City of Markham

Environmental Assessment Study, Highway 404 North Collector Roads

Traffic Report

December 2018

B00801

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1. Introduction

The purpose of this report is to provide the City of Markham (the City) with the traffic operations analysis results for the horizon years of 2017 (existing conditions), 10-year and 20-year future at intersections within the study area of the proposed Highway 404 Employment Development Area.

The following existing intersections were evaluated as part of this analysis:

- Woodbine Avenue & Honda Boulevard/Bishop's Gate;
- Woodbine Avenue & 19th Avenue; and
- Woodbine Avenue & Victoria Square Boulevard.

The study area for the proposed employment land is illustrated in **Figure 1**.

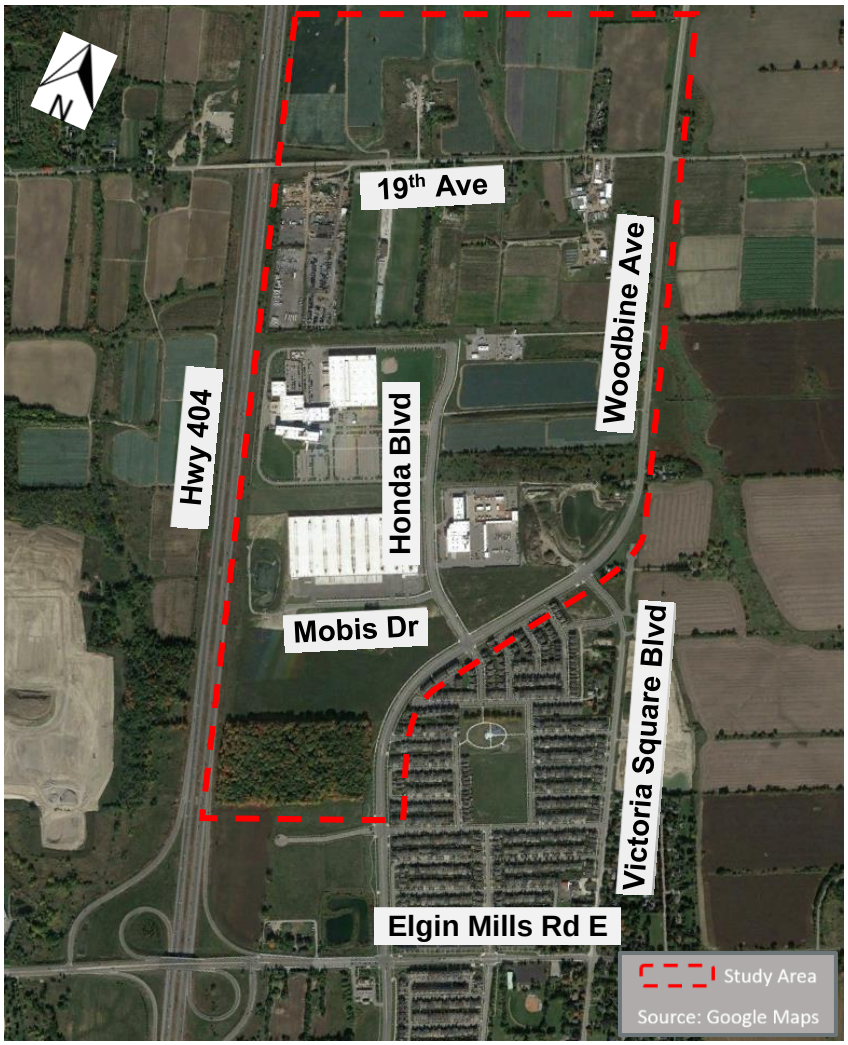


Figure 1: Study Area

2. Existing Conditions

Existing turning movement counts (TMC) were collected on June 27, 2017 at the three existing signalized/stop controlled intersections within the study area. Intersection capacity analysis was undertaken using procedures described in the Highway Capacity Manual (HCM). The analysis primarily focuses on performance measures such as level-of-service (LOS), volume to capacity (v/c) ratio, and 95th percentile queues.

LOS is a qualitative measure of operational performance and is based on control delay. The LOS criteria for signalized and unsignalized intersections are shown in **Table 1**.

Table 1: LOS Criteria for Signalized and Unsignalized Intersections

LOS	Control Delay (seconds/vehicle)		Traffic Flow Characteristics
	Signalized Intersections	Unsignalized Intersections	
A	0 – 10	0 – 10	Very Good
B	> 10 – 20	>10 – 15	Good
C	> 20 – 35	>15 – 25	Typically preferred planning objective
D	> 35 – 55	>25 – 35	Typically acceptable
E	> 55 – 80	>35 – 50	Undesirable; potentially unstable traffic flow
F	> 80	>50	Failing movements may impede traffic flow

The v/c ratio is the ratio between traffic volumes and the capacity of an intersection movement. A v/c ratio greater than 1.0 indicates that the movement is operating over capacity. The 95th Percentile Queue is the queue length that has only a 5 percent probability of being exceeded during the analysis period. It is industry practice and accepted methodology to use the 95th percentile queue length for design and operational analysis purposes.

Additionally, the review of intersection operations follows industry best practices which indicate that the analysis should identify intersections where:

- v/c ratios for overall intersection operations, through movements or shared through/turning movements are 0.90 or above;
- v/c ratios for exclusive movements are above 1.00; and
- 95th percentile queue lengths for individual movements exceed available lane storage.

2.1. Traffic Operations Analysis

Intersection operational analysis was undertaken for the three (3) signalized and unsignalized intersections within the study area using Synchro/SimTraffic 9 software to assess existing conditions. Signal timing plans for the intersection of Woodbine Avenue & Honda Boulevard/Bishop's Gate was provided by the Regional Municipality of York (the Region) and used in the existing conditions Synchro model.

The existing 2017 traffic control and lane configuration is illustrated in **Figure 2**. Existing 2017 turning movement counts are provided in **Figure 3**.

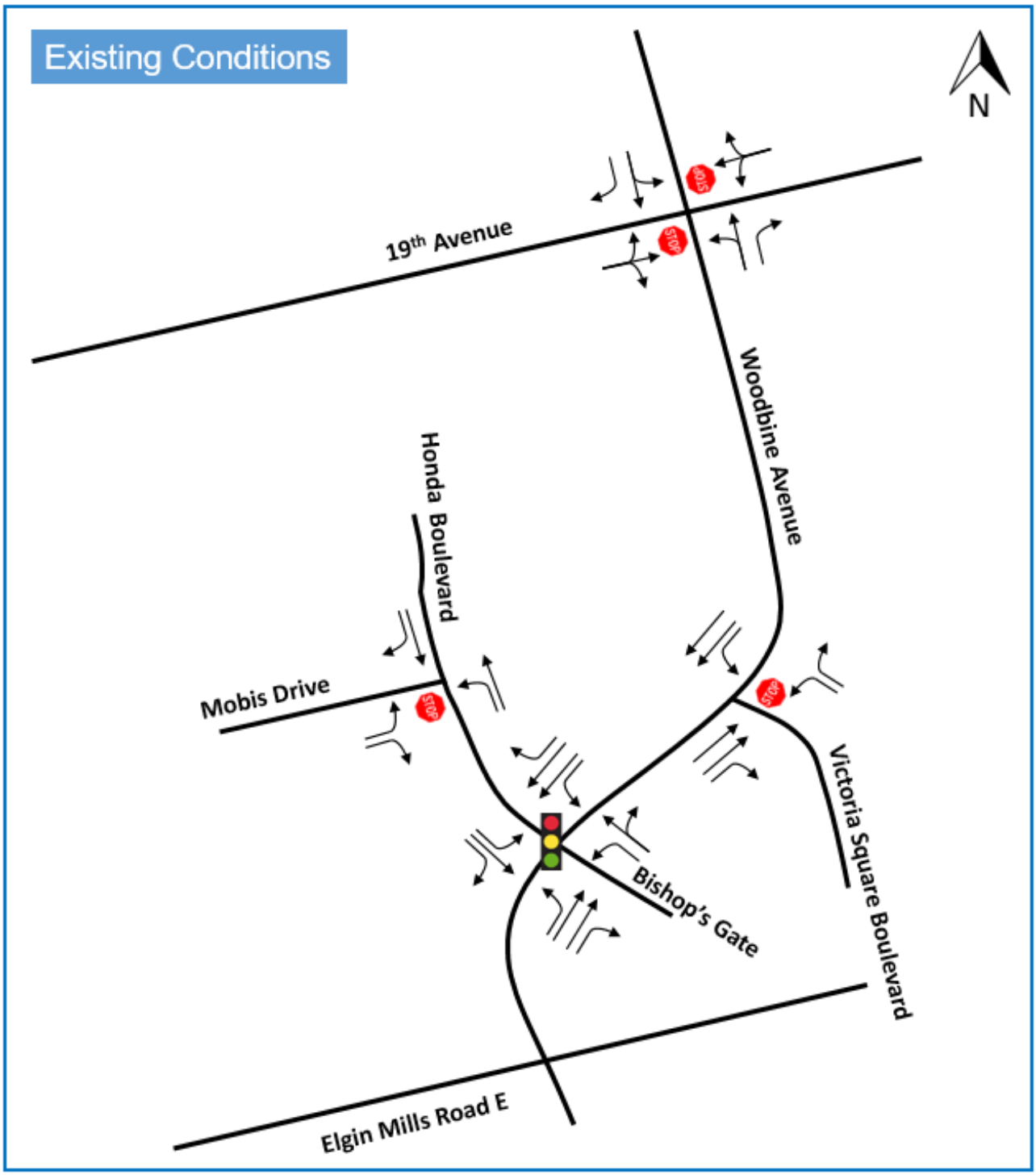


Figure 2: Existing 2017 Traffic Control/Lane Configuration

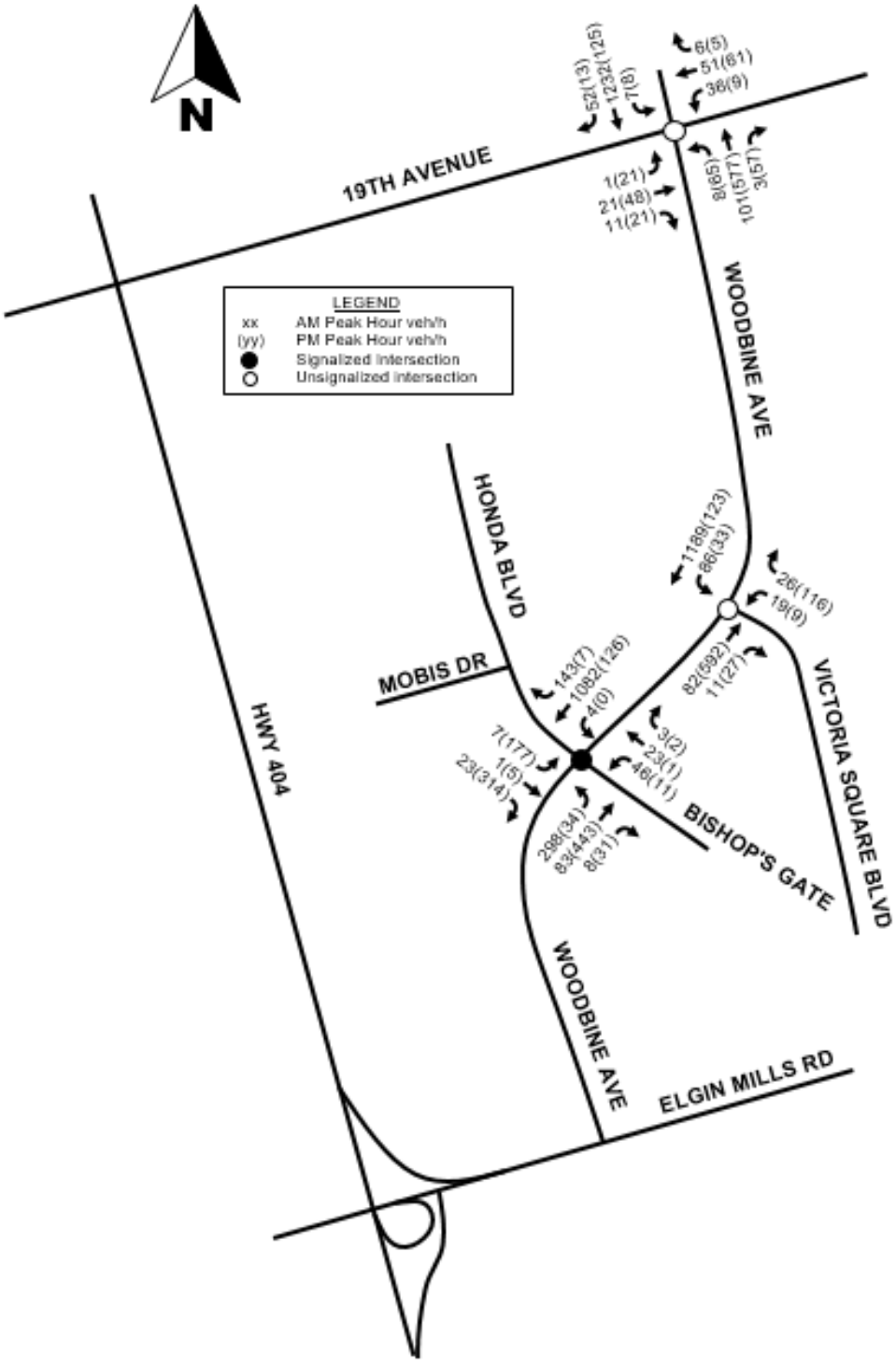


Figure 3: Existing 2017 Turning Movement Counts

The following **Table 2** provides the study area intersection performance summary based on existing intersection geometry, volumes and traffic control. Full Synchro/SimTraffic Outputs are provided in **Appendix A**.

Table 2: 2017 Existing Intersection Operations

						Legend: AM (PM)
Direction / Movement		**Storage (m)**	**v/c**	**Delay (s)**	**LOS**	**95%ile Queue (m)**
Woodbine Avenue & Honda Boulevard/Bishop's Gate (Signalized)						
EB	**L**	80	0.07 (0.70)	31 (40)	C (D)	6 (51)
	T	-	0.01 (0.01)	30 (27)	C (C)	2 (4)
	R	-	0.02 (0.23)	30 (29)	C (C)	17 (29)
WB	**L**	15	0.24 (0.24)	29 (25)	C (C)	18 (8)
	T/R	-	0.13 (0.01)	31 (27)	C (C)	16 (4)
NB	**L**	Continuous	0.86 (0.06)	27 (6)	C (A)	54 (14)
	T/T	-	0.04 (0.23)	4 (7)	A (A)	10 (31)
	R	65	0.01 (0.02)	4 (6)	A (A)	4 (6)
SB	**L**	45	- (-)	- (-)	- (-)	- (-)
	T/T	-	0.64 (0.08)	14 (10)	B (B)	65 (14)
	R	40	0.13 (0.01)	9 (10	A (A)	18 (4)
Overall		**-**	**0.83 (0.37)**	**16 (19)**	**B (B)**	**-**
Woodbine Avenue & Victoria Square Boulevard (Stop Controlled)						
WB	**L**	65	0.08 (0.03)	21 (16)	C (C)	12 (7)
	R	-	0.03 (0.18)	9 (11)	A (B)	16 (16)
NB	**T/T**	-	0.03 (0.18)	0 (0)	- (-)	- (1)
	R	30	0.01 (0.02)	0 (0)	- (-)	- (1)
SB	**L**	105	0.06 (0.04)	8 (9)	A (A)	11 (15)
	T/T	-	0.37 (0.04)	0 (0)	- (-)	- (-)
Overall		**-**	**0.93 (0.34)[1]**	**8 (2)**	**F (A)**	**-**
Woodbine Avenue & 19th Avenue (Stop Controlled)						
EB	**L/T/R**	-	0.24 (0.36)	38 (26)	E (D)	22 (19)
WB	**L/T/R**	-	0.86 (0.32)	120 (26)	F (D)	61 (18)
NB	**L/T**	-	0.02 (0.05)	1 (1)	A (A)	20 (18)
	R	15	0.00 (0.04)	0 (0)	- (-)	- (1)
SB	**L/T**	-	0.00 (0.01)	1 (1)	A (A)	13 (5)
	R	30	0.00 (0.01)	0 (0)	A (-)	3 (1)
Overall		**-**	**0.45 (0.62)**	**1 (5)**	**A (B)**	**-**

[1] See note as part of Woodbine Avenue & Victoria Square Boulevard on page 6.

The review of existing traffic operations indicates that the following movements are operating with long delays, high v/c ratios, and or/long queues:

Woodbine Avenue & Honda Boulevard/Bishop's Gate

- Westbound left-turn movement exceeds storage by 1 vehicle during the AM peak hour.

Woodbine Avenue & Victoria Square Boulevard

- Although individual movements are all operating at acceptable levels of service without significant delays or queues, overall intersection operates at a LOS F, v/c ratio of 0.93 during the AM peak hour. This is due to the heavy turning movement volume in combination with the intersection operating under stop control traffic conditions.

Woodbine Avenue & 19th Avenue

- Westbound shared left/through/right-turn operates at LOS F during the AM peak hour, however there is only a maximum queue of 7 vehicles is reported.

