BRIGIL

December
2019

Petrie Landing II - 8466 Jeanne D'Arc Boulevard

Transportation Impact Assessment Report

PARSONS

Petrie's Landing II
8466 Jeanne D'Arc Blvd

Transportation Impact Assessment Report

prepared for:
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December 18, 2019

476705 – 02000

TIA Plan Reports

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

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

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

CERTIFICATION

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

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

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Table of Contents

List of Figures

List of Tables

List of Appendices

TIA Report

Parsons has been retained by Brigil to update a TIA in support of a Site Plan Application for a residential development located at 8466 Jeanne D'Arc Boulevard. The previous submission was written prior to the new TIA Guidelines. This document follows the new TIA process, as outlined in the City Transportation Impact Assessment (TIA) Guidelines (2017). The following report represents Step 5 – Transportation Impact Assessment Report.

1. SCREENING FORM

The screening form confirmed the need for a TIA based on the Trip Generation, given that the proposed development consists of the addition of an 11-storey residential block with a total of 214 apartment units. The Location and Safety modules were not triggered. The screening form has been provided in Appendix A.

2. SCOPING REPORT

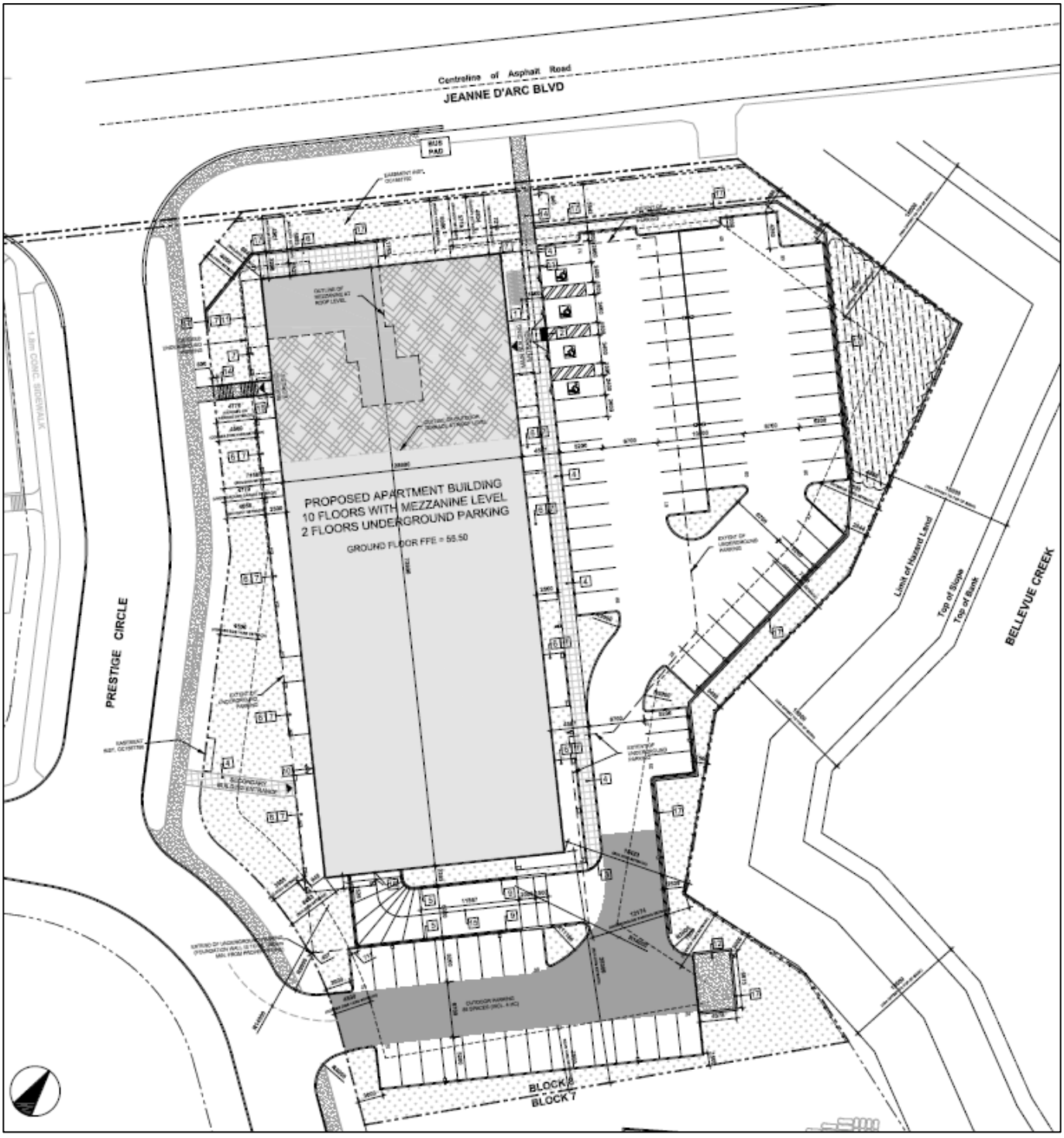
2.1. EXISTING AND PLANNED CONDITIONS

2.1.1. PROPOSED DEVELOPMENT

From the information provided, it is our understanding that Brigil Construction is proposing to proceed with the construction of block 8 within the planned Petrie's Landing II development, located at 8466 Jeanne D'Arc Boulevard in Orleans. The proposed residential block will consist of approximately 214 residential apartment units. Vehicular access will be provided via Prestige Circle and its unsignalized intersection with Jeanne D'Arc Boulevard. The local context of the site is provided as **Figure 1** and the proposed Site Plan is provided as **Figure 2**.

Figure 1: Local Context

Figure 2: Proposed Site Plan



2.1.2. EXISTING CONDITIONS

Area Road Network

OR 174 is an east-west City-owned freeway, which extends from HWY 417 in the west to Trim Road and continues east. Within the study area, OR 174 has a four-lane cross section and is grade separated at its interchange with Tenth Line Road, located approximately 1 km southwest of the site. The posted speed limit within the study area is 100 km/h.

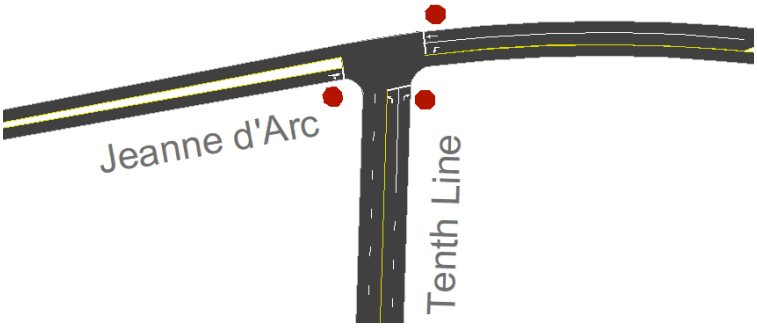
Tenth Line Road is a north-south arterial roadway that extends from Jeanne D'Arc Boulevard in the north to Smith Road in the south. Within the study area, Tenth Line Road has a four-lane cross section and the posted speed limit is 60 km/h.

Jeanne D'Arc Boulevard North is a major collector roadway that extends from Trim Road in the east to OR 174 in the west, where is continues as Jeanne D'Arc Boulevard South. Within the study area, Jeanne D'Arc Boulevard has a two-lane cross section with auxiliary turn lanes provided at major intersections. The posted speed limit is 60 km/h.

Existing Study Area Intersections

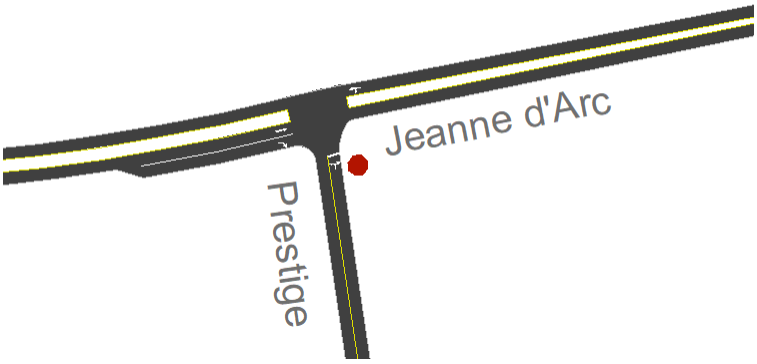
Tenth Line/Jeanne D'Arc

The Tenth Line/Jeanne D'Arc intersection is an unsignalized three-legged all-way stop intersection. The eastbound approach consists of a single through-right turn lane. The westbound approach consists of a left-turn lane and a through lane. The northbound approach consists of a left-turn lane and a right-turn lane. All movements are permitted at this location.



Prestige/Jeanne D'Arc

The Prestige/Jeanne D'Arc intersection is an unsignalized three-legged intersection with STOP control on the northbound approach only. The eastbound approach consists of a single right-turn lane and a through lane. The westbound approach consists of a single left-through lane. The northbound approach consists of a single left-right turn lane. All movements are permitted at this location.



Existing Driveways to Adjacent Developments

There are no existing driveways located on Jeanne D'Arc Boulevard between Rossignol Drive and Parkrose Private. Within Prestige Circle, there are currently 4 existing driveways which provide access to blocks 1 through 6 (block 6 is currently under construction). It is anticipated that block 7 will have its own private driveway when built, adding one more access to the Prestige Circle loop.

Pedestrian/Cycling Network

With regard to pedestrian facilities, there are currently sidewalks provided along the west side of Prestige Circle and the south side of Jeanne D'Arc Boulevard. A multi-use pathway (MUP) is provided along the north side of Jeanne D'Arc Boulevard. A connection from Jeanne D'Arc Boulevard to the MUP is provided adjacent to Prestige Circle. Sidewalks are also provided along the east and west side of Tenth Line Road.

According to the City's Cycling Plan, Jeanne D'Arc Boulevard and Tenth Line Road are classified as "Spine" cycling routes. North of the study area, Tenth Line Road is identified as a Cross-Town Bikeway that connects to St. Joseph Boulevard and

Innes Road, which are both identified as Cross-Town Bikeways. Currently, paved shoulders exist along Jeanne D'Arc Boulevard and a MUP is provided along the north side of Jeanne D'Arc Boulevard.

Transit Network

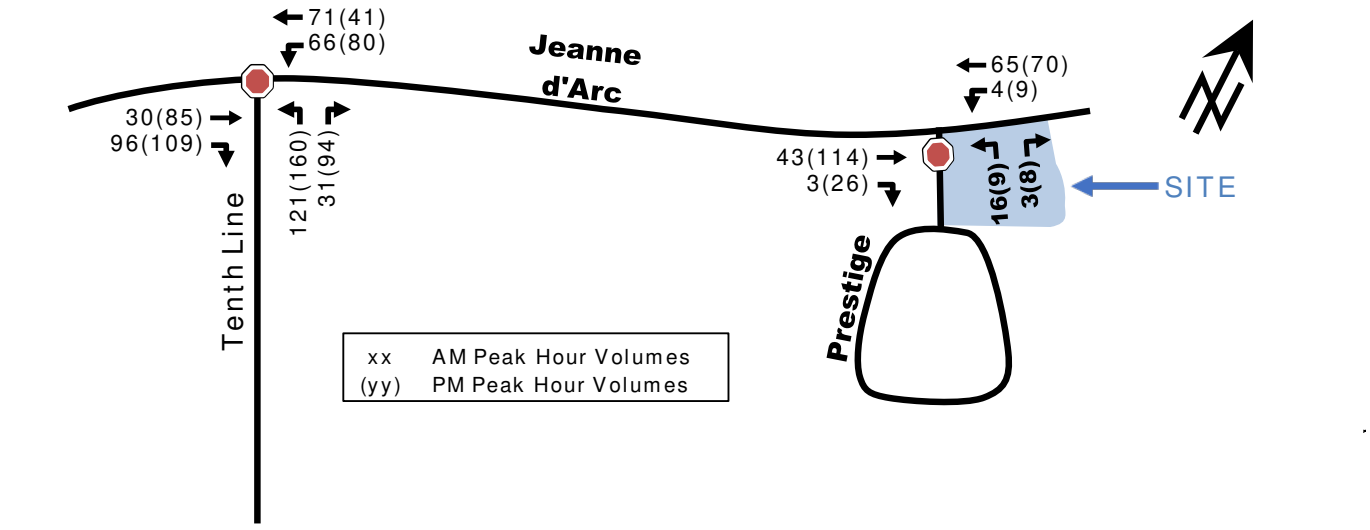
Transit service within the vicinity of the site have recently been updated as of October 6th, 2019 in response to the opening of the Confederation LRT Line. Current service provided by OC Transpo near the vicinity of site includes route #38. Bus stops for route #38 are provided along Jeanne D'Arc Boulevard, adjacent to Prestige Circle, which is an approximate 25 to 150 m walk for residents of the proposed development. Route #38 provides local daily service from Trim Station to Blair Station which connects to the Confederation LRT Line. The transit network for the study area is illustrated in **Figure 3**.

Figure 3: Area Transit Network

Peak hour travel demands

The existing peak hour traffic volumes within the study area are shown in **Figure 4**. The counts were collected by Parsons in 2017. The raw count data has been included in Appendix B.

Figure 4: Existing Peak Hour Traffic Volumes



Existing Road Safety Conditions

Collision history for study area intersections and roads (2013 to 2017, inclusive) was obtained from the City of Ottawa. Within the 5 years, only 3 collisions were reported, and most collisions (2/3) involved property damage only, indicating low impact speeds, and 1 of 3 involved personal injury. Of the collisions, 2 were rear end and 1 was single vehicle.

Both rear end collisions occurred at Tenth Line/Jeanne D'Arc while the single vehicle collision took place within the loop at Prestige Circle where a vehicle ran off the road.

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

2.1.3. PLANNED CONDITIONS

Planned Study Area Transportation Network Changes

Transit
As part of Phase 2 of the LRT Confederation Line in Ottawa, LRT is planned to be extended to Trim Road Station in the east, which is located approximately 1.4 km walk from the subject development. Phase 2 is expected to be completed by 2024. Also identified on the City's TMP Affordable Network is transit priority (isolated measures) along Tenth Line Road, south of St. Joseph Boulevard.

OR-174 Widening
An Environmental Assessment for the potential widening of OR-174 was conducted by the Townships of Prescott-Russell/City of Ottawa. The widening of OR-174 to six-lanes from Hwy 417 to Trim Road and to four-lanes from Trim Road to the City boundary is identified as a road project in the current 2013 City of Ottawa Transportation Master Plan. However, the widening of OR-174 is not identified as part of the Affordable Network Plan within the TMP. Therefore, the road widening of OR-174 east of Trim Road is unlikely within the foreseeable future.

Jeanne D'Arc Culvert Renewal
According to Ward 1 Construction Map, culvert renewal is planned along Jeanne D'Arc Boulevard, west and east of Trim Road for the period 2018 - 2021.

Other Area Development

The following section outlines adjacent developments in the general area that were considered in the TIA. Vehicle volumes generated by these developments at study area intersections have been included in Appendix D.

