



# Technical Memorandum

To:	Syed Rizvi – Town of Oakville	Date:	2021-11-18
Cc:	Kevin Singh – ARGO Development Corporation Christopher Gordon – CGH Transportation		
From:	Mark Crockford, P.Eng.	Project Number:	2019-78

## Re: Argo West Morrison Creek – Neighbourhood 9/10/11 Transportation Impact Study Addendum

### 1 Introduction

To support several residential developments in the Neighbourhood 9/10/11 areas of North Oakville, a Transportation Impact Study (TIS) was prepared and finalized in late May 2020. This study used the initial concept plan for each development to develop a TIS that examined the overall impact of the subject developments on the transportation network. The Neighbourhood 9/10/11 TIS, referred to herein as the TIS, forms the basis for this memo. This addendum acts as a covering letter for the Neighbourhood 9/10/11 TIS.

This addendum has been prepared to support Argo’s West Morrison Creek development and will examine the changes between the original concept plan considered in the TIS and the current plan that is being put forward. This includes examining the unit count and type, preparing an updated trip generation (using the same factors as those presented in the TIS), and, if significant changes to the trip generation are noted, providing updated Synchro results at key Study Area intersections.

### 2 Site Plan Comparison

The original concept plan considered in the TIS is included as Attachment 1. The updated plan, to be analyzed through this memo, is included as Attachment 2. Table 1 summarizes the unit count changes between the original concept and the updated plan.

*Table 1: Land Use Statistic Comparison*

	Single Detached LUC 210	Townhouses LUC 220	Mid-Rise LUC 221	Shopping Centre LUC 820
<b>Original</b>	85	162	0	0
<b>Updated</b>	103	90	124	140 m <sup>2</sup>
<b>Change</b>	18	-72	124	140 m <sup>2</sup>
<b>% Change</b>	21%	-44%	-	-

As shown above, the revised plan would reduce the townhouse units by 72 (44% of the total number of townhouses), and add 18 single detached units, 124 mid-rise apartment units, and 140 square meters of ground floor commercial space. Due to the change in unit counts the trip generation has been examined to determine if the proposed changes would significantly change relative to the trip generation originally considered. The trip generation equations and rates for the Single detached, townhouse units, and mid-rise apartment units were used in the TIS. The Shopping Centre Land Use was not considered in the original TIS but has been added for this analysis. The trip generation factors used for each of the land uses are summarized in Table 2.

Table 2: ITE Trip Generation Factor

	Single Detached LUC 210	Townhouses LUC 220	Mid-Rise LUC 221	Shopping Centre LUC 820
AM Peak	$T=0.71(X)+4.8$	$\ln(T) = 0.95 \ln(T) - 0.51$	$\ln(T) = 0.98 \ln(T) - 0.98$	1.2
PM Peak	$\ln(T) = 0.96 \ln(T) + 0.20$	$\ln(T) = 0.89 \ln(T) - 0.02$	$\ln(T) = 0.96 \ln(T) - 0.63$	4.88

For the residential land uses, the rate equation was used in the original TIS as the rates produced using these equations were within the range of rates listed in the data statistics for each land use code. For the Shopping Centre land use, using the rate equation yielded a rate that was outside of the range of rates listed in the ITE Trip Generation Manual and uncharacteristically high, given the limited space proposed as part of this development. Therefore, the average rates were used to better reflect the trip generation of the proposed development.

Using the above trip generation rates the total trip generation for the site has been recalculated and compared to the TIS trip generation. Table 3 summarizes and compares the trip generation between the two scenarios (original and updated).

Table 3: Vehicle Trip Generation Comparison

Scenario	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Original	28	90	118	94	55	149
Updated	34	104	138	112	71	182
Difference	4	8	11	12	11	23
% Difference	14%	9%	9%	13%	20%	15%

As shown above the changes to the trip generation will result in a net increase of approximately 13% in vehicle traffic from this development. Therefore, this increase in traffic necessitates a re-examination of the operational analysis of Marvin Avenue at Sixth Line and Marvin Avenue at Preserve Drive.

The updated vehicle trip generation has been applied to the study area intersections using the same assumptions as the TIS. Figure 1 illustrates the original traffic volumes at the intersections of Marvin Avenue / Access #6 at Sixth Line and Marvin Avenue / Access #6 at Preserve Drive. Figure 2 illustrates the updated traffic volumes.

Figure 1: Original Turning Movement Volumes (2024 Horizon)

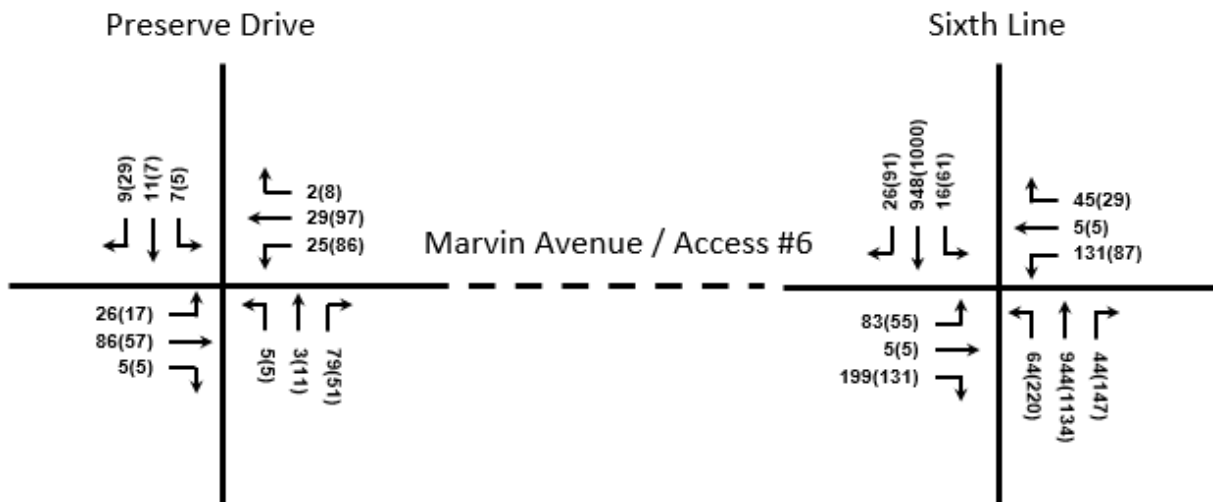
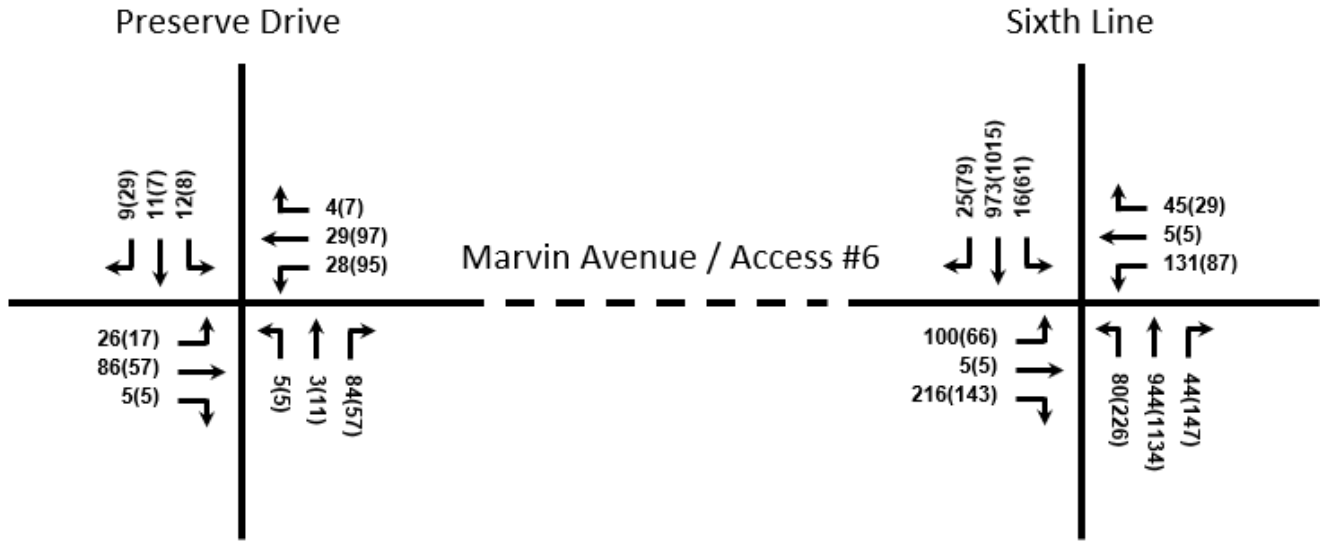


Figure 2: Updated Turning Movement Volumes (2024 Horizon)



While the differences between the original and updated volumes are minor, the Synchro analysis for these intersections has been updated to ensure that the analysis results are accurate. The Synchro parameters and analysis assumptions used in the TIS have been carried forward and only the turning movement volumes have been changed. The comparison of the operational analysis is presented in Table 4. The TIS Analysis Synchro Worksheets can be found in Attachment 3 and the Updated Analysis Synchro Worksheets can be found in Attachment 4.

Table 4: Operational Analysis Comparison

Intersection	Mvmnt	AM Peak Hour					PM Peak Hour				
		LOS	V/C	Del. (s)	Q (50 <sup>th</sup> )	Q (95 <sup>th</sup> )	LOS	V/C	Del. (s)	Q (50 <sup>th</sup> )	Q (95 <sup>th</sup> )
Marvin Avenue / Access #6 & Sixth Line (Signalized)	<b>TIS Analysis</b>										
	Overall	B	-	13	-	-	B	-	12	-	-
	<b>Updated Analysis</b>										
Overall	B	-	12	-	-	B	-	14	-	-	
Marvin Avenue / Access #6 & Sixth Line (All-way Stop Control)	<b>TIS Analysis</b>										
	EBL/T/R	A	0.15	8	-	4	A	0.11	8	-	3
	WBL/T/R	A	0.07	8	-	2	A	0.25	9	-	8
	<b>Updated Analysis</b>										
	EBL/T/R	A	0.15	8	-	4	A	0.11	8	-	3
WBL/T/R	A	0.08	8	-	2	A	0.26	9	-	8	

As shown above the incremental change of traffic, while increased by 13% from the previous version, has a minimal impact on the operational analysis of both intersections. As the results for 2024 remain consistent with the TIS it can be concluded that the 2030 analysis will have a similar result and there is no need to re-examine the results for the 2030 horizon. Therefore, the result of the original TIS remain valid with respect to the ARGO Lands’ proposed development.

### 3 Parking Justification

As part of the planning rationale, a parking plan has been prepared and is further justified herein. This section will examine the parking provisions and compare them to the North Oakville Parking Zoning By-Law requirements. A parking summary can be seen in Table 5.

Table 5: Parking Summary

Land Use	Parking Rate	Min/Max	Units	Parking Required	Parking Provided	Meets Requirement?
Single Detached	2.0 / unit	Minimum	92	≥ 184	184	Yes
Townhouse	1.0 / unit	Minimum	86	≥ 86	86	Yes
Apartment	1.25 / unit	Maximum	124	≤ 155	131	Yes
Visitor	0.2 / unit	Maximum	124	≤ 25	25	Yes
Non-residential portion of mixed-use building	1 / 30 m <sup>2</sup>	Minimum	140 m <sup>2</sup>	≥ 5	5	Yes

As can be seen in Table 5, all parking provisions meet the By-Law Requirements.

