Western Development Lands
Transportation Brief
Richmond Village, (Ottawa), ON
Mattamy Homes

Prepared By:
Stantec Consulting Ltd.

March 2012

TIA GUIDELINES CHECKLIST – TRANSPORTATION BRIEF

Report Context

☒ Municipal Address
Comment: *Section 1.1*

☒ Location relative to major elements of the existing transportation system (e.g. the site is located in the southwest quadrant of the intersection of Main Street/First Street, 600m from the Maple Street Rapid Transit Station)
Comment: *Section 1.4*

☒ Existing land uses or permitted use provisions in the Official Plan, Zoning By-Law, etc.
Comment: *Section 1.4*

☒ Proposed land uses and relevant planning regulations to be used in the analysis
Comment: *Section 1.3*

☒ Proposed development size (building size, number of residential units, etc.) and location on site
Comment: *Section 1.4*

☒ Estimated date of occupancy
Comment: *Section 3.1*

☒ Planned phasing of development
Comment: *Section 3.1*

☐ Proposed number of parking spaces (not relevant for Registration of Plans of Subdivision)
Comment: *N/A – Draft Plan of Subdivision*

☒ Proposed access points and type of access (full turns, right-in/right-out, turning restrictions, etc.)
Comment: *Figure 9,*

☒ Study area
Comment: *Figure 1*

☒ Time periods and phasing
Comment: *Section 1.3*

☒ Horizon years (including reference to phased development)
Comment: *Section 1.3*

Existing Conditions

☒ Existing roads, ramps in the study area, including jurisdiction, classification, number of lanes and posted speed limit
Comment: *Section 2.1*

☒ Existing intersections, indicating type of control, lane configurations, turning restrictions and any other relevant data (e.g. extraordinary lane widths, grades, etc.)
Comment: *Section 2.1*

☒ Existing access points to adjacent developments (both sides of all roads bordering the site)
Comment: *Figure 3*

☒ Existing transit system, including stations and stops
Comment: *Section 2.2*

☒ Existing on- and off-road bicycle facilities and pedestrian sidewalks and pathway networks
Comment: *Section 2.3*

☒ Existing system operations (V/C, LOS)
Comment: *As per the pre-consultation, intersection capacity analysis was not required for this study*

☒ Major trip generators/attractors within the study area should be indicated
Comment: *Section 2.4*

Demand Forecasting

☒ Trip generation rates
Comment: *Section 3.2.2*

Impact Analysis

☒ Qualitative assessment of impacts on capacity; non-auto modes; on-site circulation; community
Comment: *Section 3.8, 3.9, 3.10*

Mitigation Measures and Site Design Characteristics

☒ Location and timing of proposed changes to existing traffic controls at intersections (e.g. new traffic signals, Stop signs, etc.)
Comment: *Section 4.0*

☒ Mitigation measure required to offset impacts on the surface and Rapid Transit networks
Comment: *Section 4.0*

☒ New or modified elements of the bicycle and pedestrian networks
Comment: *Section 4.0*

☒ Community impact mitigation measures
Comment: *Section 4.0*

☒ Proposed TDM features or programs to support the site development.
Comment: *Section 4.0*

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1.0 INTRODUCTION

1.1 PURPOSE

Stantec Consulting Ltd. was retained by Mattamy Homes to provide an assessment of the transportation needs and impacts related to the future build-out of a residential development known as the "Western Development Lands" at 6420 Ottawa Street and 6431 Ottawa Street. These properties are located in the south-western portion of the Village of Richmond, within the City of Ottawa.

This study has been prepared in accordance with the City of Ottawa's *Transportation Impact Guidelines, 2006*. As part of the draft plan of subdivision application process, pre-consultation discussions were held with City of Ottawa staff where it was determined that a Transportation Brief (TB) would be required to support the application.

This TB has been prepared to assess the potential transportation implications of the proposed residential subdivision and to determine whether transportation improvements are required to support it.

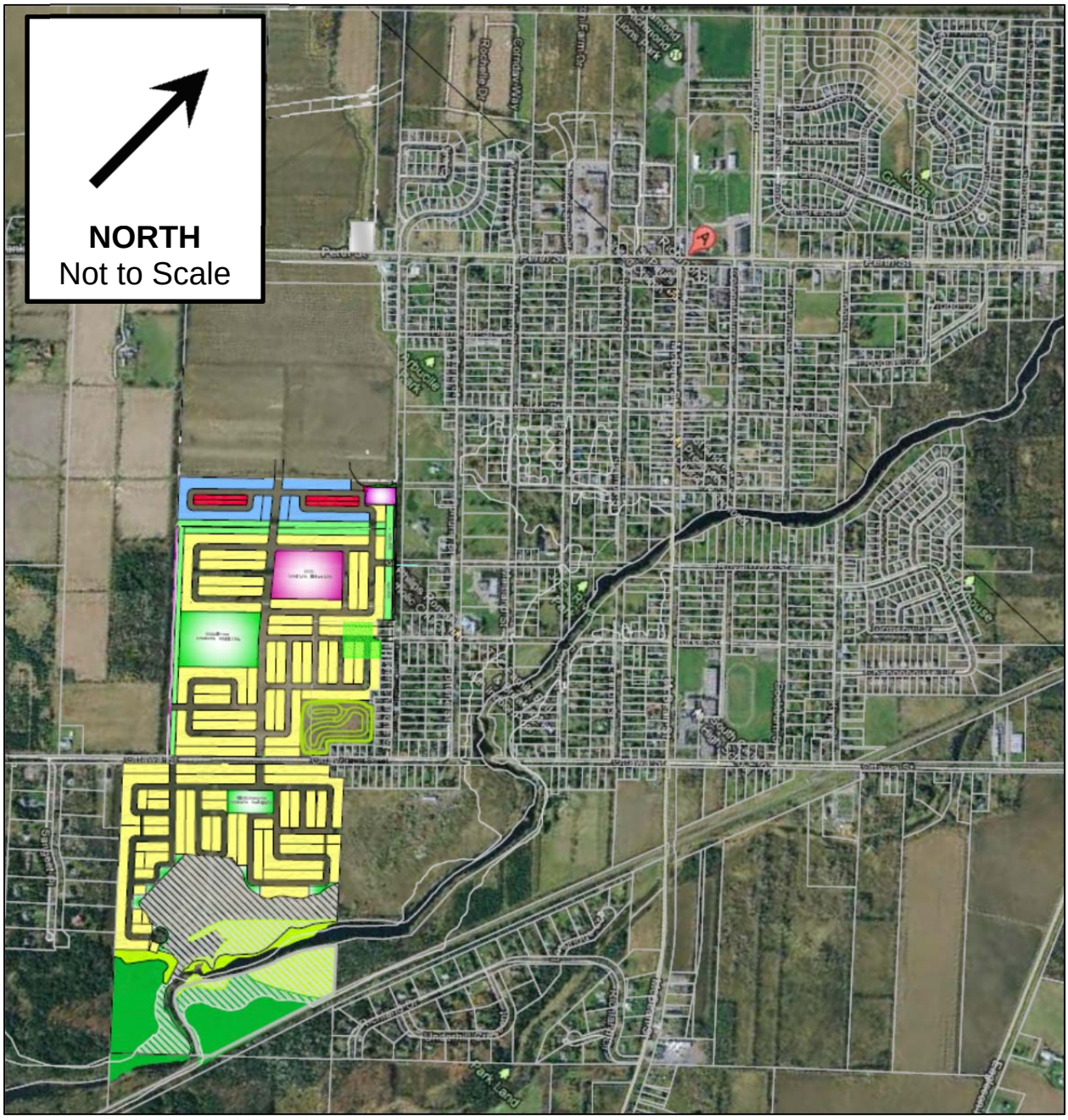
1.2 CONTEXT

Mattamy Homes' proposed community is located in the Rural Southwest area of the City of Ottawa.

Figure 1 illustrates the location of Mattamy's proposed development at 6420 and 6431 Ottawa Street.

To the north and east of the proposed development is the existing established community of Village of Richmond. To the immediate north of the subject site a development application has been submitted for a residential subdivision featuring approximately 1100 units.

Figure 1
Location of Mattamy's Lands



1.3 SCOPE OF THE ASSESSMENT

This TB has been carried out in accordance with the City of Ottawa Transportation Impact Assessment (TIA) Guidelines.

During pre-consultation discussions with the City of Ottawa, the scope of this assessment was determined to include the following:

- Study area intersections to include:
    - Perth Street at the proposed North – South (N-S) Collector street
    - Perth Street at Queen Charlotte Street
    - Perth Street at McBean Street
    - Perth Street at Huntley Road
    - Perth Street at Fowler Street
    - Perth Street at Fortune Street
    - Ottawa Street at the proposed N-S Collector street
    - Ottawa Street at a new site access (south of Ottawa Street) / west of N-S Collector
- Transportation horizon years to include:
    - 2012 Existing Conditions
    - 2023 Future Background Conditions
    - 2023 Future Conditions (Full Build-Out)
    - 2028 Ultimate Conditions (Full Build-Out plus 5 years)
- Analysis time periods to include the weekday AM and PM peak hours

The methodology used in the TB is summarized below:

- The net increase in site traffic from the proposed development will be estimated
- Background traffic growth in the study area will be explicitly accounted for based on known developments in the study area

- A 2% per annum growth rate will be used to account for growth outside of the immediate study area. This rate is consistent with previous study area traffic assessments and is supported by the growth shown at the study area intersections

- The future background traffic volumes will be combined with the net increase in site traffic volumes to determine total future traffic volumes

- Ultimate traffic volumes will be determined by adding background growth to the total future traffic volumes

- The site accesses will be examined to determine if warrants are met for upgraded traffic controls and / or auxiliary lanes

1.4 PROPOSED DEVELOPMENT

The proposed development is anticipated to consist of approximately 1100 units. The unit breakdown is anticipated to be comprised of approximately 100 townhome-style dwellings and roughly 1000 single family dwellings. The final number of residential units is subject to change as the plan is refined but these changes are not expected to be substantial. It has been assumed that development will proceed at a rate of approximately 135 units / year starting in 2015 and continuing until full build-out is achieved by 2023.

Figure 2 shows the site concept plan for Mattamy's proposed development in the Village of Richmond.

The development will be accessed by three new site access intersections including:

- Perth Street at the new North-South Collector (to be constructed as part of the new subdivision to the north)

- Ottawa Street at the new North-South (N-S) Collector

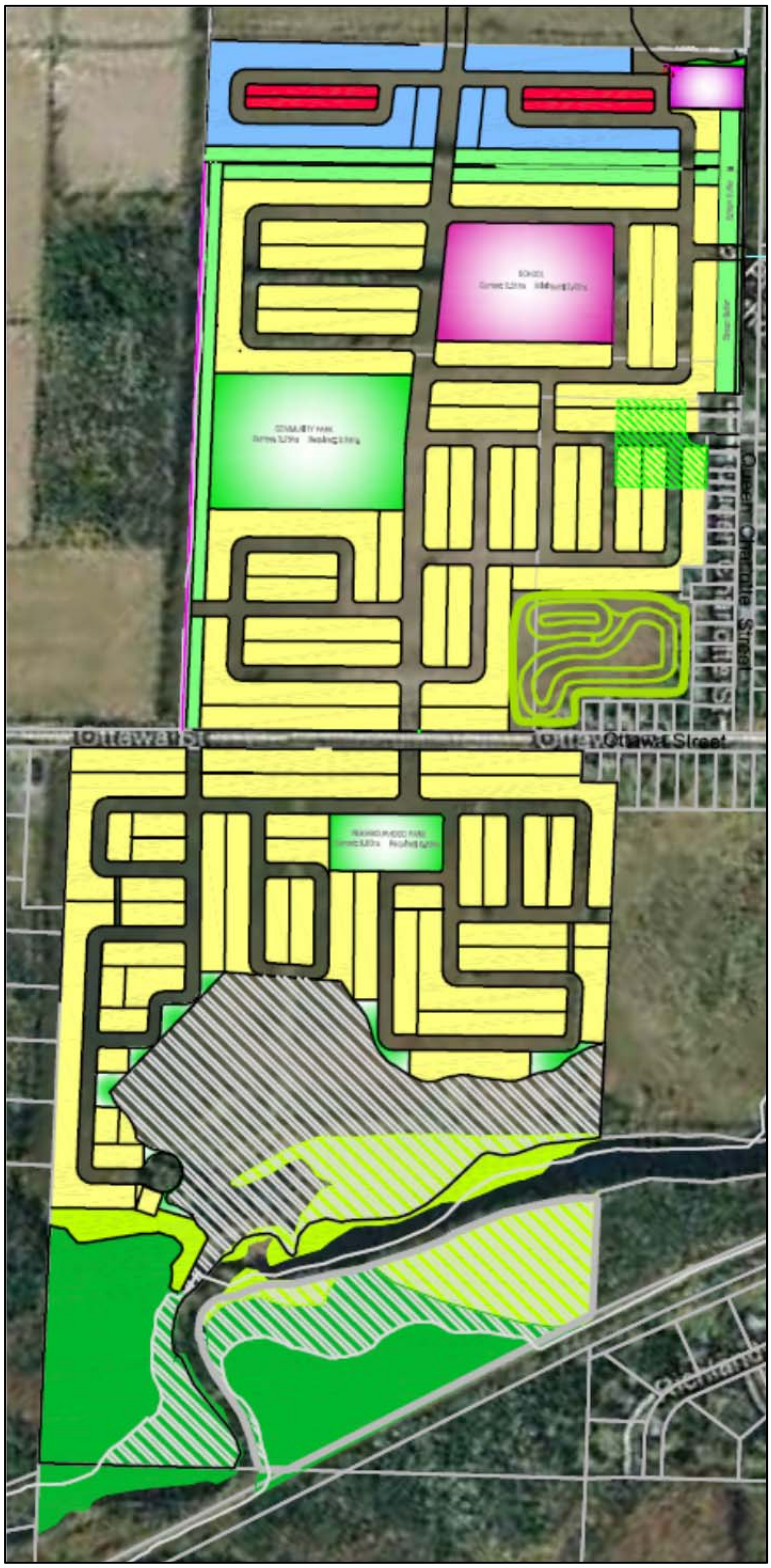
- Ottawa Street at a new access to the southern portion of the property

In addition to the new access intersections, two new accesses will be created using existing roads to the east of the site including:

- Royal York Street

- Burke Street

Figure 2
Site Concept Plan



2.0 EXISTING TRANSPORTATION ENVIRONMENT

2.1 ROADS AND TRAFFIC CONTROL

The major roadways in the study area are described below:

- Perth Street / Franktown Road – Running east – west through the Village of Richmond, Perth Street is an undivided urban arterial road with a posted speed limit of 50 km/h. East of Queen Charlotte Street Perth Street has a four lane cross section. West of Queen Charlotte Street Perth Street becomes Franktown Road where it continues as a two lane rural arterial road. Perth Street features sidewalks on both sides of the road through the Village of Richmond, which end as the transition is made to Franktown Road and a rural cross-section.

- Ottawa Street – is an east-west collector road with a rural cross-section and a 50 km/h posted speed limit. Ottawa Street does not currently have sidewalks.

- McBean Street – McBean Street intersects Perth Street at a three – way signalized intersection. It features a three-lane undivided cross-section at the intersection with Perth Street which includes an exclusive left turn lane. Sidewalks are provided on both sides of McBean Street within the Village of Richmond. McBean Street is designated as an arterial road with an urban cross-section and has a posted speed limit of 50 km/h.

- Huntley Road – Huntley Road intersects Perth Street at a three – way signalized intersection. It features a three-lane undivided cross-section at the intersection with Perth Street which includes an exclusive left turn lane. A sidewalk is provided on the west side of Huntley Road for approximately 100m north of Perth Street. Huntley Road is designated as an arterial road with a rural cross-section and has a posted speed limit of 50 km/h.

The road classifications noted above are referenced from Map 6 of the City of Ottawa's Transportation Master Plan (TMP).

Figure 3 illustrates the existing lane geometry and traffic controls at the study area intersections.

