

March 20<sup>th</sup>, 2014

Mr. Shawn Bhatia  
Director of Land Development  
161 8680 Ontario Inc.  
290 boulevard St.-Joseph  
Gatineau (Quebec) J8Y 3Y3

**Subject:** Traffic Impact Study for Full Development of First Phase of  
Parc Des Dunes Phase 2  
Limoges, Ontario  
O/ref. A000229

Mr. Bhatia,

## 1. EXECUTIVE SUMMARY

A traffic impact study was conducted to verify that the Limoges Road/Savage Road intersection can accommodate traffic generated by the first phase (Phase 2A) of the proposed Parc Des Dunes Phase 2 development without the use of a Traffic Control Signal.

The need for additional traffic controls at the intersection was assessed through the following:

- Traffic signal control warrants
- All-way stop control warrant
- General considerations (i.e. collision history and pedestrian volumes)

Peak hour traffic volumes on Savage Road were found to be below the minimum volume thresholds of the traffic control warrants.

Based on the results of the MTO warrant analysis for intersection signalization, it is concluded that the existing Limoges Road/Savage Road intersection can accommodate traffic generated by planned Phase 2A of the proposed development without additional traffic controls. The installation of a Traffic Signal Control or an All-way Stop Control is not required.

## 2. INTRODUCTION

The following technical memorandum has been prepared by CIMA Canada Inc. in support of a site plan application submitted to The Nation Municipality for the Parc Des Dunes Phase 2 development proposal.

The proposed development is located immediately northeast of the Limoges Road/Savage Road intersection in Limoges, Ontario.

It is anticipated that the integrated project will be constructed in multiple phases. The first phase, Phase 2A, consists of 68 residential units, including single family homes, semi-detached homes, as well as townhomes. Build-out for Phase 2A of the proposed development is anticipated in late 2014.

The purpose of this study is to verify that the Limoges Road/Savage Road intersection can accommodate planned Phase 2A traffic without the use of a Traffic Control Signal.

The site location map is provided in Figure 1.

The proposed site plan layout for Phase 2A is shown in Attachment #1.



Figure 1 : Site Location Map (Source: Google Maps 2014)

### **3. EXISTING CONDITIONS**

The Limoges Road/Savage Road intersection is an un-signalized T-intersection, with one-way stop control on the Savage Road approach. The nearest signalized intersection is the Limoges Road/Calypso Street intersection, located approximately 3.07 km south of the Limoges Road/Savage Road intersection.

Limoges Road is designated as a two-lane minor collector road in the Prescott-Russell United Counties Official Plan. It has a rural cross-section and a pavement width of approximately 6.5 m in the vicinity of the Limoges Road/Savage Road intersection. The posted speed limit is 70 km/h.

Savage Road is designated as a two-lane local road in the Prescott-Russell United Counties Official Plan. It has a rural cross-section and a pavement width of approximately 6.0 m. The speed limit is un-posted and under municipal regulation is set at 50 km/h.

### **4. FUTURE CONTEXT**

Based on consultation with The Nation Municipality, other developments are planned in the vicinity of the Limoges Road/Savage Road intersection. Intersections that may also become impacted by future developments include: Limoges Road/Russland Road, Limoges Road/Ottawa Street, Limoges Road/King Street/Des Pins Street, and Limoges Road/Main Street. Traffic impacts of the proposed and future developments on the surrounding Limoges intersections will be addressed under a separate Traffic Impact Study report.

### **5. TRAFFIC ANALYSIS PARAMETERS**

#### **5.1 Traffic Counts Taken**

Current traffic conditions at the Limoges Road/Savage Road intersection have been captured through a traffic count performed by Cima Canada Inc. on Wednesday, February 19, 2014. Traffic counts were taken from 6:00 AM to 9:00 AM and from 3:30 PM to 6:30 PM.

#### **5.2 Background Growth**

Given the relatively small, rural population setting, no annual background traffic growth is anticipated aside from the traffic generated by the proposed residential development.

### 5.3 Collision History of the Intersection

Based on consultation with local Ontario Provincial Police officials in Embrun, a search of recent police records showed that no collisions have been reported at the Limoges Road/Savage Road intersection over the past 3 years (2011 to 2014).

