Flower City

brampton.ca

A-2024-0321

For Office Use Only
(to be inserted by the Secretary-Treasurer
after application is deemed complete)

FILE NUMBER: ~~A-0321~~

The Personal Information collected on this form is collected pursuant to section 45 of the Planning Act and will be used in the processing of this application. Applicants are advised that the Committee of Adjustment is a public process and the information contained in the Committee of Adjustment files is considered public information and is available to anyone upon request and will be published on the City's website. Questions about the collection of personal information should be directed to the Secretary-Treasurer, Committee of Adjustment, City of Brampton.

APPLICATION
Minor Variance or Special Permission
(Please read Instructions)

NOTE: It is required that this application be filed with the Secretary-Treasurer of the Committee of Adjustment and be accompanied by the applicable fee.

The undersigned hereby applies to the Committee of Adjustment for the City of Brampton under section 45 of the Planning Act, 1990, for relief as described in this application from By-Law **270-2004.**

1. **Name of Owner(s)** 1388688 Ontario Inc (RioCan)
   Address 2300 Yonge Street, Suite 2200, Toronto, ON, M4P 1E4
   Phone # 416-847-8001 **Fax #**
   Email sbajc@riocan.com

2. **Name of Agent** Kelly Graham, SvN Architects + Planners
   Address 110 Adelaide St E, Toronto, ON, M5C 1L7
   Phone # 647-227-7367 **Fax #**
   Email kgraham@svn-ap.com

3. **Nature and extent of relief applied for (variances requested):**

   A number of minor variances are requested in order to facilitate the first residential building on the Shoppers World Brampton site. The variances are detailed in the enclosed rationale.

4. **Why is it not possible to comply with the provisions of the by-law?**

   Please refer to the enclosed rationale.

5. **Legal Description of the subject land:**
   Lot Number Part of Lots 1 and 2
   Plan Number/Concession Number Concession 1 West of Hurontario Street
   Municipal Address 499 Main St S Brampton, ON, L6Y 1N7

6. **Dimension of subject land (in metric units)**
   Frontage 540 m
   Depth 370 m
   Area 21.45 ha

7. **Access to the subject land is by:**

Provincial Highway	☐	Seasonal Road	☐
Municipal Road Maintained All Year	☑	Other Public Road	☐
Private Right-of-Way	☐	Water	☐

8. **Particulars of all buildings and structures on or proposed for the subject land: (specify in metric units ground floor area, gross floor area, number of storeys, width, length, height, etc., where possible)**

EXISTING BUILDINGS/STRUCTURES on the subject land: List all structures (dwelling, shed, gazebo, etc.)

The site contains an existing and operational shopping centre, however, the area that will contain the future residential building and ancillary parking structure currently only contain surplus surface parking.

PROPOSED BUILDINGS/STRUCTURES on the subject land:

Phase 1A residential building with two towers of 37 and 42 storeys in height with a total GFA of 56,795.45 square metres

Ancillary parking structure with six levels of parking

9. **Location of all buildings and structures on or proposed for the subject lands: (specify distance from side, rear and front lot lines in metric units)**

EXISTING

Front yard setback	approx. 90 metres at narrowest point
Rear yard setback	approx. 40 metres at narrowest point
Side yard setback	(north) approx. 75 metres at narrowest point
Side yard setback	(south) approx. 10 metres at bus terminal

PROPOSED

Front yard setback	Phase 1A: 5.75m (Steeles); Parking Structure (Main): existing mall setback is closer
Rear yard setback	Phase 1A: 12.9 m (north); Parking Structure: 3.4m (west)
Side yard setback	Phase 1A: 11.2 m (west); 0 m (east)
Side yard setback	Parking structure: 0.8 m to shared property line with Phase 1A

10. **Date of Acquisition of subject land:** 2000

11. **Existing uses of subject property:** Shopping centre and surface parking

12. **Proposed uses of subject property:** Residential building with two towers and ancillary parking structure

13. **Existing uses of abutting properties:** Residential apartments, parkland, commercial

14. **Date of construction of all buildings & structures on subject land:** Shopping centre first constructed in 1968

15. **Length of time the existing uses of the subject property have been continued:** 55 years

16. (a) **What water supply is existing/proposed?**

Municipal ☑ **Other (specify)** _____
Well ☐

(b) **What sewage disposal is/will be provided?**

Municipal ☑ **Other (specify)** _____
Septic ☐

(c) **What storm drainage system is existing/proposed?**

Sewers ☑
Ditches ☐ **Other (specify)** _____
Swales ☐

17. Is the subject property the subject of an application under the Planning Act, for approval of a plan of subdivision or consent?

Yes ☑ No ☐

If answer is yes, provide details: File # B-2022-0011, OZS-2019-0009 Status Phase 1A consent pproved, not yet registered

18. Has a pre-consultation application been filed?

Yes ☑ No ☐

19. Has the subject property ever been the subject of an application for minor variance?

Yes ☐ No ☑ Unknown ☐

If answer is yes, provide details:

File # ______ Decision ______ Relief ______
File # ______ Decision ______ Relief ______
File # ______ Decision ______ Relief ______

Kelly Graham

Signature of Applicant(s) or Authorized Agent

DATED AT THE City OF Toronto

THIS 16 DAY OF August, 20 24.

IF THIS APPLICATION IS SIGNED BY AN AGENT, SOLICITOR OR ANY PERSON OTHER THAN THE OWNER OF THE SUBJECT LANDS, WRITTEN AUTHORIZATION OF THE OWNER MUST ACCOMPANY THE APPLICATION. IF THE APPLICANT IS A CORPORATION, THE APPLICATION SHALL BE SIGNED BY AN OFFICER OF THE CORPORATION AND THE CORPORATION'S SEAL SHALL BE AFFIXED.

I, Kelly Graham, OF THE City OF Toronto

IN THE Province OF Ontario SOLEMNLY DECLARE THAT:

ALL OF THE ABOVE STATEMENTS ARE TRUE AND I MAKE THIS SOLEMN DECLARATION CONSCIENTIOUSLY BELIEVING IT TO BE TRUE AND KNOWING THAT IT IS OF THE SAME FORCE AND EFFECT AS IF MADE UNDER OATH.

DECLARED BEFORE ME AT THE

City OF Toronto

IN THE Province OF

Ontario THIS 14th DAY OF

August, 20 24.

[signature]

A Commissioner etc.

Jonathan Blake McClung
Barrister & Solicitor
Notary Public & Comissioner of Oaths
for the Province of Ontario
My Commission is of unlimited duration.
No legal advice was given.

Kelly Graham

Signature of Applicant or Authorized Agent

FOR OFFICE USE ONLY

Present Official Plan Designation: ______

Present Zoning By-law Classification: ______

This application has been reviewed with respect to the variances required and the results of the said review are outlined on the attached checklist.

Zoning Officer ______ Date ______

DATE RECEIVED AUG 16, 2024

Date Application Deemed Complete by the Municipality VL

Revised 2022/02/17

APPOINTMENT AND AUTHORIZATION OF AGENT

To: The Secretary-Treasurer
Committee of Adjustment
City of Brampton
2 Wellington Street West
Brampton, Ontario
L6Y 4R2
coa@brampton.ca

LOCATION OF THE SUBJECT LAND: 499 Main St S Brampton, ON, L6Y 1N7

I/We, 1388688 Ontario Inc
please print/type the full name of the owner(s)

the undersigned, being the registered owner(s) of the subject lands, hereby authorize

Kelly Graham, SvN Architects + Planners
please print/type the full name of the agent(s)

to make application to the **City of Brampton Committee of Adjustment** in the matter of an application for **minor variance** with respect to the subject land.

Dated this 12 day of August, 2024.

(signature of the owner[s], or where the owner is a firm or corporation, the signature of an officer of the owner.)

Anton Katipunan
(where the owner is a firm or corporation, please print or type the full name of the person signing.)

NOTE: If the owner is a firm or corporation, the corporate seal shall be affixed hereto.

NOTE: Unit owners within a Peel Standard Condominium Corporation are to secure authorization from the Directors of the Condominium Corporation in a form satisfactory to the City of Brampton, prior to submission of an application. Signatures from all Members of the Board of Directors are required.

PERMISSION TO ENTER

To: The Secretary-Treasurer
Committee of Adjustment
City of Brampton
2 Wellington Street West
Brampton, Ontario
L6Y 4R2
coa@brampton.ca

LOCATION OF THE SUBJECT LAND: 499 Main St S Brampton, ON, L6Y 1N7

I/We, 1388688 Ontario Inc
please print/type the full name of the owner(s)

the undersigned, being the registered owner(s) of the subject land, hereby authorize the Members of the City of Brampton Committee of Adjustment and City of Brampton staff members, to enter upon the above noted property for the purpose of conducting a site inspection with respect to the attached application for Minor Variance and/or consent.

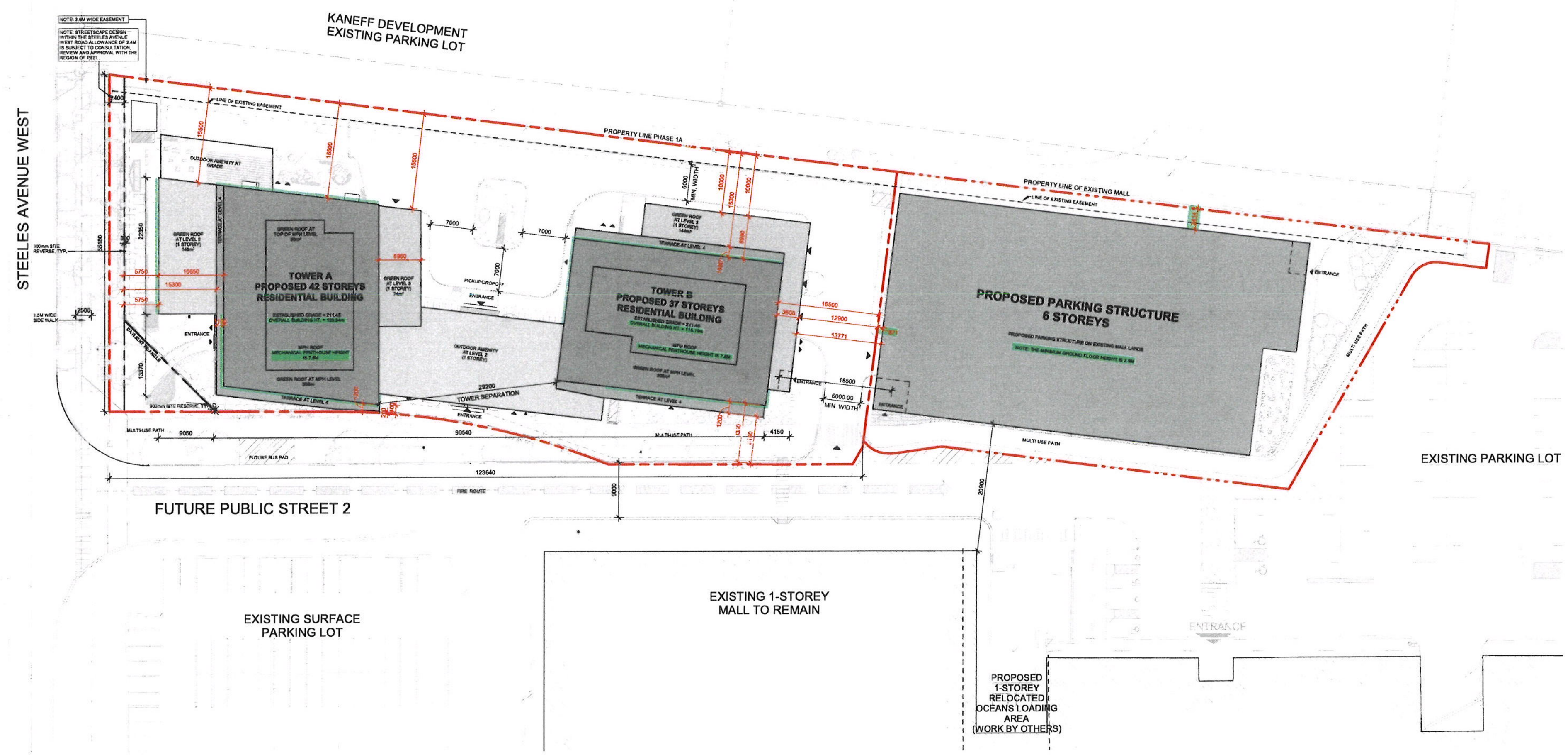
Dated this 12 day of August, 2024.

(signature of the owner[s], or where the owner is a firm or corporation, the signature of an officer of the owner.)

Anton Katipunan
(where the owner is a firm or corporation, please print or type the full name of the person signing.)

NOTE: If the owner is a firm or corporation, the corporate seal shall be affixed hereto.

NO DISCUSSION SHALL TAKE PLACE BETWEEN THE COMMITTEE MEMBERS AND THE APPLICANT DURING THE SITE INSPECTION



1 | Minor Variance Diagram
1 : 350

Authorities Having Jurisdiction

City File No.
SPA-2022-0120

Do not scale the drawings.

This Drawing Is Not To Be Used For Construction Until Signed ByThe Architect.

Date:

KIRKOR
ARCHITECTS AND PLANNERS

Revisions:

No.:	Revision:	Date:

No.:	Issued For:	Date:
03.	Minor Variabce Application	August 12, 2024
02.	SPA resubmission #1	April 26, 2024
01.	SPA	June 22, 2022

RIOCAN

Client:
1388688 Ontario Ltd. RioCan

499 Main Street South, Brampton, ON
Proposed Residential Development

Drawing Title:
Minor Variance Diagram

Scale: 1 : 350
Drawn by: AC
Checked by: CA
Project No.: 22-104
Date: 08/09/24
Drawing No.:
A101A/B

RioCan Shoppers World - Phase 1A
499 Main Street South, Brampton ON

Proposed Residential Development

DRAWING LIST

Sheet Number	Sheet Name	SPA (2022-06-30)	SPA RESUBMISSION (2024-04-26)	ISSUED FOR MINOR VARIANCE (2024-08-12)
A100	Cover Sheet	■	■	■
1				
A101.A.S	Context and Extended Site Plan	■	■	
A101.B.S	Site Plan	■	■	■
A102.S	Project Statistics	■	■	■
3				
A153.S	Parking Level P2 Floor Plan	■	■	
A154.S	Parking Level P1 Floor Plan	■	■	
A201.S	Level 1 Floor Plan	■	■	
A202.S	Level Mezzanine Floor Plan	■	■	
A203.S	Level 2 Floor Plan	■	■	
A204.S	Level 3 Floor Plan	■	■	
A205.S	Level 4 Floor Plan	■	■	
A206.S	Level 5-37 Floor Plan		■	
A207.S	Level 38 (A) and MPH (B) Floor Plan		■	
A208.S	Level 39-42 (A) Floor Plan		■	
A209.S	Level MPH (A) Floor Plan		■	
A210.S	Roof Plan	■	■	■
12				
A401.S	Tower A - North and East Elevation	■	■	
A402.S	Tower A - South and West Elevation	■	■	
A403.S	Tower B - North and East Elevation	■	■	
A404.S	Tower B - South and West Elevation	■	■	
A405.S	Tower A - Colour Elevation	■	■	
A406.S	Tower B - Colour Elevation	■	■	
A407.S	Overall_East Elevation		■	■
A408.S	Overall_West Elevation		■	
8				
A451.S	Building Section	■	■	
A452.S	Building Section	■	■	
2				
A501.S	Perspectives			■
1				
A501.S	Sun Shadow Study			■
1				

TOTAL NUMBER OF SHEETS: 28

DEVELOPER

RioCan
2300 Yonge Street, Suite 2200,
Box 2386
Toronto, ON M4P 1E4
T: 1-800-465-2733
Contact: Samantha Bajc
E: sbajc@riocan.com

ARCHITECT

KIRKOR | Architects & Planners
20 De Boers Dr. Suite #400
Toronto ON M3J 0H1
T: 416 665-6060
Contact: Carlos Antunes
E: cantunes@kirkorarchitects.com

PLANNING CONSULTANT

SvN Architects + Planners
110 Adelaide Street East, 4th Floor
Toronto, Ontario, M5C 1K9, Canada
T: 416 593 6499
Contact: Kelly Graham
E: kgraham@svn-ap.com

CIVIL ENGINEER

Counterpoint Engineering Inc
8395 Jane St, Concord, ON L4K 5Y2
T: 905 326 1404
Contact: David Di Iorio
E: ddiiorio@counterpointeng.com

LANDSCAPE ARCHITECT

SvN Architects + Planners
110 Adelaide Street East, 4th Floor
Toronto, Ontario, M5C 1K9
T: 416 593 6499
Contact: Audrey Fung
E: afung@svn-ap.com

BUILDING ENVELOPE

Morrison Hershfield / Stantec
200-2932 Baseline Road | Ottawa, ON
K2H 1B1
T: 613 739 2910
Contact: Yvon Chiasson
E: ychiasson@morrisonhershfield.com

MECHANICAL CONSULTANT

NOVATREND
54 West Beaver Creek Road, Unit 200
Richmond Hill, ON L4B 1G5
T: 905 882 5445
Contact: Eric Pun
E: epun@novatrend.ca

TRAFFIC CONSULTANT

BA CONSULTING GROUP
45 St. Clair Avenue West, Suite 300
Toronto, ON. M4V 1K9
T: 416 967 7110
Contact: Amy Z. Jiang
E: jiang@bagroup.com

ELECTRICAL CONSULTANT

NOVATREND
54 West Beaver Creek Road, Unit 200
Richmond Hill, ON L4B 1G5
T: 905 882-5445
Contact: Tommy Mui
E: tmui@novatrend.ca

WIND CONSULTANT

Gradient Wind
127 Walgreen Road, Ottawa, ON,
Canada K0A 1L0
T: 613 836 0934
Contact: Andrew Sliassa
E: andrew.sliassas@gradientwind.com

NOISE CONSULTANT

Gradient Wind
127 Walgreen Road, Ottawa, ON,
Canada K0A 1L0
T: 613 836 0934
Contact: Joshua Foster
E: joshua.foster@gradientwind.com

STRUCTURAL ENGINEER

HONEYCOMB
133 Richmond St W, Suite 302, Toronto,
ON M5H 2L3
T: 647 933 7520
Contact: Anthony Mirvish
E: anthony.mirvish@honeycombgroup.ca

SURVEYOR

J.D.Barnes Limited
401 Wheelabrator Way, Suite A,
Milton, ON L9T 3C1
T: 905 477 3600

WASTEMANAGEMENT

GHD
70 York Street, Suite 801, Toronto,
Ontario M5J 1S9
T: 416 360 1600
Contact: Erika Brown
E: erika.brown@ghd.com

ELEVATOR CONSULTANT

SOBERMAN ENGINEERING INC.
60 St. Clair Avenue East, Suite 806
Toronto, Ontario, M4T 1N5
T: 416 323 2133
Contact: JON SOBERMAN
E: jon@sobermanengineering.com

ENERGY & SUSTAINABILITY CONSULTANT

Morrison Hershfield / Stantec
200-2932 Baseline Road | Ottawa, ON
K2H 1B1
T: 613 739 2910
Contact: Duaa Salem
E: DSalem@morrisonhershfield.com

City File No.
SPA-2022-0120

Authorities Having Jurisdiction

ONTARIO ASSOCIATION OF ARCHITECTS LICENCE

Date:

KIRKOR
ARCHITECTS AND PLANNERS

20 De Boers Dr. Suite 400
Toronto, ON M3J 0H1

Revisions:

No.:	Revision:	Date:
03.	MINOR VARIANCE	Aug 12, 2024
02.	SPA RESUBMISSION #1	April 26, 2024
01.	SPA	June 22, 2022
No.:	Issued For:	Date:

RIOCAN

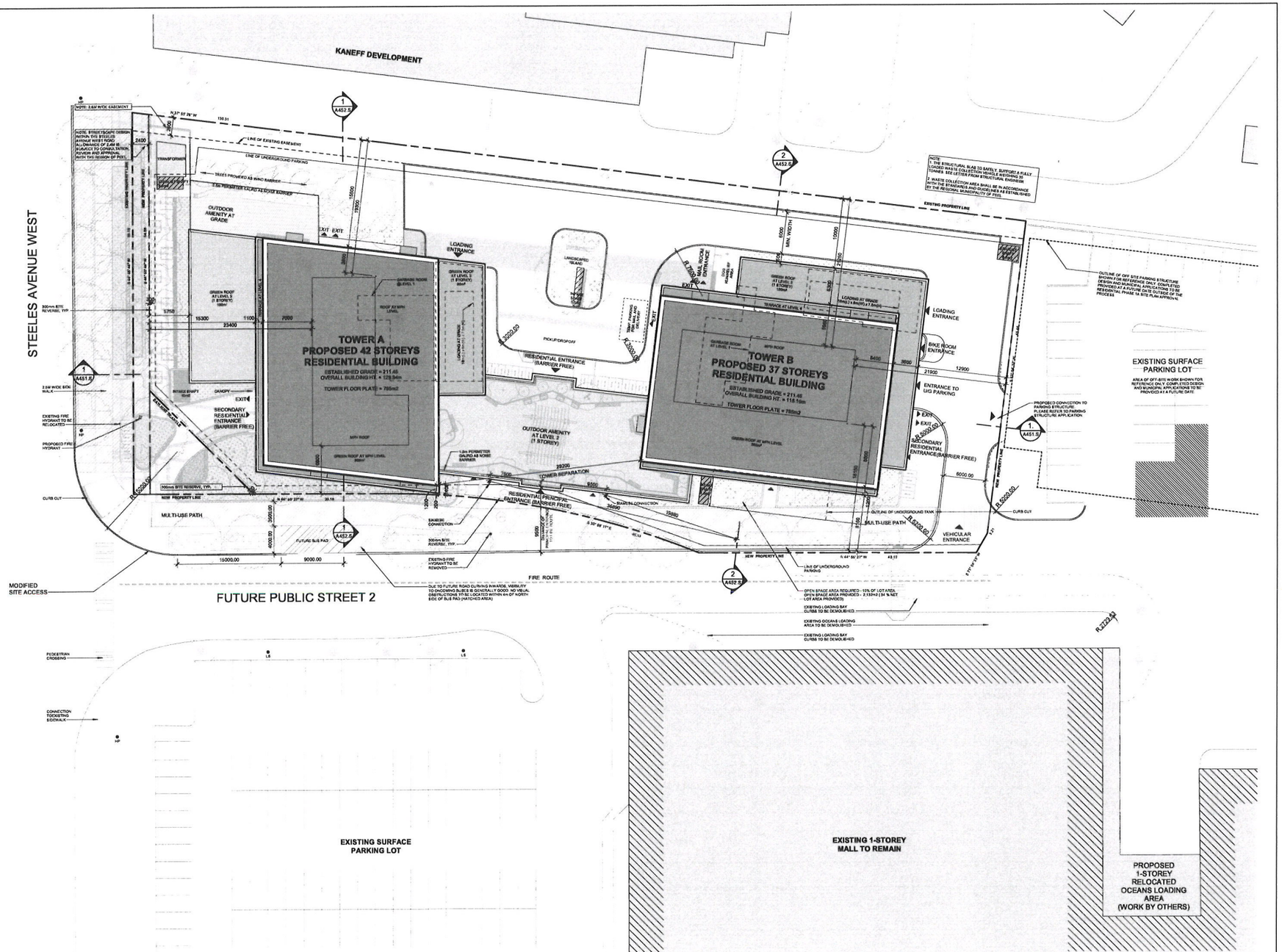
Client:
1388688 Ontario Ltd. RioCan

499 Main Street South, Brampton, ON
Proposed Residential Development

Drawing Title:
Cover Sheet

Scale:

Drawn by:
H.G., RSO
Checked by:
C.A., A.C.
Project No.:
22-104
Date:
April 26, 2024
Drawing No.:
A100



1 | Site Plan
1 : 250

City File No.
SPA-2022-0120

Authorities Having Jurisdiction

ONTARIO ASSOCIATION OF ARCHITECTS LICENCE

Date:

KIRKOR
ARCHITECTS AND PLANNERS

Revisions:

No.:	Revision:	Date:
03	MINOR VARIANCE	Aug 12, 2024
02.	SPA RESUBMISSION	April 26, 2024
01.	SPA	June 22, 2022
No.:	Issued For:	Date:

RIOCAN

Client:
1388688 Ontario Ltd. RioCan

RioCan Shoppers World - Phase 1A
499 Main Street South, Brampton ON
Proposed Residential Development

Drawing Title:
Site Plan

Scale: 1 : 250
Drawn by: H.G., RSO
Checked by: C.A., A.C.
Project No.: 22-104
Date: April 26, 2024
Drawing No.:

N

A101.B.S

RioCan Shoppers World - Phase 1A
499 Main Street South, Brampton ON
RESIDENTIAL DEVELOPMENT

PROJECT STATISTICS
April 18, 2024

Project No. 22-104

1.0 SITE INFORMATION

		m^2	ft^2	acres	hectares
1.1	**Gross Lot Area**	6,494.20	69,902.95	1.60	0.65
1.2	**Area Conveyed to City** (A+B+C)	282.10	3,036.50	0.07	0.03
	A- Public Road Conveyances	131.50	1,415.45	0.03	0.01
	B- Daylight Triangle	112.50	1,210.94	0.03	0.01
	C- Site Reserve Area	38.10	410.10	0.01	0.00
1.3	**Net Lot Area** (Gross lot area - (A+B+C))	6,212.10	66,866.49	1.53	0.62
1.4	**Proposed Floor Space Index (Net FSI)** 9.14				

FSI as per By-Law 270-2004, the figure is obtained by dividing the gross floor area, or, in the case of a residential area, the gross residential area, of all the floors in the building measured between the exterior walls of the building, by the area of the lot to the built upon.

1.5 **Landscaped Open Space (minimum 10% of the lot area required)** 2,132.00 (34% of lot area)

LANDSCAPED OPEN SPACE shall mean an unoccupied area of land which is used for the growth, maintenance and conservation of grass, flowers, trees and shrubs and other vegetation, and may include a surfaced walk, patio, screening, pool or similar visual amenity, but shall exclude any driveway, ramp, car parking or loading area, curb, retaining wall, or any covered space beneath or within any building or structure.

2.0 PROPOSED GFA (Gross Floor Area)

as per By-Law 270-2004, *Gross Floor Area shall mean the aggregate of the area of all floors in a building, whether at, above or below established grade, measured between the exterior walls of the building, but excluding any parts of the building used for mechanical equipment relating to the operation or maintenance of the building, stairwells or elevators.*

as per By-Law 270-2004, *Gross Floor Area shall mean the aggregate of the area of all floors in a building, whether at, above or below established grade, measured between the exterior walls of the building, but excluding any porch, verandah, unfinished attic, basement or any floor area used for building maintenance or service equipment, loading area, common laundry facilities, caretaker washroom, common children's play area, recreation area, parking of visitor vehicles, or storage*

Note: GFA exemptions in By-Law 270-2004 *have been interpreted to include garbage room, shaving area, bulky & hazardous storage waste disposal room, janitorial closets, tenant moving & loading rooms, storage lockers, below and above grade bicycle parking as well as bicycle maintenance areas, all amenity space including dog waste areas and guest suites.*

		no. floors	m^2/ft	m^2	ft^2
2.1	**Floor Levels (Common Levels)**				
	Level P2	1	85.11	85.11	916
	Level P1	1	88.08	88.08	948
	Level 1	1	496.72	496.72	5,347
	Total			**669.91**	**7,211**
2.2	**Floor Levels (Tower A)**	no. floors	m^2/ft	m^2	ft^2
	Level 2	1	475.97	475.97	5,123
	Level 3 - 42	40	737.35	29,494.00	317,471
	Total			**29,969.97**	**322,594**
2.3	**Floor Levels (Tower B)**	no. floors	m^2/ft	m^2	ft^2
	Level 2	1	329.03	329.03	3,542
	Level 3 - 37	35	747.90	25,826.54	277,995
	Total			**26,155.56**	**281,536**
2.4	**TOTAL GFA**			**56,795.45**	**611,341**

3.0 AMENITY

		no. floors	m^2/ft	m^2	ft^2
3.1	**Proposed Indoor Amenity**				
	Floor levels				
	Level 1	1	974.476	974.476	10,489
	Level 2	1	202.876	202.876	2,184
	Total Indoor Amenity Space			1,177.35	12,673
			Indoor Amenity Rate	1.5	
3.2	**Proposed Outdoor Amenity**				
	Floor levels	no. floors	m^2/ft	m^2	ft^2
	Level 1	1	136	136	1,463
	Level 2	1	455	455	4,897
	Total Outdoor Amenity Space			591	6,360
			Outdoor Amenity Rate	0.7	
3.3	**Total Amenity Space Provided**			**1,768.24**	**19,033**
			Over all Amenity Rate	2.1	

4.0 PARKING

Parking Type	Standard	Resident Accessible Type A	Resident Accessible Type B	Visitor Accessible Type A	Visitor Accessible Type B	Total
P1	120	2	3	2	2	129
P2	130	3	2			135
Total						**264**

5.0 BICYCLE PARKING

5.1 Bicycle Parking Required

230.5.10.1 (1) Bicycle Parking Space Rates For a **building** or portion of a **building** constructed pursuant to a building permit issued more than three years after May 9, 2013, **bicycle parking spaces** must comply with Table 230.5.10.1(1) **Office** - the minimum number of short-term **bicycle parking spaces** to be provided: (A) in Bicycle Zone 1 is 0.2 plus 0.2 **bicycle parking spaces** for each 100 square metres of **interior floor area** used for an office, other than a medical office, the minimum number of long-term **bicycle parking spaces** to be provided: (A) in Bicycle Zone 1 is 0.2 for each 100 square metres of **interior floor area** used for an office, other than a medical office **Personal Service Shop** - the minimum number of short-term **bicycle parking spaces** to be provided: (A) in Bicycle Zone 1 is 1 plus 0.3 bicycle parking spaces for each 100 square metres of **interior floor area** used for a **personal services shop**, the minimum number of long-term bicycle parking spaces to be provided: (A) in Bicycle Zone 1 is 0.2 for each 100 square metres of interior floor area used for a **personal services shop**

230.5.10.3 (5) Bicycle Parking Space Requirements for Dwelling Units **Bicycle parking space** requirements for **dwelling units** in a **apartment building** or **mixed use building** are: (A) in Bicycle Zone 1, a minimum of 1.0 **bicycle parking spaces** for each **dwelling unit**, allocated as 0.9 "long-term" **bicycle parking space per dwelling unit** and 0.1 "short-term" **bicycle parking space** per **dwelling unit**.

Parking Type	Parking Ratio	No. Units	Parking Spaces
Resident	0.50	877	439
Visitor	0.10	877	88
Total			**526**
Total Bycicle Required			**526**

5.2 Bicycle Parking Provided

Level	Short-Term	Long-Term	Parking Spaces
Level 1	88	0	88
Level2		440	440
Total			**528**
Total Bicycle Parking Provided			**528**

6.0 UNIT COUNT

	1 Bed	1Bed + Den	2 Bed	3 Bed	Total
6.1 Proposed Units - Tower A	1	2	5	[illegible]	8
Level 2	240	120	120	[illegible]	480
Level 3 - 42	243	123	120	[illegible]	486
Total	50%	25%	25%	[illegible]	100%
6.2 Proposed Units - Tower B	1 Bed	1Bed + Den	2 Bed	3 Bed	Total
Level 2	0	3	1	0	4
Level 3 - 37	175	70	105	35	385
Total	175	73	106	35	389
	45%	19%	27%	9.0%	
6.3 Total Proposed Units (Tower A + Tower B)	**418**	**195**	**225**	**35**	**877**
	48%	22%	26%	4.0%	

	1 Bed		1 Bed + Den		2 Bed		3 Bed	
6.4 Average Unit Size	m^2	ft^2	m^2	ft^2	m^2	ft^2	m^2	ft^2
Tower A	47.47	511	59.06	636	70.93	763	85.45	920
Tower B	47.49	511	52.94	570	73.52	791		
Overall	**47.48**	**511**	**59.06**	**636**	**72.21**	**777**	**85.45**	**920**

1 | Project Statistics
nts

7.0 PROPOSED BUILDING GBA (Gross Building Area)

GBA: As By-law definition has been provided. For this project, Gross Building Area shall mean the aggregate area of each floor measured from the exterior side of the exterior walls. Exclude any basement, open to below areas as noted, and services. Includes all shafts, stairs, loading areas, below grade parking, and ancillaries penthouses.

7.1 GBA Below Grade					
Levels	no floors	GBA (m^2)	GBA (sq ft.)	Total GBA (m^2)	sq ft
P1	1 x	5,591.84	60,190.00	5,591.84	60,190
P2	1 x	5,597.00	60,246.00	5,597.00	60,246
Total				11,188.84	120,436
Total GBA (Below Grade)				**11,188.84**	**120,436**
7.2 GBA Above Grade					
Common Levels	no floors	GBA (m^2)	GBA (sq ft.)	Total GBA (m^2)	sq ft
L1	1 x	2,757.00	29,676.00	2,757.00	29,676
Mezz	1 x	400.23	4,308.00	400.23	4,308
L2	1 x	1,753.71	18,877.00	1,753.71	18,877
Total				4,910.94	52,861
Tower A	floors	GBA (m^2)	GBA (sq ft.)	Total GBA (m^2)	sq ft
Level 3 - 42	40 x	790.36	8,506.00	31,982.52	344,257
Tower A MPH	1 x	335.55	3,612.00	335.55	3,612
Total				32,318.07	347,869
Tower B	no floors	GBA (m^2)	GBA (sq ft.)	Total GBA (m^2)	sq ft
Level 3 - 37	35 x	798.37	8,594.00	27,942.81	300,774
Tower B MPH	1 x	262.26	2,823.00	262.26	2,823
Total				28,205.07	303,597
Total GBA (Above Grade)				**65,434.08**	**704,327**
7.3 Overall GBA				**76,622.9**	**824,762**

8.0 PROPOSED LOCKERS		
P2		170
P3		103
L2		31
Total		**314**

PROJECT STATISTICS - Combined (Phase 1A & Parking Structure)

August 12, 2024

	Phase 1A	Parking Structure	
Site Area (sm)	6,494.20	3,604.00	
GFA (sm)	56,796.00	13,422.00	
Total Units	877		
Parking			
Resident Spaces	260	357	617
Visitor Spaces	4	88	92
Total Parking Spaces Provided			**709**

FSI

FSI is calculated based on the zone area for the HMU1-3008 zone as required by clause 3008.3(n)(3) of By-law 228-2020.

Total Area of HMU1-3008 zone (sm)	62,336
Combined GFA (Phase 1A + Parking Structure)	70,218.00
Combined FSI (Combined GFA/Area of HMU1-3008 zone)	**1.13**

2 | Project Statistics - Combined
nts

City File No. Authorities Having Jurisdiction
SPA-2022-0120

ONTARIO ASSOCIATION OF ARCHITECTS LICENCE

Date:

KIRKOR
ARCHITECTS AND PLANNERS

Revisions:

No.:	Revision:	Date:
03	MINOR VARIANCE	Aug 12, 2024
02	SPA RESUBMISSION	April 26, 2024
01	SPA	June 22, 2022
No.:	Issued For:	Date:

RIOCAN

Client:
1388688 Ontario Ltd. RioCan

RioCan Shoppers World - Phase 1A
499 Main Street South, Brampton ON
Proposed Residential Development

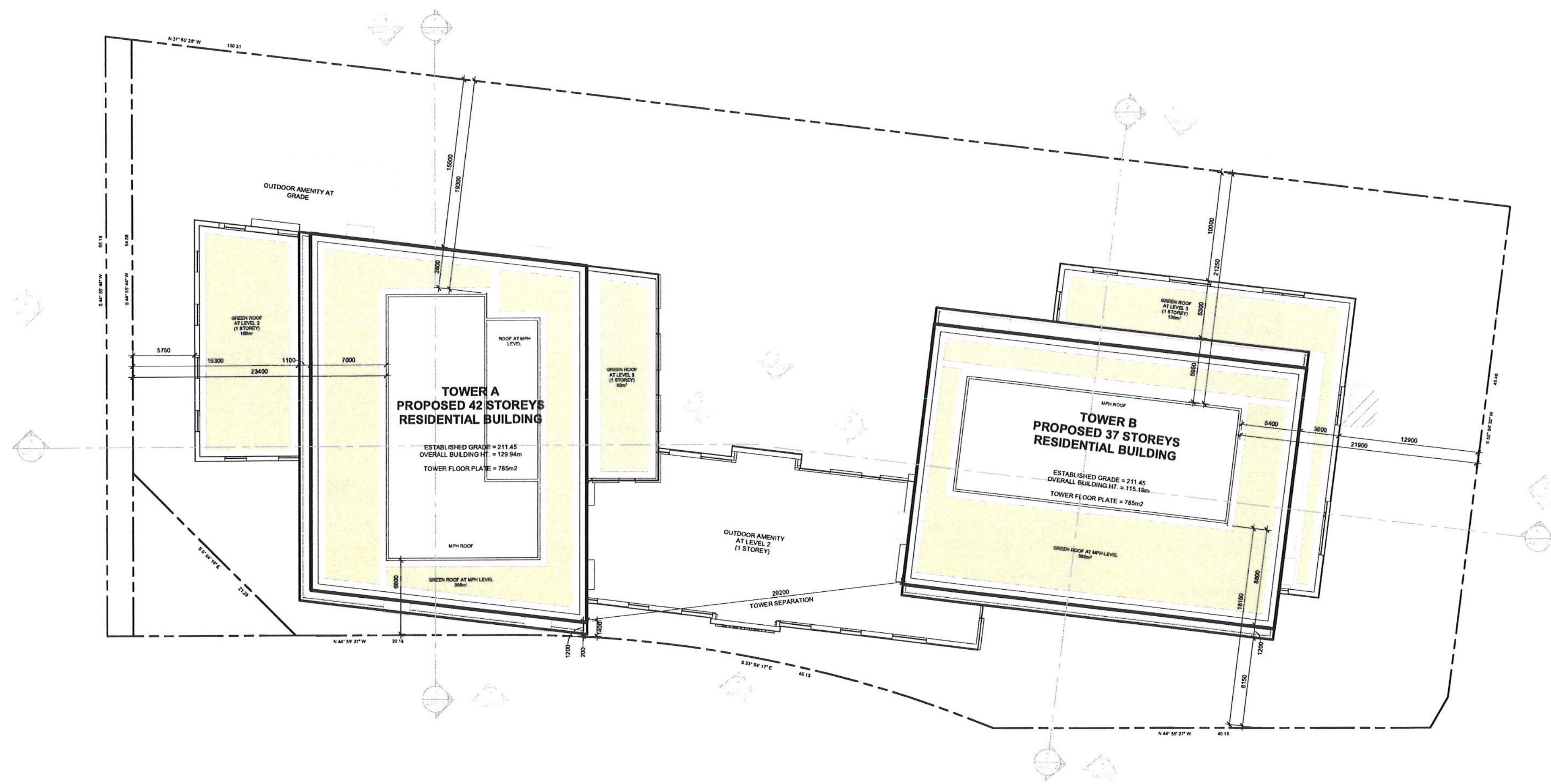
Drawing Title:
Project Statistics

Scale:

Drawn by: H.G., RSO
Checked by: C.A., A.C.
Project No.: 22-104
Date: April 26, 2024
Drawing No.:
A102.S

(m2)	Total (m2)
Total Roof Area	2,604
Area of Residential Private Terraces	129
Area of Rooftop Outdoor Amenity Space	455
Area of Renewable Energy Devices	0
Tower (s) Roof Area with floor plate less than 750m2	0
Total Available Roof Space	2,020 (m2)
Green Roof Coverage of Available Roof Space (m2)	1,028 (m2)
Green Roof Coverage of Available Roof Space (%)	50.85%

2 | Green Roof Statistics
nts



1 | Roof Plan
1 : 200

City File No.
SPA-2022-0120

Authorities Having Jurisdiction

Do not scale the drawings.

This Drawing Is Not To Be Used For Construction Until Signed ByThe Architect.

Date:

KIRKOR
ARCHITECTS AND PLANNERS

Revisions:

No.:	Revision:	Date:

No.:	Issued For:	Date:
03	MINOR VARIANCE	Aug 12, 2024
02.	SPA RESUBMISSION	April 26, 2024
01.	SPA	June 22, 2022

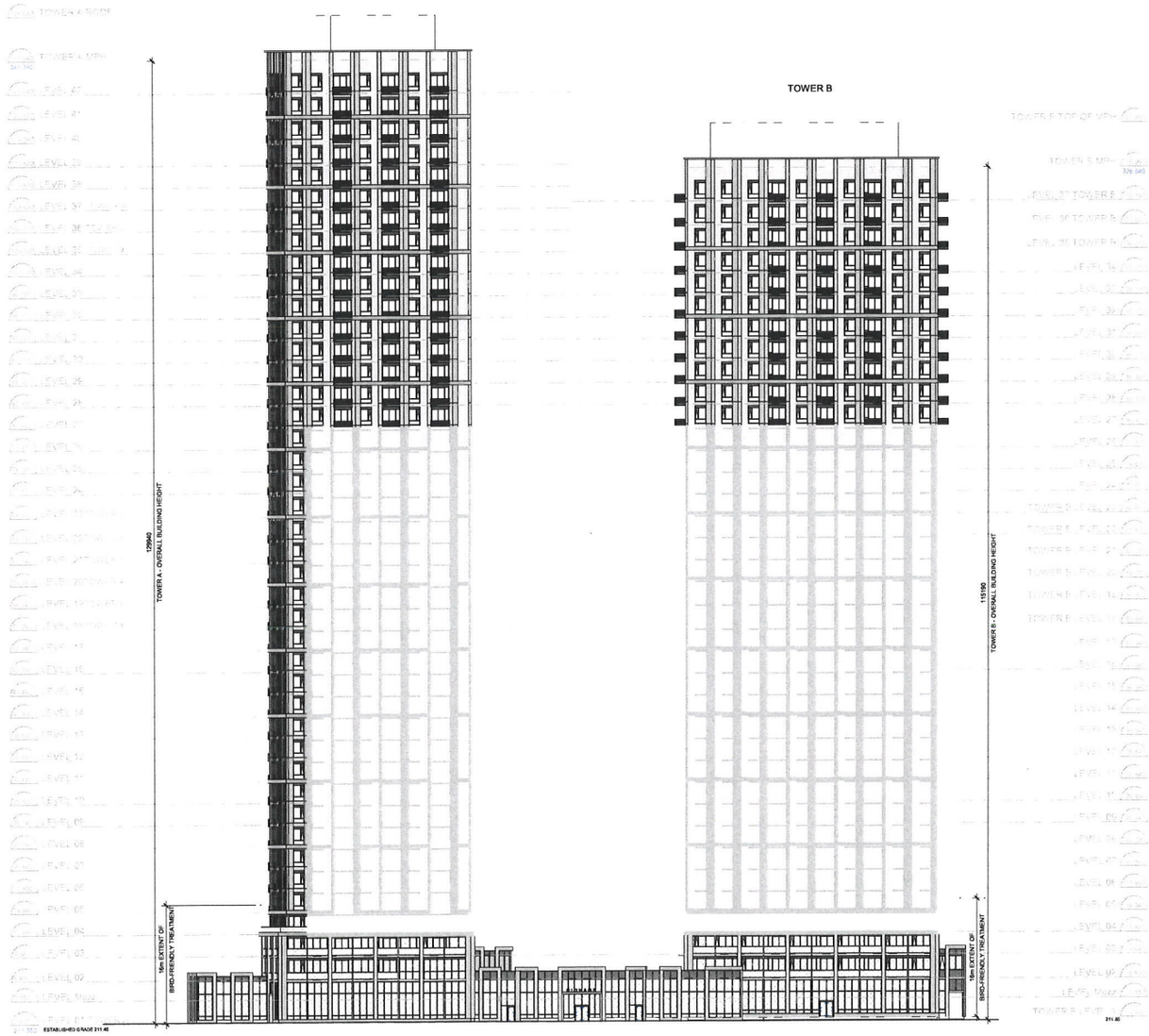
RIOCAN

Client:
1388688 Ontario Ltd. RioCan

RioCan Shoppers World - Phase 1A
499 Main Street South, Brampton ON
Proposed Residential Development

Drawing Title:
Roof Plan

Scale: 1 : 200
Drawn by: H.G., RSO
Checked by: C.A., A.C.
Project No.: 22-104
Date: April 26, 2024
Drawing No.:
A210.S



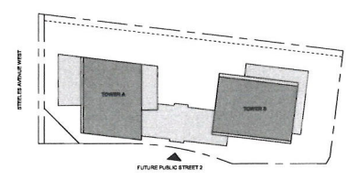
1 | Overall Elevation - East
1 : 300

	Elevation First 16m* Above Grade					
	North	South	East	West	Total (m2)	Total (%)
Glazing Area (m2)	412.22	466.30	734.06	646.89	2259.47	100
Untreated Area (m2)	33.09	30.93	25.69	33.51	123.22	5.45
Treated Area (m2)	379.13	435.37	708.37	613.38	2136.25	94.55
Low-Reflectance Opaque Glass (m2)	147.12	106.46	114.82	193.18	561.58	24.85
Visual Markers (m2)	232.01	328.91	593.55	420.20	1574.67	69.70
Shaded (m2)	0	0	0	0	0	0

	Elevation First 4m Above Rooftop Vegetation*					
	North (Floors 2,3 & 4)	South (Floors 2 & 3)	East (Floor 2 & 3)	West (Floors 3 & 4)	Total (m2)	Total (%)
Glazing Area (m2)	81.84	67.40	15.12	52.46	216.82	100
Untreated Area (m2)	12.27	10.11	2.26	7.86	32.50	15
Treated Area (m2)	69.57	57.29	12.86	44.60	184.32	85
Low-Reflectance Opaque Glass (m2)	14.38	6.16	1.43	6.33	28.30	13.05
Visual Markers (m2)	55.19	51.13	11.43	38.27	156.02	71.95
Shaded (m2)	0	0	0	0	0	0
Building Window : Wall Ratio						40%

Bird Friendly Design Strategies
- A minimum of 85% of all exterior glazing within the greater of first 16 m of the building above grade or the height of the mature tree canopy (including balcony railings, clear glass corners, parallel glass and glazing surrounding interior courtyards and other glass surfaces).
- Low reflectance, opaque materials and visual markers will be applied to glass with a maximum spacing of 50 mm x 50 mm.
- Visual markers will have a minimum width of 5 mm and a maximum spacing of 50 mm x 50 mm and will have a strong contrast.
- All glass balcony railings within the first 16 m of the building above grade will be treated with visual markers provided with a spacing of no greater than 100 mm x 100 mm.

2 | Bird-Friendly Design Statistics
nts



3 | Key-Plan
nts

City File No.
SPA-2022-0120

Authorities Having Jurisdiction

ONTARIO ASSOCIATION OF ARCHITECTS LICENCE

Date:

KIRKOR
ARCHITECTS AND PLANNERS

Revisions:		
No.:	Revision:	Date:
03	MINOR VARIANCE	Aug 12, 2024
02.	SPA RESUBMISSION	April 26, 2024
01.	SPA	June 22, 2022
No.:	Issued For:	Date:

RIOCAN

Client:
1388688 Ontario Ltd. RioCan

RioCan Shoppers World - Phase 1A
499 Main Street South, Brampton ON
Proposed Residential Development

Drawing Title:
Overall_East Elevation

Scale: 1 : 300
Drawn by: H.G., RSO
Checked by: C.A., A.C.
Project No.: 22-104
Date: April 26, 2024
Drawing No.:

A407.S

1 | View from Steeles Ave.

2 | View from Steels Ave.& Future Public Street 2

3 | View from Southeast along Future Public Street 2

4 | View from East along Future Public Street 2

City File No.
SPA-2022-0120

Authorities Having Juriadiction

ONTARIO ASSOCIATION OF ARCHITECTS LICENCE

Do not scale the drawings.

This Drawing Is Not To Be Used For Construction Until Signed ByThe Architect.

Date:

KIRKOR
ARCHITECTS AND PLANNERS
20 De Boers Drive Suite 430
Toronto, ON M3J 0H1

Revisions:

No.:	Revision:	Date:
03	MINOR VARIANCE	Aug 12, 2024
02.	SPA RESUBMISSION	April 26, 2024
01.	SPA	June 22, 2022

RIOCAN

Client:
1388688 Ontario Ltd. RioCan

RioCan Shoppers World - Phase 1A
499 Main Street South, Brampton ON
Proposed Residential Development

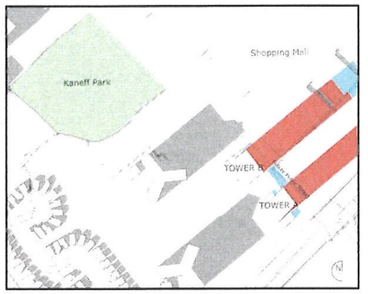
Drawing Title:
Perspectives

Scale:

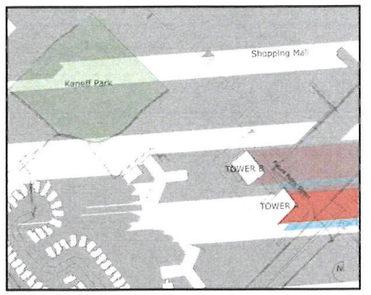
Drawn by:
H.G., RSO
Checked by:
C.A., A.C.
Project No.:
22-104
Date:
April 26, 2024
Drawing No.:
A501.S

1 | March 21th / September 21th 9h30 AM

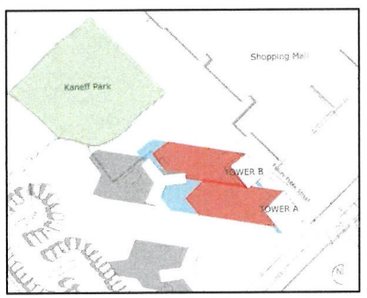
12h30 PM



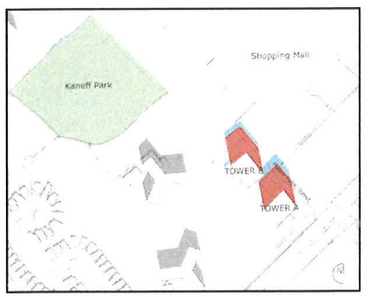
3h30 PM



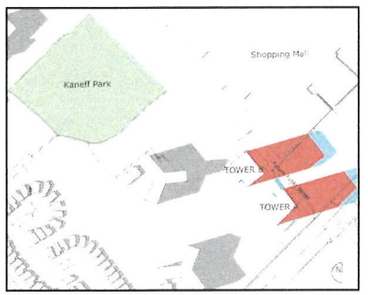
6h30 PM



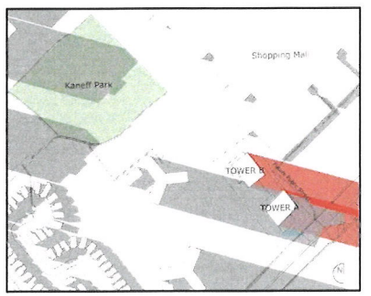
2 | June 21th 9h30 AM



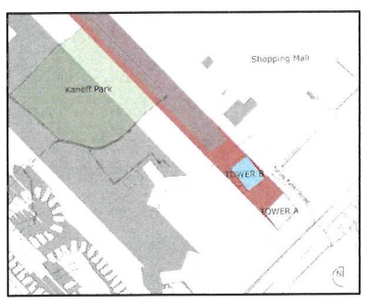
12h30 PM



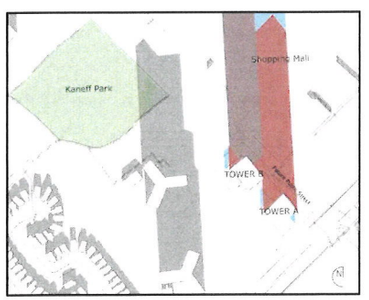
3h30 PM



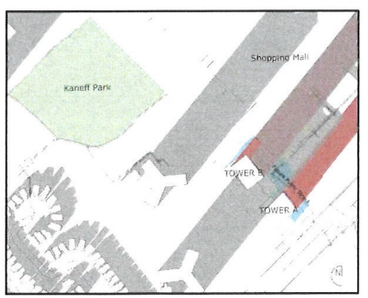
6h30 PM



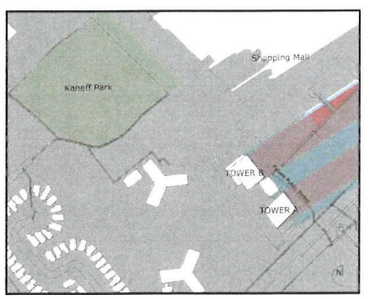
3 | December 21th 9h30 AM



12h30 PM



3h30 PM



6h30 PM

As-of-Right Shadow (97m)

Proposed Development Shadow

Existing Context Buildings Shadow

Note:

A sun shadow study has been prepared by KIRKOR Architects & Planners for the purpose of illustrating the general impact of the proposed development on the adjacent properties throughout the year. Industry-standard modeling tools and practices have been used to simulate an estimation of shadow coverage that could be cast by the proposed development.

City File No.
SPA-2022-0120

Authorities Having Jurisdiction

ONTARIO ASSOCIATION OF ARCHITECTS LICENCE

Date:

KIRKOR
ARCHITECTS AND PLANNERS

Revisions:

No.:	Revision:	Date:
03	MINOR VARIANCE	Aug 12, 2024
02.	SPA RESUBMISSION	April 26, 2024
01.	SPA	June 22, 2022

RIOCAN

Client:
1388688 Ontario Ltd. RioCan

RioCan Shoppers World - Phase 1A
499 Main Street South, Brampton ON
Proposed Residential Development

Drawing Title:
Sun Shadow Study

Scale:

N

Drawn by: H.G., RSO
Checked by: C.A., A.C.
Project No.: 22-104
Date: April 26, 2024
Drawing No.:

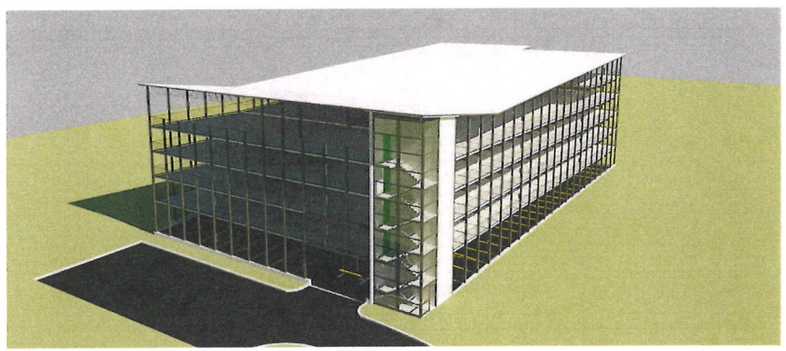
A601.S

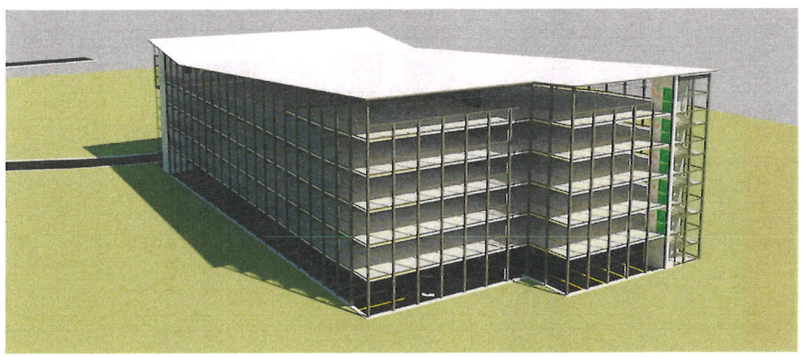
RIO CAN

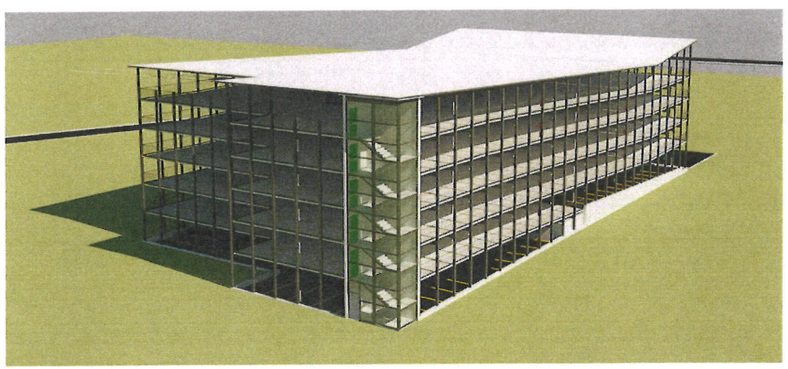
SHOPPERS WORLD BRAMPTON PARKING STRUTURE

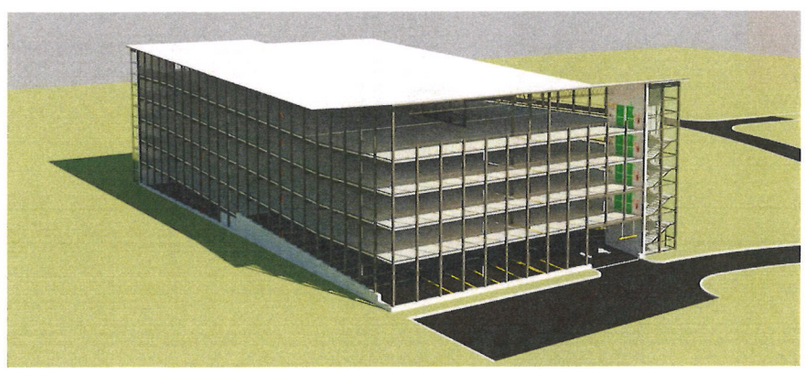
PROJECT STATUS:ISSUED FOR SPA

ARCHITECTURAL DRAWING SHEET LIST			
SHEET #	SHEET NAME	REV. #	REV. DATE
A000	COVER PAGE	B	24-08-06
A100	ABBREVIATIONS	B	24-08-06
A101	CONSTRUCTION ASSEMBLIES AND SCHEDULES	B	24-08-06
A200a	SITE PLAN W. EXISTING & OBC MATRIX	B	24-08-06
A200b	SITE PLAN W. FUTURE CONDITIONS	B	24-08-06
A200c	CONSTRUCTION MANAGEMENT PLAN	B	24-08-06
A201	GROUND FLOOR LEVEL	B	24-08-06
A202	LEVEL 2.0 - TYPICAL	B	24-08-06
A203	LEVEL 3.0 - TYPICAL	A	24-07-15
A204	LEVEL 4.0 TOP LEVEL	B	24-08-06
A205	LEVEL 5.0 - TYPICAL	B	24-08-06
A206	LEVEL 6.0 TOP LEVEL W/ PARTAIL RAMP	B	24-08-06
A207	ROOF PLAN	B	24-08-06
A300	BUILDING ELEVATIONS	B	24-08-06
A301	BUILDING ELEVATIONS	B	24-08-06
A350	BUILDING SECTIONS	B	24-08-06
A351	BUILDING SECTIONS	B	24-08-06









Newton Group Ltd.

41 MASSEY RD
GUELPH, ON
N1H 7M6
TEL: (519)822-5281
FAX: (519)823-6332
www.kiwinewton.com

LICENSED PROFESSIONAL ENGINEER
2024 08 07
C. M. KRAJCIK
100156832
PROVINCE OF ONTARIO

B	24-08-06	ISSUED FOR MINOR VARIANCE	CVL
A	24-07-15	ISSUED FOR SPA	CVL
#	DATE	DESCRIPTION	BY

PROJECT

SHOPPERS WORLD BRAMPTON PARKING STRUTURE

499 MAIN STREET S. BRAMPTON, ON L6Y 1N7

DRAWING

COVER PAGE

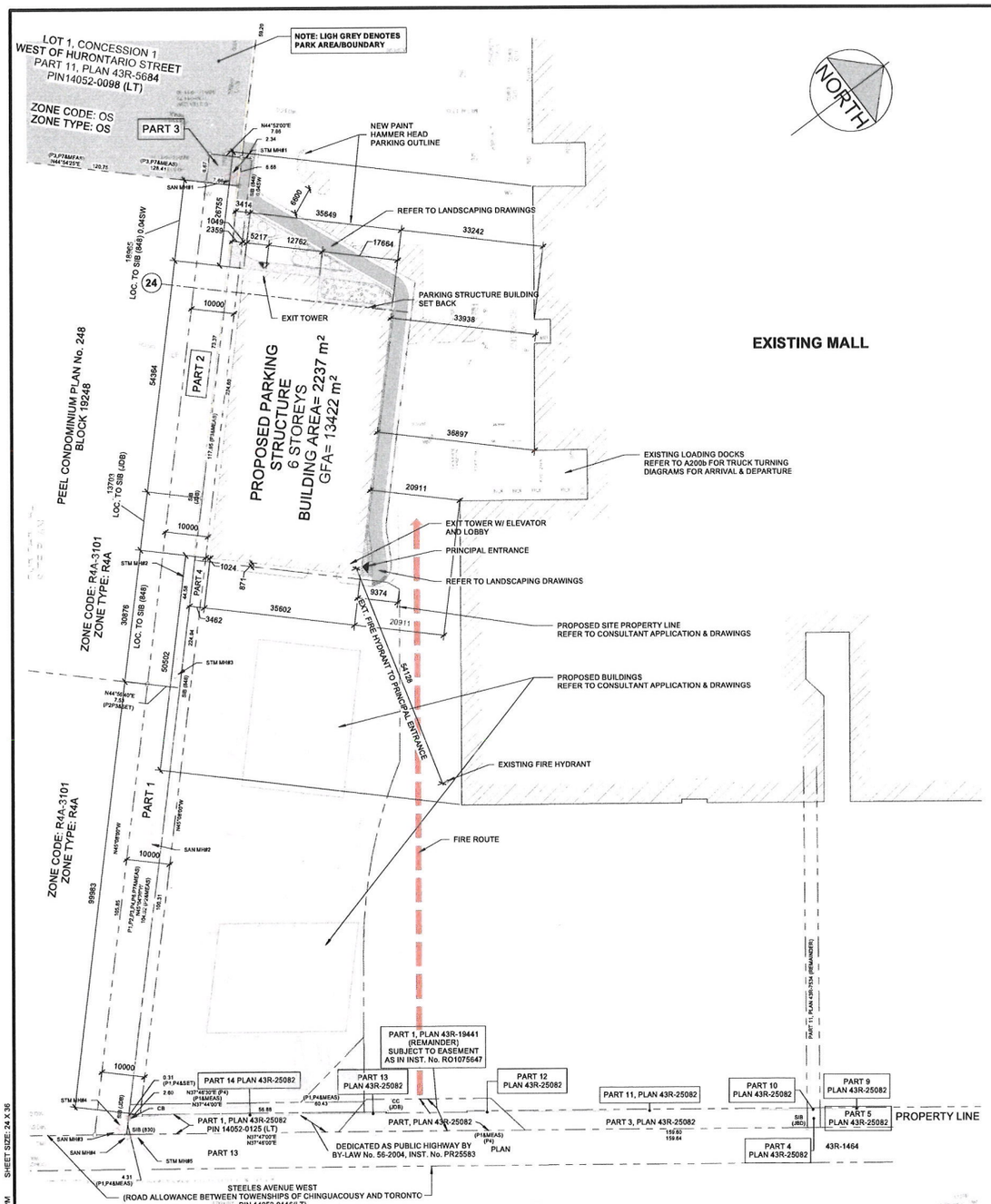
PROJECT NO.:	E24-007
PROJECT DATE:	20240402
DRAWN BY:	CVL
CHECKED BY:	CK/PH
SCALE:	AS NOTED

DRAWING NO **A000**

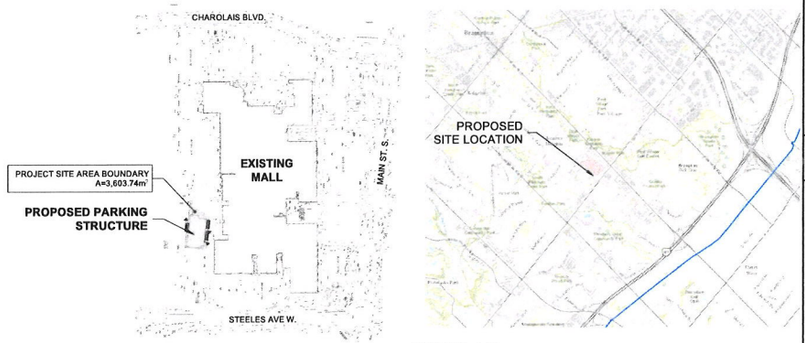
SHEET SIZE: 24 X 36

2024-08-06 2:26:07 PM

CNT FILE PATH: https://acc.autodesk.com/docs/files/projects/498514a6-46a3-4032-8483-032330254303?folderUrn=urn%3Aadsk.wipprod%3Afs.folder%3Aco.FDsiiHn3S_OqVU-Ot4PM1g&viewModel=detail&moduleId=folders



① SITE PLAN W. EXISTING SHOPPING CENTER AND PROPOSED PHASE 1A BUILDING
SCALE: 1 : 500



KEY PLAN
SCALE:N.T.S

PARKING STRUCTURE STALL COUNT		
Type	Count	Parking Stall Level Reference
TYPICAL STALL 2700 x 5400	63	GROUND FLOOR
TYPICAL STALL 2700 x 5400	30	GROUND FLOOR RAMP UP TO LEVEL 2 0
TYPICAL STALL 2700 x 5400	54	LEVEL 2 0
TYPICAL STALL 2700 x 5400	30	LEVEL 2 0 RAMP UP TO LEVEL 3 0
TYPICAL STALL 2700 x 5400	54	LEVEL 3 0
TYPICAL STALL 2700 x 5400	30	LEVEL 3 0 RAMP UP TO LEVEL 4 0
TYPICAL STALL 2700 x 5400	54	LEVEL 4 0
TYPICAL STALL 2700 x 5400	30	LEVEL 4 0 RAMP UP TO LEVEL 5 0
TYPICAL STALL 2700 x 5400	54	LEVEL 5 0
TYPICAL STALL 2700 x 5400	3	LEVEL 5 0 RAMP UP TO LEVEL 6 0
TYPICAL STALL 2700 x 5400	16	LEVEL 6 0
TYPICAL STALL 2700 x 5400	27	LEVEL 5 0 RAMP UP TO LEVEL 6 0
	445	

	Existing Shopping Centre (m²)	Shopping Centre + Prking Structure (m²)	Parking Structure Alone (m²)
Site Area	214,429	214,429	3,604
Ground Floor Area	76,273	78,510	2,237
Coverage	36%	37%	62%
Gross Floor Area	76,273	89,695	13,422

Item		Ontario Building Code Matrix Parts 3 & 9				OBC Reference	
1	Project Description	NEWTON GROUP LTD. PARKING STRUCTURE	New	Part 11		Part 3	Part 9
			Addition				2.1.1
		Change of Use	Alteration				9.10.1.3
2	Major Occupancy(s)	Group F3, Open Air Storage Garage.		Minor Occupancy(s)		3.1.2.1.(1)	--
3	Building Area (sq. M)	Garage: Existing -	New 2237 m²	Total 2237 m²		1.1.3.2	--
4	Gross Area (sq. M)	Garage: Existing -	New 13422 m²	Total 13422 m²		1.1.3.2	--
5	Number of Storeys	Above grade 6	Below grade 0			3.2.1.1	--
6	Height of Building (m)	14.383 m (FLOOR)	18.071 m (ROOF)			--	2.1.1.3
7	Number of Streets/Access Routes	1				3.2.2.10 & 3.2.5	--
8	Building Classification	3.2.2.83 Group F3, Storage Garage up to 22M High				3.2.2.83	--
9	Sprinkler System Proposed		Entire Building			3.2.2.83; 3.2.2.61	--
			Basement only				
			In lieu of roof rating				
			Not required				
10	Standpipe required		Yes	No		3.2.9.	--
11	Fire Alarm Required		Yes	No		3.2.4.	--
12	Water Service/Supply is Adequate		Yes	No		3.2.5.7.	--
13	High Building		Yes	No		3.2.6.	--
14	Permitted Construction	Combustible	Non-combustible	Both		3.2.2.26	--
	Actual Construction	Combustible	Non-combustible	Both			
15	Mezzanine(s) Area (sq. M)					3.2.1.1.(3)-(8)	--
16	Occupant load based on	S.M./Person	Design of Building			3.1.17	--
	Garage:	Occupancy: F3	Load 241	Persons			
17	Barrier-free Design		Yes	No (ACC. STALLS REFER DWG XXX TO "*SPEAK TO CK"*)		3.8	--
18	Hazardous Substances		Yes	No		3.3.1.2 & 3.3.1.19	--
19	Required Fire Resistance Rating (FRR)	Horizontal Assemblies FRR (Hours)		Listed Design No. or Description (SG-2)		3.2.2.57 & 3.2.1.4	--
		Floors 0 Hours		ULC DESIGN NO.F818			
		Roof 0 Hours		-			
		Mezzanine N/A Hours		-			
		FRR of Supporting Members		-			
		Floors 0 Hours		-			
		Roof 0 Hours		-			
		Mezzanine N/A Hours		-			
20	Spatial Separation - Construction of Exterior Walls						

Wall	Area of EBF (sm) Garage	Retail	L.D. (m)	Lim or H/L	Permitted Max % of opn'g Garage	Proposed % of opn'g Garage	Retail	FRR (hours) Garage	Retail	Listed Design or Description	Comb Const	Comb. Constr Non. Cladding	Non-Comb Const
North	1673.6		>3m										
South*	1878.4		>3m										
East	657.3		>3m										
West	634.9		>3m										

* Denotes wall faces a street

1. TWO EXITS REQUIRED FROM EACH FLOOR LEVEL. EVERY FLOOR LEVEL IS SERVED BY EXIT STAIR. DIRECT ACCESS TO GRADE PROVIDES SECOND EXIT FROM GROUND LEVEL.
2. MAXIMUM TRAVEL DISTANCE TO EXIT = 60m
3. DISTANCE BETWEEN EXITS IS GREATER THAN HALF THE DIAGONAL DIMENSION OF THE FOOTPRINT
4. GROUND FLOOR BARRIER FREE, NO ACCESSIBLE STALLS ON UPPER FLOORS

Newton Group Ltd.
41 MASSEY RD.
GUELPH, ON.
N1H 7M6
TEL: (519)823-5281
FAX: (519)823-6332
www.kawinewton.com

LICENSED PROFESSIONAL ENGINEER
2024 08 07
G. M. KRAJCIK
100158832
PROVINCE OF ONTARIO

#	DATE	DESCRIPTION	BY
B	24-08-06	ISSUED FOR MINOR VARIANCE	CVL
A	24-07-25	ISSUED FOR SPA	CVL

PRE-APPLICATION FILE NUMBER: PRE-2022-0130

PROJECT
SHOPPERS WORLD BRAMPTON PARKING STRUTURE
499 MAIN STREET S. BRAMPTON, ON L6Y 1N7

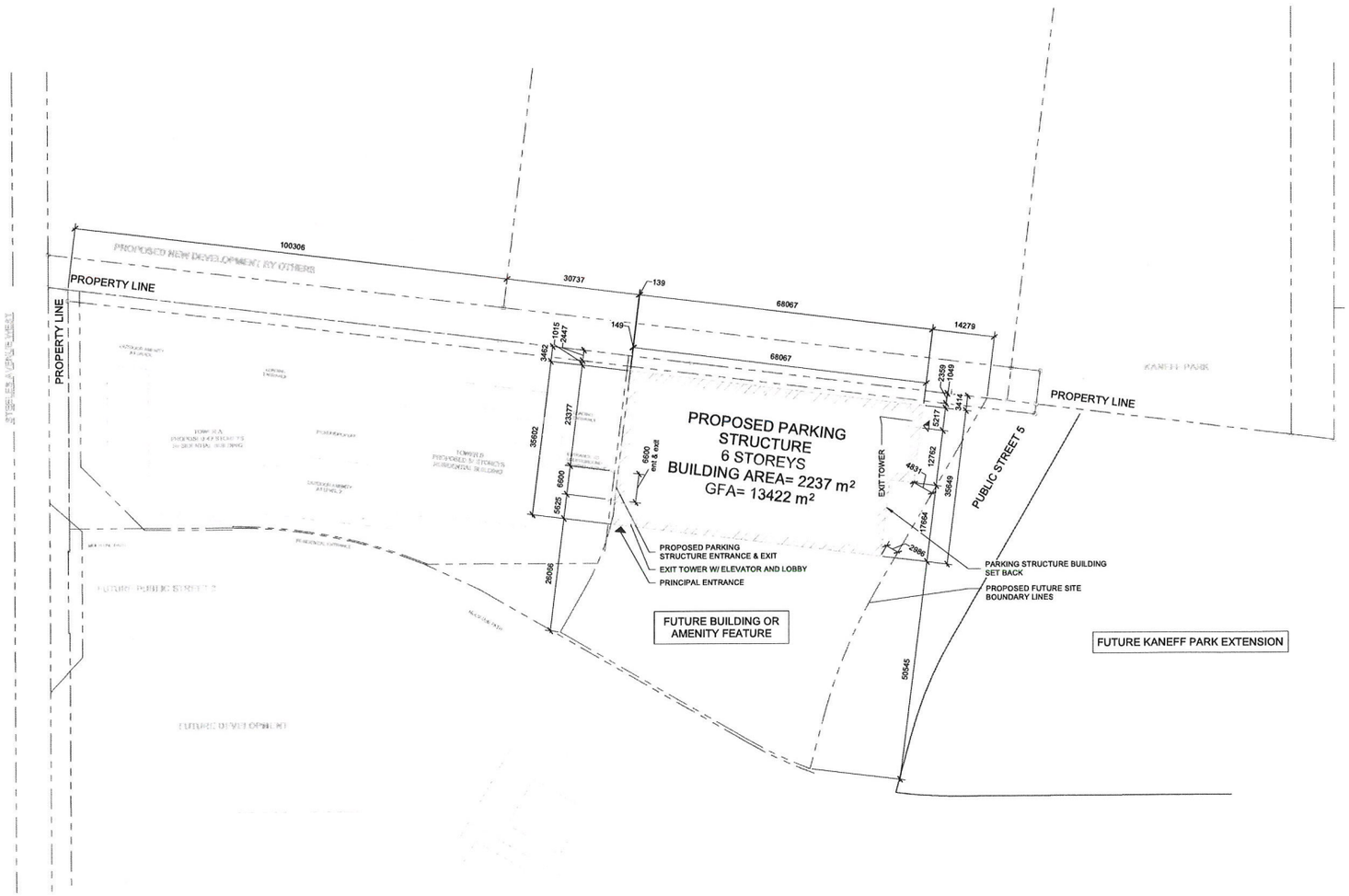
DRAWING
SITE PLAN W. EXISTING & OBC MATRIX

PROJECT NO.: E24-007
PROJECT DATE: 20240402
DRAWN BY: CVL
CHECKED BY: CK
SCALE: As indicated

DRAWING NO. **A200a**

SHEET SIZE: 24 X 36
2024-08-06 2:26:47 PM

CNT FILE PATH: https://acc.autodesk.com/docs/files/projects/498514a6-46a3-4032-8483-032330254303?folderUrn=urn%3Aadsk.wipprod%3Afs.folder%3Aco.FDsiiHn3S_OqVU-Ot4PM1g&viewModel=detail&moduleId=folders



① SITE PLAN W. FUTURE CONDITION
SCALE: 1 : 500

Newton Group Ltd.