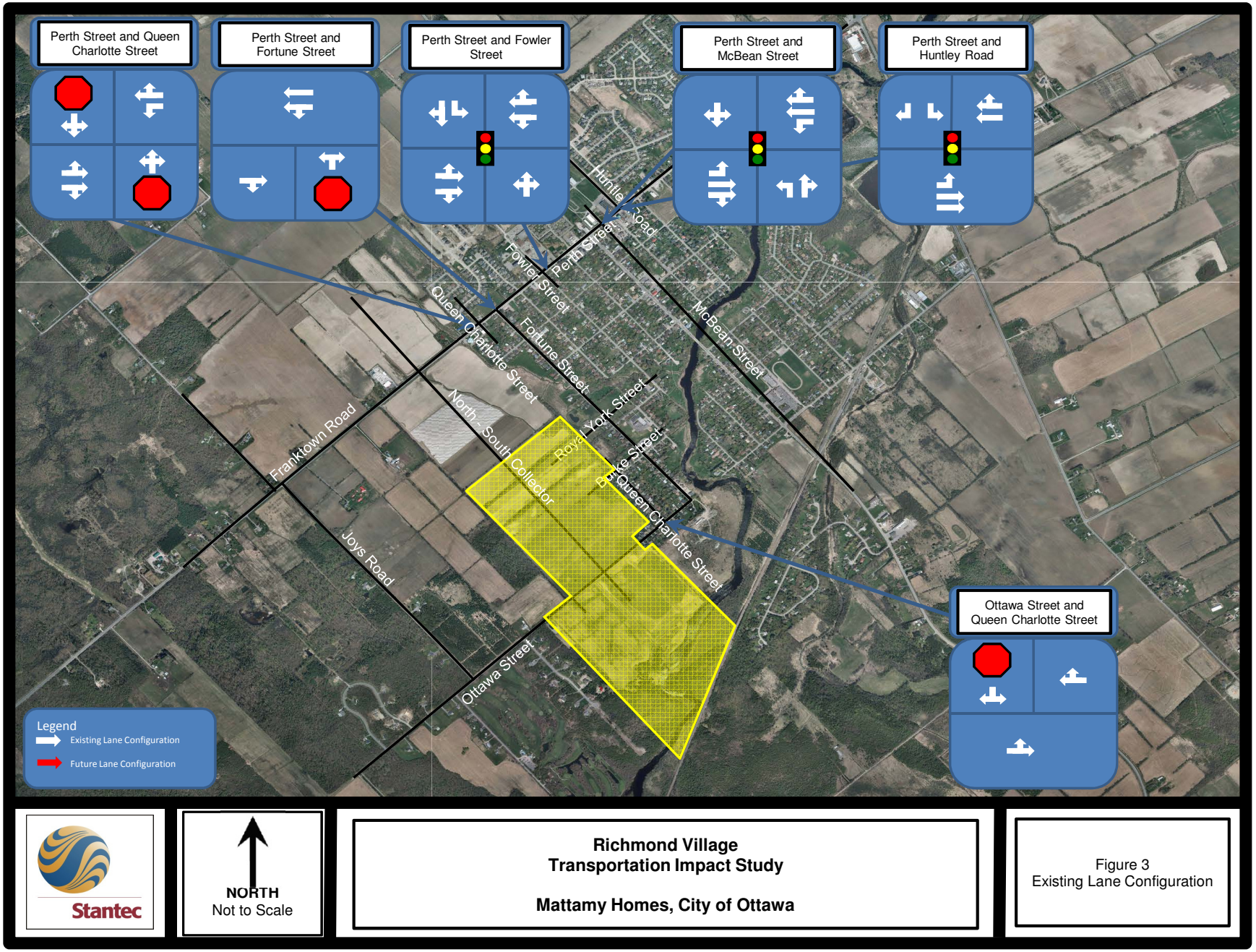


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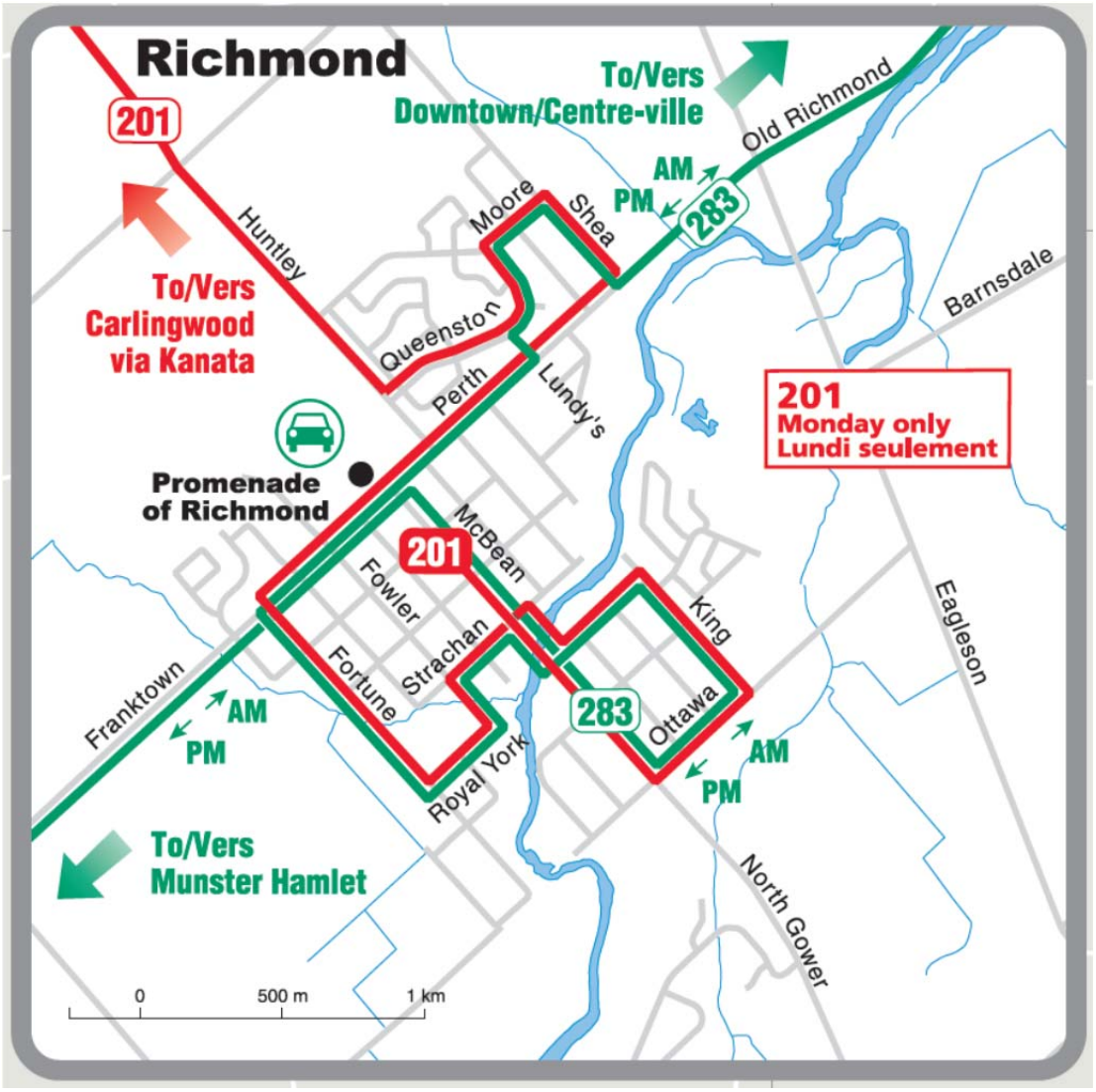
Figure 3
Existing Lane Configuration

2.2 TRANSIT

Transit service is provided throughout the study area. The existing transit network includes routes along Perth Street, McBean Street and Huntley Road. Nearby transit routes include Route 201 and Route 283.

Figure 4 illustrates the local transit routes.

Figure 4
Study Area Transit Routes



Source: OC Transpo System Map, Accessed December 11, 2012
(http://www.octranspo1.com/images/files/systemmap/systemmap.pdf)

2.3 CYCLING AND WALKING

The study area contains existing cycling and pedestrian facilities. Perth Street and McBean Street each have sidewalks along both sides of the street. Huntley Road has a sidewalk along the west side which extends approximately 100m north of Perth Street. Throughout the residential areas and local streets of the Village of Richmond sidewalks are not generally provided given that the roads predominantly feature rural cross-sections.

The Village of Richmond Transportation Master Plan, Figure 18, depicts Ottawa Street and Perth Street as designated on-road cycling route. Additionally, portions of Ottawa Street form part of the existing Rideau Trail network. This is consistent with *Ottawa Cycling Plan (OCP)*, Figure 3-4b Network Concept.

2.4 EXISTING TRAFFIC VOLUMES

Intersection turning movement counts were obtained from the City of Ottawa and supplemented with data from the Village of Richmond Transportation Master Plan and from traffic surveys undertaken by Stantec.

Recent traffic data was acquired for the following intersections:

- Franktown Road and Fowler Street (2011)
- McBean Street and Perth Street (2011)

Traffic count information was acquired from the Village of Richmond TMP for the following intersections:

- Huntley Road and Perth Street (2007)
- McBean Street and Perth Street (2007)
- Queen Charlotte Street and Perth Street (2008)
- Queen Charlotte Street and Ottawa Street (2008)

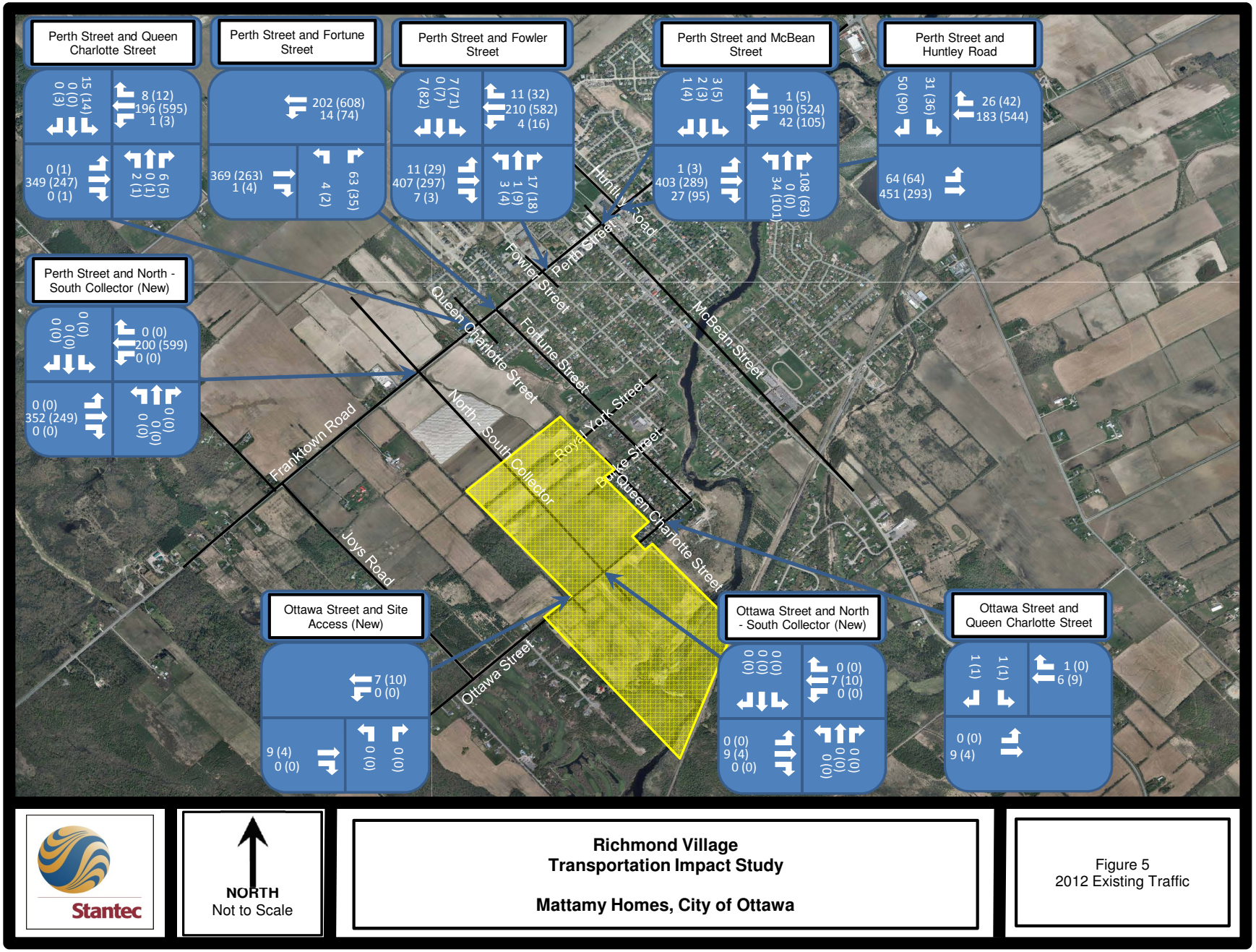
A new traffic count was undertaken at the Queen Charlotte Street and Ottawa Street intersection in November of 2012.

In the absence of turning movement count surveys at the Perth Street and Fortune Street intersection, traffic volumes at this location were estimated by reviewing the number of homes along Fortune Street and by applying industry standard trip generation rates from the *Institute of Transportation Engineers Trip Generation Manual 9th Edition*. Traffic was assigned to the road network based on the distribution results of the 2005 O-D Survey. The trip distribution is further described in **Section 3.5**. Through volumes along Perth Street were obtained from the upstream and downstream intersections.

Traffic volumes were balanced between intersections in locations where there were relatively low accesses or trip generators. All balancing was performed in a manner that favoured increasing volumes over decreasing volumes and, as a result, created a conservative estimate of the traffic volumes.

Furthermore, existing turning movement count data that was collected prior to 2012 was adjusted to the current base year (2012) using a two percent per annum growth rate.

Figure 5 illustrates existing AM and PM peak hour traffic volumes at the study area intersection. Traffic count data is provided for reference in **Appendix A**.


Perth Street and Queen Charlotte Street
15 (14)
0 (0)
0 (3)
8 (12)
196 (595)
1 (3)
0 (1)
349 (247)
0 (1)
6 (5)
0 (1)
2 (1)
Perth Street and Fortune Street
202 (608)
14 (74)
369 (263)
1 (4)
63 (35)
4 (2)
Perth Street and Fowler Street
7 (71)
0 (7)
7 (82)
11 (32)
210 (582)
4 (16)
11 (29)
407 (297)
7 (3)
17 (18)
1 (9)
3 (4)
Perth Street and McBean Street
3 (5)
2 (3)
1 (4)
1 (5)
190 (524)
42 (105)
1 (3)
403 (289)
27 (95)
108 (63)
0 (0)
34 (101)
Perth Street and Huntley Road
50 (90)
31 (36)
26 (42)
183 (544)
64 (64)
451 (293)
Perth Street and North - South Collector (New)
0 (0)
0 (0)
0 (0)
0 (0)
200 (599)
0 (0)
0 (0)
352 (249)
0 (0)
0 (0)
0 (0)
0 (0)
Ottawa Street and Site Access (New)
7 (10)
0 (0)
9 (4)
0 (0)
0 (0)
0 (0)
Ottawa Street and North - South Collector (New)
0 (0)
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7 (10)
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0 (0)
9 (4)
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0 (0)
Ottawa Street and Queen Charlotte Street
1 (1)
1 (1)
1 (0)
6 (9)
0 (0)
9 (4)
Huntley Road
Perth Street
Fowler Street
Queen Charlotte Street
Fortune Street
McBean Street
York Street
Duke Street
Royal
North - South Collector
Franktown Road
Joys Road
Ottawa Street
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Figure 5
2012 Existing Traffic

3.0 FUTURE TRANSPORTATION CONDITIONS

3.1 TRANSPORTATION NETWORK IMPROVMENTS

A review of the City of Ottawa TMP and the Village of Richmond TMP was undertaken to determine what improvements have been planned or examined previously to address existing or predicted deficiencies in the Village of Richmond traffic network.

The City of Ottawa TMP does not list any upgrades to the transportation network in the Village of Richmond.

The Village of Richmond TMP examined several upgrades to the transportation network. The primary examination was to determine the best solution to resolve anticipated east-west capacity issues. Three solutions were examined including: a new bridge across the Jock River at Ottawa Street; extending the four-lane cross-section of Perth Street to the western village limit; and an east-west village collector at the north end of the Village. The Village of Richmond TMP recommended that two of these solutions be carried forward, including the four-laning of Perth Street and the east-west collector. The bridge solution was not carried forward due to social and natural environment impacts and the low flexibility for future additional increases in capacity. Additional upgrades are recommended throughout the Village of Richmond that promote connectivity and accessibility but do not directly impact the subject site.

Through the Community Design Plan and Village TMP process a roundabout is contemplated at the intersection of Perth Street and the proposed N-S Collector. The exact configuration of this roundabout will be determined through the future detail design but is intended to function as a means of controlling traffic and as a gateway feature. The operational analysis of this intersection, to be undertaken through future TIA's may also include recommended design features to accommodate the anticipated traffic demand at this intersection.

A future multi-use path is shown in Figure 18 of the Village of Richmond TMP running along the Jock River and along Ottawa Street. Providing cycling facilities along the N-S Collector will connect the community to the planned facilities along Ottawa Street and promote active transportation throughout the proposed community.

3.2 2023 FUTURE BACKGROUND CONDITIONS

Future background conditions are assessed to determine transportation improvements that may be required to address growth in traffic exclusive from improvements that may be required to accommodate traffic generated by the subject development. Any improvements identified to address future background conditions are not the responsibility of the proponent of the subject site.

3.2.1 Future Background Growth

Future background conditions are typically derived by calculating the annual rate of growth on a transportation facility through a review of historic traffic volumes and / or by accounting for traffic

generated by other known area developments that were recently approved or that are currently in the planning approvals process.

By examining historic traffic volumes at the study area intersections a growth rate of approximately 2% was determined to be appropriate. This is consistent with previously approved TIA's and the Village of Richmond TMP.

The growth rate of 2% / annum was applied to existing traffic volumes at the study area intersections until the 2023 future horizon. This background growth rate was applied to the arterial road through volumes and all turning movements at arterial / arterial intersections.

By 2023 the development to the north of Mattamy's proposed site (Richmond Village [South] Limited) is anticipated to be fully built-out. Site trips generated by this background development were taken from the *Village of Richmond Transportation Brief*, GENIVAR August 2012, and were explicitly added to the transportation network.

3.2.2 2023 Future Background Traffic Volumes

Future background growth assumptions, detailed in **Section 3.2.1**, were applied to the existing traffic volumes to predict future background traffic volumes.

Figure 6 depicts the future background traffic volumes anticipated at the study area intersections.

To serve the background development it is anticipated that a roundabout will be implemented at the intersection of Perth Street and the new N-S Collector street. By this horizon it is anticipated that the four-laning of Perth Street will also be required to accommodate the predicted volumes. Additionally, the roundabout at Perth Street and the new site access will be constructed before 2023.

The link volumes on Perth Street, between Queen Charlotte Street and the N-S Collector are projected to exceed the capacity of a two-lane arterial road (i.e. approximately 1100 vehicles per hour versus an existing capacity of 900 vehicle per hour). This indicates that the widening of Perth Street to four lanes will be required to accommodate 2023 future background volumes.

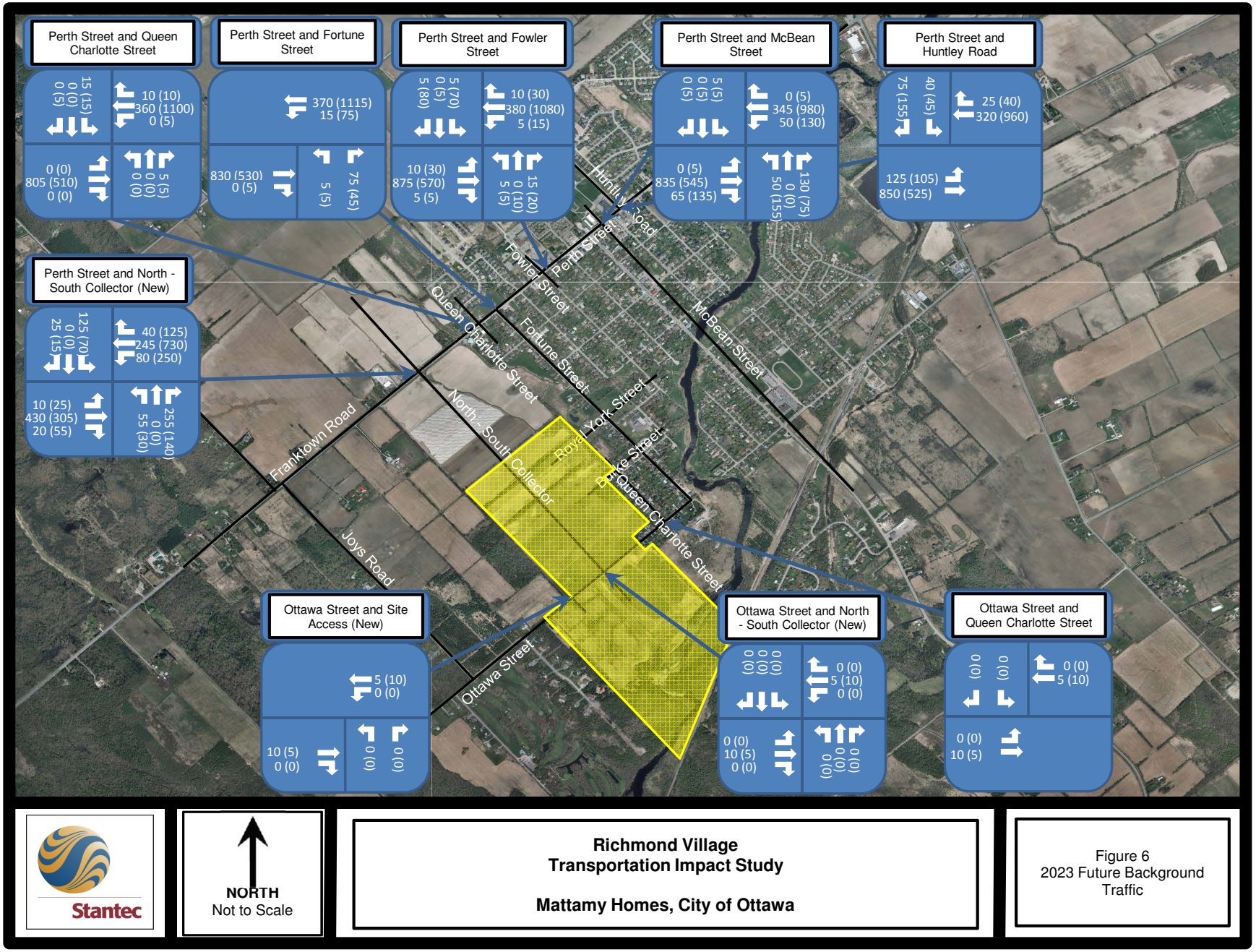

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Figure 6
2023 Future Background Traffic

3.3 MODE SHARE ASSUMPTIONS

The TRANS Committee's 2005 Origin – Destination (O-D) Survey for the National Capital Region was reviewed to ascertain the existing mode share characteristics for the Rural Southwest traffic zone. All trips for the "Other" mode listed in the O-D Survey were added to the auto mode share to ensure a conservative approach. The mode share for trips within the district and outside the district were combined to derive an estimated mode share for the new community.

