

**LTR INDUSTRIES
2610 RIDEAU ROAD
OTTAWA, ONTARIO**

TRANSPORTATION IMPACT ASSESSMENT

Prepared for:

LTR Industries (Ottawa) Ltd.
2610 Rideau Road
Ottawa, ON K1X 1A1

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**LTR INDUSTRIES
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TRANSPORTATION IMPACT ASSESSMENT

STEP 1 - SCREENING

A Screening Form has been prepared for the proposed addition building to the industrial land use at 2610 Rideau Road. The Screening Form, which is included as Exhibit 1.1 in the Appendix, determined that the Safety Trigger has been triggered. It is recommended that the assessment study proceed to the Scoping Document. The following will address the requirements of the Scoping Document.

STEP 2 - SCOPING

MODULE 2.1 – Existing and Planned Conditions

Element 2.1.1 – Proposed Development

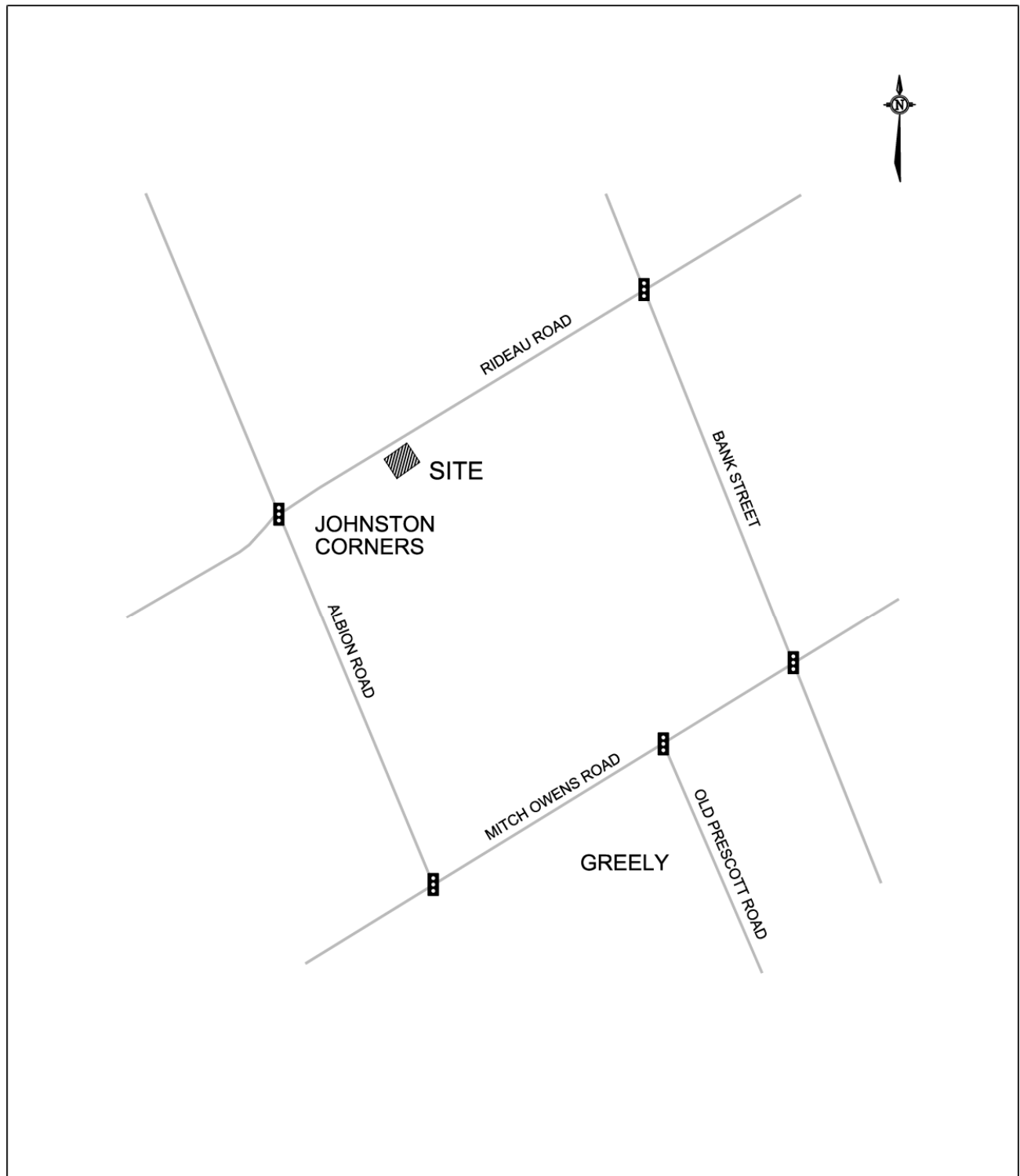
The LTR Industries is a commercial millwork cabinet shop located at 2610 Rideau Road in the former City of Gloucester. The shop is situated on the south side of Rideau Road approximately 530 m east of the intersection of Rideau Road and Albion Road. The property is 2.00 ha in size and currently has an existing millwork shop and office which are housed in a one storey building with a gross floor area of approximately 964 m². The site has two existing accesses onto Rideau Road which has a 40 m separation. Figure 2.1 shows the location of the site.

The owner is in the process of preparing a Site Plan Application for the addition of a new building structure which would provide additional space for the manufacturing equipment and storage of materials and would increase the size of the manufacturing facility. The proposed building will consist of one single storey building which would be constructed in two phases. The gross floor area of the proposed building is detailed below:

Phase 1	2,287 m ²	24,608 ft ²
Phase 2	<u>2,351 m²</u>	<u>25,297 ft²</u>
Total Gross Floor Area	4,638 m ²	49,905 ft ²

The site will be developed in two stages with the completion of Phase 1 expected by 2020 and Phase 2 by approximately 2025. The site will retain the two site accesses onto Rideau Road. The west access will be relocated 9 m east of its present location, with a separation of 90 m between the east access and west access. Both accesses

FIGURE 2.1
SITE LOCATION PLAN



NOT TO SCALE

will have a pavement width of 6.7 m. Figure 2.2 provides a conceptual site plan of the proposed site addition.

The property is currently zoned RG1[242r] “Rural General Industrial Zone” which will support the proposed Site Plan Application.

Element 2.1.2 – Existing Conditions

The LTR Industries millwork shop is located on the south side of Rideau Road, east of Albion Road. Rideau Road is under the jurisdiction of the City of Ottawa and is designated as a collector road in the City’s *Transportation Master Plan* (TMP). Rideau Road in the vicinity of the site is a two lane rural road with a 7.0 m asphalt pavement width and 2.5 m gravel shoulders.

Rideau Road has no pedestrian sidewalks or cycling facilities. The City of Ottawa TMP does not designate Rideau Road as being part of the rural cycling network.

Collision reports were obtained from the City of Ottawa through Open Data Ottawa for the five year time period between the years January 1, 2013 and December 31, 2017. The reports were for the Rideau Road segment between Albion Road and Bank Street. During the five year period there were 3 reported collisions. Table 2.1 summarizes the collisions by year and type.

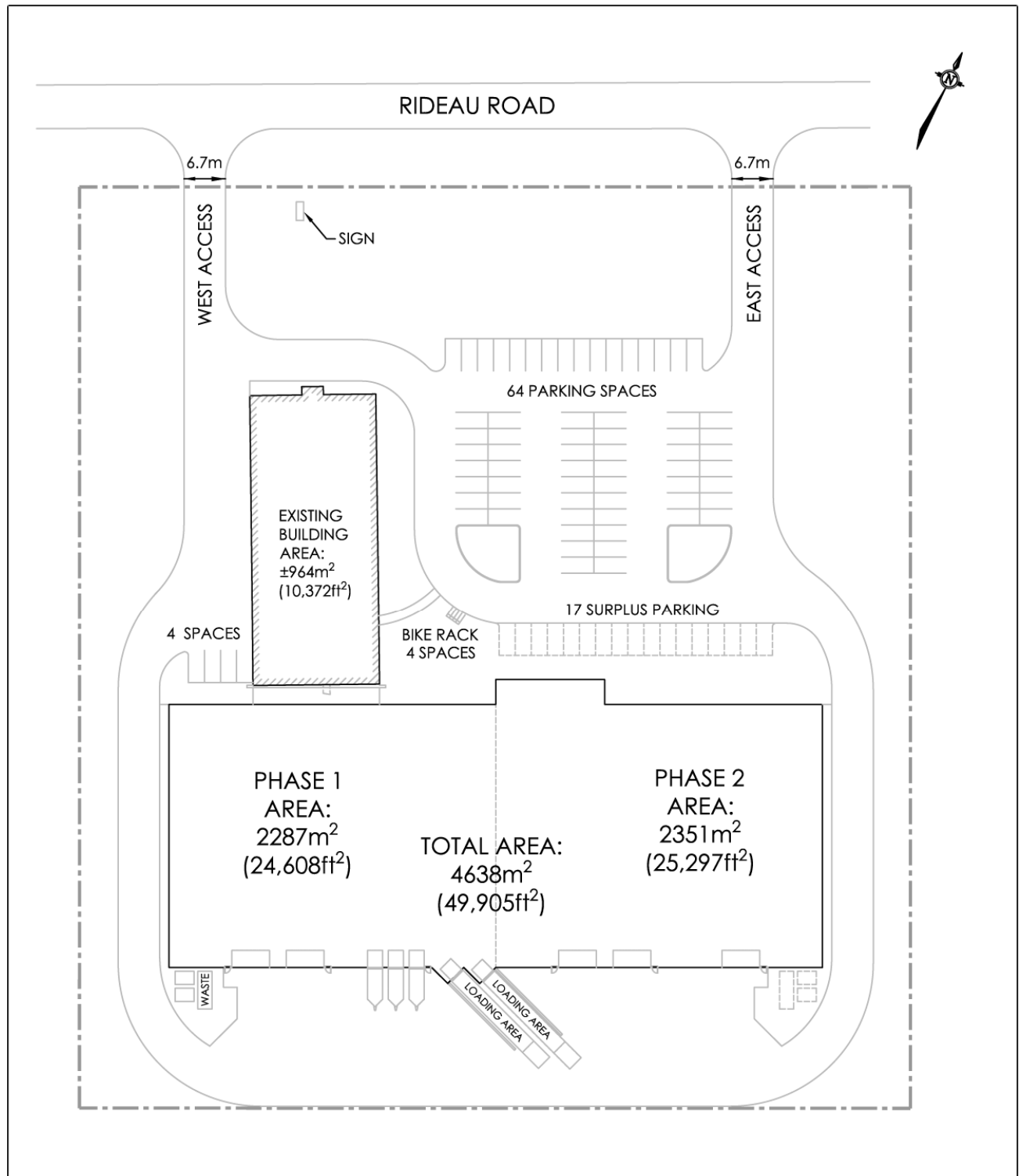
**TABLE 2.1
COLLISION SUMMARY**

YEAR	COLLISION TYPE					TOTAL
	REAR END	ANGULAR	TURNING	SIDESWIPE	OTHER (SMV)	
Rideau Road between Albion Road and Bank Street						
2013						0
2014					1	1
2015				1		1
2016			1			1
2017						0

OC Transpo does not provide regular transit service along Rideau Road or along Bank Street or Albion Road within walking distance of the site.

