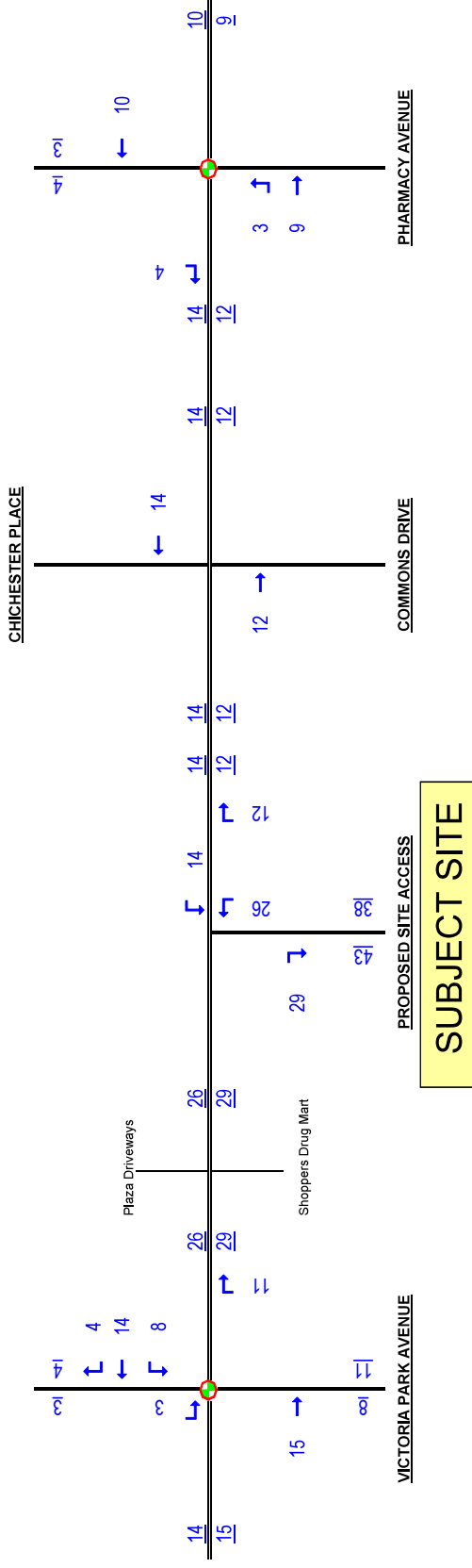
Network wide Queuing Penalty: 678

Appendix E – Future Background Developments Site Traffic

Weekday AM Peak Hour



Weekday PM Peak Hour



Proposed Development at 2933 Sheppard Avenue East

FIGURE 6.0

TOTAL SITE TRIPS (Scenario 1: No LRT)



- Sheppard Avenue West: 45%
- Sheppard Avenue East: 20%

The retail trip distribution is summarized as per trip generation data collected at the existing site accesses during the weekday PM period, as well as existing travel patterns at the Pharmacy / Sheppard intersection and the residential catchment area in the immediate neighbourhoods.

- Pharmacy Avenue North: 15%
- Pharmacy Avenue South: 15%
- Sheppard Avenue West: 25%
- Sheppard Avenue East: 45%

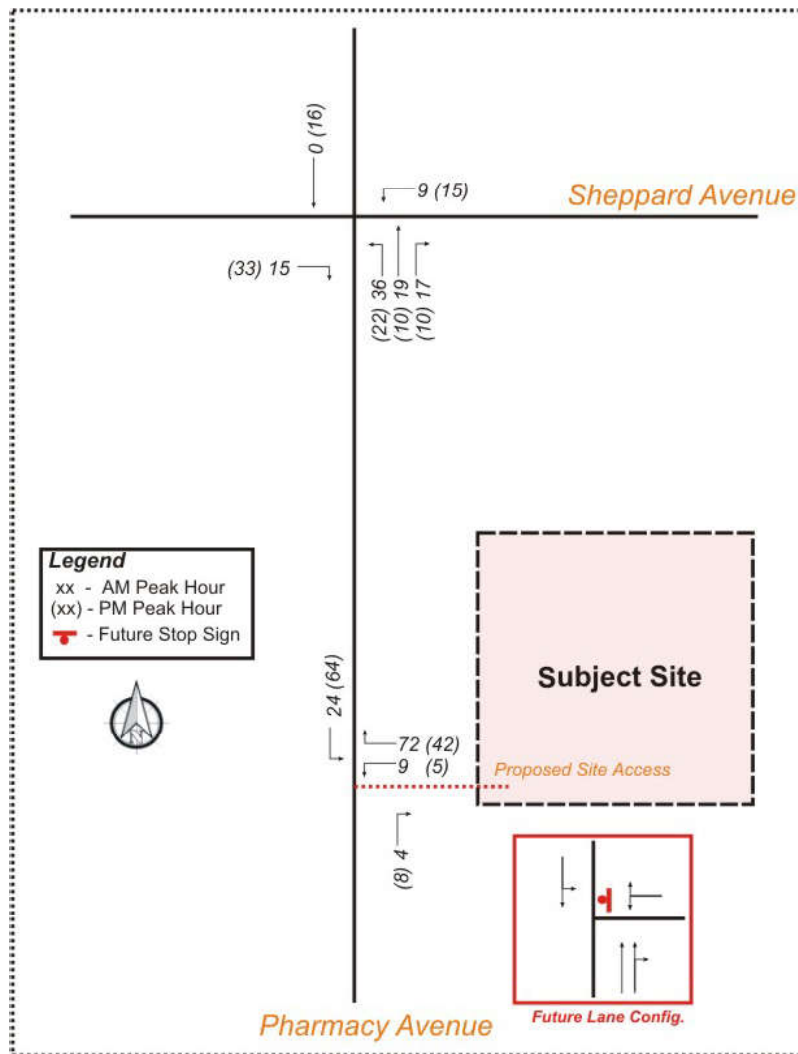
The summary of the vehicular trip generation is summarized in **Table 4.1**.

Table 4.1 – Site Trip Generation

Land Use	Parameter	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
High Rise Condominium (LUC 232) (263 units)	Gross Trip Rates (Trip / unit)	0.08	0.32	0.40	0.25	0.15	0.40
	Gross Vehicular Trip	20	85	105	65	40	105
	Non-Auto Reduction (20%)	4	17	21	13	8	21
	New Trips	16	68	84	52	32	84
	New Trip Rates	0.06	0.26	0.32	0.20	0.12	0.32
Ground Floor Retail (LUC 230) (1,305 square meters 14,047 square feet)	Gross Trip Rates (Trip / 1000 sq.ft.)	12	13	25	20	15	35
	Gross Vehicular Trip	0.94	1.01	1.95	1.56	1.17	2.73
Total New Trips		28	81	109	72	47	119

As shown from the above table, the proposed development will generate 109 new two-way trips in the morning peak hour and 119 new two-way trips in the afternoon peak hour. The site traffic volumes are shown in **Figure 4-1**.

Figure 4-1 Site Traffic Volumes



5.0 FUTURE TOTAL TRAFFIC

5.1. Future Total Traffic Assessment

The future total traffic conditions include the future background volumes plus site traffic generated from the subject site development. The estimated future (2019) total traffic volumes are illustrated in **Figure 5-1**. The traffic volumes were analyzed using Synchro 8.0 software, the detailed calculations are provided in **Appendix E** and it is summarized in **Table 5.1**.

4 SITE-GENERATED TRAFFIC

The proposed development will introduce 16 townhouses plus three residential towers with a connected podium containing a total of 780 units. The sections below discuss in detail the calculation, distribution and assignment of site-generated single-occupant vehicle (SOV) trips.

4.1 MODAL SPLIT

To determine the modal split of the trips generated by the subject site, 2011 Transportation Tomorrow Survey (TTS) modal split data was reviewed for home-based trips originating from the study area. The modal split data is summarized in **Table 4-1**, with detailed TTS data is provided in **Appendix H**.

Table 4-1: Modal Split Summary

Peak Period	Auto Driver (SOV)	Transit, excluding GO	Cycle	Auto Passenger	School Bus/Taxi	Walk	Total
AM	47%	26%	1%	13%	3%	11%	100%
PM	59%	11%	1%	15%	2%	11%	100%

Based on the results presented above, 53% and 41% of trips are made by a non-SOV (single-occupant vehicle) in the AM and PM peak periods, respectively. Therefore, an average non-SOV modal split of 47% is observed for the subject area.

4.2 TRIP GENERATION

Trip generation for the development was calculated based on the ITE Trip Generation Manual 10th Edition, utilizing the fitted curve equation for *Multifamily Housing (High-Rise) LUC 222* and *Multifamily Housing (Low-Rise) LUC 220*. It is expected that the retail component will likely be ancillary to the residents of the development and surrounding community; trip generation was not conducted for the retail uses. It is recognized that the ITE trip rates account for an approximate 10% reduction for person trips³. Therefore, as per Comment 1, a non-auto reduction of 37% (47% subtract 10%) was applied to the projected site trips. The trip generation rates are summarized in **Table 4-2**, with detailed calculations provided in **Appendix H**.

Table 4-2: ITE Trip Generation

Land Use	Trip Gen Info	Weekday AM Peak Hour			Weekday PM Peak Hour		
		In	Out	Total	In	Out	Total
Multifamily High-Rise (780 Units)	Percentage Split	21%	79%	100%	62%	38%	100%
	Trip Rate	0.07	0.26	0.33	0.23	0.14	0.37
	Trips Generated	54	201	255	179	109	288
Multifamily Low-Rise (16 Units)	Percentage Split	28%	72%	100%	59%	41%	100%
	Trip Rate	0.18	0.45	0.63	0.44	0.31	0.75
	Trips Generated	3	7	10	7	5	12
Total Site Trips		57	208	265	186	114	300
Non-SOV Reduction (37%)		-21	-76	-97	-68	-42	-110
Net SOV Trips		36	132	168	118	72	190

³ Appendix B.1: Baseline Weekday AM Peak Period Mode Share and Vehicle Occupancy Examples, ITE Trip Generation Manual 10th Edition

The proposed development is expected to generate approximately 165-190 new trips during both peak hours.

4.3 TRIP DISTRIBUTION AND ASSIGNMENT

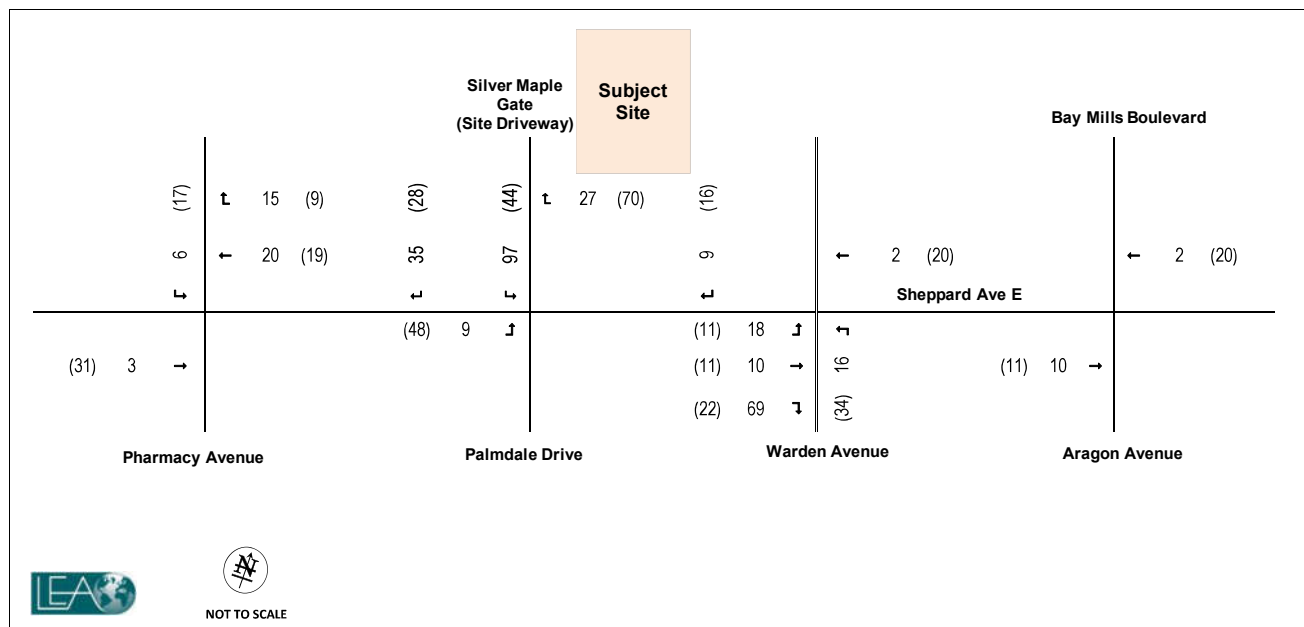
Directional trip distribution was determined using 2011 TTS data for Home-Based trip purposes for the AM and PM peak periods. Trip assignment was subsequently determined based on the trip origin, destination, site access and most logical routing. **Table 4-3** below summarizes the estimated trip distribution for this study.

Table 4-3: Directional Trip Distribution

Directions	AM Peak		PM Peak	
	Inbound	Outbound	Inbound	Outbound
Sheppard Ave (EB)	10%	7%	26%	15%
Sheppard Ave (WB)	6%	15%	18%	27%
Warden Ave (NB)	45%	14%	29%	15%
Warden Ave (SB)	24%	53%	14%	31%
Pharmacy Ave (NB)	-	11%	-	13%
Pharmacy Ave (SB)	15%	-	14%	-
TOTAL	100%	100%	100%	100%

Trip assignment was subsequently determined based on the location of the proposed site access, and the most logical and shortest route. The site-generated traffic volumes for the weekday AM and PM peak hours are illustrated in **Figure 4-1**.

