# CARDEL

# ronwood - 673 River Road

Community Transportation Study / Transportation Impact Study





### Ironwood - 673 River Road

Community Transportation Study/ Transportation Impact Study

prepared for: Cardel Homes 301 Moodie Drive, Suite 100 Ottawa, ON K2H 9C4



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### **Community Transportation Study/Transportation Impact Study**

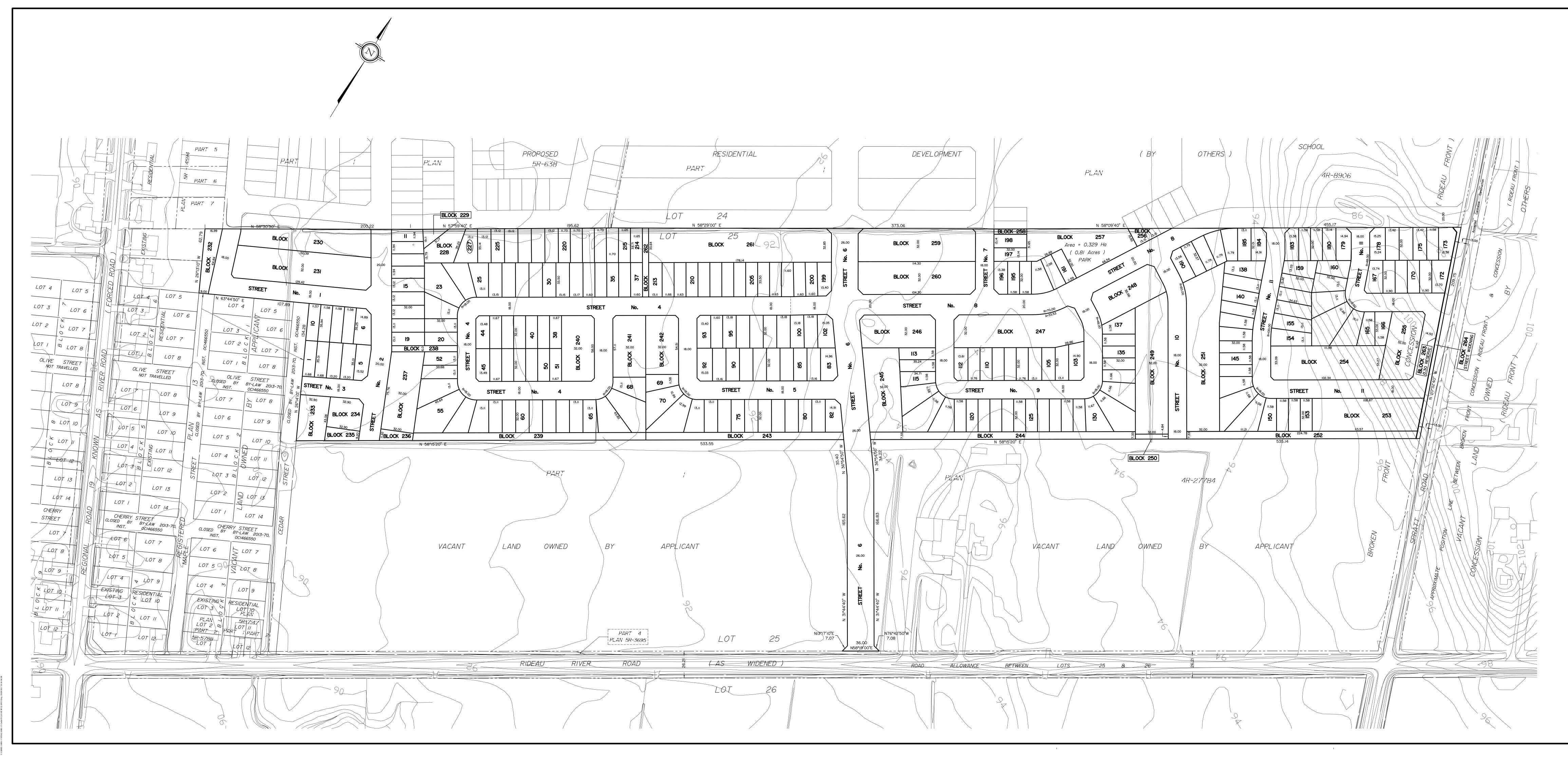
### **1. INTRODUCTION**

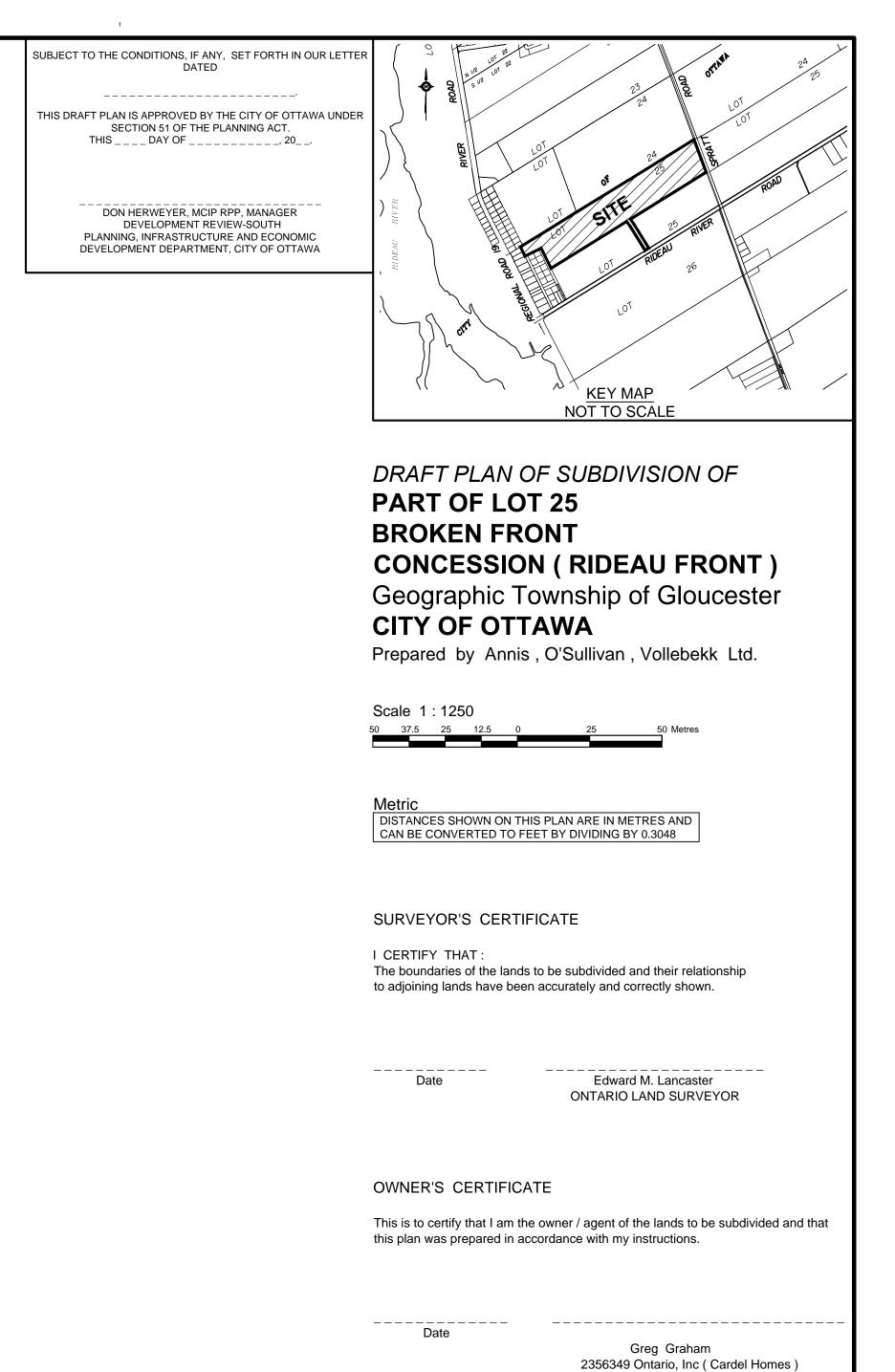
Cardel Homes is planning the Ironwood residential subdivision in the Riverside South community within in the City of Ottawa at 673 River Road. The property is divided by the Urban Boundary and only the portion within the Boundary is proposed to be developed. To support the development, a Community Transportation Study/Transportation Impact Study is required to satisfy the site plan application. The residential development will consist of 234 single family homes and 260 townhomes, for a total of 494 units. The proposed site is located north of Rideau Road, between River Road and Spratt Road.

Figure 1 illustrates the local context and Figure 2 illustrates the proposed Site Plan for Ironwood.



Figure 1: Local Context





ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51-17 OF THE PLANNING ACT

I have the authority to bind the corporation

- (a) see plan
- (b) see plan (c) see plan
- (d) single & multi-family residential housing, open space, parkland
- (e) see plan
- (f) see plan
- (g) see plan (h) City of Ottawa
- (i) see soils report
- (j) see plan
- (k) sanitary, storm sewers, municipal water, bell, hydro, cable and gas to be available
- (l) see plan



### 2. EXISTING CONDITIONS

#### 2.1. AREA ROAD NETWORK

*Earl Armstrong Road* is an east-west arterial, which extends from River Road in the east to High Road in the west. Within the study area, Riverside Drive has a four-lane divided cross section with auxiliary turn lanes provided at major intersections. The posted speed limit within the study area is 70 km/h.

*River Road* is a north-south arterial, which extends from Boundary Road in the south (where it continues as Rideau River Road) to Riverside Drive in the north. Within the study area, River Road has a two-lane undivided rural cross section with auxiliary turn lanes provided at major intersections. The posted speed limit within the study area is 80 km/h.

*Spratt Road* is a north-south major collector roadway with a two-lane rural cross-section, transitioning into a four-lane urban cross-section south of Earl Armstrong Road. Sidewalks are provided along the urban section along both sides of the roadway. The posted speed limit is 80 km/h through the rural section and 60 km/h at the urban section.

*Rideau Road* is an east-west local roadway with a rural two-lane cross-section. Gravel run along both sides of the roadway, and exponential stop bars are located at the Spratt intersection. The posted speed limit within the study area is 80 km/h.

#### 2.2. PEDESTRIAN/CYCLING NETWORK

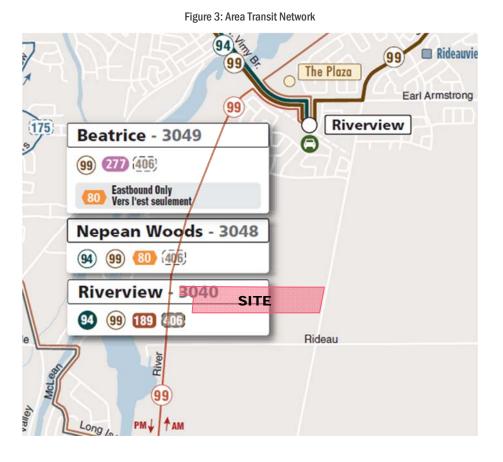
Sidewalk facilities are provided along both sides of Earl Armstrong Road and the 4-lane section of Spratt Road. Both River Road and Rideau Road have gravel shoulders and Spratt Road has paved shoulders along the 2-lane section. Bicycle facilities are currently provided in the form of bike lanes on Earl Armstrong Road along both sides of the road.

Per the City's Cycling Plan, River Road and Earl Armstrong Road are all classified as "Spine Routes" and Spratt Road and Rideau Road are classified as a "Local Route".

#### 2.3. TRANSIT NETWORK

Transit service within the vicinity of the site is currently provided by OC Transpo Peak Route #99 which provides peak hour service in the morning and afternoon. Bus stops for Route #99 are located along River Road at the River Road/Nicolls Island Road and River Road/Rideau Road intersections, approximately 100 to 400 m from the proposed development.

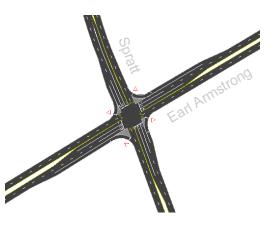
Rapid transit service (in the form of BRT) is also provided via Riverview Station, located approximately 1.5 kilometres north of the proposed development, which provides access to multiple routes along the Transitway.



#### 2.4. EXISTING STUDY AREA INTERSECTIONS

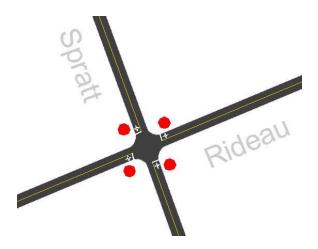
#### Spratt Road/Earl Armstrong Road

The Spratt Road/Earl Armstrong Road intersection is a signalized four-legged intersection. Each leg consists of a dedicated left-turn lane, two through lanes and a channelized right-turn lane. Bike lanes are provided in the east-west direction along Earl Armstrong Road.



#### Spratt Road/Rideau Road

The Spratt Road/Rideau Road intersection is a stopcontrolled four-legged intersection. A single lane approach is provided for each leg of this intersection with all movements permitted.



#### 2.5. EXISTING INTERSECTION OPERATIONS

Illustrated as Figure 4, are the most recent weekday morning and afternoon peak hour traffic volumes obtained from the City of Ottawa for the Earl Armstrong Road/River Road intersection. Peak hour traffic volumes are included as Appendix A.

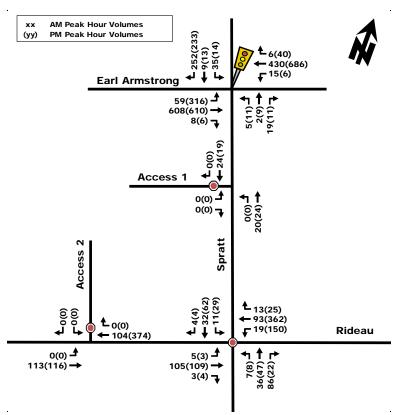


Figure 4: Existing Peak Hour Traffic Volumes

The following Table 1 provides a summary of existing traffic operations at study area intersections based on the SYNCHRO (V9) traffic analysis software. The subject intersection was assessed in terms of the volume-to-capacity (v/c) ratio and the corresponding Level of Service (LoS) for the critical movement(s). The subject intersections 'as a whole' were assessed based on a weighted v/c ratio. The SYNCHRO model output of existing conditions is provided within Appendix B.

			Weekday AM	Peak (PM Peak)			
Intersection		Critical Mover	nent	In	tersectio	n	
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c	
Spratt/Earl Armstrong	B(B)	0.66(0.69)	SBR(SBR)	8.5(10.4)	A(A)	0.36(0.46)	
Spratt/Rideau (unsignalized)	A(C)	0.16(0.73)	NBT(WBT)	8.2(16.0)	-	-	
Note: Analysis of signalized intersections assumes a PHF of 0.95 and a saturation flow rate of 1800 veh/h/lane.							