3. Future Scenarios

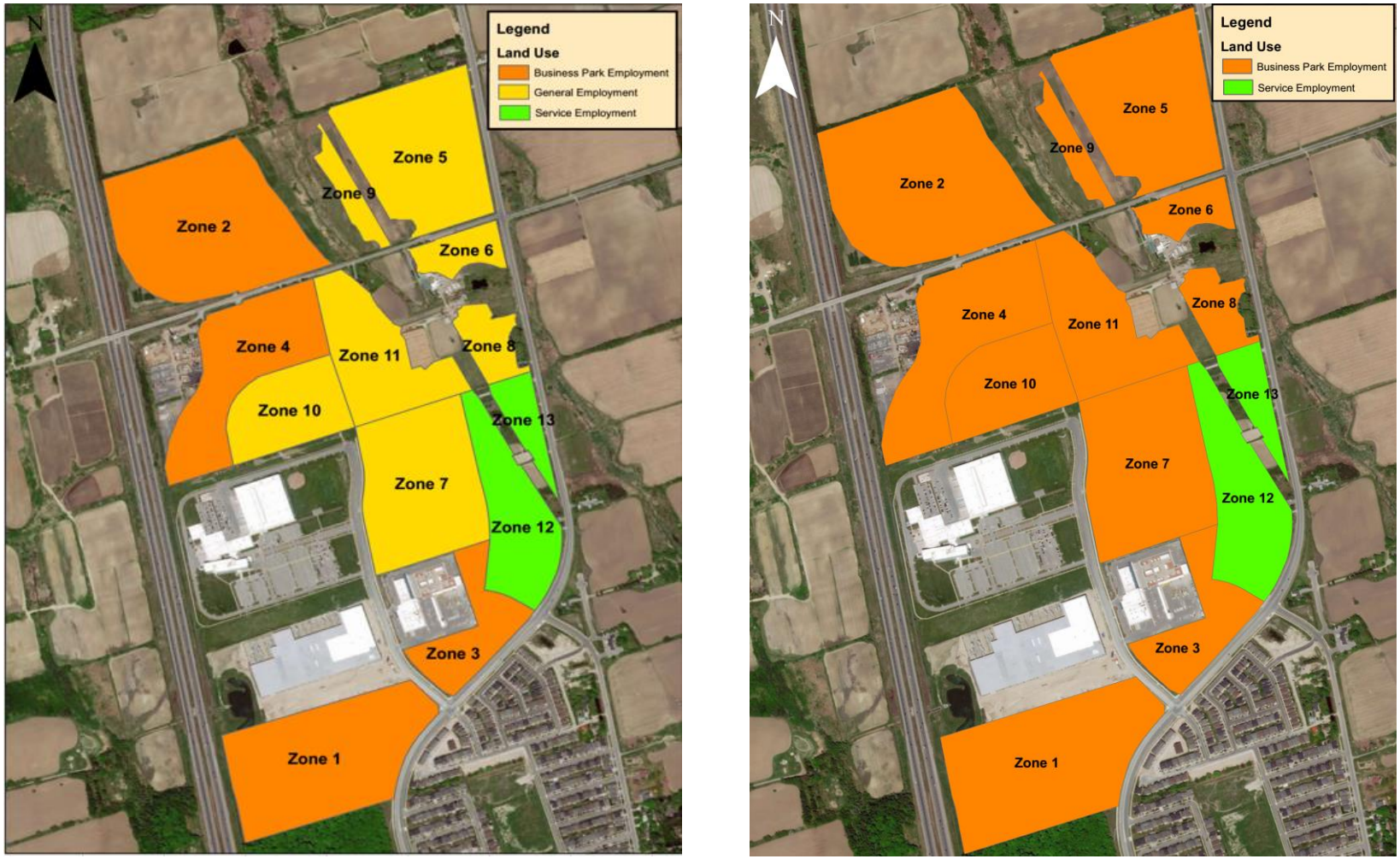
3.1. Trip Generation and Distribution

The City has indicated that the employment lands within the study area are subject to the policies of the 1987 Official Plan and Official Plan Amendment 149. This amendment designates the majority of land within the employment area as 'Business Park Area', with the remaining land designated as 'Business Corridor Area'. As such, the previously defined land use within the study area has been modified accordingly and the trip generation forecasted for all employment lands was also revised.

It is important to note that for the purposes of this analysis, the lands designated as 'Business Corridor Area' were considered as 'Service Employment Area' similar to the previous land use designation[2].

An illustration of the revised land use is provided in **Figure 4**.

[2] As discussed as part of meetings with City Staff



Previous Land Use **Revised OPA 149 Land Use**

Figure 4: Revised Land Use Zonal Map

Trip generation was estimated using the 10th edition of the Institute of Transportation Engineer's (ITE) Trip Generation Manual Land Use Code 770: Business Park for land designated as Business Park Employment land, and Land use Code 110: General Light Industrial for land designated as Service Employment Land.

It is important to note that the ITE Trip Generation Manual does not have a land use code for service employment land, as service employment land uses can vary in the type of permitted establishments.

However, it was assumed that the selected land use type would provide similar trip generation rates expected from the variety of permitted land use types. Trip Generation was conducted using Synchro 9 Traffic Impact Assessment (TIA) module, which allows for direct planning within the Synchro software. Trip Generation rates are provided in **Table 3.**

A reduction of 40% of the total Business Park Employment area and 35% of the total Service Employment area was considered as the future constructed employment buildings. This percentage of the gross floor area was used for all trip generation calculation purposes. These percentages were estimated based on employment densities of comparable locations identified as part of a review of publicly available information including the following:

- Town of Ajax, Employment Lands Strategy, March 2010
- Town of Milton, Employment Land Needs Assessment Study, October 2016
- City of Brantford, Employment (Industrial) Land Analysis & Strategies, November 2016
- City of Kingston, Employment Land Strategy, March 2015
- Town of Caledon, Employment Land Needs Study, February 2010
- City of Guelph, Employment Lands Strategy, April 2010
- Town of Markham, Employment Lands Strategy, May 2009

Table 3: Trip Generation Rates

Land Use Types	Net Area	Employees p/ha					
Business Park Employment	40%	75					
Service Employment	35%	36					
ITE Trip Gen Code		AM Peak			PM Peak		
		Rate	Ent	Ext	Rate	Ent	Ext
Land Use Code 770: Business Park (AM/PM Peak Hour of Generator - Employees)		0.45	0.85	0.15	0.39	0.22	0.78
Land Use Code 110: General Light Industrial (AM/PM Peak Hour of Generator - Employees)		0.67	0.85	0.15	0.68	0.30	0.70

Trip distribution was estimated based on existing turning movement counts for vehicles entering and exiting Honda Boulevard. Turning movement counts at Woodbine Avenue & 19th Avenue

were used to distribute volume to the north, east, and west. All southbound volume was assumed to travel along Elgin Mills Road. Existing trip distribution patterns used for all future scenarios are provided in **Table 4**.

Table 4: Trip Distribution Patterns (Existing TMC Patterns)

AM Trip Distribution Patterns		
Direction	**Entering Honda Boulevard**	**Exiting Honda Boulevard**
From/To North	30%	20%
From/To South	68%	77%
From/To East	1%	1%
From/To West	1%	2%
PM Trip Distribution Patterns		
Direction	**Entering Honda Boulevard**	**Exiting Honda Boulevard**
From/To North	14%	30%
From/To South	83%	64%
From /To East	1%	3%
From/To West	2%	3%

To corroborate our assumption, trip distribution was calculated using information provided by the 2016 Transportation Tomorrow Survey (TTS) data for work related trips within the York Region and Toronto Area, as provided in **Table 5**. It should be noted that a more localized information was not available at the time of completion of this report.

The resulting trip distribution patterns indicate a large difference in AM peak hour entering and exiting trips from north of the study area (i.e. Whitchurch-Souffville area) compared to existing entering and exiting travel patterns.

Table 5: Trip Distribution Patterns (TTS Data)

AM Trip Distribution Patterns		
Direction	**Entering Honda Boulevard**	**Exiting Honda Boulevard**
From/To North	2%	3%
From/To South	58%	76%
From/To East	36%	10%
From/To West	4%	11%
PM Trip Distribution Patterns		
Direction	**Entering Honda Boulevard**	**Exiting Honda Boulevard**
From/To North	0%	6%
From/To South	62%	54%
From /To East	38%	40%
From/To West	0%	0%

Due to the variation between the two distribution methods, the trip distribution based on existing traffic volume was selected as the preferred assumption for all traffic distribution in the

subsequent future traffic analysis with the exception of employment trips entering/exiting to/from the west. [3]

The larger of the two percentages was selected for use as a conservative estimate for all traffic generated in the west. The final distribution percentages are illustrated in **Table 6**.

Table 6: Final Trip Distribution Percentages

AM Trip Distribution Patterns		
Direction	**Entering Honda Boulevard**	**Exiting Honda Boulevard**
From/To North	27%	11%
From/To South	68%	77%
From/To East	1%	1%
From/To West	4%	11%
PM Trip Distribution Patterns		
Direction	**Entering Honda Boulevard**	**Exiting Honda Boulevard**
From/To North	14%	30%
From/To South	83%	64%
From/To East	1%	3%
From/To West	2%	3%

The proposed crossing was included in the 10-year and 20-year horizon scenarios, and all trips entering/exiting the employment lands to/from the west will do so via the crossing. The Class EA has been completed and, the preferred location is illustrated in **Figure 5**.

[3] This assumption considers the effects of a proposed road crossing of Highway 404 between Leslie Street and 19th Avenue. The Region complete a schedule C, Class Environmental Assessment (EA) for the proposed road crossing in September 2015 which identified it as the preferred design alternative.

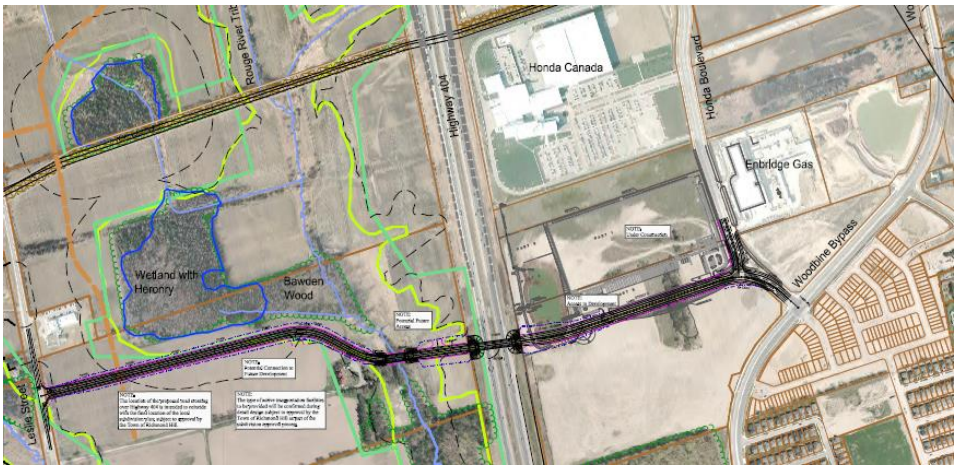


Figure 5: Proposed Highway 404 Road Crossing between Leslie Street and 19th Avenue (Preferred Option)

3.2. 10-Year Horizon Scenario (2027 Future Traffic)

To reflect the effects of continued population growth in the area a background traffic growth rate of 1.5% per year was applied to all existing intersection movements, with the exception of turning movements in and out of Honda Boulevard, for the 10-year horizon (2027).

This percentage of background traffic growth is estimated as an average growth rate estimated from previous Traffic Impact Studies submitted to the City for developments within the study area[4].

It should be noted that as part of the review of future traffic volumes within the surrounding area the Region provided AM Peak hour EMME model link volumes for the 2021 and 2031 horizon years along 19th Avenue and Woodbine Avenue. A comparison between the Region's model outputs to the existing and future traffic volume estimated as part of the employment area analysis indicates that the 2021 AM peak hour volume along Woodbine Avenue is significantly lower than the existing 2017 traffic volume used in the previous section's analysis.

As a result, the 10-year and 20-year horizon scenario traffic volume within this report was carried on since it provides a conservative traffic projection along Woodbine Avenue compared to projections conducted by the Region.

In addition to background traffic growth, 50% of the total employment and service land within the study area was assumed to be developed within a 10-year horizon year. All employment land located north of 19th Avenue is not projected to be developed before the 10-year horizon and was left out of subsequent traffic impact analysis for this period.

[4]OPA 149 Traffic Impact Assessment Study Update, prepared by iTrans, September 2008 and Honda Canada Campus – Traffic Impact Study, prepared by iTrans, October 2008.

The traffic distribution based on employment zone to both intersections within the 10-year horizon is provided in **Table 7**.

Table 7: 10-Year (2027) Employment Zone Distribution

Employment Zone Distribution – 10 Year Scenario (2027)	
Intersection	Assigned Zones
Woodbine Avenue & Honda Boulevard/Bishop's Gate	1 3 4 10 11
Woodbine Avenue & Victoria Square Boulevard	6 7 8 12 13

Under this scenario, an additional signalized access was provided for the internal employment area at the intersection of Woodbine Avenue & Victoria Square Boulevard in order to facilitate vehicles entering and exiting the employment area and distribute entering/exiting volume between two intersections.

Traffic generated by adjacent land use zones to the new access were redistributed from Honda Boulevard to the new intersection at Victoria Square Boulevard for both AM and PM peak hours. There are existing auxiliary lanes present for the northbound left-turn and southbound right-turn at the modelled signalized intersection of Woodbine Avenue & Victoria Square Boulevard.

Traffic control/lane configuration at the intersection of Woodbine Avenue & 19th Avenue was modelled as a stop-controlled intersection, similar to existing conditions to evaluate the effects of future traffic growth.

The 10-year future traffic control and lane configuration are illustrated in **Figure 6**. The Highway 404 crossing that extends westerly to Leslie Street was modelled as a connection to Honda Boulevard as a 3-legged intersection in order to project internal traffic operations within the employment area. 10-Year future turning movement counts are provided in **Figure 7**.

3.2.1. Traffic Operations Analysis

A similar signal timing was applied at the new intersection of Woodbine Avenue & Victoria Square Boulevard during both AM and PM peak hours as the intersection of Woodbine Avenue & Honda Boulevard/Bishop's Gate. Signal timing at the intersection of Woodbine Avenue & Honda Boulevard/Bishop's Gate was modified providing additional green time for the northbound left-turn movement to facilitate vehicles turning into the employment area during the AM peak hour.

The following **Table 8** provides the study area intersection performance summary based on the 10-year (2027) Future Traffic volume and intersection modifications. Full Synchro/SimTraffic Outputs are provided in **Appendix B**.

The review of future 10-year horizon (2027) traffic operations indicates that the following movements are operating with long delays, high v/c ratios, and or/long queues:

Woodbine Avenue & Honda Boulevard/Bishop's Gate

- Overall intersection is projected to operate at a LOS F, v/c ratio of 0.91 during the AM peak hour, however individual movements are all operating at acceptable levels of service without significant delays or queues.
- Westbound left-turn 95th percentile queues projected to exceed storage by 1 vehicle during the AM peak hour;
- Southbound right-turn 95th percentile queues projected to exceed storage by 3 vehicles during the AM peak hour;

Woodbine Avenue & 19th Avenue

- Overall intersection is projected to operate at a LOS F, v/c ratio of 1.06 during the AM peak hour;
- Eastbound shared left/through/right-turn projected to operate at a LOS F during the AM peak hour. Eastbound 95th percentile queues are projected to extend over 260 m during the AM peak hour;
- Westbound shared left/through/right-turn projected to operate at a LOS F, v/c ratio of 1.98 during the AM peak hour. Westbound 95th percentile queues are projected to extend over 900 m during the AM peak hour;
- SimTraffic simulations indicate both eastbound and westbound left-turning vehicles are unable to complete their turning movement due to insufficient gaps in traffic in both directions. Westbound vehicles in particular were found to have difficulty due to the high number of projected southbound vehicles.

The York Region Transportation Master Plan (York TMP) identifies the future widening of Woodbine Avenue to four lanes from Victoria Square Boulevard to 19th Avenue. It also identifies the future widening of 19th avenue to four lanes through the study area. With these widening's, it is assumed that the intersection of 19th Avenue & Woodbine Avenue will be signalized. With these future improvements the intersection is expected to operate at an improved level of service under future conditions.

It should be noted that at the time of completion of this report a specific timeline for the construction of the aforementioned widening was not available.