For the mid-rise building, parking was provided at a rate of 1.01 resident stall per unit, which does not exceed the maximum recommended rate. To ensure that the proposed parking rate will satisfy the parking demand, a proxy site has been reviewed to determine a suitable parking rate. 5220 Lakeshore Road, which is used for comparison, is a 12-storey residential tower with surface and underground parking. This building is located adjacent to low-rise suburban development, similar to the subject development. The site was surveyed on May 28, 2019. Through that survey a parking demand rate of 0.93 parking stalls per unit plus 0.09 visitor parking stalls per unit, for a combined parking rate of 1.01 parking stalls per unit. The survey results and calculation table are included in Attachment 5. Based on the proxy site survey, the proposed parking rate of 1.01 parking stalls plus 0.2 visitor stalls per unit will adequately serve the proposed site.

It is anticipated that many of the trips to the commercial component of the proposed development will be made by the residents of the mixed-use building. Thus, the minimum required number of parking spaces will be provided for the non-residential component of the mixed-use building. As the underground visitor parking will be publicly accessible, retail users will also have access to underground visitor parking. This will accommodate any fluctuation in visitor and retail parking demand throughout the day. For example, if the retail parking demand were to exceed five parking stalls during the day, the underground visitor parking area would accommodate any retail parking overflow.

Additionally, seven on-street parking stalls located immediately adjacent to the proposed mixed-use development, and 22 on-street parking stalls along the opposite site of Street ‘A’ can be utilized by the mixed-use building patrons or visitors throughout the day. The On-Street Parking Concept Plan, prepared by Korsiak, is included in Attachment 6.

## 4 Site Specific Transportation Review

This memo has been prepared to address some site-specific considerations for Argo’s West Morrison Creek including Transit Facilities Plan, Road Cross-Sections, Pedestrian Circulation Plan, Cycling Facilities Plan, and Parking Provisions.

### 4.1 Transit Facilities Plan

A Transit Facilities Plan was created as part of the Neighbourhood 9/10/11 TIS. The Transit Facilities Plan has been recreated, focusing on the West Morrison Creek Development. This plan is included in Drawing 001, Attachment 7. Per the Transit Facilities Plan, all of the residential units are within 400 metres of at least one proposed transit station.

### 4.2 Road Cross-sections

The proposed right-of-ways and cross-sections are illustrated in Drawing 002, Attachment 7. These cross-sections are proposed to be consistent with the North Oakville Urban Design and Open Space Guidelines. The cross-sections used in this plan from these guidelines have been included in Attachment 8.

### 4.3 Pedestrian Concept Plan

A pedestrian circulation plan has been created to illustrate the sidewalk locations. Sidewalk provisions are generally per the road cross-section. Drawing 003, Attachment 7, illustrates the sidewalk locations and key pedestrian crossing locations.

#### 4.4 Cycling Facilities Plan

A Cycling Facilities Plan was created as part of the Neighbourhood 9/10/11 TIS. The Cycling Facilities Plan has been recreated, focusing on the West Morrison Creek Development. This plan is included in Drawing 004, Attachment 7. Per the Cycling Facilities Plan, a signed route is provided along Marvin Avenue and a bicycle lane is provided along Sixth Line.

### 5 Conclusions

The proposed development concept has been refined since the original TIS was prepared. This addendum has verified that the changes to the unit counts and land uses will have no impact on the operational analysis and that the Neighbourhood 9/10/11 TIS remains valid.

This addendum has also addressed the site-specific issues including, parking, multi-modal transportation facilities, and roadway cross-sections. Through the plans prepared as part of this work it has been shown that the proposed development will have adequate cycling, pedestrian, and transit facilities and that the proposed right of ways are sufficient to support the appropriate cross-sections.

If you have any questions or comments, please do not hesitate to contact the undersigned.

Prepared By:

Reviewed By:



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Christopher Gordon, P. Eng.

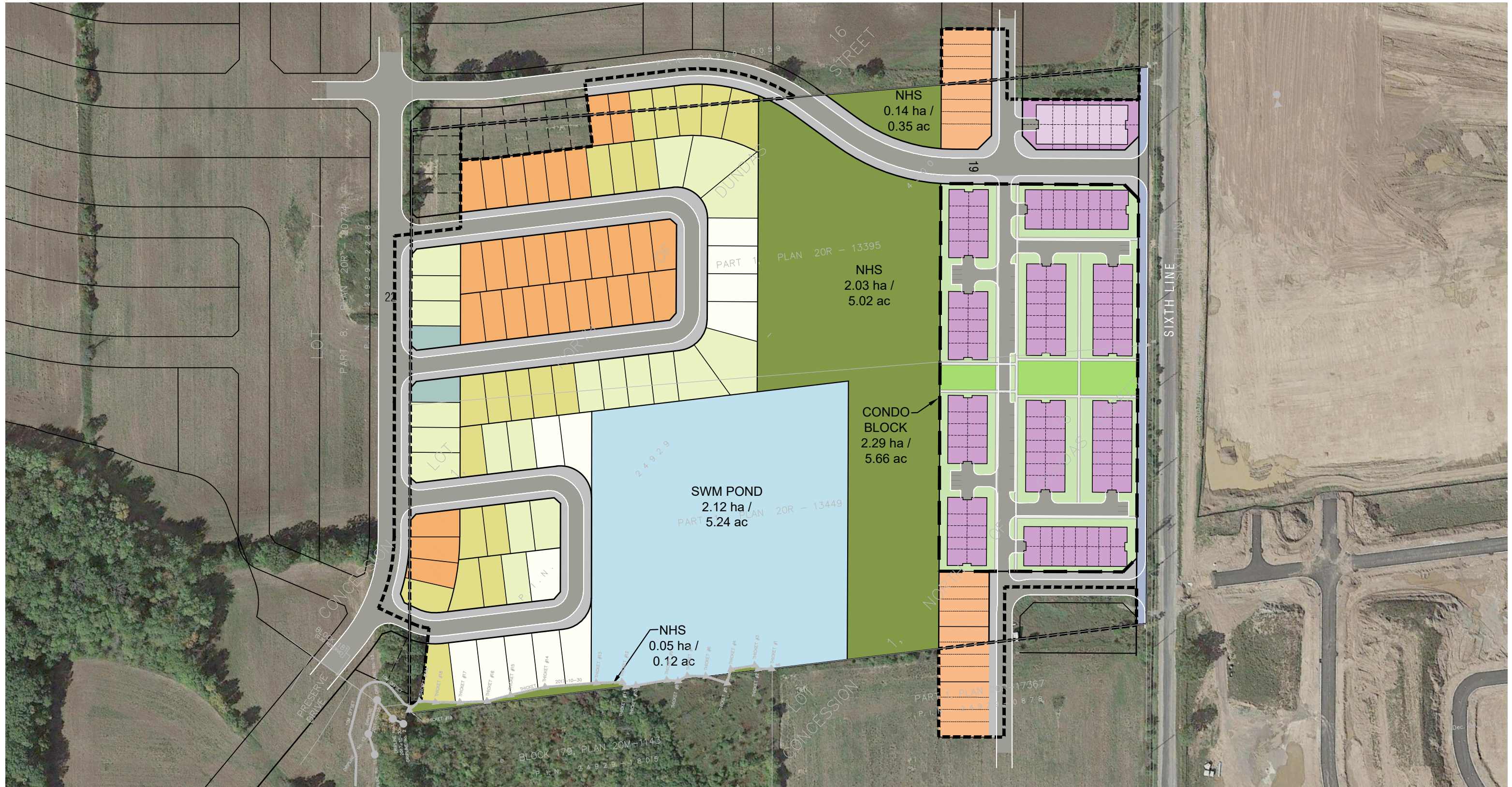
P: 343-999-9117

[Christopher.Gordon@CGHTransportation.com](mailto:Christopher.Gordon@CGHTransportation.com)

# Attachment 1

Original Concept Plan





**DRAFT**

- All Units In Metric Unless Otherwise Noted.
- Base Information Obtained From Various Sources And Is Approximate.
- Schedule / Plan Information Is Conceptual And Requires Verification by Appropriate Agency.
- Aerial Photo: Google Earth, Approx. Spring 2015

GERRARD DESIGN ASSOCIATES INC



# Attachment 2

Updated Draft Plan




**DRAFT PLAN OF SUBDIVISION  
24T-20001/1316  
Argo (West Morrison Creek) Limited**

PART OF LOT 16  
CONCESSION 1, NORTH OF DUNDAS STREET

GEOGRAPHIC TOWNSHIP OF TRAFALGAR  
NOW IN THE  
TOWN OF OAKVILLE  
REGIONAL MUNICIPALITY OF HALTON

**OWNER'S AUTHORIZATION**

I HEREBY AUTHORIZE KORSIAK URBAN PLANNING TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE TOWN OF OAKVILLE FOR APPROVAL.

SIGNED  DATE December 19, 2019  
Fabio J. Mazzocco  
Argo (West Morrison Creek) Limited  
4900 Palladium Way, Suite 105, Burlington, Ontario L7M 0W7

SIGNED \_\_\_\_\_ DATE \_\_\_\_\_  
Jason Suddegaard, A.S.O.  
Lower Fourth Development Limited & Pendent Developments Ltd.  
433 Steeles Avenue East Suite 110, Milton, On L9T 8Z4

**SURVEYOR'S CERTIFICATE**

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AS SHOWN ON THIS PLAN AND THEIR RELATIONSHIP TO ADJACENT LANDS ARE CORRECTLY AND ACCURATELY SHOWN.

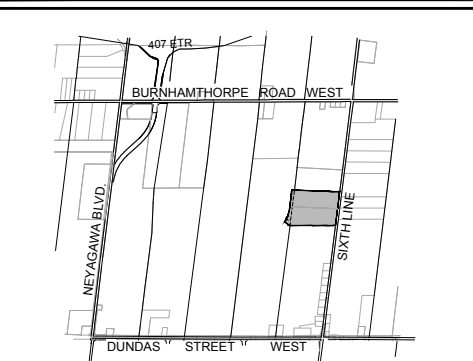
SIGNED \_\_\_\_\_ DATE \_\_\_\_\_  
Sunil Perera, OLS, OLIP  
 **J.D. BARNES LIMITED**  
LAND INFORMATION SPECIALISTS  
SURVEYING MAPPING GIS  
485 WILSON AVENUE SUITE 101 SCARBOROUGH, ONTARIO M1S 1S2  
T: (905) 875-9953 F: (905) 875-9956 www.jdbarnes.com


**ADDITIONAL INFORMATION (UNDER SECTION 51 (17) OF THE PLANNING ACT)**

- A) SHOWN ON PLAN
- B) SHOWN ON PLAN
- C) SHOWN ON PLAN
- D) SHOWN ON PLAN
- E) SHOWN ON PLAN
- F) SHOWN ON PLAN
- G) SHOWN ON PLAN
- H) MUNICIPAL AND PIPED WATER TO BE PROVIDED
- I) CLAY LOAM
- J) SHOWN ON PLAN
- K) SANITARY AND STORM SEWERS TO BE PROVIDED
- L) SHOWN ON PLAN

**LAND USE SCHEDULE**

Land Use	Lots/Blocks	Lot/Block Total	Area (ha)	Units
Single Detached (11.60 m)	1-3	3	0.09	3
Single Detached (9.45 m)	4, 25, 26, 28-30, 39, 40, 60, 61, 72, 73	12	0.30	12
Single Detached (12.20 m)	24, 27, 38, 49, 50, 59, 70, 71, 86, 90, 101, 102	12	0.39	12
Single Detached (12.8m)	5-14, 31-36, 41-47, 51-56, 62-68, 74, 81-85, 91-95, 99, 103	49	1.55	49
Single Detached (15.24m)	15-23, 37, 48, 57, 58, 69, 75-80, 87-89, 96-98, 100	27	1.14	27
Rear Lane Townhouses (6.05m)	104-115	12	1.05	59
Street Townhouses (7.3m)	116-121	6	0.59	31
Road Widening	122	1	0.17	
Mixed Use	123	1	0.24	TBD
Natural Heritage System (NHS)	124-128	5	2.25	
SWM Pond	129	1	2.07	
Residential Reserve	130-134	5	0.47	
Walkway	135	1	0.01	
0.3m Reserve	136-138	3	0.00	
7.5m ROW (205m)			0.16	
17m ROW (1079m)			1.86	
19m ROW (130m)			0.25	
22m ROW (366m)			0.81	
<b>Total</b>	<b>138</b>	<b>138</b>	<b>13.40</b>	<b>193</b>

