289 Carling Avenue

Transportation Impact Assessment

Step 2 Scoping Report

Prepared for:

The John Howard Society
c/o PBC Development and Construction Management Group Inc.
105-485 Bank Street
Ottawa, ON K2P 1Z2

Prepared by:

CGH TRANSPORTATION
13 Markham Avenue
Ottawa, ON K2G 3Z1

August 2019

PN: 2019-10

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1 Screening

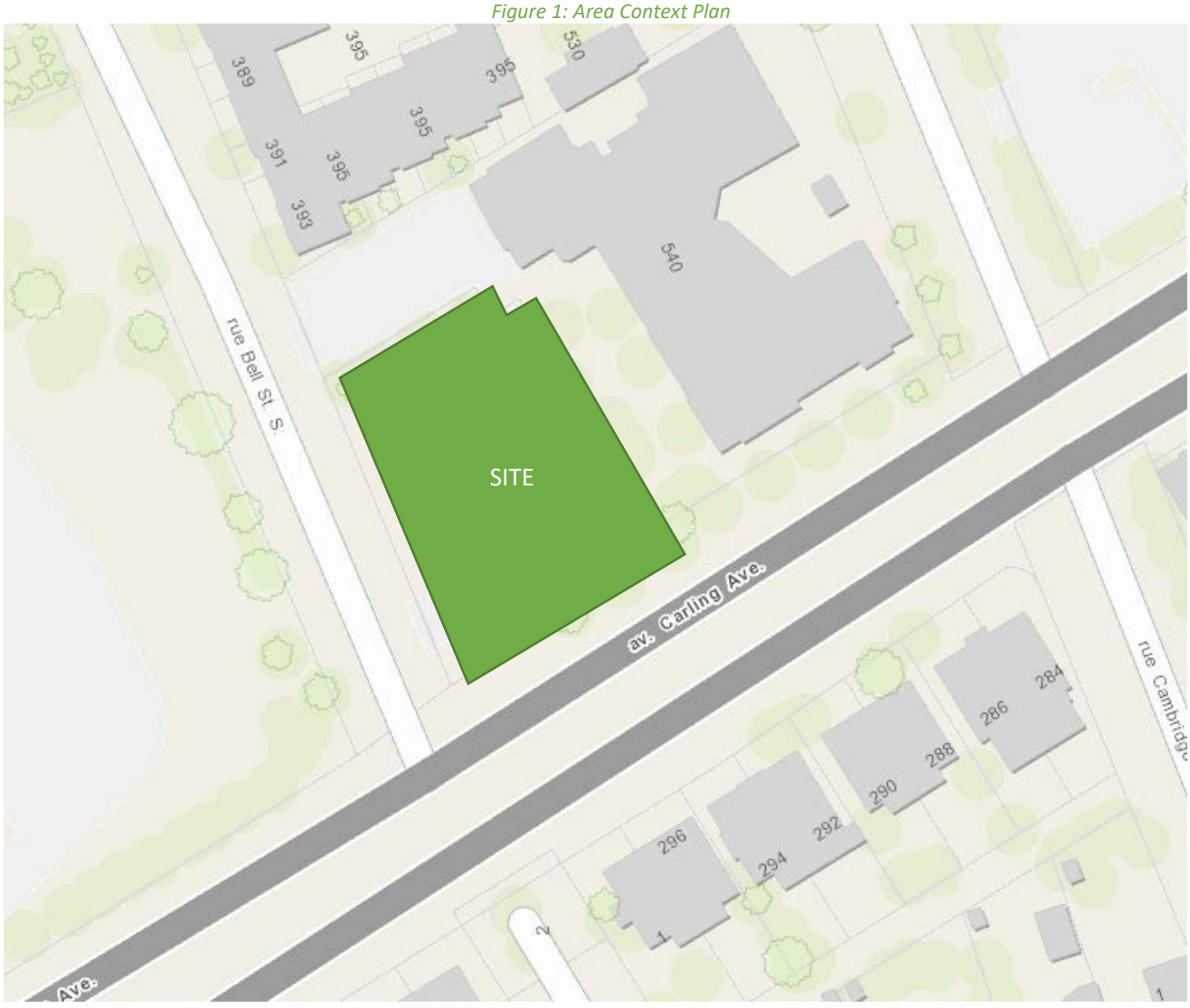
This study has been prepared according to the City of Ottawa's 2017 Transportation Impact Assessment (TIA) Guidelines. Accordingly, a Step 1 Screening Form has been prepared and is included as Appendix A, along with the Certification Form for TIA Study PM. As shown in the Screening Form, a TIA is required including the Design Review component as the trip generation and safety triggers are not met.

2 Existing and Planned Conditions

2.1 Proposed Development

The proposed development, located at 289 Carling Avenue, is within the Carling Avenue Arterial Main Street Design Priority Area, at the corner of Carling Avenue at Bell Street South. The site is currently zoned AM10, permitting select residential and non-residential units. The proposed development is for a residential building including 40 units with office support spaces totalling 1000 square metres of gross floor area. The site will access Bell Street South via two full movements driveways. The anticipated full build-out and occupancy horizon is 2022. Figure 1 illustrates the Study Area Context. Figure 2 illustrates the proposed concept plan.

Figure 1: Area Context Plan



Project Zoning Review/Statistics

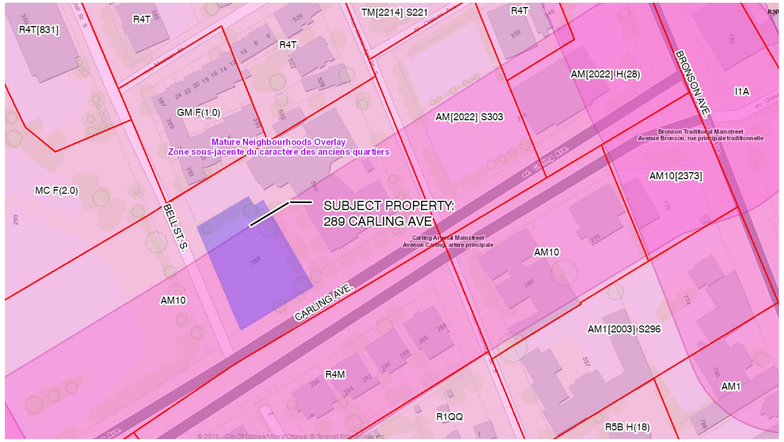
Municipality: City of Ottawa
Municipal Address: 289 Carling Avenue
Registered Owner: John Howard Society of Ottawa
Lot Area: 1270.526 m²

Zoning Analysis
Ottawa
Zoning By-Law: 2008-250
Zone: AM 10
Proposed Use: Mixed-Use Office and Apartment Building

BUILDING AREA (OUT TO OUT)

Level	Area
L0 LOWER PARKING/ BASEMENT, MAIN ENTRANCES AND OFFICE	988 m²
L1 UPPER PARKING	961 m²
L2 OFFICES	949 m²
L3 OFFICES AND RESIDENTIAL	547 m²
L4 RESIDENTIAL UNITS	547 m²
L5 RESIDENTIAL UNITS	547 m²
L6 RESIDENTIAL UNITS	547 m²

CHART TO BE INVALIDATED PRIOR TO FINAL SITE PLAN SUBMISSION



LOCATION PLAN
SCALE 1 : 1

Development Standards

CHART TO BE INVALIDATED PRIOR TO FINAL SITE PLAN SUBMISSION

		Required	Provided
Minimum Lot Area		No Minimum	13680.93 sq.m
Minimum Lot Width		No Minimum	23116.9 m
Minimum Required Yards:			
	Front and Corner Yard	0 m	3.7 m
		At least 50 % of frontage must be occupied by building walls located within 4.5 m of the frontage	315.75 sq.m + 458.43 sq.m 68.8 %
		Minimum ground floor height within 10 m of front lot line: 4.5 m	4.5 m
		Minimum building height within 10 m of front lot line: 7.5 m	10.15 m
	Interior Side Yard	0 m	0.46 m
	Rear Yard	0 m	N/A
Minimum Building Height		Any portion of a building within 10 m of a front or corner lot line must have a minimum of 2 (two) stories and have a minimum building height of: 7.5 m	6 Stories, 21.9 m
Maximum Building Height		30 m	22.53m
Landscaping Around Parking Lots	Abutting a Street:	3 m	N/A
	Not Abutting a Street	0 m for lots containing 10 or fewer spaces 1.5 m for lots containing 11 - 100 spaces	N/A N/A
Driveway Width		For lots containing fewer than 20 spaces, maximum: 3.6 m For lots containing more than 20 spaces, maximum: 6.7 m	
Drive Aisle Width		Minimum 6.7 m	6.8m
Orientation of Principal Entrance:		The ground floor façade facing a public street located within 4.5 m of the front or corner side lot line must include a minimum of one active entrance for each individual occupancy located immediately adjacent to the front or corner lot lines	Complies
Façade Requirements		A minimum of 50% of the surface area of the ground floor façade facing a public street must be comprised of transparent glazing and active customer or resident entrance access doors	Building Surface Area: 123.64 sq.m Glazing Surface Area: 74.69 sq.m = 60 %
Parking Spaces			Area Y on Schedule 1A
Dwelling Units:	Occupant Units 0.5 spaces/dwelling unit, no off street motor vehicle parking is required to be provided for the first 12 units	40 units - 12 units = 28 units 28 units x 0.5 spaces/ unit = 14 spaces	
	Visitor Units 0.1 spaces/dwelling unit, no off street motor vehicle parking is required to be provided for the first 12 units	40 units - 12 units = 28 units 28 units x 0.1 spaces/unit = 2.8 spaces = 3 spaces	
Office:		1 space/ 100 sq.m GFA 1,300 + 100 13 spaces	
		Total Parking Spaces = 14+ 3 + 13 = 30 spaces	29 spaces
Size of parking spaces:		Minimum 2.6 m x 5.2 m	
Loading Spaces	Residential:	0	
	Office:	0	
	Total:	0	0
Bicycle Parking	Dwelling units in the same building as a non-residential use:	0.5 spaces/unit 40 dwelling units x 0.5 10 spaces	20 Spaces All Indoor
	Office:	1 space/ 250 m2 GFA 1,300 + 250 5.2 spaces = 6 spaces	4 Spaces
	Total:	23 Spaces	23 Spaces
Parking For Physically Disabled	Type A:	1 Space	1 Space
	Type B:	1 Space	1 Space
Amenity Space	Total Required:	6 sq.m / unit x 40 units 240 m2	329.35 sq.m
	Communal amenity area:	Minimum 50% of total area required: 240 sq.m x 0.5 Minumin 120 sq.m	292.3 sq.m

LEGAL DESCRIPTION:
LOT 10 AND PART OF LOTS 8, 9 AND 11 (CARLING AVENUE)
REGISTERED PLAN 31326

CITY OF OTTAWA

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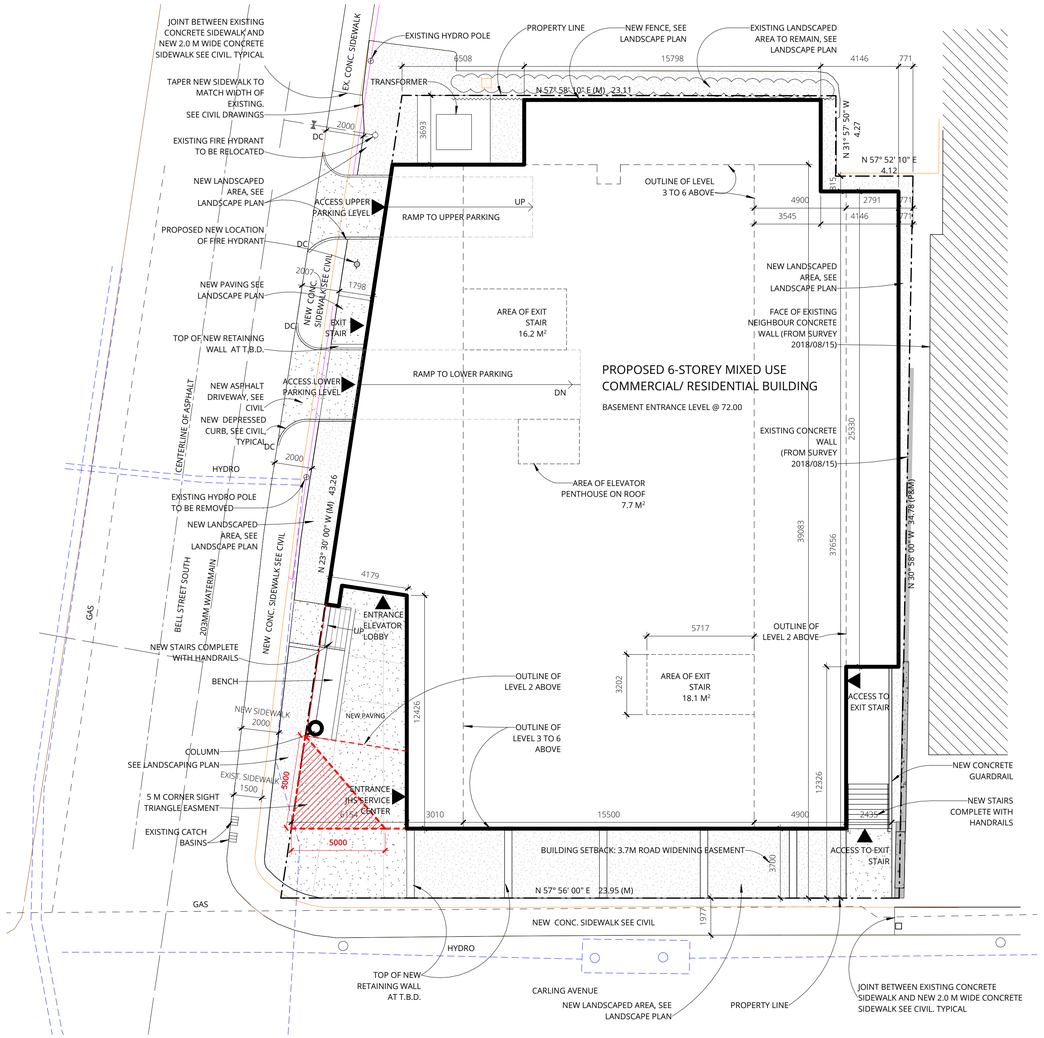

1 SITE PLAN
A100 SCALE 1 : 150

LEGAL DESCRIPTION:
LOT 10 AND PART OF LOTS 8, 9 AND 11 (CARLING AVENUE), REGISTERED PLAN 31326, CITY OF OTTAWA

Based on Survey by Fairhall Moffatt & Woodland LTD, dated 2018/08/16

NOTES:

Contractor shall check and verify all dimensions on site and report any discrepancies to the Architect before proceeding.

no.	revision	date
4	ISSUED FOR SITE PLAN COORDINATION	9 AUG 2019
3	ISSUED FOR CONSULTANT COORDINATION	18 JULY 2019
2	ISSUED FOR CONSULTANT COORDINATION	2 July 2019
1	ISSUED FOR COSTING	19 JUNE 2019

north nord

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detail no. 1 détail no.
sheet no. A1 feuille no.

project projet

JHS - 289 CARLING AVENUE

JOHN HOWARD SOCIETY
289 CARLING AVE, OTTAWA

designed by conçu par: KWC
approved by approuvé par: RZ
drawn by dessiné par: EI
project no. no. du projet: 1850
date: 2019-MAY-09
scale: as noted

drawing / dessin

SITE PLAN

revision révision
sheet no. no. de la feuille **A100**

plot scale 1:1

SHEET SIZE: ARCH D (24"x36")

2.2 Existing Conditions

2.2.1 Area Road Network

Carling Avenue

Carling Avenue is a City of Ottawa arterial road with a six-lane divided urban cross-section. The outer lanes in each direction are signed and painted as a dedicated transit and cycling lane. The posted speed limit is 60 km/h. The Ottawa Official Plan reserves a 44.5 metre right of way in the Study Area.

