2121191 Ontario Inc. & LM Barrie Holdings Inc.

City of Barrie

Draft Plan of Subdivision

FUNCTIONAL DESIGN REVIEW

17092/200 February 2017

LEA Consulting Ltd.
Consulting Engineers & Planners
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February 17, 2017 Our Ref.: 17092/200

Eric Lawton
67 Barre Drive,
Barrie, ON
L4N 7P1

Dear Mr. Lawton:

Re: Functional Design Review
Draft Plan of Subdivisions, 2121191 Ontario Inc. & LM Barrie Holdings Inc.
City of Barrie

LEA Consulting Ltd. is pleased to present the findings of our Functional Design Review for the proposed draft plan of subdivisions for the 2121191 Ontario Inc. & LM Barrie Holdings Inc**.** Lands located in the City of Barrie.

Should you have any question regarding this Functional Design Review, please do not hesitate to contact the undersigned.

Yours very truly,

LEA Consulting Ltd.

Kenneth Chan, P.Eng., PTOE
Manager, Transportation Engineering

Jillian Britto, B.A.Sc., EIT
Transportation EIT

:jb/ls

Encl.: Functional Design Review – 2121191 Ontario Inc. & LM Barrie Holdings Inc**.**

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1 INTRODUCTION

LEA Consulting Ltd. (LEA) was retained by LM Barrie Holdings Inc. and 2121191 Ontario Inc. to conduct a Functional Design Review for the proposed lands (herein referred to as the "LM Barrie & 2121191 Lands") located within the Hewitt Secondary Plan Area in the City of Barrie (herein referred to as the "City"). The LM Barrie & 2121191 Lands, which are currently vacant, are located on the north side of Mapleview Drive between Yonge Street and 20th Sideroad, as illustrated in **Figure 1-1**. The lands are bounded by Mapleview Drive to the south, residential developments to the west and vacant lands to the east and north.

Figure 1-1: Site Context

The proposal for the lands includes a residential development with a mix of single-detached, semi-detached, street townhouse and mixed-use medium density units, with the main accesses provided through Street 'A' which is proposed to span between Big Bay Point Road and Mapleview Drive. An additional access will be provided through Street H, which is proposed to be located between Street 'A' and Prince William Way on Mapleview Drive. **Figure 1-2** illustrates the LM Barrie & 2121191 Lands with respect to the Hewitt 2031 Development Plan.

200 0 200 400M

SCALE = 1:5000 (AO)

A. BEMP HOLDINGS 1 INC.
B. BEMP HOLDINGS 2 INC.
C. VAN DER HAYDEN
D. LOCKHART INNISIFIL INVESTMENTS LTD.
E. LOCKHART INNISIFIL INVESTMENTS (II) LTD.
F. LOCKMAPLE INNISFIL INVESTMENTS LTD.
G. MYRTLE BERNICE IRVING
H. RAINSONG LAND DEVELOPMENT INC.
I. CRISDAWN CONSTRUCTION INC. (WEST OF EP)
J. CRISDAWN CONSTRUCTION INC. (NORTH)
K. CRISDAWN CONSTRUCTION INC. (SOUTH)
L. 2303757 ONTARIO INC. (CAMPBELL)
M. 1091369 ONTARIO INC. (BULUT)
N. FINGER LAKES ESTATES INC.
O. 1597229 ONTARIO INC. (BLUE SKY NORTH)
P. 1597229 ONTARIO INC. (BLUE SKY EAST)
Q. 2121191 ONTARIO INC. (LM BARRIE)
R. SOBEY'S
S. DORSEY DEVELOPMENT
AA. MIELE DEVELOPMENTS INC.
Y. MAPLEVIEW SOUTH (INNISFIL) LTD.
Z. 961 BIG BAY LTD

2031 DEVELOPMENT PLAN

JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS

Date Issued:	November 18, 2016
Checked By:	RD
Project No.:	EAS-11118
Drawn By:	rr.c.r.
Drawing Name:	EAS-11118-DevPlan-16-11-18.dwg

Phase 1-3 Participating Landowner Unit Counts/Estimates

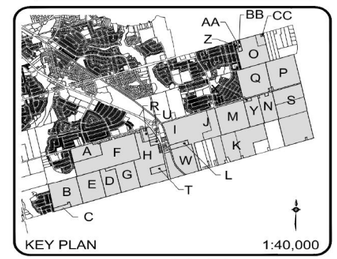
Map ID	Ownership Map #	Land Owner	Total Area (ha.)	Developable Area within Phase 1 COB Sec Plan	Total Area within 2031 Boundary (ha.)	Total Developable (ha.)	Developable Area within 2031 Boundary (2031) ha.	Phase 1	Phase 2	Phase 3	Phase 4	Total	Estimated Occupancy 2019	Estimated Occupancy 2020	Estimated Occupancy 2021	Estimated Occupancy 2022	Estimated Occupancy 2023
A	51	BEMP Hodings 1 Inc.	36.59	0.00	36.59	23.40	23.40	0	375	0	0	375					
B	53	BEMP Hodings 2 Inc.	19.44	19.44	19.44	19.44	19.44	535	0	0	0	535	218	80			
C	52	Van der Hayden	3.17	0.00	3.17	3.17	3.17	0	52.5	0	0	52.5					
D	56 & 58	Lockhart Innisfil Investments Ltd.	19.73	0.00	19.73	15.44	15.44	0	187	0	0	187					
E	55	Lockhart Innisfil Investments Ltd. II	32.19	0.00	32.19	19.65	19.65	0	402.5	0	0	402.5					
F	54, 57 & 60	Lockmaple Innisfil Investments Ltd.	65.56	58.57	65.56	58.57	58.57	1163.5	0	0	0	1163.5	200	181			
G*	59	Myrtle Bernice Irving	27.93	0.00	27.93	27.93	27.93	0	698.25	0	0	698.25					
H(a)	61	Rainsong Land Development Inc.	15.49	15.49	50.19	50.19	50.19	399	0	0	0	399	200	180			
H(b)	61	Rainsong Land Development Inc.	34.70	10.68	34.70	34.70	34.70	0	362.5	0	0	362.5					
I	63	Crisdawn Construction Inc.	122.40	18.43	122.40	97.16	97.16	868	0	0	0	868					
J	67 & 68	Crisdawn Construction Inc.		35.76				839	0	0	0	839	492	360			
K	74, 75 & 79	Crisdawn Construction Inc.		3.96				2.5	0	548.5	0	551					
L	64	2303757 Ontario Inc. (Campbell)	4.29	4.29	4.29	3.53	3.53	52	0	0	0	52	26	27			
M	73	1091369 Ontario Inc.	39.83	38.27	39.83	38.27	38.27	525	0	0	0	525	200	109			
N(a)*	77	Finger Lakes Estates Inc.	4.11	1.11	4.11	4.11	4.11	44.4	0	120	0	164.4					
N(b)*	77	Finger Lakes Estates Inc.	15.23	0.00	15.23	11.81	11.81	0	0	295.25	0	295.25					
O	84	1597229 Ontario Inc.	38.47	31.76	39.10	32.39	32.39	601	0	0	0	601	200	180			
P	86	1597229 Ontario Inc.	41.07	8.38	21.17	38.86	19.94	137.5	0	211.5	0	349					
Q	85	2121191 / LM Barrie	41.53	36.11	36.13	41.48	41.48	799.5	0	33	0	832.5	200	123			
R	87	Sobey's	8.18	8.18	8.18	8.18	8.18	0	0	0	0	0					
S	81, 82, & 83	Dorsey Development	80.23	0	0.00	51.88	0.00	0	0	0	267.5	267.5					
AA	88	Miele Developments Inc.	1.79	1.79	1.79	1.79	1.79	36				36					
Y*	89	Mapleview South (Innisfil) Ltd.	18.95	14.62	18.95	14.62	14.62	365				365	50	90			
Z	90	961 Big Bay Ltd	0.64	0.64	0.64	0.64	0.64	14				14	14				
	Total		**651.81**	**361.75**	**587.05**	**562.72**	**511.05**	**6381**	**2078**	**1208**	**268**	**9935**	1800	1330	1450	1350	1300

Phase 1-3 Non-Participating Landowner Unit Counts/Estimates

Map ID	Ownership Map #	Total Area (ha.)	Developable Area within Phase 1 COB Sec Plan	Total Area within 2031 Boundary (ha.)	Total Developable (ha.)	Phase 1	Phase 2	Phase 3	Phase 4	Total
T*	T	4.77	0.00	4.77	4.77	0	238.5	0	0	238.5
U*	U	3.84	3.84	3.84	3.84	192	0	0	0	192
V*	V	11.10	0.00	11.10	11.10	0	555	0	0	555
W*	W	26.18	2.21	26.18	10.44	55.25	0	987.6	0	1042.85
X	X	1.01	1.01	1.01	1.01	0	0	0	0	0
BB	BB	0.26	0.26	0.26	0.26	6	0	0	0	6
CC	CC	0.40	0.40	0.40	0.40	6	0	0	0	6
	Total	**47.56**	**7.72**	**47.56**	**31.82**	**259.25**	**793.5**	**987.6**	**0**	**2040.35**

Subject Lands
City of Barrie Secondary Plan 2031 Boundary
Natural Heritage System including Buffer
Phase 1-3 Non-Participating Landowners
Phase Line and Number
Phase 1 Properties Expected to Immediately Proceed
* Unit Count is an estimate only based on Secondary Plan Density permissions