#### Table 1: Existing Performance at Study Area Intersections

As shown in Table 1, the signalized Earl Armstrong Road/Spratt Road study area intersection 'as a whole' is currently operating at a LoS 'A' during both peak hours. With regard to 'critical movements' at study area intersections, the northbound through movement at the Earl Armstrong Road/Spratt Road intersection is currently operating at a LoS 'B' during peak hours.

The Spratt Road/Rideau Road 'critical movements' are identified as the northbound through during the AM peak (LoS 'A') and the westbound through during the PM peak (Los 'C')

#### 2.6. EXISTING ROAD SAFETY CONDITIONS

Collision history for study area roads (2013 to 2015, inclusive) was obtained from the City of Ottawa and most collisions (72%) involved only property damage, indicating low impact speeds, and 28% involved personal injuries.

The primary causes of collisions cited by police include; turning movement (39%), single vehicle (28%), rear end (17%), and angle (17%) type collisions.

A standard unit of measure for assessing collisions at an intersection is based on the number collisions per million entering vehicles (MEV). At intersection and road segment within the study area, reported collisions have historically take place at a rate of:

- 0.66/MEV at the Spratt Road/Earl Armstrong Road intersection; and
- 3.24/MEV on Spratt Road between Earl Armstrong Road and Rideau Road intersections.

Based on the available data, there does not appear to be any prevailing safety issues at the Spratt Road and Earl Armstrong Road intersection. The high MEV for the Spratt Road segment is driven by low volumes and three (3) total collisions within the review period. All three collisions were single vehicle incidents, with an animal strike, a daytime drive into the ditch, and a snowy condition nighttime drive into the ditch. No pattern is noted for these three incidents and as the adjacent properties are developed, the nature of the road and single vehicle incidents is anticipated to decrease.

The source collision data as provided by the City of Ottawa and related analysis is provided as Appendix C.

#### 2.7. SCREENLINE OPERATIONS

The TRANS Screenline System does not provide an existing east-west screenline that adequately capture north-south travel demand within the study area to help inform the study of the potential need to provide additional road capacity. As such, a *Study Screenline* has been created along Earl Armstrong Road that captures north-south travel demand on the subject section of Spratt Road and the arterial roads both immediately east and west. The screenline includes River Road, Spratt Road and Limebank Road.

As shown in Figure 5, the nearby existing standard screenlines within the TRANS model environment include:

- SL 42 Rideau River South/Manotick with one station at Bridge Street (west of study area);
- SL 50 Mitch Owens with stations at River Road, Dozios Road, Manotick Station Road, Stagecoach Road, Old Prescott Road and Bank Street (south of study area); and
- SL 08 Leitrim with stations at River Road, Albion Road, Bank Street and Hawthorne Road

Vehicle trips crossing the *Study Screenline* were estimated using two sources, namely observed ground counts from the peak hour intersection turning movement counts (see Figure 4) and simulated values from the TRANS regional model (AM peak only). The results are summarized in Table 2. Both data sources reveal that the approximately one half of the existing road capacity of the *Study Screenline* is being used, suggesting that there is considerable spare capacity available. Note that some individual road links may be operating closer to capacity, and others well below.

As shown in Table 2, the Study Screenline is currently operating below capacity (v/c = 1.00). It can be seen that there is available spare capacity across the screenline for future growth. The screenline analysis is provided in Appendix D.

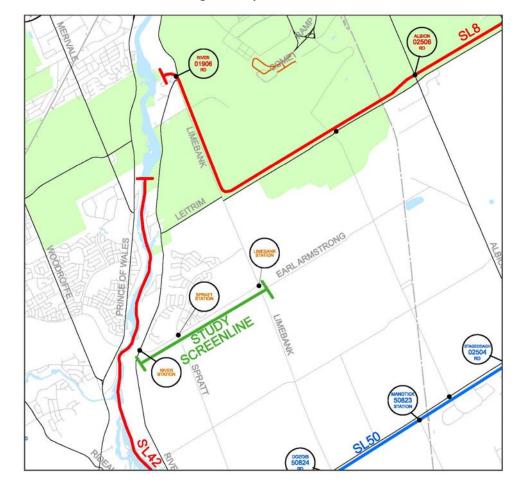
Screenline		nal Demand <sup>1</sup> :U) <sup>2</sup>	Directional	v/c		
	AM Peak	PM Peak	Capacity <sup>3</sup> (PCU)	AM Peak	PM Peak	
Study Screenline	1,374	1,428	5,780	0.24	0.25	

Table 2: Existing Study Screenline Performance

1. Existing volumes obtained from the City of Ottawa

2. PCU (Passenger Car Units) were assumed to be the sum of autos and 2 x heavy vehicles

3. Directional capacities were obtained from the City's 2008 Transportation Master Plan - Road Infrastructure Needs Study



#### Figure 5: Study Area Screenlines

### 3. DEMAND FORECASTING

#### **3.1. PLANNED STUDY AREA TRANSPORTATION NETWORK CHANGES**

Identified on the 'Affordable Network' map within the TMP is the widening of Earl Armstrong Road from 2-lanes to 4-lanes between Limebank Road and Bowesville Road and on the 'Network Concept', extending Earl Armstrong Road as a 2-lane road between Albion Road to Hawthorne Road. Additionally, on the 'Network Concept' map, Limebank Road is to be widened from 2-lanes to 4-lanes between Mitch Owens Road and Earl Armstrong Road.

Rapid transit measures within the study area include at-grade bus rapid transit (BRT) between Southwest Transitway and Riverside South Town Center on the 'Transit Network Concept' map along Earl Armstrong Road and the extension of existing o-train to Bowesville/Riverside South Station identified on the 'Transit Affordable Network' map.

Although not identified in the TMP, Spratt Road is planned to be extended south of Earl Armstrong Road to Boundary Road. It will be expanded to a 4-lane cross section with sidewalks and stop controls where warranted.

### **3.2. OTHER AREA DEVELOPMENT**

In 2005, Council approved the Riverside South CDP to direct the long-term development of the community and provide guidelines for City staff for decision-making regarding land use planning that would be consistent with the community's priorities for the future. The Plan was amended in 2010, and again in June 2016.

The most recent Land Use Plan for Riverside South is provided as Figure 6, and the development forecast at full build-out is as follows:

- Population 54,788 people (compared to 13,779 existing)
- Dwelling units 20,469 homes
- Employment 17,703 jobs within the designated employment areas, plus 9,960 more jobs within the Combined mixed-use, commercial, institutional areas.

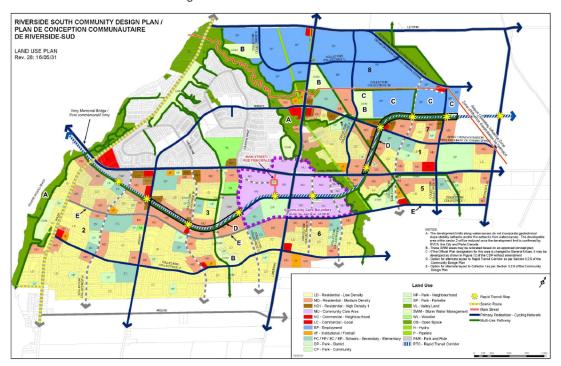


Figure 6: Riverside South CDP – Land Use Plan

According to the CDP, the road network for the Riverside South Community is based on a grid of east-west and northsouth collector roads, while two arterial roads, namely Earl Armstrong Road and Limebank Road, serve as the axis for the network. The road hierarchy is shown as Figure 7. The following modifications to the road network are suggested:

- Riverside Drive will be widened to six lanes from Limebank Road north to Hunt Club Road in the medium term, and in conjunction with River Road, which will remain a two-lane scenic road, will act as a north-south corridor that will connect Riverside South to the Vimy Memorial Bridge.
- Earl Armstrong Road has been upgraded to accommodate four lanes of traffic, and will be extended east to Bank Street. It is connected to Strandherd Drive, west of the Rideau River, via the Vimy Memorial Bridge.
- Limebank Road has been widened in part to four lanes from south of Earl Armstrong Road to its intersection with Riverside Drive/River Road north of the community and is to become the main north-south arterial linking Riverside South to the greater Ottawa area.
- Spratt Road acts as a community collector linking the existing neighbourhoods in the northwest quadrant to the future development areas to the south and east.
- Other future major and minor collectors within the new community will extend into other neighbourhoods to provide links to the arterial system.

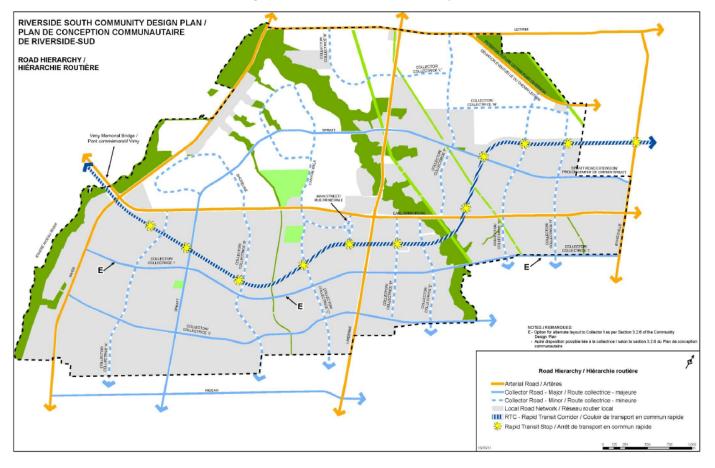


Figure 7: Riverside South CDP - Road Hierarchy

### 3.3. RIVERSIDE SOUTH PHASE 9

In 2010, Dillion Consulting completed the Riverside South Phase 9 Transportation Impact Study. This development is located immediately south of Earl Armstrong Road between River Road and Spratt Road (Figure 8). The development will consist of 244 single family homes, 751 townhomes, for a total of 995 units and approximately 191,000 sqft of institutional and commercial land.

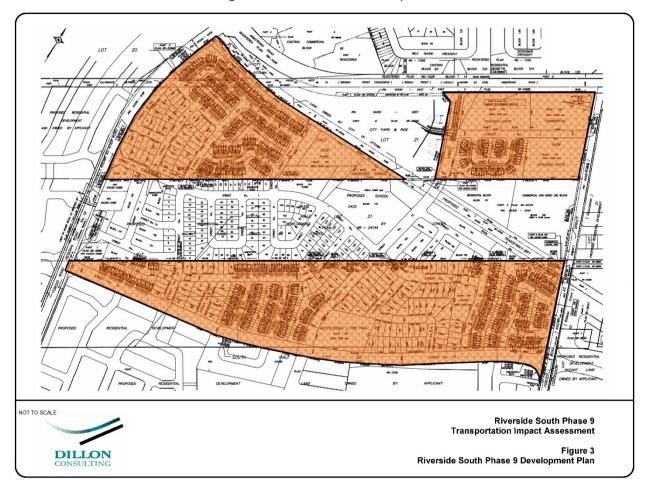
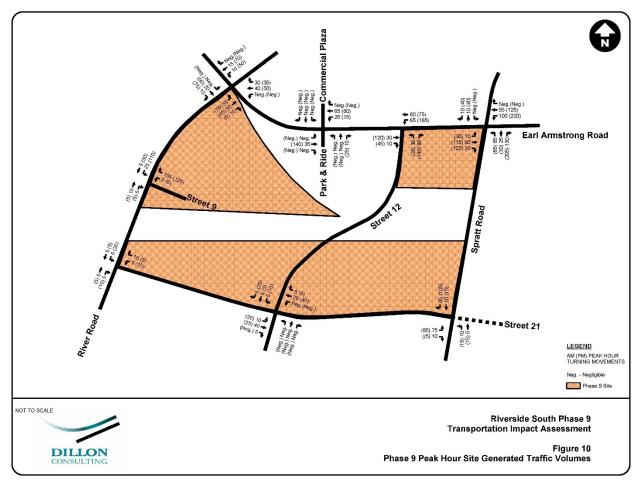


Figure 8: Riverside South Phase 9 Development

Full build-out and occupancy was forecasted for 2018 however, as of today, approximately 50% of the development has been built, the remaining being the southern-most portion of the subdivision. Because of this, only the trips generated onto Spratt Road from the new development will be taken into account.

Figure 9 shows the site generated trips to the Spratt Road and Earl Armstrong Road intersection.

Figure 9: Phase 9 Site Forecasted Volumes



### 3.4. BACKGROUND TRAFFIC GROWTH

The background traffic along River Road, Limebank Road and Earl Armstrong Road is expected to increase at a constant rate. The anticipated development of the Riverside South community will be captured by subsequent transportation impact assessments to determine when various improvements are triggered. Given the spike in vehicle demand along Earl Armstrong Road due to the opening of the Vimy Memorial Bridge, a 1% traffic growth rate per annum was assumed for the 2029 and 2034 Horizon years. Spratt Road and Rideau Road was assumed to have 0% growth at the urban boundary and any future traffic growth along the road corridor will be generated by the development of the adjacent community.

The projected background traffic volumes for the horizon years is illustrated as Figure 10 for 2029 and Figure 11 for 2034.

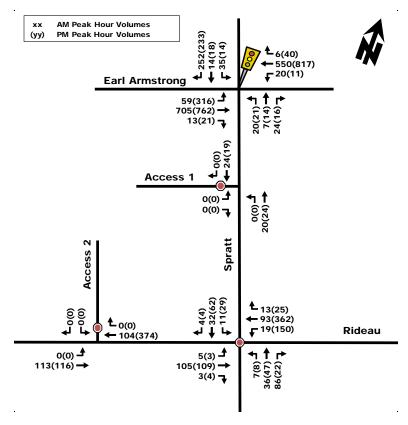
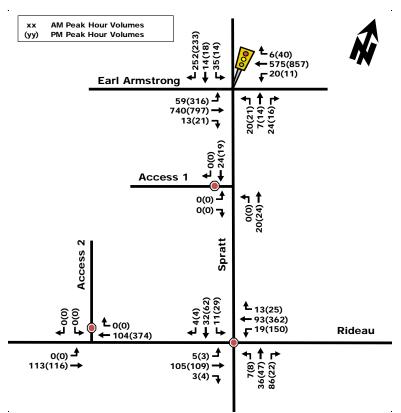


Figure 10: Projected 2029 Baseline Traffic Volumes

Figure 11: Projected 2034 Baseline Traffic Volumes



#### **3.5. SITE TRIP GENERATION**

Appropriate trip generation rates for the proposed development of approximately 234 single family homes and 260 residential townhome units were obtained from the 9<sup>th</sup> Edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual, which are summarized in Table 3.

As ITE trip generation surveys only record vehicle trips and typically reflect highly suburban locations (with little to no access by travel modes other than private automobiles), adjustment factors appropriate to the more connected suburban study area context were applied to attain estimates of person trips for the proposed development. This approach is considered appropriate within the industry for more urban developments.