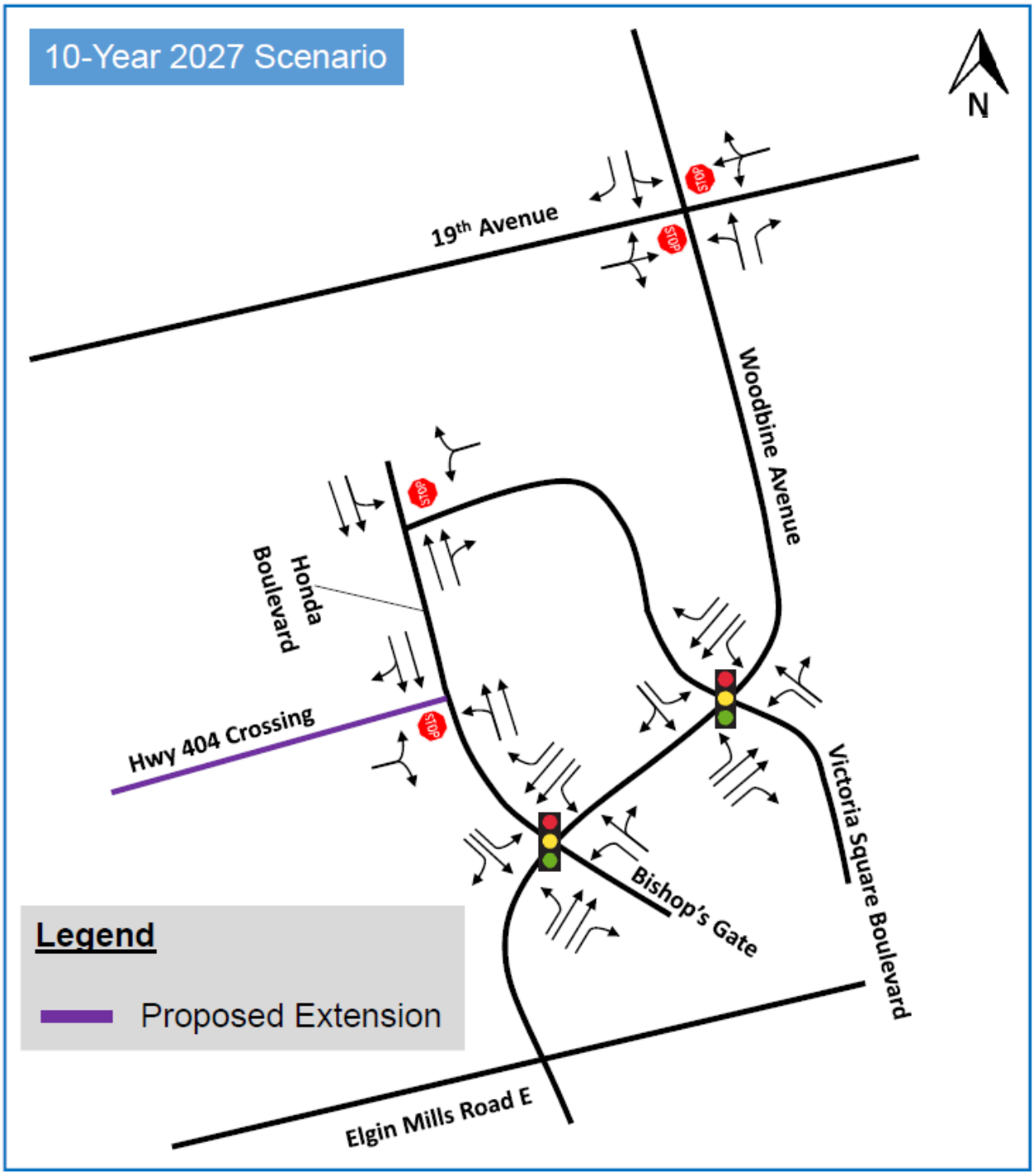


Figure 6: 10-Year Horizon (2027) Traffic Control/Lane Configuration

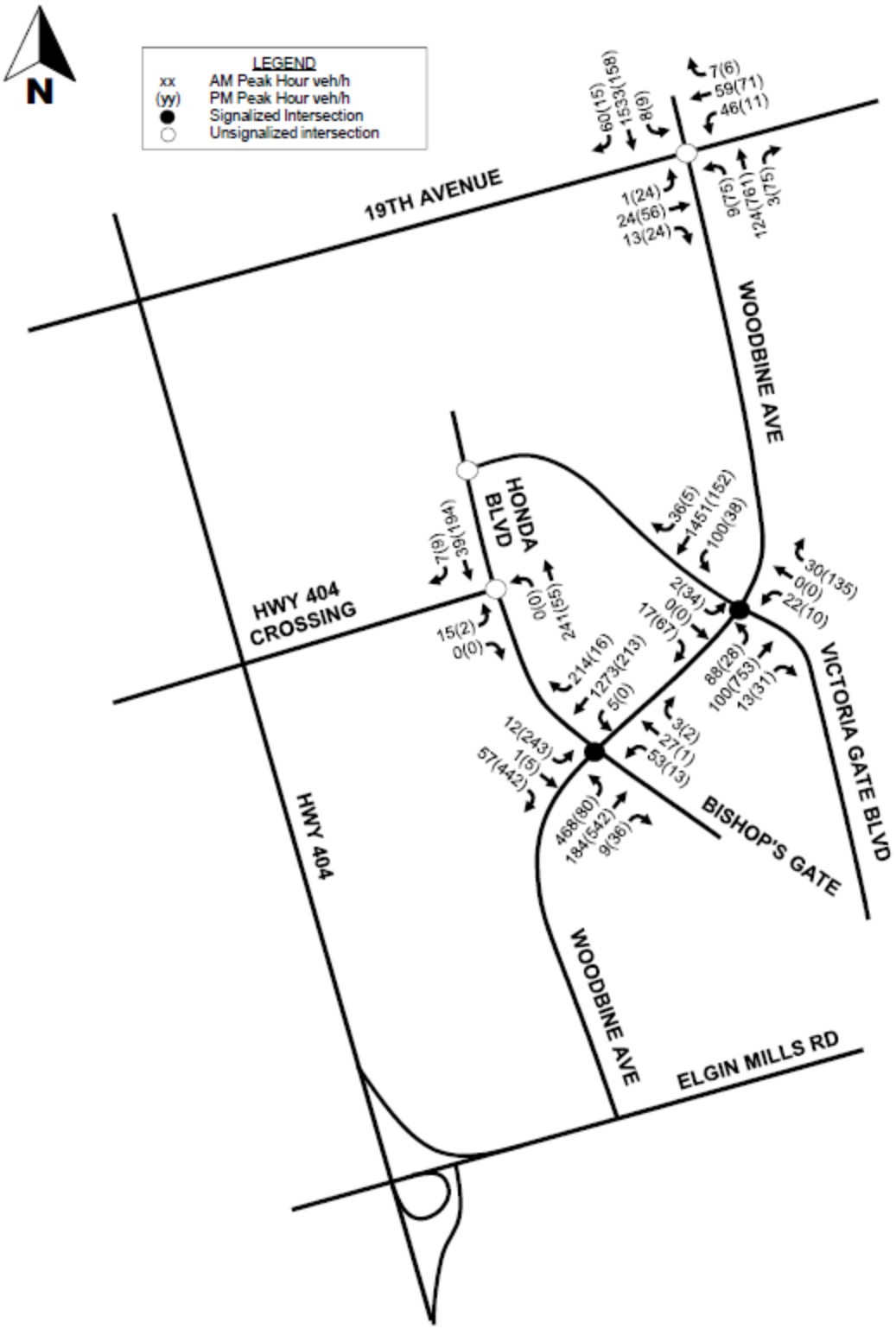


Figure 7: 10-Year Horizon (2027) Turning Movement Counts

Table 8: 10-Year (2027) Future Traffic Operations

Direction / Movement		Storage (m)	v/c	Delay (s)	LOS	95%^{ile} Queue (m)
						Legend: AM (PM)
Woodbine Avenue & Honda Boulevard/Bishop's Gate (Signalized)						
EB	**L**	80	0.16 (0.77)	42 (42)	D (D)	12 (61)
	T	-	0.01 (0.01)	40 (25)	D (C)	1 (4)
	R	-	0.06 (0.32)	41 (28)	D (C)	22 (50)
WB	**L**	15	0.47 (0.04)	45 (26)	D (C)	21 (9)
	T/R	-	0.18 (0.00)	41 (25)	D (C)	22 (3)
NB	**L**	Continuous	0.92 (0.16)	50 (9)	D (A)	131 (25)
	T/T	-	0.08 (0.30)	3 (10)	A (B)	18 (53)
	R	65	0.01 (0.03)	3 (8)	A (A)	5 (7)
SB	**L**	45	0.01 (-)	15 (-)	B (-)	15 (-)
	T/T	-	0.90 (0.15)	34 (14)	C (B)	145 (21)
	R	40	0.26 (0.01)	18 (13)	B (B)	65 (7)
Overall		**-**	**0.91 (0.47)**	**34 (21)**	**C (C)**	**-**
Woodbine Avenue & Victoria Square Boulevard (Signalized)						
EB	**L**	50	0.02 (0.15)	32 (12)	C (B)	3 (12)
	T/R	-	0.01 (0.05)	32 (12)	C (B)	8 (12)
WB	**L**	65	0.24 (0.04)	34 (12)	C (B)	13 (6)
	T/R	-	0.03 (0.18)	32 (12)	C (B)	16 (19)
NB	**L**	50	0.48 (0.05)	12 (6)	B (A)	27 (8)
	T/T	-	0.05 (0.51)	2 (7)	A (A)	13 (57)
	R	30	0.01 (0.02)	2 (5)	A (A)	3 (15)
SB	**L**	105	0.12 (0.16)	3 (6)	A (A)	18 (22)
	T/T	-	0.72 (0.10)	7 (6)	A (A)	68 (15)
	R	60	0.03 (0.00)	2 (5)	A (A)	9 (5)
Overall		**-**	**0.68 (0.40)**	**8 (8)**	**A (A)**	**-**
Woodbine Avenue & 19th Avenue (Stop Controlled)						
EB	**L/T/R**	-	0.48 (0.66)	83 (59)	F (F)	263 (31)
WB	**L/T/R**	-	1.98 (0.56)	608 (50)	F (F)	908 (26)
NB	**L/T**	-	0.02 (0.06)	1 (2)	A (A)	134 (23)
	R	15	0.00 (0.05)	0 (0)	- (-)	3 (7)
SB	**L/T**	-	0.01 (0.01)	1 (1)	A (A)	146 (8)
	R	30	0.04 (0.01)	0 (0)	- (-)	5 (2)
Overall		**-**	**1.06 (0.71)**	**38 (10)**	**F (C)**	**-**
Honda Boulevard & Hwy 404 Crossing						
EB	**L//R**	-	0.02 (0.00)	10 (10)	A (A)	11 (3)
NB	**L/T**	-	0.10 (0.02)	0 (0)	- (-)	- (-)
SB	**T**	-	0.02 (0.08)	0 (0)	- (-)	- (-)
Overall		**-**	**0.00 (0.00)**	**1 (0)**	**A (A)**	**-**

3.3. 20-Year Horizon Scenario (2037 Future Traffic)

3.3.1. Traffic Operations Analysis

Similar to the 10-year horizon scenario, a traffic growth rate of 1.5% per year was applied to all intersection movements, with the exception of turning movements into and out of Honda Boulevard, for the 20-year horizon (2037). 100% of the total employment and service land was projected to be developed including all employment lands located north of 19th Avenue. The traffic distribution based on employment zone to both intersections within the 20-year horizon is provided in **Table 9**.

Table 9: 20-Year (2037) Employment Zone Distribution

Employment Zone Distribution – 20 Year Scenario (2037)	
Intersection	**Assigned Zones**
Woodbine Avenue & Honda Boulevard/Bishop's Gate	1 2
Woodbine Avenue & Victoria Square Boulevard	7 8 12 13
19th Avenue & North Development Access	2 5 9
19th Avenue & South Development Access	4 6 10 11

An additional intersection providing access to the northern and southern employment lands through 19th Avenue was included in the 20-year traffic model. This intersection was modelled as stop-controlled for the northbound and southbound approaches to establish the feasibility of the access without the inclusion of traffic signals. An additional westbound left-turn lane was found to be warranted based on the volumes projected along 19th Avenue using the Geometric Design Standards for Ontario Highways (GDSOH) guidelines, for an assumed design speed of 80 km/h, and a 40%+ proportion of left-turns in advancing traffic. An eastbound left-turn lane was also included in the traffic model, although traffic destined to the employment areas originating further west along 19th Avenue was found to be minimal and a similar left-turn warrant based on GDSOH guidelines for the eastbound direction was not met.

Under a 20-year scenario (2037), the intersection of Woodbine Avenue & 19th Avenue was modelled as a signalized intersection due to the significant delays projected in the eastbound and westbound directions as a stop-controlled intersection. This is consistent with the long range plan for this intersection. Additional left-turn lanes in all directions were provided at the intersection in order to facilitate new traffic volume destined for the employment lands north of 19th Avenue.

The 20-year future traffic control and lane configuration are illustrated in **Figure 8**. 20-year future turning movement counts are provided in **Figure 9**.

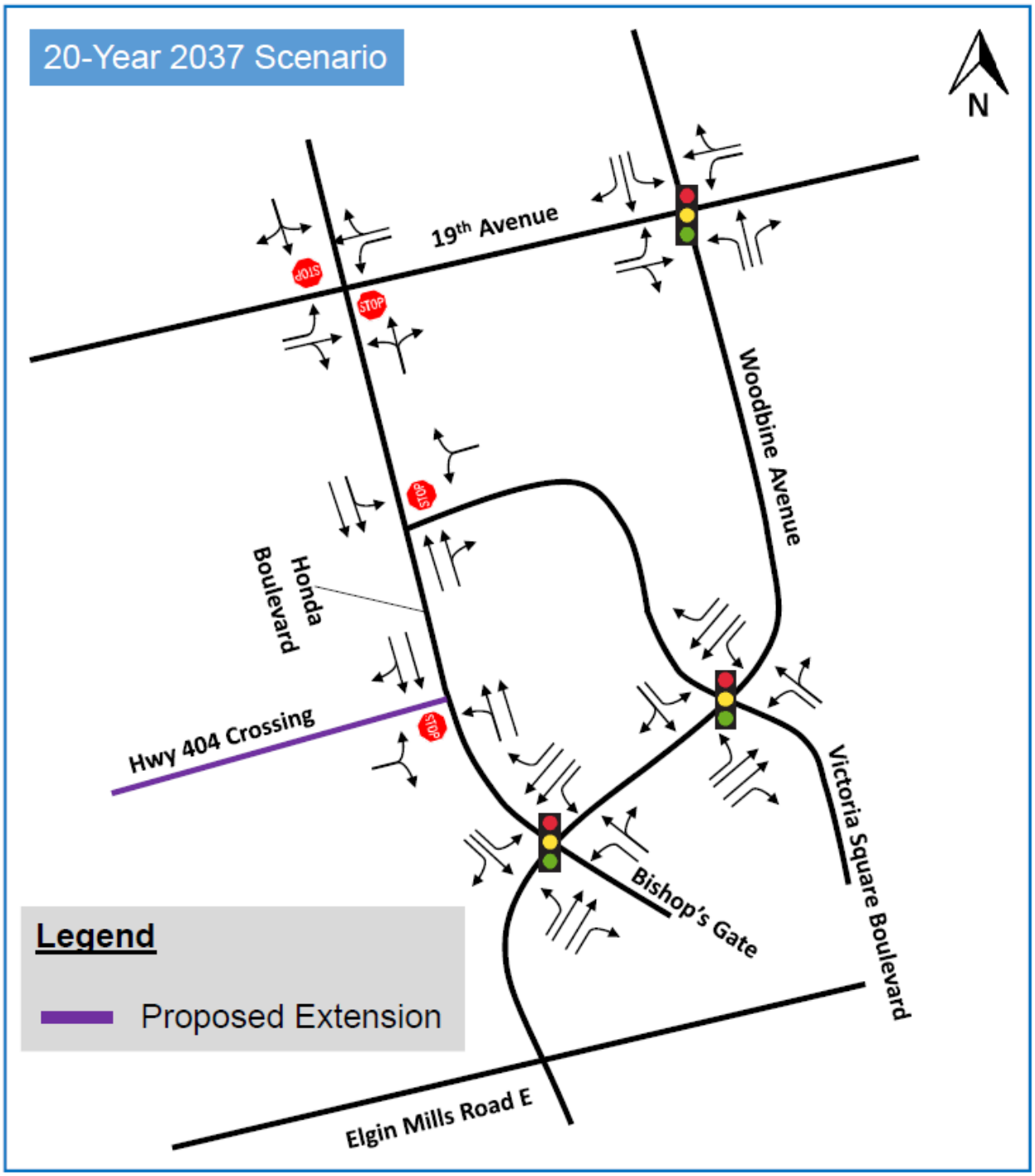


Figure 8: 20-Year Horizon (2037) Traffic Control/Lane Configuration

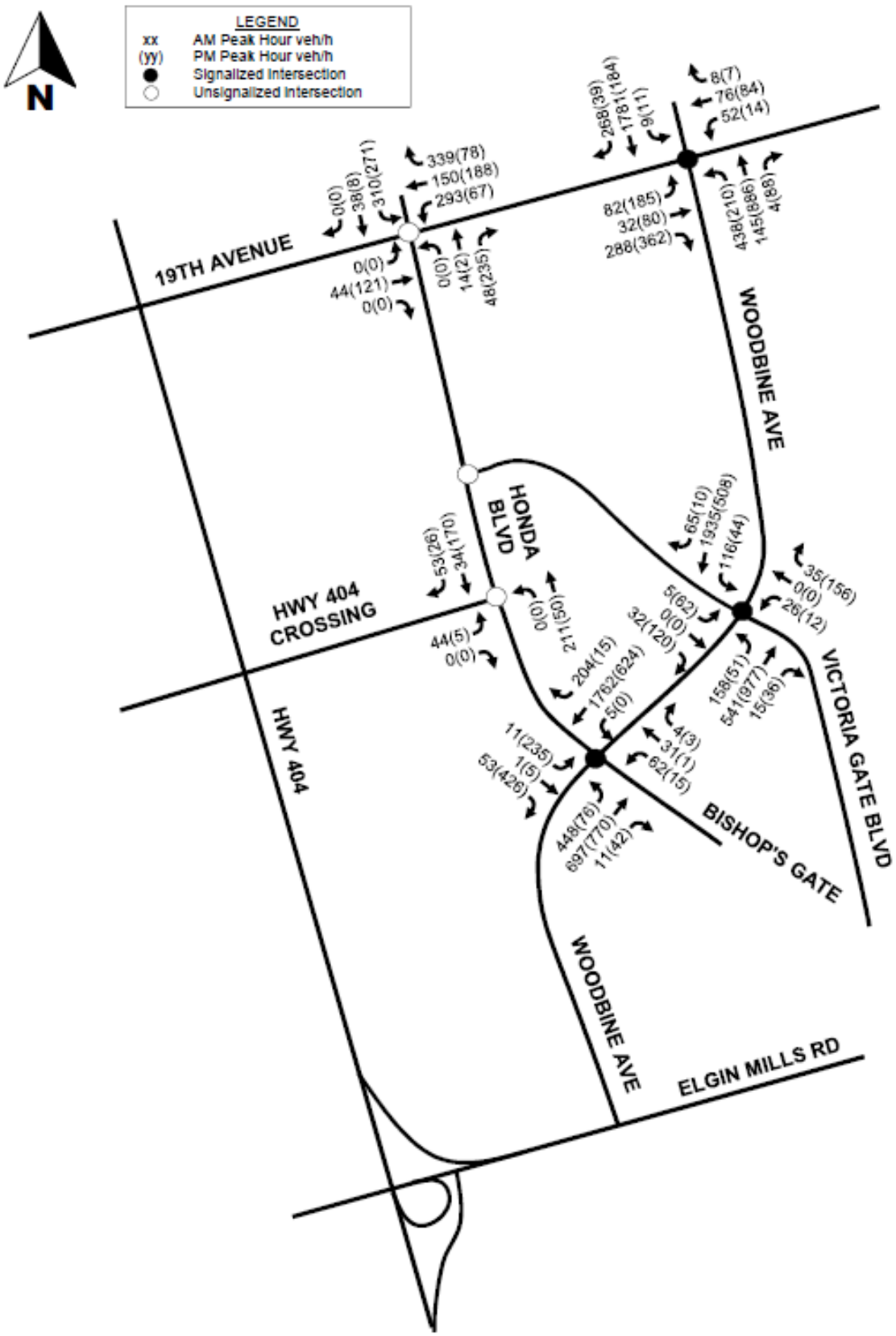


Figure 9: 20-Year Horizon (2037) Turning Movement Counts

In addition to roadway improvements, similar signal timing to existing intersections was provided at the newly signalized intersection of Woodbine Avenue & 19th Avenue during both AM and PM peak hours.

The following **Table 10** provides the study area intersection performance summary based on the 20-year (2037) Future Traffic volume and intersection modifications. Full Synchro/SimTraffic Outputs are provided in **Appendix C**.