Collision history is therefore not a significant factor in the traffic signal control warrant.

### 5.4 Traffic Signal Control Warrant Analysis

Our traffic signal warrant analysis has been conducted using the method provided in the Ontario Traffic Manual (OTM) Book 12 (November 2007) published by the Ministry of Transportation of Ontario. The OTM method is widely used in Ontario, and it is similar to the method outlined in the Manual of Uniform Traffic Control Devices (MUTCD 2009), which is used throughout North America.

The OTM Book 12 outlines seven (7) different justifications for the installation of a traffic signal. The justification(s) used in the signal warrant analysis are selected based on the driving factor(s) for considering the installation of a traffic signal control (e.g. peak hour traffic volumes, pedestrian volumes, collision history, etc.).

Traffic signal warrant analysis of the existing traffic conditions at the intersection has been performed using Justification 4 – Minimum Four-Hour Vehicle Volume. Justification 4 is the preferred warrant as it is best suited to commuter-dominated roadways with heavy demands during the AM and PM peak hours, but considerably reduced demand for the remainder of the day. Justification 4 cannot be combined with any other justifications.

Signal warrant analysis for the existing traffic conditions plus traffic generated by Phase2A has been conducted using Justification 7 – Projected Volumes. Justification 7 is used to evaluate the need for a traffic signal at an intersection based on projected traffic volumes generated by future developments.

### 5.5 Multi-way Stop Control Warrant Analysis

The MUTCD recommends that less restrictive forms of intersection control be considered prior to considering the use of a Traffic Control Signal.

A one-way stop control is currently installed at the intersection on the Savage Road approach. Further analysis has been carried out to verify whether stop controls should be installed on both of the Limoges Road approaches.

The multi-way stop control warrant analysis has been performed as outlined in the Manual of Uniform Traffic Control Devices (MUTCD 2009, Section 2b).

## 6. TRAFFIC SIGNAL CONTROL WARRANT ANALYSIS

### 6.1 Existing Traffic Conditions

The traffic signal control warrant analysis for existing traffic conditions was performed using Justification 4 – Minimum Four Hour Vehicle Volume of the OTM Book 12 method.

Based on AM and PM traffic counts taken at the intersection on January 29, 2014, the four highest peak hour vehicle volumes were obtained. Table 1 shows the vehicle volumes on the major and minor road approaches for each of the four highest peak hour vehicle volumes.

**Table 1 : Justification 4: Minimum Four-Hour Volume (Existing Traffic Conditions)**

Justification	Peak Hour Ending	Major Street - Total Volume of Both Approaches	Minor Street – Higher Volume Approach	Required Value	Average % Compliance	Overall % Compliance
		X	Y (actual)	Y (warrant threshold)		
Justification 4	16:30	367	28	180	16	16
	16:45	382	26	163	16	
	17:00	389	23	160	15	
	17:15	377	24	165	15	

The vehicle volumes for each of the four highest peak hour volumes were plotted against Four Hour Vehicular Volume curves for rural conditions (Figure 19 of the OTM Book12). All four points were below the threshold curve for a single lane major road approaches and a single lane minor road approach (refer to Attachment #2).

Existing peak hour vehicle volumes on Savage Road represent only 16% of the warrant threshold volume. Based on the result of this signal justification, installation of a traffic signal control need not be considered for the existing traffic conditions at the intersection.

## 6.2 Existing Traffic Conditions plus Site Generated Traffic

The traffic signal control warrant analysis for existing traffic conditions plus traffic generated by planned Phase 2A was performed using Justification 7 – Projected Volumes of the OTM Book 12 method.

The projected PM peak hour vehicle volume was obtained by adding the existing PM peak hour vehicle volume and the new vehicle trips generated by Phase 2A during the PM peak hour (see Site Traffic Generation in Section 7). Table 2 summarizes the projected peak hour vehicle volume at the Limoges Road/Savage Road intersection.

No pedestrians were observed at the intersection during the PM Peak Hour (i.e. 100% motorized vehicle traffic).