Table 1 summarizes the peak hour mode share assumptions applied in this study.

Table 1
Future Mode Share Assumptions (Peak Hour)

Mode	AM	PM
Auto	85%	79%
Passenger	10%	15%
Transit	3%	3%
Active Mode	2%	3%

3.4 SITE TRAFFIC FORECASTS

To determine the transportation impacts of a new development it is necessary to estimate the additional demand that will be placed on the transportation network. It is becoming common practice to first estimate the volume of "person" trips generated by a given development and then allocate these trips to the various modes of transportation.

To determine the number of peak hour person trips expected to be generated by the development the *Institute of Transportation Engineers (ITE) Trip Generation Manual*, *9th Edition* was used as a basis for estimating the volume of automobile trips.

Table 2 summarizes the base automobile trip generation characteristics of the proposed development. These rates are obtained using the equations listed in ITE Trip Generation Manual and are based on the approximate number of units and unit types that are anticipated in Mattamy's subdivision.

Table 2
ITE Land Use Categories and Trip Rates

Land Use	Units	Morning Peak Hour			Afternoon Peak Hour		
		Inbound	Outbound	Rate	Inbound	Outbound	Rate
Single Family Detached (210)	966	25%	75%	0.71	63%	37%	0.84
Residential Condominium / Townhouse (230)	99	17%	83%	0.52	67%	33%	0.60

Utilizing the above trip rates the base ITE automobile trips were generated. Converting these automobile trips to person trips is done as follows:

- As a general rule, the ITE trip generation rates are assumed to include an inherent 10% transit modal share. To account for this in the conversion to person trips the base ITE automobile trips were increased by 10%.

- An auto-occupancy factor is applied to the base ITE rates to account for auto passengers. Through the TRANS O-D Survey it was determined that for the study area 10% of AM peak hour trips and 15% of PM peak hour trips are automobile passenger trips. To reflect the auto-occupancy the trips generated were increase by 10% in the AM peak hour and 15% in the PM peak hour.

By accounting for both the inherent transit mode share and the anticipated auto-occupancy the base ITE automobile trips were converted to person trips. The person trips are then assigned to the various transportation modes using the modes shares summarized in **Section 3.3**.

Table 3 summarizes the person trips by mode as well as the inbound or outbound splits for the morning and afternoon peak hours. To simplify the trip generation and distribution the site was analyzed in two sections, one to the north of Ottawa Street and the second to the south of Ottawa Street.

As shown in **Table 3** the development is expected to generate approximately 900 person trips during the AM peak hour and roughly 1150 person trips during the PM peak hour. Similarly, the site is expected to generate roughly 800 automobile trips during the AM peak hour and 900 automobile trips during the PM peak hour.

Appendix B contains detailed trip generation information.

Table 3
Site Traffic Generation

Zone	Factors / Modes	Split	Morning Peak Hour			Split	Afternoon Peak Hour		
			In	Out	Total		In	Out	Total
Mattamy North	**Adjustment Factors**								
	Base ITE Trips		104	328	432		323	186	509
	Inherent Transit Mode Share	10%	11	36	47	10%	36	20	56
	Auto Occupancy	10%	14	44	58	15%	65	37	102
	Total Person Trips		129	408	538		424	243	667
	Site Trips by Travel Mode								
	Auto	85%	109	345	455	79%	334	191	525
	Passenger	10%	13	42	56	15%	65	37	102
	Transit	3%	4	12	16	3%	13	7	20
	Active Mode	2%	3	9	12	3%	13	7	20
Mattamy South	**Adjustment Factors**								
	Base ITE Trips		76	229	305		227	133	360
	Inherent Transit Mode Share	10%	9	25	34	10%	25	15	40
	Auto Occupancy	10%	10	30	40	15%	45	27	72
	Total Person Trips		95	284	380		297	175	472
	Site Trips by Travel Mode								
	Auto	85%	80	240	322	79%	234	138	372
	Passenger	10%	10	30	39	15%	45	27	72
	Transit	3%	3	8	11	3%	9	5	14
	Active Mode	2%	2	6	9	3%	9	5	14
Total Site Trips	**Adjustment Factors**								
	Base ITE Trips		180	557	737		550	319	869
	Inherent Transit Mode Share	10%	20	61	81	10%	61	35	96
	Auto Occupancy	10%	24	74	98	15%	110	64	174
	Total Person Trips		224	692	916		721	418	1139
	Site Trips by Travel Mode								
	Auto	85%	190	586	777	79%	568	329	897
	Passenger	10%	23	72	95	15%	110	64	174
	Transit	3%	7	20	27	3%	22	13	34
	Active Mode	2%	5	15	21	3%	22	13	34

3.5 TRAFFIC DISTRIBUTION AND ASSIGNMENT

The distribution of traffic to/from the study area was determined through examination of the TRANS Committee's 2005 Origin-Destination (O-D) Survey.

Table 4 provides a summary of the distribution of traffic from the site across the four cardinal directions.

Table 4
Traffic Distribution from the Kanata / Stittsville Traffic Zone

Cardinal Direction	Assignment
North	60%
South	5%
East	30%
West	5%

Appendix C provides a detailed summary of the trip distribution and assignment.

Site trips were assigned to the road network based on the location of each site access relative to the proximity of collector and arterial roads and proposed intersections along the boundary road network.

Figure 7 illustrates the assignment of site traffic to the boundary road network and study area intersections.

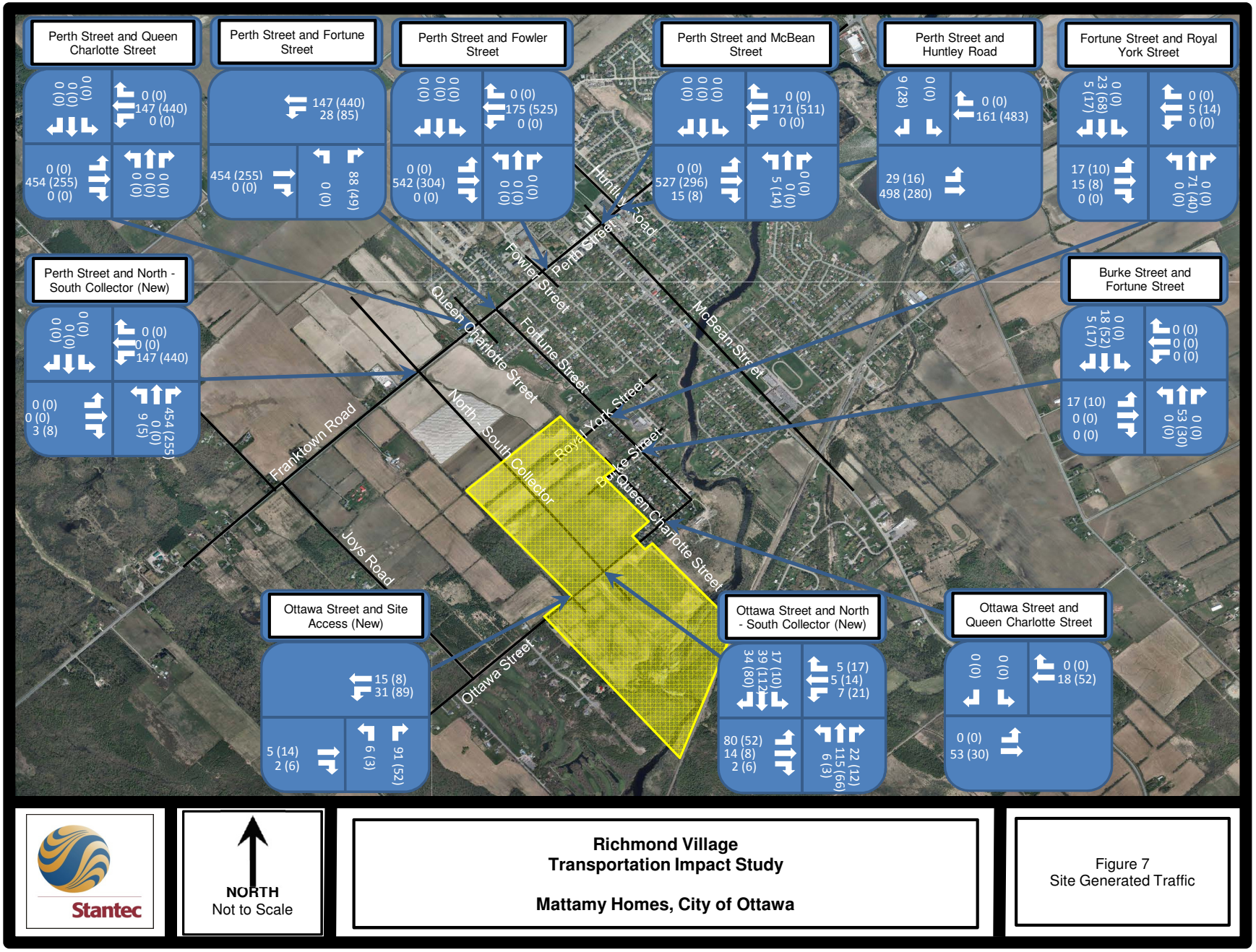

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Figure 7
Site Generated Traffic

3.6 2023 TOTAL FUTURE CONDITIONS

Total future conditions are examined to determine improvements that may be required as a direct result of the development of the site. It is anticipated that by 2023, all of the residential units within Mattamy's proposed development will be built and occupied. Total future traffic volumes are derived by adding site generated trips (**Figure 7**) to future background volumes (**Figure 6**) anticipated for 2023.

Figure 8 illustrates 2023 total future traffic volumes at the study area intersections.

The projected volume of traffic along Perth Street can be accommodated with the widening of Perth Street to a four-lane cross-section (identified to accommodate future background traffic volumes).

Detailed operational analysis of these intersections will be undertaken in subsequent TIA's submitted for each development phase. The operational performance of the site access or study area intersections, including the future roundabout at Perth Street and the N-S Collector, will be examined and addressed through the subsequent TIA's.

3.6.1 Site Access Locations / Intersections

As depicted earlier in **Figure 2**, the development will feature a N-S Collector road which will provide direct access to the community and will distribute trips to the internal subdivision streets and residential driveways. The N-S Collector will ultimately extend north of Perth Street and south of Ottawa Street.

The portion of Mattamy's development north of Ottawa Street will be accessed as follows:

- Perth Street / N-S Collector – via extension of the N-S Collector through the development lands of Richmond Village (South) Limited
- Ottawa Street / N-S Collector
- Burke Street Extension
- Royal York Street Extension

The portion of Mattamy's development south of Ottawa Street will be accessed as follows:

- Ottawa Street / N-S Collector
- Ottawa Street / New site access west of N-S Collector

3.6.2 Signal Warrants

Ministry of Transportation Ontario (MTO) traffic signal warrants were examined at the Ottawa Street / N-S Collector intersection. It was found that signals are not warranted at this location during the 2023 total future horizon. The intersection of Ottawa Street / New site access west of the N-S Collector was not explicitly examined using MTO's signal warrant calculation. However, based on the results of the signal

warrant examination at Ottawa Street / N-S Collector and a comparison of the volumes between the two intersections, a signal will not be required at Ottawa Street / New site access west of the N-S Collector. A signal warrant analysis was not performed at the intersection of Perth Street and the N-S Collector given that a roundabout has been recommended at this location through previous planning documents.

Appendix D contains the detailed signal warrant.

3.6.3 All Way Stop Control Warrants

As signals are not anticipated at either of the new intersections along Ottawa Street the implementation of an all way stop control (AWSC) was examined. Both intersections were examined using the City of Ottawa's AWSC procedure. It was determined that an AWSC will likely be required at the intersection of Ottawa Street and the N-S Collector street. However, an AWSC is not required at the intersection of Ottawa Street and the new site access west of the N-S Collector. As with the signal warrants the intersection of Perth Street and the N-S Collector was not examined as a roundabout has been assumed at this location.

Appendix D contains detailed warrant calculations.

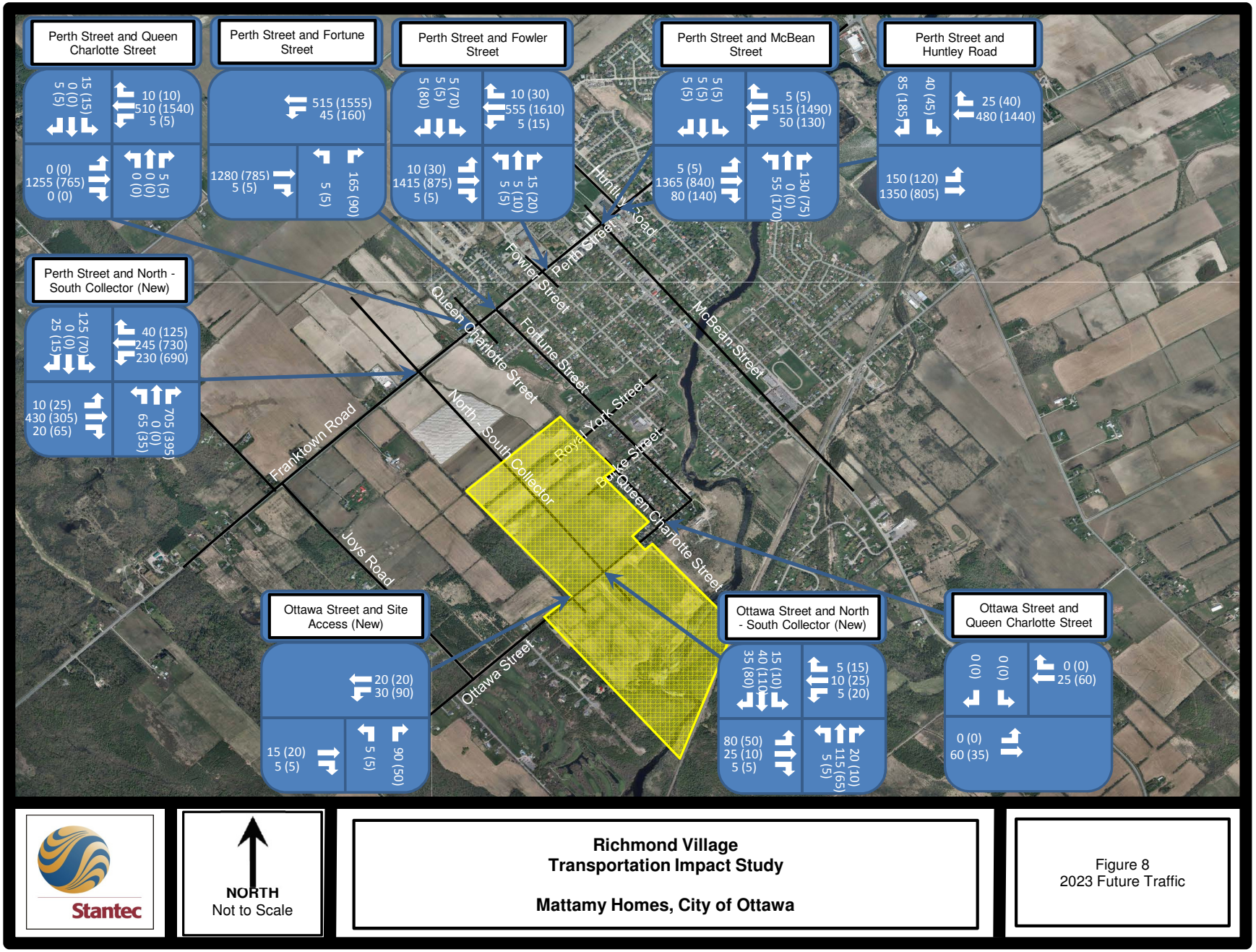
3.6.4 Auxiliary Turning Lane Needs

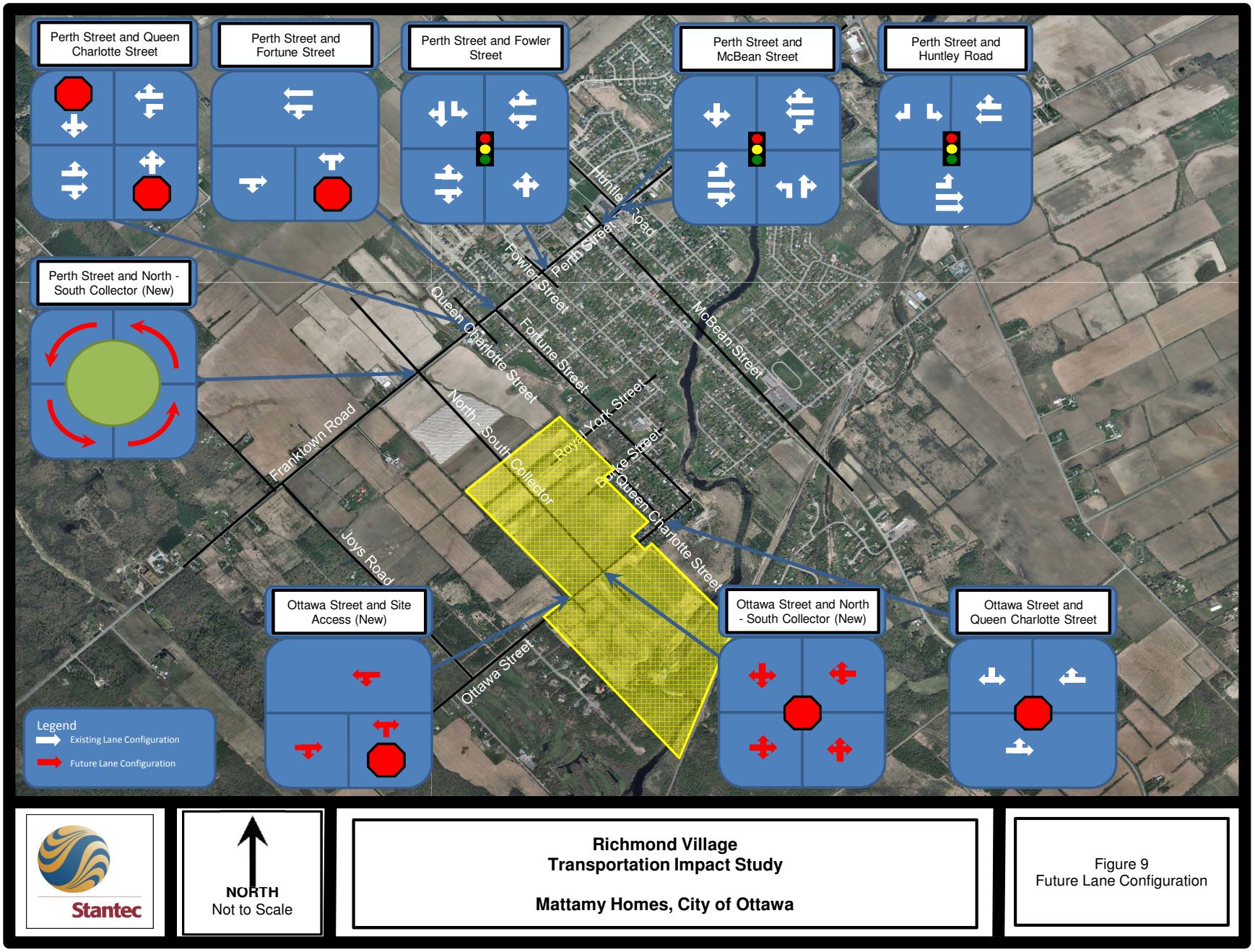
The need for auxiliary turning lane was examined to ensure that intersections can safely accommodate the anticipated turning movement volumes. At unsignalized intersections right turn lanes are considered "when the volume of decelerating or accelerating vehicles compared with the through traffic volume causes undue hazard" (Transportation Association of Canada Geometric Design Guide for Canadian Roads, Section 2.3.5.2). Given that an AWSC is warranted at the intersection of Ottawa Street and the N-S Collector it is unlikely that an undue hazard will be created at this location.