Bell Street South

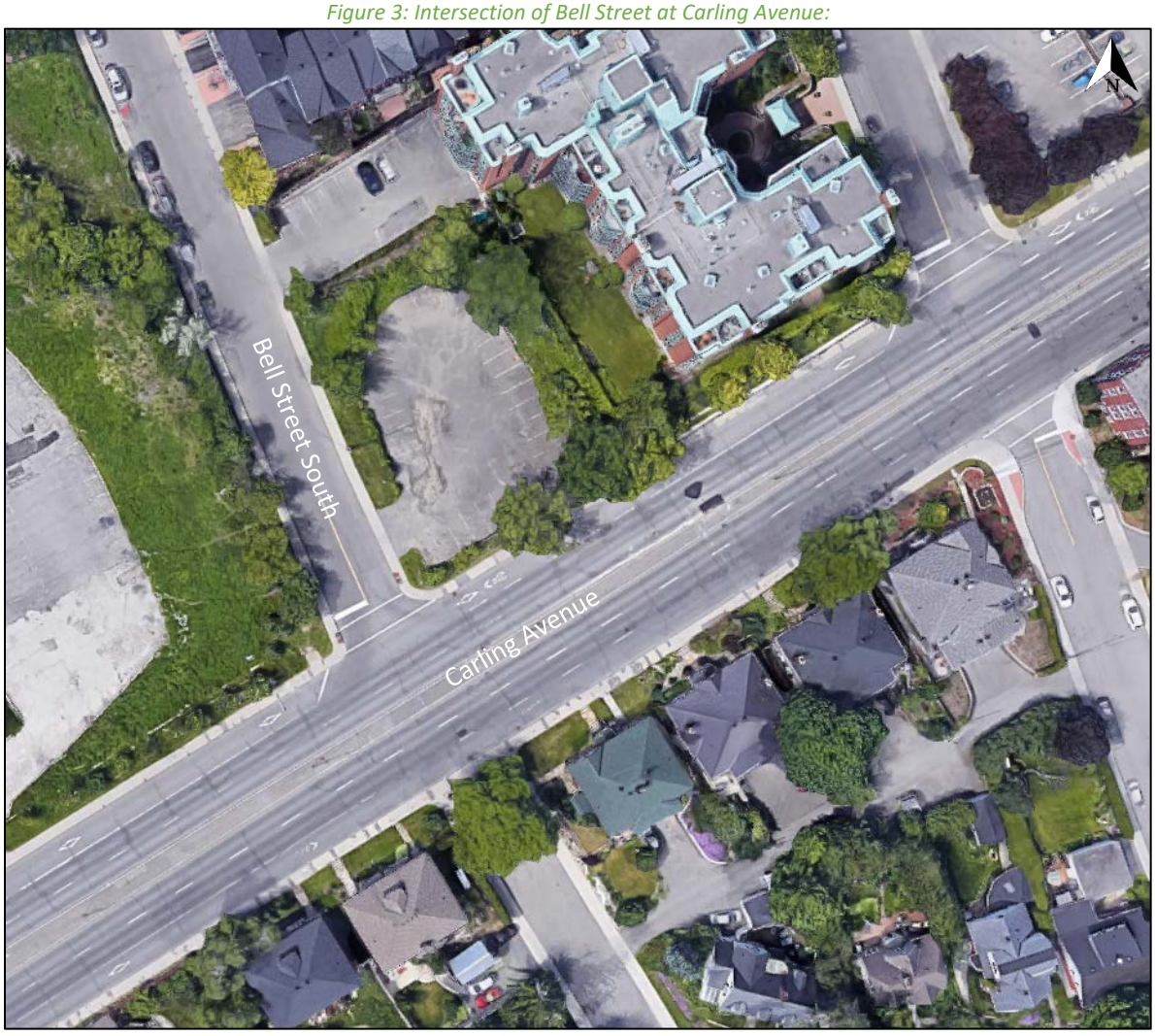
Bell Street South is a City of Ottawa local road with a two-lane undivided urban cross-section. The unposted speed limit is 50 km/h.

2.2.2 Existing Intersections

Bell Street South at Carling Avenue

The intersection of Bell Street South at Carling Avenue is an unsignalized three-legged intersection that only allows right turns to and from Carling Avenue due to a centreline median. No auxiliary lanes are provided on any leg of the intersection. Figure 3 is an aerial photograph of the subject intersection.

Figure 3: Intersection of Bell Street at Carling Avenue:



2.2.3 Existing Driveways

The adjacent property, north of 289 Carling Avenue has a driveway directly onto Bell Street South, approximately 1.5 metres north of the property line. This driveway provides access to the rear of the residential tower located at 540 Cambridge Street South.

2.2.4 Cycling and Pedestrian Facilities

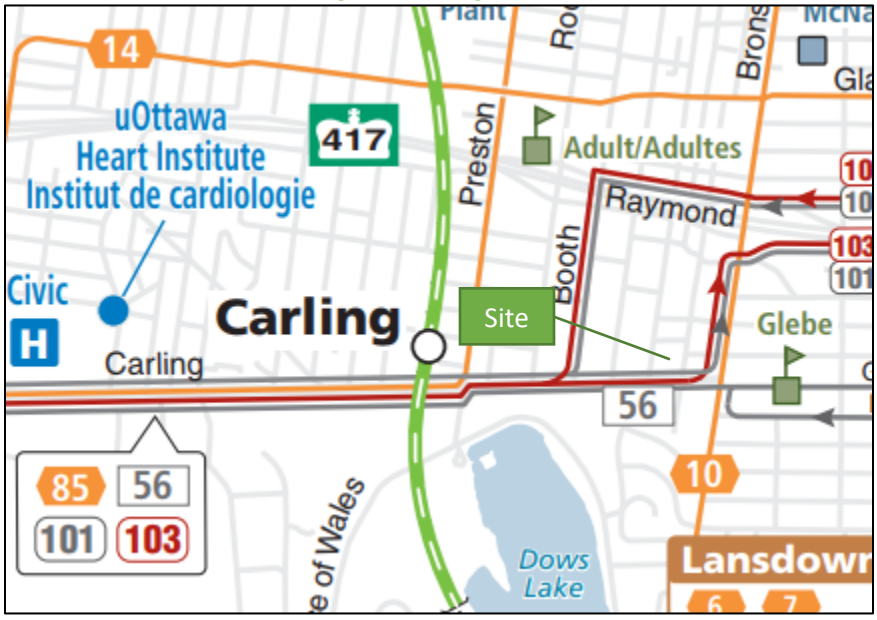
Both Carling Avenue and Bell Street South have sidewalks on both sides of the road, providing pedestrian connections to the proposed development along both frontages.

While not included on the City of Ottawa's Cycling Plan, accessed via geoOttawa.com, there are HOV / cycling / transit lanes along the curbside lanes eastbound and westbound on Carling Avenue. There are no cycling facilities along Bell Street South.

2.2.5 Existing Transit

The proposed development would be served by existing routes 56, 101, and 103 along Carling Avenue. The nearest transit stops, located at the intersection of Booth Street and Carling Avenue, are approximately 275 metres west of the site on Carling Avenue. Additionally, the O-Train Carling Station is approximately 700 metres west of the subject site.

Figure 4: Existing Transit



2.2.6 Existing Area Traffic Management Measures

There are no existing area traffic management measures within the Study Area.

2.2.7 Existing Peak Hour Travel Demand

Existing turning movement counts were not available from the City of Ottawa for the existing Study Area intersection, therefore a new turning movement count has been undertaken. Table 1 summarizes the intersection count date.

Table 1: Intersection Count Date

Intersection	Count Date
Bell Street South @ Carling Avenue	Thursday May 16, 2019

Detailed turning movement count data is included in Appendix B. Figure 5 illustrates the existing traffic counts and Table 2 summarizes the existing intersection operations. The level of service is based on the HCM criteria for average delay at unsignalized intersections. Detailed turning movement count data is included in Appendix B and the Synchro worksheets are provided in Appendix C.

Figure 5: Existing Traffic Counts

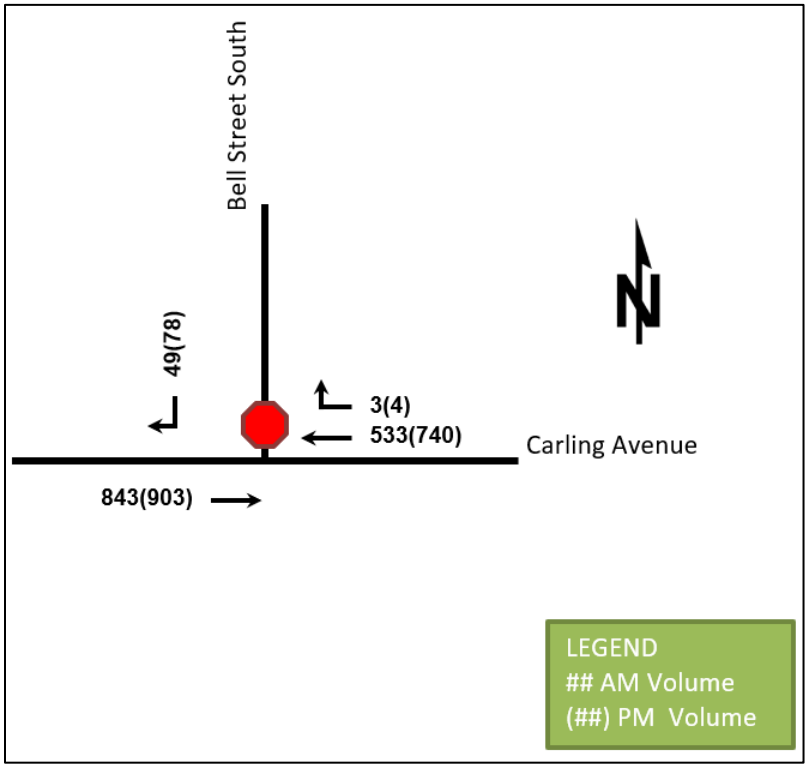


Table 2: Existing Intersection Operations

Intersection	Lane	AM Peak Hour			PM Peak Hour		
		LOS	Delay	V/C	LOS	Delay	V/C
Carling Avenue & Bell Street South ***Unsignalized***	SB	B	12	0.09	B	14	0.17

Overall, the right-in/right-out only intersection of Carling Avenue and Bell Street South operates well during the AM and PM peak hours with low delays and v/c ratios.

2.2.8 Collision Analysis

Collision data has been requested from the City of Ottawa for five years (2013-2017) prior to the commencement of this TIA at the Study Area intersection. No collisions have been reported at the intersection of Bell Street South and Carling Avenue in the period of 2013-2017.

2.3 Planned Conditions

2.3.1 Changes to the Area Transportation Network

There are no major changes to the immediate Study Area Transportation Network.

2.3.2 Other Study Area Developments

The following developments are listed on the City's Development Application Search tool:

- 265 Carling Avenue – 149 high-rise condominium/apartment units, 11 live/work townhomes, and an 88 s.m. commercial unit.
- 770 Bronson Avenue – 48 apartment units and 3,093 s.f. of ground level retail.

The traffic studies for both of these developments has been reviewed and each of these developments would contribute less than 10 vehicles per hour during the peak hour, through the intersection of Bell Street South at Carling Avenue. These developments and the associated traffic will have a minimal impact on the subject intersection.

3 Study Area and Time Periods

3.1 Study Area

The Study Area will include the intersection of Bell Street South at Carling Avenue.

3.2 Time Periods

As the proposed development is a small residential development with some support spaces.

3.3 Horizon Years

The anticipated build-out year is 2022. As a result, the full build-out plus five years horizon year is 2027.

4 Exemption Review

Table 3 summarizes the exemptions for this TIA.

Table 3: Exemption Review

Module	Element	Explanation	Exempt/Required
Design Review Component			
4.1 Development Design	4.1.2 Circulation and Access	Only required for site plans	Required
	4.2.3 New Street Networks	Only required for plans of subdivision	Exempt
4.2 Parking	4.2.1 Parking Supply	Only required for site plans	Required
	4.2.2 Spillover Parking	Only required for site plans where parking supply is 15% below unconstrained demand	Exempt
Network Impact Component			
4.5 Transportation Demand Management	All Elements	Not required for site plans expected to have fewer than 60 employees and/or students on location at any given time	Exempt
4.6 Neighbourhood Traffic Management	4.6.1 Adjacent Neighbourhoods	Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds	Exempt
4.8 Network Concept		Only required when proposed development generates more than 200 person-trips during the peak hour in excess of equivalent volume permitted by established zoning	Exempt

In addition to the above TIA requirements and exemptions, the following exemptions in Table 4 are also recommended for this TIA.