Figure 4-1: Site Generated Peak Hour Traffic Volumes



Appendix F – Historical Traffic Movement Counts

Turning Movement Count Summary Report

PHARMACY AVE AT SHEPPARD AVE (PX 749)

Survey Date: 2008-Aug-06 (Wednesday)

Survey Type: Routine Hours

Time Period	Vehicle Type	Exits	NORTHBOUND				EASTBOUND				SOUTHBOUND				WESTBOUND				Peds	Bike	Other				
			Left	Thru	Right	Total	Exits	Left	Thru	Right	Total	Exits	Left	Thru	Right	Total	Exits	Left				Thru	Right	Total	
08:00-09:00	CAR	337	86	117	28	231	809	72	551	39	662	483	230	369	437	1,036	1,804	75	1,281	148	1,504	N	80	1	0
	TRK	2	0	0	0	0	20	0	17	1	18	1	3	0	10	13	60	0	50	2	52	S	28	0	0
AM PEAK	BUS	0	0	0	0	0	24	0	24	0	24	0	0	0	5	5	40	0	35	0	35	E	77	3	0
																					W	44	2	0	
TOTAL:		339	86	117	28	231	853	72	592	40	704	484	233	369	452	1,054	1,904	75	1,366	150	1,591				
16:45-17:45	CAR	435	33	166	65	264	1,545	216	1,355	97	1,668	494	125	374	108	607	740	23	599	53	675	N	61	0	0
	TRK	4	0	0	0	0	50	3	48	0	51	2	2	2	9	13	47	0	38	1	39	S	43	0	0
PM PEAK	BUS	2	0	0	0	0	24	2	24	0	26	0	0	0	2	2	31	0	29	0	29	E	50	2	0
																					W	67	0	0	
TOTAL:		441	33	166	65	264	1,619	221	1,427	97	1,745	496	127	376	119	622	818	23	666	54	743				
OFF HR AVG	CAR	192	53	61	43	157	839	75	671	46	792	154	125	93	102	320	666	15	511	56	582	N	35	2	0
	TRK	4	0	0	0	0	32	2	28	1	31	2	4	1	7	12	40	0	33	2	35	S	37	0	0
	BUS	2	0	0	0	0	26	2	26	0	28	0	0	0	3	3	20	0	17	0	17	E	21	3	0
																						W	50	1	0
TOTAL:		198	53	61	43	157	897	79	725	47	851	156	129	94	112	335	726	15	561	58	634				
07:30-09:30	CAR	664	140	184	52	376	1,549	190	1,070	54	1,314	772	427	599	827	1,853	3,508	119	2,541	290	2,950	N	145	1	0
	TRK	5	0	0	0	0	45	1	32	1	34	3	13	2	29	44	133	0	104	4	108	S	41	1	0
2 HR AM	BUS	2	0	0	0	0	47	2	47	0	49	0	0	0	16	16	89	0	73	0	73	E	177	10	0
																					W	90	6	0	
TOTAL:		671	140	184	52	376	1,641	193	1,149	55	1,397	775	440	601	872	1,913	3,730	119	2,718	294	3,131				
16:00-18:00	CAR	818	70	335	106	511	2,958	371	2,594	153	3,118	794	258	591	213	1,062	1,457	50	1,174	112	1,336	N	123	0	0
	TRK	9	0	0	0	0	96	6	90	0	96	2	6	2	17	25	89	0	72	3	75	S	82	0	0
2 HR PM	BUS	4	0	0	0	0	48	4	48	0	52	0	0	0	4	4	60	0	56	0	56	E	107	4	0
																					W	130	0	0	
TOTAL:		831	70	335	106	511	3,102	381	2,732	153	3,266	796	264	593	234	1,091	1,606	50	1,302	115	1,467				
07:30-18:00	CAR	2,247	423	761	331	1,515	7,864	860	6,348	392	7,600	2,185	1,185	1,563	1,449	4,197	7,631	230	5,759	626	6,615	N	407	9	0
	TRK	29	0	1	1	2	269	14	235	4	253	13	33	9	74	116	382	0	308	14	322	S	271	2	0
8 HR SUM	BUS	12	0	0	0	0	200	12	200	0	212	0	0	0	32	32	230	0	198	0	198	E	366	25	0
																					W	421	8	0	
TOTAL:		2,288	423	762	332	1,517	8,333	886	6,783	396	8,065	2,198	1,218	1,572	1,555	4,345	8,243	230	6,265	640	7,135				

Total 8 Hour Vehicle Volume: 21,062

Total 8 Hour Bicycle Volume: 44

Total 8 Hour Intersection Volume: 21,106

Comment:

Turning Movement Count Summary Report

PHARMACY AVE AT SHEPPARD AVE (PX 749)

Survey Date: 2014-Feb-26 (Wednesday)

Survey Type: Routine Hours

Time Period	Vehicle Type	Exits	NORTHBOUND				EASTBOUND				SOUTHBOUND				WESTBOUND				Peds	Bike	Other				
			Left	Thru	Right	Total	Exits	Left	Thru	Right	Total	Exits	Left	Thru	Right	Total	Exits	Left				Thru	Right	Total	
08:15-09:15 AM PEAK	CAR	394	44	125	17	186	797	120	467	36	623	174	313	45	511	869	1,515	93	960	149	1,202	N	22	0	0
	TRK	18	4	5	5	14	57	4	40	2	46	13	12	6	8	26	75	5	63	9	77	S	17	0	0
	BUS	19	4	5	1	10	45	7	40	2	49	6	4	1	7	12	48	3	37	7	47	E W	43 29	0 0	0 0
TOTAL:		431	52	135	23	210	899	131	547	40	718	193	329	52	526	907	1,638	101	1,060	165	1,326				
16:45-17:45 PM PEAK	CAR	417	62	92	53	207	1,337	214	1,037	101	1,352	348	247	198	129	574	735	49	544	111	704	N	19	0	0
	TRK	27	5	7	6	18	80	11	63	7	81	28	11	12	9	32	44	9	30	9	48	S	34	0	0
	BUS	9	0	3	0	3	30	6	30	1	37	3	0	1	7	8	35	1	28	0	29	E W	29 21	0 0	0 0
TOTAL:		453	67	102	59	228	1,447	231	1,130	109	1,470	379	258	211	145	614	814	59	602	120	781				
OFF HR AVG	CAR	187	45	37	26	108	622	93	527	55	675	145	69	57	84	210	652	33	523	57	613	N	17	0	0
	TRK	22	5	6	5	16	69	7	55	7	69	19	9	8	9	26	63	4	49	9	62	S	16	0	0
	BUS	8	0	2	0	2	18	4	18	1	23	2	0	1	5	6	27	0	22	2	24	E W	21 25	0 0	0 0
TOTAL:		217	50	45	31	126	709	104	600	63	767	166	78	66	98	242	742	37	594	68	699				
07:30-09:30 2 HR AM	CAR	673	85	199	37	321	1,366	207	818	58	1,083	286	511	64	944	1,519	2,975	164	1,946	267	2,377	N	40	0	0
	TRK	30	8	7	5	20	117	10	85	4	99	32	27	16	17	60	165	12	140	13	165	S	29	0	0
	BUS	29	6	8	1	15	78	13	73	2	88	10	4	1	17	22	98	7	75	8	90	E W	87 55	0 0	0 0
TOTAL:		732	99	214	43	356	1,561	230	976	64	1,270	328	542	81	978	1,601	3,238	183	2,161	288	2,632				
16:00-18:00 2 HR PM	CAR	802	105	185	92	382	2,497	399	1,953	178	2,530	610	452	344	247	1,043	1,444	88	1,092	218	1,398	N	47	0	0
	TRK	48	10	12	7	29	151	20	118	14	152	48	26	21	15	62	87	13	62	16	91	S	59	0	0
	BUS	18	1	7	1	9	66	10	65	4	79	8	0	3	12	15	73	1	60	1	62	E W	63 58	0 0	0 0
TOTAL:		868	116	204	100	420	2,714	429	2,136	196	2,761	666	478	368	274	1,120	1,604	102	1,214	235	1,551				
07:30-18:00 8 HR SUM	CAR	2,223	368	533	234	1,135	6,352	976	4,880	457	6,313	1,474	1,238	634	1,525	3,397	7,021	383	5,128	714	6,225	N	156	0	0
	TRK	166	38	44	32	114	544	58	422	44	524	155	90	69	66	225	502	42	398	64	504	S	152	0	0
	BUS	75	7	21	2	30	217	39	210	8	257	25	5	8	49	62	279	9	223	15	247	E W	233 212	1 0	0 0
TOTAL:		2,464	413	598	268	1,279	7,113	1,073	5,512	509	7,094	1,654	1,333	711	1,640	3,684	7,802	434	5,749	793	6,976				

Total 8 Hour Vehicle Volume: 19,033

Total 8 Hour Bicycle Volume: 1

Total 8 Hour Intersection Volume: 19,034

Comment:

Appendix G – Future Background Level of Service Calculations

HCM Signalized Intersection Capacity Analysis

3: Victoria Park Avenue & Sheppard Avenue East

02/21/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			  			  	
Traffic Volume (vph)	102	507	201	256	1343	98	234	873	123	71	881	161
Future Volume (vph)	102	507	201	256	1343	98	234	873	123	71	881	161
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		4.0	7.0		4.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.95		1.00	0.99		1.00	0.98		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		1.00	1.00		0.97	1.00	
Frt	1.00	0.96		1.00	0.99		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1655	4425		1756	4919		1803	4789		1631	4690	
Flt Permitted	0.11	1.00		0.21	1.00		0.10	1.00		0.24	1.00	
Satd. Flow (perm)	188	4425		394	4919		195	4789		419	4690	
Peak-hour factor, PHF	0.71	0.82	0.91	0.94	0.89	0.74	0.94	0.90	0.86	0.83	0.86	0.79
Adj. Flow (vph)	144	618	221	272	1509	132	249	970	143	86	1024	204
RTOR Reduction (vph)	0	54	0	0	8	0	0	16	0	0	25	0
Lane Group Flow (vph)	144	785	0	272	1633	0	249	1097	0	86	1203	0
Confl. Peds. (#/hr)	130		182	182		130	150		146	146		150
Heavy Vehicles (%)	9%	8%	4%	2%	3%	3%	0%	4%	4%	7%	5%	4%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	45.1	37.1		54.0	42.0		52.0	52.0		35.0	35.0	
Effective Green, g (s)	45.1	37.1		54.0	42.0		52.0	52.0		35.0	35.0	
Actuated g/C Ratio	0.38	0.31		0.45	0.35		0.43	0.43		0.29	0.29	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	168	1368		323	1721		258	2075		122	1367	
v/s Ratio Prot	0.06	0.18		c0.09	c0.33		c0.10	0.23			0.26	
v/s Ratio Perm	0.26			0.29			c0.31			0.21		
v/c Ratio	0.86	0.57		0.84	0.95		0.97	0.53		0.70	0.88	
Uniform Delay, d1	29.5	34.8		23.0	37.9		32.6	25.0		37.9	40.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	32.5	1.8		17.7	12.5		46.0	1.0		28.9	8.4	
Delay (s)	61.9	36.6		40.7	50.5		78.6	26.0		66.8	48.9	
Level of Service	E	D		D	D		E	C		E	D	
Approach Delay (s)		40.3			49.1			35.6			50.0	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM 2000 Control Delay		44.5			HCM 2000 Level of Service			D				
HCM 2000 Volume to Capacity ratio		0.99										
Actuated Cycle Length (s)		120.0			Sum of lost time (s)			22.0				
Intersection Capacity Utilization		121.7%			ICU Level of Service			H				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

6: Pharmacy Avenue & Sheppard Avenue East

02/21/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	111	596	47	124	1216	158	85	120	44	270	57	448
Future Volume (vph)	111	596	47	124	1216	158	85	120	44	270	57	448
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00		0.97	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.96		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1703	4772		1686	4839		1758	3355		1698	3042	
Flt Permitted	0.08	1.00		0.38	1.00		0.27	1.00		0.58	1.00	
Satd. Flow (perm)	149	4772		671	4839		509	3355		1045	3042	
Peak-hour factor, PHF	0.84	0.96	0.69	0.60	0.94	0.72	0.82	0.60	0.61	0.83	0.36	0.79
Adj. Flow (vph)	132	621	68	207	1294	219	104	200	72	325	158	567
RTOR Reduction (vph)	0	12	0	0	22	0	0	33	0	0	98	0
Lane Group Flow (vph)	132	677	0	207	1491	0	104	239	0	325	627	0
Confl. Peds. (#/hr)	33		23	23		33	22		45	45		22
Heavy Vehicles (%)	6%	7%	4%	6%	4%	5%	2%	1%	4%	3%	2%	2%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	55.0	55.0		44.0	44.0		42.0	42.0		42.0	42.0	
Effective Green, g (s)	55.0	55.0		44.0	44.0		42.0	42.0		42.0	42.0	
Actuated g/C Ratio	0.50	0.50		0.40	0.40		0.38	0.38		0.38	0.38	
Clearance Time (s)	4.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	173	2386		268	1935		194	1281		399	1161	
v/s Ratio Prot	c0.05	0.14			0.31			0.07			0.21	
v/s Ratio Perm	c0.33			0.31			0.20			c0.31		
v/c Ratio	0.76	0.28		0.77	0.77		0.54	0.19		0.81	0.54	
Uniform Delay, d1	20.4	16.0		28.7	28.6		26.4	22.6		30.5	26.5	
Progression Factor	1.00	1.00		1.00	1.01		1.00	1.00		1.00	1.00	
Incremental Delay, d2	17.9	0.3		12.0	1.8		10.2	0.3		16.5	1.8	
Delay (s)	38.3	16.3		40.7	30.8		36.6	22.9		47.0	28.3	
Level of Service	D	B		D	C		D	C		D	C	
Approach Delay (s)		19.9			31.9			26.7			34.1	
Approach LOS		B			C			C			C	
Intersection Summary												
HCM 2000 Control Delay	29.5			HCM 2000 Level of Service			C					
HCM 2000 Volume to Capacity ratio	0.81											
Actuated Cycle Length (s)	110.0			Sum of lost time (s)			17.0					
Intersection Capacity Utilization	108.5%			ICU Level of Service			G					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Warden Avenue & Sheppard Avenue East