MTO's Geometric Design Guide was used to examine left turn lane warrants. It was determined that left turn lanes are not warranted at the intersection of Ottawa Street and the N-S Collector. The need for right and left auxiliary turning lanes was also examined at the intersection of Ottawa Street and the new site access. This examination determined that auxiliary lanes are not warranted at this intersection.

Appendix D contains detailed warrant calculations.

Figure 9 details the anticipated future lane configuration and traffic controls for the study area intersections based on the results of the above sections.


Perth Street and Queen Charlotte Street
15 (15)
0 (0)
5 (5)
10 (10)
510 (1540)
5 (5)
0 (0)
1255 (765)
0 (0)
5 (5)
0 (0)
0 (0)
Perth Street and Fortune Street
515 (1555)
45 (160)
1280 (785)
5 (5)
5 (5)
165 (90)
Perth Street and Fowler Street
5 (70)
5 (5)
5 (80)
10 (30)
555 (1610)
5 (15)
10 (30)
1415 (875)
5 (5)
15 (20)
5 (10)
5 (5)
Perth Street and McBean Street
5 (5)
5 (5)
5 (5)
5 (5)
515 (1490)
50 (130)
5 (5)
1365 (840)
80 (140)
130 (75)
0 (0)
55 (170)
Perth Street and Huntley Road
85 (185)
40 (45)
25 (40)
480 (1440)
150 (120)
1350 (805)
Perth Street and North - South Collector (New)
125 (70)
0 (0)
25 (15)
40 (125)
245 (730)
230 (690)
10 (25)
430 (305)
20 (65)
705 (395)
0 (0)
65 (35)
Ottawa Street and Site Access (New)
20 (20)
30 (90)
15 (20)
5 (5)
5 (5)
90 (50)
Ottawa Street and North - South Collector (New)
15 (10)
40 (110)
35 (80)
5 (15)
10 (25)
5 (20)
80 (50)
25 (10)
5 (5)
20 (10)
115 (65)
5 (5)
Ottawa Street and Queen Charlotte Street
0 (0)
0 (0)
0 (0)
25 (60)
0 (0)
60 (35)
Perth Street
Huntley Road
Fowler Street
Fortune Street
McBean Street
Queen Charlotte Street
York Street
Duke Street
Royal
North - South Collector
Franktown Road
Joys Road
Ottawa Street
Stantec
NORTH
Not to Scale
Richmond Village
Transportation Impact Study
Mattamy Homes, City of Ottawa
Figure 8
2023 Future Traffic


Perth Street and Queen Charlotte Street
Perth Street and Fortune Street
Perth Street and Fowler Street
Perth Street and McBean Street
Perth Street and Huntley Road
Perth Street and North - South Collector (New)
Ottawa Street and Site Access (New)
Ottawa Street and North - South Collector (New)
Ottawa Street and Queen Charlotte Street
Huntley Road
Perth Street
Fowler Street
Queen Charlotte Street
Fortune Street
McBean Street
York Street
Franktown Road
North - South Collector
Joys Road
Ottawa Street
Legend
Existing Lane Configuration
Future Lane Configuration
NORTH
Not to Scale
Stantec
Richmond Village
Transportation Impact Study
Mattamy Homes, City of Ottawa
Figure 9
Future Lane Configuration

3.7 2028 FUTURE CONDITIONS (5 YEARS BEYOND SITE BUILD-OUT)

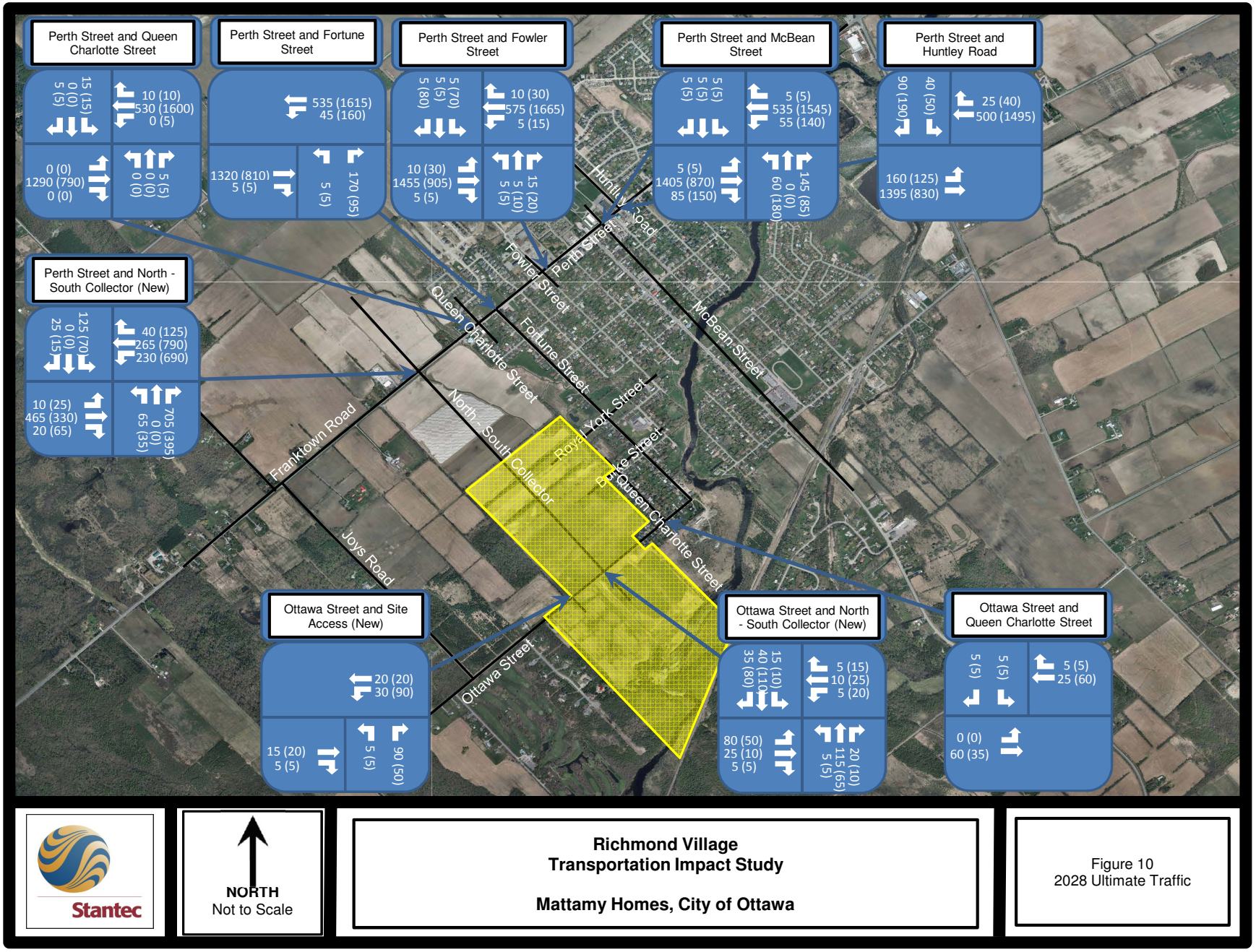
The City of Ottawa's TIA Guidelines require an assessment of transportation conditions five years beyond the build-out of a given site. Ultimate future conditions for the 2028 horizon were examined to determine if other improvements may be required due to continued background growth.

Traffic volumes for the 2028 horizon are derived by adding anticipated growth that may occur between the site build-out horizon (i.e. 2023) and the ultimate horizon. This growth includes a 2 percent annual growth rate.

Figure 10 illustrates 2028 ultimate future traffic volumes at the study area intersections.

As volumes have not significantly increased at the site accesses between 2023 and 2028 none of the traffic control or auxiliary lanes are anticipated to change. No modifications to the site access will be required to accommodate background growth 5 years beyond the full build out of the proposed development.

An operational analysis of these intersections will be undertaken in subsequent TIA's submitted for each development phase. Any operational constraints at the site access or study area intersections, including the future roundabout at Perth Street and the N-S Collector, will be examined and addressed through the subsequent TIA's.


Perth Street and Queen Charlotte Street
15 (15)
0 (0)
5 (5)
10 (10)
530 (1600)
0 (5)
0 (0)
1290 (790)
0 (0)
5 (5)
0 (0)
0 (0)
Perth Street and Fortune Street
535 (1615)
45 (160)
1320 (810)
5 (5)
5 (5)
170 (95)
Perth Street and Fowler Street
5 (70)
5 (5)
5 (80)
10 (30)
575 (1665)
5 (15)
10 (30)
1455 (905)
5 (5)
15 (20)
5 (10)
5 (5)
Perth Street and McBean Street
5 (5)
5 (5)
5 (5)
5 (5)
535 (1545)
55 (140)
5 (5)
1405 (870)
85 (150)
145 (85)
0 (0)
60 (180)
Perth Street and Huntley Road
90 (190)
40 (50)
25 (40)
500 (1495)
160 (125)
1395 (830)
Perth Street and North - South Collector (New)
125 (70)
0 (0)
25 (15)
40 (125)
265 (790)
230 (690)
10 (25)
465 (330)
20 (65)
705 (395)
0 (0)
65 (35)
Huntley Road
Perth Street
Fowler Street
Queen Charlotte Street
Fortune Street
McBean Street
York Street
Franktown Road
North - South Collector
Joys Road
Bike
Queen Charlotte Street
Ottawa Street and Site Access (New)
20 (20)
30 (90)
15 (20)
5 (5)
5 (5)
90 (50)
Ottawa Street
Ottawa Street and North - South Collector (New)
15 (10)
40 (110)
35 (80)
5 (15)
10 (25)
5 (20)
80 (50)
25 (10)
5 (5)
20 (10)
115 (65)
5 (5)
Ottawa Street and Queen Charlotte Street
5 (5)
5 (5)
5 (5)
25 (60)
0 (0)
60 (35)
Stantec
NORTH
Not to Scale
Richmond Village
Transportation Impact Study
Mattamy Homes, City of Ottawa
Figure 10
2028 Ultimate Traffic

3.8 TRANSIT SERVICE

The availability of transit service is largely dependent on the financial viability of operating additional routes and services to an area. While the Village of Richmond is currently only serviced by express routes during peak hours, the addition of more potential customers will allow OCTranspo to expand the services currently offered.

With the addition of the proposed development existing transit routes should be reconfigured to serve the new community. The proposed N-S Collector provides an ideal location for an additional loop to the existing Route 283.

3.9 CYCLING AND WALKING

In accordance with Ottawa's Pedestrian Plan, sidewalks should be provided along both sides of collector streets and, where deemed appropriate, along one side of local streets. The width of sidewalks and boulevards should generally adhere to the recommendations of the Ottawa Pedestrian Plan June 2009 (OPP) and should be coordinated with the surrounding developments to ensure connectivity and consistency in design.

The N-S Collector should be designated as a cycling route as it will provide access to a school and two parks. Furthermore, as a cycling route the N-S Collector provides continuity and connectivity to Perth Street and Ottawa Street – both of which are designated as cycling routes.

In addition, the site plan should allow for connections to be made to the pathway system and recreational areas along the Jock River.

3.10 COMMUNITY IMPACTS

The proposed road network, and the orientation of the N-S Collector, will direct the majority of site trips to the arterial road network (i.e. Perth Street). Some site trips will, however, utilize Fortune Street to access the broader network – expected to be less than 100 peak direction trips - given the direct connections made through the extensions of Burke Street and Royal York Street to the subject site. The impact of these site trips on the existing community is expected to be negligible.

3.11 TRANSPORTATION DEMAND MANAGEMENT

As the proposed development is a rural residential subdivision no specific Transportation Demand Management initiatives have been considered.

4.0 SUMMARY AND CONCLUSIONS

The Transportation Brief has found the following:

- Mattamy's proposed development at 6420 and 6431 Ottawa Street will feature approximately 1100 residential units. Roughly 1000 of these units will be single family dwellings and 100 units will be townhome-style dwellings.

- The proposed development is expected to generate approximately 900 person trips during the AM peak hour and roughly 1150 person trips during the PM peak hour. Similarly, the site is expected to generate roughly 800 automobile trips during the AM peak hour and 900 automobile trips during the PM peak hour.

- The site will be accessed at two new intersections, two existing roads along the east edge and through the proposed development to the north of the proposed development.

- With the addition of the proposed development existing transit routes should be reconfigured to serve the new community. The proposed N-S Collector provides an ideal location for an additional loop to the existing Route 283.

- Sidewalks should be provided along both sides of the subdivision collector streets and, where deemed appropriate, on one side of local streets.

- The N-S Collector should be designated as a cycling route as it will provide access to a school and two parks and because it provides continuity and connectivity to the existing network.

- The site plan should allow for connections to be made to the pathway system and recreational areas along the Jock River.

- To support development in the west end of the Village of Richmond the four lane cross-section of Perth Street should be extended to at least the intersection of Perth Street and the new N-S Collector. This improvement is consistent with the recommendations of the Village of Richmond Transportation Master Plan.

- At full build-out of the proposed development, anticipated in approximately 2023, an all-way stop control has been shown to be warranted at the intersection of the new N-S Collector and Ottawa Street. The timing of and need for the AWSC will be confirmed through TIA's for each development phase.

- The site access intersection to Ottawa Street (west of the N-S Collector) should be stop-controlled on the minor approach (i.e. site access approach). It is not anticipated that additional lanes will be required at this new access.

- While some site trips are expected to utilize Fortune Street, Burke Street and Royal York Street, the impact of these site trips on the existing community is expected to be negligible.

- The operational characteristics of the study area intersections will be examined in subsequent TIA's for each development phase.

Based on the transportation evaluation and the impacts that have been anticipated in this Transportation Brief, the proposed development of 6420 and 6431 Ottawa Street should be permitted to proceed to the next phase of the approvals process.

*****

STANTEC CONSULTING LTD.

Rob Vastag, MCIP, RPP
Project Manager, Senior Transportation Planner

Mark Crockford, Engineering Intern
Traffic Analyst

Appendix A:
Turning Movement Count Data

Richmond Village Traffic Count
Ottawa Street and Queen Charlotte Street
27-Nov-12

	NBL		NBR	SBL		SBR	EBL		EBR	WBL		WBR	
7:30 - 7:45					1				2			1	
7:45 - 8:00							1		4			1	
8:00 - 8:15									3			3	1
8:15 - 8:30												1	
Total	0	0	0	1	0	1	0	9	0	0	6	1	

	NBL		NBR	SBL		SBR	EBL		EBR	WBL		WBR	
4:30 - 4:45					1							4	
4:45 - 5:00												1	
5:00 - 5:15									2			2	
5:15 - 5:30							1		2			2	
Total	0	0	0	1	0	1	0	4	0	0	9	0	

Ottawa — *Public Works and Services Department*

Count ID 2100

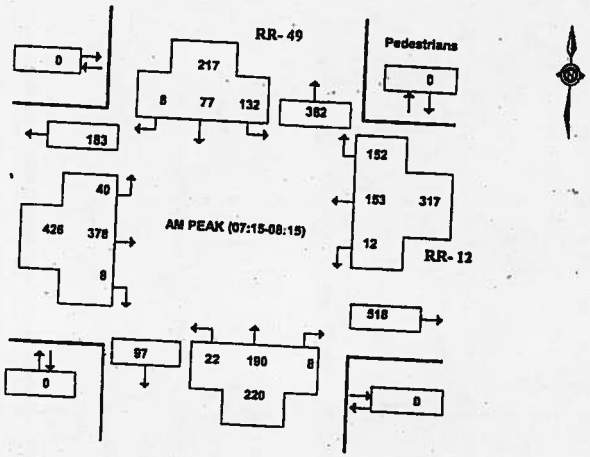
FALLOWFIELD RD and EAGLESON RD

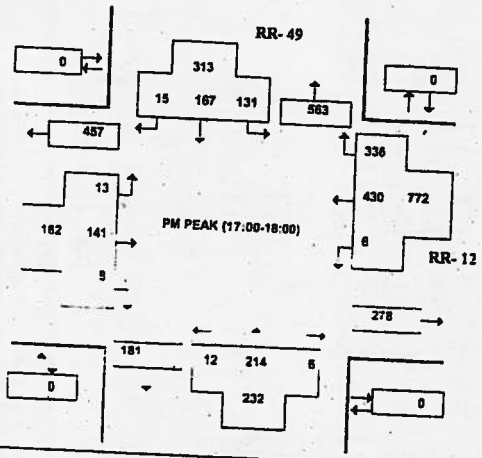
(ULRS Listing RR- 12 & RR-49)

Survey Date: Monday 8 May 2006
Conditions: DRY
Start Time: 0700

Total Observed U-Turns
Northbound: 0 Southbound: 0
Eastbound: 0 Westbound: 0

AADT Factor
Monday in May is 1





Approved by : VF

Printed on : 04/03/2008

Ottawa — *Public Works and Services Department*

Heavy Vehicle Summary Sheet - Hourly Volumes

Count ID 21008

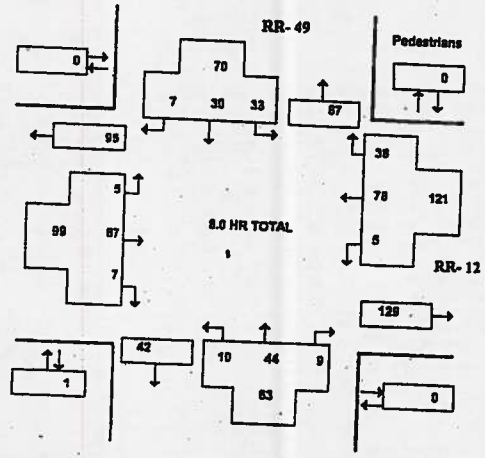
FALLOWFIELD RD and EAGLESON RD

(ULRS Listing RR- 12 & RR-49)

Survey Date :Monday 8 May 2006

Conditions : DRY

Start Time : 0700



Time Period	RR-49 Northbound LT	ST	RT	SUB TOT	Southbound LT	ST	RT	SUB TOT	STR TOT	RR-12 Eastbound LT	ST	RT	SUB TOT	Westbound LT	ST	RT	SUB TOT	STR TOT	GRAND TOT
07:00-08:00	7	12	0	19	6	2	0	8	27	1	17	2	20	1	11	8	20	40	67
08:00-09:00	1	9	1	11	6	3	1	10	21	0	16	0	16	0	7	4	11	27	48
09:00-10:00	0	5	0	5	4	5	3	12	17	3	14	1	18	0	10	5	16	34	51
11:30-12:30	0	5	0	5	2	3	0	5	10	0	5	4	9	1	3	5	9	18	28
12:30-13:30	1	2	5	8	5	5	0	10	18	0	8	0	8	2	13	4	19	27	45
15:00-16:00	1	3	0	4	2	1	0	3	7	0	7	0	7	1	11	4	16	23	30
16:00-17:00	0	4	2	6	7	6	1	14	20	1	13	0	14	0	13	4	17	31	51
17:00-18:00	0	4	1	5	1	5	2	8	13	0	7	0	7	0	10	3	13	20	33
8.0 HR TOTAL	10	44	9	63	33	30	7	70	133	5	87	7	99	5	78	38	121	220	353

Heavy Vehicles are vehicles having one rear axle with four or more wheels, or having two or more rear axles. These vehicles include most O.C. Transpo, school and inter-city buses. Further, they ARE included in the Turning Movement Count Summary.