**Table 2 : Projected PM Peak Hour Vehicle Volume (Existing Traffic Condition plus Projected Site-generated Traffic)**

Peak Hour Ending at 17:00			
Traffic Conditions	Total Intersection Hourly Volume (vph)	Hourly Volume on Major Street (both approaches) (vph)	Hourly Volume on Minor Street Approach (vph)
Existing Traffic	412	389	23
New Site-generated Traffic	81	52	29
Existing Traffic plus Site-generated Traffic	493	441	52

The Peak Hour Volume (PHV) was reduced to Average Hourly Volume (AHV) using the following relationship provided by the OTM Book 12:

$$AHV = \frac{PHV}{2}$$

The justification for a traffic control signal for the existing Limoges Road/Savage Road intersection was determined using Table 3 below under free flow (i.e. rural) conditions. For traffic signal installation to be considered, Justification 1 and 2 must have 120% compliance or greater.

For total projected traffic (i.e. existing traffic plus traffic generated by planned Phase 2A), Justification 1 and 2 do not meet the minimum 120% compliance threshold.

Average hour traffic on Limoges Road exceeds the minimum vehicular volume for a traffic signal control warrant and is approaching a level where it may cause significant delay to crossing traffic. However, the average hour traffic volume on Savage Road is significantly lower than that on Limoges Road; traffic movements from Savage Road are expected to be accommodated without additional traffic control and without significant delay to Limoges Road through traffic movements.

Based on this analysis, a traffic signal control does not need to be installed at the Limoges Road/Savage Road intersection to accommodate traffic generated by planned Phase 2A.

**Table 3 : Justification 7 – Projected Volumes (Existing Traffic plus Projected Site-generated Traffic)**

Justification	Description	Minimum Requirement 1 Lane Highways		Compliance			
		Free Flow	Restr. Flow	Sectional		Justification satisfied 120 % or more	Two Justifications satisfied 120 % or more
				Numerical	%		
1. Minimum Vehicular Volume	A. Vehicular volume, all approaches (average hour)	480	720	493	103	NO	NO
	B. Vehicle volume, along minor streets (average hour)	120	170	52	43		
2. Delay to cross traffic	A. Vehicular volume, major street (average hour)	480	720	441	92	NO	
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	5	10		

## 7. ALL-WAY STOP CONTROL WARRANT ANALYSIS

The multi-way stop control warrant analysis has been performed as outlined in the Manual of Uniform Traffic Control Devices (MUTCD 2009, Section 2b).

In order for the application of all-way stop control to be considered, one or more of the following criteria should be satisfied:

- A. Where traffic control signals are justified, the multi-way stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.
- B. Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation. Such crashes include right-turn and left-turn collisions as well as right-angle collisions.
- C. Minimum volumes:
  - i. The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for an 8 hours of an average day;
  - ii. and the combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour; but
  - iii. If the 85<sup>th</sup> percentile approach speed of the major-street traffic exceeds 40 mph (65 km/h), the minimum vehicular volume warrants are 70 percent of the values provided in items i and ii.
- D. Where no single criterion is satisfied, but where Criteria B, C.i. and C.ii. are all satisfied to 80 percent of the minimum values. Criterion C.iii. is excluded from this condition.

For projected traffic conditions (i.e. existing traffic plus projected traffic generated by Phase2A), none of the above criteria are satisfied for the following reasons:

- Traffic signal control of the intersection was found to be unwarranted in Section 6.
- There is no significant collision history at the intersection.

- The combined vehicular, pedestrian and bicycle volume entering the intersection from the minor street approach is projected to reach a maximum of 52 units per hour, which is significantly lower than 140 units per hour (i.e. 70% of 200 units per hour)

## 8. SITE TRAFFIC GENERATION

Phase 2A of the proposed development consists of 68 residential units. Trip generation rates for the various dwelling types have been obtained from the Institute of Transportation Engineers (ITE) Generation Manual, 8<sup>th</sup> edition. The ITE trip generation rates are summarized in Table 1.