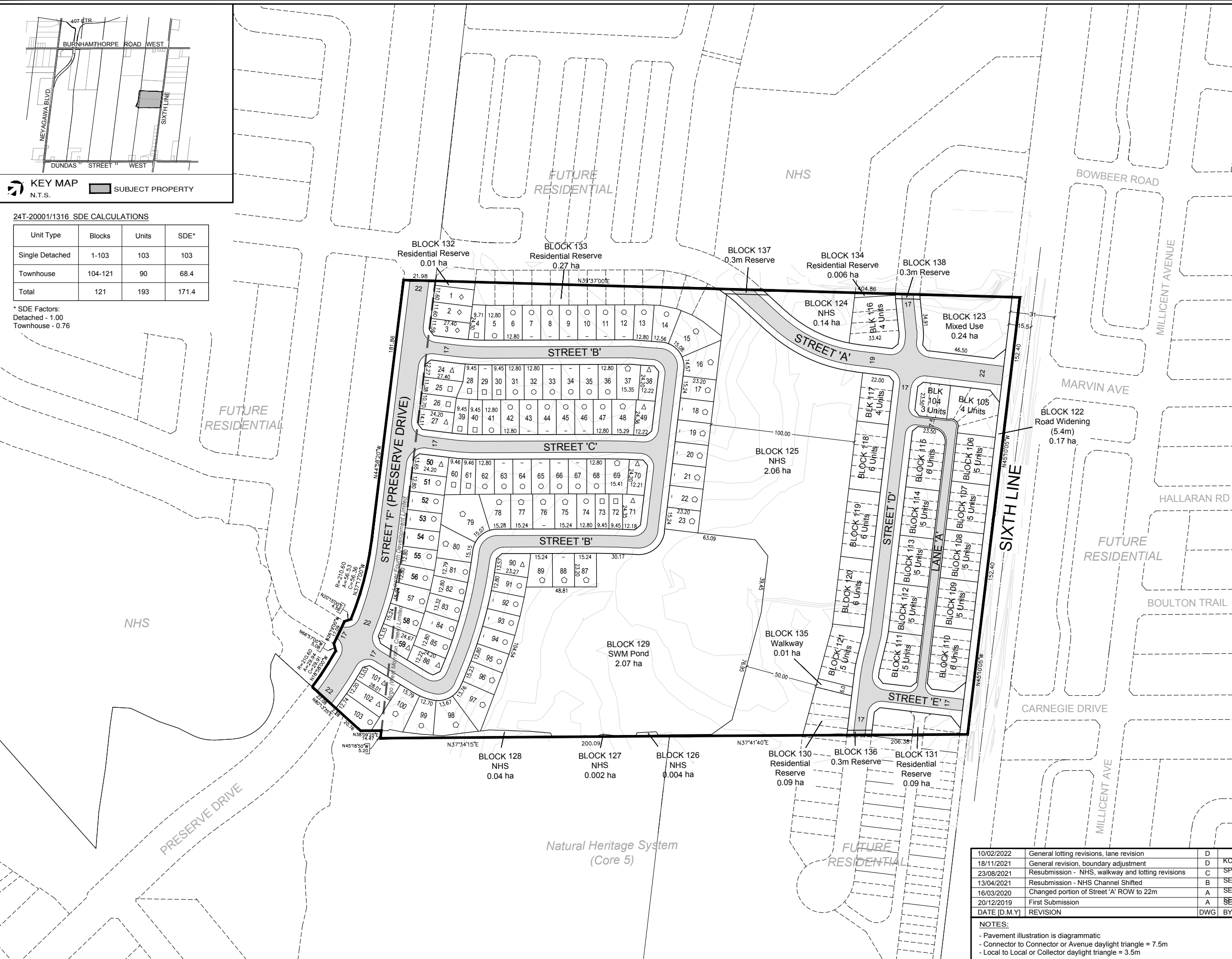


**KEY MAP**  
N.T.S.  SUBJECT PROPERTY

**24T-20001/1316 SDE CALCULATIONS**

Unit Type	Blocks	Units	SDE*
Single Detached	1-103	103	103
Townhouse	104-121	90	68.4
<b>Total</b>	<b>121</b>	<b>193</b>	<b>171.4</b>


\* SDE Factors:  
Detached - 1.00  
Townhouse - 0.76



DATE [D.M.Y.]	REVISION	BY
10/02/2022	General lotting revisions, lane revision	D KC
18/11/2021	General revision, boundary adjustment	D
23/08/2021	Resubmission - NHS, walkway and lotting revisions	C SP
13/04/2021	Resubmission - NHS Channel Shifted	B SE
16/03/2020	Changed portion of Street 'A' ROW to 22m	A SE
20/12/2019	First Submission	A SE
DATE [D.M.Y.]	REVISION	DWG BY

**NOTES:**  
- Pavement illustration is diagrammatic  
- Connector to Connector or Avenue daylight triangle = 7.5m  
- Local to Local or Collector daylight triangle = 3.5m



SCALE 1:2500 February 10, 2022  
DRAWN BY: SP CHECKED BY: KC  **D**



# Attachment 3

TIS Analysis Synchro Worksheets

Lanes, Volumes, Timings  
15: Sixth Line & Access #6/Marvin Avenue

2024 Future Total AM - Mitigation  
Neighbourhood 10



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	5	199	131	5	45	64	944	44	16	948	26
Future Volume (vph)	83	5	199	131	5	45	64	944	44	16	948	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		0.0	30.0		50.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			50.0			50.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.853			0.864			0.993			0.996	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1589	0	1770	1609	0	1770	3514	0	1770	3525	0
Flt Permitted	0.722			0.555			0.231			0.225		
Satd. Flow (perm)	1345	1589	0	1034	1609	0	430	3514	0	419	3525	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		49			49			8			4	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		121.7			102.5			226.5			436.9	
Travel Time (s)		8.8			7.4			16.3			31.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	90	5	216	142	5	49	70	1026	48	17	1030	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	90	221	0	142	54	0	70	1074	0	17	1058	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	1		1	1	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	10.0		2.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		

Lanes, Volumes, Timings  
15: Sixth Line & Access #6/Marvin Avenue

2024 Future Total AM - Mitigation  
Neighbourhood 10

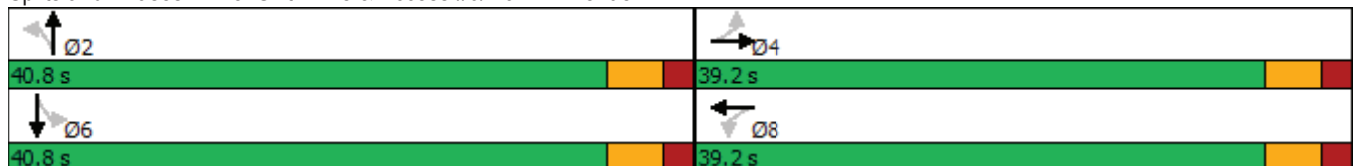


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	33.2	33.2		39.2	39.2		33.2	33.2		39.2	39.2	
Total Split (s)	39.2	39.2		39.2	39.2		40.8	40.8		40.8	40.8	
Total Split (%)	49.0%	49.0%		49.0%	49.0%		51.0%	51.0%		51.0%	51.0%	
Maximum Green (s)	34.0	34.0		34.0	34.0		35.6	35.6		35.6	35.6	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.9	1.9		1.9	1.9		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.2	5.2		5.2	5.2		5.2	5.2		5.2	5.2	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	21.0	21.0		27.0	27.0		21.0	21.0		27.0	27.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	13.2	13.2		13.2	13.2		36.6	36.6		36.6	36.6	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.61	0.61		0.61	0.61	
v/c Ratio	0.31	0.57		0.63	0.14		0.27	0.50		0.07	0.49	
Control Delay	21.7	21.9		33.7	7.7		10.3	8.2		7.1	8.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	21.7	21.9		33.7	7.7		10.3	8.2		7.1	8.2	
LOS	C	C		C	A		B	A		A	A	
Approach Delay		21.8			26.5			8.4			8.2	
Approach LOS		C			C			A			A	

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	60.3
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.63
Intersection Signal Delay:	11.1
Intersection LOS:	B
Intersection Capacity Utilization:	82.4%
ICU Level of Service:	E
Analysis Period (min):	15






















Splits and Phases: 15: Sixth Line & Access #6/Marvin Avenue





HCM 2010 Signalized Intersection Summary  
 15: Sixth Line & Access #6/Marvin Avenue

2024 Future Total AM - Mitigation  
 Neighbourhood 10

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	83	5	199	131	5	45	64	944	44	16	948	26
Future Volume (veh/h)	83	5	199	131	5	45	64	944	44	16	948	26
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	90	5	216	142	5	49	70	1026	48	17	1030	28
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	455	10	435	302	42	408	311	1919	90	306	1962	53
Arrive On Green	0.28	0.28	0.28	0.28	0.28	0.28	0.56	0.56	0.56	0.56	0.56	0.56
Sat Flow, veh/h	1345	36	1553	1155	149	1457	531	3443	161	523	3520	96
Grp Volume(v), veh/h	90	0	221	142	0	54	70	527	547	17	518	540
Grp Sat Flow(s),veh/h/ln	1345	0	1589	1155	0	1606	531	1770	1834	523	1770	1846
Q Serve(g_s), s	3.4	0.0	7.4	7.5	0.0	1.6	6.1	12.0	12.0	1.4	11.7	11.7
Cycle Q Clear(g_c), s	5.0	0.0	7.4	14.9	0.0	1.6	17.8	12.0	12.0	13.4	11.7	11.7
Prop In Lane	1.00		0.98	1.00		0.91	1.00		0.09	1.00		0.05
Lane Grp Cap(c), veh/h	455	0	445	302	0	449	311	986	1022	306	986	1029
V/C Ratio(X)	0.20	0.00	0.50	0.47	0.00	0.12	0.22	0.53	0.53	0.06	0.53	0.53
Avail Cap(c_a), veh/h	795	0	846	593	0	855	311	986	1022	306	986	1029
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.0	0.0	19.2	25.5	0.0	17.1	14.4	8.9	8.9	13.1	8.8	8.8
Incr Delay (d2), s/veh	0.2	0.0	0.9	1.1	0.0	0.1	1.7	2.1	2.0	0.3	2.0	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	3.4	2.5	0.0	0.7	1.0	6.3	6.5	0.2	6.2	6.4
LnGrp Delay(d),s/veh	19.2	0.0	20.1	26.6	0.0	17.3	16.1	11.0	10.9	13.5	10.8	10.8
LnGrp LOS	B		C	C		B	B	B	B	B	B	B
Approach Vol, veh/h		311			196			1144			1075	
Approach Delay, s/veh		19.8			24.0			11.3			10.8	
Approach LOS		B			C			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		40.8		23.1		40.8		23.1				
Change Period (Y+Rc), s		* 5.2		* 5.2		* 5.2		* 5.2				
Max Green Setting (Gmax), s		* 36		* 34		* 36		* 34				
Max Q Clear Time (g_c+I1), s		19.8		9.4		15.4		16.9				
Green Ext Time (p_c), s		8.2		2.1		8.7		1.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			13.0									
HCM 2010 LOS			B									
<b>Notes</b>												