41 MASSEY RD.
GUELPH, ON
N1H 7M5
TEL: (519)822-5281
FAX: (519)823-6332
www.kwinewton.com

REGISTERED PROFESSIONAL ENGINEER
2024 08 07
G. M. KRAJCIK
100156632
PROVINCE OF ONTARIO

#	DATE	DESCRIPTION	BY
B	21-08-06	ISSUED FOR MINOR VARIANCE	CVL
A	21-07-15	ISSUED FOR SPA	CVL

PRE-APPLICATION FILE NUMBER: PRE-2022-0130

PROJECT

SHOPPERS WORLD BRAMPTON PARKING STRUTURE

499 MAIN STREET S. BRAMPTON, ON L6Y 1N7

DRAWING

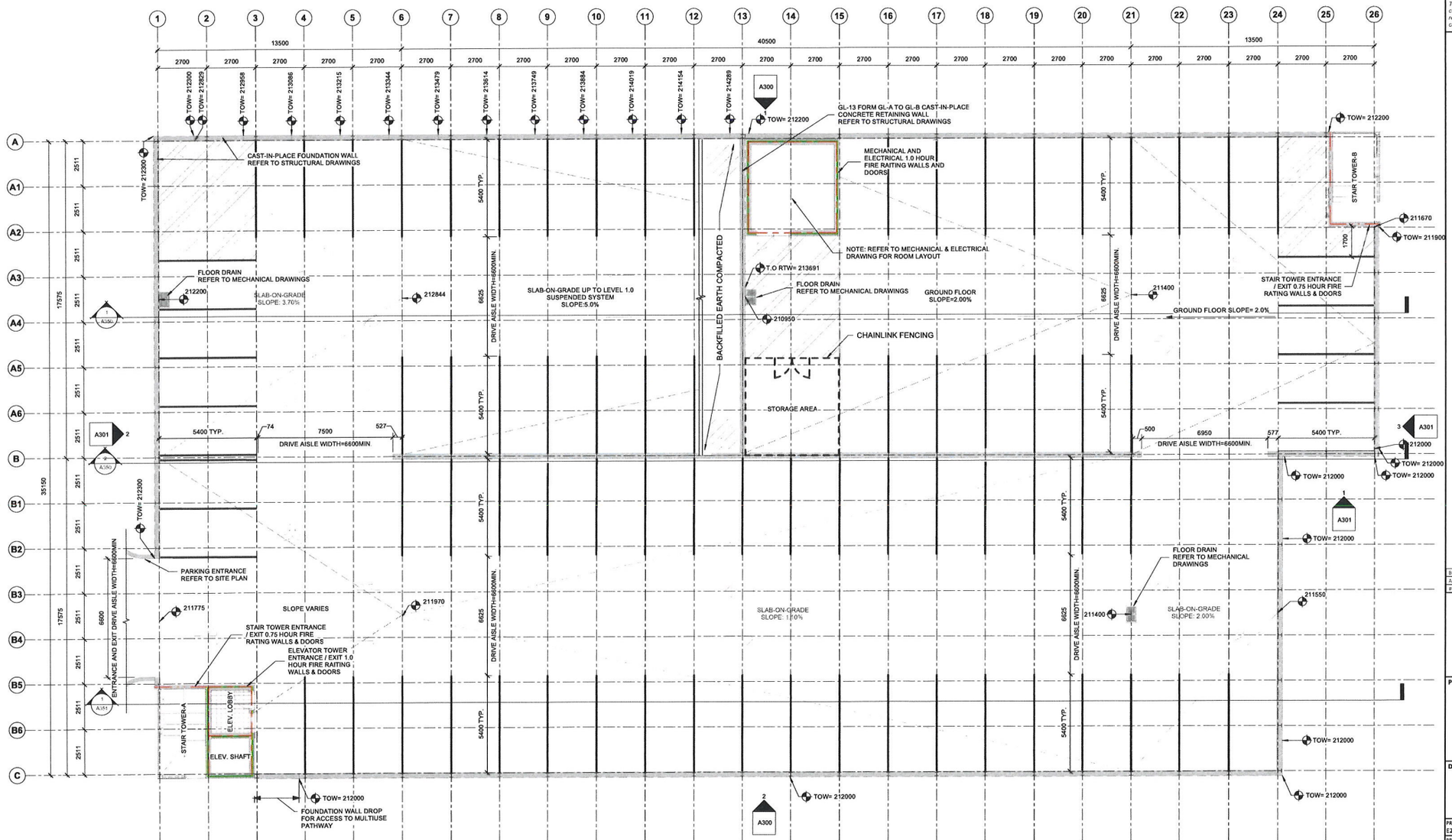
SITE PLAN W. FUTURE CONDITIONS

PROJECT NO.:	E24-007
PROJECT DATE:	20240402
DRAWN BY:	CVL
CHECKED BY:	CK
SCALE:	1 : 500

DRAWING NO **A200b**

2024-08-06 2:26:57 PM SHEET SIZE: 24 X 36

CNT FILE PATH: https://acc.autodesk.com/docs/files/projects/498514a6-46a3-4032-8483-0323302543037folderUrn=urn%3Aadsk.wipprod%3Afs.folder%3Aco.FDsiiHn3S_OqVU-Ot4PM1g&viewModel=detail&moduleId=folders



1 **GROUND FLOOR LEVEL**
SCALE: 1 : 100

2024-08-06 2:27:26 PM SHEET SIZE: 24 X 36

CNT FILE PATH: https://acc.autodesk.com/docs/files/projects/498514a6-46a3-4032-8483-0323302543037folderUrn=urn%3Aadsk.wipprod%3Afs.folder%3Aco.FDsiIHn3S_OqVU-Ot4PM1g&viewModel=detail&moduleId=folders

Newton Group Ltd.

41 MASSEY RD.
GUELPH, ON
N1H 7M6
TEL: (519)822-5281
FAX: (519)823-6332
www.knewton.com

LICENSED PROFESSIONAL ENGINEER
2024 08 07
G. M. KRAJCIK
100188832
PROVINCE OF ONTARIO

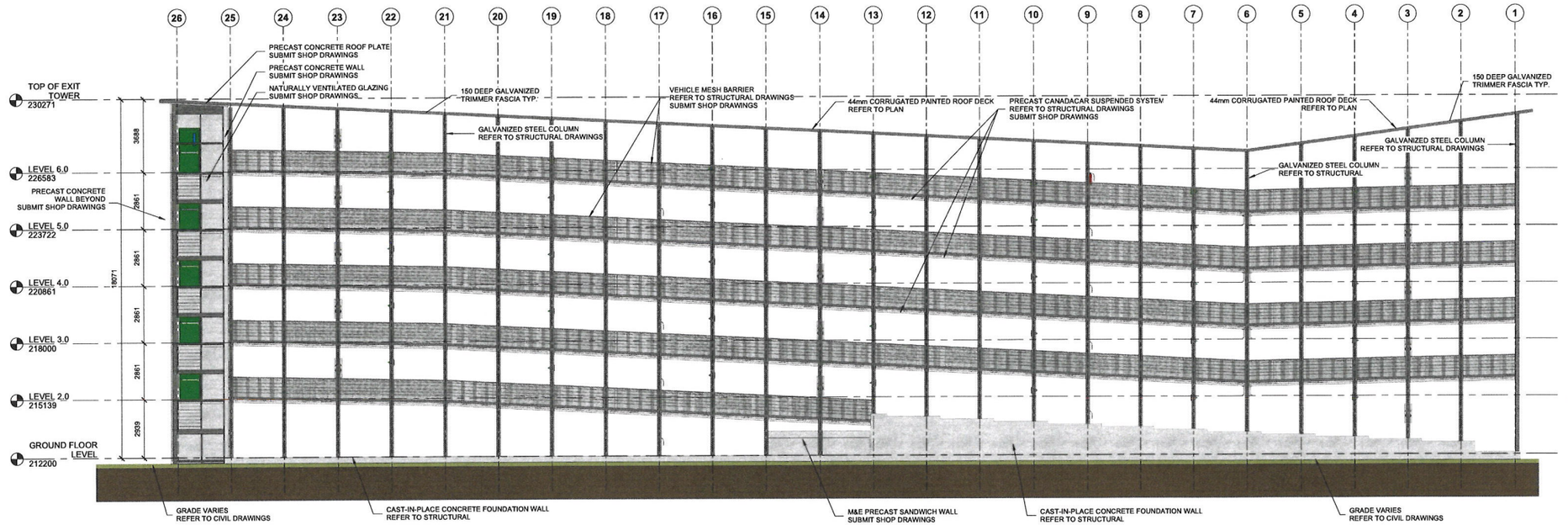
#	DATE	DESCRIPTION	BY
B	24-08-06	ISSUED FOR MINOR VARIANCE	CVL
A	24-07-15	ISSUED FOR SPA	CVL

PROJECT
SHOPPERS WORLD BRAMPTON PARKING STRUTURE
499 MAIN STREET S. BRAMPTON, ON L6Y 1N7

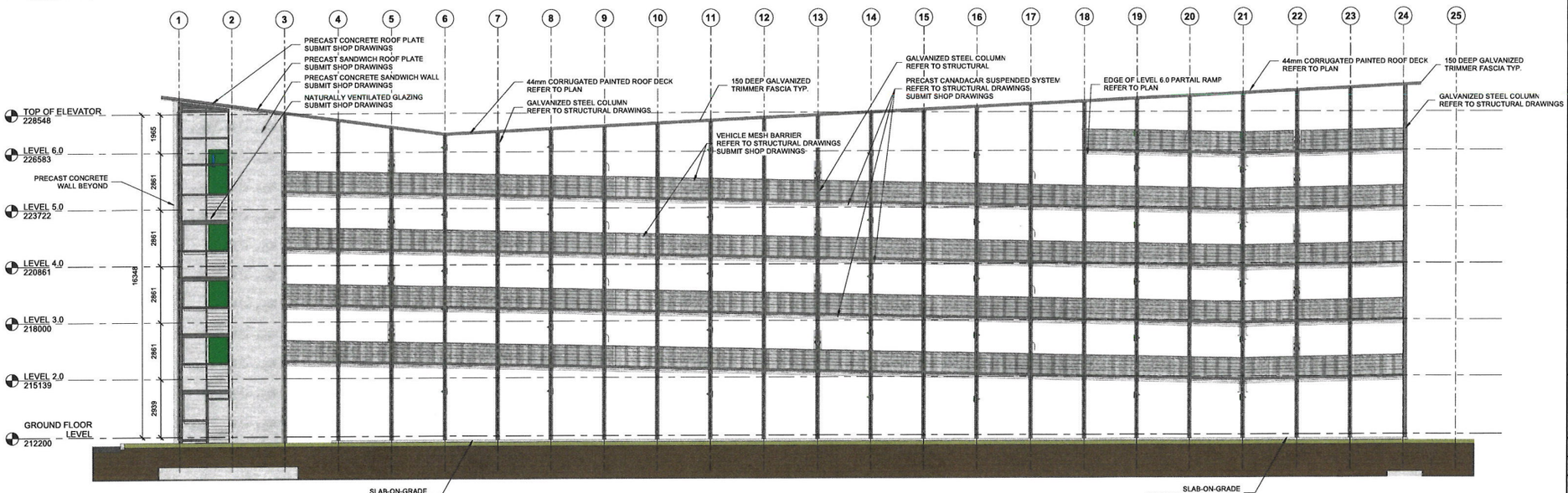
DRAWING
GROUND FLOOR LEVEL

PROJECT NO.:	E24-007
PROJECT DATE:	20240402
DRAWN BY:	CVL
CHECKED BY:	CK
SCALE:	1 : 100

DRAWING NO **A201**



1 WEST BUILDING ELEVATION
SCALE: 1 : 100



2 EAST BUILDING ELEVATION-A
SCALE: 1 : 100

Newton Group Ltd.
41 MASSEY RD
GUELPH, ON
N1H 7M6
TEL: (519)822-5281
FAX: (519)823-6332
www.kiwinewton.com

LICENSED PROFESSIONAL ENGINEER
2024 08 07
C. M. KRAJCIK
100158632
PROVINCE OF ONTARIO

#	DATE	DESCRIPTION	BY
B	24-08-06	ISSUED FOR MINOR VARIANCE	CVL
A	24-07-15	ISSUED FOR SPA	CVL

PROJECT
SHOPPERS WORLD BRAMPTON PARKING STRUTURE
499 MAIN STREET S. BRAMPTON, ON L6Y 1N7

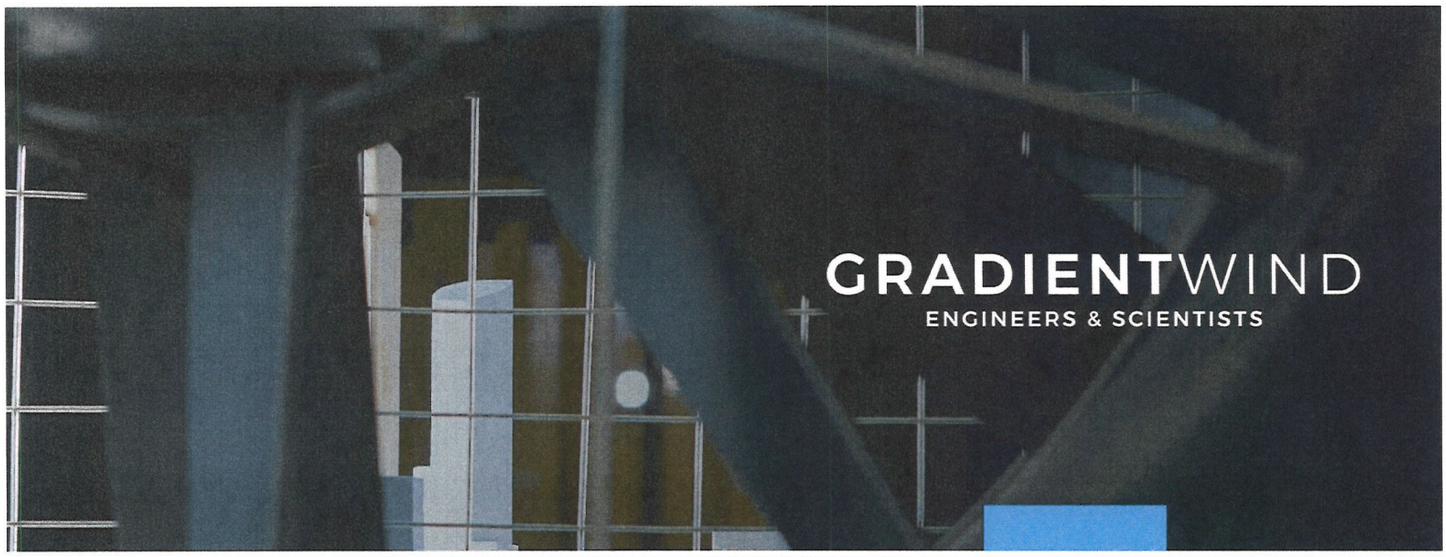
DRAWING
BUILDING ELEVATIONS

PROJECT NO.:	E24-007
PROJECT DATE:	20240402
DRAWN BY:	CVL
CHECKED BY:	CK
SCALE:	1 : 100

DRAWING NO **A300**

SHEET SIZE: 24 X 36
2024-08-06 2:28:45 PM

CNT FILE PATH: https://acc.autodesk.com/docs/files/projects/498514a6-46a3-4032-8483-032330254303?folderUrn=urn%3Aadsk.wipprod%3Afs.folder%3Aco.FDsiiHn3S_OqVU-Ot4PM1g&viewModel=detail&moduleId=folders

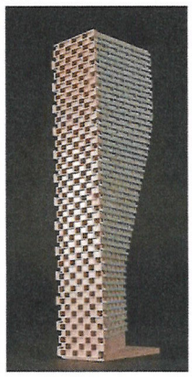


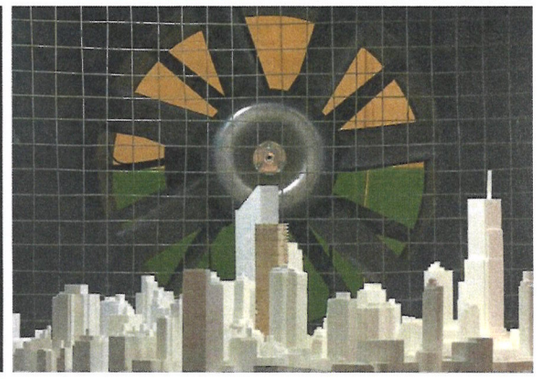
GRADIENTWIND
ENGINEERS & SCIENTISTS

PEDESTRIAN LEVEL WIND STUDY

Shoppers World Brampton Phase 1A,
Brampton, Ontario
SPA-2022-0120

REPORT: GWE24-043-WTPLW





April 26, 2024

PREPARED FOR

KIRKOR Architects & Planners
20 De Boers Drive, Suite 400,
Toronto, Ontario
M3J 0H1

PREPARED BY

Cristiano Kondo, MESc., Junior Wind Scientist
Angelina Gomes, B.Eng., EIT., Wind Scientist
Nick Petersen, P.Eng., Wind Engineer

GRADIENTWIND
ENGINEERS & SCIENTISTS

EXECUTIVE SUMMARY

This report describes a wind tunnel pedestrian level wind study undertaken to assess wind conditions for the proposed residential development, referred to as Shoppers World Brampton Phase 1A, located at 499 Main Street South in Brampton, Ontario. Two configurations were studied: (i) *existing scenario*, including all approved, surrounding developments and without the proposed developments, and (ii) *proposed scenario* with the proposed developments in place. The study involves wind tunnel measurements of pedestrian wind speeds using a physical scale model, combined with meteorological data integration, to assess pedestrian comfort at key areas within and surrounding the study site. Grade-level areas investigated include sidewalks, laneways, parking areas, landscaped spaces, outdoor amenities, and building access points. Wind comfort is also evaluated over the Level 2 outdoor amenity terrace. The results and recommendations derived from these considerations are summarized in the following paragraphs and detailed in the subsequent report.

Our work is based on industry standard wind tunnel testing and data analysis procedures, architectural drawings provided by Kirkor Architects and Planners in April 2024, surrounding street layouts, as well as existing and approved future building massing information, and recent site imagery.

A complete summary of the predicted wind conditions is provided in Section 5 of this report and is also illustrated in Figures 2A through 4B, as well as Tables A1-A3 and B1-B4 in the appendices. Based on wind tunnel test results, meteorological data analysis, and experience with similar developments in Brampton, we conclude that the future wind conditions over all grade-level pedestrian wind-sensitive areas within and surrounding the study site will be acceptable for the intended uses on a seasonal basis. Additionally, the Level 2 outdoor amenity terrace will be suitable for sitting or more sedentary activities during the summer months, without the need for mitigation.

Within the context of typical weather patterns, which exclude anomalous localized storm events such as tornadoes and downbursts, no areas over the study site were found to experience conditions that could be considered unsafe.

GRADIENTWIND
ENGINEERS & SCIENTISTS

TABLE OF CONTENTS

1. INTRODUCTION 1

2. TERMS OF REFERENCE 1

3. OBJECTIVES 2

4. METHODOLOGY 2

4.1 Wind Tunnel Context Modelling 3

4.2 Wind Speed Measurements 3

4.3 Meteorological Data Analysis - Pearson International Airport 4

4.4 Pedestrian Comfort and Safety Guidelines 6

5. RESULTS AND DISCUSSION 7

5.1 Pedestrian Comfort Suitability – *Existing Scenario* 8

5.2 Pedestrian Comfort Suitability – *Proposed Scenario* 9

6. CONCLUSIONS AND RECOMMENDATIONS 10

MODEL PHOTOGRAPHS
FIGURES
APPENDICES

Appendix A – Pedestrian Comfort Suitability (Existing Scenario)
Appendix B – Pedestrian Comfort Suitability (Proposed Scenario)
Appendix C – Wind Tunnel Simulation of the Natural Wind
Appendix D – Pedestrian Level Wind Measurement Methodology

GRADIENTWIND
ENGINEERS & SCIENTISTS

1. INTRODUCTION

This report describes a wind tunnel pedestrian level wind (PLW) study undertaken to assess wind conditions for the proposed residential development, referred to as Shoppers World Brampton Phase 1A, located at 499 Main Street South in Brampton, Ontario. Two configurations were studied: (i) *existing scenario*, including all approved, surrounding developments and without the proposed development, and (ii) *proposed scenario* with the proposed development in place. The study was performed in accordance with industry standard wind tunnel testing techniques, architectural drawings provided by Kirkor Architects and Planners in April 2024, surrounding street layouts and existing and approved future building massing information, as well as recent site imagery.

2. TERMS OF REFERENCE

The focus of this wind tunnel pedestrian wind study is the proposed development located at 499 Main Street South in Brampton, Ontario. The study site is situated approximately 300 metres southwest of the intersection between Steeles Avenue West and Main Street South.

The proposed development comprises 42- and 37-storey towers, labeled as Towers A and B and aligned south-north, respectively, on a shared two-storey podium. A laneway connecting to Future Public Street 2 along the north elevation provides access to loading areas and the ramp to two levels of underground parking. The ground floor comprises a central residential lobby accessed from the east and west elevations (primarily) and at the northeast and southeast corners, indoor amenities along the south elevation, and building support services elsewhere. An outdoor amenity space is located along the west elevation of Tower A. The floorplate sets back to the base of the towers at Level 2, accommodating an outdoor amenity terrace between the towers and a green roof along the south of Tower A. Additionally, Tower A features an indoor amenity at the northeast corner with mostly residential spaces elsewhere, and Tower B an indoor amenity at the southeast corner, residential spaces along the east elevation, and bike storage elsewhere. The floorplate sets back to the tower's typical floorplate at Level 3, featuring green roofs to the northwest of Towers A and B, and rises uniformly to the full height, where mechanical penthouses complete each tower.

Regarding wind exposures, the near-field surroundings of the development (defined as an area falling within a 200-metre radius of the site) comprise primarily low-rise commercial buildings and surface parking to the north clockwise to the southeast, and high-rise in the remaining directions. Specifically, the existing two 22-storey towers and the future towers and townhouses (26-, 37-, and 37-storeys) to the immediate west at 210 & 220 Steeles Avenue West, and the future 45- and 50-storey towers to the south at 137 Steeles Avenue West. The far-field surroundings (defined as the area beyond the near-field and within a two-kilometer radius) comprise open green space and low-rise residential exposure in all directions with isolated clusters of mid-rise buildings.

Grade-level areas investigated include sidewalks, laneways, parking areas, landscaped spaces, outdoor amenities, and building access points. Wind comfort is also evaluated over the Level 2 outdoor amenity terrace. Figures 1A and 1B illustrate the existing and proposed study sites and surrounding context, respectively, and Photographs 1 through 6 depict the wind tunnel model used to conduct the study.

3. OBJECTIVES

The principal objectives of this study are to (i) determine pedestrian level wind comfort and safety conditions at key areas within and surrounding the development site; (ii) identify areas where wind conditions may interfere with the intended uses of outdoor spaces; (iii) recommend suitable mitigation measures, where required; and (iv) evaluate the influence of the proposed development on the existing wind conditions.

4. METHODOLOGY

The approach followed to quantify pedestrian wind conditions over the site is based on wind tunnel measurements of wind speeds at selected locations on a reduced-scale physical model, meteorological analysis of the Brampton area wind climate and synthesis of wind tunnel data with industry-accepted guidelines[1]. The following sections describe the analysis procedures, including a discussion of the pedestrian comfort and safety guidelines.

[1] Pedestrian Level Wind Study Guidelines and Terms of Reference Guide, City of Brampton, 2024

4.1 Wind Tunnel Context Modelling

A detailed PLW study is performed to determine the influence of local winds at the pedestrian level for a proposed development. The physical model of the proposed developments and relevant surroundings, illustrated in Photographs 1 through 6 following the main text, was constructed at a scale of 1:400. The wind tunnel model includes all existing buildings and approved future developments within a full-scale diameter of approximately 840 metres. The general concept and approach to wind tunnel modelling is to provide building and topographic detail in the immediate vicinity of the study site on the surrounding model, and to rely on a length of wind tunnel upwind of the model to develop wind properties consistent with known turbulent intensity profiles that represent the surrounding terrain.

An industry standard practice is to omit trees, vegetation, and other existing and planned landscape elements from the wind tunnel model due to the difficulty of providing accurate seasonal representation of vegetation. The omission of trees and other landscaping elements produces slightly more conservative wind speed values.

4.2 Wind Speed Measurements

The PLW study was performed by testing a total of 81 sensor locations on the scale model in Gradient Wind's wind tunnel. Of these 81 sensors, 76 were located at grade and the remaining five sensors were located over the Level 2 amenity terrace. Wind speed measurements were performed for each of the 81 sensors for 36 wind directions at 10° intervals. Figures 1A and 1B illustrates the *existing* and *proposed* study sites and surrounding context, respectively, while sensor locations used to investigate wind conditions are illustrated in Figures 2A through 4B.

Mean and peak wind speed values for each location and wind direction were calculated from real-time pressure measurements, recorded at a sample rate of 500 samples per second, and taken over a 60-second time period. This period at model-scale corresponds approximately to one hour in full-scale, which matches the time frame of full-scale meteorological observations. Measured mean and gust wind speeds at grade were referenced to the wind speed measured near the ceiling of the wind tunnel to generate mean and peak wind speed ratios. Ceiling height in the wind tunnel represents the depth of the boundary layer of wind flowing over the earth's surface, referred to as the gradient height. Within this boundary layer, mean wind speed increases up to the gradient height and remains constant thereafter. Appendices

C and D provide greater detail of the theory behind wind speed measurements. Wind tunnel measurements for this project, conducted in Gradient Wind's wind tunnel facility, meet or exceed guidelines found in the National Building Code of Canada 2015 and of 'Wind Tunnel Studies of Buildings and Structures', ASCE Manual 7 Reports on Engineering Practice No 67.

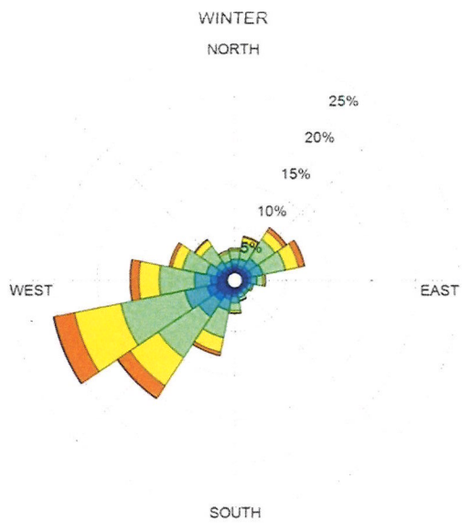
4.3 Meteorological Data Analysis - Pearson International Airport

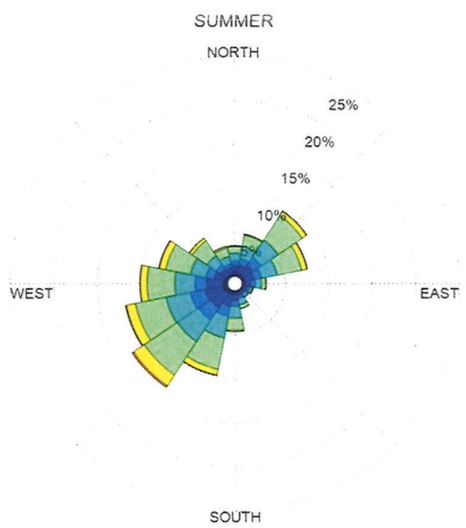
A statistical model for winds in Brampton was developed from over 50 years of hourly meteorological wind data recorded at Pearson International Airport. Wind speed and direction data were analyzed for each month of the year in order to determine the statistically prominent wind directions and corresponding speeds and to characterize similarities between monthly weather patterns. Following the Pedestrian Level Wind Study Guidelines and Terms of Reference for Brampton, the year is represented by a two-season model, and not according to the traditional calendar method.

The statistical model of the Brampton area wind climate, which indicates the directional character of local winds on a seasonal basis, is illustrated on the following page. The plots illustrate seasonal distribution of measured wind speeds and directions in km/h. Probabilities of occurrence of different wind speeds are represented as stacked polar bars in sixteen azimuth divisions. The radial direction represents the percentage of time for various wind speed ranges per wind direction during the measurement period. The preferred wind speeds and directions can be identified by the longer length of the bars. For Brampton, the most common winds concerning pedestrian comfort occur from the southwest clockwise to the north, as well as those from the east. The directional preference and relative magnitude of the wind speed varies somewhat from season to season, with the summer months displaying the calmest winds relative to the remaining seasonal periods.

GRADIENTWIND
ENGINEERS & SCIENTISTS

SEASONAL DISTRIBUTION OF WINDS FOR VARIOUS PROBABILITIES
PEARSON INTERNATIONAL AIRPORT, TORONTO, ONTARIO





Notes:

1. Radial distances indicate percentage of time of wind events.
2. Wind speeds are mean hourly in km/h, measured at 10 m above the ground.

4.4 Pedestrian Comfort and Safety Guidelines

Pedestrian comfort and safety guidelines are based on the mechanical effects of wind without consideration of other meteorological conditions (i.e. temperature, relative humidity). The comfort guidelines assume that pedestrians are appropriately dressed for a specified outdoor activity during any given season. Four pedestrian comfort classes are based on 80% non-exceedance Guest Equivalent Mean (GEM) wind speed ranges, which include (i) Sitting; (ii) Standing; (iii) Walking; and (iv) Uncomfortable. More specifically, the comfort classes and associated GEM wind speed ranges are summarized as follows:

(i) **Sitting** – A wind speed below 10 km/h (i.e. 0 – 10 km/h) would be considered acceptable for sedentary activities, including sitting.

(ii) **Standing** – A wind speed below 15 km/h (i.e. 10 km/h – 15 km/h) is acceptable for activities such as standing or leisurely strolling.

(iii) **Walking** – A wind speed below 20 km/h (i.e. 15 km/h – 20 km/h) is acceptable for walking or more vigorous activities.

(iv) **Uncomfortable** – A wind speed over 20 km/h is classified as uncomfortable from a pedestrian comfort standpoint. Brisk walking and exercise, such as jogging, would be acceptable for moderate excesses of this criterion.

The pedestrian safety wind speed guideline is based on the approximate threshold that would cause a vulnerable member of the population to fall. A 0.1% exceedance gust wind speed of greater than 90 km/h is classified as dangerous.

Experience and research on people's perception of mechanical wind effects has shown that if the wind speed levels are exceeded for more than 20% of the time, the activity level would be judged to be uncomfortable by most people. For instance, if wind speeds of 10 km/h were exceeded for more than 20% of the time most pedestrians would judge that location to be too windy for sitting or more sedentary activities. Similarly, if 20 km/h at a location were exceeded for more than 20% of the time, walking or less vigorous activities would be considered uncomfortable. As most of these criteria are based on subjective reactions of a population to wind forces, their application is partly based on experience and judgment.

Once the pedestrian wind speed predictions have been established at tested locations, the assessment of pedestrian comfort involves determining the suitability of the predicted wind conditions for their

associated spaces. This step involves comparing the predicted comfort class to the desired comfort class, which is dictated by the location type represented by the sensor (i.e. a sidewalk, building entrance, amenity space, or other). An overview of common pedestrian location types and their desired comfort classes are summarized below.

DESIRED PEDESTRIAN COMFORT CLASSES FOR VARIOUS LOCATION TYPES

Location Types	Desired Comfort Classes
Primary Building Entrance	Standing
Secondary Building Access Point	Walking
Public Sidewalks / Pedestrian Walkways	Walking
Outdoor Amenity Spaces	Sitting / Standing
Cafés / Patios / Benches / Gardens	Sitting / Standing
Plazas	Standing / Walking
Transit Stops	Standing
Public Parks	Sitting / Walking
Garage / Service Entrances	Walking
Vehicular Drop-Off Zones	Walking
Laneways / Loading Zones	Walking

5. RESULTS AND DISCUSSION

Tables A1 through A3 in Appendix A provide a summary of seasonal comfort predictions for each sensor location under the *existing* massing scenario. Similarly, Tables B1 through B3 in Appendix B provide the seasonal comfort predictions for under the *proposed* massing scenario. The tables indicate the 80% non-exceedance GEM wind speeds and corresponding comfort classifications as defined in Section 4.4. In other words, a wind speed threshold of 19.1 for the summer season indicates that 80% of the measured data falls at or below 19.1 km/h during the summer months and conditions are therefore suitable for walking, as the 80% threshold value falls within the exceedance range of 15-20 km/h for walking. The tables include the predicted threshold values for each sensor location during each season, accompanied by the corresponding predicted comfort class (i.e., sitting, standing, walking, etc.).

The most significant findings of the PLW study are summarized in Sections 5.1 and 5.2. To assist with understanding and interpretation, predicted conditions for the proposed development are also illustrated in colour-coded format in Figures 2A through 4B. Conditions suitable for sitting are represented by the colour blue, while standing is represented by green, and walking by yellow. Conditions considered uncomfortable for walking are represented by the colour orange.

5.1 Pedestrian Comfort Suitability – *Existing Scenario*

Based on the analysis of the measured data, consideration of local climate data, and the suitability descriptors provided in Tables A1-A3 in Appendix A and illustrated in Figures 2A and 2B, this section summarizes the significant findings of the PLW study with respect to the *existing scenario*, as follows:

1. Most public sidewalks, landscaped areas, laneways, and surface parking within and surrounding the proposed development currently experience wind conditions suitable for walking or better during each seasonal period. Exceptions include isolated sidewalk portions along Steeles Avenue West (Sensors 14 & 16) and an internal area of the site (Sensor 43), which marginally exceed the walking criteria during the winter months.
2. The primary entrances to the existing Oceans Fresh Food Market and Shoppers World Mall directly east of the site (Sensor 31) currently experience wind conditions comfortable for sitting throughout the year.
3. The outdoor play area of the future development at 210 & 220 Steeles Avenue West, directly west of the study building (Sensors 11-13) is currently suitable for standing or better during the summer months and walking or better during the winter months.
4. The existing tennis court to the northwest (Sensor 1) is currently suitable for standing during the summer and walking during the winter.
5. Within the context of typical weather patterns, which exclude anomalous localized storm events such as tornadoes and downbursts, no areas over the study site were found to experience wind conditions that are considered unsafe.

5.2 Pedestrian Comfort Suitability – *Proposed Scenario*

Based on the analysis of the measured data, consideration of local climate data, and the suitability descriptors provided in Tables B1-B3 in Appendix B and illustrated in Figures 3A through 4B, this section summarizes the significant findings of the PLW study with respect to the *proposed scenario*, as follows:

1. Most public sidewalks, walkways, surface parking, laneways, and landscaped areas within and surrounding the proposed development will experience wind conditions suitable for walking or better during each seasonal period, which is acceptable for the intended uses of the spaces. Exceptions include an isolated sidewalk portion along Steeles Avenue West (Sensor 16), and driveway (Sensor 69) internal to the site, which marginally exceeds the walking criterion during the colder months. It is noteworthy that the exceedance of the walking comfort threshold is pre-existing along the Steeles Avenue West sidewalk, and wind speeds remain safe at both areas, as defined in Section 4.4. Consequently, and considering the marginality of the exceedances, the noted conditions are considered acceptable.

2. Most residential lobby entrances will be comfortable for standing or better throughout the year, which is appropriate. One exception is the entrance at the northeast corner (Sensor 45), which exceeds the standing criterion during the winter months. Since testing, the noted entrance has been recessed into the building façade, which is expected to improve wind conditions to acceptable levels, therefore no further mitigation is considered necessary.

   All secondary building access points (including stairwell exits, loading areas, and vehicle entrances) throughout the proposed development will be comfortable for walking or better throughout the year, which is appropriate.

3. The primary entrances to the existing Oceans Fresh Food Market and Shoppers World Mall directly east of the site (Sensor 31) will remain comfortable for sitting throughout the year, which is appropriate.

4. The proposed dog-run area southwest of Tower B (Sensor 74) will be comfortable for standing throughout the year, which is acceptable for the intended use of space.
5. The proposed outdoor amenity area along the west of Tower A (Sensors 62-67) will generally be suitable for walking throughout the year, with the central and southwest areas (Sensors 64-66)

transitioning to uncomfortable for walking during the winter months. To reduce wind speeds over the amenity, dense conifers have since been planned along the west and north perimeters of the space, which is expected to improve wind conditions to acceptable levels, therefore no further mitigation is considered necessary.

6. The outdoor play area of the future development at 210 & 220 Steeles Avenue West, directly west of the study building (Sensors 11-13) will be suitable for standing or better throughout the year, which is acceptable and represents a marginal improvement from the existing wind conditions.
7. The existing tennis court to the northwest (Sensor 1) will be suitable for standing throughout the year, which is an improvement from the existing conditions.
8. The Level 2 outdoor amenity terrace (Sensors 77-81) will generally be suitable for sitting or more sedentary activities during the summer months, without the need for mitigation.
9. Within the context of typical weather patterns, which exclude anomalous localized storm events such as tornadoes and downbursts, no areas over the study site were found to experience wind conditions that are considered unsafe.

6. CONCLUSIONS AND RECOMMENDATIONS

This report summarizes the methodology, results, and recommendations related to a pedestrian level wind study for the proposed development located at 499 Main Street South in Brampton, Ontario. The study was performed in accordance with industry standard wind tunnel testing and data analysis procedures.

A complete summary of the predicted wind conditions is provided in Section 5 of this report and is also illustrated in Figures 2A through 4B, as well as Tables A1-A3 and B1-B4 in the appendices. Based on wind tunnel test results, meteorological data analysis, and experience with similar developments in Brampton, we conclude that the future wind conditions over all grade-level pedestrian wind-sensitive areas within and surrounding the study site will be acceptable for the intended uses on a seasonal basis. Additionally, the Level 2 outdoor amenity terrace will be suitable for sitting or more sedentary activities during the summer months, without the need for mitigation.

Within the context of typical weather patterns, which exclude anomalous localized storm events such as tornadoes and downbursts, no areas over the study site were found to experience conditions that could be considered unsafe.

This concludes our pedestrian level wind study and report. Please advise the undersigned of any questions or comments.

Sincerely,

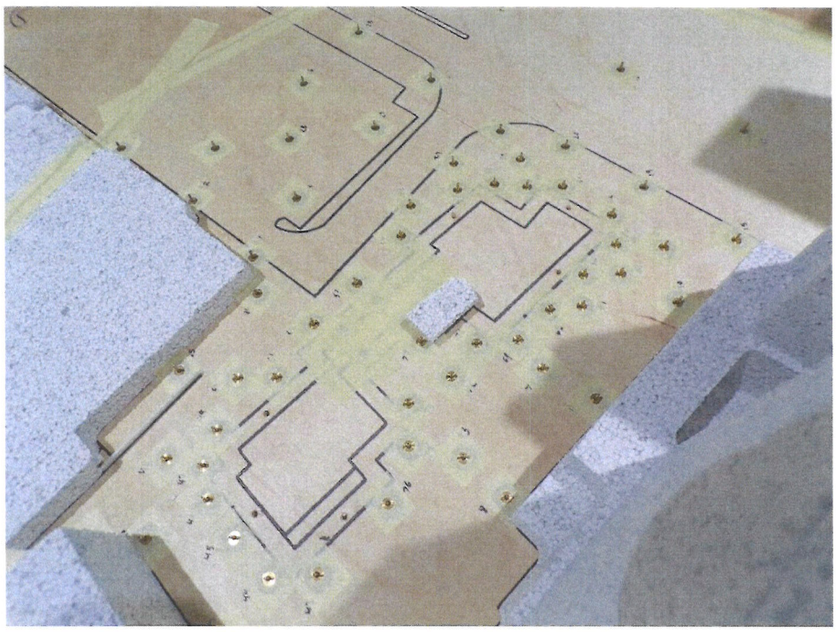
Gradient Wind Engineering Inc.

Cristiano Kondo, MESc.,
Junior Wind Scientist

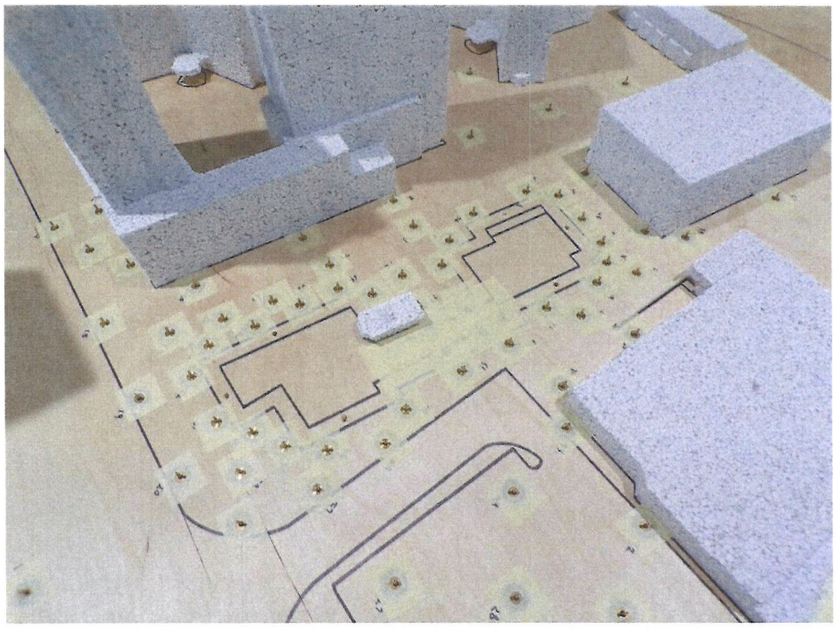
Nick Petersen, P.Eng.,
Wind Engineer

Angelina Gomes, B.Eng., EIT.,
Wind Scientist

GW24-043-WTPLW



PHOTOGRAPH 1: CLOSE-UP VIEW OF EXISTING CONTEXT MODEL LOOKING NORTHEAST

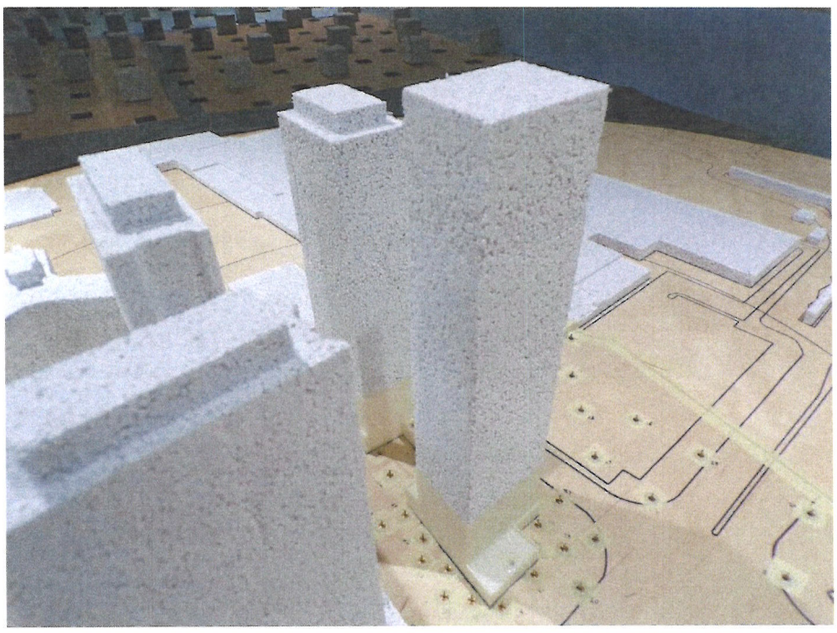


PHOTOGRAPH 2: CLOSE-UP VIEW OF EXISTING CONTEXT MODEL LOOKING SOUTHWEST

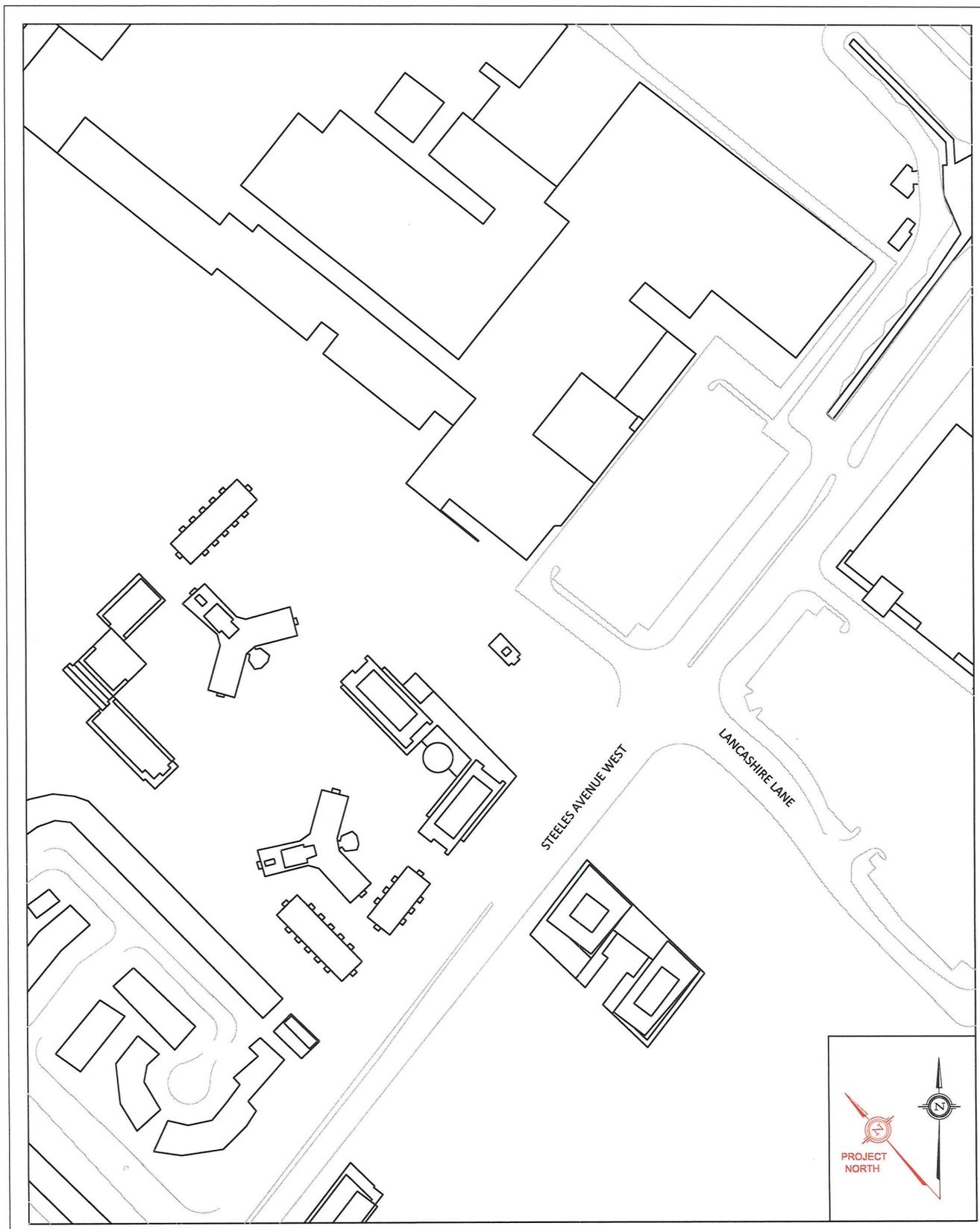
PHOTOGRAPH 3: <u>PROPOSED</u> STUDY MODEL INSIDE THE GWE WIND TUNNEL LOOKING DOWNWIND

PHOTOGRAPH 4: <u>PROPOSED</u> STUDY MODEL INSIDE THE GWE WIND TUNNEL LOOKING UPWIND

PHOTOGRAPH 5: CLOSE-UP VIEW OF <u>PROPOSED</u> STUDY MODEL LOOKING SOUTHWEST



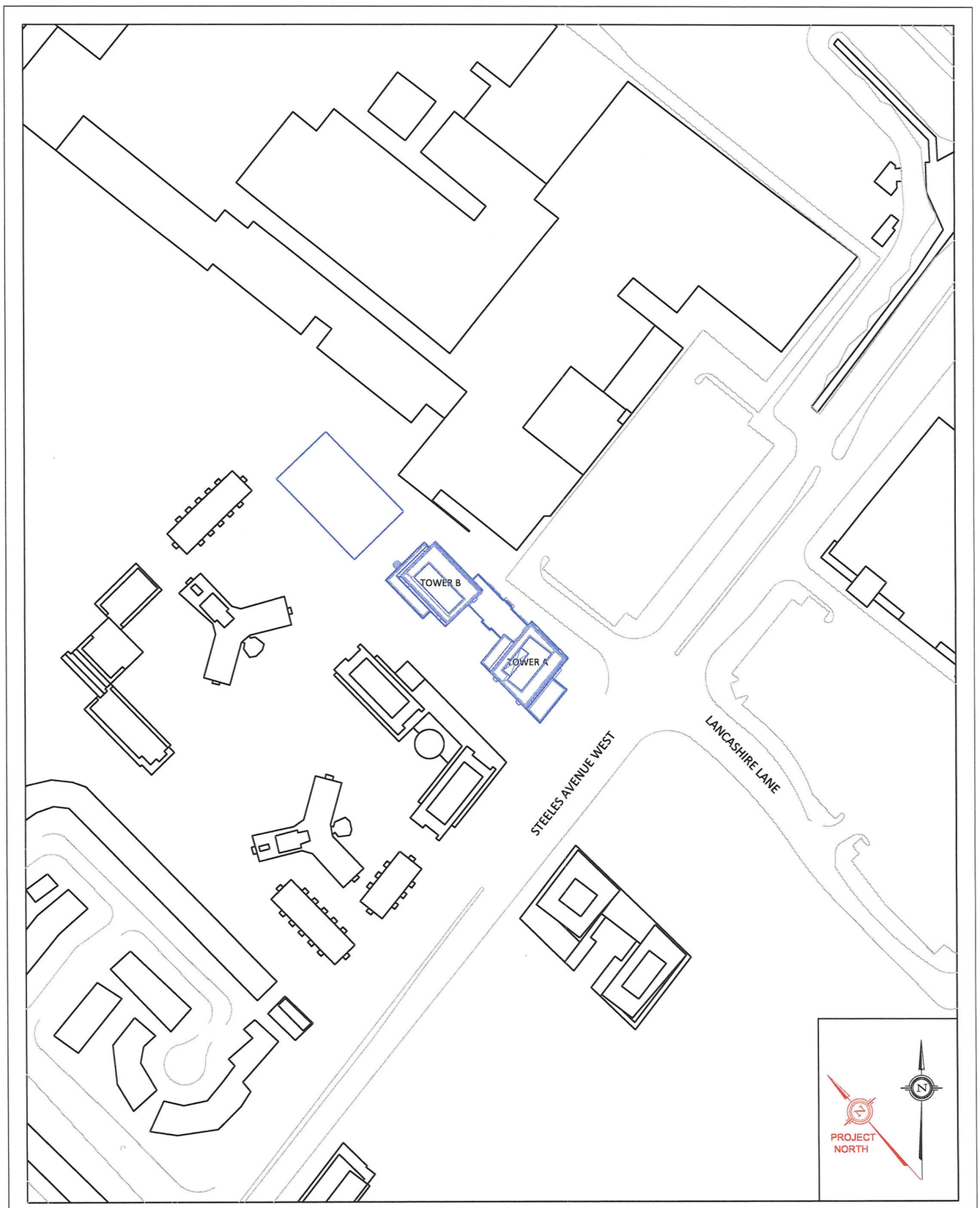
PHOTOGRAPH 6: CLOSE-UP VIEW OF <u>PROPOSED</u> STUDY MODEL LOOKING NORTH



GRADIENTWIND
ENGINEERS & SCIENTISTS

127 WALGREEN ROAD, OTTAWA, ON
613 836 0934 • GRADIENTWIND.COM

PROJECT	499 MAIN STREET SOUTH, BRAMPTON PEDESTRIAN LEVEL WIND STUDY		DESCRIPTION FIGURE 1A: EXISTING SCENARIO AND SURROUNDING CONTEXT
SCALE	1:2500 (APPROX.)	DRAWING NO.	GW24-043-PLW-1A
DATE	APRIL 16, 2024	DRAWN BY	K.A.



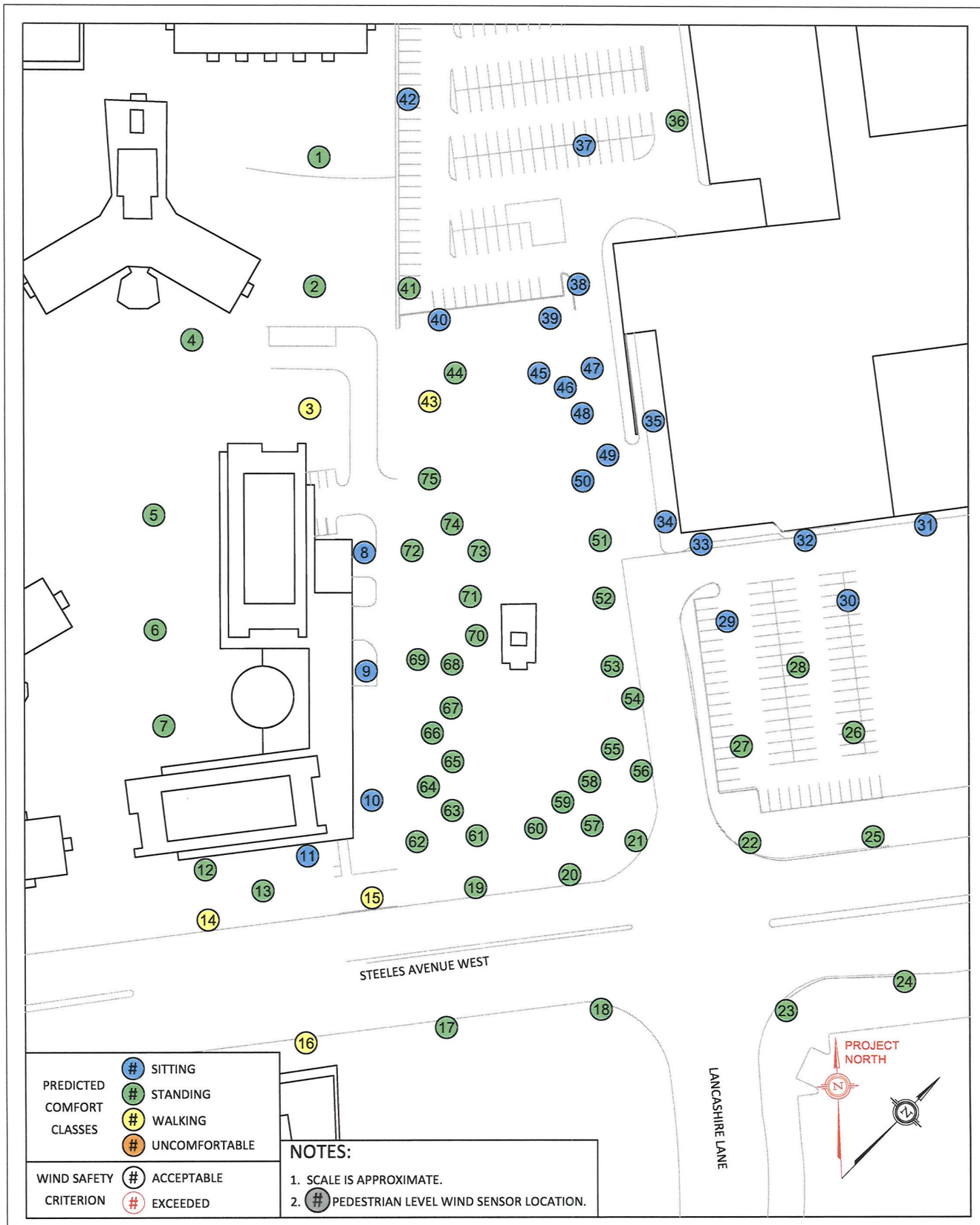
GRADIENTWIND
ENGINEERS & SCIENTISTS

127 WALGREEN ROAD, OTTAWA, ON
613 836 0934 • GRADIENTWIND.COM

PROJECT	499 MAIN STREET SOUTH, BRAMPTON PEDESTRIAN LEVEL WIND STUDY
SCALE	1:2500 (APPROX.)
DRAWING NO.	GW24-043-PLW-1B
DATE	APRIL 16, 2024
DRAWN BY	K.A.

DESCRIPTION

FIGURE 1B:
FUTURE SCENARIO
AND SURROUNDING CONTEXT



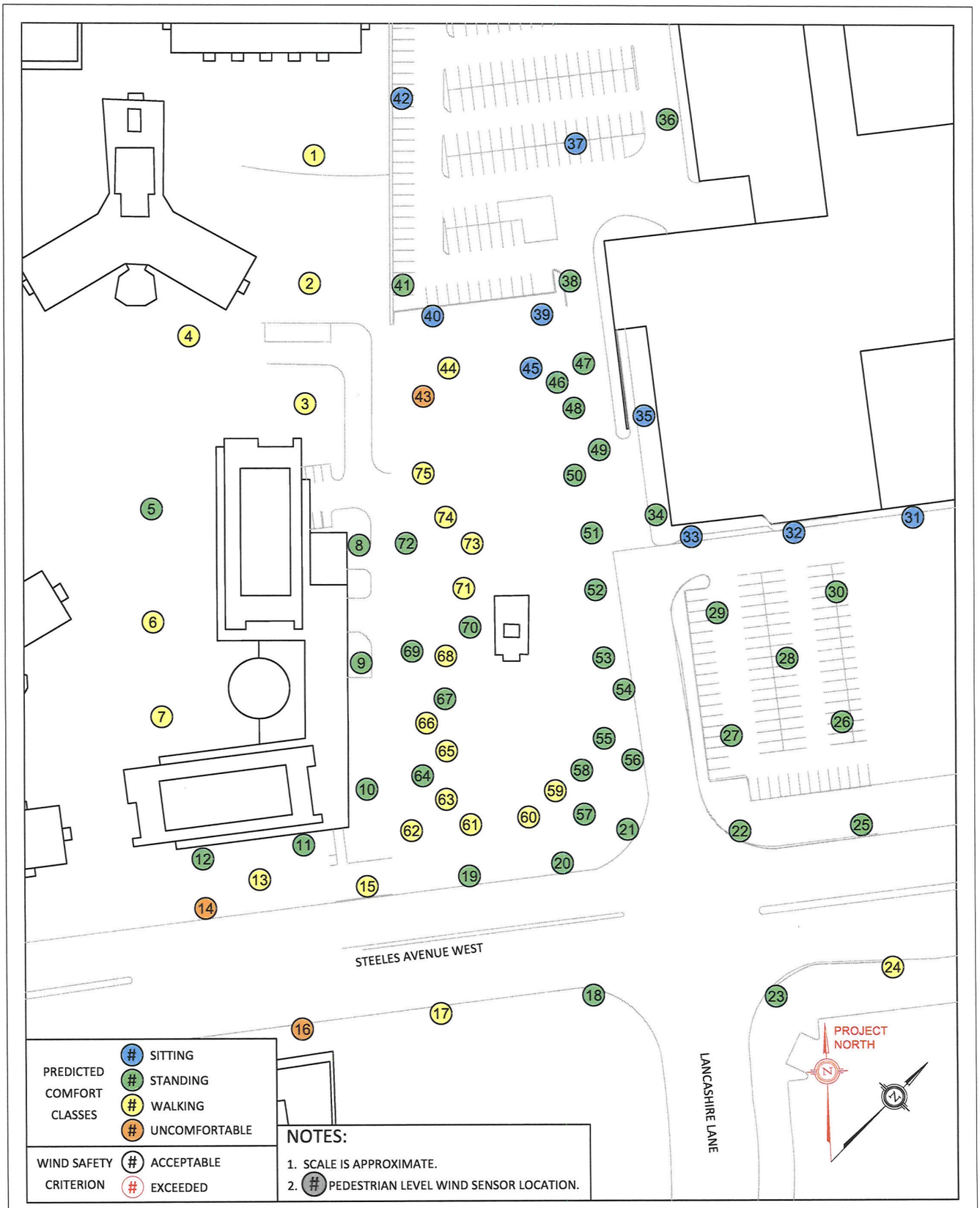
GRADIENTWIND
ENGINEERS & SCIENTISTS

127 WALGREEN ROAD, OTTAWA, ON
613 836 0934 • GRADIENTWIND.COM

PROJECT	499 MAIN STREET SOUTH, BRAMPTON PEDESTRIAN LEVEL WIND STUDY
SCALE	1:1200 (APPROX.)
DRAWING NO.	GW24-043-PLW-2A
DATE	APRIL 16, 2024
DRAWN BY	K.A.

DESCRIPTION

FIGURE 2A: SUMMER
EXISTING GRADE LEVEL PLW SENSOR LAYOUT
PEDESTRIAN COMFORT PREDICTIONS



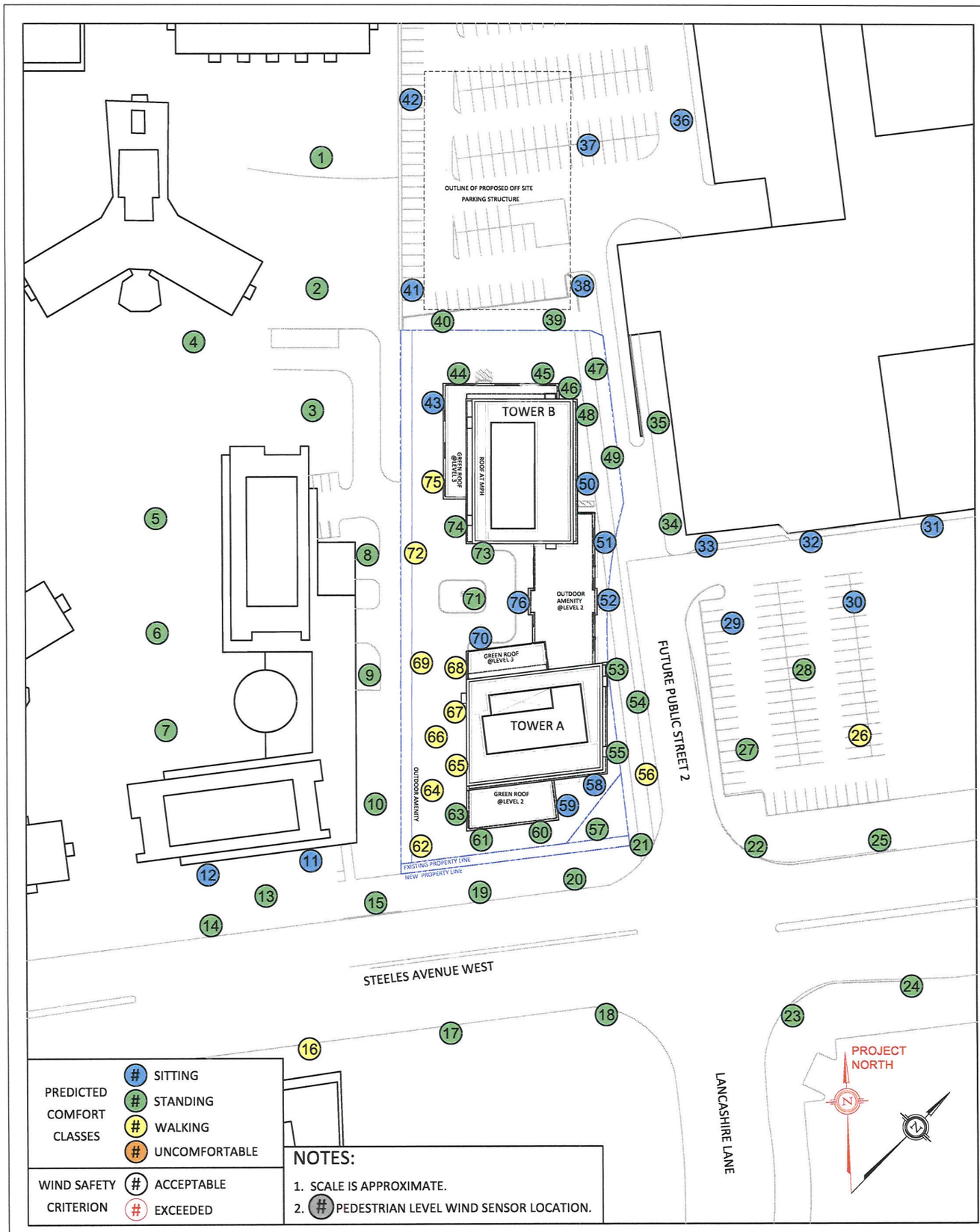
GRADIENTWIND
ENGINEERS & SCIENTISTS

127 WALGREEN ROAD, OTTAWA, ON
613 836 0934 • GRADIENTWIND.COM

PROJECT	499 MAIN STREET SOUTH, BRAMPTON PEDESTRIAN LEVEL WIND STUDY
SCALE	1:1200 (APPROX.)
DRAWING NO.	GW24-043-PLW-2B
DATE	APRIL 16, 2024
DRAWN BY	K.A.

DESCRIPTION

FIGURE 2B: WINTER
EXISTING GRADE LEVEL PLW SENSOR LAYOUT
PEDESTRIAN COMFORT PREDICTIONS



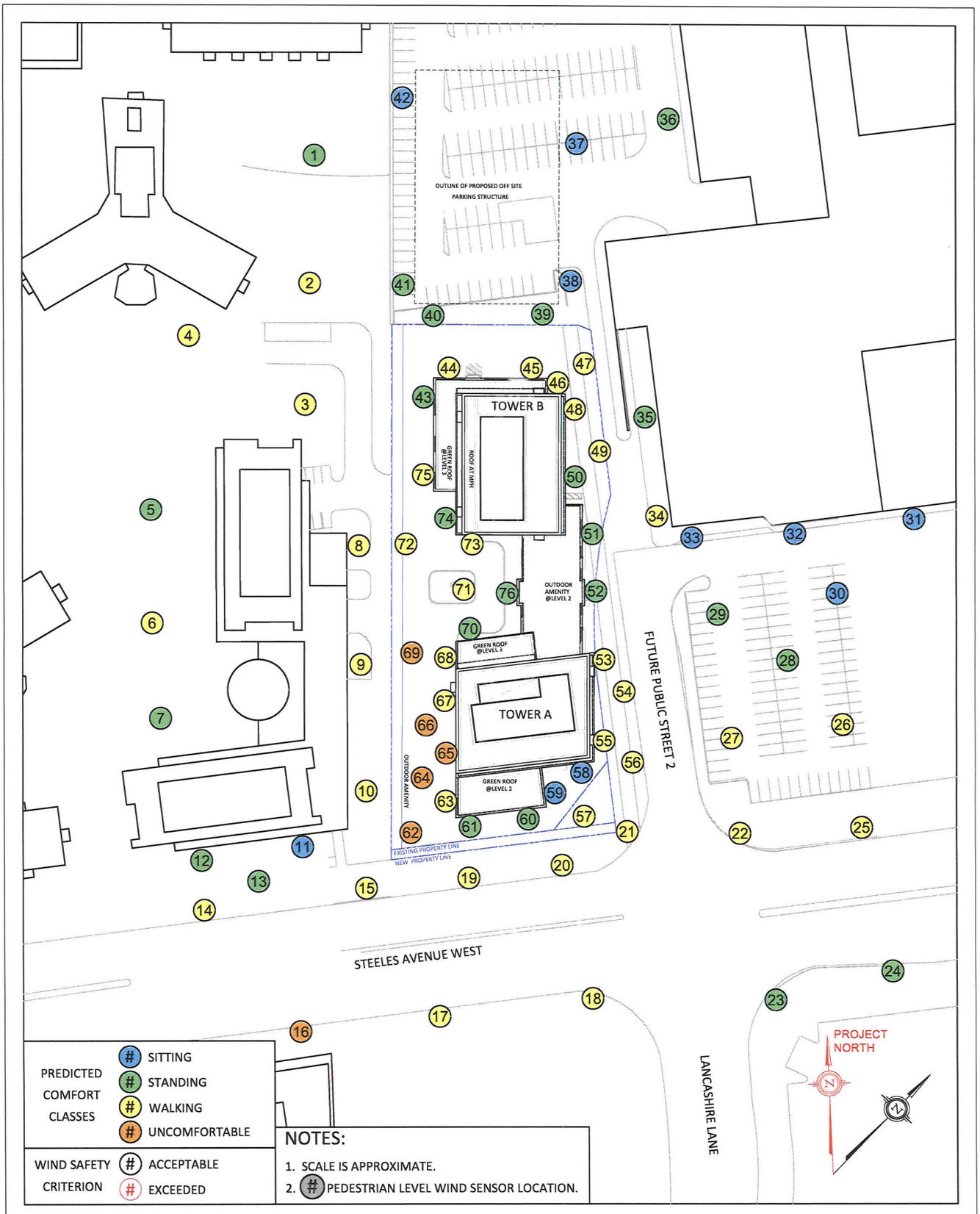
GRADIENTWIND
ENGINEERS & SCIENTISTS

127 WALGREEN ROAD, OTTAWA, ON
613 836 0934 • GRADIENTWIND.COM

PROJECT	499 MAIN STREET SOUTH, BRAMPTON PEDESTRIAN LEVEL WIND STUDY
SCALE	1:1200 (APPROX.)
DRAWING NO.	GW24-043-PLW-3A
DATE	APRIL 16, 2024
DRAWN BY	K.A.

DESCRIPTION

FIGURE 3A: SUMMER
FUTURE GRADE LEVEL PLW SENSOR LAYOUT
PEDESTRIAN COMFORT PREDICTIONS



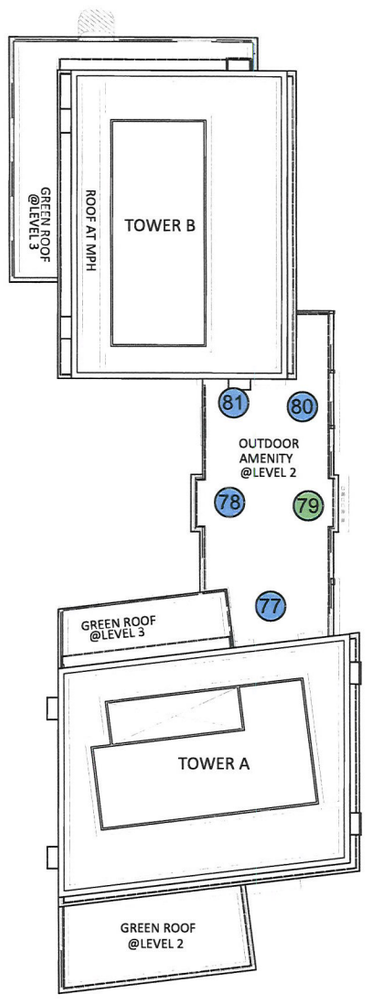
GRADIENTWIND
ENGINEERS & SCIENTISTS

127 WALGREEN ROAD, OTTAWA, ON
613 836 0934 • GRADIENTWIND.COM

PROJECT	499 MAIN STREET SOUTH, BRAMPTON PEDESTRIAN LEVEL WIND STUDY
SCALE	1:1200 (APPROX.)
DRAWING NO.	GW24-043-PLW-3B
DATE	APRIL 16, 2024
DRAWN BY	K.A.