02/21/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	99	610	244	173	1047	92	152	714	88	123	1089	131
Future Volume (vph)	99	610	244	173	1047	92	152	714	88	123	1089	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.87	1.00	1.00	0.82	1.00	1.00	0.84	1.00	1.00	0.87
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1736	3406	1315	1711	3438	1278	1770	3471	1254	1760	3505	1382
Flt Permitted	0.12	1.00	1.00	0.22	1.00	1.00	0.10	1.00	1.00	0.22	1.00	1.00
Satd. Flow (perm)	221	3406	1315	391	3438	1278	196	3471	1254	408	3505	1382
Peak-hour factor, PHF	0.72	0.86	0.97	0.90	0.93	0.72	0.92	0.92	0.67	0.83	0.92	0.78
Adj. Flow (vph)	138	709	252	192	1126	128	165	776	131	148	1184	168
RTOR Reduction (vph)	0	0	101	0	0	81	0	0	78	0	0	77
Lane Group Flow (vph)	138	709	151	192	1126	47	165	776	53	148	1184	91
Confl. Peds. (#/hr)	92		65	65		92	64		83	83		64
Heavy Vehicles (%)	4%	6%	7%	5%	5%	4%	2%	4%	8%	2%	3%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	40.0	33.0	33.0	44.0	35.0	35.0	45.1	38.1	38.1	46.9	39.0	39.0
Effective Green, g (s)	40.0	33.0	33.0	44.0	35.0	35.0	45.1	38.1	38.1	46.9	39.0	39.0
Actuated g/C Ratio	0.36	0.30	0.30	0.40	0.32	0.32	0.41	0.35	0.35	0.43	0.35	0.35
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	176	1021	394	264	1093	406	180	1202	434	271	1242	489
v/s Ratio Prot	0.05	0.21		c0.06	c0.33		c0.06	0.22		0.04	c0.34	
v/s Ratio Perm	0.23		0.11	0.23		0.04	0.32		0.04	0.19		0.07
v/c Ratio	0.78	0.69	0.38	0.73	1.03	0.12	0.92	0.65	0.12	0.55	0.95	0.19
Uniform Delay, d1	28.1	34.0	30.5	23.7	37.5	26.5	26.0	30.3	24.5	21.1	34.6	24.5
Progression Factor	1.42	1.03	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	18.8	3.6	2.6	9.6	35.2	0.6	43.6	2.7	0.6	2.2	16.6	0.8
Delay (s)	58.7	38.8	38.0	33.3	72.7	27.1	69.6	32.9	25.1	23.3	51.2	25.4
Level of Service	E	D	D	C	E	C	E	C	C	C	D	C
Approach Delay (s)		41.1			63.5			37.6			45.5	
Approach LOS		D			E			D			D	
Intersection Summary												
HCM 2000 Control Delay			48.0	HCM 2000 Level of Service					D			
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			110.0	Sum of lost time (s)					22.0			
Intersection Capacity Utilization			92.3%	ICU Level of Service					F			
Analysis Period (min)			15									
c Critical Lane Group												

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	8:05	8:05	8:05	8:05	8:05	8:05
End Time	9:15	9:15	9:15	9:15	9:15	9:15
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	7964	8008	7934	7834	7979	7940
Vehs Exited	7916	7943	7879	7833	7916	7899
Starting Vehs	322	347	369	369	370	354
Ending Vehs	370	412	424	370	433	402
Travel Distance (km)	10618	10716	10578	10542	10570	10605
Travel Time (hr)	408.4	419.0	398.9	395.9	442.4	412.9
Total Delay (hr)	208.9	217.7	200.5	197.9	243.4	213.7
Total Stops	11188	12207	11967	11475	11453	11658
Fuel Used (l)	976.0	998.1	968.2	961.1	999.8	980.7

Interval #0 Information Seeding

Start Time	8:05
End Time	8:15
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	8:15
End Time	9:15
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	7964	8008	7934	7834	7979	7940
Vehs Exited	7916	7943	7879	7833	7916	7899
Starting Vehs	322	347	369	369	370	354
Ending Vehs	370	412	424	370	433	402
Travel Distance (km)	10618	10716	10578	10542	10570	10605
Travel Time (hr)	408.4	419.0	398.9	395.9	442.4	412.9
Total Delay (hr)	208.9	217.7	200.5	197.9	243.4	213.7
Total Stops	11188	12207	11967	11475	11453	11658
Fuel Used (l)	976.0	998.1	968.2	961.1	999.8	980.7

Intersection: 3: Victoria Park Avenue & Sheppard Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	T	TR
Maximum Queue (m)	50.6	84.3	71.8	72.5	34.7	142.1	137.1	144.6	60.3	112.8	97.6	82.1
Average Queue (m)	21.9	49.0	39.4	31.2	32.3	84.9	90.4	93.3	44.3	58.6	54.2	45.1
95th Queue (m)	40.3	74.7	65.8	58.0	40.5	129.4	129.5	131.5	69.4	104.5	90.1	69.6
Link Distance (m)		258.4	258.4	258.4		498.9	498.9	498.9		650.9	650.9	650.9
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	88.9				27.3				53.0			
Storage Blk Time (%)		0			38	27			17	3		
Queuing Penalty (veh)		0			169	70			49	8		

Intersection: 3: Victoria Park Avenue & Sheppard Avenue East

Movement	SB	SB	SB	SB
Directions Served	L	T	T	TR
Maximum Queue (m)	43.6	113.9	104.4	92.1
Average Queue (m)	25.1	79.2	72.0	58.6
95th Queue (m)	49.8	106.0	97.1	84.2
Link Distance (m)		436.9	436.9	436.9
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	36.2			
Storage Blk Time (%)	3	41		
Queuing Penalty (veh)	8	29		

Intersection: 6: Pharmacy Avenue & Sheppard Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	TR	L
Maximum Queue (m)	44.0	60.9	59.0	65.4	44.5	95.0	107.3	114.2	31.0	22.5	33.6	73.2
Average Queue (m)	22.0	23.7	29.8	32.2	30.9	64.2	67.6	76.7	12.4	8.6	10.7	44.7
95th Queue (m)	40.8	51.5	55.9	58.0	54.1	93.0	97.1	106.6	24.6	18.5	24.3	70.1
Link Distance (m)		498.9	498.9	498.9		961.0	961.0	961.0		646.0	646.0	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	36.9				37.1				75.4			70.5
Storage Blk Time (%)	2	2			3	12						1
Queuing Penalty (veh)	4	2			13	15						0

Intersection: 6: Pharmacy Avenue & Sheppard Avenue East

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (m)	55.6	89.0
Average Queue (m)	11.2	45.4
95th Queue (m)	38.4	77.2
Link Distance (m)	420.4	420.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 9: Warden Avenue & Sheppard Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (m)	47.0	98.3	105.0	36.0	36.0	174.6	171.9	34.9	48.4	99.6	101.6	33.0
Average Queue (m)	23.9	55.6	64.3	30.8	30.4	160.3	154.9	15.9	35.7	54.7	57.1	15.9
95th Queue (m)	47.7	91.5	101.6	45.5	45.2	186.4	187.2	41.7	57.6	86.1	88.6	37.7
Link Distance (m)		961.0	961.0			157.6	157.6			667.3	667.3	
Upstream Blk Time (%)						50	41					
Queuing Penalty (veh)						0	0					
Storage Bay Dist (m)	39.6			28.5	28.6			27.4	40.9			25.5
Storage Blk Time (%)	4	22	35	9	19	59	62	0	11	14	32	0
Queuing Penalty (veh)	11	21	85	28	98	102	57	1	39	22	28	2

Intersection: 9: Warden Avenue & Sheppard Avenue East

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (m)	39.6	334.5	332.1	27.8
Average Queue (m)	29.6	223.1	217.7	16.7
95th Queue (m)	50.3	360.8	354.0	35.8
Link Distance (m)		404.2	404.2	
Upstream Blk Time (%)		2	2	
Queuing Penalty (veh)		0	0	
Storage Bay Dist (m)	32.3			20.3
Storage Blk Time (%)	5	59	60	1
Queuing Penalty (veh)	29	73	78	6

Network Summary

Network wide Queuing Penalty: 1046

HCM Signalized Intersection Capacity Analysis

3: Victoria Park Avenue & Sheppard Avenue East/Sheppard Avenue East

02/21/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			  			  	
Traffic Volume (vph)	192	1284	378	153	612	82	193	775	212	139	889	76
Future Volume (vph)	192	1284	378	153	612	82	193	775	212	139	889	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		4.0	7.0		4.0	7.0		4.0	7.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.95		1.00	0.98		1.00	0.96		1.00	0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1703	4638		1787	4824		1766	4676		1732	4910	
Flt Permitted	0.27	1.00		0.09	1.00		0.11	1.00		0.12	1.00	
Satd. Flow (perm)	485	4638		162	4824		206	4676		214	4910	
Peak-hour factor, PHF	0.94	0.93	0.87	0.82	0.91	0.85	0.86	0.86	0.87	0.81	0.93	0.90
Adj. Flow (vph)	204	1381	434	187	673	96	224	901	244	172	956	84
RTOR Reduction (vph)	0	44	0	0	14	0	0	37	0	0	8	0
Lane Group Flow (vph)	204	1771	0	187	755	0	224	1108	0	172	1032	0
Confl. Peds. (#/hr)	124		174	174		124	187		168	168		187
Heavy Vehicles (%)	5%	3%	2%	1%	4%	1%	2%	3%	2%	4%	2%	8%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	62.5	49.0		57.5	46.5		50.3	36.4		45.7	34.1	
Effective Green, g (s)	62.5	49.0		57.5	46.5		50.3	36.4		45.7	34.1	
Actuated g/C Ratio	0.48	0.38		0.44	0.36		0.39	0.28		0.35	0.26	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	359	1748		209	1725		246	1309		210	1287	
v/s Ratio Prot	c0.06	c0.38		c0.08	0.16		c0.10	0.24		0.07	0.21	
v/s Ratio Perm	0.21			0.32			c0.25			0.21		
v/c Ratio	0.57	1.01		0.89	0.44		0.91	0.85		0.82	0.80	
Uniform Delay, d1	20.6	40.5		33.5	31.8		33.1	44.2		32.5	44.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.1	24.9		34.8	0.8		34.4	6.9		21.4	5.3	
Delay (s)	22.7	65.4		68.3	32.6		67.5	51.0		53.9	50.1	
Level of Service	C	E		E	C		E	D		D	D	
Approach Delay (s)		61.1			39.6			53.7			50.7	
Approach LOS		E			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			53.3			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			130.0			Sum of lost time (s)			22.0			
Intersection Capacity Utilization			100.8%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

6: Pharmacy Avenue & Sheppard Avenue East

02/21/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	218	1388	88	44	647	110	62	122	67	242	249	177
Future Volume (vph)	218	1388	88	44	647	110	62	122	67	242	249	177
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.98		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.98	1.00		0.98	1.00	
Frt	1.00	0.99		1.00	0.97		1.00	0.94		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1785	4963		1799	4850		1775	3356		1765	3286	
Flt Permitted	0.23	1.00		0.12	1.00		0.39	1.00		0.60	1.00	
Satd. Flow (perm)	437	4963		236	4850		737	3356		1119	3286	
Peak-hour factor, PHF	0.80	0.90	0.60	0.81	0.91	0.74	0.63	0.81	0.75	0.88	0.85	0.83
Adj. Flow (vph)	272	1542	147	54	711	149	98	151	89	275	293	213
RTOR Reduction (vph)	0	10	0	0	28	0	0	13	0	0	120	0
Lane Group Flow (vph)	273	1679	0	54	832	0	98	227	0	275	386	0
Confl. Peds. (#/hr)	24		31	31		24	37		31	31		37
Heavy Vehicles (%)	1%	3%	0%	0%	4%	1%	0%	0%	0%	0%	0%	2%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	60.0	60.0		42.3	42.3		37.0	37.0		37.0	37.0	
Effective Green, g (s)	60.0	60.0		42.3	42.3		37.0	37.0		37.0	37.0	
Actuated g/C Ratio	0.55	0.55		0.38	0.38		0.34	0.34		0.34	0.34	
Clearance Time (s)	4.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	406	2707		90	1865		247	1128		376	1105	
v/s Ratio Prot	c0.08	0.34			0.17			0.07			0.12	
v/s Ratio Perm	c0.28			0.23			0.13			c0.25		
v/c Ratio	0.67	0.62		0.60	0.45		0.40	0.20		0.73	0.35	
Uniform Delay, d1	14.7	17.2		27.1	25.1		28.0	26.0		32.1	27.4	
Progression Factor	1.00	1.00		0.73	0.64		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.3	1.1		23.7	0.7		4.7	0.4		11.9	0.9	
Delay (s)	19.0	18.3		43.5	16.8		32.7	26.4		44.0	28.3	
Level of Service	B	B		D	B		C	C		D	C	
Approach Delay (s)		18.4			18.4			28.2			33.8	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			22.2			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			110.0			Sum of lost time (s)			17.0			
Intersection Capacity Utilization			112.1%			ICU Level of Service			H			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Warden Avenue & Sheppard Avenue East