Lanes, Volumes, Timings  
15: Sixth Line & Access #6/Marvin Avenue

2024 Future Total PM - Mitigation  
Neighbourhood 10



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	5	131	87	5	29	220	1134	147	61	1000	91
Future Volume (vph)	55	5	131	87	5	29	220	1134	147	61	1000	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		0.0	30.0		50.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			50.0			50.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.855			0.870			0.983			0.987	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1593	0	1770	1621	0	1770	3479	0	1770	3493	0
Flt Permitted	0.733			0.663			0.205			0.152		
Satd. Flow (perm)	1365	1593	0	1235	1621	0	382	3479	0	283	3493	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		50			32			21			14	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		121.7			108.4			226.5			436.9	
Travel Time (s)		8.8			7.8			16.3			31.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	5	142	95	5	32	239	1233	160	66	1087	99
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	147	0	95	37	0	239	1393	0	66	1186	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	1		1	1	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	10.0		2.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		

Lanes, Volumes, Timings  
15: Sixth Line & Access #6/Marvin Avenue

2024 Future Total PM - Mitigation  
Neighbourhood 10

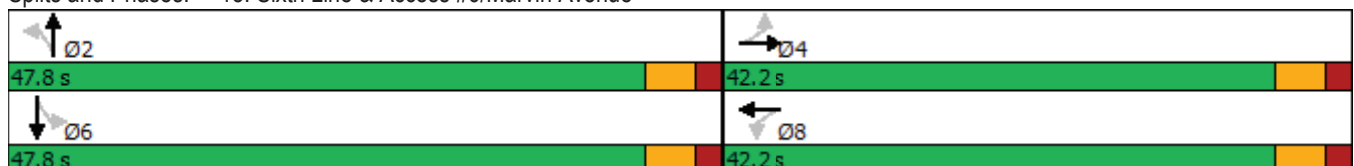


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	33.2	33.2		39.2	39.2		33.2	33.2		39.2	39.2	
Total Split (s)	42.2	42.2		42.2	42.2		47.8	47.8		47.8	47.8	
Total Split (%)	46.9%	46.9%		46.9%	46.9%		53.1%	53.1%		53.1%	53.1%	
Maximum Green (s)	37.0	37.0		37.0	37.0		42.6	42.6		42.6	42.6	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.9	1.9		1.9	1.9		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.2	5.2		5.2	5.2		5.2	5.2		5.2	5.2	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	21.0	21.0		27.0	27.0		21.0	21.0		27.0	27.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	11.4	11.4		11.4	11.4		45.5	45.5		45.5	45.5	
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.68	0.68		0.68	0.68	
v/c Ratio	0.26	0.47		0.46	0.12		0.93	0.59		0.35	0.50	
Control Delay	25.8	21.2		31.4	11.0		57.5	7.4		11.7	6.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	25.8	21.2		31.4	11.0		57.5	7.4		11.7	6.5	
LOS	C	C		C	B		E	A		B	A	
Approach Delay		22.5			25.7			14.7			6.7	
Approach LOS		C			C			B			A	

Intersection Summary





















Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	67.3
Natural Cycle:	130
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.93
Intersection Signal Delay:	12.6
Intersection LOS:	B
Intersection Capacity Utilization:	86.7%
ICU Level of Service:	E
Analysis Period (min):	15

Splits and Phases: 15: Sixth Line & Access #6/Marvin Avenue



HCM 2010 Signalized Intersection Summary  
 15: Sixth Line & Access #6/Marvin Avenue

2024 Future Total PM - Mitigation  
 Neighbourhood 10

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	5	131	87	5	29	220	1134	147	61	1000	91
Future Volume (veh/h)	55	5	131	87	5	29	220	1134	147	61	1000	91
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	60	5	142	95	5	32	239	1233	160	66	1087	99
Adj No. of Lanes	1	1	0	1	1	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	351	11	301	250	43	273	331	2039	263	271	2122	193
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.65	0.65	0.65	0.65	0.65	0.65
Sat Flow, veh/h	1365	54	1537	1236	218	1398	470	3153	407	386	3281	299
Grp Volume(v), veh/h	60	0	147	95	0	37	239	690	703	66	586	600
Grp Sat Flow(s),veh/h/ln	1365	0	1591	1236	0	1616	470	1770	1791	386	1770	1810
Q Serve(g_s), s	2.5	0.0	5.4	4.9	0.0	1.2	31.1	14.9	15.1	7.9	11.5	11.5
Cycle Q Clear(g_c), s	3.7	0.0	5.4	10.3	0.0	1.2	42.6	14.9	15.1	23.0	11.5	11.5
Prop In Lane	1.00		0.97	1.00		0.86	1.00		0.23	1.00		0.16
Lane Grp Cap(c), veh/h	351	0	311	250	0	316	331	1144	1158	271	1144	1170
V/C Ratio(X)	0.17	0.00	0.47	0.38	0.00	0.12	0.72	0.60	0.61	0.24	0.51	0.51
Avail Cap(c_a), veh/h	850	0	894	702	0	908	331	1144	1158	271	1144	1170
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.4	0.0	23.5	28.0	0.0	21.8	18.5	6.7	6.8	13.5	6.1	6.2
Incr Delay (d2), s/veh	0.2	0.0	1.1	1.0	0.0	0.2	12.8	2.4	2.4	2.1	1.6	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	2.5	1.7	0.0	0.6	5.4	7.8	8.0	1.0	6.1	6.2
LnGrp Delay(d),s/veh	23.6	0.0	24.6	29.0	0.0	22.0	31.3	9.1	9.1	15.6	7.8	7.8
LnGrp LOS	C		C	C		C	C	A	A	B	A	A
Approach Vol, veh/h		207			132			1632			1252	
Approach Delay, s/veh		24.3			27.0			12.4			8.2	
Approach LOS		C			C			B			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		47.8		18.1		47.8		18.1				
Change Period (Y+Rc), s		* 5.2		* 5.2		* 5.2		* 5.2				
Max Green Setting (Gmax), s		* 43		* 37		* 43		* 37				
Max Q Clear Time (g_c+I1), s		44.6		7.4		25.0		12.3				
Green Ext Time (p_c), s		0.0		1.4		10.0		0.7				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				12.1								
HCM 2010 LOS				B								
<b>Notes</b>												



# Attachment 4

Updated Analysis Synchro Worksheets

Lanes, Volumes, Timings  
15: Sixth Line & Access #6/Marvin Avenue

2024 Future Total AM - Mitigation Updated  
Neighbourhood 10



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	5	216	131	5	45	80	944	44	16	973	25
Future Volume (vph)	100	5	216	131	5	45	80	944	44	16	973	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		0.0	30.0		50.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			50.0			50.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.853			0.864			0.993			0.996	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1589	0	1770	1609	0	1770	3514	0	1770	3525	0
Flt Permitted	0.722			0.521			0.220			0.224		
Satd. Flow (perm)	1345	1589	0	970	1609	0	410	3514	0	417	3525	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		45			49			8			4	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		121.7			102.5			226.5			436.9	
Travel Time (s)		8.8			7.4			16.3			31.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	109	5	235	142	5	49	87	1026	48	17	1058	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	109	240	0	142	54	0	87	1074	0	17	1085	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	1		1	1	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	10.0		2.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	33.2	33.2		39.2	39.2		33.2	33.2		39.2	39.2	

Lanes, Volumes, Timings  
15: Sixth Line & Access #6/Marvin Avenue

2024 Future Total AM - Mitigation Updated  
Neighbourhood 10

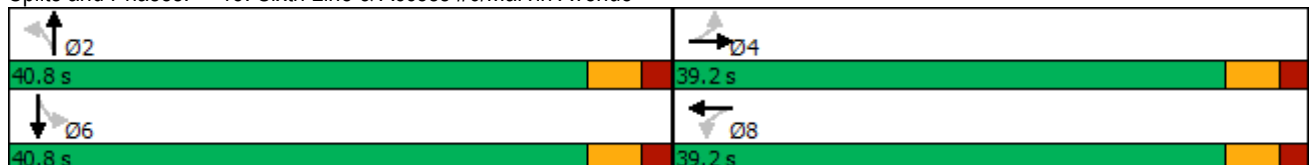


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	39.2	39.2		39.2	39.2		40.8	40.8		40.8	40.8	
Total Split (%)	49.0%	49.0%		49.0%	49.0%		51.0%	51.0%		51.0%	51.0%	
Maximum Green (s)	34.0	34.0		34.0	34.0		35.6	35.6		35.6	35.6	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.9	1.9		1.9	1.9		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.2	5.2		5.2	5.2		5.2	5.2		5.2	5.2	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	21.0	21.0		27.0	27.0		21.0	21.0		27.0	27.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	13.5	13.5		13.5	13.5		36.1	36.1		36.1	36.1	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.60	0.60		0.60	0.60	
v/c Ratio	0.36	0.61		0.65	0.14		0.35	0.51		0.07	0.51	
Control Delay	22.6	23.7		35.6	7.6		12.7	8.5		7.3	8.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.6	23.7		35.6	7.6		12.7	8.5		7.3	8.6	
LOS	C	C		D	A		B	A		A	A	
Approach Delay		23.3			27.9			8.8			8.5	
Approach LOS		C			C			A			A	
Queue Length 50th (m)	10.6	19.8		14.8	0.5		4.2	30.8		0.7	31.4	
Queue Length 95th (m)	22.4	39.3		31.2	7.5		17.4	59.6		3.8	60.6	
Internal Link Dist (m)		97.7			78.5			202.5			412.9	
Turn Bay Length (m)							30.0			30.0		
Base Capacity (vph)	762	920		549	933		246	2116		250	2121	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.14	0.26		0.26	0.06		0.35	0.51		0.07	0.51	

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	60.1
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.65
Intersection Signal Delay:	11.8
Intersection LOS:	B
Intersection Capacity Utilization:	83.7%
ICU Level of Service:	E
Analysis Period (min):	15

Splits and Phases: 15: Sixth Line & Access #6/Marvin Avenue



HCM Unsignalized Intersection Capacity Analysis  
 21: Preserve Drive & Access #6 / Marvin Avenue

2024 Future Total AM  
 Neighbourhood 10



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	26	86	5	28	29	4	5	3	84	12	11	9
Future Volume (vph)	26	86	5	28	29	4	5	3	84	12	11	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	28	93	5	30	32	4	5	3	91	13	12	10

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	126	66	99	35
Volume Left (vph)	28	30	5	13
Volume Right (vph)	5	4	91	10
Hadj (s)	0.05	0.09	-0.51	-0.06
Departure Headway (s)	4.3	4.4	3.9	4.4
Degree Utilization, x	0.15	0.08	0.11	0.04
Capacity (veh/h)	807	775	879	770
Control Delay (s)	8.1	7.8	7.3	7.6
Approach Delay (s)	8.1	7.8	7.3	7.6
Approach LOS	A	A	A	A

Intersection Summary			
Delay		7.7	
Level of Service		A	
Intersection Capacity Utilization	19.6%	ICU Level of Service	A
Analysis Period (min)	15		



Lanes, Volumes, Timings  
15: Sixth Line & Access #6/Marvin Avenue

2024 Future Total PM - Mitigation Updated  
Neighbourhood 10



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	5	143	87	5	29	226	1134	147	61	1015	79
Future Volume (vph)	66	5	143	87	5	29	226	1134	147	61	1015	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	30.0		0.0	30.0		50.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			50.0			50.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.855			0.870			0.983			0.989	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1593	0	1770	1621	0	1770	3479	0	1770	3500	0
Flt Permitted	0.733			0.641			0.204			0.152		
Satd. Flow (perm)	1365	1593	0	1194	1621	0	380	3479	0	283	3500	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		48			32			21			12	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		121.7			108.4			226.5			436.9	
Travel Time (s)		8.8			7.8			16.3			31.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	72	5	155	95	5	32	246	1233	160	66	1103	86
Shared Lane Traffic (%)												
Lane Group Flow (vph)	72	160	0	95	37	0	246	1393	0	66	1189	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	1		1	1	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	10.0		2.0	10.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4							
Detector 2 Size(m)		0.6			0.6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	33.2	33.2		39.2	39.2		33.2	33.2		39.2	39.2	