Petrie's Landing I

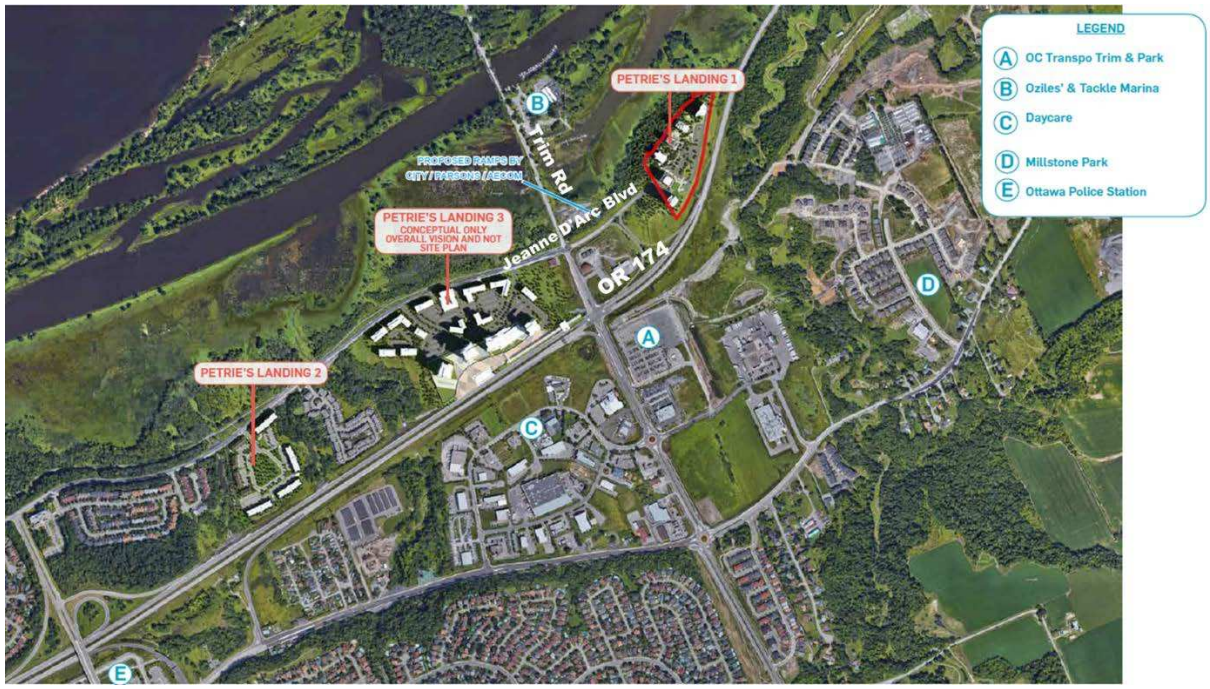
Brigil is proposing the construction of the remainder 4 of 6 total residential Towers, consisting of approximately 806 additional residential units and 1,500 sq. meters of commercial. The proposed Petrie's Landing I is located on Jeanne D'Arc Boulevard, approximately 1.5 km east of the subject site, as illustrated in **Figure 5**. Currently, Tower I has been built and Tower II is nearing completion. The projected two-way vehicle trips for this proposed residential development are approximately 70 to 65 veh/h for Tower II and 210 to 180 veh/h for Towers III-VI during the AM and PM peak hours respectively.

Petrie's Landing III

Brigil is proposing the construction of a mixed-use development consisting of approximately 370,000 ft^2 of office, 23,000 ft^2 of retail and up to 790 residential units. The proposed Petrie's Landing III is located on Jeanne D'Arc Boulevard, approximately 500 meters east of the subject site, as illustrated in **Figure 5**. The projected two-way vehicle trips for this

proposed mixed-use development is approximately 660 and 685 veh/h during the morning and afternoon peak hours, respectively.

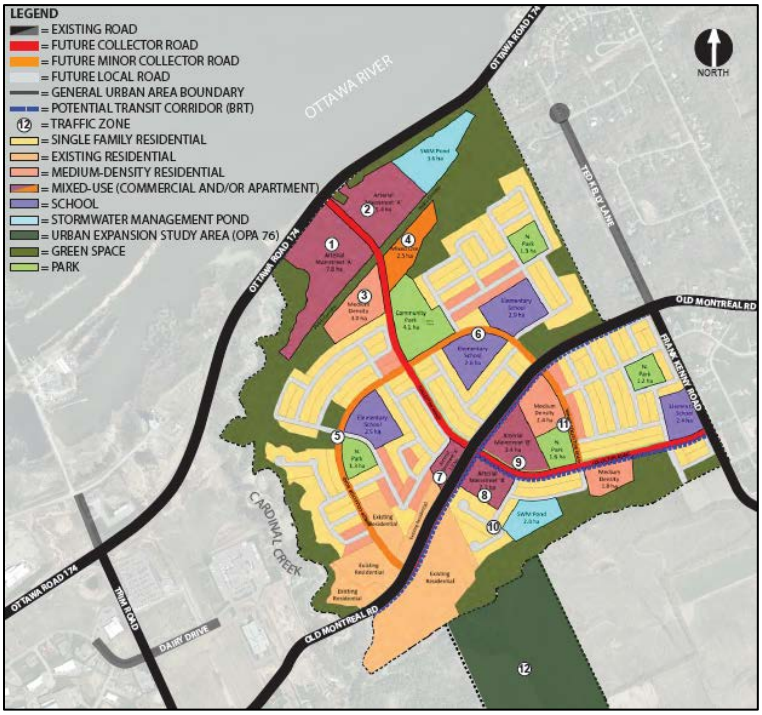
Figure 5: Petrie's Landing I, II and III Concept Plan



Cardinal Creek Village

Tamarack Homes is currently constructing a 1,446-unit subdivision and a 430,000 ft² shopping centre, south of OR-174 and east of Cardinal Creek, as illustrated in **Figure 6**. The Transportation Impact Study (prepared by IBI Group) projected approximately 1,460 veh/h and 2,619 veh/h by horizon year 2031 (full build-out) during the morning and afternoon peak hours, respectively.

Figure 6: Cardinal Creek Village

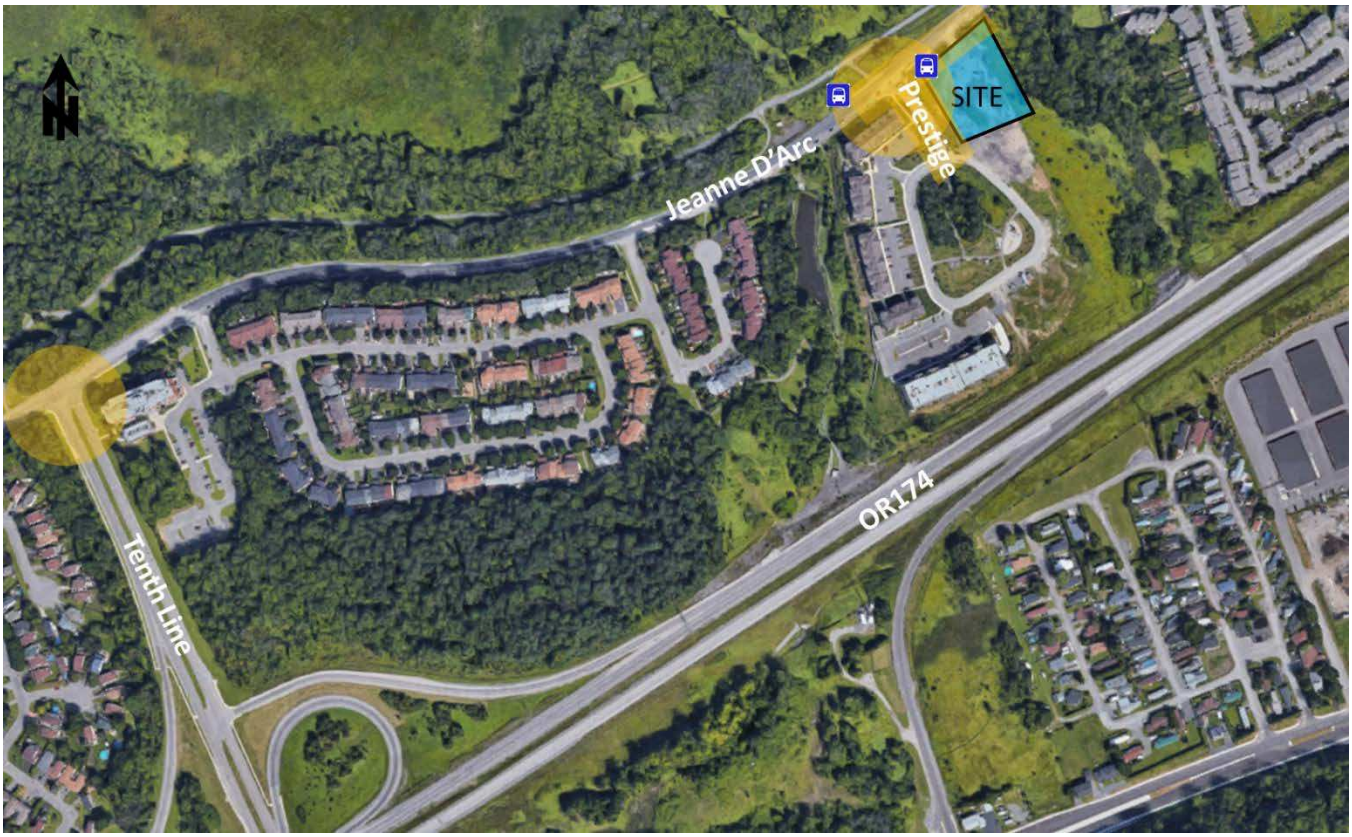


2.2. STUDY AREA AND TIME PERIODS

As the proposed site is a residential development, the time periods assessed will be the weekday morning and afternoon peak hours. The proposed study area is outlined below and highlighted in **Figure 7**.

- Tenth Line/Jeanne D'Arc intersection;
- Prestige/Jeanne D'Arc intersection;
- Jeanne D'Arc Boulevard adjacent to the site; and
- Prestige Circle adjacent to the site.

Figure 7: Study Area



2.3. EXEMPTION REVIEW

The following modules/elements of the TIA process recommended to be exempt in the subsequent steps of the TIA process, based on the City's TIA guidelines and the subject site:

Table 1: Exemptions Review Summary

Module	Element	Exemption Consideration
4.1 Development Design	4.1.2 New Streets Network	Not required for applications involving site plans.
4.2 Parking	4.2.2 Spillover Parking	The parking is expected to meet By-Law requirements.
4.8 Review of Network Concept	All elements	The site is not expected to generate 200 trips more than the established zoning.

3. FORECASTING REPORT

3.1. DEVELOPMENT GENERATED TRAVEL DEMAND

3.1.1. TRIP GENERATION AND MODE SHARES

Trip generation rates for the proposed development, consisting of 214 high-rise residential apartment units, were obtained from the City's TRANS Trip Generation Report. Table 2 provides the appropriate trip generation rates for residential use.

Table 2: Vehicle Trip Generation Rates

Land Use	Data Source	Trip Rates	
		AM Peak	PM Peak
High-Rise Apartments	TRANS 222 (Table 3.18)	T = 0.29(du)	T = 0.36(du)
Notes: T = Average Vehicle Trip Ends			

Using the TRANS Trip Generation rates, the total amount of vehicle trips generated by the proposed block 8 development consisting of 214 units was calculated. The results are summarized in **Table 3**.

Table 3: TRANS Vehicle Trip Generation

Land Use	Data Source	Units	AM Peak (veh/h)			PM Peak (veh/h)		
			In	Out	Total	In	Out	Total
Block 8	TRANS	214	14	48	62	47	30	77

Using the TRANS trip projections in **Table 3** and the mode share percentages from the TRANS Trip Generation Report (Table 3.13), the total projected number of person trips by mode were calculated and are summarized in **Table 4**. The person trips were then used to calculate the vehicle trips generated based on mode shares for Orleans extracted from the OD-Survey conducted in 2011 as seen in **Table 5**.

Table 4: Site Person Trip Generation – Block 8

Travel Mode	AM Mode Share	AM Peak (persons/h)			PM Mode Share	PM Peak (persons/h)		
		In	Out	Total		In	Out	Total
Auto Driver	44%	14	48	62	44%	47	30	77
Auto Passenger	9%	2	10	12	14%	15	9	24
Transit	34%	11	37	48	33%	36	22	58
Non-motorized	13%	4	15	19	9%	10	6	16
Total People Trips	**100%**	**31**	**110**	**141**	**100%**	**108**	**67**	**175**

Table 5: Site Vehicle Trip Generation Using OD Mode Shares – Block 8

Travel Mode	AM Mode Share	AM Peak (veh/h)			PM Mode Share	PM Peak (veh/h)		
		In	Out	Total		In	Out	Total
Auto Driver	50%	17	54	71	55%	59	37	96
Auto Passenger	15%	6	15	21	15%	16	10	26
Transit	25%	8	27	35	20%	21	14	35
Non-motorized	10%	3	11	14	10%	11	7	18
Total People Trips	**100%**	**34**	**107**	**141**	**100%**	**107**	**68**	**175**
Total 'New' Auto Trips for Block 8		**17**	**54**	**71**	-	**59**	**37**	**96**

As per **Table 5**, block 8 of the subject site is projected to generated approximately 70 and 95 vehicles in the AM and PM peaks respectively.

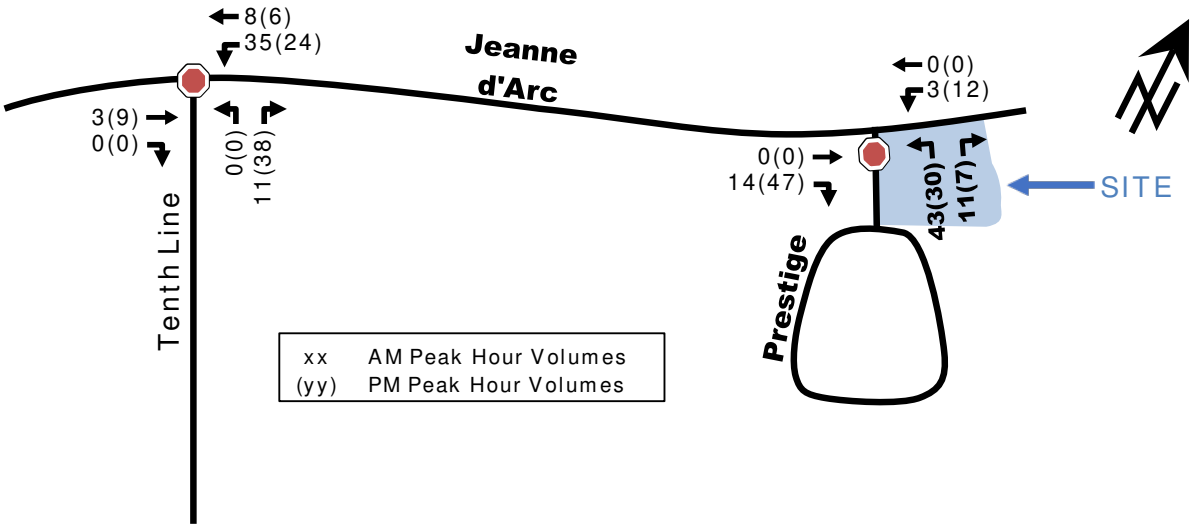
3.1.2. TRIP DISTRIBUTION AND ASSIGNMENT

Traffic distribution was based on the site's connectivity to the existing road network and our knowledge of the surrounding area. The resultant distribution is outlined as follows:

- 80% to/from the west; and
- 20% to/from the east.

Based on these distributions, 'new' site-generated trips to/from the proposed development are assigned to study area intersections and are illustrated as **Figure 8**.

Figure 8: Site-Generated Traffic (Block 8)



3.2. BACKGROUND NETWORK TRAVEL DEMAND

3.2.1. TRANSPORTATION NETWORK PLANS

The transportation network changes have been discussed within Section 2.1.3., and none were anticipated to impact the transportation analysis for this development.

3.2.2. BACKGROUND GROWTH

A 2% annual background traffic growth has been added along the Jeanne D'Arc Boulevard through movements to anticipate future development growth along the corridor. Given that Jeanne D'Arc Boulevard between Tenth Line Road and Trim Road (arterials on each side of the study area) are bound by OR 174 and the Ottawa River, a 2% background growth is conservative. Known future developments were superimposed on top of the 2% annual growth and are described in section 3.2.3.