Hewitt's Secondary Plan
Overall Development Plan



KEY PLAN 1:40,000

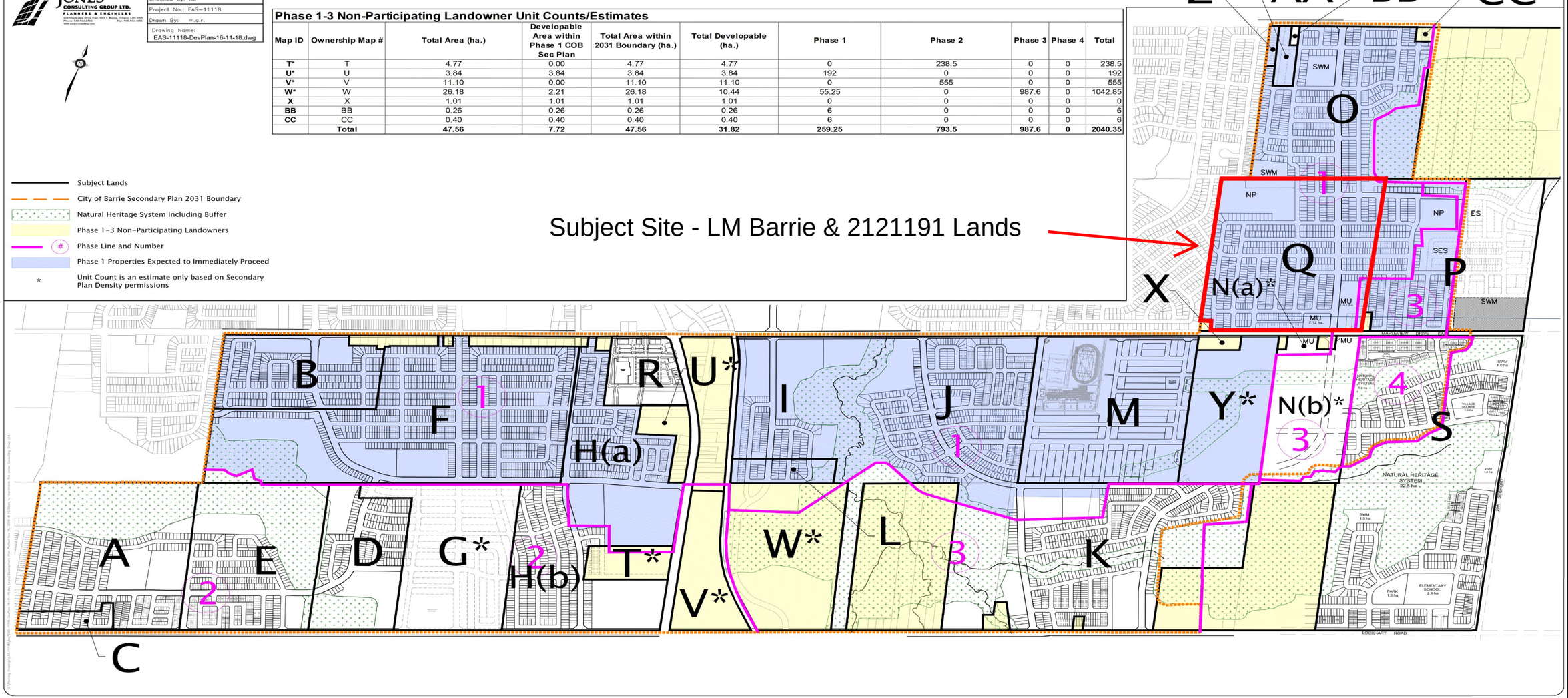


Figure 1-2
Subject Site Location within the Hewitt Secondary Plan Area
LM Barrie Holdings Inc. & 2121191 Ontario Inc. - Functional Design Review

*Not to scale

LEA has completed a Master Transportation Study (herein referred to as the "Hewitt Study") for the entire Hewitt development, which included the LM Barrie & 2121191 Lands. The Hewitt Study included the evaluation of the Hewitt development for the following two horizon years:

- Interim horizon (2020), which analysed the traffic impacts of the partial development of the Hewitt Lands prior to the opening of the Harvie Road / Big Bay Point overpass at Highway 400; and
- Ultimate horizon (2031), which analysed the traffic impacts associated with the full build-out of the Hewitt Lands.

Analysis of the Ultimate horizon within the Hewitt Study accounted for all City-proposed roadway improvement projects and provided the recommended intersection improvements required to accommodate the full build-out of the Hewitt Lands.

This Functional Design Review report is supplemental to the Hewitt Study with a focus on the proposed LM Barrie & 2121191 development, which is expected to be developed within Phase 1 of the entire Hewitt development. The completion of Phase 1 of the Hewitt development falls in-between the two analyzed horizons, 2020 and 2031. Therefore, the results and recommendations presented in this report correspond to that proposed for the Ultimate horizon in the Hewitt Study in order to maintain consistency and develop the lands for the full build-out of the Hewitt Lands.

This report will focus on the following objectives:

- Provide a description of the existing conditions within the vicinity of the LM Barrie & 2121191 Lands;
- Determine site traffic generated by the proposed development, which is expected to be developed within Phase 1 of the entire Hewitt development; and
- Provide the results of the traffic assessment, recommended lane configurations, intersection controls, and recommended dimensions of any required turning lanes of the LM Barrie & 2121191 Lands site accesses based on the analysis conducted for the Ultimate horizon in the Hewitt Study.

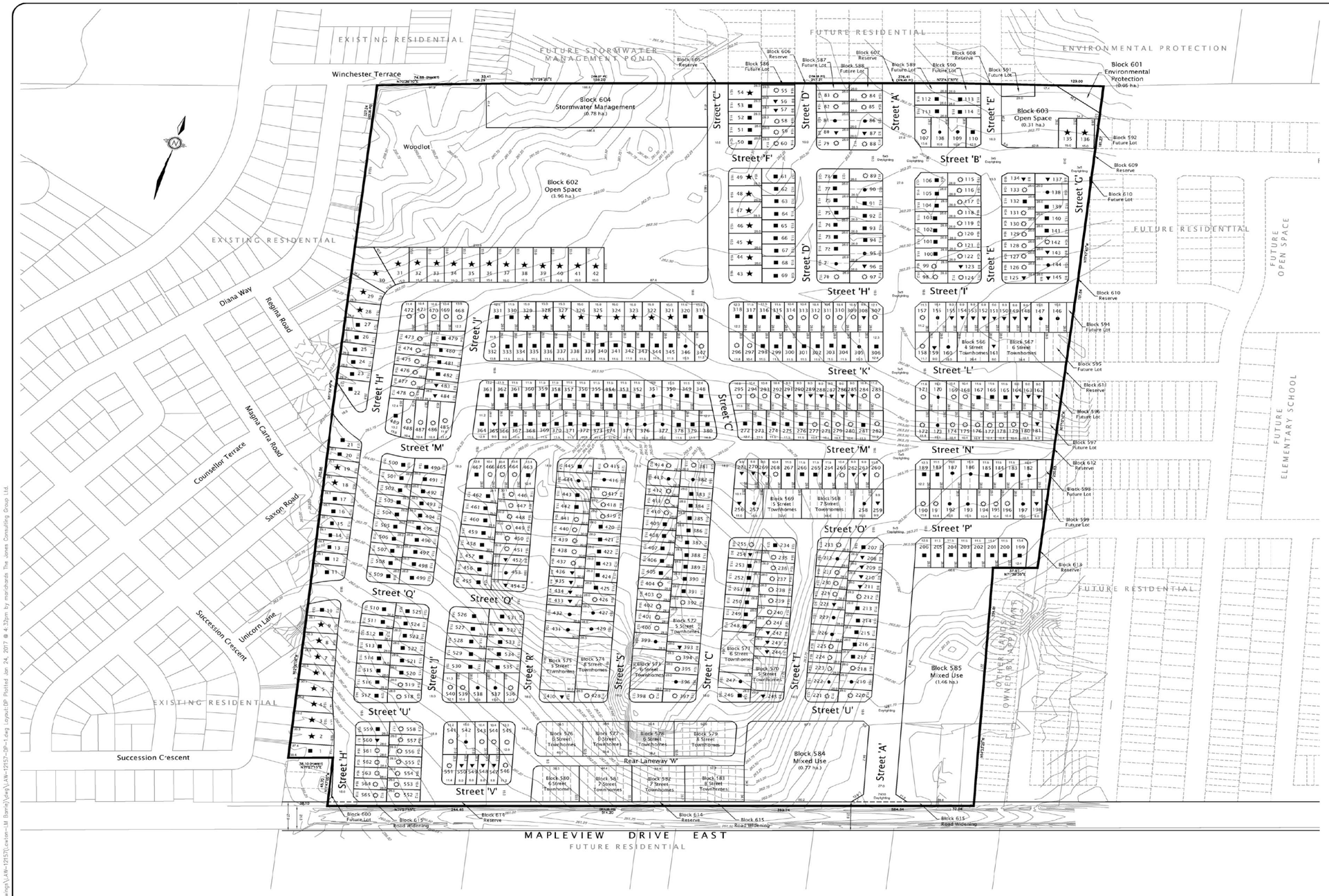
1.1 PROPOSED DEVELOPMENT

The proposal for the lands is to develop the area into a residential development with single-detached, semi-detached, street townhouse and mixed-use medium density units. The main accesses are provided through Street A which is proposed to span between Big Bay Point Road and Mapleview Drive, and Street H, which is proposed to be located between Street A and Prince William Way on Mapleview Drive. A summary of the site statistics for the LM Barrie & 2121191 Lands, which is to be developed within Phase 1 of the entire Hewitt development, is provided in **Table 1-1** .