Lanes, Volumes, Timings  
15: Sixth Line & Access #6/Marvin Avenue

2024 Future Total PM - Mitigation Updated  
Neighbourhood 10

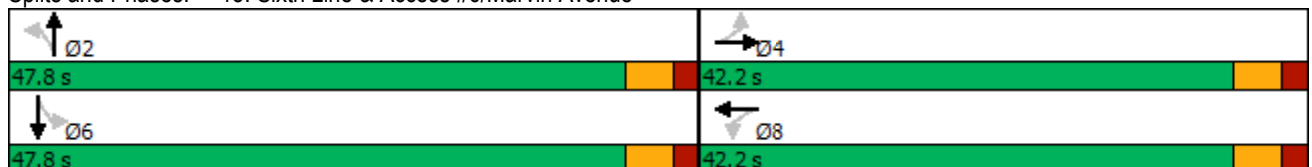


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	42.2	42.2		42.2	42.2		47.8	47.8		47.8	47.8	
Total Split (%)	46.9%	46.9%		46.9%	46.9%		53.1%	53.1%		53.1%	53.1%	
Maximum Green (s)	37.0	37.0		37.0	37.0		42.6	42.6		42.6	42.6	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	1.9	1.9		1.9	1.9		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.2	5.2		5.2	5.2		5.2	5.2		5.2	5.2	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	21.0	21.0		27.0	27.0		21.0	21.0		27.0	27.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	11.4	11.4		11.4	11.4		45.4	45.4		45.4	45.4	
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.67	0.67		0.67	0.67	
v/c Ratio	0.31	0.52		0.47	0.12		0.96	0.59		0.35	0.50	
Control Delay	26.8	23.0		32.0	11.0		65.1	7.4		11.7	6.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	26.8	23.0		32.0	11.0		65.1	7.4		11.7	6.5	
LOS	C	C		C	B		E	A		B	A	
Approach Delay		24.2			26.2			16.1			6.8	
Approach LOS		C			C			B			A	
Queue Length 50th (m)	8.0	12.6		10.8	0.5		22.6	38.5		2.8	30.2	
Queue Length 95th (m)	18.5	28.8		23.8	7.3		#45.6	69.6		13.0	54.2	
Internal Link Dist (m)		97.7			84.4			202.5			412.9	
Turn Bay Length (m)							30.0			30.0		
Base Capacity (vph)	754	902		660	910		256	2355		191	2366	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.10	0.18		0.14	0.04		0.96	0.59		0.35	0.50	

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 67.3  
 Natural Cycle: 140  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 0.96  
 Intersection Signal Delay: 13.5      Intersection LOS: B  
 Intersection Capacity Utilization 87.5%      ICU Level of Service E  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 15: Sixth Line & Access #6/Marvin Avenue



HCM Unsignalized Intersection Capacity Analysis  
 21: Preserve Drive & Access #6 / Marvin Avenue

2024 Future Total PM  
 Neighbourhood 10



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	17	57	5	95	97	7	5	11	57	8	7	29
Future Volume (vph)	17	57	5	95	97	7	5	11	57	8	7	29
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	62	5	103	105	8	5	12	62	9	8	32

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	85	216	79	49
Volume Left (vph)	18	103	5	9
Volume Right (vph)	5	8	62	32
Hadj (s)	0.04	0.11	-0.42	-0.32
Departure Headway (s)	4.5	4.4	4.2	4.4
Degree Utilization, x	0.11	0.26	0.09	0.06
Capacity (veh/h)	772	788	789	757
Control Delay (s)	8.0	9.0	7.7	7.6
Approach Delay (s)	8.0	9.0	7.7	7.6
Approach LOS	A	A	A	A

Intersection Summary			
Delay		8.4	
Level of Service		A	
Intersection Capacity Utilization	29.0%	ICU Level of Service	A
Analysis Period (min)	15		

# Attachment 5

Proxy Parking Survey Results



## ONTARIO TRAFFIC INC - PARKING SURVEY

**Location:** 5220 Lakeshore Rd, Burlington (The Lakeshore Club - VLC Group)

**Date:** Tuesday, May 28, 2019

Time			Surface				Underground	
			Visitor		Tenant		94	
			12		72			
			Parked	Available	Parked	Available	Parked	Available
08:00	to	08:30	3	9	43	29	74	20
08:30	to	09:00	4	8	37	35	69	25
09:00	to	09:30	5	7	34	38	61	33
09:30	to	10:00	5	7	32	40	60	34
10:00	to	10:30	6	6	33	39	56	38
10:30	to	11:00	5	7	33	39	54	40
11:00	to	11:30	6	6	34	38	51	43
11:30	to	12:00	5	7	34	38	53	41
12:00	to	12:30	8	4	31	41	54	40
12:30	to	13:00	9	3	30	42	52	42
13:00	to	13:30	8	4	27	45	49	45
13:30	to	14:00	9	3	28	44	50	44
14:00	to	14:30	10	2	29	43	51	43
14:30	to	15:00	9	3	31	41	53	41
15:00	to	15:30	11	1	33	39	51	43
15:30	to	16:00	6	6	28	44	52	42
16:00	to	16:30	7	5	30	42	61	33
16:30	to	17:00	6	6	34	38	61	33
17:00	to	17:30	5	7	37	35	60	34
17:30	to	18:00	5	7	35	37	59	35

*Table 1: Calculated Parking Demand Rates*

Parking Type	Demand Rate
Tenant (Surface +Underground)	$(43+74)/126$ units = 0.93 spaces per unit
Visitor	$11/126$ units = 0.09 spaces per unit

# Attachment 6

Korsiak Planning – Parking Concept Plan

**PRELIMINARY ON-STREET  
PARKING ANALYSIS**  
Argo (West Morrison Creek) Limited

PART OF LOT 16  
CONCESSION 1, NORTH OF DUNDAS STREET

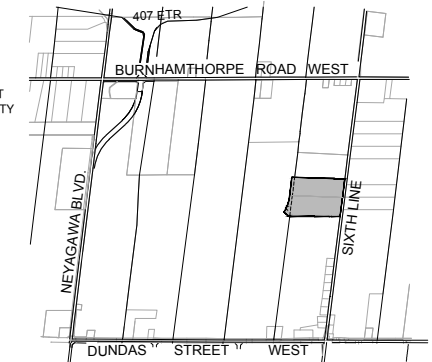
GEOGRAPHIC TOWNSHIP OF TRAFALGAR  
NOW IN THE  
TOWN OF OAKVILLE  
REGIONAL MUNICIPALITY OF HALTON

**KEY MAP**

N.T.S.

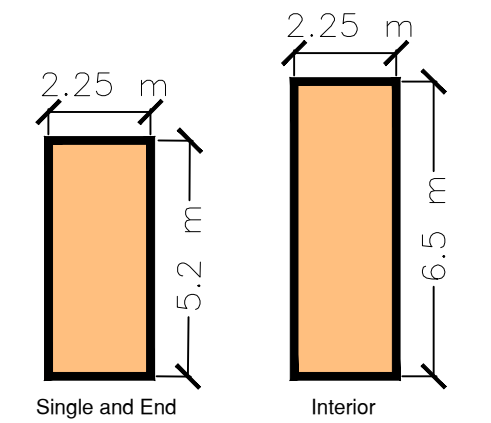


SUBJECT  
PROPERTY



- ± 96 On-street parking spaces\*
- ± 193 Residential units
- ± 0.50 Visitor parking space/ unit
- ± 16 On-street Sixth Line parking spaces directly serving West Morrison Creek
- ± 36 Other on-street Sixth Line parking spaces
- ± 681 Residential parking spaces

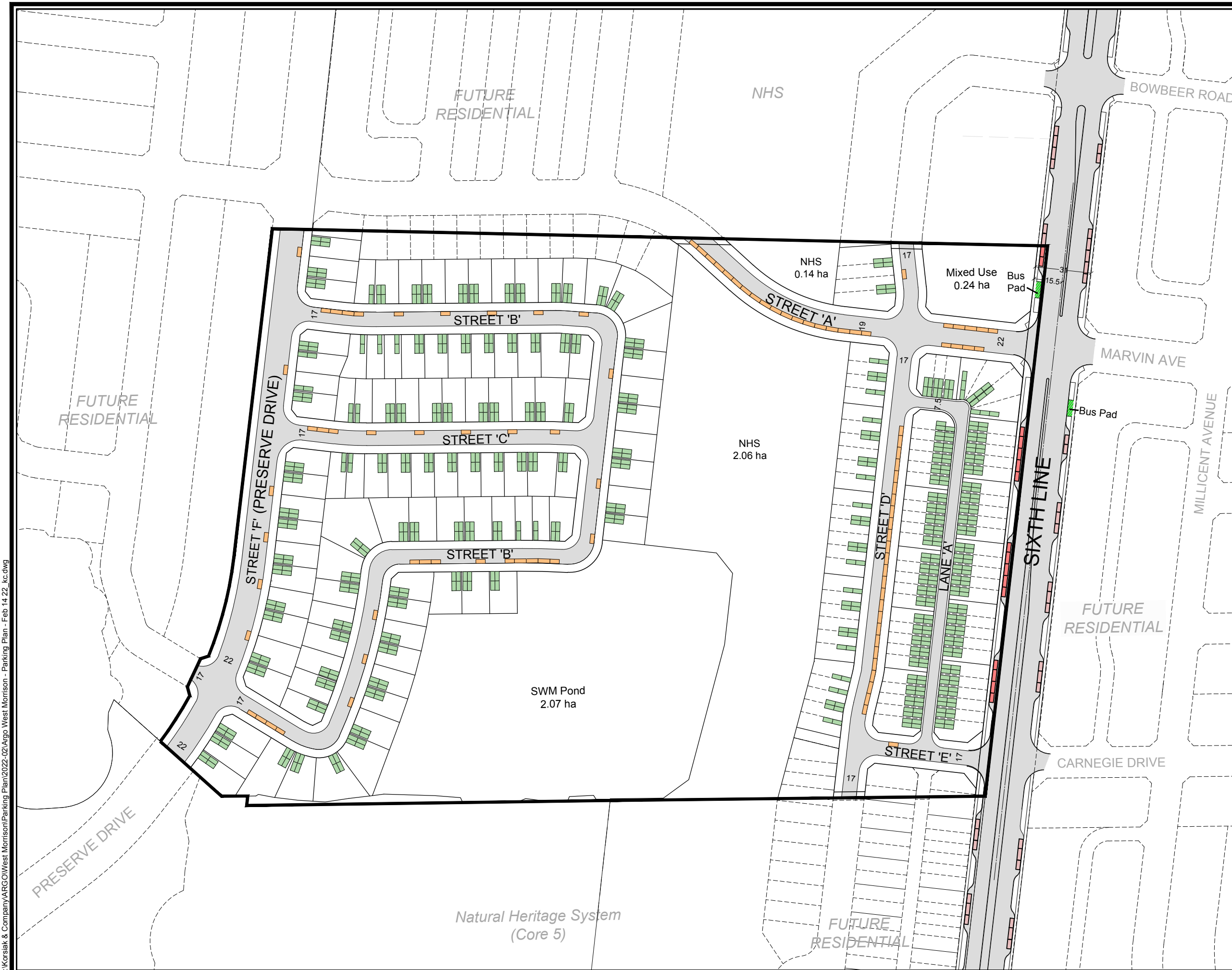
**TYPICAL ON-STREET PARKING SPACE\*\***



\* Subject to adjustment during detailed engineering design  
\*\* Per North Oakville Parking Strategy



SCALE 1:2000  
February 14, 2022



S:\Korsiak & Company\ARGO\West Morrison\Plan\2022-02\Argo West Morrison - Parking Plan - Feb 14 22.kc.dwg