Table 4: Recommended Additional Exemptions

Module	Element	Explanation
Forecasting		
3.1 Development Generated Travel Demand	All Elements	Trip generation trigger was not met, therefore trip and mode share forecasting is not required for the subject site. An estimation of the on-site activity is approximately 45 person trips per hour, of which 30 are anticipated to be vehicle trips.
3.2 Background Network Travel Demand	All Elements	No intersection constraints were noted for the existing volumes and the background growth would continue to be accommodated within the network.
3.3 Demand Rationalization	All Elements	Subject to the trip generation trigger not being met, no demand rationalization is required as part of this TIA. The existing conditions summarized in Section 2.2.7 illustrate residual capacity in the existing road network and the network can support the anticipated trip generation of the proposed development.
Design Review Component		
4.3 Boundary Street Design	All Elements	Along Carling Avenue, the ROW is designated as a design priority area. This street will be upgraded as a whole corridor. The frontage of the subject site along Carling Avenue is also very short and any MMLOS upgrades would not be continuous. A ROW widening has been taken along the Carling Avenue frontage to allow for future upgrades to the entire corridor.
4.4 Access Intersection Design	4.4.2 Intersection Control 4.4.3 Intersection Design	The access intersection is anticipated to be a typical private approach design, completed as per City standards and operational requirements for site vehicles. Therefore, the need for a TIA to review the intersection control or operational characteristics is not required and can be completed as part of the site plan review process within the existing submission.
Network Impact Components		
4.7 Transit	All Elements	Subject to the trip generation trigger not being met, no demand rationalization is required as part of this TIA as there will not be a significant increase in the number of transit riders as a result of this development.
4.9 Network Intersections	All Elements	As outlined previously in this table, the low traffic generation will have minimal impact on network intersections and sufficient capacity if currently provided to accommodate an increase in line with background growth.

5 Design Review Component

5.1 Development Design

5.1.1 Circulation and Access Location / Design

The proposed site plan includes two access points, each of which will provide access to fewer than 20 parking stalls and therefore a three-metre-wide access at a minimum is required for two-way traffic. One access will be at a grade of 9.5% up to the upper level of parking and the other will be at a grade of 15% down to the lower level of parking. These ramp grades are needed due to the narrow width of the proposed property. By providing these steep grades, the remainder of the parking lot can adhere to the zoning by-law for parking lots, with respect to parking stall size and drive aisle width. When the vehicle leaves the underground access there is adequate space for the vehicle to reach a level position and see both ways on Bell Street South.

Figure 6 illustrates the distance between the two driveways, the approximate distance to the driveway for the adjacent property, the clear throat length, the access widths, and the distance to the adjacent intersection of Bell Street South and Carling Avenue. Additionally, as requested by City of Ottawa Staff, it has been shown that a passenger vehicle can fit between the two accesses. The interior parking area provides drive aisles and parking stall dimensions that are consistent with City of Ottawa By-laws.

Garbage collection will be via curbside pickup at the northern access point (upper level access). The accesses will accommodate passenger vehicles only and therefore no turning templates are required for site circulation of municipal vehicles. Emergency services will access the building from the adjacent streets and will not be required to circulate the proposed site.

5.2 Parking Supply

The proposed development will have two levels of parking, one upper and one lower. The upper level will have 14 parking spaces and the lower level will have 15 parking spaces. Table 5 below summarizes the required and provided parking for the proposed development.

Table 5: Parking Statistic Summary

Land Use	Units / GFA	Parking Rate	Required Parking	Provided Parking	Surplus / (Deficit)
Residential	40 units	0.5/unit >12	14	16	2
Residential (Visitor)		0.1/unit >12	3	3	-
Office	1000 s.m.	1/100 s.m.	10	10	-
Total			27	29	2

The proposed site plan will include a total of 29 parking stalls, two more than the minimum required under the zoning by-law.

6 MMLOS

Intersection MMLOS is only undertaken at signalized intersections. Therefore, this section will examine the segment MMLOS for Carling Avenue and Bell Street South.

6.1 Pedestrian MMLOS

Segment MMLOS for pedestrian facilities is evaluated based on a look-up table and the cross-section and roadway characteristics. Along both frontages of the site the existing sidewalks will be maintained, each of which are currently 1.5 metres in width and have no boulevard. Carling Avenue is estimated to have an AADT greater than 3000 and Bell Street South is estimated to have an AADT less than 3000. Table 6 below shows the actual and target PLOS.

Table 6: Pedestrian LOS

Segment	PLOS	Target (General Urban Area)
Carling Avenue	F	C
Bell Street South	E	C

Expanding the sidewalks would create a sidewalk that varies in width along both Carling Avenue and Bell Street South. A road widening easement has been taken along the Carling Avenue frontage. At the time that Carling Avenue is reconstructed the PLOS will be improved by constructing upgraded sidewalks and providing a boulevard, if required.

6.2 Bicycle MMLOS

Segment MMLOS for pedestrian facilities is evaluated based on a look-up table and the cross-section and roadway characteristics. Both Carling Avenue and Bell Street South provide mixed traffic cycling facilities. Table 7 summarizes the actual and target BLOS.

Table 7: Bicycle LOS

Segment	BLOS	Target (General Urban Area)
Carling Avenue	D	D
Bell Street South	B	D

Both streets meet the target BLOS for Carling Avenue and Bell Street South. These may be further improved upon as part of the future widening of Carling Avenue.

6.3 Transit MMLOS

Segment MMLOS for transit is primarily applied along corridors with existing rapid transit priority measures. Carling Avenue has a curbside cycling / transit lane. The TLOS for Carling Avenue is B and the target TLOS is B.

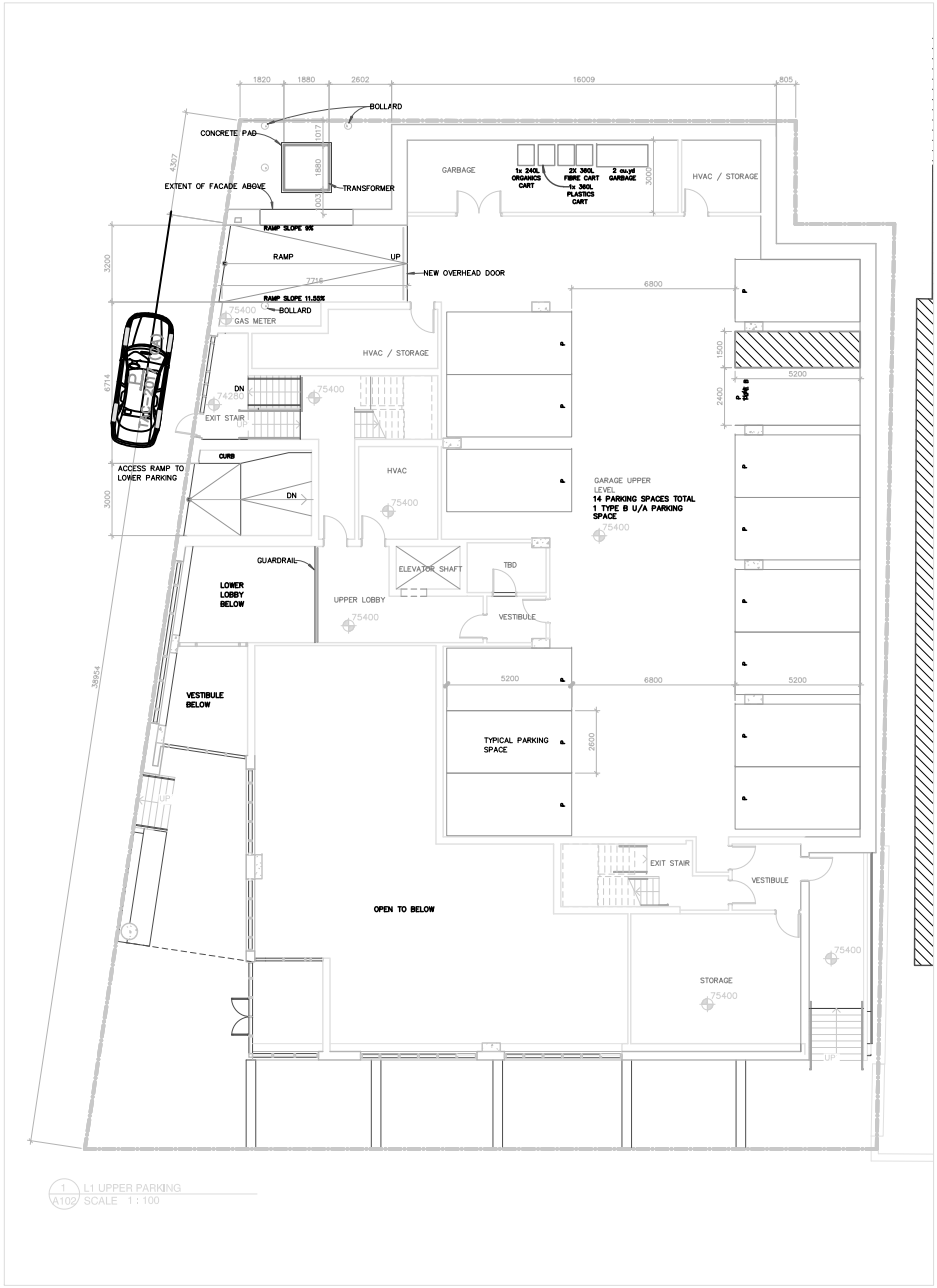
6.4 Truck MMLOS

Segment MMLOS for trucks is evaluated based on the curb lane width and the number of travel lanes. Table 8 summarizes the Truck LOS.

Table 8:Truck LOS

Segment	TkLOS	Target (General Urban Area)
Carling Avenue	A	D
Bell Street South	B	D

Both road segments meet the Truck LOS target for the area.



NOTES:

Contractor shall check and verify all dimensions on site and report any discrepancies to the Architect before proceeding.

no.	revision	date
8	ISSUED FOR SITE PLAN COORDINATION	9 AUG 2019
7	ISSUED FOR CONSULTANT COORDINATION	06 AUG 2019
6	ISSUED FOR CONSULTANT COORDINATION	30 JULY 2019
5	ISSUED FOR CONSULTANT COORDINATION	15 JULY 2019
4	ISSUED FOR CONSULTANT COORDINATION	5 JULY 2019
3	ISSUED FOR COSTING	19 JUNE 2019

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JHS - 289 CARLING AVENUE

JOHN HOWARD SOCIETY
289 CARLING AVE, OTTAWA

LEVEL 1 UPPER PARKING PLAN

A102

plot scale 1:1

SHEET SIZE: ARCH D (24"x36")

7 Summary and Conclusion

Based on the foregoing TIA, the following transportation related conclusions can be offered.

A. The proposed development at 289 Carling Avenue will include 40 residential units and 1000 square metres of office space.
B. The proposed development will trigger the Design Review component of the TIA Guidelines, based on the Design Priority Area criteria, as the section of Carling Avenue adjacent to the site is designated as part of the Carling Arterial Mainstreet.
C. The operational analysis of the intersection of Bell Street South at Carling Avenue illustrated that the intersection is operating well and there is residual capacity to accommodate additional vehicular traffic.
D. No collisions have been reported at the intersection of Bell Street South and Carling Avenue within a five-year period prior to this report.
E. The MMLOS review has shown that the road segments adjacent to the subject development meet the criteria for general urban area, with the exception of the pedestrian LOS, which is limited by the existing sidewalk width.
F. The site design characteristics have been reviewed and it has been determined that intersection location and design is appropriate for the proposed land use and will allow access to and from the proposed parking lots.
G. The proposed 29 parking spaces are adequate to support the proposed development.

Given the above, it is the recommendation of this Screening/Scoping Report that the TIA requirements for the proposed development have been met and no further review or assessment of the development is required.

Prepared By:

Mark Crockford, P.Eng.

Senior Transportation Engineer

Reviewed By:

Christopher Gordon, P.Eng.

Senior Transportation Engineer

Appendix A

TIA Screening Form and PM Certification Form

13 Markham Avenue
Ottawa ON K2G 3Z1

City of Ottawa 2017 TIA Guidelines
Step 1 - Screening Form

Date: 03-Apr-19
Project Number: 2019-10
Project Reference: 289 Carling Avenue

1.1 Description of Proposed Development	
Municipal Address	289 Carling Avenue
Description of Location	PLAN 31326 LOT 10 PT LOTS 8;9 AND 11 RP 5R4231 PA
Land Use Classification	Residential
Development Size	40 residential units; ~1100 s.m. office space
Accesses	Two accesses onto Bell St. South
Phase of Development	Single phase
Buildout Year	2022
TIA Requirement	Design Review Component

1.2 Trip Generation Trigger	
Land Use Type	See attached. Does not meet Trip Gen Trigger.
Development Size	G.F.A.
Trip Generation Trigger	Enter Size

1.3 Location Triggers	
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks?	No
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?	Yes
Location Trigger	Yes

1.4. Safety Triggers	
Are posted speed limits on a boundary street are 80 km/hr or greater?	No
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?	No
Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions)?	No
Is the proposed driveway within auxiliary lanes of an intersection?	No
Does the proposed driveway make use of an existing median break that serves an existing site?	No
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?	No
Does the development include a drive-thru facility?	No
Safety Trigger	No

Land Use Type	Min. Dev. S	Units/m^2	Development	
Single-family homes	40	Units		
Townhomes or apartments	90	Units	40	44%
Office	3500	m^2	1000	29%
Industrial	500	m^2		
Fast-food restaurant or coffee shop	100	m^2		
Destination retail	1000	m^2		
Gas station or convenience market	75	m^2		
			Total	73%

TIA Plan Reports

On 14 June 2017, the Council of the City of Ottawa adopted new Transportation Impact Assessment (TIA) Guidelines. In adopting the guidelines, Council established a requirement for those preparing and delivering transportation impact assessments and reports to sign a letter of certification.

Individuals submitting TIA reports will be responsible for all aspects of development-related transportation assessment and reporting, and undertaking such work, in accordance and compliance with the City of Ottawa's Official Plan, the Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines.

By submitting the attached TIA report (and any associated documents) and signing this document, the individual acknowledges that s/he meets the four criteria listed below.

CERTIFICATION

1. I have reviewed and have a sound understanding of the objectives, needs and requirements of the City of Ottawa's Official Plan, Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines;
2. I have a sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;
3. I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and
4. I am either a licensed[1] or registered[2] professional in good standing, whose field of expertise [check √ appropriate field(s)] is either transportation engineering √ or transportation planning □.

[1,2] License of registration body that oversees the profession is required to have a code of conduct and ethics guidelines that will ensure appropriate conduct and representation for transportation planning and/or transportation engineering works.

City Of Ottawa
Infrastructure Services and Community Sustainability
Planning and Growth Management
110 Laurier Avenue West, 4th fl.
Ottawa, ON K1P 1J1
Tel. : 613-580-2424
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Ville d'Ottawa
Services d 'infrastructure et Viabilité des collectivités
Urbanisme et Gestion de la croissance
110, avenue Laurier Ouest
Ottawa (Ontario) K1P 1J1
Tél. : 613-580-2424
Télécopieur: 613-560-6006

Dated at Newmarket (City) this 03 day of December, 2018.