DESCRIPTION

FIGURE 3B: WINTER
FUTURE GRADE LEVEL PLW SENSOR LAYOUT
PEDESTRIAN COMFORT PREDICTIONS



PREDICTED COMFORT CLASSES	#	SITTING
	#	STANDING
	#	WALKING
	#	UNCOMFORTABLE
WIND SAFETY CRITERION	#	ACCEPTABLE
	#	EXCEEDED

NOTES:

1. SCALE IS APPROXIMATE.
2. # PEDESTRIAN LEVEL WIND SENSOR LOCATION.

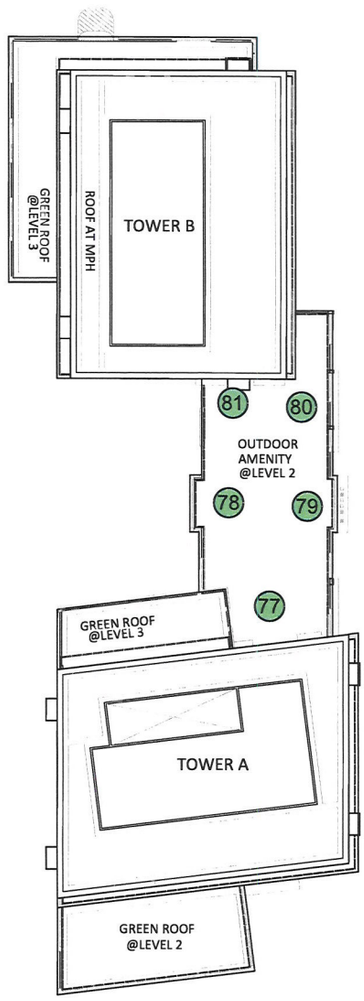
PROJECT NORTH

GRADIENTWIND
ENGINEERS & SCIENTISTS
127 WALGREEN ROAD, OTTAWA, ON
613 836 0934 • GRADIENTWIND.COM

PROJECT	499 MAIN STREET SOUTH, BRAMPTON PEDESTRIAN LEVEL WIND STUDY
SCALE	1:750 (APPROX.)
DRAWING NO.	GW24-043-PLW-4A
DATE	APRIL 16, 2024
DRAWN BY	K.A.

DESCRIPTION

FIGURE 4A: SUMMER
FUTURE TERRACE PLW SENSOR LAYOUT
PEDESTRIAN COMFORT PREDICTIONS



PREDICTED COMFORT CLASSES	#	SITTING
	#	STANDING
	#	WALKING
	#	UNCOMFORTABLE
WIND SAFETY CRITERION	#	ACCEPTABLE
	#	EXCEEDED

NOTES:

1. SCALE IS APPROXIMATE.
2. # PEDESTRIAN LEVEL WIND SENSOR LOCATION.

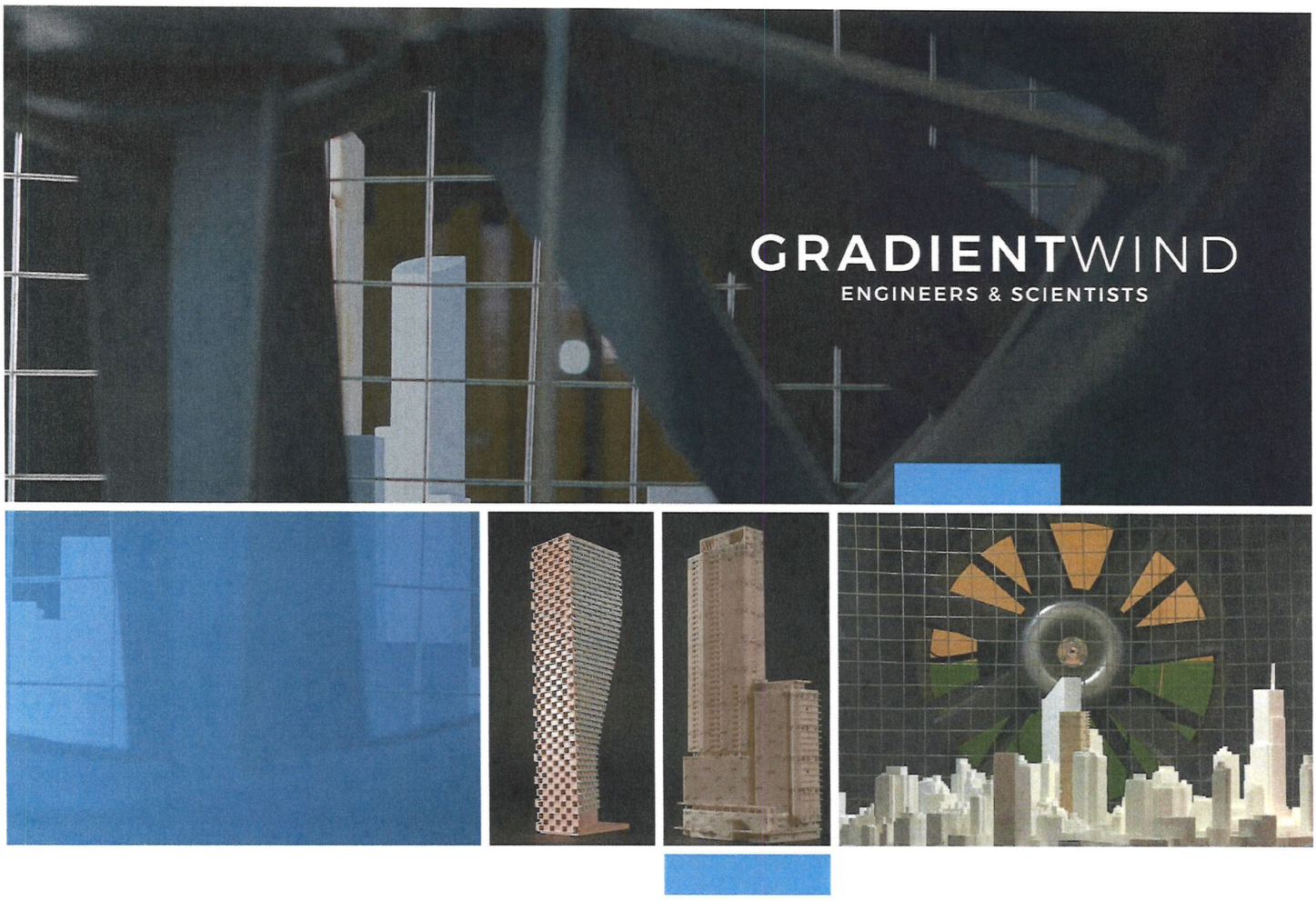
PROJECT NORTH

GRADIENTWIND
ENGINEERS & SCIENTISTS
127 WALGREEN ROAD, OTTAWA, ON
613 836 0934 • GRADIENTWIND.COM

PROJECT	499 MAIN STREET SOUTH, BRAMPTON PEDESTRIAN LEVEL WIND STUDY
SCALE	1:750 (APPROX.)
DRAWING NO.	GW24-043-PLW-4B
DATE	APRIL 16, 2024
DRAWN BY	K.A.

DESCRIPTION

FIGURE 4B: WINTER
FUTURE TERRACE PLW SENSOR LAYOUT
PEDESTRIAN COMFORT PREDICTIONS



APPENDIX A

PEDESTRIAN COMFORT SUITABILITY, TABLES A1-A3 (EXISTING SCENARIO)

127 WALGREEN ROAD, OTTAWA, ON, CANADA K0A 1L0 | 613 836 0934
GRADIENTWIND.COM

Guidelines	
Pedestrian Comfort	**20% exceedance wind speed** 0-10 km/h = Sitting, 10-15 km/h = Standing, 15-20 km/h = Walking, >20 km/h = Uncomfortable
Pedestrian Safety	**0.1% exceedance wind speed** 0-90 km/h = Safe

TABLE A1: SUMMARY OF PEDESTRIAN COMFORT (EXISTING SCENARIO)

Sensor	Pedestrian Safety					
	Summer		Winter		Annual	
	Wind Speed	Comfort Class	Wind Speed	Comfort Class	Wind Speed	Safety Class
1	12.5	Standing	15.9	Walking	60.1	Safe
2	13.7	Standing	16.9	Walking	62.1	Safe
3	15.1	Walking	19.8	Walking	66.8	Safe
4	13.3	Standing	17.2	Walking	63.8	Safe
5	11.9	Standing	13.7	Standing	56.4	Safe
6	13.6	Standing	17.5	Walking	66.3	Safe
7	13.5	Standing	16.4	Walking	60.7	Safe
8	9.6	Sitting	12.5	Standing	57.4	Safe
9	8.6	Sitting	10.9	Standing	44.2	Safe
10	9.7	Sitting	12.1	Standing	49.2	Safe
11	9.2	Sitting	10.1	Standing	41.9	Safe
12	10.3	Standing	12.7	Standing	57.4	Safe
13	13.6	Standing	16.1	Walking	62.4	Safe
14	16.1	Walking	20.4	Uncomfortable	75.0	Safe
15	15.9	Walking	18.0	Walking	65.7	Safe
16	15.7	Walking	20.1	Uncomfortable	72.0	Safe
17	13.4	Standing	17.7	Walking	68.3	Safe
18	12.2	Standing	14.8	Standing	52.6	Safe
19	12.8	Standing	14.6	Standing	54.0	Safe
20	12.2	Standing	14.4	Standing	50.2	Safe
21	12.3	Standing	14.5	Standing	50.1	Safe
22	12.2	Standing	14.5	Standing	50.0	Safe
23	12.6	Standing	14.5	Standing	49.5	Safe
24	13.3	Standing	15.5	Walking	53.1	Safe
25	12.4	Standing	14.6	Standing	48.4	Safe
26	12.0	Standing	14.2	Standing	49.3	Safe
27	12.2	Standing	14.3	Standing	48.2	Safe
28	11.4	Standing	13.4	Standing	47.8	Safe
29	9.7	Sitting	11.4	Standing	42.9	Safe
30	9.2	Sitting	10.7	Standing	40.1	Safe
31	6.5	Sitting	7.4	Sitting	26.7	Safe
32	6.1	Sitting	7.4	Sitting	31.3	Safe
33	6.5	Sitting	8.0	Sitting	31.7	Safe
34	9.8	Sitting	11.9	Standing	47.5	Safe
35	6.7	Sitting	8.2	Sitting	34.3	Safe

Guidelines	
Pedestrian Comfort	**20% exceedance wind speed** 0-10 km/h = Sitting, 10-15 km/h = Standing, 15-20 km/h = Walking, >20 km/h = Uncomfortable
Pedestrian Safety	**0.1% exceedance wind speed** 0-90 km/h = Safe

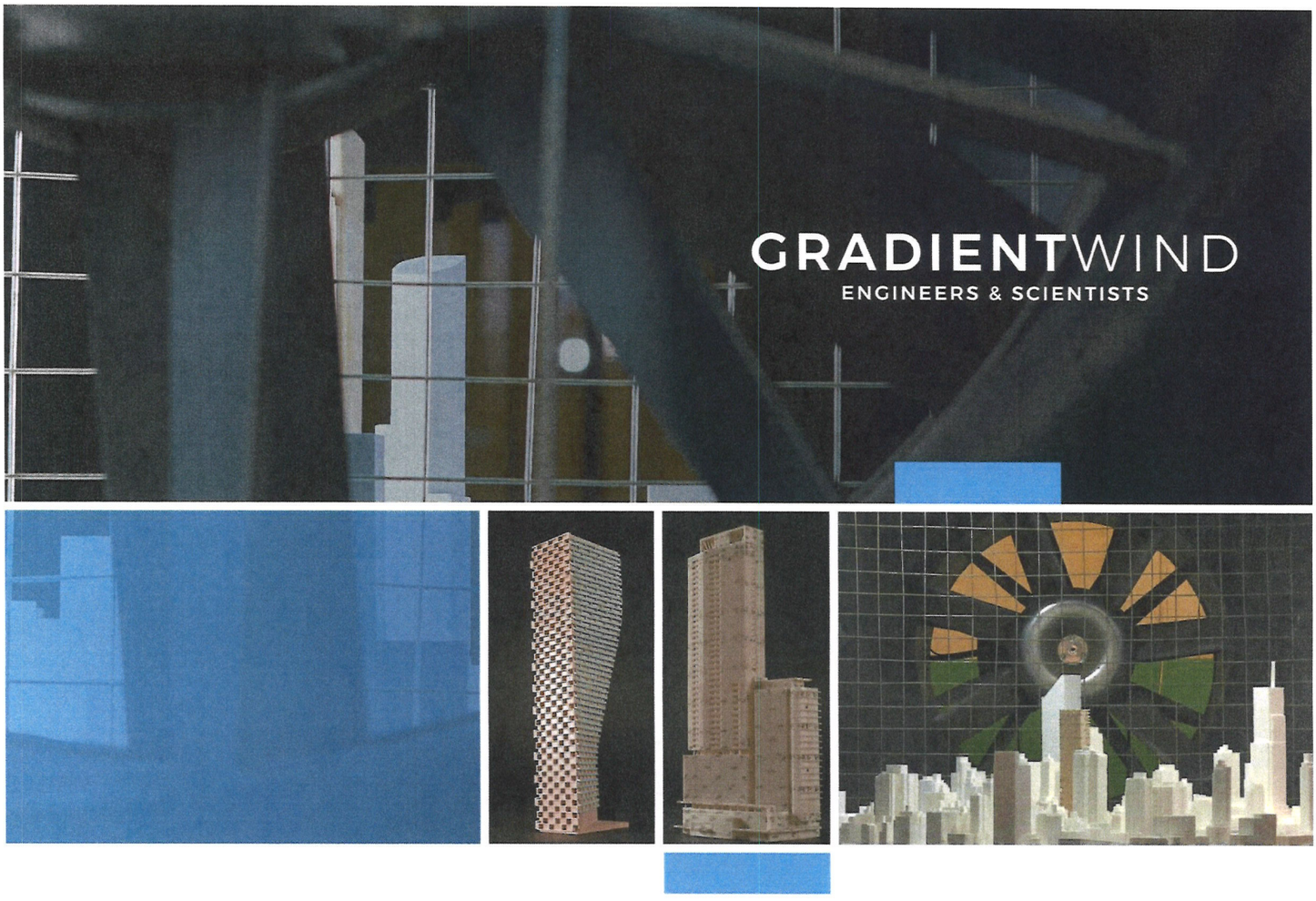
TABLE A2: SUMMARY OF PEDESTRIAN COMFORT (EXISTING SCENARIO)

Sensor	Pedestrian Safety						
	Spring		Winter			Annual	
	Wind Speed	Comfort Class	Wind Speed	Wind Speed	Comfort Class	Wind Speed	Safety Class
36	10.6	Standing	14.5	Standing	53.8	Safe	10.6
37	7.1	Sitting	9.0	Sitting	37.8	Safe	7.1
38	9.5	Sitting	12.2	Standing	49.0	Safe	9.5
39	6.4	Sitting	8.1	Sitting	34.9	Safe	6.4
40	7.8	Sitting	9.8	Sitting	46.8	Safe	7.8
41	10.7	Standing	14.6	Standing	69.8	Safe	10.7
42	7.9	Sitting	9.5	Sitting	39.9	Safe	7.9
43	15.5	Walking	20.8	Uncomfortable	75.4	Safe	15.5
44	11.7	Standing	15.5	Walking	64.9	Safe	11.7
45	7.6	Sitting	9.7	Sitting	42.3	Safe	7.6
46	8.5	Sitting	10.4	Standing	39.7	Safe	8.5
47	9.1	Sitting	11.2	Standing	43.3	Safe	9.1
48	8.6	Sitting	10.7	Standing	42.5	Safe	8.6
49	9.9	Sitting	12.5	Standing	44.4	Safe	9.9
50	9.5	Sitting	12.3	Standing	46.2	Safe	9.5
51	10.3	Standing	13.2	Standing	47.0	Safe	10.3
52	10.5	Standing	12.9	Standing	45.5	Safe	10.5
53	11.0	Standing	12.8	Standing	45.4	Safe	11.0
54	11.5	Standing	13.3	Standing	45.3	Safe	11.5
55	12.9	Standing	14.7	Standing	50.3	Safe	12.9
56	12.8	Standing	14.9	Standing	50.6	Safe	12.8
57	12.5	Standing	14.7	Standing	51.5	Safe	12.5
58	12.1	Standing	14.1	Standing	50.7	Safe	12.1
59	12.9	Standing	15.1	Walking	52.5	Safe	12.9
60	13.3	Standing	15.1	Walking	52.0	Safe	13.3
61	14.3	Standing	15.9	Walking	54.2	Safe	14.3
62	14.8	Standing	16.0	Walking	55.8	Safe	14.8
63	14.1	Standing	15.8	Walking	51.9	Safe	14.1
64	11.3	Standing	13.9	Standing	52.7	Safe	11.3
65	12.7	Standing	15.7	Walking	55.2	Safe	12.7
66	11.9	Standing	15.1	Walking	55.5	Safe	11.9
67	12.0	Standing	15.0	Standing	57.1	Safe	12.0
68	12.4	Standing	15.6	Walking	57.4	Safe	12.4
69	11.2	Standing	14.0	Standing	54.0	Safe	11.2
70	11.2	Standing	14.3	Standing	53.5	Safe	11.2

Guidelines	
Pedestrian Comfort	**20% exceedance wind speed** 0-10 km/h = Sitting, 10-15 km/h = Standing, 15-20 km/h = Walking, >20 km/h = Uncomfortable
Pedestrian Safety	**0.1% exceedance wind speed** 0-90 km/h = Safe

TABLE A3: SUMMARY OF PEDESTRIAN COMFORT (EXISTING SCENARIO)

Sensor	Pedestrian Safety					
	Spring		Winter		Annual	
	Wind Speed	Comfort Class	Wind Speed	Comfort Class	Wind Speed	Safety Class
71	12.0	Standing	15.2	Walking	55.8	Safe
72	11.7	Standing	15.0	Standing	56.2	Safe
73	11.7	Standing	15.1	Walking	57.2	Safe
74	11.8	Standing	15.6	Walking	64.2	Safe
75	14.3	Standing	19.5	Walking	75.2	Safe



APPENDIX B

PEDESTRIAN COMFORT SUITABILITY, TABLES B1-B3 (PROPOSED SCENARIO)

127 WALGREEN ROAD, OTTAWA, ON, CANADA K0A 1L0 | 613 836 0934
GRADIENTWIND.COM

Guidelines	
Pedestrian Comfort	**20% exceedance wind speed** 0-10 km/h = Sitting, 10-15 km/h = Standing, 15-20 km/h = Walking, >20 km/h = Uncomfortable
Pedestrian Safety	**0.1% exceedance wind speed** 0-90 km/h = Safe

TABLE B1: SUMMARY OF PEDESTRIAN COMFORT (PROPOSED SCENARIO)

Sensor	Pedestrian Safety					
	Spring		Winter		Annual	
	Wind Speed	Comfort Class	Wind Speed	Comfort Class	Wind Speed	Safety Class
1	11.6	Standing	14.6	Standing	56.4	Safe
2	13.6	Standing	16.8	Walking	61.5	Safe
3	13.1	Standing	16.9	Walking	62.4	Safe
4	12.3	Standing	15.3	Walking	60.4	Safe
5	11.0	Standing	12.9	Standing	54.9	Safe
6	12.8	Standing	16.3	Walking	63.7	Safe
7	11.4	Standing	13.8	Standing	53.0	Safe
8	14.1	Standing	17.8	Walking	67.8	Safe
9	12.3	Standing	15.8	Walking	62.9	Safe
10	14.3	Standing	18.2	Walking	59.5	Safe
11	8.8	Sitting	9.7	Sitting	39.2	Safe
12	9.8	Sitting	12.4	Standing	56.7	Safe
13	11.8	Standing	13.9	Standing	51.9	Safe
14	13.6	Standing	17.4	Walking	66.5	Safe
15	14.5	Standing	16.8	Walking	58.8	Safe
16	16.4	Walking	20.9	Uncomfortable	72.5	Safe
17	14.3	Standing	19.0	Walking	69.5	Safe
18	13.4	Standing	16.9	Walking	62.0	Safe
19	13.6	Standing	16.7	Walking	61.7	Safe
20	13.7	Standing	16.8	Walking	64.4	Safe
21	14.2	Standing	16.8	Walking	62.9	Safe
22	13.6	Standing	16.0	Walking	60.4	Safe
23	12.8	Standing	14.6	Standing	53.5	Safe
24	13.7	Standing	15.5	Standing	57.7	Safe
25	13.7	Standing	15.7	Walking	56.5	Safe
26	15.1	Walking	17.6	Walking	62.0	Safe
27	14.3	Standing	16.9	Walking	63.5	Safe
28	12.9	Standing	14.8	Standing	57.3	Safe
29	10.0	Sitting	11.9	Standing	49.3	Safe
30	8.7	Sitting	9.9	Sitting	39.4	Safe
31	7.4	Sitting	8.7	Sitting	31.4	Safe
32	6.4	Sitting	7.7	Sitting	30.8	Safe
33	6.5	Sitting	7.9	Sitting	30.8	Safe
34	12.4	Standing	16.4	Walking	60.0	Safe
35	10.7	Standing	14.8	Standing	60.0	Safe

Guidelines	
Pedestrian Comfort	**20% exceedance wind speed** 0-10 km/h = Sitting, 10-15 km/h = Standing, 15-20 km/h = Walking, >20 km/h = Uncomfortable
Pedestrian Safety	**0.1% exceedance wind speed** 0-90 km/h = Safe

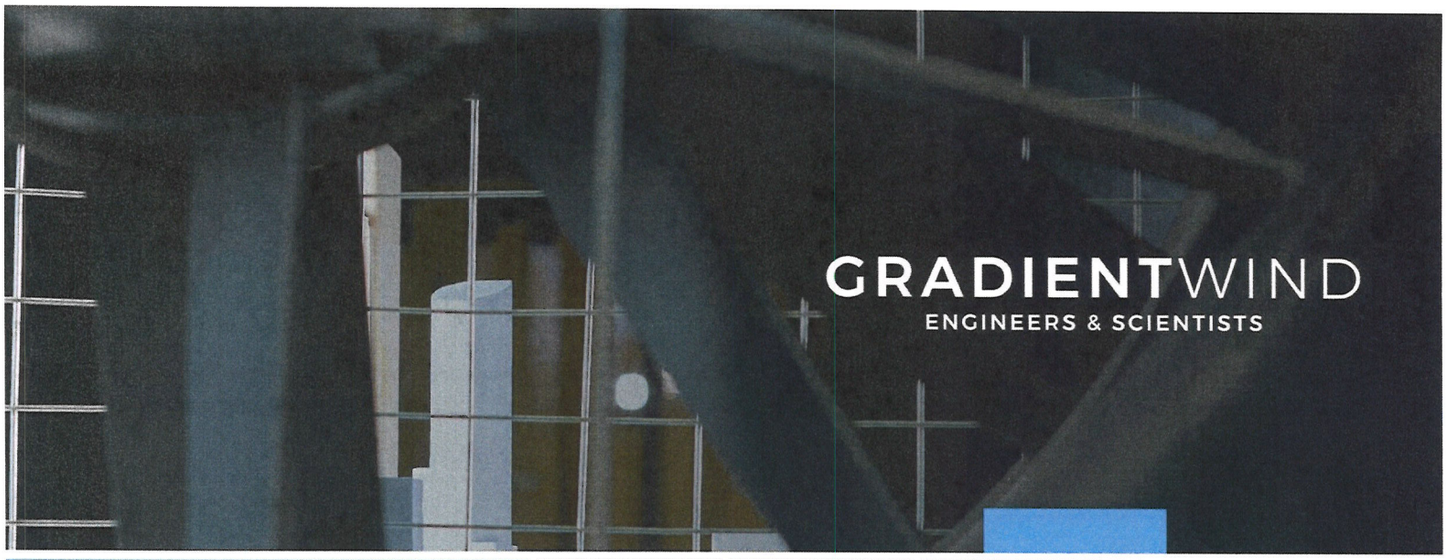
TABLE B2: SUMMARY OF PEDESTRIAN COMFORT (PROPOSED SCENARIO)

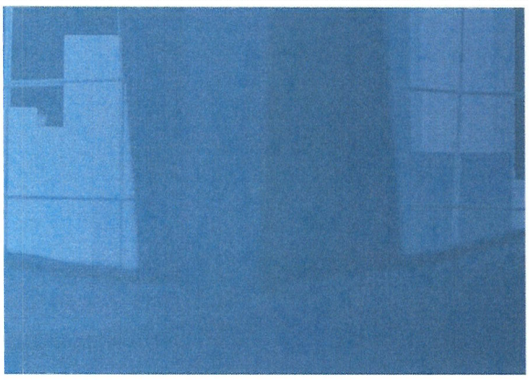
Sensor	Pedestrian Safety					
	Spring		Winter		Annual	
	Wind Speed	Comfort Class	Wind Speed	Comfort Class	Wind Speed	Safety Class
36	9.7	Sitting	13.5	Standing	53.0	Safe
37	7.1	Sitting	9.3	Sitting	51.8	Safe
38	7.5	Sitting	9.9	Sitting	47.1	Safe
39	11.4	Standing	14.7	Standing	50.2	Safe
40	11.5	Standing	15.0	Standing	66.2	Safe
41	9.3	Sitting	12.3	Standing	63.5	Safe
42	7.9	Sitting	9.6	Sitting	39.2	Safe
43	9.9	Sitting	12.6	Standing	50.7	Safe
44	13.7	Standing	18.3	Walking	74.2	Safe
45	12.3	Standing	16.4	Walking	64.4	Safe
46	13.2	Standing	18.9	Walking	72.5	Safe
47	12.7	Standing	17.1	Walking	56.2	Safe
48	11.6	Standing	16.2	Walking	74.3	Safe
49	12.3	Standing	17.0	Walking	72.4	Safe
50	7.8	Sitting	10.3	Standing	50.7	Safe
51	9.9	Sitting	12.6	Standing	57.1	Safe
52	9.3	Sitting	12.2	Standing	51.1	Safe
53	13.0	Standing	17.5	Walking	67.4	Safe
54	13.5	Standing	17.5	Walking	66.5	Safe
55	13.3	Standing	16.6	Walking	62.0	Safe
56	16.7	Walking	19.3	Walking	67.2	Safe
57	13.8	Standing	16.6	Walking	66.0	Safe
58	7.2	Sitting	8.2	Sitting	35.1	Safe
59	6.4	Sitting	8.1	Sitting	38.2	Safe
60	10.9	Standing	12.8	Standing	56.3	Safe
61	11.0	Standing	13.0	Standing	50.4	Safe
62	16.8	Walking	20.9	Uncomfortable	71.9	Safe
63	14.1	Standing	17.5	Walking	61.4	Safe
64	17.5	Walking	22.0	Uncomfortable	72.4	Safe
65	17.8	Walking	21.0	Uncomfortable	76.0	Safe
66	17.9	Walking	22.3	Uncomfortable	73.6	Safe
67	16.5	Walking	19.0	Walking	64.3	Safe
68	16.3	Walking	18.8	Walking	65.5	Safe
69	16.9	Walking	20.9	Uncomfortable	71.5	Safe
70	8.7	Sitting	11.1	Standing	43.2	Safe

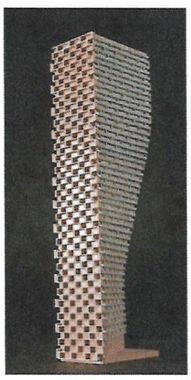
Guidelines	
Pedestrian Comfort	**20% exceedance wind speed** 0-10 km/h = Sitting, 10-15 km/h = Standing, 15-20 km/h = Walking, >20 km/h = Uncomfortable
Pedestrian Safety	**0.1% exceedance wind speed** 0-90 km/h = Safe

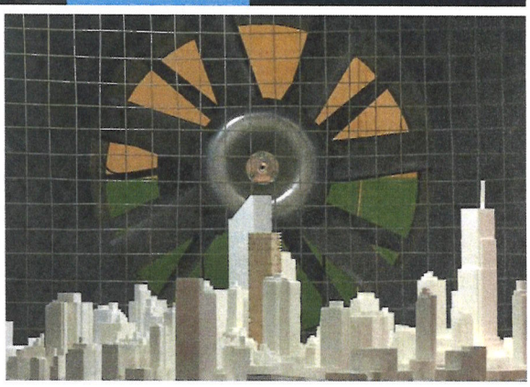
TABLE B3: SUMMARY OF PEDESTRIAN COMFORT (PROPOSED SCENARIO)

Sensor	Pedestrian Safety					
	Spring		Winter		Annual	
	Wind Speed	Comfort Class	Wind Speed	Comfort Class	Wind Speed	Safety Class
71	12.9	Standing	16.3	Walking	55.9	Safe
72	15.8	Walking	19.5	Walking	66.4	Safe
73	11.5	Standing	15.9	Walking	88.3	Safe
74	10.2	Standing	13.1	Standing	50.4	Safe
75	15.2	Walking	19.5	Walking	70.3	Safe
76	9.7	Sitting	12.5	Standing	49.0	Safe
77	7.9	Sitting	10.6	Standing	43.9	Safe
78	9.9	Sitting	12.5	Standing	54.8	Safe
79	10.2	Standing	13.7	Standing	57.6	Safe
80	9.8	Sitting	12.5	Standing	50.2	Safe
81	9.7	Sitting	12.3	Standing	63.7	Safe









APPENDIX C

WIND TUNNEL SIMULATION OF THE NATURAL WIND

127 WALGREEN ROAD, OTTAWA, ON, CANADA K0A 1L0 | 613 836 0934
GRADIENTWIND.COM

WIND TUNNEL SIMULATION OF THE NATURAL WIND

Wind flowing over the surface of the earth develops a boundary layer due to the drag produced by surface features such as vegetation and man-made structures. Within this boundary layer, the mean wind speed varies from zero at the surface to the gradient wind speed at the top of the layer. The height of the top of the boundary layer is referred to as the gradient height, above which the velocity remains more-or-less constant for a given synoptic weather system. The mean wind speed is taken to be the average value over one hour. Superimposed on the mean wind speed are fluctuating (or turbulent) components in the longitudinal (i.e. along wind), vertical and lateral directions. Although turbulence varies according to the roughness of the surface, the turbulence level generally increases from nearly zero (smooth flow) at gradient height to maximum values near the ground. While for a calm ocean the maximum could be 20%, the maximum for a very rough surface such as the center of a city could be 100%, or equal to the local mean wind speed. The height of the boundary layer varies in time and over different terrain roughness within the range of 400 metres (m) to 600 m.

Simulating real wind behaviour in a wind tunnel requires simulating the variation of mean wind speed with height, simulating the turbulence intensity, and matching the typical length scales of turbulence. It is the ratio between wind tunnel turbulence length scales and turbulence scales in the atmosphere that determines the geometric scales that models can assume in a wind tunnel. Hence, when a 1:200 scale model is quoted, this implies that the turbulence scales in the wind tunnel and the atmosphere have the same ratios. Some flexibility in this requirement has been shown to produce reasonable wind tunnel predictions compared to full scale. In model scale the mean and turbulence characteristics of the wind are obtained with the use of spires at one end of the tunnel and roughness elements along the floor of the tunnel. The fan is located at the model end and wind is pulled over the spires, roughness elements and model. It has been found that, to a good approximation, the mean wind profile can be represented by a power law relation, shown below, giving height above ground versus wind speed.

$$U = U_g \left(\frac{Z}{Z_g} \right)^{\alpha}$$

Where; U = mean wind speed, U_g = gradient wind speed, Z = height above ground, Z_g = depth of the boundary layer (gradient height) and α is the power law exponent.

Figure B1 on the following page plots three velocity profiles for open country, and suburban and urban exposures.

The exponent α varies according to the type of upwind terrain; α ranges from 0.14 for open country to 0.33 for an urban exposure. Figure C2 illustrates the theoretical variation of turbulence for open country, suburban and urban exposures.

The integral length scale of turbulence can be thought of as an average size of gust in the atmosphere. Although it varies with height and ground roughness, it has been found to generally be in the range of 100 m to 200 m in the upper half of the boundary layer. Thus, for a 1:300 scale, the model value should be between 1/3 and 2/3 of a metre. Integral length scales are derived from power spectra, which describe the energy content of wind as a function of frequency. There are several ways of determining integral length scales of turbulence. One way is by comparison of a measured power spectrum in model scale to a non-dimensional theoretical spectrum such as the Davenport spectrum of longitudinal turbulence. Using the Davenport spectrum, which agrees well with full-scale spectra, one can estimate the integral scale by plotting the theoretical spectrum with varying L until it matches as closely as possible the measured spectrum:

$$f \times S(f) = \frac{\frac{4(Lf)^2}{U_{10}^{\ 2}}}{\left[1 + \frac{4(Lf)^2}{U_{10}^{\ 2}}\right]^{\frac{4}{3}}}$$

Where, f is frequency, S(f) is the spectrum value at frequency f, U10 is the wind speed 10 m above ground level, and L is the characteristic length of turbulence.

Once the wind simulation is correct, the model, constructed to a suitable scale, is installed at the center of the working section of the wind tunnel. Different wind directions are represented by rotating the model to align with the wind tunnel center-line axis.

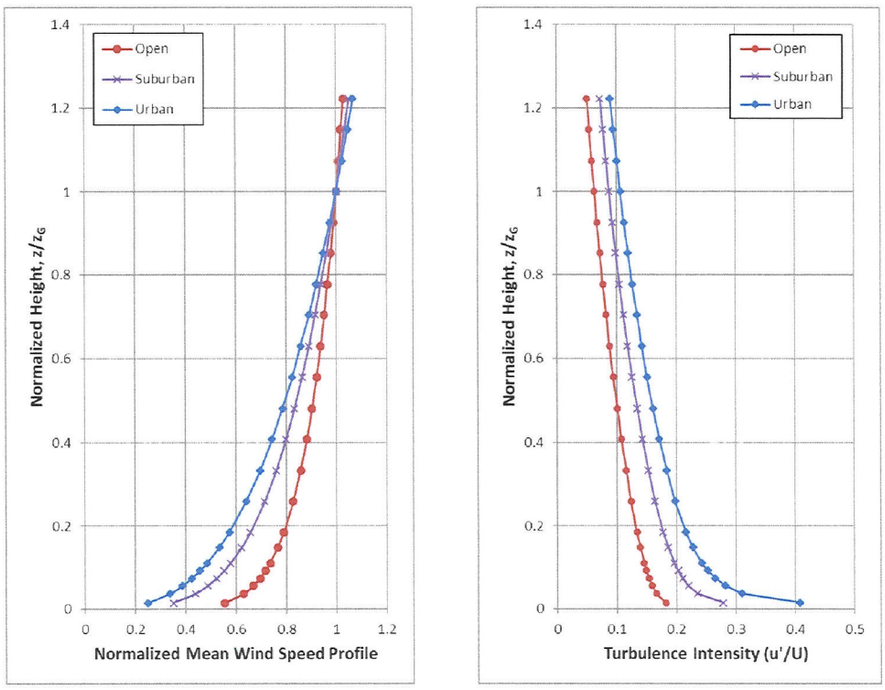


FIGURE C1 (LEFT): MEAN WIND SPEED PROFILES;
FIGURE C2 (RIGHT): TURBULENCE INTENSITY PROFILES

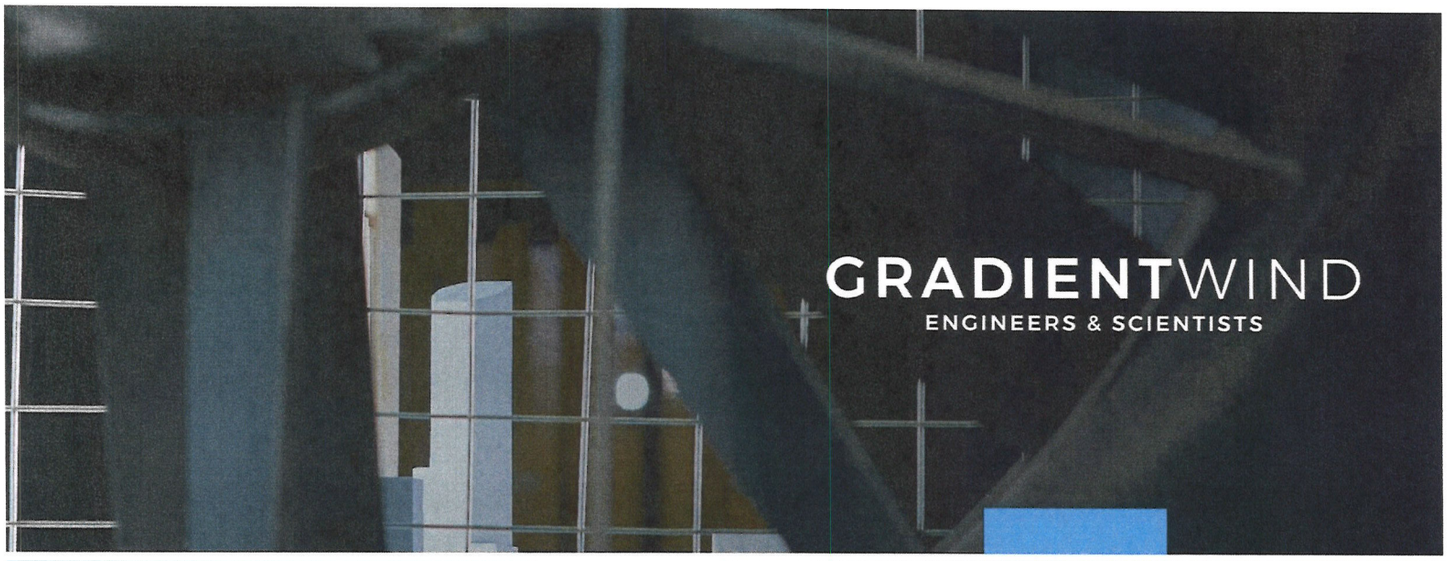
REFERENCES

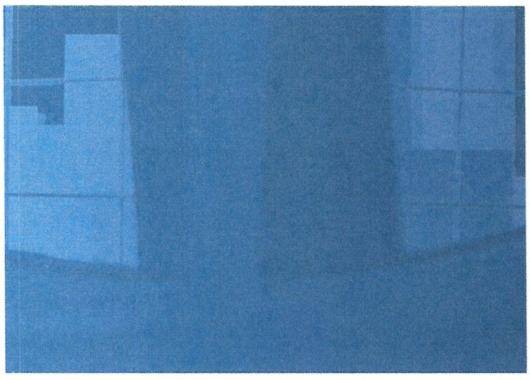
1. Teunissen, H.W., 'Characteristics of The Mean Wind And Turbulence In The Planetary Boundary Layer', Institute For Aerospace Studies, University Of Toronto, UTIAS # 32, Oct. 1970

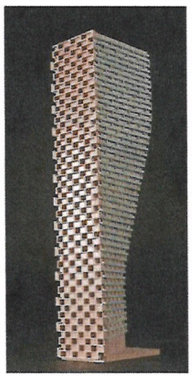
2. Flay, R.G., Stevenson, D.C., 'Integral Length Scales in an Atmospheric Boundary Layer Near The Ground', 9th Australian Fluid Mechanics Conference, Auckland, Dec. 1966

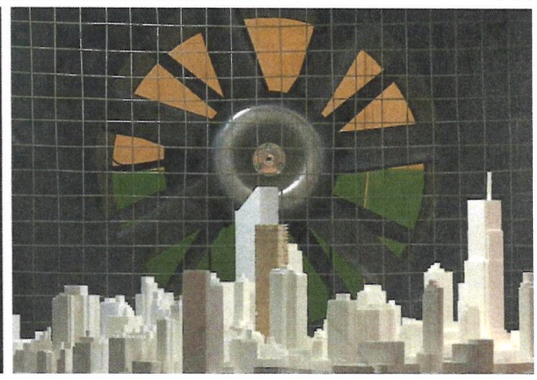
3. ESDU, 'Characteristics of Atmospheric Turbulence Near the Ground', 74030

4. Bradley, E.F., Coppin, P.A., Katen, P.C., '*Turbulent Wind Structure Above Very Rugged Terrain*', 9th Australian Fluid Mechanics Conference, Auckland, Dec. 1966









APPENDIX D

PEDESTRIAN LEVEL WIND MEASUREMENT METHODOLOGY

127 WALGREEN ROAD, OTTAWA, ON, CANADA K0A 1L0 | 613 836 0934
GRADIENTWIND.COM

GRADIENTWIND
ENGINEERS & SCIENTISTS

PEDESTRIAN LEVEL WIND MEASUREMENT METHODOLOGY

Pedestrian level wind studies are performed in a wind tunnel on a physical model of the study buildings at a suitable scale. Instantaneous wind speed measurements are recorded at a model height corresponding to 1.5 m full scale using either a hot wire anemometer or a pressure-based transducer. Measurements are performed at any number of locations on the model and usually for 36 wind directions. For each wind direction, the roughness of the upwind terrain is matched in the wind tunnel to generate the correct mean and turbulent wind profiles approaching the model.

The hot wire anemometer is an instrument consisting of a thin metallic wire conducting an electric current. It is an omni-directional device equally sensitive to wind approaching from any direction in the horizontal plane. By compensating for the cooling effect of wind flowing over the wire, the associated electronics produce an analog voltage signal that can be calibrated against velocity of the air stream. For all measurements, the wire is oriented vertically so as to be sensitive to wind approaching from all directions in a horizontal plane.

The pressure sensor is a small cylindrical device that measures instantaneous pressure differences over a small area. The sensor is connected via tubing to a transducer that translates the pressure to a voltage signal that is recorded by computer. With appropriately designed tubing, the sensor is sensitive to a suitable range of fluctuating velocities.

For a given wind direction and location on the model, a time history of the wind speed is recorded for a period of time equal to one hour in full-scale. The analog signal produced by the hot wire or pressure sensor is digitized at a rate of 400 samples per second. A sample recording for several seconds is illustrated in Figure D1. This data is analyzed to extract the mean, root-mean-square (rms) and the peak of the signal. The peak value, or gust wind speed, is formed by averaging a number of peaks obtained from sub-intervals of the sampling period. The mean and gust speeds are then normalized by the wind tunnel gradient wind speed, which is the speed at the top of the model boundary layer, to obtain mean and gust ratios. At each location, the measurements are repeated for 36 wind directions to produce normalized polar plots, which will be provided upon request.

In order to determine the duration of various wind speeds at full scale for a given measurement location the gust ratios are combined with a statistical (mathematical) model of the wind climate for the project site. This mathematical model is based on hourly wind data obtained from one or more meteorological stations (usually airports) close to the project location. The probability model used to represent the data is the Weibull distribution expressed as:

$$P\left(>U_g\right) = A_\theta \bullet \exp\left[\left(-\frac{U_g}{C_\theta}\right)^{K\theta}\right]$$

Where,

P (> U_g) is the probability, fraction of time, that the gradient wind speed ***U_g*** is exceeded; θ is the wind direction measured clockwise from true north, ***A***, ***C***, ***K*** are the Weibull coefficients, (Units: A - dimensionless, C - wind speed units [km/h] for instance, K - dimensionless). ***A_θ*** is the fraction of time wind blows from a 10° sector centered on θ.

Analysis of the hourly wind data recorded for a length of time, on the order of 10 to 30 years, yields the ***A_θ***, ***C_θ*** and ***K_θ*** values. The probability of exceeding a chosen wind speed level, say 20 km/h, at sensor ***N*** is given by the following expression:

$$P_N(>20) = \Sigma_\theta P\left[\frac{(>20)}{\left(\frac{U_N}{U_g}\right)}\right]$$

$$P_N\,(>20) \;=\; \Sigma_\theta P\,\{>20/(U_N/Ug)\}$$

Where, ***U_N/U_g*** is the gust velocity ratios, where the summation is taken over all 36 wind directions at 10° intervals.

If there are significant seasonal variations in the weather data, as determined by inspection of the C_θ and K_θ values, then the analysis is performed separately for two or more times corresponding to the groupings of seasonal wind data. Wind speed levels of interest for predicting pedestrian comfort are based on the comfort guidelines chosen to represent various pedestrian activity levels as discussed in the main text.

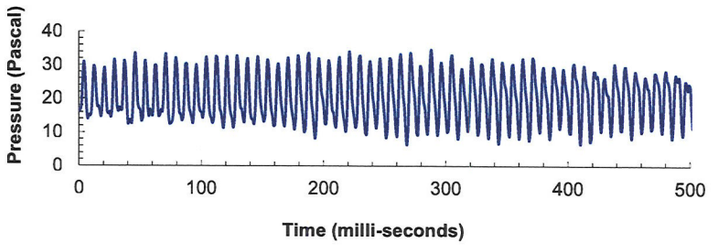


FIGURE D1: TIME VERSUS VELOCITY TRACE FOR A TYPICAL WIND SENSOR

REFERENCES

1. Davenport, A.G., '*The Dependence of Wind Loading on Meteorological Parameters*', Proc. of Int. Res. Seminar, Wind Effects on Buildings & Structures, NRC, Ottawa, 1967, University of Toronto Press.

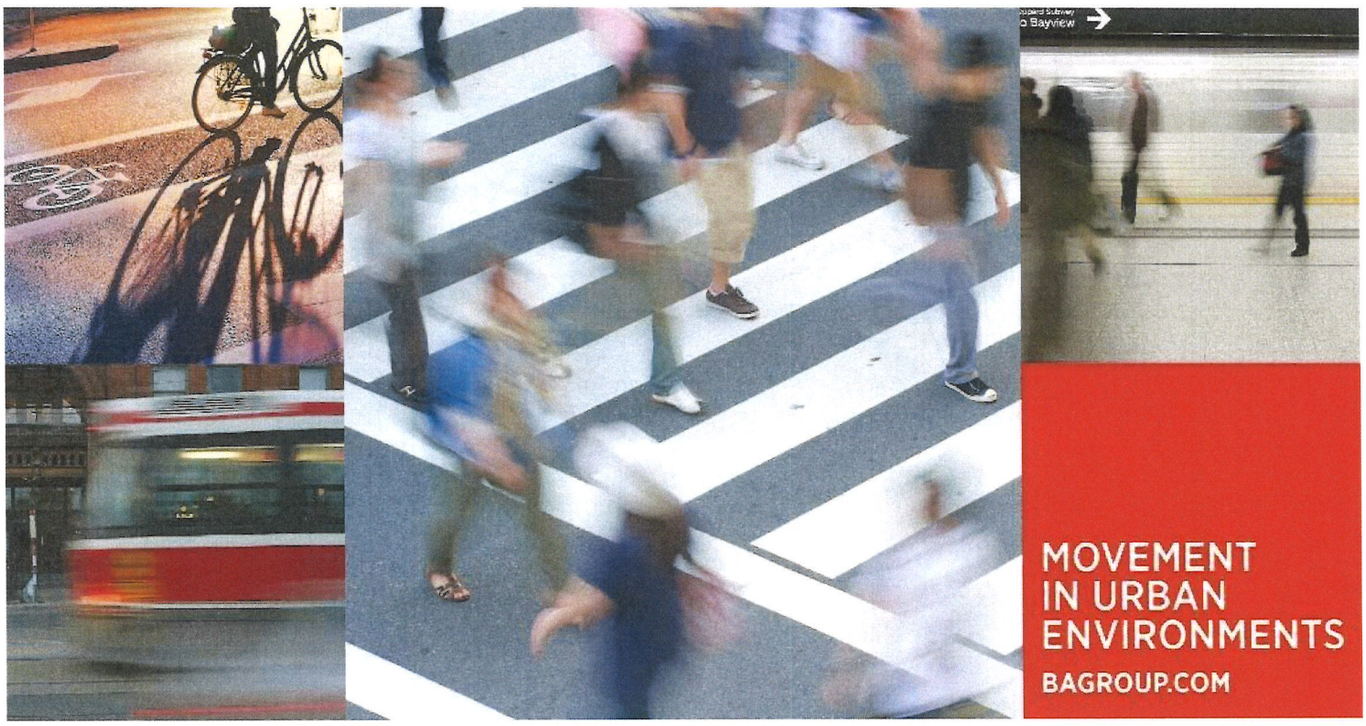
2. Wu, S., Bose, N., 'An *Extended Power Law Model for the Calibration of Hot-wire/Hot-film Constant Temperature Probes*', Int. J. of Heat Mass Transfer, Vol.17, No.3, pp.437-442, Pergamon Press.

SHOPPERS WORLD BRAMPTON
PHASE 1A SITE PLAN APPLICATION (SPA-2022-0120)
CITY OF BRAMPTON

Traffic Impact and Parking Study

Prepared For: 1388688 Ontario Ltd. (RioCan Management Inc.)

May 29, 2024



45 St. Clair Avenue West, Suite 300
Toronto, ON M4V 1K9
www.bagroup.com

TABLE OF CONTENTS

1.0 INTRODUCTION 1
1.1 Shoppers World Brampton Master Plan 1
1.2 Phase 1A Development 2

2.0 SUMMARY AND CONCLUSIONS 7

3.0 PHASE 1A DEVELOPMENT PLAN 10
3.1 Development Programme 10
3.2 Steeles Avenue West Right of Way Widening 11
3.3 Consent Application 11
3.4 Future Street 2 11
3.5 Vehicular Site Access and Circulation 12
3.5.1 Existing Shoppers World Brampton Access 12
3.5.2 Phase 1A Near-Term Site Access 12
3.5.3 Phase 1A Ultimate Site Access 12
3.5.4 Oceans Supermarket Loading Area Reconfiguration 12
3.5.5 Fire Route 13
3.6 Parking 13
3.7 Pick-Up / Drop-Off 13
3.8 Loading 14
3.9 Mobility Plan Strategies 14

4.0 TRANSPORTATION CONTEXT 15
4.1 Area Road Network 15
4.2 Area Transit Network 19
4.2.1 Existing Transit Network 19
4.2.2 Future Transit Improvement 24
4.3 Area Cycling Network 28
4.3.1 Existing Cycling Infrastructure 28
4.3.2 Planned Cycling Network Improvements 29

5.0 VEHICULAR PARKING CONSIDERATIONS 31
5.1 Zoning By-law Requirements 31
5.1.1 Site-Specific Zoning By-law 228-2020 31
5.1.2 City of Brampton Zoning By-law 45-2021 32
5.2 Proposed Parking Supply 32
5.2.1 Resident Parking 33
5.2.2 Visitor Parking 33

5.3 Accessible Parking 34
5.4 Electric Vehicle Parking 34

6.0 LOADING CONSIDERATIONS 35

7.0 BICYCLE PARKING CONSIDERATIONS 36
7.1 Zoning By-law Requirements 36
7.2 Proposed Supply 36

8.0 TRAVEL DEMAND ASSESSMENT 37
8.1 Analysis Scenarios and Horizons 37
8.2 Existing Traffic Volumes 38
8.3 Future Background Traffic Volumes 40
8.3.1 Background Developments 40
8.3.2 Corridor Growth 41
8.3.3 Corridor Traffic Volume Displacement 44
8.3.4 Future Background Traffic Volumes 44
8.4 Site Traffic Volumes 47
8.4.1 Vehicle Trip Generation 47
8.4.2 Vehicle Trip Distribution and Assignment 47
8.4.3 Multi-Modal Trip Generation 48
8.5 Future Total Traffic Volumes 49

9.0 TRAFFIC OPERATIONS ANALYSIS 52
9.1 Capacity Analysis Methodology 52
9.2 Analysis Parameters 52
9.3 Signalized Intersection Analysis Results 54
9.3.1 Steeles Avenue / Hurontario Street / Main Street South 54
9.3.2 Steeles Avenue West / Lancashire Lane 55
9.4 Unsignalized Intersection Analysis Results 56
9.4.1 Lancashire Lane / Phase 1A Site Driveway 56
9.5 Overall Traffic Operations Summary 57

10.0 RESPONSE TO COMMENTS 58
10.1 City of Brampton Comments 58
10.1.1 Traffic Services Review 58
10.1.2 Transit Review 58
10.2 Region of Peel Comments 58
10.2.1 Sustainable Transportation 58
10.2.2 Traffic 60

LIST OF TABLES

Table 1	Current Development Programme	10
Table 2	Development Programme Comparison	11
Table 3	Road Classification Summary	15
Table 4	Area Transit Network	19
Table 5	Area Existing Cycling Infrastructure	28
Table 6	Area Proposed Cycling Infrastructure	29
Table 7	Site-Specific Zoning By-law 228-2020 Parking Requirements	31
Table 8	City Brampton Zoning By-law 45-2021 Parking Requirements – Phase 1A	32
Table 9	Site-Specific Zoning By-law 228-2020 Bicycle Parking Requirements	36
Table 10	Existing Traffic Counts	38
Table 11	Background Developments Summary	41
Table 12	Corridor Traffic Reduction Rates	44
Table 13	Residential Site Trip Generation	47
Table 14	Phase 1A Site Traffic Distribution	47
Table 15	Area Residential Mode Split	48
Table 16	Residential Multi-Modal Trip Generation (External Trips)	49
Table 17	Steeles Avenue / Hurontario Street / Main Street South Capacity Analysis Results	54
Table 18	Steeles Avenue West / Lancashire Lane Capacity Analysis Results	56
Table 19	Phase 1A Site Driveway Capacity Analysis Results	56

LIST OF FIGURES

Figure 1:	Site Location	3
Figure 2:	Site Context	4
Figure 3:	Site Concept Plan	5
Figure 4:	Shoppers World Brampton Master Plan Concept	6
Figure 5:	Existing Street Network	16
Figure 6A:	Existing Street Lane Configuration and Traffic Control	17
Figure 6B:	Future Street Lane Configuration and Traffic Control	18
Figure 7:	Existing Transit Network	23

Figure 8: Planned Higher Frequency Transit Network 26
Figure 9: Hurontario LRT Extension 27
Figure 10: Existing and Future Cycling Network 30
Figure 11: Existing Traffic Volumes 39
Figure 12: Area Background Developments 42
Figure 13: Background Development Traffic Volumes 43
Figure 14: Future Corridor Traffic Displacement 45
Figure 15: Future Background Traffic Volumes 46
Figure 16: New Site Traffic Volumes 50
Figure 17: Future Total Traffic Volumes 51

TABLE OF APPENDICES

Appendix A: Reduced-Scale Architectural Plans
Appendix B: Vehicle Manoeuvring Diagrams
Appendix C: Site Access Plans
Appendix D: Pavement Marking and Signage Plans
Appendix E: Fire Route
Appendix F: Transportation Tomorrow Survey Data
Appendix G: Synchro Analysis Output Sheets

1.0 INTRODUCTION

BA Group is retained by RioCan Management Inc. on behalf of 1388688 Ontario Ltd. to provide urban transportation consulting services for a Site Plan Approval (SPA) application being made to the City of Brampton for a residential development located in the southwest corner of Shoppers World Brampton shopping centre at 499 Main Street South in Brampton. The proposed development comprises the first phase (Phase 1A) of a multi-phase mixed-use redevelopment of the Shoppers World Brampton property.

The Shoppers World Brampton property ("**Shoppers World Brampton**") is located in the northwest quadrant of the Steeles Avenue / Hurontario Street / Main Street South intersection in the City of Brampton. The property is approximately 21.45 hectares (53 acres) in size and is bounded by Steeles Avenue West to the south, Main Street South to the east, Charolais Boulevard to the north, and existing residential apartment buildings (owned by others) and an existing park (Kaneff Park) to the west.

The site location is illustrated in **Figure 1** and the site context is illustrated in **Figure 2**. The Phase 1A site plan is illustrated in **Figure 3**.

1.1 SHOPPERS WORLD BRAMPTON MASTER PLAN

The Shoppers World Brampton redevelopment is a multi-phase, multi-decade master plan to transform an existing automobile-oriented shopping centre into a high-density, transit-oriented, mixed-use community.

The redevelopment of Shoppers World Brampton is proposed to occur in phases as market conditions and opportunities permit as well as considering the transition of the existing retail mall uses on the property over time. The overall master redevelopment plan consists of a range of retail, commercial, residential, office, institutional and community uses in a mix of building types. The new mixed-use community will be organized around a new walkable, cycle and transit-oriented transportation and open space network consisting of new public and private streets, parks and open spaces.

A transportation master plan has been developed for the ultimate development plan that includes four new public streets (including two north-south streets – **Street 2** and **Street 3**, and two east-west streets – **Street 1** and **Street 4**) and a fine-grained network of private streets that will accommodate multi-modal travel throughout the new community. New pedestrian and bicycle infrastructure will be provided within the new street network, connecting to wider area pedestrian and bicycle facilities beyond Shoppers World Brampton.

A Zoning By-law Amendment (ZBA) and Draft Plan of Subdivision (DPOS) application for the Shoppers World Brampton property was first submitted in September 2019, and a revised application was submitted in August 2020. Site-Specific Zoning By-law 228-2020 was passed by the City Council on November 25, 2020, and permits the redevelopment of the property for a range of residential and commercial uses supported by a network of new public and private streets linking through the property.

The parking standards contained in Site-Specific Zoning By-law 228-2020 were subsequently overwritten by parking standards contained in the new City of Brampton Zoning By-law 45-2021. The DPOS application has not yet been approved and is subject to finalization.

Following the approval of the Site-Specific Zoning By-law, an SPA application was made to the City in June 2022 for Phase 1A.

BA Group has previously prepared three transportation studies as part of the previous ZBA, DPOS and SPA applications:

- "*Shoppers World Brampton Mixed Use Redevelopment – City of Brampton – Transportation Study*", dated September 30, 2019 (herein referred to as the "**September 2019 BA Group study**");
- "*Shoppers World Brampton Mixed Use Redevelopment – City of Brampton – Transportation Study – Update 1*", dated August 24, 2020 (herein referred to as the "**August 2020 BA Group study**"); and
- "Shoppers World Brampton Phase 1A Site Plan Application – City of Brampton – Urban Transportation Considerations", dated June 21, 2022 (herein referred to as the "**June 2022 BA Group study**").

A reduced-scale version of the overall Shoppers World Master Plan from the June 2022 BA Group study is illustrated in **Figure 4**.

1.2 PHASE 1A DEVELOPMENT

The Phase 1A parcel (**"the site"**) is a 0.65-hectare (1.38 acre), roughly rectangular-shaped block located at the southwest corner of the overall Shoppers World Brampton property. The parcel is currently vacant and was the former site of the Brampton Gateway Transit Terminal (**"Brampton Gateway Terminal"**) which was relocated to its current location at the northwest corner of Steeles Avenue / Hurontario Street / Main Street South intersection in 2012.

Following the initial SPA submission in June 2022, comments on the application and supporting documents were received from the City of Brampton's Planning, Building, and Growth Management Development Services division via a memorandum dated August 30, 2022, and the Region of Peel's Public Works division via a memorandum dated August 31, 2022. A revised SPA application is now being made that reflects an updated site plan and addresses comments received to date.

The current Phase 1A development proposal features two residential towers (both rental), with a total of 877 units. All existing mall buildings on the Brampton Shoppers World property will be maintained and the existing access driveway network will be relied upon to support the Phase 1A development site until further development occurs on the property. The site concept plan is illustrated in **Figure 3.** Reduced-scale architectural site plans are attached in **Appendix A**.

This report provides an updated transportation assessment of the Phase 1A development proposal and responds to comments from City and Regional staff. Similar to the June 2022 BA Group study that was prepared for the previous Phase 1A SPA application, the traffic assessment contained in this study reflects a focused review of the local area impacts of the proposed development and reviews the incremental traffic activity over and above the existing mall activity today. A focused local area road network bounded by Steeles Avenue West, Hurontario Street / Main Street South and Lancashire Lane is reviewed.

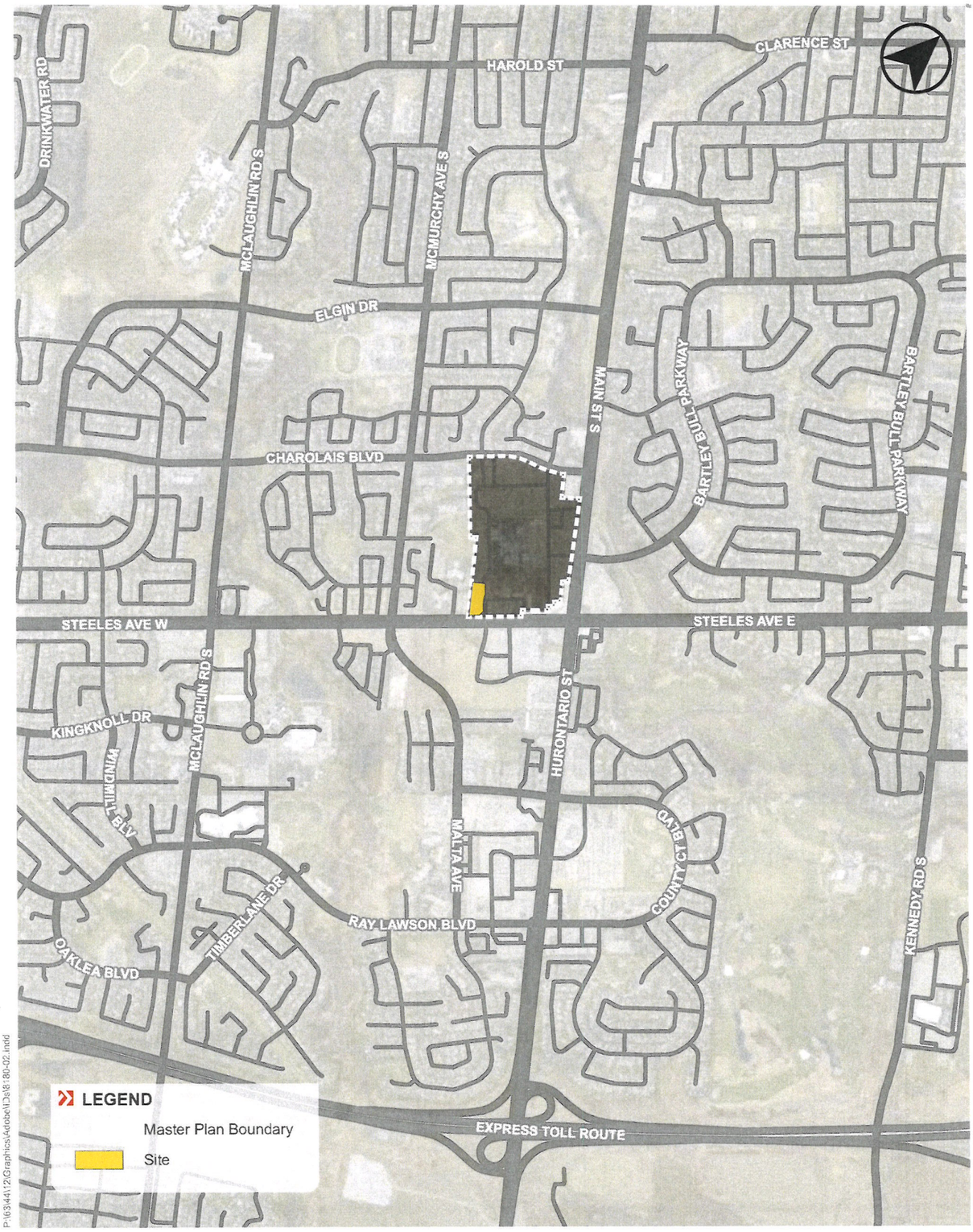


FIGURE 1 SITE LOCATION

FIGURE 2 EXISTING SITE CONTEXT

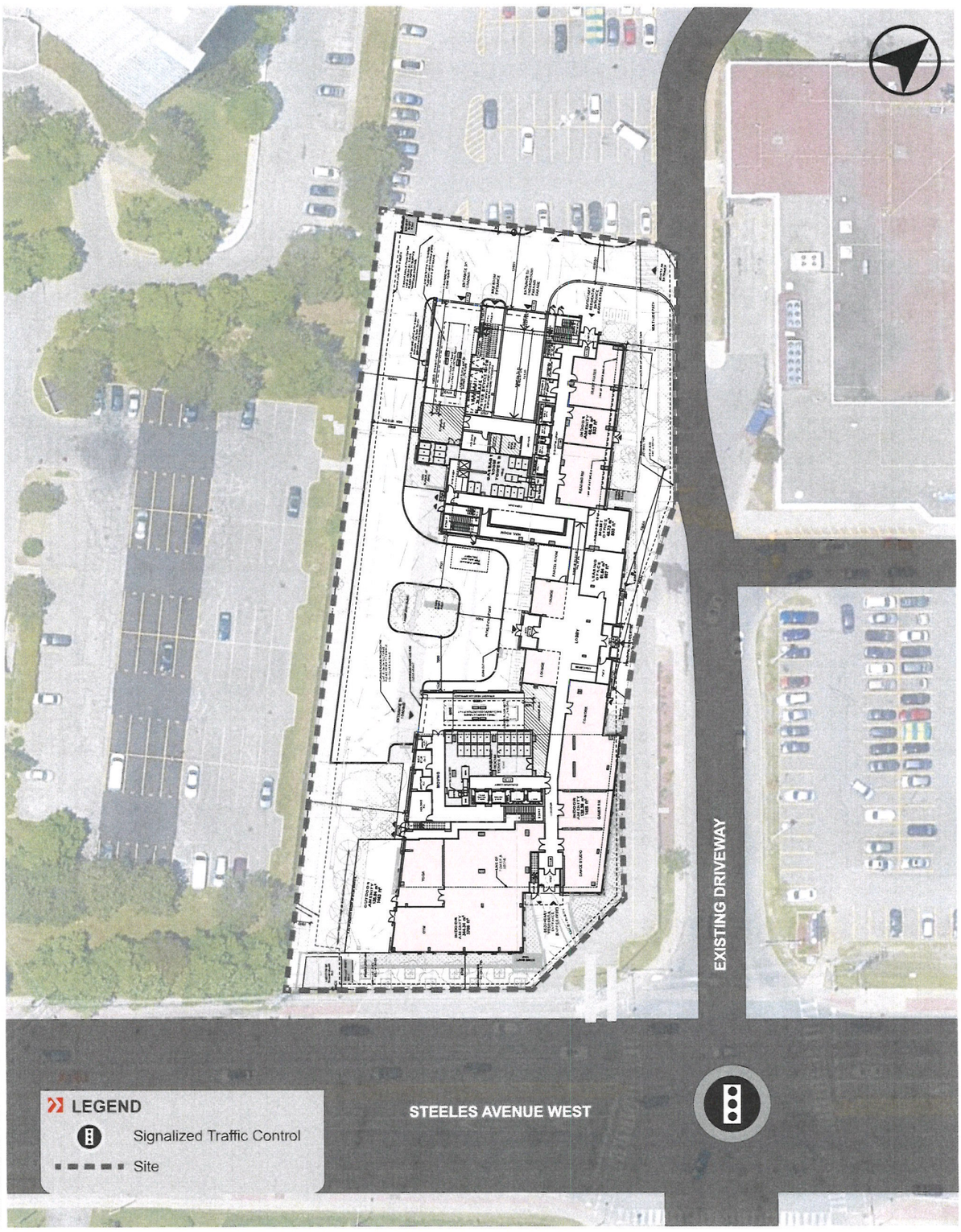


FIGURE 3 SITE CONCEPT PLAN

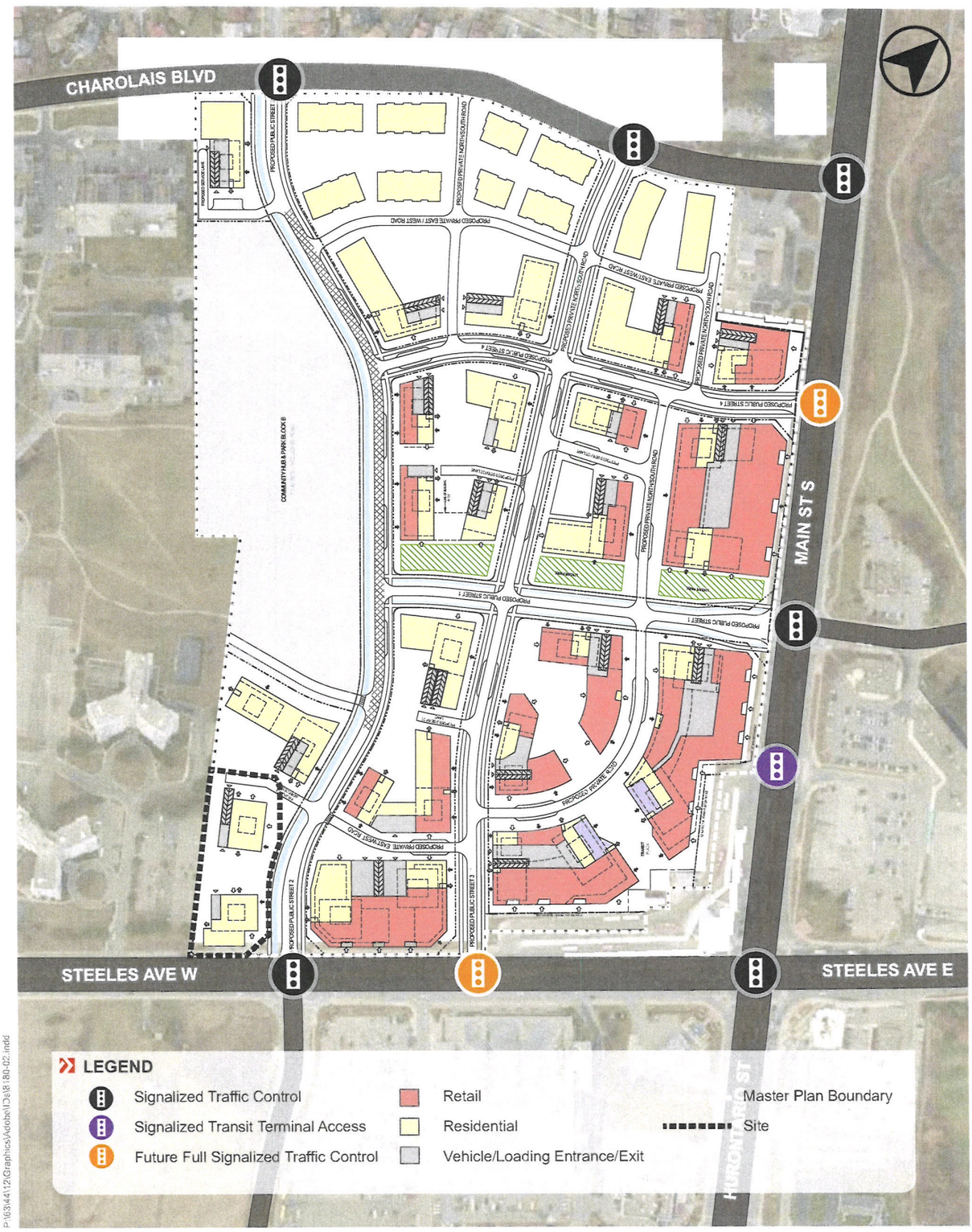


FIGURE 4 PROPOSED MASTER PLAN

Source: June 2020 BA Group Study

2.0 SUMMARY AND CONCLUSIONS

BA Group is retained by RioCan Management Inc. on behalf of 1388688 Ontario Ltd. to provide urban transportation consulting services in relation to a Site Plan Application (SPA) being made to the City of Brampton for a residential development located in the southwest corner of Shoppers World Brampton at 499 Main Street South in Brampton. The proposed development comprises the first phase (Phase 1A) of a multi-phase mixed-use redevelopment of the Shoppers World Brampton property.

DEVELOPMENT PROPOSAL AND SITE PLAN

1. The Phase 1A Site Plan Application proposes two residential towers (both rental), with a total of 877 units.

2. Vehicular access to the parking, loading and internal drive court will be provided via an east-west driveway along the north side of the site that connects to an existing north-south private driveway along the east side of the site. The north-south private driveway runs between Steeles Avenue West and Charolais Boulevard and operates under signal control at both locations.

3. In future phases of the Shoppers World Brampton redevelopment, the north-south driveway will be realigned and rebuilt as a public street ("**Street 2**") connecting Steeles Avenue West and Charolais Boulevard as part of the overall Shoppers World Brampton transportation master plan.

4. As part of the Phase 1A development plan a widening of approximately 2.4 metres along the Steeles Avenue West frontage is provided in response to Region of Peel requirements to provide for a total distance from the Steeles Avenue West centreline of 25.25 metres.

VEHICLE PARKING

5. Application of the site-specific Zoning By-law 228-2020 to the subject site would require a minimum of 867 spaces, including 735 resident spaces and 132 visitor spaces.

6. City of Brampton Zoning By-law 45-2021 overwrites the parking standards outlined within site-specific Zoning By-law 228-2020. Application of the City of Brampton Zoning Bylaw 45-2021 to the subject site would require a minimum of 177 spaces, of which all would be visitor spaces.

7. A total of 260 resident spaces are proposed in the Phase 1A underground parking garage, while an additional 361 resident parking spaces will be provided in the adjacent above-grade parking structure, for a total of 621 resident spaces. The overall resident parking supply for the Phase 1A buildings is in the order of 0.71 spaces/unit, including on-site parking (0.30 spaces/unit in the underground garage) and off-site parking (0.41 spaces/unit in the above-grade parking structure).

8. The proposed parking supply target meets the minimum requirements of By-law 45-2021 (no minimum requirement) and, by way of reference, is lower than the requirements of the previously approved standards outlined in Site-Specific Zoning By-law 228-2020.

9. The proposed resident parking supply and arrangements are appropriate and respond to the City's initiatives to reduce vehicle parking and auto trips within Brampton's urban areas. It is noted, in this regard, that the site is well served by significant transit services today, and these will continue to improve over time. As well, planned cycling and pedestrian facilities will provide strong active travel connections beyond the site.

10. It is proposed to adopt a visitor parking supply standard of 0.10 spaces/unit for Phase 1A and the broader Shoppers World Brampton master plan. This represents a reduction from the visitor parking requirement contained in the general City of Brampton Zoning By-law 45-2021 (i.e. 0.20 spaces/unit). The application of the proposed 0.10 spaces/unit visitor parking standard would require the provision of 88 visitor spaces for the Phase 1A buildings.

11. The proposed reduced visitor parking standard of 0.10 spaces/unit compared to the By-law requirement of 0.20 spaces/unit is considered to be appropriate for adoption for the Phase 1A development and, more broadly, the Shoppers World Brampton property given the nature of the planned mixed-use community being advanced and, most specifically, the adjacency of the Brampton Gateway Transit Terminal and planned Hazel McCallion Line.