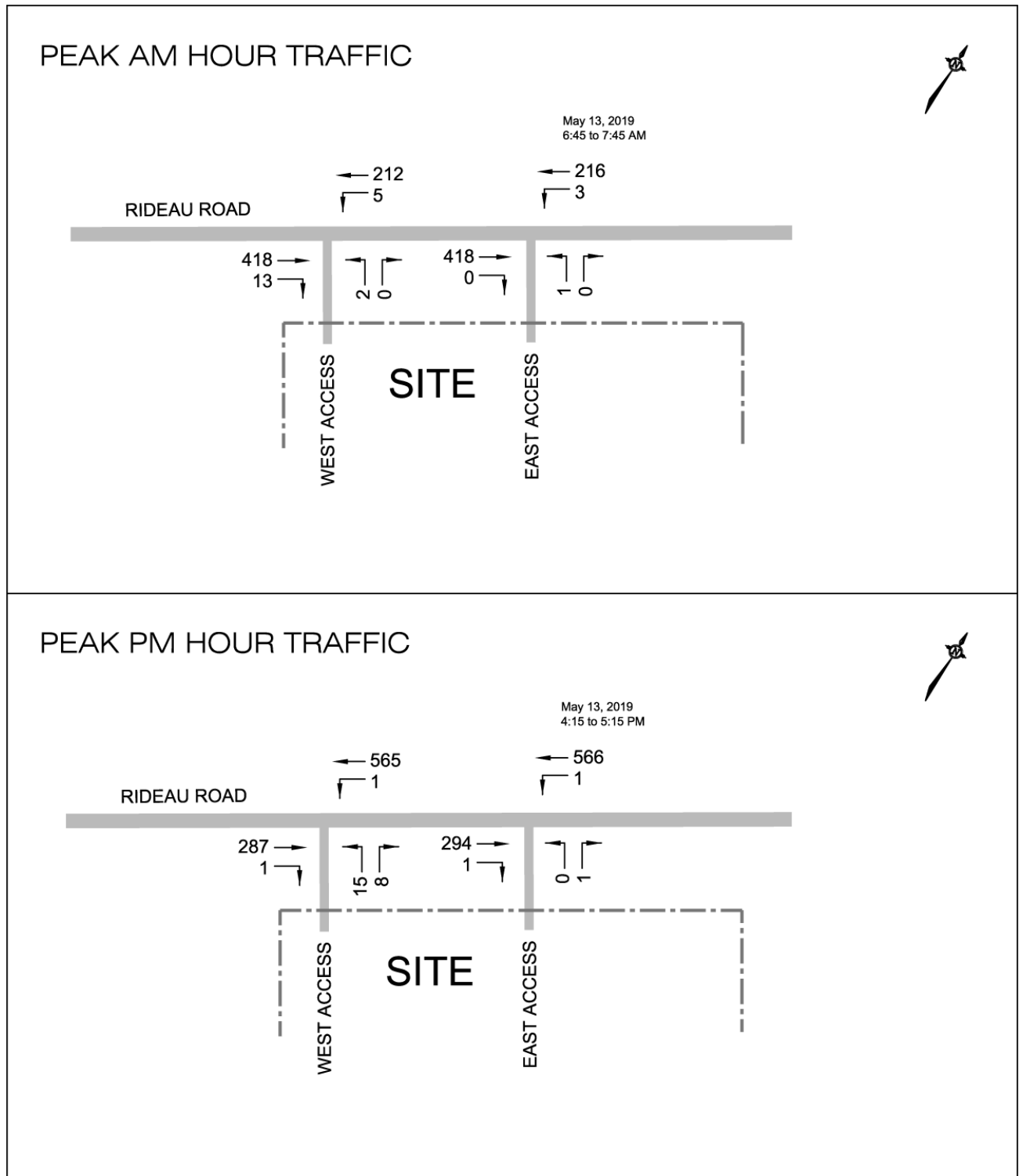
Traffic counts were taken by the consultant on May 13, 2019 at the east and west site accesses onto Rideau Road. The traffic counts are presented in the Appendix as Exhibit 2.1 for the West Access and Exhibit 2.2 for the East Access. Figure 2.3 shows the AM and PM peak hour traffic along Rideau Road past the site.

FIGURE 2.2
CONCEPTUAL SITE PLAN



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FIGURE 2.3
2019 AM AND PM PEAK HOUR TRAFFIC COUNTS



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Element 2.1.3 – Planned Conditions

The *Transportation Master Plan 2013* (TMP) has identified the widening of Bank Street from Leitrim Road to Rideau Road within the Roadway Network - 2031 Affordable Network. The widening will be from a two lane road to a four lane road with Phase 2 from Leitrim Road to Blais Road scheduled between 2020 and 2025, and Phase 3 from Blais Road to Rideau Road scheduled between 2025 and 2031. The widening would provide capacity for growth in the Leitrim area.

Other development planned in the area is the expansion of the Rideau Carleton Raceway Casino located along Albion Road approximately 1 kilometre north of Rideau Road. The expansion would include additional gaming tables, a theatre, and a nine storey hotel.

MODULE 2.2 – Study Area and Time Periods

Element 2.2.1 – Study Area

The proposed development would consist of an additional building which will house manufacturing equipment and provide additional storage. With the TIA triggering only the safety trigger in the Screening Form (Rideau Road bordering the site has a posted speed limit of 80 km./h.), the study area of the TIA would be confined to the location, safety and operation of the two site accesses onto Rideau Road.

Element 2.2.2 – Time Periods

The time period for the analysis would be the weekday peak AM and PM time periods of traffic which would occur during the peak hours of the adjacent street traffic when drivers are travelling to and from work. The hours of the millwork shop are between 7:00 - 8:00 AM and 4:00 – 5:00 PM, Monday through Friday. The commercial millwork shop is not open Saturdays or Sundays.

Element 2.2.3 – Horizon Years

The TIA will address the impact of the additional building for the millwork operation. Phase 2 of the development is expected to be completed and operational by the year 2025. The analysis will further examine the impact at the year 2030 which is five years beyond the total completion of the building addition.

MODULE 2.3 – Exemptions Review

The exemptions, which provide possible reductions to the scope of work of the TIA Study, were examined using Table 4: Possible Exemptions which is provided in the City's *Transportation Impact Assessment Guidelines (2017)*. Utilizing the table, the following lists the possible exemptions proposed for the TIA Study report:

MODULE	ELEMENT	EXEMPTION CONSIDERATIONS
Design Review Component		
4.1 Development Design	4.1.2 Circulation and Access	No – The site will use the two existing site accesses. The operation and circulation will be examined.
	4.1.3 New Street Networks	Yes - Only required for subdivisions.
4.2 Parking	4.2.1 Parking Supply	No – The parking supply and demand will be examined along with the circulation of traffic within the site.
	4.2.2 Spillover Parking	Yes – The plan will provide adequate on-site parking. For the expected number of employees. Spillover parking will not to be a problem.
Network Impact Component		
4.5 Transportation Demand Management	All Elements	Yes – The proposed development would generate fewer than 60 employees, and the rural site location would not benefit from TDM measures.
4.6 Neighbourhood Traffic Management	4.6.1 Adjacent Neighbourhoods	Yes – The site will have access onto a collector road and would not exceed ATM capacity thresholds.
4.8 Network Concept		Yes - The site would not generate more than 200 person-trips per peak hour in excess of the volume permitted by established zoning.

STEP 3 - FORECASTING

MODULE 3.1 - Development-generated Travel Demand

Element 3.1.1 – Trip Generation and Mode Shares

The proposed development will consist of the addition of a one storey building which would be used in the manufacturing process of the shop and the storage of materials and product. The existing millwork shop and office will remain on site.

The number of site generated trips and modal share was determined from traffic counts taken on May 13, 2019 for the existing millwork operation. The hours of operation of the site are from 7:00 – 8:00 AM and 4:00 – 5:00 PM Monday to Friday. The manufacturing facility current has 27 employees, and the counts determined the employees would

generate a total of 21 trips entering the site during the peak hour. The traffic counts determined the peak hours to be 6:45 to 7:45 AM and 4:15 to 5:15 PM. Table 3.1 shows the existing number of total trips entering and exiting the site during the peak hours for both the West and East Accesses for 27 employees. Trips entering and exiting outside the peak hours would be related to customers or service vehicles.

TABLE 3.1
EXISTING VEHICLE TRIPS ENTERING/EXITING THE SITE

Peak Hour	Peak AM Hour	Peak PM Hour
Vehicles Entering	21 (87%)	4 (14%)
Vehicles Exiting	<u>3 (13%)</u>	<u>24 (86%)</u>
Total Vehicle Trips	24	28
Directional Distribution	62% To/From the West and 38% To/From the East	

The expected vehicle trips and modal share were determined from the traffic counts and the number of employees for the facility. Table 3.2 summarizes the employees for each phase of development for a total of 36 new employees for Phase 1 and 2.

TABLE 3.2
NUMBER OF EMPLOYEES

Phase of Development	Number of Employees
Existing Employees	27
Employees at Phase 1	12
Employees at Phase 2	<u>24</u>
Total Employees at Completion	63

] 36 Employees

The TIA analysis has assumed a linear relationship between the number of employees and the number of AM and PM peak hour vehicle trips. The expected number of new trips following the completion of Phase 2 would use the following growth factor:

$$36 \text{ Total Employees} / 27 \text{ Existing Employees} = 1.33 \text{ growth factor}$$

Table 3.3 shows the expected new auto-trips following the completion of Phase 2. The trips were determined by applying the above growth factor to the existing traffic counts entering and exiting the site from Table 3.1. These trips are new trips and do not include the existing trips from the 27 employees which are shown in Figure 2.3. The existing trips will be accounted for as background traffic.

TABLE 3.3
NEW AUTO-TRIPS AND DIRECTIONAL SPLITS

<div> <div>PEAK HOUR</div> <div>PHASE</div> </div>	WEEKDAY PEAK AM HOUR			WEEKDAY PEAK PM HOUR		
	Total	Enter	Exit	Total	Enter	Exit
Completion of Phase 2	32	28 (87%)	4 (13%)	37	5 (14%)	32 (86%)

The modal share was determined from the examination of the surrounding area to the site, and the type of traffic which entered and exited the site from the May 13, 2019 traffic counts. There is no OC Transpo transit service to the surrounding area which resulted in a 0% Transit Share. With no pedestrian sidewalks and little residential development in the surrounding area, there would be 0% Walking Share. The traffic counts did not count any bicycle trips to/from the site. Although the weather was warm and sunny, there was only 1 eastbound bicycle between 6:30 AM – 6:45 AM which was counted along Rideau Road. A bicycle rack will be placed at the entrance to the proposed building, but the analysis has assumed a 0% Cycling Share. There were 22 vehicles (employees) entering the site during the two hour morning count. With 27 employees, the 5 extra employees were considered passengers which related to 19% Auto Passenger Share. Table 3.4 presents the modal shared summary which will be used for both the weekday peak AM and PM hour in the TIA Submission.

TABLE 3.4
MODE SHARE SUMMARY (Person-Trips)

FUTURE MODE SHARE TARGETS FOR THE DEVELOPMENT		
Travel Mode	Mode Share Target	Rationale
Transit	0%	No Transit Service
Walking	0%	No sidewalks or residential in area
Cycling	0%	No existing cycle trips or residential in area
Auto Passenger	19%	Based on existing traffic counts
Auto Driver	81%	

The auto-trips shown in Table 3.5, which are also presented in Table 3.3, represent the number of new trips following the completion of Phase 2 in 2025. The number of person-trips was determined by the number of auto-trips which were multiplied by 1.28 (from the TIA Guidelines) to convert auto-trips to person-trips. Table 3.5 shows the future peak hour auto-trips and person-trips.

TABLE 3.5
TOTAL NEW PEAK HOUR SITE GENERATED TRIPS

Trips	AUTO-TRIP GENERATION		FUTURE PERSON-TRIPS	
	Peak AM Hr.	Peak PM Hr.	Peak AM Hr.	Peak PM Hr.
Total Phase 2	32 veh.	37 veh.	41 per.	47 per.

The peak hour person-trips per mode were determined by the product of the peak hour person-trips from Table 3.5 and the mode share from Table 3.4. The mode share of Table 3.4 was applied to both the expected AM and PM peak hour trips. The peak hour person-trips for all modes are shown in Table 3.6.