Name: Mark Crockford
(Please Print)

Professional Title: Professional Engineer

Signature of Individual certifier that s/he meets the above four criteria

Office Contact Information (Please Print)
Address: 628 Haines Road
City / Postal Code: Newmarket / L3Y 6V5
Telephone / Extension: (905) 251-4070
E-Mail Address: Mark.Crockford@CGHTransportation.com

Appendix B

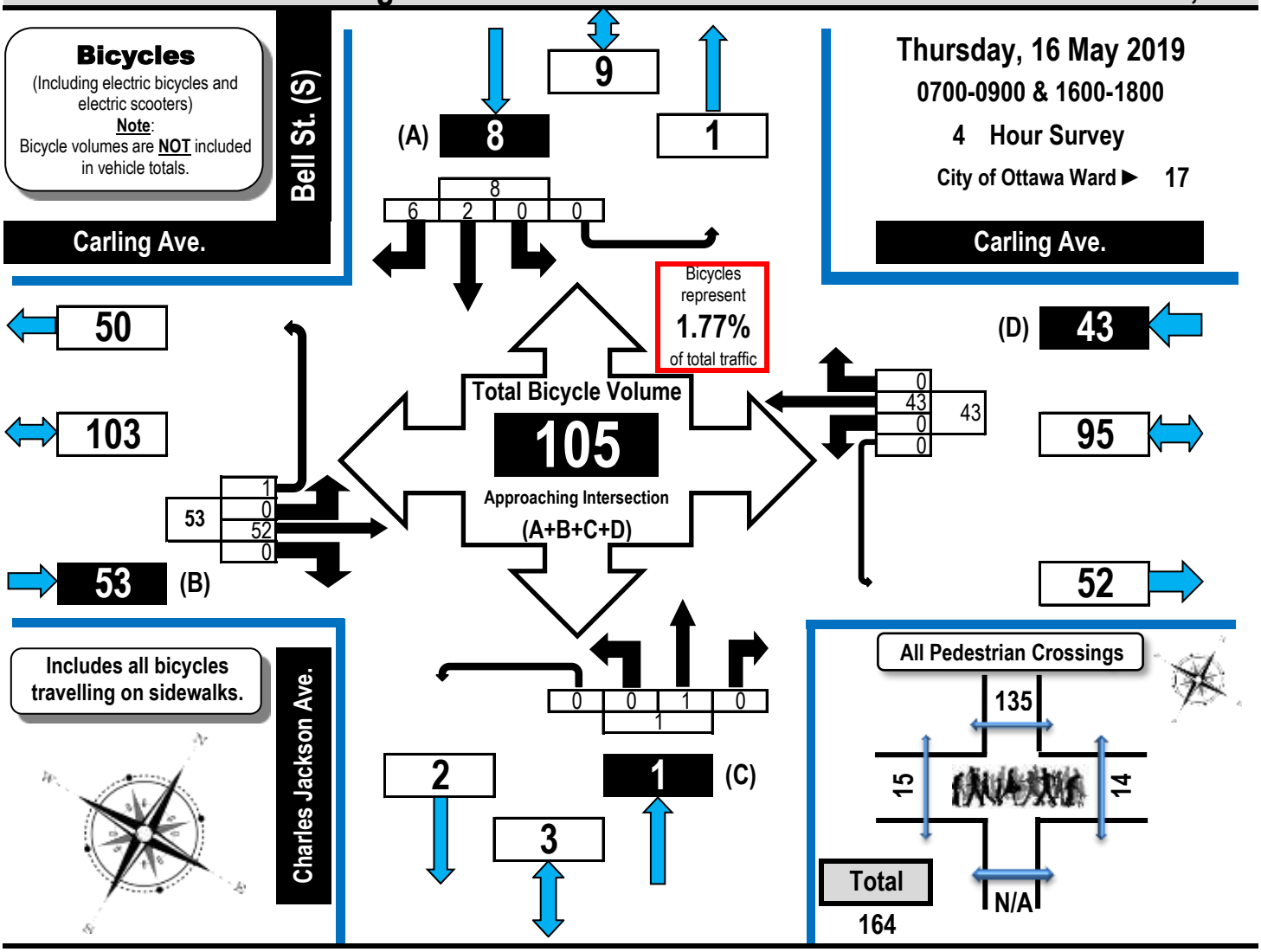
Turning Movement Counts

Turning Movement Count
Bicycle Summary
Flow Diagram

Bell Street South & Carling Avenue — Ottawa, ON

Bicycles
(Including electric bicycles and electric scooters)
Note:
Bicycle volumes are NOT included in vehicle totals.

Thursday, 16 May 2019
0700-0900 & 1600-1800
4 Hour Survey
City of Ottawa Ward ► 17



	Carling Ave. Eastbound					Carling Ave. Westbound					Charles Jackson Ave. Northbound					Bell St. (S) Southbound					
Time Period	LT	ST	RT	UT	S. Tot	LT	ST	RT	UT	S. Tot	LT	ST	RT	UT	S. Tot	LT	ST	RT	UT	S. Tot	G.Tot.
0700-0800	0	12	0	0	12	0	9	0	0	9	0	0	0	0	0	0	0	1	0	1	22
0800-0900	0	27	0	0	27	0	12	0	0	12	0	0	0	0	0	0	1	3	0	4	43
1600-1700	0	6	0	1	7	0	14	0	0	14	0	1	0	0	1	0	1	0	0	1	23
1700-1800	0	7	0	0	7	0	8	0	0	8	0	0	0	0	0	0	0	2	0	2	17
Totals	0	52	0	1	53	0	43	0	0	43	0	1	0	0	1	0	2	6	0	8	105

Charles Jackson Avenue is closed at Carling Avenue and is accessible only by pedestrians and cyclists.

Comments:

Charles Jackson Avenue is closed at Carling Avenue and is accessible only by bicycles and pedestrians. Traffic backs up eastbound in the south curb lane on Carling Avenue from Bronson Avenue to beyond Charles Jackson Avenue occasionally between 1600 & 1800H.

ACCURATE TRUSTED TRAFFIC DATA

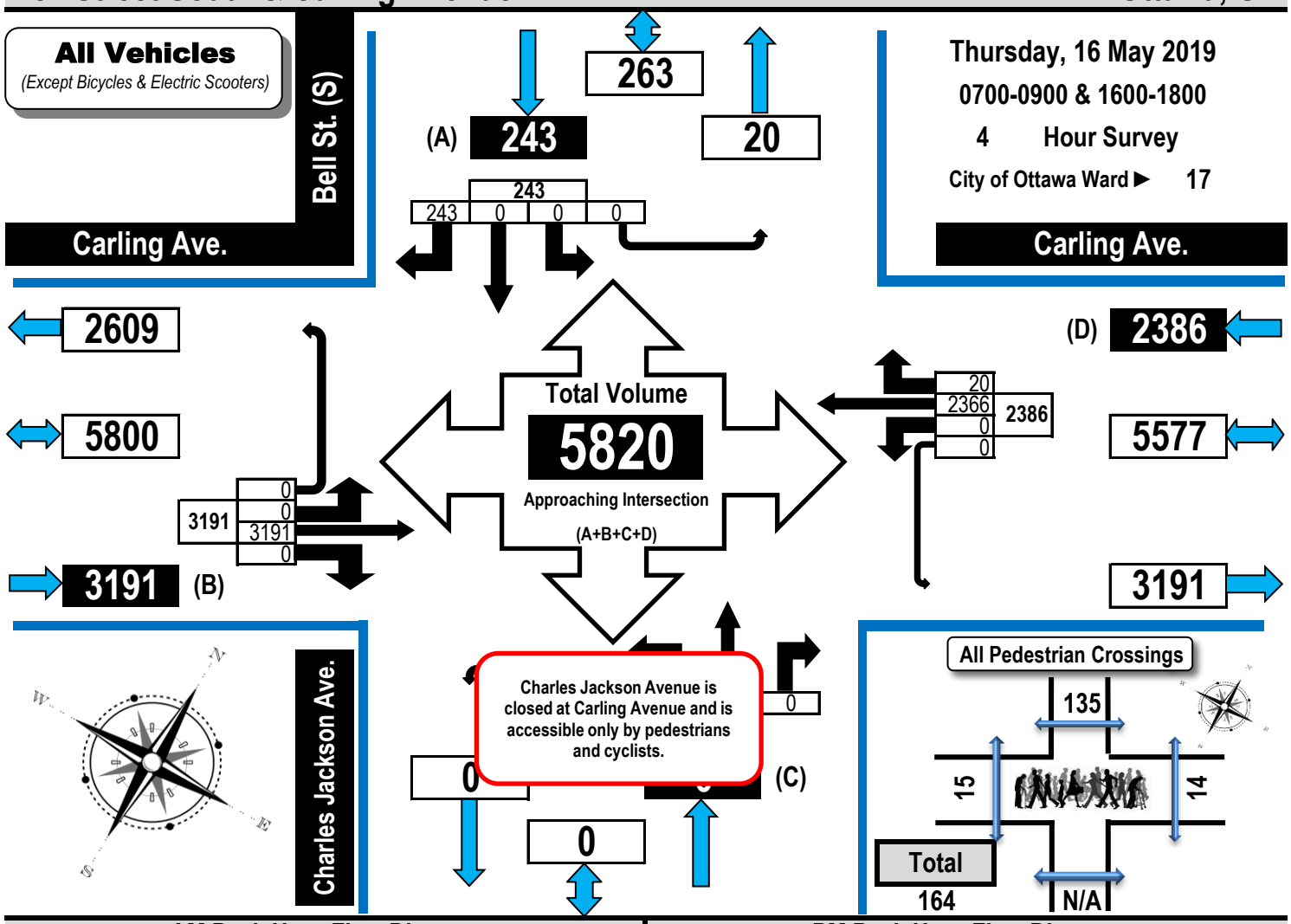
Turning Movement Count
Summary, AM and PM Peak Hour Flow Diagrams

Automobiles, Taxis, Light Trucks, Vans, SUV's, Motorcycles, Heavy Trucks, Buses, and School Buses

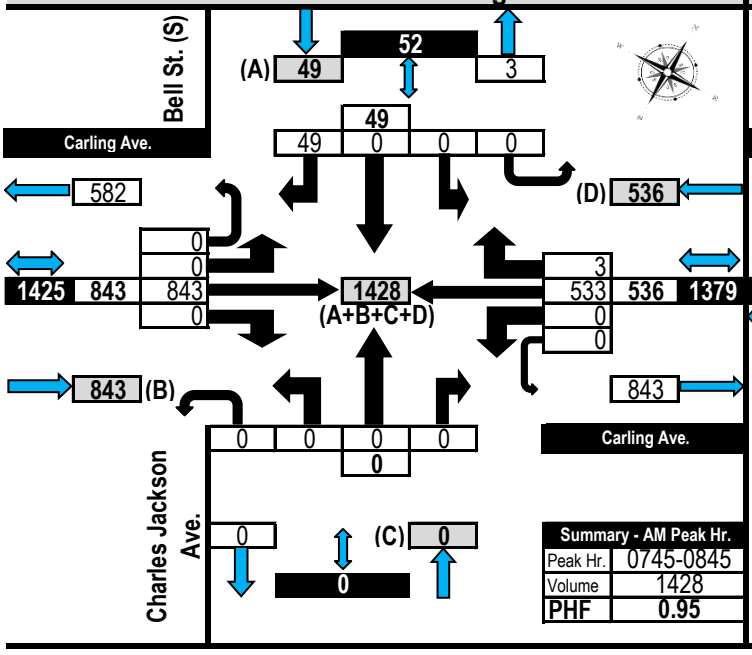
Bell Street South & Carling Avenue — Ottawa, ON

All Vehicles
(Except Bicycles & Electric Scooters)

Thursday, 16 May 2019
0700-0900 & 1600-1800
4 Hour Survey
City of Ottawa Ward ▶ 17