**Table 4. Trip Generation Rates**

Land Use	Data Source	Trip Generation Rates	
		AM Peak Generator Curve	PM Peak Generator Curve
Single-Family Home (Detached and Semi-Detached)	ITE 210	$T = 0.70(X) + 12.12$	$\ln(T) = 0.88\ln(X) + 0.62$
Residential – Condominium/Townhouse	ITE 230	$\ln(T) = 0.82\ln(X) + 0.15$	$T = 0.34(X) + 35.87$
Notes: T = Average Vehicle Trip Ends X = Dwelling Units			

Due to the rural setting as well as the low prevalence of transit services and pedestrian facilities along roadways, the predominant mode of travel within the study area is expected to be by car. We have assumed that 90% of the trips generated are passenger car trips. The remaining 10% of trips are assumed to be by transit (Russell Transpo and OCTranspo) or by another mode. Trips by cycling and walking are assumed to be negligible.

Our modal split estimates have been developed based on the modal split pattern observed in East Rural Ottawa through the 2011 O-D TRANS survey. The East Rural Ottawa region is bordered by Russland Road, only 1.5 km north of the study area. Given the geographic proximity to the site and comparable rural characteristics (i.e. limited transit services and pedestrian facilities), the modal split patterns are expected to be similar.

Based on ITE pass-by rates, there are no pass-by trips associated with this residential development. Therefore, all vehicle trips generated by Phase 2A are new vehicle trips.

The new vehicle trip generation (i.e. passenger car only) associated with Phase 2A is presented in Table 2.

**Table 5 : New Vehicle Trip Generation**

Land Use	Data Source	Dwelling Units	AM Peak (Vehicle Trips/hr)			PM Peak (Vehicles Trips/hr)		
			In	Out	Total	In	Out	Total
			26%	74%		64	36	
Single-Family Home (Detached and Semi-Detached)	ITE 210	34	8	24	32	24	14	38
			19%	81%		64	36	
Residential Condominium/Townhouse	ITE 230	34	4	16	20	28	15	43
Total		68	12	40	52	52	29	81

We have assumed that trip distribution (and route assignment) for the proposed development will follow the existing peak hour route assignment pattern observed at the Limoges Road/Savage Road intersection. Eighty percent (80%) of vehicle trips travel north on Limoges Road while twenty percent (20%) head south.

**Table 6 : Vehicle Trip Distribution/Route Assignment**

Trip Distribution		Total	North (80%)	South (20%)
AM	Trips In	12	10	2
	Trips Out	40	32	8
PM	Trips In	52	42	10
	Trips Out	29	23	6

## 9. Summary of Findings

Based on our signal justification analysis and multi-stop control warrant analysis as well as our general consideration for collision history at the intersection and pedestrian volumes, the following conclusions are offered:

### Existing Traffic Volumes (2014)

- Peak hour traffic volumes on Savage Road are below the minimum threshold volumes for the traffic signal and all-way stop control warrants.
- Existing traffic conditions at the Limoges Road/Savage Road intersection do not warrant a traffic control signal or an all-way stop control.

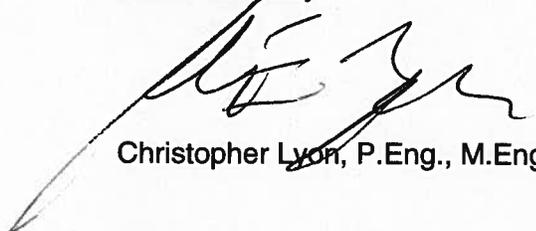
**Existing Traffic Volumes (2014) plus Projected Traffic Volumes Generated by Phase 2A**

- Peak hour traffic volumes on Savage Road are below the minimum threshold volumes for the traffic signal and all-way stop control warrants.
- Traffic volumes generated by Phase 2A of the proposed Parc Des Dunes Phase 2 Residential Development can be supported by the existing Limoges Road/Savage Road intersection.
- The use of an all-way stop control or a traffic signal control is not required.

**10. Conclusion**

We trust that the provided study demonstrates that the existing Limoges Road/Savage Road intersection is capable of supporting the traffic generated by Phase 2A of the proposed Parc Des Dunes Phase 2 development. If you have any questions or concerns regarding this letter, please do not hesitate to contact the undersigned.

Yours sincerely,



Christopher Lyon, P.Eng., M.Eng.

CL/bas

encl.

Attachment #1: Parc Des Dunes Phase 2 Site Plan (Phase 2A)

Attachment #2: Figure 19 - Justification 4 - Minimum Four Hour Justification, Unrestricted Flow (OTM Book 12)



A000173  
 PARC DES DUNES PHASE 2 (PHASE 2A)  
 TIS LETTER  
 2014.03.26.  
 B.A.S.