3.2.3. OTHER AREA DEVELOPMENTS

Other area developments were outlined in **Section 2.1.3**. Trips generated by these developments have been summarized in **Table 6**.

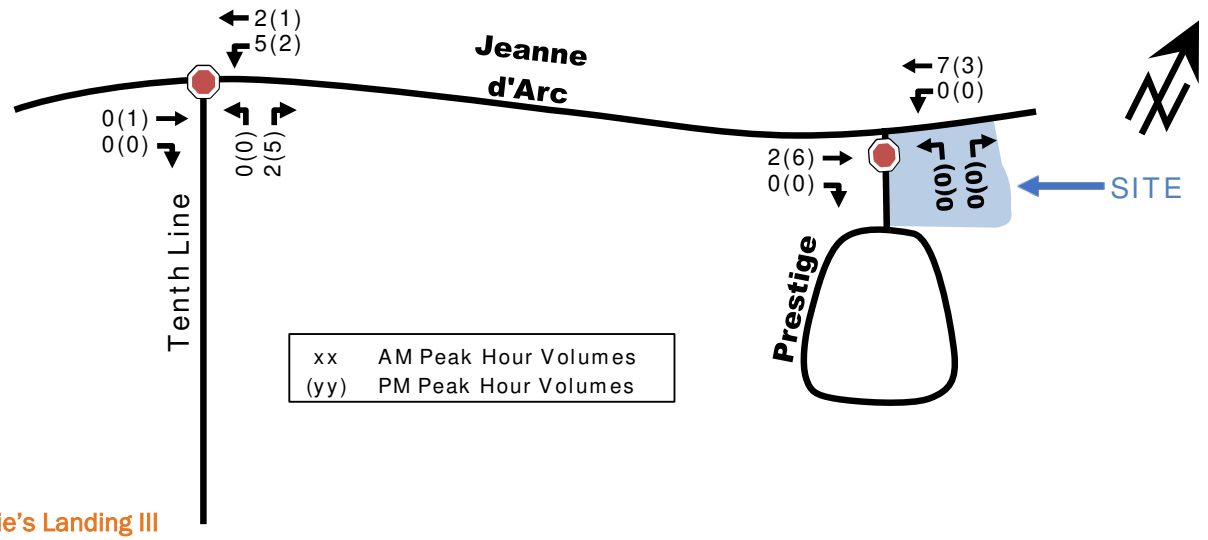
Table 6: Other Area Developments Vehicle Trip Generation

	AM Peak (persons/h)			PM Peak (persons/h)		
	In	Out	Total	In	Out	Total
Petrie's Landing I	72	210	282	144	101	245
Petrie's Landing II – Blocks 6 & 7	11	35	46	48	30	78
Petrie's Landing III	422	237	659	254	430	584
Cardinal Creek (External Only)	412	940	1,352	1,246	980	2,226
Total	**917**	**1,422**	**2,339**	**1,692**	**1,541**	**3,233**

Petrie's Landing I – Tower II to VI

Petrie's Landing I – Tower II to VI are expected to be fully occupied by 2024. For a more conservative analysis, all Towers were superimposed to background 2022 and forward. The projected traffic volumes are illustrated in **Figure 9**.

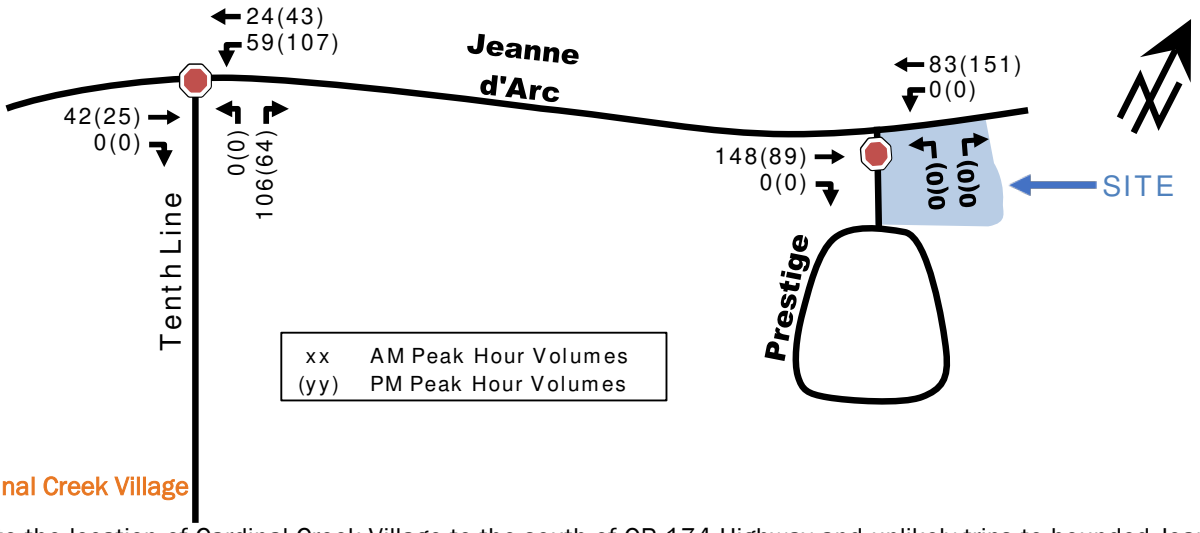
Figure 9: Petrie's Landing I Tower II - IV Projected Traffic Volumes



Petrie's Landing III

Figure 10 illustrates the projected traffic volumes for Petrie's Landing III at full build-out, obtained from the 2013 Petrie's Landing I TIS. Considering assumed time horizons, 30% of build-out volumes will be applied in year 2022, and 100% in year 2027.

Figure 10: Petrie's Landing III Projected Traffic Volumes – Full Build-Out



Cardinal Creek Village

Due to the location of Cardinal Creek Village to the south of OR 174 Highway and unlikely trips to bounded Jeanne D'Arc Boulevard by the Ottawa River and Highway, it is anticipated that no vehicles will enter the study area.

3.2.4. BACKGROUND TRAFFIC GROWTH

The future background volumes were calculated by superimposing other area developments on to the network and adding a background growth of 2% along the east-west through lanes on Jeanne D'Arc Boulevard. Background volumes were

created for the buildout year 2022 and for 5 years after buildout, year 2027. The resulting background traffic volumes for buildout and buildout plus 5 years are depicted in **Figure 11** and **Figure 12**.

Figure 11: 2022 Background Traffic Volumes

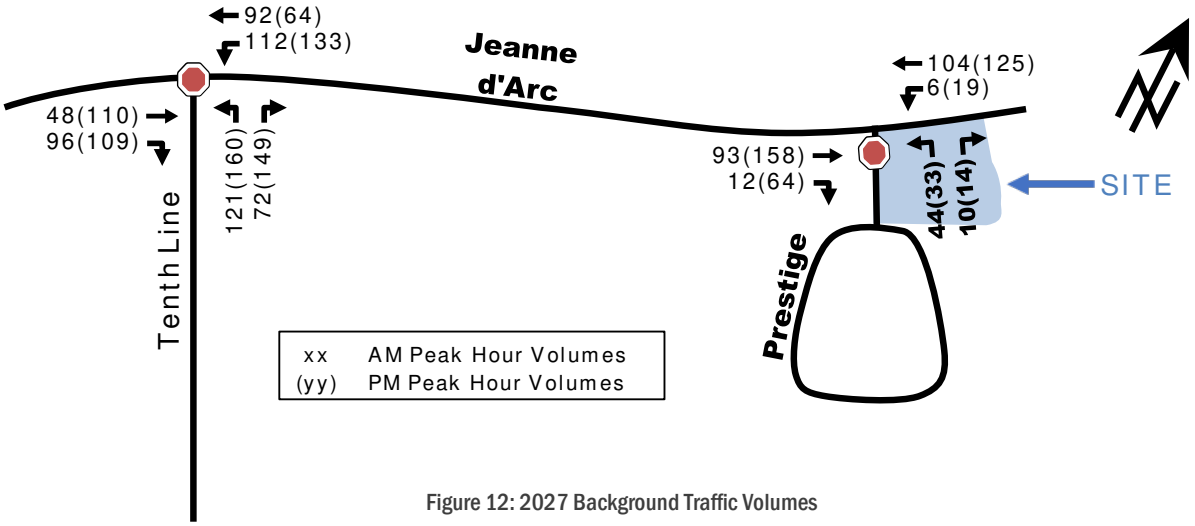
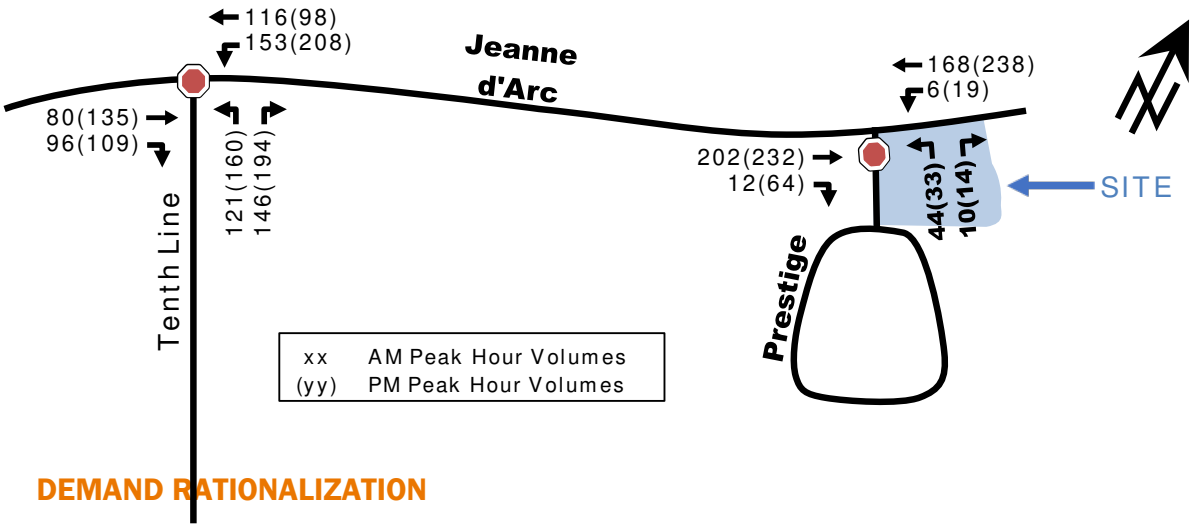


Figure 12: 2027 Background Traffic Volumes



3.3. DEMAND RATIONALIZATION

3.3.1. EXISTING CAPACITY CONDITIONS

The following **Table 7** provides a summary of the existing traffic operations at the study area intersection based on the Synchro (V10) traffic analysis software. The subject intersections were assessed in terms of the volume-to-capacity (v/c) ratio and the corresponding Level of Service (LoS) for the critical movement(s). The Synchro model outputs of existing conditions are provided within Appendix D.

Table 7: Existing Intersection Performance

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection		
	LoS	Delay (s)	Movement	Delay (s)	LoS	v/c
Tenth Line/Jeanne D'Arc	B(B)	10(10)	NB(NB)	9(10)	A(B)	-
Prestige/Jeanne D'Arc	A(A)	9(9)	NB(NB)	2(1)	A(A)	-
Note: Analysis of signalized intersections assumes a PHF of 0.90 and a saturation flow rate of 1800 veh/h/lane.						

As shown in **Table 7**, all the intersections within the subject area are currently operating 'as a whole' at good LoS 'B' or better during the AM and PM peak hours. All 'critical movements' at study area intersections are currently operating at a good LoS 'B' or better during both peak hours.

Overall, the existing Synchro analysis indicates there are no capacity constraints in the network.

4. STRATEGY REPORT

4.1. DEVELOPMENT DESIGN

Location of Transit Facilities

Both the eastbound and westbound OC-Transpo bus stops are located less than 100 meters from block 8 on Jeanne D'Arc Boulevard.

Pedestrian Routes and Facilities

Sidewalks are located along Prestige Circle and the front of each building, connecting all the blocks through the parking areas. Block 8 proposes sidewalks which connect to existing infrastructure. A multiuse pathway (MUP) connection at Prestige/Jeanne D'Arc currently exists which links the development site to the MUP along the Ottawa River which provides east-west connectivity.

Bicycle Parking

The proponent is providing bicycle parking spaces at a rate of 0.5 per unit which equates to 107 bicycle parking spaces, meeting the City's By-Law requirements. It is anticipated that the majority of bicycle parking spaces will be provided indoors in a secure, well-lit area.

Vehicle Access

The proposed development access will be provided through a driveway connecting to Prestige Circle. A two-way ramp is proposed for underground parking in addition to the surface parking proposed. It is anticipated that on-site vehicle circulation and parking lot circulation will meet the City's By-Law requirements.

Garbage pick-up will take place on-site.

4.2. PARKING SUPPLY

Based on the City of Ottawa parking bylaws, vehicle and bicycle parking requirements were calculated based on the site's location and are summarized in **Table 8** and **Table 9** respectively.

Table 8: Vehicle Parking Spaces Requirements

Building / Units		Rate (spaces/unit)	Required # of Parking Spaces			Proposed # of Parking Spaces
			Residential	Visitor	Total	
Block 8	214	1.2*	242	43	285	300
*The first 12 units are exempt from the rate 1.2 spaces per unit						

According to **Table 8**, the subject development is required to provide 242 parking spaces for residents, and 43 parking spaces for visitors, for a total of 285 parking spaces. With a total of 300 proposed parking spaces (214 underground and 86 surface parking spaces), the subject development meets City requirements.

Table 9 summarizes bicycle parking requirements as per City of Ottawa Zoning By-Law-Part 4, sections 100-114.

Table 9: Bicycle Parking Requirements

Land Use	Units	# of Bicycle Spaces	
		Required	Proposed
Block 8	214	107	107

According to **Table 9**, the subject development is required to provide 107 bicycle parking spaces. With a total 107 proposed bicycle parking spaces, the subject meets City requirements.

4.3. BOUNDARY STREET DESIGN

The boundary streets for the development are Jeanne D'Arc Boulevard and Prestige Circle. The existing roadway geometry consists of the following features:

- Jeanne D'Arc Boulevard
  - 1 vehicle travel lane in each direction;
  - 2m sidewalk with no boulevard on south side of the roadway only; and,
  - Less than 3,000 vehicles per day.
- Prestige Circle
  - 1 vehicle travel lane in each direction;
  - 2m sidewalk with boulevard on west side of the roadway – east side of the roadway proposed; and,
  - Less than 3,000 vehicles per day.

The multi-modal level of service analysis for the subject road segments adjacent to the site is summarized in **Table 10** with detail analysis provided in Appendix E.

Table 10: MMLOS –Road Segments Adjacent to the Site

Road Segment	Level of Service			
	Pedestrian (PLoS)		Bicycle (BLoS)	
	PLoS	Target	BLoS	Target
Jeanne D'Arc Boulevard	C	C	D	D
Prestige Circle	A	C	A	D

Pedestrian PLoS targets and cyclist BLoS targets were met on both adjacent road segments.

4.4. ACCESS INTERSECTION DESIGN

The proposed development will make use of a new driveway for access which connects to Prestige Circle. The driveway will access at grade parking and provide a two-way ramp to underground parking spaces. Internal surface sidewalks are proposed within the site which offers pedestrian connectivity between all the blocks and to Prestige Circle and Jeanne D'Arc Boulevard.

4.5. TRANSPORTATION DEMAND MANAGEMENT

The development generated travel demand has been estimated in Section 3.1.1 using modal shares from the 2011 TRANS O-D survey for Orléans. These modal shares reflect conditions for a wide variety of transportation services supply within Orléans. Once the envisioned LRT is completed, a rise in transit ridership is anticipated, post-occupancy TDM measures are recommended and attached as Appendix F.