	Data	Trip F	Rates				
Land Use Source		AM Peak	PM Peak				
Single Family Homes	Single Family Homes ITE 210 T = 0.70(x) + 9.74		Ln(T) = 0.90(x) + 0.51				
Townhomes	ITE 230	Ln(T) = 0.80(x) + 0.26	Ln(T) = 0.82(x) + 0.32				
Notes: T = Average Vehicle Trip Ends X = 1000 ft <sup>2</sup> Gross Floor Area							

Table 3	: ITE	Trip	Generation	Rates
Tuble		mp	achiciation	nutus

To convert ITE vehicle trip rates to person trips, an auto occupancy factor and a non-auto trip factor were applied to the ITE vehicle trip rates. Our review of available literature suggests that a combined factor of approximately 1.3 is considered reasonable to account for typical North American auto occupancy values of approximately 1.15 and combined transit and non-motorized modal shares of less than 10%. As such, the person trip generation for the proposed site is summarized in Table 4.

Land Use	Units	AM Pea	ak (Person T	rips/h)	PM Peak (Person Trips/h)			
		In	Out	Total	In	Out	Total	
Single Family Homes	234	56	170	226	185	109	294	
Townhomes	260	24	120	144	114	57	171	
Tot	al Person Trips	80	290	370	299	166	465	
Note: 1.3 factor to account	Note: 1.3 factor to account for typical North American auto occupancy values of approximately 1.15 and combined transit and non-							

Table 4: Modified Person Trip Generation

Note: 1.3 factor to account for typical North American auto occupancy values of approximately 1.15 and combined transit and nonmotorized modal shares of less than 10%

The person trips shown in Table 4 for the proposed site were then reduced by modal share values, with the total sitegenerated vehicle traffic summarized in Table 5.

Land Lloo	Mode Share	AM Peak (veh/h)			PM Peak (veh/h)		
Land Use	woue Share	In	Out	Total	In	Out	Total
Auto Driver	65%	52	189	241	195	108	303
Auto Passenger	20%	16	58	74	60	34	94
Transit	10%	8	29	37	30	16	46
Non-motorized	5%	4	14	18	14	8	22
Тс	tal 'New' Auto Trips	52	189	241	195	108	303

Table 5: Total Site Vehicle Trip Generation

As shown in Table 5, the resulting number of potential 'new' two-way vehicle trips for the proposed development is approximately 241 and 303 veh/h during the weekday morning and afternoon peak hours, respectively.

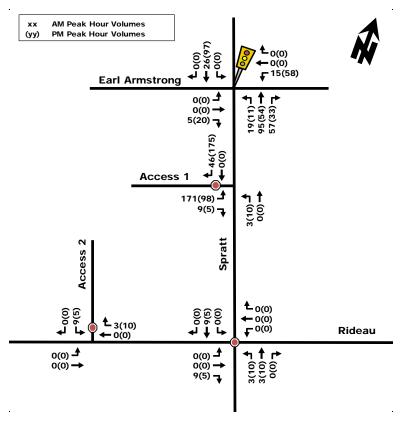
### 3.6. VEHICLES DISTRIBUTION AND ASSIGNMENT

Traffic distribution was based on the different types of land uses, existing volume splits at study area intersections and our knowledge of the surrounding area. The resultant distribution is outlined as follows.

#### Residential

- 10% to/from the north via River Road and Earl Armstrong Road
- 50% to/from the north via Spratt Road and Limebank Road
- 30% to/from the north via Earl Armstrong Road and Limebank Road
- 5% to/from the south via Spratt Road
- <u>5%</u> to/from the south via Rideau Road and Spratt Road 100%

Based on these distributions, 'new' site-generated trips were assigned to study area intersections, which are illustrated as Figure 12.





### 4. FUTURE TRAFFIC OPERATIONS

#### 4.1. PROJECTED 2029 CONDITIONS AT FULL SITE DEVELOPMENT

The total projected 2029 volumes associated with the proposed development were derived by superimposing 'new' sitegenerated traffic volumes (Figure 12) onto projected 2029 background traffic volumes (Figure 10). The resulting total projected 2029 volumes are illustrated as Figure 13

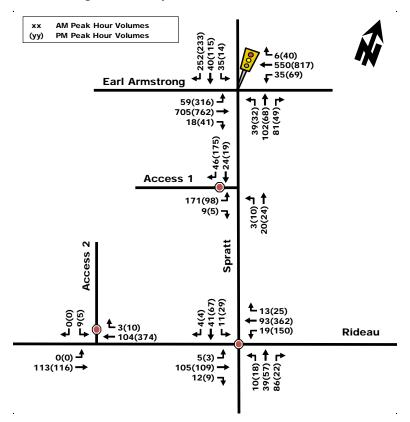


Figure 13: Total Projected 2029 Peak Hour Traffic Volumes

The following Table 6 provides a projected performance summary for study area intersections, based on total projected 2029 traffic volumes. The detailed SYNCHRO model output of projected 2029 conditions is provided within Appendix E.

Table 6: Projected 2029 Performance of St	tudy Area Intersections
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	Weekday AM Peak (PM Peak)							
		Critical Move	ement	Intersection 'as a Whole'				
Intersection	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c		
Spratt/Earl Armstrong	B(B)	0.65(0.65)	SBR(SBR)	12.3(12.3)	A(A)	0.38(0.48)		
Spratt/Site Access 1 (unsignalized)	A(A)	9.9(10.0)	EBL(EBL)	6.6(3.3)	-	-		
Rideau/Site Access 2 (unsignalized)	A(B)	9.8(12.1)	SBL(SBL)	0.4(0.1)	-	-		
Spratt/Rideau (unsignalized)	A(C)	8.4(20.7)	EBT(WBT)	8.3(16.6)	-	-		
Notes: Analysis of signalized intersections	assumes a	PHF of 0.95 and	a saturation flow ra	ate of 1800 veh/h	/lane.			

As shown in Table 6, all study area intersections 'as a whole' are projected to operate at an acceptable LoS 'C' or better during peak hours. With regard to the 'critical movements' at study area intersections, the critical movements are projected to operate at an acceptable LoS 'C' or better during the morning and afternoon peak hours with respect to the City of Ottawa operating standards of LoS 'D' or better ( $v/c \le 0.90$ ).

#### 4.2. PROJECTED 2034 CONDITIONS AT FIVE YEARS BEYOND FULL SITE DEVELOPMENT

The total projected 2024 volumes associated with the proposed development were derived by superimposing 'new' sitegenerated volumes (Figure 12) onto projected 2024 baseline traffic volumes (Figure 11). The resulting total projected 2024 volumes are illustrated as Figure 14.

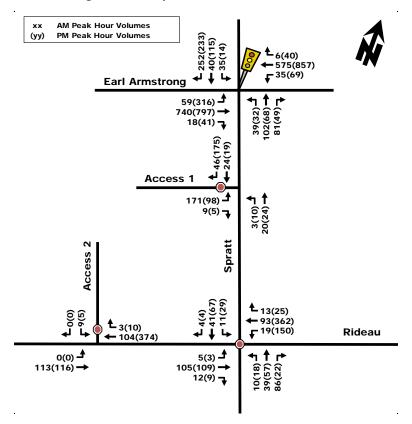


Figure 14: Total Projected 2034 Peak Hour Traffic Volumes

The following Table 7 provides a projected performance summary for study area intersections, based on total projected 2024 traffic volumes (5-years beyond full site build-out). The detailed SYNCHRO model output of projected 2034 conditions is provided within Appendix G.

			Weekday AM P	eak (PM Peak	)	
		Critical Move	ment	Intersec	tion 'as a	a Whole'
Intersection		max. v/c or				
	LoS	avg. delay	Movement	Delay (s)	LoS	v/c
		(s)				
Spratt/Earl Armstrong	B(B)	0.65(0.65)	SBR(SBR)	12.2(12.4)	A(A)	0.39(0.50)
Spratt/Site Access 1 (unsignalized)	A(B)	9.9(10.0)	EBL(EBL)	6.1(3.3)	-	-
Rideau/Site Access 2 (unsignalized)	A(B)	9.8(12.1)	SBL(SBL)	0.4(0.1)	-	-
Spratt/Rideau (unsignalized)	A(C)	8.4(20.7)	EBT(WBT)	8.3(16.6)	-	-
Notes: Analysis of signalized intersections	assumes a	PHF of 0.95 and	a saturation flow ra	ate of 1800 veh/l	n/lane.	

Table 7: Projected 2034 Performance of Study Area Intersections

As shown in Table 7, with the continued 1% traffic growth along Earl Armstrong Road, Limebank Road and River Road, all study area intersections 'as a whole' are projected to operate at an acceptable LoS 'C' or better during peak hours. With regard to the 'critical movements' at study area intersections, the critical movements are projected to operate at an acceptable LoS 'C' or better during the morning and afternoon peak hours with respect to the City of Ottawa operating standards of LoS 'D' or better ( $v/c \le 0.90$ ).

#### 4.3. NEIGHBOURHOOD IMPACTS

Based on the Riverside South CDP, the proposed development is in accordance with the forecasted Land Use Plan outlined in the CDP. Ironwood is a predominantly residential development north of Rideau Road between Spratt Road and River Road which does not conflict with the Community Design Plan Map located in the CDP. This development has been forecasted for and as such will not have any unexpected impacts on the traffic network that have not already been accounted for in the planned community.

#### 4.4. PROJECTED SCREENLINE OPERATIONS

The projected screenline capacity for the 2029 and 2034 horizon are summarized below in Table 8. Similar to the existing conditions, the *Study Screenline* capacity is anticipated to be approximately 26% through to 2034, with spare capacity for future growth.

Screenline		nal Demand <sup>1</sup> CU) <sup>2</sup>		v,	/c
	AM Peak	PM Peak	Capacity <sup>3</sup> (PCU)	AM Peak	PM Peak
2029 Study Screenline	1,710	1,783	5,780	0.30	0.31
2034 Study Screenline	1,750	1,819	5,780	0.30	0.31

Table 8: Projected	Study Screenline Performance
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1. 2029 and 2034 volumes obtained from Study Projections

2. PCU (Passenger Car Units) were assumed to be the sum of autos and 2 x heavy vehicles

3. Directional capacities were obtained from the City's 2008 Transportation Master Plan – Road Infrastructure Needs Study

### 5. TRANSPORTATION DEMAND MANAGEMENT

Depending on the nature of a development, Transportation Demand Management (TDM) strategies have the potential to be an integral part of a planned development to address and support the City's policies with regard to TDM. Several other TDM measures could also be considered, including:

- Improving the quality and safety of pedestrian facilities, such as enhanced sidewalks/lighting;
- Promote transit passes and park & ride options within the Riverside South and to the Riverview Station; and
- Promote appropriate car sharing programs/facilities to reduce auto ownership and attract residents who do not own a vehicle.

TDM strategies are important in encouraging active modes of transportation to/from the site, further lessening the reliance on the private automobile.

### 6. SITE PLAN REVIEW

#### SITE ACCESS

Based on the projected volumes, the Street No. 8 intersection with Spratt Road and the Street No. 6 intersection with Rideau Road will both operate well as a minor street stop-control. No left-turn auxiliary lanes are required for these roads.

Typically, if the right-turning volume exceeds 60 vehicles per hours, or represents a volume greater than 10-20% of the approaching volume, a right-turn lane should be considered. At the Street No. 8 and Spratt Road intersection, the turning volumes (175 vehicles) and the percentage approaching volume (90%) exceed both of these conditions, and the discussion should occur if a right-turn lane is required. Breaking down the southbound volumes by movement, the will be approximately three right-turning vehicles every minute and one through vehicle every three minutes. Given the low volume of southbound through vehicles, the single lane on Spratt Road will operate predominantly as a right-turn lane and have very little impact on the through volumes to the south. Once Spratt Road is widened to two-lanes, this issue

may be revisited within the context of an urban collector. It is noted that this recommendation would be consistent with the recommendation in the Riverside South Phase 9 TIS, dated November 2010 by Dillon, for Spratt Road and Street 21 (CDP Collector 'I'). This intersection is illustrated as a two-lane roadway on Spratt Road with minor stop-control on the east-west Street 21.

#### **EMERGENCY ACCESS**

As the development of the site is anticipated to occur before the lands to the north are initiated, a secondary emergency access/egress will be required once the development reaches a total of 200 units. It is anticipated that Street No. 6 and 8 will provide dual access points for the subject site.

#### INTERNAL ROADWAYS

The internal road network is comprised of 14.5m window lanes, 18.0m local roads, 20.0m internal collector roads and a 26.0m minor community collector, as per the CDP. Short block lengths and the offset internal road grid provide a high level of connectivity with minimal loading on the internal intersections.

It is noted that the western limits of the site plan require the development of the lands to the north (or south) for road connectivity and would require a temporary access if they are to proceed prior to the northern connection being established.

#### SIDEWALKS

Within the community, sidewalks can be provided on both sides of the north-south minor collector (26.0m right-of-way), and sidewalks along a single side will be provided for the 20.0m and 18.0m right-of-ways. The window lanes cannot support a sidewalk, although a connection to the adjacent street sidewalks should be provided for connectivity.

This conforms with the current City of Ottawa review of the typical cross-sections (only 16.5m and 18.0m approved to date) that have identified that a four-party trench is required to support a single sidewalk and have assumed that a 22.0m right-of-way is required for two sidewalks along a roadway.

#### CYCLING

Cycling facilities are to be provided along the north-south collector (26.0m right-of-way), as identified within the CDP. The remainder of the cycling network will accommodate through shared on-road facilities.

#### TRAFFIC CALMING

The implementation of passive traffic calming measures are currently being incorporated into new subdivisions with the goal of reducing potential reconstruction costs soon after a new development roads are completed. The nature of these calming measures should primarily be limited to horizontal features. Within the subject lands, curb narrowings should be provided at the local road intersections with Street No. 6 and 8 to reduce the entrance and exit speeds onto local roads and reduce the crossing distance for pedestrians travelling along the corridors. In addition, a full intersection narrowing should be considered at the Street No. 6 and 8 intersection as it is the major intersection for both north-south and east-west travel within the development.

### 7. FINDINGS AND RECOMMENDATIONS

Ironwood, located north of Rideau Road, between River Road and Spratt Road, is a residential development that will consist of 234 single family homes and 260 townhomes, for a total of 494 units. It was determined that the proposed development will generate 241 new vehicle trips in the morning peak hour and 303 vehicle trips in the afternoon peak hour.

Based on the foregoing analysis of the proposed development, the following transportation-related conclusions are offered:

#### **EXISTING CONDITIONS**

- The study area intersection north of the site are currently operating 'as a whole' with an overall LoS 'C' or better during the weekday morning and afternoon peak hours.
- With regard to 'critical movements' at the study area intersection, they are noted as operating at an acceptable LoS 'C' or better during the peak hours.
- Based on the available data, there does not appear to be any safety issues at the signalized study area intersections adjacent to the proposed site.
- The Project Screenline, south of Earl Armstrong Road, is operating below 30% capacity during the weekday peak hours.