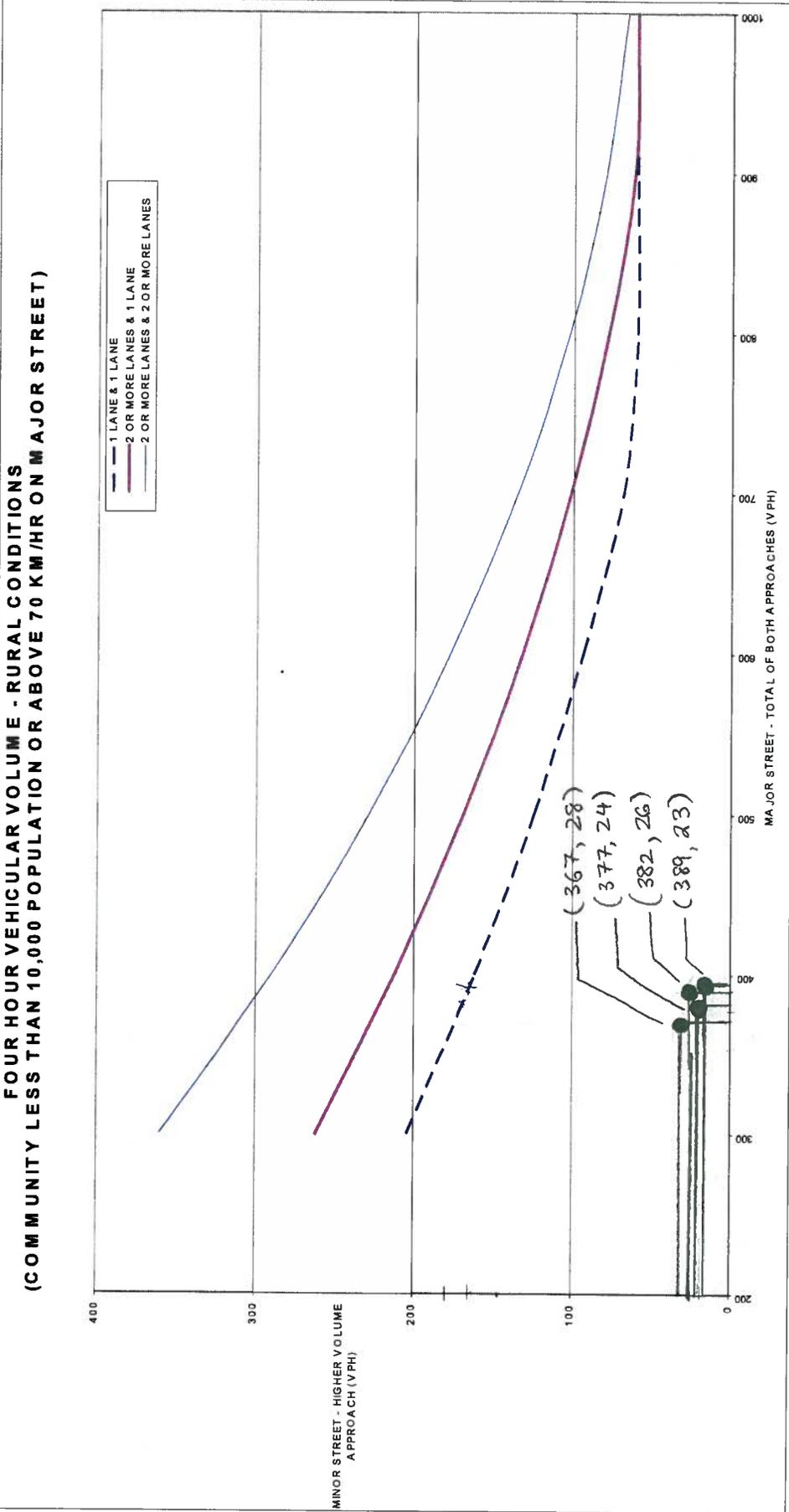


Figure 19 - Justification 4 - Minimum Four Hour Justification, Unrestricted Flow

ATTACHMENT #2.