02/21/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Traffic Volume (vph)	117	994	188	157	643	128	146	799	138	131	981	108
Future Volume (vph)	117	994	188	157	643	128	146	799	138	131	981	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.76	1.00	1.00	0.87	1.00	1.00	0.83	1.00	1.00	0.81
Flpb, ped/bikes	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1668	3505	1206	1787	3406	1384	1787	3505	1324	1800	3505	1303
Flt Permitted	0.39	1.00	1.00	0.09	1.00	1.00	0.12	1.00	1.00	0.16	1.00	1.00
Satd. Flow (perm)	687	3505	1206	167	3406	1384	228	3505	1324	296	3505	1303
Peak-hour factor, PHF	0.91	0.90	0.92	0.89	0.94	0.91	0.90	0.96	0.66	0.83	0.92	0.78
Adj. Flow (vph)	129	1104	204	176	684	141	162	832	209	158	1066	138
RTOR Reduction (vph)	0	0	75	0	0	57	0	0	83	0	0	83
Lane Group Flow (vph)	129	1104	129	176	684	84	162	832	126	158	1066	55
Confl. Peds. (#/hr)	68		126	126		68	101		89	89		101
Heavy Vehicles (%)	3%	3%	2%	1%	6%	1%	1%	3%	1%	0%	3%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	41.0	41.0	41.0	52.0	52.0	52.0	40.0	33.0	33.0	40.0	33.0	33.0
Effective Green, g (s)	41.0	41.0	41.0	52.0	52.0	52.0	40.0	33.0	33.0	40.0	33.0	33.0
Actuated g/C Ratio	0.37	0.37	0.37	0.47	0.47	0.47	0.36	0.30	0.30	0.36	0.30	0.30
Clearance Time (s)	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	256	1306	449	182	1610	654	182	1051	397	203	1051	390
v/s Ratio Prot		0.31		c0.06	0.20		c0.06	0.24		0.05	c0.30	
v/s Ratio Perm	0.19		0.11	c0.40		0.06	0.27		0.09	0.23		0.04
v/c Ratio	0.50	0.85	0.29	0.97	0.42	0.13	0.89	0.79	0.32	0.78	1.01	0.14
Uniform Delay, d1	26.6	31.6	24.2	24.5	19.1	16.3	28.5	35.3	29.8	26.3	38.5	28.1
Progression Factor	0.71	0.76	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.5	5.5	1.3	56.5	0.8	0.4	37.5	6.1	2.1	17.0	31.4	0.8
Delay (s)	24.4	29.6	13.5	81.0	20.0	16.7	66.0	41.5	31.9	43.3	69.9	28.9
Level of Service	C	C	B	F	B	B	E	D	C	D	E	C
Approach Delay (s)		26.9			30.2			43.1			62.6	
Approach LOS		C			C			D			E	
Intersection Summary												
HCM 2000 Control Delay			41.2									HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio			1.01									
Actuated Cycle Length (s)			110.0									Sum of lost time (s) 22.0
Intersection Capacity Utilization			107.7%									ICU Level of Service G
Analysis Period (min)			15									
c Critical Lane Group												

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	5:05	5:05	5:05	5:05	5:05	5:05
End Time	6:15	6:15	6:15	6:15	6:15	6:15
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	8208	8440	8422	8389	8281	8349
Vehs Exited	8137	8365	8300	8321	8175	8259
Starting Vehs	321	340	381	408	393	368
Ending Vehs	392	415	503	476	499	456
Travel Distance (km)	10772	11023	11013	10904	10836	10910
Travel Time (hr)	365.1	408.6	403.0	434.8	441.3	410.5
Total Delay (hr)	163.6	202.2	197.5	230.5	238.6	206.5
Total Stops	10744	11806	11740	11667	11493	11490
Fuel Used (l)	948.2	1002.3	996.4	1015.1	1018.5	996.1

Interval #0 Information Seeding

Start Time	5:05
End Time	5:15
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	5:15
End Time	6:15
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	8208	8440	8422	8389	8281	8349
Vehs Exited	8137	8365	8300	8321	8175	8259
Starting Vehs	321	340	381	408	393	368
Ending Vehs	392	415	503	476	499	456
Travel Distance (km)	10772	11023	11013	10904	10836	10910
Travel Time (hr)	365.1	408.6	403.0	434.8	441.3	410.5
Total Delay (hr)	163.6	202.2	197.5	230.5	238.6	206.5
Total Stops	10744	11806	11740	11667	11493	11490
Fuel Used (l)	948.2	1002.3	996.4	1015.1	1018.5	996.1

Queuing and Blocking Report

Baseline

02/21/2019

Intersection: 3: Victoria Park Avenue & Sheppard Avenue East/Sheppard Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	T	TR
Maximum Queue (m)	96.3	173.0	155.2	175.6	34.7	103.4	97.1	72.2	60.4	101.2	93.1	91.7
Average Queue (m)	55.9	111.9	102.8	101.2	27.6	47.9	42.4	46.5	43.6	61.9	60.5	57.5
95th Queue (m)	112.5	159.0	143.8	148.6	41.7	104.5	75.6	70.1	68.6	91.7	84.3	83.0
Link Distance (m)		258.4	258.4	258.4		498.9	498.9	498.9		650.9	650.9	650.9
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	88.9				27.3				53.0			
Storage Blk Time (%)	0	17			39	7			6	10		
Queuing Penalty (veh)	0	32			80	11			15	20		

Intersection: 3: Victoria Park Avenue & Sheppard Avenue East/Sheppard Avenue East

Movement	SB	SB	SB	SB
Directions Served	L	T	T	TR
Maximum Queue (m)	43.6	122.5	113.0	87.3
Average Queue (m)	35.1	84.3	75.3	58.9
95th Queue (m)	56.2	116.7	106.0	84.3
Link Distance (m)		436.9	436.9	436.9
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	36.2			
Storage Blk Time (%)	12	43		
Queuing Penalty (veh)	36	60		

Queuing and Blocking Report

Baseline

02/21/2019

Intersection: 6: Pharmacy Avenue & Sheppard Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	TR	L
Maximum Queue (m)	44.2	121.6	126.9	131.4	44.4	154.6	145.8	129.2	31.3	23.3	36.0	73.6
Average Queue (m)	36.7	68.5	74.6	79.2	32.3	60.9	44.8	39.6	11.6	10.2	14.6	43.2
95th Queue (m)	55.3	116.9	121.1	124.9	53.8	188.2	153.0	131.7	24.3	20.5	28.6	67.4
Link Distance (m)		498.9	498.9	498.9		961.0	961.0	961.0		646.0	646.0	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	36.9				37.1				75.4			70.5
Storage Blk Time (%)	7	18			47	1						1
Queuing Penalty (veh)	31	39			101	1						1

Intersection: 6: Pharmacy Avenue & Sheppard Avenue East

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (m)	75.6	61.6
Average Queue (m)	28.6	32.6
95th Queue (m)	54.3	55.2
Link Distance (m)	420.4	420.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report

Baseline

02/21/2019

Intersection: 9: Warden Avenue & Sheppard Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (m)	47.0	142.2	152.1	36.0	35.9	111.2	91.6	34.9	48.4	147.0	141.6	33.0
Average Queue (m)	28.3	70.4	75.9	27.3	29.3	53.4	39.2	16.9	35.9	76.5	77.7	23.0
95th Queue (m)	54.9	127.9	134.1	47.9	42.7	93.3	76.0	37.5	57.7	123.8	121.9	42.7
Link Distance (m)		961.0	961.0			157.6	157.6			667.3	667.3	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	39.6			28.5	28.6			27.4	40.9			25.5
Storage Blk Time (%)	4	22	35	2	18	18	10	1	8	28	43	1
Queuing Penalty (veh)	17	26	66	10	57	28	13	2	31	41	60	4

Intersection: 9: Warden Avenue & Sheppard Avenue East

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (m)	39.7	371.4	369.4	27.8
Average Queue (m)	29.6	254.8	247.9	14.9
95th Queue (m)	48.8	427.9	419.6	33.5
Link Distance (m)		404.2	404.2	
Upstream Blk Time (%)		14	12	
Queuing Penalty (veh)		0	0	
Storage Bay Dist (m)	32.3			20.3
Storage Blk Time (%)	8	65	66	1
Queuing Penalty (veh)	37	85	72	6

Network Summary

Network wide Queuing Penalty: 981

Optimized Future Background Level of Service Calculations

HCM Signalized Intersection Capacity Analysis

3: Victoria Park Avenue & Sheppard Avenue East/Sheppard Avenue East

02/22/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	192	1284	378	153	612	82	193	775	212	139	889	76
Future Volume (vph)	192	1284	378	153	612	82	193	775	212	139	889	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		4.0	7.0		4.0	7.0		4.0	7.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.95		1.00	0.98		1.00	0.96		1.00	0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1703	4638		1787	4824		1766	4676		1732	4910	
Flt Permitted	0.27	1.00		0.09	1.00		0.11	1.00		0.12	1.00	
Satd. Flow (perm)	485	4638		162	4824		206	4676		214	4910	
Peak-hour factor, PHF	0.94	0.93	0.87	0.82	0.91	0.85	0.86	0.86	0.87	0.81	0.93	0.90
Adj. Flow (vph)	204	1381	434	187	673	96	224	901	244	172	956	84
RTOR Reduction (vph)	0	44	0	0	14	0	0	37	0	0	8	0
Lane Group Flow (vph)	204	1771	0	187	755	0	224	1108	0	172	1032	0
Confl. Peds. (#/hr)	124		174	174		124	187		168	168		187
Heavy Vehicles (%)	5%	3%	2%	1%	4%	1%	2%	3%	2%	4%	2%	8%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	62.5	49.0		57.5	46.5		50.3	36.4		45.7	34.1	
Effective Green, g (s)	62.5	49.0		57.5	46.5		50.3	36.4		45.7	34.1	
Actuated g/C Ratio	0.48	0.38		0.44	0.36		0.39	0.28		0.35	0.26	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	359	1748		209	1725		246	1309		210	1287	
v/s Ratio Prot	c0.06	c0.38		c0.08	0.16		c0.10	0.24		0.07	0.21	
v/s Ratio Perm	0.21			0.32			c0.25			0.21		
v/c Ratio	0.57	1.01		0.89	0.44		0.91	0.85		0.82	0.80	
Uniform Delay, d1	20.6	40.5		33.5	31.8		33.1	44.2		32.5	44.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.1	24.9		34.8	0.8		34.4	6.9		21.4	5.3	
Delay (s)	22.7	65.4		68.3	32.6		67.5	51.0		53.9	50.1	
Level of Service	C	E		E	C		E	D		D	D	
Approach Delay (s)		61.1			39.6			53.7			50.7	
Approach LOS		E			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			53.3			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			130.0			Sum of lost time (s)			22.0			
Intersection Capacity Utilization			100.8%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

6: Pharmacy Avenue & Sheppard Avenue East

02/22/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	218	1388	88	44	647	110	62	122	67	242	249	177
Future Volume (vph)	218	1388	88	44	647	110	62	122	67	242	249	177
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.5	6.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.98		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.98	1.00		0.98	1.00	
Frt	1.00	0.99		1.00	0.97		1.00	0.94		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1784	4963		1805	4850		1775	3356		1765	3286	
Flt Permitted	0.28	1.00		0.08	1.00		0.38	1.00		0.60	1.00	
Satd. Flow (perm)	520	4963		151	4850		703	3356		1119	3286	
Peak-hour factor, PHF	0.80	0.90	0.60	0.81	0.91	0.74	0.63	0.81	0.75	0.88	0.85	0.83
Adj. Flow (vph)	272	1542	147	54	711	149	98	151	89	275	293	213
RTOR Reduction (vph)	0	10	0	0	30	0	0	62	0	0	120	0
Lane Group Flow (vph)	273	1679	0	54	830	0	98	178	0	275	386	0
Confl. Peds. (#/hr)	24		31	31		24	37		31	31		37
Heavy Vehicles (%)	1%	3%	0%	0%	4%	1%	0%	0%	0%	0%	0%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	61.1	55.1		58.4	54.0		33.0	33.0		33.0	33.0	
Effective Green, g (s)	61.1	55.1		58.4	54.0		33.0	33.0		33.0	33.0	
Actuated g/C Ratio	0.56	0.50		0.53	0.49		0.30	0.30		0.30	0.30	
Clearance Time (s)	4.0	6.0		4.5	6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	357	2486		146	2380		210	1006		335	985	
v/s Ratio Prot	c0.04	0.34		0.01	0.17			0.05			0.12	
v/s Ratio Perm	c0.38			0.18			0.14			c0.25		
v/c Ratio	0.76	0.68		0.37	0.35		0.47	0.18		0.82	0.39	
Uniform Delay, d1	15.8	20.7		15.2	17.2		31.3	28.5		35.8	30.5	
Progression Factor	1.00	1.00		1.43	0.67		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.4	1.5		1.4	0.4		7.3	0.4		19.8	1.2	
Delay (s)	25.2	22.2		23.2	11.9		38.6	28.8		55.5	31.7	
Level of Service	C	C		C	B		D	C		E	C	
Approach Delay (s)		22.6			12.5			31.7			40.1	
Approach LOS		C			B			C			D	
Intersection Summary												
HCM 2000 Control Delay	24.5			HCM 2000 Level of Service			C					
HCM 2000 Volume to Capacity ratio	0.80											
Actuated Cycle Length (s)	110.0			Sum of lost time (s)			17.5					
Intersection Capacity Utilization	112.1%			ICU Level of Service			H					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Warden Avenue & Sheppard Avenue East