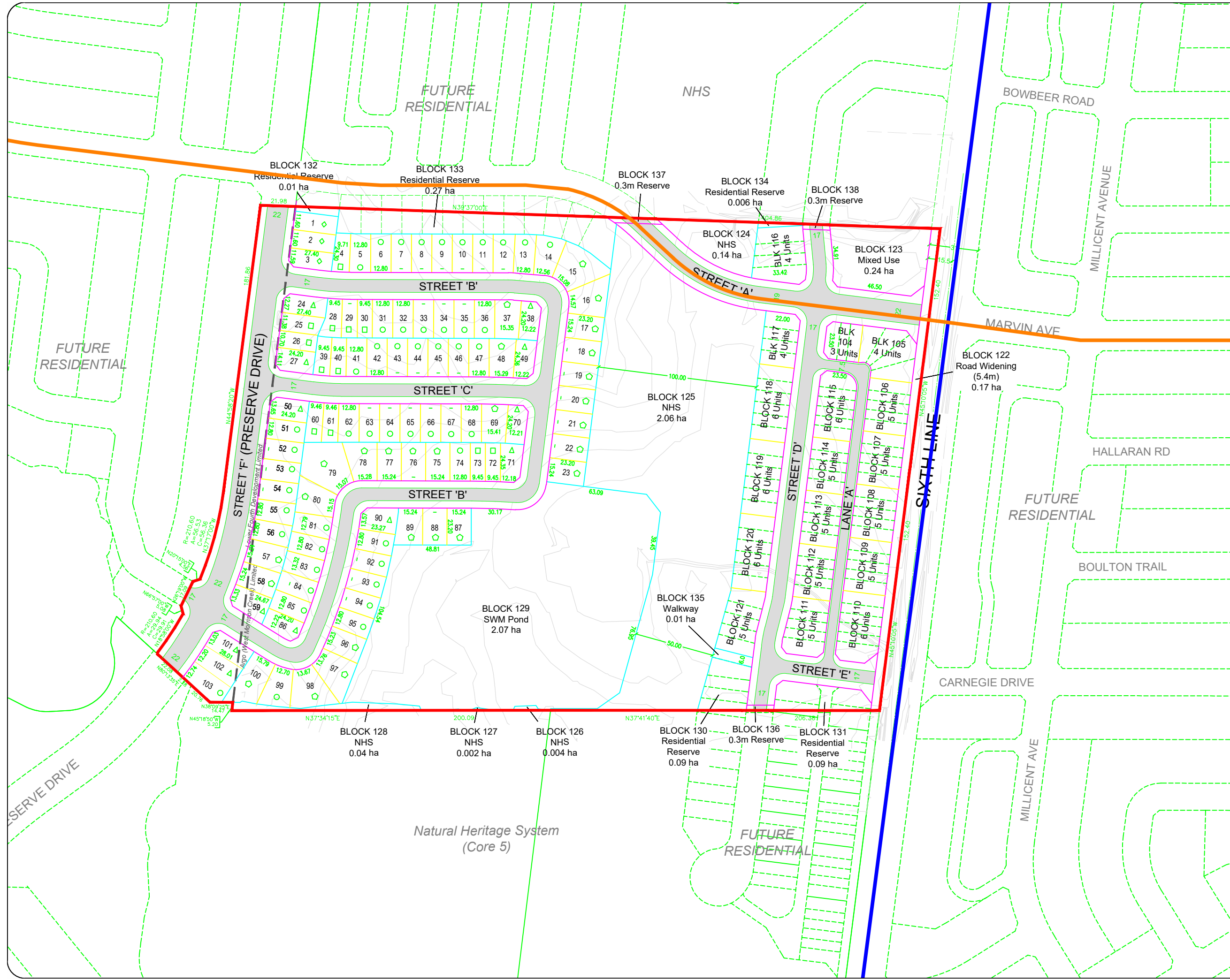
# Attachment 7

Transit Facilities Plan

Road Cross-Section Plan

Pedestrian Concept Plan

Cycling Facilities Plan



Notes:

**LEGEND:**

- Signed Route
- Bicycle Lane

A	description	by	xx/xx/xx
REV:	DESCRIPTION:	BY:	DATE:
STATUS:		status	



**CGH Transportation**  
 628 Haines Road  
 Newmarket, ON  
 L3Y 6V5  
 (905) 251-4070

**CLIENT:** Argo Development Corporation  
 Argo West Morrison Creek

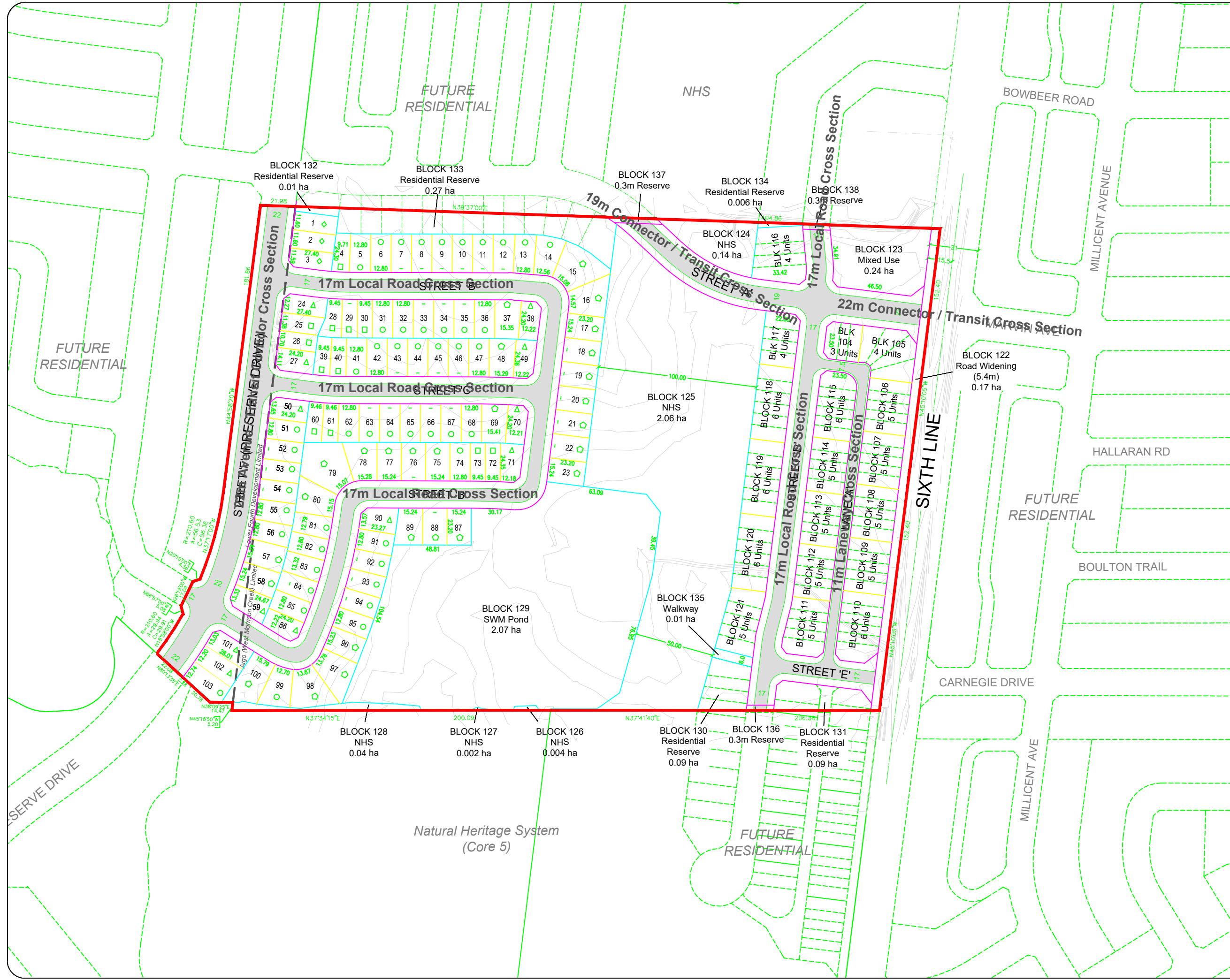
**ARCHITECT:**

**SITE:** Neighbourhood 9/10

**TITLE:** Cycling Facilities  
 Concept Plan

<b>SCALE AT A3:</b> NTS	<b>DATE:</b> 2022-02-11	<b>DRAWN:</b> MC	<b>CHECKED:</b>
<b>PROJECT NO:</b> 2019-78	<b>DRAWING NO:</b> 004	<b>REVISION:</b>	





Notes:

A	description	by	xx/xx/xx
REV:	DESCRIPTION:	BY:	DATE:
STATUS:		status	



**CGH Transportation**  
 628 Haines Road  
 Newmarket, ON  
 L3Y 6V5  
 (905) 251-4070

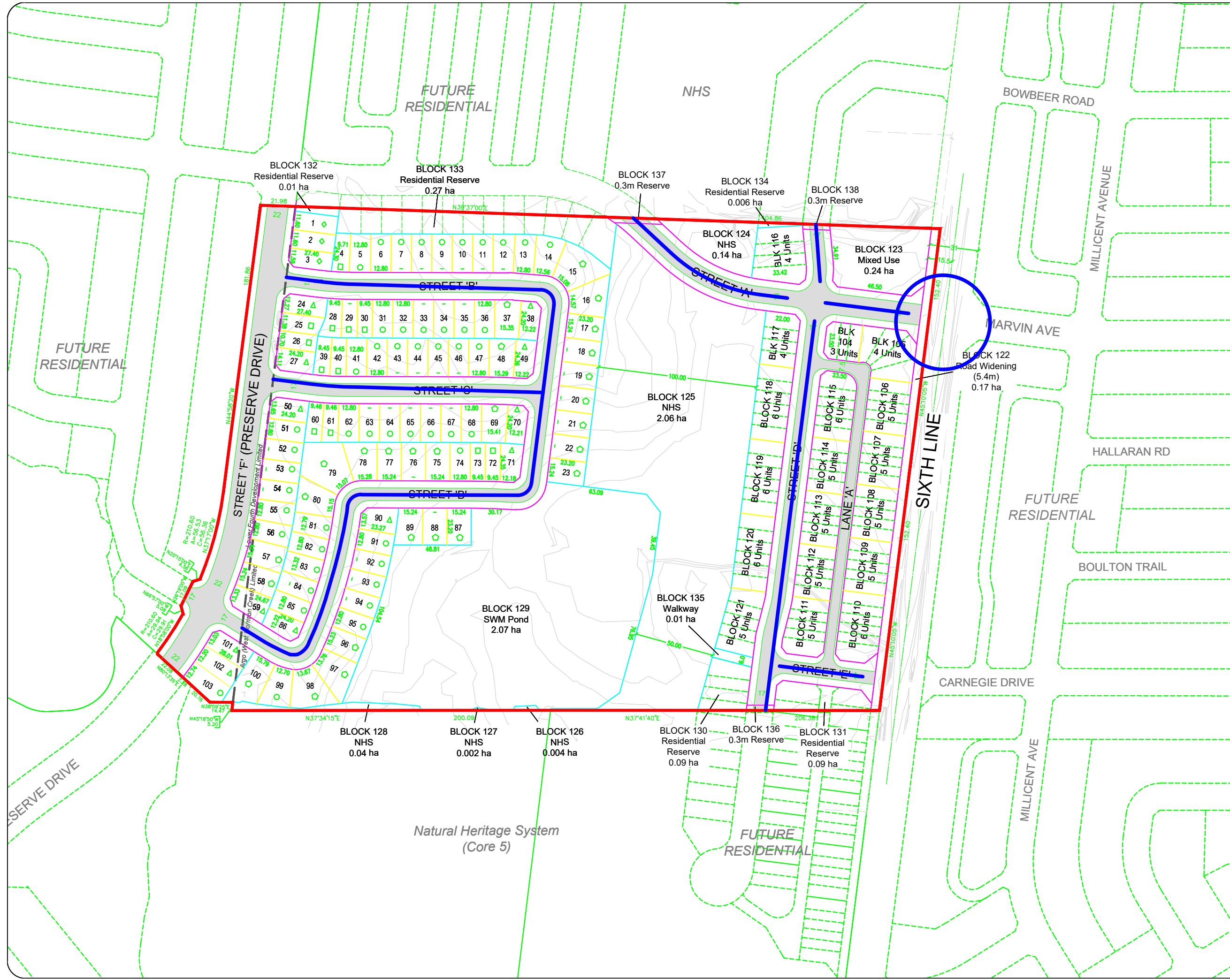
CLIENT: Argo Development Corporation  
 Argo West Morrison Creek