4.6. ROUTE CAPACITY

It is anticipated that there will be sufficient transit capacity on local route #38 with service every 30 minutes or less during regular service hours. Once the LRT reaches Trim Station in 2024, there will be additional capacity from the 600 passengers per train and 12 trains per hour capacity during peak hours.

4.7. INTERSECTION DESIGN

Multi-Modal Level of Service for Intersections

In accordance to the TIA Guidelines, 'Intersection MMLOS' must be completed for signalized intersections only. Given that the study area has no signalized intersections, no MMLOS for intersections will be completed.

4.7.1. PROJECTED BACKGROUND 2022 OPERATIONS

The 2022 background volumes from **Section 3.2.4** and **Figure 11** were inputted in Synchro to analyze the 2022 background conditions. Results are summarized in **Table 11** with detailed analyses provided in Appendix G.

Table 11: Projected 2022 Background Operations at Study Area Intersections

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection		
	LoS	Delay (s)	Movement	Delay (s)	LoS	v/c
Tenth Line/Jeanne D'Arc	A(B)	9(11)	NB(EB)	9(10)	A(B)	-
Prestige/Jeanne D'Arc	B(B)	10(10)	NB(NB)	2(1)	A(A)	-
Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane.						

As shown in **Table 11**, all the intersections within the subject area are projected to operate 'as a whole' at good LoS 'B' or better during the AM and PM peak hours. All of the 'critical movements' at study area intersections are projected to operate at good LoS 'B' or better during both peak.

4.7.2. PROJECTED BACKGROUND 2027 OPERATIONS

The 2027 background volumes from Section 3.2.4 and **Figure 12** were inputted in Synchro to analyze the future ultimate background conditions. Results are summarized in **Table 12** with detailed analyses provided in Appendix G.

Table 12: Projected Background 2027 Operations at Study Area Intersections

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection		
	LoS	Delay (s)	Movement	Delay (s)	LoS	v/c
Tenth Line/Jeanne D'Arc	B(B)	10(12)	WB(EB)	10(12)	B(B)	-
Prestige/Jeanne D'Arc	B(B)	11(12)	NB(NB)	2(1)	A(A)	-
Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane.						

As shown in **Table 12**, all the intersections within the subject area are projected to operate 'as a whole' at good LoS 'B' or better during the AM and PM peak hours. All of the 'critical movements' at study area intersections are projected to operate at good LoS 'B' during both peak hours. No significant changes between existing conditions and 2027 background future were noted.

4.7.3. FUTURE PROJECTED FULL BUILDOUT 2022 CONDITIONS

The future full buildout projected 2022 conditions were derived by superimposing the 2022 background volumes onto the site-generated volumes and are illustrated in **Figure 13**. Synchro results for study area intersection performance are summarized in **Table 13** with detailed analyses provided in Appendix H.

Figure 13: Future Projected Full Buildout 2022 Conditions

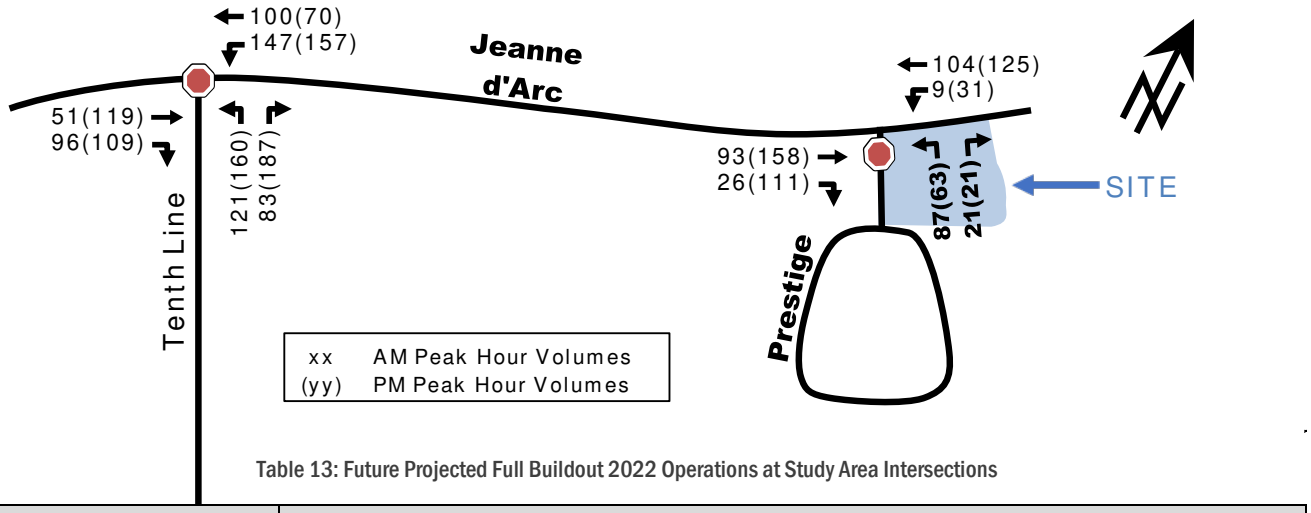


Table 13: Future Projected Full Buildout 2022 Operations at Study Area Intersections

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection		
	LoS	Delay (s)	Movement	Delay (s)	LoS	v/c
Tenth Line/Jeanne D'Arc	B(B)	10(11)	WB(EB)	9(11)	A(B)	-
Prestige/Jeanne D'Arc	B(B)	10(11)	NB(NB)	3(2)	A(A)	-
Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane.						

As shown in **Table 13**, all the intersections within the subject area are projected to operate 'as a whole' at good LoS 'B' or better during the AM and PM peak hours. All of the 'critical movements' at study area intersections are projected to operate at good LoS 'B' during both peak hours. No significant changes between 2022 background conditions and 2022 future conditions were noted.

4.7.4. FUTURE PROJECTED FULL BUILDOUT +5 YEARS CONDITIONS

The future projected ultimate buildout conditions plus 5 years were derived by superimposing the 2027 background volumes onto the site-generated volumes and are illustrated in **Figure 14**. Synchro results for study area intersection performance are summarized in **Table 14** with detailed analyses provided in Appendix H.

Figure 14: Future Projected Full Buildout +5 Years Conditions

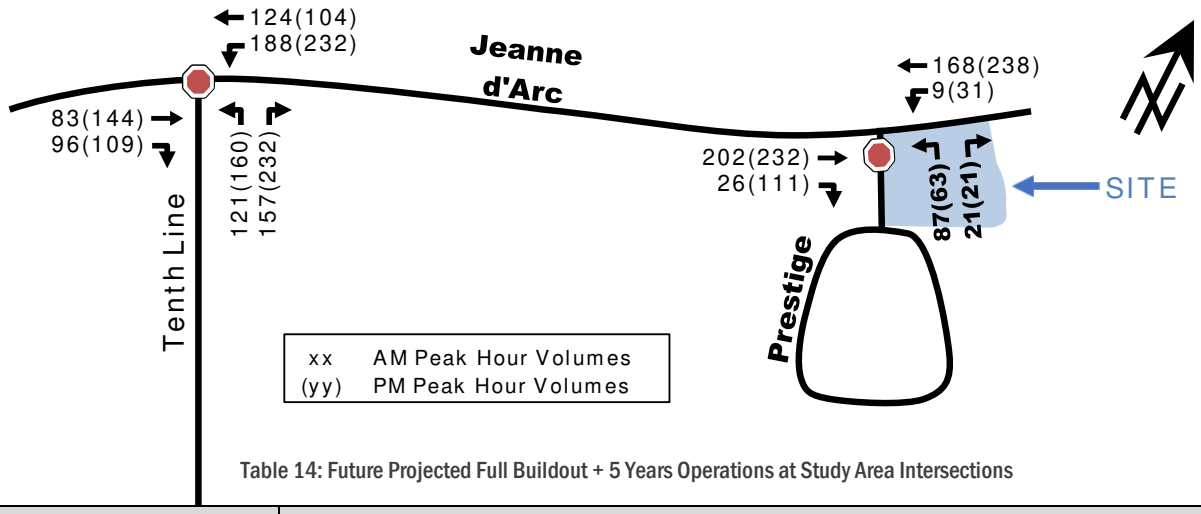


Table 14: Future Projected Full Buildout + 5 Years Operations at Study Area Intersections

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection		
	LoS	Delay (s)	Movement	Delay (s)	LoS	v/c
Tenth Line/Jeanne D'Arc	B(B)	11(13)	NB(EB)	10(12)	B(B)	-
Prestige/Jeanne D'Arc	B(B)	12(13)	NB(NB)	3(2)	A(A)	-
Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane.						

As shown in **Table 14**, the majority of the intersections within the subject area are projected to operate 'as a whole' at good LoS 'B' or better during the AM and PM peak hours. All of the 'critical movements' at study area intersections are projected to operate at good LoS 'B' during both peak hours.

Overall, there are no significant traffic changes within the study area with the addition of Block 8, a 2% annual growth rate and nearby other area developments when compared to existing conditions.

5. SUMMARY OF FINDINGS

Proposed Development

- The proposed development is located at 8466 Jeanne D'Arc Boulevard
- The site is currently a vacant lot on the south-east corner of Prestige/Jeanne D'Arc
- The proposed development will consist of an 11-storey, 214 residential apartment units and is expected to have occupancy by 2022

Existing Conditions

- Tenth Line/Jeanne D'Arc and Prestige/Jeanne D'Arc intersections operate overall at good LoS 'B' or better
- Both intersections operate with critical movements of LoS 'B' or better

Background Conditions

- A 2% annual growth rate was applied to Jeanne D'Arc Boulevard through movements
- Other area developments noted in the study included:
  - Petrie's Landing I (280-245 veh/h)
  - Petrie's Landing II, addition of blocks 6 & 7 (45-80 veh/h)
  - Petrie's Landing III (660-585 veh/h)
  - Cardinal Creek Community (1,350-2,225 veh/h)
- The other area developments were accounted for separately in the traffic analysis

Trip Generation and Parking

- Full buildout (2022) of the proposed development was expected to generate approximately 70 and 95 vehicle trips during the weekday morning and afternoon periods respectively
- The subject development will provide a total of 300 underground and surface vehicle parking spaces, which meets City parking bylaws
- The subject development will provide a total of 107 bicycle parking spaces, which met City bicycle parking bylaws

Projected Conditions

- Projected full buildout plus 5 years (2027) traffic conditions are projected to be similar to existing traffic conditions, indicating that the new development does not play a big role in worsening network operations.
- The MMLOS road segment analysis showed pedestrian and cyclist levels-of-service targets (PLoS and BLoS respectively) were met on Jeanne D'Arc Boulevard and Prestige Circle.

Transit

- Site-generated transit trips at full buildout were approximately 35 trips during the weekday morning and afternoon peak hours.
- The estimated transit trips could be accommodated by route #38 with 30-minute intervals.
- The future phase 2 of the LRT Confederation Line will add Trim Station, located approximately 1.4km away and offer grade separated public transit with 5-minute intervals during peak hours.

Site Access, Circulation and Connectivity

- The proposed development will make use of a new driveway for access which connects to Prestige Circle. The driveway will access at grade parking and provide a two-way ramp to underground parking spaces.
- The proposed site plan is considered supportive of pedestrian connectivity by providing internal surface sidewalks within the site which offers pedestrian connectivity between all the blocks, to Prestige Circle and Jeanne D'Arc Boulevard.
- The proposed site plan is considered supportive of cycling connectivity by providing a paved MUP connection to the MUP located on the north side of Jeanne D'Arc Boulevard.

Based on the foregoing, the proposed 8466 Jeanne D'Arc Boulevard Block 8 of Petrie's Landing II development is recommended from a transportation perspective.

Prepared By:

Juan Lavin, E.I.T.

Reviewed By:

Austin Shih, P.Eng.
Senior Transportation Engineer

Appendix A

Screening Form

PARSONS

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P: +1 613.738.4160 l F: +1 613.739.7105 l www.parsons.com

City of Ottawa 2017 TIA Guidelines

TIA Screening Form

Date	5-Jun-19
Project	Petrie's Landing 2
Project Number	476705-02000

Results of Screening	Yes/No
Development Satisfies the Trip Generation Trigger	Yes
Development Satisfies the Location Trigger	No
Development Satisfies the Safety Trigger	No

Module 1.1 - Description of Proposed Development	
Municipal Address	8466 Jeanne D'Arc Boulevard
Description of location	Currently a vacant lot, located south of Jeanne D'Arc Blvd and just east of Prestige Circle entry throat
Land Use	Proposed residential building
Development Size	214 Residential Units
Number of Accesses and Locations	A single proposed access to Prestige Circle
Development Phasing	Single-Phased
Buildout Year	2022
Sketch Plan / Site Plan	See attached

Module 1.2 - Trip Generation Trigger		
Land Use Type	Townhomes or Apartments	
Development Size	214	Units
Trip Generation Trigger Met?	Yes	

Module 1.3 - Location Triggers	
Development Proposes a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit, or Spine Bicycle Networks (See Sheet 3)	No
Development is in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone. (See Sheet 3)	No
Location Trigger Met?	No

Module 1.4 - Safety Triggers	
Posted Speed Limit on any boundary road	<80
Horizontal / Vertical Curvature on a boundary street limits sight lines at a proposed driveway	No
A proposed driveway is within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions) or within auxiliary lanes of an intersection;	No
A proposed driveway makes use of an existing median break that serves an existing site	No
There is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development	No
The development includes a drive-thru facility	No
Safety Trigger Met?	No

Appendix B

Traffic Counts

Parsons
1223 Michael St
Ottawa , ON,

Turn Count Summary

Location: **Prestige at Jeanne D'Arc, Ottawa**
GPS Coordinates:
Date: **2017-09-13**
Day of week: **Wednesday**
Weather: **Sunny**
Analyst: **Rani Nahas**

Total vehicle traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:15	0	0	0	0	6	0	1	0	0	0	0	0	7
07:20	0	0	0	0	2	0	2	0	1	0	5	0	10
07:25	0	0	0	0	9	0	2	0	0	0	7	0	18
07:30	0	0	0	0	5	0	0	0	0	0	4	0	9
07:35	0	0	0	1	9	0	3	0	0	0	6	1	20
07:40	0	0	0	1	5	0	0	0	0	0	3	0	9
07:45	0	0	0	0	3	1	1	0	0	0	7	0	12
07:50	0	0	0	1	4	0	2	0	0	0	1	0	8
07:55	0	0	0	0	6	0	2	0	1	0	3	0	12
08:00	0	0	0	0	3	0	2	0	0	0	3	1	9
08:05	0	0	0	0	6	0	1	0	1	0	1	1	10
08:10	0	0	0	1	10	0	0	0	0	0	4	0	15

Car traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:15	0	0	0	0	5	0	1	0	0	0	0	0	6
07:20	0	0	0	0	1	0	2	0	1	0	4	0	8
07:25	0	0	0	0	9	0	2	0	0	0	7	0	18
07:30	0	0	0	0	5	0	0	0	0	0	3	0	8
07:35	0	0	0	1	7	0	3	0	0	0	6	1	18
07:40	0	0	0	1	4	0	0	0	0	0	3	0	8
07:45	0	0	0	0	3	1	1	0	0	0	6	0	11
07:50	0	0	0	1	3	0	2	0	0	0	0	0	6
07:55	0	0	0	0	6	0	2	0	1	0	3	0	12
08:00	0	0	0	0	3	0	2	0	0	0	3	1	9
08:05	0	0	0	0	6	0	1	0	1	0	1	1	10
08:10	0	0	0	1	6	0	0	0	0	0	4	0	11