12. All visitor parking spaces, with the exception of accessible visitor parking spaces, are proposed to be provided in the above-grade parking structure adjacent to the site. A total of 84 visitor spaces are proposed in the structure. In addition, 4 accessible visitor spaces are proposed in the below-grade parking garage to meet the accessible parking needs of site visitors. The total proposed supply of 88 visitor spaces meets the proposed visitor parking standard.

13. City of Brampton Traffic By-law 93-93 requires 4 percent of the total public parking spaces provided to be provided as accessible parking where there are between 13 and 100 parking spaces, rounding up to the nearest whole number. Based on a total public parking supply of 88 visitor spaces, a total of 4 accessible visitor parking spaces are required. The bylaw does not contain a minimum standard for resident parking.

14. The current architectural plans illustrate 10 accessible resident spaces (including 5 Type A and 5 Type B) and 4 accessible visitor spaces (including 2 Type A and 2 Type B) in the underground parking garage. The proposed accessible parking supply meets the accessible parking requirements of By-law 93-93.

15. Site-Specific Zoning By-law 228-2020 does not contain electric vehicle (EV) parking requirements. However, it is proposed to equip a total of 27 spaces in the underground parking garage (approximately 10% of spaces) with EV charging equipment and an additional 77 spaces (approximately 30% of spaces) with rough-ins for future EV charging equipment.

LOADING

16. The Site-Specific Zoning By-law does not contain loading requirements for residential buildings.

17. One loading space is proposed in each of Building A and Building B, each with minimum dimensions of 13 metres long x 4 metres wide x 6.1 metres high, which meets the requirements of a Peel Region Front Loader waste collection vehicle.

BICYCLE PARKING

18. Application of the Site-Specific Zoning Bylaw 228-2020 to the subject site would require a minimum of 527 bicycle parking spaces, including 439 resident spaces and 88 residential visitor spaces.

19. A total of 528 bicycle parking spaces are proposed on the ground floor and within the underground parking garage, including 440 resident spaces and 88 visitor spaces. The proposed supply meets the minimum requirements of the site-specific zoning bylaw.

TRAVEL DEMAND ASSESSMENT

20. The proposed development is expected to generate in the order of 205 two-way vehicular trips during both the weekday morning and afternoon peak hours.

21. The proposed Phase 1A development is expected to generate a total of 345 and 355 two-way total person trips (i.e. for all modes) during the weekday morning and afternoon peak hours, respectively.

TRAFFIC OPERATIONS ANALYSIS

22. Based on the analysis conducted by BA Group, the forecast vehicle site traffic generated by the proposed development will have minimal impacts on the overall operation of the network signalized and unsignalized intersections.

23. New site traffic can be appropriately accommodated at all intersections in the study area. All of the study area signalized and unsignalized intersections can acceptably accommodate site-related traffic activity and will continue to operate within capacity and at acceptable levels of service.

3.0 PHASE 1A DEVELOPMENT PLAN

3.1 DEVELOPMENT PROGRAMME

Two residential buildings are proposed as part of the Phase 1A development plan. Both are proposed to be rental buildings. The south building (Tower A) has 42 storeys while the north building (Tower B) has 37 storeys. The current development programme is summarized in **Table 1**.

TABLE 1 CURRENT DEVELOPMENT PROGRAMME

Feature			Current Proposal
	**Residential Units**	--	877 units
	**Parking**	Resident	• On-site (Parking Garage) – 260 spaces • Off-site (Parking Structure) – 361 spaces • **Subtotal – 621 spaces** (0.71 spaces/unit)
		Non-Resident	• On-site (Parking Garage) – 4 spaces[3] • Off-site (Parking Structure) – 84 spaces • **Subtotal – 88 spaces** (0.10 spaces/unit)
		Total	• On-site (Parking Garage) – 264 spaces • Off-site (Parking Structure) – 445 spaces • **Total – 709 spaces**
	**Bicycle Parking**	Resident	440 spaces (long-term)
		Visitor	88 spaces (short-term)
		Total	**528 spaces**
	**Loading**	--	No change

Notes:
1. Based on architectural plans provided by Kirkor Architects dated April 26, 2024.
2. A portion of the overall parking supply for the Phase 1A development is proposed to be provided in an adjacent above-grade parking structure. The parking structure is the subject of a separate SPA application being made to the City.
3. Four accessible visitor parking spaces are provided on-site within the underground parking garage.

A comparison of the current development programme and the June 2022 development proposal is summarized in **Table 2**.

TABLE 2 DEVELOPMENT PROGRAMME COMPARISON

Feature			June 2022 Proposal	Current Proposal [1]	Change
	Residential Units	Condo	396 units	--	--
		Rental	363 units	877 units	--
		Total	**759 units**	**877 units**	**+118 units**
	Parking	Resident	646 spaces	621 spaces (0.71 spaces/unit)	-25 spaces
		Non-Resident	76 spaces	88 spaces (0.10 spaces/unit)	+12 spaces
		Total	**722 spaces**	**709 spaces**	**-13 spaces**
	Bicycle Parking	Resident	414 spaces	440 spaces	+26 spaces
		Visitor	76 spaces	88 spaces	+12 spaces
		Total	**490 spaces**	**528 spaces**	**+38 spaces**
	Loading	--	**2 spaces**	**2 spaces**	--

Notes:
1. Based on architectural plans provided by Kirkor Architects dated April 26, 2024.
2. A portion of the overall parking supply for the Phase 1A development is proposed to be provided in an adjacent above-grade parking structure. The parking structure is the subject of a separate SPA application being made to the City.

3.2 STEELES AVENUE WEST RIGHT OF WAY WIDENING

An approximately 2.4-metre right-of-way widening of Steeles Avenue West is being provided across the south Phase 1A property frontage, as required by the Region of Peel, in order to achieve a total distance from the Steeles Avenue West centreline of 25.25 metres.

3.3 CONSENT APPLICATION

A consent to sever application was submitted on August 10, 2022 to permit the severance of the Phase 1A lands from the broader Shoppers World Brampton property. The consent application was approved by the Committee of Adjustment on September 13, 2022 and the appeal period has since passed. RioCan is now finalizing consent agreements with the City of Brampton and the Region of Peel and is also registering the Reference Plan (R-Plan).

3.4 FUTURE STREET 2

The Phase 1A development plans and proposed severance protect the future conveyance and dedication of lands to create Street 2 as a public street, as illustrated in the Shoppers World Brampton master plan.

Street 2 will be advanced as part of subsequent phases of development once portions of the existing mall have been demolished to enable the implementation of the planned public street network.

In the interim, access to the Phase 1A buildings is proposed via the existing mall driveway connections, including the signalized driveway to Steeles Avenue West at Lancashire Lane immediately to the south.

Provision is also made within the Phase 1A development for a future daylight triangle between Steeles Avenue West and Street 2 which will be conveyed to the City at the same time as the advancement and dedication of Street 2.

Provision is also made for the future conveyance of a 0.3-metre-wide reserve along the future Street 2 property line. This land will be conveyed to the City when construction of Street 2 is advanced.

3.5 VEHICULAR SITE ACCESS AND CIRCULATION

3.5.1 Existing Shoppers World Brampton Access

The existing Shoppers World Brampton mall is served by an internal network of private driveways with five (5) existing connections to the surrounding area public road network, including one signalized connection at Steeles Avenue West to the south, one signalized connection and one unsignalized connection at Main Street South to the east, and two signalized connections at Charolais Boulevard to the north.

3.5.2 Phase 1A Near-Term Site Access

In the near term, before the buildout of new Street 2, vehicular access to the Phase 1A development is proposed to be provided via the existing north-south mall driveway that runs on the west side of the mall buildings from Steeles Avenue West to Charolais Boulevard. The driveway intersections at Steeles Avenue West and Charolais Boulevard both operate under traffic signal control. In particular, the driveway intersection at Steeles Avenue West, opposite Lancashire Lane, is located immediately to the south of the Phase 1A development and is expected to function as the primary site access.

Access to the parking ramp, internal drive court and loading facilities for the Phase 1A buildings is provided via a driveway connection to the existing north-south mall driveway along the north side of the buildings.

The near-term site access plan is illustrated in FD-01 in **Appendix C**.

3.5.3 Phase 1A Ultimate Site Access

In the future, with the buildout of new public Street 2, the existing north-south mall driveway will be replaced. The site driveway will be extended to connect to the new public Street 2 instead of the existing north-south mall driveway.

The ultimate site access plan is illustrated in FD-02 in **Appendix C**.

3.5.4 Oceans Supermarket Loading Area Reconfiguration

Some reconfiguration is proposed to the southern portion of the existing north-south mall driveway around the Oceans Supermarket building to provide for the proposed extent of the Phase 1A development site.

It is proposed, as part of this modification, to relocate the existing loading facility serving the Oceans Supermarket to the north side of the building with appropriate space being provided adjacent to the loading area for truck manoeuvring.

A separate Limited Site Plan application (SPA-2024-0026) has been made to the City to permit this modification.

3.5.5 Fire Route

In the near term, fire truck access to the Phase 1A buildings will be provided via the existing north-south mall driveway connecting to Steeles Avenue West. In the ultimate condition, fire truck access will be provided via new Street 2.

The proposed fire route enables fire department access to within 15 metres of the principal entrances of the proposed buildings. The fire route is less than 90 metres in length from the nearest public street, so no formal turnaround is required at the terminus of the fire route.

The fire route plan is attached in **Appendix E**.

3.6 PARKING

A total of 264 parking spaces are proposed in a 2-level underground parking garage, including 260 resident spaces (including 250 standard and 10 accessible spaces) and 4 visitor spaces (all accessible). The visitor spaces in the underground parking garage are all designed as accessible spaces and are intended to meet the accessible visitor parking requirement for the development.

Additional parking is proposed to be provided in a 5-storey above-grade parking structure located immediately to the north of the Phase 1A parcel. A total of 445 spaces are proposed in the parking structure, including 361 resident and 84 visitor spaces. Access to the above-grade parking structure will be provided via the site driveway located along the north side of the buildings connecting to the existing north-south mall driveway.

The total resident parking supply of 621 spaces results in an effective supply of 0.71 spaces/unit, while the total visitor parking supply of 88 spaces results in an effective supply of 0.10 spaces/unit.

The above-grade parking structure is the subject of a separate SPA application being made to the City.

3.7 PICK-UP / DROP-OFF

An internal drive court is proposed on the site on the west side of the property in between the two buildings to accommodate pick-up/drop-off, layby and delivery activity. Access to the drive court is proposed via the site driveway located along the north side of the buildings connecting to the existing north-south mall driveway.

3.8 LOADING

Two loading spaces are proposed at grade, integrated within each of the buildings, including one located at the northwest corner of Tower A and another located at the northwest corner of Tower B. Both loading spaces are 6.0 metres in width, 18.0 metres in length and have 7.5 metres of vertical clearance. The two loading facilities will appropriately accommodate the refuse collection, loading/unloading, moving and delivery activity of the two buildings.

Vehicle manoeuvring diagrams (VMDs) illustrating the ingress and egress of municipal waste collection trucks to/from the loading spaces are attached in **Appendix B**.

The pavement marking and signage plan is provided in **Appendix D**.

3.9 MOBILITY PLAN STRATEGIES

A number of Transportation Demand Management (TDM) measures are being contemplated as part of the development of Phase 1A and throughout the full development of the Shoppers World Brampton Master Plan. These include:

- The development of a mixed-use site that allows people to live and work without the use of a vehicle;
- New pedestrian and cycling connections that are integrated into the proposed road plan for the site, which will support active transportation as a viable mode of travelling to and from the site;
- The provision of bicycle parking to support and encourage cycling;
- Consideration for e-bike parking and charging in the building;
- Consideration of car-share facilities in future phases of development (i.e. as car-share companies expand further in the GTA and as the densities in and around the site are sufficient to attract car-share companies);
- Strong connectivity to the transit facilities adjacent to the site to facilitate and maximize transit usage;
- Providing new residents and commercial tenants with information on transportation options to promote alternative modes of travel to the single-occupant vehicle; and
- Additional measures developed in consultation with the City of Brampton.

4.0 TRANSPORTATION CONTEXT

4.1 AREA ROAD NETWORK

The site is well served by a network of streets including major arterials, minor arterials, and collectors. Steeles Avenue and Hurontario Street / Main Street South provide the site with strong east-west and north-south connections to various areas across the City and Region, respectively.

The existing area road network is described in **Table 3** and illustrated in **Figure 5**. The existing and future area road configuration and traffic control are illustrated in **Figure 6A** and **Figure 6B**, respectively.

TABLE 3 ROAD CLASSIFICATION SUMMARY

Road Name		Roadway Limits	Cross-Section and Parking Regulations	Speed Limit
Major Arterial (Regional)	Steeles Avenue	Steeles Avenue is an east-west regional major arterial road that extends from the Town of Milton in the west to the City of Vaughan and the City of Toronto, forming the border between these two municipalities.	The roadway has a 6-lane cross-section with 3 vehicular travel lanes in each direction and a centre median left turn lane. At Malta Avenue / McMurchy Avenue South, adjacent to the site, there are dedicated left turn lanes in all directions (dual southbound left turn lanes) and a dedicated and channelized eastbound right turn lane. The eastbound right turn lane is also an exclusive through lane for public transit. Parking is not permitted on either side of the roadway.	60 to 70 km/h
Major Arterial (City)	Hurontario Street	Hurontario Street is a north-south major arterial road that extends from Steeles Avenue West in the north to Mississauga in the south.	The roadway has a 6-lane cross-section with 3 vehicular travel lanes in each direction. At Steeles Avenue, dedicated turning lanes are provided wherein each leg has dual left turn lanes and a channelized right turn lane. After the construction of the Hazel McCallion Line, 2 through vehicular travel lanes (1 in each direction) along the roadway to accommodate LRT tracks. Dual left-turns at Steeles Avenue will be maintained but channelized right-turns will be removed. Parking is not permitted on either side of the roadway.	60 km/h
	Main Street South	Main Street South is a north-south major arterial road that extends from Steeles Avenue West in the south to Queen Street in the north, where it continues as Main Street North until Bovaird Drive West where it continues as Hurontario Street in the north to Caledon.		60 km/h
Local	Lancashire Lane	Lancashire Lane is an L-shaped private, local road that extends from Steeles Avenue West in the north to Hurontario Street in the east. Lancashire Lane services several commercial facilities located in surrounding plazas.	The roadway has a 2-lane cross-section with 1 vehicular travel lane in each direction. At the Hurontario Street and Steeles Avenue West intersections, dedicated turning lanes are provided.	50 km/h (assumed)

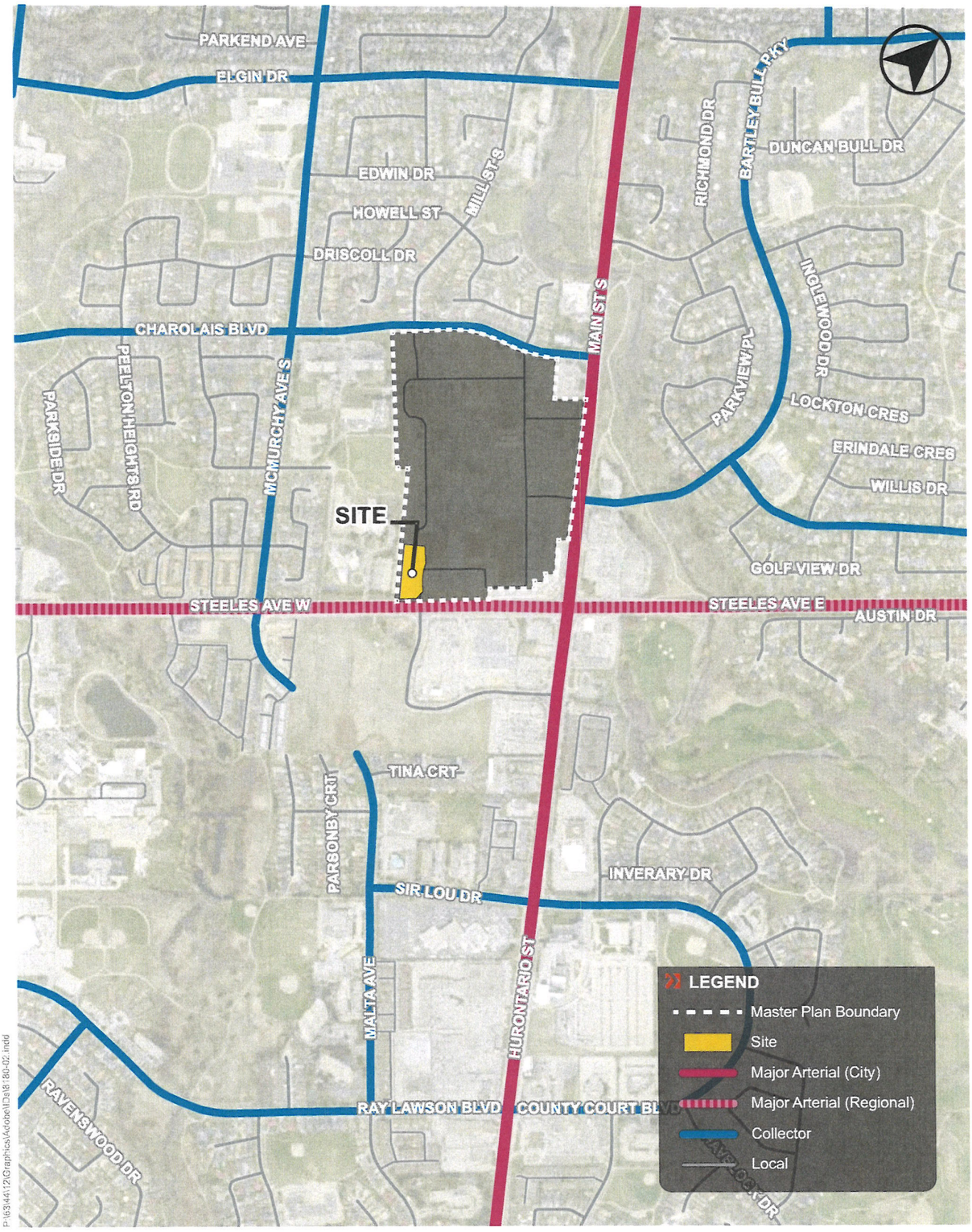


FIGURE 5 EXISTING STREET NETWORK

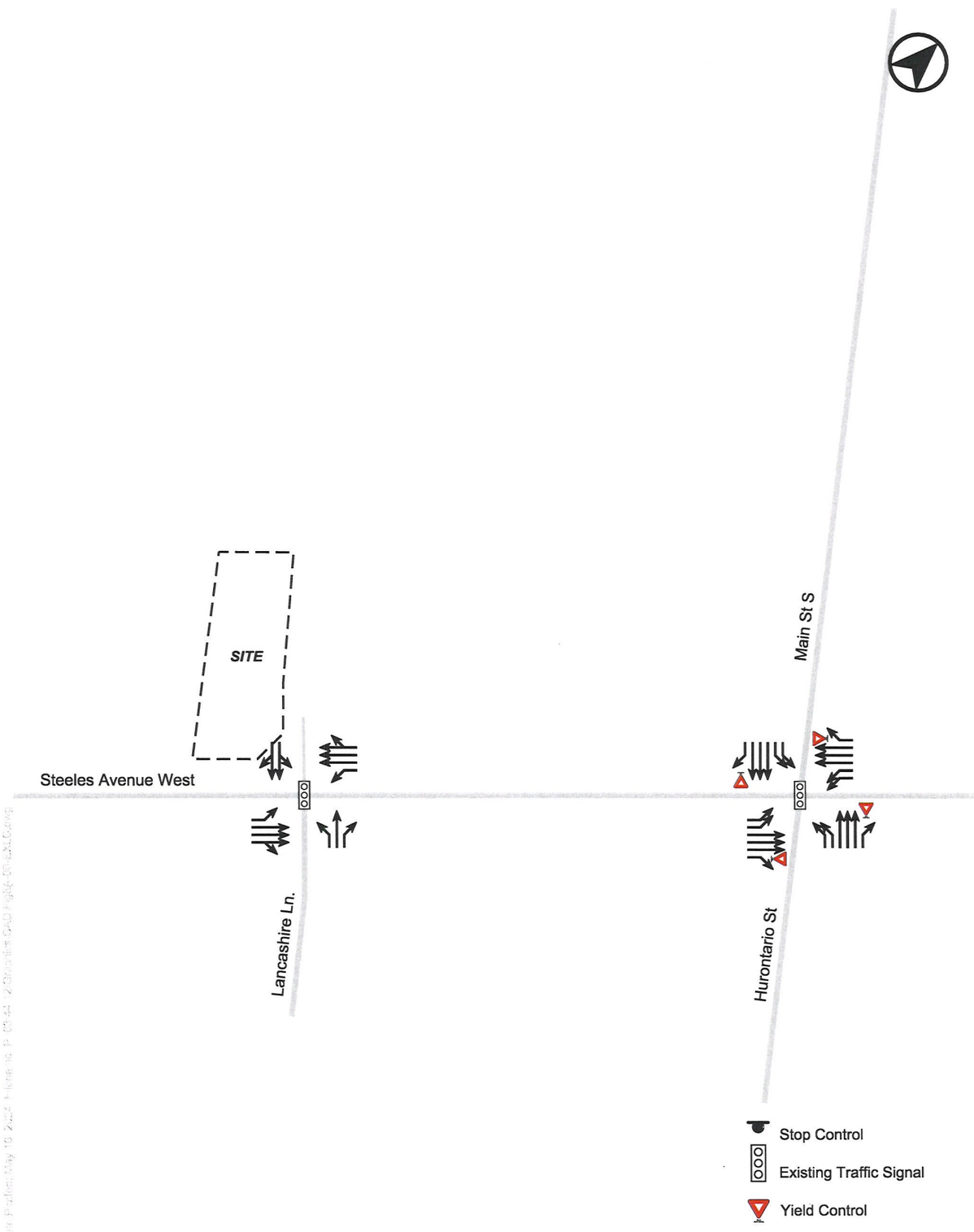


FIGURE 6A EXISTING STREET LANE CONFIGURATION & TRAFFIC CONTROL

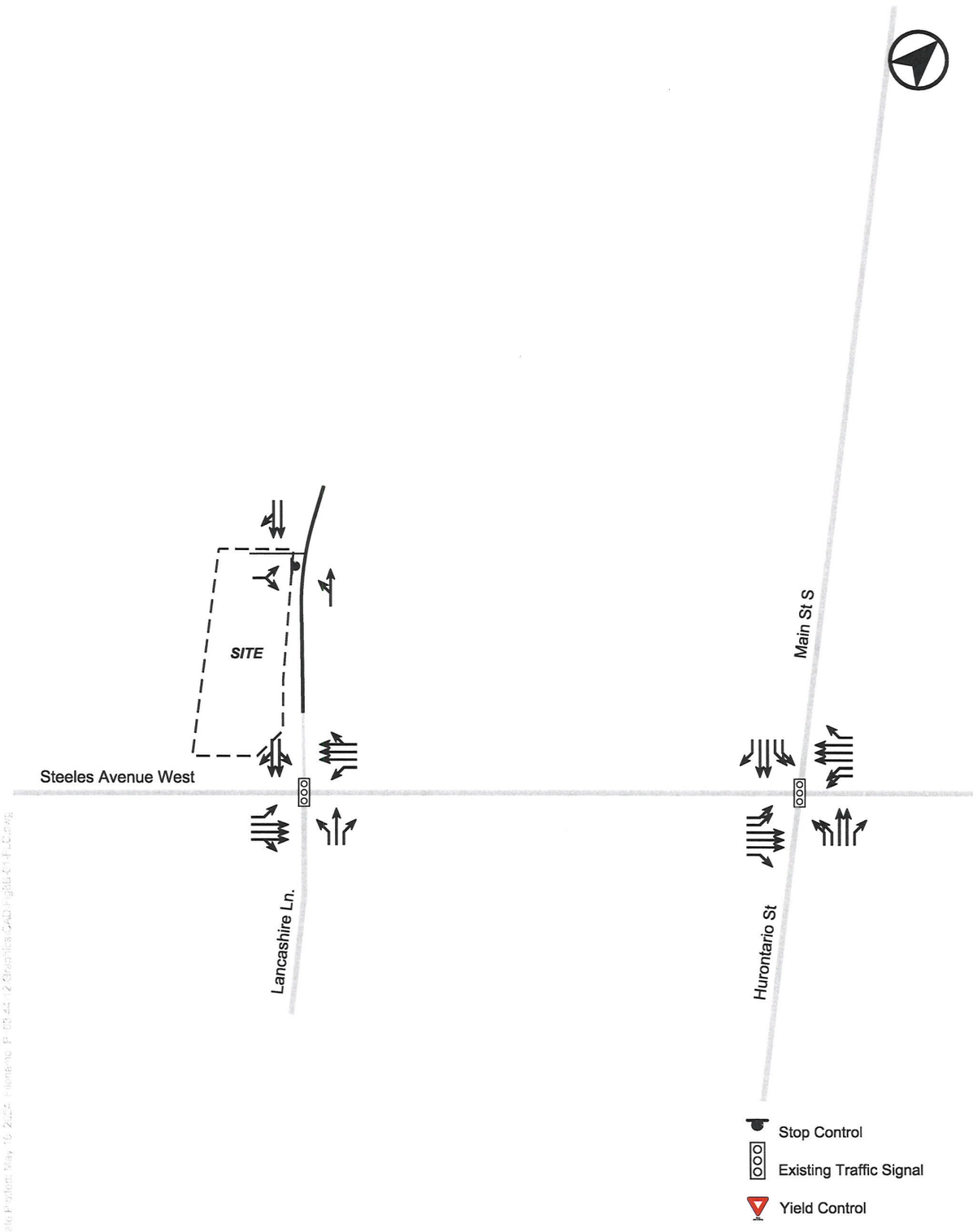


FIGURE 6B FUTURE STREET LANE CONFIGURATION & TRAFFIC CONTROL

4.2 AREA TRANSIT NETWORK

4.2.1 Existing Transit Network

The site is well-situated relative to surface transit services including Brampton Transit Express Bus Service (i.e., Züm), Brampton Transit Local Service, MiWay (Mississauga) Transit Local Bus Service, and Metrolinx GO Transit Regional Bus Service. Most notably, the site is located within walking distance (~250 metres) of the Brampton Gateway Terminal, offering connectivity to numerous transit routes that provide local connections to the surrounding neighbourhood and the broader region. Overall, the site is within walking distance of more than 15 surface transit routes.

An overview of the existing area transit services is provided in **Table 4** and illustrated in **Figure 7**.

TABLE 4 AREA TRANSIT NETWORK

Route		Headway (Weekday Peak)	Closest Stop (Distance from site)	Route Description
Brampton Transit Express Bus Service (Züm)	Züm 502 – Main	~7 – 10 minutes	Brampton Gateway Terminal (~250 m / ~3-min walk)	The 502 –Züm Main route predominantly runs along Hurontario Street, connecting the City Centre Transit Terminal in the south and Sandalwood Loop in the north.
	Züm 511 – Steeles	~7 – 15 minutes	Brampton Gateway Terminal (~250 m / ~3-min walk)	The 511 – Züm Steeles route predominantly runs along Steeles Avenue, connecting Lisgar GO Station in the west and Brampton Gateway Terminal in the east. The route provides service along Argentia Road, Winston Churchill Boulevard, Sheridan College, Finch Avenue and Humber College Boulevard. The A and C Branches provide extended service from Brampton Gateway Terminal to Humber College in the east.
Brampton Transit Local Bus Service	2 Main	~20 minutes	Brampton Gateway Terminal (~250 m / ~3-min walk)	The 2 Main bus route runs predominantly along Main Street, between Sandalwood Parkway East in the north, where it runs until Heart Lake Terminal, to Hurontario Street and Highway 407 Park and Ride in the south. This route also provides service on Longside Drive, Maritz Drive, Skyway Drive, Superior Boulevard, and Edwards Boulevard south of Derry Road.
	3 McLaughlin	~12 – 14 minutes	Brampton Gateway Terminal (~250 m / ~3-min walk)	The 3 McLaughlin bus route runs predominantly along McLaughlin Road North and McLaughlin Road South. In the north, this route provides service on Wanless Drive, Hurontario Street, Sandalwood Parkway East to the Heart Lake Terminal. In the south, this route provides service to Sheridan College and continues along Steeles Avenue West to the Brampton Gateway Terminal.

Route		Headway (Weekday Peak)	Closest Stop (Distance from site)	Route Description
	4 Chinguacousy	~ 9 – 15 minutes	Brampton Gateway Terminal (~250 m / ~3-min walk)	The 4 Chinguacousy bus route runs predominantly on Chinguacousy Road between Wanless Drive in the north and Steeles Avenue West in the south. In the south, the route runs along Steeles Avenue West to the Brampton Gateway Terminal, with northbound buses passing through Sheridan College. In the north, the route provides service on Brisdale Drive and Bovaird Drive West to the Mount Pleasant GO station. An A branch provides service on Creditview Road, Fairhill Avenue, and Worthington Avenue.
	8 Centre	~50 – 55 minutes	Brampton Gateway Terminal (~250 m / ~3-min walk)	The 8 Centre bus route runs between the Bramalea Terminal in the east and the Brampton Gateway Terminal in the west. The route runs from Queen Street East to Rutherford Road North, where it follows Centre Street North. It also provides service to John Street, Trueman Street, Peel Memorial Hospital, Sterne Avenue, Marsden Crescent, Harper Road, and Bartley Bull Parkway to Main Street South.
	11 Steeles	~8 – 10 minutes	Brampton Gateway Terminal (~250 m / ~3-min walk)	The 11 Steeles bus route predominantly runs along Steeles Avenue East and Steeles Avenue West. In the west, the route runs from Winston Churchill Boulevard and the Lisgar GO Sation to Goreway Drive along Steeles Avenue. In the east, the route provides service along Kenview Boulevard, Finch Avenue, Steinway Boulevard, Signal Hill Avenue, Albion Road, and Humberline Drive, to Humber College in the east. An A Branch provides service between Brampton Gateway Terminal in the west and Humber College in the east.
	51 Hereford	~30 minutes	Brampton Gateway Terminal (~250 m / ~3-min walk)	The 51 Hereford bus route predominantly runs along Steeles Avenue West. In the east, the route runs from Brampton Gateway Terminal and provides service to Sheridan College. In the east, the route runs along Financial Drive, Derry Road West, Mississauga Road, and Hereford Street, providing service to the industrial sector of southwest Brampton.
	52 McMurchy	~50 minutes	Brampton Gateway Terminal (~250 m / ~3-min walk)	The 52 McMurchy bus route predominantly runs along McMurchy Avenue South, connecting Brampton Gateway Terminal to the Downtown Brampton Terminal. In the north, the route runs along Railroad Street to McMurchy Avenue North. In the south, the route provides service along Main Street South, Mill Street South, and Elgin Drive.
	53 Ray Lawson	~25 – 30 minutes	Brampton Gateway Terminal (~250 m / ~3-min walk)	The 53 Ray Lawson bus route runs between the Brampton Gateway Terminal to James Potter Road at Charolais Boulevard, serving many residential areas of southwestern Brampton. This route provides service along Steeles Avenue West, McLaughlin Road South, Kingknoll Drive, Oaklea Boulevard, Chinguacousy Road, and Clementine Drive.

Route		Headway (Weekday Peak)	Closest Stop (Distance from site)	Route Description
	54 County Court	~20 minutes	Brampton Gateway Terminal (~250 m / ~3-min walk)	The 54 County Court bus route is a loop that starts and ends at Brampton Gateway Terminal. This route provides service along Hurontario Street, County Court Boulevard, Ray Lawson Boulevard, Cherrytree Drive, Timberlane Drive, Gurdwara Gate, McLaughlin Road South, and Steeles Avenue West. The route also runs through Sheridan College.
	56 Kingknoll	~40 minutes	Brampton Gateway Terminal (~250 m / ~3-min walk)	The 56 Kingknoll bus route is a loop that starts and ends at Brampton Gateway Terminal. This route provides service along Hurontario Street, County Court Boulevard, Havelock Drive, Ray Lawson Boulevard, Kingknoll Drive, McLaughlin Road South, and Steeles Avenue West. The route also runs through Sheridan College.
	57 Charolais	25 min, weekday peak	Brampton Gateway Terminal (~250 m / ~3-min walk)	The 57 Charolais bus route from Brampton Gateway Terminal in the south to Chinguacousy Road at Major William Sharpe Drive in the north, primarily provides service to Charolais Boulevard and the Flower City Community Campus.
	104 Chinguacousy Express	~18 – 20 minutes	Brampton Gateway Terminal (~250 m / ~3-min walk)	The 104 Chinguacousy Express route runs predominantly along Chinguacousy Road. The route runs from Brampton Terminal in the south, providing service along Steeles Avenue West and in Sheridan College. In the north, the route runs along Bovaird Drive West to connect to Mount Pleasant GO Station.
	199 UTM Express	~60 minutes	Brampton Gateway Terminal (~250 m / ~3-min walk)	The 199 UTM Express route is a weekday route that runs between the University of Toronto at Mississauga in the south and Brampton Gateway Terminal in the north. The route predominantly runs along Highway 407, as well as on Hurontario Street in the north and Highway 403, Erin Mills Parkway, and The Collegeway in the south.
MiWay (Mississauga) Transit Local Bus Service	18 McLaughlin-Derry	~12 – 15 minutes	Sheridan College Brampton Campus (~600m / ~9-min walk)	The 18 McLaughlin-Derry route is a weekday route that runs primarily along Derry Road, connecting Sheridan College (Davis Campus) in the west to Westwood Square in the east, and also providing service to the Malton GO Station. This route also provides service on McLaughlin Road, Goreway Drive, and Moring Star Drive.
	57 Courtneypark	~10 – 15 minutes	Mclaughlin Rd At Sheridan College Dr (~700m / ~10-min walk)	The 57 Courtney route is a weekday route that runs primarily along Mavis Road, Courtneypark Drive, and Convair Road, connecting Sheridan College (Davis Campus) in the west to the Renforth Transitway Bus Station. This route also provides regular service along Steeles Avenue and Netherhart Rd and limited service along Brittania Road East.

Route		Headway (Weekday Peak)	Closest Stop (Distance from site)	Route Description
	MiWay 61 Mavis	~10 – 15 minutes	Sheridan College Brampton Campus (~600m / ~9-min walk)	The 61 Mavis route predominantly runs along Mavis Road. On weekdays, the route runs from the City Central Transit Terminal at Square One in the south to Sheridan College, with service also provided on Rathburn Road West and Steeles Avenue West.
	MiWay 66 McLaughlin	~10 – 15 minutes	Sheridan College Brampton Campus (~600m / ~9-min walk)	The 66 McLaughlin route predominantly runs along McLaughlin Road, connecting the City Centre Transit Terminal at Square One in the south and Sheridan College in the north. This route also provides service on Rathburn Road and Steeles Avenue West.
	MiWay 103 Hurontario Express	~15 – 20 minutes	Brampton Gateway Terminal (~250 m / ~3-min walk)	The 103 Hurontario Express route predominantly runs along Hurontario Street, connecting Trillium Health Centre on The Queensway West in the south to Brampton Gateway Terminal on Steeles Avenue in the north.
GO Transit Regional Bus Service	GO 31 Georgetown	~25 minutes	Shopper's World (~1 km from site / ~14-min walk)	The 31 Georgetown route operates daily and runs from Union Station Bus Terminal in the east to Georgetown GO in the west.
	GO 33 Guelph / North York	~35 minutes	Shopper's World (~1 km from site / ~14-min walk)	The 33 Guelph/North York route operates during weekdays and runs from Georgetown GO in the west to York Mills Bus terminal in the east.

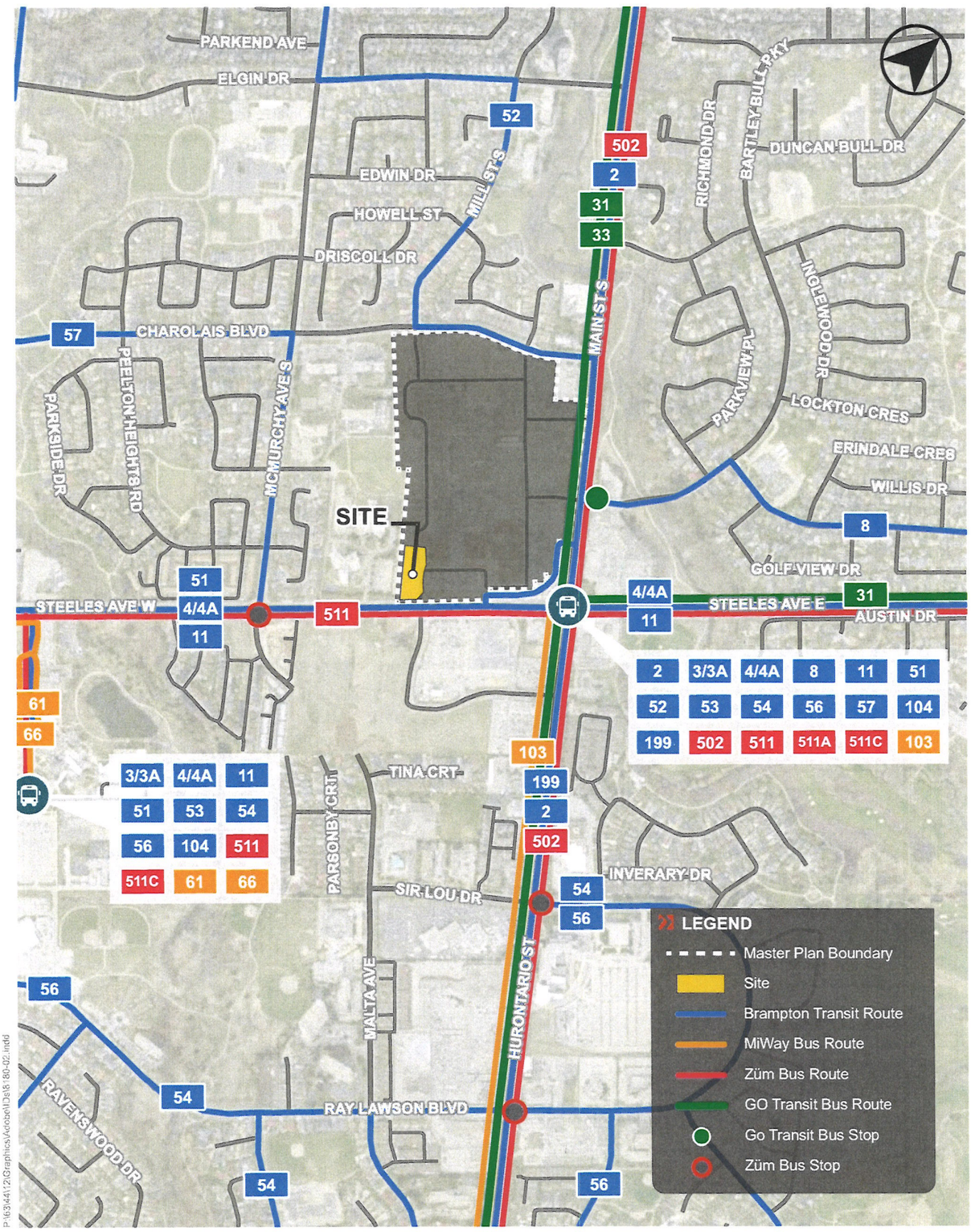


FIGURE 7 EXISTING TRANSIT NETWORK

4.2.2 Future Transit Improvement

There are significant transit improvements planned in the vicinity of the site that will have a significant influence on access to quality higher-order transit services and access to regional transit services.

4.2.2.1 Hazel McCallion Line (Hurontario LRT)

The Hazel McCallion Line, also known as the Hurontario-Main Light Rail Transit (LRT), will provide significantly improved transit service in the site vicinity. This new LRT line, currently under construction, is planned to open in fall 2024 and will add 18 kilometres of higher-order transit and 19 stops along the Hurontario corridor, connecting Brampton's Gateway Terminal in the north to Port Credit GO Station in the south, as illustrated in **Figure 8**. Notably, the Brampton Gateway Terminal is located approximately 250 metres east of the subject site.

The Hazel McCallion Line will provide local connections within and between Brampton and Mississauga, as well as regional connections to the Milton GO Line at Cooksville GO Station and the Lakeshore West GO Line at Port Credit GO Station. In the next two decades, the City of Mississauga reports that approximately one-quarter of the City's employment and residents will be along this corridor.

Overall, the future LRT will link the two GO Stations and the proposed site to the Mississauga Transitway, Square One GO Bus Terminal, Brampton Gateway Terminal, and key MiWay and Brampton Transit routes. The Hazel McCallion Line will generally run at grade in a segregated lane, separate from other road traffic and will use grade-separated crossings at rail lines and highways as required, allowing for efficient travel across the Region.

The site is located approximately 250 metres west of the planned Brampton Gateway Terminal stop of the future Hazel McCallion Line. As such, the site is afforded rapid transit connections along Hurontario Street, providing convenient access to employment, educational, and retail options throughout the City. This future LRT system, replacing numerous buses along Hurontario Street, also allows for increased reliability and comfort for passengers.

4.2.2.2 LRT Extension Study

Metrolinx and the City of Brampton are currently in the process of conducting the "LRT Extension Study", which plans to extend the Hazel McCallion Line further north to Downtown Brampton. The project is focused on the Main Street South corridor, extending from Brampton Gateway Terminal in the south to Brampton GO Station (and the downtown Brampton area) in the north. The proposed route extension is considering both surface and tunnel alignment options, as illustrated in **Exhibit 1** and **Exhibit 2**, respectively.

As of April 2024, the project team has completed the development of the draft 30% preliminary design for both the surface and tunnel alignment options with the corresponding draft Environmental Project Report (EPR) for each option. The Province has accepted the initial business case for the LRT extension. City staff are directed to have further dialogue with Metrolinx and Provincial officials to inform the preferred alignment to be taken through the Transit Project Assessment Process (TPAP).

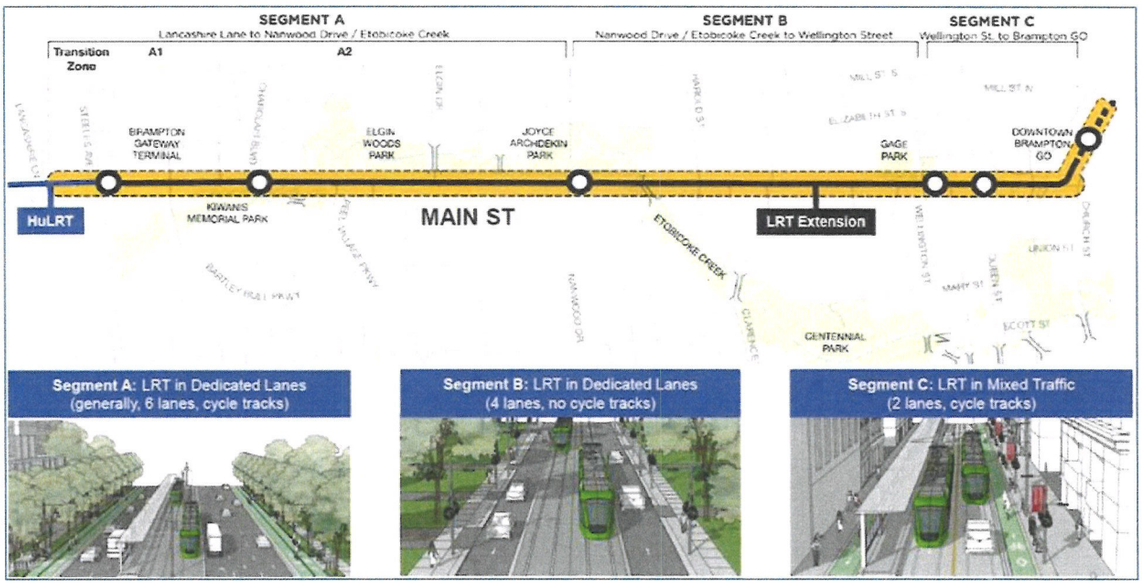


EXHIBIT 1. LRT EXTENSION STUDY – PREFERRED SURFACE ALIGNMENT (CITY OF BRAMPTON)

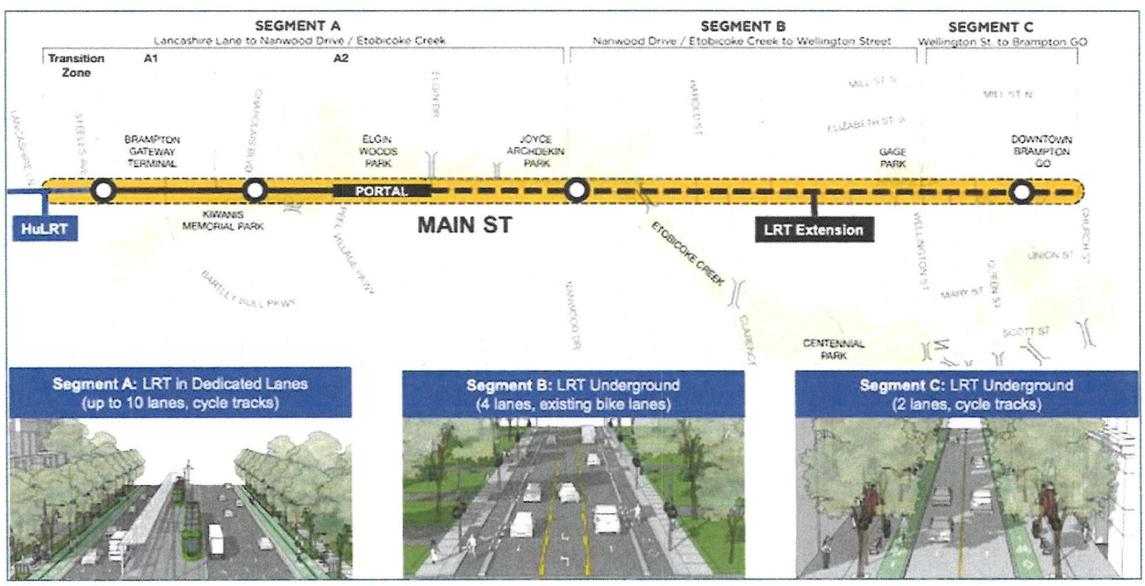


EXHIBIT 2. LRT EXTENSION STUDY – PREFERRED TUNNEL ALIGNMENT (CITY OF BRAMPTON)

The LRT extension will directly benefit the proposed development (and other planned developments along the Hurontario corridor) as it will extend the site's transit reach to/from areas in the City and broader region (via the Brampton GO Station).

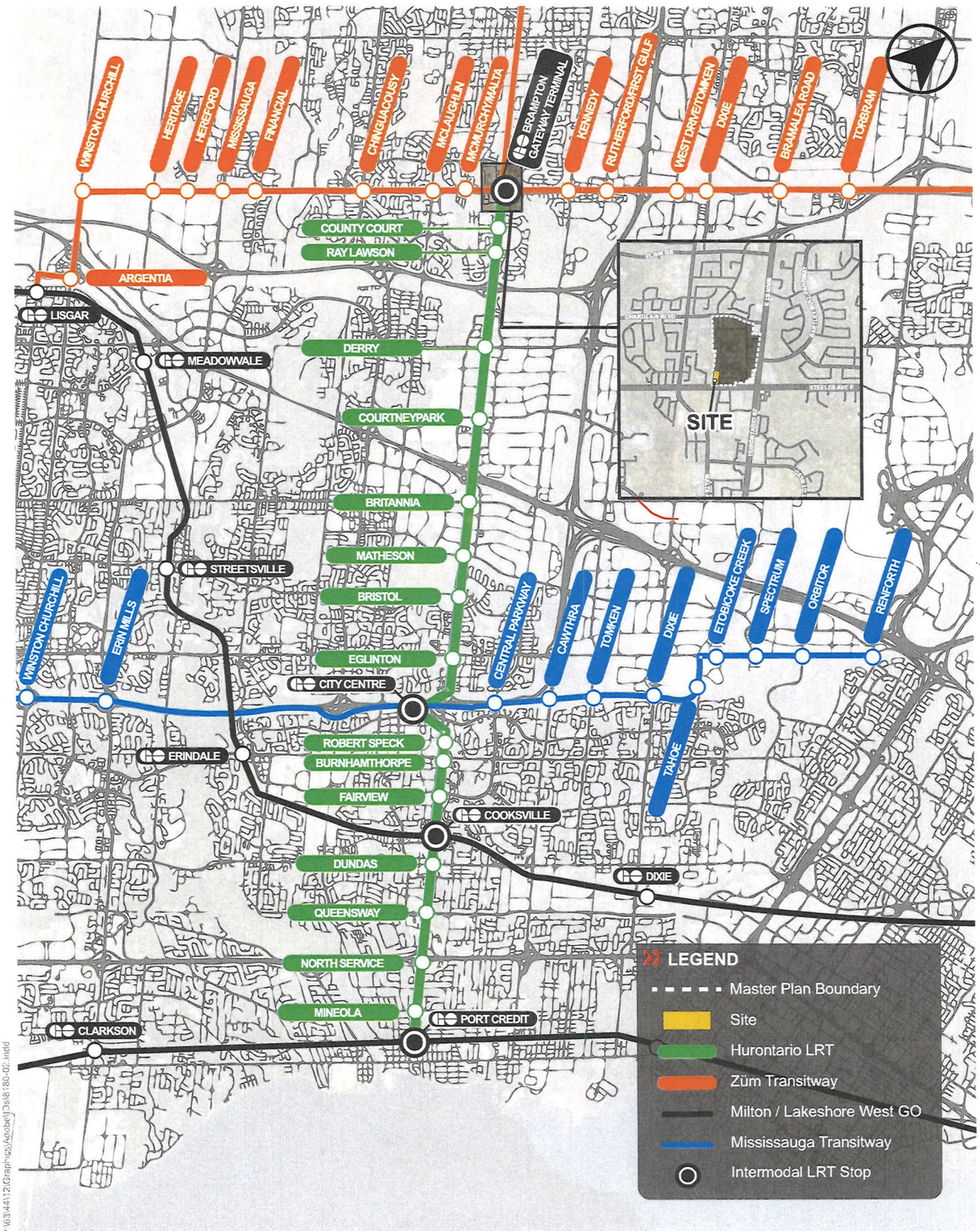


FIGURE 8 PLANNED HIGHER FREQUENCY TRANSIT NETWORK

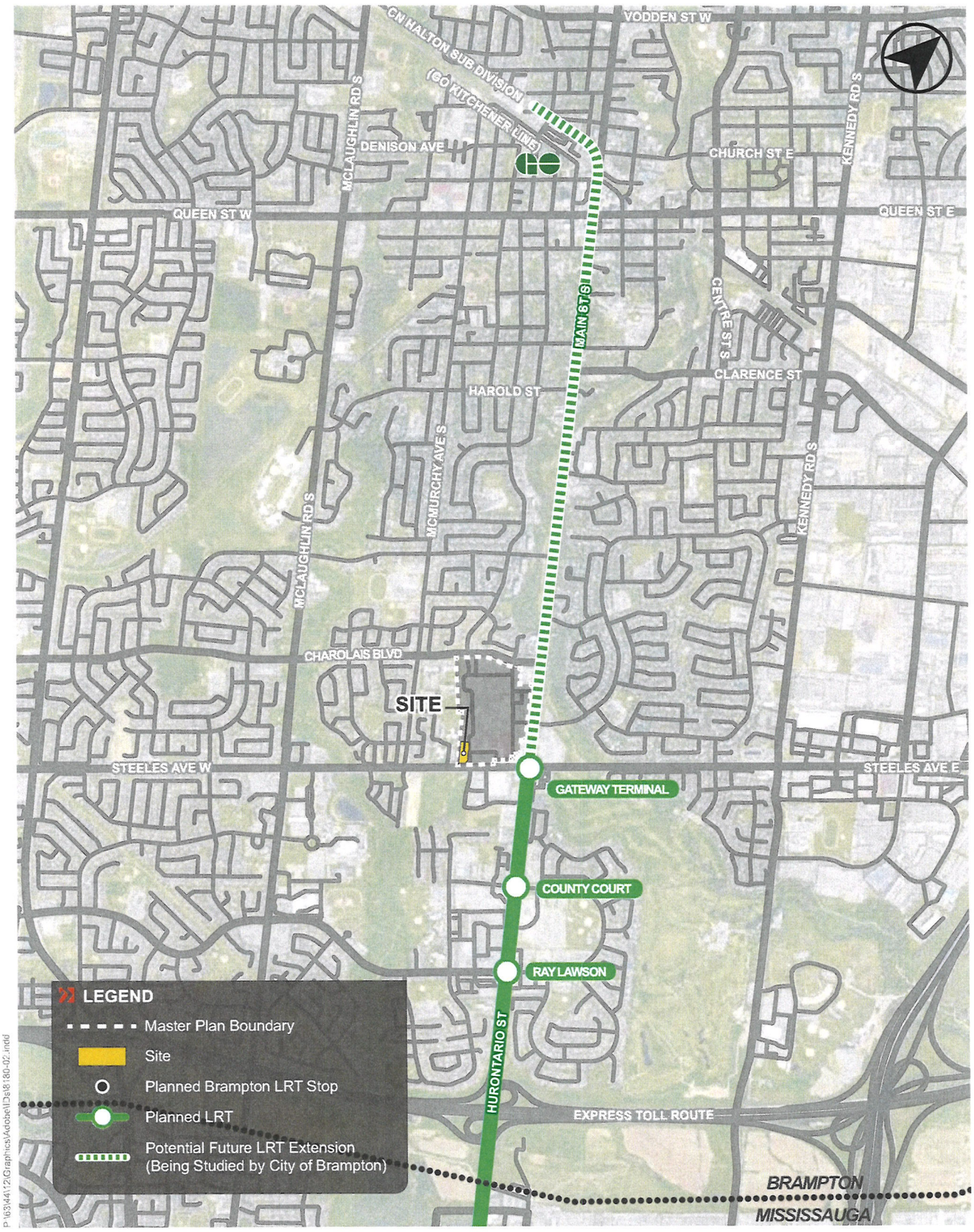


FIGURE 9 HURONTARIO LRT EXTENSION

4.3 AREA CYCLING NETWORK

4.3.1 Existing Cycling Infrastructure

The site is located in close proximity to a variety of cycling facilities that connect within the City of Brampton and across the broader Region. Nearby cycling infrastructure consists of boulevard bike paths, recreational trails, bike lanes, urban shoulders, and off-street multi-use paths.

An overview of the area cycling routes in proximity to the site is provided in **Table 5** and illustrated in **Figure 10**.

TABLE 5 AREA EXISTING CYCLING INFRASTRUCTURE

Route Name	Direction	Type	Description
County Court Boulevard	East-West	Bike Lanes	Route travels in a C-shape from Hurontario Street in the north to Hurontario Street in the south. Route is marked on the pavement and lanes are provided in each direction. Route provides connections to the Etobicoke Creek Recreational Trail to the north and the County Court Park path.
McMurchy Avenue South	North-South	Signed Routes & Urban Shoulders	Route is an urban shoulder that travels from Kingsview Boulevard in the north to Charolais Boulevard in the south. Route is on-street and is separated from the vehicle lane by pavement markings.
McMurchy Avenue South	North-South	Signed Routes & Urban Shoulders	Route is a signed route that travels from Charolais Boulevard in the north to Steeles Avenue in the south. Route is on-street and consists of sharrows on both the east and west sides of McMurchy Avenue South. Signage is posted along the route indicating cyclists and vehicles share the road.
Bartley Bull Parkway	East-West	Signed Routes & Urban Shoulders	Route is a signed route that travels from Hurontario Street in the west to Orchard Drive in the west, where it crosses Steeles Avenue West to connect to the Peel Village Golf Course. Route is on-street and signage is posted along the route indicating cyclists and vehicles share the road.
Peelton Hills Park	North-South	Recreational Trails	Route travels from Charolais Boulevard in the north to Steeles Avenue in the south. Route is separated from roads and railways and shared with pedestrian traffic.
Bach Park	Recreational Trails	Recreational Trails	Route travels from Charolais Boulevard in the north to South Fletcher's Creek Park where it continues until Elgin Drive. Route is separated from roads and railways and shared with pedestrian traffic.
Ray Lawson Valley	Recreational Trails	Recreational Trails	Route travels from Axelrod Avenue in the north to Ray Lawson Boulevard in the south. Route is separated from roads and railways and shared with pedestrian traffic.

4.3.2 Planned Cycling Network Improvements

A series of planned infrastructure investments (included as part of the City of Brampton plans) will benefit the reach of the cycling network connected to the site. Planned connections and improvements have been identified by the City of Brampton and have been addressed through the *Active Transportation Master Plan (2019),* a policy document that addresses existing active transportation challenges and provides strategic solutions to help facilitate the population and employment growth that the city is anticipated to experience to 2041.

As part of the Active Transportation Master Plan, the City of Brampton has identified various proposed cycling facilities within an 800-metre radius of the site, described further in **Table 6**.

TABLE 6 AREA PROPOSED CYCLING INFRASTRUCTURE

Route Name	Direction	Description
Proposed Protected Bike Lanes / Cycle Tracks		
Main Street / Hurontario Street	North-South	Proposed route extends north-south throughout the entire City of Brampton.
Charolais Boulevard	East-West	Proposed route extends from James Potter Road in the west to Main Street in the east.
Proposed Bike Lanes / Buffered Bike Lanes		
Malta Avenue	North-South	Proposed route extends from Snead Road in the north to Ray Lawson Boulevard in the south. This route connects to the proposed infrastructure along Lancashire Lane / Sir Lou Drive.
Lancashire Lane	North-South	Proposed route extends from Malta Avenue in the west to Hurontario Street in the east. This route connects to the proposed infrastructure along Malta Avenue.
Sir Lou Drive	North-South	Proposed route extends from Malta Avenue in the west to Hurontario Street in the east and connects to existing bike lanes along Sir Lou Drive, east of Hurontario Street. This route connects to the proposed infrastructure along Malta Avenue.
McMurchy Avenue	North-South	Proposed route extends from Steeles Avenue in the south to Charolais Boulevard in the north; and
Proposed Recreational Trails		
Fletcher's Creek	North-South	Proposed route connects the existing recreational trail north of Steeles Avenue to the existing trail that extends from the southernmost portion of Axelrod Avenue, thereby "completing" or "linking" the existing trail.

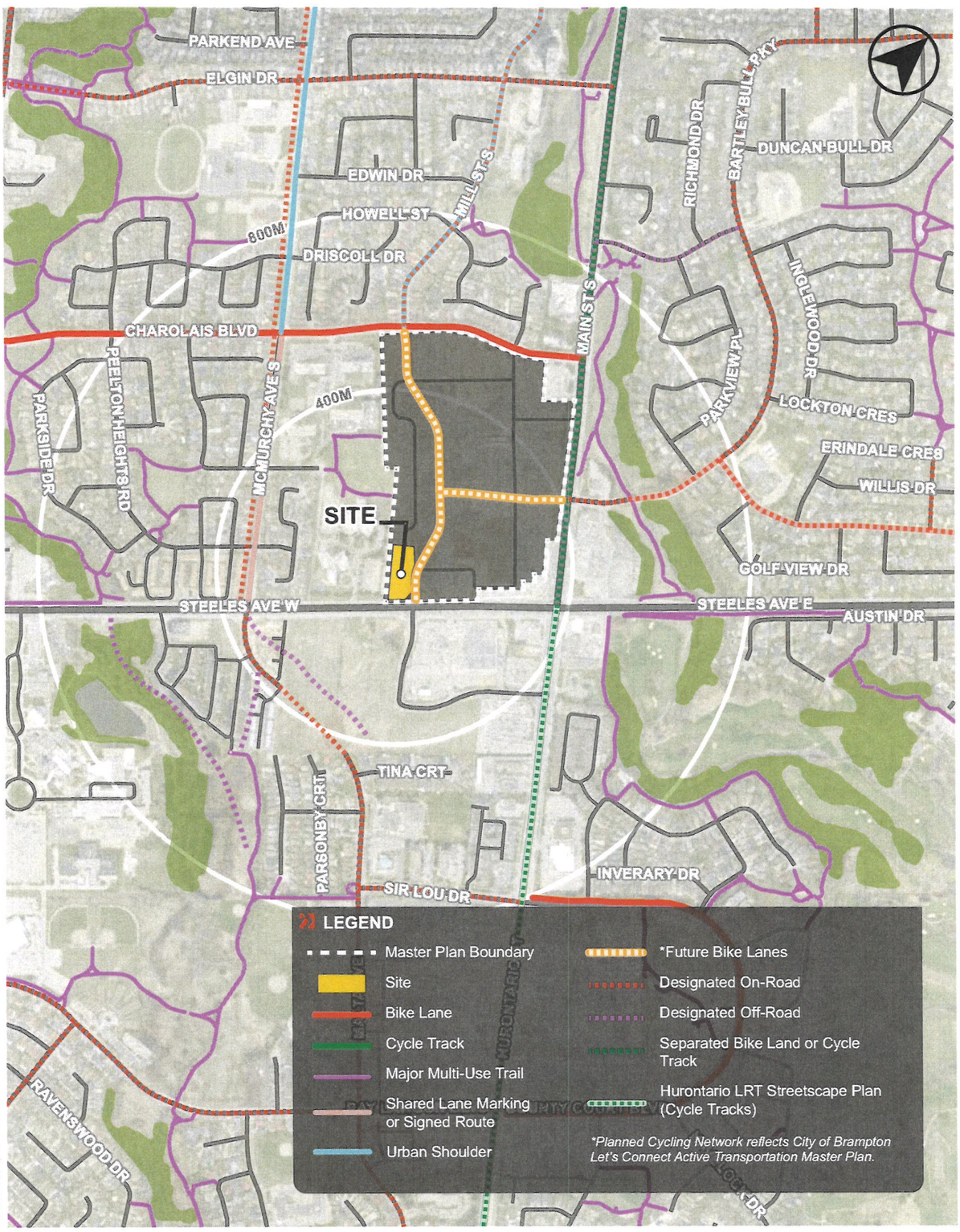


FIGURE 10 EXISTING AND FUTURE CYCLING NETWORK

5.0 VEHICULAR PARKING CONSIDERATIONS

Vehicle parking requirements for the Shoppers World Brampton master plan were established during the Zoning By-law Amendment process. Site-Specific Zoning By-law 228-2020 outlines the minimum parking requirements for all new and existing uses on the Shoppers World Brampton property.

In 2021, the City of Brampton initiated a review of the City-wide parking standards that resulted in the adoption of the City of Brampton Zoning By-law 45-2021, which removed minimum resident and non-residential parking requirements (but not visitor parking requirements) for most developments within the Downtown, Central Area and Hurontario-Main corridor including Shoppers World Brampton. As a result, the parking standards contained in Site-Specific Zoning By-law 228-2020 were overwritten by those contained in the new Zoning By-law 45-2021.

5.1 ZONING BY-LAW REQUIREMENTS

5.1.1 Site-Specific Zoning By-law 228-2020

The application of the Site-Specific Zoning By-law 228-2020 parking requirements to the Phase 1A development, as well to the existing mall, is summarized in **Table 7**.

TABLE 7 SITE-SPECIFIC ZONING BY-LAW 228-2020 PARKING REQUIREMENTS

Use	Units / GFA	Minimum Standard	Minimum Requirement [1]
Existing Mall			
Retail	60,000 m^2 GFA	1 space / 40 m^2 GFA	1,500 spaces
Phase 1A			
1-Bedroom	613 units	0.8 spaces per unit	490 spaces
2-Bedroom	229 units	0.9 spaces per unit	206 spaces
3-Bedroom	35 units	1.1 spaces per unit	39 spaces
Resident Subtotal	**877 units**	--	**735 spaces**
Residential Visitor	877 units	0.15 spaces per unit	132 spaces
TOTAL PHASE 1A	--	--	**867 spaces**

Notes:
1. When a parking calculation results in a fraction of a number, if the resulting fraction is 0.5 or greater, the number has been rounded up to the next whole number, while if the fraction is less than 0.5, the number has been rounded down.
2. Site-Specific Zoning By-law 228-2020 permits the provision of car-share parking spaces, which shall reduce the parking space requirement by 4 parking spaces for each car share parking space provided.
3. Site-Specific Zoning By-law 228-2020 permits parking to be shared between non-resident uses (in this case, residential visitors and retail users), and contains temporal parking formulae that calculate the combined parking requirements for mixed-use developments. However, because residential visitor and retail user requirements 'peak' at the same time, these formulae do not result in reductions to the total minimum parking requirement and have thus not been applied.

Application of the Site-Specific Zoning By-law 228-2020 to the subject site would require a minimum of **867 spaces for the Phase 1A development**, including 735 resident spaces and 132 visitor spaces. In addition, it would require a minimum of **1,500 non-resident spaces for the existing mall**.

5.1.2 City of Brampton Zoning By-law 45-2021

City of Brampton Zoning By-law 45-2021 overwrites the parking standards contained in the Site-Specific Zoning By-law 228-2020.

As previously discussed, Zoning By-law 45-2021 does not require minimum parking provisions for resident and non-resident uses, with the exception of visitor parking for which it adopted a higher standard (0.20 spaces/unit) than the Site-Specific Zoning By-law 228-2020 (0.15 spaces/unit).

The application of the Zoning By-law 45-2021 parking requirements to the Phase 1A development, as well as to the existing mall, is summarized in **Table 8**.

TABLE 8 CITY BRAMPTON ZONING BY-LAW 45-2021 PARKING REQUIREMENTS – PHASE 1A

Use	Units / GFA	Minimum Standard	Minimum Requirement [1]
Existing Mall			
Retail	60,000 m² GFA	None	0 spaces
Phase 1A			
Resident	877 units	None	0 spaces
Residential Visitor		0.20 spaces per unit	175 spaces
TOTAL	--	--	**175 spaces**

Notes:
1. When a parking calculation results in a fraction of a number, if the resulting fraction is 0.5 or greater, the number has been rounded up to the next whole number, while if the fraction is less than 0.5, the number has been rounded down.

Application of Zoning By-law 45-2021 to the subject site would require a minimum of **175 visitor spaces** for the new residential uses and a minimum of **0 spaces** for the existing mall.

5.2 PROPOSED PARKING SUPPLY

A total of 264 parking spaces are proposed in a 2-level underground parking garage, including 260 resident spaces (including 250 standard and 10 accessible spaces) and 4 visitor spaces (all accessible). The visitor spaces in the underground parking garage are all designed as accessible spaces and are intended to meet the accessible visitor parking requirement for the development.

Additional parking is proposed to be provided in a 5-storey above-grade parking structure located immediately to the north of the Phase 1A parcel. A total of 445 spaces are proposed in the parking structure, including 361 resident and 84 visitor spaces. Access to the above-grade parking structure will be provided via the site driveway located along the north side of the buildings connecting to the existing north-south mall driveway.

The above-grade parking structure is the subject of a separate SPA application being made to the City.

5.2.1 Resident Parking

The total resident parking supply of 621 spaces results in an effective supply of 0.71 spaces/unit. The proposed resident parking supply meets the minimum requirements of By-law 45-2021 (no minimum requirement) and, by way of reference, is lower than the requirements of the previously approved standards outlined in Site-Specific Zoning By-law 228-2020.

The proposed resident parking supply and arrangements are appropriate and respond to the City's initiatives to reduce vehicle parking and auto trips within Brampton's urban areas. It is noted, in this regard, that the site is well served by significant transit services today, and these will continue to improve over time. As well, planned cycling and pedestrian facilities will provide strong active travel connections beyond the site.

5.2.2 Visitor Parking

It is proposed to adopt a visitor parking supply standard of 0.10 spaces/unit for Phase 1A and the broader Shoppers World Brampton master plan. This represents a reduction from the visitor parking requirement contained in the general City of Brampton Zoning By-law 45-2021 (i.e. 0.20 spaces/unit).

The intent of this proposed reduction is to recognize the highly supportive location of the Shoppers World Brampton property relative to significant existing and planned transit services that will enable a reduction in the visitor (and general) parking needs of residential development on the site.

The Brampton Gateway Transit Terminal and planned Hazel McCallion Line are, notably, located immediately adjacent to the Shoppers World Brampton property and will provide a significant mobility alternative for visitors travelling to/from residential uses on the site. It is notable that a reduced visitor parking standard was adopted within Site-Specific By-law 228-2020 for the Shoppers World Brampton property.

The adoption of a reduced visitor standard also recognizes the availability of surplus parking in the existing Shoppers World Brampton mall today, as well as planned future retail / commercial parking for the broader Shoppers World Brampton master plan given the extent and range of retail uses ultimately proposed. Non-resident parking is intended to be consolidated between uses to maximize the efficient use of built parking resources and recognize that this consolidation will provide a substantial "pool" of parking that can be flexibly used to support both retail and residential visitors of the development.

The adoption of a reduced residential visitor parking standard of 0.10 spaces/unit is, based upon the above, considered to be appropriate for the Shoppers World Brampton property as a whole including the Phase 1A development. Relief from the requirements of the Zoning By-law will be sought through the appropriate minor variance process.

The application of the proposed 0.10 spaces/unit visitor parking standard would require the provision of 88 visitor spaces for the Phase 1A buildings.

All visitor parking spaces, with the exception of accessible visitor parking spaces, are proposed to be provided in the above-grade parking structure adjacent to the site. A total of 84 visitor spaces are proposed in the structure. In addition, 4 accessible visitor spaces are proposed in the below-grade parking garage to meet the accessible parking needs of site visitors. The total proposed supply of 88 visitor spaces meets the proposed visitor parking standard.

5.3 ACCESSIBLE PARKING

Site-Specific Zoning By-law 228-2020 does not contain any specific accessible parking requirements. The updated City of Brampton Zoning By-law 045-2021 requires that accessible parking be provided in accordance with Traffic By-law 93-93.

City of Brampton Traffic By-law 93-93 requires 4 percent of the total public parking spaces provided to be provided as accessible parking where there are between 13 and 100 parking spaces, rounding up to the nearest whole number. Based on a total public parking supply of 88 visitor spaces, a total of 4 accessible visitor parking spaces are required, of which 2 are Type A and 2 are Type B, where spaces are to be designed as follows;

- Type A: minimum width of 3.4 metres and length of 5.4 metres
- Type B minimum width of 2.4 metres and length of 5.4 metres

The bylaw does not contain a minimum standard for resident parking.

The current architectural plans illustrate 10 accessible resident spaces (including 5 Type A and 5 Type B) and 4 accessible visitor spaces (including 2 Type A and 2 Type B) in the underground parking garage. The proposed accessible parking supply meets the accessible parking requirements of By-law 93-93.

5.4 ELECTRIC VEHICLE PARKING

Site-Specific Zoning By-law 228-2020 does not contain electric vehicle (EV) parking requirements. However, it is proposed to equip a total of 27 spaces in the underground parking garage (approximately 10% of spaces) with EV charging equipment and an additional 77 spaces (approximately 30% of spaces) with rough-ins for future EV charging equipment.

6.0 LOADING CONSIDERATIONS

Site-Specific Zoning By-law 228-2020 does not contain any specific loading requirements.

The City of Brampton Zoning By-law 270-2004, which applies to the loading requirements on the site, does not contain loading provisions for residential uses.

Notwithstanding the above, one loading space is proposed in each of Building A and Building B, with both having dimensions of 6.0 metres wide x 18.0 metres long x 7.5 metres vertical clearance. Both loading spaces are located within screened areas and provide staging areas to accommodate waste bin staging.

The loading provisions, loading facility arrangements and circulation elements have been designed to appropriately accommodate the ingress, egress and on-site manoeuvring of a Peel Region front loader waste collection vehicle.

Vehicle manoeuvring diagrams (VMDs) illustrating the ingress and egress of a waste and recycling collection vehicle to/from both loading spaces are attached in **Appendix B**.

7.0 BICYCLE PARKING CONSIDERATIONS

7.1 ZONING BY-LAW REQUIREMENTS

The application of the Site-Specific Zoning By-law 228-2020 bicycle parking requirements to the proposed development is summarized in **Table 9**.

TABLE 9 SITE-SPECIFIC ZONING BY-LAW 228-2020 BICYCLE PARKING REQUIREMENTS

Use	Units / GFA	Minimum Standard	Minimum Requirement[1]
Residential – Occupant	877 units	0.5 spaces per unit	439 spaces
Residential – Visitor		0.1 spaces per unit	88 spaces
TOTAL	--	--	**527 spaces**

Notes:
1. When a parking calculation results in a fraction of a number, if the resulting fraction is 0.5 or greater, the number has been rounded up to the next whole number, while if the fraction is less than 0.5, the number has been rounded down.

Application of the Site-Specific Zoning By-law 228-2020 to the subject site would require a minimum of 527 bicycle parking spaces, including 439 resident spaces and 88 residential visitor spaces.

7.2 PROPOSED SUPPLY

A total of 528 bicycle parking spaces are proposed on the site including 440 resident and 88 visitor spaces, which meets the requirements of the Site-Specific Zoning By-law. Resident spaces are located in a secured bicycle room on Level 2. Visitor spaces are located on the ground level at highly visible areas.

8.0 TRAVEL DEMAND ASSESSMENT

8.1 ANALYSIS SCENARIOS AND HORIZONS

The introduction and construction of the Hazel McCallion Line will significantly transform Hurontario Street along the LRT route and the local travel characteristics in the study area:

- **Lane Configuration:** The LRT will operate in dedicated centre lanes, resulting in the removal of two travel lanes (one in each direction) along Hurontario Street to accommodate the tracks and platforms. At the intersection Steeles Avenue / Hurontario Street / Main Street South, the following reconfigurations will be made:

    - Reduce the north-south through traffic lanes (along Hurontario Street / Main Street South) to two through lanes in each direction;
    - Maintain the auxiliary turn lanes;
    - Remove channelized right-turn lanes; and
    - Reduce corner radii at all four corners.