Printed on: 04/03/2008

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Count ID 1790

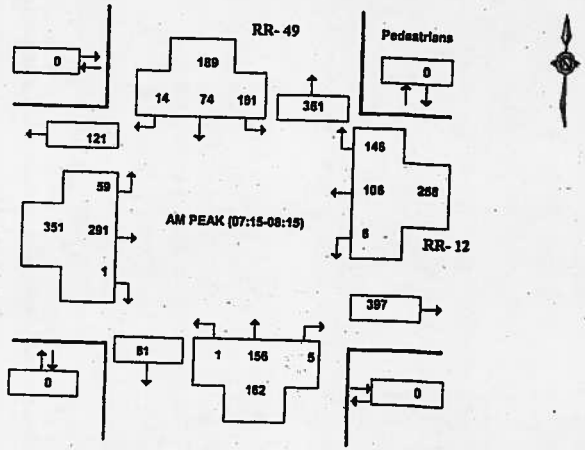
FALLOWFIELD RD and EAGLESON RD

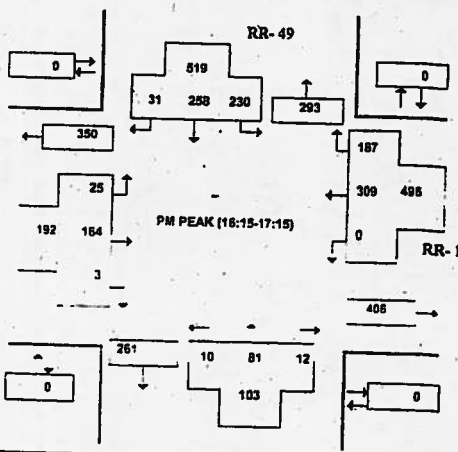
(ULRS Listing RR- 12 & RR- 49)

Survey Date: Thursday 5 August 2004
Conditions: DRY
Start Time: 0700

Total Observed U-Turns
Northbound: 0 Southbound: 0
Eastbound: 0 Westbound: 0

AADT Factor
Thursday in August i
0.9





Approved by : JM

Printed on : 04/03/2008

Ottawa — *Public Works and Services Department*

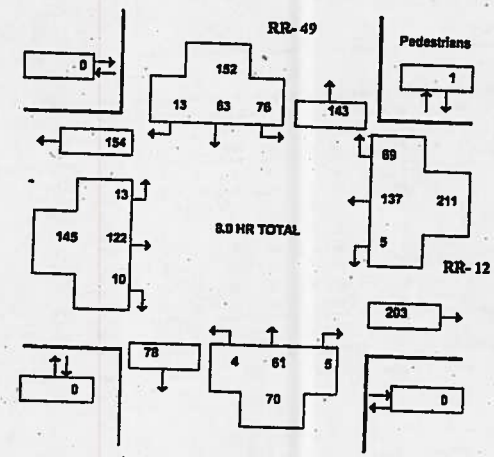
Heavy Vehicle Summary Sheet - Hourly Volumes

Count ID 17906

FALLOWFIELD RD and EAGLESON RD

(ULRS Listing RR- 12 & RR- 49)

Survey Date :Thursday 5 August 2004 **Conditions : DRY** **Start Time : 0700**



	RR- 49									RR- 12									
	Northbound			SUB	Southbound			SUB	STR	Eastbound			SUB	Westbound			SUB	STR	GRAND
Time Period	LT	ST	RT	TOT	LT	ST	RT	TOT	TOT	LT	ST	RT	TOT	LT	ST	RT	TOT	TOT	TOT
07:00-08:00	0	8	0	8	5	3	1	9	17	0	27	1	28	3	14	11	28	56	73
08:00-09:00	0	5	1	6	4	3	2	9	15	0	14	3	17	2	21	10	33	50	65
09:00-10:00	1	15	2	18	3	11	1	15	33	2	22	4	28	0	15	5	20	48	81
11:30-12:30	0	4	0	4	8	4	3	15	19	0	10	0	10	0	14	13	27	37	56
12:30-13:30	0	13	0	13	9	11	0	20	33	3	11	0	14	0	12	12	24	38	71
15:00-16:00	0	4	0	4	13	10	4	27	31	4	13	0	17	0	22	6	28	45	76
16:00-17:00	2	4	1	7	15	11	0	26	33	3	15	1	19	0	26	9	35	54	87
17:00-18:00	1	8	1	10	19	10	2	31	41	1	10	1	12	0	13	3	16	28	69
8.0 HR TOTAL	4	61	5	70	76	83	13	152	222	13	122	10	145	5	137	69	211	356	578

Heavy Vehicles are vehicles having one rear axle with four or more wheels, or having two or more rear axles. These vehicles include most O C Transpo, school and inter-city buses. Further, they ARE included in the Turning Movement Count Summary.

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Ottawa — *Public Works and Services Department*

Count ID 1524

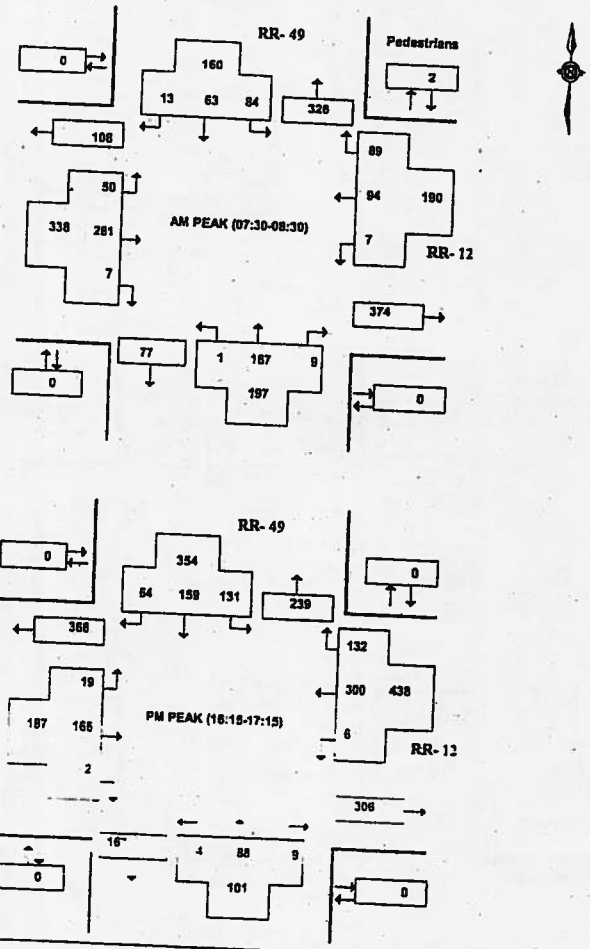
FALLOWFIELD RD and EAGLESON RD

(ULRS Listing RR- 12 & RR- 49)

Survey Date: Monday 19 August 2002
Conditions: DRY
Start Time: 0700

Total Observed U-Turns
Northbound: 0 Southbound: 0
Eastbound: 0 Westbound: 0

AADT Factor
Monday in August is 1



Approved by : DT

Printed on : 04/03/2008

Ottawa — *Public Works and Services Department*

Heavy Vehicle Summary Sheet - Hourly Volumes

Count ID 15240

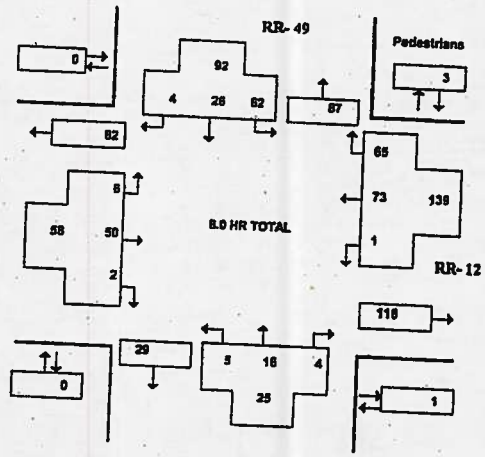
FALLOWFIELD RD and EAGLESON RD

(ULRS Listing RR- 12 & RR- 49)

Survey Date :Monday 19 August 2002

Conditions : DRY

Start Time : 0700



	RR- 49									RR- 12									
	Northbound			SUB	Southbound			SUB	STR	Eastbound			SUB	Westbound			SUB	STR	GRAND
Time Period	LT	ST	RT	TOT	LT	ST	RT	TOT	TOT	LT	ST	RT	TOT	LT	ST	RT	TOT	TOT	TOT
07:00-08:00	0	2	0	2	7	3	0	10	12	1	7	1	9	0	9	11	20	29	41
08:00-09:00	0	3	2	5	6	3	1	10	15	1	9	0	10	0	3	6	9	19	34
09:00-10:00	1	0	0	1	9	4	1	14	15	0	1	0	1	0	9	10	19	20	35
11:30-12:30	0	2	0	2	11	2	0	13	15	0	10	0	10	0	9	5	14	24	39
12:30-13:30	0	4	2	6	8	1	0	9	15	3	6	0	9	1	6	15	22	31	46
15:00-16:00	1	0	0	1	9	3	1	13	14	1	5	0	6	0	14	9	23	29	43
16:00-17:00	1	4	0	5	11	3	0	14	19	0	7	0	7	0	15	6	22	29	48
17:00-18:00	2	1	0	3	1	7	1	9	12	0	5	1	6	0	7	3	10	16	28
8.0 HR TOTAL	5	16	4	25	82	26	4	92	117	6	50	2	58	1	73	65	139	197	314

Heavy Vehicles are vehicles having one rear axle with four or more wheels, or having two or more rear axles. These vehicles include most O.C. Transpo, school and inter-city buses. Further, they ARE included in the Turning Movement Count Summary.

Printed on: 04/03/2008

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Count ID: 1001

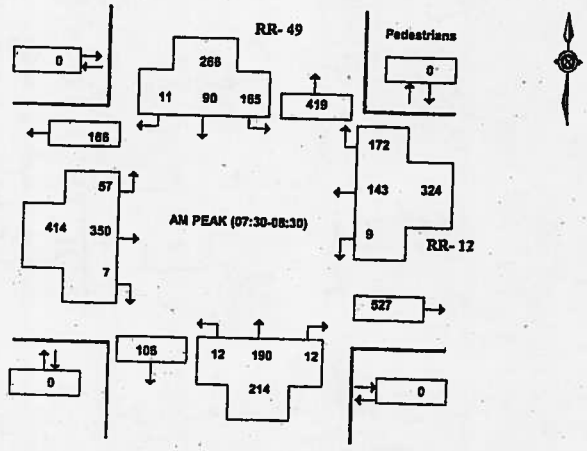
FALLOWFIELD RD and EAGLESON RD

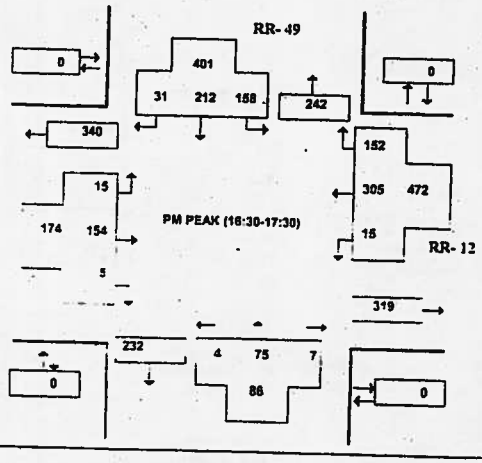
(ULRS Listing RR- 12 & RR- 49)

Survey Date: Monday 4 June 2001
Conditions: Wet
Start Time: 0700

Total Observed U-Turns
Northbound: 0 Southbound: 0
Eastbound: 0 Westbound: 0

AADT Factor
Monday in June is 0.9





Approved by : DT

Printed on : 04/03/2008

Ottawa — *Public Works and Services Department*

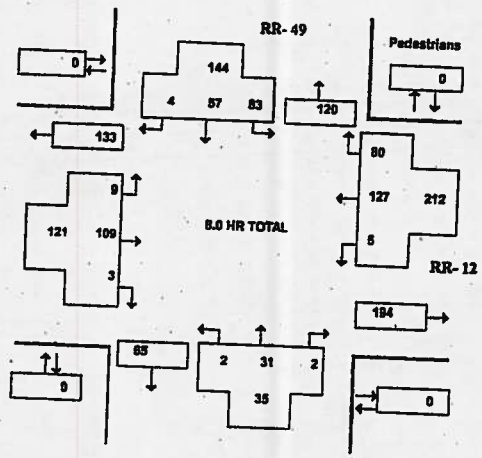
Heavy Vehicle Summary Sheet - Hourly Volumes

Count ID: 10019

FALLOWFIELD RD and EAGLESON RD

(ULRS Listing RR- 12 & RR- 49)

Survey Date :Monday 4 June 2001 **Conditions : Wet** **Start Time : 0700**



	RR- 49									RR- 12									
	Northbound			SUB	Southbound			SUB	STR	Eastbound			SUB	Westbound			SUB	STR	GRAND
Time Period	LT	ST	RT	TOT	LT	ST	RT	TOT	TOT	LT	ST	RT	TOT	LT	ST	RT	TOT	TOT	TOT
07:00-08:00	0	6	0	6	16	4	1	23	29	2	14	1	17	1	14	23	38	55	84
08:00-09:00	2	10	1	13	15	3	0	18	31	1	22	0	23	1	16	13	30	53	84
09:00-10:00	0	3	1	4	9	9	0	18	22	1	18	0	19	1	17	11	29	48	70
11:30-12:30	0	5	0	5	5	10	0	15	20	2	4	1	7	0	13	11	24	31	51
12:30-13:30	0	2	0	2	8	9	1	18	20	1	11	0	12	1	11	5	17	29	49
15:00-16:00	0	2	0	2	15	7	2	24	26	2	18	1	21	0	18	7	25	46	72
16:00-17:00	0	2	0	2	12	9	0	21	23	0	13	0	13	0	27	7	34	47	70
17:00-18:00	0	1	0	1	1	6	0	7	8	0	9	0	9	1	11	3	15	24	32
8.0 HR TOTAL	2	31	2	35	83	57	4	144	179	9	109	3	121	5	127	80	212	333	512

Heavy Vehicles are vehicles having one rear axle with four or more wheels, or having two or more rear axles. These vehicles include most O C Transpo, school and inter-city buses. Further, they ARE included in the Turning Movement Count Summary.

Printed on: 04/03/2008

Ottawa — *Public Works and Services Department*

Count ID 8701

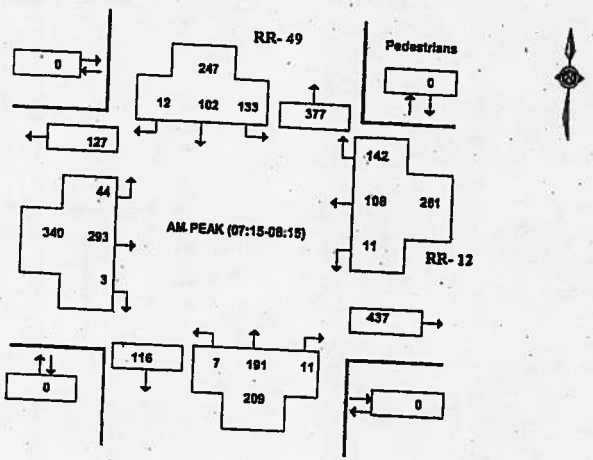
FALLOWFIELD RD and EAGLESON RD

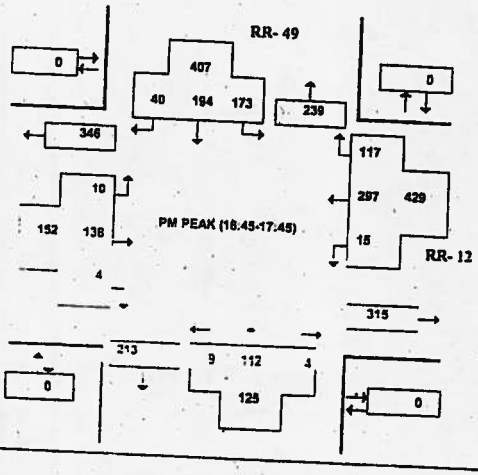
(ULRS Listing RR- 12 & RR- 49)

Survey Date: Friday 9 June 2000
Conditions: Dry
Start Time: 0700

Total Observed U-Turns
Northbound: 0 Southbound: 0
Eastbound: 0 Westbound: 0

AADT Factor
Friday in June is 0.8





Approved by : DT

Printed on : 04/03/2008

Ottawa — *Public Works and Services Department*

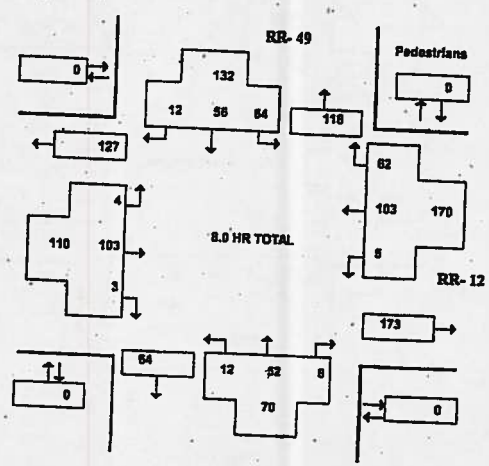
Heavy Vehicle Summary Sheet - Hourly Volumes

Count ID 8701

FALLOWFIELD RD and EAGLESON RD

(ULRS Listing RR- 12 & RR- 49)

Survey Date :Friday 9 June 2000 **Conditions : Dry** **Start Time : 0700**



	RR- 49 Northbound				RR- 49 Southbound					RR- 12 Eastbound				RR- 12 Westbound					
Time Period	LT	ST	RT	SUB TOT	LT	ST	RT	SUB TOT	STR TOT	LT	ST	RT	SUB TOT	LT	ST	RT	SUB TOT	STR TOT	GRAND TOT
07:00-08:00	3	13	0	16	6	5	0	11	27	1	21	1	23	0	12	13	25	48	75
08:00-09:00	3	6	2	11	7	6	2	15	26	1	8	1	10	0	11	6	17	27	53
09:00-10:00	1	12	1	14	9	5	2	16	30	0	10	0	10	1	14	7	22	32	62
11:30-12:30	0	4	0	4	3	7	3	13	17	0	12	0	12	2	5	6	13	25	42
12:30-13:30	1	3	2	6	11	6	3	20	26	1	11	0	12	1	11	7	19	31	57
15:00-16:00	3	5	0	8	14	8	0	22	30	1	15	1	17	0	17	8	25	42	72
16:00-17:00	1	4	0	5	9	10	1	20	25	0	16	0	16	0	17	13	30	46	71
17:00-18:00	0	5	1	6	5	9	1	15	21	0	10	0	10	1	16	2	19	29	50
8.0 HR TOTAL	12	52	6	70	64	56	12	132	202	4	103	3	110	5	103	62	170	280	482

Heavy Vehicles are vehicles having one rear axle with four or more wheels, or having two or more rear axles. These vehicles include most O.C. Transpo, school and inter-city buses. Further, they ARE included in the Turning Movement Count Summary.