TABLE 3.6
FUTURE DEVELOPMENT GENERATED PERSON-TRIPS

TRAVEL MODE	DEVELOPMENT GENERATED PERSON-TRIPS	
	PEAK AM HOUR	PEAK PM HOUR
Transit	0 per./trips	0 per./trips
Walking	0 per./trips	0 per./trips
Cycling	0 per./trips	0 per./trips
Auto Passenger	8 per./trips	9 per./trips
Auto Driver	33 per./trips	38 per./trips
Total Trips	41 per./trips	47 per./trips

The TIA Guidelines allow for three Trip Reduction Factors that may be applied to the expected development trips. Below discusses the three factors, with none of the factors providing a trip reduction for the development:

1. Deduction of Existing Development Trips - The site contains the current LTR Industries millwork shop housed in a 964 m² building. The existing building will remain along with the existing site generated trips entering and exiting the site. No trip reduction was applied for the existing building on site, but the existing site trips will be accounted for in the background traffic.
2. Pass-by Vehicular Trips - The manufacturing facility will be the destination of all trips. The site generated trips are considered primary trips with no pass-by trips. There will be no reductions in background traffic due to pass-by trips.

3. Synergy or Internalization – The LTR Industries millwork facility is the only land use for the site. There are no other land uses in the immediate facility which would share trips with the millwork shop. There will be no reductions in site generated trips due to shared or internalized trips.

Element 3.1.2 – Trip Distribution

The distribution of site generated trips for the proposed addition to the millwork shop was determined by examining the existing peak hour traffic pattern along Rideau Road at both the West and East Accesses. The trip distribution for the existing trips to the facility will be used for the additional trips following the completion of Phase 2 of the work space. The distribution shown below was applied to both the peak AM and PM hour site generated trips:

To/From the west along Rideau Road	62%
To/From the east along Rideau Road	38%

Element 3.1.3 – Trip Assignment

The trip assignment has examined the site generated trips with respect to the shortest and most convenient routes to/from the development. The trip distribution as discussed in Element 3.1.2 was applied to the peak AM and PM hour site generated trips shown in Table 3.3. The site will utilize the existing two accesses with the West Access shifted further east and the separation between the West Access and East Access increased to improve site circulation and safety. From examination of the parking lot and circulation of traffic on site, it was assumed that 75% of the trips entering the site would be from the closest access and would depart from the closest access to the direction in which they intent to travel along Rideau Road. Figure 3.1 presents the new peak hour site generated trips for Phase 1 and Phase 2 of the development.

MODULE 3.2 - Background Network Traffic Demands

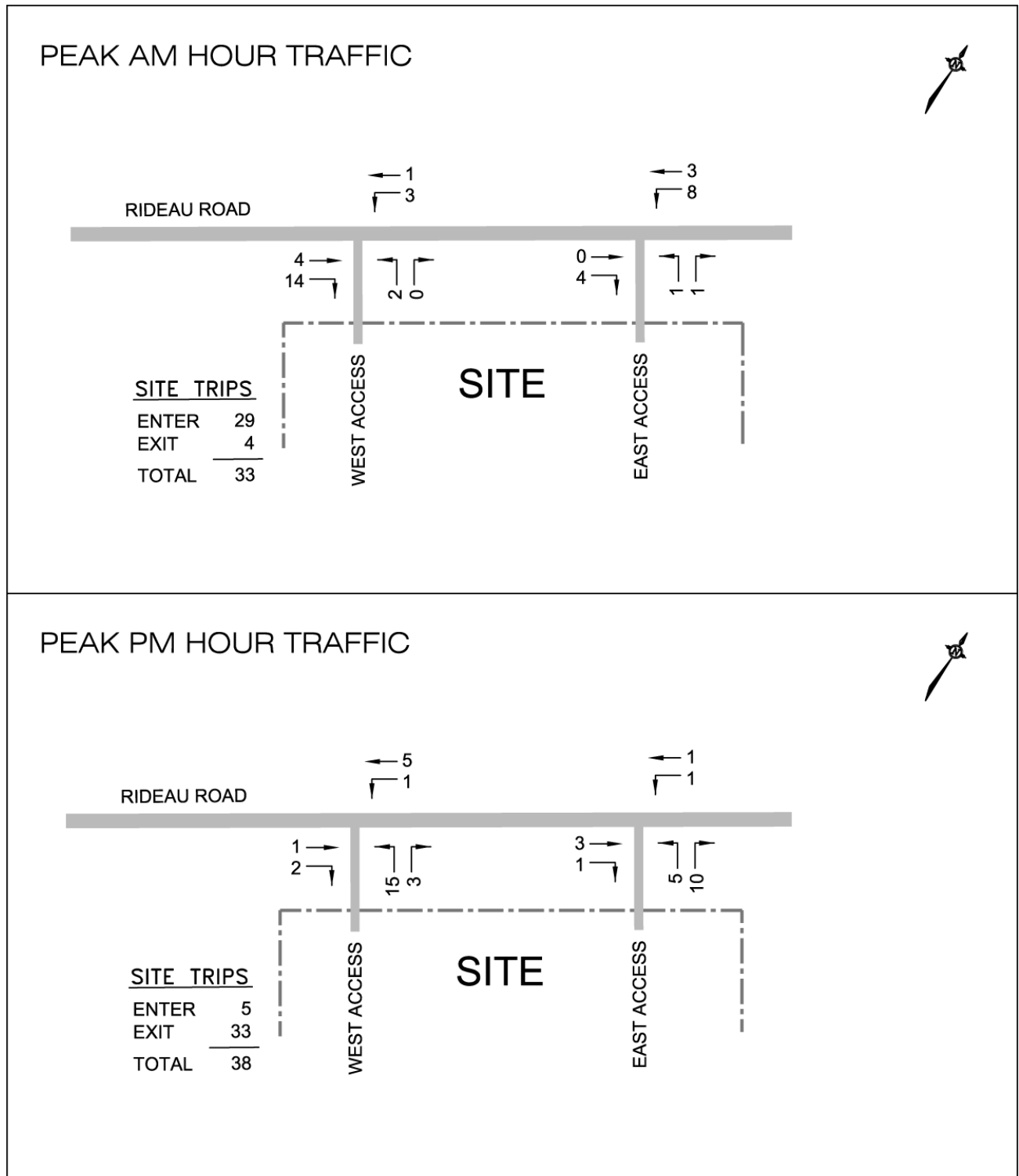
Element 3.2.1 – Transportation Network Plans

The City of Ottawa *Transportation Master Plan 2013* was reviewed to identify transit and roadway projects in the vicinity of the development. The document identified as part of the 2031 Affordable Network, the widening of Bank Street from two lanes to four lanes between Leitrim Road and Rideau Road. The widening would provide additional transportation capacity for growth in the Leitrim area, but would have little impact on the volume of traffic along Rideau Road past the site.

Element 3.2.2 – Background Growth

The background traffic volumes along Rideau Road would represent the expected traffic volumes which would not include the expected trips from the additional buildings of Phase 1 and 2. The growth in background traffic along Rideau Road was determined from the TRANS document, *National Capital Region Travel Trends*. The document

FIGURE 3.1
WEEKDAY PEAK AM AND PM HOUR SITE GENERATED TRIPS



NOT TO SCALE

determined that the population in the rural southeast has increased by an annual rate of 1.86% between the years 2005 and 2011. The *Community Transportation Study, Remer Lands* dated May 2016 and prepared by the IBI Group for the development of lands along Bank Street north of the site compared the growth in traffic along Bank Street from counts obtained from the City of Ottawa between 2007 and 2015. The counts determined that there was a decrease in traffic along Bank Street during the weekday peak hours with the study conservatively applying a 1.0 percent annual growth rate. The LTR Industries TIA study has utilized a 2.0 percent average annual compounded growth rate for the background traffic. The following growth factors were applied to the 2019 through traffic movements along Rideau Road past the site:

Growth Factor (2.0 % Annual Growth)

2019 → 2025 = 1.126

2019 → 2030 = 1.243

Element 3.2.3 – Other Developments

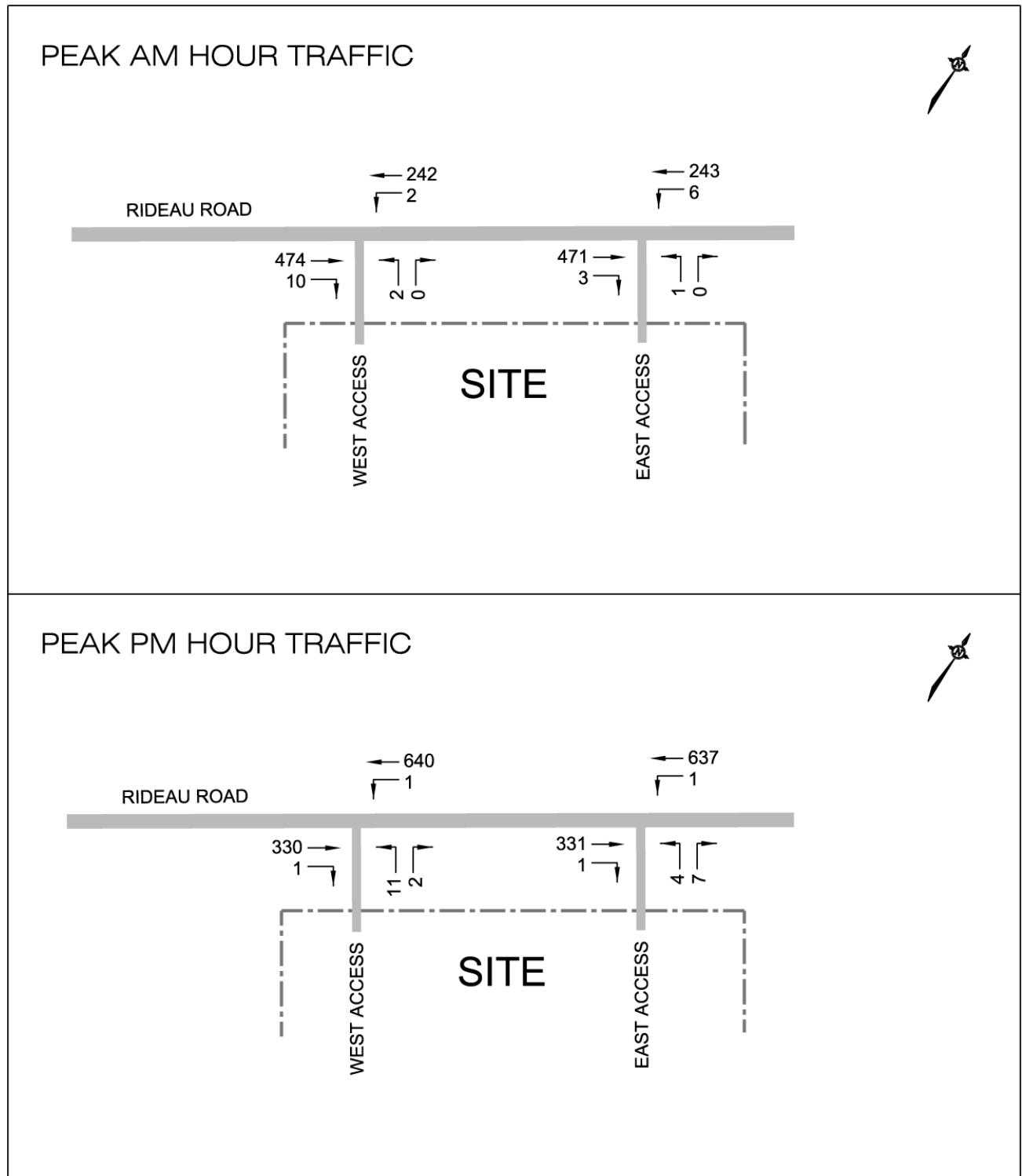
Other development in the area is the Rideau Carleton Raceway Casino located along Albion Road approximately 1 kilometre north of Rideau Road. It is proposed that the Casino site will be expanded and will include additional gaming tables, a theatre and hotel. The additional trips to and from the Casino site would have little impact during the weekday peak AM hours of the roads, and would have a minor impact on Rideau Road past the site during the weekday peak PM hour. The majority of the Casino trips would originate north of the Casino, or travel along Albion Road from the Greely area south of the Casino, or would be internalized with the proposed hotel. Any trips past the site which are associated with the Casino are accounted for in the growth in background traffic as discussed in Element 3.2.2.