    These changes will reduce turning speeds at the intersection and improve the pedestrian environment.

- **Area Mode Split** – With the implementation of the Hazel McCallion Line, it is expected that the area auto mode share will decline and be offset to sustainable transportation modes primarily transit.

- **Corridor Traffic Volumes** – After the completion of the Hazel McCallion Line, general traffic volumes along Hurontario Street / Main Street South will experience a decline due to a) travellers shifting modes of transportation (i.e., transit) and b) a decrease in processing capacity at intersections along Hurontario Street as a result of the removals of travel lanes. This is further discussed in **Section 8.3.3.**

The Hazel McCallion Line is expected to be completed in 2024. Accordingly, traffic analysis has been completed for the following weekday morning and afternoon peak hour scenarios:

- **Existing Traffic (2024) –** volumes on the road network under existing conditions, assuming existing lane configuration present under pre-construction (2019) conditions at Steeles Avenue / Hurontario Street / Main Street South (further discussed in **Section 8.2**).
- **5-year Future Background Traffic (2029) –** volumes in the future prior to the build-out of the site which considers area growth and the completion of the Hazel McCallion Line: assumes future area road lane configuration, future area mode split, and reduction in corridor traffic volumes along Hurontario Street / Main Street South.
- **5-year Future Total Traffic (2029) –** volumes in the future after the build-out of the site, inclusive of area background growth, assuming the completion of the Hazel McCallion Line.

8.2 EXISTING TRAFFIC VOLUMES

Base existing traffic volumes for vehicles, cycles and pedestrians were established for the weekday morning and afternoon peak hours (the busiest hour of traffic between 7:00 – 10:00 am and 4:00 – 7:00 pm, respectively) for intersections within the study area, based on current and historical traffic count information collected by Spectrum Traffic Inc. on behalf of BA Group.

Due to construction along Hurontario Street for the LRT, traffic volumes collected in September 2023 may not be reflective of typical peak conditions. As a result, historical traffic count information from 2019 was used for Steeles Avenue / Hurontario Street / Main Street South.

Traffic count information adopted as the basis for the traffic operations analysis undertaken to assess the operational impacts of the proposed development is summarized in **Table 10**.

TABLE 10 EXISTING TRAFFIC COUNTS

Intersection	Date of Count	Source
Steeles Avenue / Hurontario Street / Main Street South	Tue, Dec 17, 2019	Spectrum Traffic Data Inc.
Steeles Avenue West / Lancashire Lane	Wed, Sept 20, 2023	

The existing turning movement counts were reviewed in detail to ensure general consistency in the traffic volumes on roadways between intersections. Where necessary, minor adjustments were made to balance traffic volumes between intersections to create a representative traffic volume base for the purpose of the traffic operations analyses undertaken as part of this study.

Existing peak-hour traffic volumes are illustrated in **Figure 11**.

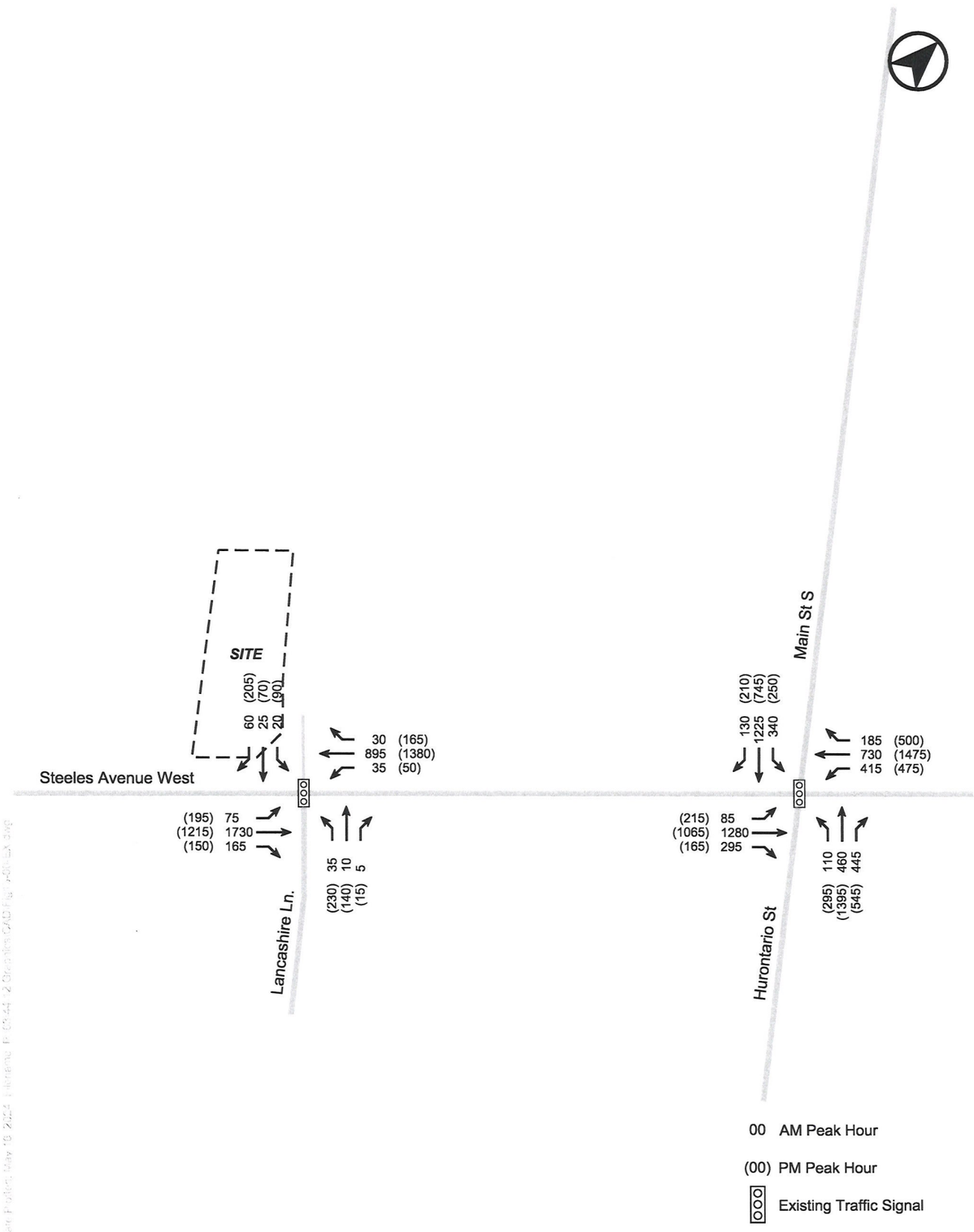


FIGURE 11 EXISTING TRAFFIC VOLUMES

8.3 FUTURE BACKGROUND TRAFFIC VOLUMES

Traffic growth surrounding the site has been established based on an evaluation of traffic volume changes related to:

- Specific area development traffic (i.e., background development traffic);
- General corridor traffic growth on area arterial roads; and
- Future corridor traffic displacement (reduction) on area arterial roads.

8.3.1 Background Developments

A comprehensive series of allowances have been made within the analysis to account for traffic generated by new area developments that are anticipated to be completed prior to, or at the same time as, the proposed development. Allowances were made to account for new traffic generated by other development proposals in the area that are either under construction, approved, being reviewed or for which an application is expected to be submitted to the City in the near future. A total of 10 development proposals have been considered, which represent in the order of 5,203 residential units and 8,335 m^2 non-residential GFA. Background developments included in this analysis are summarized in **Table 11** and illustrated in **Figure 12**.

The adopted area background development site trip generation and assignment are based on information provided in the traffic impact studies submitted to the City as part of the approvals processes for each development. It should be noted, however, that adjustments were made to the site traffic assignments for certain area developments to reflect area travel characteristics and changes made to the approved development programmes following completion of the traffic study. Where traffic studies were not available, BA Group generated site traffic for the specific background developments based on trip rates and distribution parameters and assumptions outlined in this study.

Traffic activity associated with the background developments considered in this study is illustrated in **Figure 13**.

TABLE 11 BACKGROUND DEVELOPMENTS SUMMARY

Development		Development Statistics	Source	Status
1	7800–7890 Hurontario Street	360 condominium units 983 m^2 retail GFA 4,278 m^2 office GFA	Trans-plan	Oct 2022
2	225 Malta Avenue (Phase 2)	301 condominium units	Paradigm	Aug 2020
3	151 Main Street	363 condominium units 255 m^2 retail GFA	BA Group	Dec 2020
4	17-29 Clarence Street	96 townhouse units	Cole Engineering Group	Oct 2019
5	2 Bartley Bull Parkway	242 condominium units	BA Group	Dec 2020
6	227 & 229 Main Street South	400 condominium units	C.F. Crozier & Associates Inc.	Nov 2021
7	137 Steeles Ave West	1,147 condominium units 1,622 m^2 retail GFA	Trans-Plan	May 2023
8	210-220 Steeles Avenue West	1,283 condominium units 443 m^2 daycare GFA	NextEng Consulting Group Inc.	Mar 2022
9	245 Steeles Avenue West (Phase 1)	345 condominium units 341 m^2 retail GFA	BA Group	Jun 2021
10	245 Steeles Avenue West (Phase 2)	666 condominium units 413 m^2 retail GFA	BA Group	May 2024
Total		**5,203 residential units and 8,335 m^2 non-residential GFA**		

8.3.2 Corridor Growth

Historical traffic volume counts at the intersection Steeles Avenue / Main Street South / Hurontario Avenue were reviewed to determine if there have been any changes in traffic activity levels due to general corridor traffic growth along the Steeles Avenue corridor within the study area over the past 10 years.

The observed trends indicated negative traffic growth in the east-west direction along Steeles Avenue during weekday morning and afternoon peak hours. This is likely reflective of the impact of the surface transits at the Brampton Gateway Transit Terminal and the alternate travel mode opportunities they provide, as well as other traffic capacity constraints that exist in the vicinity of the study area that limit the extent to which traffic volumes can, in reality, increase along Steeles Avenue. In most instances, traffic volumes appear to have dropped marginally during the commuter peak hours over this period.

Based on this review, it is not considered appropriate, nor necessary, to provide for general corridor growth allowances on Steeles Avenue over and above the comprehensive series of specific allowances made to account for other new area development.

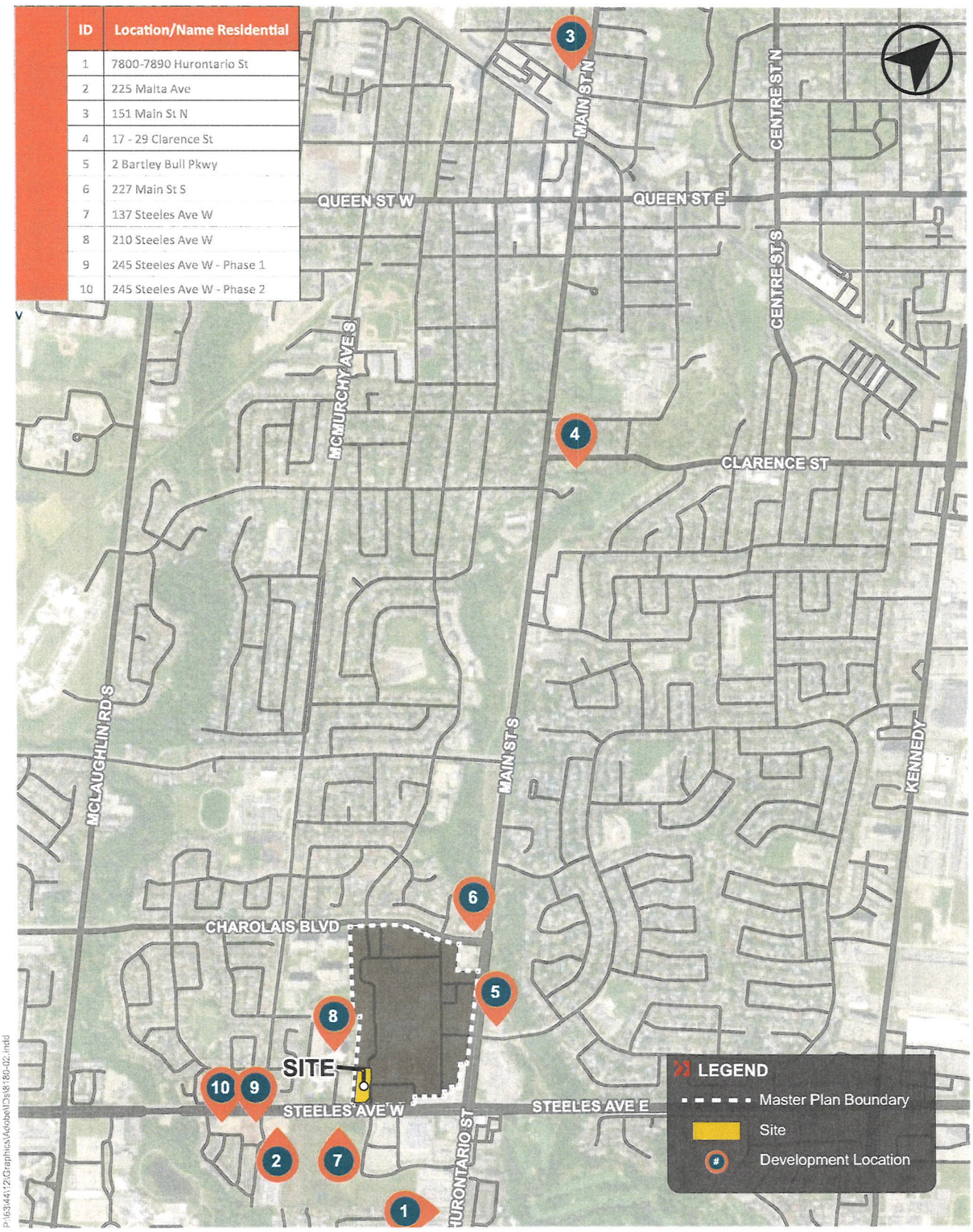


FIGURE 12 AREA BACKGROUND DEVELOPMENTS

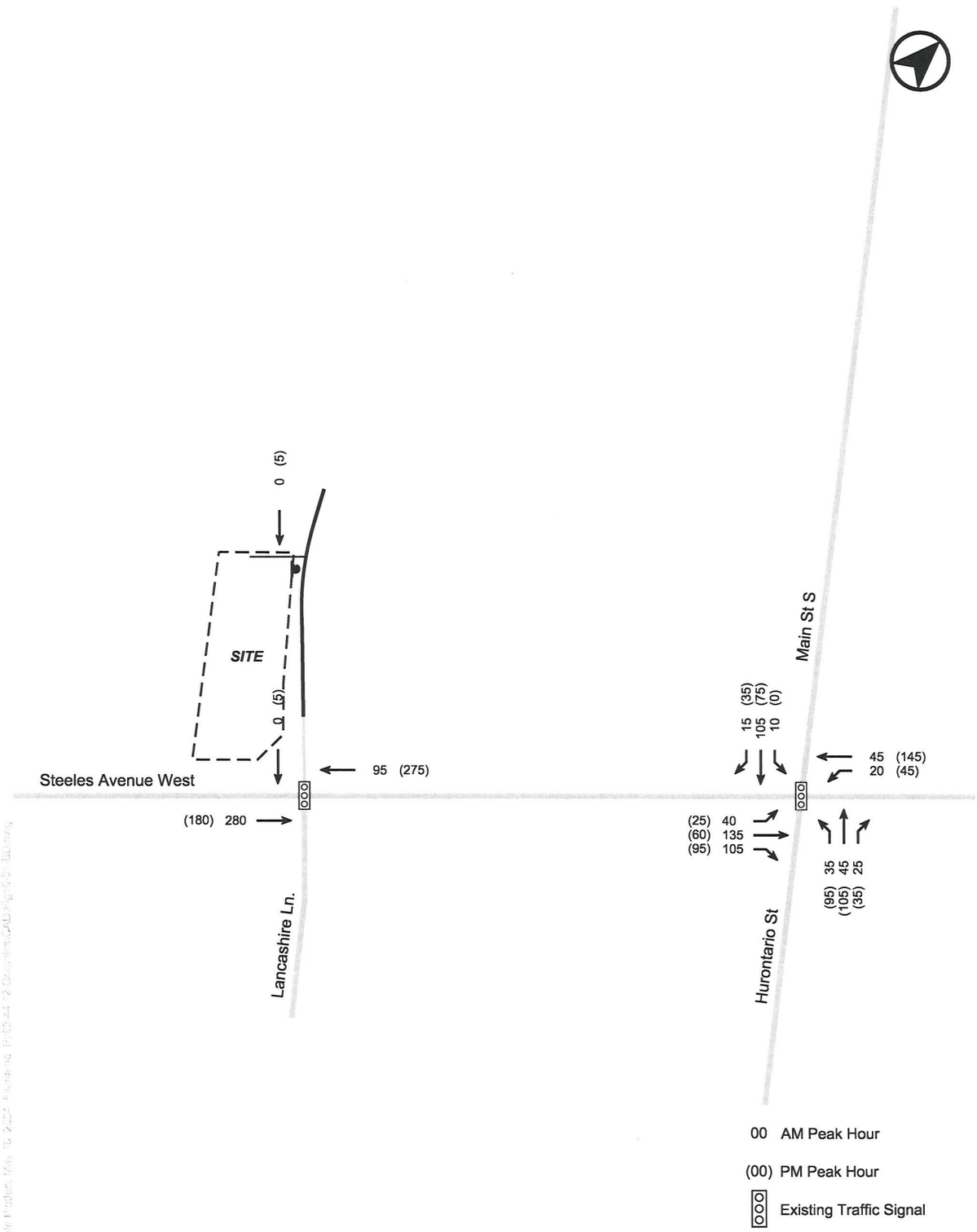


FIGURE 13 AREA BACKGROUND DEVELOPMENTS TRAFFIC VOLUMES

8.3.3 Corridor Traffic Volume Displacement

With the implementation of the Hazel McCallion Line, a general decrease in corridor traffic volumes is anticipated due to:

- Removal of two (2) traffic lanes along the Hurontario Street corridor, as described in **Section 8.1**, decreases the processing capacity of the intersections along the corridor. Drivers shift to other modes (transit) or adjacent roadways due to increased vehicle travel times during peak commuter periods.
- Drivers travelling along the Hurontario Street corridor shift to alternative modes (i.e., transit) as a result of better accessibility to higher-order transit.

Traffic reduction rates were established at the intersection at Steeles Avenue / Hurontario Street / Main Street South, based on outputs from the City of Mississauga travel demand model which captured the nearby intersection of Hurontario Street near Derry Road in Mississauga. These rates are consistent with the reduction applied in other transportation studies, including the transportation study prepared for 245 Steeles Avenue West (Phase 1) submitted in 2021 that was approved by the City of Brampton staff. The corridor traffic reduction rates along Hurontario Street are summarized in **Table 12.**

TABLE 12 CORRIDOR TRAFFIC REDUCTION RATES

Corridor	Direction	Reduction Rate	
		AM Peak Hour	PM Peak Hour
Hurontario Street / Main Street South	Northbound	-16%	-27%
	Southbound	-32%	-25%

The reduction rates in **Table 12** were applied in the northbound and southbound directions along Hurontario Street and Main Street South respectively for the target horizon year. Future corridor traffic displacement is illustrated in **Figure 14**.

8.3.4 Future Background Traffic Volumes

Future background traffic volumes representing the sum of existing traffic, background development traffic allowances, and general corridor growth and displacement are illustrated in **Figure 15.**

FIGURE 14 FUTURE CORRIDOR TRAFFIC DISPLACEMENT

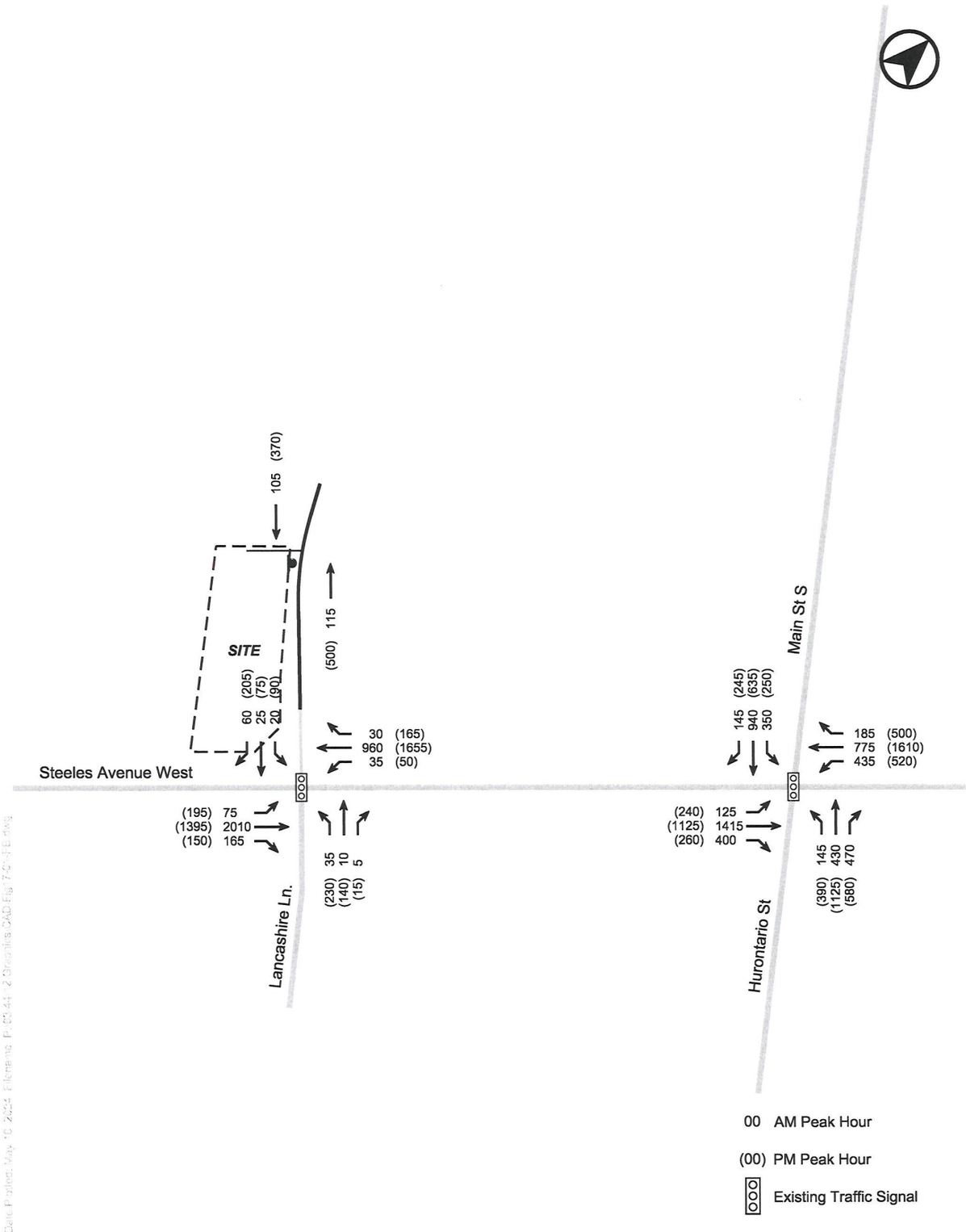


FIGURE 15 FUTURE BACKGROUND TRAFFIC VOLUMES

8.4 SITE TRAFFIC VOLUMES

8.4.1 Vehicle Trip Generation

The residential trip generation rates adopted to forecast the vehicular traffic generation characteristics are consistent with the June 2022 BA Group study. The adopted trip rates and site-related traffic generation are summarized in **Table 13**.

TABLE 13 RESIDENTIAL SITE TRIP GENERATION

	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
Residential Vehicle Trip Rate (Trips / Unit)	0.05	0.18	0.23	0.14	0.09	0.23
Residential Trips (877 units)	**45**	**160**	**205**	**125**	**80**	**205**

Notes:
1. Rounded to the nearest 5 trips.

The proposed development is anticipated to generate in the order of **205 two-way vehicular trips** during both the weekday morning and afternoon peak hours.

8.4.2 Vehicle Trip Distribution and Assignment

New residential site traffic was assigned onto the area road network based on a review of travel information provided by the 2016 Transportation for Tomorrow Survey (TTS) and existing road network traffic patterns and connectivity. Site traffic distribution, consistent with what was assumed in the November 2019 and August 2020 BA Group studies, is summarized in **Table 14**. Detailed output TTS data and distribution assumptions for vehicular trips are attached in **Appendix F**.

TABLE 14 PHASE 1A SITE TRAFFIC DISTRIBUTION

Direction	Outbound	Inbound
To / From the West on Steeles Avenue West	20%	35%
To / From the East on Steeles Avenue West	25%	25%
To / From the North on Main Street South	15%	15%
To / From the South on Hurontario Street	35%	15%
To / From the South on Lancashire Lane	15%	10%

Notes:
1. Inbound based on afternoon peak period residential inbound trips
2. Outbound based on morning peak period residential outbound trips

New residential site traffic generated by the proposed Phase 1A development was assigned onto the area road network based on the directional distribution summarized in **Table 14**, with considerations of prevailing traffic patterns and signal controls. Additionally, it was conservatively assumed in this analysis that all new residential site traffic would utilize the intersection Steeles Avenue West / Lancashire Lane to access the

proposed residential block, whereas, in reality, some drivers to/from the north may cut through the existing shopping centre resulting in improved traffic distribution.

New residential site traffic volumes generated by the proposed development are illustrated in **Figure 16**.

8.4.3 Multi-Modal Trip Generation

The Hazel McCallion Line is expected to be completed in fall 2024. The implementation of the Hazel McCallion Line will significantly transform Hurontario Street along the LRT route and local travel characteristics in the study area. In particular, it is expected that the site auto mode share will decline and be offset to active transportation modes, reflecting greater transit usage for primary trips and walking for interaction trips. Both existing and future mode splits (accounting for the introduction of the Hazel McCallion Line) are summarized in **Table 15**.

A detailed derivation of future mode split is described in **Section 8.2** of the November 2019 BA Group study.

TABLE 15 AREA RESIDENTIAL MODE SPLIT

Land Use	Mode	AM Peak Hour		PM Peak Hour	
		Inbound	Outbound	Inbound	Outbound
Existing Mode Split					
Residential	Driver	55%	55%	55%	55%
	Passenger	11%	16%	11%	16%
	Transit	21%	19%	21%	19%
	Walk	11%	9%	11%	9%
	Cycle	2%	1%	2%	1%
	Total	**100%**	**100%**	**100%**	**100%**
Future Mode Split					
Residential	Driver	45%	45%	45%	45%
	Passenger	11%	16%	11%	16%
	Transit	31%	29%	31%	29%
	Walk	11%	9%	11%	9%
	Cycle	2%	1%	2%	1%
	Total	**100%**	**100%**	**100%**	**100%**

BA Group has developed a forecast of trip generation for all modes based on mode split projections from **Table 15**, as summarized in **Table 16**. Future travel in the future to/from the proposed development will be significantly more non-auto-focused than exists today, reflecting the excellent location of the site relative to the existing Brampton Gateway Terminal bus station and the future Gateway Terminal Station for the Hazel McCallion Line.

TABLE 16 RESIDENTIAL MULTI-MODAL TRIP GENERATION (EXTERNAL TRIPS)

Mode	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
Driver	35	120	155	100	60	160
Passenger	10	40	50	25	20	45
Transit	25	75	100	70	40	110
Walk	10	25	35	25	10	35
Cycle	0	5	5	5	0	5
Total	**80**	**265**	**345**	**225**	**130**	**355**

Notes:
1. Rounded to the nearest 5 trips

Based on the foregoing, the proposed Phase 1A development is expected to generate a total of **345 and 355 two-way external person trips** during the weekday morning and afternoon peak hours, respectively.

8.5 FUTURE TOTAL TRAFFIC VOLUMES

Future total traffic volumes, reflecting the addition of existing area traffic volumes, background traffic volumes and new site traffic volumes, are illustrated in **Figure 17**.

FIGURE 16 NEW SITE TRAFFIC VOLUMES

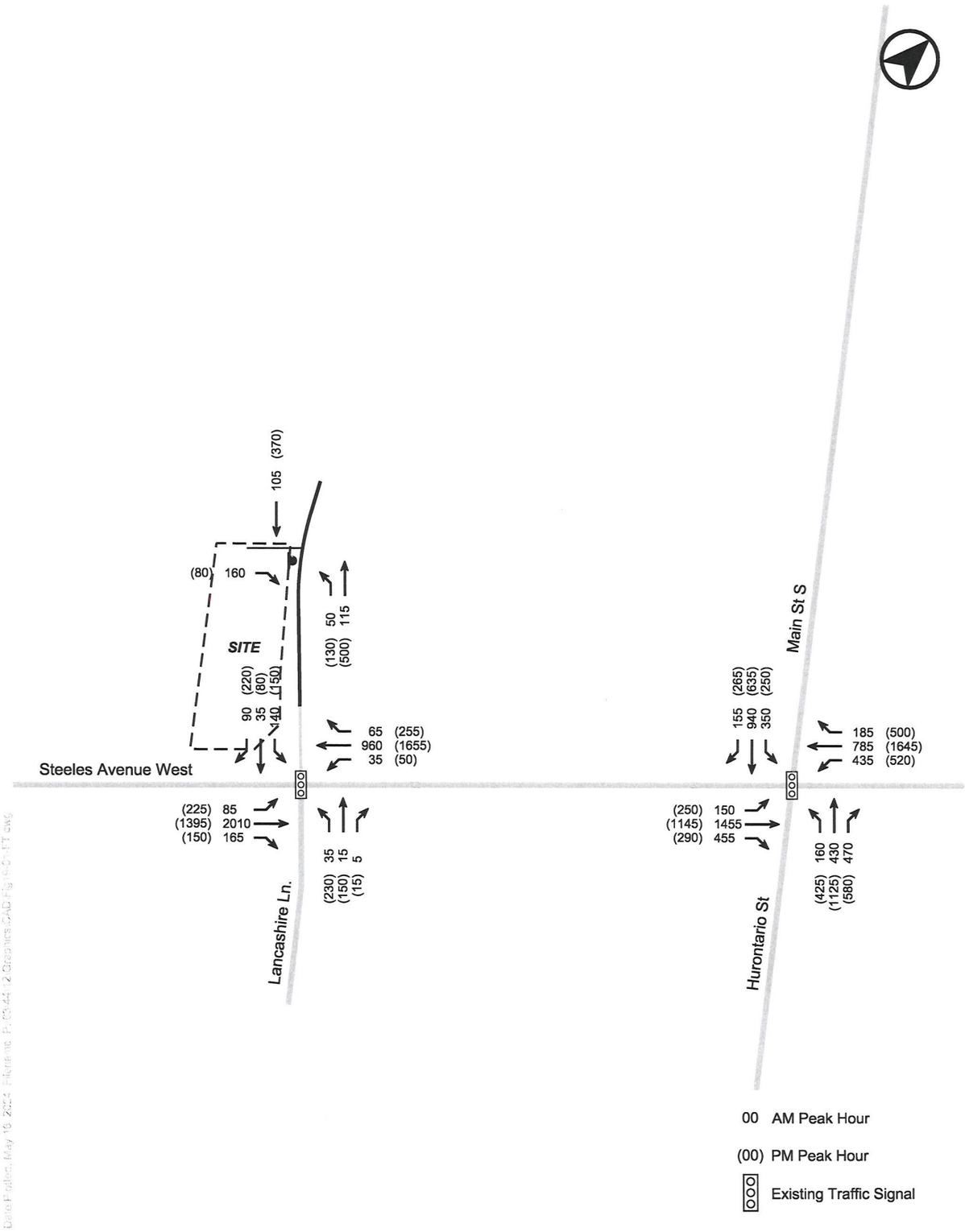


FIGURE 17 FUTURE TOTAL TRAFFIC VOLUMES

9.0 TRAFFIC OPERATIONS ANALYSIS

9.1 CAPACITY ANALYSIS METHODOLOGY

Traffic operations analyses have been undertaken at the area intersections using standard capacity analysis procedures as follows.

Signalized Intersection Methodology

Analyses undertaken at intersections operating under traffic signal control have been undertaken using the methodologies and procedures outlined in the Highway Capacity Manual (HCM) 2000 and in accordance with the Region of Peel's guidelines for analyses undertaken using Synchro 9.0 software. The product of the signalized intersection evaluation is an intersection performance index (volume to capacity ratio or v/c), where a v/c index of 1.00 indicates 'at or near capacity' conditions.

Unsignalized Intersection Methodology

Unsignalized intersection analyses have been carried out using standard capacity procedures for intersections operating under "Two-way" and "All-Way" STOP control and in accordance with the methodologies outlined in the Highway Capacity Manual 2000 (HCM, 2000).

The product of these analyses is a level of service (LOS) designation, ranging from LOS of A to F; which provides a relative indication of the level of delay experienced by motorists completing a turning manoeuvre at an intersection. LOS A represents conditions under which motorists would experience little delay and LOS F reflects conditions where more extended delays can be expected.

HCM level of service (LOS) criteria for unsignalized intersections are as follows:

- **LOS A**: Control Delay ≤ 10s
- **LOS B**: 10s < Control Delay ≤ 15s
- **LOS C**: 15s < Control Delay ≤ 25s
- **LOS D**: 25s < Control Delay ≤ 35s
- **LOS E**: 35s < Control Delay ≤ 50s
- **LOS F**: Control Delay > 50s

9.2 ANALYSIS PARAMETERS

Key analysis parameters were assumed based on requirements contained in the Region of Peel's *Regional Guidelines for Using Synchro* (December 2010), summarized as follows:

Existing Signal Timing

Existing signal timings, phasing plans, and cycle lengths were obtained from the City of Brampton.

Future Signal Timing

Existing signal timings were maintained during the analysis of future conditions whenever possible. When necessary, signal timings were optimized under future background and future total conditions, including the following:

- Total splits for all phases are optimized at the intersection Steeles Avenue / Hurontario Street / Main Street South for the weekday afternoon peak hour.

Heavy Vehicle Assumptions

Heavy and medium truck percentages incorporated into the analysis were based on information provided as part of the intersection turning movement counts.

Ideal Saturation Flow Assumptions

The Region of Peel's *Regional Guidelines for Using Synchro* (December 2010) specifies a base saturation flow rate of 1,900 vehicles per hour of green time per lane (vphgpl) for signalized and unsignalized intersections. These default rates were adopted in the analysis of the proposed development.

Lost Time Adjustments

The Region of Peel's *Regional Guidelines for Using Synchro* (December 2010) specifies a base lost time adjustment factor of 0.0 seconds (i.e. a total loss time per phase equal to the amber plus all-red time). This default value was adopted in the analysis.

Peak Hour Factor

The Region of Peel's *Regional Guidelines for Using Synchro* (December 2010) specifies a based peak hour factor (PHF) of 1.00 for all movement on all approaches at all intersections.

Lane Utilization Factors

Under existing conditions, default Synchro lane utilization factors (LUF) were adopted, which take into consideration the distribution of individual lane usage within each movement group.

9.3 SIGNALIZED INTERSECTION ANALYSIS RESULTS

Traffic operation analysis results and discussion for the area signalized intersections for the existing, future background, and future total conditions are summarized in the following sections. Detailed capacity analysis reports are attached in **Appendix G**.

9.3.1 Steeles Avenue / Hurontario Street / Main Street South

The results of the signalized intersection traffic operations analyses undertaken for the intersection Steeles Avenue / Hurontario Street / Main Street South are summarized in **Table 17**.

The westbound left movement of this intersection is expected to exceed its capacity under future background conditions. Note that for the purpose of this analysis, the pre-LRT construction signal timings have been adopted as the basis of the 'existing' and 'future background' operations analyses, as the future post-LRT construction signal timings are not yet known. Following the completion of the LRT (potentially in late 2024) and the reconfiguration of this intersection to accommodate dedicated LRT lanes, the signal timings for this intersection will be revised in order to best respond to future transit and traffic needs, and will not remain the same as pre-LRT signal timings. For the purpose of this analysis, an optimized future signal timing plan has been adopted within the existing cycle length (160 seconds) for the weekday afternoon peak hour. It is expected that the Region, in consultation with the City and Metrolinx, will determine the most appropriate signal timing plan for future post-LRT operations.

TABLE 17 STEELES AVENUE / HURONTARIO STREET / MAIN STREET SOUTH CAPACITY ANALYSIS RESULTS

Lane Group	Existing		Future Background		Future Total		Future Total (Optimized)	
	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS
EBL	0.44 (0.72)	F (F)	0.54 (0.78)	E (F)	0.57 (0.80)	E (F)	0.57 (0.97)	E (F)
EBT	0.78 (0.73)	E (D)	0.89 (0.79)	D (D)	0.93 (0.81)	E (D)	0.93 (0.88)	E (E)
EBR	0.38 (0.11)	C (E)	0.51 (0.17)	E (E)	0.64 (0.20)	D (D)	0.64 (0.25)	D (E)
WBL	0.85 (0.94)	F (F)	0.87 (1.16)	F (F)	0.88 (1.16)	F (F)	0.88 (0.97)	F (F)
WBT	0.37 (0.83)	C (D)	0.42 (0.96)	D (E)	0.40 (0.98)	D (E)	0.40 (0.94)	D (E)
WBR	0.15 (0.67)	B (D)	0.13 (0.62)	C (D)	0.12 (0.62)	C (D)	0.12 (0.61)	C (D)
NBL	0.55 (0.77)	E (E)	0.64 (0.92)	E (F)	0.61 (0.99)	E (F)	0.61 (0.92)	E (F)
NBT	0.36 (0.90)	D (E)	0.47 (0.98)	D (E)	0.46 (0.98)	D (E)	0.46 (0.97)	D (E)
NBR	0.68 (0.85)	D (E)	0.78 (0.87)	E (E)	0.76 (0.87)	E (E)	0.76 (0.79)	E (E)
SBL	0.88 (0.73)	F (E)	0.89 (0.72)	F (E)	0.90 (0.72)	F (E)	0.90 (0.74)	F (E)
SBT	0.81 (0.50)	D (D)	0.89 (0.62)	E (D)	0.90 (0.62)	E (D)	0.90 (0.65)	E (D)
SBR	0.16 (0.19)	C (D)	0.12 (0.29)	D (D)	0.13 (0.35)	D (D)	0.13 (0.43)	D (D)
Overall	**0.83 (0.89)**	**D (E)**	**0.90 (1.03)**	**E (E)**	**0.92 (1.05)**	**E (E)**	**0.92 (0.99)**	**E (E)**

Notes:
1. 00 (00): Weekday morning peak hour (Weekday afternoon peak hour).

Under existing conditions, the intersection operates under acceptable conditions with a v/c ratio of 0.83 and 0.89 during the weekday morning and afternoon peak hours, respectively.

Maintaining existing signal timings, under future background conditions, with the addition of future background traffic, the intersection continues to operate under acceptable conditions with an overall v/c ratio of 0.90 and 1.03 during the weekday morning and afternoon peak hours, respectively. The maximum v/c ratio observed for any individual movement is 1.16 for the westbound left movement in the weekday afternoon peak hour. It should be noted that this over-capacity condition is expected to take place mainly because of the removal of 2 through travel lanes along Hurontario Street to accommodate LRT construction, regardless of the proposed development.

Maintaining existing signal timings, under future total conditions, with the addition of site-related traffic, the intersection continues to operate under busy conditions with an overall v/c ratio of 0.92 and 1.05 during the weekday morning and afternoon peak hours, respectively. The maximum v/c ratio observed for any individual movement is 1.16 for the westbound left movement in the weekday afternoon peak hour.

Under future total conditions, with optimized signal timings, the intersection is expected to operate under busy but acceptable conditions with an overall v/c ratio of 0.92 and 0.99 during the weekday morning and afternoon peak hours, respectively. The maximum v/c ratio observed for any individual movement is 0.97 for the eastbound left, westbound left and northbound through movements.

With the completion of the Hazel McCallion Line, 2 through-vehicle travel lanes (1 in each direction) will be removed from the Hurontario Street corridor to accommodate LRT tracks and terminals. As a result, the processing capacity and vehicle travel demand along the Hurontario Street / Main Street South corridor is expected to change. Therefore, to accommodate these changes, it will be necessary to optimize splits of all phases within the existing cycle length at this intersection.

Notwithstanding the above, the addition of site traffic has minimal impacts on the overall intersection operations. With the recommended signal timing adjustments, all individual movements and the intersection overall are expected to operate at acceptable levels of service and within capacity.

9.3.2 Steeles Avenue West / Lancashire Lane

The result of the signalized intersection traffic operations analyses undertaken for the Steeles Avenue West / Lancashire Lane intersection is summarized in **Table 18**.

TABLE 18 STEELES AVENUE WEST / LANCASHIRE LANE CAPACITY ANALYSIS RESULTS

Lane Group	Existing		Future Background		Future Total	
	v/c	LOS	v/c	LOS	v/c	LOS
EBL	0.17 (0.85)	A (E)	0.18 (0.90)	A (F)	0.21 (0.95)	A (F)
EBTR	0.52 (0.52)	B (C)	0.61 (0.59)	B (C)	0.64 (0.59)	B (C)
WBL	0.20 (0.26)	B (B)	0.26 (0.30)	C (B)	0.28 (0.30)	C (B)
WBTR	0.26 (0.66)	A (C)	0.30 (0.77)	B (B)	0.30 (0.83)	C (B)
NBL	0.20 (0.76)	E (E)	0.23 (0.82)	E (E)	0.23 (0.97)	E (F)
NBT	0.04 (0.22)	E (D)	0.04 (0.23)	E (D)	0.05 (0.25)	E (D)
NBR	0.00 (0.01)	E (C)	0.00 (0.01)	E (D)	0.00 (0.01)	E (D)
SBLTR	0.13 (0.26)	E (D)	0.13 (0.29)	E (D)	0.50 (0.45)	E (D)
Overall	**0.46 (0.83)**	**B (C)**	**0.54 (0.89)**	**B (C)**	**0.61 (0.98)**	**C (C)**

Notes:
1. 00 (00): Weekday morning peak hour (Weekday afternoon peak hour).

The addition of site traffic has minimal impacts on the overall intersection operations. All individual movements and the intersection overall are expected to operate at acceptable levels of service and within capacity.

9.4 UNSIGNALIZED INTERSECTION ANALYSIS RESULTS

9.4.1 Lancashire Lane / Phase 1A Site Driveway

The result of the signalized intersection traffic operations analyses undertaken for the Phase 1A Site Driveway is summarized in **Table 19**. Synchro outputs are attached in **Appendix G**.

TABLE 19 PHASE 1A SITE DRIVEWAY CAPACITY ANALYSIS RESULTS

Lane Group	Existing		Future Background		Future Total	
	LOS	Delay	LOS	Delay	LOS	Delay
EBLR	This intersection will only be constructed under future total.				A (A)	9.3 (9.8)
NBL					A (A)	2.5 (2.8)

Notes:
1. 00 (00): Weekday morning peak hour (Weekday afternoon peak hour).
2. Control delay calculated in seconds

Traffic operations at the Phase 1A Site Driveway operate at acceptable levels of service under all scenarios. All movements will function at LOS A or better in future scenarios. Site traffic can be acceptably accommodated at this intersection.

3. Suggest providing bicycle parking for short-term use in highly visible and lighted areas, sheltered from the weather wherever possible.

Response:
Noted. The short-term bicycle parking spaces are located in a highly visible area on the ground floor, as illustrated in the architectural plans attached in **Appendix A**.

4. Provide secure underground parking equivalent to at least the number of units of condominiums or apartments in the proposed plan to accommodate this family residential development.

Response:
It appears this comment refers to *bicycle* parking and not *vehicle* parking. The vehicle parking considerations and bicycle parking considerations are discussed in **Section 5.0** and **Section 7.0** of this report, respectively.

5. Provide a permanent bike repair station, with normally used tools and an air pump adjacent to the main at-grade, and at the secure underground bicycle parking area.

Response:
Noted. The bike repair station is located in the bicycle room on Level 2, as illustrated in the architectural plans attached in **Appendix A**.

6. To reduce the number of parking spaces, it is recommended that the development provides PRESTO Transit cards with discounted pricing as an incentive to use transit rather than vehicle travel.

Response:
The provision of PRESTO transit cards is not currently being proposed. The site is located immediately adjacent to a major transit hub (Brampton Gateway Terminal) and a future transit station on the Hazel McCallion Line. The one-time financial incentive of a PRESTO card, in the context of the proposed development, may not be as effective compared to the advantages brought by the site location.

Additionally, the current development proposal features a transitional parking strategy, where a portion of resident and visitor parking supply is provided off-site within an above-ground parking structure. Over time, as parking demand for the site decreases, the off-site parking supply can be allocated to other uses. This strategy prevents the over-supply of parking at any given time, particularly in the on-site underground parking garage, and ensures that overall parking supply can be reduced in line with evolving demand.

Finally, because the entire development is proposed to be rental, tenant turnover will be more frequent than in a condominium building. Thus, providing one-time PRESTO cards for the initial tenants is not an effective long-term method of incentivizing transit use. The alternative of providing PRESTO cards for all new tenants is likewise not a sustainable TDM strategy, as the costs would logically be passed on to each tenant, many of whom would already own PRESTO cards and would have selected the building due to its convenient proximity to transit.

Other TDM measures are being proposed in the building, including the provision of bicycle parking, the provision of new multi-use paths connecting from Steeles Avenue to/from Kaneff Park, the provision of EV

charging equipment and EV-ready spaces in the underground garage, consideration of carshare for future phases of development (see response below), and unbundling of parking spaces.

7. Would recommend unbundling parking to minimize the number of parking spaces.

Response:
Noted. The sale of parking spaces is unbundled from the sale of residential units.

8. Suggestion providing EV charging stations for residents to accommodate various EV vehicle types (E-bike, E-Car, E-Scooters).

Response:
A total of 27 spaces in the underground parking garage are equipped with EV charging equipment and an additional 77 spaces are roughed in for future EV charging equipment.

9. Provide carshare parking spaces of up to three vehicles and work with a local carshare company to provide membership to residents at discounted pricing.

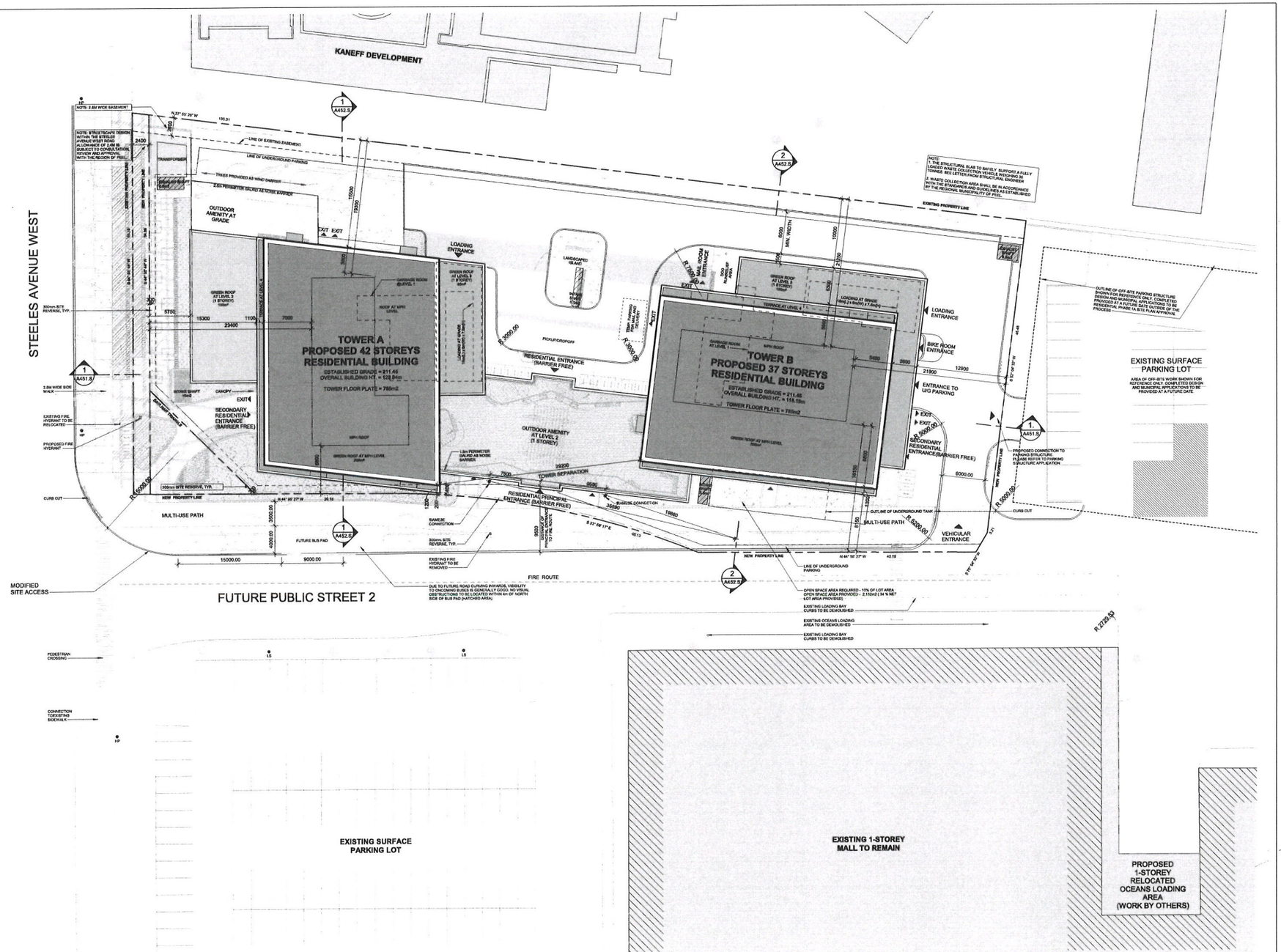
Response:
Carshare parking spaces are not being proposed in Phase 1A due to the lack of carshare providers currently operating in Brampton. However, the provision of carshare parking spaces will be explored as part of future phases of development, as carshare providers expand their operations across the GTA.

10.2.2 Traffic

10. The submitted material is still under review with Regional staff. A supplementary comment letter will follow.

Response:
Noted.

Appendix A:
Reduced-Scale Architectural Plans



1 | Site Plan
1 : 250

City File No.
SPA-2022-0120

Authorities Having Jurisdiction

Date:

KIRKOR
ARCHITECTS AND PLANNERS
20 De Boers Drive Suite 400
Toronto ON M3J 0H1

Revisions:

No.:	Revision:	Date:
02.	SPA RESUBMISSION	April 26, 2024
01.	SPA	June 22, 2022

RIOCAN

Client:
1388688 Ontario Ltd. RioCan

RioCan Shoppers World - Phase 1A
499 Main Street South, Brampton ON
Proposed Residential Development

Drawing Title:
Site Plan

Scale: 1 : 250
Drawn by: H.G., RSO
Checked by: C.A., A.C.
Project No.: 22-104
Date: April 26, 2024
Drawing No.:

A101.B.S

9.5 OVERALL TRAFFIC OPERATIONS SUMMARY

Based on the analysis conducted by BA Group, the forecast vehicle site traffic generated by the proposed development is expected to have modest impacts on the overall operation of the network signalized and unsignalized intersections.

The following improvements are recommended:

- Optimize splits of all phases within the existing cycle length at the intersection Steeles Avenue / Hurontario Street / Main Street South during the weekday afternoon peak hours.

Based on the foregoing, new site traffic can be appropriately accommodated at all intersections in the study area. With the recommended improvements, all of the signalized and unsignalized intersections in the study area will continue to operate within capacity and at acceptable levels of service.

10.0 RESPONSE TO COMMENTS

10.1 CITY OF BRAMPTON COMMENTS

10.1.1 Traffic Services Review

1. Provide the interim and ultimate land configuration at future Public Street 2 and how both accesses will connect to the future public Road.

Response:
The interim and ultimate access plans are illustrated in **FD-01** and **FD-02** in **Appendix C**, respectively.

2. The proposed southern access and the turnaround area are recommended to be removed and use northern access for truck maneuvering, drop off/pick up area.

Response:
Noted. The current architectural plans are attached in **Appendix A**.

10.1.2 Transit Review

3. Page 33 of the TIS shows a decreased future transit modal share and a higher driver modal share. This does not appear to be consistent with the tables on Pages 34 and 35. Could you please confirm the predicted change in Transit Modal Share and provide a rationale on why it is expected to decrease in the future.

Response:
The mode split has been updated and is discussed in **Section 8.4.3** of this report.

10.2 REGION OF PEEL COMMENTS

10.2.1 Sustainable Transportation

1. As development is on Shopper's World property, due to high traffic volumes, consider designing roadways used on the property that are used for access by cyclists use a target operating speed of no more than 30 km/h or prove a separate cycling facility.

Response:
A separate multi-use path facility is proposed on Street 2 to accommodate cyclists. The width and the curvature are designed to calm the vehicular traffic travelling along the new street.

2. Provide wayfinding signage for site access (where required when multiple buildings or entrances exist) and egress (where warranted, such as when directions to reach transit stops/stations, trails or other common destinations are not obvious).

Response:
Noted.

RioCan Shoppers World - Phase 1A
499 Main Street South, Brampton ON
RESIDENTIAL DEVELOPMENT

PROJECT STATISTICS
April 18, 2024

Project No. 22-104

1.0 SITE INFORMATION

		m²	ft²	acres	hectares
1.1	Gross Lot Area	6,494.20	69,902.99	1.60	0.65
1.2	Area Conveyed to City (A+B+C)	282.10	3,036.50	0.07	0.03
	A- Public Road Conveyances	131.50	1,415.45	0.03	0.01
	B- Daylight Triangle	112.50	1,210.94	0.03	0.01
	C- Site Reserve Area	38.10	410.10	0.01	0.00
1.3	Net Lot Area (Gross lot area - (A+B+C))	6,212.10	66,866.49	1.53	0.62

1.4 **Proposed Floor Space Index (Net FSI)** 9.14

FSI, as per By-Law 270-2004, the figure is obtained by dividing the gross floor area, or, in the case of a residential area, the gross residential area, of all the floors in the building measured between the exterior walls of the building, by the area of the lot to the built upon

1.5 **Landscaped Open Space (minimum 10% of the lot area required)** 2,132.00 (34% of lot area)

LANDSCAPED OPEN SPACE shall mean an unoccupied area of land which is used for the growth, maintenance and conservation of grass, flowers, trees and shrubs and other vegetation, and may include a surfaced walk, patio, screening, pool or similar visual amenity, but shall exclude any driveway, ramp, car parking or loading area, curb, retaining wall, or any covered space beneath or within any building or structure.

2.0 PROPOSED GFA (Gross Floor Area)

as per By-Law 270-2004, Gross Floor Area shall mean the aggregate of the area of all floors in a building, whether at, above or below established grade, measured between the exterior walls of the building, but excluding any parts of the building used for mechanical equipment relating to the operation or maintenance of the building, stairwells or elevators.

as per By-Law 270-2004, Gross Floor Area shall mean the aggregate of the area of all floors in a building, whether at, above or below established grade, measured between the exterior walls of the building, but excluding any porch, verandah, unfinished attic, basement or any floor area used for building maintenance or service equipment, loading area, common laundry facilities, common washroom, common children's play area, recreation area, parking of motor vehicles, or storage

Note: GFA exemptions in By-Law 270-2004 have been interpreted to include garbage room, staging area, bulky & hazardous storage waste disposal room, janitorial closets, tenant moving & holding rooms, storage lockers, below and above grade bicycle parking as well as bicycle maintenance areas, all amenity space including dog wash areas and guest suites.

2.1 Floor Levels (Common Levels)	no. floors	m²/fl	m²	ft²
Level P2	1	85.11	85.11	916
Level P1	1	88.08	88.08	948
Level 1	1	496.72	496.72	5,347
Total			**669.91**	**7,211**

2.2 Floor Levels (Tower A)	no. floors	m²/fl	m²	ft²
Level 2	1	475.97	475.97	5,123
Level 3 - 42	40	737.35	29,494.00	317,471
Total			**29,969.97**	**322,594**

2.3 Floor Levels (Tower B)	no. floors	m²/fl	m²	ft²
Level 2	1	329.03	329.03	3,542
Level 3 - 37	35	737.90	25,826.54	277,995
Total			**26,155.56**	**281,536**

2.4 **TOTAL GFA** **56,795.45** m² **611,341** ft²

3.0 AMENITY

3.1 Proposed Indoor Amenity Floor Levels	no. floors	m²/fl	m²	ft²
Level 1	1	974.476	974.476	10,489
Level 2	1	202.876	202.876	2,184
Total Indoor Amenity Space			1,177.35	12,673
		Indoor Amenity Ratio	1.3	

3.2 Proposed Outdoor Amenity Floor Levels	no. floors	m²/fl	m²	ft²
Level 1	1	136	136	1,463
Level 2	1	455	455	4,897
Total Outdoor Amenity Space			591	6,360
		Outdoor Amenity Ratio	0.7	

3.3 **Total Amenity Space Provided** **1,768.24** m² **19,033** ft² (Overall Amenity Ratio 2.0)

4.0 PARKING

Parking Type	Standard	Resident Accessible Type A	Resident Accessible Type B	Visitor Accessible Type A	Visitor Accessible Type B	Total
P1	120	2	3	2	2	129
P2	130	3	2			135
Total						**264**

5.0 BICYCLE PARKING

5.1 **Bicycle Parking Required**

230.5.10.1 (1) Bicycle Parking Space Rates For a building or portion of a building constructed pursuant to a building permit issued more than three years after May 9, 2013, **bicycle parking spaces** must comply with Table 230.5.10.1(1) **Office** - the minimum number of short-term **bicycle parking spaces** to be provided: (A) in Bicycle Zone 1 is 3 plus 0.2 **bicycle parking spaces** for each 100 square metres of **interior floor area** used for an office, other than a medical office, the minimum number of long-term **bicycle parking spaces** to be provided: (A) in Bicycle Zone 1 is 0.2 for each 100 square metres of **interior floor area** used for an office other than a medical office **Personal Service Shop** - the minimum number of short-term **bicycle parking spaces** to be provided: (A) in Bicycle Zone 1 is 3 plus 0.3 bicycle parking spaces for each 100 square metres of **interior floor area** used for a **personal services shop** the minimum number of long-term bicycle parking spaces to be provided (A) in Bicycle Zone 1 is 0.2 for each 100 square metres of interior floor area used for a **personal services shop**

230.5.10.1 (5) Bicycle Parking Space Requirements for Dwelling Units **Bicycle parking space** requiremetns for **dwelling units** in a **apartment building** or **mixed use building** are (A) in Bicycle Zone 1 a minimum of 1.0 **bicycle parking spaces** for each **dwelling unit**, allocated as 0.9 "long-term" **bicycle parking space per dwling unit** and 0.1 "Short term" **bicycle parking space** per **dwelling unit**.

Parking Type	Parking Ratio	No. Units	Parking Spaces
Resident	**0.50**	877	439
Visitor	**0.10**	877	88
Total			**526**

Total Bycicle Required **526**

5.2 **Bicycle Parking Provided**

Level	Short-Term	Long-Term	Parking Spaces
Level 1	88	0	88
Level2		440	440
Total			**528**

Total Bicycle Parking Provided **528**

6.0 UNIT COUNT

6.1 Proposed Units - Tower A	1 Bed	1Bed + Den	2 Bed	3 Bed	Total
Level 2	3	2	3	-	8
Level 3 - 42	240	120	120	-	480
Total	243	122	123	-	488
	50%	25%	25%		100%

6.2 Proposed Units - Tower B	1 Bed	1Bed + Den	2 Bed	3 Bed	Total
Level 2	0	3	1	0	4
Level 3 - 37	175	70	105	35	385
Total	175	73	106	35	389
	45%	19%	27%	9.0%	

6.3 Total Proposed Units (Tower A + Tower B)	1 Bed	1Bed + Den	2 Bed	3 Bed	Total
	418	**195**	**229**	**35**	**877**
	48%	22%	26%	4.0%	

6.4 Average Unit Size	1 Bed m²	1 Bed ft²	1 Bed + Den m²	1 Bed + Den ft²	2 Bed m²	2 Bed ft²	3 Bed m²	3 Bed ft²
Tower A	47.47	511	59.08	636	70.91	763	-	
Tower B	47.49	511	52.94	570	73.52	791	85.45	920
Overall	**47.48**	**511**	**59.08**	**636**	**72.21**	**777**	**85.45**	**920**

7.0 PROPOSED BUILDING GBA (Gross Building Area)

GBA: No By-law definition has been provided. For this project, Gross Building Area shall mean the aggregate area of each floor measured from the exterior side of the exterior walls. Exclude only balconies, open to below areas as noted, and terraces. Includes all shafts, stairs, loading areas, below grade parking, and mechanical penthouses.

7.1 GBA Below Grade Levels	no. floors	GBA (m²)	GBA (sq.ft.)	Total GBA (m²)	sq.ft.
P1	1 x	5,591.84	60,190.00	5,591.84	60,190
P2	1 x	5,597.00	60,246.00	5,597.00	60,246
Total				11,188.84	120,436

Total GBA (Below Grade) **11,188.84** **120,436**

7.2 GBA Above Grade Common Levels	no. floors	GBA (m²)	GBA (sq.ft.)	Total GBA (m²)	sq.ft.
L1	1 x	2,757.00	29,676.00	2,757.00	29,676
Mezz	1 x	400.23	4,308.00	400.23	4,308
L2	1 x	1,753.71	18,877.00	1,753.71	18,877
Total				4,910.94	52,861

Tower A	floors	GBA (m²)	GBA (sq.ft.)	Total GBA (m²)	sq.ft.
Level 3 - 42	40 x	799.56	8,606.00	31,982.52	344,257
Tower A MPH	1 x	335.55	3,612.00	335.55	3,612
Total				32,318.07	347,869

Tower B	no. floors	GBA (m²)	GBA (sq.ft.)	Total GBA (m²)	sq.ft.
Level 3 - 37	35 x	798.37	8,594.00	27,942.81	300,774
Tower B MPH	1 x	262.26	2,823.00	262.26	2,823
Total				28,205.07	303,597

Total GBA (Above Grade) **65,434.08** **704,327**

7.3 **Overall GBA** **76,622.9** **824,762**

8.0 PROPOSED LOCKERS

P2	176
P1	103
L2	35
Total	**314**

1 | Project Statistics
nts

Kirkor Architects & Planners
20 De Boers Dr. # 400
Toronto ON M3J 0H1
T: 416-665-6060
F: 416-665-1234

Name of Project: RioCan Shoppers World - Phase 1A

Location: 499 Main Street Brampton, Ontario

Seal must be signed to be valid

Item	The Ontario Building Code 2012 Containing the Building Code Act and O. Reg 332/12 in effect Jan 1, 2014 Data Matrix Part 3 High Rise Residential Buildings	OBC Reference
1	Project Description: New Residential Apartment Bldg	1.1.2.
2	Major Occupancy(s): *Group C - Residential occupancies*	3.1.2.1.(1)
3	Subsidiary Occupancy(s) Group F3 - Medium hazard industrial occupancies (Storage Garage) *Group A2 – Assembly occupancies (Amenity Areas)*	3.1.2.1.(1)
4	Building Area (m²) 2760 m²	1.4.1.2.
5	Gross Area (m²) 64550 m²	1.4.1.2.
6	Number of Storeys 42 Above grade 42 Below grade 2 Tower A - 42 storey Tower B - 37 storey	1.4.1.2. & 3.2.1.1.
7	Number of streets/Fire Fighter Access 2	3.2.2.10. & 3.2.5.
8	Building Classification: Group C - Residential occupancies Group F3 - Medium hazard industrial occupancies (Storage Garage)	 3.2.2.42. 3.2.2.73.
9	Sprinkler System Proposed Entire Building	3.2.2.20.-.83
10	Standpipe required Yes	3.2.9.
11	Fire Alarm required Yes	3.2.4.
12	Water Service/Supply is Adequate Yes	3.2.5.7.
13	High Building Yes	3.2.6.
14	Construction Restrictions Non-combustible required	3.2.2.20 - 83
15	Barrier Free Design Yes	3.8

2 | OBC Matrix
nts

City File No.
SPA-2022-0120

Authorities Having Jurisdiction

Date:

KIRKOR
ARCHITECTS AND PLANNERS

Revisions:

No.:	Revision:	Date:

No.:	Issued For:	Date:
02.	SPA RESUBMISSION	April 26, 2024
01.	SPA	June 22, 2022

RIOCAN

Client:
1388688 Ontario Ltd. RioCan

RioCan Shoppers World - Phase 1A
499 Main Street South, Brampton ON
Proposed Residential Development

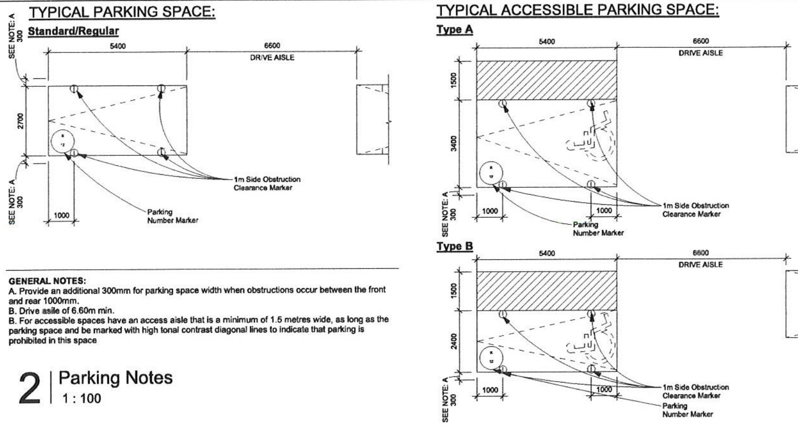
Drawing Title:
Project Statistics

Scale:

Drawn by: H.G., RSO
Checked by: C.A., A.C.
Project No.: 22-104
Date: April 26, 2024
Drawing No.:

A102.S

Plot Date: 5/6/2024 4:23:36 PM File Path: C:\Revit\2023\A-KAP_22104_Shoppers World Brampton_2024-05-06_RVT2023_achang53CXR.rvt



GENERAL NOTES:

A. Provide an additional 300mm for parking space width when obstructions occur between the front and rear 1000mm.

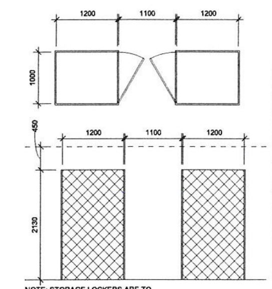
B. Drive asile of 6.60m min.

B. For accessible spaces have an access aisle that is a minimum of 1.5 metres wide, as long as the parking space and be marked with high tonal contrast diagonal lines to indicate that parking is prohibited in this space

2 | Parking Notes
1 : 100

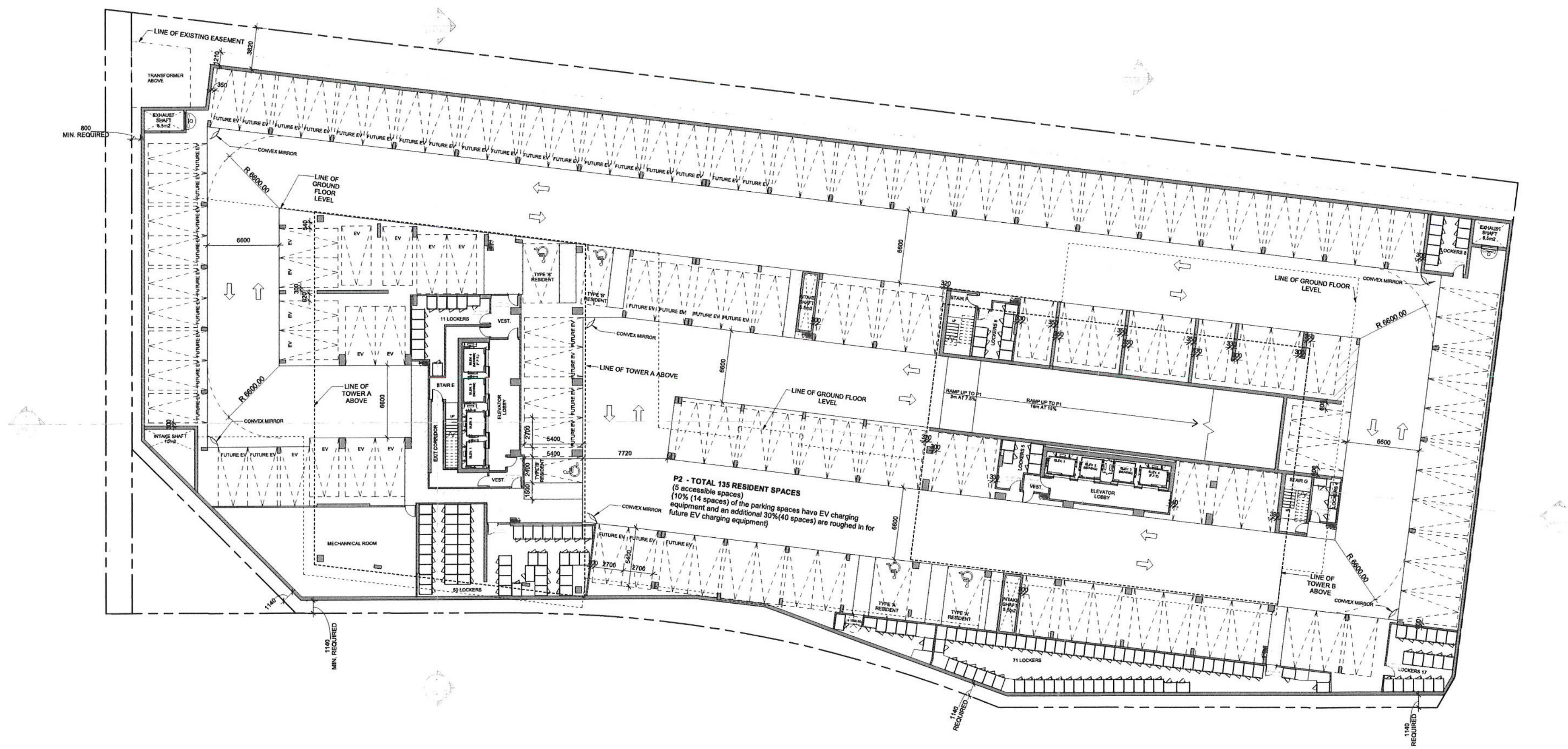
TOTAL LOCKER SPACES = 314			
LOCKER	LEVELS		
	LEVEL P2	LEVEL P1	LEVEL 2
	176	103	35
TOTALS	314		

TYPICAL STORAGE LOCKER :



NOTE: STORAGE LOCKERS ARE TO HAVE A MIN. 1100mm WALKWAY AISLE IN FRONT FOR ACCESS

3 | Typical Storage Locker Notes
1 : 50



1 | Parking Level P2 Floor Plan
1 : 200

City File No.
SPA-2022-0120

Authorities Having Jurisdiction

Do not scale the drawings.

This Drawing Is Not To Be Used For Construction Until Signed ByThe Architect.