Approved by : DT

Printed on: 04/03/2008

Ottawa — *Public Works and Services Department*

Count ID 2189

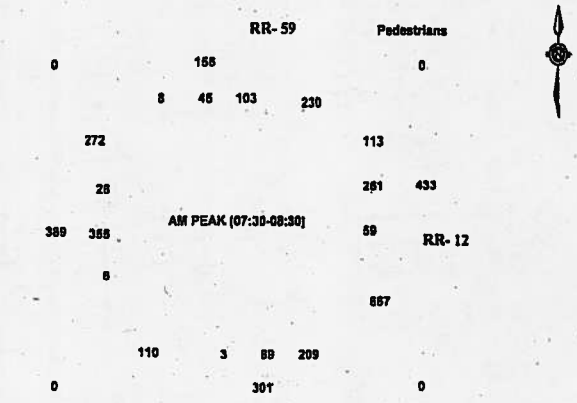
FALLOWFIELD RD and RICHMOND RD

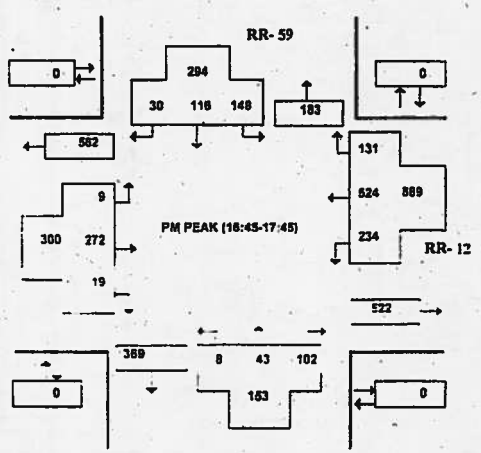
(ULRS Listing RR- 12 & RR- 59)

Survey Date: Wednesday 5 July 2006
Conditions: DRY
Start Time: 0700

Total Observed U-Turns
Northbound: 0 Southbound: 0
Eastbound: 0 Westbound: 0

AADT Factor
Wednesday in July is 0.9





Approved by : DT

Printed on : 03/03/2008

Ottawa — *Public Works and Services Department*

Count ID 2146

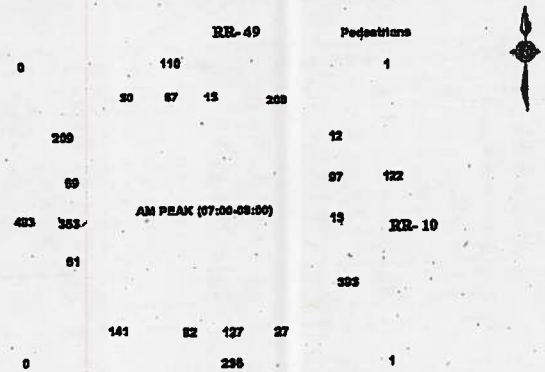
PERTH ST and EAGLESON RD

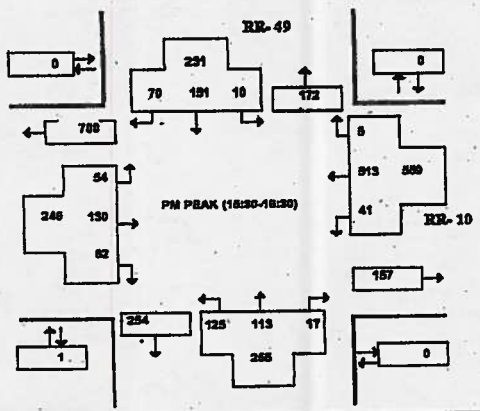
(ULRS Listing RR- 10 & RR- 49)

Survey Date: Friday 23 June 2006
Conditions: DRY
Start Time: 0700

Total Observed U-Turns
Northbound: 0 Southbound: 0
Eastbound: 0 Westbound: 0

AADT Factor
Friday in June is 0.8





Approved by : JM HEAVY VHE. VOLUME UP DUE TO CONST. ON PERTH ST

Printed on : 27/03/2008

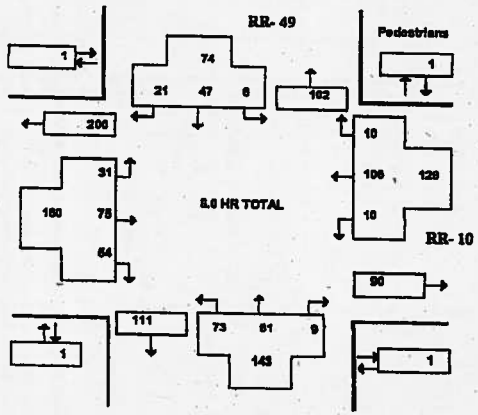
Ottawa — *Public Works and Services Department*

Heavy Vehicle Summary Sheet - Hourly Volumes — Count ID 21465

PERTH ST and EAGLESON RD

(ULRS Listing RR- 10 & RR- 49)

Survey Date : Friday 23 June 2006 — Conditions : DRY — Start Time : 0700



	RR- 49 Northbound				RR- 49 Southbound					RR- 10 Eastbound				RR- 10 Westbound					
Time Period	LT	ST	RT	SUB TOT	LT	ST	RT	SUB TOT	STR TOT	LT	ST	RT	SUB TOT	LT	ST	RT	SUB TOT	STR TOT	GRAND TOT
07:00-08:00	11	13	1	25	2	6	3	11	36	2	12	7	21	0	6	2	8	29	65
08:00-09:00	6	9	1	16	3	2	0	5	21	3	9	8	20	1	5	0	9	29	50
09:00-10:00	4	2	2	8	0	5	5	10	18	7	8	11	26	1	16	0	17	43	61
11:30-12:30	8	7	0	15	0	4	2	6	21	3	5	5	13	2	12	0	14	27	48
12:30 13:30	6	11	2	19	1	5	2	8	27	4	16	5	25	2	19	2	23	48	75
15:00-16:00	12	6	2	20	0	9	6	15	35	4	13	5	22	1	14	1	16	38	73
16:00-17:00	15	6	1	22	0	8	1	9	31	4	11	8	23	1	20	0	21	44	75
17:00-18:00	11	7	0	18	0	8	2	10	28	4	1	5	10	2	11	5	18	28	56
8.0 HR TOTAL	73	61	9	143	6	47	21	74	217	31	75	54	160	10	106	10	126	286	503

Heavy Vehicles are vehicles having one rear axle with four or more wheels, or having two or more rear axles. These vehicles include most O.C. Transpo, school and inter-city buses. Further, they ARE included in the Turning Movement Count Summary.

Approved by: JM — HEAVY VHE VOLUME UP DUE TO CONST ON PERTH ST — Printed on: 27/03/2008

Ottawa — *Public Works and Services Department*

Count ID 2916

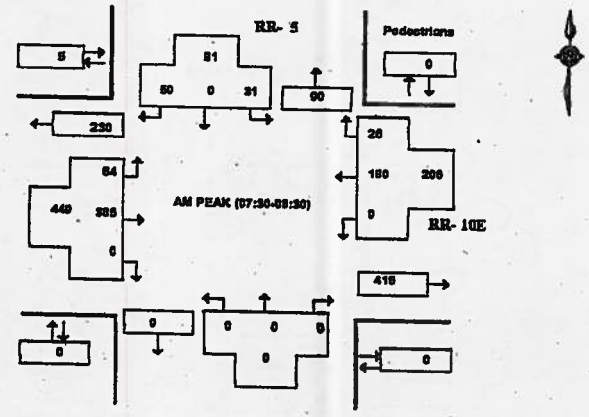
HUNTLEY RD and PERTH ST

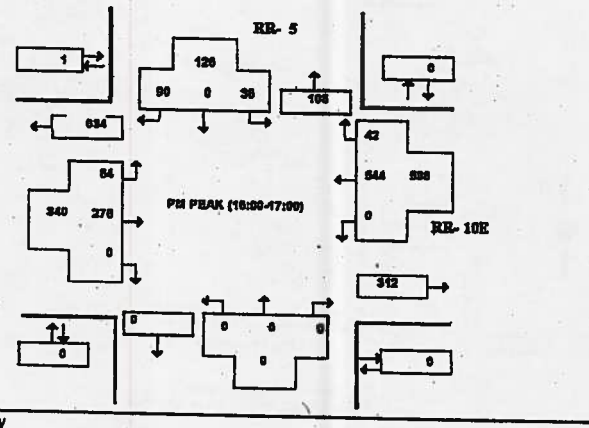
(ULRS Listing RR- 5 & RR- 10E)

Survey Date: Friday 20 July 2007
Conditions: DRY
Start Time: 0700

Total Observed U-Turns
Northbound: 0 Southbound: 0
Eastbound: 0 Westbound: 0

AADT Factor
Friday in July is 0.9





Approved by: AW — Printed on : 25/03/2008

Ottawa — *Public Works and Services Department*

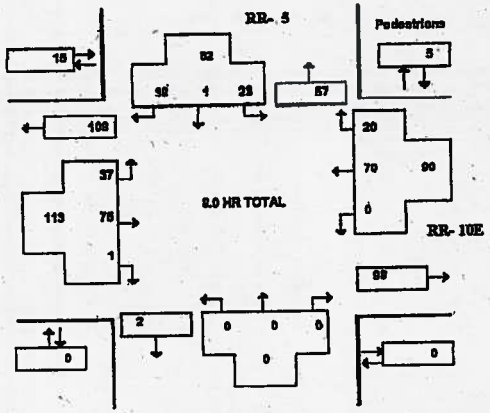
Count ID 23164

Heavy Vehicle Summary Sheet - Hourly Volumes

HUNTLEY RD and PERTH ST

(ULRS Listing RR- 5 & RR- 10E)

Survey Date : Friday 20 July 2007 **Conditions : DRY** **Start Time : 0700**



	RR- 5									RR- 10E									
	Northbound			SUB	Southbound			SUB	STR	Eastbound			SUB	Westbound			SUB	STR	GRAND
Time Period	LT	ST	RT	TOT	LT	ST	RT	TOT	TOT	LT	ST	RT	TOT	LT	ST	RT	TOT	TOT	TOT
07:00-08:00	0	0	0	0	5	0	4	9	9	4	15	0	19	0	10	5	15	34	43
08:00-09:00	0	0	0	0	2	0	7	9	9	4	10	0	14	0	7	4	11	25	34
09:30-10:00	0	0	0	0	3	0	3	6	6	1	6	0	7	0	9	1	10	17	23
11:30-12:30	0	0	0	0	3	0	6	9	9	5	8	0	13	0	5	1	6	19	28
12:30 13:30	0	0	0	0	4	0	3	7	7	6	9	0	15	0	10	2	12	27	34
15:00-16:00	0	0	0	0	0	0	6	6	6	6	10	0	16	0	11	1	12	28	34
16:00-17:00	0	0	0	0	5	0	4	9	9	8	9	1	18	0	12	5	17	35	42
17:00-18:00	0	0	0	0	1	1	5	7	7	5	8	0	13	0	6	1	7	20	27
8.0 HR TOTAL	0	0	0	0	23	1	38	62	62	37	75	1	113	0	70	20	90	203	265

Heavy Vehicles are vehicles having one rear axle with four or more wheels, or having two or more rear axles. These vehicles include most O.C. Transpo, school and inter-city buses. Further, they ARE included in the Turning Movement Count Summary.

Approved by: AW

Printed on: 25/03/2008

Ottawa — *Public Works and Services Department*

Count ID 2331

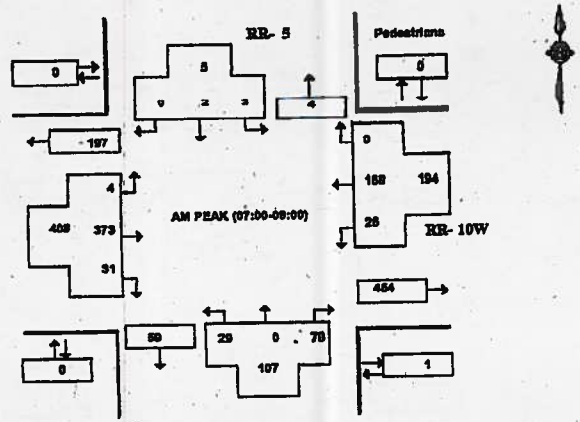
MCBEAN ST and PERTH ST

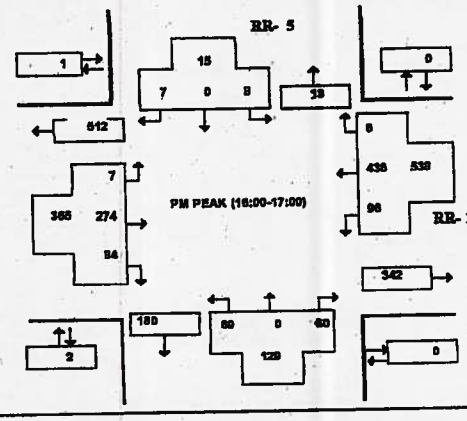
(ULMS Listing RR- 5 & RR- 10W)

Survey Date: Tuesday 31 July 2007
Conditions: DRY
Start Time: 0700

Total Observed U-Turns
Northbound: 0 Southbound: 1
Eastbound: 1 Westbound: 0

AADT Factor
Tuesday in July is 0.9





Approved by: DT

Printed on : 25/03/2008

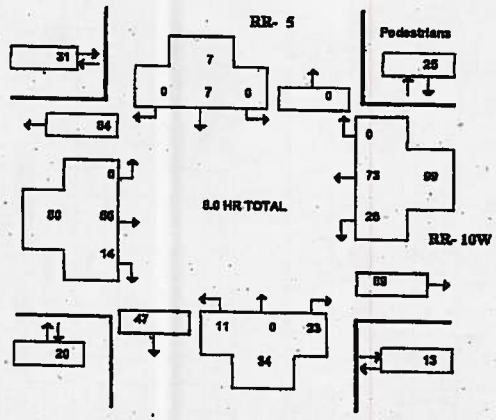
Ottawa — *Public Works and Services Department*

Heavy Vehicle Summary Sheet - Hourly Volumes — Count ID 23318

MCBEAN ST and PERTH ST

(ULRS Listing RR- 5 & RR- 10W)

Survey Date : Tuesday 31 July 2007 **Conditions : DRY** **Start Time : 0700**



	RR- 5								RR- 10W									
	Northbound			SUB	Southbound			SUB	STR	Eastbound			SUB	Westbound			SUB	STR	GRAND
Time Period	LT	ST	RT	TOT	LT	ST	RT	TOT	TOT	LT	ST	RT	TOT	LT	ST	RT	TOT	TOT	TOT
07:00-08:00	0	0	1	1	0	0	0	0	1	0	7	0	7	3	3	0	6	13	14
08:00-09:00	2	0	4	6	0	7	0	7	13	0	7	0	7	5	9	0	14	21	34
09:00-10:00	2	0	2	4	0	0	0	0	4	0	7	3	10	1	8	0	9	19	23
11:30-12:30	1	0	4	5	0	0	0	0	5	0	10	2	12	5	9	0	14	26	31
12:30 13:30	2	0	2	4	0	0	0	0	4	0	4	3	7	4	11	0	15	22	26
15:00-16:00	0	0	6	6	0	0	0	0	6	0	7	1	8	1	9	0	10	18	24
16:00-17:00	0	0	4	4	0	0	0	0	4	0	10	3	13	4	10	0	14	32	36
17:00-18:00	4	0	0	4	0	0	0	0	4	0	9	2	11	3	14	0	17	28	32
8.0 HR TOTAL	11	0	23	34	0	7	0	7	41	0	66	14	80	26	73	0	99	179	220

Heavy Vehicles are vehicles having one rear axle with four or more wheels, or having two or more rear axles. These vehicles include most O.C. Transpo, school and inter-city buses. Further, they ARE included in the Turning Movement Count Summary.