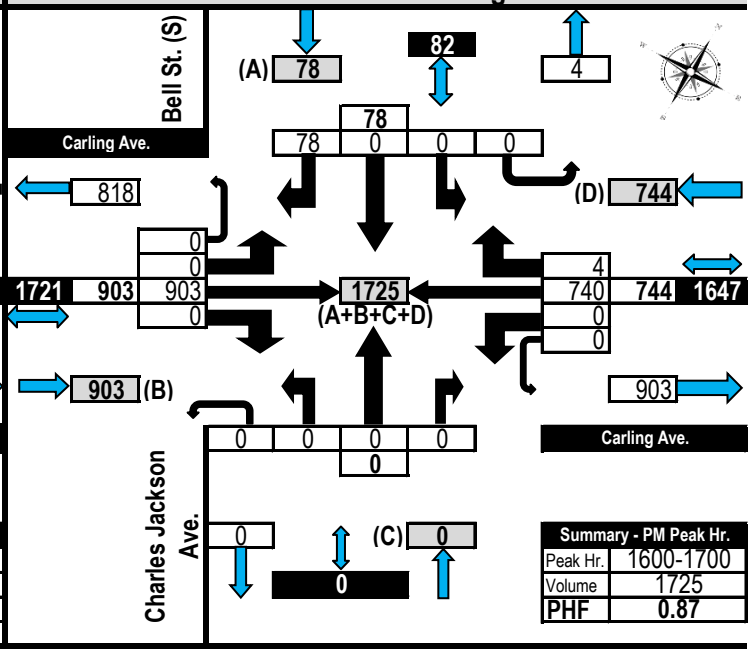


AM Peak Hour Flow Diagram



Summary - AM Peak Hr.	
Peak Hr.	0745-0845
Volume	1428
PHF	0.95

PM Peak Hour Flow Diagram



Summary - PM Peak Hr.	
Peak Hr.	1600-1700
Volume	1725
PHF	0.87

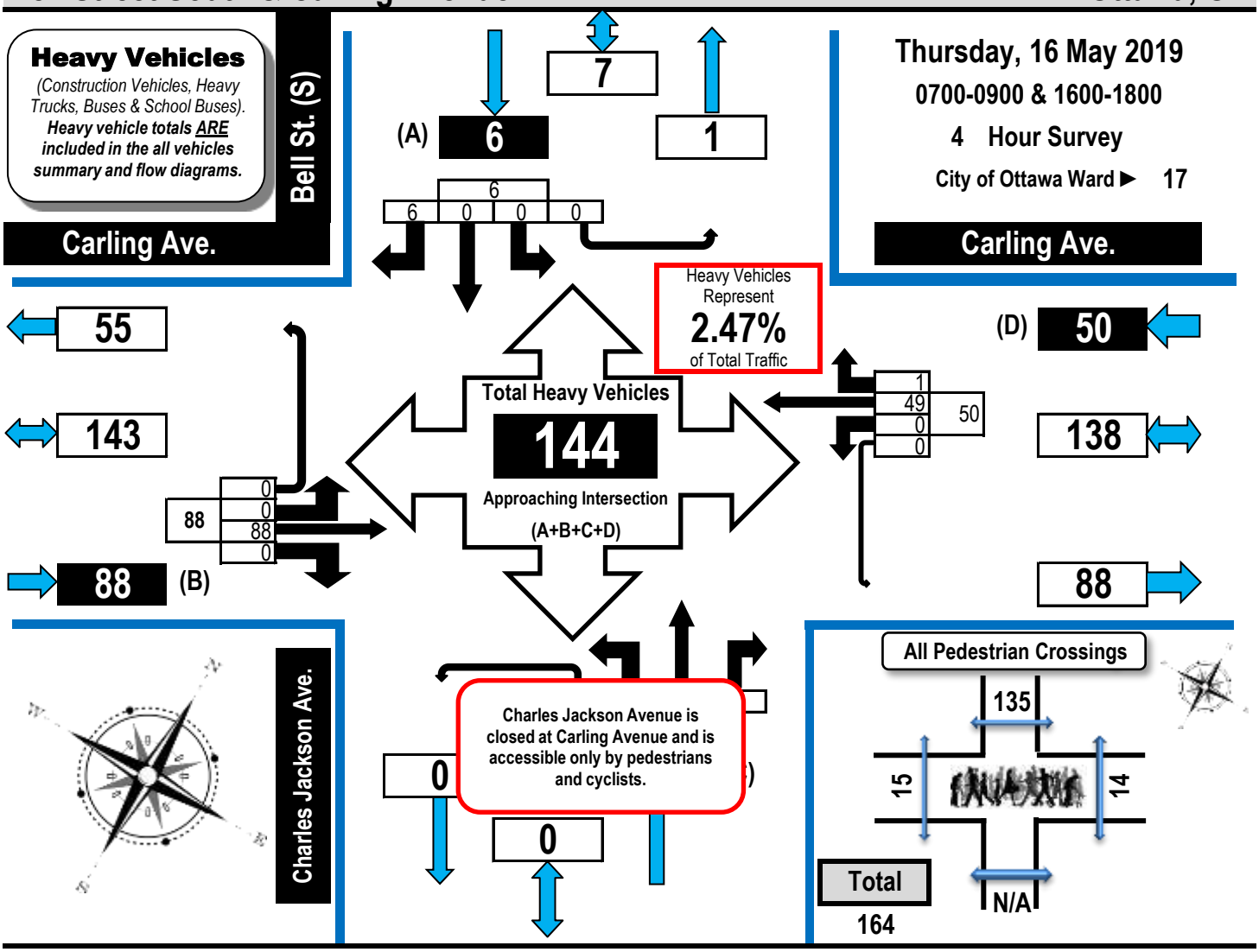
Turning Movement Count
Heavy Vehicle Summary
Flow Diagram

Heavy Trucks, Buses, and School Buses

Bell Street South & Carling Avenue — Ottawa, ON

Heavy Vehicles
(Construction Vehicles, Heavy Trucks, Buses & School Buses).
Heavy vehicle totals ARE included in the all vehicles summary and flow diagrams.

Thursday, 16 May 2019
0700-0900 & 1600-1800
4 Hour Survey
City of Ottawa Ward ► 17



	Carling Ave. Eastbound					Carling Ave. Westbound					harles Jackson Av Northbound					Bell St. (S) Southbound					
Time Period	LT	ST	RT	UT	S. Tot	LT	ST	RT	UT	S. Tot	LT	ST	RT	UT	S. Tot	LT	ST	RT	UT	S. Tot	G.Tot.
0700-0800	0	25	0	0	25	0	17	0	0	17	0	0	0	0	0	0	0	0	0	0	42
0800-0900	0	22	0	0	22	0	13	1	0	14	0	0	0	0	0	0	0	3	0	3	39
1600-1700	0	24	0	0	24	0	8	0	0	8	0	0	0	0	0	0	0	2	0	2	34
1700-1800	0	17	0	0	17	0	11	0	0	11	0	0	0	0	0	0	0	1	0	1	29
Totals	0	88	0	0	88	0	49	1	0	50	0	0	0	0	0	0	0	6	0	6	144

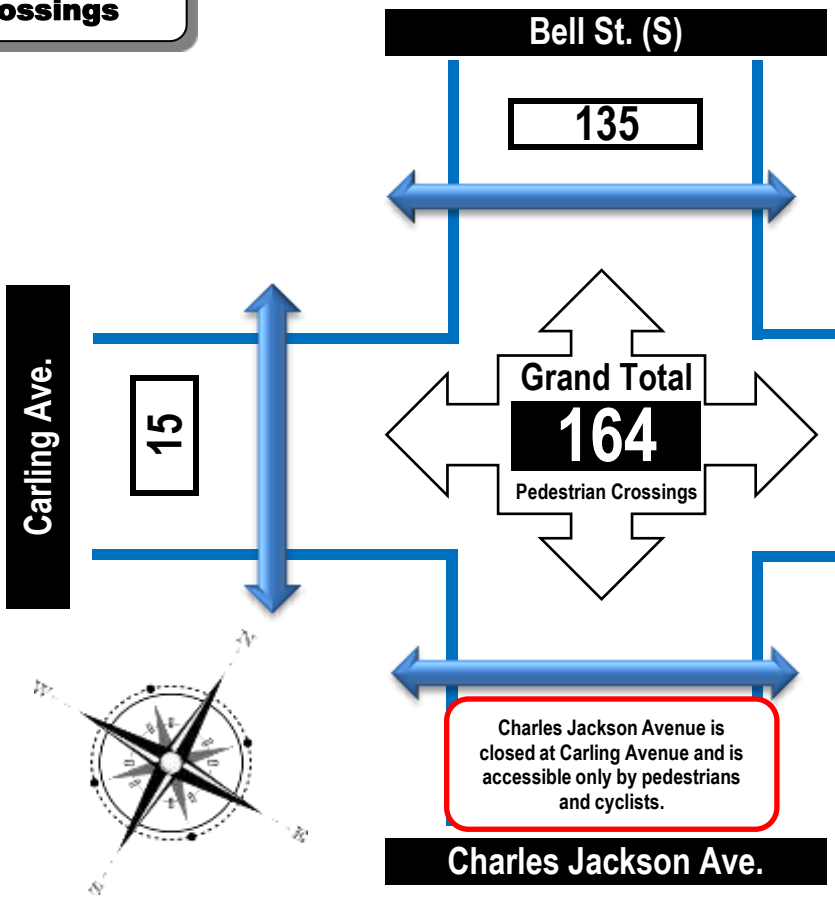
Comments:
Charles Jackson Avenue is closed at Carling Avenue and is accessible only by bicycles and pedestrians. Traffic backs up eastbound in the south curb lane on Carling Avenue from Bronson Avenue to beyond Charles Jackson Avenue occasionally between 1600 & 1800H.

Turning Movement Count
Pedestrian Crossings Summary and Flow Diagram

Bell Street South & Carling Avenue — Ottawa, ON

Pedestrian Crossings

Thursday, 16 May 2019
0700-0900 & 1600-1800
4 Hour Survey
City of Ottawa Ward ► 17



Charles Jackson Avenue is closed at Carling Avenue and is accessible only by pedestrians and cyclists.

Note

*The values in the summary table below and the flow diagram represent the number of pedestrian crossing**s** **NOT** the number of individual pedestrian**s** crossing. For example, some pedestrians will cross one approach, then another to reach their destination. Accordingly, one pedestrian crossing two approaches will be recorded as two crossings.*

Time Period	West Side Crossing Carling Ave.	East Side Crossing Carling Ave.	Street Total	South Side Crossing Charles Jackson Ave.	North Side Crossing Bell St. (S)	Street Total	Grand Total
0700-0800	3	1	4	0	17	17	21
0800-0900	3	2	5	0	48	48	53
1600-1700	2	4	6	0	39	39	45
1700-1800	7	7	14	0	31	31	45
Totals	15	14	29	0	135	135	164

Comments:

Charles Jackson Avenue is closed at Carling Avenue and is accessible only by bicycles and pedestrians. Traffic backs up eastbound in the south curb lane on Carling Avenue from Bronson Avenue to beyond Charles Jackson Avenue occasionally between 1600 & 1800H.

ACCURATE TRUSTED TRAFFIC DATA

Turning Movement Count
Summary Report
AADT and Expansion Factors

Automobiles, Taxis, Light Trucks, Vans, SUV's, Motorcycles, Heavy Trucks, Buses, and School Buses

Bell Street South & Carling Avenue — Ottawa, ON

Survey Date: Thursday, 16 May 2019 **Start Time:** 0700 **AADT Factor:** 0.9
Weather AM: Partly Cloudy +5ºC **Survey Duration:** 4 Hrs. **Survey Hours:** 0700-0900 & 1600-1800
Weather PM: Partly Cloudy +13ºC **Surveyor(s):** Carmody

	Carling Ave. Eastbound					Carling Ave. Westbound						Charles Jackson Ave. Northbound					Bell St. (S) Southbound						
Time Period	LT	ST	RT	UT	E/B Tot	LT	ST	RT	UT	W/B Tot	Street Total	LT	ST	RT	UT	N/B Tot	LT	ST	RT	UT	S/B Tot	Street Total	Grand Total
0700-0800	0	666	0	0	**666**	0	516	8	0	**524**	**1190**	0	0	0	0	**0**	0	0	29	0	**29**	**29**	**1219**
0800-0900	0	869	0	0	**869**	0	506	2	0	**508**	**1377**	0	0	0	0	**0**	0	0	49	0	**49**	**49**	**1426**
1600-1700	0	903	0	0	**903**	0	740	4	0	**744**	**1647**	0	0	0	0	**0**	0	0	78	0	**78**	**78**	**1725**
1700-1800	0	753	0	0	**753**	0	604	6	0	**610**	**1363**	0	0	0	0	**0**	0	0	87	0	**87**	**87**	**1450**
Totals	**0**	**3191**	**0**	**0**	**3191**	**0**	**2366**	**20**	**0**	**2386**	**5577**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**243**	**0**	**243**	**243**	**5820**

Equivalent 12 & 24-hour Vehicle Volumes Including the Annual Average Daily Traffic (AADT) Factor Applicable to the Day and Month of the Turning Movement Count

Expansion factors are applied exclusively to standard weekday 8-hour turning movement counts conducted during the hours of 0700h - 1000h, 1130h - 1330h and 1500h - 1800h

Equivalent 12-hour vehicle volumes. These volumes are calculated by multiplying the 8-hour totals by the 8 ➡12 expansion factor of 1.39

Equ. 12 Hr	n/a	n/a	n/a	n/a	**n/a**	n/a	n/a	n/a	n/a	**n/a**	**n/a**	n/a	n/a	n/a	n/a	**n/a**	n/a	n/a	n/a	n/a	**n/a**	**n/a**	**n/a**

Average daily 12-hour vehicle volumes. These volumes are calculated by multiplying the equivalent 12-hour totals by the AADT factor of: 0.9

AADT 12-hr	n/a	n/a	n/a	n/a	**n/a**	n/a	n/a	n/a	n/a	**n/a**	**n/a**	n/a	n/a	n/a	n/a	**n/a**	n/a	n/a	n/a	n/a	**n/a**	**n/a**	**n/a**

24-Hour AADT. These volumes are calculated by multiplying the average daily 12-hour vehicle volumes by the 12 ➡24 expansion factor of 1.31

AADT 24 Hr	n/a	n/a	n/a	n/a	**n/a**	n/a	n/a	n/a	n/a	**n/a**	**n/a**	n/a	n/a	n/a	n/a	**n/a**	n/a	n/a	n/a	n/a	**n/a**	**n/a**	**n/a**

AADT and expansion factors provided by the City of Ottawa

AM Peak Hour Factor ➡ 0.95												Highest Hourly Vehicle Volume Between 0700h & 0900h											
AM Peak Hr	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	G.TOT
0745-0845	0	843	0	0	**843**	0	533	3	0	**536**	**1379**	0	0	0	0	**0**	0	0	49	0	**49**	**49**	**1428**

PM Peak Hour Factor ➡ 0.87												Highest Hourly Vehicle Volume Between 1600h & 1800h											
PM Peak Hr	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	G.TOT
1600-1700	0	903	0	0	**903**	0	740	4	0	**744**	**1647**	0	0	0	0	**0**	0	0	78	0	**78**	**78**	**1725**

Comments:

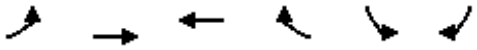
Charles Jackson Avenue is closed at Carling Avenue and is accessible only by bicycles and pedestrians. Traffic backs up eastbound in the south curb lane on Carling Avenue from Bronson Avenue to beyond Charles Jackson Avenue occasionally between 1600 & 1800H.

Notes:

1. Includes all vehicle types except bicycles, electric bicycles, and electric scooters.
2.When expansion and AADT factors are applied, the results will differ slightly due to rounding.