ARCHITECT:

SITE:  
 Neighbourhood 9/10

TITLE:  
 Road Cross-Section  
 Concept Plan

SCALE AT A3: NTS	DATE: 2022-02-11	DRAWN: MC	CHECKED:
PROJECT NO: 2019-78	DRAWING NO: 002	REVISION:	



Notes:

**LEGEND:**

- Single Side Sidewalk
- Both Side Sidewalk
- Pedestrian Crossing

A	description	by	xx/xx/xx
REV:	DESCRIPTION:	BY:	DATE:
STATUS:		status	



**CGH Transportation**  
 628 Haines Road  
 Newmarket, ON  
 L3Y 6V5  
 (905) 251-4070

**CLIENT:** Argo Development Corporation  
 Argo West Morrison Creek

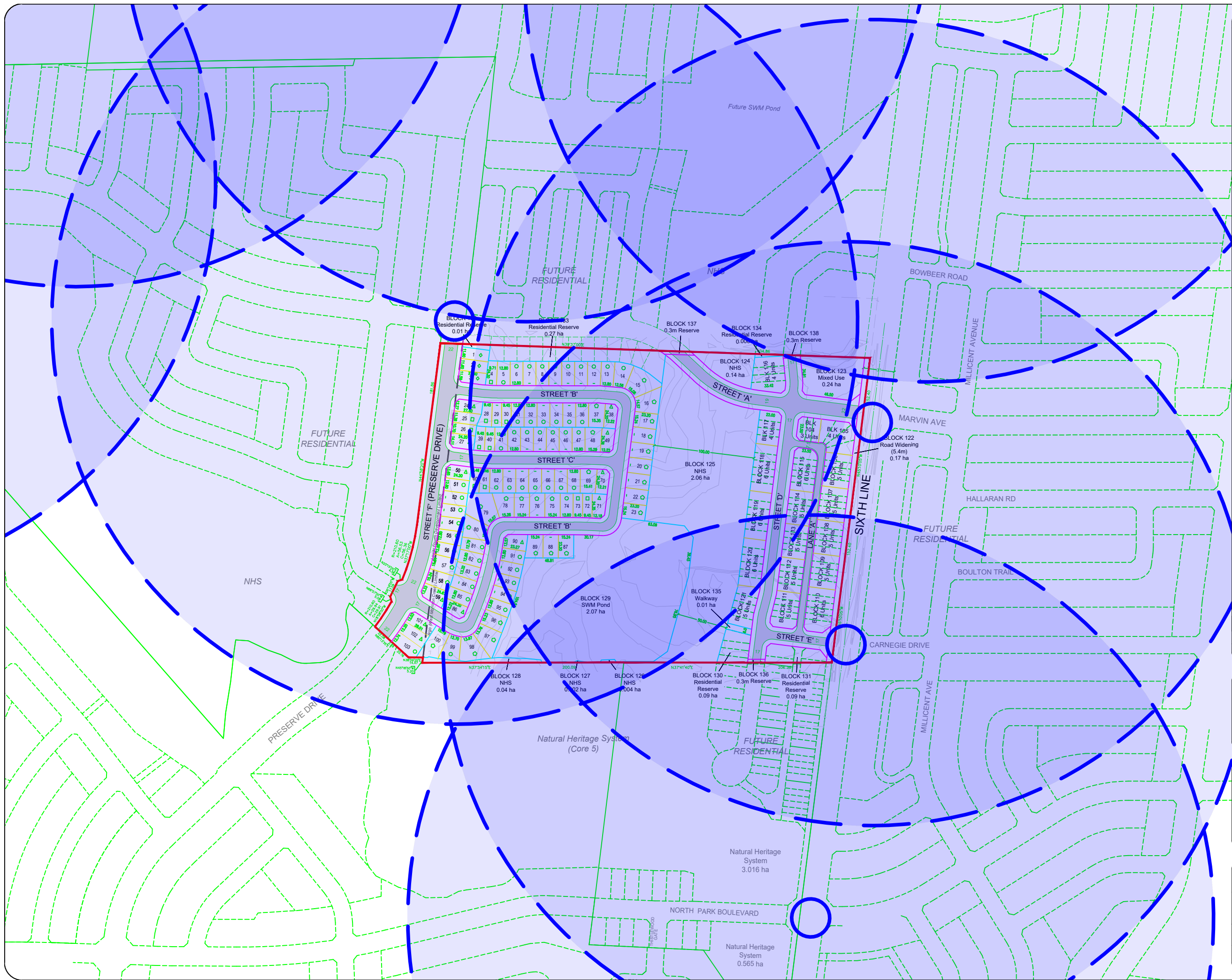
**ARCHITECT:**

**SITE:** Neighbourhood 9/10

**TITLE:** Cycling Facilities  
 Concept Plan

<b>SCALE AT A3:</b> NTS	<b>DATE:</b> 2022-02-11	<b>DRAWN:</b> MC	<b>CHECKED:</b>
<b>PROJECT NO:</b> 2019-78	<b>DRAWING NO:</b> 003	<b>REVISION:</b>	





Notes:

LEGEND:

- 400m Transit Walking Distance

REV:	DESCRIPTION:	BY:	DATE:
A	description	by	xx/xx/xx

STATUS: status



**CGH Transportation**  
 628 Haines Road  
 Newmarket, ON  
 L3Y 6V5  
 (905) 251-4070

CLIENT: Argo Development Corporation  
 West Morrison Creek

ARCHITECT:

SITE: Neighbourhood 9/10

TITLE: Transit Facilities  
 Concept Plan

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2022-02-11	MC	
PROJECT NO:	DRAWING NO:	REVISION:	
2019-78	001		

# Attachment 8

Proposed Cross-Sections – North Oakville Urban Design and Open Space Guidelines

### 5.2.2. Avenue/Transit Corridor

Between the Arterial/Transit Corridors, the Avenue/Transit Corridors provide a finer grid of connection within and between neighbourhoods. These connections provide alternative routes for access to Neighbourhood Centres and serve to disperse traffic on a smaller street section.

Avenue/Transit Corridors serve mainly intermediate volumes of intra-neighbourhood/district travel, accommodate local transit, connect Urban Centres Areas and serve as a major internal connector for Urban Core Areas.

The treatment of the boulevard will reflect adjacent land use and whether on-street parking is provided.

Specific technical details of the cross-section (i.e. plant material, soil type, engineering standards) will be determined through the appropriate design review process.

#### Transit Supportive Uses

Transit supportive land uses are to be encouraged along the right-of-way, such as:

- Walk-up apartments;
- Townhouses; and,
- Small-lot detached homes.

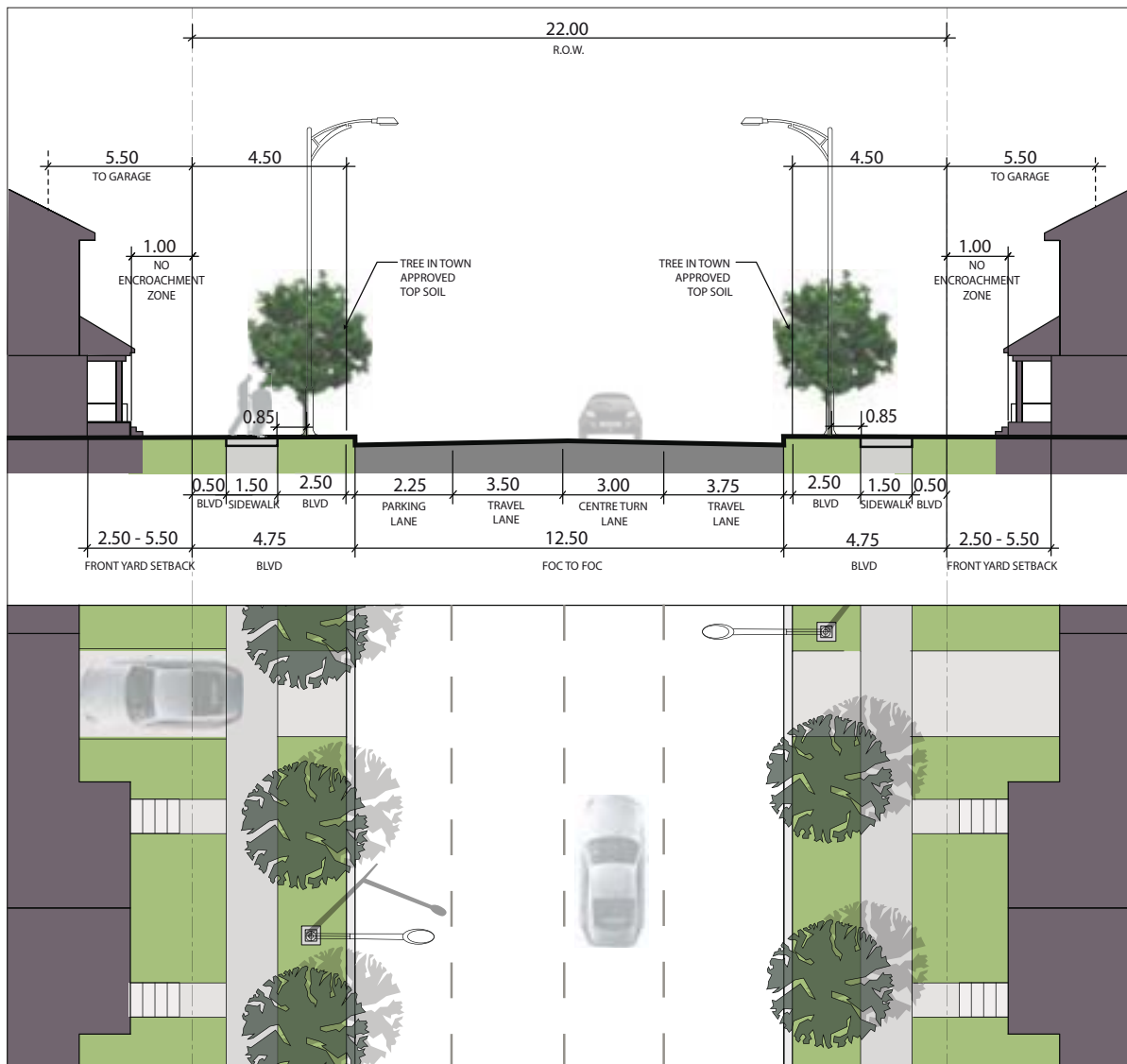


Figure 5.4: Typical Avenue/Transit Corridor section through the General Urban and Sub Urban Design. Street tree height at maturity will vary according to species and the availability of optimum growing conditions (i.e. adequate water, sunlight, soil volume), the protection from compacted soils, salt spray, mechanical damage, pests, and maintenance programs. Please refer to tree habitat design guidelines found in Table 9 of Oakville's Urban Forest: Our Solution to Our Pollution (2006).



### 5.2.3. Connector/Transit Corridor

Connector/Transit Corridors should be designed to serve relatively low volumes of intra-neighbourhood travel, accommodate local transit service and distribute traffic to and from Major and Minor Arterial/Transit Corridors and Avenue/Transit Corridors.

The treatment of the boulevard will reflect adjacent land use and whether on-street parking is provided.