#### PROJECTED CONDITIONS

- Given the increase if vehicular volumes along Earl Armstrong Road, a 1% traffic growth rate per annum was assumed for the 2029 and 2034 horizon years. No background growth was assumed for Spratt Road.
- The proposed development is projected to generate 'new' two-way vehicle volumes of approximately 241 and 303 veh/h during the weekday morning and afternoon peak hours, respectively.
- At full occupancy (year 2029), study area intersections 'as a whole' are projected to operate at an acceptable LoS 'C' or better and the 'critical movements' are projected to operate at acceptable levels of service during both peak hours.
- At 5-years beyond site build-out, study area intersections 'as a whole' are projected to operate at an acceptable LoS 'C' or better;

#### SITE PLAN

- A single road connection support up to 200 units within the subdivision and a secondary access will be required for emergency access beyond this threshold. Street No. 6 and 8 will fulfill this purpose and no other connections will be required for the subject site.
- Local roads and internal collector roads can support sidewalks along a single side of the roadway and the minor collector roads within the development are sufficiently wide enough to permit the construction of sidewalks along both sides of the road.
- Intersection narrowings are recommended on the local road approaches to the internal collectors (Street No. 6 and 8) and at the intersection of Street No. 6 and 8, as it is central within the community for both north-south and east-west travel.

Based on the foregoing, the proposed development fits well into the context of the surrounding area, and its location and design serves to promote use of walking, cycling, and transit modes, thus supporting City of Ottawa policies, goals and objectives with respect to redevelopment, intensification and modal share.

Therefore, the proposed Cardel Homes' Ironwood development is recommended from a transportation perspective.

Prepared By:

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Rani Nahas, E.I.T Engineering Associate, Transportation



## **Appendix A – Current Peak Hour Traffic Volumes**

**5252499 - Earl Armstrong and Limebank - June - 7th - TMC** Tue Jun 7, 2016 AM Peak (7:15AM - 8:15AM) - Overall Peak Hour Al Classes (Pedestrians, Bicycles on Road, Lights) All Movemens ID: 323544, Location: 45, 2806, -75, 567 103, Site Code: 359 48103

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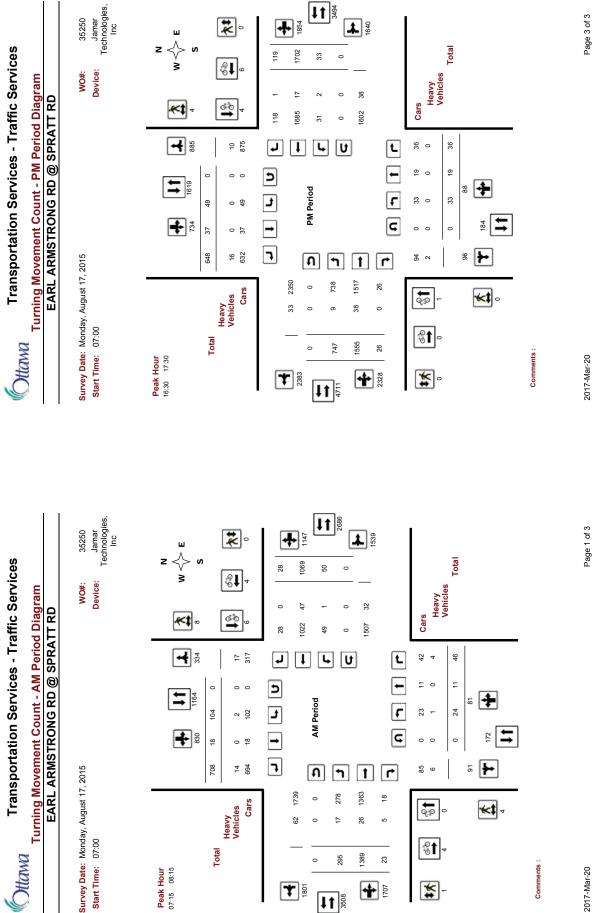
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Ottawa

2017-Mar-20

Comments

Page 1 of 3

Intersection: Spratt / Rideau

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8:00AM - 8:15AM	1	7	14	4	10	1	2	13	0	2	16	3	73
8:15AM - 8:30AM	1	8	5	1	6	2	1	17	2	3	14	0	60
1.5 Hour Total	7	36	86	11	32	4	5	105	3	19	93	13	407

Intersection: Spratt / Rideau

Date: Tuesday, May 30, 2017

Time: 4:00PM to 5:30PM

	1	<b>†</b>	r 🕈	<b>L</b>	+	4		->	-	<b>•</b>	-	▲	15-Minute
Time	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Total
4:00PM - 4:15PM	0	7	4	3	12	1	1	19	0	17	42	0	106
4:15PM - 4:30PM	0	6	4	5	5	0	0	13	0	21	46	0	100
4:30PM - 4:45PM	1	9	3	5	6	1	1	10	1	22	54	1	114
4:45PM - 5:00PM	3	6	3	5	9	1	0	15	0	19	55	3	119
5:00PM - 5:15PM	3	6	3	5	6	0	1	14	1	20	50	3	112
5:15PM - 5:30PM	1	4	3	2	7	0	0	16	1	25	52	1	112
1.5 Hour Total	8	38	20	25	45	3	3	87	3	124	299	8	655

# Appendix B – SYNCHRO Capacity Analysis: Existing Conditions

	٦	t	۲	7	ŧ	4	•	+	•	۲	<b>→</b>	7
ane Group.	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
ane Configurations	F	ŧ	×.	۶	*	×.	٣	ŧ	۰.	۶	ŧ	¥
Fraffic Volume (vph)	59	608	œ	15	430	9	2	2	19	35	6	252
Future Volume (vph)	26	608	œ	15	430	9	2	2	19	35	6	252
-ane Group Flow (vph)	. 62	640	۵	16	453	9 0	ۍ ۱	2	20	37	6	265
urn Type	pm+pt	N	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	A	Perm
Protected Phases	0	2	c		9		c	~	¢		4	
Permitted Phases	.7 1	c	.7 0	φ τ		9、	~ ~	c	~ ~	4 •		4.
Detector Phase	ç	2	2		9	9	0	×	×	4	4	4
Switch Phase	C L			C L								-
Vinimum Initial (S)	5.U	4.0	4.0	D.C	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
VIInimum Split (S)	11.4	30.3	30.3	11.4	30.3	30.3	31.2	31.2	31.2	31.2	31.2	31.2
Lotal Split (S)	10.01	/0.0	/0.U	10.01	/0.U	/0.U	0.05 /00 00	0.05 /00 00	0.05 /00.00	0.05 /00.00	0.05 /00.00	0.05 /00.00
1 Utdi Split (20) Vollau: Timo (c)	9 4	9 V C OC	0/ C.OC	9 V 7 V	0/ C. OC	9 V C . OC	0/7.77	0/7.77	0/7.47	0/7.47	0/7.47	0/7.77
all-Red Time (s)	, t	1 7	1 7	, c	1 7	1 7	о С	2.5	2.C	с С	с С	о. С
ost Time Adiust (s)	-2.4	-2.3	-2.3	-2.4	-2.3	-2.3			0.6-	0.2	0.2	C.C-
otal Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
-ead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	C-Max	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	97.4	93.5	93.5	94.6	88.0	88.0	13.5	13.5	13.5	13.5	13.5	13.5
Actuated g/C Ratio	0.81	0.78	0.78	0.79	0.73	0.73	0.11	0.11	0.11	0.11	0.11	0.11
V/c Ratio	0.09	0.25	0.0	0.03	0.19	0.01	0.03	0.01	0.08	0.25	0.02	0.66
Control Delay	3.4	0.0	0.0	0.5 0.0	0.0	0.0	42.2	41.0	0.7	C.44	42.3	13.0
Jueue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
I Utali Liciay	0.4 A	0.0	0.0	0 0	0.0	0.0	7.24	P. C		C. 74	C.24	0.CI D
Annrnach Delav	c	۲ ۲ ۲	¢	c	4	c	د	7 FL	¢	د	18.7	ב
Approach LOS		9.0 V			A A			8			8	
Dueue Length 50th (m)	1.8	11.4	0.0	0.4	14.8	0.0	1.1	0.2	0.0	8.3	1.0	0.0
Queue Length 95th (m)	8.0	47.6	0.0	3.0	34.1	0.0	4.3	1.3	0.0	16.2	3.1	21.6
nternal Link Dist (m)		597.2			504.8			103.7			577.6	
Furn Bay Length (m)	55.0		88.0	52.0		80.0	55.0		20.0	0.06		25.0
Base Capacity (vph)	739	2582	1151	661	2431	1083	338	856	441	340	856	574
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductin	0	0 0	0 0	-	-	0	-	0 0	-	-	-	- C
Siorage Cap Reducin Doduced vic Potio		0.75	0 0	0 000	0 10	0 10	0 0		0.05	0 11	0 0	0 46 0
Kenncen V/C Kallo	000	CZ-U	0.01	70°0	0.19	0.01	0.01	0.00	CU.U		0.01	0.40
ntersection Summary												
Cycle Length: 120 Actuated Cycle Length: 120												
Offset: 93 (78%), Referenced to phase 2:EBTL, Start of Green	d to phase	2:EBTL,	Start of (	breen								
Natural Cycle: /b Control Tyme: Actuated.Conrolinated	rdinated											
Maximum v/c Ratio: 0.66												
ntersection Signal Delay: 8.5	5			5	Intersection LOS: A	ILOS: A						
Intersection Capacity Utilization 44.3% Analysis Period (min) 15	tion 44.3%			2	ICU Level of Service A	of Service	A					

Existing AM 2: Spratt & Earl Armstrong	06/08/2017
Splits and Phases: 2: Spratt & Earl Armstrong	
🖌 Ø1 🛛 🍦 🐥 Ø2 (R)	4×04
15 s 70 s	35 s
Je active the second s	

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Synchro 9 Report Page 2

Existing AM 6: Spratt & Rideau				06/08	06/08/2017
	t	Ŧ	+	+	
Lane Group	EBT	WBT NBT	NBT	SBT	
Lane Configurations	¢	ŧ	ŧ	÷	
Traffic Volume (vph)	105	93	36	32	
Future Volume (vph)	105	93	36	32	
Lane Group Flow (vph)	119	132	136	50	
Sign Control	Stop	Stop	Stop	Stop	
Intersection Summary					
Control Type: Unsignalized					
Intersection Capacity Utilization 28.9%	n 28.9%			ICU Level of Service A	
Analysis Period (min) 15					

Synchro 9 Report Page 3

	٦	t	۲	4	ţ	~	4	+	۲	۶	<b>→</b>	7
ane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
ane Configurations	F	ŧ	۴.,	۴	ŧ	¥	۶	ŧ	¥.,	۶	ŧ	*-
Traffic Volume (vph)	316	610	9	9	686	40	11	6	1	14	13	233
Future Volume (vph)	316	610	9	9	686	40	11	6	11	14	13	233
ane Group Flow (vph).	333	642	9	9	722	42	12	6	12	15	14	245
Furn Type	pm+pt	NA	Perm	pm+pt	M	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	ഗ	2	c	- ,	9		c	œ	c		4	
Permitted Phases	7 1	c	7 0	• •	7	Q 7	x c	c	x c	4 4	Y	4 4
vitch Dhaco	0	7	7	-	D	D	0	0	0	+	+	2-
owituri Pridoe Minimum Initial (c)	50	U V	01	6	01	07	10	UV	10	10	10	0 V
Minimum Shift (s)	0.0 A 11 A	20.2	20.2		20.2	20.2	21.0	21.0	21.0	21.0	21.0	21.0
rotal Snlit (s)	25.0	63.0	63.0	75.0	63.0	630	32.0	32.0	32.0	32.0	32.0	32.0
otal Split (%)	20.8%	52.5%	52.5%	20.8%	52.5%	52.5%	26.7%	26.7%	26.7%	26.7%	26.7%	26.7%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.8	1.7	1.7	1.8	1.7	1.7	2.5	2.5	2.5	2.5	2.5	2.5
-ost Time Adjust (s)	-2.4	-2.3	-2.3	-2.4	-2.3	-2.3	-2.2	-2.2	-2.2	-2.2	-2.2	-2.2
otal Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
-ead-Lag Optimize?		Yes	Yes	Yes	Yes	Yes						
Recall Mode		C-Max	C-Max	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	101.0	98.6	98.6	91.9	84.0	84.0	11.0	11.0	11.0	11.0	11.0	11.0
actuated g/C Ratio	0.65	78.0	0.00	0.01	0.70	0/.0	010	60.0	60.0	0.0	0.05	60.0
Control Delay	89	3.5	0.0	3.0	8.0	01	49.0	446	0.50	49.8	0.0	16.5
Oueue Delav	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.8	3.5	0.0	3.0	8.2	0.1	49.0	46.6	0.5	49.8	47.2	16.5
OS	A	A	A	A	A	A		۵	A	۵	۵	8
Approach Delay		4.2			7.7			30.7			19.9	
Approach LOS		A			A			U			в	
Queue Length 50th (m)	9.7	9.7	0.0	0.2	27.7	0.0	2.7	1.0	0.0	3.4	1.6	0.0
lueue Length 95th (m)	26.3	37.1	0.0	1.1	55.3	0.3	8.1	3.4	0.0	9.4	4.6	23.0
Internal Link Dist (m)		597.2		1	504.8			103.7			577.6	4
lurn Bay Length (m)	0.65	CULU	88.0	52.0	ULCL	80.0	55.0	<i>C L L</i>	20.0	90.0	CLL	25.0 E 20
Starvation Can Reductn	000	0	0071	9 C	0707	7401	+ C		00+		<u>,</u> 0	170
Spillback Cap Reductin					0		0		0	0		, 0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.24	0.00	0.01	0.31	0.04	0.04	0.01	0.03	0.05	0.02	0.46
ntersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120	-	101										
Offset: 15 (13%), Referenced to phase 2:EBTL, Start of Green Natural Cycle: 80	ed to phase	Z:EBIL,	Start of (	ireen								
Control Type: Actuated-Coordinated	ordinated											
Maximum v/c Ratio: 0.69												
ntersection Signal Delay: 8.0	0.0			= ;	Intersection LOS: A	ILOS: A						
ntersection Capacity Utilization 56.0% Analysis Period (min) 15	ation 56.0%			≚	ICU Level of Service B	of Service	9					

Existing PM 2: Spratt & Earl Armstrong	rl Armstrong	06/08/2017
Splits and Phases:	Splits and Phases: 2: Spratt & Earl Armstrong	
01	🚽 🔶 🖉 (R)	↓ _ D4
25 s	63 s	32 s
<b>→</b> 05	₹	
25 s	63 s	32 s

Existing PM 6: Spratt & Rideau					06/08/2017
	t	ţ	+	+	
Lane Group	EBT	WBT NBT	NBT	SBT	
Lane Configurations	¢	¢	¢	¢	
Traffic Volume (vph)	109	362	47	62	
Future Volume (vph)	109	362	47	62	
Lane Group Flow (vph)	122	565	80	100	
Sign Control	Stop	Stop	Stop	Stop	
Intersection Summary					
Control Type: Unsignalized					
Intersection Capacity Utilization 55.5%	n 55.5%			ICU Level of Service B	
Analysis Period (min) 15					