Table 10: 20-Year 2037 Future Traffic Operations

	Direction / Movement	Storage (m)	v/c	Delay (s)	LOS	Legend: AM (PM) 95%ile Queue (m)
Woodbine Avenue & Honda Boulevard/Bishop's Gate (Signalized)						
EB	**L**	80	0.13 (0.76)	41 (42)	D (D)	15 (55)
	T	-	0.01 (0.01)	40 (26)	D (C)	1 (2)
	R	-	0.05 (0.67)	40 (35)	D (D)	20 (52)
WB	**L**	15	0.53 (0.05)	46 (26)	D (C)	22 (9)
	T/R	-	0.20 (0.00)	41 (26)	D (C)	23 (3)
NB	**L**	Continuous	1.02 (0.23)	80 (9)	E (A)	297 (26)
	T/T	-	0.32 (0.43)	4 (11)	A (B)	314 (55)
	R	65	0.01 (0.03)	3 (8)	A (A)	44 (16)
SB	**L**	45	0.02 (-)	13 (-)	B (-)	2 (-)
	T/T	-	1.14 (0.42)	98 (16)	F (B)	111 (45)
	R	40	0.24 (0.01)	16 (13)	B (B)	54 (7)
	Overall	**-**	**1.04 (0.56)**	**68 (21)**	**E (C)**	**-**
Woodbine Avenue & Victoria Square Boulevard (Signalized)						
EB	**L**	50	0.05 (0.22)	42 (14)	D (B)	6 (16)
	T/R	-	0.02 (0.08)	42 (13)	D (B)	13 (16)
WB	**L**	65	0.28 (0.04)	44 (13)	D (B)	17 (8)
	T/R	-	0.03 (0.33)	42 (14)	D (B)	32 (22)
NB	**L**	50	0.72 (0.14)	39 (7)	D (A)	69 (43)
	T/T	-	0.24 (0.64)	3 (10)	A (A)	407 (94)
	R	30	0.01 (0.03)	2 (6)	A (A)	28 (24)
SB	**L**	105	0.25 (0.27)	8 (8)	A (A)	20 (21)
	T/T	-	1.11 (0.33)	74 (7)	E (A)	101 (30)
	R	60	0.05 (0.01)	6 (6)	A (A)	18 (7)
	Overall	**-**	**1.00 (0.53)**	**53 (10)**	**D (A)**	**-**

	Direction / Movement	Storage (m)	v/c	Delay (s)	LOS	Legend: AM (PM) 95%ile Queue (m)
Woodbine Avenue & 19th Avenue (Signalized)						
EB	**L**	15	0.32 (0.63)	40 (42)	D (D)	30 (30)
	T/R	-	0.84 (0.97)	77 (83)	E (F)	396 (314)
WB	**L**	15	0.37 (0.25)	41 (45)	D (D)	24 (17)
	T/R	-	0.34 (0.31)	46 (43)	D (D)	42 (39)
NB	**L**	15	2.06 (0.32)	533 (10)	F (B)	37 (27)
	T	-	0.16 (1.04)	8 (62)	A (E)	741 (649)
	R	15	0.00 (0.07)	7 (9)	A (A)	2 (22)
SB	**L**	15	0.01 (0.08)	13 (16)	B (B)	3 (8)
	T	-	2.01 (0.23)	486 (17)	F (B)	557 (37)
	R	30	0.29 (0.03)	16 (15)	B (B)	44 (21)
	Overall	**-**	**1.80 (1.09)**	**358 (51)**	**F (D)**	**-**
19th Avenue & Employment Land Access (Stop Controlled)						
EB	**L**	-	0.00 (0.00)	0 (0)	- (-)	- (-)
	T/R	-	0.03 (0.07)	0 (0)	- (-)	- (11)
WB	**L**	30	0.20 (0.05)	8 (8)	A (A)	11 (8)
	T/R	-	0.30 (0.16)	0 (0)	- (-)	2 (-)
NB	**L/T/R**	-	0.15 (0.27)	14 (10)	B (B)	15 (65)
SB	**L/T/R**	-	2.35 (1.27)	675 (193)	F (F)	50 (119)
	Overall	**-**	**0.12 (0.14)**	**193 (58)**	**A (A)**	**-**
Honda Boulevard & Hwy 404 Crossing						
EB	**L/T/R**	-	0.06 (0.01)	10 (10)	A (A)	13 (6)
NB	**L/T**	-	0.00 (0.00)	0 (0)	- (-)	- (-)
	T/R	-	0.09 (0.02)	0 (0)	- (-)	- (-)
SB	**L/T**	-	0.01 (0.07)	0 (0)	- (-)	- (-)
	T/R	-	0.04 (0.05)	0 (0)	- (-)	- (-)
	Overall	**-**	**0.00 (0.00)**	**1 (0)**	**A (A)**	**-**

The review of future 20-year horizon (2037) traffic operations indicates that the following movements are operating with long delays, high v/c ratios, and or/long queues:

Woodbine Avenue & Honda Boulevard/Bishop's Gate

- Overall intersection is projected to operate with a v/c ratio of 1.04 during the AM peak hour;
- Northbound left-turn projected to operate with a v/c ratio of 1.02 during the AM peak hour. This is an increase over 10-year scenario (2027) due to the increase in southbound through traffic volume and the reduction in availability gaps in traffic; and
- Northbound through and left-turn 95th percentile queues are projected to extend over 295 m during the AM peak hour. These queues are a result of queues extending from downstream intersections of Woodbine Avenue & Victoria Square Boulevard, and Woodbine Avenue & 19th Avenue; and
- Westbound left-turn 95th percentile queues projected to exceed storage by 1 vehicle during the AM peak hour.

Woodbine Avenue & Victoria Square Boulevard

- Southbound through projected to operate at a LOS E, v/c ratio of 1.11 during the AM peak hour;
- Northbound left-turn 95th percentile queues projected to exceed storage by 3 vehicles during the AM peak hour; and
- Northbound through 95th percentile queues are projected to extend over 400 m. Queues are the extension of northbound queues from Woodbine Avenue & 19th Avenue.

Woodbine Avenue & 19th Avenue

- Overall intersection projected to operate at a LOS F, v/c ratio 1.80 during the AM peak hour, and a LOS D v/c ratio 1.09 during the PM peak hour;
- Eastbound through projected to operate at LOS F, v/c ratio of 0.97 during the PM peak hour. Queues along 19th avenue during the AM and PM peak are projected in excess of 310 m, however are not expected to reach the employment land intersection;
- Northbound left-turn projected to operate at a LOS F, v/c ratio of 2.06 during the AM peak hour with delays over 530 seconds;
- Northbound through 95th percentile queues are projected to extend in excess of 740 m during the AM peak hour. Queues are projected to extend beyond the nearest upstream intersection of Woodbine Avenue & Victoria Square Boulevard during the AM Peak hour;
- Northbound through projected to operate with a v/c ratio of 1.04 during the PM peak hour. Northbound 95th percentile queues are not projected to extend to the nearest upstream intersection during the PM peak hour; and
- Southbound through projected to operate at a LOS F, v/c ratio of 2.01 during the AM peak hour with a delay over 485 seconds. Southbound 95th percentile queues are projected to extend over 550 m.

19th Avenue & Employment Land Access

- Southbound shared left/through/right-turn projected to operate at LOS F, v/c ratio above 1.37 during both the AM and PM peak hour. However, 95th percentile queues are only projected to reach a maximum of 5 vehicles during the AM peak. 95th percentile queues projected to extend beyond 115 m during the PM peak hour.

3.4. Sensitivity Analysis – Relocation of Access Along Woodbine Avenue

A sensitivity analysis was conducted relocating the additional proposed access to the southern employment lands previously located at Victoria Square Boulevard and Woodbine Avenue, to an existing hydro access road, located approximately 660 m north of Victoria Square Boulevard.

Woodbine Avenue at this location is a 2-lane road and the access is currently an unpaved gravel road. Traffic operations were evaluated for 10 and 20-year scenarios as a signalized T-intersection using the lane configuration from previous analysis at the intersection of Woodbine Avenue & Victoria Square Boulevard, with the exception of modelling only 2-lanes along Woodbine Avenue. This road may be considered as a possible connection to the North Markham Future Urban Area. **Figure 10** illustrates the location of the relocated access and lane configuration.

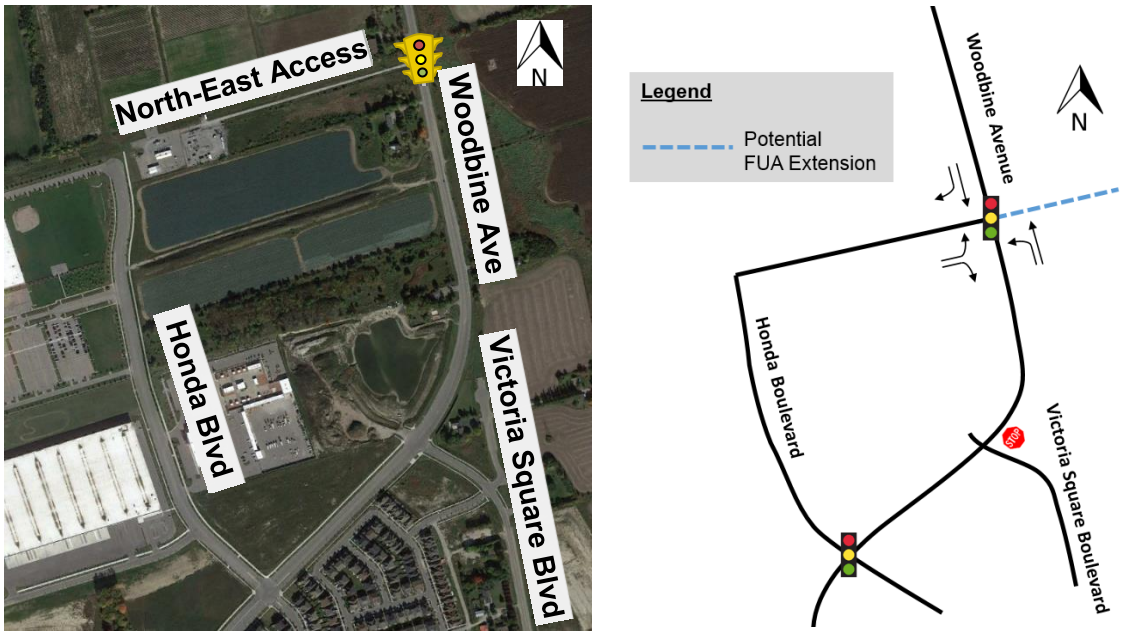


Figure 10: Proposed Northeast Access Location & Lane Configuration

The following **Table 11** provides the intersection performance summary for the new north-east access based on the 10-year (2027) Future Traffic volume and intersection modifications. Signal timing was kept identical to previous analysis of the access location at Victoria Square Boulevard, which provides permissive phases for all movements in both directions, during both the AM and PM peak hours. Full Synchro/SimTraffic Outputs are provided in **Appendix D**.

Table 11: 10-Year 2027 Future Traffic Operations (Sensitivity)

						Legend: AM (PM)
Direction / Movement		**Storage (m)**	**v/c**	**Delay (s)**	**LOS**	**95%ile Queue (m)**
Woodbine Avenue & North-East Access (Signalized)						
EB	**L**	65	0.05 (0.00)	36 (-)	D (A)	5 (12)
	R	-	0.01 (-)	35 (-)	D (-)	19 (13)
NB	**L**	50	1.02 (-)	108 (-)	F (-)	61 (17)
	T	-	0.09 (0.41)	2 (1)	A (A)	878 (64)
SB	**T**	-	1.32 (0.09)	156 (0)	F (A)	120 (15)
	R	60	0.03 (-)	2 (-)	A (-)	17 (3)
Overall		**-**	**1.25** (0.61)	**139** (37)	**F** (A)	**-**

The review of future 10-year horizon (2027) traffic operations indicate that the following movements are operating with long delays, high v/c ratios, and or/long queues:

- Overall intersection is projected to operate at a LOS F, v/c ratio of 1.25 during the AM peak hour;
- Northbound left-turn projected to operate at a LOS F and v/c ratio of 1.02 during the AM peak hour;

- Southbound through projected to operate at a LOS F and v/c ratio of 1.32 during the AM peak hour;
- Northbound through 95th percentile queues are projected to extend over 875 m during the AM peak hour. SimTraffic animations indicate northbound left-turning vehicles are unable to complete their turning movement due to insufficient gaps in southbound traffic. The resulting queues effectively starve the northbound through lane.
    - Signal timing improvements in the form of a protected/permissive northbound left-turn phase is expected to improve northbound queues, however may result in worse traffic operations for the southbound through movement due to the reduction of available green time.

The following **Table 12** provides the intersection performance summary for the new north-east access based on the 20-year (2037) Future Traffic volume and intersection modifications. Signal timing was kept identical to previous analysis of the access location at Victoria Square Boulevard, which includes a northbound left-turn protected/permissive phase during the AM peak hour. Full Synchro/SimTraffic Outputs are provided in **Appendix D**.

Table 12: 20-Year 2037 Future Traffic Operations (Sensitivity)

Legend: AM (PM)						
Direction / Movement		**Storage (m)**	**v/c**	**Delay (s)**	**LOS**	**95%ile Queue (m)**
Woodbine Avenue & North-East Access (Signalized)						
EB	**L**	65	0.09 (0.34)	44 (27)	D (C)	8 (17)
	R	-	0.02 (0.08)	44 (25)	D (C)	15 (22)
NB	**L**	50	0.87 (0.10)	73 (3)	E (A)	46 (39)
	T	-	0.53 (0.85)	9 (14)	A (B)	35 (202)
SB	**T**	-	2.02 (0.44)	477 (5)	F (A)	1030 (46)
	R	60	0.07 (0.01)	5 (3)	A (A)	109 (5)
Overall		**-**	**1.78 (0.77)**	**342 (12)**	**F (B)**	**-**

The review of future 20-year horizon (2037) traffic operations indicate that the following movements are operating with long delays, high v/c ratios, and or/long queues:

- Overall intersection is projected to operate at a LOS F, v/c ratio of 1.78 during the AM peak hour; and
- Southbound through projected to operate at a LOS F and v/c ratio of 2.02 during the AM peak hour. 95th percentile queues are projected to extend over 1.0 km, which will reach well beyond the upstream intersection of Woodbine Avenue & 19th Avenue.

4. Conclusions

4.1. 10-Year Horizon Scenario (2027)

Under a 50% completion of developable employment lands within the study area, which is projected within a 10-year scenario (2027), the road network presented in **Figure 11** can support the proposed employment lands with an additional access being provided at either the existing intersection Victoria Square Boulevard (Option 1), or the northeast location located in the vicinity of the existing unpaved access (Option 2), as illustrated.

It is important to note that the intersection with Victoria Square Boulevard already has existing auxiliary lane infrastructure as well as a 4-lane cross section along Woodbine Avenue, where as the location to the northeast has neither. However, the York TMP identifies Woodbine Avenue to be widened to four lanes in the future to 19th Avenue.

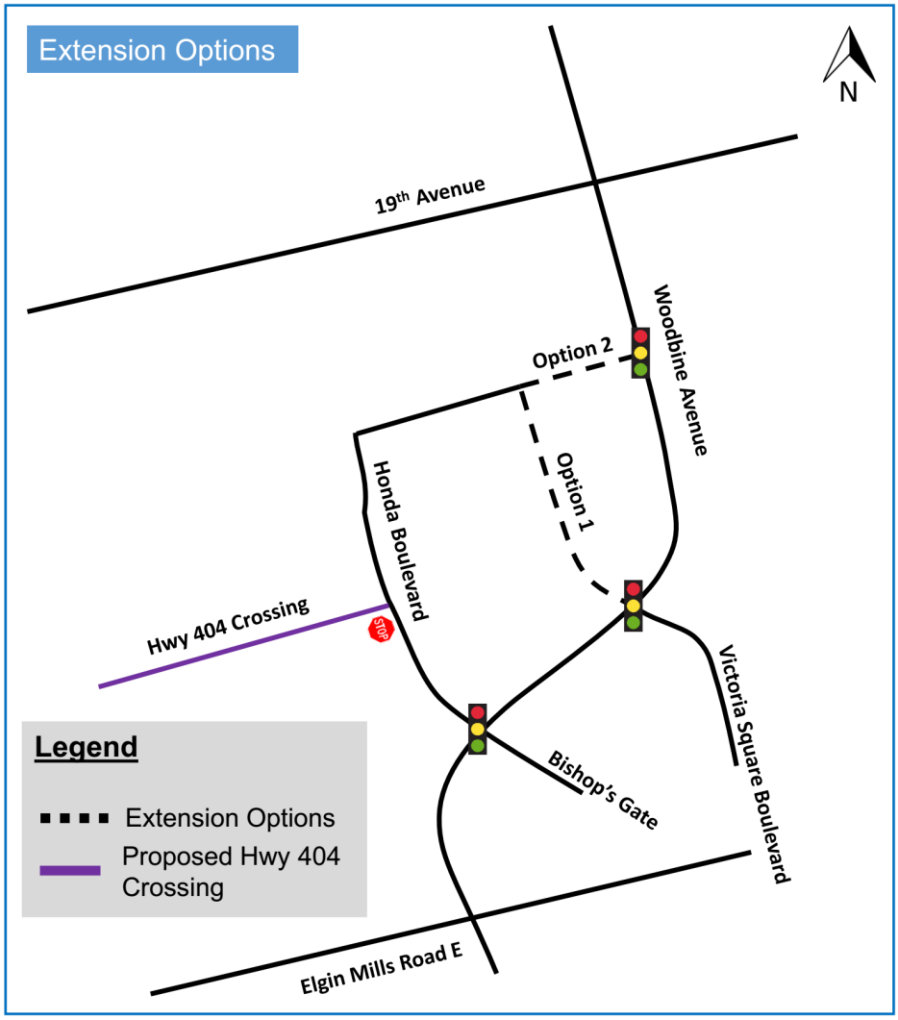


Figure 11: 10-Year (2027) Southern Employment Area Access Extension Options

Signalization of the intersection of Woodbine Avenue & 19th Avenue intersection is expected to reduce delays and queuing of vehicles travelling along 19th Avenue in the eastbound and

westbound directions, however may impose heavy delays to the northbound and southbound directions with the change from a 'free flow' movement. Additional capacity in the form of two southbound through lanes can be considered due to the heavy southbound through volume projected.

No negative effects are expected as a result of the proposed Highway 404 crossing from Leslie Street to Honda Boulevard.

4.2. 20-Year Horizon Scenario (2037)

Under 100% completion of the developable employment land including the area to the north of 19th Avenue, traffic operations at the intersection of Woodbine Avenue and 19th Avenue is expected to deteriorate and result in excessive northbound and southbound queues, particularly during the AM peak hour. The 20-year (2037) turning movement counts at the intersection of Woodbine Avenue & 19th Avenue are shown in **Figure 12**.

Over 450 northbound left-turning vehicles conflict with 1795 southbound through vehicles for available green time at the signalized intersection. It is important to note that 207 vehicles from the total northbound left-turning vehicles are destined for the southern employment area and could potentially be redirected to the northbound left-turns at either Honda Boulevard, Victoria Square Boulevard (Option 1) or the Northeast Access (Option 2), however this may trigger the need for additional improvements at these intersections. Regardless of the northbound left-turn redistribution, the projected southbound through movement would still be expected to have considerable delays/queuing during the AM peak hour and suggests the need for additional capacity.