Date:

KIRKOR
ARCHITECTS AND PLANNERS

Revisions:

No.:	Revision:	Date:

No.:	Issued For:	Date:
02.	SPA RESUBMISSION	April 26, 2024
01.	SPA	June 22, 2022

RIOCAN

Client:
1388688 Ontario Ltd. RioCan

RioCan Shoppers World - Phase 1A
499 Main Street South, Brampton ON
Proposed Residential Development

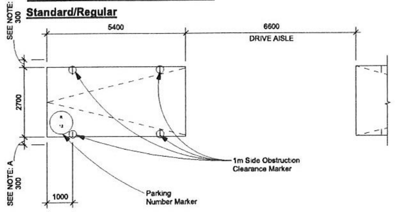
Drawing Title:
Parking Level P2 Floor Plan

Scale: As indicated
Drawn by: H.G., RSO
Checked by: C.A., A.C.
Project No.: 22-104
Date: April 26, 2024
Drawing No.:

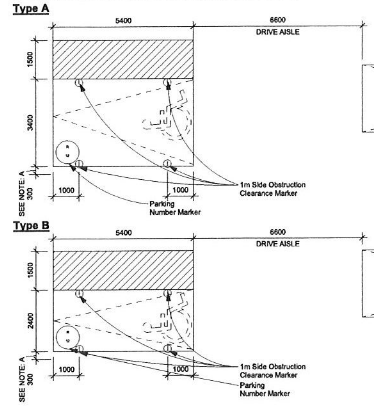
A153.S

TYPICAL PARKING SPACE:

Standard/Regular



TYPICAL ACCESSIBLE PARKING SPACE:

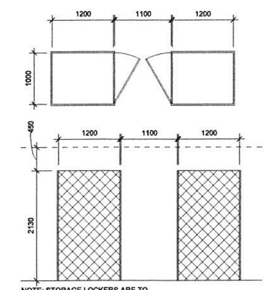


GENERAL NOTES:
A. Provide an additional 300mm for parking space width when obstructions occur between the front and rear 1000mm.
B. Drive asile of 6.60m min.
B. For accessible spaces have an access aisle that is a minimum of 1.5 metres wide, as long as the parking space and be marked with high tonal contrast diagonal lines to indicate that parking is prohibited in this space

3 | Typical Parking Stall Details
1 : 100

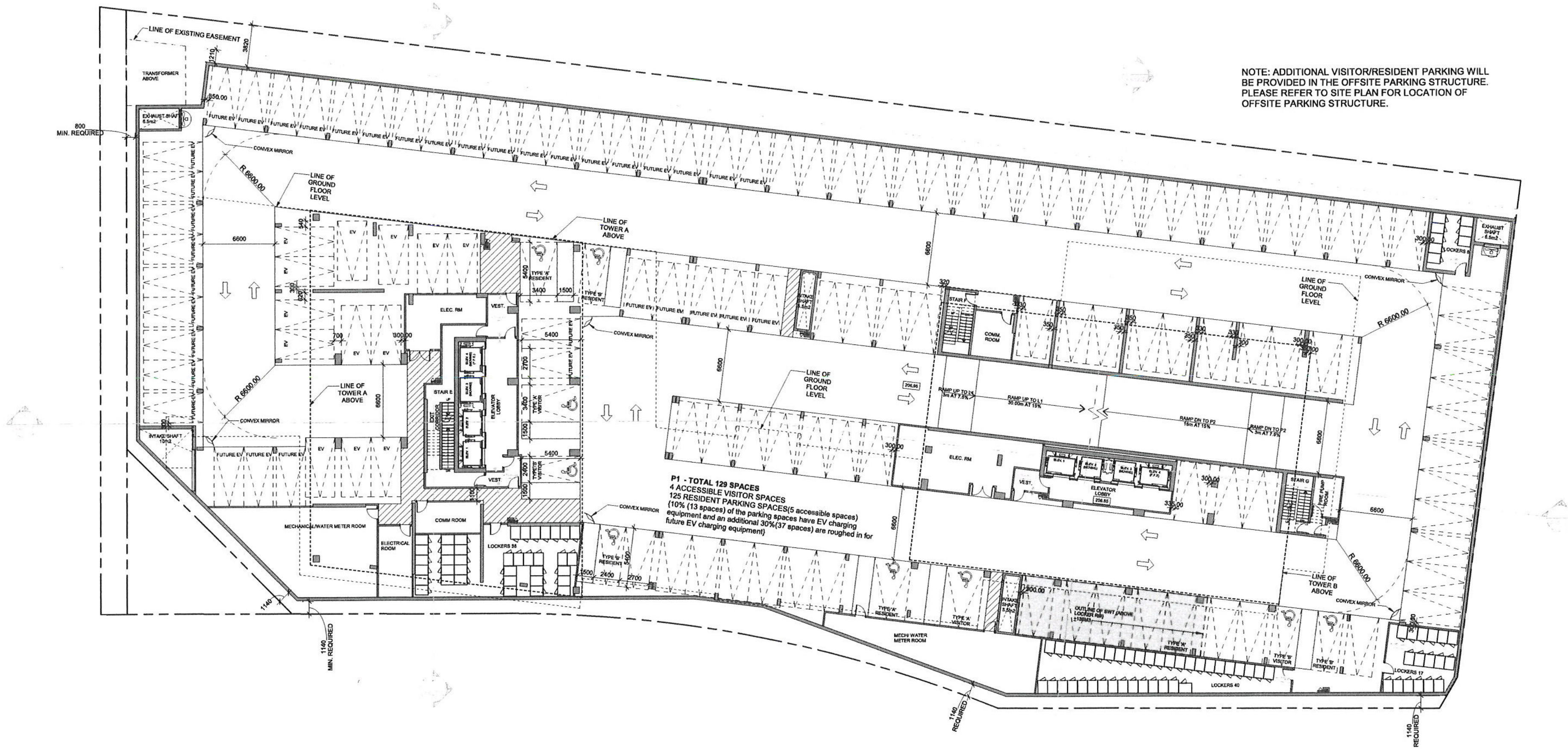
TYPICAL STORAGE LOCKER :

TOTAL LOCKER SPACES = 314			
LOCKER	LEVELS		
	LEVEL P2	LEVEL P1	LEVEL 2
	176	103	35
TOTALS	314		



NOTE: STORAGE LOCKERS ARE TO HAVE A MIN. 1100mm WALKWAY ASILE IN FRONT FOR ACCESS

2 | Typical Storage Locker Notes
1 : 50



P1 - TOTAL 129 SPACES
4 ACCESSIBLE VISITOR SPACES
125 RESIDENT PARKING SPACES(5 accessible spaces)
(10% (13 spaces) of the parking spaces have EV charging equipment and an additional 30%(37 spaces) are roughed in for future EV charging equipment)

NOTE: ADDITIONAL VISITOR/RESIDENT PARKING WILL BE PROVIDED IN THE OFFSITE PARKING STRUCTURE. PLEASE REFER TO SITE PLAN FOR LOCATION OF OFFSITE PARKING STRUCTURE.

1 | Parking Level P1 Floor Plan
1 : 200

City File No.
SPA-2022-0120

Authorities Having Jurisdiction

Do not scale the drawings.

This Drawing Is Not To Be Used For Construction Until Signed ByThe Architect.

Date:

KIRKOR
ARCHITECTS AND PLANNERS

Revisions

No.:	Revision:	Date:

No.:	Issued For:	Date:
02.	SPA RESUBMISSION	April 26, 2024
01.	SPA	June 22, 2022

RIOCAN

Client:
1388688 Ontario Ltd. RioCan

RioCan Shoppers World - Phase 1A
499 Main Street South, Brampton ON
Proposed Residential Development

Drawing Title:
Parking Level P1 Floor Plan

Scale:
As indicated

Drawn by:
H.G., RSO

Checked by:
C.A., A.C.

Project No.:
22-104

Date:
April 26, 2024

Drawing No.:
A154.S

WASTE HANDELING NOTES:

- ACCESS DRIVEWAY FOR WASTE COLLECTION VEHICLE DESIGNED TO SUPPORT 35,000KG FULLY LOADED WASTE COLLECTION VEHICLE
- A CLEAR HEIGHT OF 4.4M ALONG THE WASE COLLECTION VEHICLE ACCESS AND EGRESS ROUTE IS PROVIDED

- PROPOSED SYSTEM:

Single Garbage Chute with tri-sorter
Compactor for garbage provided in garbage room

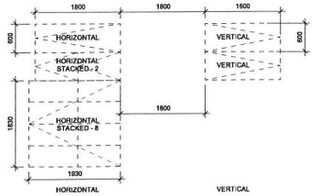
Tower A - 488 Units
Room Size: 121m² + 10 m² (Bulk) + 4.78 m² (Hazadious) = 135.78m²
Bins = 10(G)+11(R)+3(O)=24 bins (3yd³)

Tower B - 389 Units
Room Size: 100m² +10 m² (Bulk) + 4.5 m² (Hazadious) = 114.50m²
Bins = 8(G)+9(R)+2(O)=19 bins (3yd³)

Note: Please refer to waste management report for details.

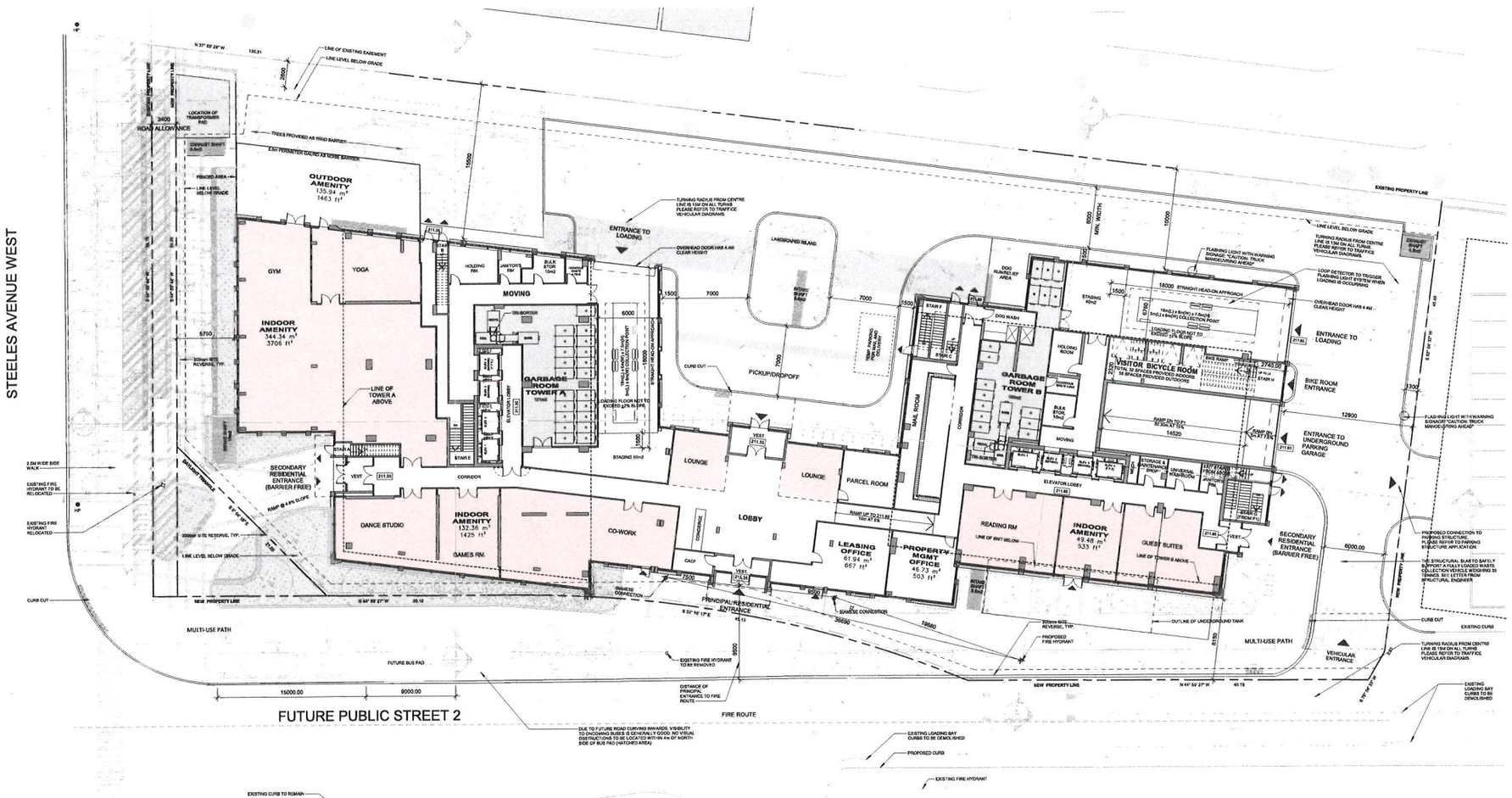
TYPICAL BICYCLE PARKING SPACE :

TOTAL BIKE PARKING SPACES = 528		
LEVELS	RESIDENTIAL	
	LONG-TERM	SHORT-TERM
LEVEL 2	440	0
LEVEL 1	0	88
TOTALS	440	88
	528	



NOTE:
- HORIZONTAL BIKE SPACES ARE 0.6m x 1.8m x 1.9m (high vertical clearance).
- VERTICAL BIKE SPACES ARE 0.6m x 1.6m x 1.9m (high vertical clearance).
- STACKED HORIZONTAL BIKE PARKING, TWO HORIZONTAL BIKE SPACES CAN BE STACKED WITH AN OVERALL CLEAR HEIGHT OF 2.55m

2 | Bicycle Parking Notes
1 : 50



1 | Level 1 Floor Plan
1 : 200

City File No.
SPA-2022-0120

Authorities Having Jurisdiction

Date:

KIRKOR
ARCHITECTS AND PLANNERS

Revisions:

No.:	Revision:	Date:
02.	SPA RESUBMISSION	April 26, 2024
01.	SPA	June 22, 2022
No.:	Issued For:	Date:

RIOCAN

Client:
1388688 Ontario Ltd. RioCan

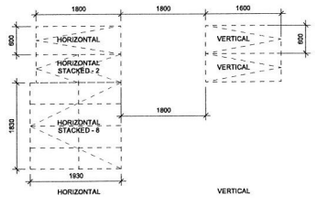
RioCan Shoppers World - Phase 1A
499 Main Street South, Brampton ON
Proposed Residential Development

Drawing Title:
Level 1 Floor Plan

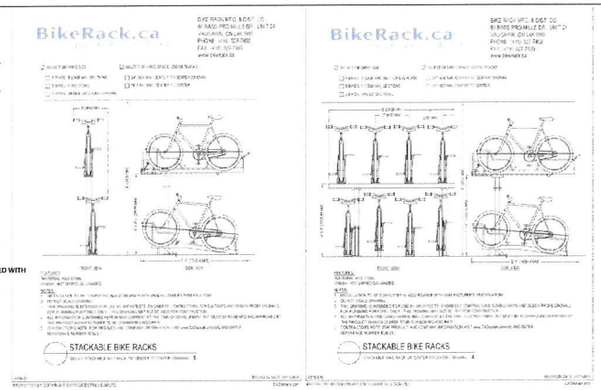
Scale: As indicated
Drawn by: H.G., RSO
Checked by: C.A., A.C.
Project No.: 22-104
Date: April 26, 2024
Drawing No.:
A201.S

TYPICAL BICYCLE PARKING SPACE :

TOTAL BIKE PARKING SPACES = 528		
LEVELS	RESIDENTIAL	
	LONG-TERM	SHORT-TERM
LEVEL 2	440	0
LEVEL 1	0	88
TOTALS	440	88
	528	



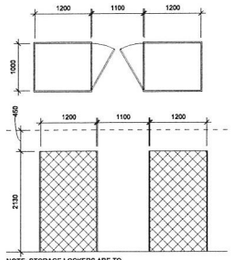
NOTE:
- HORIZONTAL BIKE SPACES ARE 0.6m x 1.8m x 1.9m (high vertical clearance).
- VERTICAL BIKE SPACES ARE 0.6m x 1.6m x 1.9m (high vertical clearance).
- STACKED HORIZONTAL BIKE PARKING, TWO HORIZONTAL BIKE SPACES CAN BE STACKED WITH AN OVERALL CLEAR HEIGHT OF 2.55m



2 | Bicycle Parking Notes.
1 : 50

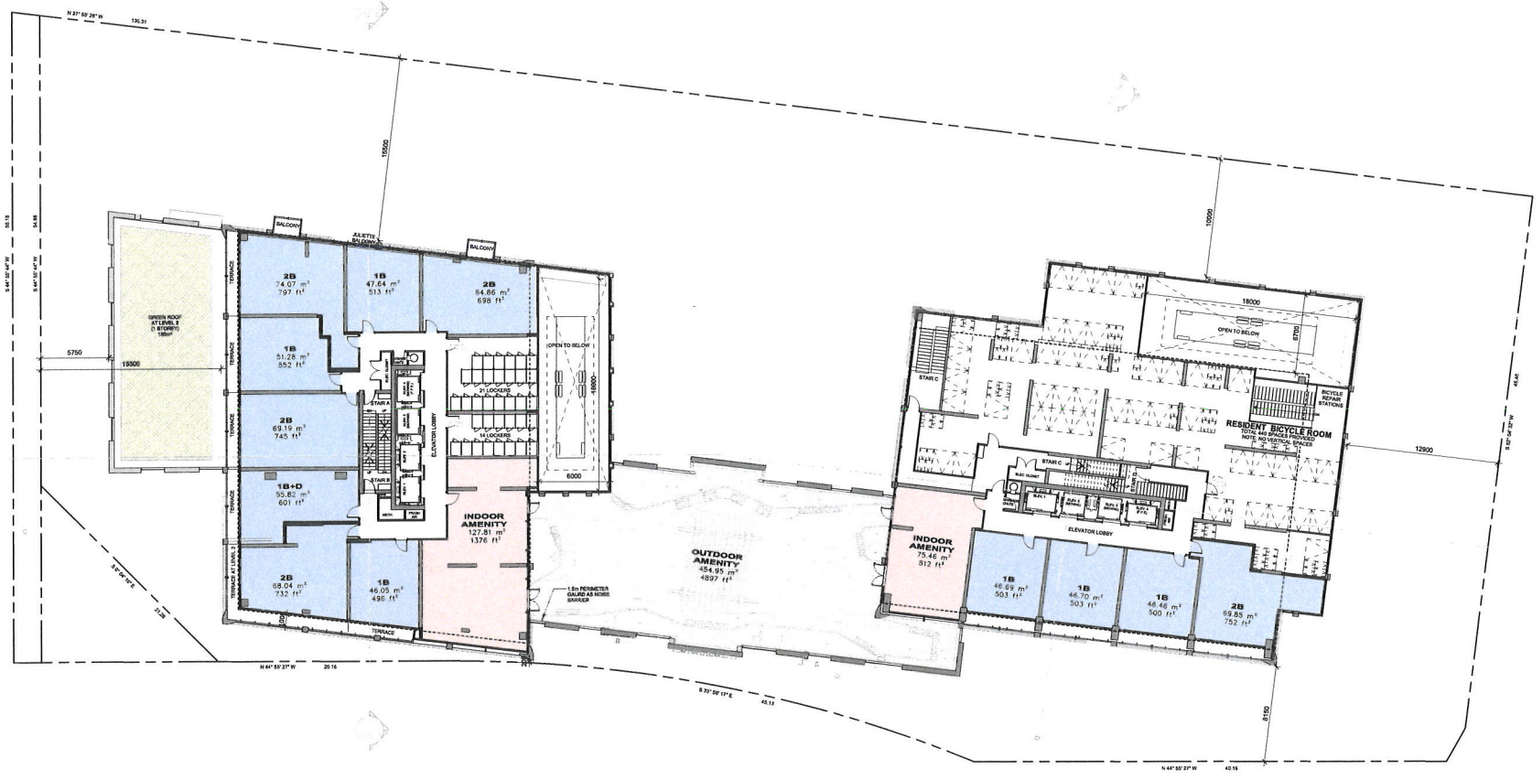
TYPICAL STORAGE LOCKER :

TOTAL LOCKER SPACES = 314			
LOCKER	LEVELS		
	LEVEL P2	LEVEL P1	LEVEL 2
	176	103	35
TOTALS	314		



NOTE: STORAGE LOCKERS ARE TO HAVE A MIN. 1100mm WALKWAY ASILE IN FRONT FOR ACCESS

3 | Locker Notes
1 : 50



1 | Level 2 Floor Plan
1 : 200

City File No.
SPA-2022-0120

Authorities Having Jurisdiction

Date:

KIRKOR
ARCHITECTS AND PLANNERS

Revisions:

No.:	Revision:	Date:
02.	SPA RESUBMISSION	April 26, 2024
01.	SPA	June 22, 2022
No.:	Issued For:	Date:

RIOCAN

Client:
1388688 Ontario Ltd. RioCan

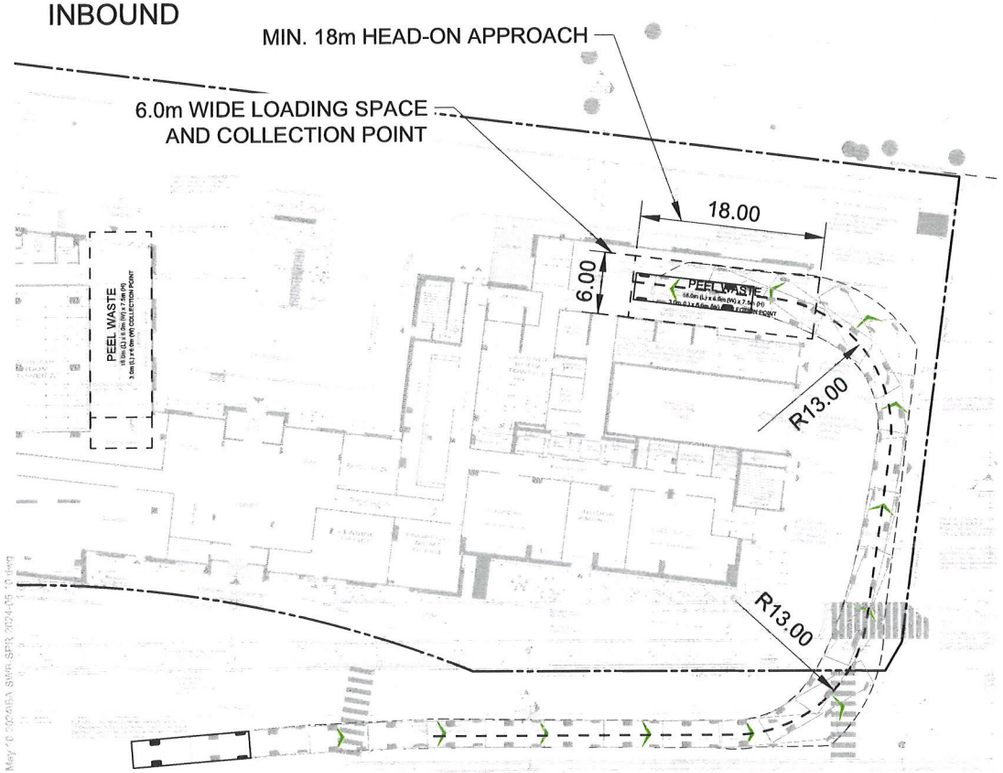
RioCan Shoppers World - Phase 1A
499 Main Street South, Brampton ON
Proposed Residential Development

Drawing Title:
Level 2 Floor Plan

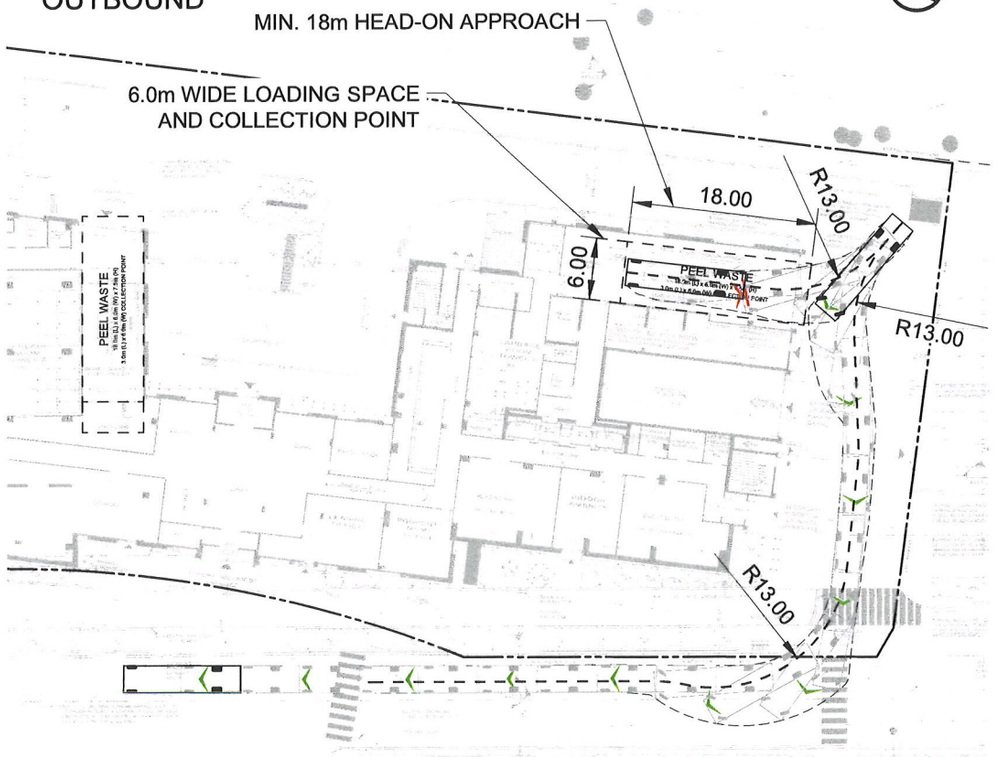
Scale: As indicated
Drawn by: H.G., RSO
Checked by: C.A., A.C.
Project No.: 22-104
Date: April 26, 2024
Drawing No.:
A203.S

Appendix B:
Vehicle Manoeuvring Diagrams

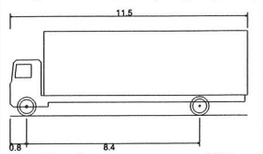
INBOUND



OUTBOUND



Design Vehicle - TAC HSU (Heavy Single Unit)



Overall Length	11.50m
Overall Width	2.60m
Overall Body Height	4.11m
Outside Turning Radius	14.56m
Inside Turning Radius	8.69m

BA Group

SHOPPERS WORLD PHASE 1A

VEHICLE MANOEUVRING DIAGRAM

REGION OF PEEL GARBAGE TRUCK - TOWER B WASTE AREA

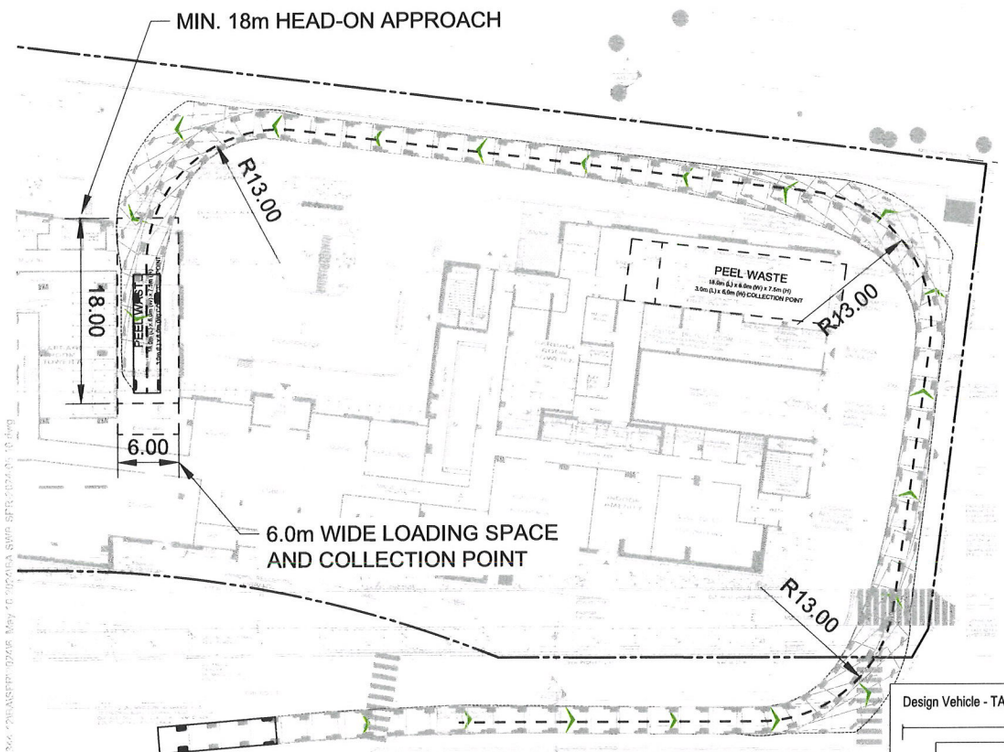
HEAVY SINGLE UNIT TRUCK AS STAND-IN FOR PEEL REGION COLLECTION VEHICLE

Project:	SHOPPER WORLD
Project No.	6344-12
Date:	April 26, 2024
Revised:	--

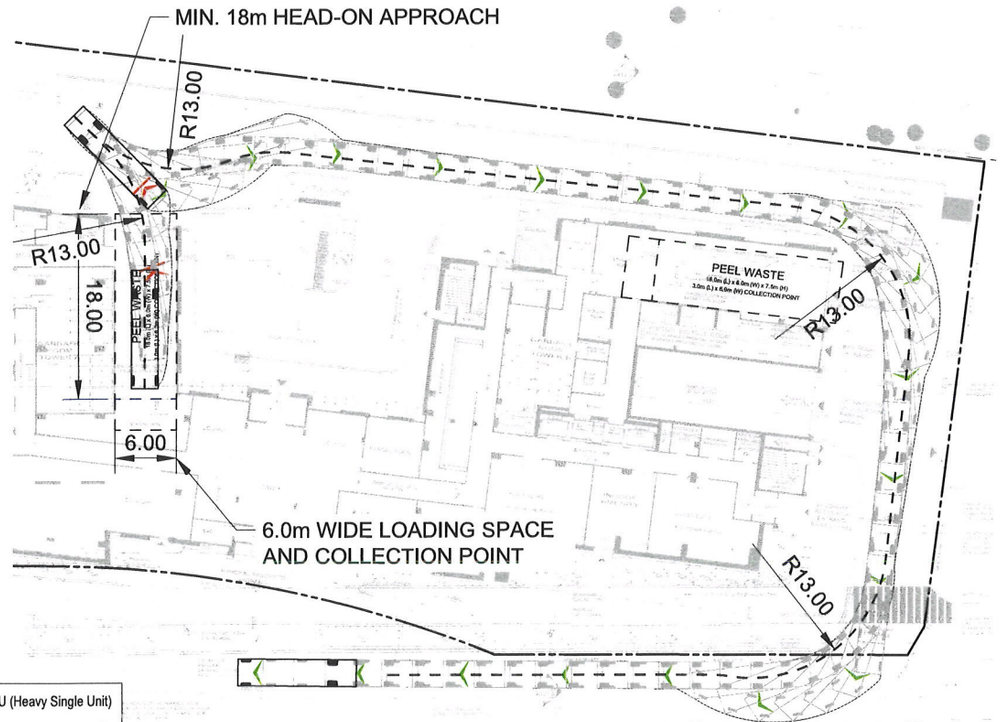
Scale 1:500 (0 5 10 15 20m)

Drawing No. VMD-01

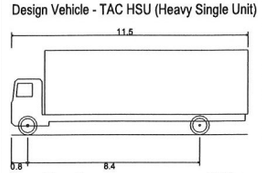
INBOUND



OUTBOUND



Design Vehicle - TAC HSU (Heavy Single Unit)



Overall Length	11.50m
Overall Width	2.60m
Overall Body Height	4.11m
Outside Turning Radius	14.56m
Inside Turning Radius	8.69m

BA Group

SHOPPERS WORLD PHASE 1A

VEHICLE MANOEUVRING DIAGRAM

REGION OF PEEL GARBAGE TRUCK - TOWER A WASTE AREA

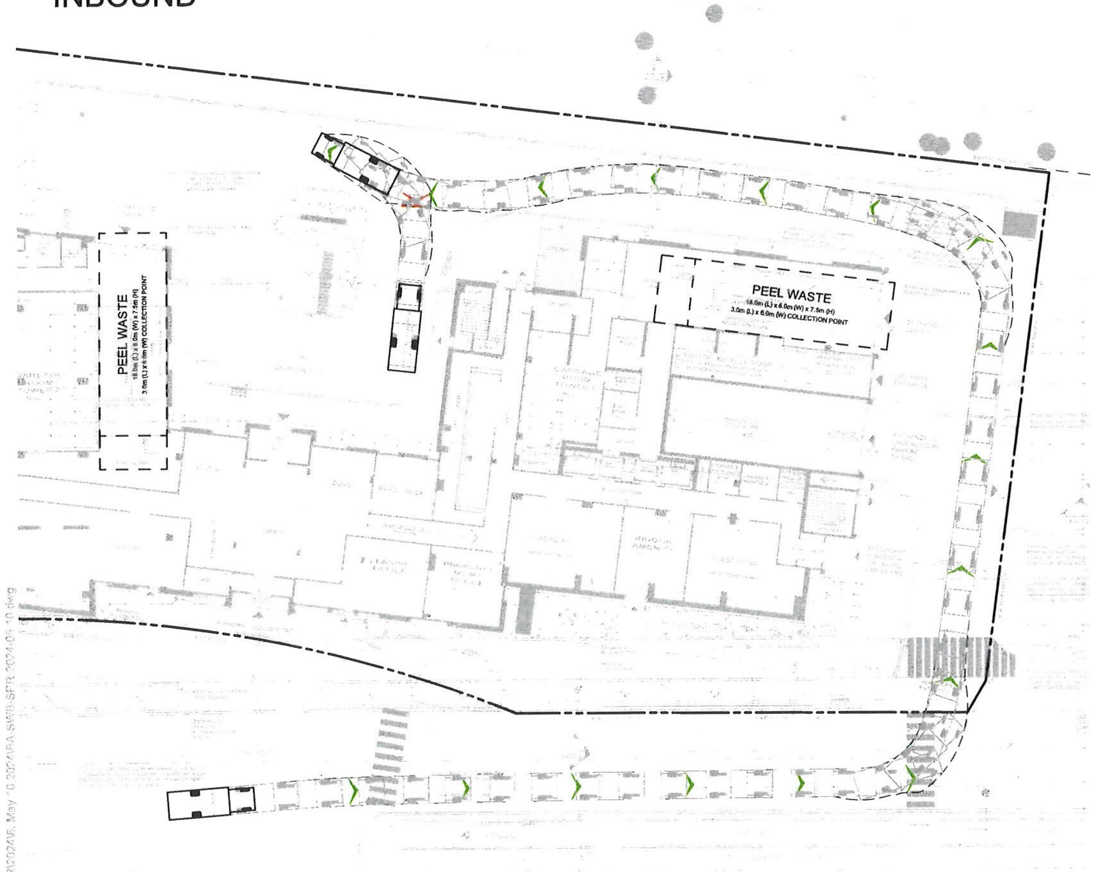
HEAVY SINGLE UNIT TRUCK AS STAND-IN FOR PEEL REGION COLLECTION VEHICLE

Project:	SHOPPER WORLD
Project No.	6344-12
Date:	April 26, 2024
Revised:	--

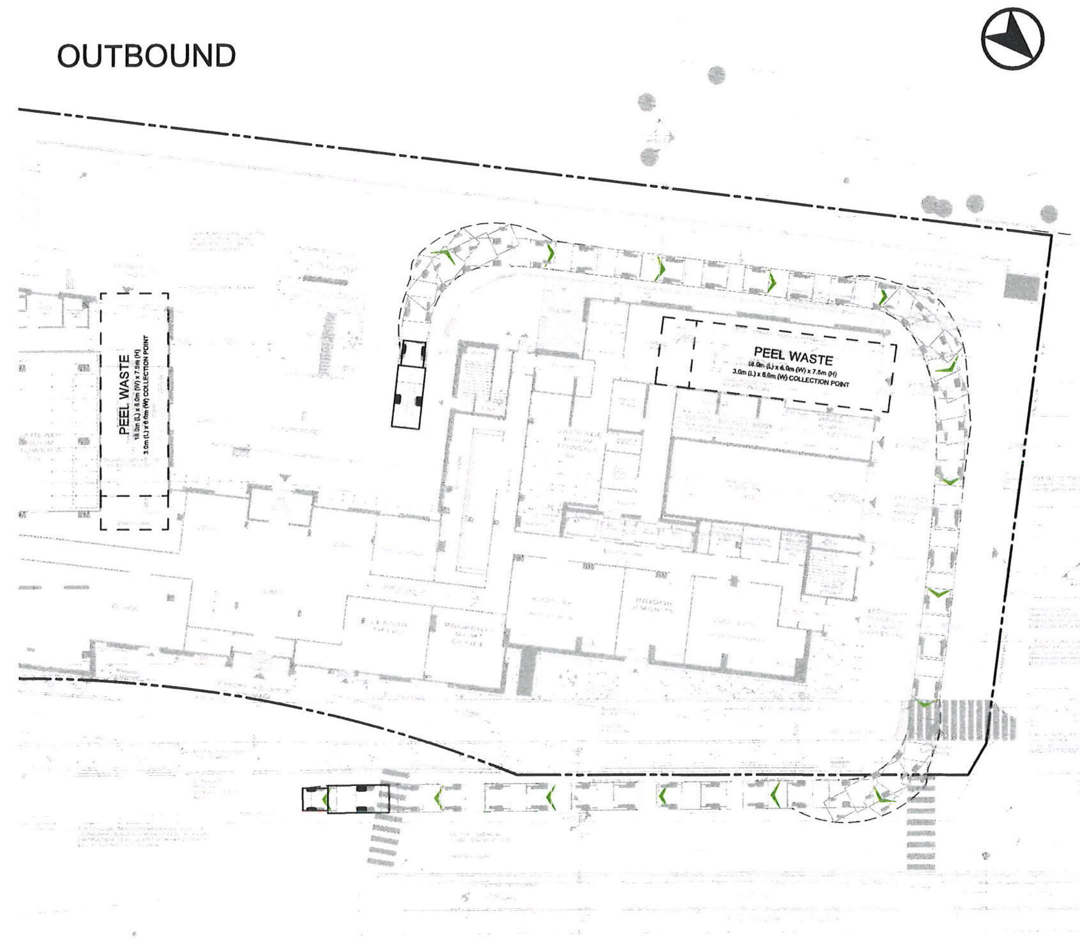
Scale 1:500 (0 5 10 15 20m)

Drawing No. VMD-02

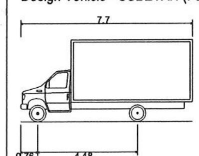
INBOUND



OUTBOUND



Design Vehicle - CUBEVAN (Ford E350)



Overall Length	7.70m
Overall Width	2.45m
Overall Body Height	3.66m
Outside Turning Radius	9.49m
Inside Turning Radius	5.68m

BA Group

SHOPPERS WORLD PHASE 1A

VEHICLE MANOEUVRING DIAGRAM
FORD E350 CUBEVAN
TEMPORARY MAIL DELIVERY PARKING AREA

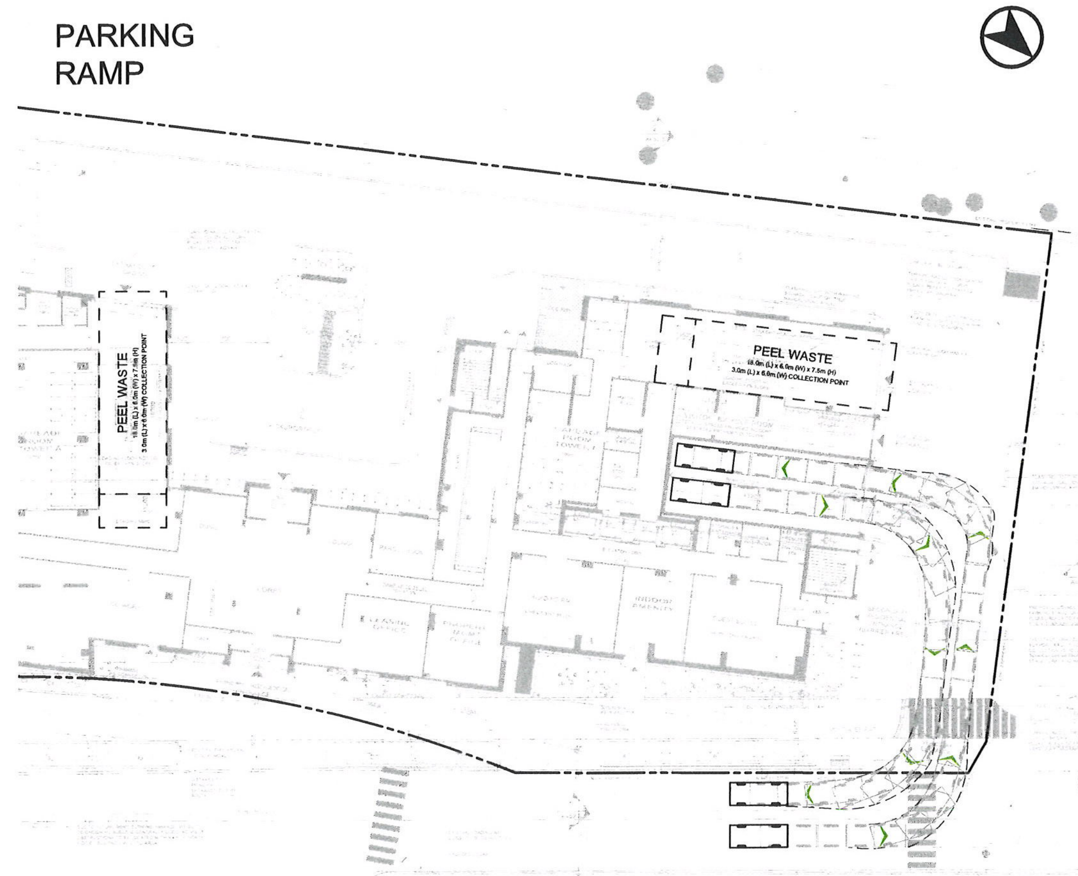
Project:	SHOPPER WORLD
Project No.	6344-12
Date:	April 26, 2024
Revised:	--

Scale 1:500 (0 5 10 15 20m)

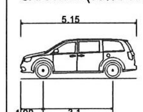
Drawing No. VMD-03

PU/DO

PARKING RAMP



Design Vehicle - 2012 DODGE GRAND CARAVAN (95% Passenger Vehicle)



Overall Length	5.15m
Overall Width	2.01m
Overall Body Height	1.74m
Outside Turning Radius	*6.50m
Inside Turning Radius	*3.40m

*Field Measurements By BA Group

BA Group

SHOPPERS WORLD PHASE 1A

VEHICLE MANOEUVRING DIAGRAM

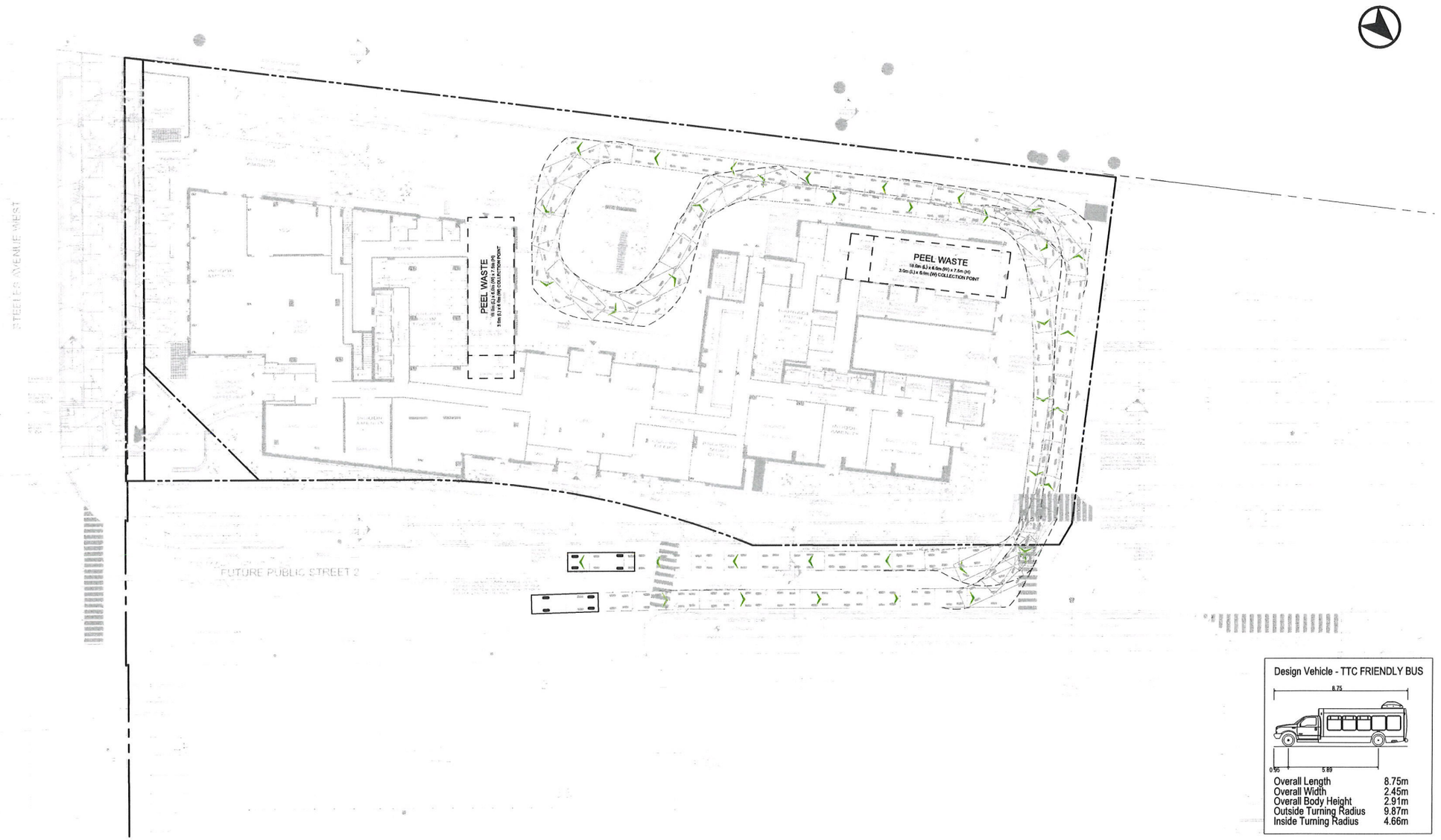
2012 DODGE GRAND CARAVAN (95th % PASSENGER VEHICLE)

PU/DO LOOP (6 SPACES OF CAPACITY) AND PARKING RAMP

Project:	SHOPPER WORLD
Project No.	6344-12
Date:	April 26, 2024
Revised:	--

Scale 1:500 — 0 5 10 15 20m

Drawing No. VMD-04



Design Vehicle - TTC FRIENDLY BUS

Overall Length	8.75m
Overall Width	2.45m
Overall Body Height	2.91m
Outside Turning Radius	9.87m
Inside Turning Radius	4.66m

BA Group

SHOPPERS WORLD PHASE 1A

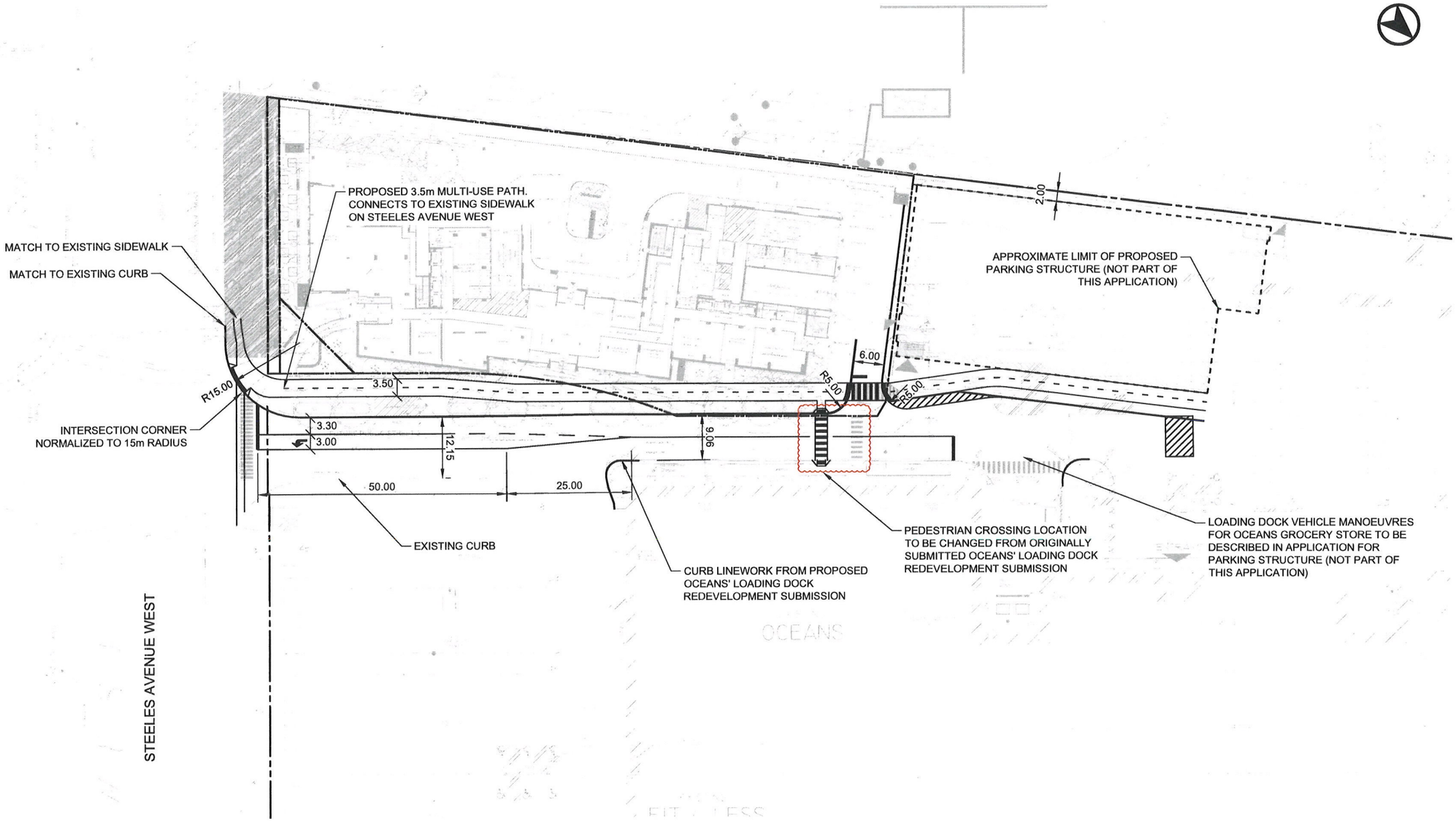
VEHICLE MANOEUVRING DIAGRAM
TTC WHEEL TRANS VEHICLE
PICK UP DROP OFF LOOP

Project:	SHOPPER WORLD
Project No.	6344-12
Date:	April 26, 2024
Revised:	--

Scale 1:500 (0 5 10 15 20m)

Drawing No. VMD-05

Appendix C:
Site Access Plans



BA Group

SHOPPERS WORLD

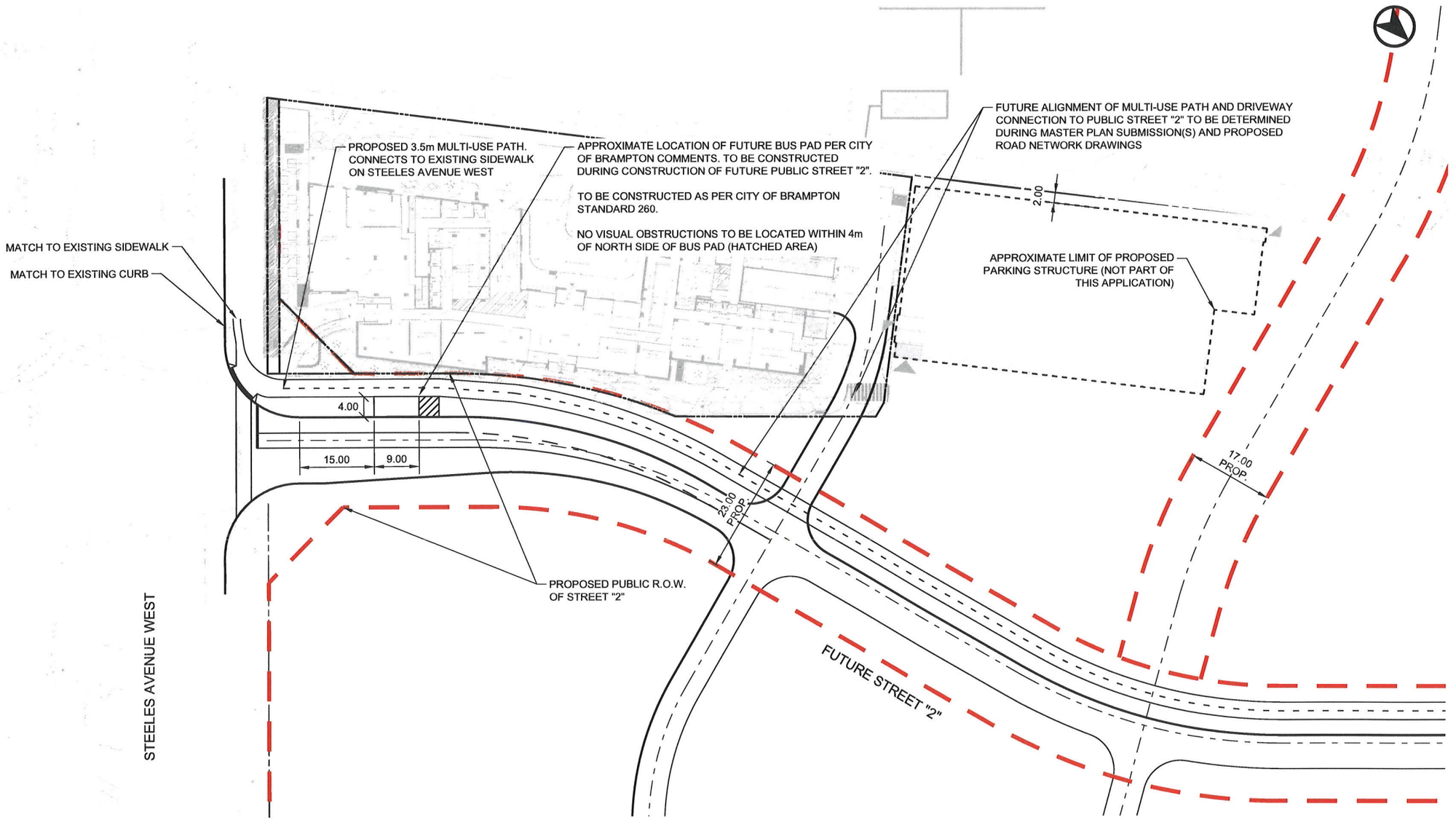
FUNCTIONAL ROAD PLAN

INTERIM ROAD CONNECTION TO STEELES AVENUE WEST

Project:	SHOPPER WORLD
Project No.	6344-12
Date:	April 26, 2024
Revised:	--

Scale 1:750 (0 — 15 — 30m)

Drawing No. FD-01



BA Group

SHOPPERS WORLD

FUNCTIONAL ROAD PLAN

CONCEPTUAL ROAD CONNECTION TO PROPOSED MASTER PLAN ROAD NETWORK

FOR REFERENTIAL PURPOSES ONLY

Project:	SHOPPER WORLD
Project No.	6344-12
Date:	April 26, 2024
Revised:	--

Scale 1:750 (0, 15, 30m)

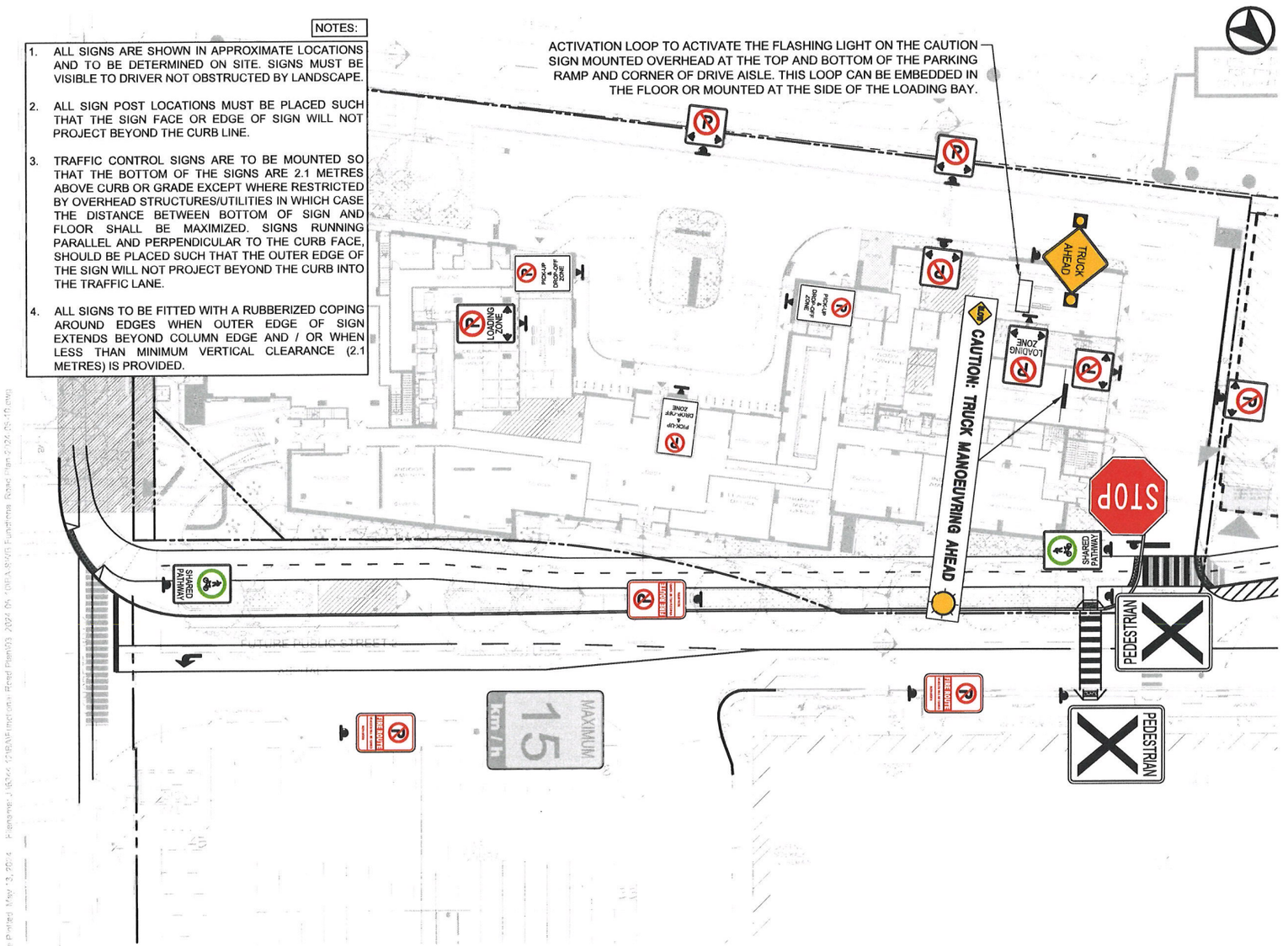
Drawing No. FD-02

Appendix D:
Pavement Marking and Signage Plans

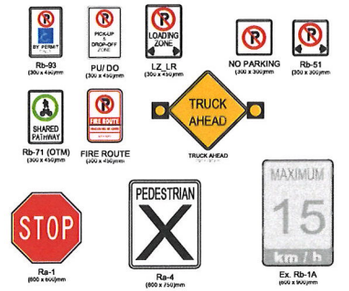
NOTES:

1. ALL SIGNS ARE SHOWN IN APPROXIMATE LOCATIONS AND TO BE DETERMINED ON SITE. SIGNS MUST BE VISIBLE TO DRIVER NOT OBSTRUCTED BY LANDSCAPE.
2. ALL SIGN POST LOCATIONS MUST BE PLACED SUCH THAT THE SIGN FACE OR EDGE OF SIGN WILL NOT PROJECT BEYOND THE CURB LINE.
3. TRAFFIC CONTROL SIGNS ARE TO BE MOUNTED SO THAT THE BOTTOM OF THE SIGNS ARE 2.1 METRES ABOVE CURB OR GRADE EXCEPT WHERE RESTRICTED BY OVERHEAD STRUCTURES/UTILITIES IN WHICH CASE THE DISTANCE BETWEEN BOTTOM OF SIGN AND FLOOR SHALL BE MAXIMIZED. SIGNS RUNNING PARALLEL AND PERPENDICULAR TO THE CURB FACE, SHOULD BE PLACED SUCH THAT THE OUTER EDGE OF THE SIGN WILL NOT PROJECT BEYOND THE CURB INTO THE TRAFFIC LANE.
4. ALL SIGNS TO BE FITTED WITH A RUBBERIZED COPING AROUND EDGES WHEN OUTER EDGE OF SIGN EXTENDS BEYOND COLUMN EDGE AND / OR WHEN LESS THAN MINIMUM VERTICAL CLEARANCE (2.1 METRES) IS PROVIDED.

ACTIVATION LOOP TO ACTIVATE THE FLASHING LIGHT ON THE CAUTION SIGN MOUNTED OVERHEAD AT THE TOP AND BOTTOM OF THE PARKING RAMP AND CORNER OF DRIVE AISLE. THIS LOOP CAN BE EMBEDDED IN THE FLOOR OR MOUNTED AT THE SIDE OF THE LOADING BAY.



TRAFFIC CONTROL SIGN LEGEND:



PAVEMENT MARKING LEGEND:

NOTE: ALL MARKINGS MUST CONFORM TO THE ONTARIO TRAFFIC MANUAL (OTM) BOOKS 11 AND 18

- YELLOW HATCHING (10cm WIDE YELLOW STRIPS)
- INTERNATIONAL SYMBOL OF ACCESS
  - 1.5m x 1.5m
  - 10cm BORDER - TRAFFIC WHITE
  - SYMBOL - TRAFFIC WHITE
  - BLUE BACKGROUND
- PROPOSED PAVEMENT MARKING
- ALL STOP BARS TO BE 60cm (2 ft.) WHITE SOLID
- PEDESTRIAN CROSSING
  - COLD PLASTIC "POLYMERIC"
  - WIDTH AS SHOWN
  - PATTERN: 60cm PAINTED, 60cm GAP
  - TRAFFIC WHITE

BA Group

SHOPPERS WORLD

SIGNAGE AND PAVEMENT MARKING PLAN

INTERIM ROAD CONNECTION AND GROUND FLOOR SITE PLAN

Project:	SHOPPERS WORLD
Project No.	6344-12
Date:	April 26, 2024
Revised:	--

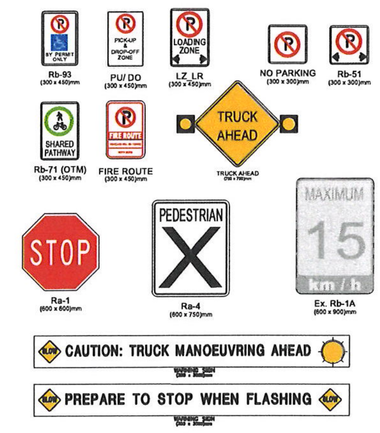
Scale 1:500 (0 5 10 15 20m)

Drawing No. SN-01

NOTES:

1. ALL SIGNS ARE SHOWN IN APPROXIMATE LOCATIONS AND TO BE DETERMINED ON SITE. SIGNS MUST BE VISIBLE TO DRIVER NOT OBSTRUCTED BY LANDSCAPE.
2. ALL SIGN POST LOCATIONS MUST BE PLACED SUCH THAT THE SIGN FACE OR EDGE OF SIGN WILL NOT PROJECT BEYOND THE CURB LINE.
3. TRAFFIC CONTROL SIGNS ARE TO BE MOUNTED SO THAT THE BOTTOM OF THE SIGNS ARE 2.1 METRES ABOVE CURB OR GRADE EXCEPT WHERE RESTRICTED BY OVERHEAD STRUCTURES/UTILITIES IN WHICH CASE THE DISTANCE BETWEEN BOTTOM OF SIGN AND FLOOR SHALL BE MAXIMIZED. SIGNS RUNNING PARALLEL AND PERPENDICULAR TO THE CURB FACE, SHOULD BE PLACED SUCH THAT THE OUTER EDGE OF THE SIGN WILL NOT PROJECT BEYOND THE CURB INTO THE TRAFFIC LANE.
4. ALL SIGNS TO BE FITTED WITH A RUBBERIZED COPING AROUND EDGES WHEN OUTER EDGE OF SIGN EXTENDS BEYOND COLUMN EDGE AND / OR WHEN LESS THAN MINIMUM VERTICAL CLEARANCE (2.1 METRES) IS PROVIDED.

TRAFFIC CONTROL SIGN LEGEND:



POST SIGN
WALL MOUNT SIGN
SIDE WALL MOUNT SIGN
CONVEX MIRROR
SUSPENDED SIGN

PAVEMENT MARKING LEGEND:

NOTE: ALL MARKINGS MUST CONFORM TO THE ONTARIO TRAFFIC MANUAL (OTM) BOOKS 11 AND 18

YELLOW HATCHING (10cm WIDE YELLOW STRIPS)

INTERNATIONAL SYMBOL OF ACCESS
- 1.5m x 1.5m
- 10cm BORDER - TRAFFIC WHITE
- SYMBOL - TRAFFIC WHITE
- BLUE BACKGROUND

PROPOSED PAVEMENT MARKING

ALL STOP BARS TO BE 60cm (2 ft.) WHITE SOLID

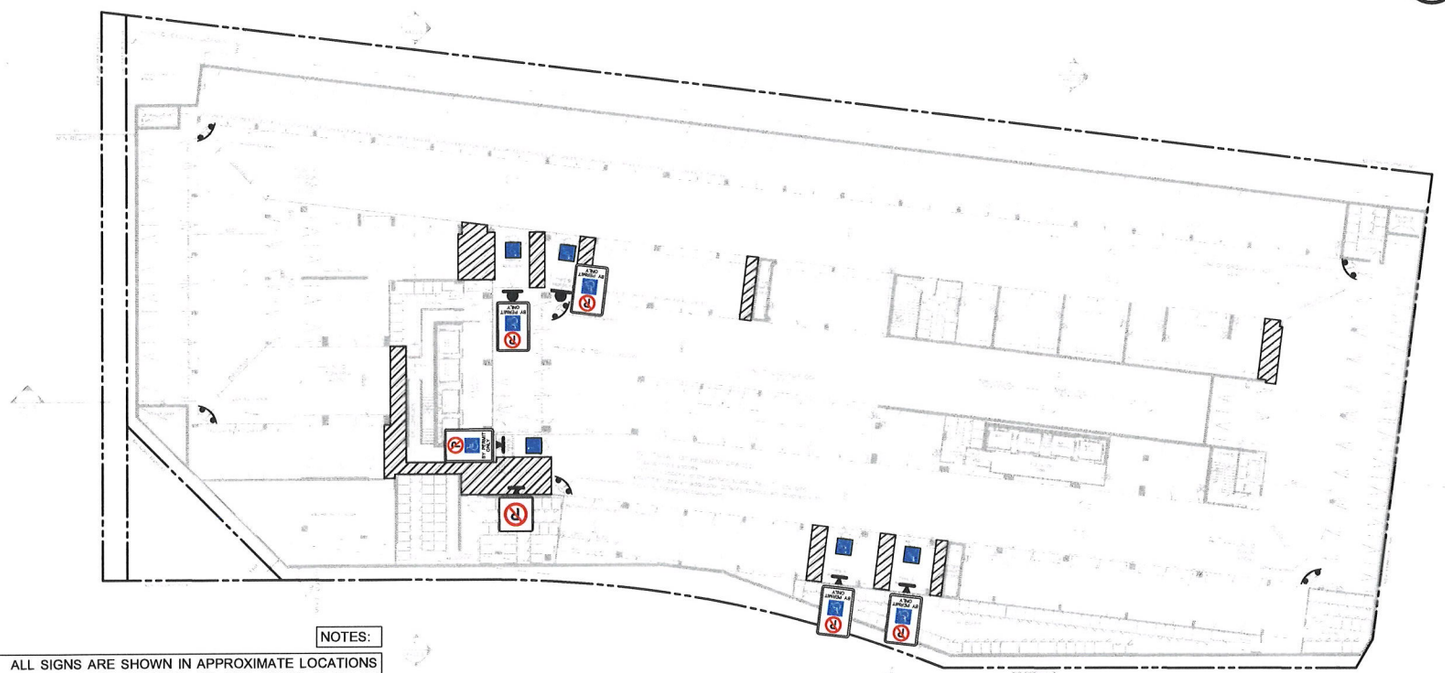
PEDESTRIAN CROSSING
- COLD PLASTIC "POLYMERIC"
- WIDTH AS SHOWN
- PATTERN: 60cm PAINTED, 60cm GAP
- TRAFFIC WHITE

BA Group

SHOPPERS WORLD

SIGNAGE AND PAVEMENT MARKING PLAN
P1 GARAGE LEVEL

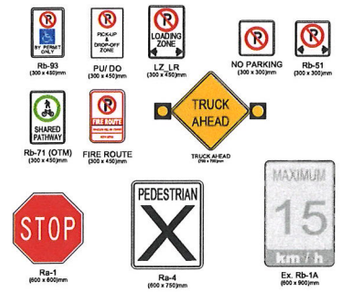
Project:	SHOPPERS WORLD
Project No.	6344-12
Date:	April 26, 2024
Revised:	--
Scale	1:500 (0 5 10 15 20m)
Drawing No.	SN-02



NOTES:

1. ALL SIGNS ARE SHOWN IN APPROXIMATE LOCATIONS AND TO BE DETERMINED ON SITE. SIGNS MUST BE VISIBLE TO DRIVER NOT OBSTRUCTED BY LANDSCAPE.
2. ALL SIGN POST LOCATIONS MUST BE PLACED SUCH THAT THE SIGN FACE OR EDGE OF SIGN WILL NOT PROJECT BEYOND THE CURB LINE.
3. TRAFFIC CONTROL SIGNS ARE TO BE MOUNTED SO THAT THE BOTTOM OF THE SIGNS ARE 2.1 METRES ABOVE CURB OR GRADE EXCEPT WHERE RESTRICTED BY OVERHEAD STRUCTURES/UTILITIES IN WHICH CASE THE DISTANCE BETWEEN BOTTOM OF SIGN AND FLOOR SHALL BE MAXIMIZED. SIGNS RUNNING PARALLEL AND PERPENDICULAR TO THE CURB FACE, SHOULD BE PLACED SUCH THAT THE OUTER EDGE OF THE SIGN WILL NOT PROJECT BEYOND THE CURB INTO THE TRAFFIC LANE.
4. ALL SIGNS TO BE FITTED WITH A RUBBERIZED COPING AROUND EDGES WHEN OUTER EDGE OF SIGN EXTENDS BEYOND COLUMN EDGE AND / OR WHEN LESS THAN MINIMUM VERTICAL CLEARANCE (2.1 METRES) IS PROVIDED.