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# Appendix C – Collision Data and Analysis

#### Total Area

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	3	3	0	2	0	5	0	0	13	72%
Non-fatal injury	0	4	0	1	0	0	0	0	5	28%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	3	7	0	3	0	5	0	0	18	100%
	#3 or 17%	#1 or 39%	#5 or 0%	#3 or 17%	#5 or 0%	#2 or 28%	#5 or 0%	#5 or 0%		

#### EARL ARMSTRONG RD/SPRATT RD

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2013-2015	14	19,340	1095	0.66

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	3	3	0	1	0	2	0	0	9	64%
Non-fatal injury	0	4	0	1	0	0	0	0	5	36%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	3	7	0	2	0	2	0	0	14	100%
	21%	50%	0%	14%	0%	14%	0%	0%		_

### SPRATT RD, EARL ARMSTRONG RD to RIDEAU RD

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2013-2015	3	845	1095	3.24

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	<i>Single vehicle (Unattended vehicle)</i>	Other	Total	
P.D. only	0	0	0	0	0	3	0	0	3	100%
Non-fatal injury	0	0	0	0	0	0	0	0	0	0%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	0	0	0	0	0	3	0	0	3	100%
	0%	0%	0%	0%	0%	100%	0%	0%		-

#### RIDEAU RD/SPRATT RD

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2013-2015	1	n/a	1095	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	0	0	0	1	0	0	0	0	1	100%
Non-fatal injury	0	0	0	0	0	0	0	0	0	0%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	0	0	0	1	0	0	0	0	1	100%
	0%	0%	0%	100%	0%	0%	0%	0%		_



### City Operations - Transportation Services Collision Details Report - Public Version

From: January 1, 2014 To: December 31, 2015

Traffic Control: Tra	ffic signal						Total Co	ollisions: 10	
Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuve	er Vehicle type	First Event	No. Ped
2014-Apr-04, Fri,10:30	Clear	SMV other	P.D. only	Dry	East	Turning left	Pick-up truck	Ran off road	
2014-Oct-30, Thu,18:39	Clear	Rear end	P.D. only	Dry	South	Turning right	Pick-up truck	Other motor vehicle	
					South	Turning right	Pick-up truck	Other motor vehicle	
2014-Jan-03, Fri,11:15	Snow	Turning movement	P.D. only	Ice	East	Turning left	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Pick-up truck	Other motor vehicle	
2014-May-27, Tue,09:20	Clear	Rear end	P.D. only	Dry	South	Turning right	Pick-up truck	Other motor vehicle	
					South	Turning right	Passenger van	Other motor vehicle	
2015-Feb-12, Thu,20:30	Clear	Angle	P.D. only	Loose snow	South	Turning right	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Dec-16, Tue,08:54	Clear	Turning movement	Non-fatal injury	Dry	East	Turning left	Pick-up truck	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	

2014-Jul-04, Fri,18:09	Clear	Turning movement	Non-fatal injury	Dry	East	Turning left	Pick-up truck	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
2015-May-19, Tue,16:21	Clear	Turning movement	Non-fatal injury	Dry	West	Going ahead	Pick-up truck	Other motor vehicle
					East	Turning left	Passenger van	Other motor vehicle
2015-May-28, Thu,08:30	Clear	Turning movement	Non-fatal injury	Dry	West	Turning left	Pick-up truck	Other motor vehicle
					East	Going ahead	Passenger van	Other motor vehicle
2015-Sep-17, Thu,14:25	Clear	Rear end	P.D. only	Dry	East	Slowing or stopping	Pick-up truck	Other motor vehicle
					East	Stopped	Passenger van	Other motor vehicle

Traffic Control: No	control						Total C	ollisions: 2	
Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuve	er Vehicle type	First Event	No. Ped
2014-Sep-03, Wed, 19:30	Clear	SMV other	P.D. only	Dry	North	Going ahead	Pick-up truck	Animal - wild	
2015-Jul-25, Sat,06:40	Clear	SMV other	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Ditch	

### **Collision Main Detail Summary**

OnTRAC Reporting System

#### EARL ARMSTRONG RD & SPRATT RD

Former Munic	ipality: Gloucester	Traffic Control: Traffic	signal		Numbe	er of Collisions: 4			
	DATE DAY TIME ENV	IMPACT LIGHT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
1	2013-02-28 Thu 08:02 Snow	Daylight Angle	Non-fatal	V1 W V2 N	Packed snow Packed snow	Going ahead Turning left	Automobile, station Pick-up truck	Other motor vehicle Other motor vehicle	0
2	2013-11-01 Fri 01:30 Clear	Dark Single vehicle	P.D. only	V1 E	Wet	Turning left	Automobile, station	Curb	0
3	2013-11-14 Thu 18:03 Clear	Dark Turning	P.D. only	V1 N V2 S	Dry Dry	Turning left Going ahead	Pick-up truck Automobile, station	Other motor vehicle Other motor vehicle	0
4	2013-11-17 Sun 13:27 Clear	Daylight Turning	P.D. only	V1 E V2 W	Dry Dry	Turning left Going ahead	Automobile, station Automobile, station	Other motor vehicle Other motor vehicle	0
RIDEAU RD	& SPRATT RD								
-	e & SPRATT RD ipality: Gloucester	Traffic Control: Stop si	gn		Numbe	er of Collisions: 1			
-		Traffic Control: <b>Stop si</b> IMPACT LIGHT TYPE	gn CLASS	DIR	Numbe SURFACE COND'N	er of Collisions: 1 VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
-	ipality: Gloucester	IMPACT	-		SURFACE	VEHICLE	VEHICLE TYPE Automobile, station Passenger van	FIRST EVENT Other motor vehicle Other motor vehicle	
Former Munic	DATE DAY TIME ENV	IMPACT LIGHT TYPE Daylight Angle	CLASS	V1 N	SURFACE COND'N Dry	VEHICLE MANOEUVRE Going ahead	Automobile, station	Other motor vehicle	PED
Former Munic	DATE DAY TIME ENV 2013-07-30 Tue 08:58 Clear	IMPACT LIGHT TYPE Daylight Angle	CLASS P.D. only	V1 N	SURFACE COND'N Dry Dry	VEHICLE MANOEUVRE Going ahead	Automobile, station	Other motor vehicle	PED
Former Munic	DATE DAY TIME ENV 2013-07-30 Tue 08:58 Clear D, EARL ARMSTRONG RD to 1	IMPACT LIGHT TYPE Daylight Angle	CLASS P.D. only	V1 N	SURFACE COND'N Dry Dry	VEHICLE MANOEUVRE Going ahead Turning left	Automobile, station	Other motor vehicle	PED

### Appendix D – Screenline Traffic Volumes

	line Earl Arms nd - NB, Outbo	•	Direction	Peak	Passenger Veh	Taxis	Light Trucks	Heavy Trucks	Buses	Other	Total Vehicles	PCUs	v/c
Station	# lanes	Assumed Capacity*											
			Inbound	AM	524			131			655	786	0.39
River	2	2,000	Inbound	PM	309			78			387	465	0.23
I (IVEI	2	2,000	Outbound	AM	239			60			299	359	0.18
			Outbound	PM	545			137			682	819	0.41
			Inbound	AM	20			6			26	32	0.02
Spratt	2	1,680	Inbound	PM	24			7			31	38	0.02
opratt	2	1,000	Outbound	AM	28			8			36	44	0.03
			Outbound	PM	20			5			25	30	0.02
			Inbound	AM	370			93			463	556	0.26
Limebank	2	2,100	Inbound	PM	176			44			220	264	0.13
LIITIEDalik	2	2,100	Outbound	AM	187			47			234	281	0.13
			Outbound	PM	385			97			482	579	0.28
			link av in d	AM	914	0	0	230	0	0	1144	1374	0.24
TOTAL		5 700	Inbound	PM	509	0	0	129	0	0	638	767	0.13
TOTAL	6	5,780		AM	454	0	0	115	0	0	569	684	0.12
			Outbound	PM	950	0	0	239	0	0	1189	1428	0.25
* Assumed capacity base	ed on similar suburb	an roads obtained from the 20	008 Road Infrastr	ucture Needs St	tudy								

	line Earl Armst nd - NB, Outbo	•	Direction	Peak	Passenger Veh	Taxis	Light Trucks	Heavy Trucks	Buses	Other	Total Vehicles	PCUs	v/c
Station	# lanes	Assumed Capacity*											
			Inbound	AM	562			141			703	844	0.42
River	2	2,000	mbound	PM	326			81			407	488	0.24
RIVEI	2	2,000	Outbound	AM	253			63			316	379	0.19
			Outbound	PM	597			149			746	895	0.45
			Inbound	AM	178			44			222	266	0.16
Spratt	2	1,680	mbound	PM	119			30			149	179	0.11
oprati	2	1,000	Outbound	AM	74			19			93	112	0.07
			Outbound	PM	180			45			225	270	0.16
			Inbound	AM	400			100			500	600	0.29
Limebank	2	2,100	mbound	PM	188			47			235	282	0.13
LIIIEDalik	2	2,100	Outbound	AM	197			49			246	295	0.14
			Outbound	PM	412			103			515	618	0.29
			lin hin um al	AM	1140	0	0	285	0	0	1425	1710	0.30
TOTAL		5 700	Inbound	PM	633	0	0	158	0	0	791	949	0.16
TOTAL	6	5,780		AM	524	0	0	131	0	0	655	786	0.14
			Outbound	PM	1189	0	0	297	0	0	1486	1783	0.31
* Assumed capacity base	d on similar suburba	an roads obtained from the 20	08 Road Infrastru	icture Needs St	ldy		8	8					

	line Earl Armst nd - NB, Outbo	•	Direction	Peak	Passenger Veh	Taxis	Light Trucks	Heavy Trucks	Buses	Other	Total Vehicles	PCUs	v/c
Station	# lanes	Assumed Capacity*											
			Inbound	AM	577			144			721	865	0.43
River	2	2,000	mbound	PM	330			83			413	496	0.25
Rivei	2	2,000	Outbound	AM	257			64			321	385	0.19
			Outbound	PM	609			152			761	913	0.46
			Inbound	AM	178			44			222	266	0.16
Spratt	2	1,680	mbound	PM	119			30			149	179	0.11
oprati	2	1,000	Outbound	AM	74			19			93	112	0.07
			Outbound	PM	180			45			225	270	0.16
			Inbound	AM	413			103			516	619	0.29
Limebank	2	2,100	mbound	PM	193			48			241	289	0.14
LINEDANK	2	2,100	Outbound	AM	202			50			252	302	0.14
			Outbound	PM	424			106			530	636	0.30
			Inbound	AM	1168	0	0	291	0	0	1459	1750	0.30
TOTAL		5 700	DINDOUN	PM	642	0	0	161	0	0	803	964	0.17
TOTAL	6	5,780	Quith and	AM	533	0	0	133	0	0	666	799	0.14
			Outbound	PM	1213	0	0	303	0	0	1516	1819	0.31
* Assumed capacity base	d on similar suburba	an roads obtained from the 20	08 Road Infrastru	icture Needs St	ldy		8						

# Appendix E – SYNCHRO Capacity Analysis: Projected 2029 Conditions

Projected 2029 AM 1: Spratt/Spatt & Site Access	Acces	s		06/19/2017
	٠	+	<b>→</b>	
Lane Group	EBL	NBT	SBT	
Lane Configurations	≻	÷	÷2	
Traffic Volume (vph)	171	20	24	
Future Volume (vph)	171	20	24	
Lane Group Flow (vph)	189	24	73	
Sign Control	Stop	Free	Free	
Intersection Summary				
Control Type: Unsignalized				
Intersection Capacity Utilization 21.6%	21.6% ו			ICU Level of Service A
Analysis Period (min) 15				

Synchro 9 Report Page 1

Lane Group         EBL           ane Configurations         1           ane Configurations         5           future Volume (pph)         59           future Volume (pph)         59           Lane Group Flow (pph)         62           Lane Group Flow (pph)         62           Denscriptions         62	•	t	۲	4	ţ	~	•	•	•	۲	<b>→</b>	7
	Я	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
	F	ŧ	۰.	۶	ŧ	к.	۶	ŧ	۰.	۶	ŧ	۰.
	59	705	18	35	550	9	39	102	81	35	40	252
	59	705	18	35	550	9	39	102	81	35	40	252
	62	742	19	37	579	9	41	107	85	37	42	265
DIPLIPU PURSES	ţ.	NA .	Perm	pm+pt	M	Perm	Perm	A ,	Perm	Perm	NA	Perm
	ۍ م	2	¢		9		¢	×	¢		4	
Permitted Phases	7 1	c	7 0	- O		• •	~ ~	c	~ ~	4 •		4
Delector Phase	0	7	7	-	0	0	œ	x	œ	4	4	4
al (c)	50	4.0	4.0	5 U	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
	0.0 11 A	30.3	30.3	11 4	30.3	30.3	31.2	31.0	31.2	31.2	31.2	31.2
	15.0	70.0	70.07	15.0	70.07	70.0	35.0	35.0	35.0	35.0	35.0	35.0
1		58.3%	58.3%	12.5%	58.3%	58.3%	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%
(1		4.6	4.6	4.6	4.6	4.6	3.7	3.7	3.7	3.7	3.7	3.7
	1.8	1.7	1.7	1.8	1.7	1.7	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s) -2.	-2.4	-2.3	-2.3	-2.4	-2.3	-2.3	-2.2	-2.2	-2.2	-2.2	-2.2	-2.2
Time (s)	0.	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
_	pe	Lag	Lag	Lead	Lag	Lag						
timize?			Yes	Yes	Yes	Yes						
~			C-Max	None	None	None	None	None	None	None	None	None
	Ŀ.	90.1	90.1	94.2	87.3	87.3	14.2	14.2	14.2	14.2	14.2	14.2
g/C Ratio	8	0.75	0.75	0.78	0.73	0.73	0.12	0.12	0.12	0.12	0.12	0.12
	2	0:30	0.02	0.07	0.24	0.0	0.27	0.27	0.34	0.26	0.11	0.65
	3.0	0.0	- 0	0.0	/	0.0	47.4	48.0	6.11	47.8	44.7	13.1
Jueue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.0	0.0	0.0	10.0
	, <	0.0	- <	0, <		0.0	- C	0.04	2	0.64		- a
ach Delav	¢	44	¢	¢	( 0 ( 4	c	د	35.2	ב	د	000	2
Annrach I OS		4			0.0 V			1.00			- C	
50th (m)	18	27 4	0.0	-	20.3	00	6.0	17.5	00	83	48	0.0
		57.6	0.0	5.4	44.3	0.0	17.5	18.3	12.0	16.4	0.00	216
		0.70	0.0	5	504.8	0	2.2	103.7	1	r o	577.6	7 1:0
Turn Bay Length (m) 55.0		7:1/0	88.0	52.0	0.500	80.0	55.0	1.001	20.0	0.09	0.110	25.0
	663	2489	1113	590	2412	1075		856	441	308	856	574
lctn	0	0	0	0	0	0		0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0		0	0	0	0	0
Reduced v/c Ratio 0.09	60	0.30	0.02	0.06	0.24	0.01	0.1	0.13	0.19	0.12	0.05	0.46
ntersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120 Offset: 93 (78%). Referenced to phase 2:FBTU. Start of Green	ase 2:	FBTL	Start of G	ireen								
Natural Cycle: 75		Ī										
Control Type: Actuated-Coordinated	q											
Maximum V/C Ratio: 0.05 Intercontion Stand Dology 12.2				-	toreaction	Intercetion I OC. D						
Intersection Signal Delay. 12:3 Intersection Canacity Hillization 47 0%	%0					ICLI Level of Service	4					
Analysis Period (min) 15	2			2		200	5					

rojected 2029 AM	Spratt & Earl Armstrong	
LL.	$\sim$	

Projected 2029 AM 5: Rideau & Access 2	~			06/19/2017
	t	ţ	۲	
Lane Group	EBT	WBT	SBL	
Lane Configurations	÷Ţ	\$	≻	
Traffic Volume (vph)	113	104	6	
Future Volume (vph)	113	104	6	
Lane Group Flow (vph)	119	112	6	
Sign Control	Free	Free	Stop	
Intersection Summary				
Control Type: Unsignalized				
Intersection Capacity Utilization 16.3%	n 16.3%			ICU Level of Service A
Analysis Period (min) 15				