Truck traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0
07:20	0	0	0	0	1	0	0	0	0	0	1	0	2
07:25	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	1	0	1
07:35	0	0	0	0	1	0	0	0	0	0	0	0	1
07:40	0	0	0	0	1	0	0	0	0	0	0	0	1
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0
07:50	0	0	0	0	1	0	0	0	0	0	1	0	2
07:55	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0
08:05	0	0	0	0	0	0	0	0	0	0	0	0	0
08:10	0	0	0	0	3	0	0	0	0	0	0	0	3

Bicycle traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:15	0	0	0	0	1	0	0	0	0	0	0	0	1
07:20	0	0	0	0	0	0	0	0	0	0	0	0	0
07:25	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0
07:35	0	0	0	0	1	0	0	0	0	0	0	0	1
07:40	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	1	0	1
07:50	0	0	0	0	0	0	0	0	0	0	0	0	0
07:55	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0
08:05	0	0	0	0	0	0	0	0	0	0	0	0	0
08:10	0	0	0	0	1	0	0	0	0	0	0	0	1

Pedestrian volumes

Interval starts	NE			NW			SW			SE			Total
	Left	Right	Total	Left	Right	Total	Left	Right	Total	Left	Right	Total	
07:15	0	0	0	0	0	0	0	1	1	0	0	0	1
07:20	0	0	0	0	0	0	0	0	0	0	0	0	0
07:25	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0
07:35	0	0	0	0	0	0	1	0	1	0	0	0	1
07:40	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0
07:50	0	0	0	0	0	0	0	0	0	0	0	0	0
07:55	0	0	0	0	0	0	1	0	1	0	0	0	1
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0
08:05	0	0	0	0	0	0	0	0	0	0	0	0	0
08:10	0	0	0	0	0	0	0	1	1	0	0	0	1

Intersection Peak Hour

07:15 - 08:15

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	0	0	0	4	68	1	16	0	3	0	44	3	139
Factor	0.00	0.00	0.00	0.33	0.57	0.08	0.44	0.00	0.25	0.00	0.52	0.25	0.58
Approach Factor	0.00			0.55			0.53			0.56			

Peak Hour Vehicle Summary

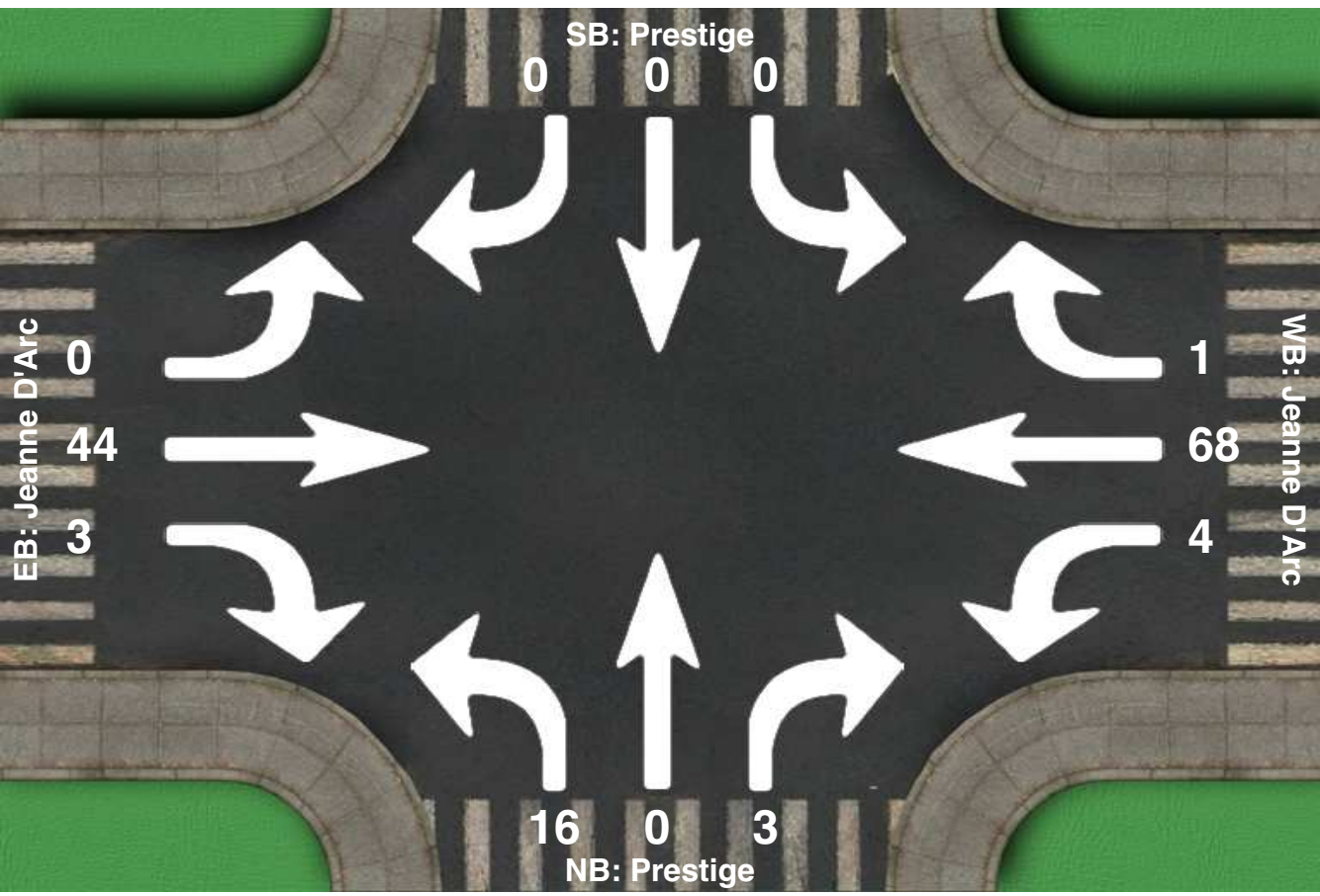
Vehicle	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Car	0	0	0	4	58	1	16	0	3	0	40	3	125
Truck	0	0	0	0	7	0	0	0	0	0	3	0	10
Bicycle	0	0	0	0	3	0	0	0	0	0	1	0	4

Peak Hour Pedestrians

	NE			NW			SW			SE			Total
	Left	Right	Total	Left	Right	Total	Left	Right	Total	Left	Right	Total	
Pedestrians	0	0	0	0	0	0	2	2	4	0	0	0	4

Intersection Peak Hour

Location: Prestige at Jeanne D'Arc, Ottawa
GPS Coordinates:
Date: 2017-09-13
Day of week: Wednesday
Weather: Sunny
Analyst: Rani Nahas



Intersection Peak Hour

07:15 - 08:15

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	0	0	0	4	68	1	16	0	3	0	44	3	139
Factor	0.00	0.00	0.00	0.33	0.57	0.08	0.44	0.00	0.25	0.00	0.52	0.25	0.58
Approach Factor	0.00			0.55			0.53			0.56			

Parsons
1223 Michael St
Ottawa , ON,

Turn Count Summary

Location: **Prestige at Jeanne D'Arc, Ottawa**
GPS Coordinates:
Date: **2017-09-13**
Day of week: **Wednesday**
Weather: **Sunny**
Analyst: **Rani Nahas**

Total vehicle traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16:14	0	0	0	0	3	0	0	0	0	0	2	0	5
16:15	1	0	0	0	6	0	2	0	0	0	4	1	14
16:20	0	0	0	0	9	0	1	0	0	0	9	2	21
16:25	0	0	0	0	6	0	1	0	0	0	5	0	12
16:30	0	0	0	0	10	0	0	0	0	0	6	3	19
16:35	0	0	0	0	8	0	2	0	1	0	8	4	23
16:40	0	0	0	0	8	0	1	0	0	0	9	4	22
16:45	0	0	0	0	8	0	1	0	2	0	11	1	23
16:50	0	0	0	2	5	0	0	0	1	0	10	3	21
16:55	0	0	0	1	2	0	0	0	0	0	14	2	19
17:00	0	0	0	0	7	0	1	0	0	0	14	2	24
17:05	0	0	0	2	8	0	2	0	2	0	3	0	17
17:10	0	0	0	1	4	0	3	0	1	0	8	4	21
17:15	0	0	0	1	4	0	0	0	0	0	12	1	18
17:20	0	0	0	1	4	0	0	0	1	0	12	1	19
17:25	0	0	0	1	3	0	0	0	0	0	11	1	16

Car traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16:14	0	0	0	0	2	0	0	0	0	0	2	0	4
16:15	0	0	0	0	6	0	2	0	0	0	4	1	13
16:20	0	0	0	0	9	0	1	0	0	0	7	2	19
16:25	0	0	0	0	6	0	1	0	0	0	4	0	11
16:30	0	0	0	0	9	0	0	0	0	0	6	3	18
16:35	0	0	0	0	8	0	2	0	1	0	7	4	22
16:40	0	0	0	0	7	0	1	0	0	0	8	4	20
16:45	0	0	0	0	8	0	1	0	2	0	10	1	22
16:50	0	0	0	2	5	0	0	0	1	0	9	2	19
16:55	0	0	0	1	2	0	0	0	0	0	13	2	18
17:00	0	0	0	0	7	0	1	0	0	0	14	2	24
17:05	0	0	0	2	8	0	2	0	2	0	3	0	17
17:10	0	0	0	1	3	0	2	0	1	0	8	4	19
17:15	0	0	0	1	4	0	0	0	0	0	12	1	18
17:20	0	0	0	1	3	0	0	0	1	0	10	1	16
17:25	0	0	0	1	3	0	0	0	0	0	9	1	14

Truck traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16:14	0	0	0	0	1	0	0	0	0	0	0	0	1
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0
16:20	0	0	0	0	0	0	0	0	0	0	2	0	2
16:25	0	0	0	0	0	0	0	0	0	0	1	0	1
16:30	0	0	0	0	1	0	0	0	0	0	0	0	1
16:35	0	0	0	0	0	0	0	0	0	0	1	0	1
16:40	0	0	0	0	1	0	0	0	0	0	0	0	1
16:45	0	0	0	0	0	0	0	0	0	0	1	0	1
16:50	0	0	0	0	0	0	0	0	0	0	0	1	1
16:55	0	0	0	0	0	0	0	0	0	0	1	0	1
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0
17:05	0	0	0	0	0	0	0	0	0	0	0	0	0
17:10	0	0	0	0	1	0	0	0	0	0	0	0	1
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0
17:20	0	0	0	0	0	0	0	0	0	0	2	0	2
17:25	0	0	0	0	0	0	0	0	0	0	0	0	0

Bicycle traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16:14	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	1	0	0	0	0	0	0	0	0	0	0	0	1
16:20	0	0	0	0	0	0	0	0	0	0	0	0	0
16:25	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0
16:35	0	0	0	0	0	0	0	0	0	0	0	0	0
16:40	0	0	0	0	0	0	0	0	0	0	1	0	1
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0
16:50	0	0	0	0	0	0	0	0	0	0	1	0	1
16:55	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0
17:05	0	0	0	0	0	0	0	0	0	0	0	0	0
17:10	0	0	0	0	0	0	1	0	0	0	0	0	1
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0
17:20	0	0	0	0	1	0	0	0	0	0	0	0	1
17:25	0	0	0	0	0	0	0	0	0	0	2	0	2

Pedestrian volumes

Interval starts	NE			NW			SW			SE			Total
	Left	Right	Total	Left	Right	Total	Left	Right	Total	Left	Right	Total	
16:14	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0
16:20	0	0	0	0	0	0	0	0	0	1	0	1	1
16:25	0	0	0	0	0	0	4	0	4	0	0	0	4
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0
16:35	0	0	0	0	0	0	0	0	0	0	0	0	0
16:40	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0
16:50	0	0	0	0	0	0	0	0	0	0	0	0	0
16:55	0	0	0	0	0	0	0	0	0	2	0	2	2
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0
17:05	0	0	0	0	0	0	0	0	0	0	0	0	0
17:10	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	2	2	0	0	0	2
17:20	0	0	0	0	0	0	0	0	0	1	0	1	1
17:25	0	0	0	0	0	0	0	0	0	0	0	0	0

Intersection Peak Hour

16:30 - 17:30

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	0	0	0	9	71	0	10	0	8	0	118	26	242
Factor	0.00	0.00	0.00	0.38	0.59	0.00	0.28	0.00	0.33	0.00	0.70	0.54	0.84
Approach Factor	0.00			0.67			0.38			0.75			

Peak Hour Vehicle Summary

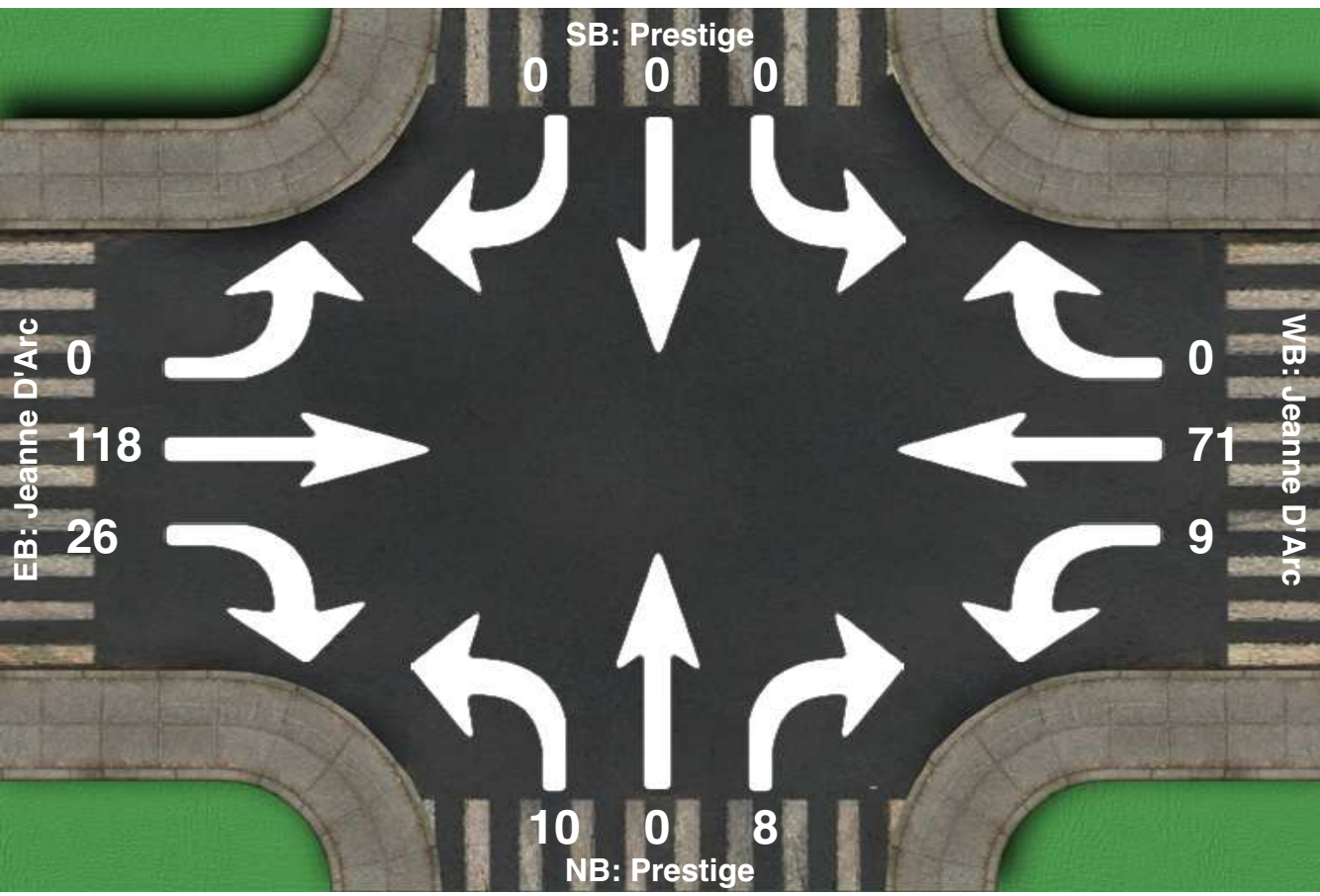
Vehicle	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Car	0	0	0	9	67	0	9	0	8	0	109	25	227
Truck	0	0	0	0	3	0	0	0	0	0	5	1	9
Bicycle	0	0	0	0	1	0	1	0	0	0	4	0	6