Appendix C

Synchro Worksheets – Existing Conditions



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	843	533	3	0	49
Future Volume (vph)	0	843	533	3	0	49
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	0.91	0.91	0.91	1.00	1.00
Frt			0.999			0.865
Flt Protected						
Satd. Flow (prot)	0	4818	4813	0	0	1526
Flt Permitted						
Satd. Flow (perm)	0	4818	4813	0	0	1526
Link Speed (k/h)		50	50		50	
Link Distance (m)		200.0	200.0		200.0	
Travel Time (s)		14.4	14.4		14.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	916	579	3	0	53
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	916	582	0	0	53
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		0.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 20.9%		ICU Level of Service A	
Analysis Period (min) 15			

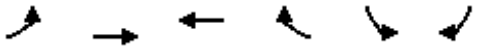
Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑↑			↱
Traffic Vol, veh/h	0	843	533	3	0	49
Future Vol, veh/h	0	843	533	3	0	49
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	916	579	3	0	53

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	291
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	0	-	-	-	0	602
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	602
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	11.6
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	602
HCM Lane V/C Ratio	-	-	-	0.088
HCM Control Delay (s)	-	-	-	11.6
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.3



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	903	740	4	0	78
Future Volume (vph)	0	903	740	4	0	78
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	0.91	0.91	0.91	1.00	1.00
Frt			0.999			0.865
Flt Protected						
Satd. Flow (prot)	0	4818	4813	0	0	1526
Flt Permitted						
Satd. Flow (perm)	0	4818	4813	0	0	1526
Link Speed (k/h)		50	50		50	
Link Distance (m)		200.0	200.0		200.0	
Travel Time (s)		14.4	14.4		14.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	982	804	4	0	85
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	982	808	0	0	85
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		0.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 27.0%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	903	740	4	0	78
Future Vol, veh/h	0	903	740	4	0	78
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	982	804	4	0	85

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	404
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	0	-	-	-	0	509
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	509
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	13.5
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	509
HCM Lane V/C Ratio	-	-	-	0.167
HCM Control Delay (s)	-	-	-	13.5
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.6

Technical Memorandum

To:	Wally Dubyk, City of Ottawa	Date:	2019-08-09
Cc:	Christopher Gordon – CGH Transportation Maria Martinez – PBC Group		
From:	Mark Crockford, P.Eng.	Project Number:	2019-10

Re: 289 Carling Avenue – Vertical Sightline Review

Comments have been received from the City of Ottawa on June 14, 2019 for the development application for the proposed residential development at 289 Carling Avenue. As part of those comments a review of the vertical sightlines has been requested. This memo summarizes the required sight distance and the field review of sight distances.

The proposed access is onto Bell Street South, a local road. The subject segment is a short segment with several driveways and intersections with other local roads, including an all way stop at the intersection of Bell Street South and Powell Avenue, and a stop control on Bell Street at Carling Avenue with a right-in/right-out intersection. Therefore, while the unposted limit is 50 km/h it is unlikely that vehicles will reach the posted speed limit and a design speed of 40 km/h has been used for this sight line review.

Given the road grades along the frontage of the site an adjustment factor will be applied to the sight distance using TAC Table 9.9.2 (1.1 will be used based on the design speed and estimated % grade).

The departure sight distance to the south is limited by the intersection of Carling Avenue at Bell Street South and is unobstructed. Therefore, this memo will focus on the sight line to the north. The left-turn out design case will be examined, Case B1, TAC Table 9.9.4. The departure sight distance required is 85 metres, increased by 1.1 to account for grade, requiring a departure sight distance of 93.5 metres. The required stopping sight distance is 50 metres, increased by 1.1 to account for grade, requiring a stopping sight distance of 55 metres.

The site visit examined the distance from the estimated northern site access location. Using this location several reference points were selected and the available sight distance was measured.

Looking from the access to the north it was determined that there is approximately 94 metres of available sight distance, meeting the departure sight distance for a design speed of 40 km/h. In the opposite direction, looking towards the access from the north, it was determined that there is approximately 77 metres of sight distance, meeting the stopping sight distance for a 50 km/h design speed.

Based on the field review of the available sight distance it was found that the departure sight distance for a 40 km/h design speed is provided and stopping sight distance for a 50 km/h design speed. Given the low speed urban environment, and the short section of Bell Street between Powell and Carling, these are acceptable design speeds for this local road.

TAC Reference Tables

Table 9.9.2: Adjustment Factors for Sight Distance Based on Approach Grade

Approach Grade (%)	Design Speed (km/h)													
	20	30	40	50	60	70	80	90	100	110	120	130	—	—
-6	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.2	—	—
-5	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	—	—
-4	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	—	—
-3 to +3	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	—	—
+4	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	—	—
+5	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	—	—
+6	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	—	—

Table 9.9.4: Design Intersection Sight Distance – Case B1, Left Turn From Stop

Design Speed (km/h)	Stopping Sight Distance (m)	Intersection Sight Distance for Passenger Cars	
		Calculated (m)	Design (m)
20	20	41.7	45
30	35	62.6	65
40	50	83.4	85
50	65	104.3	105
60	85	125.1	130
70	105	146.0	150
80	130	166.8	170
90	160	187.7	190
100	185	208.5	210
110	220	229.4	230
120	250	250.2	255
130	285	271.1	275

Photo from Fire Hydrant, looking north on Bell St.

- Picture height approximately 150cm
- UPS truck approximately 96m away, headlights visible
- Pedestrians approximately 70m away

Photo from corner of retaining wall, looking south on Bell St.

- Picture height approximately 140cm
- Green garbage bins visible at hydro pole
- Approximate distance of 77m (at corner of retaining wall of 360 Bell)
- Similar site distance to next hydro pole 18m farther adjacent to existing parking access

Photo from manhole / fire hydrant on opposite side of Bell St, looking south on Bell St.

- Picture height approximately 140cm
- In front of UPS truck
- Green garbage bin lids visible at hydro pole

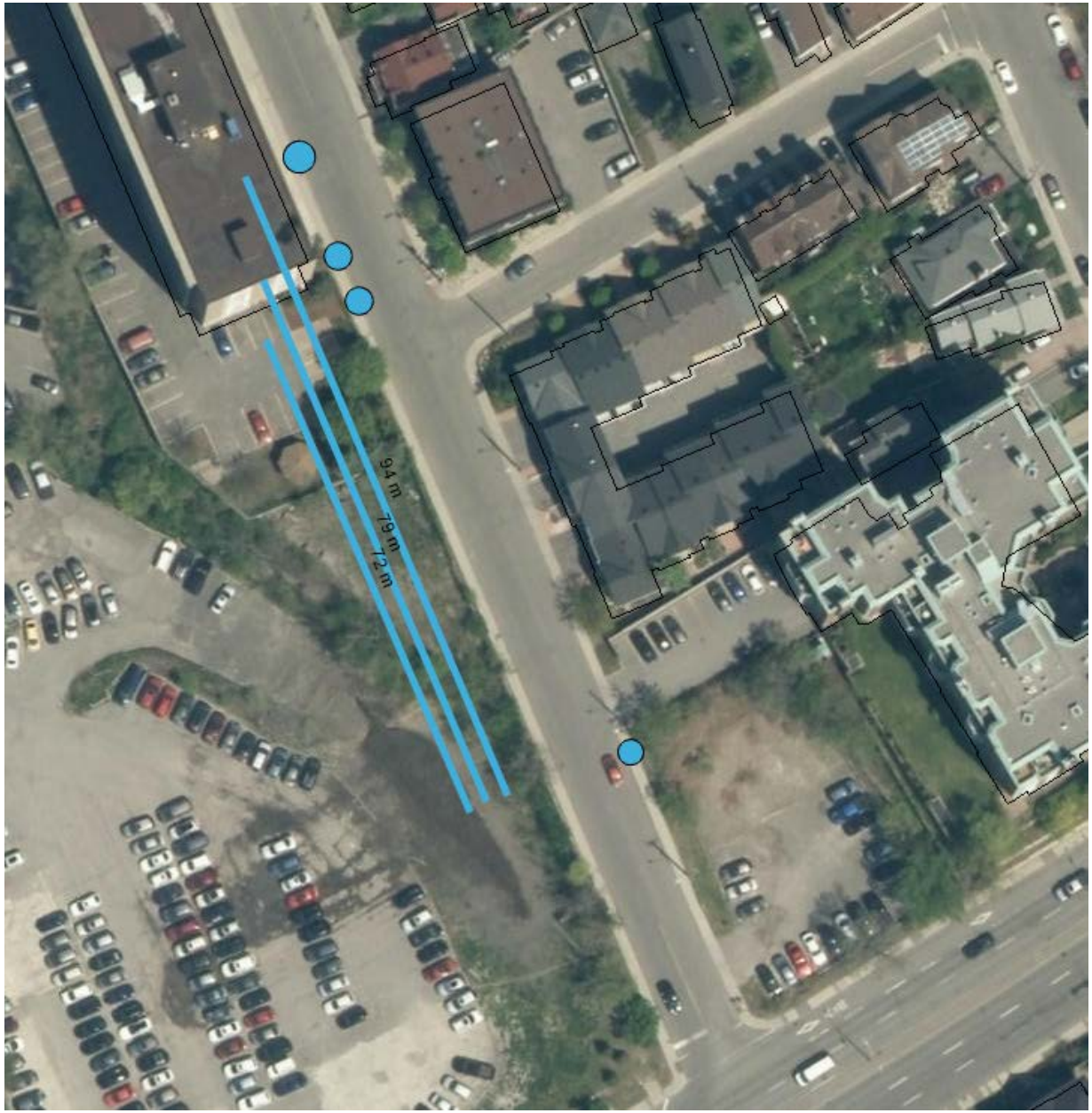
Photo from car, near end of radius of McLane Street (or near where pedestrians were in 1st photo), looking south on Bell St.

- Similar to previous photos for site distance
-

Manhole/Hydrant in front of UPS truck

Corner of 360 Bell retaining wall

Frontage of site, greenery makes landmarks difficult to determine. Landscaped front would correct this.


94 m
79 m
72 m

Technical Memorandum

To:	Maria Martinez, PBC Development & Construction Management Group Inc.	Date:	2019-08-16
Cc:	Christopher Gordon, CGH Transportation		
From:	Mark Crockford, P.Eng.	Project Number:	2019-10

Re: 289 Carling Avenue – Traffic Management Plan

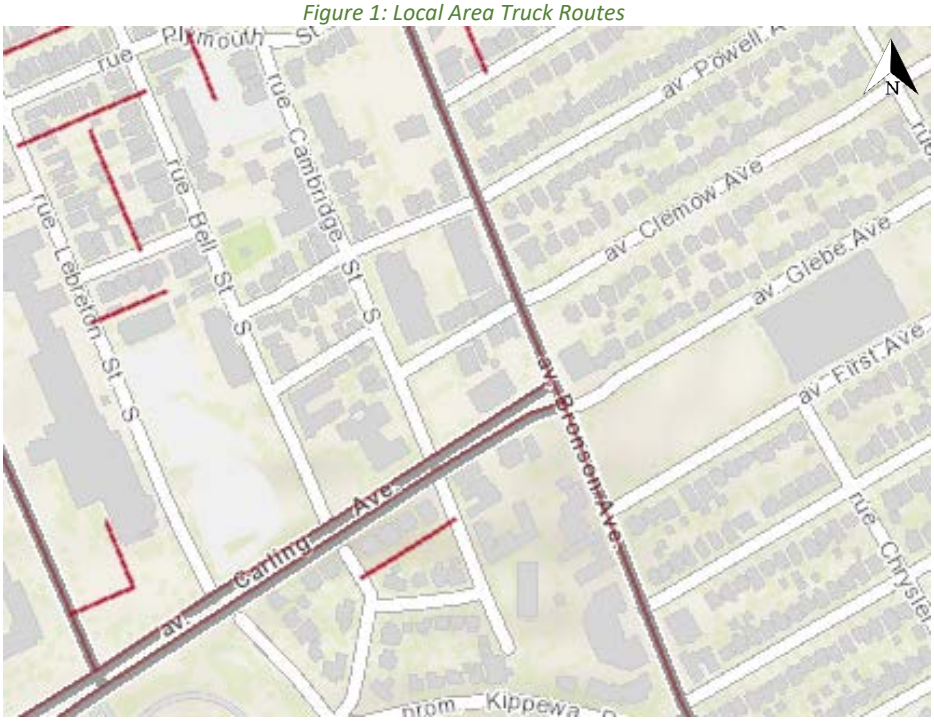
1 Context

As part of the ongoing development application the City of Ottawa has requested a Traffic Management Plan identifying the impact of construction activities on the adjacent roadways. The construction access for the development will be through the new west entrance for the development. This memo will review the truck route network, key intersections, and estimated truck volumes associated with the site construction.

2 Truck Routes

The adjacent roadway, Carling Avenue, is an Ottawa Truck Route, that permits full loads. Figure 1 illustrates the truck routes adjacent to the site. A short diversion from the truck route network is required for deliveries to/from the site, turning from Carling Avenue, onto Bell Street South. Additionally, no lane closures or on road impacts are anticipated as a result of construction activities.

Figure 1: Local Area Truck Routes



3 Construction Traffic

It is anticipated that 30 workers will access the site during construction, entering during the AM peak hour and exiting during the PM peak hour. Additionally, it is anticipated that the construction activities for the site will require an estimated two to three trucks daily, an equivalent of less than 1 one-way trip per hour. The TIA found that this development would not meet the trip generation trigger due to the low volume of traffic anticipated to be generated. The construction traffic is anticipated to be less than the traffic generated by the full build-out of the development and will therefore have a negligible impact on the adjacent intersections.

4 Summary and Conclusions

The following summarizes the analysis presented in this memo:

- A development application is currently underway for 289 Carling Avenue
- The construction access is located at the proposed future access to the development, on Bell Street South
- The City of Ottawa trucking routes provide direct access to the construction access
- The estimated daily construction traffic is estimated to be approximately 30 vehicles per hour during the peak hour, with approximately one truck entering the site per hour throughout the day
- No operational issues are anticipated for the construction access
- No construction staging will occur within the Bell Street South or Carling Avenue right of way
- Construction delivery and trucking routes shall be provided by the contractor to all suppliers, and will be available on site
- Flagging operations may be provided to alleviate the minimal impact of truck turning movements to and from Bell Street South

Technical Memorandum

To:	Maria Martinez, PBC Group	Date:	2019-07-10
Cc:	Christopher Gordon – CGH Transportation		
From:	Mark Crockford, P.Eng.	Project Number:	2019-10

Re: 289 Carling Avenue TIA – Transportation Comment Response

Comments have been received from the City of Ottawa on the development application for the proposed residential development at 289 Carling Avenue. CGH Transportation has been asked to prepare a response to the Transportation Comments.

Comment 1.: Carling Avenue is designated as an Arterial road within the City's Official Plan with a ROW protection limit of 44.5 metres. The ROW protection limit and the offset distance (22.25 metres) are to be dimensioned from the existing centerline of pavement and shown on the drawings.

Response 1.: The proponent does not have survey information regarding the south side of the road. However, the road widening has been approved by the City of Ottawa Planning department based on a 3.7 metre road widening from the property line (as dimensioned on the current plan). Please see the attached email chain for further details or contact Julie Sarazin (Julie.Sarazin@Ottawa.ca).

Comment 2.: ROW interpretation – Land for a road widening will be taken equally from both sides of a road, measured from the centreline in existence at the time of the widening if required by the City. The centreline is a line running down the middle of a road surface, equidistant from both edges of the pavement. In determining the centreline, paved shoulders, bus lay-bys, auxiliary lanes, turning lanes and other special circumstances are not included in the road surface.