→       →       →       →       →         Lane Group       EBI       WBI       NBI       SBI         Lane Configurations       -       -       -       -         Lane Configurations       -       -       -       -         Lane Configurations       -       -       -       -         Tarfic Volume (pph)       105       93       39       41         Future Volume (pph)       129       132       143       59         Sign Control       Stop       Stop       Stop       Stop         Intersection Summary       -       -       -       -         Analxis Pendor (min) 129       -       -       -       ICU Level of Service A	Projected 2029 AM 6: Spratt & Rideau				L102(91)20
EBT         WBT         NBT         SBT           4b         4b         4b         4b         4b           105         93         39         41           105         93         39         41           105         93         39         41           105         93         39         41           1129         132         143         59           120         132         143         59           122         132         143         59           122         132         143         50           132         Stop         Stop         Stop         Stop           132         Utilization 29.6%         15         143         50		t	ţ	+	-
4b         4b<	Lane Group	EBT		NBT	SBT
105 93 39 41 105 93 39 41 105 93 39 41 12 13 13 13 13 13 13 13 13 13 12 13 12 13 12 15 10 11 10 11 10	Lane Configurations	¢	¢	¢	÷
105 93 39 41 129 132 143 59 132 143 50 140 Stop Stop Stop Stop 14112etton 29.6%	Traffic Volume (vph)	105	93	39	41
low (vph) 129 132 143 59 Stop Stop Stop Stop Stop Unsignalized Unsignalized Admin 15	Future Volume (vph)	105	93	39	41
Stop Stop Stop Stop Stop Stop Annuary Unsignalized Unsignalized and Unlitization 29,6%	Lane Group Flow (vph)	129	132	143	59
l	Sign Control	Stop	Stop	Stop	Stop
	Intersection Summary				
	Control Type: Unsignalized				
Analysis Period (min) 15	Intersection Capacity Utilizatio	n 29.6%			ICU Level of Service A
	Analysis Period (min) 15				

Projected 2029 PM				
1: Spratt/Spatt & Site Access	e Acce	SS		06/19/2017
	٩	+	<b>→</b>	
Lane Group	EBL	NBT	SBT	
Lane Configurations	⊁	÷	÷2	
Traffic Volume (vph)	98	24	19	
Future Volume (vph)	98	24	19	
Lane Group Flow (vph)	108	36	204	
Sign Control	Stop	Free	Free	
Intersection Summary				
Control Type: Unsignalized				
Intersection Capacity Utilization 25.2%	on 25.2%			ICU Level of Service A
Analysis Period (min) 15				

ER         ER         WEI         WRI		٩	t	۲	>	ŧ	~	•	+	•	۶	<b>→</b>	7
1         1	-ane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
316         722         41         69         817         40         32         68         49         11           333         802         41         73         80         42         72         14         15         12           333         802         41         73         80         42         72         14         11           5         2         1         6         6         8         8         8         4         4           5         1         6         6         8         8         8         4         4           5         2         6         6         8         8         8         4         4           5         2         1         40         32         323         312         312         312         312         312         312         313	-ane Configurations	F	ŧ	ĸ.	۶	**	×.	۴	ŧ	۴.,	۴	ŧ	
316         762         41         69         817         40         32         52         81         40         15         121           5         2         1         60         8         8         8         4         4           5         2         2         1         6         6         8         8         4         4           5         2         2         1         6         6         8         8         4         4           5         1         6         6         8         8         8         4         4           5         1         6         6         8         8         8         4         4           5         1         4         40         40         40         40         40         40         4           114         303         303         114         303         312	raffic Volume (vph)	316	762	41	69	817	40	32	89	49	14	115	233
333         802         43         73         860         43         73         860         43         73         860         43         73         860         44         44           7         2         2         1         6         6         8         8         4         4           7         3	uture Volume (vph)	316	762	41	69	817	40	32	68	49	14	115	233
pm-pi         NA         Perm         pm-pi         NA         Perm         NA         Perm         NA         Perm         NA           5         2         1         6         6         8         8         8         4         4           5         2         1         6         6         8         8         8         4         4           5         2         1         6         6         8         8         8         4         4           50         40	ane Group Flow (vph)	333	802	43	73	860	42	34	72	52	15	121	245
2         2         1         6         6         8         8         8         4         4           5         2         2         1         6         6         8         8         8         4         4           5         2         2         1         6         6         8         8         8         4         4           50         40         40         50         530         530         331         312         <	urn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	A.	Perm
Z         Z         O         6         8         8         4         4           11         303         303         11         40	rotected Phases	، ۲	2	•		9			00		1	4	
5         2         2         1         6         6         6         4	ermitted Phases	.7 1	c	.7 0	φ <del>τ</del>		9、	~ ~	c	~ ~	4		4
50         40         40         50         40<	etector Phase	ç	2	2	-	9	9	×	×	00	4	4	4
30         40<	witch Phase	C L			C L								
114         303         303         114         303         303         114         303         303         114         303         303         114         303         303         114         303         303         104         303         303         205         50         5	linimum Initial (s)	5.0	4.0	4.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
250         630         630         630         630         530         320         337         311         311         311         311         311         311         311         311         311         311         311         311         311         311         311 <td>linimum Split (s)</td> <td>11.4</td> <td>30.3</td> <td>30.3</td> <td>11.4</td> <td>30.3</td> <td>30.3</td> <td>31.2</td> <td>31.2</td> <td>31.2</td> <td>31.2</td> <td>31.2</td> <td>31.2</td>	linimum Split (s)	11.4	30.3	30.3	11.4	30.3	30.3	31.2	31.2	31.2	31.2	31.2	31.2
2018%         2.2.5%         2.0.8%         2.2.5%         2.0.7% </td <td>otal Split (s)</td> <td>25.0</td> <td>63.0</td> <td>63.0</td> <td>25.0</td> <td>63.0</td> <td>63.0</td> <td>32.0</td> <td>32.0</td> <td>32.0</td> <td>32.0</td> <td>32.0</td> <td>32.(</td>	otal Split (s)	25.0	63.0	63.0	25.0	63.0	63.0	32.0	32.0	32.0	32.0	32.0	32.(
18         17         18         17         17         17         17         3.1           40         40         40         40         40         3.1         3.1         3.1           41         40         40         40         40         40         40         40         40           40         40         40         40         40         40         40         40         40         40           140         40	otal Split (%)	ZU.8%	%G.2G	%G.2d	%8.UZ	%G.2G	%G.2G	20.1%	20.1%	20.1%	20.1%	%1.07 %1.07	7.07
10       1,1       1,2       1,3       1,3       1,3       1,3       1,4       1,0       1,1       1,	ellow IIIIE (S)	0,4	4.0 -	4 r	0, 0	4 0	4 C	0.7	- · ·	) . C	C	) . C	o c
4.0         4.0 <td>n-rcu muc (s) cet Timo Adinet (e)</td> <td>0.1</td> <td>2.0</td> <td>2.5</td> <td>0'-</td> <td>1.1</td> <td>2.0</td> <td>C C C</td> <td>C.2</td> <td>C C C</td> <td>C C C</td> <td>C C C</td> <td>4 0</td>	n-rcu muc (s) cet Timo Adinet (e)	0.1	2.0	2.5	0'-	1.1	2.0	C C C	C.2	C C C	C C C	C C C	4 0
Lead         Lag         Lag <thlag< th=""> <thlag< td="" thr<=""><td>ost mine Aujust (s) otal Lost Time (s)</td><td>4.0</td><td>40</td><td>0.4</td><td>4.12</td><td>0.4</td><td>0.4</td><td>404</td><td>4.0</td><td>7.7</td><td>4.1</td><td>7.7</td><td>7-7- 0 0</td></thlag<></thlag<>	ost mine Aujust (s) otal Lost Time (s)	4.0	40	0.4	4.12	0.4	0.4	404	4.0	7.7	4.1	7.7	7-7- 0 0
Yes         Yes <td>ead/Lag</td> <td>Lead</td> <td>Lao</td> <td>Lao</td> <td>Lead</td> <td>Lao</td> <td>Lao</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td></td>	ead/Lag	Lead	Lao	Lao	Lead	Lao	Lao	2	2	2	2	2	
None         C-Max         Come         None         None <t< td=""><td>ead-Lag Optimize?</td><td>Yes</td><td>Yes</td><td>Yes</td><td>Yes</td><td>Yes</td><td>Yes</td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	ead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
99.0         88.6         90.0         81.1         81.1         11.2         12.8         12.8         12.8         12.8         12.8         12.8         12.8         12.8         12.8         12.8         12.8         12.8         12.8         12.8         12.8         13.4         0.11         0.01         0.0         0	Recall Mode	None	C-Max	C-Max	None	None	None	None	None	None	None	None	None
0.82         0.74         0.74         0.75         0.68         0.68         0.11         0.11         0.11         0.11         0.11         0.11         0.11         0.11         0.11         0.11         0.11         0.11         0.11         0.11         0.11         0.11         0.11         0.34 <th0.35< th="">         0.34         0.34         <th0< td=""><td>ct Effct Green (s)</td><td>99.0</td><td>88.6</td><td>88.6</td><td>0.06</td><td>81.1</td><td>81.1</td><td>12.8</td><td>12.8</td><td>12.8</td><td>12.8</td><td>12.8</td><td>12.8</td></th0<></th0.35<>	ct Effct Green (s)	99.0	88.6	88.6	0.06	81.1	81.1	12.8	12.8	12.8	12.8	12.8	12.8
0.62         0.33         0.04         0.14         0.38         0.04         0.27         0.20         0.22         0.11         0.13         0.14         0.14         0.33         0.14         0.13         0.14         0.13         0.14         0.13         0.14         0.13         0.11         0.14         0.13         0.11         0.13         0.14         0.13         0.11         0.13         0.11         0.13         0.11         0.13         0.11         0.13         0.11         0.13         0.11         0.13         0.11         0.13         0.11         0.13         0.11         0.13         0.14         0.12         0.11         0.13         0.14         0.10         0.11         0.13         0.11         0.14         0.12         0.11         0.13         0.14         0.12         0.11         0.14         0.12         0.14         0.12         0.14         0.12         0.14         0.12         0.14         0.12         0.14         0.12         0.14         0.12         0.14         0.12         0.14         0.12         0.14         0.12         0.14         0.12         0.14         0.12         0.14         0.12         0.14         0.12         0.14 <th< td=""><td>ctuated g/C Ratio</td><td>0.82</td><td>0.74</td><td>0.74</td><td>0.75</td><td>0.68</td><td>0.68</td><td>0.11</td><td>0.11</td><td>0.11</td><td>0.11</td><td>0.11</td><td>0.11</td></th<>	ctuated g/C Ratio	0.82	0.74	0.74	0.75	0.68	0.68	0.11	0.11	0.11	0.11	0.11	0.11
79     67     01     35     101     01     53     489     47     482     513     1       79     6.7     01     35     101     01     532     489     47     482     513     1       7     6.8     9.3     101     01     533     833     216     00	c Ratio	0.62	0.33	0.04	0.14	0.38	0.04	0.27	0.20	0.22	0.11	0.34	0.6
00         00<	ontrol Delay	7.9	6.7	0.1	3.5	10.1	0.1	53.2	48.9	4.7	48.2	51.3	14.0
79         67         0.1         35         10.1         0.1         53.2         49.9         4.7         48.2         51.3           A         A         A         A         B         A         D         D         A         B         A         D <td>ueue Delay</td> <td>0.0</td>	ueue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
A         A         B         A         D         D         A         D <thd< th="">         D         D         D</thd<>	otal Delay	7.9	6.7	0.1	3.5	10.1	0.1	53.2	48.9	4.7	48.2	51.3	14.6
08         72         53.3         C         C           12.3         31.4         00         2.3         39.6         00         7.6         8.3         0.0         3.3         14.2           27.4         52.4         0.4         6.6         74.9         0.3         16.7         14.6         3.5         9.4         2.2         2           55.0         59.12         50.4         6.6         74.9         0.3         16.7         14.6         3.5         9.4         2.2         2           55.0         88.0         5.20         800         55.0         200         900         777.6         377.6         3         14.2         3         14.2         3         14.2         3         14.2         3         14.2         3         14.2         3         14.2         3         14.2         3         14.2         3         14.2         3         14.2         3         14.2         3         14.2         3         14.2         3         14.2         3         3         14.3         3         3         3         3         3         3         3         3         3         3         3         3         3<		A	A (	A	A	20	A		U C	A			
123     314     00     23     396     00     76     83     00     33     142       274     524     04     66     749     03     167     146     35     94     222     2       550     880     520     800     550     800     550     90     900     33     142       550     880     520     800     550     90     900     33     73       600     249     118     62     2241     1010     74     73     408     298     773       0     0     0     0     0     0     0     0     0     0       0     0     0     0     0     0     0     0     0       0     0     0     0     0     0     0     0     0       0     0     0     0     0     0     0     0     0       120     0.16     0.11     0.38     0.16     0     0       120     0.05     0.0     0     0     0     0     0       120     0.16     0.1     0.3     0.16     0       120     0.16     0 <t< td=""><td></td><td></td><td>0.0</td><td></td><td></td><td>7.7</td><td></td><td></td><td>C.CC</td><td></td><td></td><td>0.12</td><td></td></t<>			0.0			7.7			C.CC			0.12	
712     514     0.4     6.5     370     0.3     17     14.6     3.5     9.4     577.6       550     800     520     800     550     200     900     577.6       550     880     520     800     550     200     900     773       666     2449     113     682     241     1010     274     773     408     773       0     0     0     0     0     0     0     0     0     0       0     0     0     0     0     0     0     0     0       0     0     0     0     0     0     0     0     0       0.55     0.33     0.04     0.11     0.38     0.04     0.13     0.05     0.16       120     0.55     0.33     0.04     0.11     0.38     0.04     0.1     0       120     0.55     0.33     0.04     0.12     0.09     0     0     0       120     0.55     0.33     0.04     0.11     0.38     0.14     0     0       120     0.55     0.33     0.04     0.11     0.38     0.14     0     0       120	upindui LUS	10.0	A 10		00	A 00	00	7 4	6	00	66	۲۲ ر	
577.2         54.8         777.6           55.0         88.0         52.0         50.0         55.0         777.6           606         2449         118         68.2         241         1010         274         773         408         88         777.6           0	ucue Length John (m)	D 7 4	52.4	0.0	99	0.45	0.0	16.7	14.6	о с о с	0.0	2.11	200
0         80.0         55.0         20.0         90.0           22         2241         1010         274         773         408         773           0         0         0         0         0         0         0         0           11         0.38         0.04         0.12         0.09         0.13         0.05         0.16           11         0.38         0.04         0.12         0.09         0.13         0.05         0.16           11         0.38         0.04         0.12         0.09         0.13         0.05         0.16           Intersection LOS: B         0.05         0.13         0.05         0.16         0	ternal Link Dist (m)		597.2	5	2	504.8	2	10	103.7	2		577.6	ł
22 2241 1010 274 773 408 288 773 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 11 0.38 0.04 0.12 0.09 0.13 0.05 0.16 Intersection LOS: B	urn Bav Lenath (m)	55.0	1	88.0	52.0	2	80.0	55.0		20.0	0.06	2	25.0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ase Capacity (vph)	909	2449	1118	682	2241	1010	274	773	408	288	773	529
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	tarvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
0 0 0 0 0 0 0 0 0 16 16 16 16 17 0.38 0.04 0.12 0.09 0.13 0.05 0.16 116 116 116 116 116 116 116 116 116	pillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
11 0.38 0.04 0.12 0.09 0.13 0.05 0.16 Intersection LOS: B Intersection LOS: B	torage Cap Reductn			0	0		0	0	0	0	0	0	0
	educed v/c Ratio	0.55	0.33	0.04	0.11	0.38	0.04	0.12	0.09	0.13	0.05	0.16	0.46
	Itersection Summary												
	Cycle Length: 120												
	ctuated Cycle Length: 120 ffset: 15 (13%) Reference	d to phase	<b>3-FRTI</b>	Start of G	reen								
%	Natural Cycle: 80	active of the	2. LUIL										
. 12.3 zation 60.9%	ontrol Type: Actuated-Coc	rdinated											
ization 60.9%	Taximum V/C Ratio: 0.65				4		0.001						
	itersection Signal Delay: 1. Marsection Canacity Hiliza	2.3 tion 60 0%				TI Level 1	of Service	а					
	nalysis Period (min) 15	100.000			2			2 V					