Land Use	Phase 1
Single-Detached Units	515
Semi-Detached Units	100
Street Townhouse Units	60
Mixed-Use Medium Density Units	121
Total Residential Units	**796**

Table 1-1: LM Barrie & 2121191 Lands Development Phase 1 Site Statistics

The proposed draft plan for the LM Barrie & 2121191 Lands is illustrated in **Figure 1-3** .



Draft Plan of Subdivision
Part of Lot 19, Concession 12
City of Barrie
2016

OWNER'S CERTIFICATE

I, THE UNDERSIGNED, BEING THE REGISTERED OWNER OF THE SUBJECT LANDS, HEREBY AUTHORIZE THE JONES CONSULTING GROUP LTD., TO PREPARE THIS DRAFT PLAN OF SUBDIVISION AND TO SUBMIT SAME TO THE CITY OF BARRIE FOR APPROVAL.

DATE _____ OWNER _____

SURVEYOR'S CERTIFICATE

I CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AND THEIR RELATIONSHIP TO ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

DATE _____ RUDY MAK, O.L.S.
ONTARIO LAND SURVEYORS

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

a) SHOWN ON DRAFT PLAN
b) SHOWN ON DRAFT PLAN
c) SHOWN ON KEY PLAN
d) RESIDENTIAL, SWM, EP MIXED USE, OPEN SPACE
e) SHOWN ON DRAFT PLAN
f) SHOWN ON DRAFT PLAN
g) SHOWN ON DRAFT PLAN
h) MUNICIPAL PIPED WATER TO BE PROVIDED
i) SANDY CLAY LOAM
j) SHOWN ON DRAFT PLAN
k) ALL MUNICIPAL SERVICES TO BE PROVIDED
l) SHOWN ON DRAFT PLAN

STATISTICS

RESIDENTIAL LOT BREAKDOWN

★ 15.0m SINGLES		44 units
■ 11.5m SINGLES		235 units
○ 10.36m SINGLES		168 units
▼ 9.0m SINGLES		68 units
● SEMI DETACHED UNITS (LOTS 1 - 565)		100 units
SUB TOTAL	18.93 ha.	615 units
STREET TOWNHOMES (6.0m) (BLOCKS 566 - 575)	1.09 ha.	60 units
MIXED USE (BLOCKS 576 - 585)	3.39 ha.	121 units
FUTURE LOTS (BLOCKS 586 - 600)	0.33 ha.	
ENVIRONMENTAL PROTECTION (BLOCK 601)	0.05 ha.	
OPEN SPACE (BLOCKS 602 & 603)	4.27 ha.	
STORM WATER MANAGEMENT (BLOCK 604)	0.78 ha.	
RESERVES (BLOCKS 605 - 614)	0.02 ha.	
WIDENING (BLOCK 615)	0.20 ha.	
ROADS (MAJOR COLLECTOR: STREET 'A') (MINOR COLLECTOR: STREET 'B') (LOCAL STREETS 'C' - 'V') (REAR LANEWAY 'W')	11.76 ha.	
TOTAL	40.81 ha.	796 units

50 0 30 60 90 120 150 METRES
SCALE = 1:1500 (A1)

LM BARRIE
DRAFT PLAN OF SUBDIVISION

Raymond J. Duhamel REGISTERED PROFESSIONAL PLANNER R.P.P.

Date Issued:	JAN 24, 2016
Checked By:	RD
Project No.:	LAW-12157
Drawn By:	m.c.r.
Drawing Name:	LAW-12157-DP-1.dwg

JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS
220 Maplerview Drive East, Unit 1, Barrie, Ontario, L4N 0W5
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www.jonesconsulting.com

G:\Planning Drawings\LAW-12157\Layout-LM Barrie\Dwg\LAW-12157-DP-1.dwg Layout:DP Plotted: Jan 24, 2017 @ 4:32pm by mrohrbeck The Jones Consulting Group Ltd.

Figure 1-3
LM Barrie & 2121191 Draft Plan of Subdivision
LM Barrie Holdings Inc. & 2121191 Ontario Inc. - Functional Design Review

*Not to scale

2 EXISTING CONDITIONS

The following section describes the existing major roadways and transit services within the vicinity of the LM Barrie & 2121191 Lands.

2.1 ROAD NETWORK

The major roadways within the vicinity of the site are described below, with lane configurations illustrated in **Figure 2-1**.

Mapleview Drive – an east-west major arterial roadway under the jurisdiction of the City between County Road 27 and 20th Sideroad. This road provides direct access to Highway 400 and the Park Place shopping centre. Mapleview Drive currently operates with a seven-lane cross-section between Veteran's Drive and Huronia Road, and a two-lane cross-section between Huronia Road and 20th Sideroad (within the vicinity of the site). Mapleview Drive has a posted speed limit of 60km/h within the study area.

Big Bay Point Road – an east-west major arterial roadway under the jurisdiction of the City of Barrie between Fairview Road (located slightly east of Highway 400) and 20th Sideroad. Big Bay Point Road begins east of Highway 400; west of Highway 400 it becomes Harvie Road. The two roadways are currently not connected to each other. Big Bay Point Road currently operates with a two-lane cross-section from Fairview Road to Huronia Road, a five-lane cross-section between Huronia Road and Prince William Way, and a two-lane cross-section east of Prince William Way to 20th Sideroad. Big Bay Point Road has a posted speed limit of 50km/h within the study area.

Yonge Street – a north-south major arterial roadway under the jurisdiction of the City between Garden Drive and 10th Line/Victoria Street. Yonge Street currently operates with a five-lane cross-section between Garden Drive and Mapleview Drive, and a two-lane cross-section south of Mapleview Drive. Yonge Street has a posted speed limit of 50 km/h north of Mapleview Drive and 60 km/h south of Mapleview Drive.

20th Sideroad – a north-south arterial roadway under the City's jurisdiction from Big Bay Point Road to Lockhart Road, where it then falls under the County's jurisdiction. 20th Sideroad operates with a two-lane cross-section with a posted speed limit of 80km/h.

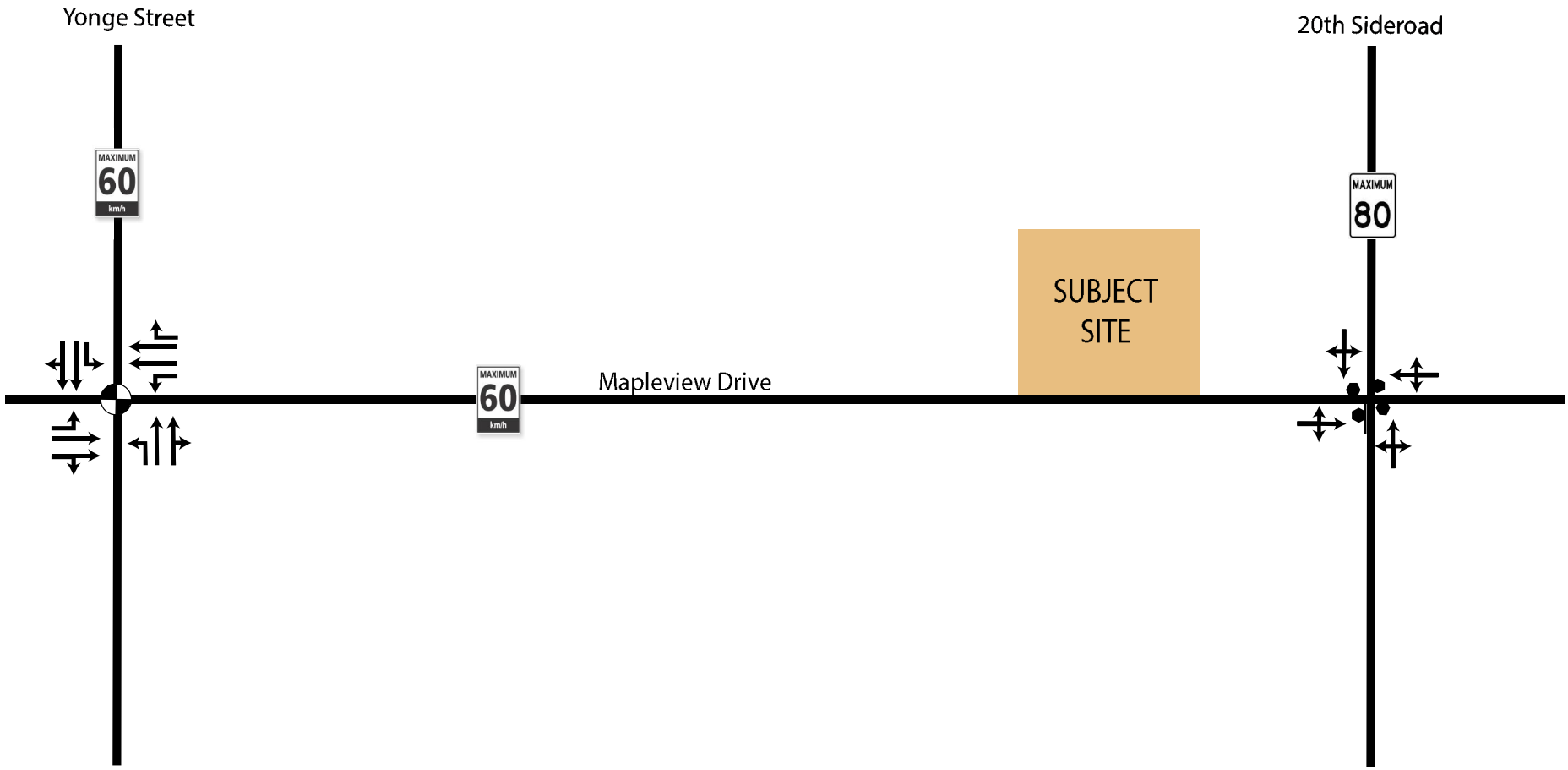


Figure 2-1
Existing Road Network and Lane Configurations
LM Barrie Holdings Inc. & 2121191 Ontario Inc. - Functional Design Review

2.2 TRANSIT NETWORK

The LM Barrie & 2121191 Lands are serviced by bus routes operated by Barrie Transit and the site is approximately 2,300 meters east of the Barrie South GO Station. The existing transit network nearest to the LM Barrie & 2121191 Lands is outlined below and illustrated in **Figure 2-2**.

