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October 25, 2019

Trevor Adams, P.Eng.
KVM Consultants Ltd.
51 Cobequid Road
Lower Sackville, NS B4C 2N1

RE: A Traffic Impact Statement for a proposed development on Kingswood Drive

Dear Mr. Adams:

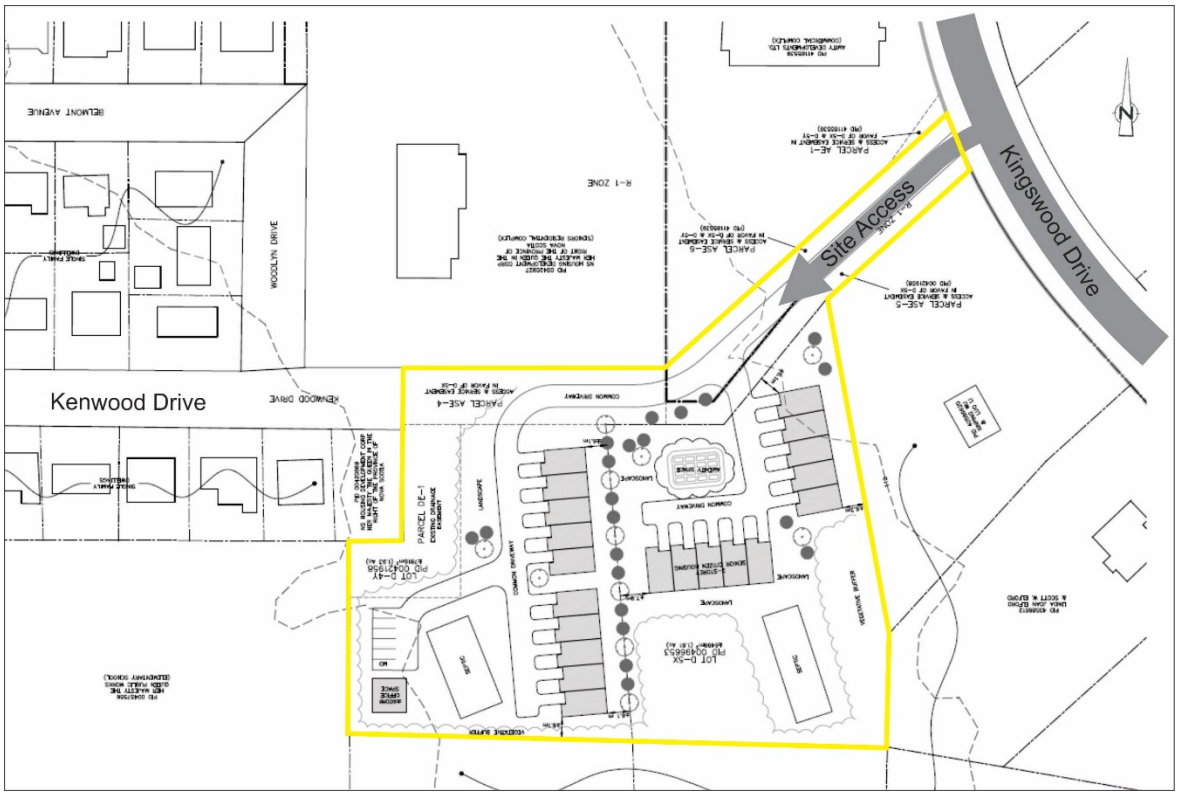
1.0 INTRODUCTION

At the request of *KVM Consultants Ltd. (KVM)*, the GRIFFIN transportation group inc. has carried out a qualitative Stage 1 - Traffic Impact Assessment in support of the planning application process for a proposed 20-unit residential development to be located at civics #5-#7 Kingswood Drive, located in the community of Hammonds Plains, Halifax Regional Municipality (HRM). It is understood that the proposed development will be comprised of 20 residential townhome units – marketed as independent senior living – plus a supporting 900 ft^2 office building. Each residential unit will have a single floor and will have individual driveways.