02/22/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Traffic Volume (vph)	117	994	188	157	643	128	146	799	138	131	981	108
Future Volume (vph)	117	994	188	157	643	128	146	799	138	131	981	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.76	1.00	1.00	0.87	1.00	1.00	0.83	1.00	1.00	0.81
Flpb, ped/bikes	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1668	3505	1206	1787	3406	1384	1787	3505	1324	1800	3505	1303
Flt Permitted	0.39	1.00	1.00	0.09	1.00	1.00	0.12	1.00	1.00	0.15	1.00	1.00
Satd. Flow (perm)	687	3505	1206	175	3406	1384	232	3505	1324	289	3505	1303
Peak-hour factor, PHF	0.91	0.90	0.92	0.89	0.94	0.91	0.90	0.96	0.66	0.96	0.94	0.88
Adj. Flow (vph)	129	1104	204	176	684	141	162	832	209	136	1044	123
RTOR Reduction (vph)	0	0	77	0	0	57	0	0	84	0	0	84
Lane Group Flow (vph)	129	1104	127	176	684	84	162	832	125	136	1044	39
Confl. Peds. (#/hr)	68		126	126		68	101		89	89		101
Heavy Vehicles (%)	3%	3%	2%	1%	6%	1%	1%	3%	1%	0%	3%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	39.0	39.0	39.0	51.0	51.0	51.0	41.3	32.4	32.4	40.7	32.1	32.1
Effective Green, g (s)	39.0	39.0	39.0	51.0	51.0	51.0	41.3	32.4	32.4	40.7	32.1	32.1
Actuated g/C Ratio	0.35	0.35	0.35	0.46	0.46	0.46	0.38	0.29	0.29	0.37	0.29	0.29
Clearance Time (s)	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	243	1242	427	198	1579	641	212	1032	389	225	1022	380
v/s Ratio Prot		0.31		c0.06	0.20		c0.06	0.24		0.05	c0.30	
v/s Ratio Perm	0.19		0.11	c0.35		0.06	0.22		0.09	0.18		0.03
v/c Ratio	0.53	0.89	0.30	0.89	0.43	0.13	0.76	0.81	0.32	0.60	1.02	0.10
Uniform Delay, d1	28.2	33.5	25.6	23.7	19.8	16.8	27.4	35.9	30.2	25.4	39.0	28.4
Progression Factor	0.57	0.61	0.27	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.0	7.4	1.3	34.7	0.9	0.4	15.0	6.7	2.2	4.5	33.7	0.5
Delay (s)	22.1	27.7	8.3	58.4	20.7	17.3	42.5	42.6	32.4	29.9	72.7	29.0
Level of Service	C	C	A	E	C	B	D	D	C	C	E	C
Approach Delay (s)		24.5			26.8			40.8			64.1	
Approach LOS		C			C			D			E	
Intersection Summary												
HCM 2000 Control Delay			39.4		HCM 2000 Level of Service					D		
HCM 2000 Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			110.0		Sum of lost time (s)					22.0		
Intersection Capacity Utilization			107.7%		ICU Level of Service					G		
Analysis Period (min)			15									
c Critical Lane Group												

c Critical Lane Group

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	5:05	5:05	5:05	5:05	5:05	5:05
End Time	6:15	6:15	6:15	6:15	6:15	6:15
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	8348	8328	8116	8239	8322	8274
Vehs Exited	8243	8258	8078	8171	8256	8201
Starting Vehs	364	373	384	370	374	374
Ending Vehs	469	443	422	438	440	443
Travel Distance (km)	10950	10865	10653	10781	10919	10834
Travel Time (hr)	382.7	438.4	390.0	418.1	441.8	414.2
Total Delay (hr)	177.8	234.9	191.2	216.5	237.4	211.6
Total Stops	11520	12203	10852	11353	11818	11548
Fuel Used (l)	971.5	1019.7	961.8	993.4	1020.3	993.3

Interval #0 Information Seeding

Start Time	5:05
End Time	5:15
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	5:15
End Time	6:15
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	8348	8328	8116	8239	8322	8274
Vehs Exited	8243	8258	8078	8171	8256	8201
Starting Vehs	364	373	384	370	374	374
Ending Vehs	469	443	422	438	440	443
Travel Distance (km)	10950	10865	10653	10781	10919	10834
Travel Time (hr)	382.7	438.4	390.0	418.1	441.8	414.2
Total Delay (hr)	177.8	234.9	191.2	216.5	237.4	211.6
Total Stops	11520	12203	10852	11353	11818	11548
Fuel Used (l)	971.5	1019.7	961.8	993.4	1020.3	993.3

Intersection: 3: Victoria Park Avenue & Sheppard Avenue East/Sheppard Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	T	TR
Maximum Queue (m)	96.3	193.6	181.1	175.8	34.7	69.8	69.3	74.2	60.4	100.1	88.0	91.4
Average Queue (m)	61.1	118.9	108.3	107.8	29.3	37.7	39.0	45.1	44.8	61.4	60.1	58.0
95th Queue (m)	117.5	178.7	164.6	162.1	40.8	67.7	61.9	67.5	68.5	88.9	83.6	84.9
Link Distance (m)		258.4	258.4	258.4		498.9	498.9	498.9		650.9	650.9	650.9
Upstream Blk Time (%)		0										
Queuing Penalty (veh)		0										
Storage Bay Dist (m)	88.9				27.3				53.0			
Storage Blk Time (%)	0	20			32	9			5	11		
Queuing Penalty (veh)	0	39			66	14			13	22		

Intersection: 3: Victoria Park Avenue & Sheppard Avenue East/Sheppard Avenue East

Movement	SB	SB	SB	SB
Directions Served	L	T	T	TR
Maximum Queue (m)	43.6	117.6	106.0	91.5
Average Queue (m)	34.5	81.6	72.5	57.7
95th Queue (m)	53.5	109.5	100.6	87.6
Link Distance (m)		436.9	436.9	436.9
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	36.2			
Storage Blk Time (%)	9	44		
Queuing Penalty (veh)	28	61		

Intersection: 6: Pharmacy Avenue & Sheppard Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	TR	L
Maximum Queue (m)	44.3	130.9	128.8	130.6	31.3	24.4	25.2	38.3	31.2	27.0	31.4	77.3
Average Queue (m)	34.2	72.1	77.2	80.1	11.9	11.5	9.7	16.7	13.0	11.2	14.9	50.9
95th Queue (m)	54.2	121.0	120.5	122.1	25.2	22.4	20.9	29.9	25.7	21.5	28.1	78.4
Link Distance (m)		498.9	498.9	498.9		961.0	961.0	961.0		646.0	646.0	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	36.9				37.1				75.4			70.5
Storage Blk Time (%)	4	20			0							8
Queuing Penalty (veh)	17	43			1							10

Intersection: 6: Pharmacy Avenue & Sheppard Avenue East

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (m)	86.6	81.1
Average Queue (m)	34.1	36.5
95th Queue (m)	79.3	68.3
Link Distance (m)	420.4	420.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 9: Warden Avenue & Sheppard Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (m)	47.0	165.1	173.6	36.0	35.9	99.5	85.7	34.9	48.3	111.1	110.2	33.0
Average Queue (m)	28.4	91.2	96.1	26.7	28.1	53.4	40.5	16.4	34.8	67.4	69.2	21.5
95th Queue (m)	55.1	165.8	170.6	48.6	42.8	89.6	74.2	36.2	57.0	101.8	103.7	42.2
Link Distance (m)		961.0	961.0			157.6	157.6			667.3	667.3	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	39.6			28.5	28.6			27.4	40.9			25.5
Storage Blk Time (%)	7	40	52	2	18	19	10	0	4	23	40	1
Queuing Penalty (veh)	36	47	98	8	57	29	12	1	17	34	55	3

Intersection: 9: Warden Avenue & Sheppard Avenue East

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (m)	39.6	381.6	381.5	27.8
Average Queue (m)	32.0	295.3	286.6	16.9
95th Queue (m)	49.2	483.7	474.4	35.2
Link Distance (m)		404.2	404.2	
Upstream Blk Time (%)		19	17	
Queuing Penalty (veh)		0	0	
Storage Bay Dist (m)	32.3			20.3
Storage Blk Time (%)	10	65	66	1
Queuing Penalty (veh)	49	85	71	4

Network Summary

Network wide Queuing Penalty: 920

Appendix H – TTS Data

TTS AM

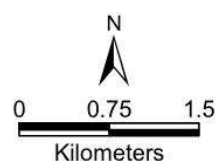
Column1	Column2	Column3	Column4	Column5	Column6	Column7	Column8	Column9	Column10	Column11	Column12	Column13	Column14	Column15
Fri Feb 15 2019 16:12:16 GMT-0500 (Eastern Standard Time) - Run Time: 2436ms														
Cross Tabulation Query Form - Trip - 2016 v1.1														
Row: 2006 GTA zone of origin - gta06_orig														
Column: Planning district of destination - pd_dest														
Filters:														
(2006 GTA zone of origin - gta06_orig In 585														
and														
Start time of trip - start_time In 700-959														
and														
Primary travel mode of trip - mode_prime In D														
M														
T)														
Trip 2016														
Table:														
PD 1 of Toronto PD 5 of Toronto PD 6 of Toronto PD 9 of Toronto PD 10 of Toronto PD 11 of Toronto PD 12 of Toronto PD 13 of Toronto PD 16 of Toronto Newmarket Richmond Hill Markham Vaughan Mississauga														
585	55	183	42	79	46	40	203	207	311	9	67	211	106	35

TTS PM

Column1	Column2	Column3	Column4	Column5	Column6	Column7	Column8	Column9	Column10	Column11	Column12	Column13	Column14	Column15	Column16	Column17	Column18	Column19
Fri Feb 15 2019 16:12:39 GMT-0500 (Eastern Standard Time) - Run Time: 1479ms																		
Cross Tabulation Query Form - Trip - 2016 v1.1																		
Row: 2006 GTA zone of origin - gta06_orig																		
Column: Planning district of destination - pd_dest																		
Filters:																		
(2006 GTA zone of origin - gta06_orig In 585																		
and																		
Start time of trip - start_time In 1600-1859																		
and																		
Primary travel mode of trip - mode_prime In D																		
M																		
T)																		
Trip 2016																		
Table:																		
PD 2 of Toronto PD 3 of Toronto PD 4 of Toronto PD 5 of Toronto PD 6 of Toronto PD 12 of Toronto PD 13 of Toronto PD 15 of Toronto PD 16 of Toronto Pickering Ajax Whitby Oshawa Georgina Richmond IMarkham Mississaug Niagara Falls																		
585	41	46	11	28	16	173	136	18	341	14	77	35	21	30	69	100	11	25

TTS NON-AUTO

Column1	Column2	Column3	Column4	Column5
Fri Mar 22 2019 20:26:40 GMT-0400 (Eastern Daylight Time) - Run Time: 1399ms				
Cross Tabulation Query Form - Trip - 2016 v1.1				
Row: 2006 GTA zone of household - gta06_hhhd				
Column: Primary travel mode of trip - mode_prime				
Filters:				
(Type of dwelling unit - dwell_type In 2				
and				
2006 GTA zone of household - gta06_hhhd In 585)				
Trip 2016				
Table:				
Transit excluding				
GO rail Auto driver Auto passenger Walk				
585	1604	1491	181	700



HOUSEHOLD CHARACTERISTICS

HOUSEHOLD CHARACTERISTICS																		
Households	Dwelling Type			Household Size					Number of Available Vehicles					Household Averages				
	House	Townhouse	Apartment	1	2	3	4	5+	0	1	2	3	4+	Persons	Workers	Drivers	Vehicles	Trips/Day
25,300	27%	11%	62%	26%	30%	19%	15%	11%	19%	51%	25%	3%	1%	2.6	1.3	1.6	1.2	4.5

Population Characteristics																
Population	Age							Daily Trips per Person (age 11+)	Daily Work Trips per Worker	Population	Employment Type			Student	Licensed	Transit Pass
	0-10	11-15	16-25	26-45	46-64	65+	Median				Full Time	Part Time	At Home			
	Male															
										31,300	42%	6%	3%	22%	69%	18%
Female																
66,100	11%	5%	12%	27%	27%	18%	42.5	2.0	0.77	34,700	33%	9%	2%	19%	55%	19%

TRIPS MADE BY RESIDENTS OF CITY OF TORONTO - WARD 40																
Time Period	Trips	% 24hr	Trip Purpose				Mode of Travel						Median Trip Length (km)			
			HB-W	HB-S	HB-D	N-HB	Driver	Pass.	Transit	GO Train	Walk & Cycle	Other	Driver	Pass.	Transit	GO Train
6-9 AM	29,600	25.7%	50%	19%	21%	10%	54%	12%	25%	0%	7%	1%	7.0	3.6	10.9	16.0
24 Hrs	115,100		37%	12%	37%	14%	55%	13%	24%	0%	7%	1%	5.9	4.3	8.6	16.8

TRIPS MADE TO CITY OF TORONTO - WARD 40 - BY RESIDENTS OF THE TTS AREA																
Time Period	Trips	% 24 hr	Trip Purpose				Mode of Travel						Median Trip Length (km)			
			Work	School	Home	Other	Driver	Pass.	Transit	GO Train	Walk & Cycle	Other	Driver	Pass.	Transit	GO Train
6-9 AM	15,700	16.8%	49%	16%	9%	26%	60%	11%	14%	*	12%	2%	7.0	3.5	5.1	*
24 Hrs	93,800		15%	3%	52%	29%	58%	14%	19%	0%	8%	1%	5.3	4.2	7.4	16.9