l PM I Armstrong	Splits and Phases: 2: Spratt & Earl Armstrong	🚽 📥 🖉 (R)	63 S	90 🔶	
Projected 2029 PM 2: Spratt & Earl Armstrong	Splits and Phases:	10	25 s	<b>→</b> Ø5	

+ 04 80

Parsons

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Projected 2029 PM 5: Rideau & Spratt				06/19/2017
	t	ţ	لر	
Lane Group	EBT	WBT	SBL	
Lane Configurations	÷	\$	*	
Traffic Volume (vph)	116	374	ß	
Future Volume (vph)	116	374	ഹ	
Lane Group Flow (vph)	122	405	ഹ	
Sign Control	Free	Free	Stop	
Intersection Summary				
Control Type: Unsignalized				
Intersection Capacity Utilization 31.4%	n 31.4%			ICU Level of Service A
Analysis Perind (min) 15				

Projected 2029 PM 6: Rideau					06/19/2017
	† †	ļ Ļ	←	<b>→</b>	
Lane Group	EBT	WBT	NBT	SBT	
Lane Configurations	ম	\$	¢	÷	
Traffic Volume (vph)	109	362	57	67	
Future Volume (vph)	109	362	57	67	
Lane Group Flow (vph)	127	565	102	106	
Sign Control	Stop	Stop	Stop	Stop	
Intersection Summary					
Control Type: Unsignalized					
Intersection Capacity Utilization 52.9%	ion 52.9%			ICU Level of Service A	
Analysis Period (min) 15					

# Appendix F – SYNCHRO Capacity Analysis: Projected 2034 Conditions

Projected 2034 AM 1: Spratt/Spatt & Site Access	Acces	ŝ		2102/97/012
	•	+	<b>→</b>	
Lane Group	EBL	NBT	SBT	
Lane Configurations	⊁	÷	¢	
Traffic Volume (vph)	171	20	24	
Future Volume (vph)	171	20	24	
Lane Group Flow (vph)	189	24	73	
Sign Control	Stop	Free	Free	
Intersection Summary				
Control Type: Unsignalized				
Intersection Capacity Utilization 21.6%	1 21.6%			ICU Level of Service A
Analysis Period (min) 15				

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Lane Group         EBL         EBT         EBR           Lane Configurations         1         1         1           Lame Configurations         1         1         1         1           Tardit Volume (wph)         59         740         18           Lame Group Flow (wph)         59         740         18           Lame Group Flow (wph)         62         779         19           Urn Type         pm+pt         NA         Permited           Detector Phases         5         2         2         2           Switch Phases         5         2         2         2         2           Switch Phases         5         2<	WBL 35 35 35 35 37 37 37 37 11.4 1 1 1.6 11.4 1.6 11.4 1.6 11.4 5.0 12.5% 5.0 12.5% 5.0 12.5% 5.0 12.5% 5.0 12.5% 5.0 12.5% 5.0 10.7% 5.0% 5.0% 5.0% 5.0% 5.0% 5.0% 5.0% 5.0				NBT 102 102 107 107 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 31.2 29.2% 29.2% 4.0	NBR 81 81 85 85 88 88 8 8 8 31.2 35.0 35.0 29.2% 29.2%	SBL 35 35 37 35 37 44 44 44 44 44 43 37 337.0 337.0 337.0 337	40 40 40	SBR
T         T         T         T           59         740         18           59         740         18           52         779         19           5         2         2           5         2         2           5         2         2           5         2         2           5         2         2           5         2         2           5         2         2           5         2         2           5         2         2           5         2         2           5         4.0         4.0           11.4         30.3         30.3           15.0         70.0         70.0           15.0         70.0         70.0           14.6         4.1         1.7           1.8         1.7         1.7           2.4         2.3         2.3           4.0         1.4         4.0           1.8         1.7         1.7           2.4         4.0         4.0           1.8         1.7         1.7           2.4         <					↑↑           102           107           1107	81 81 85 85 85 8 8 8 8 8 8 31.2 35.0 35.0 37 2 3.7 8 35.0 8 37 2 3.7 8 37 2 3.7 8 37 8 37 8 37 8 37 8 35 8 35 85 85 85 85 85 85 85 85 85 85 85 85 85	35 35 37 37 37 37 4 4 4 4 4 37.2 35.0 31.2 35.0 29.2% 37.2 37.2 37 37 37.2 37 37.2%	<b>†</b> 04 04	260
59         740         18           52         779         19           52         779         19           5         2         2           5         5         2         2           5         5         2         2           5         5         2         2           5         5         2         2         2           5         5         2         2         2           5         5         4.0         4.0         4.0           11.4         30.3         30.3         30.3         30.3           15.0         70.0         70.0         70.0         70.0           11.4         30.3         4.0         4.16         4.16           1.8         1.4         4.16         4.16         4.16           1.8         1.1         1.7         1.7         1.7         1.7           1.8         1.4         4.16         4.16         4.16         4.16           1.8         1.7         1.1         1.7         1.7         1.1         1.1         1.1         1.1         1.1         1.1         1.1         1.1					102 107 NA 8 8 4.0 31.2 31.2 31.2 3.7 29.2% 3.7 4.0 4.0	81 81 85 85 85 8 8 8 8 4.0 31.2 35.0 29.2%	35 37 37 37 37 44 44 44 40 40 31.2 35.0 31.2 35.0 29.2% 29.2%	40	757
59         740         18           62         779         19           62         779         19           75         2         2           5         2         2           55         2         2           56         4.0         4.0           11.4         30.3         30.3           15.0         70.0         700           115.6%         58.3%         58.3%           11.4         30.3         30.3           15.6         70.0         700           11.4         30.3         30.3           11.4         30.3         30.3           11.4         30.3         70.3           11.4         30.3         70.3           11.4         30.3         70.3           11.4         30.3         70.3           12.4         2.3         2.3           21.4         1.7         1.7           22.4         2.3         2.3           23.5         90.1         90.1           0.10         0.31         0.02           0.10         0.35         0.1           3.5         6.9					102 107 8 8 8 8 8 8 8 8 8 8 8 3 1.2 29.2% 3 3.7 29.2% 3.7 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2	81 85 85 86 8 8 8 4.0 31.2 35.0 3.7 29.2%	35 37 37 87 4 4 4 4 4 4 31.2 35.0 35.0 37.2 9.2%	40	707
62         779         19           pm+pl         NA         Perm           2         2         2           5         2         2           5         2         2           5.0         4.0         4.0           11.4         30.3         30.3           15.0         7.0         700         700           11.55         58.3%         58.3%           4.6         4.6         4.6           1.13         1.7         1.7           1.24         2.3         2.3           4.4         4.0         4.6           1.8         1.7         1.7           1.4         2.3         2.3           4.4         4.0         4.6           1.8         1.7         1.7           2.4         4.3         4.0           1.8         1.7         1.7           2.1         4.0         4.6           1.8         1.7         2.3           2.1         2.3         4.0           1.8         1.7         1.7           2.8         Yes         Yes <tr td="">         1.7      <tr td=""></tr></tr>		д <u>8</u> 2			107 NA 8 8 8 8 8 8 4.0 35.0 29.2% 3.7 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2	85 Perm 8 8 8 4.0 31.2 35.0 35.0 3.7 3.7 29.2%	37 Perm 4 4 4 4 4 4 31.2 35.0 37.2 37.0 37 37	:	252
pm-pt         NA         Perm           5         2         2           5         2         2         2           5         2         2         2         2           50         4.0         4.0         10         10           15.0         70.0         70.0         70.0         70.0           15.0         70.0         70.0         70.0         70.0           15.0         70.0         70.0         70.0         70.0           15.0         70.0         70.0         70.0         70.0           15.0         70.0         70.0         70.0         70.0           15.0         70.1         2.3         30.3         30.3           14.0         1.7         1.7         1.7         1.7           2.4         4.4         4.0         4.0         4.0           Ves         Ves         Ves         Ves         Ves           Void         0.75         0.17         90.1         90.1           3.5         6.9         0.1         90.1         90.1           3.5         6.9         0.1         90.1         90.1           3.5 <td></td> <td></td> <td></td> <td></td> <td>NA 8 8 4.0 31.2 35.0 31.2 29.2% 2.5 2.5 -2.2 4.0</td> <td>Perm 8 8 8 31.2 35.0 29.2% 3.7 3.7</td> <td>Perm 4 4 4.0 31.2 35.0 3.7 3.7 3.7</td> <td>42</td> <td>265</td>					NA 8 8 4.0 31.2 35.0 31.2 29.2% 2.5 2.5 -2.2 4.0	Perm 8 8 8 31.2 35.0 29.2% 3.7 3.7	Perm 4 4 4.0 31.2 35.0 3.7 3.7 3.7	42	265
5 2 2 2 15. 2 2 15. 11.4 30.3 20.11.4 30.3 20.11.4 30.3 20.11.5 15.0 4.0 4.0 12.5% 58.3% 58.3% 14.6 4.16 1.3 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.1		28			8 8 4.0 31.2 35.0 31.2 29.2% 2.5 2.5 2.5 4.0	8 8 4.0 31.2 35.0 29.2% 3.7 25.5	4 4 4.0 31.2 35.0 29.2% 3.7	NA	Perm
5         2         2           55         2         2           55         4.0         4.0           11.4         30.3         30.3           15.0         70.0         700           115.6%         58.3%         58.3%           4.6         4.6         4.6           4.6         4.6         4.6           1.7         2.4         2.3         2.3           2.4         2.3         2.3         2.3           2.4         2.3         2.3         2.3           2.4         2.3         2.3         2.3           2.4         2.3         2.3         2.3           2.4         2.3         2.3         2.3           2.4         2.3         2.3         2.3           2.4         0.1         0.1         0.1           0.5         0.1         0.0         0.0           3.5         6.9         0.1         0.0           3.5         6.9         0.1         0.1           0.7         0.0         0.0         0.0         0.0           3.5         6.9         0.1         0.1           0.7 <td></td> <td>2 28</td> <td></td> <td></td> <td>8 4.0 31.2 35.0 29.2% 2.5 2.5 -2.2 4.0</td> <td>8 8 4.0 31.2 35.0 29.2% 3.7 3.7</td> <td>4 4 40 31.2 35.0 29.2% 3.7 3.7</td> <td>4</td> <td>1</td>		2 28			8 4.0 31.2 35.0 29.2% 2.5 2.5 -2.2 4.0	8 8 4.0 31.2 35.0 29.2% 3.7 3.7	4 4 40 31.2 35.0 29.2% 3.7 3.7	4	1
5.0 4.0 4.0 11.4 30.3 30.3 15.0 70.0 70.0 12.5% 58.3% 58.3% 4.6 4.6 4.6 4.6 1.8 1.7 1.7 2.4 2.3 2.3 4.0 4.0 4.0 4.0 Lead Lag Lag Lead Lag Lag Lead Lag Lag Ves Yes Ves None C-Max C-Max None C-Max C-Max 9.7 90.1 90.1 0.35 6.9 0.1 3.5 6.9 0.1 0.0 0.0 3.5 6.9 0.1 0.0 0.0 1.8 2,2 0.0 0.1 0.0 0.0 0.0		28			8 4.0 31.2 35.0 29.2% 2.5 2.5 -2.2 4.0	8 4.0 31.2 35.0 29.2% 3.7 25.5	4 4.0 31.2 35.0 29.2% 3.7 3.7		4
5.0         4.0         4.0         4.0           11.4         30.3         30.3         30.3           15.0         70.0         70.0         70.0           12.5%         58.3%         58.3%         58.3%           12.5%         58.3%         58.3%         58.3%           12.5%         58.3%         58.3%         58.3%           1.8         1.7         1.7         1.7           1.8         1.7         1.7         1.7           2.4         4.0         4.0         4.0         4.0           Yes         Yes         Yes         Yes         Yes           None         C-Max         Volation         1.00         2.3           0.10         0.31         0.02         0.0         3.5         6.9         0.1           3.5         6.9         0.1         90.1         90.1         90.1         90.1           3.5         6.9         0.1         90.1         90.1         90.1         90.1           3.5         6.9         0.1         90.1         90.1         90.1         90.1           1.8         2.9         5.9         0.1         90.1         9		28			4.0 31.2 35.0 35.0 3.7 2.5 2.5 4.0	4.0 31.2 35.0 29.2% 3.7 25	4.0 31.2 35.0 29.2% 3.7	4	4
11.4 30.3 30.3 11.4 30.3 700 700 700 700 700 700 700 700 700 70		200			31.2 35.0 35.0 3.7 2.5 2.5 4.0	31.2 35.0 29.2% 3.7 3.7	31.2 35.0 29.2% 3.7 3.7	10	10
15.0         70.0         70.0           15.0         70.0         70.0           4.6         4.6         4.6           4.6         4.6         4.6           4.6         4.7         1.7           2.4         2.3         2.3           2.4         2.3         2.3           2.4         2.3         2.3           4.0         4.0         4.0           4.0         4.0         4.0           1.4         1.3         2.3           2.4         2.3         2.3           2.4         2.3         2.3           2.4         2.0         2.3           4.0         1.40         Lead           1.40         2.40         0.1           95.7         90.1         90.1           0.10         0.31         0.02           3.5         6.9         0.1           3.5         6.9         0.1           1.8         2.92         0.0		28			35.0 35.0 3.7 3.7 2.5 2.5 -2.2 4.0	31.2 35.0 29.2% 3.7 2.5	31.2 35.0 29.2% 3.7	0,4	0.40
12.5% 58.3% 58.3% 58.3% 58.3% 58.3% 58.3% 54.6 4.6 4.6 4.6 4.6 4.6 4.6 4.6 4.6 4.6		202			29.2% 3.7 2.5 -2.2 4.0	29.2% 3.7 3.5	29.2% 3.7	35.0	35.0
4.0         0.0         0.0         0.0           1.8         1.7         1.7         1.7           2.4         4.0         4.0         4.0           2.4         4.0         4.0         4.0           4.0         4.0         4.0         4.0           Ves         Ves         Ves         Ves           Vois         C-Max         2.0         4.0           95.7         9.01         90.1         90.1           0.10         0.31         0.02         0.0           3.5         6.9         0.1         9.1           1.8         A         A         A           1.8         2.9         0.0         0.0		K <			2.5 2.5 -2.2 4.0	3.7	3.7	70 C CC	%C 0C
1.8 1.7 -2.4 -2.3 . -2.4 -2.3 . -2.4 -2.3 . Ves Ves Ves Ves Ves Ves 0.10 0.5 0.0 95.7 90.1 0.31 0.0 0.10 0.31 0.0 3.5 6.9 0.75 0.0 3.5 6.9 0.0 1.8 29.2 0.0	1.8 -2.4 4.0 4.0 Ves Ves 94.2 94.2 0.7 8 0.7 3.6 0.0	2	1.7 -2.3 4.0 4.0 Yes 97.3 0ne	2.5-2.2-4.0	2.5 -2.2 4.0	2.5		37	3.7
2.4 2.3 2.4 2.3 2.4 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4	-2.4 4.0 Lead Yes 94.2 0.78 0.78 0.07 0.07	2	-2.3 4.0 Lag Yes 37.3	-2.2 4.0	-2.2 4.0		C.7	2.5	2.5
4.0. 4.0 Lead Lag Ves Xes Ves Nune C-Mes 95.7 90:1 9 95.7 90:1 9 0.10 0.31 0 0.10 0.31 0 3.5 6.9 A A A 6.5 A A A 6.5 A A A 6.5 A A A	4.0 Lead Yes 94.2 0.78 0.78 0.07 0.07 0.0	2	4.0 Lag Yes one 37.3	4.0	4.0				
Lead Lag Yes Yes Yes Yes Yes Yes 2000 C.Max C.Max C. 95.7 90.1 0 0.10 0.31 0 3.5 6.9 0.0 3.5 6.9 A A A A A A A A A A A A A A A A A A A	Lead Yes None 94.2 0.77 0.07 3.6 0.0	~	Lag Yes one 37.3			4.0	4.0	4.0	4.0
Ves	Yes None 94.2 0.78 0.07 3.6 0.0	2	Yes one 37.3						
None C-Max C-P 95.7 90.1 5 0.80 0.31 6 0.10 0.31 6 3.5 6.9 3.5 6.9 3.5 6.9 6.5 6.5 7 6.5 1.8 29.2	None 94.2 0.78 0.07 3.6 0.0	2	one 37.3						
95.7 90.1 5 0.0 0.75 0 0.10 0.75 0 3.5 6.9 3.5 6.9 3.5 6.9 6.5 6.5 6.5 6.5 6.5 6.5 7 2.5 6.5 7 2.5 6.5 7 2.5 6.5 7 2.5 6.5 7 2.5 6.5 7 2.5 6.5 7 2.5 7	94.2 0.78 0.07 3.6 0.0		37.3	None	None	None	None	None	None
080 0.75 0 0.10 0.31 0 3.5 6.9 3.5 6.9 4 A 6.5 6.5 6.5 1.8 29.2	0.78 0.07 3.6 0.0			14.2	14.2	14.2	14.2	14.2	14.2
0.10 0.31 0 3.5 6.9 3.5 6.9 3.5 6.9 A A A A A A A A A A A A A A A A A A A	0.07 3.6 0.0		0.73	0.12	0.12	0.12	0.12	0.12	0.12
3.5 6.9 0.0 0.0 3.5 6.9 A A 6.5 A A 6.5 A 2.3 A 2.3 2 4.2	3.6 0.0	0.25 0	0.01	0.27	0.27	0.34	0.26	0.11	0.65
0.0 0.0 3.5 6.9 A A 6.5 1.8 A 6.5 A 2.9.2	0.0	7.1	0.0	49.9	48.0	11.9	49.8	44.7	13.1
3.5 6.9 A A A 6.5 1.8 29.2		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
A 6.5 6.5 1.8 29.2	3.6	7.1	0.0	49.9	48.0	11.9	49.8	44.7	13.1
0.5 A 1.8 29.2 0.0 2.9.2	A	A (	A	a	D O	я		n	Э
A 1.8 29.2		6.9			35.2			20.9	
1.8 29.2		A .	4	4		4		ပ <u>၊</u>	4
1. L.7 V/O		21.4	0.0	9.2	12.5	0.0	8.3	4.8	0.0
0.0 01.2	5.4	46.5	0.0	17.5	18.3	12.1	16.4	80.0	21.6
597.2					103.7			577.6	4
0.05	0.26		80.0	55.0		20.0	90.0		25.0
048 2489	1/0		c/0	321	820	44 -	308	820	6/ C
					-	-		- ·	
Spillback Lap Reducin U U U		-	-	-	-	0 0	0	-	0
0.31	0.06		0 01	0 13	0 13	010	012	0.05	0 46
1000 0100	00.0		-	2.0	2.0		0.12	000	04.0
ntersection Summary									
Cycle Length: 120									
Actuated Cycle Length: 120	roon								
Natural Cycle: 75									
Control Type: Actuated-Coordinated									
Maximum v/c Ratio: 0.65									
Intersection Signal Delay: 12.2	Inte	Intersection LOS: B	DS: B						
Intersection Capacity Utilization 47.6%	ICU	ICU Level of Service	ervice A	_					
Analysis Period (min) 15									