TRAFFIC CONTROL SIGN LEGEND:



PAVEMENT MARKING LEGEND:

NOTE: ALL MARKINGS MUST CONFORM TO THE ONTARIO TRAFFIC MANUAL (OTM) BOOKS 11 AND 18

YELLOW HATCHING
(10cm WIDE YELLOW STRIPS)

INTERNATIONAL SYMBOL OF ACCESS
- 1.5m x 1.5m
- 10cm BORDER - TRAFFIC WHITE
- SYMBOL - TRAFFIC WHITE
- BLUE BACKGROUND

PROPOSED PAVEMENT MARKING

ALL STOP BARS TO BE 60cm (2 ft.) WHITE SOLID

PEDESTRIAN CROSSING
- COLD PLASTIC "POLYMERIC"
- WIDTH AS SHOWN
- PATTERN: 60cm PAINTED, 60cm GAP
- TRAFFIC WHITE

BA Group

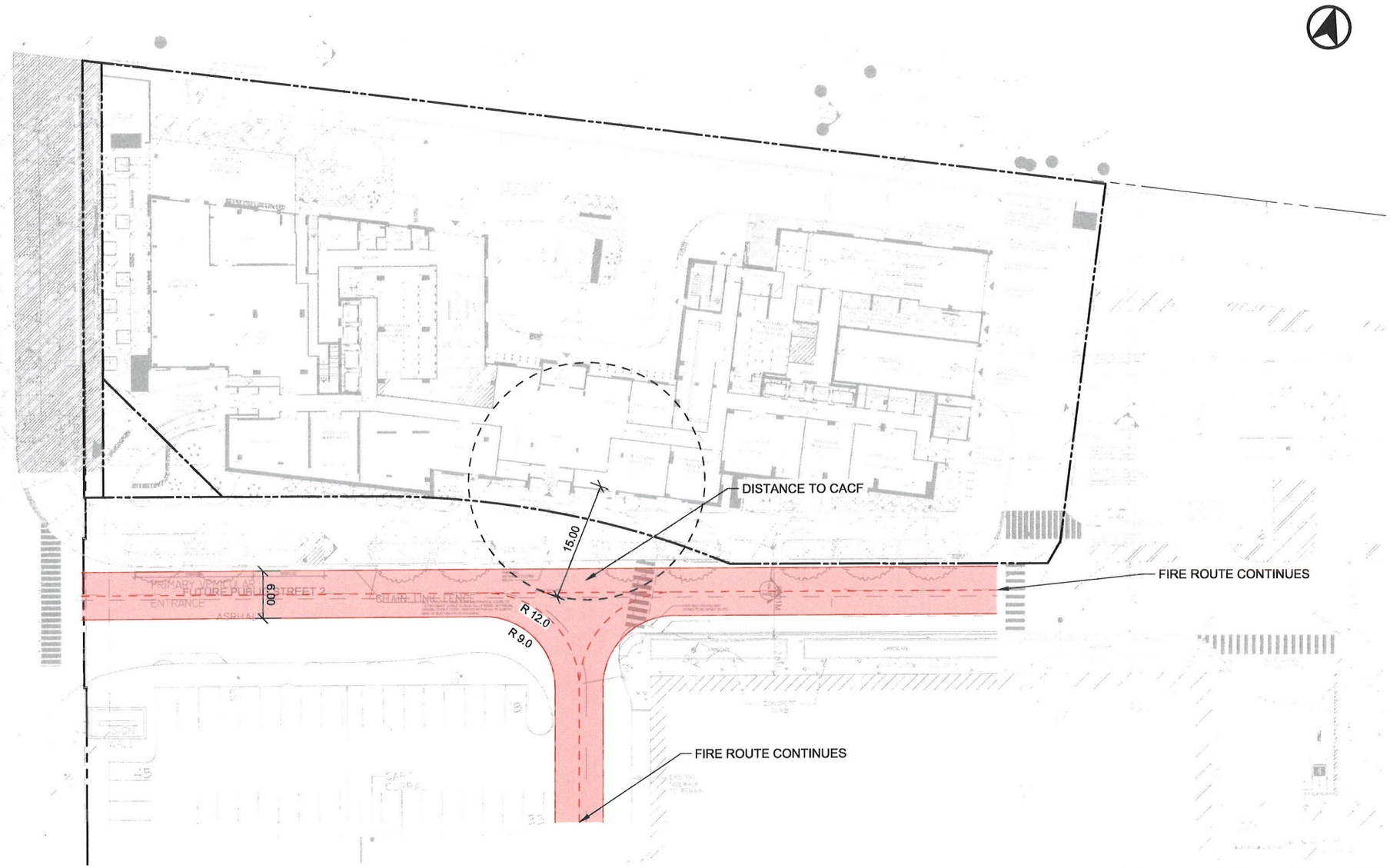
SHOPPERS WORLD
SIGNAGE AND PAVEMENT MARKING PLAN
P2 GARAGE LEVEL

Project:	SHOPPERS WORLD
Project No.	6344-12
Date:	April 26, 2024
Revised:	--

Scale 1:500 (0, 5, 10, 15, 20m)

Drawing No. SN-03

Appendix E:
Fire Route



BA Group

SHOPPERS WORLD
FIRE ROUTE REVIEW

Project:	SHOPPER WORLD
Project No.	6344-12
Date:	April 26, 2024
Revised:	--

Scale 1:500 (0 5 10 15 20m)

Drawing No. FR-01

Appendix F:
Transportation Tomorrow Survey Data

Project Name Shoppers World Phase 1A
Project No. 8180-02
Description: TTS Query - Outbound

Thu May 23 2019 17:40:41 GMT-0400 (Eastern Daylight Time) - Run Time: 2412ms

Cross Tabulation Query Form - Trip - 2016 v1.1

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

Filters:
2006 GTA zone of origin - gta06_orig In 3367,3494,3325,3368,3495,3326
and
Primary travel mode of trip - mode_prime In d,m,p,l,u
and
Start time of trip - start_time In 600-859
and
Trip purpose of origin - purp_orig In H,

Trip 2016
Table:

	3325	3326	3367	3368	3494	3495
PD 1 of Toronto	0	0	0	8	0	0
PD 2 of Toronto	0	0	0	7	34	0
PD 3 of Toronto	0	0	0	89	81	0
PD 4 of Toronto	0	0	0	21	0	0
PD 5 of Toronto	3	0	0	0	40	0
PD 7 of Toronto	0	0	0	38	0	29
PD 8 of Toronto	0	100	76	23	0	10
PD 9 of Toronto	0	0	57	26	46	16
PD 10 of Toronto	0	0	4	0	62	9
PD 11 of Toronto	0	0	0	55	0	0
PD 12 of Toronto	0	0	0	29	0	0
PD 13 of Toronto	92	0	0	0	0	0
Oshawa	0	0	35	0	0	0
Richmond Hill	7	0	0	28	5	0
Whitchurch-Stouffville	3	0	0	0	0	0
Markham	0	0	0	74	0	0
King	0	0	13	0	0	0
Vaughan	0	0	14	34	0	8
Caledon	0	0	42	7	0	0
Brampton	427	0	1159	1488	225	306
3323	10		19	**0**	0	0
3324	0		0	**27**	0	0
3325	122		0	**38**	0	5
3326	0		0	**0**	5	0
3327	57		110	**113**	0	185
3328	0		146	**11**	0	0
3331	113		0	**67**	0	10
3332	7		0	**0**	0	0
3333	0		0	**27**	0	0
3334	0		0	**0**	5	0
3335	0		0	**18**	0	0
3338	0		0	**27**	0	0
3339	0		0	**0**	7	0
3340	9		0	126	0	0
3341	0		0	11	0	0
3342	0		22	0	0	0
3343	0		0	57	14	0
3344	0		63	9	67	0
3345	0		21	0	0	0
3348	0		5	0	0	0
3350	0		30	0	0	0
3351	0		0	49	25	0
3356	0		0	0	0	3
3357	15		28	39	0	0
3360	0		0	0	0	3
3361	0		0	11	0	0
3363	0		0	30	0	0
3364	0		0	16	0	0
3365	0		0	7	0	0
3367	0		28	0	8	0
3368	5		0	300	0	0
3375	0		0	0	13	0
3378	0		0	6	0	0
3380	0		0	89	0	0
3381	0		0	5	0	0
3383	19		0	0	0	0
3384	0		0	0	9	0
3419	45		21	0	0	30
3421	0		16	7	0	20
3423	3		0	31	0	0
3424	3		0	0	0	31
3430	0		171	0	0	0
3434	0		0	34	0	0
3439	0		0	25	0	0
3447	0		0	8	0	0
3455	0		73	0	0	0
3461	0		0	0	7	0
3469	0		0	4	0	0
3480	0		0	28	0	25
3483	0		0	24	0	0
3484	0		112	0	19	0
3489	18		69	0	0	0
3492	0		0	3	0	0
3494	0		0	57	41	0
3495	0		0	67	0	0
3496	0		224	0	0	0
3499	0		0	26	0	0
3504	0		0	0	0	5
3506	0		0	26	0	0
3507	0		0	0	0	7
3510	0		0	4	0	0
3511	0		0	26	0	0
3514	0		0	11	0	0
3515	0		0	5	8	0
Mississauga	532	**76**	997	894	229	105
Halton Hills	0	**31**	12	8	0	0
Milton	24	**0**	176	0	0	0
Oakville	0	**3**	0	11	14	0
Burlington	0	**0**	112	38	0	0
Dundas	0	**0**	0	0	12	0
Hamilton	3	**0**	0	0	0	0
City of Guelph	0	**0**	35	5	0	0
Centre Wellington	0	**8**	0	0	0	0
Barrie	0	**0**	0	11	0	0

Thu May 23 2019 17:41:52 GMT-0400 (Eastern Daylight Time) - Run Time: 2132ms

Cross Tabulation Query Form - Trip - 2016 v1.1

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

Filters:
2006 GTA zone of origin - gta06_orig In 3367,3494,3325,3368,3495,3326
and
Primary travel mode of trip - mode_prime In d,m,p,l,u
and
Start time of trip - start_time In 600-859
and
Trip purpose of origin - purp_orig In H,
and
Planning district of destination - pd_dest In 35,

Trip 2016
Table:

	3325	3367	3368	3494	3495
3323	10	19	**0**	0	0
3324	0	0	**27**	0	0
3325	122	0	**38**	0	5
3326	0	0	**0**	5	0
3327	57	110	**113**	0	185
3328	0	146	**11**	0	0
3331	113	0	**67**	0	10
3332	7	0	**0**	0	0
3333	0	0	**27**	0	0
3334	0	0	**0**	5	0
3335	0	0	**18**	0	0
3338	0	0	**27**	0	0
3339	0	0	**0**	7	0
3340	9	0	126	0	0
3341	0	0	11	0	0
3342	0	22	0	0	0
3343	0	0	57	14	0
3344	0	63	9	67	0
3345	0	21	0	0	0
3348	0	5	0	0	0
3350	0	30	0	0	0
3351	0	0	49	25	0
3356	0	0	0	0	3
3357	15	28	39	0	0
3360	0	0	0	0	3
3361	0	0	11	0	0
3363	0	0	30	0	0
3364	0	0	16	0	0
3365	0	0	7	0	0
3367	0	28	0	8	0
3368	5	0	300	0	0
3375	0	0	0	13	0
3378	0	0	6	0	0
3380	0	0	89	0	0
3381	0	0	5	0	0
3383	19	0	0	0	0
3384	0	0	0	9	0
3419	45	21	0	0	30
3421	0	16	7	0	20
3423	3	0	31	0	0
3424	3	0	0	0	31
3430	0	171	0	0	0
3434	0	0	34	0	0
3439	0	0	25	0	0
3447	0	0	8	0	0
3455	0	73	0	0	0
3461	0	0	0	7	0
3469	0	0	4	0	0
3480	0	0	28	0	25
3483	0	0	24	0	0
3484	0	112	0	19	0
3489	18	69	0	0	0
3492	0	0	3	0	0
3494	0	0	57	41	0
3495	0	0	67	0	0
3496	0	224	0	0	0
3499	0	0	26	0	0
3504	0	0	0	0	5
3506	0	0	26	0	0
3507	0	0	0	0	7
3510	0	0	4	0	0
3511	0	0	26	0	0
3514	0	0	11	0	0
3515	0	0	5	8	0

Project Name Shoppers World Phase 1A
Project No. 8180-02
Description: TTS Query - Inbound

Wed Sep 04 2019 16:12:41 GMT-0400 (Eastern Daylight Time) - Run Time: 2369ms

Cross Tabulation Query Form - Trip - 2016 v1.1

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

Filters:
Start time of trip - start_time In 1500-1759
and
Trip purpose of destination - purp_dest In H
and
Primary travel mode of M P T U
and
2006 GTA zone of dest 3494 3325 3368 3495 3326

Trip 2016
Table:

	3325	3326	3367	3368	3494	3495
PD 1 of Toronto	0	0	0	15	0	0
PD 2 of Toronto	0	0	22	7	34	3
PD 4 of Toronto	0	0	0	21	0	0
PD 5 of Toronto	3	0	0	0	40	0
PD 6 of Toronto	0	0	4	0	0	0
PD 7 of Toronto	0	0	0	38	0	0
PD 8 of Toronto	14	0	0	23	0	10
PD 9 of Toronto	0	8	35	0	0	6
PD 10 of Toronto	0	0	4	4	62	11
PD 11 of Toronto	0	0	0	20	0	0
Newmarket	0	0	44	0	0	0
Richmond Hill	0	0	0	25	5	0
Whitchurch-Stouffville	3	0	0	0	0	0
Markham	0	0	14	93	61	0
Vaughan	0	0	142	108	18	8
Caledon	0	0	53	19	0	0
3323	10	0	19	0	0	0
3324	0	0	0	7	0	0
3325	118	0	0	107	0	0
3327	9	0	68	115	39	12
3328	0	0	146	11	0	0
3331	113	0	0	0	0	10
3332	7	0	0	16	0	0
3333	0	0	0	27	0	0
3334	0	0	0	34	0	0
3335	0	0	0	18	0	8
3338	0	0	0	27	0	0
3340	20	0	0	131	0	0
3342	10	0	0	31	0	0
3343	0	0	0	57	14	0
3344	0	0	0	9	0	0
3345	37	0	42	43	22	0
3348	0	0	5	18	0	3
3349	0	0	30	0	0	0
3350	0	0	30	0	0	0
3351	0	0	12	0	14	0
3352	0	0	0	48	0	0
3354	5	0	0	0	0	0
3355	0	0	0	6	0	0
3356	0	0	0	0	0	3
3357	15	0	15	39	0	0
3358	0	0	0	0	0	3
3360	0	0	73	20	0	0
3361	0	0	0	5	0	0
3363	0	0	0	30	0	0
3364	0	0	0	16	0	0
3365	5	0	36	7	0	0
3366	0	0	0	0	6	0
3367	247	3	103	43	73	0
3368	0	0	50	303	21	29
3370	0	0	0	5	0	0
3376	0	0	0	41	0	0
3378	0	0	0	6	0	0
3381	0	0	0	5	0	0
3383	19	0	0	0	0	0
3384	0	0	0	0	9	0
3417	0	0	14	0	0	3
3419	0	0	117	18	0	30
3421	0	0	8	7	0	16
3423	3	0	0	13	0	0
3424	3	0	0	0	0	31
3425	0	0	0	15	0	0
3426	23	0	0	0	0	0
3434	0	0	0	0	5	0
3439	0	0	0	39	0	0
3447	0	0	0	6	0	0
3455	0	0	73	0	4	0
3461	0	0	0	0	7	0
3469	0	0	0	4	0	0
3480	0	0	84	28	0	25
3482	0	0	0	0	21	0
3483	0	0	0	49	0	0
3484	0	0	112	0	19	0
3485	0	0	0	0	0	48
3487	0	0	0	0	0	3
3489	0	0	251	0	0	0
3490	0	0	0	0	8	0
3492	5	0	0	0	0	0
3493	0	0	0	4	0	0
3495	0	0	0	74	0	0
3498	0	0	0	7	0	3
3504	0	0	0	0	0	12
3507	0	0	0	0	0	7
3509	0	0	0	9	0	0
3513	0	0	4	0	0	0
3514	0	0	0	11	0	0
3515	0	0	0	0	8	0
Mississauga	541	84	464	999	126	137
Halton Hills	0	34	6	30	99	3
Milton	24	0	112	0	0	0
Oakville	45	3	13	0	0	0
Burlington	0	0	0	8	0	0
Hamilton	3	0	0	0	18	0
City of Guelph	0	0	35	5	0	0
Centre Wellington	0	8	0	0	0	0

Wed Sep 04 2019 16:09:04 GMT-0400 (Eastern Daylight Time) - Run Time: 2112ms

Cross Tabulation Query Form - Trip - 2016 v1.1

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

Filters:
Start time of trip - start_time In 1500-1759
and
Trip purpose of destination - purp_dest In H
and
Primary trav M P T U
and
2006 GTA z 3494 3325 3368 3495 3326
and
Planning district of origin - pd_orig In 35

Trip 2016
Table:

	3325	3326	3367	3368	3494	3495
3323	10	0	19	0	0	0
3324	0	0	0	7	0	0
3325	118	0	0	107	0	0
3327	9	0	68	115	39	12
3328	0	0	146	11	0	0
3331	113	0	0	0	0	10
3332	7	0	0	16	0	0
3333	0	0	0	27	0	0
3334	0	0	0	34	0	0
3335	0	0	0	18	0	8
3338	0	0	0	27	0	0
3340	20	0	0	131	0	0
3342	10	0	0	31	0	0
3343	0	0	0	57	14	0
3344	0	0	0	9	0	0
3345	37	0	42	43	22	0
3348	0	0	5	18	0	3
3349	0	0	30	0	0	0
3350	0	0	30	0	0	0
3351	0	0	12	0	14	0
3352	0	0	0	48	0	0
3354	5	0	0	0	0	0
3355	0	0	0	6	0	0
3356	0	0	0	0	0	3
3357	15	0	15	39	0	0
3358	0	0	0	0	0	3
3360	0	0	73	20	0	0
3361	0	0	0	5	0	0
3363	0	0	0	30	0	0
3364	0	0	0	16	0	0
3365	5	0	36	7	0	0
3366	0	0	0	0	6	0
3367	247	3	103	43	73	0
3368	0	0	50	303	21	29
3370	0	0	0	5	0	0
3376	0	0	0	41	0	0
3378	0	0	0	6	0	0
3381	0	0	0	5	0	0
3383	19	0	0	0	0	0
3384	0	0	0	0	9	0
3417	0	0	14	0	0	3
3419	0	0	117	18	0	30
3421	0	0	8	7	0	16
3423	3	0	0	13	0	0
3424	3	0	0	0	0	31
3425	0	0	0	15	0	0
3426	23	0	0	0	0	0
3434	0	0	0	0	5	0
3439	0	0	0	39	0	0
3447	0	0	0	6	0	0
3455	0	0	73	0	4	0
3461	0	0	0	0	7	0
3469	0	0	0	4	0	0
3480	0	0	84	28	0	25
3482	0	0	0	0	21	0
3483	0	0	0	49	0	0
3484	0	0	112	0	19	0
3485	0	0	0	0	0	48
3487	0	0	0	0	0	3
3489	0	0	251	0	0	0
3490	0	0	0	0	8	0
3492	5	0	0	0	0	0
3493	0	0	0	4	0	0
3495	0	0	0	74	0	0
3498	0	0	0	7	0	3
3504	0	0	0	0	0	12
3507	0	0	0	0	0	7
3509	0	0	0	9	0	0
3513	0	0	4	0	0	0
3514	0	0	0	11	0	0
3515	0	0	0	0	8	0

Appendix G:
Synchro Analysis Output Sheets

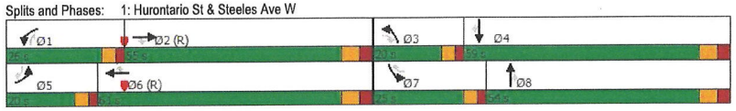
Timings
1: Hurontario St & Steeles Ave W

Existing AM
Shoppers World Brampton - Phase 1A (8180-02)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	1280	295	415	730	185	110	460	445	340	1225	130
Future Volume (vph)	85	1280	295	415	730	185	110	460	445	340	1225	130
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2 3			7 6			1 8			5 4
Detector Phase	5	2	2 3	1	6	7 6	3	8	1 8	7	4	5 4
Switch Phase												
Minimum Initial (s)	8.0	12.0		8.0	12.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	13.0	49.2		13.0	49.2		13.0	49.2		13.0	49.2	
Total Split (s)	20.0	55.0		26.0	61.0		20.0	54.0		25.0	59.0	
Total Split (%)	12.5%	34.4%		16.3%	38.1%		12.5%	33.8%		15.6%	36.9%	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	3.2		2.0	3.2		2.0	3.2		2.0	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	7.2		5.0	7.2		5.0	7.2		5.0	7.2	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Min		None	C-Min		None	Min		None	Min	
Act Effct Green (s)	9.9	51.5	68.2	23.2	64.8	91.7	11.7	41.2	71.6	19.7	49.2	66.3
Actuated g/C Ratio	0.06	0.32	0.43	0.14	0.40	0.57	0.07	0.26	0.45	0.12	0.31	0.41
v/c Ratio	0.44	0.78	0.44	0.85	0.37	0.22	0.55	0.36	0.64	0.88	0.80	0.24
Control Delay	91.3	43.6	15.2	83.3	35.2	3.8	81.8	48.8	33.0	91.7	55.5	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	91.3	43.6	15.2	83.3	35.2	3.8	81.8	48.8	33.0	91.7	55.5	9.4
LOS	F	D	B	F	D	A	F	D	C	F	E	A
Approach Delay		41.0			45.9			45.4			59.2	
Approach LOS		D			D			D			E	

Intersection Summary		
Cycle Length: 160		
Actuated Cycle Length: 160		
Offset: 107 (67%), Referenced to phase 2:EBT and 6:WBT, Start of Green		
Natural Cycle: 135		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.88		
Intersection Signal Delay: 48.3	Intersection LOS: D	
Intersection Capacity Utilization 105.9%	ICU Level of Service G	
Analysis Period (min) 15		

Splits and Phases: 1: Hurontario St & Steeles Ave W



Queues
1: Hurontario St & Steeles Ave W

Existing AM
Shoppers World Brampton - Phase 1A (8180-02)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	85	1280	295	415	730	185	110	460	445	340	1225	130
v/c Ratio	0.44	0.78	0.44	0.85	0.37	0.22	0.55	0.36	0.64	0.88	0.80	0.24
Control Delay	91.3	43.6	15.2	83.3	35.2	3.8	81.8	48.8	33.0	91.7	55.5	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	91.3	43.6	15.2	83.3	35.2	3.8	81.8	48.8	33.0	91.7	55.5	9.4
Queue Length 50th (m)	14.5	147.9	58.0	69.5	63.0	1.9	18.7	46.2	94.5	58.5	137.6	6.6
Queue Length 95th (m)	25.8	116.2	18.7	#105.9	81.7	15.1	29.4	55.5	134.0	#85.5	154.2	20.4
Internal Link Dist (m)		304.7			400.6			350.8			409.8	
Turn Bay Length (m)	125.0		250.0	135.0		180.0	135.0		150.0	100.0		102.0
Base Capacity (vph)	295	1639	703	486	1947	848	255	1447	693	397	1607	577
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.78	0.42	0.85	0.37	0.22	0.43	0.32	0.64	0.86	0.76	0.23

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	1280	295	415	730	185	110	460	445	340	1225	130
Future Volume (vph)	85	1280	295	415	730	185	110	460	445	340	1225	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	5.0	7.2	7.2	5.0	7.2	5.0	5.0	7.2	5.0	5.0	7.2	5.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3148	5092	1455	3362	4812	1349	2727	4948	1486	3148	4948	1193
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3148	5092	1455	3362	4812	1349	2727	4948	1486	3148	4948	1193
Peak-hour factor, PHF	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. Flow (vph)	85	1280	295	415	730	185	110	460	445	340	1225	130
RTOR Reduction (vph)	0	0	54	0	0	81	0	0	38	0	0	61
Lane Group Flow (vph)	85	1280	241	415	730	104	110	460	407	340	1225	69
Confl. Peds. (#/hr)	30		20	20		30	40		15	15		40
Heavy Vehicles (%)	10%	3%	6%	3%	9%	15%	27%	6%	5%	10%	6%	28%
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2 3			7 6			1 8			5 4
Actuated Green, G (s)	9.9	51.5	70.4	23.2	64.8	91.7	11.7	41.2	71.6	19.7	49.2	66.3
Effective Green, g (s)	9.9	51.5	70.4	23.2	64.8	84.5	11.7	41.2	64.4	19.7	49.2	59.1
Actuated g/C Ratio	0.06	0.32	0.44	0.14	0.40	0.53	0.07	0.26	0.40	0.12	0.31	0.37
Clearance Time (s)	5.0	7.2		5.0	7.2		5.0	7.2		5.0	7.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	194	1638	640	487	1948	712	199	1274	598	387	1521	440
v/s Ratio Prot	0.03	c0.25		c0.12	0.15		0.04	0.09		c0.11	c0.25	
v/s Ratio Perm			0.17			0.08			0.27			0.06
v/c Ratio	0.44	0.78	0.38	0.85	0.37	0.15	0.55	0.36	0.68	0.88	0.81	0.16
Uniform Delay, d1	72.4	49.2	30.1	66.7	33.4	19.3	71.6	48.6	39.3	69.0	51.0	33.8
Progression Factor	1.18	0.80	0.62	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	3.3	0.3	13.5	0.6	0.1	3.3	0.2	3.2	19.6	3.2	0.2
Delay (s)	86.9	42.6	18.9	80.2	33.9	19.4	74.9	48.8	42.5	88.6	54.2	33.9
Level of Service	F	D	B	F	C	B	E	D	D	F	D	C
Approach Delay (s)		40.7			46.4			48.9			59.5	
Approach LOS		D			D			D			E	

Intersection Summary					
HCM 2000 Control Delay	49.1	HCM 2000 Level of Service	D		
HCM 2000 Volume to Capacity ratio	0.83				
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	24.4		
Intersection Capacity Utilization	105.9%	ICU Level of Service	G		
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	75	1730	35	865	35	10	5	20	25
Future Volume (vph)	75	1730	35	865	35	10	5	20	25
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	5	2	1	6		4			8
Permitted Phases	2		6		4		4	8	
Detector Phase	5	2	1	6	4	4	4	8	8
Switch Phase									
Minimum Initial (s)	5.0	12.0	5.0	12.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	8.0	52.8	8.0	52.8	50.4	50.4	50.4	50.4	50.4
Total Split (s)	15.0	88.0	15.0	88.0	57.0	57.0	57.0	57.0	57.0
Total Split (%)	9.4%	55.0%	9.4%	55.0%	35.6%	35.6%	35.6%	35.6%	35.6%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.8	0.0	2.8	3.4	3.4	3.4	3.4	3.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	6.8	3.0	6.8	7.4	7.4	7.4		7.4
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
Act Effct Green (s)	125.3	115.3	123.3	113.0	22.6	22.6	22.6		22.6
Actuated g/C Ratio	0.78	0.72	0.77	0.71	0.14	0.14	0.14		0.14
v/c Ratio	0.16	0.53	0.19	0.27	0.23	0.04	0.02		0.23
Control Delay	7.0	13.8	10.9	6.8	57.3	49.1	0.2		24.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	7.0	13.8	10.9	6.8	57.3	49.1	0.2		24.8
LOS	A	B	B	A	E	D	A		C
Approach Delay		13.6		7.0		49.9			24.8
Approach LOS		B		A		D			C

Intersection Summary
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 111 (69%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.53
Intersection Signal Delay: 12.6 Intersection LOS: B
Intersection Capacity Utilization 85.6% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 2: Lancashire Ln & Steeles Ave W

Queues
2: Lancashire Ln & Steeles Ave W

Existing AM
Shoppers World Brampton - Phase 1A (8180-02)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	75	1895	35	895	35	10	5	105
v/c Ratio	0.16	0.53	0.19	0.27	0.23	0.04	0.02	0.23
Control Delay	7.0	13.8	10.9	6.8	57.3	49.1	0.2	24.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.0	13.8	10.9	6.8	57.3	49.1	0.2	24.8
Queue Length 50th (m)	2.6	70.8	1.0	18.6	11.5	3.2	0.0	7.6
Queue Length 95th (m)	14.7	170.6	6.0	26.4	19.3	8.0	0.0	14.4
Internal Link Dist (m)		343.1		304.7		68.7		68.5
Turn Bay Length (m)	90.0		115.0		65.0		80.0	
Base Capacity (vph)	515	3564	244	3342	336	595	512	937
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	0.15	0.53	0.14	0.27	0.10	0.02	0.01	0.11

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: Lancashire Ln & Steeles Ave W

Existing AM
Shoppers World Brampton - Phase 1A (8180-02)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	1730	165	35	865	30	35	10	5	20	25	60
Future Volume (vph)	75	1730	165	35	865	30	35	10	5	20	25	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	3.0	6.8		3.0	6.8		7.4	7.4	7.4		7.4	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00		0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97		0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85		0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00		0.99	
Satd. Flow (prot)	1760	4938		1733	4733		1505	1921	1552		3196	
Flt Permitted	0.29	1.00		0.09	1.00		0.69	1.00	1.00		0.90	
Satd. Flow (perm)	540	4938		160	4733		1087	1921	1552		2892	
Peak-hour factor, PHF	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. Flow (vph)	75	1730	165	35	865	30	35	10	5	20	25	60
RTOR Reduction (vph)	0	4	0	0	1	0	0	0	4	0	52	0
Lane Group Flow (vph)	75	1891	0	35	894	0	35	10	1	0	53	0
Confl. Peds. (#/hr)	35		15	15		35	5		15	15		5
Heavy Vehicles (%)	1%	5%	0%	3%	10%	9%	18%	0%	0%	5%	0%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	122.0	114.7		118.4	112.9		22.6	22.6	22.6		22.6	
Effective Green, g (s)	122.0	114.7		118.4	112.9		22.6	22.6	22.6		22.6	
Actuated g/C Ratio	0.76	0.72		0.74	0.71		0.14	0.14	0.14		0.14	
Clearance Time (s)	3.0	6.8		3.0	6.8		7.4	7.4	7.4		7.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	467	3539		172	3339		153	271	219		408	
v/s Ratio Prot	c0.01	c0.38		c0.01	0.19			0.01				
v/s Ratio Perm	0.12			0.14			c0.03		0.00		0.02	
v/c Ratio	0.16	0.53		0.20	0.27		0.23	0.04	0.00		0.13	
Uniform Delay, d1	4.8	10.4		7.0	8.5		61.0	59.3	59.0		60.1	
Progression Factor	1.00	1.00		1.28	0.61		1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.2	0.6		0.6	0.2		0.8	0.1	0.0		0.1	
Delay (s)	5.0	11.0		9.6	5.4		61.7	59.4	59.0		60.3	
Level of Service	A	B		A	A		E	E	E		E	
Approach Delay (s)		10.7			5.6			61.0			60.3	
Approach LOS		B			A			E			E	

Intersection Summary					
HCM 2000 Control Delay	11.7	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.47				
Actuated Cycle Length (s)	160.0	Sum of lost time (s)		17.2	
Intersection Capacity Utilization	85.6%	ICU Level of Service		E	
Analysis Period (min)	15				
c Critical Lane Group					

Timings
1: Hurontario St & Steeles Ave W

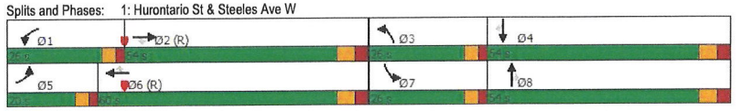
Existing PM
Shoppers World Brampton - Phase 1A (8180-02)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	215	1065	165	475	1465	500	295	1395	545	250	745	210
Future Volume (vph)	215	1065	165	475	1465	500	295	1395	545	250	745	210
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	8.0	12.0	12.0	8.0	12.0	12.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	13.0	49.2	49.2	13.0	49.2	49.2	13.0	49.2	49.2	13.0	49.2	49.2
Total Split (s)	20.0	54.0	54.0	26.0	60.0	60.0	26.0	54.0	54.0	26.0	54.0	54.0
Total Split (%)	12.5%	33.8%	33.8%	16.3%	37.5%	37.5%	16.3%	33.8%	33.8%	16.3%	33.8%	33.8%
Maximum Green (s)	15.0	46.8	46.8	21.0	52.8	52.8	21.0	46.8	46.8	21.0	46.8	46.8
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	3.2	3.2	2.0	3.2	3.2	2.0	3.2	3.2	2.0	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	Min	Min	None	Min	Min
Walk Time (s)		8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0
Flash Dont Walk (s)		34.0	34.0		34.0	34.0		34.0	34.0		34.0	34.0
Pedestrian Calls (#/hr)		85	85		85	85		75	75		75	75

Intersection Summary

Cycle Length: 160
Actuated Cycle Length: 160
Offset: 61 (38%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 135
Control Type: Actuated-Coordinated

Splits and Phases: 1: Hurontario St & Steeles Ave W



Queues
1: Hurontario St & Steeles Ave W

Existing PM
Shoppers World Brampton - Phase 1A (8180-02)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	215	1065	165	475	1465	500	295	1395	545	250	745	210
v/c Ratio	0.71	0.73	0.31	0.94	0.83	0.76	0.77	0.90	0.89	0.73	0.50	0.44
Control Delay	111.4	36.4	5.4	94.5	53.4	28.1	82.3	62.1	48.0	81.4	48.1	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	111.4	36.4	5.4	94.5	53.4	28.1	82.3	62.1	48.0	81.4	48.1	8.2
Queue Length 50th (m)	39.0	97.4	0.0	~89.3	170.1	70.4	49.9	162.2	109.4	42.3	75.3	0.2
Queue Length 95th (m)	53.9	71.4	13.0	#127.2	190.9	124.3	66.7	187.0	#186.6	57.5	90.7	22.7
Internal Link Dist (m)		304.7			400.6			350.8			409.8	
Turn Bay Length (m)	125.0		250.0	135.0		180.0	135.0		150.0	100.0		102.0
Base Capacity (vph)	324	1475	543	503	1759	657	428	1564	614	402	1499	478
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.72	0.30	0.94	0.83	0.76	0.69	0.89	0.89	0.62	0.50	0.44

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	215	1065	165	475	1465	500	295	1395	545	250	745	210
Future Volume (vph)	215	1065	165	475	1465	500	295	1395	545	250	745	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.93	1.00	1.00	0.87	1.00	1.00	0.95	1.00	1.00	0.83
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3463	5043	1459	3429	5043	1350	3267	5193	1500	3064	5043	1116
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3463	5043	1459	3429	5043	1350	3267	5193	1500	3064	5043	1116
Peak-hour factor, PHF	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. Flow (vph)	215	1065	165	475	1465	500	295	1395	545	250	745	210
RTOR Reduction (vph)	0	0	117	0	0	186	0	0	162	0	0	147
Lane Group Flow (vph)	215	1065	48	475	1465	314	295	1395	383	250	745	63
Confl. Peds. (#/hr)	105		50	50		105	140		35	35		140
Heavy Vehicles (%)	0%	4%	2%	1%	4%	3%	6%	1%	1%	13%	4%	19%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	13.9	46.2	46.2	23.5	55.8	55.8	18.8	48.0	48.0	17.9	47.1	47.1
Effective Green, g (s)	13.9	46.2	46.2	23.5	55.8	55.8	18.8	48.0	48.0	17.9	47.1	47.1
Actuated g/C Ratio	0.09	0.29	0.29	0.15	0.35	0.35	0.12	0.30	0.30	0.11	0.29	0.29
Clearance Time (s)	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	300	1456	421	503	1758	470	383	1557	450	342	1484	328
v/s Ratio Prot	0.06	0.21		c0.14	c0.29		c0.09	c0.27		0.08	0.15	
v/s Ratio Perm			0.03			0.23			0.26			0.06
v/c Ratio	0.72	0.73	0.11	0.94	0.83	0.67	0.77	0.90	0.85	0.73	0.50	0.19
Uniform Delay, d1	71.1	51.3	41.8	67.6	47.8	44.2	68.5	53.6	52.6	68.7	46.7	42.2
Progression Factor	1.40	0.65	0.72	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.2	3.0	0.5	26.6	4.8	7.3	9.2	7.1	14.2	7.8	0.3	0.3
Delay (s)	106.4	36.4	30.7	94.2	52.6	51.6	77.7	60.7	66.9	76.5	47.0	42.5
Level of Service	F	D	C	F	D	D	E	E	E	E	D	D
Approach Delay (s)		46.2			60.5			64.5			52.3	
Approach LOS		D			E			E			D	

Intersection Summary				
HCM 2000 Control Delay	57.5	HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio	0.89			
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	24.4	
Intersection Capacity Utilization	112.1%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	195	1215	50	1380	230	140	15	90	70
Future Volume (vph)	195	1215	50	1380	230	140	15	90	70
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	5	2	1	6		4			8
Permitted Phases	2		6		4		4	8	
Detector Phase	5	2	1	6	4	4	4	8	8
Switch Phase									
Minimum Initial (s)	5.0	12.0	5.0	12.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	8.0	52.8	8.0	52.8	50.4	50.4	50.4	50.4	50.4
Total Split (s)	20.0	89.0	20.0	89.0	51.0	51.0	51.0	51.0	51.0
Total Split (%)	12.5%	55.6%	12.5%	55.6%	31.9%	31.9%	31.9%	31.9%	31.9%
Maximum Green (s)	17.0	82.2	17.0	82.2	43.6	43.6	43.6	43.6	43.6
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.8	0.0	2.8	3.4	3.4	3.4	3.4	3.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	6.8	3.0	6.8	7.4	7.4	7.4		7.4
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
Walk Time (s)		8.0		8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		38.0		38.0	35.0	35.0	35.0	35.0	35.0
Pedestrian Calls (#/hr)		0		0	0	0	0	0	0

Intersection Summary
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 64 (40%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated

Splits and Phases: 2: Lancashire Ln & Steeles Ave W

Queues
2: Lancashire Ln & Steeles Ave W

Existing PM
Shoppers World Brampton - Phase 1A (8180-02)

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	195	1365	50	1545	230	140	15	365
v/c Ratio	0.83	0.54	0.24	0.67	0.77	0.22	0.03	0.36
Control Delay	55.5	26.9	11.3	18.1	65.2	38.6	0.1	18.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.5	26.9	11.3	18.1	65.2	38.6	0.1	18.4
Queue Length 50th (m)	36.4	112.3	3.9	52.7	68.1	33.2	0.0	20.8
Queue Length 95th (m)	#70.2	129.3	m4.1	46.8	#111.5	51.8	0.0	35.8
Internal Link Dist (m)		343.1		304.7		68.7		68.5
Turn Bay Length (m)	90.0		115.0		65.0		80.0	
Base Capacity (vph)	268	2583	311	2535	300	647	509	1004
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	0.73	0.53	0.16	0.61	0.77	0.22	0.03	0.36

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
2: Lancashire Ln & Steeles Ave W

Existing PM
Shoppers World Brampton - Phase 1A (8180-02)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	195	1215	150	50	1380	165	230	140	15	90	70	205
Future Volume (vph)	195	1215	150	50	1380	165	230	140	15	90	70	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	3.0	6.8		3.0	6.8		7.4	7.4	7.4		7.4	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00		0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.98		1.00	1.00	0.89		0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.98	1.00	1.00		0.98	
Frt	1.00	0.98		1.00	0.98		1.00	1.00	0.85		0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00		0.99	
Satd. Flow (prot)	1784	4842		1715	4904		1757	1921	1421		3150	
Flt Permitted	0.08	1.00		0.15	1.00		0.48	1.00	1.00		0.81	
Satd. Flow (perm)	159	4842		268	4904		891	1921	1421		2590	
Peak-hour factor, PHF	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. Flow (vph)	195	1215	150	50	1380	165	230	140	15	90	70	205
RTOR Reduction (vph)	0	10	0	0	10	0	0	0	10	0	131	0
Lane Group Flow (vph)	195	1355	0	50	1535	0	230	140	5	0	234	0
Confl. Peds. (#/hr)	75		70	70		75	25		90	90		25
Heavy Vehicles (%)	0%	6%	2%	4%	4%	0%	0%	0%	0%	1%	1%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	91.9	82.6		81.3	75.0		53.9	53.9	53.9		53.9	
Effective Green, g (s)	91.9	82.6		81.3	75.0		53.9	53.9	53.9		53.9	
Actuated g/C Ratio	0.57	0.52		0.51	0.47		0.34	0.34	0.34		0.34	
Clearance Time (s)	3.0	6.8		3.0	6.8		7.4	7.4	7.4		7.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	232	2499		193	2298		300	647	478		872	
v/s Ratio Prot	c0.07	0.28		0.01	0.31			0.07				
v/s Ratio Perm	c0.41			0.12			c0.26		0.00		0.09	
v/c Ratio	0.84	0.54		0.26	0.67		0.77	0.22	0.01		0.27	
Uniform Delay, d1	33.6	26.0		20.8	32.9		47.4	37.9	35.3		38.7	
Progression Factor	1.00	1.00		0.68	0.51		1.00	1.00	1.00		1.00	
Incremental Delay, d2	23.0	0.9		0.4	1.0		11.1	0.2	0.0		0.2	
Delay (s)	56.7	26.9		14.5	17.8		58.6	38.1	35.3		38.8	
Level of Service	E	C		B	B		E	D	D		D	
Approach Delay (s)		30.6			17.7			50.2			38.8	
Approach LOS		C			B			D			D	

Intersection Summary

HCM 2000 Control Delay	28.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	17.2
Intersection Capacity Utilization	130.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	115	105	0
Future Volume (Veh/h)	0	0	0	115	105	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	0	115	105	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				138		
pX, platoon unblocked						
vC, conflicting volume	220	52	105			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	220	52	105			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	748	1004	1484			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	0	115	70	35
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1484	1700	1700
Volume to Capacity	0.00	0.00	0.04	0.02
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	0.0	0.0	0.0	
Approach LOS	A			

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		9.4%	ICU Level of Service A
Analysis Period (min)		15	

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	75	2010	35	960	35	10	5	20	25
Future Volume (vph)	75	2010	35	960	35	10	5	20	25
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	5	2	1	6		8			4
Permitted Phases	2		6		8		8	4	
Detector Phase	5	2	1	6	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	5.0	12.0	5.0	12.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	9.5	52.8	9.5	52.8	50.4	50.4	50.4	50.4	50.4
Total Split (s)	15.0	88.0	15.0	88.0	57.0	57.0	57.0	57.0	57.0
Total Split (%)	9.4%	55.0%	9.4%	55.0%	35.6%	35.6%	35.6%	35.6%	35.6%
Maximum Green (s)	12.0	81.2	12.0	81.2	49.6	49.6	49.6	49.6	49.6
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.8	0.0	2.8	3.4	3.4	3.4	3.4	3.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	6.8	3.0	6.8	7.4	7.4	7.4		7.4
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
Walk Time (s)		8.0		8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		38.0		38.0	35.0	35.0	35.0	35.0	35.0
Pedestrian Calls (#/hr)		20		20	10	10	10	10	10

Intersection Summary
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 11 (7%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated

Splits and Phases: 2: Lancashire Ln & Steeles Ave W

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	75	2010	35	960	35	10	5	20	25
Future Volume (vph)	75	2010	35	960	35	10	5	20	25
Lane Group Flow (vph)	75	2175	35	990	35	10	5	0	105
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	5	2	1	6		8			4
Permitted Phases	2		6		8		8	4	
Detector Phase	5	2	1	6	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	5.0	12.0	5.0	12.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	9.5	52.8	9.5	52.8	50.4	50.4	50.4	50.4	50.4
Total Split (s)	15.0	88.0	15.0	88.0	57.0	57.0	57.0	57.0	57.0
Total Split (%)	9.4%	55.0%	9.4%	55.0%	35.6%	35.6%	35.6%	35.6%	35.6%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.8	0.0	2.8	3.4	3.4	3.4	3.4	3.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	6.8	3.0	6.8	7.4	7.4	7.4		7.4
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
v/c Ratio	0.17	0.61	0.23	0.30	0.23	0.04	0.02		0.23
Control Delay	7.1	15.4	25.3	19.5	57.3	49.1	0.2		24.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	7.1	15.4	25.3	19.5	57.3	49.1	0.2		24.8
Queue Length 50th (m)	2.6	88.0	2.6	85.5	11.5	3.2	0.0		7.6
Queue Length 95th (m)	14.7	212.7	m18.0	78.9	19.3	8.0	0.0		14.4
Internal Link Dist (m)		174.7		301.9		77.1			113.9
Turn Bay Length (m)	90.0		115.0		65.0		80.0		
Base Capacity (vph)	475	3575	208	3343	336	595	512		937
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	0.16	0.61	0.17	0.30	0.10	0.02	0.01		0.11

Intersection Summary

Cycle Length: 160
Actuated Cycle Length: 160
Offset: 11 (7%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Lancashire Ln & Steeles Ave W

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	2010	165	35	960	30	35	10	5	20	25	60
Future Volume (vph)	75	2010	165	35	960	30	35	10	5	20	25	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	3.0	6.8		3.0	6.8		7.4	7.4	7.4		7.4	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00		0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97		0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85		0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00		0.99	
Satd. Flow (prot)	1762	4946		1733	4736		1505	1921	1552		3196	
Flt Permitted	0.26	1.00		0.06	1.00		0.69	1.00	1.00		0.90	
Satd. Flow (perm)	482	4946		109	4736		1087	1921	1552		2892	
Peak-hour factor, PHF	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. Flow (vph)	75	2010	165	35	960	30	35	10	5	20	25	60
RTOR Reduction (vph)	0	3	0	0	1	0	0	0	4	0	52	0
Lane Group Flow (vph)	75	2172	0	35	989	0	35	10	1	0	53	0
Confl. Peds. (#/hr)	35		15	15		35	5		15	15		5
Heavy Vehicles (%)	1%	5%	0%	3%	10%	9%	18%	0%	0%	5%	0%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	122.2	114.9		118.2	112.9		22.6	22.6	22.6		22.6	
Effective Green, g (s)	122.2	114.9		118.2	112.9		22.6	22.6	22.6		22.6	
Actuated g/C Ratio	0.76	0.72		0.74	0.71		0.14	0.14	0.14		0.14	
Clearance Time (s)	3.0	6.8		3.0	6.8		7.4	7.4	7.4		7.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	426	3551		134	3341		153	271	219		408	
v/s Ratio Prot	c0.01	c0.44		c0.01	0.21			0.01				
v/s Ratio Perm	0.13			0.18			c0.03		0.00		0.02	
v/c Ratio	0.18	0.61		0.26	0.30		0.23	0.04	0.00		0.13	
Uniform Delay, d1	4.8	11.3		8.6	8.8		61.0	59.3	59.0		60.1	
Progression Factor	1.00	1.00		3.17	1.74		1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.2	0.8		1.0	0.2		0.8	0.1	0.0		0.1	
Delay (s)	5.0	12.1		28.2	15.4		61.7	59.4	59.0		60.3	
Level of Service	A	B		C	B		E	E	E		E	
Approach Delay (s)		11.9			15.9			61.0			60.3	
Approach LOS		B			B			E			E	

Intersection Summary

HCM 2000 Control Delay	15.3	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.54				
Actuated Cycle Length (s)	160.0	Sum of lost time (s)		17.2	
Intersection Capacity Utilization	89.9%	ICU Level of Service		E	
Analysis Period (min)	15				

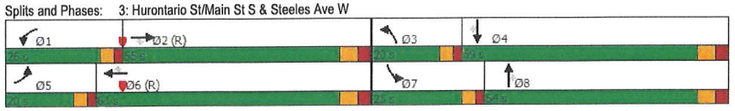
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	1415	400	435	775	185	145	430	470	350	940	145
Future Volume (vph)	125	1415	400	435	775	185	145	430	470	350	940	145
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	8.0	12.0	12.0	8.0	12.0	12.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	13.0	49.2	49.2	13.0	49.2	49.2	13.0	49.2	49.2	13.0	49.2	49.2
Total Split (s)	20.0	55.0	55.0	26.0	61.0	61.0	20.0	54.0	54.0	25.0	59.0	59.0
Total Split (%)	12.5%	34.4%	34.4%	16.3%	38.1%	38.1%	12.5%	33.8%	33.8%	15.6%	36.9%	36.9%
Maximum Green (s)	15.0	47.8	47.8	21.0	53.8	53.8	15.0	46.8	46.8	20.0	51.8	51.8
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	3.2	3.2	2.0	3.2	3.2	2.0	3.2	3.2	2.0	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Min	Min	None	Min	Min
Walk Time (s)		8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0
Flash Dont Walk (s)		34.0	34.0		34.0	34.0		34.0	34.0		34.0	34.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0

Intersection Summary

Cycle Length: 160
Actuated Cycle Length: 160
Offset: 61 (38%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 135
Control Type: Actuated-Coordinated

Splits and Phases: 3: Hurontario St/Main St S & Steeles Ave W



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	1415	400	435	775	185	145	430	470	350	940	145
Future Volume (vph)	125	1415	400	435	775	185	145	430	470	350	940	145
Lane Group Flow (vph)	125	1415	400	435	775	185	145	430	470	350	940	145
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	8.0	12.0	12.0	8.0	12.0	12.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	13.0	49.2	49.2	13.0	49.2	49.2	13.0	49.2	49.2	13.0	49.2	49.2
Total Split (s)	20.0	55.0	55.0	26.0	61.0	61.0	20.0	54.0	54.0	25.0	59.0	59.0
Total Split (%)	12.5%	34.4%	34.4%	16.3%	38.1%	38.1%	12.5%	33.8%	33.8%	15.6%	36.9%	36.9%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	3.2	3.2	2.0	3.2	3.2	2.0	3.2	3.2	2.0	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Min	Min	None	Min	Min
v/c Ratio	0.54	0.89	0.63	0.87	0.42	0.27	0.63	0.47	0.85	0.89	0.89	0.31
Control Delay	79.7	55.2	28.4	84.0	37.2	5.6	83.6	51.2	43.2	93.8	64.4	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.7	55.2	28.4	84.0	37.2	5.6	83.6	51.2	43.2	93.8	64.4	7.3
Queue Length 50th (m)	21.3	182.3	85.0	73.6	69.8	0.0	24.5	63.7	83.4	60.3	157.1	0.0
Queue Length 95th (m)	29.3	#201.3	138.5	#113.4	89.8	18.1	37.0	78.5	129.5	#87.8	181.1	17.0
Internal Link Dist (m)		301.9			174.6			265.4			343.4	
Turn Bay Length (m)	125.0		250.0	135.0		180.0	135.0		150.0	100.0		135.0
Base Capacity (vph)	303	1593	637	500	1853	691	266	1046	599	400	1147	491
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.89	0.63	0.87	0.42	0.27	0.55	0.41	0.78	0.88	0.82	0.30

Intersection Summary

Cycle Length: 160
Actuated Cycle Length: 160
Offset: 61 (38%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 135
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Hurontario St/Main St S & Steeles Ave W

HCM Signalized Intersection Capacity Analysis
3: Hurontario St/Main St S & Steeles Ave W

Future Background AM
05-16-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	1415	400	435	775	185	145	430	470	350	940	145
Future Volume (vph)	125	1415	400	435	775	185	145	430	470	350	940	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	0.94
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3236	4995	1523	3362	4683	1463	2838	3579	1500	3206	3544	1215
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3236	4995	1523	3362	4683	1463	2838	3579	1500	3206	3544	1215
Peak-hour factor, PHF	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. Flow (vph)	125	1415	400	435	775	185	145	430	470	350	940	145
RTOR Reduction (vph)	0	0	151	0	0	112	0	0	169	0	0	102
Lane Group Flow (vph)	125	1415	249	435	775	73	145	430	301	350	940	43
Confl. Peds. (#/hr)	15		5	5		15	40		10	10		40
Heavy Vehicles (%)	7%	5%	3%	3%	12%	6%	22%	2%	4%	8%	3%	24%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	11.5	51.1	51.1	23.8	63.4	63.4	12.9	41.1	41.1	19.6	47.8	47.8
Effective Green, g (s)	11.5	51.1	51.1	23.8	63.4	63.4	12.9	41.1	41.1	19.6	47.8	47.8
Actuated g/C Ratio	0.07	0.32	0.32	0.15	0.40	0.40	0.08	0.26	0.26	0.12	0.30	0.30
Clearance Time (s)	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	232	1595	486	500	1855	579	228	919	385	392	1058	362
v/s Ratio Prot	0.04	c0.28		c0.13	0.17		0.05	0.12		c0.11	c0.27	
v/s Ratio Perm			0.16			0.05			0.20			0.04
v/c Ratio	0.54	0.89	0.51	0.87	0.42	0.13	0.64	0.47	0.78	0.89	0.89	0.12
Uniform Delay, d1	71.7	51.7	44.3	66.6	34.9	30.7	71.3	50.2	55.3	69.2	53.6	40.8
Progression Factor	1.02	0.93	1.19	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	6.3	3.1	14.9	0.7	0.5	5.7	0.4	10.0	21.7	9.2	0.1
Delay (s)	75.1	54.5	55.9	81.5	35.6	31.2	77.0	50.6	65.3	90.9	62.8	40.9
Level of Service	E	D	E	F	D	C	E	D	E	F	E	D
Approach Delay (s)		56.1			49.3			60.8			67.4	
Approach LOS		E			D			E			E	

Intersection Summary				
HCM 2000 Control Delay	58.1	HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio	0.90			
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	24.4	
Intersection Capacity Utilization	107.0%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
1: Lancashire Ln & Site Access

Future Background PM
05-16-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	500	370	0
Future Volume (Veh/h)	0	0	0	500	370	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	0	500	370	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				138		
pX, platoon unblocked	0.89					
vC, conflicting volume	870	185	370			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	796	185	370			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	290	826	1185			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	0	500	247	123
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1185	1700	1700
Volume to Capacity	0.00	0.00	0.15	0.07
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	0.0	0.0	0.0	
Approach LOS	A			

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	29.6%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	195	1395	50	1655	230	140	15	90	75
Future Volume (vph)	195	1395	50	1655	230	140	15	90	75
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	5	2	1	6		8			4
Permitted Phases	2		6		8		8	4	
Detector Phase	5	2	1	6	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	5.0	12.0	5.0	12.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	9.5	52.8	9.5	52.8	50.4	50.4	50.4	50.4	50.4
Total Split (s)	20.0	89.0	20.0	89.0	51.0	51.0	51.0	51.0	51.0
Total Split (%)	12.5%	55.6%	12.5%	55.6%	31.9%	31.9%	31.9%	31.9%	31.9%
Maximum Green (s)	17.0	82.2	17.0	82.2	43.6	43.6	43.6	43.6	43.6
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.8	0.0	2.8	3.4	3.4	3.4	3.4	3.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	6.8	3.0	6.8	7.4	7.4	7.4		7.4
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
Walk Time (s)		8.0		8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		38.0		38.0	35.0	35.0	35.0	35.0	35.0
Pedestrian Calls (#/hr)		20		20	10	10	10	10	10

Intersection Summary

Cycle Length: 160
Actuated Cycle Length: 160
Offset: 64 (40%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated

Splits and Phases: 2: Lancashire Ln & Steeles Ave W

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	195	1545	50	1820	230	140	15	370
v/c Ratio	0.89	0.59	0.27	0.77	0.82	0.23	0.03	0.38
Control Delay	80.9	26.2	10.5	18.3	73.9	41.7	0.1	21.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	80.9	26.2	10.5	18.3	73.9	41.7	0.1	21.1
Queue Length 50th (m)	48.2	133.7	3.9	57.7	68.9	33.3	0.0	22.5
Queue Length 95th (m)	#88.4	134.5	m3.3	m51.0	#130.2	56.4	0.0	40.9
Internal Link Dist (m)		174.7		301.9		77.1		113.9
Turn Bay Length (m)	90.0		115.0		65.0		80.0	
Base Capacity (vph)	237	2624	286	2536	280	616	487	962
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	0.82	0.59	0.17	0.72	0.82	0.23	0.03	0.38

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

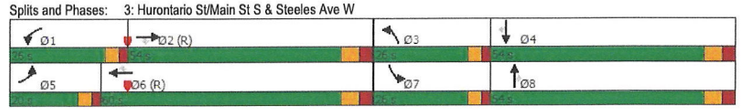
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	195	1395	150	50	1655	165	230	140	15	90	75	205
Future Volume (vph)	195	1395	150	50	1655	165	230	140	15	90	75	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	3.0	6.8		3.0	6.8		7.4	7.4	7.4		7.4	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00		0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	0.89		0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.98	1.00	1.00		0.98	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85		0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00		0.99	
Satd. Flow (prot)	1785	4854		1715	4925		1757	1921	1421		3157	
Flt Permitted	0.05	1.00		0.12	1.00		0.47	1.00	1.00		0.81	
Satd. Flow (perm)	95	4854		212	4925		873	1921	1421		2592	
Peak-hour factor, PHF	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. Flow (vph)	195	1395	150	50	1655	165	230	140	15	90	75	205
RTOR Reduction (vph)	0	8	0	0	8	0	0	0	10	0	130	0
Lane Group Flow (vph)	195	1537	0	50	1812	0	230	140	5	0	240	0
Confl. Peds. (#/hr)	75		70	70		75	25		90	90		25
Heavy Vehicles (%)	0%	6%	2%	4%	4%	0%	0%	0%	0%	1%	1%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	94.4	85.3		82.3	76.2		51.4	51.4	51.4		51.4	
Effective Green, g (s)	94.4	85.3		82.3	76.2		51.4	51.4	51.4		51.4	
Actuated g/C Ratio	0.59	0.53		0.51	0.48		0.32	0.32	0.32		0.32	
Clearance Time (s)	3.0	6.8		3.0	6.8		7.4	7.4	7.4		7.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	216	2587		166	2345		280	617	456		832	
v/s Ratio Prot	c0.09	0.32		0.01	0.37			0.07				
v/s Ratio Perm	c0.45			0.14			c0.26		0.00		0.09	
v/c Ratio	0.90	0.59		0.30	0.77		0.82	0.23	0.01		0.29	
Uniform Delay, d1	50.0	25.5		20.7	34.7		50.1	39.8	37.0		40.6	
Progression Factor	1.00	1.00		0.72	0.50		1.00	1.00	1.00		1.00	
Incremental Delay, d2	35.8	1.0		0.4	1.1		17.3	0.2	0.0		0.2	
Delay (s)	85.8	26.5		15.3	18.3		67.4	39.9	37.0		40.8	
Level of Service	F	C		B	B		E	D	D		D	
Approach Delay (s)		33.2			18.2			56.2			40.8	
Approach LOS		C			B			E			D	

Intersection Summary				
HCM 2000 Control Delay	29.5	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.89			
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	17.2	
Intersection Capacity Utilization	130.9%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	240	1125	260	520	1610	500	390	1125	580	250	635	245
Future Volume (vph)	240	1125	260	520	1610	500	390	1125	580	250	635	245
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	8.0	12.0	12.0	8.0	12.0	12.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	13.0	49.2	49.2	13.0	49.2	49.2	13.0	49.2	49.2	24.0	49.2	49.2
Total Split (s)	20.0	54.0	54.0	26.0	60.0	60.0	26.0	54.0	54.0	26.0	54.0	54.0
Total Split (%)	12.5%	33.8%	33.8%	16.3%	37.5%	37.5%	16.3%	33.8%	33.8%	16.3%	33.8%	33.8%
Maximum Green (s)	15.0	46.8	46.8	21.0	52.8	52.8	21.0	46.8	46.8	21.0	46.8	46.8
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	3.2	3.2	2.0	3.2	3.2	2.0	3.2	3.2	2.0	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	Min	Min	None	Min	Min
Walk Time (s)		8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0
Flash Dont Walk (s)		34.0	34.0		34.0	34.0		34.0	34.0		34.0	34.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0

Intersection Summary
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 61 (38%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated

Splits and Phases: 3: Hurontario St/Main St S & Steeles Ave W



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	240	1125	260	520	1610	500	390	1125	580	250	635	245
v/c Ratio	0.78	0.79	0.42	1.16	0.96	0.72	0.92	0.98	0.90	0.72	0.62	0.49
Control Delay	105.7	45.8	9.0	151.1	65.9	26.0	95.7	76.0	49.9	80.7	52.1	13.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	105.7	45.8	9.0	151.1	65.9	26.0	95.7	76.0	49.9	80.7	52.1	13.5
Queue Length 50th (m)	43.6	68.8	1.2	~105.4	194.8	66.7	67.4	197.9	124.3	42.3	97.4	11.2
Queue Length 95th (m)	#60.0	91.3	24.7	#144.0	#228.3	115.0	#98.5	#260.6	#208.9	57.2	119.7	39.0
Internal Link Dist (m)		301.9			174.6			265.4			267.4	
Turn Bay Length (m)	120.0		230.0	120.0		135.0	90.0		135.0	100.0		135.0
Base Capacity (vph)	321	1420	619	450	1682	692	428	1147	641	416	1020	496
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.79	0.42	1.16	0.96	0.72	0.91	0.98	0.90	0.60	0.62	0.49

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	240	1125	260	520	1610	500	390	1125	580	250	635	245
Future Volume (vph)	240	1125	260	520	1610	500	390	1125	580	250	635	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.94	1.00	1.00	0.97	1.00	1.00	0.87
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3429	4856	1489	3429	5043	1506	3267	3650	1536	3177	3476	1209
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3429	4856	1489	3429	5043	1506	3267	3650	1536	3177	3476	1209
Peak-hour factor, PHF	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. Flow (vph)	240	1125	260	520	1610	500	390	1125	580	250	635	245
RTOR Reduction (vph)	0	0	184	0	0	190	0	0	159	0	0	141
Lane Group Flow (vph)	240	1125	76	520	1610	310	390	1125	421	250	635	104
Confl. Peds. (#/hr)	40		25	25		40	105		15	15		105
Heavy Vehicles (%)	1%	8%	3%	1%	4%	0%	6%	0%	1%	9%	5%	15%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	14.4	46.8	46.8	21.0	53.4	53.4	20.8	50.3	50.3	17.5	47.0	47.0
Effective Green, g (s)	14.4	46.8	46.8	21.0	53.4	53.4	20.8	50.3	50.3	17.5	47.0	47.0
Actuated g/C Ratio	0.09	0.29	0.29	0.13	0.33	0.33	0.13	0.31	0.31	0.11	0.29	0.29
Clearance Time (s)	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	308	1420	435	450	1683	502	424	1147	482	347	1021	355
v/s Ratio Prot	0.07	0.23		c0.15	c0.32		c0.12	c0.31		0.08	0.18	
v/s Ratio Perm			0.05			0.21			0.27			0.09
v/c Ratio	0.78	0.79	0.17	1.16	0.96	0.62	0.92	0.98	0.87	0.72	0.62	0.29
Uniform Delay, d1	71.2	52.1	42.2	69.5	52.2	44.7	68.8	54.4	51.8	68.9	48.8	43.7
Progression Factor	1.27	0.80	1.59	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.3	4.0	0.8	92.5	13.8	5.6	24.7	21.9	15.9	7.2	1.2	0.5
Delay (s)	101.0	45.6	67.8	162.0	66.0	50.3	93.5	76.3	67.8	76.1	50.0	44.1
Level of Service	F	D	E	F	E	D	F	E	E	E	D	D
Approach Delay (s)		57.3			82.0			77.1			54.5	
Approach LOS		E			F			E			D	

Intersection Summary						
HCM 2000 Control Delay		71.1	HCM 2000 Level of Service		E	
HCM 2000 Volume to Capacity ratio		1.03				
Actuated Cycle Length (s)		160.0	Sum of lost time (s)		24.4	
Intersection Capacity Utilization		115.8%	ICU Level of Service		H	
Analysis Period (min)		15				
c Critical Lane Group						

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	160	50	115	105	0
Future Volume (Veh/h)	0	160	50	115	105	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	160	50	115	105	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				138		
pX, platoon unblocked						
vC, conflicting volume	320	52	105			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	320	52	105			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	84	97			
cM capacity (veh/h)	627	1004	1484			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	160	165	70	35
Volume Left	0	50	0	0
Volume Right	160	0	0	0
cSH	1004	1484	1700	1700
Volume to Capacity	0.16	0.03	0.04	0.02
Queue Length 95th (m)	4.5	0.8	0.0	0.0
Control Delay (s)	9.3	2.5	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	9.3	2.5	0.0	
Approach LOS	A			

Intersection Summary			
Average Delay		4.4	
Intersection Capacity Utilization		32.1%	ICU Level of Service A
Analysis Period (min)		15	

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	85	2010	35	960	35	15	5	140	35
Future Volume (vph)	85	2010	35	960	35	15	5	140	35
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	5	2	1	6		8			4
Permitted Phases	2		6		8		8	4	
Detector Phase	5	2	1	6	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	5.0	12.0	5.0	12.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	9.5	52.8	9.5	52.8	50.4	50.4	50.4	50.4	50.4
Total Split (s)	15.0	88.0	15.0	88.0	57.0	57.0	57.0	57.0	57.0
Total Split (%)	9.4%	55.0%	9.4%	55.0%	35.6%	35.6%	35.6%	35.6%	35.6%
Maximum Green (s)	12.0	81.2	12.0	81.2	49.6	49.6	49.6	49.6	49.6
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.8	0.0	2.8	3.4	3.4	3.4	3.4	3.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	6.8	3.0	6.8	7.4	7.4	7.4		7.4
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
Walk Time (s)		8.0		8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		38.0		38.0	35.0	35.0	35.0	35.0	35.0
Pedestrian Calls (#/hr)		20		20	10	10	10	10	10

Intersection Summary
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 11 (7%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated

Splits and Phases: 2: Lancashire Ln & Steeles Ave W

Queues
2: Lancashire Ln & Steeles Ave W

Future Total AM
05-16-2024

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	85	2010	35	960	35	15	5	140	35
Future Volume (vph)	85	2010	35	960	35	15	5	140	35
Lane Group Flow (vph)	85	2175	35	1025	35	15	5	0	265
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	5	2	1	6		8			4
Permitted Phases	2		6		8		8	4	
Detector Phase	5	2	1	6	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	5.0	12.0	5.0	12.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	9.5	52.8	9.5	52.8	50.4	50.4	50.4	50.4	50.4
Total Split (s)	15.0	88.0	15.0	88.0	57.0	57.0	57.0	57.0	57.0
Total Split (%)	9.4%	55.0%	9.4%	55.0%	35.6%	35.6%	35.6%	35.6%	35.6%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.8	0.0	2.8	3.4	3.4	3.4	3.4	3.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	6.8	3.0	6.8	7.4	7.4	7.4		7.4
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
v/c Ratio	0.21	0.64	0.25	0.30	0.23	0.05	0.02		0.56
Control Delay	7.8	17.2	27.2	23.6	55.4	48.5	0.2		49.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	7.8	17.2	27.2	23.6	55.4	48.5	0.2		49.4
Queue Length 50th (m)	4.6	114.0	6.4	95.1	11.0	4.6	0.0		35.7
Queue Length 95th (m)	16.1	215.9	m18.2	93.0	19.5	10.4	0.0		43.6
Internal Link Dist (m)		174.7		301.9		77.1			113.9
Turn Bay Length (m)	90.0		115.0		65.0		80.0		
Base Capacity (vph)	446	3401	200	3370	287	595	472		839
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	0.19	0.64	0.17	0.30	0.12	0.03	0.01		0.32

Intersection Summary

Cycle Length: 160
Actuated Cycle Length: 160
Offset: 11 (7%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Lancashire Ln & Steeles Ave W

HCM Signalized Intersection Capacity Analysis
2: Lancashire Ln & Steeles Ave W

Future Total AM
05-16-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	2010	165	35	960	65	35	15	5	140	35	90
Future Volume (vph)	85	2010	165	35	960	65	35	15	5	140	35	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	3.0	6.8		3.0	6.8		7.4	7.4	7.4		7.4	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00		0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	0.89		0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.98	1.00	1.00		0.95	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85		0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1775	4874		1716	4960		1752	1921	1421		3136	
Flt Permitted	0.25	1.00		0.06	1.00		0.50	1.00	1.00		0.80	
Satd. Flow (perm)	459	4874		102	4960		929	1921	1421		2575	
Peak-hour factor, PHF	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. Flow (vph)	85	2010	165	35	960	65	35	15	5	140	35	90
RTOR Reduction (vph)	0	4	0	0	3	0	0	0	4	0	50	0
Lane Group Flow (vph)	85	2171	0	35	1022	0	35	15	1	0	215	0
Confl. Peds. (#/hr)	75		70	70		75	25		90	90		25
Heavy Vehicles (%)	0%	6%	2%	4%	4%	0%	0%	0%	0%	1%	1%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	118.5	110.9		114.1	108.7		26.5	26.5	26.5		26.5	
Effective Green, g (s)	118.5	110.9		114.1	108.7		26.5	26.5	26.5		26.5	
Actuated g/C Ratio	0.74	0.69		0.71	0.68		0.17	0.17	0.17		0.17	
Clearance Time (s)	3.0	6.8		3.0	6.8		7.4	7.4	7.4		7.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	402	3378		127	3369		153	318	235		426	
v/s Ratio Prot	c0.01	c0.45		c0.01	0.21			0.01				
v/s Ratio Perm	0.15			0.19			0.04		0.00		c0.08	
v/c Ratio	0.21	0.64		0.28	0.30		0.23	0.05	0.00		0.50	
Uniform Delay, d1	6.0	13.6		10.5	10.4		57.9	56.1	55.7		60.8	
Progression Factor	1.00	1.00		3.20	1.92		1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.3	1.0		1.1	0.2		0.8	0.1	0.0		0.9	
Delay (s)	6.2	14.5		34.5	20.1		58.7	56.2	55.7		61.7	
Level of Service	A	B		C	C		E	E	E		E	
Approach Delay (s)		14.2			20.6			57.7			61.7	
Approach LOS		B			C			E			E	

Intersection Summary

HCM 2000 Control Delay	20.2	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	17.2	
Intersection Capacity Utilization	119.3%	ICU Level of Service	H	
Analysis Period (min)	15			

c Critical Lane Group

Timings
3: Hurontario St/Main St S & Steeles Ave W

Future Total AM
05-16-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	1455	455	435	785	185	160	430	470	350	940	155
Future Volume (vph)	150	1455	455	435	785	185	160	430	470	350	940	155
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	8.0	12.0	12.0	8.0	12.0	12.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	13.0	49.2	49.2	13.0	49.2	49.2	13.0	49.2	49.2	13.0	49.2	49.2
Total Split (s)	20.0	55.0	55.0	26.0	61.0	61.0	20.0	54.0	54.0	25.0	59.0	59.0
Total Split (%)	12.5%	34.4%	34.4%	16.3%	38.1%	38.1%	12.5%	33.8%	33.8%	15.6%	36.9%	36.9%
Maximum Green (s)	15.0	47.8	47.8	21.0	53.8	53.8	15.0	46.8	46.8	20.0	51.8	51.8
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	3.2	3.2	2.0	3.2	3.2	2.0	3.2	3.2	2.0	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Min	Min	None	Min	Min
Walk Time (s)		8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0
Flash Dont Walk (s)		34.0	34.0		34.0	34.0		34.0	34.0		34.0	34.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0

Intersection Summary

Cycle Length: 160
Actuated Cycle Length: 160
Offset: 61 (38%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 135
Control Type: Actuated-Coordinated

Splits and Phases: 3: Hurontario St/Main St S & Steeles Ave W

Queues
3: Hurontario St/Main St S & Steeles Ave W

Future Total AM
05-16-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	1455	455	435	785	185	160	430	470	350	940	155
Future Volume (vph)	150	1455	455	435	785	185	160	430	470	350	940	155
Lane Group Flow (vph)	150	1455	455	435	785	185	160	430	470	350	940	155
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	8.0	12.0	12.0	8.0	12.0	12.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	13.0	49.2	49.2	13.0	49.2	49.2	13.0	49.2	49.2	13.0	49.2	49.2
Total Split (s)	20.0	55.0	55.0	26.0	61.0	61.0	20.0	54.0	54.0	25.0	59.0	59.0
Total Split (%)	12.5%	34.4%	34.4%	16.3%	38.1%	38.1%	12.5%	33.8%	33.8%	15.6%	36.9%	36.9%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	3.2	3.2	2.0	3.2	3.2	2.0	3.2	3.2	2.0	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Min	Min	None	Min	Min
v/c Ratio	0.58	0.93	0.73	0.88	0.40	0.26	0.62	0.46	0.83	0.90	0.90	0.33
Control Delay	81.4	58.2	31.5	85.5	37.3	5.6	81.4	50.8	41.3	94.5	65.1	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	81.4	58.2	31.5	85.5	37.3	5.6	81.4	50.8	41.3	94.5	65.1	7.2
Queue Length 50th (m)	25.5	~189.5	106.8	73.6	70.7	0.0	27.1	63.4	82.3	60.4	157.1	0.0
Queue Length 95th (m)	34.7	#217.7	150.1	#111.9	89.8	18.1	39.9	78.2	127.7	#88.4	182.5	17.6
Internal Link Dist (m)		301.9			174.6			265.4			343.4	
Turn Bay Length (m)	125.0		250.0	135.0		180.0	135.0		150.0	100.0		135.0
Base Capacity (vph)	321	1559	626	496	1965	699	306	1067	609	397	1127	496
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.93	0.73	0.88	0.40	0.26	0.52	0.40	0.77	0.88	0.83	0.31

Intersection Summary

Cycle Length: 160
Actuated Cycle Length: 160
Offset: 61 (38%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 135
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Hurontario St/Main St S & Steeles Ave W

HCM Signalized Intersection Capacity Analysis
3: Hurontario St/Main St S & Steeles Ave W

Future Total AM
05-16-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	1455	455	435	785	185	160	430	470	350	940	155
Future Volume (vph)	150	1455	455	435	785	185	160	430	470	350	940	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.94	1.00	1.00	0.97	1.00	1.00	0.87
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3429	4856	1489	3429	5043	1506	3267	3650	1536	3177	3476	1209
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3429	4856	1489	3429	5043	1506	3267	3650	1536	3177	3476	1209
Peak-hour factor, PHF	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. Flow (vph)	150	1455	455	435	785	185	160	430	470	350	940	155
RTOR Reduction (vph)	0	0	148	0	0	113	0	0	168	0	0	108
Lane Group Flow (vph)	150	1455	307	435	785	72	160	430	302	350	940	47
Confl. Peds. (#/hr)	40		25	25		40	105		15	15		105
Heavy Vehicles (%)	1%	8%	3%	1%	4%	0%	6%	0%	1%	9%	5%	15%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	12.2	51.4	51.4	23.1	62.3	62.3	12.8	41.4	41.4	19.7	48.3	48.3
Effective Green, g (s)	12.2	51.4	51.4	23.1	62.3	62.3	12.8	41.4	41.4	19.7	48.3	48.3
Actuated g/C Ratio	0.08	0.32	0.32	0.14	0.39	0.39	0.08	0.26	0.26	0.12	0.30	0.30
Clearance Time (s)	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	261	1559	478	495	1963	586	261	944	397	391	1049	364
v/s Ratio Prot	0.04	c0.30		c0.13	0.16		0.05	0.12		c0.11	c0.27	
v/s Ratio Perm			0.21			0.05			0.20			0.04
v/c Ratio	0.57	0.93	0.64	0.88	0.40	0.12	0.61	0.46	0.76	0.90	0.90	0.13
Uniform Delay, d1	71.4	52.6	46.4	67.1	35.3	31.3	71.2	49.8	54.7	69.1	53.4	40.6
Progression Factor	1.04	0.92	1.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.4	9.6	5.2	16.1	0.6	0.4	4.2	0.4	8.3	22.1	10.0	0.2
Delay (s)	77.0	58.0	52.0	83.2	35.9	31.8	75.4	50.2	63.0	91.2	63.5	40.7
Level of Service	E	E	D	F	D	C	E	D	E	F	E	D
Approach Delay (s)		58.0			50.0			59.7			67.8	
Approach LOS		E			D			E			E	

Intersection Summary				
HCM 2000 Control Delay	58.8	HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio	0.92			
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	24.4	
Intersection Capacity Utilization	109.1%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
1: Lancashire Ln & Site Access

Future Total PM
05-16-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	80	130	500	370	0
Future Volume (Veh/h)	0	80	130	500	370	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	80	130	500	370	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				138		
pX, platoon unblocked	0.88					
vC, conflicting volume	1130	185	370			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1079	185	370			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	90	89			
cM capacity (veh/h)	167	826	1185			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	80	630	247	123
Volume Left	0	130	0	0
Volume Right	80	0	0	0
cSH	826	1185	1700	1700
Volume to Capacity	0.10	0.11	0.15	0.07
Queue Length 95th (m)	2.6	2.9	0.0	0.0
Control Delay (s)	9.8	2.8	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	9.8	2.8	0.0	
Approach LOS	A			

Intersection Summary				
Average Delay	2.3			
Intersection Capacity Utilization	58.7%	ICU Level of Service	B	
Analysis Period (min)	15			

Timings
2: Lancashire Ln & Steeles Ave W

Future Total PM
05-16-2024

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	225	1395	50	1655	230	150	15	150	80
Future Volume (vph)	225	1395	50	1655	230	150	15	150	80
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	5	2	1	6		8			4
Permitted Phases	2		6		8		8	4	
Detector Phase	5	2	1	6	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	5.0	12.0	5.0	12.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	8.0	52.8	8.0	52.8	50.4	50.4	50.4	50.4	50.4
Total Split (s)	20.0	89.0	20.0	89.0	51.0	51.0	51.0	51.0	51.0
Total Split (%)	12.5%	55.6%	12.5%	55.6%	31.9%	31.9%	31.9%	31.9%	31.9%
Maximum Green (s)	17.0	82.2	17.0	82.2	43.6	43.6	43.6	43.6	43.6
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.8	0.0	2.8	3.4	3.4	3.4	3.4	3.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	6.8	3.0	6.8	7.4	7.4	7.4		7.4
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
Walk Time (s)		8.0		8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		38.0		38.0	35.0	35.0	35.0	35.0	35.0
Pedestrian Calls (#/hr)		20		20	10	10	10	10	10