Appendix I – Future Total Traffic Level of Service Calculations

HCM Signalized Intersection Capacity Analysis

3: Victoria Park Avenue & Sheppard Avenue East

08/16/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			  			  	
Traffic Volume (vph)	102	518	201	286	1364	98	234	873	125	78	881	161
Future Volume (vph)	102	518	201	286	1364	98	234	873	125	78	881	161
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		4.0	7.0		4.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.95		1.00	0.99		1.00	0.98		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		1.00	1.00		0.97	1.00	
Frt	1.00	0.96		1.00	0.99		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1655	4431		1757	4921		1803	4786		1631	4690	
Flt Permitted	0.11	1.00		0.21	1.00		0.10	1.00		0.24	1.00	
Satd. Flow (perm)	188	4431		383	4921		195	4786		418	4690	
Peak-hour factor, PHF	0.71	0.82	0.91	0.94	0.89	0.74	0.94	0.90	0.86	0.83	0.86	0.79
Adj. Flow (vph)	144	632	221	304	1533	132	249	970	145	94	1024	204
RTOR Reduction (vph)	0	53	0	0	8	0	0	16	0	0	25	0
Lane Group Flow (vph)	144	800	0	304	1657	0	249	1099	0	94	1203	0
Confl. Peds. (#/hr)	130		182	182		130	150		146	146		150
Heavy Vehicles (%)	9%	8%	4%	2%	3%	3%	0%	4%	4%	7%	5%	4%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	45.0	37.0		54.0	42.0		52.0	52.0		35.0	35.0	
Effective Green, g (s)	45.0	37.0		54.0	42.0		52.0	52.0		35.0	35.0	
Actuated g/C Ratio	0.38	0.31		0.45	0.35		0.43	0.43		0.29	0.29	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	168	1366		321	1722		258	2073		121	1367	
v/s Ratio Prot	0.06	0.18		c0.10	c0.34		c0.10	0.23			0.26	
v/s Ratio Perm	0.26			0.32			c0.31			0.22		
v/c Ratio	0.86	0.59		0.95	0.96		0.97	0.53		0.78	0.88	
Uniform Delay, d1	29.7	35.0		24.8	38.2		32.6	25.0		38.9	40.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	32.5	1.8		36.1	14.4		46.0	1.0		37.7	8.4	
Delay (s)	62.1	36.9		60.8	52.6		78.6	26.0		76.6	48.9	
Level of Service	E	D		E	D		E	C		E	D	
Approach Delay (s)		40.5			53.9			35.6			50.8	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM 2000 Control Delay		46.4			HCM 2000 Level of Service			D				
HCM 2000 Volume to Capacity ratio		1.01										
Actuated Cycle Length (s)		120.0			Sum of lost time (s)			22.0				
Intersection Capacity Utilization		123.3%			ICU Level of Service			H				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

6: Pharmacy Avenue & Sheppard Avenue East

08/16/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			 			 	
Traffic Volume (vph)	114	596	67	134	1216	158	136	147	60	270	57	448
Future Volume (vph)	114	596	67	134	1216	158	136	147	60	270	57	448
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.98		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		0.98	1.00		0.99	1.00		0.97	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.96		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1703	4728		1676	4839		1758	3338		1704	3042	
Flt Permitted	0.08	1.00		0.37	1.00		0.27	1.00		0.54	1.00	
Satd. Flow (perm)	149	4728		648	4839		509	3338		965	3042	
Peak-hour factor, PHF	0.84	0.96	0.69	0.60	0.94	0.72	0.82	0.60	0.61	0.83	0.36	0.79
Adj. Flow (vph)	136	621	97	223	1294	219	166	245	98	325	158	567
RTOR Reduction (vph)	0	19	0	0	22	0	0	39	0	0	98	0
Lane Group Flow (vph)	136	699	0	223	1491	0	166	304	0	325	627	0
Confl. Peds. (#/hr)	33		23	23		33	22		45	45		22
Heavy Vehicles (%)	6%	7%	4%	6%	4%	5%	2%	1%	4%	3%	2%	2%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	55.0	55.0		44.0	44.0		42.0	42.0		42.0	42.0	
Effective Green, g (s)	55.0	55.0		44.0	44.0		42.0	42.0		42.0	42.0	
Actuated g/C Ratio	0.50	0.50		0.40	0.40		0.38	0.38		0.38	0.38	
Clearance Time (s)	4.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	173	2364		259	1935		194	1274		368	1161	
v/s Ratio Prot	c0.05	0.15			0.31			0.09			0.21	
v/s Ratio Perm	0.34			c0.34			0.33			c0.34		
v/c Ratio	0.79	0.30		0.86	0.77		0.86	0.24		0.88	0.54	
Uniform Delay, d1	20.5	16.1		30.2	28.6		31.2	23.1		31.7	26.5	
Progression Factor	1.00	1.00		1.01	1.01		1.00	1.00		1.00	1.00	
Incremental Delay, d2	20.5	0.3		21.5	2.1		35.5	0.4		25.0	1.8	
Delay (s)	41.1	16.5		52.0	31.0		66.8	23.6		56.8	28.3	
Level of Service	D	B		D	C		E	C		E	C	
Approach Delay (s)		20.4			33.7			37.7			37.1	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			32.3			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			110.0			Sum of lost time (s)				17.0		
Intersection Capacity Utilization			109.1%			ICU Level of Service				H		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Warden Avenue & Sheppard Avenue East

08/16/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Traffic Volume (vph)	99	621	249	173	1054	92	155	714	88	123	1089	131
Future Volume (vph)	99	621	249	173	1054	92	155	714	88	123	1089	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.87	1.00	1.00	0.82	1.00	1.00	0.84	1.00	1.00	0.87
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1736	3406	1315	1712	3438	1278	1770	3471	1254	1760	3505	1382
Flt Permitted	0.12	1.00	1.00	0.21	1.00	1.00	0.10	1.00	1.00	0.22	1.00	1.00
Satd. Flow (perm)	221	3406	1315	377	3438	1278	196	3471	1254	408	3505	1382
Peak-hour factor, PHF	0.72	0.86	0.97	0.90	0.98	0.72	0.92	0.92	0.67	0.83	0.92	0.78
Adj. Flow (vph)	138	722	257	192	1076	128	168	776	131	148	1184	168
RTOR Reduction (vph)	0	0	101	0	0	81	0	0	78	0	0	77
Lane Group Flow (vph)	138	722	156	192	1076	47	168	776	53	148	1184	91
Confl. Peds. (#/hr)	92		65	65		92	64		83	83		64
Heavy Vehicles (%)	4%	6%	7%	5%	5%	4%	2%	4%	8%	2%	3%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	40.0	33.0	33.0	44.0	35.0	35.0	45.1	38.1	38.1	46.9	39.0	39.0
Effective Green, g (s)	40.0	33.0	33.0	44.0	35.0	35.0	45.1	38.1	38.1	46.9	39.0	39.0
Actuated g/C Ratio	0.36	0.30	0.30	0.40	0.32	0.32	0.41	0.35	0.35	0.43	0.35	0.35
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	176	1021	394	260	1093	406	180	1202	434	271	1242	489
v/s Ratio Prot	0.05	0.21		c0.06	c0.31		c0.06	0.22		0.04	c0.34	
v/s Ratio Perm	0.23		0.12	0.24		0.04	0.32		0.04	0.19		0.07
v/c Ratio	0.78	0.71	0.40	0.74	0.98	0.12	0.93	0.65	0.12	0.55	0.95	0.19
Uniform Delay, d1	27.6	34.2	30.6	23.8	37.2	26.5	26.1	30.3	24.5	21.1	34.6	24.5
Progression Factor	1.36	1.03	1.14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	18.5	3.8	2.7	10.4	23.7	0.6	47.9	2.7	0.6	2.2	16.6	0.8
Delay (s)	56.0	38.9	37.7	34.3	61.0	27.1	74.0	32.9	25.1	23.3	51.2	25.4
Level of Service	E	D	D	C	E	C	E	C	C	C	D	C
Approach Delay (s)		40.8			54.2			38.4			45.5	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			45.4		HCM 2000 Level of Service					D		
HCM 2000 Volume to Capacity ratio			0.96									
Actuated Cycle Length (s)			110.0		Sum of lost time (s)					22.0		
Intersection Capacity Utilization			92.4%		ICU Level of Service					F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

12: Pharmacy Avenue & Site Access

08/16/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	94	13	11	249	228	30
Future Volume (Veh/h)	94	13	11	249	228	30
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)	102	14	12	271	248	33
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)					112	
pX, platoon unblocked						
vC, conflicting volume	560	264	281			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	560	264	281			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	79	98	99			
cM capacity (veh/h)	485	774	1282			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	116	283	281			
Volume Left	102	12	0			
Volume Right	14	0	33			
cSH	508	1282	1700			
Volume to Capacity	0.23	0.01	0.17			
Queue Length 95th (m)	7.0	0.2	0.0			
Control Delay (s)	14.2	0.4	0.0			
Lane LOS	B	A				
Approach Delay (s)	14.2	0.4	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.6			
Intersection Capacity Utilization			34.7%	ICU Level of Service		A
Analysis Period (min)			15			

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	8:05	8:05	8:05	8:05	8:05	8:05
End Time	9:15	9:15	9:15	9:15	9:15	9:15
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	8057	8177	8046	7976	8075	8067
Vehs Exited	8021	8084	7962	7923	7985	7995
Starting Vehs	412	386	398	358	356	381
Ending Vehs	448	479	482	411	446	455
Travel Distance (km)	11917	12102	11798	11697	11868	11876
Travel Time (hr)	496.8	486.6	482.4	428.8	409.8	460.9
Total Delay (hr)	272.5	259.0	260.6	209.0	186.2	237.5
Total Stops	12251	12767	11728	11073	11346	11830
Fuel Used (l)	1116.0	1120.2	1093.4	1043.4	1034.4	1081.5

Interval #0 Information Seeding

Start Time	8:05
End Time	8:15
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	8:15
End Time	9:15
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	8057	8177	8046	7976	8075	8067
Vehs Exited	8021	8084	7962	7923	7985	7995
Starting Vehs	412	386	398	358	356	381
Ending Vehs	448	479	482	411	446	455
Travel Distance (km)	11917	12102	11798	11697	11868	11876
Travel Time (hr)	496.8	486.6	482.4	428.8	409.8	460.9
Total Delay (hr)	272.5	259.0	260.6	209.0	186.2	237.5
Total Stops	12251	12767	11728	11073	11346	11830
Fuel Used (l)	1116.0	1120.2	1093.4	1043.4	1034.4	1081.5

Intersection: 3: Victoria Park Avenue & Sheppard Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	T	TR
Maximum Queue (m)	51.0	68.7	65.6	67.6	34.7	177.6	181.3	182.5	60.4	96.5	89.1	65.8
Average Queue (m)	22.7	46.0	42.1	41.4	33.3	109.0	114.1	118.3	41.4	52.7	50.5	41.6
95th Queue (m)	42.3	65.3	62.2	62.8	39.1	163.9	169.9	173.8	65.7	86.4	75.9	63.7
Link Distance (m)		494.7	494.7	494.7		499.2	499.2	499.2		650.8	650.8	650.8
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	88.9				27.3				53.0			
Storage Blk Time (%)					50	31			11	3		
Queuing Penalty (veh)					228	88			32	8		

Intersection: 3: Victoria Park Avenue & Sheppard Avenue East

Movement	SB	SB	SB	SB
Directions Served	L	T	T	TR
Maximum Queue (m)	43.6	111.0	99.4	102.3
Average Queue (m)	25.5	68.0	68.1	61.6
95th Queue (m)	50.3	97.1	95.0	91.2
Link Distance (m)		698.6	698.6	698.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	36.2			
Storage Blk Time (%)	5	34		
Queuing Penalty (veh)	15	27		

Intersection: 6: Pharmacy Avenue & Sheppard Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	TR	L
Maximum Queue (m)	43.5	56.7	56.5	59.6	44.4	105.0	103.7	108.6	52.1	27.9	32.5	77.5
Average Queue (m)	18.2	18.9	24.2	25.0	34.0	63.3	65.3	72.5	22.8	11.6	12.0	47.8
95th Queue (m)	35.0	42.8	48.5	49.3	54.6	97.0	97.1	106.2	42.5	22.7	24.5	74.4
Link Distance (m)		499.2	499.2	499.2		960.4	960.4	960.4		84.1	84.1	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	36.9				37.1				75.4			70.5
Storage Blk Time (%)	1	1			5	12			0			3
Queuing Penalty (veh)	2	1			20	16			0			1

Intersection: 6: Pharmacy Avenue & Sheppard Avenue East

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (m)	90.4	98.6
Average Queue (m)	13.7	47.6
95th Queue (m)	49.9	84.2
Link Distance (m)	420.4	420.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 9: Warden Avenue & Sheppard Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (m)	47.0	93.3	281.6	36.0	36.0	174.8	173.0	34.9	48.4	104.2	103.8	33.0
Average Queue (m)	24.6	56.1	69.9	31.4	29.2	162.7	159.5	16.3	34.3	56.0	57.4	15.4
95th Queue (m)	48.6	87.0	198.6	44.7	44.2	181.0	185.6	41.4	56.2	91.8	92.2	37.8
Link Distance (m)		960.4	960.4			157.6	157.6			667.3	667.3	
Upstream Blk Time (%)						58	53					
Queuing Penalty (veh)						0	0					
Storage Bay Dist (m)	39.6			28.5	28.6			27.4	40.9			25.5
Storage Blk Time (%)	2	23	34	12	15	60	62	0	12	15	32	0
Queuing Penalty (veh)	6	23	86	36	81	104	57	0	43	23	28	1