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203	t Earl	
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	plits and Phases: 2: Spr. g a 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Splits and Phases: 2: Spratt & Earl Armstrong	100 € 5 5 S	
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5: Rideau & Access 2	5: Řideau & Access 2			06/19/2017
	t	ţ	ار	
Lane Group	EBT	WBT	SBL	
Lane Configurations	¥	\$	>	
Traffic Volume (vph)	113	104	6	
Future Volume (vph)	113	104	6	
Lane Group Flow (vph)	119	112	6	
Sign Control	Free	Free	Stop	
Intersection Summary				
Control Type: Unsignalized				
Intersection Capacity Utilization 16.3%	ion 16.3%			ICU Level of Service A
Analysis Period (min) 15				

				06/19/2017
	†	t	←	-
Lane Group E	EBT	WBT	NBT	SBT
Lane Configurations	¢	¢	¢	÷
	105	93	39	41
Future Volume (vph)	105	93	39	41
Lane Group Flow (vph)	129	132	143	59
Sign Control S	Stop	Stop	Stop	Stop
Intersection Summary				
Control Type: Unsignalized				
Intersection Capacity Utilization 29.6%	%9.6			ICU Level of Service A
Analvsis Period (min) 15				

Projected 2034 PM				
1: Spratt/Spatt & Site Access	Acces	s		06/19/2017
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Lane Group	EBL	NBT	SBT	
Lane Configurations	≻	ţ	¢2	
Traffic Volume (vph)	98	24	19	
Future Volume (vph)	98	24	19	
Lane Group Flow (vph)	108	36	204	
Sign Control	Stop	Free	Free	
Intersection Summary				
Control Type: Unsignalized				
Intersection Capacity Utilization 25.2%	1 25.2%			ICU Level of Service A
Analysis Period (min) 15				

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-ane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
-ane Configurations	F	ŧ	¥.,	۶	ŧ	×.	F	ŧ	¥.,	۶	ŧ	×
raffic Volume (vph)	316	197	41	69	857	40	32	<del>8</del> 9	49	14	115	233
Future Volume (vph)	316	797	41	69	857	40	32	68	49	14	115	233
-ane Group Flow (vph)	333	839	43	73	902	42	34	72	52	15	121	245
urn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	AN	Perm
Protected Phases	2	2			9			œ			4	
permitted Phases	2		2	9		9	~		~	4		4
Detector Phase	2	2	2		9	9	œ	8	œ	4	4	4
Switch Phase												
Vinimum Initial (s)	5.0	4.0	4.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.4	30.3	30.3	11.4	30.3	30.3	31.2	31.2	31.2	31.2	31.2	31.2
Total Split (s)	25.0	63.0	63.0	25.0	63.0	63.0	32.0	32.0	32.0	32.0	32.0	32.0
otal Split (%)	20.8%	52.5%	52.5%	20.8%	52.5%	52.5%	26.1%	26.1%	26.1%	26.1%	26.1%	26.7%
Y ellow Time (S)	4. 4 0. 0	4 0 1	4 f	4 r	4 f	4 f	3./	3. /	ς. γ	3. /	ς. γ	γ. c
All-Keg Time (S)	<u>8.</u>	/	/	<u>.</u>	/.		C'7	C.7	C.2	G.2	C.2	C.7
-ost time Adjust (s)	- 2.4	-2.3	-2.3	-2.4	-7.5	-2.5	77-	77-	7.2-	7.2-	7.2-	7.7-
otal Lost Hime (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leaurtay	reau	Lag	Lag	read	Lay	Lay						
-eao-Lag Uptimizer	Yes	C Mov	C Mou	Yes	Yes	Yes	Nono	Nono	Mono	Nono	Mono	Mond
Act Effet Croon (c)		00 K	00 A				al OI	10 0 CL	210 O	210N	210 O	10.01
Actuated a/C Batio	0.87	0.00	0.00	07.7 0 75	0.00	0.00	0.11	0.11	0.11	0.11	0.11	0.11
V/r Ratin	0.64	0 34	100	0.14	0.0	0.0	0 27	0.20	0.22	011	0.34	0.65
Control Delav	8.5	6.8	0.1	3.7	10.6	0.1	53.2	48.9	4.7	48.2	51.3	14.6
Queue Delav	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.5	6.8	0.1	3.7	10.6	0.1	53.2	48.9	4.7	48.2	51.3	14.6
, SOL	A	A	A	A	в	A			A			8
Approach Delay		7.0			<i>L</i> .6			35.3			27.6	
Approach LOS		A			A			۵			U	
Queue Length 50th (m)	12.3	33.3	0.0	2.3	42.4	0.0	7.6	8.3	0.0	3.3	14.2	0.0
ueue Length 95th (m)	27.4	55.6	0.4	6.6	82.6	0.3	16.7	14.6	3.5	9.4	22.2	22.8
nternal Link Dist (m)		597.2			504.8			103.7			577.6	
Furn Bay Length (m)	55.0	01.10	88.0	52.0	1000	80.0	55.0	0.000	20.0	90.0	0.000	25.0
Base Capacity (vph)	593 2	2449	1118	999 Ŭ	2231 î	1006 î	274	773	408	288	773	529
Starvation Cap Reductn	0 0	0 0	0	0 0	0	0	0	0	0	0 0	0	0
Spillback Cap Reductn	-	0	0	-	-	-	- c	-	0	-	0	0
Storage Cap Reducin Dadrized v/r Datio	0 56	0 34		0 11 0	0 00		0 1 0		0 12	0 10	016	0.46
annen vir kallo			0.U4		0.40	1.0 <del>4</del>	0. IZ	40.0	CI 70	0.00	0.10	0.40
ntersection Summary												
Cycle Length: 120 Actuated Cycle Length: 120												
Offset: 15 (13%), Referenced to phase 2:EBTL, Start of Green	ed to phase	2:EBTL,	Start of G	ireen								
Natural Cycle: ou Control Type: Actuated-Coordinated	ordinated											
Maximum v/c Ratio: 0.65												
Intersection Signal Delay: 12.4	2.4			드	Intersection LOS: B	ILOS: B						
ntersection Capacity Utilization 62.0%	ition 62.0%			2	ICU Level of Service	of Service	в					
Analysis Period (min) 15												

Projected 2034 PM 2: Spratt & Earl Armstrong	Splits and Phases: 2: Spratt & Earl Armstrong	31 🕴 🔶 02 (R)
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Splits and Phases:	lits and Phases: 2: Spratt & Earl Armstrong	
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25 s	63 S	32 s
<b>D</b> 05	🕈 🖉	*∱øs
25 s	63 S	32 s

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-ane Group	EBT	WBT	SBL	
-ane Configurations	₩	<u>ج</u>	≽	
Traffic Volume (vph)	116	374	2	
Future Volume (vph)	116	374	2	
Lane Group Flow (vph)	122	405	2	
Sign Control	Free	Free	Stop	
ntersection Summary				
Control Type: Unsignalized				
ntersection Capacity Utilization 31.4%	on 31.4%			ICU Level of Service A
Analvsis Period (min) 15				

Projected 2034 PM 6: Spratt				06/19/2017
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Lane Group	EBT	WBT	NBT	SBT
Lane Configurations	¢	¢	¢	¢
Traffic Volume (vph)	109	362	57	67
Future Volume (vph)	109	362	57	67
Lane Group Flow (vph)	127	565	102	106
Sign Control	Stop	Stop	Stop	Stop
Intersection Summary				
Control Type: Unsignalized				
Intersection Capacity Utilization 52.9%	1 52.9%			ICU Level of Service A
Analysis Period (min) 15				