The North Markham Future Urban Area Conceptual Master Plan[5] which evaluates the Future Urban Area in North Markham presents similar findings along 19th Avenue and Kennedy Road. The report highlights that 4-lane widening is proposed under 2031 traffic conditions on Woodbine Avenue north of Victoria Gate Boulevard to 19th Avenue, as well as the east and west legs of 19th Avenue at Woodbine Avenue to facilitate increased volumes easterly of the 19th Avenue & Woodbine Avenue intersection.

[5] North Markham Future Urban Area Conceptual Master Plan Phase 2 Impact Assessment – Traffic Analysis, 2nd Iteration, prepared by Parsons – April 17, 2017

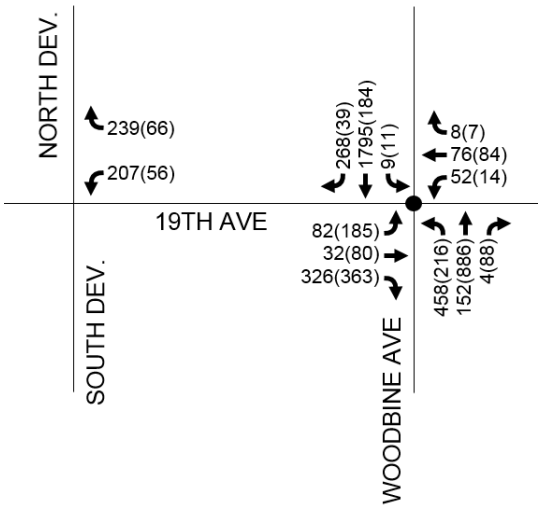


Figure 12: 20-Year (2037) Turning Movement Counts – Woodbine Avenue & 19th Avenue

At this point in time the need for any additional internal access road cannot be identified as the exact location of internal development is unknown and cannot be accurately predicted.

However, internal roads within the employment area, as illustrated in **Figure 13** can potentially redirect traffic volume away from the northern intersection of Woodbine Avenue & 19th Avenue. Drivers can choose to turn into the southern employment area at Honda Boulevard and travel internally to the northern employment area due to the projected delays in the northbound and southbound directions at the intersection of Woodbine Avenue & 19th Avenue.

At the stop-controlled intersection of 19th Avenue & North/South Access to Employment lands, high delays and v/c ratios were projected for the southbound shared left/through/right-turn movement. Signalization of the intersection could be considered in order to facilitate southbound turning movements.

No negative effects are expected because of the proposed Highway 404 crossing from Leslie Street to Honda Boulevard.

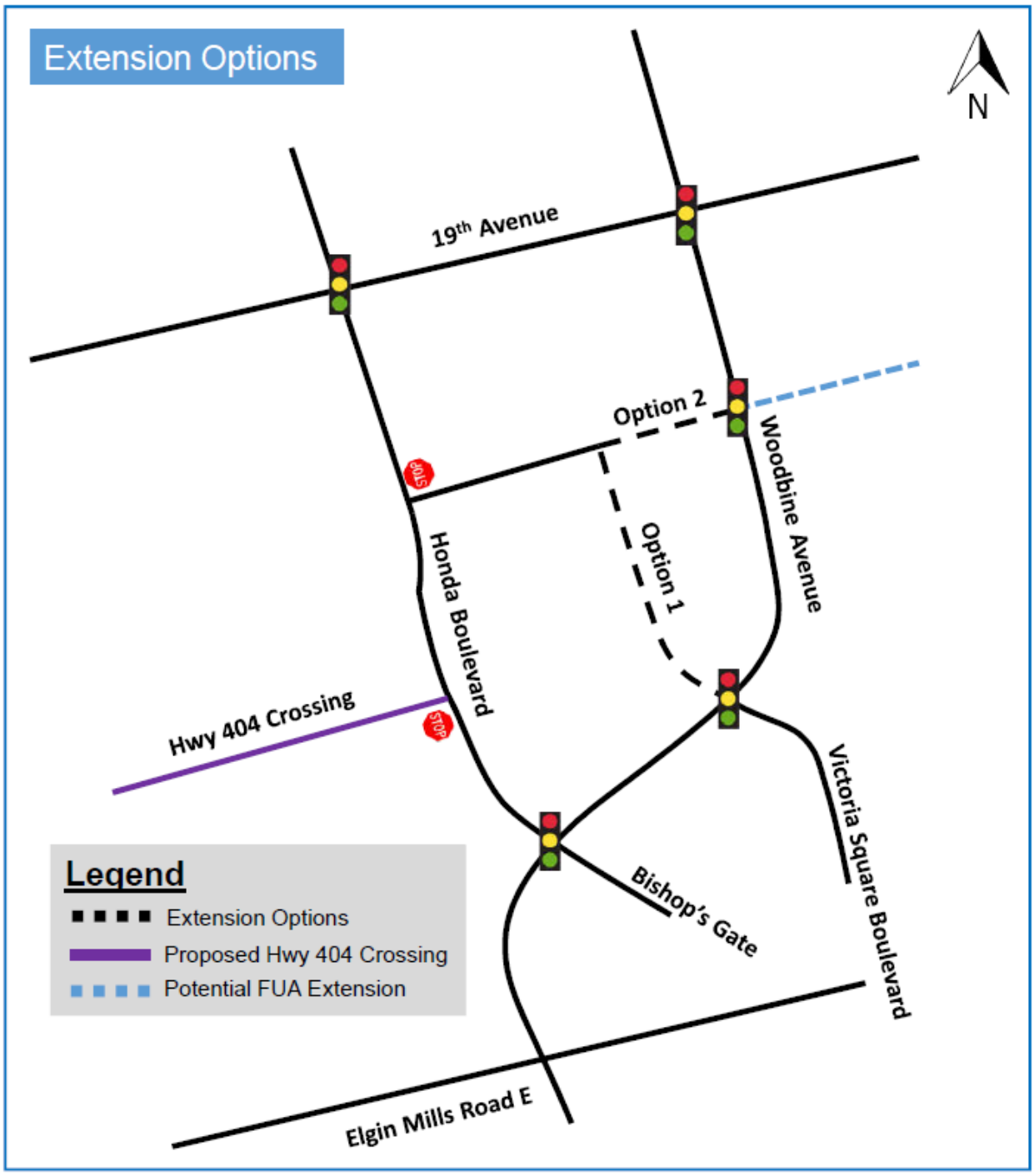


Figure 13: 20-Year (2037) Southern Employment Area Access Extension Options

5. Recommendations

The following recommendations are proposed to address traffic operation concerns under a 10-year (2027) and 20-year (2037) scenarios:

10-Year (2027) Scenario

- Additional access to the southern employment land located at Victoria Square Boulevard, or the Northeast access located along Woodbine Avenue;
- Signalization of the Woodbine & 19th Avenue intersection; and
- Additional southbound through lane at the intersection of Woodbine Avenue & 19th Avenue.

20-Year (2037) Scenario:

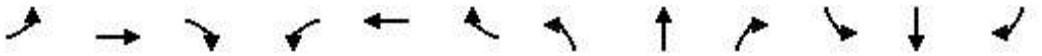
- Additional northbound left-turn lane at the intersection of Woodbine Avenue & 19th Avenue;
- Redirection of traffic volume to Honda Boulevard, Victoria Square Boulevard or the northeast access located along Woodbine Avenue. However additional improvements may be recommended at these intersections with the redirection of traffic volume;
- Further review the storage length requirements at the intersection of Woodbine Avenue & 19th Avenue with additional capacity considerations; and
- Signalization of the intersection to the northern/southern employment lands along 19th Avenue.

6. Reference Material

1. ITE (2017). *Institute of Transportation Engineer's Trip Generation Manual - 10th Edition*
2. Data Management Group University of Toronto (2016). *Transportation Tomorrow Survey Results*, https://dmg.utoronto.ca/
3. MMM Group (2015). *Class Environmental Assessment Study Road Crossing of Highway 404*.
4. iTrans (2008). *OPA 149 Traffic Impact Assessment Study Update*.
5. iTrans (2008). *Honda Canada Campus – Traffic Impact Study*.
6. Parsons (2017). *North Markham Future Urban Area Conceptual Master Plan Phase 2 Impact Assessment – Traffic Analysis 2nd Iteration*.

A

Appendix A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	21	11	36	51	6	8	101	3	7	1232	52
Future Volume (Veh/h)	1	21	11	36	51	6	8	101	3	7	1232	52
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	1	22	11	38	53	6	8	105	3	7	1283	54
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1450	1421	1283	1440	1472	105	1337			108		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1450	1421	1283	1440	1472	105	1337			108		
tC, single (s)	7.1	6.5	6.5	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.5	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	84	94	57	57	99	98			100		
cM capacity (veh/h)	71	134	178	89	124	949	516			1483		

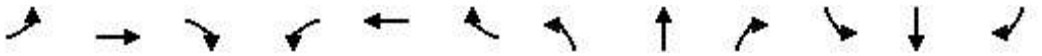
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	34	97	113	3	1290	54
Volume Left	1	38	8	0	7	0
Volume Right	11	6	0	3	0	54
cSH	141	113	516	1700	1483	1700
Volume to Capacity	0.24	0.86	0.02	0.00	0.00	0.03
Queue Length 95th (m)	7.1	40.9	0.4	0.0	0.1	0.0
Control Delay (s)	38.4	120.4	1.0	0.0	0.2	0.0
Lane LOS	E	F	A		A	
Approach Delay (s)	38.4	120.4	1.0		0.2	
Approach LOS	E	F				

Intersection Summary				
Average Delay	8.4			
Intersection Capacity Utilization	93.0%	ICU Level of Service	F	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	19	26	82	11	86	1189
Future Volume (Veh/h)	19	26	82	11	86	1189
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	20	27	86	12	91	1252
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			348			
pX, platoon unblocked						
vC, conflicting volume	894	43			98	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	894	43			98	
tC, single (s)	7.0	7.5			4.2	
tC, 2 stage (s)						
tF (s)	3.6	3.6			2.3	
p0 queue free %	92	97			94	
cM capacity (veh/h)	249	934			1464	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	20	27	43	43	12	91	626	626
Volume Left	20	0	0	0	0	91	0	0
Volume Right	0	27	0	0	12	0	0	0
cSH	249	934	1700	1700	1700	1464	1700	1700
Volume to Capacity	0.08	0.03	0.03	0.03	0.01	0.06	0.37	0.37
Queue Length 95th (m)	2.1	0.7	0.0	0.0	0.0	1.6	0.0	0.0
Control Delay (s)	20.7	9.0	0.0	0.0	0.0	7.6	0.0	0.0
Lane LOS	C	A				A		
Approach Delay (s)	14.0		0.0			0.5		
Approach LOS	B							

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1	23	46	23	3	298	83	8	0	1082	143
Future Volume (vph)	7	1	23	46	23	3	298	83	8	0	1082	143
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.5	7.5	7.5	4.0	7.5		4.0	7.5	7.5		7.5	7.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00		0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		1.00	1.00
Satd. Flow (prot)	1204	1765	1070	1676	1735		1676	3000	1366		3320	1500
Flt Permitted	0.74	1.00	1.00	0.76	1.00		0.17	1.00	1.00		1.00	1.00
Satd. Flow (perm)	938	1765	1070	1336	1735		307	3000	1366		3320	1500
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	7	1	24	48	24	3	310	86	8	0	1127	149
RTOR Reduction (vph)	0	0	21	0	3	0	0	0	2	0	0	43
Lane Group Flow (vph)	7	1	3	48	24	0	310	86	6	0	1127	106
Heavy Vehicles (%)	42%	2%	43%	2%	2%	2%	2%	14%	12%	2%	3%	2%
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		1	6			2	
Permitted Phases	4		4	8			6		6	2		2
Actuated Green, G (s)	7.9	7.9	7.9	7.9	7.9		52.3	52.3	52.3		40.2	40.2
Effective Green, g (s)	7.9	7.9	7.9	11.4	7.9		52.3	52.3	52.3		40.2	40.2
Actuated g/C Ratio	0.11	0.11	0.11	0.15	0.11		0.70	0.70	0.70		0.53	0.53
Clearance Time (s)	7.5	7.5	7.5	7.5	7.5		4.0	7.5	7.5		7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	98	185	112	202	182		360	2086	950		1774	801
v/s Ratio Prot		0.00			0.01		c0.09	0.03			0.34	
v/s Ratio Perm	0.01		0.00	c0.04			c0.50		0.00			0.07
v/c Ratio	0.07	0.01	0.02	0.24	0.13		0.86	0.04	0.01		0.64	0.13
Uniform Delay, d1	30.3	30.1	30.2	28.1	30.5		8.5	3.6	3.5		12.3	8.8
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.0	0.1	0.6	0.3		18.6	0.0	0.0		1.7	0.3
Delay (s)	30.7	30.1	30.3	28.7	30.9		27.1	3.6	3.5		14.1	9.1
Level of Service	C	C	C	C	C		C	A	A		B	A
Approach Delay (s)		30.3			29.5			21.6			13.5	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	16.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	75.2	Sum of lost time (s)	19.0
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Intersection: 1: Woodbine Ave & 19th Ave

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LT	LT	R
Maximum Queue (m)	29.2	72.0	34.9	27.6	5.8
Average Queue (m)	8.7	28.2	4.3	1.1	0.5
95th Queue (m)	22.1	60.9	20.3	12.5	3.2
Link Distance (m)	467.7	838.5	713.0	202.5	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					20.0
Storage Blk Time (%)			3	0	
Queuing Penalty (veh)			0	0	

Intersection: 2: Woodbine Ave By-Pass/Woodbine Ave & Victoria Square Blvd

Movement	WB	WB	SB
Directions Served	L	R	L
Maximum Queue (m)	14.0	18.3	16.2
Average Queue (m)	4.3	6.4	2.8
95th Queue (m)	12.4	15.8	10.7
Link Distance (m)		229.8	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)	65.0		105.0
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Woodbine Ave By-Pass & Honda Blvd/Bishops Gate

Movement	EB	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	T	R	T	T	R
Maximum Queue (m)	13.7	5.6	23.6	20.2	21.1	63.2	12.2	9.6	8.7	77.8	72.8	20.3
Average Queue (m)	1.1	0.3	5.9	8.5	5.5	31.3	2.7	1.1	0.5	37.5	39.0	8.6
95th Queue (m)	6.4	2.4	17.4	18.4	16.1	53.8	9.5	5.8	4.1	65.4	63.1	18.0
Link Distance (m)		494.2	494.2		40.4	317.8	317.8	317.8		326.3	326.3	
Upstream Blk Time (%)					0							
Queuing Penalty (veh)					0							
Storage Bay Dist (m)	80.0			15.0					65.0			40.0
Storage Blk Time (%)				6	1					4	6	
Queuing Penalty (veh)				2	0					0	9	

Network Summary

Network wide Queuing Penalty: 12

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	48	21	9	61	5	65	577	57	8	125	13
Future Volume (Veh/h)	21	48	21	9	61	5	65	577	57	8	125	13
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	22	51	22	10	65	5	69	614	61	9	133	14
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	940	964	133	950	917	614	147			675		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	940	964	133	950	917	614	147			675		
tC, single (s)	7.1	6.5	6.5	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.5	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	88	79	97	95	75	99	95			99		
cM capacity (veh/h)	186	241	854	187	256	492	1435			916		

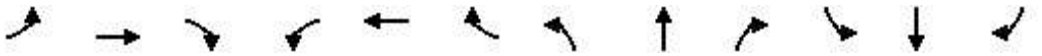
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	95	80	683	61	142	14
Volume Left	22	10	69	0	9	0
Volume Right	22	5	0	61	0	14
cSH	267	252	1435	1700	916	1700
Volume to Capacity	0.36	0.32	0.05	0.04	0.01	0.01
Queue Length 95th (m)	12.4	10.5	1.2	0.0	0.2	0.0
Control Delay (s)	25.8	25.8	1.3	0.0	0.7	0.0
Lane LOS	D	D	A		A	
Approach Delay (s)	25.8	25.8	1.2		0.6	
Approach LOS	D	D				

Intersection Summary				
Average Delay	5.1			
Intersection Capacity Utilization	62.4%	ICU Level of Service		B
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	116	592	27	33	123
Future Volume (Veh/h)	9	116	592	27	33	123
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	9	122	623	28	35	129
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			348			
pX, platoon unblocked						
vC, conflicting volume	758	312			651	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	758	312			651	
tC, single (s)	6.8	6.9			4.4	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.4	
p0 queue free %	97	82			96	
cM capacity (veh/h)	329	684			849	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	9	122	312	312	28	35	64	64
Volume Left	9	0	0	0	0	35	0	0
Volume Right	0	122	0	0	28	0	0	0
cSH	329	684	1700	1700	1700	849	1700	1700
Volume to Capacity	0.03	0.18	0.18	0.18	0.02	0.04	0.04	0.04
Queue Length 95th (m)	0.7	5.2	0.0	0.0	0.0	1.0	0.0	0.0
Control Delay (s)	16.2	11.4	0.0	0.0	0.0	9.4	0.0	0.0
Lane LOS	C	B				A		
Approach Delay (s)	11.7		0.0			2.0		
Approach LOS	B							

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	33.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	177	5	314	11	1	3	34	443	31	0	126	7
Future Volume (vph)	177	5	314	11	1	3	34	443	31	0	126	7
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.5	7.5	7.5	4.0	7.5		4.0	7.5	7.5		7.5	7.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00		0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.89		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		1.00	1.00
Satd. Flow (prot)	1676	1765	1485	1676	1566		1462	3320	1500		3320	1500
Flt Permitted	0.76	1.00	1.00	0.75	1.00		0.61	1.00	1.00		1.00	1.00
Satd. Flow (perm)	1333	1765	1485	1331	1566		942	3320	1500		3320	1500
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	190	5	338	12	1	3	37	476	33	0	135	8
RTOR Reduction (vph)	0	0	269	0	2	0	0	0	12	0	0	4
Lane Group Flow (vph)	190	5	69	12	2	0	37	476	21	0	135	4
Heavy Vehicles (%)	2%	2%	3%	2%	2%	2%	17%	3%	2%	2%	3%	2%
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		1	6			2	
Permitted Phases	4		4	8			6		6	2		2
Actuated Green, G (s)	17.4	17.4	17.4	17.4	17.4		53.4	53.4	53.4		45.4	45.4
Effective Green, g (s)	17.4	17.4	17.4	20.9	17.4		53.4	53.4	53.4		45.4	45.4
Actuated g/C Ratio	0.20	0.20	0.20	0.24	0.20		0.62	0.62	0.62		0.53	0.53
Clearance Time (s)	7.5	7.5	7.5	7.5	7.5		4.0	7.5	7.5		7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	270	357	301	324	317		610	2066	933		1756	793
v/s Ratio Prot		0.00			0.00		0.00	c0.14			0.04	
v/s Ratio Perm	c0.14		0.05	0.01			0.03		0.01			0.00
v/c Ratio	0.70	0.01	0.23	0.04	0.01		0.06	0.23	0.02		0.08	0.01
Uniform Delay, d1	31.8	27.3	28.6	24.8	27.3		6.4	7.1	6.2		9.9	9.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	8.1	0.0	0.4	0.0	0.0		0.0	0.3	0.0		0.1	0.0
Delay (s)	39.9	27.4	29.0	24.8	27.3		6.4	7.4	6.2		10.0	9.6
Level of Service	D	C	C	C	C		A	A	A		B	A
Approach Delay (s)		32.8			25.4			7.3			10.0	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	85.8	Sum of lost time (s)	19.0
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Intersection: 1: Woodbine Ave & 19th Ave