Figure 3.2 shows the 2025 peak AM and PM hour background traffic which includes the existing trips from the LTR Industries site, and Figure 3.3 the expected 2030 peak hour background traffic.

MODULE 3.3 - Demand Rationalization

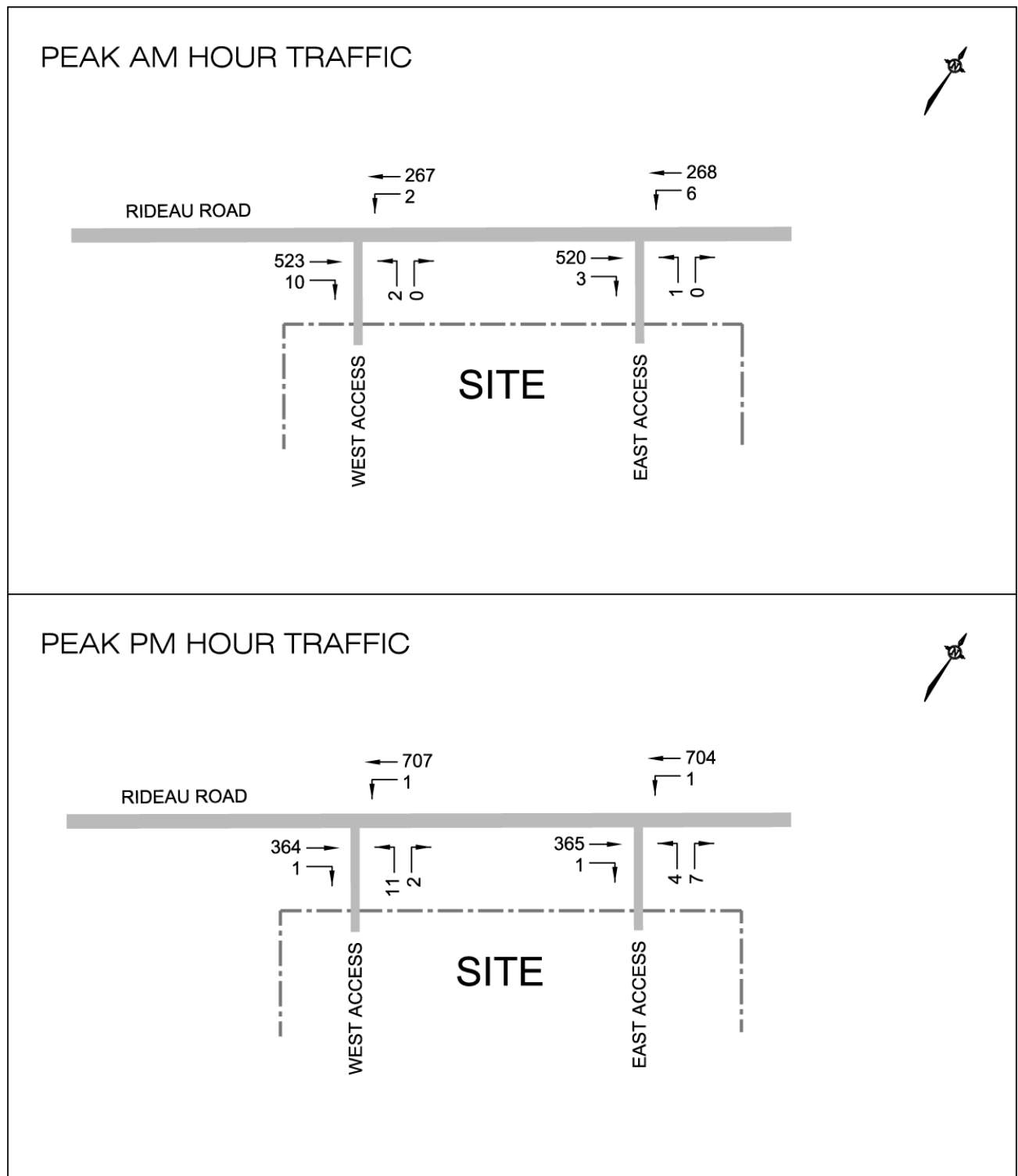
There are no areas or intersections in the vicinity of the LTR Industries site which are identified as having travel capacity issues. The future capacity of the surrounding roadway network will be addressed in the widening of Bank Street from two lanes to four lanes as documented in the City of Ottawa TMP.

FIGURE 3.2
2025 PEAK AM AND PM HOUR BACKGROUND TRAFFIC



NOT TO SCALE

FIGURE 3.3
2030 PEAK AM AND PM HOUR BACKGROUND TRAFFIC



STEP 4 – ANALYSIS

MODULE 4.1 – Development Design

Element 4.1.1 – Design for Sustainable Modes

The proposed Site Plan for the LTR Industries site shows 64 parking spaces including one barrier free space in the parking lot, and 4 spaces at the east side of the existing building. Under Phase 2 of the development, an additional 17 spaces will be provided for a total of 85 parking spaces. The site will provide racks for the storage of 4 bicycles in a protected area close to the building entrance. The number of bicycle spaces provided would satisfy the City of Ottawa By-laws.

The site is located in a rural area with no OC Transpo transit service.

Rideau Road is a rural roadway with no pedestrian sidewalks. There is little residential development within walking distance of the site.

Element 4.1.2 – Circulation and Access

The site will have two accesses onto Rideau Road. The entrances will be designed to accommodate all delivery, service and fire protection trucks. Large delivery trucks would enter at the West Access, load/unload at the rear of the buildings, and exit at the East Access. Smaller trucks and passenger vehicles would enter and exit at the most convenient access. There would be no loading or unloading of trucks on the public street. The fire route is designated around the front and rear of the buildings as shown on the Site Plan.

Element 4.1.3 – New Street Networks

Exempt as determined in the Scoping Document.

MODULE 4.2 – Parking

Element 4.2.1 – Parking Supply

The site will provide 64 parking spaces including one barrier free space at the front of the building and 4 spaces at the east side of the building under Phase 1. The Phase 2 construction will include 17 additional spaces for a total of 85 parking spaces. The site currently has 27 employees, which will increase to 39 employees by the completion of Phase 1 and 63 employees by Phase 2. The parking supply will meet the City's Parking By-law with the supply exceeding the expected demand by employees.

Element 4.2.2 – Spillover Parking

Exempt as determined in the Scoping Document.

MODULE 4.3 – Boundary Street Design

The City of Ottawa Complete Streets concept allows for the safe movement of everyone whether they choose to walk, bike, drive, or take public transit. The boundary roads to the site would consist of Rideau Road bordering the north limit of the site, Albion Road 530 m west of the site, and Bank Street 1,660 m east of the site. All three roads are rural roads with no sidewalks or cycling facilities. Albion Road and Bank Street are designated as Spine Routes in the primary rural cycling network of the TMP. Both roads have paved shoulders. Rideau Road is not designated as a Spine Route and has gravel shoulders. There are no OC Transpo transit routes in the area.

There were three reported collisions along Rideau Road between Albion Road and Bank Street during the five year period between 2013 and 2017. The pattern of collisions, as summarized in Table 2.1, did not identify any measures which could be taken to reduce the number of collisions.

MODULE 4.4 – Access Intersection Design

Element 4.4.1 – Location and Design of Access

The site is located on the south side of Rideau Road. There is no development or driveways along the north side of Rideau Road across from the site. On the south side there is a private driveway to the property adjacent to the west limit of the site. The property is a residential house with a driveway approximately 26 m west of the proposed location of the site's West Access. Adjacent to the east limit of the site is a driveway to a residential/commercial property with a driveway approximately 32 m east of the site's East Access.

The two site accesses will each be 6.7 m in width with an 8.0 m radius at the access point to Rideau Road. The clear throat length of each access is 25 m.

Element 4.4.2 – Intersection Control

The site will have the West Access and East Access each intersecting Rideau Road. The access intersection would each be controlled by a stop sign or implied stop at the northbound site exit approach. Each access intersection would be considered a two-way stop controlled intersection.

Element 4.4.3 – Intersection Design

The analysis of the West Access intersection and East Access intersection to the site were completed for all modes using the *Multi-Modal Level of Service (MMLOS) Guidelines*. Each mode will be addressed in the following sections:

VEHICLE LEVEL OF SERVICE (LoS) – Intersection Capacity Analysis

The analysis of the West Access and East Access intersections will use the *Highway Capacity Software, Version 7.7*, which uses the capacity analysis procedure as documented in the Transportation Research Board publications, *Highway Capacity Manual (HCM) 2010* and the *HCM 6th Edition*.

For unsignalized intersections, the level of service of each lane movement and approach is determined as a function of the delay of vehicles at the approach. The following relates the level of service of each lane movement with the expected control delay at the approach.

LEVEL OF SERVICE	DELAY	
Level of Service A	0-10 sec./vehicle	Little or No Delay
Level of Service B	>10-15 sec./vehicle	Short Traffic Delays
Level of Service C	>15-25 sec./vehicle	Average Traffic Delays
Level of Service D	>25-35 sec./vehicle	Long Traffic Delays
Level of Service E	>35-50 sec./vehicle	Very Long Traffic Delays
Level of Service F	>50 sec./vehicle	Extreme Delays – Demand Exceeds Capacity

The expected length of queue at the critical lane movements for an unsignalized two-way stop controlled intersection was determined by the calculation of the 95th percentile queue at the lane approach. The 95th percentile queue length is the calculated 95th greatest queue length out of 100 occurrences at a movement during a 15-minute peak period. The 95th percentile queue length is a function of the capacity of a movement and the total expected traffic, with the calculated value determining the magnitude of the queue by representing the queue length as fractions of vehicles.