For the purposes of this assessment Kingswood Drive is assumed to be aligned in a general north-south direction and the subject lands are located on the west side of the street, immediately south of the retail plaza. The civic #5 and #7 properties are currently undeveloped with an existing access connecting to Kingswood Drive immediately south of the retail plaza. The subject lands have a R-1 (Single Unit Dwelling) Zoning designation, as part of the *Beaver Bank, Hammonds Plains, Upper Sackville Land Use By-law* area.

The qualitative traffic impact assessment associated with the proposed development is discussed in the following Sections. The site context and proposed site layout is generally illustrated in *Figure 1.*

Figure 1: Proposed Site Concept Plan



2.0 STUDY AREA AND SITE CONEXT

2.1 Overview

The proposed development is located on the west side of Kingswood Drive, between Hammonds Plains Road and Brenda Drive – immediately south of the retail plaza. Kingswood Drive serves as the main connection to/from the Kingswood South residential subdivision and terminates at a signalized intersection with Hammonds Plains Road. It is under the jurisdiction of HRM and has a regulatory posted speed limit of 50 km/h. In the vicinity of the proposed development, Kingswood Drive has a two-lane, two-way asphalt surface and a rural cross-section comprised of gravel shoulders and open ditches.

The proposed vehicle access will be located on the west side of Kingswood Drive, about 160-170m south of Hammonds Plains Road, as shown in *Figure 1*. An existing site access driveway exists in this location and it is understood that this will form the basis of the main vehicle access point.

3.0 EXISTING TRAFFIC CONDITIONS

Since the proposed development will be predominantly comprised of residential units, is adjacent to other residential housing, and near the local elementary school it seemed reasonable to assume the highest overall study area volumes would occur during the weekday morning and afternoon peak periods. Therefore, these two peak times were selected and used in this assessment.

A site visit was carried out on Tuesday October 15th, 2019 to gather information associated with driver sight distances, driver behavior, existing vehicle access location, pedestrian activity and so forth. Supplementary traffic data was also gathered from other study reports which suggests the average daily volume on Kingswood Drive is about 2,000 vehicles/day (vpd). Typically, the afternoon peak hour volume is about 10% of the daily volume and so the estimated two-way peak hour volumes traveling by the proposed access location is about 200 vehicles/hour.

Based on this estimate, it suggests that the existing vehicle demand on Kingswood Drive is well below the capacity of this street and that there is a notable amount of residual capacity to accommodate future traffic growth.

4.0 ACCESS SIGHT DISTANCE REVIEW

Typically, a driver sight line review is carried out as part of the traffic impact assessment process in order to identify any driver sight distance or visibility limitations in the vicinity of the site access. The proposed vehicle access shown on the concept site plan in *Figure 1* was used for the visibility measurements recorded on-site. Photos contained in *Figure 2*, taken during the site visit, attempt to illustrate the available driver sight distance.

GRIFFIN followed the latest NSTIR best practices for measuring the available driver sight distance of an approaching driver traveling on Kingswood Drive – referred to as stopping sight distance (SSD). The parameters applied to this measurement procedure included a driver eye height of 1.05m, and an object height of 0.6m. The sight distance measurements recorded in the field have been summarized in *Table 2*.

Table 1: Available Driver Sight Distance Results – Toward New Access

	Travel Direction on Major Roadway	Measured SSD (Available)	Sight Distance Limitation
Proposed New Access	Traveling NB on Kingswood	130m	vertical crest curve
	Traveling SB on Kingswood	138m	horizontal curve

Figure 2: Driver Sight Distance along Kingswood Drive

Sight distance looking north from proposed access

Sight distance looking south from proposed access

The next step in the sight distance review process requires practitioners to determine the minimum required distance a driver would need to bring their vehicle to a stop given the site-specific conditions. Kingswood Drive appears to have an approximate 2-3% down slope from Hammonds Plains Road towards the proposed site access. Therefore, southbound vehicles would require slightly more distance to stop and northbound vehicles would require slightly less. Minimum SSD requirements were obtained from the Transportation Association of Canada's (TAC)

June 2017 *Geometric Design Guide for Canadian Road* (Chapter 2) document. As noted, TAC guidelines require drivers travelling at 80 km/h on a 3% downslope to be provided with 136m of vehicle stopping distance. As such, the available driver sight distances at the proposed site access location exceed those required for the expected vehicle operating speed range of 50-70 km/h on Kingswood Drive.