Barrie Transit

8A RVH/Yonge (Northbound) / 8B Crosstown/Essa (Southbound) bus routes operate in a circle encompassing the area of Livingstone Street West in the north, Essa Road in the west, Mapleview Drive in the south and Yonge Street in the east. The major stops along this route include Georgian College, Georgian Mall, Barrie Fairgrounds Park Place and the Barrie South GO Station. The 8A and 8B bus routes operate at 30 minute frequencies during weekday morning and afternoon peak travel periods.

3A Georgian (Northbound) / 3B Painswick (Southbound) bus routes operate between Georgian College, the Royal Victoria Hospital and Barrie South GO Station, generally in a north-south direction. The major stops along this route include Park Place, Allendale Recreation Centre, the Downtown Barrie Bus Terminal and Painswick Library. The 3A and 3B bus routes operate at 30 minute frequencies during weekday morning and afternoon peak travel periods.

4A East Bayfield (Northbound) / 4B South GO (Southbound) bus routes operate between the Georgian Mall and Barrie South GO Station, generally in a north-south direction. The major stops along this route include Painswick Library, Allendale Waterfront GO Station, the Downtown Barrie Bus Terminal and Bayfield Mall. The 4A and 4B bus routes operate at 35 minute frequencies during weekday morning and afternoon peak travel periods.

GO Transit

As mentioned above, the LM Barrie & 2121191 Lands are located approximately 2,300 meters east of the Barrie South GO Station. This station is serviced by the following GO buses and trains:

Bus Route 68 operates from Barrie to Newmarket with a connecting service at Newmarket, Route 65, travelling to Union Station. This route operates with 30 minute headways travelling southbound and hourly headways travelling northbound during the morning peak period, and the opposite frequencies during the afternoon peak period. This bus route also operates during the weekends with hourly frequencies.

The **Barrie Train Line** operates between Union Station in Toronto to Barrie South and Allandale Waterfront GO Stations in Barrie. There are currently five train departures in the morning travelling towards Union Station and seven train departures travelling towards Barrie during afternoon peak period. All trains services operate with approximately 30 minute headways. This route operates during the weekends with three southbound trains departing in the morning and three northbound trains arriving in the night on both days.

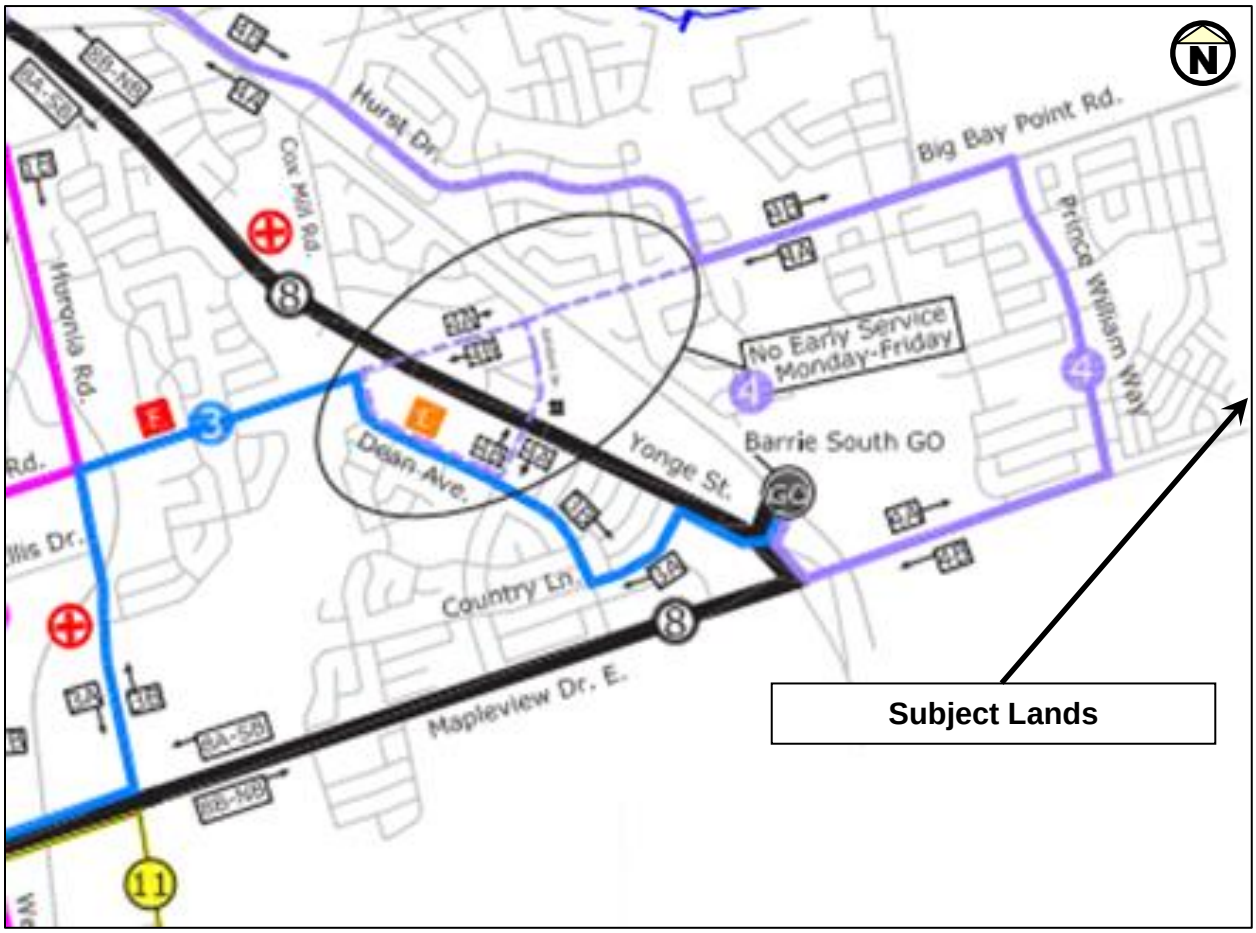


Figure 2-2: Existing Transit Services

3 SITE TRAFFIC GENERATION AND DISTRIBUTION

The proposal for the LM Barrie & 2121191 Lands is to develop the area into a residential development with 515 single-detached, 100 semi-detached, 60 street townhouse and 121 mixed-use medium density units.

Trip generation for the proposed development was based on the trip rates obtained from a proxy site survey of the residential development located along Prince William Way between Mapleview Drive and Big Bay Point Road, which is illustrated in **Figure 3-1**.

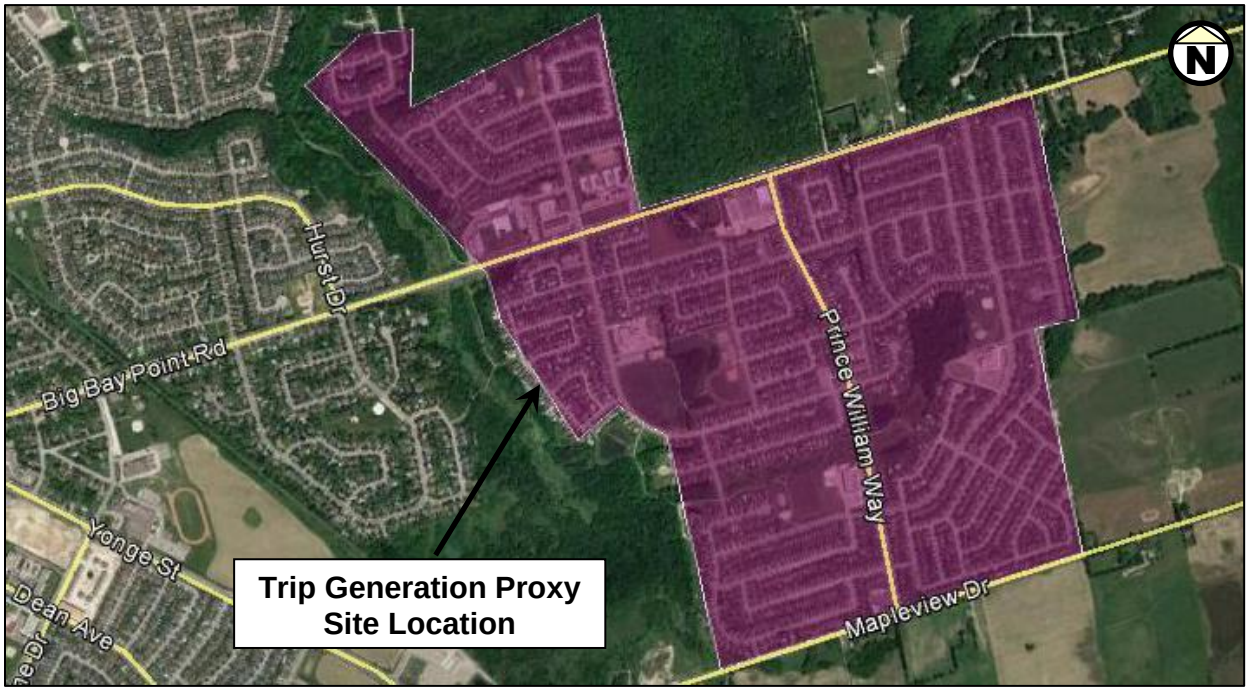


Figure 3-1: Trip Generation Proxy Site Survey Location

Due to the uncertainty of the type of land use contained within the mixed-use buildings, at this time we expect it to be a small retail component servicing the immediate residential community. As such, we expect majority of the retail trips to be internal trips, with a minimal impact on the external road network. Therefore, only residential trips associated with the mixed-use buildings were included in our analysis.