The total traffic is the sum of the peak hour site generated trips shown in Figure 3.1 and the peak hour background traffic (Figure 3.2 for the year 2025 and Figure 3.3 for the year 2030). Figure 4.1 presents the total 2025 peak hour traffic and Figure 4.2 the total 2030 peak hour vehicular traffic. The results of the analysis are discussed in detail in the following sections:

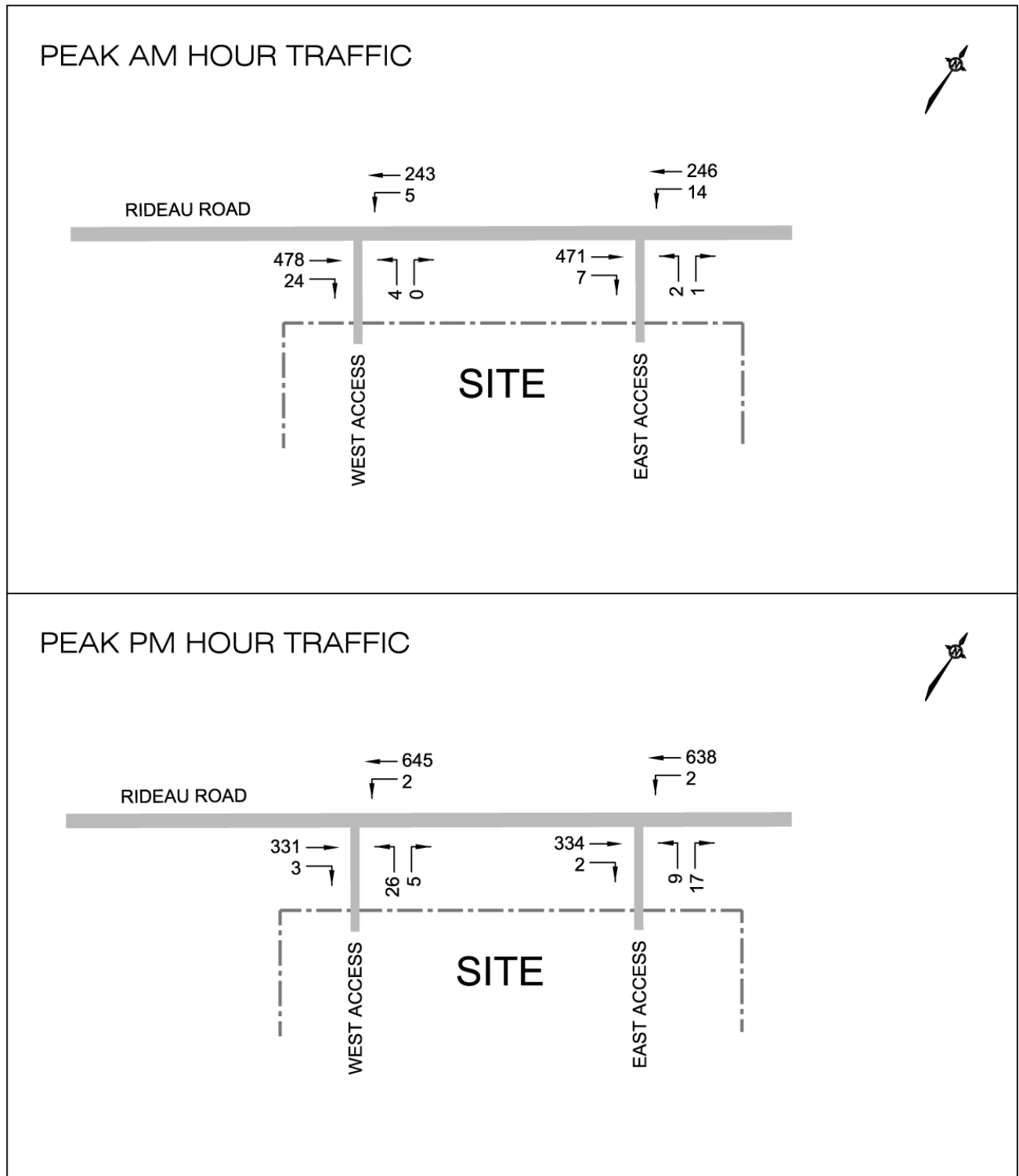
West Access/Rideau and East Access/Rideau Intersection

The operational analysis of the two site accesses onto Rideau Road will utilize the existing traffic counts taken on May 13, 2019 (Figure 2.3), and at the total development of Phase 2 in 2025 (Figure 4.1) and at five years beyond completion of the site in 2030 (Figure 4.2).

The West Access and East Access each currently have the following lane configuration:

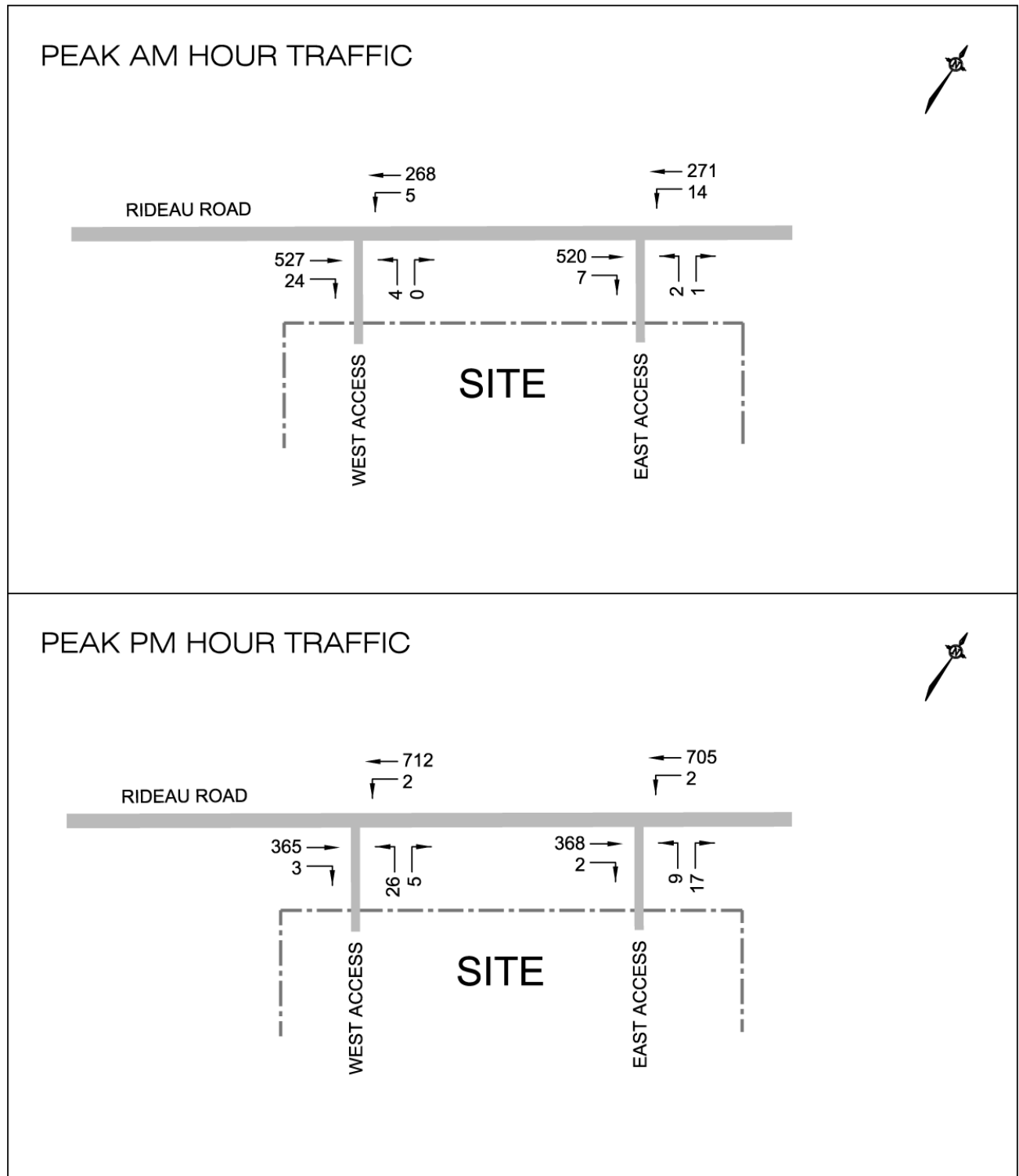
Eastbound Rideau Road	Shared Through/Right Lane
Westbound Rideau Road	Shared Left/Through Lane
Northbound Site Access	Shared Left/Right Turn Lane - Stop Controlled Approach

FIGURE 4.1
2025 PEAK AM AND PM HOUR TOTAL TRAFFIC



NOT TO SCALE

FIGURE 4.2
2030 PEAK AM AND PM HOUR TOTAL TRAFFIC



NOT TO SCALE

Year 2019 Traffic Counts - The operational analysis at the West and East Accesses using the existing access location and May 13, 2019 traffic counts determined that the lane movements at all approaches functioned at a Level of Service (LoS) "A" to "C" during both the peak AM and PM hours. Table 4.1 summarizes the operation of the intersections with the analysis sheets provided as Exhibits 4.1 to 4.4 for both accesses.

TABLE 4.1
VEHICULAR LEVEL OF SERVICE (LOS) – Site Access Intersections

Intersection Approach	WEEKDAY PEAK AM HOUR YEAR 2019 2025 (2030)		WEEKDAY PEAK PM HOUR YEAR 2019 2025 (2030)	
	LoS	Delay (sec.)	LoS	Delay (sec.)
West Access				
WB Left/Through – Rideau Road	A A (A)	8.6 8.9 (9.0)	A A (A)	8.0 8.1 (8.2)
NB Left/Right – West Access	B C (C)	14.0 15.4 (16.7)	C C (C)	15.3 19.9 (22.7)
East Access				
WB Left/Through – Rideau Road	A A (A)	8.5 8.8 (9.0)	A A (A)	8.0 8.1 (8.2)
NB Left/Right – East Access	B B (C)	13.8 14.2 (15.2)	A B (C)	10.0 14.1 (15.2)

Note: The 2025 and 2030 analysis utilizes the proposed access locations and trip patterns

A left turn lane warrant analysis was conducted for both the West and East Accesses using the expected 2030 AM peak hour traffic as shown in Figure 4.2. The peak AM hour would provide the highest volume of left turning vehicles. The warrant follows the procedure as documented in the Ministry of Transportation (MTO) publication, *Geometric Design Standards for Ontario Highways*. The left turn lane warrant analysis was conducted for the westbound Rideau Road left turn movement into the site for both accesses. The analysis determined that no exclusive westbound left turn lane was required for either intersection as shown in Exhibit 4.5. The intersection was examined for both the 2025 and 2030 total traffic assuming the following lane configuration and relocated accesses for both the West and East Accesses:

Eastbound Rideau Road	Shared Through/Right Lane
Westbound Rideau Road	Shared Left/Through Lane
Northbound Site Access	Shared Left/Right Turn Lane - Stop Controlled Approach

Year 2025 Total Traffic – The total traffic comprising of the proposed site generated trips and background traffic (Figure 4.1) was examined to determine the operation of the site accesses for the proposed access locations and 2025 traffic. The operational analysis determined that both the West Access and East Access functioned at an

acceptable LoS “A” to “C” as summarized in Table 4.1 with the analysis sheets provided as Exhibits 4.6 to 4.9.

Year 2030 Total Traffic – For the expected 2030 traffic, which represents five years beyond completion of Phase 2, all approaches continue to function at an acceptable level of service from LoS “A” to LoS “C”. The northbound site exit experienced a 95th percentile queue of 0.5 vehicles at the West Access, and 0.2 vehicle queue at the East Access during the peak PM hour time period. The operation of the intersection is summarized in Table 4.1 with the analysis sheets provided as Exhibits 4.10 to 4.13.

The sight line at the two accesses was examined utilizing the “Turning Sight Distance” guideline published by the Transportation Association of Canada (TAC) in the *Geometric Design Guide for Canadian Roads*. The first guideline was for a vehicle turning left onto a two lane roadway across a passenger vehicle approaching from the left. Figure 2.3.3.4 of the TAC manual was used with a design speed of 90 km./h. (posted speed of 80 km./h.). The guideline determined the required sight distance to be 175 m (B-1 graph line). The second guideline was for a vehicle turning left onto a road and attaining 85% of the design speed before being overtaken by a vehicle travelling westbound. The guideline determined the required sight distance to be 310 m (B-2b graph line). The third guideline was for a vehicle turning right onto a road and attaining 85% of the design speed before being overtaken by a vehicle travelling eastbound. The guideline determined the required sight distance to be 310 m (Cb graph line). The sight distance was field measured from the height of the turning vehicle driver’s eye to an approaching vehicle at a point of 150 mm below the top of the vehicle. Measurements at both the West and East Accesses determined that there was a clear sight distance west to the Albion/Rideau intersection (530 m), and to the east to a point in excess of 750 m. The sight line at both site accesses exceeded the guidelines in the TAC manual, *Geometric Design Guide for Canadian Roads*.