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	R	LT	R
Maximum Queue (m)	26.0	25.5	25.4	1.3	8.9	1.1
Average Queue (m)	10.2	9.4	5.0	0.0	0.9	0.0
95th Queue (m)	18.8	18.0	17.6	0.9	5.1	0.8
Link Distance (m)	467.7	838.5	713.0		202.5	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)				15.0		20.0
Storage Blk Time (%)			0		0	
Queuing Penalty (veh)			0		0	

Intersection: 2: Woodbine Ave By-Pass/Woodbine Ave & Victoria Square Blvd

Movement	WB	WB	NB	NB	SB
Directions Served	L	R	T	R	L
Maximum Queue (m)	8.3	20.6	1.3	1.3	19.9
Average Queue (m)	1.7	9.1	0.0	0.0	4.6
95th Queue (m)	7.1	16.2	0.9	0.9	14.7
Link Distance (m)		252.2	327.2		
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	65.0			30.0	105.0
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Woodbine Ave By-Pass & Honda Blvd/Bishops Gate

Movement	EB	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	T	R	T	T	R
Maximum Queue (m)	56.4	6.9	37.2	12.8	7.2	17.8	31.8	38.8	9.0	16.9	14.6	9.8
Average Queue (m)	29.0	0.7	16.7	2.3	0.6	4.5	11.9	14.7	1.8	5.9	3.1	0.5
95th Queue (m)	51.2	4.0	28.6	8.4	3.9	14.0	24.5	31.0	6.3	14.2	11.3	4.1
Link Distance (m)		494.2	494.2		40.4	317.8	317.8	317.8		327.2	327.2	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0			15.0					65.0			40.0
Storage Blk Time (%)	0			1	0							
Queuing Penalty (veh)	0			0	0							

Network Summary

Network wide Queuing Penalty: 0

B

Appendix B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	24	13	42	59	7	9	117	3	8	1430	60
Future Volume (Veh/h)	1	24	13	46	59	7	9	124	3	8	1533	60
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	1	25	14	48	61	7	9	129	3	8	1597	63
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1798	1763	1597	1786	1823	129	1660			132		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1798	1763	1597	1786	1823	129	1660			132		
tC, single (s)	7.1	6.5	6.5	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.5	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	69	88	0	19	99	98			99		
cM capacity (veh/h)	20	82	114	41	75	921	388			1453		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	40	116	138	3	1605	63
Volume Left	1	48	9	0	8	0
Volume Right	14	7	0	3	0	63
cSH	83	59	388	1700	1453	1700
Volume to Capacity	0.48	1.98	0.02	0.00	0.01	0.04
Queue Length 95th (m)	16.1	88.7	0.6	0.0	0.1	0.0
Control Delay (s)	82.8	607.8	1.3	0.0	0.7	0.0
Lane LOS	F	F	A		A	
Approach Delay (s)	82.8	607.8	1.3		0.7	
Approach LOS	F	F				

Intersection Summary				
Average Delay	38.2			
Intersection Capacity Utilization	105.7%	ICU Level of Service	G	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	22	0	30	0	95	13	100	1380	0
Future Volume (vph)	2	0	17	22	0	30	88	100	13	100	1451	36
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.85		1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1676	1500		1555	1177		1676	3027	1404	1613	2780	1500
Flt Permitted	0.74	1.00		0.75	1.00		0.14	1.00	1.00	0.69	1.00	1.00
Satd. Flow (perm)	1299	1500		1220	1177		254	3027	1404	1164	2780	1500
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	2	0	18	23	0	32	93	105	14	105	1527	38
RTOR Reduction (vph)	0	17	0	0	29	0	0	0	3	0	0	9
Lane Group Flow (vph)	2	1	0	23	3	0	93	105	11	105	1527	29
Heavy Vehicles (%)	2%	2%	2%	10%	2%	30%	2%	13%	9%	6%	23%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	5.8	5.8		5.8	5.8		56.4	56.4	56.4	56.4	56.4	56.4
Effective Green, g (s)	5.8	5.8		5.8	5.8		56.4	56.4	56.4	56.4	56.4	56.4
Actuated g/C Ratio	0.08	0.08		0.08	0.08		0.76	0.76	0.76	0.76	0.76	0.76
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	101	117		95	92		193	2300	1067	884	2113	1140
v/s Ratio Prot		0.00			0.00			0.03			c0.55	
v/s Ratio Perm	0.00			c0.02			0.37		0.01	0.09		0.02
v/c Ratio	0.02	0.01		0.24	0.03		0.48	0.05	0.01	0.12	0.72	0.03
Uniform Delay, d1	31.6	31.6		32.1	31.6		3.4	2.2	2.2	2.3	4.7	2.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.0		1.3	0.1		8.4	0.0	0.0	0.3	2.2	0.0
Delay (s)	31.7	31.6		33.5	31.7		11.7	2.2	2.2	2.6	6.9	2.2
Level of Service	C	C		C	C		B	A	A	A	A	A
Approach Delay (s)		31.6			32.4			6.4			6.5	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	74.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1	23	53	27	3	298	96	9	5	1256	143
Future Volume (vph)	12	1	57	53	27	3	468	184	9	5	1273	214
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.5	7.5	7.5	7.5	7.5		4.0	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1204	1765	1070	1676	1739		1676	3000	1366	1676	3320	1500
Flt Permitted	0.74	1.00	1.00	0.76	1.00		0.09	1.00	1.00	0.63	1.00	1.00
Satd. Flow (perm)	934	1765	1070	1336	1739		151	3000	1366	1113	3320	1500
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	12	1	59	55	28	3	488	192	9	5	1326	223
RTOR Reduction (vph)	0	0	54	0	3	0	0	0	2	0	0	50
Lane Group Flow (vph)	13	1	5	55	28	0	488	192	7	5	1326	173
Heavy Vehicles (%)	42%	2%	43%	2%	2%	2%	2%	14%	12%	2%	3%	2%
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		1	6			2	
Permitted Phases	4		4	8			6		6	2		2
Actuated Green, G (s)	8.5	8.5	8.5	8.5	8.5		73.0	73.0	73.0	42.8	42.8	42.8
Effective Green, g (s)	8.5	8.5	8.5	8.5	8.5		73.0	73.0	73.0	42.8	42.8	42.8
Actuated g/C Ratio	0.09	0.09	0.09	0.09	0.09		0.76	0.76	0.76	0.44	0.44	0.44
Clearance Time (s)	7.5	7.5	7.5	7.5	7.5		4.0	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	82	155	94	117	153		528	2269	1033	493	1472	665
v/s Ratio Prot		0.00			0.02		c0.25	0.06			0.40	
v/s Ratio Perm	0.01		0.00	c0.04			c0.45		0.00	0.00		0.12
v/c Ratio	0.16	0.01	0.06	0.47	0.18		0.92	0.08	0.01	0.01	0.90	0.26
Uniform Delay, d1	40.7	40.1	40.3	41.9	40.8		27.5	3.1	2.9	15.0	24.9	16.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.0	0.2	3.0	0.6		22.0	0.1	0.0	0.0	9.2	1.0
Delay (s)	41.6	40.2	40.6	44.8	41.4		49.5	3.1	2.9	15.0	34.1	17.8
Level of Service	D	D	D	D	D		D	A	A	B	C	B
Approach Delay (s)		40.7			43.6			36.0			31.7	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	33.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	96.5	Sum of lost time (s)	19.0
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	0	0	0
Future Volume (Veh/h)	15	0	0	241	39	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	16	0	0	254	41	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				304		
pX, platoon unblocked						
vC, conflicting volume	172	24	48			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	172	24	48			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	100	100			
cM capacity (veh/h)	802	1047	1557			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	16	85	169	27	21
Volume Left	16	0	0	0	0
Volume Right	0	0	0	0	7
cSH	802	1557	1700	1700	1700
Volume to Capacity	0.02	0.00	0.10	0.02	0.01
Queue Length 95th (m)	0.5	0.0	0.0	0.0	0.0
Control Delay (s)	9.6	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	9.6	0.0		0.0	
Approach LOS	A				

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Woodbine Ave & 19th Ave

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	R	LT	R
Maximum Queue (m)	241.0	843.0	168.6	4.0	197.0	7.4
Average Queue (m)	152.3	627.3	30.3	0.1	13.7	1.2
95th Queue (m)	263.0	907.9	133.5	2.8	145.5	5.2
Link Distance (m)	516.0	838.5	713.0		649.6	
Upstream Blk Time (%)		18			1	
Queuing Penalty (veh)		0			0	
Storage Bay Dist (m)				15.0		30.0
Storage Blk Time (%)			21	0	1	
Queuing Penalty (veh)			1	0	1	

Intersection: 2: Woodbine Ave By-Pass/Woodbine Ave & Victoria Square Blvd

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (m)	6.4	9.6	16.6	19.4	32.6	19.3	5.9	7.6	22.7	80.9	87.2	10.4
Average Queue (m)	0.3	2.7	4.8	6.0	14.9	3.8	0.3	0.4	7.1	35.7	38.9	2.6
95th Queue (m)	3.0	8.4	13.3	15.5	27.4	12.9	2.7	3.0	17.5	68.3	69.6	9.1
Link Distance (m)		205.7		229.9		313.7	313.7			272.1	272.1	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	50.0		65.0		50.0			30.0	105.0			60.0
Storage Blk Time (%)										0	1	
Queuing Penalty (veh)										0	0	

Intersection: 3: Woodbine Ave By-Pass & Honda Blvd

Movement	EB	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	T	R	L	T	T
Maximum Queue (m)	17.6	1.6	30.2	21.2	40.2	147.0	22.8	20.0	9.8	22.7	173.4	178.0
Average Queue (m)	3.0	0.1	8.3	11.2	7.2	79.8	7.5	3.4	0.8	1.6	85.5	90.4
95th Queue (m)	11.5	0.9	21.6	20.5	22.4	131.2	18.0	12.5	5.0	15.4	144.9	148.3
Link Distance (m)		273.3	273.3		93.6	321.1	321.1	321.1			313.7	313.7
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0			15.0					65.0	45.0		
Storage Blk Time (%)				17	2						29	33
Queuing Penalty (veh)				5	1						1	71

Intersection: 3: Woodbine Ave By-Pass & Honda Blvd

Movement	SB
Directions Served	R
Maximum Queue (m)	47.5
Average Queue (m)	35.8
95th Queue (m)	64.6
Link Distance (m)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	40.0
Storage Blk Time (%)	0
Queuing Penalty (veh)	2

Intersection: 6: Honda Blvd & HWY 404 Crossing

Movement	EB
Directions Served	LR
Maximum Queue (m)	10.1
Average Queue (m)	3.6
95th Queue (m)	10.7
Link Distance (m)	370.1
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Zone Summary

Zone wide Queuing Penalty: 83

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	56	24	10	71	6	75	670	66	9	145	15
Future Volume (Veh/h)	24	56	24	11	71	6	75	761	75	9	158	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	26	60	26	12	76	6	80	810	80	10	168	16
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1202	1238	168	1214	1174	810	184			890		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1202	1238	168	1214	1174	810	184			890		
tC, single (s)	7.1	6.5	6.5	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.5	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	74	63	97	88	57	98	94			99		
cM capacity (veh/h)	101	163	815	104	178	380	1391			761		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	112	94	890	80	178	16
Volume Left	26	12	80	0	10	0
Volume Right	26	6	0	80	0	16
cSH	170	169	1391	1700	761	1700
Volume to Capacity	0.66	0.56	0.06	0.05	0.01	0.01
Queue Length 95th (m)	30.3	23.1	1.5	0.0	0.3	0.0
Control Delay (s)	59.4	50.3	1.5	0.0	0.7	0.0
Lane LOS	F	F	A		A	
Approach Delay (s)	59.4	50.3	1.3		0.6	
Approach LOS	F	F				

Intersection Summary				
Average Delay	9.4			
Intersection Capacity Utilization	70.8%	ICU Level of Service	C	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	10	0	135	0	687	31	38	143	0
Future Volume (vph)	34	0	67	10	0	135	28	753	31	38	152	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.85		1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1676	1500		1676	1500		1676	3353	1500	1487	3353	1500
Flt Permitted	0.67	1.00		0.71	1.00		0.65	1.00	1.00	0.35	1.00	1.00
Satd. Flow (perm)	1176	1500		1254	1500		1148	3353	1500	551	3353	1500
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	36	0	71	11	0	142	29	793	33	40	160	5
RTOR Reduction (vph)	0	56	0	0	86	0	0	0	18	0	0	3
Lane Group Flow (vph)	36	15	0	11	56	0	29	793	15	40	160	2
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	15%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	7.8	7.8		7.8	7.8		17.3	17.3	17.3	17.3	17.3	17.3
Effective Green, g (s)	7.8	7.8		7.8	7.8		17.3	17.3	17.3	17.3	17.3	17.3
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.47	0.47	0.47	0.47	0.47	0.47
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	247	315		263	315		535	1563	699	256	1563	699
v/s Ratio Prot		0.01			c0.04			c0.24			0.05	
v/s Ratio Perm	0.03			0.01			0.03		0.01	0.07		0.00
v/c Ratio	0.15	0.05		0.04	0.18		0.05	0.51	0.02	0.16	0.10	0.00
Uniform Delay, d1	11.9	11.7		11.7	12.0		5.4	6.9	5.3	5.7	5.5	5.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.1		0.1	0.3		0.0	0.3	0.0	0.3	0.0	0.0
Delay (s)	12.2	11.7		11.7	12.3		5.5	7.2	5.4	6.0	5.6	5.3
Level of Service	B	B		B	B		A	A	A	A	A	A
Approach Delay (s)		11.9			12.2			7.1			5.6	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	37.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	177	5	314	13	1	2	34	514	36	0	146	7
Future Volume (vph)	243	5	442	13	1	2	80	542	36	0	213	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.5	7.5	7.5	7.5	7.5		4.0	7.5	7.5		7.5	7.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00		0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.90		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		1.00	1.00
Satd. Flow (prot)	1676	1765	1485	1676	1588		1462	3320	1500		3320	1500
Flt Permitted	0.76	1.00	1.00	0.75	1.00		0.56	1.00	1.00		1.00	1.00
Satd. Flow (perm)	1334	1765	1485	1331	1588		857	3320	1500		3320	1500
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	261	5	475	14	1	2	86	583	39	0	229	17
RTOR Reduction (vph)	0	0	355	0	1	0	0	0	16	0	0	9
Lane Group Flow (vph)	261	5	120	14	2	0	86	583	23	0	229	8
Heavy Vehicles (%)	2%	2%	3%	2%	2%	2%	17%	3%	2%	2%	3%	2%
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		1	6			2	
Permitted Phases	4		4	8			6		6	2		2
Actuated Green, G (s)	23.0	23.0	23.0	23.0	23.0		52.7	52.7	52.7		42.9	42.9
Effective Green, g (s)	23.0	23.0	23.0	23.0	23.0		52.7	52.7	52.7		42.9	42.9
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.25		0.58	0.58	0.58		0.47	0.47
Clearance Time (s)	7.5	7.5	7.5	7.5	7.5		4.0	7.5	7.5		7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	338	447	376	337	402		536	1929	871		1570	709
v/s Ratio Prot		0.00			0.00		0.01	c0.18			0.07	
v/s Ratio Perm	c0.20		0.08	0.01			0.08		0.02			0.01
v/c Ratio	0.77	0.01	0.32	0.04	0.00		0.16	0.30	0.03		0.15	0.01
Uniform Delay, d1	31.4	25.3	27.5	25.5	25.3		8.6	9.7	8.1		13.5	12.7
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	10.5	0.0	0.5	0.1	0.0		0.1	0.4	0.1		0.2	0.0
Delay (s)	41.9	25.3	28.0	25.6	25.3		8.7	10.1	8.1		13.7	12.7
Level of Service	D	C	C	C	C		A	B	A		B	B
Approach Delay (s)		32.9			25.5			9.8			13.7	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	20.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	90.7	Sum of lost time (s)	19.0
Intersection Capacity Utilization	59.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	0	0	0
Future Volume (Veh/h)	2	0	0	55	194	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	2	0	0	58	204	9
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				254		
pX, platoon unblocked						
vC, conflicting volume	238	106	213			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	238	106	213			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	730	927	1355			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	2	19	39	136	77
Volume Left	2	0	0	0	0
Volume Right	0	0	0	0	9
cSH	730	1355	1700	1700	1700
Volume to Capacity	0.00	0.00	0.02	0.08	0.05
Queue Length 95th (m)	0.1	0.0	0.0	0.0	0.0
Control Delay (s)	9.9	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	9.9	0.0		0.0	
Approach LOS	A				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Woodbine Ave & 19th Ave

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	R	LT	R
Maximum Queue (m)	40.3	35.2	43.1	11.7	11.2	4.4
Average Queue (m)	15.1	12.8	6.1	1.3	1.8	0.1
95th Queue (m)	31.4	25.9	23.4	6.9	8.0	1.9
Link Distance (m)	506.6	838.5	713.0		528.5	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)				15.0		20.0
Storage Blk Time (%)			1	0	0	
Queuing Penalty (veh)			1	0	0	

Intersection: 2: Woodbine Ave By-Pass/Woodbine Ave & Victoria Square Blvd

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (m)	13.1	14.6	9.3	22.6	10.6	66.4	53.8	31.3	25.6	16.4	18.9	8.1
Average Queue (m)	4.6	6.2	1.3	9.9	2.9	34.2	20.3	3.1	9.1	7.3	5.1	1.0
95th Queue (m)	11.8	12.2	6.3	19.0	8.1	57.4	42.3	15.3	21.7	14.7	14.2	5.2
Link Distance (m)		225.9		250.4	314.2	314.2	314.2			271.7	271.7	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	50.0		65.0					30.0	105.0			60.0
Storage Blk Time (%)							1	0				
Queuing Penalty (veh)							0	0				