The site traffic generated by the residential component of the proposed LM Barrie & 2121191 development is summarized in **Table 3-1**.

Land Use		AM Peak Hour			PM Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Residential (796 units)	Proxy Site Trip Rate	0.14	0.34	0.48	0.41	0.25	0.66
	LM Barrie & 2121191 Lands Site Trips	111	271	382	326	199	525

Table 3-1: Trip Generation Summary – LM Barrie & 2121191 Lands Site Traffic

The proposed development is expected to generate 382 two-way trips (111 in, 271 out) in the AM peak hour and 525 two-way trips (326 in, 199 out) in the PM peak hour by the end of Phase 1 of the entire Hewitt development.

It should be noted the above-mentioned site traffic is only a component of the trips accounted for in the analysis of the Ultimate horizon within the Hewitt Study.

The City's macroscopic EMME travel demand forecast model was utilized for the distribution of the site generated trips. A detailed discussion of the trip generation and distribution methodologies is included in the Hewitt Master Transportation Study.

4 TRAFFIC ASSESSMENT

The Hewitt Master Transportation Study evaluated the external roadway network for an interim horizon (2020) prior to the opening of the Harvie Road / Big Bay Point Road Highway 400 overpass and an ultimate horizon (2031) corresponding with the full build-out of the Hewitt development. The analysis included the following components for each horizon year:

- The mesoscopic level analysis – Aimsun Modeling Software; and
- The microscopic level analysis – Synchro 8.0 Software.

The Aimsun Model was utilized as a large scale review of the entire Hewitt development with respect to the southern portion of Barrie and the northern portion of Innisfil, and as a screening tool to present the areas of constraint for detailed analyses using the Synchro software.

In addition to the detailed analyses for the identified constraint areas, the proposed Hewitt site accesses were also analyzed at the microscopic level to determine the required lane configuration and dimensions of any required turning lanes.

All analyses were conducted for the 2020 and 2031 horizon years. However, the completion of Phase 1 of the Hewitt development falls in-between 2020 and 2031. Therefore, the results and recommendations presented in this section will correspond to the 2031 horizon year to maintain consistency with the recommendations provided for the full build-out scenario in the Master Transportation Study.

4.1 SITE ACCESS INTERSECTION CAPACITY ANALYSES

As part of the Master Transportation Study, an intersection capacity analysis was completed focusing only on the site accesses of the Hewitt development under the Ultimate Horizon (2031) traffic conditions. While the results presented below are only for the intersections providing direct access to the BEMP II Lands, the analysis undertaken in the Hewitt Study under Ultimate traffic conditions includes the traffic generated from the entire Hewitt development.

It should be noted that the proposed site accesses were labeled Street '4' and Collector Road 11, whereas they are labeled Street 'H' and Street 'A', respectively, in the LM Barrie & 2121191 draft plan.

The results for the intersection capacity analysis at the proposed site access during the AM and PM peak hours are summarized in **Table 4-1** and **Table 4-2**, respectively. The tables only include the

movements of interest (movements with either a volume-to-capacity (V/C) ratio of 0.85 and higher or a level of service (LOS) of E and higher). The detailed synchro output sheets are provided in **Appendix A**.

Intersection	Movement of Interest	Future Total (2020) Site Accesses AM Peak Hour					
		Flow Rate (vph)	Capacity (vph)	Control Delay (s)	95th Queue (m)	V/C	LOS
Mapleview Drive & Street A	-	-	-	-	-	-	-
Mapleview Drive & Street H	-	-	-	-	-	-	-

Table 4-1: Ultimate Horizon (2031) Intersection Capacity Analysis –Site Accesses AM Peak Hour

Intersection	Movement of Interest	Future Total (2020) Site Accesses PM Peak Hour					
		Flow Rate (vph)	Capacity (vph)	Control Delay (s)	95th Queue (m)	V/C	LOS
Mapleview Drive & Street A	-	-	-	-	-	-	-
Mapleview Drive & Street H	-	-	-	-	-	-	-

Table 4-2: Ultimate Horizon (2031) Intersection Capacity Analysis –Site Accesses PM Peak Hour

The intersection capacity analysis results demonstrate that both the site accesses are expected to operate well under future traffic conditions during both the AM and PM peak hours.

4.2 RECOMMENDED LANE CONFIGURATIONS

The analysis presented in the section above and the corresponding results determined the most effective intersection control type and lane configuration at the proposed development site accesses (Street 'H' and Street 'A'), which are illustrated in **Figure 4-1**.

As illustrated in **Figure 4-1**, we recommend exclusive eastbound left-turn lanes at site accesses. It should be noted that a two-way-left-turn-lane is proposed along Mapleview Drive between Country Lane and the proposed Street 'A' as part of the City's roadway improvements to be implemented by 2031. However, Phase 1 of the Hewitt development, which includes the LM Barrie & 2121191 Lands, is to be constructed prior to 2031. Therefore, the proposed exclusive eastbound left-turn lane is recommended as part of our analysis.

The storage and taper lengths for the proposed exclusive turning lane are based on the results of the intersection capacity analyses and the Transportation Association of Canada (TAC) minimum requirements; the recommended storage and taper lengths are summarized in **Table 4-3**.

Intersection	Movement	95th Queue (m)		Design Speed (km/h)	Storage (m)	Taper (m)
		AM Peak Hour	PM Peak Hour			
Mapleview Drive & Street A	EBL	2	2	70	15	35
Mapleview Drive & Street H	EBL	2	2	70	15	35

Table 4-3: Recommended Storage and Taper Lengths

Shared westbound through-right lanes will provide sufficient capacity for traffic entering the site from the east at both site accesses. The recommended intersection design along with the storage and taper lengths for all the site accesses are illustrated in **Figure 4-2** and should be implemented during the detailed design of the subdivision. If additional right-of-way is required to accommodate these intersection requirements, modifications to the draft-plan will be required.

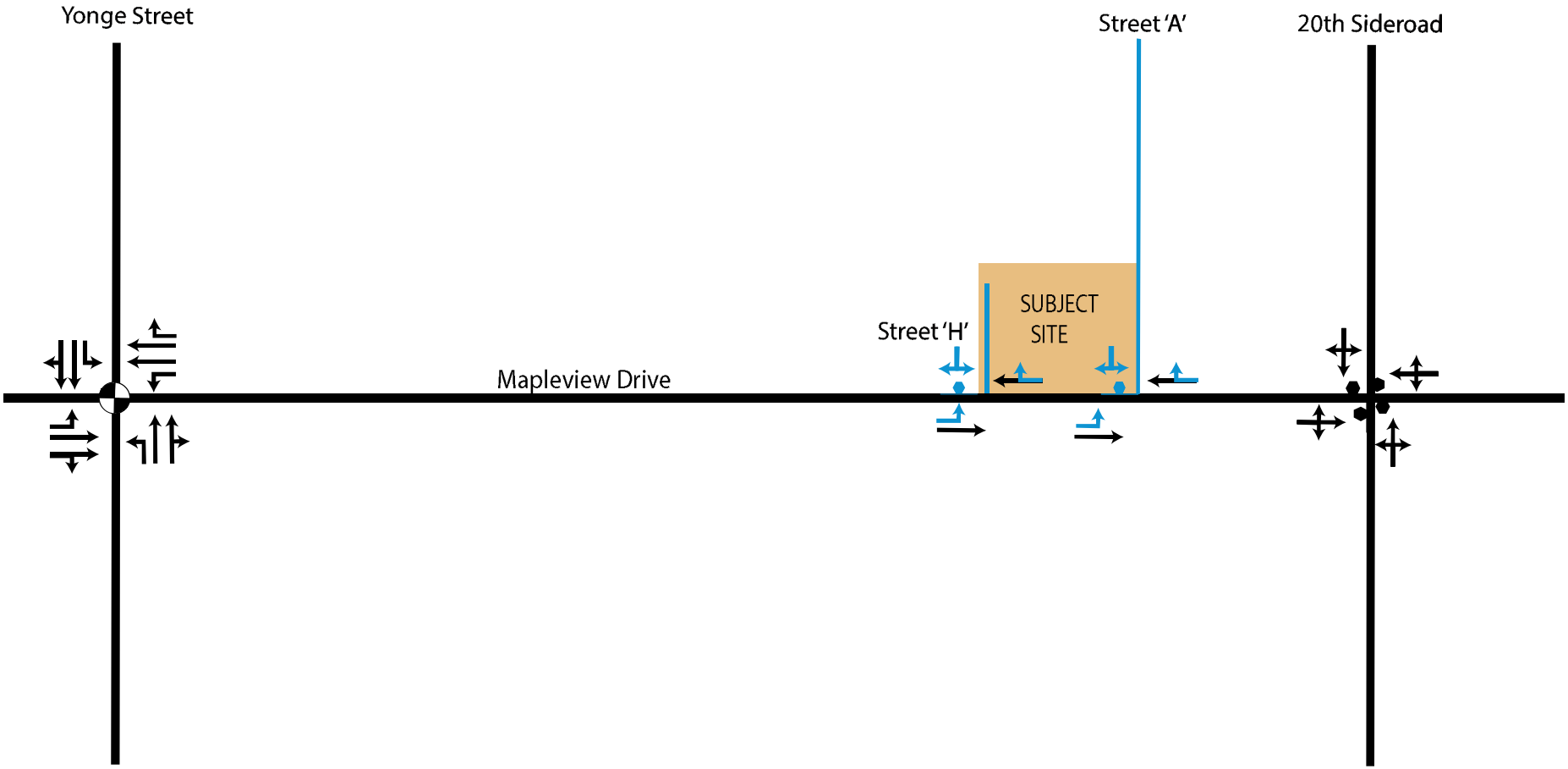


Figure 4-1
Future Recommended Road Network and Lane Configurations
LM Barrie Holdings Inc. & 2121191 Ontario Inc. - Functional Design Review