Approved by: DT

Printed on: 25/03/2008

GENIVAR

Page 1 of 4

Turning Movements

Project: 07-08-612-00-07 Richmond - Metcalfe
Intersection: Queen Charlotte St (N-S) at Perth St (E-W)
Control: Stop control on Queen Charlotte St (N-S) only
Survey Period: 7:30 AM to 10:30 AM (Morning Peak Period) and 2:45 PM to 5:45 PM (Afternoon Peak Period)
Survey Date: Wednesday, May 7, 2008

Table 1: Turning Movement Volumes - Queen Charlotte Street at Perth Street - AM Peak

Time Period		Traffic Volumes																	
		Northbound				Southbound				Eastbound				Westbound				Total	
From	To	NB-LT	NB-TH	NB-RT	NB-U	SB-LT	SB-TH	SB-RT	SB-U	EB-LT	EB-TH	EB-RT	WB-LT	WB-TH	WB-RT	15-minute	Hourly
7:30	7:45	2	0	2	4	0	0	0	0	0	90	0	0	41	2	141	
7:45	8:00	0	0	1	1	3	0	0	3	0	92	0	0	46	1	143	
8:00	8:15	0	0	0	0	5	0	0	5	0	69	0	0	42	4	122	
8:15	8:30	0	0	1	1	2	0	0	2	0	72	0	1	28	0	102	508
8:30	8:45	0	0	0	0	6	0	1	7	1	69	0	0	48	2	117	484
8:45	9:00	0	0	0	0	5	0	0	5	1	89	0	0	38	3	84	425
9:00	9:15	1	0	2	3	0	0	0	0	0	42	0	2	43	1	90	393
9:15	9:30	0	0	2	2	0	0	1	1	0	50	0	0	35	2	90	381
9:30	9:45	2	0	0	2	0	0	0	0	0	46	0	1	36	0	81	345
9:45	10:00	1	0	0	1	3	0	0	3	0	46	0	1	41	7	102	363
10:00	10:15	1	0	0	1	3	0	1	4	0	33	1	0	28	0	64	337
10:15	10:30	0	0	1	1	4	0	0	4	0	33	0	0	31	3	72	319
Total (3-hour)		7	0	6	14	31	0	3	34	2	668	2	5	449	25		
Peak Hour (7:30-8:30)		2	0	6	14	0	0	0	0	0	323	0	1	168	7		

Table 2: Turning Movement Volumes - Queen Charlotte Street at Perth Street - PM Peak

Time Period		Traffic Volumes																	
		Northbound				Southbound				Eastbound				Westbound				Total	
From	To	NB-LT	NB-TH	NB-RT	NB-U	SB-LT	SB-TH	SB-RT	SB-U	EB-LT	EB-TH	EB-RT	WB-LT	WB-TH	WB-RT	15-minute	Hourly
2:45	3:00	0	0	0	0	0	0	4	4	0	45	2	2	41	1	95	
3:00	3:15	0	0	4	4	0	0	1	1	0	41	0	0	43	4	93	
3:15	3:30	0	0	0	0	5	0	1	6	0	52	1	2	71	5	137	
3:30	3:45	0	0	1	1	5	0	2	7	2	47	0	1	85	2	146	474
3:45	4:00	1	0	0	1	3	1	0	4	0	44	0	0	69	5	144	520
4:00	4:15	0	0	3	3	0	0	0	0	3	75	1	0	80	5	164	546
4:15	4:30	1	0	3	4	3	0	0	3	0	44	1	1	98	5	157	609
4:30	4:45	0	0	1	1	0	0	0	0	0	45	0	1	85	3	145	609
4:45	5:00	0	0	1	1	3	0	2	5	1	51	0	2	116	5	151	645
5:00	5:15	0	0	0	0	4	0	0	4	0	46	1	1	104	3	154	651
5:15	5:30	1	0	2	3	4	0	1	5	0	49	0	0	97	2	156	684
5:30	5:45	0	1	2	3	6	0	0	6	0	51	0	0	108	4	172	663
Total (3-hour)		3	1	8	12	30	1	6	37	6	693	6	10	1028	39		
Peak Hour (4:45-5:45)		1	1	8	10	14	0	3	17	1	197	1	3	425	12		

Heavy Vehicle Movements

GENIVAR

Project: OT-08-013-00-OT Richmond - Mattamy
Intersection: Queen Charlotte St (N-S) at Perth St (E-W)
Control: Stop control on Queen Charlotte St (N-S) only
Survey Period: 7:30 AM to 10:30 AM (Morning Peak Period) and 2:45 PM to 5:45 PM (Afternoon Peak Period)
Survey Date: Wednesday, May 7, 2008

Table 3: Heavy Vehicle Volumes - Queen Charlotte Street at Perth Street - AM Peak

Time Period		Heavy Vehicle Volumes													
		Northbound			Southbound			Eastbound			Westbound			Total	
From	To	NB-LT	NB-TH	NB-RT	SB-LT	SB-TH	SB-RT	EB-LT	EB-TH	EB-RT	WB-LT	WB-TH	WB-RT	15-minute	Hourly
7:30	7:45	1	0	0	0	0	0	0	3	0	0	7	0	11	
7:45	8:00	0	0	0	0	0	0	0	4	0	0	7	0	11	
8:00	8:15	0	0	0	0	0	0	0	5	0	0	9	0	14	
8:15	8:30	0	0	0	2	0	0	0	7	0	0	3	0	12	44
8:30	8:45	0	0	0	1	0	0	1	7	0	0	9	0	18	56
8:45	9:00	0	0	0	1	0	0	0	4	0	0	2	0	7	51
9:00	9:15	0	0	1	0	0	0	0	6	0	1	3	0	11	48
9:15	9:30	0	0	0	0	0	0	0	8	0	0	6	0	12	48
9:30	9:45	1	0	0	0	0	0	0	5	0	0	3	0	9	39
9:45	10:00	0	0	0	0	0	0	0	3	0	0	1	1	5	37
10:00	10:15	0	0	0	0	0	0	0	5	0	0	3	0	8	34
10:15	10:30	0	0	0	0	0	0	0	4	0	0	5	0	9	31
Total (3-hour)		2	0	1	4	0	0	1	69	0	1	54	1		
Peak Hour (7:30-8:30)		1	0	0	2	0	0	0	19	0	0	22	0		

Table 4: Heavy Vehicle Volumes - Queen Charlotte Street at Perth Street - PM Peak

Time Period		Heavy Vehicle Volumes													
		Northbound			Southbound			Eastbound			Westbound			Total	
From	To	NB-LT	NB-TH	NB-RT	SB-LT	SB-TH	SB-RT	EB-LT	EB-TH	EB-RT	WB-LT	WB-TH	WB-RT	15-minute	Hourly
2:45	3:00	0	0	0	0	0	2	2	10	0	0	2	0	16	
3:00	3:15	0	0	0	0	0	1	0	2	0	0	1	0	4	
3:15	3:30	0	0	0	0	0	0	0	3	1	0	6	0	10	
3:30	3:45	0	0	1	0	0	1	2	4	0	1	9	0	18	48
3:45	4:00	1	0	0	0	0	0	0	6	0	0	5	0	12	44
4:00	4:15	0	0	0	2	0	0	3	3	0	0	5	0	13	53
4:15	4:30	0	0	0	0	0	0	0	3	0	1	5	0	9	52
4:30	4:45	0	0	0	0	0	0	0	4	0	0	5	0	9	43
4:45	5:00	0	0	0	0	0	0	0	2	0	1	6	0	9	40
5:00	5:15	0	0	0	0	0	0	0	2	0	0	1	0	3	30
5:15	5:30	0	0	0	0	0	0	0	0	0	0	2	0	2	23
5:30	5:45	0	0	0	0	0	0	0	2	0	0	4	0	6	20
Total (3-hour)		1	0	1	2	0	4	7	41	1	3	51	0		
Peak Hour (4:45-5:45)		0	0	0	0	0	0	0	6	0	1	15	0		

Heavy Vehicle Percentages

GENIVAR

Project: OT-08-013-00-OT Richmond - Mattamy
Intersection: Queen Charlotte St (N-S) at Perth St (E-W)
Control: Stop control on Queen Charlotte St (N-S) only
Survey Period: 7:30 AM to 10:30 AM (Morning Peak Period) and 2:45 PM to 5:45 PM (Afternoon Peak Period)
Survey Date: Wednesday, May 7, 2008

Table 5: Heavy Vehicle Percentages - Queen Charlotte Street at Perth Street - AM Peak

Time Period		Heavy Vehicle Volumes													
		Northbound			Southbound			Eastbound			Westbound			Total Approach	
From	To	NB-LT	NB-TH	NB-RT	SB-LT	SB-TH	SB-RT	EB-LT	EB-TH	EB-RT	WB-LT	WB-TH	WB-RT	15-minute	Hourly
7:30	7:45	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.3%	0.0%	0.0%	7.5%	0.0%	5.0%	
7:45	8:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.5%	0.0%	0.0%	15.9%	0.0%	7.7%	
8:00	8:15	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.2%	0.0%	0.0%	21.4%	0.0%	11.5%	
8:15	8:30	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	9.7%	0.0%	0.0%	11.5%	0.0%	11.8%	8.7%
8:30	8:45	0.0%	0.0%	0.0%	20.0%	0.0%	0.0%	100.0%	11.9%	0.0%	0.0%	18.8%	0.0%	16.4%	11.4%
8:45	9:00	0.0%	0.0%	0.0%	20.0%	0.0%	0.0%	0.0%	10.3%	0.0%	0.0%	8.6%	0.0%	8.3%	12.0%
9:00	9:15	0.0%	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%	14.3%	0.0%	50.0%	7.1%	0.0%	12.2%	12.2%
9:15	9:30	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	12.0%	0.0%	0.0%	17.1%	0.0%	13.3%	12.8%
9:30	9:45	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	12.2%	0.0%	0.0%	8.3%	0.0%	11.1%	11.3%
9:45	10:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	8.3%	0.0%	0.0%	2.4%	14.3%	4.9%	10.9%
10:00	10:15	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	15.2%	0.0%	0.0%	12.0%	0.0%	12.5%	10.1%
10:15	10:30	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	12.1%	0.0%	0.0%	16.1%	0.0%	12.5%	9.7%
Total (3-hour)		28.6%	0.0%	8.1%	11.1%	0.0%	0.0%	50.0%	8.9%	0.0%	20.0%	12.0%	4.0%		
Peak Hour (9:30-10:30)		50.0%	0.0%	0.0%	14.3%	0.0%	0.0%	0.0%	8.9%	0.0%	0.0%	14.2%	0.0%		9.7%

Table 6: Heavy Vehicle Percentages - Queen Charlotte Street at Perth Street - PM Peak

Time Period		Heavy Vehicle Volumes													
		Northbound			Southbound			Eastbound			Westbound			Total	
From	To	NB-LT	NB-TH	NB-RT	SB-LT	SB-TH	SB-RT	EB-LT	EB-TH	EB-RT	WB-LT	WB-TH	WB-RT	15-minute	Hourly
2:45	3:00	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	20.8%	0.0%	0.0%	4.9%	0.0%	16.5%	
3:00	3:15	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	4.9%	0.0%	0.0%	2.5%	0.0%	4.5%	
3:15	3:30	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.9%	100.0%	0.0%	8.5%	0.0%	7.3%	
3:30	3:45	0.0%	0.0%	100.0%	0.0%	0.0%	50.0%	100.0%	8.5%	0.0%	100.0%	10.5%	0.0%	12.3%	10.1%
3:45	4:00	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	13.6%	0.0%	0.0%	5.6%	0.0%	8.5%	8.5%
4:00	4:15	0.0%	0.0%	0.0%	66.7%	0.0%	0.0%	100.0%	4.0%	0.0%	0.0%	6.3%	0.0%	7.7%	8.9%
4:15	4:30	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	8.8%	0.0%	100.0%	5.1%	0.0%	8.0%	8.5%
4:30	4:45	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	8.9%	0.0%	0.0%	5.3%	0.0%	6.2%	7.1%
4:45	5:00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.9%	0.0%	50.0%	5.2%	0.0%	5.0%	6.2%
5:00	5:15	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.3%	0.0%	0.0%	1.0%	0.0%	1.9%	4.8%
5:15	5:30	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.1%	0.0%	1.5%	3.8%
5:30	5:45	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.9%	0.0%	0.0%	3.7%	0.0%	3.5%	3.0%
Total (3-hour)		33.3%	0.0%	11.1%	5.3%	0.0%	33.3%	116.7%	6.9%	16.7%	30.0%	5.0%	0.0%		
Peak Hour (4:45-5:45)		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.0%	0.0%	33.3%	3.1%	0.0%		3.0%

Pedestrian Movements

GENIVAR

Project: OT-08-013-00-OT Richmond - Mattamy
Intersection: Queen Charlotte St (N-S) at Perth St (E-W)
Control: Stop control on Queen Charlotte St (N-S) only
Survey Period: 7:30 AM to 10:30 AM (Morning Peak Period) and 2:45 PM to 5:45 PM (Afternoon Peak Period)
Survey Date: Wednesday, May 7, 2008

Table 7: Pedestrian Volumes - Queen Charlotte Street at Perth Street - AM Peak

Time Period		Pedestrian Crossing Volumes					
		North Leg	South Leg	East Leg	West Leg	Total	
From	To					15-minute	Hourly
7:30	7:45	0	0	0	0	0	
7:45	8:00	0	0	0	0	0	
8:00	8:15	0	0	0	1	1	
8:15	8:30	0	0	0	0	0	1
8:30	8:45	0	0	0	0	0	1
8:45	9:00	0	0	0	0	0	1
9:00	9:15	0	0	0	0	0	0
9:15	9:30	0	0	0	0	0	0
9:30	9:45	0	0	0	0	0	0
9:45	10:00	0	0	0	0	0	0
10:00	10:15	0	0	0	0	0	0
10:15	10:30	1	0	0	0	1	1
Total (3-hour)		1	0	0	1		
Peak Hour (9:30-10:30)		0	0	0	1		1

Table 8: Pedestrian Volumes - Queen Charlotte Street at Perth Street - PM Peak

Time Period		Pedestrian Crossing Volumes					
		North Leg	South Leg	East Leg	West Leg	Total	
From	To					15-minute	Hourly
2:45	3:00	0	1	0	0	1	
3:00	3:15	0	1	0	0	1	
3:15	3:30	1	0	0	0	1	
3:30	3:45	0	0	0	0	0	3
3:45	4:00	0	0	0	0	0	2
4:00	4:15	0	0	0	0	0	1
4:15	4:30	0	0	0	0	0	0
4:30	4:45	0	0	0	0	0	0
4:45	5:00	0	0	0	1	1	1
5:00	5:15	0	0	0	0	0	1
5:15	5:30	0	0	0	0	0	1
5:30	5:45	0	0	0	0	0	1
Total (3-hour)		1	2	0	1		
Peak Hour (4:45-5:45)		0	0	0	1		1

Turning Movements

GENIVAR

Project: OT-08-013-00-OT Richmond - Mattamy
Intersection: Queen Charlotte St (N-S) at Ottawa St (E-W)
Control: All-Way Stop Control
Survey Period: 7:30 AM to 10:30 AM (Morning Peak Period) and 2:45 PM to 5:45 PM (Afternoon Peak Period)
Survey Date: Wednesday, May 7, 2008

Table 1: Turning Movement Volumes - Queen Charlotte Street at Ottawa Street - AM Peak

Time Period		Traffic Volumes													
		Northbound			Southbound			Eastbound			Westbound			Total	
From	To	NB-LT	NB-TH	NB-RT	SB-LT	SB-TH	SB-RT	EB-LT	EB-TH	EB-RT	WB-LT	WB-TH	WB-RT	15-minute	Hourly
7:30	7:45				0		0	0	1			2	0	3	
7:45	8:00				0		0	0	2			2	0	4	
8:00	8:15				1		0	0	3			3	0	7	
8:15	8:30				2		0	0	1			1	1	5	19
8:30	8:45				0		0	0	3			0	1	4	20
8:45	9:00				0		2	0	1			5	0	8	24
9:00	9:15				0		0	0	2			2	0	4	21
9:15	9:30				0		0	0	2			2	0	4	20
9:30	9:45				0		1	0	5			5	0	11	27
9:45	10:00				0		0	0	1			4	0	5	24
10:00	10:15				1		0	0	2			5	0	8	28
10:15	10:30				0		0	2	4			3	0	9	33
Total (3-hour)					4		3	2	27			34	2		
Peak Hour (9:30-10:30)					1		1	2	12			17	0		

Table 2: Turning Movement Volumes - Queen Charlotte Street at Ottawa Street - PM Peak

Time Period		Traffic Volumes													
		Northbound			Southbound			Eastbound			Westbound			Total	
From	To	NB-LT	NB-TH	NB-RT	SB-LT	SB-TH	SB-RT	EB-LT	EB-TH	EB-RT	WB-LT	WB-TH	WB-RT	15-minute	Hourly
2:45	3:00				1		0	0	0			1	0	2	
3:00	3:15				1		0	1	4			2	0	8	
3:15	3:30				0		0	0	4			3	0	7	
3:30	3:45				0		0	1	2			2	0	5	22
3:45	4:00				0		0	1	2			2	0	6	25
4:00	4:15				2		1	1	4			3	0	11	28
4:15	4:30				0		0	1	3			5	0	9	30
4:30	4:45				0		0	0	1			6	0	7	32
4:45	5:00				0		0	0	3			1	0	4	31
5:00	5:15				0		1	0	5			2	1	9	29
5:15	5:30				1		0	0	2			6	0	9	29
5:30	5:45				1		0	0	5			6	0	12	34
Total (3-hour)					6		2	6	35			39	1		
Peak Hour (4:45-5:45)					2		1	0	15			15	1		

Heavy Vehicle Movements

GENIVAR

Project: OT-08-013-00-OT Richmond - Mattamy
Intersection: Queen Charlotte St (N-S) at Ottawa St (E-W)
Control: All-Way Stop Control
Survey Period: 7:30 AM to 10:30 AM (Morning Peak Period) and 2:45 PM to 5:45 PM (Afternoon Peak Period)
Survey Date: Wednesday, May 7, 2008

Table 3: Heavy Vehicle Volumes - Queen Charlotte Street at Ottawa Street - AM Peak

Time Period		Heavy Vehicle Volumes													
		Northbound			Southbound			Eastbound			Westbound			Total	
From	To	NB-LT	NB-TH	NB-RT	SB-LT	SB-TH	SB-RT	EB-LT	EB-TH	EB-RT	WB-LT	WB-TH	WB-RT	15-minute	Hourly
7:30	7:45				0		0	0	1			0	0	1	
7:45	8:00				0		0	0	0			0	0	0	
8:00	8:15				0		0	0	0			0	0	0	
8:15	8:30				1		0	0	0			0	0	1	2
8:30	8:45				0		0	0	0			0	0	0	1
8:45	9:00				0		1	0	1			0	0	2	3
9:00	9:15				0		0	0	1			0	0	1	4
9:15	9:30				0		0	0	0			1	0	1	4
9:30	9:45				0		0	0	0			1	0	1	5
9:45	10:00				0		0	0	0			0	0	0	3
10:00	10:15				0		0	0	0			0	0	0	2
10:15	10:30				0		0	0	1			0	0	1	2
Total (3-hour)					1		1	0	4			2	0		
Peak Hour (9:30-10:30)					0		0	0	1			1	0		

Table 4: Heavy Vehicle Volumes - Queen Charlotte Street at Ottawa Street - PM Peak

Time Period		Heavy Vehicle Volumes													
		Northbound			Southbound			Eastbound			Westbound			Total	
From	To	NB-LT	NB-TH	NB-RT	SB-LT	SB-TH	SB-RT	EB-LT	EB-TH	EB-RT	WB-LT	WB-TH	WB-RT	15-minute	Hourly
2:45	3:00				1		0	0	0			0	0	1	
3:00	3:15				1		0	0	1			1	0	3	
3:15	3:30				0		0	0	0			1	0	1	
3:30	3:45				0		0	0	0			0	0	0	5
3:45	4:00				0		0	0	0			1	0	1	5
4:00	4:15				1		0	0	1			1	0	3	5
4:15	4:30				0		0	0	1			0	0	1	5
4:30	4:45				0		0	0	0			0	0	0	5
4:45	5:00				0		0	0	0			0	0	0	4
5:00	5:15				0		0	0	1			0	0	1	2
5:15	5:30				0		0	0	1			0	0	1	2
5:30	5:45				0		0	0	1			0	0	1	3
Total (3-hour)					3		0	0	6			4	0		
Peak Hour (4:45-5:45)					0		0	0	3			0	0		