Intersection: 3: Woodbine Ave By-Pass & Honda Blvd/Bishops Gate

Movement	EB	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	T	R	T	T	R
Maximum Queue (m)	64.0	4.4	66.0	9.9	8.7	33.2	45.3	58.7	16.9	27.7	22.3	9.7
Average Queue (m)	35.2	0.3	23.4	2.9	0.7	11.5	14.3	28.8	3.1	7.8	8.2	1.3
95th Queue (m)	59.3	2.0	47.5	9.5	4.6	26.0	32.1	48.8	10.8	18.5	18.2	6.1
Link Distance (m)		224.2	224.2		200.4	321.0	321.0	321.0		314.2	314.2	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0			15.0					65.0			40.0
Storage Blk Time (%)	0			0				0				
Queuing Penalty (veh)	0			0				0				

Intersection: 21: Honda Blvd & HWY 404 Crossing

Movement	EB
Directions Served	LR
Maximum Queue (m)	6.8
Average Queue (m)	0.4
95th Queue (m)	3.3
Link Distance (m)	441.8
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Zone Summary

Zone wide Queuing Penalty: 1

C

Appendix C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	28	15	48	69	8	11	136	4	9	1659	70
Future Volume (vph)	82	32	288	52	76	8	438	145	4	9	1781	268
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	6.0		4.0	6.0		4.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.86		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1676	1250		1676	1740		1676	1475	1500	1676	1748	1500
Flt Permitted	0.69	1.00		0.24	1.00		0.06	1.00	1.00	0.66	1.00	1.00
Satd. Flow (perm)	1221	1250		430	1740		108	1475	1500	1166	1748	1500
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	85	33	300	54	79	8	456	151	4	9	1855	279
RTOR Reduction (vph)	0	183	0	0	3	0	0	0	1	0	0	47
Lane Group Flow (vph)	85	150	0	54	84	0	456	151	3	9	1855	232
Heavy Vehicles (%)	2%	2%	27%	2%	2%	2%	2%	22%	2%	2%	3%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	22.8	16.6		22.4	16.4		76.4	76.4	76.4	61.3	61.3	61.3
Effective Green, g (s)	22.8	16.6		22.4	16.4		76.4	76.4	76.4	61.3	61.3	61.3
Actuated g/C Ratio	0.20	0.14		0.19	0.14		0.66	0.66	0.66	0.53	0.53	0.53
Clearance Time (s)	4.0	6.0		4.0	6.0		4.0	7.0	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	3.0	3.0
Lane Grp Cap (vph)	264	178		147	246		221	971	987	616	923	792
v/s Ratio Prot	0.02	c0.12		c0.02	0.05		c0.20	0.10			1.06	
v/s Ratio Perm	0.05			0.05			c1.16		0.00	0.01		0.15
v/c Ratio	0.32	0.84		0.37	0.34		2.06	0.16	0.00	0.01	2.01	0.29
Uniform Delay, d1	39.4	48.4		39.7	44.9		39.5	7.5	6.8	13.0	27.4	15.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	28.4		1.6	0.8		493.8	0.3	0.0	0.0	458.2	0.9
Delay (s)	40.2	76.8		41.3	45.7		533.3	7.9	6.8	13.0	485.6	16.2
Level of Service	D	E		D	D		F	A	A	B	F	B
Approach Delay (s)		69.4			44.0			400.0			422.5	
Approach LOS		E			D			F			F	

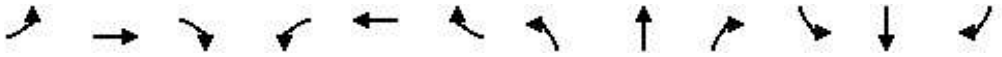
Intersection Summary			
HCM 2000 Control Delay	357.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.80		
Actuated Cycle Length (s)	116.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	112.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	26	0	35	0	110	15	116	1601	0
Future Volume (vph)	5	0	32	26	0	35	158	541	15	116	1935	65
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.85		1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1676	1500		1555	1177		1676	3027	1404	1613	2780	1500
Flt Permitted	0.73	1.00		0.73	1.00		0.06	1.00	1.00	0.44	1.00	1.00
Satd. Flow (perm)	1293	1500		1203	1177		101	3027	1404	744	2780	1500
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	0	34	27	0	37	166	569	16	122	2037	68
RTOR Reduction (vph)	0	31	0	0	34	0	0	0	3	0	0	22
Lane Group Flow (vph)	5	3	0	27	3	0	166	569	13	122	2037	46
Heavy Vehicles (%)	2%	2%	2%	10%	2%	30%	2%	13%	9%	6%	23%	2%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	8.1	8.1		8.1	8.1		79.1	79.1	79.1	65.6	65.6	65.6
Effective Green, g (s)	8.1	8.1		8.1	8.1		79.1	79.1	79.1	65.6	65.6	65.6
Actuated g/C Ratio	0.08	0.08		0.08	0.08		0.80	0.80	0.80	0.66	0.66	0.66
Clearance Time (s)	6.0	6.0		6.0	6.0		4.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	105	122		98	96		231	2413	1119	492	1838	991
v/s Ratio Prot		0.00			0.00		c0.07	0.19			c0.73	
v/s Ratio Perm	0.00			c0.02			0.50		0.01	0.16		0.03
v/c Ratio	0.05	0.02		0.28	0.03		0.72	0.24	0.01	0.25	1.11	0.05
Uniform Delay, d1	42.0	41.9		42.8	41.9		28.4	2.5	2.1	6.8	16.8	5.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.1		1.5	0.1		10.2	0.2	0.0	1.2	57.3	0.1
Delay (s)	42.2	42.0		44.3	42.1		38.6	2.7	2.1	8.0	74.1	6.0
Level of Service	D	D		D	D		D	A	A	A	E	A
Approach Delay (s)		42.0			43.0			10.7			68.4	
Approach LOS		D			D			B			E	

Intersection Summary			
HCM 2000 Control Delay	53.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	99.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1	23	62	31	4	298	112	11	5	1457	143
Future Volume (vph)	11	1	53	62	31	4	448	697	11	5	1762	204
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.5	7.5	7.5	7.5	7.5		4.0	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1204	1765	1070	1676	1735		1676	3000	1366	1676	3320	1500
Flt Permitted	0.73	1.00	1.00	0.76	1.00		0.08	1.00	1.00	0.38	1.00	1.00
Satd. Flow (perm)	930	1765	1070	1336	1735		139	3000	1366	663	3320	1500
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	11	1	55	65	32	4	467	726	11	5	1835	212
RTOR Reduction (vph)	0	0	50	0	4	0	0	0	3	0	0	40
Lane Group Flow (vph)	11	1	5	65	32	0	467	726	8	5	1835	173
Heavy Vehicles (%)	42%	2%	43%	2%	2%	2%	2%	14%	12%	2%	3%	2%
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		1	6			2	
Permitted Phases	4		4	8			6		6	2		2
Actuated Green, G (s)	9.0	9.0	9.0	9.0	9.0		73.1	73.1	73.1	46.9	46.9	46.9
Effective Green, g (s)	9.0	9.0	9.0	9.0	9.0		73.1	73.1	73.1	46.9	46.9	46.9
Actuated g/C Ratio	0.09	0.09	0.09	0.09	0.09		0.75	0.75	0.75	0.48	0.48	0.48
Clearance Time (s)	7.5	7.5	7.5	7.5	7.5		4.0	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	86	163	99	123	160		456	2258	1028	320	1603	724
v/s Ratio Prot		0.00			0.02		c0.23	0.24			c0.55	
v/s Ratio Perm	0.01		0.00	c0.05			0.54		0.01	0.01		0.12
v/c Ratio	0.13	0.01	0.05	0.53	0.20		1.02	0.32	0.01	0.02	1.14	0.24
Uniform Delay, d1	40.4	40.0	40.2	42.0	40.7		31.5	3.9	3.0	13.1	25.1	14.7
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.0	0.2	4.1	0.6		48.4	0.4	0.0	0.1	73.0	0.8
Delay (s)	41.1	40.0	40.4	46.1	41.4		80.0	4.3	3.0	13.2	98.1	15.5
Level of Service	D	D	D	D	D		E	A	A	B	F	B
Approach Delay (s)		40.5			44.4			33.6			89.4	
Approach LOS		D			D			C			F	

Intersection Summary			
HCM 2000 Control Delay	67.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	97.1	Sum of lost time (s)	19.0
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	44	0	0	150	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	44	0	293	150	339	0	14	48	310	38	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	46	0	308	158	357	0	15	51	326	40	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	515			46			840	1177	46	1057	998	336
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	515			46			840	1177	46	1057	998	336
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			80			100	90	95	0	80	100
cM capacity (veh/h)	1051			1562			205	153	1023	152	196	706

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	0	46	308	515	66	366
Volume Left	0	0	308	0	0	326
Volume Right	0	0	0	357	51	0
cSH	1700	1700	1562	1700	447	156
Volume to Capacity	0.00	0.03	0.20	0.30	0.15	2.35
Queue Length 95th (m)	0.0	0.0	5.9	0.0	4.1	246.2
Control Delay (s)	0.0	0.0	7.9	0.0	14.4	675.1
Lane LOS			A		B	F
Approach Delay (s)	0.0		2.9		14.4	675.1
Approach LOS					B	F

Intersection Summary				
Average Delay	192.5			
Intersection Capacity Utilization	11.7%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	0	0	0
Future Volume (Veh/h)	44	0	0	211	34	53
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	46	0	0	222	36	56
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				267		
pX, platoon unblocked						
vC, conflicting volume	175	46	92			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	175	46	92			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	100	100			
cM capacity (veh/h)	798	1014	1501			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	46	74	148	24	68
Volume Left	46	0	0	0	0
Volume Right	0	0	0	0	56
cSH	798	1501	1700	1700	1700
Volume to Capacity	0.06	0.00	0.09	0.01	0.04
Queue Length 95th (m)	1.5	0.0	0.0	0.0	0.0
Control Delay (s)	9.8	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	9.8	0.0		0.0	
Approach LOS	A				

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:27	8:27	8:27	8:27	8:27	8:27
Total Time (min)	90	90	90	90	90	90
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	3705	3686	3674	3677	3638	3677
Vehs Exited	3401	3496	3363	3450	3327	3407
Starting Vehs	322	320	348	325	347	326
Ending Vehs	626	510	659	552	658	595
Travel Distance (km)	6095	6153	5952	6101	5851	6031
Travel Time (hr)	1504.4	1514.0	1731.0	1572.3	1657.3	1595.8
Total Delay (hr)	1383.0	1391.0	1612.8	1450.5	1540.9	1475.6
Total Stops	6453	6148	6910	6219	6172	6380
Fuel Used (l)	1619.2	1640.5	1806.0	1685.9	1741.5	1698.6

Interval #0 Information Seeding

Start Time	6:57
End Time	7:27
Total Time (min)	30

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:27
End Time	8:27
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3705	3686	3674	3677	3638	3677
Vehs Exited	3401	3496	3363	3450	3327	3407
Starting Vehs	322	320	348	325	347	326
Ending Vehs	626	510	659	552	658	595
Travel Distance (km)	6095	6153	5952	6101	5851	6031
Travel Time (hr)	1504.4	1514.0	1731.0	1572.3	1657.3	1595.8
Total Delay (hr)	1383.0	1391.0	1612.8	1450.5	1540.9	1475.6
Total Stops	6453	6148	6910	6219	6172	6380
Fuel Used (l)	1619.2	1640.5	1806.0	1685.9	1741.5	1698.6

Intersection: 1: Woodbine Ave & 19th Ave

Movement	EB	EB	WB	WB	NB	NB	NB	B14	B14	B8	B8	SB
Directions Served	L	TR	L	TR	L	T	R	T		T	T	L
Maximum Queue (m)	22.4	336.9	22.5	51.7	37.4	746.9	3.4	108.1	27.6	285.0	292.1	5.4
Average Queue (m)	17.3	259.4	11.8	19.4	37.3	732.0	0.1	92.6	0.9	225.4	221.9	0.2
95th Queue (m)	29.7	396.4	23.7	41.6	37.4	791.2	1.7	138.0	14.0	380.3	383.0	3.3
Link Distance (m)		506.6		837.1		711.3		72.3	72.3	270.6	270.6	
Upstream Blk Time (%)						93		89	0	49	43	
Queuing Penalty (veh)						539		260	1	142	124	
Storage Bay Dist (m)	15.0		15.0		30.0		15.0					15.0
Storage Blk Time (%)	26	77	13	21	87	4						
Queuing Penalty (veh)	82	63	11	11	130	18						

Intersection: 1: Woodbine Ave & 19th Ave

Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	561.5	37.5
Average Queue (m)	551.1	16.9
95th Queue (m)	558.1	43.2
Link Distance (m)	543.0	
Upstream Blk Time (%)	78	
Queuing Penalty (veh)	0	
Storage Bay Dist (m)		30.0
Storage Blk Time (%)	49	0
Queuing Penalty (veh)	137	3

Intersection: 2: Woodbine Ave By-Pass/Woodbine Ave & Hwy 404 crossing

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (m)	8.2	19.2	25.2	41.4	57.4	328.6	334.3	37.4	26.9	119.2	130.4	29.8
Average Queue (m)	1.2	4.5	6.2	10.4	31.8	170.1	164.8	6.2	8.7	49.3	48.9	2.5
95th Queue (m)	5.6	12.9	17.0	31.7	68.8	405.8	406.8	28.2	20.0	98.3	101.2	18.1
Link Distance (m)		263.2		251.0		315.3	315.3			270.6	270.6	
Upstream Blk Time (%)						30	29					
Queuing Penalty (veh)						108	103					
Storage Bay Dist (m)	50.0		65.0		50.0			30.0	105.0			60.0
Storage Blk Time (%)				0	0	54	54	0		1	4	
Queuing Penalty (veh)				0	1	86	8	0		1	3	

Intersection: 3: Woodbine Ave By-Pass & Honda Blvd

Movement	EB	EB	EB	WB	WB	NB	NB	NB	NB	B5	B5	SB
Directions Served	L	T	R	L	TR	L	T	T	R	T	T	L
Maximum Queue (m)	20.4	2.2	30.3	21.9	33.6	310.4	309.9	306.2	72.4	223.6	222.0	3.2
Average Queue (m)	3.5	0.1	6.7	11.9	8.5	118.1	104.5	103.6	7.8	38.4	39.4	0.4
95th Queue (m)	14.6	0.9	19.8	21.6	23.3	297.4	313.5	307.8	43.5	221.3	223.6	2.1
Link Distance (m)		237.8	237.8		272.6	321.0	321.0	321.0		434.2	434.2	
Upstream Blk Time (%)						11	12	9		3	3	
Queuing Penalty (veh)						0	0	0		0	0	
Storage Bay Dist (m)	80.0			15.0					65.0			45.0
Storage Blk Time (%)				20	3			32	0			
Queuing Penalty (veh)				7	2			4	0			

Intersection: 3: Woodbine Ave By-Pass & Honda Blvd

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (m)	123.8	128.4	47.5
Average Queue (m)	58.5	60.7	21.4
95th Queue (m)	106.7	110.7	53.8
Link Distance (m)	315.3	315.3	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			40.0
Storage Blk Time (%)	14	17	0
Queuing Penalty (veh)	1	35	1

Intersection: 15: Honda Blvd & 19th Ave

Movement	WB	WB	NB	SB
Directions Served	L	TR	LTR	LTR
Maximum Queue (m)	13.3	2.5	16.5	64.6
Average Queue (m)	3.2	0.1	8.0	27.9
95th Queue (m)	10.9	1.6	14.6	49.6
Link Distance (m)		506.6	243.9	209.7
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	30.0			
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 24: Honda Blvd & HWY 404 Crossing

Movement	EB
Directions Served	LR
Maximum Queue (m)	14.0
Average Queue (m)	6.4
95th Queue (m)	13.0
Link Distance (m)	327.3
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Zone Summary

Zone wide Queuing Penalty: 1880

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	65	28	12	82	7	88	777	77	11	168	18
Future Volume (vph)	185	80	362	14	84	7	210	886	88	11	184	39
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	6.0		5.0	5.0		4.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.88		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1676	1289		1676	1745		1676	1463	1500	1676	1714	1500
Flt Permitted	0.56	1.00		0.19	1.00		0.59	1.00	1.00	0.17	1.00	1.00
Satd. Flow (perm)	993	1289		339	1745		1045	1463	1500	299	1714	1500
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	197	85	385	15	89	7	223	943	94	12	196	41
RTOR Reduction (vph)	0	137	0	0	2	0	0	0	24	0	0	20
Lane Group Flow (vph)	197	333	0	15	94	0	223	943	70	12	196	21
Heavy Vehicles (%)	2%	2%	27%	2%	2%	2%	2%	23%	2%	2%	5%	2%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	31.8	31.8		20.8	20.8		74.1	74.1	74.1	59.7	59.7	59.7
Effective Green, g (s)	31.8	31.8		20.8	20.8		74.1	74.1	74.1	59.7	59.7	59.7
Actuated g/C Ratio	0.27	0.27		0.17	0.17		0.62	0.62	0.62	0.50	0.50	0.50
Clearance Time (s)	4.0	6.0		5.0	5.0		4.0	7.0	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	3.0	3.0
Lane Grp Cap (vph)	311	344		59	305		706	911	934	150	860	753
v/s Ratio Prot	0.04	c0.26			0.05		0.03	c0.64			0.11	
v/s Ratio Perm	0.13			0.04			0.17		0.05	0.04		0.01
v/c Ratio	0.63	0.97		0.25	0.31		0.32	1.04	0.07	0.08	0.23	0.03
Uniform Delay, d1	37.7	43.0		42.4	42.8		9.8	22.4	8.9	15.4	16.6	14.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.2	39.6		2.3	0.6		0.3	39.3	0.2	1.0	0.6	0.1
Delay (s)	41.8	82.6		44.6	43.3		10.1	61.7	9.0	16.4	17.3	15.0
Level of Service	D	F		D	D		B	E	A	B	B	B
Approach Delay (s)		70.6			43.5			48.6			16.8	
Approach LOS		E			D			D			B	