Response 2.: The proponent does not have survey information regarding the south side of the road. However, the road widening has been approved by the City of Ottawa Planning department based on a 3.7 metre road widening from the property line (as dimensioned on the current plan). Please see the attached email chain for further details or contact Julie Sarazin (Julie.Sarazin@Ottawa.ca).

Comment 3.: A 5.0 metres x 5.0 metres sight triangle would be required at the intersection of Carling Avenue and Bell Street and is to be shown on all drawings. The sight triangle dimensions are to be measured from the protected ROW limits.

Response 3.: Noted. The proponent and Site Plan architect have been informed.

Comment 4.: The concrete sidewalks should be 2.0 metres in width and be continuous and depressed through the proposed access (please refer to the City's sidewalk and curb standard).
Response 4.: Noted. The proponent and Site Plan architect have been informed.

Comment 5.: The closure of an existing private approach shall reinstate the sidewalk, shoulder, curb and boulevard to City standards.
Response 5.: Noted. The proponent and Site Plan architect have been informed.

Comment 6.: Bicycle parking is required for this development. Figure 6 shows a bike storage area, but it is not well described in this report. Provide details regarding the amount of bicycle parking spaces, and how cyclists access the storage facility. Cyclists will find it challenging to use the garage ramp with 15% grade.
Response 6.: The bike storage is for residents who will have access to the elevator allowing cyclists to use their bicycles without using the vehicle ramps. This will also avoid conflicts on the ramp of incoming vehicles with outgoing cyclists (and the reverse).

Comment 7.: All underground and above ground building footprints and permanent walls need to be shown on the plan to confirm that any permanent structure does not extend either above or below into the City's ROW limits, sight triangles and/or future road widening protection limits.
Response 7.: Noted. The proponent and Site Plan architect have been informed.

Comment 8.: The Traffic Management Plan is to be submitted for approval in advance of the Site Plan application.
Response 8.: This has been prepared and will be submitted under a separate cover.

Comment 9.: This development meets the safety trigger (this section was not included in the Screening Form). The vertical curvature on Bell Street and Carling Avenue will affect sight lines.
Response 9.: A field review of the vertical sightlines has been undertaken. A technical memo has been prepared under a separate cover.

Comment 10.: Forecasting report can be exempted for this development.
Response 10.: Noted.

Comment 11.: The development is expected to generate fewer than 60 person-trips, therefore the network impact components may be excluded. MMLOS including VLOS for background travel demands can be exempted for this development.

Response 11.: Noted.

Comment 12.: A Strategy Report is required and must include Module 4.1 and specifically Element 4.1 – Design for Sustainable Modes. The TDM-Supportive Development Design and Infrastructure Checklist is required to encourage sustainable modes of transportation, as per City objectives.

Response 12.: See attached.

Comment 13.: As part of Element 4.1.2 analyze the sight lines from and to the accesses. The provided distance between the two two-way private approaches is insufficient.

Response 13.: It was discussed previously with City Staff that, while the distance between the accesses does not meet the private approach by-law, it should be demonstrated that a single passenger vehicle could be stored between the two accesses. As shown on Figure 6 of the TIA a TAC P type passenger vehicle can be accommodated between the two access points. (For refence the TAC P is approximately equivalent in length to a Chevrolet Suburban or other similar large SUV). Therefore, it has been demonstrated that the two accesses are a sufficient distance apart. In addition, the low volume of traffic accessing each of the parking levels will further reduce the conflicts between vehicles using each of the access points. In the latest site plan this distance has been increased to maximize the distance between the two access points.

Comment 14.: Indicate the proposed Carling Avenue transit priority measures in the report.

Response 14.: Along the Carling Avenue frontage of the site the curbside lane is a shared transit / cycling lane. This lane ends 35 metres east of Booth Street (~200 metres west of the subject site). The TMP proposes Transit Priority – Continuous Lanes along Carling Avenue, ultimately upgrading to an LRT with at-grade crossings. The Carling Avenue Transit Priority Measures Recommended Functional Plan includes interrupted transit lanes from Lincoln Fields to Bronson Avenue.

Maria J. Martinez

From: Sarazin, Julie <Julie.Sarazin@ottawa.ca>
Sent: Tuesday, February 26, 2019 8:51 AM
To: Maria J. Martinez
Cc: Christine MacIntosh (cmacintosh@ottawa.johnhoward.ca)
Subject: RE: 2019-02-12_JHS_289 Carling_Right Of Way

Good morning Maria,

Yesterday, I finally received an answer from the consultants, Stantec, who are working for the City's Infrastructure group.
I was advised that the preliminary design plans do not require any property to be taken from 289 Carling Ave.
However, since the JHS project is moving faster than the work being done by Stantec, I am required to contact Planning to confirm.

I will be in touch shortly, as I expect a quick answer to my email.

Thanks,

Julie

Julie Sarazin MCIP, RPP
Housing Developer | Agente, Aménagement de logements sociaux
City of Ottawa | Ville d'Ottawa
100 Constellation Cres., 8th floor East, Ottawa, Ontario K2G 6J8 | 100, croissant Constellation, 8ième étage est, Ottawa, Ontario K2G 6J8
Tel/ Tél : 613-580-2424 x 13872 | Fax/Téléc : 613-580-2648 | Email/Courriel: julie.sarazin@ottawa.ca

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From: Maria J. Martinez <mmartinez@pbcgroup.ca>
Sent: Friday, February 22, 2019 1:46 PM
To: Sarazin, Julie <Julie.Sarazin@ottawa.ca>
Cc: Christine MacIntosh (cmacintosh@ottawa.johnhoward.ca) <cmacintosh@ottawa.johnhoward.ca>
Subject: RE: 2019-02-12_JHS_289 Carling_Right Of Way

Hi Julie,

Any updates?

Maria Martinez, B.Arch.
Project / Construction Manager
P: 613.739.1327 x226 | F: 613.722.7125 | C: 613.316.0749
mmartinez@pbcgroup.ca
205-485 Bank St., Ottawa, ON K2P 1Z2
www.pbcgroup.ca

From: Sarazin, Julie [mailto:Julie.Sarazin@ottawa.ca]
Sent: Tuesday, February 19, 2019 9:11 AM
To: Maria J. Martinez <mmartinez@pbcgroup.ca>
Subject: RE: 2019-02-12_JHS_289 Carling_Right Of Way

Good morning Maria,

I sent them an email this morning at 8:15.
I hope to have a response quickly.
Will advise as soon as possible.

Thanks,

Julie

Julie Sarazin MCIP, RPP
Housing Developer | Agente, Aménagement de logements sociaux
City of Ottawa | Ville d'Ottawa
100 Constellation Cres., 8th floor East, Ottawa, Ontario K2G 6J8 | 100, croissant Constellation, 8ième étage est, Ottawa, Ontario K2G 6J8
Tel/ Tél : 613-580-2424 x 13872 | Fax/Téléc : 613-580-2648 | Email/Courriel: julie.sarazin@ottawa.ca

From: Maria J. Martinez <mmartinez@pbcgroup.ca>
Sent: Tuesday, February 19, 2019 9:06 AM
To: Sarazin, Julie <Julie.Sarazin@ottawa.ca>
Subject: RE: 2019-02-12_JHS_289 Carling_Right Of Way

Hi Julie,
Following up on this, did you get a chance to talk to infrastructure?
Any feedback?
Please let me know.
Thanks,

Maria Martinez, B.Arch.
Project / Construction Manager
P: 613.739.1327 x226 | F: 613.722.7125 | C: 613.316.0749
mmartinez@pbcgroup.ca

205-485 Bank St., Ottawa, ON K2P 1Z2
www.pbcgroup.ca

From: Maria J. Martinez
Sent: Friday, February 15, 2019 9:37 AM
To: 'Sarazin, Julie' <Julie.Sarazin@ottawa.ca>
Cc: 'Jaime Posen' <posen@fotenn.com>; Brian Casagrande <casagrande@fotenn.com>; Paul Bouzanis (pbouzanis@pbcgroup.ca) <pbouzanis@pbcgroup.ca>; 'Ran Zaig' <rzaig@kwc-arch.ca>; Ralph Wiesbrock <rwiesbrock@kwc-arch.ca>; Stefan Krauss <skrauss@kwc-arch.com>; 'Christine MacIntosh' <cmacintosh@jhsottawa.ca>
Subject: FW: 2019-02-12_JHS_289 Carling_Right Of Way
Importance: High

Hi Julie,

Nice chatting with you this morning.

As discussed, after receiving the survey CAD file and locating Carling's centerline, it was noted that the right of way for Carling's widening would not be 3.7 as indicated in the Action Ottawa RFP but 9.7mts instead.

The requirement in the official plan Anex1-8 under Road Classification and Right of Way protection indicates 44.5mts for Carling from Richmond to Bronson, that's how we get to the 22.25mts from the center line.

See attached sketch by KWC showing where the new setback would need to be, this complicates the layout even further making an already tight site even more challenging.

I've also attached the 1979 survey showing the 3.7mts road allowance which looks like what the neighboring property is aligned to.

As indicated, design is on hold until we receive confirmation from the City on this issue.

Thank you for your help.

Best,

Maria Martinez, B.Arch.
Project / Construction Manager
P: 613.739.1327 x226 | F: 613.722.7125 | C: 613.316.0749
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205-485 Bank St., Ottawa, ON K2P 1Z2
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From: Ran Zaig [mailto:rzaig@kwc-arch.ca]
Sent: Tuesday, February 12, 2019 7:06 PM
To: Maria J. Martinez <mmartinez@pbcgroup.ca>
Cc: Jaime Posen <posen@fotenn.com>; Brian Casagrande <casagrande@fotenn.com>; Ralph Wiesbrock <rwiesbrock@kwc-arch.ca>; Stefan Krauss <skrauss@kwc-arch.com>
Subject: 2019-02-12_JHS_289 Carling_Right Of Way

Hi Maria,

As per your discussion with Ralph this evening I have attached a PDF showing zoning right-of-way protection requirements based on the most recent survey.

Measuring 22.25M from the centre of the median on Carling Ave.

Regards,

Ran Zaig
Associate Partner, Architect
B.ARCH. l OAA l MRAIC l =^.^=

KWCarchitects
383 Parkdale Avenue, Suite 201, Ottawa, Ontario, K1Y 4R4
T: 613-238-2117; 223 **F:** 613-238-6595 **E:** rzaig@kwc-arch.com

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Maria J. Martinez

From: Sarazin, Julie <Julie.Sarazin@ottawa.ca>
Sent: Wednesday, February 27, 2019 10:46 AM
To: Maria J. Martinez
Cc: 'Christine MacIntosh'
Subject: 289 Carling Ave

Good morning Maria,

Just a brief update.
I have spoken to Doug James, Manager of Development Review, and advised him of our concerns regarding the road widening requirement.
They will take another look at the requirement and they will get back to me as soon as possible.

Will keep you informed of the outcome.

Thanks for your patience.

Regards,

Julie

Julie Sarazin MCIP, RPP
Housing Developer | Agente, Aménagement de logements sociaux
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Tel/ Tél : 613-580-2424 x 13872 | Fax/Téléc : 613-580-2648 | Email/Courriel: julie.sarazin@ottawa.ca

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'

Maria J. Martinez

From: Sarazin, Julie <Julie.Sarazin@ottawa.ca>
Sent: Thursday, February 28, 2019 7:56 AM
To: Maria J. Martinez
Cc: 'Christine MacIntosh'; Kluke, Jenny
Subject: Road widening Carling Ave

Good morning Maria,

I have been advised by Planning that they will be taking a 3.7 metre road widening at this location. Please proceed with finalizing the Site Plan application package.
I am in a meeting this morning but will be available to discuss later should you have any questions.
Thanks,
Julie
Housing Services

Sent with BlackBerry Work
(www.blackberry.com)
'

'

Introduction

The City of Ottawa's *Transportation Impact Assessment (TIA) Guidelines* (specifically Module 4.3—Transportation Demand Management) requires proponents of qualifying developments to assess the context, need and opportunity for transportation demand management (TDM) measures at their development. The guidelines require that proponents complete the City's **TDM Measures Checklist**, at a minimum, to identify any TDM measures being proposed.

The remaining sections of this document are:

- Using the Checklist
- Glossary
- TDM Measures Checklist: Non-Residential Developments
- TDM Measures Checklist: Residential developments

Readers are encouraged to contact the City of Ottawa's TDM Officer for any guidance and assistance they require to complete this checklist.

Using the Checklist

The City's *TIA Guidelines* are designed so that *Module 3.1—Development-Generated Travel Demand*, *Module 4.1—Development Design*, and *Module 4.2—Parking* are complete before a proponent begins *Module 4.3—Transportation Demand Management*.

Within Module 4.3, *Element 4.3.1—Context for TDM* and *Element 4.3.2—Need and Opportunity* are intended to create an understanding of the need for any TDM measures, and of the results they are expected to achieve or support. Once those two elements are complete, proponents begin *Element 4.3.3—TDM Program* that requires proponents to identify proposed TDM measures using the **TDM Measures Checklist**, at a minimum. The *TIA Guidelines* note that the City may require additional analysis for large or complex development proposals, or those that represent a higher degree of performance risk; as well, proponents proposing TDM measures for a new development must also propose an implementation plan that addresses planning and coordination, funding and human resources, timelines for action, performance targets and monitoring requirements.

This **TDM Measures Checklist** document includes two actual checklists, one for non-residential developments (office, institutional, retail or industrial) and one for residential developments (multi-family, condominium or subdivision). Readers may download the applicable checklist in electronic format and complete it electronically, or print it out and complete it by hand. As an alternative, they may create a freestanding document that lists the TDM measures being proposed and provides additional detail on them, including an implementation plan as required by the City's *TIA Guidelines*.

Each measure in the checklist is numbered for easy reference. Each measure is also flagged as:

- BASIC —The measure is generally feasible and effective, and in most cases would benefit the development and its users.
- BETTER —The measure could maximize support for users of sustainable modes, and optimize development performance.
- ★ —The measure is one of the most dependably effective tools to encourage the use of sustainable modes.

Glossary

This glossary defines and describes the following measures that are identified in the **TDM Measures Checklist**:

TDM program management
- Program coordinator
- Travel surveys

Parking
- Priced parking

Walking & cycling
- Information on walking/cycling routes & destinations
- Bicycle skills training
- Valet bike parking

Transit
- Transit information
- Transit fare incentives
- Enhanced public transit service
- Private transit service

Ridesharing
- Ridematching service
- Carpool parking price incentives
- Vanpool service

Carsharing & bikesharing
- Bikeshare stations & memberships
- Carshare vehicles & memberships

TDM marketing & communications
- Multimodal travel information
- Personalized trip planning
- Promotions

Other incentives & amenities
- Emergency ride home
- Alternative work arrangements
- Local business travel options
- Commuter incentives
- On-site amenities

For further information on selecting and implementing TDM measures (particularly as they apply to non-residential developments, with a focus on workplaces), readers may find it helpful to consult Transport Canada's *Workplace Travel Plans: Guidance for Canadian Employers*, which can be

downloaded in English and French from the ACT Canada website at
www.actcanada.com/resources/act-resources.