Legend

- Subject Site
- Signalized Intersection
- Unsignalized Intersection
- Existing
- Proposed City Roadway Improvements
- Recommended Hewitt Improvements

*Not to scale

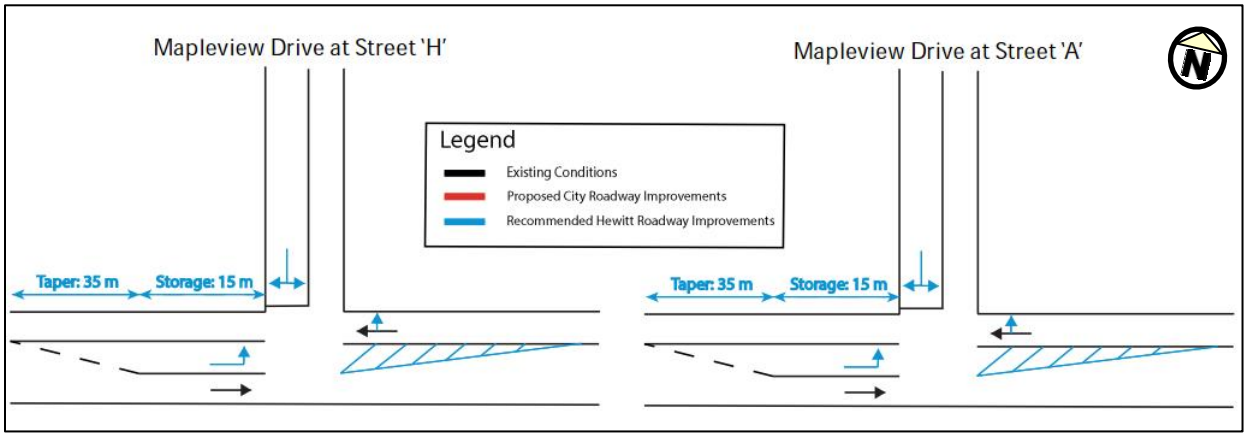


Figure 4-2: LM Barrie & 2121191 Lands Site Accesses – Recommended Intersection Requirements

4.3 COLLECTOR ROAD NETWORK ASSESSMENT

As part of the Traffic Assessment, the proposed collector road network was reviewed to determine its compliance with the right-of-way (ROW) requirements specified in the City's Multi-Modal Active Transportation Master Plan (TMP) and the Hewitt Secondary Plan. Both documents provide recommendations of the locations and classifications of the transportation corridors within the Hewitt development.

The Multi-Modal Active TMP and the Hewitt Secondary Plan recommended transportation networks are illustrated in **Figure 4-3** and **Figure 4-4**, respectively. The three major roadway classifications and recommended ROWs in the Secondary Plan are:

- Arterial – 41 meter maximum ROW;
- Major Collector – 27 meter maximum ROW; and
- Minor Collector – 24 meter maximum ROW.

It should be noted that the recommended ROWs in the Secondary Plan are maximum values and are higher than the recommended ROWs in the Multi-Modal Active TMP.

The transportation network proposed in the LM Barrie & 2121191 Draft Plan was reviewed to determine that the proposed ROWs for the transportation network correspond to the TMP recommendations; the transportation network review is presented in **Figure 4-5**. The recommended and proposed ROWs are summarized in **Table 4-4**.

Roadway	Classification	SP Max. ROW (m)	TMP ROW (m)	Proposed ROW (m)	Is Proposed ROW Sufficient
Mapleview Drive	Arterial	41	34	34	Yes
Street 'A'	Major Collector	27	27	27	Yes
Street 'B'	Minor Collector	24	24	24	Yes

Table 4-4: LM Barrie & 2121191 Lands Right-of-Way Summary

The summary table above indicates that the proposed ROWs in the LM Barrie & 2121191 draft plan will be sufficient to satisfy the TMP ROW requirements. However, it should be noted that the City is currently undertaking a Municipal Class Environmental Assessment (EA) for the Hewitt Secondary Plan Area transportation network to determine detailed cross-sections of arterial roads within the secondary plan area. Pending the outcome of the EA, Block 584 and Block 585, along with properties fronting on Mapleview Drive, of the draft plan may be subject to changes which can be accommodated through the detail design process.

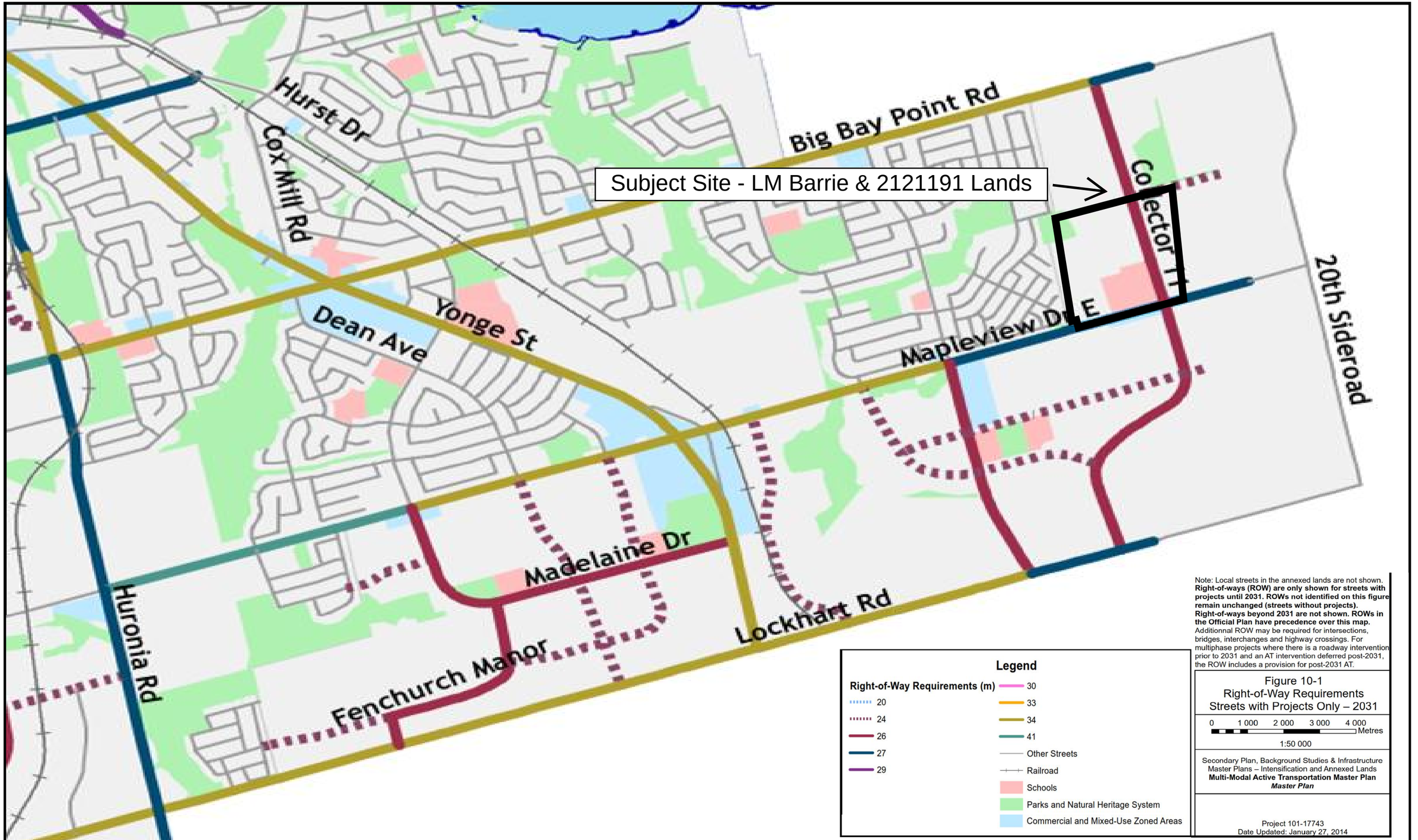


Figure 4-3
Multi-Modal Active Transportation Master Plan Recommended Hewitt Transportation Network
LM Barrie Holding Inc. & 2121191 Ontario Inc. - Functional Design Review