Intersection Summary

Cycle Length: 160
Actuated Cycle Length: 160
Offset: 64 (40%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated

Splits and Phases: 2: Lancashire Ln & Steeles Ave W

Queues
2: Lancashire Ln & Steeles Ave W

Future Total PM
05-16-2024

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	225	1545	50	1910	230	150	15	450
v/c Ratio	0.95	0.59	0.27	0.83	0.97	0.25	0.03	0.51
Control Delay	91.9	25.3	9.4	17.8	105.7	43.4	0.1	32.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	91.9	25.3	9.4	17.8	105.7	43.4	0.1	32.3
Queue Length 50th (m)	58.5	124.9	3.4	60.1	76.9	37.6	0.0	43.6
Queue Length 95th (m)	#111.4	130.3	m3.0	m49.8	#146.0	61.1	0.0	66.0
Internal Link Dist (m)		174.7		301.9		77.1		113.9
Turn Bay Length (m)	90.0		115.0		65.0		80.0	
Base Capacity (vph)	238	2634	289	2515	236	608	481	885
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	0.95	0.59	0.17	0.76	0.97	0.25	0.03	0.51

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

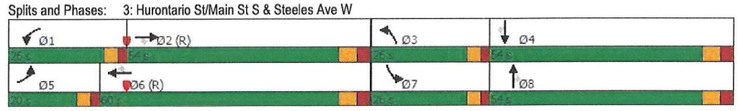
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	225	1395	150	50	1655	255	230	150	15	150	80	220
Future Volume (vph)	225	1395	150	50	1655	255	230	150	15	150	80	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	3.0	6.8		3.0	6.8		7.4	7.4	7.4		7.4	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00		0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.98		1.00	1.00	0.89		0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00	1.00		0.97	
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85		0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00		0.98	
Satd. Flow (prot)	1785	4854		1715	4869		1761	1921	1421		3161	
Flt Permitted	0.05	1.00		0.12	1.00		0.40	1.00	1.00		0.77	
Satd. Flow (perm)	96	4854		219	4869		747	1921	1421		2475	
Peak-hour factor, PHF	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. Flow (vph)	225	1395	150	50	1655	255	230	150	15	150	80	220
RTOR Reduction (vph)	0	8	0	0	14	0	0	0	10	0	101	0
Lane Group Flow (vph)	225	1537	0	50	1896	0	230	150	5	0	349	0
Confl. Peds. (#/hr)	75		70	70		75	25		90	90		25
Heavy Vehicles (%)	0%	6%	2%	4%	4%	0%	0%	0%	0%	1%	1%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	95.1	86.0		81.2	75.1		50.7	50.7	50.7		50.7	
Effective Green, g (s)	95.1	86.0		81.2	75.1		50.7	50.7	50.7		50.7	
Actuated g/C Ratio	0.59	0.54		0.51	0.47		0.32	0.32	0.32		0.32	
Clearance Time (s)	3.0	6.8		3.0	6.8		7.4	7.4	7.4		7.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	236	2609		168	2285		236	608	450		784	
v/s Ratio Prot	c0.10	0.32		0.01	0.39			0.08				
v/s Ratio Perm	c0.46			0.14			c0.31		0.00		0.14	
v/c Ratio	0.95	0.59		0.30	0.83		0.97	0.25	0.01		0.45	
Uniform Delay, d1	52.9	25.0		21.0	36.9		54.0	40.5	37.5		43.5	
Progression Factor	1.00	1.00		0.69	0.46		1.00	1.00	1.00		1.00	
Incremental Delay, d2	45.4	1.0		0.4	1.3		51.0	0.2	0.0		0.4	
Delay (s)	98.2	26.0		14.9	18.2		105.0	40.7	37.5		43.9	
Level of Service	F	C		B	B		F	D	D		D	
Approach Delay (s)		35.2			18.1			78.0			43.9	
Approach LOS		D			B			E			D	

Intersection Summary				
HCM 2000 Control Delay	32.4	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.98			
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	17.2	
Intersection Capacity Utilization	133.5%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	1145	290	520	1645	500	425	1125	580	250	635	265
Future Volume (vph)	250	1145	290	520	1645	500	425	1125	580	250	635	265
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	8.0	12.0	12.0	8.0	12.0	12.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	13.0	49.2	49.2	13.0	49.2	49.2	13.0	49.2	49.2	24.0	49.2	49.2
Total Split (s)	20.0	54.0	54.0	26.0	60.0	60.0	26.0	54.0	54.0	26.0	54.0	54.0
Total Split (%)	12.5%	33.8%	33.8%	16.3%	37.5%	37.5%	16.3%	33.8%	33.8%	16.3%	33.8%	33.8%
Maximum Green (s)	15.0	46.8	46.8	21.0	52.8	52.8	21.0	46.8	46.8	21.0	46.8	46.8
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	3.2	3.2	2.0	3.2	3.2	2.0	3.2	3.2	2.0	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	Min	Min	None	Min	Min
Walk Time (s)		8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0
Flash Dont Walk (s)		34.0	34.0		34.0	34.0		34.0	34.0		34.0	34.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0

Intersection Summary
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 61 (38%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated

Splits and Phases: 3: Hurontario St/Main St S & Steeles Ave W



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	250	1145	290	520	1645	500	425	1125	580	250	635	265
v/c Ratio	0.80	0.81	0.46	1.16	0.98	0.72	0.99	0.98	0.90	0.72	0.62	0.54
Control Delay	102.5	46.7	7.9	151.1	70.2	26.1	109.8	76.0	49.9	80.7	52.2	16.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	102.5	46.7	7.9	151.1	70.2	26.1	109.8	76.0	49.9	80.7	52.2	16.6
Queue Length 50th (m)	45.3	72.7	0.0	~105.4	201.0	66.7	74.4	197.9	124.3	42.3	97.4	16.8
Queue Length 95th (m)	#64.1	95.3	23.6	#144.0	#236.9	115.0	#111.7	#260.6	#208.9	57.2	119.7	48.1
Internal Link Dist (m)		301.9			174.6			265.4			267.4	
Turn Bay Length (m)	120.0		230.0	120.0		135.0	90.0		135.0	100.0		135.0
Base Capacity (vph)	321	1420	637	450	1678	690	428	1147	641	416	1016	494
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.81	0.46	1.16	0.98	0.72	0.99	0.98	0.90	0.60	0.63	0.54

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	1145	290	520	1645	500	425	1125	580	250	635	265
Future Volume (vph)	250	1145	290	520	1645	500	425	1125	580	250	635	265
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.94	1.00	1.00	0.97	1.00	1.00	0.87
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3429	4856	1489	3429	5043	1506	3267	3650	1536	3177	3476	1209
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3429	4856	1489	3429	5043	1506	3267	3650	1536	3177	3476	1209
Peak-hour factor, PHF	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. Flow (vph)	250	1145	290	520	1645	500	425	1125	580	250	635	265
RTOR Reduction (vph)	0	0	202	0	0	190	0	0	159	0	0	141
Lane Group Flow (vph)	250	1145	88	520	1645	310	425	1125	421	250	635	124
Confl. Peds. (#/hr)	40		25	25		40	105		15	15		105
Heavy Vehicles (%)	1%	8%	3%	1%	4%	0%	6%	0%	1%	9%	5%	15%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	14.6	46.8	46.8	21.0	53.2	53.2	21.0	50.3	50.3	17.5	46.8	46.8
Effective Green, g (s)	14.6	46.8	46.8	21.0	53.2	53.2	21.0	50.3	50.3	17.5	46.8	46.8
Actuated g/C Ratio	0.09	0.29	0.29	0.13	0.33	0.33	0.13	0.31	0.31	0.11	0.29	0.29
Clearance Time (s)	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	312	1420	435	450	1676	500	428	1147	482	347	1016	353
v/s Ratio Prot	0.07	0.24		c0.15	c0.33		c0.13	c0.31		0.08	0.18	
v/s Ratio Perm			0.06			0.21			0.27			0.10
v/c Ratio	0.80	0.81	0.20	1.16	0.98	0.62	0.99	0.98	0.87	0.72	0.62	0.35
Uniform Delay, d1	71.3	52.4	42.6	69.5	52.9	44.9	69.4	54.4	51.8	68.9	49.0	44.6
Progression Factor	1.21	0.80	1.24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.0	4.3	0.9	92.5	18.0	5.7	41.5	21.9	15.9	7.2	1.2	0.6
Delay (s)	98.0	46.4	53.8	162.0	70.9	50.6	110.9	76.3	67.8	76.1	50.2	45.2
Level of Service	F	D	D	F	E	D	F	E	E	E	D	D
Approach Delay (s)		55.4			84.9			80.9			54.7	
Approach LOS		E			F			F			D	

Intersection Summary					
HCM 2000 Control Delay	72.7	HCM 2000 Level of Service		E	
HCM 2000 Volume to Capacity ratio	1.05				
Actuated Cycle Length (s)	160.0	Sum of lost time (s)		24.4	
Intersection Capacity Utilization	116.8%	ICU Level of Service		H	
Analysis Period (min)	15				
c Critical Lane Group					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	160	50	115	105	0
Future Volume (Veh/h)	0	160	50	115	105	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	160	50	115	105	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				138		
pX, platoon unblocked						
vC, conflicting volume	320	52	105			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	320	52	105			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	84	97			
cM capacity (veh/h)	627	1004	1484			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	160	165	70	35
Volume Left	0	50	0	0
Volume Right	160	0	0	0
cSH	1004	1484	1700	1700
Volume to Capacity	0.16	0.03	0.04	0.02
Queue Length 95th (m)	4.5	0.8	0.0	0.0
Control Delay (s)	9.3	2.5	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	9.3	2.5	0.0	
Approach LOS	A			

Intersection Summary				
Average Delay		4.4		
Intersection Capacity Utilization		32.1%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	85	2010	35	960	35	15	5	140	35
Future Volume (vph)	85	2010	35	960	35	15	5	140	35
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	5	2	1	6		8			4
Permitted Phases	2		6		8		8	4	
Detector Phase	5	2	1	6	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	5.0	12.0	5.0	12.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	9.5	52.8	9.5	52.8	50.4	50.4	50.4	50.4	50.4
Total Split (s)	15.0	88.0	15.0	88.0	57.0	57.0	57.0	57.0	57.0
Total Split (%)	9.4%	55.0%	9.4%	55.0%	35.6%	35.6%	35.6%	35.6%	35.6%
Maximum Green (s)	12.0	81.2	12.0	81.2	49.6	49.6	49.6	49.6	49.6
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.8	0.0	2.8	3.4	3.4	3.4	3.4	3.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	6.8	3.0	6.8	7.4	7.4	7.4		7.4
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
Walk Time (s)		8.0		8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		38.0		38.0	35.0	35.0	35.0	35.0	35.0
Pedestrian Calls (#/hr)		20		20	10	10	10	10	10

Intersection Summary
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 11 (7%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated

Splits and Phases: 2: Lancashire Ln & Steeles Ave W

Queues
2: Lancashire Ln & Steeles Ave W

Future Total AM - Optimized
05-16-2024

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	85	2010	35	960	35	15	5	140	35
Future Volume (vph)	85	2010	35	960	35	15	5	140	35
Lane Group Flow (vph)	85	2175	35	1025	35	15	5	0	265
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	5	2	1	6		8			4
Permitted Phases	2		6		8		8	4	
Detector Phase	5	2	1	6	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	5.0	12.0	5.0	12.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	9.5	52.8	9.5	52.8	50.4	50.4	50.4	50.4	50.4
Total Split (s)	15.0	88.0	15.0	88.0	57.0	57.0	57.0	57.0	57.0
Total Split (%)	9.4%	55.0%	9.4%	55.0%	35.6%	35.6%	35.6%	35.6%	35.6%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.8	0.0	2.8	3.4	3.4	3.4	3.4	3.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	6.8	3.0	6.8	7.4	7.4	7.4		7.4
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
v/c Ratio	0.21	0.64	0.25	0.30	0.23	0.05	0.02		0.56
Control Delay	7.8	17.2	27.2	23.6	55.4	48.5	0.2		49.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	7.8	17.2	27.2	23.6	55.4	48.5	0.2		49.4
Queue Length 50th (m)	4.6	114.0	6.4	95.1	11.0	4.6	0.0		35.7
Queue Length 95th (m)	16.1	215.9	m18.2	93.0	19.5	10.4	0.0		43.6
Internal Link Dist (m)		174.7		301.9		77.1			113.9
Turn Bay Length (m)	90.0		115.0		65.0		80.0		
Base Capacity (vph)	446	3401	200	3370	287	595	472		839
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	0.19	0.64	0.17	0.30	0.12	0.03	0.01		0.32

Intersection Summary

Cycle Length: 160
Actuated Cycle Length: 160
Offset: 11 (7%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Lancashire Ln & Steeles Ave W

HCM Signalized Intersection Capacity Analysis
2: Lancashire Ln & Steeles Ave W

Future Total AM - Optimized
05-16-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	2010	165	35	960	65	35	15	5	140	35	90
Future Volume (vph)	85	2010	165	35	960	65	35	15	5	140	35	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	3.0	6.8		3.0	6.8		7.4	7.4	7.4		7.4	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00		0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	0.89		0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.98	1.00	1.00		0.95	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85		0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1775	4874		1716	4960		1752	1921	1421		3136	
Flt Permitted	0.25	1.00		0.06	1.00		0.50	1.00	1.00		0.80	
Satd. Flow (perm)	459	4874		102	4960		929	1921	1421		2575	
Peak-hour factor, PHF	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. Flow (vph)	85	2010	165	35	960	65	35	15	5	140	35	90
RTOR Reduction (vph)	0	4	0	0	3	0	0	0	4	0	50	0
Lane Group Flow (vph)	85	2171	0	35	1022	0	35	15	1	0	215	0
Confl. Peds. (#/hr)	75		70	70		75	25		90	90		25
Heavy Vehicles (%)	0%	6%	2%	4%	4%	0%	0%	0%	0%	1%	1%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	118.5	110.9		114.1	108.7		26.5	26.5	26.5		26.5	
Effective Green, g (s)	118.5	110.9		114.1	108.7		26.5	26.5	26.5		26.5	
Actuated g/C Ratio	0.74	0.69		0.71	0.68		0.17	0.17	0.17		0.17	
Clearance Time (s)	3.0	6.8		3.0	6.8		7.4	7.4	7.4		7.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	402	3378		127	3369		153	318	235		426	
v/s Ratio Prot	c0.01	c0.45		c0.01	0.21			0.01				
v/s Ratio Perm	0.15			0.19			0.04		0.00		c0.08	
v/c Ratio	0.21	0.64		0.28	0.30		0.23	0.05	0.00		0.50	
Uniform Delay, d1	6.0	13.6		10.5	10.4		57.9	56.1	55.7		60.8	
Progression Factor	1.00	1.00		3.20	1.92		1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.3	1.0		1.1	0.2		0.8	0.1	0.0		0.9	
Delay (s)	6.2	14.5		34.5	20.1		58.7	56.2	55.7		61.7	
Level of Service	A	B		C	C		E	E	E		E	
Approach Delay (s)		14.2			20.6			57.7			61.7	
Approach LOS		B			C			E			E	

Intersection Summary

HCM 2000 Control Delay	20.2	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.61				
Actuated Cycle Length (s)	160.0	Sum of lost time (s)		17.2	
Intersection Capacity Utilization	119.3%	ICU Level of Service		H	
Analysis Period (min)	15				

c Critical Lane Group

Timings
3: Hurontario St/Main St S & Steeles Ave W

Future Total AM - Optimized
05-16-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	1455	455	435	785	185	160	430	470	350	940	155
Future Volume (vph)	150	1455	455	435	785	185	160	430	470	350	940	155
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	8.0	12.0	12.0	8.0	12.0	12.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	13.0	49.2	49.2	13.0	49.2	49.2	13.0	49.2	49.2	13.0	49.2	49.2
Total Split (s)	20.0	55.0	55.0	26.0	61.0	61.0	20.0	54.0	54.0	25.0	59.0	59.0
Total Split (%)	12.5%	34.4%	34.4%	16.3%	38.1%	38.1%	12.5%	33.8%	33.8%	15.6%	36.9%	36.9%
Maximum Green (s)	15.0	47.8	47.8	21.0	53.8	53.8	15.0	46.8	46.8	20.0	51.8	51.8
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	3.2	3.2	2.0	3.2	3.2	2.0	3.2	3.2	2.0	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Min	Min	None	Min	Min
Walk Time (s)		8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0
Flash Dont Walk (s)		34.0	34.0		34.0	34.0		34.0	34.0		34.0	34.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0

Intersection Summary

Cycle Length: 160
Actuated Cycle Length: 160
Offset: 61 (38%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 135
Control Type: Actuated-Coordinated

Splits and Phases: 3: Hurontario St/Main St S & Steeles Ave W

Queues
3: Hurontario St/Main St S & Steeles Ave W

Future Total AM - Optimized
05-16-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	1455	455	435	785	185	160	430	470	350	940	155
Future Volume (vph)	150	1455	455	435	785	185	160	430	470	350	940	155
Lane Group Flow (vph)	150	1455	455	435	785	185	160	430	470	350	940	155
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	8.0	12.0	12.0	8.0	12.0	12.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	13.0	49.2	49.2	13.0	49.2	49.2	13.0	49.2	49.2	13.0	49.2	49.2
Total Split (s)	20.0	55.0	55.0	26.0	61.0	61.0	20.0	54.0	54.0	25.0	59.0	59.0
Total Split (%)	12.5%	34.4%	34.4%	16.3%	38.1%	38.1%	12.5%	33.8%	33.8%	15.6%	36.9%	36.9%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	3.2	3.2	2.0	3.2	3.2	2.0	3.2	3.2	2.0	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Min	Min	None	Min	Min
v/c Ratio	0.58	0.93	0.73	0.88	0.40	0.26	0.62	0.46	0.83	0.90	0.90	0.33
Control Delay	81.4	58.2	31.5	85.5	37.3	5.6	81.4	50.8	41.3	94.5	65.1	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	81.4	58.2	31.5	85.5	37.3	5.6	81.4	50.8	41.3	94.5	65.1	7.2
Queue Length 50th (m)	25.5	~189.5	106.8	73.6	70.7	0.0	27.1	63.4	82.3	60.4	157.1	0.0
Queue Length 95th (m)	34.7	#217.7	150.1	#111.9	89.8	18.1	39.9	78.2	127.7	#88.4	182.5	17.6
Internal Link Dist (m)		301.9			174.6			265.4			343.4	
Turn Bay Length (m)	125.0		250.0	135.0		180.0	135.0		150.0	100.0		135.0
Base Capacity (vph)	321	1559	626	496	1965	699	306	1067	609	397	1127	496
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.93	0.73	0.88	0.40	0.26	0.52	0.40	0.77	0.88	0.83	0.31

Intersection Summary

Cycle Length: 160
Actuated Cycle Length: 160
Offset: 61 (38%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 135
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Hurontario St/Main St S & Steeles Ave W

HCM Signalized Intersection Capacity Analysis
3: Hurontario St/Main St S & Steeles Ave W

Future Total AM - Optimized
05-16-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	1455	455	435	785	185	160	430	470	350	940	155
Future Volume (vph)	150	1455	455	435	785	185	160	430	470	350	940	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.94	1.00	1.00	0.97	1.00	1.00	0.87
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3429	4856	1489	3429	5043	1506	3267	3650	1536	3177	3476	1209
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3429	4856	1489	3429	5043	1506	3267	3650	1536	3177	3476	1209
Peak-hour factor, PHF	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. Flow (vph)	150	1455	455	435	785	185	160	430	470	350	940	155
RTOR Reduction (vph)	0	0	148	0	0	113	0	0	168	0	0	108
Lane Group Flow (vph)	150	1455	307	435	785	72	160	430	302	350	940	47
Confl. Peds. (#/hr)	40		25	25		40	105		15	15		105
Heavy Vehicles (%)	1%	8%	3%	1%	4%	0%	6%	0%	1%	9%	5%	15%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	12.2	51.4	51.4	23.1	62.3	62.3	12.8	41.4	41.4	19.7	48.3	48.3
Effective Green, g (s)	12.2	51.4	51.4	23.1	62.3	62.3	12.8	41.4	41.4	19.7	48.3	48.3
Actuated g/C Ratio	0.08	0.32	0.32	0.14	0.39	0.39	0.08	0.26	0.26	0.12	0.30	0.30
Clearance Time (s)	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	261	1559	478	495	1963	586	261	944	397	391	1049	364
v/s Ratio Prot	0.04	c0.30		c0.13	0.16		0.05	0.12		c0.11	c0.27	
v/s Ratio Perm			0.21			0.05			0.20			0.04
v/c Ratio	0.57	0.93	0.64	0.88	0.40	0.12	0.61	0.46	0.76	0.90	0.90	0.13
Uniform Delay, d1	71.4	52.6	46.4	67.1	35.3	31.3	71.2	49.8	54.7	69.1	53.4	40.6
Progression Factor	1.04	0.92	1.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.4	9.6	5.2	16.1	0.6	0.4	4.2	0.4	8.3	22.1	10.0	0.2
Delay (s)	77.0	58.0	52.0	83.2	35.9	31.8	75.4	50.2	63.0	91.2	63.5	40.7
Level of Service	E	E	D	F	D	C	E	D	E	F	E	D
Approach Delay (s)		58.0			50.0			59.7			67.8	
Approach LOS		E			D			E			E	

Intersection Summary				
HCM 2000 Control Delay	58.8	HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio	0.92			
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	24.4	
Intersection Capacity Utilization	109.1%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
1: Lancashire Ln & Site Access

Future Total PM - Optimized
05-16-2024

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	80	130	500	370	0
Future Volume (Veh/h)	0	80	130	500	370	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	80	130	500	370	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				138		
pX, platoon unblocked	0.88					
vC, conflicting volume	1130	185	370			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1079	185	370			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	90	89			
cM capacity (veh/h)	167	826	1185			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	80	630	247	123
Volume Left	0	130	0	0
Volume Right	80	0	0	0
cSH	826	1185	1700	1700
Volume to Capacity	0.10	0.11	0.15	0.07
Queue Length 95th (m)	2.6	2.9	0.0	0.0
Control Delay (s)	9.8	2.8	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	9.8	2.8	0.0	
Approach LOS	A			

Intersection Summary				
Average Delay	2.3			
Intersection Capacity Utilization	58.7%	ICU Level of Service	B	
Analysis Period (min)	15			

Timings
2: Lancashire Ln & Steeles Ave W

Future Total PM - Optimized
05-16-2024

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	225	1395	50	1655	230	150	15	150	80
Future Volume (vph)	225	1395	50	1655	230	150	15	150	80
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases	5	2	1	6		8			4
Permitted Phases	2		6		8		8	4	
Detector Phase	5	2	1	6	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	5.0	12.0	5.0	12.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	9.5	52.8	9.5	52.8	50.4	50.4	50.4	50.4	50.4
Total Split (s)	20.0	89.0	20.0	89.0	51.0	51.0	51.0	51.0	51.0
Total Split (%)	12.5%	55.6%	12.5%	55.6%	31.9%	31.9%	31.9%	31.9%	31.9%
Maximum Green (s)	17.0	82.2	17.0	82.2	43.6	43.6	43.6	43.6	43.6
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.8	0.0	2.8	3.4	3.4	3.4	3.4	3.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	3.0	6.8	3.0	6.8	7.4	7.4	7.4		7.4
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	None	C-Min	None	None	None	None	None
Walk Time (s)		8.0		8.0	8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		38.0		38.0	35.0	35.0	35.0	35.0	35.0
Pedestrian Calls (#/hr)		20		20	10	10	10	10	10

Intersection Summary

Cycle Length: 160
Actuated Cycle Length: 160
Offset: 64 (40%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated

Splits and Phases: 2: Lancashire Ln & Steeles Ave W

Queues
2: Lancashire Ln & Steeles Ave W

Future Total PM - Optimized
05-16-2024

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	225	1545	50	1910	230	150	15	450
v/c Ratio	0.95	0.59	0.27	0.83	0.97	0.25	0.03	0.51
Control Delay	91.9	25.3	8.6	18.9	105.7	43.4	0.1	32.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	91.9	25.3	8.6	18.9	105.7	43.4	0.1	32.3
Queue Length 50th (m)	58.5	124.9	3.0	52.6	76.9	37.6	0.0	43.6
Queue Length 95th (m)	#111.4	130.3	m2.8	46.0	#146.0	61.1	0.0	66.0
Internal Link Dist (m)		174.7		301.9		77.1		113.9
Turn Bay Length (m)	90.0		115.0		65.0		80.0	
Base Capacity (vph)	238	2634	289	2515	236	608	481	885
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	0.95	0.59	0.17	0.76	0.97	0.25	0.03	0.51

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

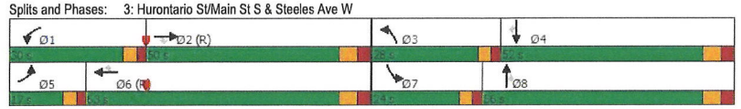
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	225	1395	150	50	1655	255	230	150	15	150	80	220
Future Volume (vph)	225	1395	150	50	1655	255	230	150	15	150	80	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	3.0	6.8		3.0	6.8		7.4	7.4	7.4		7.4	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00		0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.98		1.00	1.00	0.89		0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00	1.00		0.97	
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85		0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00		0.98	
Satd. Flow (prot)	1785	4854		1715	4869		1761	1921	1421		3161	
Flt Permitted	0.05	1.00		0.12	1.00		0.40	1.00	1.00		0.77	
Satd. Flow (perm)	96	4854		219	4869		747	1921	1421		2475	
Peak-hour factor, PHF	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. Flow (vph)	225	1395	150	50	1655	255	230	150	15	150	80	220
RTOR Reduction (vph)	0	8	0	0	14	0	0	0	10	0	101	0
Lane Group Flow (vph)	225	1537	0	50	1896	0	230	150	5	0	349	0
Confl. Peds. (#/hr)	75		70	70		75	25		90	90		25
Heavy Vehicles (%)	0%	6%	2%	4%	4%	0%	0%	0%	0%	1%	1%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	95.1	86.0		81.2	75.1		50.7	50.7	50.7		50.7	
Effective Green, g (s)	95.1	86.0		81.2	75.1		50.7	50.7	50.7		50.7	
Actuated g/C Ratio	0.59	0.54		0.51	0.47		0.32	0.32	0.32		0.32	
Clearance Time (s)	3.0	6.8		3.0	6.8		7.4	7.4	7.4		7.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	236	2609		168	2285		236	608	450		784	
v/s Ratio Prot	c0.10	0.32		0.01	0.39			0.08				
v/s Ratio Perm	c0.46			0.14			c0.31		0.00		0.14	
v/c Ratio	0.95	0.59		0.30	0.83		0.97	0.25	0.01		0.45	
Uniform Delay, d1	52.9	25.0		21.0	36.9		54.0	40.5	37.5		43.5	
Progression Factor	1.00	1.00		0.60	0.48		1.00	1.00	1.00		1.00	
Incremental Delay, d2	45.4	1.0		0.4	1.6		51.0	0.2	0.0		0.4	
Delay (s)	98.2	26.0		13.0	19.3		105.0	40.7	37.5		43.9	
Level of Service	F	C		B	B		F	D	D		D	
Approach Delay (s)		35.2			19.1			78.0			43.9	
Approach LOS		D			B			E			D	

Intersection Summary				
HCM 2000 Control Delay	32.9	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.98			
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	17.2	
Intersection Capacity Utilization	133.5%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	1145	290	520	1645	500	425	1125	580	250	635	265
Future Volume (vph)	250	1145	290	520	1645	500	425	1125	580	250	635	265
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	8.0	12.0	12.0	8.0	12.0	12.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	13.0	49.2	49.2	13.0	49.2	49.2	13.0	49.2	49.2	24.0	49.2	49.2
Total Split (s)	17.0	50.0	50.0	30.0	63.0	63.0	28.0	56.0	56.0	24.0	52.0	52.0
Total Split (%)	10.6%	31.3%	31.3%	18.8%	39.4%	39.4%	17.5%	35.0%	35.0%	15.0%	32.5%	32.5%
Maximum Green (s)	12.0	42.8	42.8	25.0	55.8	55.8	23.0	48.8	48.8	19.0	44.8	44.8
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	3.2	3.2	2.0	3.2	3.2	2.0	3.2	3.2	2.0	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	Min	Min	None	Min	Min
Walk Time (s)		8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0
Flash Dont Walk (s)		34.0	34.0		34.0	34.0		34.0	34.0		34.0	34.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0

Intersection Summary
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 61 (38%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated

Splits and Phases: 3: Hurontario St/Main St S & Steeles Ave W



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	250	1145	290	520	1645	500	425	1125	580	250	635	265
v/c Ratio	0.97	0.88	0.49	0.97	0.94	0.71	0.92	0.97	0.85	0.74	0.65	0.58
Control Delay	126.3	58.5	13.7	98.7	61.4	25.1	93.2	73.2	38.7	83.1	54.1	23.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	126.3	58.5	13.7	98.7	61.4	25.1	93.2	73.2	38.7	83.1	54.1	23.4
Queue Length 50th (m)	45.4	83.2	11.3	90.5	195.1	66.7	73.2	197.9	104.3	42.3	99.2	28.3
Queue Length 95th (m)	#75.5	120.6	33.1	#128.7	#218.3	113.8	#104.4	#252.3	#178.9	58.0	122.0	61.4
Internal Link Dist (m)		301.9			174.6			265.4			267.4	
Turn Bay Length (m)	120.0		230.0	120.0		135.0	90.0		135.0	100.0		135.0
Base Capacity (vph)	257	1298	588	535	1758	706	469	1161	681	377	982	460
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.97	0.88	0.49	0.97	0.94	0.71	0.91	0.97	0.85	0.66	0.65	0.58

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	1145	290	520	1645	500	425	1125	580	250	635	265
Future Volume (vph)	250	1145	290	520	1645	500	425	1125	580	250	635	265
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.94	1.00	1.00	0.97	1.00	1.00	0.87
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3429	4856	1489	3429	5043	1506	3267	3650	1536	3177	3476	1209
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3429	4856	1489	3429	5043	1506	3267	3650	1536	3177	3476	1209
Peak-hour factor, PHF	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. Flow (vph)	250	1145	290	520	1645	500	425	1125	580	250	635	265
RTOR Reduction (vph)	0	0	191	0	0	182	0	0	193	0	0	118
Lane Group Flow (vph)	250	1145	99	520	1645	318	425	1125	387	250	635	147
Confl. Peds. (#/hr)	40		25	25		40	105		15	15		105
Heavy Vehicles (%)	1%	8%	3%	1%	4%	0%	6%	0%	1%	9%	5%	15%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	12.0	42.7	42.7	25.0	55.7	55.7	22.7	50.9	50.9	17.0	45.2	45.2
Effective Green, g (s)	12.0	42.7	42.7	25.0	55.7	55.7	22.7	50.9	50.9	17.0	45.2	45.2
Actuated g/C Ratio	0.08	0.27	0.27	0.16	0.35	0.35	0.14	0.32	0.32	0.11	0.28	0.28
Clearance Time (s)	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2	5.0	7.2	7.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	257	1295	397	535	1755	524	463	1161	488	337	981	341
v/s Ratio Prot	0.07	0.24		c0.15	c0.33		c0.13	c0.31		0.08	0.18	
v/s Ratio Perm			0.07			0.21			0.25			0.12
v/c Ratio	0.97	0.88	0.25	0.97	0.94	0.61	0.92	0.97	0.79	0.74	0.65	0.43
Uniform Delay, d1	73.8	56.3	46.1	67.2	50.5	43.1	67.7	53.8	49.7	69.4	50.4	46.9
Progression Factor	1.13	0.90	1.47	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	44.3	7.9	1.3	31.6	11.0	5.2	23.0	19.1	8.6	8.5	1.5	0.9
Delay (s)	127.8	58.4	68.8	98.8	61.5	48.3	90.7	72.9	58.4	77.9	51.9	47.8
Level of Service	F	E	E	F	E	D	F	E	E	E	D	D
Approach Delay (s)		70.5			66.3			72.5			56.6	
Approach LOS		E			E			E			E	

Intersection Summary					
HCM 2000 Control Delay	67.5	HCM 2000 Level of Service		E	
HCM 2000 Volume to Capacity ratio	0.99				
Actuated Cycle Length (s)	160.0	Sum of lost time (s)		24.4	
Intersection Capacity Utilization	116.8%	ICU Level of Service		H	
Analysis Period (min)	15				
c Critical Lane Group					

Shoppers World Brampton

Minor Variance Rationale:

Phase 1A and Ancillary Parking Structure

Prepared by: SvN Architects + Planners

August 14, 2024

Contents

1. Introduction 2
2. Background 2
2.1. Site and Surrounding Context 2
2.2. History of the Proposal 3
3. The Proposal 3
3.1 Description of the Proposal 3
3.2 Requested Variances 5
4. Planning Policy and Regulatory Context 6
4.1 Provincial Policy 6
4.2 City of Brampton Official Plan 7
4.3 Hurontario-Main Corridor Secondary Plan 9
4.4 Zoning By-law 9
5. Variance Rationale 10
5.1 Phase 1A Building 10
5.2 Parking Structure 14
6. Conclusion 17

1. Introduction

SvN Architects + Planners have been retained by RioCan Management Inc. on behalf of 1388688 Ontario Ltd ("RioCan") to prepare this Minor Variance Rationale in support of a number of minor variances related to the first phase of the Shoppers World Brampton redevelopment, located at 499 Main Street South.

The Phase 1A proposal consists of two residential towers at 37 and 42 storeys in height atop a shared podium. A site plan application was first submitted in June 2022 (City file no. SPA-2022-0120). A resubmission was provided in May 2024 to address the comments received from City Staff and other commenting agencies. Partial comments on the second submission have been received.

To meet the market demand for parking over the near term, an ancillary parking structure is proposed adjacent to the Phase 1A residential development, but on the shopping centre property. The proposed ancillary parking structure supports the delivery of Phase 1A, and provides additional flexibility to respond to market demand for parking as future phases of the project are constructed. A separate site plan application for the proposed ancillary parking structure was submitted on July 17, 2024 (City file no. SPA-2024-0104).

This Rationale addresses the four tests for a minor variance under section 45(1) of the Planning Act. For clarity, the variances have been grouped so that those for the Phase 1A residential development are distinguished from those for the ancillary parking structure. As analyzed below, it is our opinion that the variances for the Phase 1A residential development and ancillary parking structure maintain the general intent of the Official Plan and Zoning By-law, are desirable for the appropriate development and use of the site, and are minor in nature.

2. Background

2.1. Site and Surrounding Context

Shoppers World Brampton is located in Uptown Brampton. Its primary frontage is on Main Street South, and it is flanked by Steeles Avenue West and Charolais Boulevard. The entire property is 21.45 hectares (53 acres) in area and contains a one-storey shopping centre with approximately 72,563 square metres of existing Gross Floor Area (GFA). The remainder of the site consists of surface parking to serve the shopping centre; however, the parking is never fully utilized. The Gateway Bus Terminal is located at the northwest corner of the intersection of Steeles Avenue West and Main Street South.

The Phase 1A site is located at the southwest corner of the shopping centre property, near the westernmost entrance. It is approximately 0.65 hectares (1.6 acres) in area (including future conveyances) and currently contains the former bus terminal and surface parking.

The ancillary parking structure is proposed in the parking area just to the north of the Phase 1A site, with a new multi-use path proposed along a reconstructed driveway to connect Steeles Avenue West to Kaneff Park.

2.2. History of the Proposal

Shoppers World Brampton has existed at 499 Main Street South since 1969. Over subsequent decades, a series of modifications and additions have been made, with the last major reconstruction occurring in 2012. The shopping centre was acquired by RioCan in 2000. It continues to be an important destination for shopping and services in the region, although the number of visitors has declined in recent years.

In 2017, RioCan began the Master Plan study with the intent to revitalize the site as a retail destination and live-work community for the 21st century. In October 2019, RioCan submitted a joint application for a zoning by-law amendment and draft plan of subdivision for the entirety of the Shoppers World Brampton property (City file no. OZS-2019-0009). The Master Plan establishes the parameters for a mixed-use neighbourhood of low-, mid- and high-rise buildings, featuring best in class community amenities and a network of exceptional open spaces. The zoning by-law amendment received Council approval on November 25, 2020 (enacted as Zoning By-law 228-2020). The plan of subdivision approvals process is still ongoing.

The pre-application consultation meeting for Phase 1A took place on March 30, 2020. In April 2022, the project team met with City Staff to discuss some of the high-level considerations for the project, and to share how some of the thinking had evolved. The site plan control application was submitted on June 22, 2022 (City file no. SPA-2022-0120). In September 2022, the project was presented to the Brampton Urban Design Review Panel. Also in September, a Consent to Sever application was approved by Brampton Committee of Adjustment (City file no. B-2022-0011). A SPA resubmission was provided in May 2024 to address the comments received from City Staff and other commenting agencies.

RioCan and SvN met with City Staff in 2023 to discuss the possibility of an above-grade ancillary parking structure to be constructed within the larger shopping centre property, immediately adjacent to the Phase 1A site. In an effort to satisfy current consumer expectations while reducing the environmental impacts and costs associated with additional levels of underground parking, a shared parking strategy was proposed, utilizing an above-grade parking structure to help satisfy current parking demand. Staff indicated that they could support this approach, provided that the ancillary parking structure would be designed and built in accordance with the policies of Section 3.4.2.60 of the 2023 City of Brampton Official Plan.

RioCan and the project team have advanced the design of the Phase 1A residential development and the ancillary parking structure concurrently. A site plan application to facilitate the addition of the parking structure to the larger shopping centre property was submitted on June 17, 2024 (City file no. SPA-2024-0104).

3. The Proposal

3.1 Description of the Proposal

The Phase 1A residential development proposal includes two residential towers at 37 and 42 storeys in height on a shared podium. The building has a total Gross Floor Area of 56,795.45 m2 (611,341 ft2) and 877 units. It provides 1,177.35 m2 (12,673 ft2) of indoor amenity space, and 591 m2 (6,360 ft2) of outdoor amenity space. A mix of one, two, and three-bedroom units are proposed. 260 resident parking spaces,

including ten (barrier-free spaces), are provided in a two-level underground parking structure. In addition, the underground parking contains four barrier-free parking spaces for visitors (Type A and B), satisfying the barrier-free visitor space requirement of the zoning by-law.

A separate above-ground ancillary parking structure is proposed to be built within the shopping centre parking area, directly north of the Phase 1A site. Currently, both the ancillary parking structure and the Phase 1A residential development proposal are on the same property. However, the severance of the Phase 1A site will soon be registered, and it will become its own parcel.

The parking structure will contain 361 resident parking spaces and 84 visitor parking spaces. Combined with the below grade parking, this achieves a parking ratio of 0.7 residential spaces per unit, and 0.1 visitor spaces per unit for the Phase 1A residential development.

This is a high-density project that supports the achievement of the overall Floor Space Index (FSI) of 4.5 for lands within the HUM1-3008 zone, and implements the objectives of the Hurontario-Main Corridor Secondary Plan. The proposal delivers an expanded pedestrian zone along Steeles Avenue West, as well as the initial segment of future Public Street 2, which includes a new multi-use path connecting Steeles Avenue West to Kaneff Park. In addition, new street trees and landscaped amenity areas are provided to create a comfortable urban public realm condition, which will endure through the full build-out of the site. Please refer to Figures 1 and 3 below:

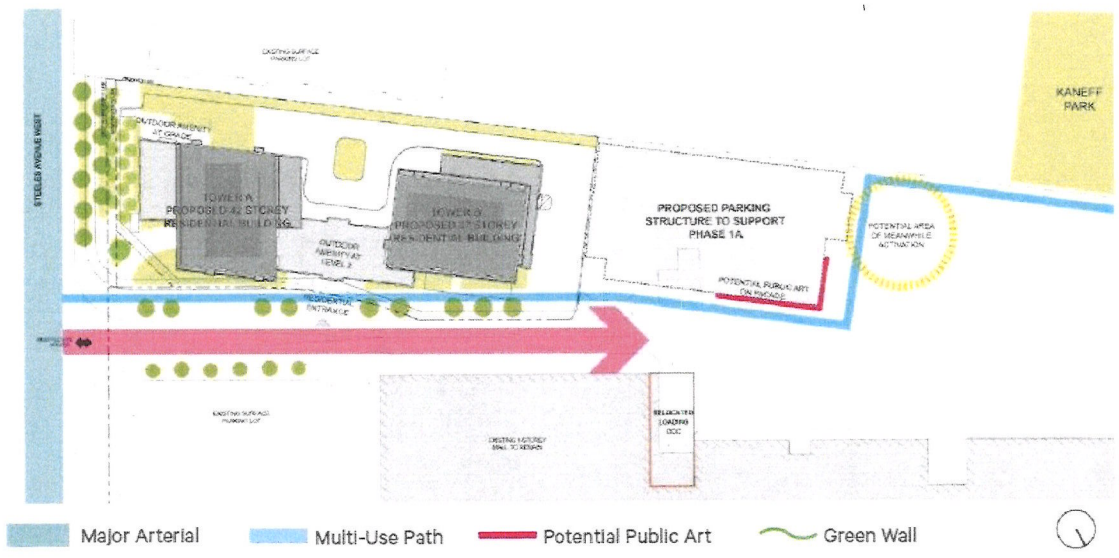


Figure 1. Proposed Phase 1A Interim Public Realm Improvements

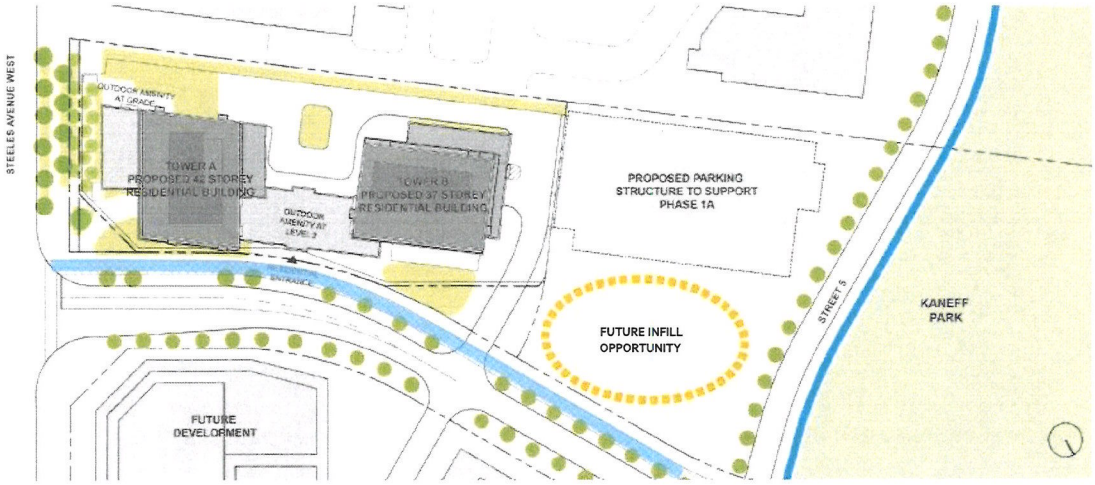


Figure 2. Proposed Phase 1A Ultimate Street 2 Alignment

3.2 Requested Variances

The current proposal maintains the intent of the Major Transit Station Area and the Mixed-Use policies of the Brampton Plan 2023 (policies 2.1.2.27, 2.2.3.4.c, and 2.2.6.2) and the zoning by-law. Through the detailed design and feasibility analysis for Phase 1A residential development, every effort was made to comply with the zone standards. In order to deliver the proposed homes, amenities, and public realm improvements, a number of variances are sought. The list below references the specific provisions in site-specific zoning by-law 228-2020, Central Area parking by-law 45-2021, and City-wide By-law 270-2004.

The following variances relate to the proposed Phase 1A residential development:

- *Maximum building height (By law 228-2020 clause 3008.3.j)*
  Permitted/Required: Maximum height of 97 metres (~ 32 storeys)
  Requested variance: Maximum height of 132 metres (Tower A) and 117 metres (Tower B)

- *Mechanical penthouse height (By law 228-2020 clause 3008.3.k)*
  Permitted/Required: Maximum additional height of 3 metres
  Requested variance: The mechanical penthouses may project over the maximum height by 7.5 metres

- *Minimum tower setback from edge of podium (By law 228-2020 clause 3008.3.d.1)*
  Permitted/Required: Minimum setback from the edge of the podium is 2 metres
  Requested Variance: The tower may be set back between 0 metres and 1.2 metres from the edge of the podium in specific locations, as detailed on the enclosed diagram.

- *Minimum continuous street wall (By law 228-2020 clause 3008.3.f)*
  Permitted/Required: Minimum 95% of the available frontage along Steeles Avenue West

Requested Variance: A building wall at grade level may occupy 78% of the available frontage facing Steeles Avenue West.

- Visitor Parking Rate (By-law 45-2021 clause 1.1.b)
  Permitted/Required: 0.2 visitor parking spaces per unit
  Requested Variances: 0.1 visitor parking spaces per unit

- *Off-Site Parking (By-law 270-2004, clause 6.17.2.a)*
  Permitted/Required: Parent By-law 270-2004 states that required parking spaces shall be provided on the same lot or parcel as the building or use for which they are required.
  Requested Variance: Required visitor parking spaces may be provided on 499 Main Street South, within 100 metres of the Phase 1A site.

The following variances relate to the proposed ancillary parking structure:

- *Minimum rear yard setback (By law 228-2020 clause 3008.3.b)*
  Permitted/Required: 6 metres
  Requested Variance: The building may be set back 3.3 metres from the west lot line.

- *Minimum interior yard setback (By law 228-2020 clause 3008.3.c)*
  Permitted/Required: 3 metres
  Requested Variance: The building may set back 0.5 metres from the south lot line where it abuts a private driveway.

- *Minimum ground floor height for above ground parking structures (By law 228-2020 clause 3008.3.t.4)*
  Permitted/Required: 4 metres
  Requested Variance: The minimum ground floor height is 2.9 metres.

4. Planning Policy and Regulatory Context

This section provides an overview of the provincial and municipal planning policy framework applicable to the proposal. Within each section, applicable policies are reviewed and then a description of how the proposal responds to these policies is presented.

4.1 Provincial Policy

The *Provincial Policy Statement* ("the PPS") came into effect in May 2020 and provides direction on matters of provincial interest related to land use planning and development, including growth management, housing, economic development, and conservation. The PPS focuses growth and development within urban settlement

areas and prioritizes efficient development patterns based on general principles that seek to provide opportunities for higher densities and a greater mix of land uses, in areas that are served by transit.

The *Growth Plan for the Greater Golden Horseshoe* (2019) ("the Growth Plan") implements the principles and policies of the PPS by specifying density targets for Strategic Growth Areas in the Greater Golden Horseshoe and specifying how that growth should occur. The site falls within a Major Transit Station Area (MTSA), which is a Strategic Growth Area as referenced in Section 7. The MTSA relates to the Brampton Gateway Terminal, which is a stop on the planned Hazel McCallion LRT line, a Priority Transit Corridor. In accordance with Section 2.2.4, MTSAs on LRT corridors should be planned to meet a minimum density target of 160 residents and jobs combined per hectare.

Both the PPS and the Growth Plan promote complete communities and direct intensification, a mix of uses, and a range of housing options to areas that are near existing and planned transit.

The proposal, along with the requested variances, supports achievement of the MTSA density target and the delivery of housing in an area that is supported by a number of existing bus lines, and will be served by higher-order transit in the near future. As such, the proposal and the requested variances are consistent with the PPS and conform to the Growth Plan.

4.2 City of Brampton Official Plan

The City of Brampton's 2023 Official Plan ("the Brampton Plan") was adopted by City Council on November 1, 2024, and approved by the Region of Peel on May 16, 2024. The Brampton Plan is a comprehensive update to the 2006 Official Plan to ensure conformity with provincial plans, and guide growth and development in the City up to 2051.

The proposal maintains the intent of the policies of the Brampton Plan, as described in the following subsections.

<u>City Structure and Land Use</u>

The Shoppers World Brampton site is an integral part of the Uptown Brampton Urban Centre and is within a Major Transit Station Area (MTSA) according to Schedule A1, City Structure. These are Strategic Growth Areas within Brampton's planning hierarchy, and should be planned for the highest densities and tallest buildings. Over time, Uptown Brampton will evolve into a thriving live/work hub and regional shopping destination that is accessible by walking, cycling, and higher-order transit. The Brampton Plan carries forward the minimum density target of 160 people and jobs per hectare from the Growth Plan. The Brampton Plan contemplates a broad range of uses to support the creation of a 15-minute neighbourhood in Uptown Brampton (2.2.3.4.c, 2.1.2.27).

The site is designated Mixed-Use according to Schedule 2, Designations. Lands within the Mixed-Use designation should be developed with uses and densities that support transit, enhance the pedestrian experience, and provide connections to community facilities and parks (2.2.6.2). The Shoppers World Brampton Master Plan demonstrates how the site will be transformed over time from a single-use retail plaza with surface parking into a vibrant mixed-use district with walkable streets, a park and the heart, and new landscaped open spaces that help to bring the natural world back in.

Building Design and Public Realm

The Brampton Plan also contains built-form policies that guide development in Urban Centres. Policy 2.2.3.11 states that Urban Centres will experience growth and intensification through the development of high-quality and compact buildings that leverage proximity and access to the Rapid Transit Network and local bus routes. Building location, massing, and orientation should mitigate adverse impacts on pedestrian comfort and safety, while open spaces should be provided to foster gathering and enhance the pedestrian experience.

Parking Structure Policies

Section 3.4.2, "Sustainable Mobility" contains the policies for the City's transportation system. Subsection 3.4.2.60 provides the following direction for the design of new parking garages:

a) Include other uses along the street, at grade, to support pedestrian activity;
b) Provide landscape, art, murals or decorative street treatments;
c) Minimize the frontage and visibility of the parking garage from the street, where appropriate.
d) Ensure that the primacy of pedestrians along the sidewalk is maintained at all times through the use of traffic control and other measures that regulate the crossing of vehicles at all access points;
e) Be designed to minimize any negative aesthetic or environmental impacts and consider the following; and/or
    - Porous or permeable surfaces;
    - Light coloured materials instead of asphalt;
    - Tree planting; and,
    - Pedestrian access and connectivity.
f) Encourage the provision of electric vehicle charging spaces and dedicated car share spaces.

The proposed parking structure has been designed in accordance with Subsection 3.4.2.60. It has one vehicular entrance at the southeast corner, where it is accessed from a private driveway that is shared with the Phase 1A residential development. The proposed structure does not abut a public street, in fact, over the long term there is potential to construct a new building between the parking structure and future Street 2. In the interim, RioCan will explore opportunities for public art or a green wall on the north and east facades.

The proposed multi-use path facilitates walking and cycling access to Kaneff Park from Steeles Avenue West. New landscaping augments the aesthetic quality of the parking structure, and the light-coloured roof reflects sunlight. Pedestrian access is facilitated by separating the multi-use path from traffic, and providing landscaping and bollards for added protection. A marked crossing is provided between the structure and the Phase 1A residential development. Electric vehicle charging spaces are provided within the underground parking of the Phase 1A residential development.

The proposed Phase 1A residential development and ancillary parking structure maintain the intent of to the Brampton Plan. Particularly, the proposal introduces transit-supportive intensification in a contemporary architectural design that is compatible with the existing and planned Uptown Brampton. The Phase 1A residential development is appropriately scaled for its context, and provides high-quality amenity spaces and public realm improvements that enhance quality of life for residents.

4.3 Hurontario-Main Corridor Secondary Plan

The Hurontario-Main Corridor Secondary Plan ("the Secondary Plan") was approved by Brampton City Council on March 8, 2017 and adopted as Amendment no. 124 to the Brampton Official Plan (Chapter 55). The Secondary Plan includes land use, transportation, and urban design policies to guide the area's transformation from an auto-oriented, highway commercial area, into a mixed use, high density, transit-oriented community. The Secondary Plan prioritizes excellence in community design, an attractive, human-scaled built form, the creation of destinations through place-making, and an interconnected public realm network that includes parks, streets, pathways, and active transportation facilities.

The site is designated Regional Commercial in the Secondary Plan. It is intended to serve as a regional retail node over the long term, while introducing new residential and non-residential uses in buildings that are at least three (3) storeys in height.

The Secondary Plan permits parking structures and shared parking facilities, in accordance with Section 5.9.6. Parking structures are discouraged fronting Hurontario/Main Street and all major streets. The proposed parking structure does not front onto Main Street South, or any other existing or future public street. Its location towards the west property line facilitates the future development of an additional building or public realm feature, between the structure and future Public Street 2. In the short term, the parking spaces within the structure are required to support the Phase 1A residential development. However, in the longer term it is expected that parking demand will change in response to the introduction of rapid transit to the area. The location of the parking structure facilitates potential sharing of parking with part of future phases of development.

The proposed Phase 1A residential development and ancillary parking structure both conform to the Hurontario-Main Corridor Secondary Plan.

4.4 Zoning By-law

Site-Specific Zoning By-law 228-2020 amends City-wide By-law 270-2004 to implement the Shoppers World Brampton Master Plan through site-specific building performance standards. This facilitates development on the site that meets the broader goals of the Master Plan while providing appropriate an appropriate relationship to adjacent lands and future development blocks.

The site is zoned as HMU1-3008, and a mix of uses including residential, commercial, and institutional uses, are permitted. The following built-form requirements also apply:

- Maximum building height: 97 metres
- Permitted projections: additional 3 metres
- Maximum FSI: 4.5 (measured over the whole HMU1-3008 zone)
- Minimum tower setback from edge of the podium: 2 metres
- Minimum continuous street wall: 95% of the available frontage facing Steeles Ave W

In addition to By-law 228-2020, this application seeks relief from provisions in Central Area Parking By-law 45-2021 and City-Wide By-law 270-2004.

4.5 The City of Brampton MTSA Study

Following Council's approval of the Brampton Plan in 2023, City Staff embarked on a study of the City's 14 Primary MTSAs, which includes the Gateway MTSA at Steeles Avenue and Main Street South. In May 2024, open houses were held to present preliminary information about proposed maximum building heights, densities, and land use designations for the 14 MTSAs. The height and density distribution for the Gateway MTSA largely reflects the approved zoning for the Shoppers World Master Plan. A maximum density of 5 FSI is proposed for the Phase1A site through the open house materials. No maximum height was assigned.

A statutory public meeting is targeted for September 9, 2024 for the draft Official Plan Amendments. Subsequent work to update the Comprehensive Zoning By-law is intended to be completed in Q1 2025.

The current proposal for the subject site aligns with the density and height contemplated as part of the MTSA study.

5. Variance Rationale

It is our opinion that the requested variances for the Phase 1A residential development and the ancillary parking structure satisfy the four tests for a minor variance as set out in the Planning Act. In accordance with Section 51(1), the variances must:

1. Maintain the general intent and purpose of the Official Plan;
2. Maintain the general intent and purpose of the Zoning By-law;
3. Be desirable for the appropriate development and use of the land; and,
4. Be minor in nature.

The following provides an analysis of the requested variances based on the four tests.

5.1 Variances related to the Phase 1A Building

1. General Intent and Purpose of the Official Plan

   It is SvN's opinion that the requested variances maintain the general intent and purpose of the Brampton Plan and the Hurontario-Main Corridor Secondary Plan, as discussed in Sections 3.2 and 3.3 of this Rationale. The site is in a Strategic Growth Area, and the policies contemplate high-density, transit-supportive development. The requested variances will facilitate the first phase of a multi-phase redevelopment which will eventually transform the area into a compact, walkable community with a range of housing options as well as places for people to work and play. The proposed development is consistent with this vision, and the proposed ancillary parking structure conforms to the specific design criteria of Section 3.4.2.60 of the Brampton Plan.

2. General Intent and Purpose of the Zoning By-law

The proposed variances maintain the general intent of Zoning By-law 270-2004 (as amended by By-law 228-2020 and 45-2021). The test for intent and purpose of the zoning by-law is evaluated for each variance individually, as well as together. The requested variances will facilitate the construction of a high-quality and architecturally distinctive residential building, and an ancillary parking structure that enables future flexibility to respond to changing parking needs as the area transforms. Individual analysis of each variance is provided below.

Building Height (By law 228-2020 clause 3008.3.j)
Permitted/Required: Maximum height of 97 metres (~ 32 storeys)
Requested Variance: Maximum height of 132 metres (Tower A) and 117 metres (Tower B)

The building height regulation is used to control the scale and intensity of development, while preserving sky views and limiting shadow impact on the surrounding area. The By-law permits a maximum height of 97 metres (32 storeys). The proposed Tower A is 42 storeys, and Tower B is 37 storeys. In our opinion, while the proposal includes 10 and 5 additional storeys respectively, this does not result in adverse impacts on the surrounding area.

The proposal responds to the emerging surrounding context by introducing towers that are of similar height to the approved development by Kaneff Group at 210-220 Steeles Avenue West, directly west of the site. The approved Zoning By-law 93-2024 for that site permits heights of 6 to 45 storeys. The proposal provides a complementary built-form response to the emerging intensification in the area.

As demonstrated by the shadow study prepared by Kirkor Architects, the increase in height adds slightly more shadow over Kaneff Park than an as-of-right development of 32 storeys during the morning hours in March and September. The park does not experience adverse shadow impacts otherwise, and receives ample sunlight during the summer months.

Mechanical Penthouse Height (By law 228-2020 clause 3008.3.k)
Permitted/Required: Maximum additional height of 3 metres
Requested Variance: The mechanical penthouses may project over the maximum height by 7.5 metres

The intent of the regulating the mechanical penthouse height is to limit the visibility of the rooftop equipment from the street, and ensure compatibility with surrounding architecture, without compromising building operations.

Projections are permitted beyond the maximum building height to a maximum of 3 metres, whereas the requested variance seeks 7.5 metres in height. The mechanical penthouses are functional

elements of the building and are required for building operations. They facilitate good air quality for the apartment units and support the energy efficiency of the building.

The mechanical penthouses have substantial setbacks from the building main walls. On tower A, the setback ranges from 6.8 to 23.4 metres. On Tower B, it ranges from 18.2 to 21.9 metres. Given these large setbacks, the height of the mechanical penthouses is not perceptible from street level. They do not impact the pedestrian experience.

Tower Setback (By law 228-2020 clause 3008.3.d.1)
Permitted/Required: Minimum setback from the edge of the podium is 2 metres
Requested Variance: The tower may be set back between 0 metres and 1.2 metres from the edge of the podium in specific locations, as detailed on the enclosed Minor Variance Diagram.

The intent of regulating tower setback is to provide a pedestrian-scaled street wall, minimizing the perceived volume of the building by setting the tower portion back from the façade of the building. A tower-podium relationship creates a more comfortable sidewalk condition by mitigating wind downdrafts.

The minimum required tower setback from the edge of the podium is 2 metres, while the proposed tower setback varies significantly is accordance with the articulation in the podium wall. It ranges from 0 metres in some locations, to approximately 10 metres on the Steeles Avenue West facade. The podium articulation contributes to a more interesting building, with different volumes visible from different vantages points. The majority of the facades have a clearly defined podium-tower relationship, with only small corner areas where the façade reaches from the tower to grade.

According to the Pedestrian Level Wind Study prepared by Gradient Wind, most residential entrances and building access points are comfortable for standing and sitting all year round, with the exception of the building entrance at the northeast corner. To address this, the northeast entrance has been recessed into the building façade. Overall, the proposed setbacks optimize building form and orientation while maintaining pedestrian comfort.

Continuous Street Wall (By law 228-2020 clause 3008.3.f)
Permitted/Required: Minimum 95% of the available frontage along Steeles Avenue West
Requested Variance: A building wall at grade level may occupy 78% of the available frontage facing Steeles Avenue West.

Regulating a continuous street wall provides for a consistent frontage along the street and creates a comfortable and safe walking experience for pedestrians.

The proposed building addresses Steeles Avenue West with a secondary residential entrance and an indoor amenity area that help to activate the public realm. To the west of the building, an outdoor

amenity area of approximately 136 square metres provides a range of active living opportunities for residents. The amenity area will be screened by a 10-metre high living wall, providing visual interest from both sides. The amenity space abuts a similar proposed open space on the neighbouring property. The reduced street wall percentage has minor impacts, because the primary facade of the proposed development is Future Street 2, which has the main entrance and lobby for the building, and achieves a continuous street wall for approximately 86% of the frontage.

Visitor Parking Rate (By-law 45-2021 clause 1.1.b)
Permitted/Required: 0.2 visitor parking spaces per unit
Requested Variances: 0.1 visitor parking spaces per unit

The intent of the visitor parking rate is to manage parking demand by ensuring that a given development can provide an adequate number of parking spaces for the anticipated number of visitors. This limits the risk of spillover parking onto neighbouring properties and public streets, contributing to general traffic congestion.

The proposed rate of 0.1 visitor parking spaces per unit results in a total requirement of 88 parking spaces, including four barrier-free spaces. The four barrier-free spaces are proposed in the Phase 1A underground, and the remaining visitor parking spaces are provided in the adjacent parking structure. The reduced visitor parking standard of 0.1 reflects the requirement within Site-Specific By-law 228-2020, which acknowledges that visitor parking and parking for non-residential uses may be shared across the blocks in the redevelopment as a whole. In the near term, there are surplus parking spaces within the existing shopping centre parking area that can be used by visitors. Over time, parking demand will be monitored to ensure that parking is not over-supplied across the site as a whole.

This variance is minor in nature as it does not impact the overall parking available for visitors on the site as a whole. As stated in the Traffic Impact Study prepared by BA Group, the reduction of the visitor parking rate recognizes the location of the site relative to significant existing and planned transit, particularly Brampton Gateway Transit Terminal and the planned Hazel McCallion line. The reduction also recognizes the availability of surplus parking in the existing Shoppers World Brampton mall today, as well as planned future retail and commercial parking for the broader Shoppers World Brampton Master Plan. Non-resident parking is intended to be consolidated between uses to maximize the efficient use of built parking resources.

Off-Site Parking (By-law 270-2004, clause 6.17.2.a)
Permitted/Required: Required parking spaces shall be provided on the same lot or parcel as the building or use for which they are required.
Requested Variance: Required visitor parking spaces may be provided on 499 Main Street South, within 100 metres of the Phase 1A site.

A total of 445 parking spaces are provided in the ancillary parking structure, including the 84 required visitor parking spaces.

The intent of this regulation is to ensure that parking is conveniently located close to the uses that it serves. This is particularly important for accessible parking spaces, which should have a direct and barrier-free means of travel between the parking area and the destination. By locating all of the required accessible visitor parking spaces within the underground parking structure, the intent of this regulation is met. The distance between the ancillary parking structure entrance and the Phase 1A building is less than 20 metres, allowing for convenient access and integration with the residential uses.

3. Desirable for the Appropriate Development and Use of the Site

The variances are desirable and appropriate in that they facilitate the high density development that is contemplated by the Shoppers World Brampton Master Plan, the Brampton Plan, and the Secondary Plan. The site is ideally located for transit-oriented residential intensification given its proximity to existing and future public transit, contributing to the achievement of provincial housing targets and growth forecasts. The residential building with two towers will be a landmark for Uptown, heralding the new urban future for the area.

4. Minor in Nature

The consideration of whether a variance is minor in nature is not simply a numerical calculation; rather, it is based on an analysis of fit and impact on the immediate context and the surrounding neighbourhood.

The proposal maintains the intent of the various built form standards in the zoning by-law. The modest increases in height and reductions in the tower setback and street wall length are appropriate given the site's location in an intensifying urban context, and will not have adverse impacts on surrounding properties. The reduced visitor parking rate and off-site parking are also appropriate given the over-supply of parking on the Shoppers World Brampton site as a whole, and anticipating changing parking demands with the introduction of higher-order transit in the near future.

5.2 Variances related to the Ancillary Parking Structure

1. General Intent and Purpose of the Official Plan

It is SvN's opinion that the requested variances for the ancillary parking structure maintain the

general intent and purpose of the Brampton Plan and the Hurontario-Main Corridor Secondary Plan, as discussed in Sections 3.2 and 3.3 of this rationale. In particular, the proposed parking structure responds to Subsection 3.4.2.60 of the Brampton Plan that contains design strategies for parking garages.

2. General Intent and Purpose of the Zoning By-law

The intent and purpose of Zoning-Bylaw 228-2020 is to support the redevelopment of the Shoppers World Brampton site in accordance with the Master Plan. The requested variances for the parking structure will support the construction of an attractive, high-quality parking garage that maintains the intent of the zoning by-law. The site-specific variances to the built form standards listed below optimize the number of parking spaces available while maintaining safety for cyclists and pedestrians.

Rear Yard Setback (By law 228-2020 clause 3008.3.b)
Permitted/Required: 6 metres
Requested Variance: The building may be set back 3.3 metres from the west lot line

The purpose of regulating rear yard setback is to provide a buffer between the proposed building and any neighbouring building to its rear. Six metres is sufficient width to accommodate a driveway, facilitating servicing and parking for a residential, commercial, or mixed use building. In cases where this setback is not required for access, the setback can be used for landscaping.

The proposed ancillary parking structure is accessed from the shared driveway between the structure and the Phase 1A residential building. Given that the setback is not needed for access, this setback can be reduced. Moreover, a smaller setback discourages loitering and any nefarious activities that may be inclined to occur in areas where they are hidden from view. The proposed parking garage will have openings on all side for casual surveillance, which further promotes public safety. The reduced rear yard will be landscaped to provide a transition between the ancillary parking structure and the adjacent property to the west.

Interior Yard Setback (By law 228-2020 clause 3008.3.c)
Permitted/Required: 3 metres
Requested Variance: The building may set back 0.5 metres from the south lot line where it abuts a private driveway.

The intent of regulating the interior side yard setback is to provide an appropriate buffer between the proposed building and a neighbouring property with which it shares an interior side yard. In a typical condition this space enables access to the rear of the building, and can accommodate any landscaping.

In the case of the proposal, the interior side lot line is the lot line that separates the parking structure and the Phase 1A private driveway, which will be shared. The total separation between the two buildings is 13.8 metres, and contains a 6 metre driveway and sidewalk which provides access to both buildings.

Ground Floor Height (By law 228-2020 clause 3008.3.t.4)
Permitted/Required: 4 metres
Requested Variance: The minimum ground floor height is 2.9 metres.

The intent of regulating the ground floor height of an above-ground parking structure is to provide a ground floor scale that is consistent with adjacent buildings, to create the appearance of a continuous rhythm of frontages along a public street. This is largely an aesthetic priority, however, a taller ground floor also facilitates future adaptation of the parking structure for non-parking uses, such as pop-up retail or markets.

The proposed ancillary parking structure does not have frontage on a public street, so the aesthetic concern for a continuous street wall is less of a priority. In fact, the proposed structure has been intentionally located closer to the west lot line to facilitate future development on the remainder of the block, creating potential for a new building or public realm feature to animate Future Street 2.

The proposed ground floor height of 2.9 metres is sufficient to accommodate the movement of people and vehicles into and out of the garage.

3. Desirable for the Appropriate Development and Use of the Site

The variances for the proposed ancillary parking structure are desirable and appropriate development in that they enable RioCan to deliver the first phase of the Shoppers World Brampton Master Plan, along with the parking it requires, in a manner that is flexible and more environmentally responsible than providing additional levels of underground parking. As time goes on and demand for parking changes, there is an opportunity to reallocate the spaces within the proposed structure to other uses, or to redevelop the parking structure site entirely.

In undertaking the technical studies for the Phase 1A development, RioCan's consultants determined that the bedrock on site is extremely shallow. Two levels of underground parking is the most that can be accommodated, without the need for significant blasting of the underlying limestone. Not only is blasting costly, it is also extremely unpleasant for surrounding neighbours, and bad for the environment. During blasting, residents and businesses in the surrounding area are impacted by ground vibration, noise, fly rock, and noxious gases.

In addition to the negative impacts of blasting, underground parking is very carbon intensive. Cast-in-place reinforced concrete is the largest driver of emissions across the built environment, and underground parking can be responsible for up to 60% of a building's carbon emissions. A standalone parking structure made primarily of steel is significantly less carbon intensive.

The parking structure accommodates much of the parking needed for the Phase 1A development, thereby enabling Phase 1A to maximize its residential intensification potential. By doing so, the parking structure helps the Phase 1A development to contribute towards the achievement of the density target specified in the Growth Plan and the Official Plan.

4. Minor in Nature

The requested variances for the parking structure do not adversely impact the ongoing operations of the shopping centre, nor do they adversely impact neighbouring properties. Therefore, they are deemed to be minor in nature.

6. Conclusion

Based on the foregoing analysis, it is our conclusion that the proposed Phase 1A residential development, ancillary parking structure, and the corresponding variances meet the criteria of Section 45 (1) of the Planning Act. As such, it is our opinion that the requested variances represent good land use planning, and should be approved.

SvN

August 14, 2024

Committee of Adjustment, City of Brampton
2 Wellington Street West
Brampton, ON
L6Y 4R2

Attention: Clara Vani, Secretary-Treasurer, Committee of Adjustment

RE: Application for Minor Variances - 499 Main Street South
Shoppers World Brampton – Phase 1A and Parking Structure

On behalf of RioCan Management Inc. and 1388688 Ontario Ltd ("RioCan"), SvN Architects + Planners is pleased to submit the enclosed materials in support of a minor variance application to facilitate the first phase of the Shoppers World Brampton master-planned redevelopment.

Shoppers World Brampton, located at 499 Main Street South, is a mid-century automobile-oriented shopping centre that is optimally located along several bus routes as well a stop on the future Hazel McCallion LRT line, and only 2.5 kilometers south of Downtown Brampton. The first phase of residential development ("Phase 1A") will catalyse the site's transformation into a vibrant new mixed-use and transit-oriented community.

The Phase 1A proposal consists of two residential towers and 37 and 42 storeys in height atop a shared podium. A site plan application was first submitted in June 2022 (City file no. SPA-2022-0120). A resubmission was provided in May 2024 to address the comments received from City Staff and other commenting agencies.

To meet the market demand for parking over the near term, an ancillary parking structure is proposed adjacent to the Phase 1A residential development, but on the shopping centre property. The proposed ancillary parking structure supports the delivery of Phase 1A, and provides additional flexibility to respond to market demand for parking as future phases of the project are constructed. A separate site plan application for the proposed ancillary parking structure was submitted on July 17, 2024 (City file no. SPA-2024-0104).

Ultimately, the Phase 1A residential building will be on a separate parcel of land. A severance application was submitted and approved by the Committee in September 2022 (City file no. B-2022-0011). The parcel has not been registered, so for now the lands are still one parcel and thus the minor variances for the Phase 1A residential building and the ancillary parking structure are included as one application.

110 Adelaide St East, 4th Floor
Toronto, Ontario, M5C 1K9
T 416-593-8499
F 416-593-1530
info@svn-ap.com
www.svn-ap.com

SvN

The Minor Variance Rationale, prepared by SvN Architects + Planners, addresses the four tests for a minor variance under section 45(1) of the Planning Act. The variances support the delivery of the Shoppers World Master Plan, which implements the direction of provincial and municipal policies, and the Brampton 2040 Vision. They maintain the general intent of the 2023 City of Brampton Official Plan as well as the applicable zoning by-laws, and do not adversely impact the function of the shopping centre or create adverse impacts on adjacent lands. The variances are desirable for the appropriate development of the site, and are minor in nature. As such, it is our opinion that the requested variances represent good land use planning, and should be approved.

Submission Details

The following is a list of materials digitally submitted in support of the Committee of Adjustment application for the proposed development. Two hard copies of the first 5 items will be sent via courier.

1. Completed **Minor Variance Application Form** (including **Authorization and Permission to Enter Forms);**
2. **Minor Variance Rationale**, prepared by SvN Architects + Planners and dated August 12, 2024;
3. **Minor Variance Diagram,** prepared by Kirkor Architects and dated August 12, 2024;
4. **Phase 1A Architectural Drawings and Shadow Study**, prepared by Kirkor Architects and dated August 12, 2024; including the following:
    - Cover Sheet, drawing no. A100
    - Project Statistics, drawing no. A102.S
    - Roof Plan, drawing no. A210.S
    - Overall East Elevation, drawing no. A407.S
    - Perspectives, drawing no. A501.S
    - Sun Shadow Study, drawing no. A601.S
5. **Ancillary Parking Structure Architectural Drawings,** prepared by Newton Group Ltd. and dated August 6, 2024; including the following:
    - Cover Page, drawing no. A000
    - Site Plan with Existing & OBC Matrix, drawing no. A200a
    - Site Plan with Future Conditions, drawing no. A200b
    - Ground Floor Level, drawing no. A201

10 Adelaide St. East, 4th Floor
Toronto, Ontario, M5C 1K9
T 416-593-6499
F 416-593-1550
info@svn-ap.com
www.svn-ap.com

SvN

- Building Elevations, drawing no. A300

6. **Phase 1A Traffic Impact and Parking Study**, prepared by BA Group and dated May 29, 2024 (digital submission only); and,

7. **Phase 1A Pedestrian Level Wind Study,** prepared by Gradient Wind and dated April 26, 2024 (digital submission only).

We trust the above materials provide the information required to adequately evaluate the application. We look forward to our continued working relationship with all City departments, agencies, and stakeholders as we work through the approvals process.

Best regards,

Kelly Graham, MCIP, RPP
Associate, Planning

C. Stuart Craig, RioCan
Joel Farber, Fogler Rubinoff

110 Adelaide St East, 4th Floor
Toronto, Ontario, M5C 1K9

T 416-593-8499
F 416-593-1660

info@svn-ap.com
www.svn-ap.com