Peak Hour Pedestrians

	NE			NW			SW			SE			Total
	Left	Right	Total	Left	Right	Total	Left	Right	Total	Left	Right	Total	
Pedestrians	0	0	0	0	0	0	0	2	2	3	0	3	5

Intersection Peak Hour

Location: Prestige at Jeanne D'Arc, Ottawa
GPS Coordinates:
Date: 2017-09-13
Day of week: Wednesday
Weather: Sunny
Analyst: Rani Nahas



Intersection Peak Hour

16:30 - 17:30

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	0	0	0	9	71	0	10	0	8	0	118	26	242
Factor	0.00	0.00	0.00	0.38	0.59	0.00	0.28	0.00	0.33	0.00	0.70	0.54	0.84
Approach Factor	0.00			0.67			0.38			0.75			

Parsons
1223 Michael St
Ottawa , ON,

Turn Count Summary

Location: **Tenth Line at Jeanne D'Arc , Ottawa**
GPS Coordinates:
Date: **2017-09-14**
Day of week: **Thursday**
Weather: **Sunny**
Analyst: **Rani Nahas**

Total vehicle traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:11	0	0	0	5	6	0	4	0	2	0	4	3	24
07:15	0	0	0	7	3	1	2	0	1	0	0	8	22
07:20	0	0	0	7	7	0	8	0	3	0	3	8	36
07:25	0	2	0	6	9	0	10	0	4	0	1	11	43
07:30	0	0	0	2	4	1	13	0	0	0	2	8	30
07:35	0	0	0	4	9	0	8	0	4	0	4	8	37
07:40	0	0	0	4	9	0	8	0	3	0	1	8	33
07:45	0	0	0	5	7	0	16	0	0	0	1	8	37
07:50	0	0	0	2	2	0	16	0	2	0	4	8	34
07:55	0	0	0	7	6	0	7	0	5	0	7	11	43
08:00	0	0	0	9	4	0	16	0	4	0	2	8	43
08:05	0	0	0	7	2	0	13	0	5	0	5	4	36
08:10	0	0	0	6	10	1	14	0	0	0	0	7	38

Car traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:11	0	0	0	4	4	0	4	0	2	0	4	3	21
07:15	0	0	0	7	3	1	2	0	1	0	0	8	22
07:20	0	0	0	6	6	0	6	0	3	0	2	8	31
07:25	0	0	0	6	9	0	8	0	4	0	1	11	39
07:30	0	0	0	2	4	1	11	0	0	0	2	8	28
07:35	0	0	0	4	9	0	6	0	4	0	4	8	35
07:40	0	0	0	4	7	0	7	0	2	0	1	8	29
07:45	0	0	0	4	7	0	16	0	0	0	1	8	36
07:50	0	0	0	2	2	0	16	0	2	0	3	7	32
07:55	0	0	0	7	5	0	7	0	5	0	7	11	42
08:00	0	0	0	9	4	0	15	0	4	0	2	7	41
08:05	0	0	0	7	1	0	13	0	5	0	5	4	35
08:10	0	0	0	6	6	1	12	0	0	0	0	5	30

Truck traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:11	0	0	0	1	2	0	0	0	0	0	0	0	3
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0
07:20	0	0	0	1	1	0	1	0	0	0	1	0	4
07:25	0	0	0	0	0	0	1	0	0	0	0	0	1
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0
07:35	0	0	0	0	0	0	0	0	0	0	0	0	0
07:40	0	0	0	0	2	0	0	0	1	0	0	0	3
07:45	0	0	0	1	0	0	0	0	0	0	0	0	1
07:50	0	0	0	0	0	0	0	0	0	0	1	1	2
07:55	0	0	0	0	1	0	0	0	0	0	0	0	1
08:00	0	0	0	0	0	0	0	0	0	0	0	1	1
08:05	0	0	0	0	0	0	0	0	0	0	0	0	0
08:10	0	0	0	0	4	0	0	0	0	0	0	1	5

Bicycle traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:11	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0
07:20	0	0	0	0	0	0	1	0	0	0	0	0	1
07:25	0	2	0	0	0	0	1	0	0	0	0	0	3
07:30	0	0	0	0	0	0	2	0	0	0	0	0	2
07:35	0	0	0	0	0	0	2	0	0	0	0	0	2
07:40	0	0	0	0	0	0	1	0	0	0	0	0	1
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0
07:50	0	0	0	0	0	0	0	0	0	0	0	0	0
07:55	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	1	0	0	0	0	0	1
08:05	0	0	0	0	1	0	0	0	0	0	0	0	1
08:10	0	0	0	0	0	0	2	0	0	0	0	1	3

Pedestrian volumes

Interval starts	NE			NW			SW			SE			Total
	Left	Right	Total	Left	Right	Total	Left	Right	Total	Left	Right	Total	
07:11	0	0	0	0	0	0	0	0	0	1	0	1	1
07:15	0	0	0	0	0	0	0	1	1	0	0	0	1
07:20	0	0	0	0	0	0	0	0	0	0	0	0	0
07:25	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0
07:35	0	0	0	0	0	0	0	1	1	0	0	0	1
07:40	1	0	1	0	0	0	0	0	0	0	0	0	1
07:45	1	0	1	0	0	0	0	1	1	1	0	1	3
07:50	0	0	0	0	0	0	0	0	0	0	0	0	0
07:55	0	0	0	0	0	0	0	1	1	0	1	1	2
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0
08:05	0	0	0	0	0	0	0	0	0	0	0	0	0
08:10	0	0	0	0	0	0	0	0	0	0	0	0	0

Intersection Peak Hour

07:15 - 08:15

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	0	2	0	66	72	3	131	0	31	0	30	97	432
Factor	0.00	0.08	0.00	0.61	0.60	0.25	0.68	0.00	0.52	0.00	0.36	0.73	0.84
Approach Factor	0.08			0.69			0.68			0.59			

Peak Hour Vehicle Summary

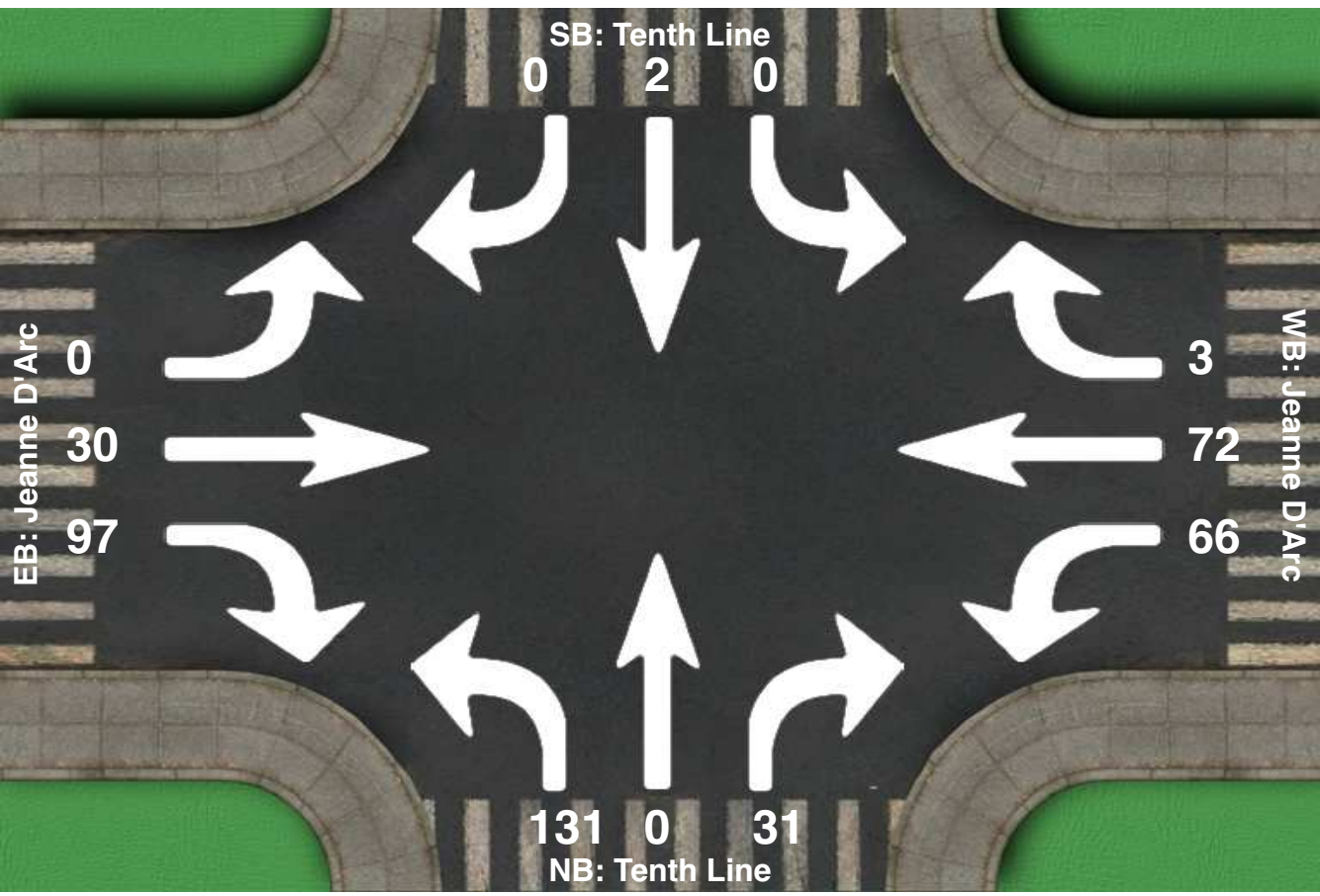
Vehicle	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Car	0	0	0	64	63	3	119	0	30	0	28	93	400
Truck	0	0	0	2	8	0	2	0	1	0	2	3	18
Bicycle	0	2	0	0	1	0	10	0	0	0	0	1	14

Peak Hour Pedestrians

	NE			NW			SW			SE			Total
	Left	Right	Total	Left	Right	Total	Left	Right	Total	Left	Right	Total	
Pedestrians	2	0	2	0	0	0	0	4	4	1	1	2	8

Intersection Peak Hour

Location: Tenth Line at Jeanne D'Arc , Ottawa
GPS Coordinates:
Date: 2017-09-14
Day of week: Thursday
Weather: Sunny
Analyst: Rani Nahas



Intersection Peak Hour

07:15 - 08:15

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	0	2	0	66	72	3	131	0	31	0	30	97	432
Factor	0.00	0.08	0.00	0.61	0.60	0.25	0.68	0.00	0.52	0.00	0.36	0.73	0.84
Approach Factor	0.08			0.69			0.68			0.59			

Parsons
1223 Michael St
Ottawa , ON,

Turn Count Summary

Location: **Tenth Line at Jeanne D'Arc, Ottawa**
GPS Coordinates:
Date: **2017-09-14**
Day of week: **Thursday**
Weather: **Sunny**
Analyst: **Rani Nahas**

Total vehicle traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16:27	0	1	0	5	2	1	3	0	4	0	4	3	23
16:30	0	0	0	6	3	0	9	0	7	0	8	7	40
16:35	0	1	0	5	3	0	15	0	7	0	6	8	45
16:40	0	1	0	6	2	0	13	0	5	0	8	12	47
16:45	0	0	0	13	1	0	9	0	6	0	14	7	50
16:50	0	1	0	8	5	0	21	0	6	0	8	13	62
16:55	0	0	0	4	3	0	15	0	9	0	12	10	53
17:00	0	0	0	4	4	0	13	0	9	0	4	5	39
17:05	0	0	0	9	6	0	13	0	10	0	7	9	54
17:10	0	0	0	7	3	0	10	0	13	0	5	6	44
17:15	0	1	0	7	7	1	16	0	7	0	5	10	54
17:20	0	0	0	6	1	0	15	0	7	0	8	17	54
17:25	0	0	0	5	3	0	15	0	9	0	4	9	45
17:30	0	0	0	1	1	0	2	0	2	0	0	2	8

Car traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16:27	0	0	0	5	1	1	3	0	4	0	3	3	20
16:30	0	0	0	6	3	0	9	0	7	0	8	6	39
16:35	0	0	0	5	2	0	14	0	7	0	5	8	41
16:40	0	0	0	6	2	0	13	0	5	0	6	12	44
16:45	0	0	0	13	1	0	8	0	6	0	12	7	47
16:50	0	0	0	8	5	0	21	0	6	0	6	11	57
16:55	0	0	0	4	3	0	15	0	9	0	10	10	51
17:00	0	0	0	4	4	0	11	0	8	0	4	5	36
17:05	0	0	0	9	6	0	13	0	10	0	6	9	53
17:10	0	0	0	7	3	0	10	0	13	0	5	6	44
17:15	0	0	0	7	6	1	16	0	7	0	5	10	52
17:20	0	0	0	6	1	0	15	0	7	0	7	16	52
17:25	0	0	0	5	3	0	15	0	9	0	4	9	45
17:30	0	0	0	1	1	0	2	0	2	0	0	2	8

Truck traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16:27	0	0	0	0	0	0	0	0	0	0	1	0	1
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0
16:35	0	0	0	0	1	0	0	0	0	0	1	0	2
16:40	0	0	0	0	0	0	0	0	0	0	1	0	1
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0
16:50	0	0	0	0	0	0	0	0	0	0	1	0	1
16:55	0	0	0	0	0	0	0	0	0	0	2	0	2
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0
17:05	0	0	0	0	0	0	0	0	0	0	1	0	1
17:10	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	1	0	0	0	0	0	0	0	1
17:20	0	0	0	0	0	0	0	0	0	0	1	0	1
17:25	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0

Bicycle traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16:27	0	1	0	0	1	0	0	0	0	0	0	0	2
16:30	0	0	0	0	0	0	0	0	0	0	0	1	1
16:35	0	1	0	0	0	0	1	0	0	0	0	0	2
16:40	0	1	0	0	0	0	0	0	0	0	1	0	2
16:45	0	0	0	0	0	0	1	0	0	0	2	0	3
16:50	0	1	0	0	0	0	0	0	0	0	1	2	4
16:55	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	2	0	1	0	0	0	3
17:05	0	0	0	0	0	0	0	0	0	0	0	0	0
17:10	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	1	0	0	0	0	0	0	0	0	0	0	1
17:20	0	0	0	0	0	0	0	0	0	0	0	1	1
17:25	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0

Pedestrian volumes

Interval starts	NE			NW			SW			SE			Total
	Left	Right	Total	Left	Right	Total	Left	Right	Total	Left	Right	Total	
16:27	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	1	1	1
16:35	0	0	0	0	0	0	0	1	1	0	1	1	2
16:40	0	0	0	0	0	0	0	0	0	1	1	2	2
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0
16:50	0	0	0	0	0	0	0	0	0	0	0	0	0
16:55	1	0	1	0	0	0	0	0	0	0	0	0	1
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0
17:05	0	0	0	0	1	1	0	0	0	0	0	0	1
17:10	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0
17:20	0	0	0	0	0	0	0	1	1	0	1	1	2
17:25	0	0	0	2	0	2	0	0	0	0	0	0	2
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0