Intersection: 9: Warden Avenue & Sheppard Avenue East

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (m)	39.6	296.0	293.9	27.8
Average Queue (m)	28.6	204.0	198.1	16.0
95th Queue (m)	50.0	357.2	352.5	35.2
Link Distance (m)		404.2	404.2	
Upstream Blk Time (%)		8	8	
Queuing Penalty (veh)		0	0	
Storage Bay Dist (m)	32.3			20.3
Storage Blk Time (%)	3	58	59	1
Queuing Penalty (veh)	17	72	78	5

Intersection: 12: Pharmacy Avenue & Site Access

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	22.9	14.4
Average Queue (m)	12.9	0.5
95th Queue (m)	21.0	5.5
Link Distance (m)	17.9	542.8
Upstream Blk Time (%)	2	
Queuing Penalty (veh)	0	
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 1097

HCM Signalized Intersection Capacity Analysis

3: Victoria Park Avenue & Sheppard Avenue East

08/16/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	192	1300	378	169	626	82	193	775	218	152	889	76
Future Volume (vph)	192	1300	378	169	626	82	193	775	218	152	889	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		4.0	7.0		4.0	7.0		4.0	7.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.95		1.00	0.98		1.00	0.96		1.00	0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1704	4641		1787	4827		1766	4668		1732	4910	
Flt Permitted	0.26	1.00		0.09	1.00		0.11	1.00		0.12	1.00	
Satd. Flow (perm)	473	4641		162	4827		208	4668		214	4910	
Peak-hour factor, PHF	0.94	0.93	0.87	0.90	0.91	0.85	0.86	0.86	0.87	0.81	0.93	0.90
Adj. Flow (vph)	204	1398	434	188	688	96	224	901	251	188	956	84
RTOR Reduction (vph)	0	43	0	0	13	0	0	38	0	0	8	0
Lane Group Flow (vph)	204	1789	0	188	771	0	224	1114	0	188	1032	0
Confl. Peds. (#/hr)	124		174	174		124	187		168	168		187
Heavy Vehicles (%)	5%	3%	2%	1%	4%	1%	2%	3%	2%	4%	2%	8%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	62.5	49.0		57.5	46.5		50.0	36.1		46.0	34.1	
Effective Green, g (s)	62.5	49.0		57.5	46.5		50.0	36.1		46.0	34.1	
Actuated g/C Ratio	0.48	0.38		0.44	0.36		0.38	0.28		0.35	0.26	
Clearance Time (s)	4.0	7.0		4.0	7.0		4.0	7.0		4.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	355	1749		209	1726		246	1296		214	1287	
v/s Ratio Prot	c0.06	c0.39		c0.08	0.16		c0.10	0.24		0.08	0.21	
v/s Ratio Perm	0.22			0.32			c0.25			0.23		
v/c Ratio	0.57	1.02		0.90	0.45		0.91	0.86		0.88	0.80	
Uniform Delay, d1	20.6	40.5		33.8	31.9		33.0	44.5		32.8	44.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.2	27.5		35.6	0.8		34.4	7.6		30.8	5.3	
Delay (s)	22.9	68.0		69.3	32.8		67.4	52.1		63.6	50.1	
Level of Service	C	E		E	C		E	D		E	D	
Approach Delay (s)		63.5			39.8			54.6			52.2	
Approach LOS		E			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			54.7			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			130.0			Sum of lost time (s)			22.0			
Intersection Capacity Utilization			102.0%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

6: Pharmacy Avenue & Sheppard Avenue East

08/16/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			 			 	
Traffic Volume (vph)	218	1388	123	101	647	110	92	144	96	242	257	177
Future Volume (vph)	218	1388	123	101	647	110	92	144	96	242	257	177
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.98		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.98	1.00		0.98	1.00	
Frt	1.00	0.98		1.00	0.97		1.00	0.94		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1784	4920		1805	4850		1776	3324		1769	3291	
Flt Permitted	0.28	1.00		0.07	1.00		0.37	1.00		0.56	1.00	
Satd. Flow (perm)	531	4920		141	4850		689	3324		1035	3291	
Peak-hour factor, PHF	0.80	0.90	0.60	0.81	0.91	0.74	0.63	0.81	0.75	0.88	0.85	0.83
Adj. Flow (vph)	272	1542	205	125	711	149	146	178	128	275	302	213
RTOR Reduction (vph)	0	15	0	0	30	0	0	84	0	0	116	0
Lane Group Flow (vph)	273	1732	0	125	830	0	146	222	0	275	399	0
Confl. Peds. (#/hr)	24		31	31		24	37		31	31		37
Heavy Vehicles (%)	1%	3%	0%	0%	4%	1%	0%	0%	0%	0%	0%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	60.0	54.0		60.0	54.0		33.0	33.0		33.0	33.0	
Effective Green, g (s)	60.0	54.0		60.0	54.0		33.0	33.0		33.0	33.0	
Actuated g/C Ratio	0.55	0.49		0.55	0.49		0.30	0.30		0.30	0.30	
Clearance Time (s)	4.0	6.0		4.0	6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	357	2415		167	2380		206	997		310	987	
v/s Ratio Prot	c0.04	0.35		0.04	0.17			0.07			0.12	
v/s Ratio Perm	c0.37			0.37			0.21			c0.27		
v/c Ratio	0.76	0.72		0.75	0.35		0.71	0.22		0.89	0.40	
Uniform Delay, d1	16.2	22.0		17.6	17.2		34.2	28.9		36.7	30.7	
Progression Factor	1.00	1.00		2.07	0.70		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.4	1.9		14.8	0.4		18.6	0.5		29.0	1.2	
Delay (s)	25.6	23.9		51.2	12.3		52.8	29.4		65.8	31.9	
Level of Service	C	C		D	B		D	C		E	C	
Approach Delay (s)		24.1			17.3			37.0			43.7	
Approach LOS		C			B			D			D	
Intersection Summary												
HCM 2000 Control Delay	27.5			HCM 2000 Level of Service			C					
HCM 2000 Volume to Capacity ratio	0.81											
Actuated Cycle Length (s)	110.0			Sum of lost time (s)			17.0					
Intersection Capacity Utilization	112.1%			ICU Level of Service			H					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

9: Warden Avenue & Sheppard Avenue East

08/16/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Traffic Volume (vph)	117	1008	203	157	678	128	168	799	138	131	981	108
Future Volume (vph)	117	1008	203	157	678	128	168	799	138	131	981	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.76	1.00	1.00	0.87	1.00	1.00	0.83	1.00	1.00	0.81
Flpb, ped/bikes	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1672	3505	1206	1787	3406	1384	1787	3505	1324	1800	3505	1303
Flt Permitted	0.38	1.00	1.00	0.09	1.00	1.00	0.12	1.00	1.00	0.15	1.00	1.00
Satd. Flow (perm)	665	3505	1206	175	3406	1384	232	3505	1324	290	3505	1303
Peak-hour factor, PHF	0.91	0.90	0.92	0.89	0.94	0.91	0.90	0.96	0.66	0.96	0.94	0.88
Adj. Flow (vph)	129	1120	221	176	721	141	187	832	209	136	1044	123
RTOR Reduction (vph)	0	0	77	0	0	54	0	0	84	0	0	84
Lane Group Flow (vph)	129	1120	144	176	721	87	187	832	125	136	1044	39
Confl. Peds. (#/hr)	68		126	126		68	101		89	89		101
Heavy Vehicles (%)	3%	3%	2%	1%	6%	1%	1%	3%	1%	0%	3%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)	39.0	39.0	39.0	51.0	51.0	51.0	41.4	32.4	32.4	40.6	32.0	32.0
Effective Green, g (s)	39.0	39.0	39.0	51.0	51.0	51.0	41.4	32.4	32.4	40.6	32.0	32.0
Actuated g/C Ratio	0.35	0.35	0.35	0.46	0.46	0.46	0.38	0.29	0.29	0.37	0.29	0.29
Clearance Time (s)	7.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	235	1242	427	198	1579	641	214	1032	389	225	1019	379
v/s Ratio Prot		0.32		c0.06	0.21		c0.07	0.24		0.05	c0.30	
v/s Ratio Perm	0.19		0.12	c0.35		0.06	0.26		0.09	0.18		0.03
v/c Ratio	0.55	0.90	0.34	0.89	0.46	0.14	0.87	0.81	0.32	0.60	1.02	0.10
Uniform Delay, d1	28.5	33.7	26.0	23.9	20.1	16.9	27.8	35.9	30.2	25.5	39.0	28.5
Progression Factor	0.61	0.61	0.36	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.2	7.8	1.5	40.3	1.0	0.4	35.7	6.7	2.2	4.5	34.6	0.5
Delay (s)	23.4	28.2	10.7	64.2	21.0	17.3	63.6	42.6	32.4	30.0	73.6	29.0
Level of Service	C	C	B	E	C	B	E	D	C	C	E	C
Approach Delay (s)		25.2			27.8			44.1			64.8	
Approach LOS		C			C			D			E	
Intersection Summary												
HCM 2000 Control Delay			40.6		HCM 2000 Level of Service					D		
HCM 2000 Volume to Capacity ratio			0.96									
Actuated Cycle Length (s)			110.0		Sum of lost time (s)					22.0		
Intersection Capacity Utilization			108.9%		ICU Level of Service					G		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

12: Pharmacy Avenue & Site Access

08/16/2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Traffic Volume (veh/h)	81	10	20	251	381	100
Future Volume (Veh/h)	81	10	20	251	381	100
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)	88	11	22	273	414	109
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)					112	
pX, platoon unblocked	0.87	0.87	0.87			
vC, conflicting volume	786	468	523			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	675	309	372			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	75	98	98			
cM capacity (veh/h)	355	633	1028			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	99	295	523			
Volume Left	88	22	0			
Volume Right	11	0	109			
cSH	374	1028	1700			
Volume to Capacity	0.26	0.02	0.31			
Queue Length 95th (m)	8.4	0.5	0.0			
Control Delay (s)	18.1	0.8	0.0			
Lane LOS	C	A				
Approach Delay (s)	18.1	0.8	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay		2.2				
Intersection Capacity Utilization		41.5%		ICU Level of Service		A
Analysis Period (min)		15				

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	5:05	5:05	5:05	5:05	5:05	5:05
End Time	6:15	6:15	6:15	6:15	6:15	6:15
Total Time (min)	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	8485	8602	8552	8535	8541	8544
Vehs Exited	8436	8449	8456	8439	8417	8439
Starting Vehs	405	371	350	360	389	371
Ending Vehs	454	524	446	456	513	476
Travel Distance (km)	11082	11148	11083	11035	11074	11084
Travel Time (hr)	454.9	475.3	407.1	425.1	445.4	441.6
Total Delay (hr)	247.2	266.7	199.2	218.1	236.9	233.6
Total Stops	12739	13145	12221	12497	12677	12657
Fuel Used (l)	1046.3	1069.4	1001.8	1019.2	1037.5	1034.8

Interval #0 Information Seeding

Start Time	5:05
End Time	5:15
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	5:15
End Time	6:15
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	4	5	Avg
Vehs Entered	8485	8602	8552	8535	8541	8544
Vehs Exited	8436	8449	8456	8439	8417	8439
Starting Vehs	405	371	350	360	389	371
Ending Vehs	454	524	446	456	513	476
Travel Distance (km)	11082	11148	11083	11035	11074	11084
Travel Time (hr)	454.9	475.3	407.1	425.1	445.4	441.6
Total Delay (hr)	247.2	266.7	199.2	218.1	236.9	233.6
Total Stops	12739	13145	12221	12497	12677	12657
Fuel Used (l)	1046.3	1069.4	1001.8	1019.2	1037.5	1034.8

Intersection: 3: Victoria Park Avenue & Sheppard Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	T	TR
Maximum Queue (m)	96.3	208.0	201.7	181.2	34.7	98.2	85.5	89.1	60.5	101.9	99.8	91.2
Average Queue (m)	60.4	118.9	110.5	110.2	30.5	48.0	44.1	49.0	44.0	61.7	60.1	59.7
95th Queue (m)	115.7	178.5	166.8	162.2	41.4	88.9	73.7	75.4	67.7	89.9	85.0	84.1
Link Distance (m)		258.4	258.4	258.4		499.1	499.1	499.1		650.9	650.9	650.9
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	88.9				27.3				53.0			
Storage Blk Time (%)	0	20			42	9			5	10		
Queuing Penalty (veh)	0	38			88	15			14	20		

Intersection: 3: Victoria Park Avenue & Sheppard Avenue East

Movement	SB	SB	SB	SB
Directions Served	L	T	T	TR
Maximum Queue (m)	43.6	127.8	119.3	96.4
Average Queue (m)	35.1	87.1	77.4	62.2
95th Queue (m)	54.4	119.8	107.5	89.5
Link Distance (m)		436.9	436.9	436.9
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	36.2			
Storage Blk Time (%)	16	44		
Queuing Penalty (veh)	47	66		