PEDESTRIAN LEVEL OF SERVICE (PLOS)

The pedestrian level of service was determined utilizing the City of Ottawa publication, *Multi-Modal Level of Service (MMLOS) Guidelines*. The site is in a rural area with no sidewalks along Rideau Road in the vicinity of the site. The study area does not include signalized intersections. The minimum desirable targets in the MMLOS guidelines provide no target for a general rural area. There were no pedestrians counted along Rideau Road or entering/exiting the site during the peak hours. The PLOS was not determined in the analysis.

BICYCLE LEVEL OF SERVICE (BLOS)

The bicycle level of service was determined utilizing the City of Ottawa publication, *Multi-Modal Level of Service (MMLOS) Guidelines*. The site is in a rural area with no cycling facilities along Rideau Road. Rideau Road is not identified as a Spine Route in the City of Ottawa TMP. The minimum desirable targets in the MMLOS guidelines provide no target for a general rural area. There were no cyclists counted along Rideau

Road or entering/exiting the site during the peak AM and PM hours. The BLOS was not determined in the analysis.

TRANSIT LEVEL OF SERVICE (TLOS)

OC Transpo does not provide transit service to the rural area in the vicinity of the site. The TLOS was not determined in the analysis.

TRUCK LEVEL OF SERVICE (TkLOS) - Street Segment

The truck level of service was determined utilizing the City of Ottawa publication, *Multi-Modal Level of Service (MMLOS) Guidelines*. The site is in a rural area with Rideau Road classified as a collector road and is not identified as a truck route. The minimum desirable targets in the MMLOS guidelines provide no target for a collector road in a general rural area. The TkLOS was not determined in the analysis.

MODULE 4.5 – Transportation Demand Management

Exempt as determined in the Scoping Document.

MODULE 4.6 – Neighbourhood Traffic Management

Element 4.6.1 – Adjacent Neighbourhoods

Exempt as determined in the Scoping Document.

MODULE 4.7 - Transit

Element 4.7.1 – Route Capacity

OC Transpo does not provide transit routes along Rideau Road past the site or within an acceptable walking distance from Albion Road or Bank Street. The route capacity was not examined in the TIA study.

Element 4.7.1 – Transit Priority

OC Transpo does not provide transit routes along Rideau Road past the site or within an acceptable walking distance from Albion Road or Bank Street. The transit priority was not examined in the TIA study.

MODULE 4.8 – Review of Network Concept

Exempt as determined in the Scoping Document.

MODULE 4.9 – Intersection Design

Element 4.9.1 – Intersection Control

The study area did not include network intersections. The two site accesses onto Rideau Road were controlled by two-way stop controls.

Element 4.9.2 – Intersection Design

There were no network intersections within the study area. All intersections examined were access intersections which were analyzed in Element 4.4.3.

SUMMARY

The Site Plan Application proposes the addition of a one storey building to the existing LTR Industries millwork shop site at 2610 Rideau Road. The 4,638 m² building will be an addition to the existing 964 m² building and would provide additional manufacturing and storage space. The proposed building will be constructed in two phases with the total completion of Phase 2 expected by the year 2025.

The total site is 2.0 ha in size and currently has two accesses onto Rideau Road. In order to improve the operation of the site accesses and increase safety, the West access was shifted approximately 9 m east, and the separation of the West and East Accesses was increased from 40 m to 90 m.

The study area was confined to the operation of the two site accesses onto Rideau Road and Rideau Road in the vicinity of the site. The time periods would be the peak AM and peak PM hours at the completion of Phase 2 at 2025, and at five years beyond build out at the year 2030. The analysis has determined the following:

1. The existing site has 27 employees generating 24 vehicle trips entering and exiting during the peak AM hour and 28 vehicle trips during the peak PM hour.
2. The proposed additional building will provide 36 new employees at the completion of Phase 2 in 2025. The additional employees will add 33 peak AM hour trips and 38 peak PM hour trips to the site. The TIA study will examine the operation of the two site accesses for a total of 57 peak AM hour trips, and a total of 66 peak PM hour trips. The number of total peak hour trips was determined from the number of existing and proposed employees.
3. The vehicular analysis of the site accesses determined that there was no requirement of an exclusive left turn lane at either the West Access or East Access. The approaches to both the West and East Accesses would function at a Level of Service (LoS) “A” to “C”. Vehicular traffic along Rideau Road would function at a LoS “A”. The two site accesses would be two-way stop controlled

intersections. The clear throat length at both the West and East Accesses exceeded the expected 95th percentile queue at the year 2030.

4. The sight line was examined at both the West Access and East Access. The field measurements determined that the sight line at both accesses exceeded the guidelines for a vehicle turning from a stop as set forth in the TAC document, *Geometric Design Guide for Canadian Roads*.

A summary of the level of service for the various modes of transportation are summarized in Table 4.2 with the results detailed in the analysis sheets provided as Exhibits in the Appendix.

TABLE 4.2
MULTI-MODAL (MMLOS) SUMMARY TABLE

SEGMENTS	Level of Service (LoS) – 2030				
	Pedestrian	Bicycle	Transit	Auto	Truck
Rideau Road	-	-	-	A	-
INTERSECTIONS	Level of Service (LoS) – 2030				
	Pedestrian	Bicycle	Transit	Auto	Truck
West Access/Rideau	-	-	-	A-C	-
East Access/Rideau	-	-	-	A-C	-

The two site accesses and Rideau Road adjacent to the site were analyzed to determine the level of service, and compare the level of service to the MMLOS targets for pedestrians, bicycles, transit and trucks. The targets are shown in Exhibit 22 of the *Multi-Modal Level of Service (MMLOS) Guidelines*. The target for auto trips in a General Rural Area is a LoS “D”. Both the roadway segment along Rideau Road and the site accesses exceeded the MMLOS targets. For a collector road in a General Rural Area with no transit service, there were no targets set for pedestrians, bicycles, transit or trucks.

Prepared by:

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David J. Halpenny, M. Eng., P. Eng.



APPENDIX

SCREENING FORM

TRAFFIC COUNTS

TRAFFIC AND MMLOS ANALYSIS SHEETS

LEFT TURN WARRANT ANALYSIS

EXHIBIT 1.1 SCREENING FORM

City of Ottawa 2017 TIA Guidelines Screening Form

1. Description of Proposed Development

Municipal Address	2610 Rideau Road
Description of Location	South side of road approximately 530 m east of Albion Road
Land Use Classification	RG1[242r] "Rural General Industrial Zone"
Development Size (units)	
Development Size (m ²)	4,569 m ² one storey building addition (See Figure 1.1)
Number of Accesses and Locations	Two existing accesses onto Rideau Road
Phase of Development	Two Phases
Buildout Year	2025

If available, please attach a sketch of the development or site plan to this form.

2. Trip Generation Trigger

Considering the Development's Land Use type and Size (as filled out in the previous section), please refer to the Trip Generation Trigger checks below.

Land Use Type	Minimum Development Size
Industrial	5,000 m ²

** If the development has a land use type other than what is presented in the table above, estimates of person-trip generation may be made based on average trip generation characteristics represented in the current edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual.*

	Yes	No
Is the land use greater than the minimum development size 4,569 m ² < 5,000 m ²		X

If the proposed development size is greater than the sizes identified above, the Trip Generation Trigger is satisfied.

3. Location Triggers

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

*DPA and TOD are identified in the City of Ottawa Official Plan (DPA in Section 2.5.1 and Schedules A and B; TOD in Annex 6). See Chapter 4 for a list of City of Ottawa Planning and Engineering documents that support the completion of TIA).

If any of the above questions were answered with 'Yes,' the Location Trigger is satisfied.

4. Safety Triggers

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

If any of the above questions were answered with 'Yes,' the Safety Trigger is satisfied.

5. Summary

	Yes	No
Does the development satisfy the Trip Generation Trigger?		X
Does the development satisfy the Location Trigger?		X
Does the development satisfy the Safety Trigger?	X	

If none of the triggers are satisfied, the TIA Study is complete. If one or more of the triggers is satisfied, the TIA Study must continue into the next stage (Screening and Scoping).

EXHIBIT 2.1 2016 WEST ACCESS AND RIDEAU ROAD TRAFFIC COUNTS

All Vehicles

Time Period	Northbound			Southbound			Eastbound			Westbound			
AM	LT	ST	RT	LT	ST	RT	LT	ST	RT	LT	ST	RT	Total
06:30 – 06:45	0	-	0	-	-	-	-	83	0	0	57	-	140
06:45 – 06:00	1	-	0	-	-	-	-	114	1	0	44	-	160
07:00 – 07:15	0	-	0	-	-	-	-	94	3	3	44	-	144
07:15 – 07:30	1	-	0	-	-	-	-	105	8	2	47	-	163
07:30 – 07:45	0	-	0	-	-	-	-	105	1	0	77	-	183
07:45 – 08:00	0	-	1	-	-	-	-	91	0	0	61	-	153
08:00 – 08:15	0	-	0	-	-	-	-	57	1	0	51	-	109
08:15 – 08:30	1	-	0	-	-	-	-	77	0	0	57	-	135
PM													
03:30 – 03:45	1	-	0	-	-	-	-	76	0	0	71	-	148
03:45 – 04:00	0	-	0	-	-	-	-	70	0	0	112	-	182
04:00 – 04:15	0	-	0	-	-	-	-	56	1	0	123	-	180
04:15 – 04:30	0	-	0	-	-	-	-	58	1	0	138	-	197
04:30 – 04:45	12	-	5	-	-	-	-	79	0	1	157	-	254
04:45 – 05:00	1	-	2	-	-	-	-	96	0	0	131	-	230
05:00 – 05:15	2	-	1	-	-	-	-	57	0	0	139		199
05:15 – 05:30	0	-	1	-	-	-	-	54	0	0	123		178

Truck & Bus Traffic

Time Period	Northbound			Southbound			Eastbound			Westbound			
AM	LT	ST	RT	LT	ST	RT	LT	ST	RT	LT	ST	RT	Total
06:30 – 06:45	0	-	0	-	-	-	-	9	0	0	18	-	27
06:45 – 07:00	0	-	0	-	-	-	-	10	0	0	10	-	20
07:00 – 07:15	0	-	0	-	-	-	-	5	0	0	6	-	11
07:15 – 07:30	0	-	0	-	-	-	-	8	0	0	17	--	25
07:30 – 07:45	0	-	0	-	-	-	-	4	0	0	17	-	21
07:45 – 08:00	0	-	0	-	-	-	-	5	0	0	17	-	22
08:00 – 08:15	0	-	0	-	-	-	-	1	0	0	10	-	11
08:15 – 08:30	0	-	0	-	-	-	-	7	0	0	7	-	14
PM													
03:30 – 03:45	0	-	0	-	-	-	-	12	0	0	4	-	16
03:45 – 04:00	0	-	0	-	-	-	-	13	0	0	11	-	24
04:00 – 04:15	0	-	0	-	-	-	-	10	0	0	10	-	20
04:15 – 04:30	0	-	0	-	-	-	-	6	0	0	8	-	14
04:30 – 04:45	0	-	0	-	-	-	-	16	0	0	18	-	34
04:45 – 05:00	0	-	0	-	-	-	-	12	0	0	9	-	21
05:00 – 05:15	0	-	0	-	-	-	-	12	0	0	11	-	23
05:15 – 05:30	0	-	0	-	-	-	-	10	0	0	8	-	18