Specific technical details of the cross-section (i.e. plant material, soil type, engineering standards) will be determined through the appropriate design review process.

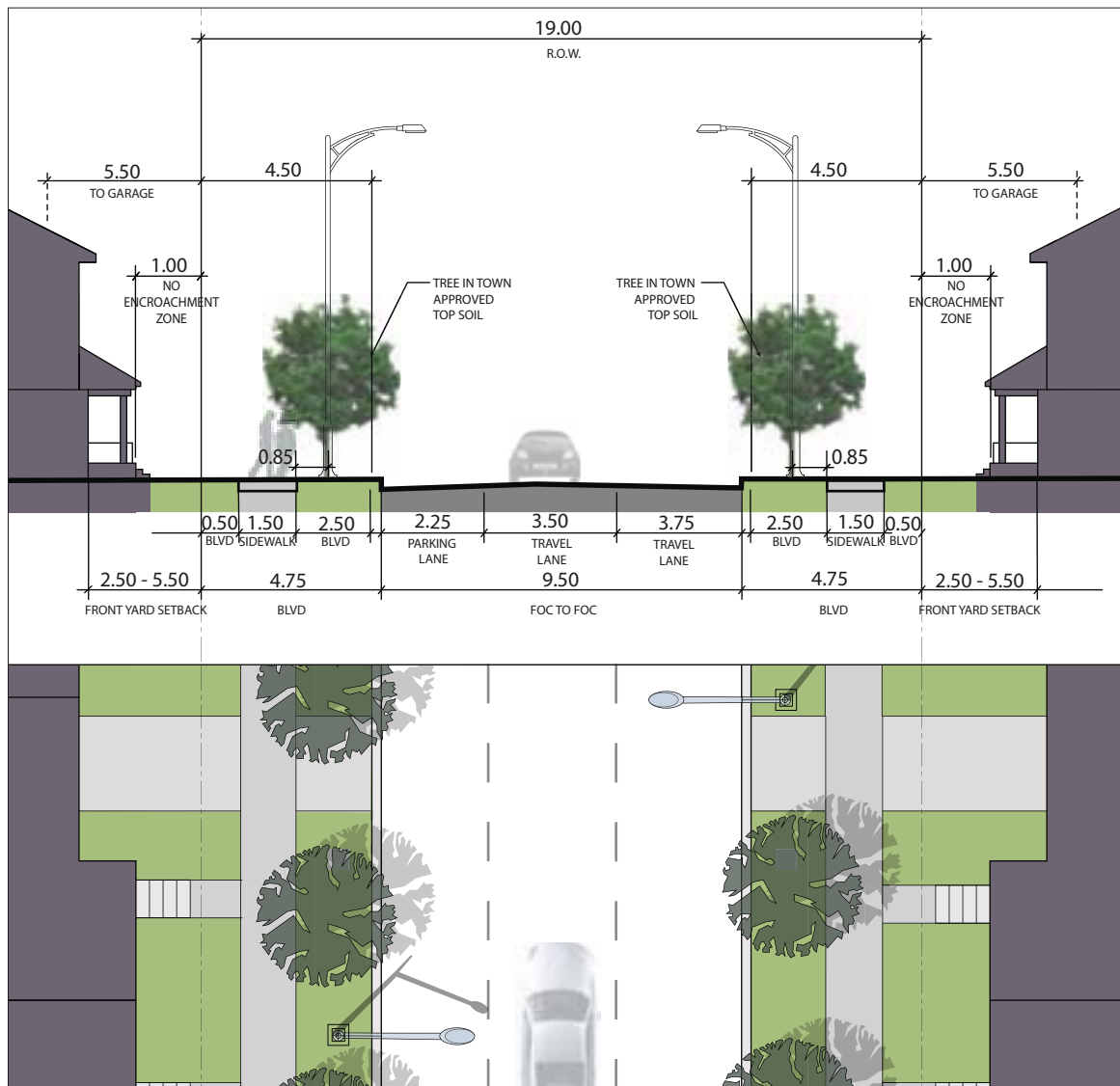


Figure 5.5: Typical Connector/Transit Corridor section through the General Urban and Sub Urban Designation. Street tree height at maturity will vary according to species and the availability of optimum growing conditions (i.e. adequate water, sunlight, soil volume), the protection from compacted soils, salt spray, mechanical damage, pests, and maintenance programs. Please refer to tree habitat design guidelines found in Table 9 of Oakville's Urban Forest: Our Solution to Our Pollution (2006).

### 5.2.4. Local Road

Local Roads will be designed to provide access to individual properties and serve internal residential neighbourhood, Core Area or Employment District travel demands. Local Roads will also connect individual properties to other Local Roads, Avenue/ Transit Corridors or Connector/Transit Corridors.

The treatment of the boulevard will reflect adjacent land use and whether on-street parking is provided.

Specific technical details of the cross-section (i.e. plant material, soil type, engineering standards) will be determined through the appropriate design review process.

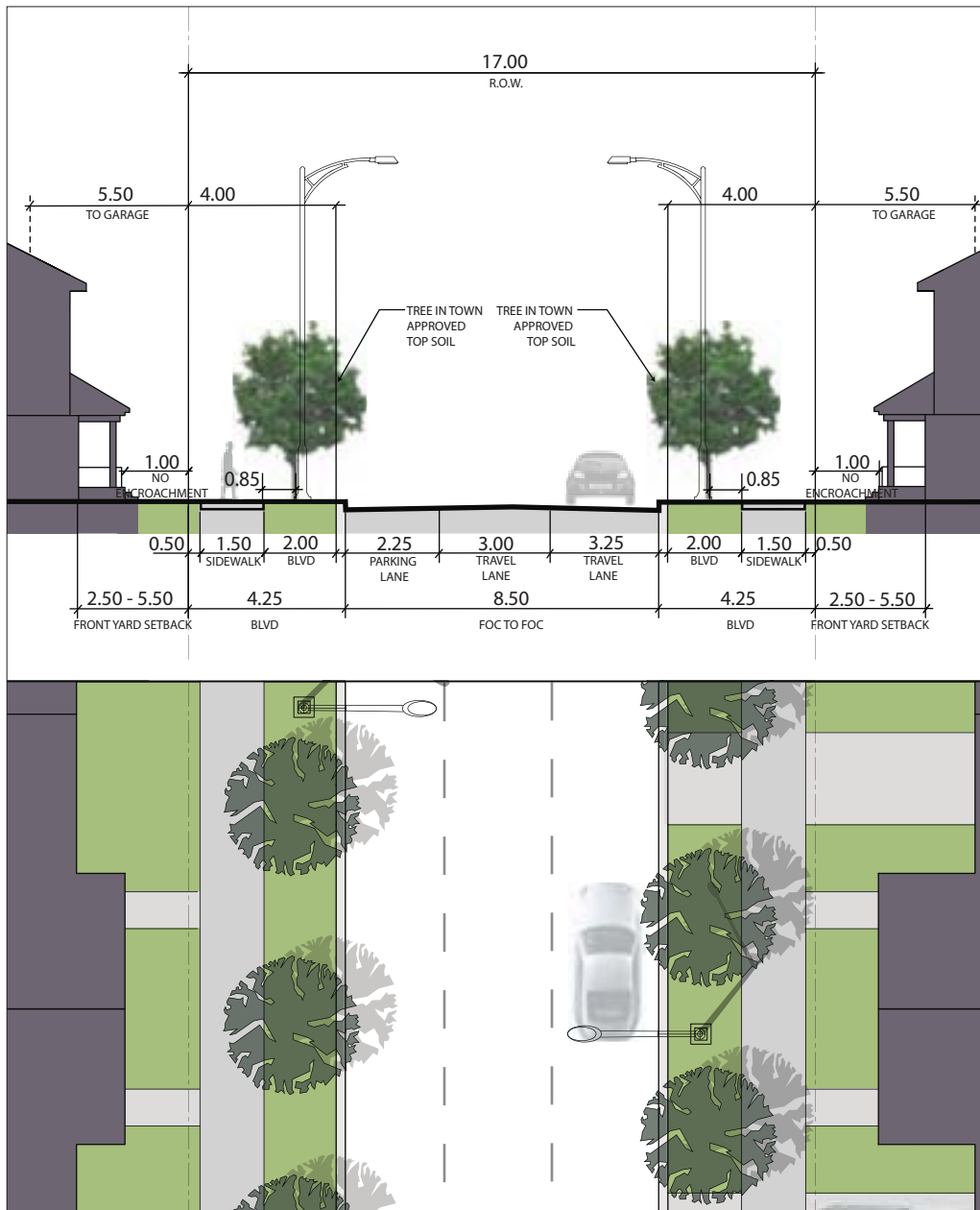


Figure 5.6: Typical Local Road section through the General Urban and Sub Urban Designation. Street tree height at maturity will vary according to species and the availability of optimum growing conditions (i.e. adequate water, sunlight, soil volume), the protection from compacted soils, salt spray, mechanical damage, pests, and maintenance programs. Please refer to tree habitat design guidelines found in Table 9 of Oakville's Urban Forest: Our Solution to Our Pollution (2006).

## Laneway

Typical roadway cross-sections for the 11.0m laneway right-of way includes:

- Sidewalks on one side of the laneway;
- One lane in each direction;
- Buffer setback on both sides - may include small stature/narrow crown street tree and foundation planting;
- Street tree species shall adhere to approved Town of Oakville specifications;
- All planting shall be in accordance with the North Oakville Urban Forestry Strategic Management Plan.
- Street light poles and luminaires shall reflect approved Town standards, complementary to the surrounding communities.

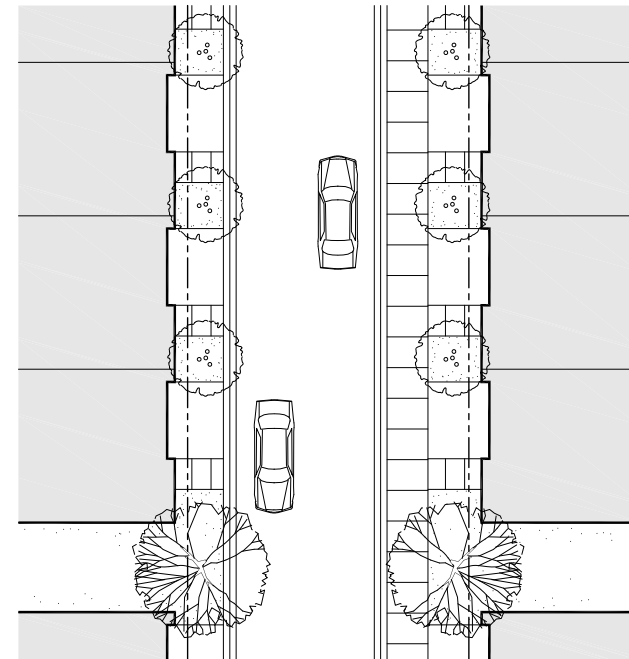
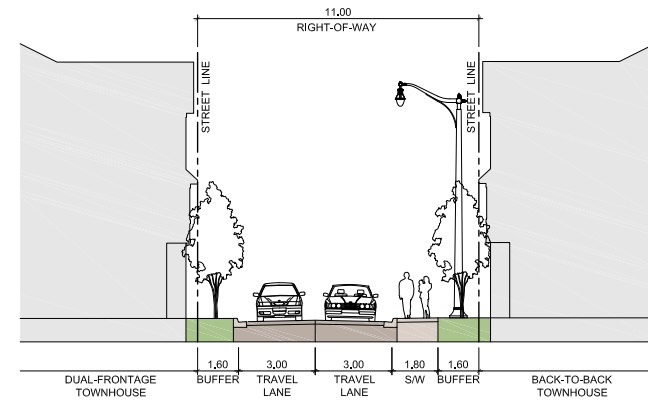


Figure 6.3.1d - Laneway - 11.0m R.O.W. / 2 travel lanes / sidewalk on one side / buffer on both sides