Intersection: 6: Pharmacy Avenue & Sheppard Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	TR	L
Maximum Queue (m)	44.3	130.7	137.5	138.5	40.0	26.5	25.8	35.1	53.7	32.1	41.6	77.8
Average Queue (m)	35.5	80.6	86.9	91.4	21.9	11.8	10.1	16.2	23.2	15.4	23.1	55.0
95th Queue (m)	55.8	130.3	132.9	135.6	37.0	22.2	20.2	29.1	47.3	27.3	39.3	84.0
Link Distance (m)		499.1	499.1	499.1		960.1	960.1	960.1		84.7	84.7	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	36.9				37.1				75.4			70.5
Storage Blk Time (%)	2	25			3	0						9
Queuing Penalty (veh)	11	53			6	0						12

Intersection: 6: Pharmacy Avenue & Sheppard Avenue East

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (m)	131.9	104.6
Average Queue (m)	40.8	41.1
95th Queue (m)	94.4	79.6
Link Distance (m)	420.4	420.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 9: Warden Avenue & Sheppard Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (m)	47.0	182.0	189.0	36.0	36.0	118.4	106.2	34.9	48.4	156.5	161.4	33.0
Average Queue (m)	29.7	100.1	106.2	25.9	30.9	63.3	48.1	15.3	40.8	90.5	92.1	23.2
95th Queue (m)	54.7	166.4	171.2	47.6	43.2	104.9	88.7	35.1	60.0	149.9	149.3	43.8
Link Distance (m)		960.1	960.1			157.6	157.6			667.3	667.3	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	39.6			28.5	28.6			27.4	40.9			25.5
Storage Blk Time (%)	7	47	56	1	25	22	10	1	26	29	48	1
Queuing Penalty (veh)	36	55	113	5	86	34	13	2	103	48	66	4

Intersection: 9: Warden Avenue & Sheppard Avenue East

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (m)	39.6	393.8	395.4	27.8
Average Queue (m)	31.2	283.9	276.4	16.5
95th Queue (m)	48.9	455.5	450.2	35.1
Link Distance (m)		404.2	404.2	
Upstream Blk Time (%)		18	17	
Queuing Penalty (veh)		0	0	
Storage Bay Dist (m)	32.3			20.3
Storage Blk Time (%)	10	67	68	2
Queuing Penalty (veh)	51	88	74	8

Intersection: 12: Pharmacy Avenue & Site Access

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (m)	24.6	28.1	4.0
Average Queue (m)	11.5	4.2	0.1
95th Queue (m)	21.2	17.0	1.7
Link Distance (m)	23.7	545.2	84.7
Upstream Blk Time (%)	1		
Queuing Penalty (veh)	0		
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

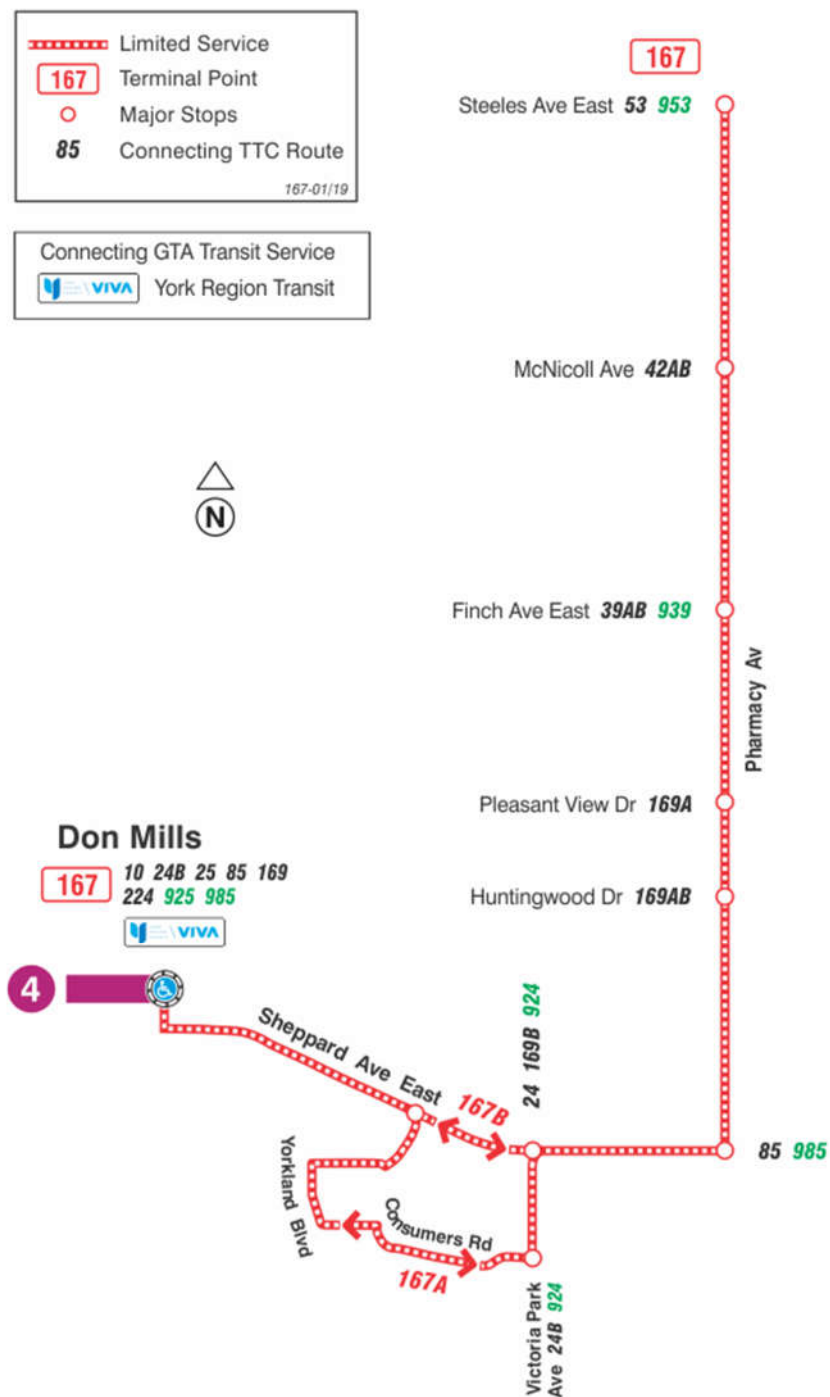
Network wide Queuing Penalty: 1155

Appendix J – Transit Route Services

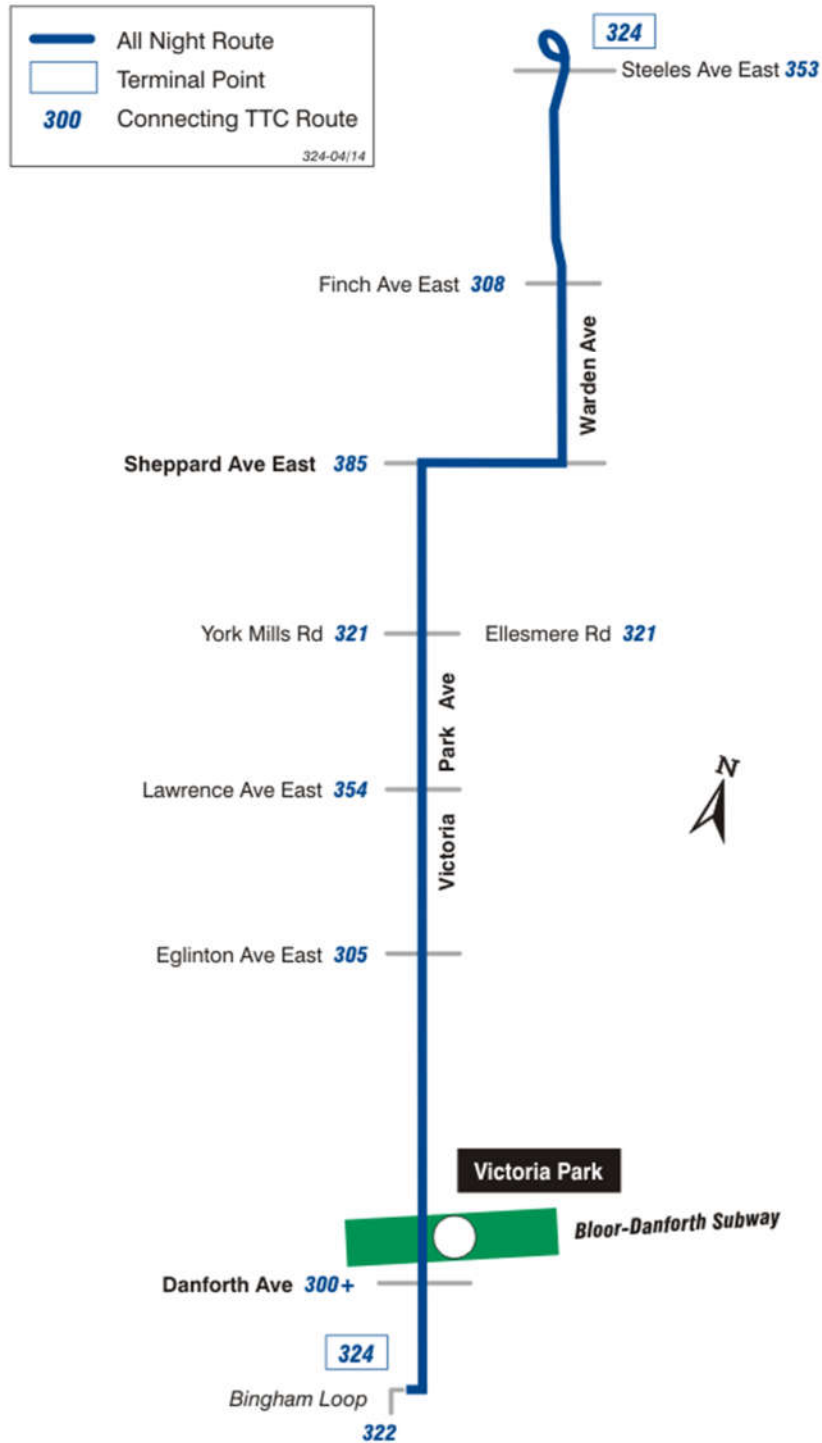
TTC Bus Route 85 Sheppard East



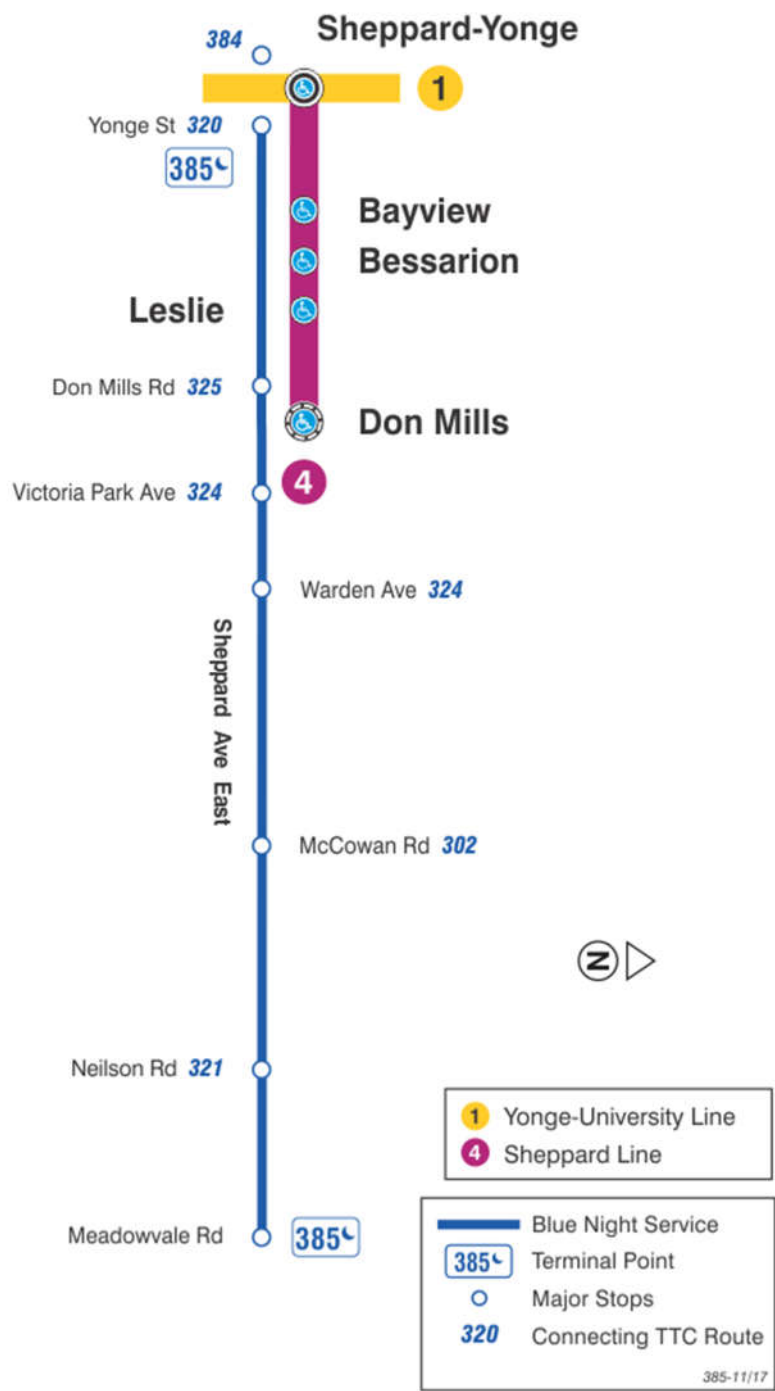
TTC Bus Route 167 Pharmacy North



TTC Bus Route 324 Victoria Park



TTC Bus Route 385 Sheppard East



TTC Bus Route 985 Sheppard East Express