EXHIBIT 2.2 2016 EAST ACCESS AND RIDEAU ROAD TRAFFIC COUNTS

All Vehicles

Time Period	Northbound			Southbound			Eastbound			Westbound			
AM	LT	ST	RT	LT	ST	RT	LT	ST	RT	LT	ST	RT	Total
06:30 – 06:45	0	-	0	-	-	-	-	83	0	0	57	-	140
06:45 – 06:00	0	-	0	-	-	-	-	114	0	0	44	-	158
07:00 – 07:15	1	-	0	-	-	-	-	94	0	0	46	-	141
07:15 – 07:30	0	-	0	-	-	-	-	105	0	3	49	-	157
07:30 – 07:45	0	-	0	-	-	-	-	105	0	0	77	-	182
07:45 – 08:00	0	-	0	-	-	-	-	92	0	0	61	-	153
08:00 – 08:15	0	-	0	-	-	-	-	57	0	0	51	-	108
08:15 – 08:30	0	-	0	-	-	-	-	77	0	0	57	-	134
PM													
03:30 – 03:45	0	-	0	-	-	-	-	76	0	0	71	-	147
03:45 – 04:00	0	-	0	-	-	-	-	70	0	0	112	-	182
04:00 – 04:15	0	-	0	-	-	-	-	56	0	0	123	-	179
04:15 – 04:30	0	-	0	-	-	-	-	58	0	1	138	-	197
04:30 – 04:45	0	-	1	-	-	-	-	83	1	0	158	-	243
04:45 – 05:00	0	-	0	-	-	-	-	96	0	0	131	-	227
05:00 – 05:15	0	-	0	-	-	-	-	0	57	0	139	-	196
05:15 – 05:30	0	-	0	-	-	-	-	0	54	0	123	-	177

Truck & Bus Traffic

Time Period	Northbound			Southbound			Eastbound			Westbound			
AM	LT	ST	RT	LT	ST	RT	LT	ST	RT	LT	ST	RT	Total
06:30 – 06:45	0	-	0	-	-	-	-	9	0	0	18	-	27
06:45 – 07:00	0	-	0	-	-	-	-	10	0	0	10	-	20
07:00 – 07:15	0	-	0	-	-	-	-	5	0	0	6	-	11
07:15 – 07:30	0	-	0	-	-	-	-	8	0	0	17	-	25
07:30 – 07:45	0	-	0	-	-	-	-	4	0	0	17	-	21
07:45 – 08:00	0	-	0	-	-	-	-	5	0	0	17	-	22
08:00 – 08:15	0	-	0	-	-	-	-	1	0	0	10	-	11
08:15 – 08:30	0	-	0	-	-	-	-	7	0	0	7	-	14
PM													
03:30 – 03:45	0	-	0	-	-	-	-	12	0	0	4	-	16
03:45 – 04:00	0	-	0	-	-	-	-	13	0	0	11	-	24
04:00 – 04:15	0	-	0	-	-	-	-	10	0	0	10	-	20
04:15 – 04:30	0	-	0	-	-	-	-	6	0	0	8	-	14
04:30 – 04:45	0	-	0	-	-	-	-	16	0	0	18	-	34
04:45 – 05:00	0	-	0	-	-	-	-	12	0	0	9	-	21
05:00 – 05:15	0	-	0	-	-	-	-	12	0	0	11	-	23
05:15 – 05:30	0	-	0	-	-	-	-	10	0	0	8	-	18

EXHIBIT 4.1

2019 PEAK AM HOUR TRAFFIC ANALYSIS – West Access/Rideau

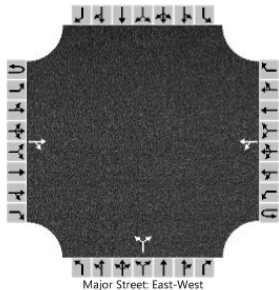
HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst								Intersection	West Access/Rideau							
Agency/Co.								Jurisdiction	City of Ottawa							
Date Performed	5/21/2019							East/West Street	Rideau Road							
Analysis Year	2019							North/South Street	West Acvcss							
Time Analyzed	Peak AM Hour							Peak Hour Factor	0.92							
Intersection Orientation	East-West							Analysis Time Period (hrs)	0.25							
Project Description	LTR Industries															
Lanes																
																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			418	13		5	212			2		0				
Percent Heavy Vehicles (%)						20				1		1				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															
Critical and Follow-up Headways																
Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.30				6.41		6.21				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.38				3.51		3.31				
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)						5				2						
Capacity, c (veh/h)						1005				403						
v/c Ratio						0.01				0.01						
95% Queue Length, Q ₉₅ (veh)						0.0				0.0						
Control Delay (s/veh)						8.6				14.0						
Level of Service (LOS)						A				B						
Approach Delay (s/veh)					0.3				14.0							
Approach LOS									B							

EXHIBIT 4.2

2019 PEAK PM HOUR TRAFFIC ANALYSIS – West Access/Rideau

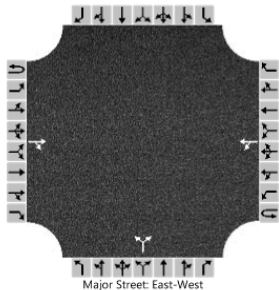
HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst								Intersection	West Access/Rideau							
Agency/Co.								Jurisdiction	City of Ottawa							
Date Performed	5/21/2019							East/West Street	Rideau Road							
Analysis Year	2019							North/South Street	West Acvcss							
Time Analyzed	Peak PM Hour							Peak Hour Factor	0.92							
Intersection Orientation	East-West							Analysis Time Period (hrs)	0.25							
Project Description	LTR Industries															
Lanes																
																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			287	1		1	565			15		8				
Percent Heavy Vehicles (%)						8				1		1				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															
Critical and Follow-up Headways																
Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.18				6.41		6.21				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.27				3.51		3.31				
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)						1				25						
Capacity, c (veh/h)						1214				375						
v/c Ratio						0.00				0.07						
95% Queue Length, Q ₉₅ (veh)						0.0				0.2						
Control Delay (s/veh)						8.0				15.3						
Level of Service (LOS)						A				C						
Approach Delay (s/veh)					0.0				15.3							
Approach LOS									C							

EXHIBIT 4.3

2019 PEAK AM HOUR TRAFFIC ANALYSIS – East Access/Rideau

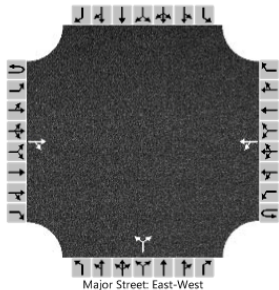
HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst								Intersection				East Access/Rideau				
Agency/Co.								Jurisdiction				City of Ottawa				
Date Performed	5/21/2019							East/West Street				Rideau Road				
Analysis Year	2019							North/South Street				East Acvcess				
Time Analyzed	Peak AM Hour							Peak Hour Factor				0.92				
Intersection Orientation	East-West							Analysis Time Period (hrs)				0.25				
Project Description	LTR Industries															
Lanes																
																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			418	0		3	216			1		0				
Percent Heavy Vehicles (%)						20				1		1				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															
Critical and Follow-up Headways																
Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.30				6.41		6.21				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.38				3.51		3.31				
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)						3					1					
Capacity, c (veh/h)						1018					408					
v/c Ratio						0.00					0.00					
95% Queue Length, Q ₉₅ (veh)						0.0					0.0					
Control Delay (s/veh)						8.5					13.8					
Level of Service (LOS)						A					B					
Approach Delay (s/veh)					0.1				13.8							
Approach LOS									B							

EXHIBIT 4.4

2019 PEAK PM HOUR TRAFFIC ANALYSIS – East Access/Rideau

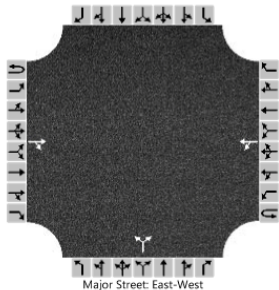
HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst								Intersection	East Access/Rideau							
Agency/Co.								Jurisdiction	City of Ottawa							
Date Performed	5/21/2019							East/West Street	Rideau Road							
Analysis Year	2019							North/South Street	East Acvcess							
Time Analyzed	Peak PM Hour							Peak Hour Factor	0.92							
Intersection Orientation	East-West							Analysis Time Period (hrs)	0.25							
Project Description	LTR Industries															
Lanes																
																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			294	1		1	566			0		1				
Percent Heavy Vehicles (%)						8				1		1				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															
Critical and Follow-up Headways																
Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.18				6.41		6.21				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.27				3.51		3.31				
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)						1				1						
Capacity, c (veh/h)						1206				723						
v/c Ratio						0.00				0.00						
95% Queue Length, Q ₉₅ (veh)						0.0				0.0						
Control Delay (s/veh)						8.0				10.0						
Level of Service (LOS)						A				A						
Approach Delay (s/veh)					0.0				10.0							
Approach LOS					A				A							