*Not to scale

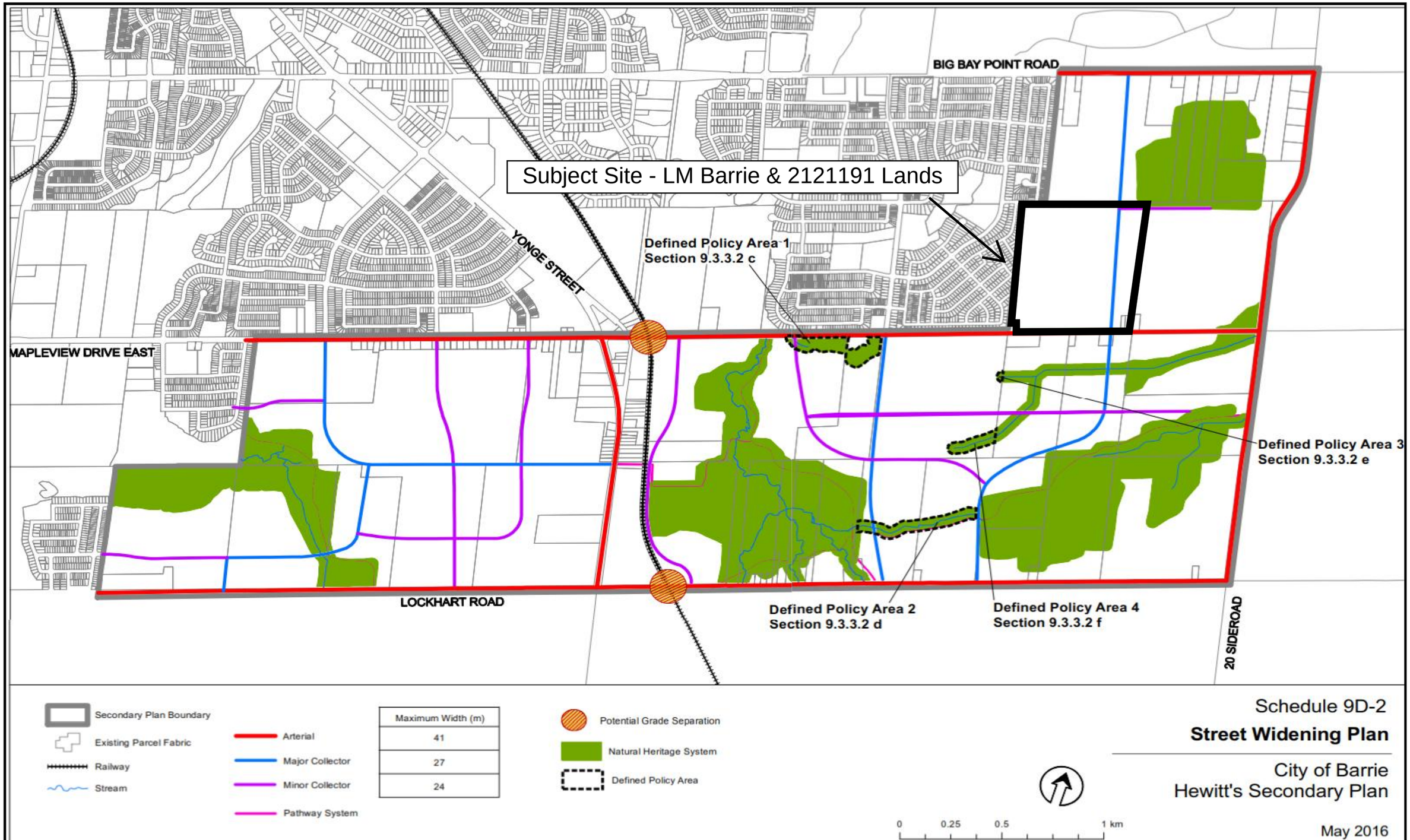


Figure 4-4
Hewitt Secondary Plan Recommended Transportation Network
LM Barrie Holdings Inc. & 2121191 Ontario Inc. - Functional Design Review

*Not to scale

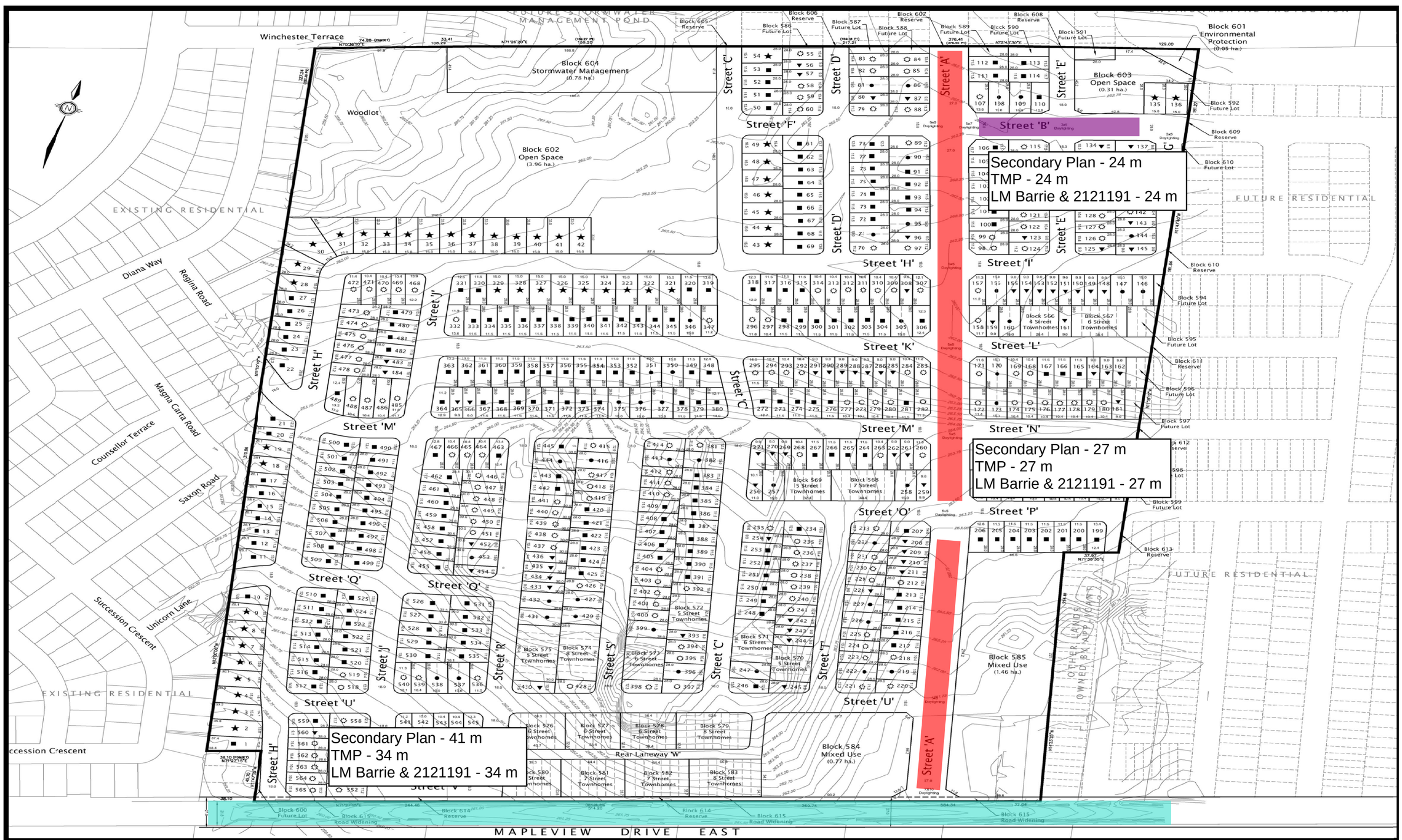


Figure 4-5

Transportation Network Review

LM Barrie Holding Inc. & 2121191 Ontario Inc. - Functional Design Review

Legend

- 41 meters
- 34 meters
- 27 meters
- 24 meters

*Not to scale

4.4 INTERNAL COLLECTOR ROAD NETWORK ASSESSMENT

An internal collector road network assessment was undertaken to determine appropriate intersection controls required at collector-to-collector intersections. This assessment was based on the site traffic volumes generated under Ultimate traffic conditions, which corresponds to the full build-out of the entire Hewitt development.

Based on the projected traffic volumes along the collector roads within the Hewitt development included in the Hewitt Study, signalization of collector-to-collector intersections is not recommended. The following intersection controls are recommended for the various intersection types:

- Major Collector to Major Collector – All-way stop control;
- Major Collector to Minor Collector – Two-way stop control at the minor approaches; and
- Minor Collector to Minor Collector – All-way stop control.

Based on the above, the recommended intersection controls for the collector road network within the LM Barrie & 2121191 Lands are illustrated in **Figure 4-6**.