Heavy Vehicle Percentages

GENIVAR

Project: OT-08-013-00-OT Richmond - Mattamy
Intersection: Queen Charlotte St (N-S) at Ottawa St (E-W)
Control: All-Way Stop Control
Survey Period: 7:30 AM to 10:30 AM (Morning Peak Period) and 2:45 PM to 5:45 PM (Afternoon Peak Period)
Survey Date: Wednesday, May 7, 2008

Table 5: Heavy Vehicle Percentages - Queen Charlotte Street at Ottawa Street - AM Peak

Time Period		Heavy Vehicle Volumes													
		Northbound			Southbound			Eastbound			Westbound			Total Approach	
From	To	NB-LT	NB-TH	NB-RT	SB-LT	SB-TH	SB-RT	EB-LT	EB-TH	EB-RT	WB-LT	WB-TH	WB-RT	15-minute	Hourly
7:30	7:45				0.0%		0.0%	0.0%	100.0%			0.0%	0.0%	33.3%	
7:45	8:00				0.0%		0.0%	0.0%	0.0%			0.0%	0.0%	0.0%	
8:00	8:15				0.0%		0.0%	0.0%	0.0%			0.0%	0.0%	0.0%	
8:15	8:30				50.0%		0.0%	0.0%	0.0%			0.0%	0.0%	20.0%	10.5%
8:30	8:45				0.0%		0.0%	0.0%	0.0%			0.0%	0.0%	0.0%	5.0%
8:45	9:00				0.0%		50.0%	0.0%	100.0%			0.0%	0.0%	25.0%	12.5%
9:00	9:15				0.0%		0.0%	0.0%	50.0%			0.0%	0.0%	25.0%	19.0%
9:15	9:30				0.0%		0.0%	0.0%	0.0%			50.0%	0.0%	25.0%	20.0%
9:30	9:45				0.0%		0.0%	0.0%	0.0%			20.0%	0.0%	9.1%	16.5%
9:45	10:00				0.0%		0.0%	0.0%	0.0%			0.0%	0.0%	0.0%	12.5%
10:00	10:15				0.0%		0.0%	0.0%	0.0%			0.0%	0.0%	0.0%	7.1%
10:15	10:30				0.0%		0.0%	0.0%	25.0%			0.0%	0.0%	11.1%	6.1%
Total (3-hour)					25.0%		33.3%	0.0%	14.3%			5.9%	0.0%		
Peak Hour (9:30-10:30)					0.0%		0.0%	0.0%	8.3%			5.9%	0.0%		5.1%

Table 6: Heavy Vehicle Percentages - Queen Charlotte Street at Ottawa Street - PM Peak

Time Period		Heavy Vehicle Volumes													
		Northbound			Southbound			Eastbound			Westbound			Total	
From	To	NB-LT	NB-TH	NB-RT	SB-LT	SB-TH	SB-RT	EB-LT	EB-TH	EB-RT	WB-LT	WB-TH	WB-RT	15-minute	Hourly
2:45	3:00				100.0%		0.0%	0.0%	0.0%			0.0%	0.0%	50.0%	
3:00	3:15				100.0%		0.0%	0.0%	25.0%			50.0%	0.0%	37.5%	
3:15	3:30				0.0%		0.0%	0.0%	0.0%			33.3%	0.0%	14.3%	
3:30	3:45				0.0%		0.0%	0.0%	0.0%			0.0%	0.0%	0.0%	22.7%
3:45	4:00				0.0%		0.0%	0.0%	0.0%			50.0%	0.0%	20.0%	20.0%
4:00	4:15				50.0%		0.0%	0.0%	25.0%			33.3%	0.0%	27.3%	17.9%
4:15	4:30				0.0%		0.0%	0.0%	33.3%			0.0%	0.0%	11.1%	18.7%
4:30	4:45				0.0%		0.0%	0.0%	0.0%			0.0%	0.0%	0.0%	15.6%
4:45	5:00				0.0%		0.0%	0.0%	0.0%			0.0%	0.0%	0.0%	12.9%
5:00	5:15				0.0%		0.0%	0.0%	20.0%			0.0%	0.0%	11.1%	8.9%
5:15	5:30				0.0%		0.0%	0.0%	50.0%			0.0%	0.0%	11.1%	8.9%
5:30	5:45				0.0%		0.0%	0.0%	20.0%			0.0%	0.0%	8.3%	8.8%
Total (3-hour)					50.0%		0.0%	0.0%	17.1%			10.3%	0.0%		
Peak Hour (4:45-5:45)					0.0%		0.0%	0.0%	20.0%			0.0%	0.0%		8.8%

Pedestrian Movements

GENIVAR

Project: QT-08-013-00-OT Richmond - Mattamy
Intersection: Queen Charlotte St (N-S) at Ottawa St (E-W)
Control: All-Way Stop Control
Survey Period: 7:30 AM to 10:30 AM (Morning Peak Period) and 2:45 PM to 5:45 PM (Afternoon Peak Period)
Survey Date: Wednesday, May 7, 2008

Table 7: Pedestrian Volumes - Queen Charlotte Street at Perth Street - AM Peak

Time Period		Pedestrian Crossing Volumes					
		North Leg	South Leg	East Leg	West Leg	Total	
From	To					15-minute	Hourly
7:30	7:45	1		0	2	3	
7:45	8:00	1		0	0	1	
8:00	8:15	0		2	0	2	
8:15	8:30	0		0	0	0	6
8:30	8:45	0		0	0	0	3
8:45	9:00	0		0	0	0	2
9:00	9:15	0		0	0	0	0
9:15	9:30	0		0	0	0	0
9:30	9:45	0		0	0	0	0
9:45	10:00	0		0	0	0	0
10:00	10:15	1		0	0	1	1
10:15	10:30	0		2	0	2	3
Total (3-hour)		3		4	2		
Peak Hour (9:30-10:30)		1		2	0		3

Table 8: Pedestrian Volumes - Queen Charlotte Street at Perth Street - PM Peak

Time Period		Pedestrian Crossing Volumes					
		North Leg	South Leg	East Leg	West Leg	Total	
From	To					15-minute	Hourly
2:45	3:00	0		0	0	0	
3:00	3:15	1		0	0	1	
3:15	3:30	0		0	0	0	
3:30	3:45	0		0	0	0	1
3:45	4:00	0		0	0	0	1
4:00	4:15	0		0	0	0	0
4:15	4:30	0		0	0	0	0
4:30	4:45	0		3	0	3	3
4:45	5:00	0		0	0	0	3
5:00	5:15	0		0	0	0	3
5:15	5:30	0		0	0	0	3
5:30	5:45	0		0	0	0	0
Total (3-hour)		1		3	0		
Peak Hour (4:45-5:45)		0		0	0		0

Appendix B: Trip Generation

	Land Use	Units / 1000's SF	Morning Peak Hour			Units / 1000's SF	Afternoon Peak Hour		
			Rate	Inbound	Outbound		Rate	Inbound	Outbound
Mattamy North	Single Family Detached	536	0.71	25%	75%	536	0.84	63%	37%
	Residential Condominium / Townhouse	99	0.52	17%	83%	99	0.60	67%	33%
Mattamy South	Single Family Detached	430	0.71	25%	75%	430	0.84	63%	37%
Fortune Street	Single Family Detached	121	0.78	25%	75%	121	1.03	63%	37%
		Synergy / Pass-By	Morning Peak Hour			Synergy / Pass-By	Afternoon Peak Hour		
			Inbound	Outbound	Total		Inbound	Outbound	Total
Mattamy North	Single Family Detached		95	285	381		283	166	449
	Residential Condominium / Townhouse		9	43	51		40	20	60
	Total		104	328	432		323	186	509
Mattamy South	Single Family Detached		76	229	305		227	133	360
	Residential Condominium / Townhouse		0	0	0		0	0	0
	Total		76	229	305		227	133	360
Fortune Street	Single Family Detached		24	71	94		79	46	125
	Total		24	71	94		79	46	125
Mattamy North		Factor	Inbound	Outbound	Total	Factor	Inbound	Outbound	Total
	Trip Gen		104	328	432		323	186	509
	Mode Share	0.9	115	364	480	0.9	359	206	565
	Auto Occupancy	1.12	129	408	538	1.18	424	243	667
	Mode	Split				Split			
	Auto	85%	109	345	455	79%	334	191	525
	Passenger	10%	13	42	56	15%	65	37	102
	Transit	3%	4	12	16	3%	13	7	20
	Active Mode	2%	3	9	12	3%	13	7	20
Mattamy South	Trip Gen		76	229	305		227	133	360
	Mode Share	0.9	85	254	339	0.9	252	148	400
	Auto Occupancy	1.12	95	284	380	1.18	297	175	472
	Mode	Split				Split			
	Auto	85%	80	240	322	79%	234	138	372
	Passenger	10%	10	30	39	15%	45	27	72
	Transit	3%	3	8	11	3%	9	5	14
	Active Mode	2%	2	6	9	3%	9	5	14

Fortune Street	Trip Gen		24	71	94		79	46	125
	Mode Share	0.9	26	78	104	0.9	88	51	139
	Auto Occupancy	1.12	29	87	116	1.18	104	60	164
	Mode	Split				Split			
	Auto	85%	25	74	98	79%	82	47	129
	Passenger	10%	3	9	12	15%	16	9	25
	Transit	3%	1	3	3	3%	3	2	5
	Active Mode	2%	1	2	3	3%	3	2	5
Total	Trip Gen		204	628	831		628	365	994
	Mode Share	0.9	226	696	923	0.9	699	405	1104
	Auto Occupancy	1.12	253	779	1034	1.18	825	478	1303
	Mode	Split				Split			
	Auto	85%	214	659	875	79%	650	376	1026
	Passenger	10%	26	81	107	15%	126	73	199
	Transit	3%	7	23	30	3%	25	14	39
	Active Mode	2%	6	17	23	3%	25	14	39

Appendix C:
Trip Distribution and Assignment

AM			Rurual Southwest	Percent	Direction
	Ottawa	Centre	670	6%	N
Ottawa	Inner	Area	760	6%	N
	Ottawa	East	160	1%	N
	Beacon	Hill	230	2%	N
	Alta	Vista	680	6%	N
	Hunt	Club	360	3%	E
		Merivale	1,390	12%	N
	Ottawa	West	260	2%	N
	Bayshore /	Cedarview	770	7%	N
		Orléans	80	1%	N
	Rural	East	-	0%	E
	Rural	Southeast	690	6%	E
South	Gloucester /	Leitrim	90	1%	E
	South	Nepean	310	3%	N
	Rural	Southwest	3,480	29%	
	Kanata /	Stittsville	1,430	12%	N
	Rural	West	80	1%	W
	Île de	Hull	110	1%	N
	Hull	Périphérie	110	1%	N
		Plateau	-	0%	N
		Aylmer	-	0%	N
	Rural	Northwest	10	0%	N
	Pointe	Gatineau	40	0%	N
	Gatineau	Est	70	1%	N
	Rural	Northeast	20	0%	N
Buckingham /	Masson-	Angers	-	0%	E
		External		0%	
		Total	11,800	100%	

AM		
N	60%	*63%*
E	10%	*35%*
S	0%	*0%*
W	1%	*2%*

PM			Rurual Southwest	Percent	Direction
	Ottawa	Centre	400	3%	N
Ottawa	Inner	Area	600	5%	N
	Ottawa	East	200	2%	N
	Beacon	Hill	300	3%	N
	Alta	Vista	700	6%	N
	Hunt	Club	300	3%	E
		Merivale	1600	14%	N
	Ottawa	West	400	3%	N
	Bayshore /	Cedarview	1000	9%	N
		Orléans	100	1%	N
	Rural	East	0	0%	E
	Rural	Southeast	600	5%	E
South	Gloucester /	Leitrim	200	2%	E
	South	Nepean	500	4%	N
	Rural	Southwest	3000	26%	
	Kanata /	Stittsville	1300	11%	N
	Rural	West	100	1%	W
	Île de	Hull	0	0%	N
	Hull	Périphérie	100	1%	N
		Plateau	0	0%	N
		Aylmer	0	0%	N
	Rural	Northwest	0	0%	N
	Pointe	Gatineau	0	0%	N
	Gatineau	Est	100	1%	N
	Rural	Northeast	0	0%	N
Buckingham /	Masson-	Angers	0	0%	E
		External	0	0%	
		Total	11,500	100%	

PM	Via	
N	63%	*66%*
E	10%	*32%*
S	0%	*0%*
W	1%	*2%*

Appendix D:
Traffic Control and Auxiliary Lane Warrants

3/27/2013

Multi-Way Stop Control Warrant Analysis
Urban Local/Collector Streets

INTERSECTION: North-South Collector @ Ottawa Street

DATE OF COUNT USED:

NUMBER OF LEGS: 4

LENGTH OF STUDY IN hours: 8

Criteria:

Volume: Total vehicle volume for all approaches exceeds an AVERAGE of 200 vehicles per hour over heaviest 8-hour period (between 7am and 6pm) **AND**
Total minor street volume (including pedestrians crossing the major) exceeds 80 each hour over same 8-hr period

OR

Collision: Where an avg of 3 or more collisions considered preventable by all-way stop controls (I.e. right angle) has occurred during 3 yr period

OR

Visibility: Where the sight distance from a point 2.7m from the edge of the major street is less than
55m to the left
60m from the right

	Total Vol all approaches		Veh Vol from Minor	Ped Vol Xing Major	Total Minor St Vol	
Hour 1	290	100%	110		110	100%
Hour 2	290	100%	110		110	100%
Hour 3	290	100%	110		110	100%
Hour 4	290	100%	110		110	100%
Hour 5	310	100%	105		105	100%
Hour 6	310	100%	105		105	100%
Hour 7	310	100%	105		105	100%
Hour 8	310	100%	105		105	100%
Total Volume Warrant		**100.0%**	**Minor Approach Warrant:**		**100.0%**	

Volume Criteria Met :	**YES**
Percent Volume Criteria Met:	**100.0%**

Directional Split: (Four-Legged 65/35) Criteria Met: (Yes/No) **Yes**
(Three-Legged 75/25) Criteria Met: (Yes/No) **N/A**

300.00 107.50 36%

Collision Data:

Total number of preventable collisions in past 3 years **No**

Visibility:

Is visibility restricted at this intersection? (yes/no) **N**

Comments:

3/27/2013

Multi-Way Stop Control Warrant Analysis
Urban Local/Collector Streets

INTERSECTION: South Side Access @ Ottawa Street

DATE OF COUNT USED:

NUMBER OF LEGS: 3

LENGTH OF STUDY IN hours: 8

Criteria:

Volume: Total vehicle volume for all approaches exceeds an AVERAGE of 200 vehicles per hour over heaviest 8-hour period (between 7am and 6pm) **AND**
Total minor street volume (including pedestrians crossing the major) exceeds 80 each hour over same 8-hr period

OR

Collision: Where an avg of 3 or more collisions considered preventable by all-way stop controls (I.e. right angle) has occurred during 3 yr period

OR

Visibility: Where the sight distance from a point 2.7m from the edge of the major street is less than
55m to the left
60m from the right

	Total Vol all approaches		Veh Vol from Minor	Ped Vol Xing Major	Total Minor St Vol	
Hour 1	145	73%	80		80	100%
Hour 2	145	73%	80		80	100%
Hour 3	145	73%	80		80	100%
Hour 4	145	73%	80		80	100%
Hour 5	145	73%	45		45	56%
Hour 6	145	73%	45		45	56%
Hour 7	145	73%	45		45	56%
Hour 8	145	73%	45		45	56%
Total Volume Warrant		**72.5%**	**Minor Approach Warrant:**		**78.1%**	

Volume Criteria Met :	**NO**
Percent Volume Criteria Met:	**72.5%**

Directional Split: (Four-Legged 65/35) Criteria Met: (Yes/No) **N/A**
(Three-Legged 75/25) Criteria Met: (Yes/No) **Yes**

145.00 62.50 43%

Collision Data:

Total number of preventable collisions in past 3 years **No**

Visibility:

Is visibility restricted at this intersection? (yes/no) **N**

Comments:

Results Sheet

Input Sheet | Analysis Sheet | Proposed Collision

GO TO Justification:

Intersection: N-S Collector / Ottawa Street

Count Date: Predicted

Summary Results

Justification			Compliance	Signal Justified? YES	Signal Justified? NO
1. Minimum Vehicular Volume	A	Total Volume	42 %	☐	☑
	B	Crossing Volume	63 %		
2. Delay to Cross Traffic	A	Main Road	27 %	☐	☑
	B	Crossing Road	100 %		
3. Combination	A	Justificaton 1	42 %	☐	☑
	B	Justification 2	27 %		
4. 4-Hr Volume			14 %	☐	☑
5. Collision Experience			0 %	☐	☑
6. Pedestrians	A	Volume	Justification not met	☐	☑
	B	Delay	Justification not met		

Input Data Sheet

Analysis Sheet | Results Sheet | Proposed Collision | GO TO Justification:

What are the intersecting roadways? N-S Collector / Ottawa Street

What is the direction of the Main Road street? North-South

When was the data collected? Predicted

Justification 1 - 4: Volume Warrants

a.- Number of lanes on the Main Road? 1

b.- Number of lanes on the Minor Road? 1

c.- How many approaches? 4

d.- What is the operating environment? Urban **Population >= 10,000 AND Speed < 70 km/hr**

e.- What is the eight hour vehicle volume at the intersection? (Please fill in table below)

Hour Ending	Main Northbound Approach			Minor Eastbound Approach			Main Southbound Approach			Minor Westbound Approach			Pedestrians Crossing Main Road
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
7:00	5	90	15	65	20	5	15	30	25	5	10	5	10
8:00	5	90	15	65	20	5	15	30	25	5	10	5	10
9:00	5	90	15	65	20	5	15	30	25	5	10	5	10
10:00	5	90	15	65	20	5	15	30	25	5	10	5	10
15:00	5	50	10	40	10	5	5	85	60	15	20	15	10
16:00	5	50	10	40	10	5	5	85	60	15	20	15	10
17:00	5	50	10	40	10	5	5	85	60	15	20	15	10
18:00	5	50	10	40	10	5	5	85	60	15	20	15	10
Total	**40**	**560**	**100**	**420**	**120**	**40**	**80**	**460**	**340**	**80**	**120**	**80**	**80**

Justification 5: Collision Experience

Preceding Months	Number of Collisions*
1-12	0
13-24	0
25-36	0

***** Include only collisions that are susceptable to correction through the installation of traffic signal control

Justification 6: Pedestrian Volume

a.- Please fill in table below summarizing total pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Factored 8 hour pedestrian volume	0		0		0		0		
% Assigned to crossing rate	100%		50%		0%		0%		
Net 8 Hour Pedestrian Volume at Crossing									0
Net 8 Hour Vehicular Volume on Street Being Crossed									6,411

b.- Please fill in table below summarizing delay to pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Total 8 hour pedestrians delayed greater than 10 seconds	0	0	0	0	0	0	0	0	
Factored volume of total pedestrians	0		0		0		0		
Factored volume of delayed pedestrians	0		0		0		0		
% Assigned to Crossing Rate	100%		50%		0%		0%		
Net 8 Hour Volume of Total Pedestrians									0
Net 8 Hour Volume of Delayed Pedestrians									0