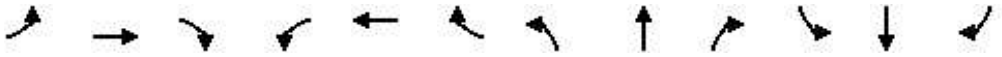
Intersection Summary			
HCM 2000 Control Delay	51.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	118.9	Sum of lost time (s)	20.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	12	0	156	0	797	36	44	166	0
Future Volume (vph)	62	0	120	12	0	156	51	977	36	44	508	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.85		1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1676	1500		1676	1500		1676	3353	1500	1487	3353	1500
Flt Permitted	0.65	1.00		0.68	1.00		0.45	1.00	1.00	0.23	1.00	1.00
Satd. Flow (perm)	1153	1500		1193	1500		799	3353	1500	355	3353	1500
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	65	0	126	13	0	164	54	1028	38	46	535	11
RTOR Reduction (vph)	0	94	0	0	40	0	0	0	19	0	0	6
Lane Group Flow (vph)	65	32	0	13	124	0	54	1028	19	46	535	5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	15%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	11.2	11.2		11.2	11.2		21.2	21.2	21.2	21.2	21.2	21.2
Effective Green, g (s)	11.2	11.2		11.2	11.2		21.2	21.2	21.2	21.2	21.2	21.2
Actuated g/C Ratio	0.25	0.25		0.25	0.25		0.48	0.48	0.48	0.48	0.48	0.48
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	290	378		300	378		381	1600	716	169	1600	716
v/s Ratio Prot		0.02			c0.08			c0.31			0.16	
v/s Ratio Perm	0.06			0.01			0.07		0.01	0.13		0.00
v/c Ratio	0.22	0.08		0.04	0.33		0.14	0.64	0.03	0.27	0.33	0.01
Uniform Delay, d1	13.2	12.7		12.5	13.5		6.5	8.7	6.1	7.0	7.2	6.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.1		0.1	0.5		0.2	0.9	0.0	0.9	0.1	0.0
Delay (s)	13.6	12.8		12.6	14.0		6.7	9.6	6.2	7.8	7.3	6.1
Level of Service	B	B		B	B		A	A	A	A	A	A
Approach Delay (s)		13.0			13.9			9.4			7.4	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	44.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	177	5	314	15	1	3	34	597	42	0	170	7
Future Volume (vph)	235	5	426	15	1	3	76	770	42	0	624	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.5	7.5	7.5	7.5	7.5		4.0	7.5	7.5		7.5	7.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00		0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.89		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		1.00	1.00
Satd. Flow (prot)	1676	1765	1485	1676	1566		1462	3320	1500		3320	1500
Flt Permitted	0.76	1.00	1.00	0.75	1.00		0.33	1.00	1.00		1.00	1.00
Satd. Flow (perm)	1333	1765	1485	1331	1566		506	3320	1500		3320	1500
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	253	5	458	16	1	3	82	828	45	0	671	16
RTOR Reduction (vph)	0	0	210	0	2	0	0	0	19	0	0	8
Lane Group Flow (vph)	253	5	248	16	2	0	82	828	26	0	671	8
Heavy Vehicles (%)	2%	2%	3%	2%	2%	2%	17%	3%	2%	2%	3%	2%
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		1	6			2	
Permitted Phases	4		4	8			6		6	2		2
Actuated Green, G (s)	22.4	22.4	22.4	22.4	22.4		52.7	52.7	52.7		42.9	42.9
Effective Green, g (s)	22.4	22.4	22.4	22.4	22.4		52.7	52.7	52.7		42.9	42.9
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.25		0.58	0.58	0.58		0.48	0.48
Clearance Time (s)	7.5	7.5	7.5	7.5	7.5		4.0	7.5	7.5		7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	331	438	369	330	389		357	1941	877		1580	714
v/s Ratio Prot		0.00			0.00		0.01	c0.25			0.20	
v/s Ratio Perm	c0.19		0.17	0.01			0.12		0.02			0.01
v/c Ratio	0.76	0.01	0.67	0.05	0.00		0.23	0.43	0.03		0.42	0.01
Uniform Delay, d1	31.4	25.5	30.5	25.7	25.5		8.6	10.3	7.9		15.5	12.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	10.1	0.0	4.7	0.1	0.0		0.3	0.7	0.1		0.8	0.0
Delay (s)	41.5	25.5	35.3	25.8	25.5		9.0	11.0	8.0		16.3	12.5
Level of Service	D	C	D	C	C		A	B	A		B	B
Approach Delay (s)		37.4			25.7			10.7			16.2	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	90.1	Sum of lost time (s)	19.0
Intersection Capacity Utilization	59.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	121	0	0	188	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	121	0	67	188	78	0	2	235	271	8	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	127	0	71	198	82	0	2	247	285	8	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	280			127			471	549	127	756	508	239
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	280			127			471	549	127	756	508	239
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			95			100	100	73	0	98	100
cM capacity (veh/h)	1283			1459			478	422	923	228	445	800

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	0	127	71	280	249	293
Volume Left	0	0	71	0	0	285
Volume Right	0	0	0	82	247	0
cSH	1700	1700	1459	1700	914	231
Volume to Capacity	0.00	0.07	0.05	0.16	0.27	1.27
Queue Length 95th (m)	0.0	0.0	1.2	0.0	8.9	120.3
Control Delay (s)	0.0	0.0	7.6	0.0	10.4	192.7
Lane LOS			A		B	F
Approach Delay (s)	0.0		1.5		10.4	192.7
Approach LOS					B	F

Intersection Summary				
Average Delay	58.4			
Intersection Capacity Utilization	13.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	0	0	0
Future Volume (Veh/h)	5	0	0	50	170	26
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	0	0	53	179	27
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				294		
pX, platoon unblocked						
vC, conflicting volume	219	103	206			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	219	103	206			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	100	100			
cM capacity (veh/h)	749	932	1363			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	5	18	35	119	87
Volume Left	5	0	0	0	0
Volume Right	0	0	0	0	27
cSH	749	1363	1700	1700	1700
Volume to Capacity	0.01	0.00	0.02	0.07	0.05
Queue Length 95th (m)	0.2	0.0	0.0	0.0	0.0
Control Delay (s)	9.8	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	9.8	0.0		0.0	
Approach LOS	A				

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:27	8:27	8:27	8:27	8:27	8:27
Total Time (min)	90	90	90	90	90	90
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	3203	3262	3147	3080	3081	3152
Vehs Exited	3144	3186	3101	3094	3076	3119
Starting Vehs	222	215	222	224	234	218
Ending Vehs	281	291	268	210	239	257
Travel Distance (km)	6319	6413	6204	6020	6057	6203
Travel Time (hr)	409.4	432.8	369.7	335.9	363.2	382.2
Total Delay (hr)	286.2	308.0	248.8	218.5	245.0	261.3
Total Stops	7281	7905	7224	7201	6886	7299
Fuel Used (l)	667.2	690.8	636.0	606.3	623.6	644.8

Interval #0 Information Seeding

Start Time	6:57
End Time	7:27
Total Time (min)	30

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:27
End Time	8:27
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	3203	3262	3147	3080	3081	3152
Vehs Exited	3144	3186	3101	3094	3076	3119
Starting Vehs	222	215	222	224	234	218
Ending Vehs	281	291	268	210	239	257
Travel Distance (km)	6319	6413	6204	6020	6057	6203
Travel Time (hr)	409.4	432.8	369.7	335.9	363.2	382.2
Total Delay (hr)	286.2	308.0	248.8	218.5	245.0	261.3
Total Stops	7281	7905	7224	7201	6886	7299
Fuel Used (l)	667.2	690.8	636.0	606.3	623.6	644.8

Intersection: 1: Woodbine Ave & 19th Ave

Movement	EB	EB	WB	WB	NB	NB	NB	B14	B8	B8	SB	SB
Directions Served	L	TR	L	TR	L	T	R	T	T	T	L	T
Maximum Queue (m)	22.4	511.5	22.4	46.6	22.4	595.4	22.5	6.3	16.4	1.9	12.0	38.8
Average Queue (m)	21.0	442.6	4.5	18.2	14.4	438.7	6.5	0.5	0.7	0.1	1.4	15.6
95th Queue (m)	27.9	560.4	15.3	36.3	25.8	563.0	21.4	6.5	12.1	1.3	6.3	33.7
Link Distance (m)		506.6		837.1		711.3		72.3	269.8	269.8		543.0
Upstream Blk Time (%)		6				1						
Queuing Penalty (veh)		41				7						
Storage Bay Dist (m)	15.0		15.0		15.0		15.0				15.0	
Storage Blk Time (%)	53	57	3	23	6	34	0				0	10
Queuing Penalty (veh)	232	105	2	3	59	102	2				0	5

Intersection: 1: Woodbine Ave & 19th Ave

Movement	SB
Directions Served	R
Maximum Queue (m)	25.4
Average Queue (m)	3.6
95th Queue (m)	14.2
Link Distance (m)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	30.0
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Intersection: 2: Woodbine Ave By-Pass/Woodbine Ave & Victoria Square Blvd

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (m)	19.5	17.7	9.5	25.7	57.3	116.1	98.9	37.4	24.7	32.3	35.4	8.2
Average Queue (m)	7.7	8.1	1.9	11.8	13.9	56.5	44.5	6.1	9.1	15.8	17.7	1.5
95th Queue (m)	15.7	15.6	7.7	22.1	43.0	93.8	83.7	24.2	21.2	26.0	30.4	6.5
Link Distance (m)		271.3		252.3		315.9	315.9			269.8	269.8	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	50.0		65.0		50.0			30.0	105.0			60.0
Storage Blk Time (%)						14	11	0				
Queuing Penalty (veh)						7	4	0				

Intersection: 3: Woodbine Ave By-Pass & Honda Blvd

Movement	EB	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	T	R	T	T	R
Maximum Queue (m)	62.9	3.0	67.1	13.4	6.0	31.2	57.2	58.4	28.5	47.8	49.0	8.4
Average Queue (m)	32.1	0.3	27.0	2.6	0.6	12.7	30.1	34.8	3.8	23.6	25.3	1.6
95th Queue (m)	54.9	1.7	51.6	9.0	3.4	26.3	50.6	54.6	15.9	42.8	44.7	6.7
Link Distance (m)		265.2	265.2		272.6	321.0	321.0	321.0		315.9	315.9	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0			15.0					65.0			40.0
Storage Blk Time (%)				1				0	0	0	1	
Queuing Penalty (veh)				0				0	0	0	0	

Intersection: 15: Honda Blvd & 19th Ave

Movement	EB	WB	NB	SB
Directions Served	TR	L	LTR	LTR
Maximum Queue (m)	13.8	11.6	72.1	115.6
Average Queue (m)	1.9	1.9	26.9	44.8
95th Queue (m)	11.4	8.1	65.2	118.5
Link Distance (m)	479.2		262.7	209.7
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)		30.0		
Storage Blk Time (%)	0			
Queuing Penalty (veh)	0			

Intersection: 24: Honda Blvd & HWY 404 Crossing

Movement	EB
Directions Served	LR
Maximum Queue (m)	7.5
Average Queue (m)	1.4
95th Queue (m)	6.1
Link Distance (m)	494.7
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Zone Summary

Zone wide Queuing Penalty: 571

D

Appendix D

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	95	1380	0
Future Volume (vph)	4	17	88	105	1461	41
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1676	1500	1676	1593	1463	1500
Flt Permitted	0.95	1.00	0.06	1.00	1.00	1.00
Satd. Flow (perm)	1676	1500	114	1593	1463	1500
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	4	18	93	111	1538	43
RTOR Reduction (vph)	0	17	0	0	0	4
Lane Group Flow (vph)	4	1	93	111	1538	39
Heavy Vehicles (%)	2%	2%	2%	13%	23%	2%
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Actuated Green, G (s)	3.5	3.5	61.7	61.7	61.7	61.7
Effective Green, g (s)	3.5	3.5	61.7	61.7	61.7	61.7
Actuated g/C Ratio	0.05	0.05	0.80	0.80	0.80	0.80
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	75	68	91	1273	1169	1198
v/s Ratio Prot				0.07	c1.05	
v/s Ratio Perm	c0.00	0.00	0.81			0.03
v/c Ratio	0.05	0.01	1.02	0.09	1.32	0.03
Uniform Delay, d1	35.3	35.2	7.8	1.7	7.8	1.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.1	100.4	0.1	148.2	0.1
Delay (s)	35.6	35.3	108.2	1.8	155.9	1.6
Level of Service	D	D	F	A	F	A
Approach Delay (s)	35.3			50.3	151.7	
Approach LOS	D			D	F	

Intersection Summary			
HCM 2000 Control Delay	138.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.25		
Actuated Cycle Length (s)	77.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	81.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Intersection: 2: Woodbine Ave By-Pass/Woodbine Ave & N/E Access

Movement	EB	EB	NB	NB	SB	SB	B8
Directions Served	L	R	L	T	T	R	T
Maximum Queue (m)	7.1	26.1	57.4	645.9	226.5	27.4	197.6
Average Queue (m)	0.9	5.4	55.7	487.2	23.2	1.6	7.9
95th Queue (m)	4.8	19.2	61.1	878.0	119.9	16.5	96.4
Link Distance (m)	261.1	261.1		704.8	272.5		434.5
Upstream Blk Time (%)				38	0		0
Queuing Penalty (veh)				0	0		0
Storage Bay Dist (m)			50.0			60.0	
Storage Blk Time (%)			95	0	2		
Queuing Penalty (veh)			100	0	1		

Network Summary

Network wide Queuing Penalty: 101

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	687	143	0
Future Volume (vph)	37	67	28	759	153	6
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				1.00	1.00	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				1765	1765	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				1765	1765	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	723	151	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	723	151	0
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Actuated Green, G (s)				36.5	36.5	
Effective Green, g (s)				36.5	36.5	
Actuated g/C Ratio				1.00	1.00	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				1765	1765	
v/s Ratio Prot				c0.41	0.09	
v/s Ratio Perm						
v/c Ratio				0.41	0.09	
Uniform Delay, d1				0.0	0.0	
Progression Factor				1.00	1.00	
Incremental Delay, d2				0.2	0.0	
Delay (s)				0.2	0.0	
Level of Service				A	A	
Approach Delay (s)	0.0			0.2	0.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	0.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	36.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	43.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 2: Woodbine Ave By-Pass/Woodbine Ave & N/E Access

Movement	EB	EB	NB	NB	SB	SB
Directions Served	L	R	L	T	T	R
Maximum Queue (m)	15.4	18.0	39.3	73.1	22.0	6.2
Average Queue (m)	5.0	5.9	3.0	25.6	4.4	0.4
95th Queue (m)	11.6	12.6	17.2	64.0	15.2	3.0
Link Distance (m)	243.6	243.6		662.6	272.0	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)			50.0			60.0
Storage Blk Time (%)			0	2		
Queuing Penalty (veh)			0	1		

Network Summary

Network wide Queuing Penalty: 1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	110	1601	0
Future Volume (vph)	9	32	158	565	1980	74
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1676	1500	1676	1593	1463	1500
Flt Permitted	0.95	1.00	0.06	1.00	1.00	1.00
Satd. Flow (perm)	1676	1500	102	1593	1463	1500
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	9	34	166	595	2084	78
RTOR Reduction (vph)	0	32	0	0	0	6
Lane Group Flow (vph)	9	2	166	595	2084	72
Heavy Vehicles (%)	2%	2%	2%	13%	23%	2%
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			3	2	6	
Permitted Phases	4	4	2			6
Actuated Green, G (s)	5.9	5.9	76.3	69.3	69.3	69.3
Effective Green, g (s)	5.9	5.9	76.3	69.3	69.3	69.3
Actuated g/C Ratio	0.06	0.06	0.78	0.71	0.71	0.71
Clearance Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	100	90	191	1124	1032	1058
v/s Ratio Prot			c0.06	0.37	c1.42	
v/s Ratio Perm	c0.01	0.00	0.61			0.05
v/c Ratio	0.09	0.02	0.87	0.53	2.02	0.07
Uniform Delay, d1	43.6	43.4	41.8	6.8	14.5	4.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.1	31.6	1.8	462.2	0.1
Delay (s)	44.0	43.5	73.4	8.6	476.6	4.6
Level of Service	D	D	E	A	F	A
Approach Delay (s)	43.6			22.7	459.6	
Approach LOS	D			C	F	

Intersection Summary			
HCM 2000 Control Delay	341.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.78		
Actuated Cycle Length (s)	98.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	93.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Intersection: 2: Woodbine Ave By-Pass/Woodbine Ave & N/E Access

Movement	EB	EB	NB	NB	SB	SB	B8
Directions Served	L	R	L	T	T	R	T
Maximum Queue (m)	10.4	19.8	53.5	63.4	305.7	110.0	639.1
Average Queue (m)	2.0	6.4	26.0	7.4	262.8	31.9	256.3
95th Queue (m)	7.6	15.4	45.5	35.0	348.1	109.3	681.9
Link Distance (m)	279.8	279.8		663.0	270.5		622.6
Upstream Blk Time (%)					13		9
Queuing Penalty (veh)					0		0
Storage Bay Dist (m)			50.0			60.0	
Storage Blk Time (%)			1	0	22		
Queuing Penalty (veh)			3	0	17		

Network Summary

Network wide Queuing Penalty: 20

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	797	166	0
Future Volume (vph)	68	120	51	982	509	11
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1676	1500	1676	1765	1765	1500
Flt Permitted	0.95	1.00	0.44	1.00	1.00	1.00
Satd. Flow (perm)	1676	1500	773	1765	1765	1500
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	72	126	54	1034	536	12
RTOR Reduction (vph)	0	110	0	0	0	4
Lane Group Flow (vph)	72	16	54	1034	536	8
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Actuated Green, G (s)	8.1	8.1	44.5	44.5	44.5	44.5
Effective Green, g (s)	8.1	8.1	44.5	44.5	44.5	44.5
Actuated g/C Ratio	0.13	0.13	0.69	0.69	0.69	0.69
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	210	188	532	1215	1215	1033
v/s Ratio Prot				c0.59	0.30	
v/s Ratio Perm	c0.04	0.01	0.07			0.01
v/c Ratio	0.34	0.08	0.10	0.85	0.44	0.01
Uniform Delay, d1	25.8	25.0	3.4	7.6	4.5	3.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	0.2	0.1	5.9	0.3	0.0
Delay (s)	26.8	25.2	3.4	13.5	4.7	3.1
Level of Service	C	C	A	B	A	A
Approach Delay (s)	25.8			13.0	4.7	
Approach LOS	C			B	A	

Intersection Summary			
HCM 2000 Control Delay	11.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	64.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 2: Woodbine Ave By-Pass/Woodbine Ave & N/E Access

Movement	EB	EB	NB	NB	SB	SB
Directions Served	L	R	L	T	T	R
Maximum Queue (m)	24.0	27.5	57.2	215.4	51.0	8.5
Average Queue (m)	9.3	11.1	12.1	90.3	22.9	0.9
95th Queue (m)	17.0	22.0	39.2	201.7	45.9	5.2
Link Distance (m)	279.8	279.8		663.0	270.5	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)			50.0			60.0
Storage Blk Time (%)				19	0	
Queuing Penalty (veh)				9	0	

Network Summary

Network wide Queuing Penalty: 9

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