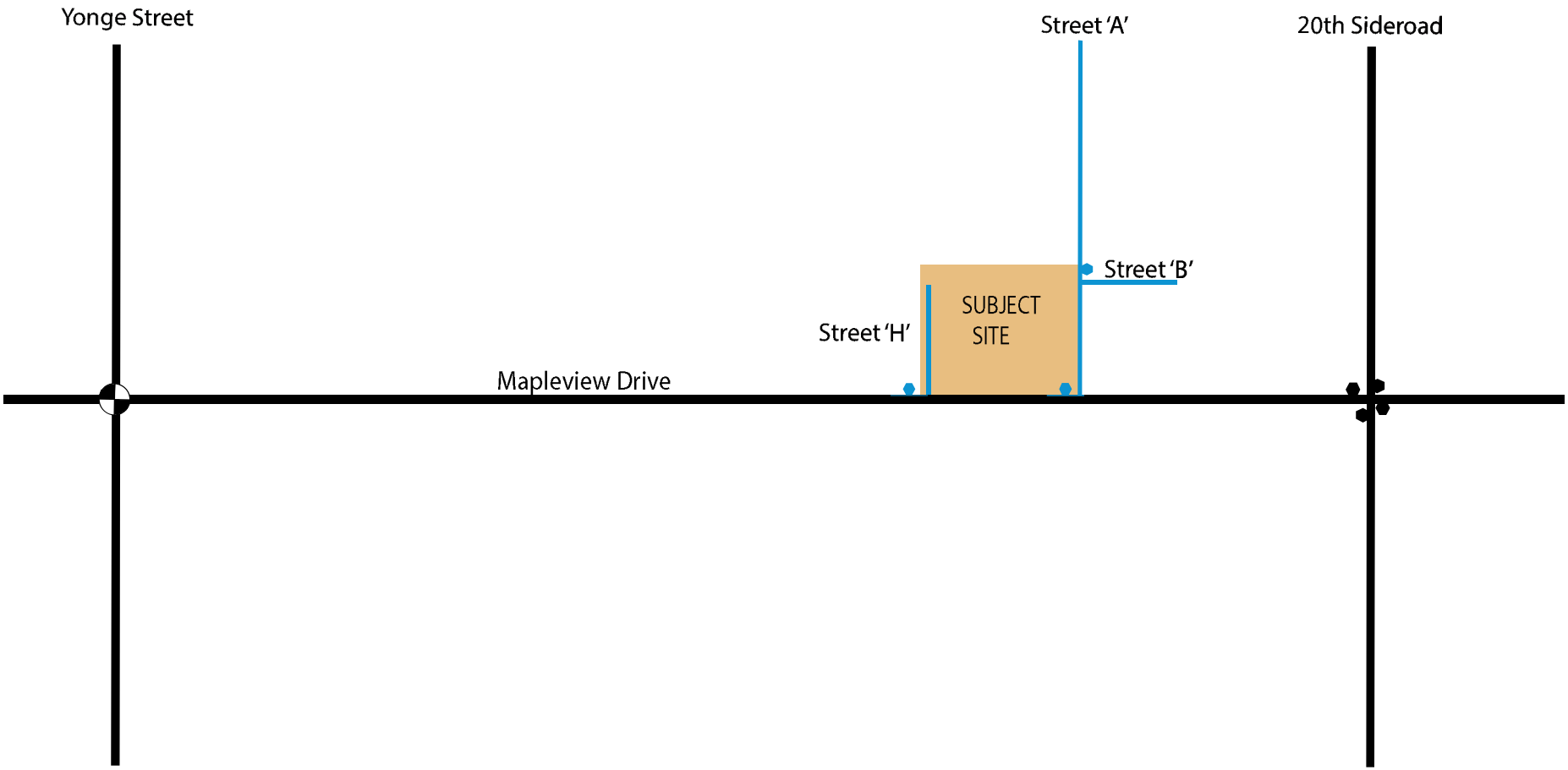


Figure 4-6
Recommended Internal Collector-to-Collector Intersection Controls
LM Barrie Holdings Inc. & 2121191 Ontario Inc. - Functional Design Review

Legend
- Subject Site
- Signalized Intersection
- Unsignalized Intersection
- Existing
- Proposed City Roadway Improvements
- Recommended Hewitt Improvements

*Not to scale

5 CONCLUSION

LEA was retained by LM Barrie Holdings Inc. and 2121191 Ontario Inc. to conduct a Functional Design Review for the proposed residential development with a mix of single-detached, semi-detached, townhouse and mixed-use medium density units located within the Hewitt Secondary Plan Area in the City of Barrie. The LM Barrie & 2121191 Lands will have the main accesses provided through Street 'A' which is proposed to span between Big Bay Point Road and Mapleview Drive and Street 'H', which is proposed to be located between Street 'A' and Prince William Way on Mapleview Drive.

The proposed development is expected to consist of 515 single-detached, 100 semi-detached, 60 street townhouse and 121 mixed-use medium density units by the end of Phase 1 of the entire Hewitt development. The site traffic estimated to be generated by the end of Phase 1 includes 382 two-way trips (111 in, 271 out) in the AM peak hour and 525 two-way trips (326 in, 199 out) in the PM peak hour.

This Functional Design Review report is supplemental to the Hewitt Study with a focus on the proposed BEMP II development, which is expected to be developed within Phase 1 of the entire Hewitt development. The completion of Phase 1 of the Hewitt development falls in-between the two analyzed horizons, 2020 and 2031. Therefore, the results and recommendations presented in this report correspond to that proposed for the Ultimate horizon in the Hewitt Study in order to maintain consistency and develop the lands for the full build-out of the Hewitt Lands.

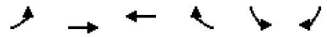
The intersection capacity analysis results demonstrate that both site accesses are expected to operate well under full build-out traffic conditions during both the AM and PM peak hours. Exclusive eastbound left-turn lanes are recommended at both site accesses, with storage lengths of 15 meters and taper lengths of 35 meters. For the traffic entering the site from the east, shared westbound through-right lanes will provide sufficient capacity at both accesses.

The proposed road network ROWs in the LM Barrie & 2121191 draft plan corresponds to the recommendations provided in the City's Multi-Modal Active Transportation Master Plan. However, the City is currently undertaking an EA for the Hewitt Secondary Plan Area transportation network to refine the required cross-sections of the arterial road network. The proposed draft plan can be modified upon the completion of the EA findings. For the LM Barrie & 2121191, Blocks 584 and 585, as well as properties fronting on Mapleview Drive, may be subject to change along the Mapleview Drive frontage.

Based on the projected traffic volumes along the collector roads within the Hewitt development and the LM Barrie & 2121191, we recommend a two-way stop control at the Street 'A' / Street 'B' intersection.

APPENDIX A

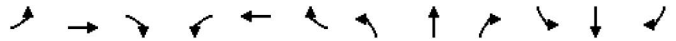
Detailed Synchro Output Sheets –
Ultimate Horizon LM Barrie & 2121191 Site Accesses



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	62	225	531	2	4	138
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	62	225	531	2	4	138
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	533				881	532
vC1, stage 1 conf vol					532	
vC2, stage 2 conf vol					349	
vCu, unblocked vol	533				881	532
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	94				99	75
cM capacity (veh/h)	1035				503	547

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	62	225	533	142
Volume Left	62	0	0	4
Volume Right	0	0	2	138
cSH	1035	1700	1700	546
Volume to Capacity	0.06	0.13	0.31	0.26
Queue Length 95th (m)	1.5	0.0	0.0	8.3
Control Delay (s)	8.7	0.0	0.0	13.9
Lane LOS	A			B
Approach Delay (s)	1.9		0.0	13.9
Approach LOS				B

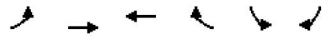
Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	84	103	41	6	242	10	62	28	0	41	51	193
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour 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
Hourly flow rate (vph)	84	103	41	6	242	10	62	28	0	41	51	193
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	252			144			764	556	124	544	571	247
vC1, stage 1 conf vol							292	292		259	259	
vC2, stage 2 conf vol							472	264		285	312	
vCu, unblocked vol	252			144			764	556	124	544	571	247
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			100			80	95	100	93	91	76
cM capacity (veh/h)	1313			1438			304	533	927	575	548	792

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	84	144	6	252	90	285
Volume Left	84	0	6	0	62	41
Volume Right	0	41	0	10	0	193
cSH	1313	1700	1438	1700	351	698
Volume to Capacity	0.06	0.08	0.00	0.15	0.26	0.41
Queue Length 95th (m)	1.6	0.0	0.1	0.0	8.0	15.9
Control Delay (s)	7.9	0.0	7.5	0.0	18.8	13.7
Lane LOS	A		A		C	B
Approach Delay (s)	2.9		0.2		18.8	13.7
Approach LOS					C	B

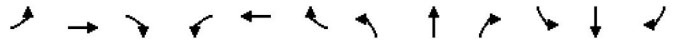
Intersection Summary			
Average Delay	7.3		
Intersection Capacity Utilization	44.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	116	306	270	3	0	106
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	116	306	270	3	0	106
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	273				810	272
vC1, stage 1 conf vol					272	
vC2, stage 2 conf vol					538	
vCu, unblocked vol	273				810	272
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	91				100	86
cM capacity (veh/h)	1290				493	767

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	116	306	273	106
Volume Left	116	0	0	0
Volume Right	0	0	3	106
cSH	1290	1700	1700	767
Volume to Capacity	0.09	0.18	0.16	0.14
Queue Length 95th (m)	2.4	0.0	0.0	3.8
Control Delay (s)	8.1	0.0	0.0	10.4
Lane LOS	A			B
Approach Delay (s)	2.2		0.0	10.4
Approach LOS				B

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	37.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	92	106	64	0	106	161	51	36	2	8	16	111
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour 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
Hourly flow rate (vph)	92	106	64	0	106	161	51	36	2	8	16	111
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	267			170			547	589	138	496	540	186
vC1, stage 1 conf vol							322	322		186	186	
vC2, stage 2 conf vol							225	267		310	354	
vCu, unblocked vol	267			170			547	589	138	496	540	186
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			100			90	93	100	99	97	87
cM capacity (veh/h)	1297			1407			507	518	910	574	547	856

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	92	170	0	267	89	135
Volume Left	92	0	0	0	51	8
Volume Right	0	64	0	161	2	111
cSH	1297	1700	1700	1700	517	781
Volume to Capacity	0.07	0.10	0.00	0.16	0.17	0.17
Queue Length 95th (m)	1.8	0.0	0.0	0.0	4.9	5.0
Control Delay (s)	8.0	0.0	0.0	0.0	13.4	10.6
Lane LOS	A				B	B
Approach Delay (s)	2.8		0.0		13.4	10.6
Approach LOS					B	B

Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		