EXHIBIT 4.5 LEFT TURN LANE WARRANT ANALYSIS – West Access & East Access

WEST ACCESS

TRAFFIC

$V_o = 551$ vph
 $V_A = 273$ vph
 $V_L = 5$ vph

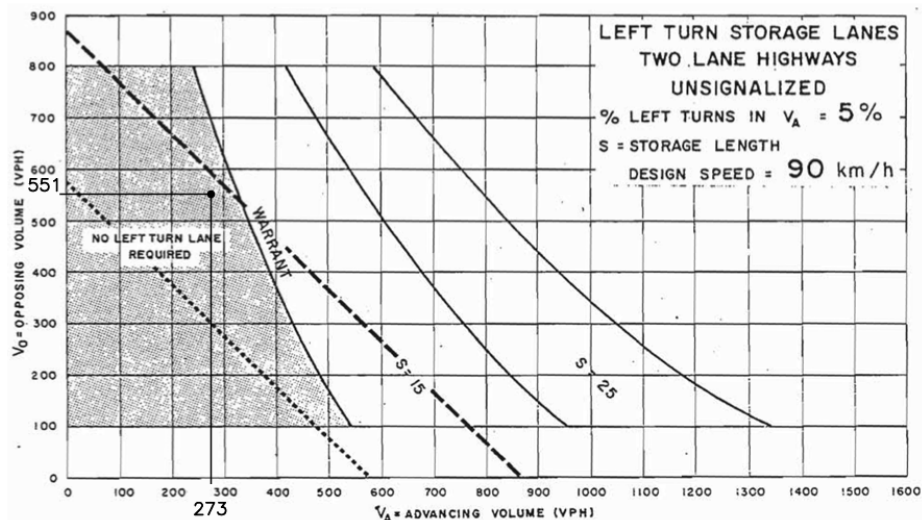
$V_L/V_A = 1.83\%$

POSTED SPEED
80 km/h

WARRANT

NO LEFT TURN
LANE REQUIRED

WESTBOUND LEFT PEAK AM HOUR



--- TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL
AREAS OR URBAN AREAS WITH RESTRICTED FLOW

--- TRAFFIC SIGNALS MAY BE WARRANTED IN
"FREE FLOW" URBAN AREAS

EAST ACCESS

TRAFFIC

$V_o = 527$ vph
 $V_A = 285$ vph
 $V_L = 14$ vph

$V_L/V_A = 4.91\%$

POSTED SPEED
80 km/h

WARRANT

NO LEFT TURN
LANE REQUIRED

WESTBOUND LEFT PEAK AM HOUR

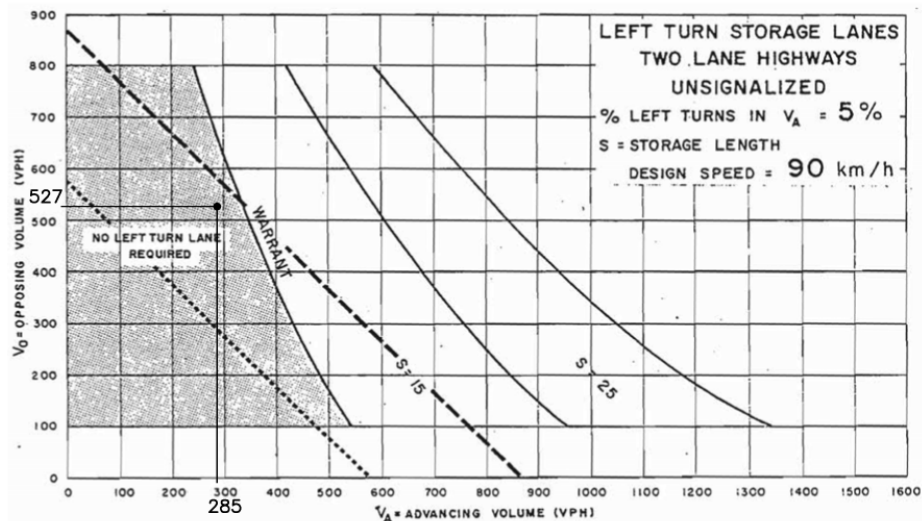


EXHIBIT 4.6 2025 PEAK AM HOUR TRAFFIC ANALYSIS – West Access/Rideau

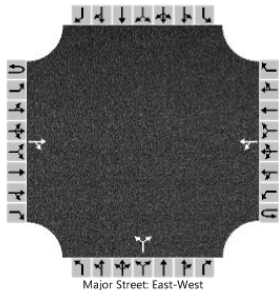
HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst								Intersection				West Access/Rideau				
Agency/Co.								Jurisdiction				City of Ottawa				
Date Performed	5/21/2019							East/West Street				Rideau Road				
Analysis Year	2025							North/South Street				West Access				
Time Analyzed	Peak AM Hour							Peak Hour Factor				0.92				
Intersection Orientation	East-West							Analysis Time Period (hrs)				0.25				
Project Description	LTR Industries															
Lanes																
																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			478	24		5	243			4		0				
Percent Heavy Vehicles (%)						20				1		1				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															
Critical and Follow-up Headways																
Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.30				6.41		6.21				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.38				3.51		3.31				
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)						5					4					
Capacity, c (veh/h)						939					349					
v/c Ratio						0.01					0.01					
95% Queue Length, Q ₉₅ (veh)						0.0					0.0					
Control Delay (s/veh)						8.9					15.4					
Level of Service (LOS)						A					C					
Approach Delay (s/veh)					0.2				15.4							
Approach LOS									C							

EXHIBIT 4.7 2025 PEAK PM HOUR TRAFFIC ANALYSIS – West Access/Rideau

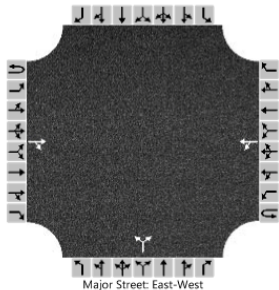
HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst								Intersection	West Access/Rideau							
Agency/Co.								Jurisdiction	City of Ottawa							
Date Performed	5/21/2019							East/West Street	Rideau Road							
Analysis Year	2025							North/South Street	West Acvcss							
Time Analyzed	Peak PM Hour							Peak Hour Factor	0.92							
Intersection Orientation	East-West							Analysis Time Period (hrs)	0.25							
Project Description	LTR Industries															
Lanes																
 <p>Major Street: East-West</p>																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			331	3		2	645			26		5				
Percent Heavy Vehicles (%)						8				1		1				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															
Critical and Follow-up Headways																
Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.18				6.41		6.21				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.27				3.51		3.31				
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)						2					34					
Capacity, c (veh/h)						1163					275					
v/c Ratio						0.00					0.12					
95% Queue Length, Q ₉₅ (veh)						0.0					0.4					
Control Delay (s/veh)						8.1					19.9					
Level of Service (LOS)						A					C					
Approach Delay (s/veh)					0.0				19.9							
Approach LOS									C							

EXHIBIT 4.8

2025 PEAK AM HOUR TRAFFIC ANALYSIS – East Access/Rideau

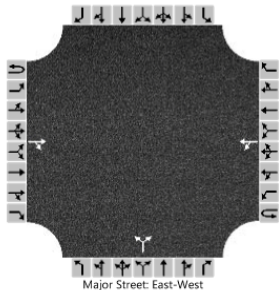
HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst								Intersection	East Access/Rideau							
Agency/Co.								Jurisdiction	City of Ottawa							
Date Performed	5/21/2019							East/West Street	Rideau Road							
Analysis Year	2025							North/South Street	East Acvcss							
Time Analyzed	Peak AM Hour							Peak Hour Factor	0.92							
Intersection Orientation	East-West							Analysis Time Period (hrs)	0.25							
Project Description	LTR Industries															
Lanes																
																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			471	7		14	246			2		1				
Percent Heavy Vehicles (%)						20				1		1				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															
Critical and Follow-up Headways																
Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.30				6.41		6.21				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.38				3.51		3.31				
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)						15					3					
Capacity, c (veh/h)						961					394					
v/c Ratio						0.02					0.01					
95% Queue Length, Q ₉₅ (veh)						0.0					0.0					
Control Delay (s/veh)						8.8					14.2					
Level of Service (LOS)						A					B					
Approach Delay (s/veh)					0.6				14.2							
Approach LOS									B							

EXHIBIT 4.9

2025 PEAK PM HOUR TRAFFIC ANALYSIS – East Access/Rideau

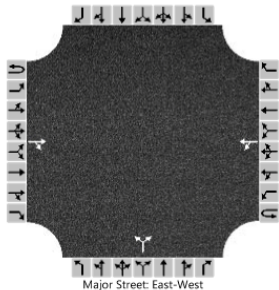
HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst								Intersection				East Access/Rideau				
Agency/Co.								Jurisdiction				City of Ottawa				
Date Performed	5/21/2019							East/West Street				Rideau Road				
Analysis Year	2025							North/South Street				East Acvcess				
Time Analyzed	Peak PM Hour							Peak Hour Factor				0.92				
Intersection Orientation	East-West							Analysis Time Period (hrs)				0.25				
Project Description	LTR Industries															
Lanes																
																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			334	2		2	638			9		17				
Percent Heavy Vehicles (%)						8				1		1				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															
Critical and Follow-up Headways																
Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.18				6.41		6.21				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.27				3.51		3.31				
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)						2					28					
Capacity, c (veh/h)						1161					425					
v/c Ratio						0.00					0.07					
95% Queue Length, Q ₉₅ (veh)						0.0					0.2					
Control Delay (s/veh)						8.1					14.1					
Level of Service (LOS)						A					B					
Approach Delay (s/veh)					0.0				14.1							
Approach LOS									B							

EXHIBIT 4.10 2030 PEAK AM HOUR TRAFFIC ANALYSIS – West Access/Rideau

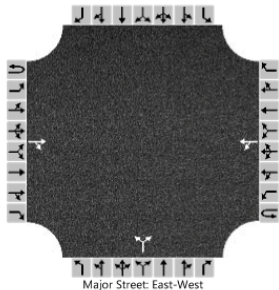
HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst								Intersection	West Access/Rideau							
Agency/Co.								Jurisdiction	City of Ottawa							
Date Performed	5/21/2019							East/West Street	Rideau Road							
Analysis Year	2030							North/South Street	West Acvcss							
Time Analyzed	Peak AM Hour							Peak Hour Factor	0.92							
Intersection Orientation	East-West							Analysis Time Period (hrs)	0.25							
Project Description	LTR Industries															
Lanes																
 <p>Major Street: East-West</p>																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			527	24		5	268			4		0				
Percent Heavy Vehicles (%)						20				1		1				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															
Critical and Follow-up Headways																
Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.30				6.41		6.21				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.38				3.51		3.31				
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)						5					4					
Capacity, c (veh/h)						896					313					
v/c Ratio						0.01					0.01					
95% Queue Length, Q ₉₅ (veh)						0.0					0.0					
Control Delay (s/veh)						9.0					16.7					
Level of Service (LOS)						A					C					
Approach Delay (s/veh)					0.2				16.7							
Approach LOS									C							

EXHIBIT 4.11

2030 PEAK PM HOUR TRAFFIC ANALYSIS – West Access/Rideau

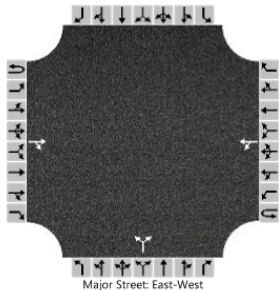
HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst								Intersection	West Access/Rideau							
Agency/Co.								Jurisdiction	City of Ottawa							
Date Performed	5/21/2019							East/West Street	Rideau Road							
Analysis Year	2030							North/South Street	West Acvcss							
Time Analyzed	Peak PM Hour							Peak Hour Factor	0.92							
Intersection Orientation	East-West							Analysis Time Period (hrs)	0.25							
Project Description	LTR Industries															
Lanes																
																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			365	3		2	712			26		5				
Percent Heavy Vehicles (%)						8				1		1				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															
Critical and Follow-up Headways																
Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.18				6.41		6.21				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.27				3.51		3.31				
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)						2					34					
Capacity, c (veh/h)						1127					237					
v/c Ratio						0.00					0.14					
95% Queue Length, Q ₉₅ (veh)						0.0					0.5					
Control Delay (s/veh)						8.2					22.7					
Level of Service (LOS)						A					C					
Approach Delay (s/veh)					0.1				22.7							
Approach LOS									C							

EXHIBIT 4.12

2030 PEAK AM HOUR TRAFFIC ANALYSIS – East Access/Rideau

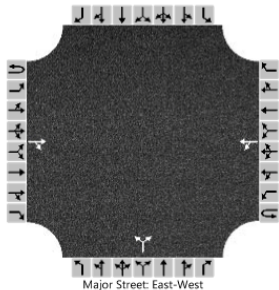
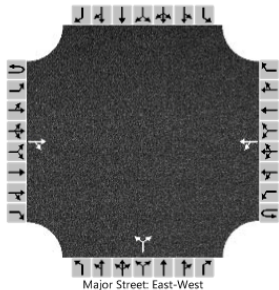
HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst								Intersection				East Access/Rideau				
Agency/Co.								Jurisdiction				City of Ottawa				
Date Performed	5/21/2019							East/West Street				Rideau Road				
Analysis Year	2030							North/South Street				East Acvcss				
Time Analyzed	Peak AM Hour							Peak Hour Factor				0.92				
Intersection Orientation	East-West							Analysis Time Period (hrs)				0.25				
Project Description	LTR Industries															
Lanes																
 <p>Major Street: East-West</p>																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			520	7		14	271			2		1				
Percent Heavy Vehicles (%)						20				1		1				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															
Critical and Follow-up Headways																
Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.30				6.41		6.21				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.38				3.51		3.31				
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)						15				3						
Capacity, c (veh/h)						917				356						
v/c Ratio						0.02				0.01						
95% Queue Length, Q ₉₅ (veh)						0.1				0.0						
Control Delay (s/veh)						9.0				15.2						
Level of Service (LOS)						A				C						
Approach Delay (s/veh)					0.6				15.2							
Approach LOS									C							

EXHIBIT 4.13

2030 PEAK PM HOUR TRAFFIC ANALYSIS – East Access/Rideau

HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst								Intersection				East Access/Rideau				
Agency/Co.								Jurisdiction				City of Ottawa				
Date Performed	5/21/2019							East/West Street				Rideau Road				
Analysis Year	2030							North/South Street				East Acvcess				
Time Analyzed	Peak PM Hour							Peak Hour Factor				0.92				
Intersection Orientation	East-West							Analysis Time Period (hrs)				0.25				
Project Description	LTR Industries															
Lanes																
																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			368	2		2	705			9		17				
Percent Heavy Vehicles (%)						8				1		1				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															
Critical and Follow-up Headways																
Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.18				6.41		6.21				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.27				3.51		3.31				
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)						2					28					
Capacity, c (veh/h)						1125					380					
v/c Ratio						0.00					0.07					
95% Queue Length, Q ₉₅ (veh)						0.0					0.2					
Control Delay (s/veh)						8.2					15.2					
Level of Service (LOS)						A					C					
Approach Delay (s/veh)					0.1				15.2							
Approach LOS									C							