▶ *TDM program management*

While some TDM measures can be implemented with a minimum of effort through routine channels (e.g. parking or human resources), more complex measures or a larger development site may warrant assigning responsibility for TDM program coordination to a designated person either inside or outside the implementing organization. Similarly, some TDM measures are more effective if they are targeted or customized for specific audiences, and would benefit from the collection of related information.

Program coordinator. This person is charged with day-to-day TDM program development and implementation. Only in very large employers with thousands of workers is this likely to be a full-time, dedicated position. Usually, it is added to an existing role in parking, real estate, human resources or environmental management. In practice, this role may be called TDM coordinator, commute trip reduction coordinator or employee transportation coordinator. The City of Ottawa can identify external resources (e.g. non-profit organizations or consultants) that could provide these services.

Travel surveys. Travel surveys are most commonly conducted at workplaces, but can be helpful in other settings. They identify how and why people travel the way they do, and what barriers and opportunities exist for different behaviours. They usually capture the following information:

- *Personal data* including home address or postal code, destination, job type or function, employment status (full-time, part-time and/or teleworker), gender, age and hours of work
- *Commute information* including distance or time for the trip between home and work, usual methods of commuting, and reasons for choosing them
- *Barriers and opportunities* including why other commuting methods are unattractive, willingness to consider other options, and what improvements to other options could make them more attractive

▶ *Parking*

Priced parking. Charging for parking is typically among the most effective ways of getting drivers to consider other travel options. While drivers may not support parking fees, they can be more accepting if the revenues are used to improve other travel options (e.g. new showers and change rooms, improved bicycle parking or subsidized transit passes). At workplaces or daytime destinations, parking discounts (e.g. early bird specials, daily passes that cost significantly less than the equivalent hourly charge, monthly passes that cost significantly less than the equivalent daily charge) encourage long-term parking and discourage the use of other travel options. For residential uses, unbundling parking costs from dwelling purchase, lease or rental costs provides an incentive for residents to own fewer cars, and can reduce car use and the costs of parking provision.

▶ *Walking & cycling*

Active transportation options like cycling and walking are particularly attractive for short trips (typically up to 5 km and 2 km, respectively). Other supportive factors include an active, health-conscious audience, and development proximity to high-quality walking and cycling networks. Common challenges to active transportation include rain, darkness, snowy or icy conditions, personal safety concerns, the potential for bicycle theft, and a lack of shower and change facilities for those making longer trips.

Information on walking/cycling routes & destinations. Ottawa, Gatineau and the National Capital Commission all publish maps to help people identify the most convenient and comfortable walking or cycling routes.

Bicycle skills training. Potential cyclists can be intimidated by the need to ride on roads shared with motor vehicles. This barrier can be reduced or eliminated by offering cycling skills training to interested cyclists (e.g. CAN-BIKE certification courses).

Valet bike parking. For large events, temporary “valet parking” areas can be easily set up to maximize convenience and security for cyclists. Experienced local non-profit groups can help.

▶ *Transit*

Transit information. Difficulty in finding or understanding basic information on transit fares, routes and schedules can prevent people from trying transit. Employers can help by providing online links to OC Transpo and STO websites. Transit users also appreciate visible maps and schedules of transit routes that serve the site; even better, a screen that shows real-time transit arrival information is particularly useful at sites with many transit users and an adjacent transit stop or station.

Transit fare incentives. Free or subsidized transit fares are an attractive incentive for non-transit riders to try transit. Many non-users are unsure of how to pay a fare, and providing tickets or a preloaded PRESTO card (or, for special events, pre-arranging with OC Transpo that transit fares are included with event tickets) overcome that barrier.

Enhanced public transit service. OC Transpo may adjust transit routes, stop locations, service hours or frequencies for an agreed fee under contract, or at no cost where warranted by the potential ridership increase. Information provided by a survey of people who travel to a given development can support these decisions.

Private transit service. At remote suburban or rural workplaces, a poor transit connection to the nearest rapid transit station can be an obstacle for potential transit users, and an employer in this situation could initiate a private shuttle service to make transit use more feasible or attractive. Other circumstances where a shuttle makes sense include large special events, or a residential development for people with limited independent mobility who still require regular access to shops and services.

▶ *Ridesharing*

Ridesharing's potential is greatest in situations where transit ridership is low, where parking costs are high, and/or where large numbers of car commuters (e.g. employees or full-time students) live reasonably far from the workplace.

Ridematching service. Potential carpoolers in Ottawa are served by www.OttawaRideMatch.com, an online service to help people find carpool partners. Employers can arrange for a dedicated portal where their employees can search for potential carpool partners only among their colleagues, if they desire. Some very large employers may establish internal ridematching services, to maximize employee uptake and corporate control. Ridematching service providers typically include a waiver to relieve employers of liability when their employees start carpooling through a ridematching service. Ridesharing with co-workers also tends to eliminate security concerns.

Carpool parking price incentives. Discounted parking fees for carpools can be an extra incentive to rideshare.

Vanpool service. Vanpools operate in the Toronto and Vancouver metropolitan areas, where vans that carry up to about ten occupants are driven by one of the vanpool members. Vanpools tend to operate on a cost-recovery basis, and are most practical for long-distance commutes where transit is not an option. Current legislation in Ontario does not permit third-party (i.e. private or non-profit) vanpool services, but does permit employers to operate internal vanpools.

▶ *Carsharing & bikesharing*

Bikeshare station & memberships. VeloGO Bike Share and Right Bike both operate bikesharing services in Ottawa. Developments that would benefit from having a bikeshare station installed at or near their development may negotiate directly with either service provider.

Carshare vehicles & memberships. VRTUCAR and Zipcar both operate carsharing services in Ottawa, for use by the general public or by businesses as an alternative to corporate fleets. Carsharing services offer 24-hour access, self-serve reservation systems, itemized monthly billings, and outsourcing of all financing, insurance, maintenance and administrative responsibilities.

▶ *TDM marketing & communications*

Multimodal travel information. Aside from mode-specific information discussed elsewhere in this document, multimodal information that identifies and explains the full range of travel options available to people can be very influential—especially when provided at times and locations where individuals are actively choosing among those options. Examples include: employees when their employer is relocating, or when they are joining a new employer; students when they are starting a program at a new institution; visitors or customers travelling to an unfamiliar destination, or when faced with new options (e.g. shuttle services or parking restrictions); and residents when they purchase or occupy a residence that is new to them.

Personalized trip planning. As an extension to the simple provision of information, this technique (also known as *individualized marketing*) is effective in helping people make more sustainable travel choices. The approach involves identifying who is most likely to change their travel choices (notably relocating employees, students or residents) giving them customized information, training and incentives to support them in making that change. It may be conducted with assistance from an external service provider with the necessary skills, and delivered in a variety of settings including workplaces and homes.

Promotions. Special events and incentives can raise awareness and encourage individuals to examine and try new travel options.

- *Special events* can help attract attention, build participation and celebrate successes. Events that have been held in Ottawa include Earth Day (in April) Bike to Work Month (in May), Environment Week (early June), International Car Free Day (September 22), and Canadian Ridesharing Week (October). At workplaces or educational institutions, similarly effective internal events could include workshops, lunch-and-learns, inter-departmental challenges, pancake breakfasts, and so on.
- *Incentives* can encourage trial of sustainable modes, and might include loyalty rewards for duration or consistency of activity (e.g. 1,000 km commuted by bicycle), participation prizes (e.g. for completing a survey or joining a special event), or personal recognition that highlights individual accomplishments.

▶ *Other incentives & amenities*

Emergency ride home. This measure assures non-driving commuters that they will be able to get home quickly and conveniently in case of family emergency (or in some workplaces, in case of unexpected overtime, severe weather conditions, or the early departure of a carpool driver) by offering a chit or reimbursement for taxi, carshare or rental car usage. Limits on annual usage or cost per employee may be set, although across North America the actual rates of usage are typically very low.

Alternative work arrangements. A number of alternatives to the standard 9-to-5, Monday-to-Friday workweek can support sustainable commuting (and work-life balance) at workplaces:

- *Flexible working hours* allow transit commuters to take advantage of the fastest and most convenient transit services, and allow potential carpoolers to include people who work slightly different schedules in their search for carpool partners. They also allow active commuters to travel at least one direction in daylight, either in the morning or the afternoon, during the winter.
- *Compressed workweeks* allow employees to work their required hours over fewer days (e.g. five days in four, or ten days in nine), eliminating the need to commute on certain days. For employees, this can promote work-life balance and gives flexibility for appointments. For employers, this can permit extended service hours as well as reduced parking demands if employees stagger their days off.
- *Telework* is a normal part of many workplaces. It helps reduce commuting activity, and can lead to significant cost savings through workspace sharing. Telework initiatives involve many stakeholders, and may face as much resistance as support within an organization. Consultation, education and training are helpful.

Local business travel options. A common obstacle for people who might prefer to not drive to work is that their employer requires them to bring a car to work so they can make business trips during the day. Giving employees convenient alternatives to private cars for local business travel during the workday makes walking, cycling, transit or carpooling in someone else's car more practical.

- *Walking and cycling*—Active transportation can be a convenient and enjoyable way to make short business trips. They can also reduce employer expenses, although they may require extra travel time. Providing a fleet of shared bikes, or reimbursing cyclists for the kilometres they ride, are inexpensive ways to validate their choice.
- *Public transit*—Transit can be convenient and inexpensive compared to driving. OC Transpo's PRESTO cards are transferable among employees and automatically reloadable, making them the perfect tool for enabling transit use during the day.
- *Ridesharin*g—When multiple employees attend the same off-site meeting or event, they can be reminded to carpool whenever possible.
- *Taxis or ride-hailing*—Taxis and ride-hailing can eliminate parking costs, save time and eliminate collision liability concerns. Taxi chits eliminate cash transactions and minimize paperwork.
    - *Fleet vehicles or carsharing*—Fleet vehicles can be cost-effective for high travel volumes, while carsharing is a great option for less frequent trips.
    - *Interoffice shuttles*—Employers with multiple worksites in the region could use a shuttle service to move people as well as mail or supplies.
    - *Videoconferencing*—New technologies mean that staying in the office to hold meetings electronically is more viable, affordable and productive than ever.

Commuter incentives. Financial incentives can help create a level playing field and support commuting by sustainable modes. A "commuting allowance" given to all employees as a taxable benefit is one such incentive; employees who choose to drive could then be charged for parking, while other employees could use the allowance for transit fares or cycling equipment, or for spending or saving. (Note that in the United States this practice is known as "parking cash-out," and is popular because commuting allowances are not taxable up to a certain limit). Alternatively, a monthly commuting allowance for non-driving employees would give drivers an incentive to choose a different commuting mode. Another practical incentive for active commuters or transit users is to offer them discounted "rainy day" parking passes for a small number of days each month.

On-site amenities. Developments that offer services to limit employees' need for a car during their commute (e.g. to drop off clothing at the dry cleaners) or during their workday (e.g. to buy lunch) can free employees to make the commuting decision that otherwise works best for them.

TDM Measures Checklist:
Residential Developments (multi-family, condominium or subdivision)

Legend

BASIC — The measure is generally feasible and effective, and in most cases would benefit the development and its users

BETTER — The measure could maximize support for users of sustainable modes, and optimize development performance

★ — The measure is one of the most dependably effective tools to encourage the use of sustainable modes

		TDM measures: *Residential developments*	Check if proposed & add descriptions
	1.	**TDM PROGRAM MANAGEMENT**	
	1.1	**Program coordinator**	
BASIC ★	1.1.1	Designate an internal coordinator, or contract with an external coordinator	☐
	1.2	**Travel surveys**	
BETTER	1.2.1	Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	☐
	2.	**WALKING AND CYCLING**	
	2.1	**Information on walking/cycling routes & destinations**	
BASIC	2.1.1	Display local area maps with walking/cycling access routes and key destinations at major entrances *(multi-family, condominium)*	☒
	2.2	**Bicycle skills training**	
BETTER	2.2.1	Offer on-site cycling courses for residents, or subsidize off-site courses	☐

		TDM measures: *Residential developments*	Check if proposed & add descriptions
		3. TRANSIT	
		3.1 Transit information	
BASIC		3.1.1 Display relevant transit schedules and route maps at entrances *(multi-family, condominium)*	☒
BETTER		3.1.2 Provide real-time arrival information display at entrances *(multi-family, condominium)*	☐
		3.2 Transit fare incentives	
BASIC	★	3.2.1 Offer PRESTO cards preloaded with one monthly transit pass on residence purchase/move-in, to encourage residents to use transit	☐
BETTER		3.2.2 Offer at least one year of free monthly transit passes on residence purchase/move-in	☐
		3.3 Enhanced public transit service	
BETTER	★	3.3.1 Contract with OC Transpo to provide early transit services until regular services are warranted by occupancy levels *(subdivision)*	☐
		3.4 Private transit service	
BETTER		3.4.1 Provide shuttle service for seniors homes or lifestyle communities (e.g. scheduled mall or supermarket runs)	☐
		4. CARSHARING & BIKESHARING	
		4.1 Bikeshare stations & memberships	
BETTER		4.1.1 Contract with provider to install on-site bikeshare station (*multi-family)*	☐
BETTER		4.1.2 Provide residents with bikeshare memberships, either free or subsidized *(multi-family)*	☐
		4.2 Carshare vehicles & memberships	
BETTER		4.2.1 Contract with provider to install on-site carshare vehicles and promote their use by residents	☐
BETTER		4.2.2 Provide residents with carshare memberships, either free or subsidized	☐
		5. PARKING	
		5.1 Priced parking	
BASIC	★	5.1.1 Unbundle parking cost from purchase price *(condominium)*	☐
BASIC	★	5.1.2 Unbundle parking cost from monthly rent *(multi-family)*	☐

			TDM measures: *Residential developments*	Check if proposed & add descriptions
		6.	**TDM MARKETING & COMMUNICATIONS**	
		6.1	**Multimodal travel information**	
BASIC	★	6.1.1	Provide a multimodal travel option information package to new residents	☐
		6.2	**Personalized trip planning**	
BETTER	★	6.2.1	Offer personalized trip planning to new residents	☐