Intersection Peak Hour

16:30 - 17:30

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	0	4	0	80	41	1	164	0	95	0	89	113	587
Factor	0.00	0.33	0.00	0.51	0.49	0.08	0.65	0.00	0.61	0.00	0.53	0.55	0.79
Approach Factor	0.33			0.68			0.80			0.67			

Peak Hour Vehicle Summary

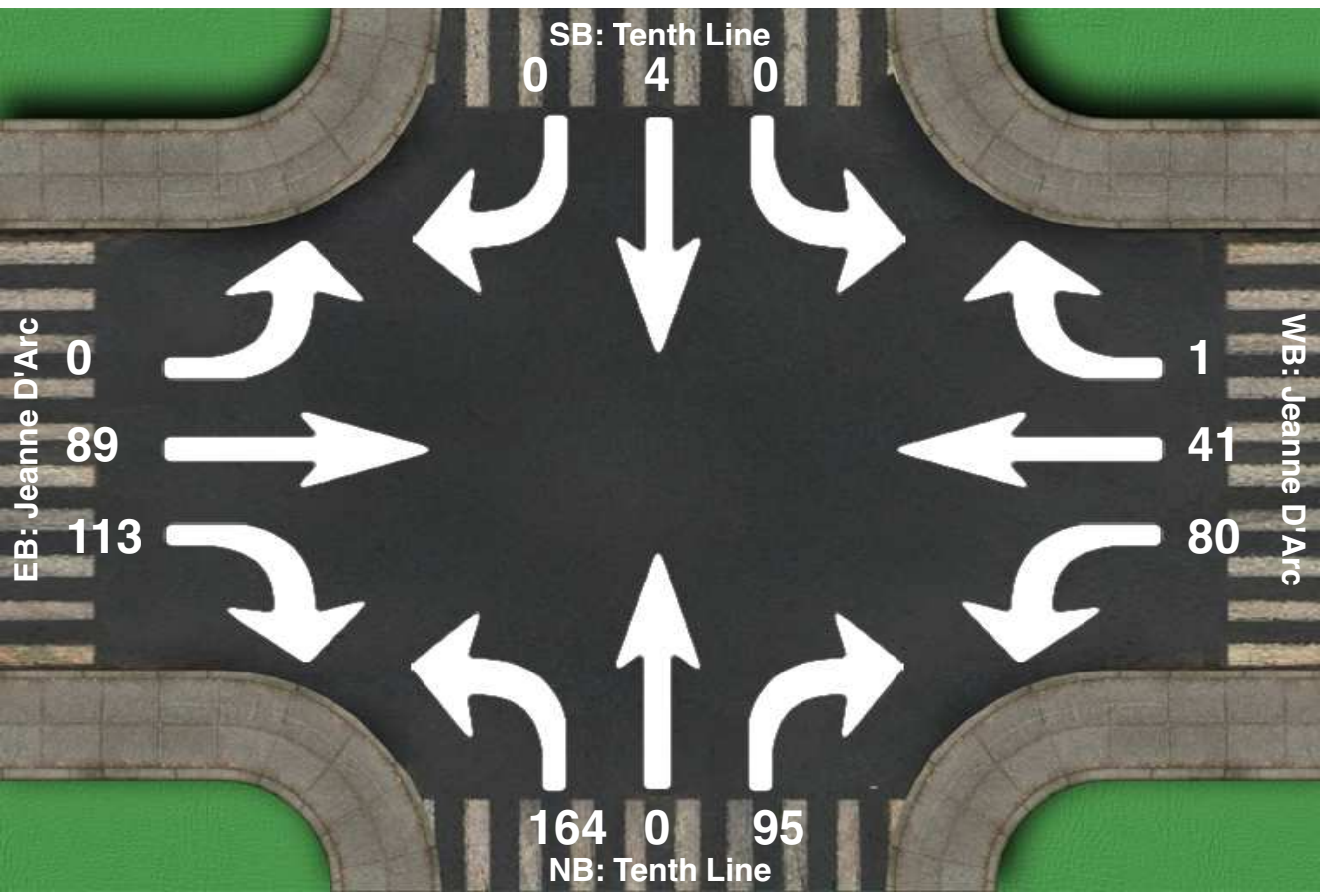
Vehicle	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Car	0	0	0	80	39	1	160	0	94	0	78	109	561
Truck	0	0	0	0	2	0	0	0	0	0	7	0	9
Bicycle	0	4	0	0	0	0	4	0	1	0	4	4	17

Peak Hour Pedestrians

	NE			NW			SW			SE			Total
	Left	Right	Total	Left	Right	Total	Left	Right	Total	Left	Right	Total	
Pedestrians	1	0	1	2	1	3	0	2	2	1	4	5	11

Intersection Peak Hour

Location: Tenth Line at Jeanne D'Arc, Ottawa
GPS Coordinates:
Date: 2017-09-14
Day of week: Thursday
Weather: Sunny
Analyst: Rani Nahas



Intersection Peak Hour

16:30 - 17:30

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	0	4	0	80	41	1	164	0	95	0	89	113	587
Factor	0.00	0.33	0.00	0.51	0.49	0.08	0.65	0.00	0.61	0.00	0.53	0.55	0.79
Approach Factor	0.33			0.68			0.80			0.67			

Appendix C

Collision Data

Total Area

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	2	0	0	0	0	0	0	0	2	67%
Non-fatal injury	0	0	0	0	0	1	0	0	1	33%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	**2**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**3**	100%
	#1 or 67%	#3 or 0%	#3 or 0%	#3 or 0%	#3 or 0%	#2 or 33%	#3 or 0%	#3 or 0%		

JEANNE D'ARC BLVD/NORTH SERVICE RD @ TENTH LIN

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
5	2	4,320	1825	**0.25**

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	2	0	0	0	0	0	0	0	2	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	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	100%
	100%	0%	0%	0%	0%	0%	0%	0%		

PRESTIGE CIR btwn JEANNE D'ARC BLVD N & PRESTIGE CIR

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
5	1	1,250	1825	**0.44**

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	0	0	0	0	0	0	0%
Non-fatal injury	0	0	0	0	0	1	0	0	1	100%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	100%
	0%	0%	0%	0%	0%	100%	0%	0%		

Appendix D

Synchro Analysis: Existing Conditions

Intersection	
Intersection Delay, s/veh	9
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	30	96	66	71	121	31
Future Vol, veh/h	30	96	66	71	121	31
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	33	107	73	79	134	34
Number of Lanes	1	0	1	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	8.5	8.8	9.5
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	100%	0%
Vol Thru, %	0%	0%	24%	0%	100%
Vol Right, %	0%	100%	76%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	121	31	126	66	71
LT Vol	121	0	0	66	0
Through Vol	0	0	30	0	71
RT Vol	0	31	96	0	0
Lane Flow Rate	134	34	140	73	79
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.214	0.043	0.176	0.115	0.112
Departure Headway (Hd)	5.741	4.536	4.535	5.628	5.126
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	625	788	791	637	700
Service Time	3.476	2.271	2.563	3.356	2.853
HCM Lane V/C Ratio	0.214	0.043	0.177	0.115	0.113
HCM Control Delay	10	7.5	8.5	9.1	8.5
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.8	0.1	0.6	0.4	0.4

Intersection	
Intersection Delay, s/veh	9.9
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	85	109	80	41	160	94
Future Vol, veh/h	85	109	80	41	160	94
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	94	121	89	46	178	104
Number of Lanes	1	0	1	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	10	9.4	10
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	100%	0%
Vol Thru, %	0%	0%	44%	0%	100%
Vol Right, %	0%	100%	56%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	160	94	194	80	41
LT Vol	160	0	0	80	0
Through Vol	0	0	85	0	41
RT Vol	0	94	109	0	0
Lane Flow Rate	178	104	216	89	46
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.292	0.137	0.294	0.148	0.07
Departure Headway (Hd)	5.916	4.709	4.915	6.008	5.504
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	604	756	729	595	648
Service Time	3.676	2.468	2.968	3.77	3.265
HCM Lane V/C Ratio	0.295	0.138	0.296	0.15	0.071
HCM Control Delay	11.1	8.2	10	9.8	8.7
HCM Lane LOS	B	A	A	A	A
HCM 95th-tile Q	1.2	0.5	1.2	0.5	0.2

Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	43	3	4	65	16	3
Future Vol, veh/h	43	3	4	65	16	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	450	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	48	3	4	72	18	3

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	51	0	128	48
Stage 1	-	-	-	-	48	-
Stage 2	-	-	-	-	80	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1555	-	866	1021
Stage 1	-	-	-	-	974	-
Stage 2	-	-	-	-	943	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1555	-	863	1021
Mov Cap-2 Maneuver	-	-	-	-	863	-
Stage 1	-	-	-	-	971	-
Stage 2	-	-	-	-	943	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	9.2
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	885	-	-	1555	-
HCM Lane V/C Ratio	0.024	-	-	0.003	-
HCM Control Delay (s)	9.2	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	114	26	9	70	9	8
Future Vol, veh/h	114	26	9	70	9	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	450	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	127	29	10	78	10	9

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	156	0	225	127
Stage 1	-	-	-	-	127	-
Stage 2	-	-	-	-	98	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1424	-	763	923
Stage 1	-	-	-	-	899	-
Stage 2	-	-	-	-	926	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1424	-	758	923
Mov Cap-2 Maneuver	-	-	-	-	758	-
Stage 1	-	-	-	-	893	-
Stage 2	-	-	-	-	926	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	9.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	828	-	-	1424	-
HCM Lane V/C Ratio	0.023	-	-	0.007	-
HCM Control Delay (s)	9.4	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Appendix E

MMLOS Analysis: Road Segments

Multi-Modal Level of Service - Segments Form

Consultant	**Parsons**	**Project**	**476705**
Scenario	**Prestige Circle**	**Date**	**9/25/2017**
Comments	**1 - Prestige, 3 - Jeanne,**		
	5 - Jeanne w/Sidewalk		

SEGMENTS		**Street A**	Prestige	Section	Jeanne North	Section	Jeanne South
			1	2	3	4	5
Pedestrian	Sidewalk Width Boulevard Width		≥ 2 m > 2 m		no sidewalk n/a		≥ 2 m < 0.5
	Avg Daily Curb Lane Traffic Volume		≤ 3000		≤ 3000		≤ 3000
	Operating Speed On-Street Parking		> 30 to 50 km/h yes		> 50 to 60 km/h no		> 50 to 60 km/h no
	Exposure to Traffic PLoS	**-**	**A**	-	**F**	-	**C**
	Effective Sidewalk Width						
	Pedestrian Volume						
	Crowding PLoS		-	-	-	-	-
	Level of Service		**-**	**-**	**-**	**-**	**-**
Bicycle	Type of Cycling Facility		Mixed Traffic		Mixed Traffic		Mixed Traffic
	Number of Travel Lanes		≤ 2 (no centreline)		≤ 2 (no centreline)		≤ 2 (no centreline)
	Operating Speed		≤ 40 km/h		≥ 50 to 60 km/h		≥ 50 to 60 km/h
	# of Lanes & Operating Speed LoS		**A**	-	**D**	-	**D**
	Bike Lane (+ Parking Lane) Width						
	Bike Lane Width LoS	**D**	-	-	-	-	-
	Bike Lane Blockages						
	Blockage LoS		-	-	-	-	-
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge		< 1.8 m refuge		< 1.8 m refuge
	No. of Lanes at Unsignalized Crossing		≤ 3 lanes		≤ 3 lanes		≤ 3 lanes
	Sidestreet Operating Speed		≤ 40 km/h		>50 to 60 km/h		>50 to 60 km/h
	Unsignalized Crossing - Lowest LoS		**A**	-	**B**	-	**B**
	Level of Service		**A**	**-**	**D**	**-**	**D**
Transit	Facility Type				Mixed Traffic		Mixed Traffic
	Friction or Ratio Transit:Posted Speed	**D**			Vt/Vp ≥ 0.8		Vt/Vp ≥ 0.8
	Level of Service		**-**	**-**	**D**	**-**	**D**
Truck	Truck Lane Width		> 3.7 m		≤ 3.5 m		≤ 3.5 m
	Travel Lanes per Direction	**C**	1		1		1
	Level of Service		**B**	**-**	**C**	**-**	**C**

Appendix F

TDM Measures

TDM-Supportive Development Design and Infrastructure Checklist:
Residential Developments (multi-family or condominium)

Legend

REQUIRED	The Official Plan or Zoning By-law provides related guidance that must be followed
BASIC	The measure is generally feasible and effective, and in most cases would benefit the development and its users
BETTER	The measure could maximize support for users of sustainable modes, and optimize development performance

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	1.	**WALKING & CYCLING: ROUTES**	
	1.1	**Building location & access points**	
BASIC	1.1.1	Locate building close to the street, and do not locate parking areas between the street and building entrances	☑
BASIC	1.1.2	Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	☑
BASIC	1.1.3	Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	☑
	1.2	**Facilities for walking & cycling**	
REQUIRED	1.2.1	Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations *(see Official Plan policy 4.3.3)*	☑
REQUIRED	1.2.2	Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major building entrances; providing walkways from public streets to major building entrances; within a site, providing walkways along the front of adjoining buildings, between adjacent buildings, and connecting areas where people may congregate, such as courtyards and transit stops; and providing weather protection through canopies, colonnades, and other design elements wherever possible *(see Official Plan policy 4.3.12)*	☑

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
REQUIRED	1.2.3	Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas from vehicle areas, and provide marked pedestrian crosswalks at intersection sidewalks *(see Official Plan policy 4.3.10)*	☑
REQUIRED	1.2.4	Make sidewalks and open space areas easily accessible through features such as gradual grade transition, depressed curbs at street corners and convenient access to extra-wide parking spaces and ramps *(see Official Plan policy 4.3.10)*	☑
REQUIRED	1.2.5	Include adequately spaced inter-block/street cycling and pedestrian connections to facilitate travel by active transportation. Provide links to the existing or planned network of public sidewalks, multi-use pathways and on-road cycle routes. Where public sidewalks and multi-use pathways intersect with roads, consider providing traffic control devices to give priority to cyclists and pedestrians *(see Official Plan policy 4.3.11)*	☑
BASIC	1.2.6	Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	☑
BASIC	1.2.7	Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	☑
BASIC	1.2.8	Design roads used for access or circulation by cyclists using a target operating speed of no more than 30 km/h, or provide a separated cycling facility	☐
	1.3	**Amenities for walking & cycling**	
BASIC	1.3.1	Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails	☑
BASIC	1.3.2	Provide wayfinding signage for site access (where required, e.g. when multiple buildings or entrances exist) and egress (where warranted, such as when directions to reach transit stops/stations, trails or other common destinations are not obvious)	☐

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	2.	**WALKING & CYCLING: END-OF-TRIP FACILITIES**	
	2.1	**Bicycle parking**	
REQUIRED	2.1.1	Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible *(see Official Plan policy 4.3.6)*	☑
REQUIRED	2.1.2	Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas *(see Zoning By-law Section 111)*	☑
REQUIRED	2.1.3	Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored *(see Zoning By-law Section 111)*	☑
BASIC	2.1.4	Provide bicycle parking spaces equivalent to the expected number of resident-owned bicycles, plus the expected peak number of visitor cyclists	☐
	2.2	**Secure bicycle parking**	
REQUIRED	2.2.1	Where more than 50 bicycle parking spaces are provided for a single residential building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers *(see Zoning By-law Section 111)*	☑
BETTER	2.2.2	Provide secure bicycle parking spaces equivalent to at least the number of units at condominiums or multi-family residential developments	☐
	2.3	**Bicycle repair station**	
BETTER	2.3.1	Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	☐
	3.	**TRANSIT**	
	3.1	**Customer amenities**	
BASIC	3.1.1	Provide shelters, lighting and benches at any on-site transit stops	☐
BASIC	3.1.2	Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	☐
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	4.	**RIDESHARING**	
	4.1	**Pick-up & drop-off facilities**	
BASIC	4.1.1	Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	☐
	5.	**CARSHARING & BIKESHARING**	
	5.1	**Carshare parking spaces**	
BETTER	5.1.1	Provide up to three carshare parking spaces in an R3, R4 or R5 Zone for specified residential uses *(see Zoning By-law Section 94)*	☐
	5.2	**Bikeshare station location**	
BETTER	5.2.1	Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	☐
	6.	**PARKING**	
	6.1	**Number of parking spaces**	
REQUIRED	6.1.1	Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	☑
BASIC	6.1.2	Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	☑
BASIC	6.1.3	Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly *(see Zoning By-law Section 104)*	☐
BETTER	6.1.4	Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking *(see Zoning By-law Section 111)*	☐
	6.2	**Separate long-term & short-term parking areas**	
BETTER	6.2.1	Provide separate areas for short-term and long-term parking (using signage or physical barriers) to permit access controls and simplify enforcement (i.e. to discourage residents from parking in visitor spaces, and vice versa)	☐

Appendix G

Synchro Analysis: Background Conditions

Intersection	
Intersection Delay, s/veh	9.1
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	48	96	112	92	121	72
Future Vol, veh/h	48	96	112	92	121	72
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	48	96	112	92	121	72
Number of Lanes	1	0	1	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	8.8	9.2	9.3
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	100%	0%
Vol Thru, %	0%	0%	33%	0%	100%
Vol Right, %	0%	100%	67%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	121	72	144	112	92
LT Vol	121	0	0	112	0
Through Vol	0	0	48	0	92
RT Vol	0	72	96	0	0
Lane Flow Rate	121	72	144	112	92
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.198	0.094	0.188	0.177	0.133
Departure Headway (Hd)	5.895	4.688	4.703	5.688	5.185
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	609	762	762	631	691
Service Time	3.637	2.43	2.741	3.425	2.922
HCM Lane V/C Ratio	0.199	0.094	0.189	0.177	0.133
HCM Control Delay	10.1	7.9	8.8	9.7	8.7
HCM Lane LOS	B	A	A	A	A
HCM 95th-tile Q	0.7	0.3	0.7	0.6	0.5

Intersection	
Intersection Delay, s/veh	10.1
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	110	109	112	92	160	149
Future Vol, veh/h	110	109	112	92	160	149
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	110	109	112	92	160	149
Number of Lanes	1	0	1	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	10.5	9.8	10.1
HCM LOS	B	A	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	100%	0%
Vol Thru, %	0%	0%	50%	0%	100%
Vol Right, %	0%	100%	50%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	160	149	219	112	92
LT Vol	160	0	0	112	0
Through Vol	0	0	110	0	92
RT Vol	0	149	109	0	0
Lane Flow Rate	160	149	219	112	92
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.271	0.203	0.31	0.189	0.142
Departure Headway (Hd)	6.108	4.9	5.097	6.079	5.575
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	584	726	701	586	638
Service Time	3.883	2.674	3.167	3.858	3.353
HCM Lane V/C Ratio	0.274	0.205	0.312	0.191	0.144
HCM Control Delay	11.2	8.9	10.5	10.3	9.3
HCM Lane LOS	B	A	B	B	A
HCM 95th-tile Q	1.1	0.8	1.3	0.7	0.5

Intersection	
Int Delay, s/veh	2.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	93	12	6	104	44	10
Future Vol, veh/h	93	12	6	104	44	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	450	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	93	12	6	104	44	10

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	105	0	209	93
Stage 1	-	-	-	-	93	-
Stage 2	-	-	-	-	116	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1486	-	779	964
Stage 1	-	-	-	-	931	-
Stage 2	-	-	-	-	909	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1486	-	776	964
Mov Cap-2 Maneuver	-	-	-	-	776	-
Stage 1	-	-	-	-	927	-
Stage 2	-	-	-	-	909	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	9.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	805	-	-	1486	-
HCM Lane V/C Ratio	0.067	-	-	0.004	-
HCM Control Delay (s)	9.8	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	158	64	19	125	33	14
Future Vol, veh/h	158	64	19	125	33	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	450	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	158	64	19	125	33	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	222	0	321	158
Stage 1	-	-	-	-	158	-
Stage 2	-	-	-	-	163	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1347	-	673	887
Stage 1	-	-	-	-	871	-
Stage 2	-	-	-	-	866	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1347	-	663	887
Mov Cap-2 Maneuver	-	-	-	-	663	-
Stage 1	-	-	-	-	858	-
Stage 2	-	-	-	-	866	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1	10.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	717	-	-	1347	-
HCM Lane V/C Ratio	0.066	-	-	0.014	-
HCM Control Delay (s)	10.4	-	-	7.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Intersection Delay, s/veh	9.9
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	80	96	153	116	121	146
Future Vol, veh/h	80	96	153	116	121	146
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	80	96	153	116	121	146
Number of Lanes	1	0	1	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	9.8	10.1	9.7
HCM LOS	A	B	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	100%	0%
Vol Thru, %	0%	0%	45%	0%	100%
Vol Right, %	0%	100%	55%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	121	146	176	153	116
LT Vol	121	0	0	153	0
Through Vol	0	0	80	0	116
RT Vol	0	146	96	0	0
Lane Flow Rate	121	146	176	153	116
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.207	0.201	0.246	0.251	0.174
Departure Headway (Hd)	6.155	4.946	5.036	5.915	5.411
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	581	720	708	604	659
Service Time	3.921	2.712	3.103	3.683	3.178
HCM Lane V/C Ratio	0.208	0.203	0.249	0.253	0.176
HCM Control Delay	10.5	9	9.8	10.7	9.3
HCM Lane LOS	B	A	A	B	A
HCM 95th-tile Q	0.8	0.7	1	1	0.6

Intersection	
Intersection Delay, s/veh	11.5
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	135	109	208	98	160	194
Future Vol, veh/h	135	109	208	98	160	194
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	135	109	208	98	160	194
Number of Lanes	1	0	1	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	11.8	11.8	11
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	100%	0%
Vol Thru, %	0%	0%	55%	0%	100%
Vol Right, %	0%	100%	45%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	160	194	244	208	98
LT Vol	160	0	0	208	0
Through Vol	0	0	135	0	98
RT Vol	0	194	109	0	0
Lane Flow Rate	160	194	244	208	98
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.292	0.288	0.373	0.368	0.16
Departure Headway (Hd)	6.566	5.353	5.507	6.374	5.868
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	549	671	654	566	613
Service Time	4.293	3.08	3.533	4.1	3.594
HCM Lane V/C Ratio	0.291	0.289	0.373	0.367	0.16
HCM Control Delay	12	10.2	11.8	12.8	9.7
HCM Lane LOS	B	B	B	B	A
HCM 95th-tile Q	1.2	1.2	1.7	1.7	0.6

Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	202	12	6	168	44	10
Future Vol, veh/h	202	12	6	168	44	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	450	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	202	12	6	168	44	10

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	214	0	382	202
Stage 1	-	-	-	-	202	-
Stage 2	-	-	-	-	180	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1356	-	620	839
Stage 1	-	-	-	-	832	-
Stage 2	-	-	-	-	851	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1356	-	617	839
Mov Cap-2 Maneuver	-	-	-	-	617	-
Stage 1	-	-	-	-	828	-
Stage 2	-	-	-	-	851	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	11.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	649	-	-	1356	-
HCM Lane V/C Ratio	0.083	-	-	0.004	-
HCM Control Delay (s)	11.1	-	-	7.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	232	64	19	238	33	14
Future Vol, veh/h	232	64	19	238	33	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	450	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	232	64	19	238	33	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	296	0	508	232
Stage 1	-	-	-	-	232	-
Stage 2	-	-	-	-	276	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1265	-	525	807
Stage 1	-	-	-	-	807	-
Stage 2	-	-	-	-	771	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1265	-	516	807
Mov Cap-2 Maneuver	-	-	-	-	516	-
Stage 1	-	-	-	-	793	-
Stage 2	-	-	-	-	771	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	11.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	578	-	-	1265	-
HCM Lane V/C Ratio	0.081	-	-	0.015	-
HCM Control Delay (s)	11.8	-	-	7.9	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Appendix H

Synchro Analysis: Future Conditions

Intersection	
Intersection Delay, s/veh	9.4
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	51	96	147	100	121	83
Future Vol, veh/h	51	96	147	100	121	83
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	51	96	147	100	121	83
Number of Lanes	1	0	1	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	9	9.7	9.4
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	100%	0%
Vol Thru, %	0%	0%	35%	0%	100%
Vol Right, %	0%	100%	65%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	121	83	147	147	100
LT Vol	121	0	0	147	0
Through Vol	0	0	51	0	100
RT Vol	0	83	96	0	0
Lane Flow Rate	121	83	147	147	100
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.202	0.111	0.196	0.234	0.145
Departure Headway (Hd)	6.013	4.806	4.793	5.724	5.221
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	595	743	745	626	685
Service Time	3.765	2.557	2.841	3.47	2.966
HCM Lane V/C Ratio	0.203	0.112	0.197	0.235	0.146
HCM Control Delay	10.3	8.2	9	10.2	8.9
HCM Lane LOS	B	A	A	B	A
HCM 95th-tile Q	0.7	0.4	0.7	0.9	0.5

Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	119	109	157	70	160	187
Future Vol, veh/h	119	109	157	70	160	187
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	119	109	157	70	160	187
Number of Lanes	1	0	1	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	10.9	10.7	10.4
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	100%	0%
Vol Thru, %	0%	0%	52%	0%	100%
Vol Right, %	0%	100%	48%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	160	187	228	157	70
LT Vol	160	0	0	157	0
Through Vol	0	0	119	0	70
RT Vol	0	187	109	0	0
Lane Flow Rate	160	187	228	157	70
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.276	0.26	0.331	0.27	0.111
Departure Headway (Hd)	6.211	5.002	5.234	6.188	5.683
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	573	711	679	575	624
Service Time	4.003	2.792	3.322	3.986	3.48
HCM Lane V/C Ratio	0.279	0.263	0.336	0.273	0.112
HCM Control Delay	11.4	9.6	10.9	11.3	9.2
HCM Lane LOS	B	A	B	B	A
HCM 95th-tile Q	1.1	1	1.4	1.1	0.4

Intersection	
Int Delay, s/veh	3.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	93	26	9	104	87	21
Future Vol, veh/h	93	26	9	104	87	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	450	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	93	26	9	104	87	21

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	119	0	215	93
Stage 1	-	-	-	-	93	-
Stage 2	-	-	-	-	122	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1469	-	773	964
Stage 1	-	-	-	-	931	-
Stage 2	-	-	-	-	903	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1469	-	768	964
Mov Cap-2 Maneuver	-	-	-	-	768	-
Stage 1	-	-	-	-	924	-
Stage 2	-	-	-	-	903	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	10.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	800	-	-	1469	-
HCM Lane V/C Ratio	0.135	-	-	0.006	-
HCM Control Delay (s)	10.2	-	-	7.5	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	158	111	31	125	63	21
Future Vol, veh/h	158	111	31	125	63	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	450	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	158	111	31	125	63	21

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	269	0	345	158
Stage 1	-	-	-	-	158	-
Stage 2	-	-	-	-	187	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1295	-	652	887
Stage 1	-	-	-	-	871	-
Stage 2	-	-	-	-	845	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1295	-	635	887
Mov Cap-2 Maneuver	-	-	-	-	635	-
Stage 1	-	-	-	-	848	-
Stage 2	-	-	-	-	845	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.6	11
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	684	-	-	1295	-
HCM Lane V/C Ratio	0.123	-	-	0.024	-
HCM Control Delay (s)	11	-	-	7.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0.1	-

Intersection	
Intersection Delay, s/veh	10.2
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	83	96	188	124	121	157
Future Vol, veh/h	83	96	188	124	121	157
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	83	96	188	124	121	157
Number of Lanes	1	0	1	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	10	10.6	9.9
HCM LOS	A	B	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	100%	0%
Vol Thru, %	0%	0%	46%	0%	100%
Vol Right, %	0%	100%	54%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	121	157	179	188	124
LT Vol	121	0	0	188	0
Through Vol	0	0	83	0	124
RT Vol	0	157	96	0	0
Lane Flow Rate	121	157	179	188	124
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.211	0.221	0.255	0.311	0.188
Departure Headway (Hd)	6.271	5.061	5.127	5.955	5.451
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	569	703	695	600	652
Service Time	4.051	2.841	3.209	3.734	3.23
HCM Lane V/C Ratio	0.213	0.223	0.258	0.313	0.19
HCM Control Delay	10.7	9.3	10	11.4	9.5
HCM Lane LOS	B	A	A	B	A
HCM 95th-tile Q	0.8	0.8	1	1.3	0.7

Intersection	
Intersection Delay, s/veh	12.2
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	144	109	232	104	160	232
Future Vol, veh/h	144	109	232	104	160	232
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	144	109	232	104	160	232
Number of Lanes	1	0	1	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	12.4	12.7	11.6
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	100%	0%
Vol Thru, %	0%	0%	57%	0%	100%
Vol Right, %	0%	100%	43%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	160	232	253	232	104
LT Vol	160	0	0	232	0
Through Vol	0	0	144	0	104
RT Vol	0	232	109	0	0
Lane Flow Rate	160	232	253	232	104
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.298	0.353	0.399	0.42	0.174
Departure Headway (Hd)	6.694	5.479	5.674	6.514	6.008
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	538	657	635	552	598
Service Time	4.431	3.216	3.707	4.248	3.741
HCM Lane V/C Ratio	0.297	0.353	0.398	0.42	0.174
HCM Control Delay	12.3	11.2	12.4	13.9	10
HCM Lane LOS	B	B	B	B	A
HCM 95th-tile Q	1.2	1.6	1.9	2.1	0.6

Intersection	
Int Delay, s/veh	2.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	202	26	9	168	87	21
Future Vol, veh/h	202	26	9	168	87	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	450	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	202	26	9	168	87	21

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	228	0	388	202
Stage 1	-	-	-	-	202	-
Stage 2	-	-	-	-	186	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1340	-	616	839
Stage 1	-	-	-	-	832	-
Stage 2	-	-	-	-	846	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1340	-	612	839
Mov Cap-2 Maneuver	-	-	-	-	612	-
Stage 1	-	-	-	-	826	-
Stage 2	-	-	-	-	846	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	11.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	646	-	-	1340	-
HCM Lane V/C Ratio	0.167	-	-	0.007	-
HCM Control Delay (s)	11.7	-	-	7.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.6	-	-	0	-

Intersection	
Int Delay, s/veh	1.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	232	111	31	238	63	21
Future Vol, veh/h	232	111	31	238	63	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	450	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	232	111	31	238	63	21

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	343	0	532	232
Stage 1	-	-	-	-	232	-
Stage 2	-	-	-	-	300	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1216	-	508	807
Stage 1	-	-	-	-	807	-
Stage 2	-	-	-	-	752	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1216	-	493	807
Mov Cap-2 Maneuver	-	-	-	-	493	-
Stage 1	-	-	-	-	784	-
Stage 2	-	-	-	-	752	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	12.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	546	-	-	1216	-
HCM Lane V/C Ratio	0.154	-	-	0.025	-
HCM Control Delay (s)	12.8	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0.1	-