5.0 SITE TRIP GENERATION

5.1 Vehicle Demand

In order to assess the change in traffic volumes on the study area streets under future conditions, there was a need to determine the expected number of new vehicles that would be added to the study area roads and intersections, explicitly associated with the proposed development. This is referred to as the trip generation calculation process. Typically, traffic engineers use trip generation rates published by the Institute of Transportation Engineers (ITE) to forecast site-generated volumes for specific land use types, if deemed appropriate. Based on our review of the medium-density residential land use type being proposed it was determined that ITE's published trip generation rates were appropriate. As such, ITE's *Trip Generation, 10th Edition* document was used.

Although the developer intends to build and market the 20 medium density residential units towards independent senior living, GRIFFIN has applied a higher vehicle trip generation rate to this analysis to provide a higher-than-expected vehicle forecast. As such, ITE's land Use 220 – Multifamily Housing (Low-Rise) has been applied to this assessment which is representative of one or two floor townhome units and uses a per unit trip rate that is about twice as high as that expected of independent senior living units. Further, the following assumptions were applied to the calculation process in order to establish a conservative, worst-case scenario:

- That all 20 units would be built and occupied,
- The higher "Suburban/Urban" vehicle trip rate was applied instead of the lower "Dense Multi-use Urban" trip rate,
- The ITE regression formula was used to provide a higher rate relative to using the ITE published average rate.

The forecast site-generated trips are summarized in *Table 3*.

Table 2: Site Trip Generation for the Proposed Development

	Size	Trip Rate	New Vehicle Trips / Hour		
			In	Out	Total
AM Peak Hour					
Multifamily Housing (Code 220)	20 Units	0.50/unit[A]	2 (23%)	8 (77%)	10
Small Office Building (Code 712)	900 ft^2	1.92/1k ft^2	2 (83%)	0 (18%)	2
AM Peak Total Trips			**4**	**8**	**12**
PM Peak Hour					
Multifamily Housing (Code 220)	20 Units	0.70/unit[A]	9 (63%)	5 (37%)	14
Small Office Building (Code 712)	900 ft^2	2.45/1k ft^2	1 (32%)	2 (68%)	3
PM Peak Total Trips			**10**	**7**	**17**

A – ITE's regression formula used to determine the per unit trip rate.

Based on the results contained in *Table 2*, the proposed medium density residential development is expected to generate 12 new vehicle trips/hour (4 inbound and 8 outbound) during the weekday morning peak period and 17 new vehicle trips/hour (10 inbound and 7 outbound) during the weekday afternoon peak period. This generally equates to adding one new vehicle trip to the study area streets every 4-5 minutes – on average.

It should be noted that the forecast volumes contained in *Table 2* represent a worst-case scenario due to the following:

- No trip generation reductions associated with public transit trips, and
- No trip generation reductions due to walking, cycling or other types of active transportation as residents move between their townhomes and the adjacent retail shops including a grocery store, coffee shop, pharmacy and so forth.

5.2 Parking Supply

Parking for the future residents of this development will be provided on-site. As shown on the site plan layout in *Figure 1*, each residential unit will have a separate driveway connecting to the internal laneways. In addition, 6 vehicle parking spaces will be provided adjacent to the small office building. It is suggested that discussions are held with HRM to ensure all parking By-law requirements are met for the appropriate residential land use type, including an adequate number of accessible parking spaces.

6.0 TRAFFIC IMPACTS ON SURROUNDING STREETS

The proposed 20-unit residential development is forecast to generate a small number of new vehicle trips during the weekday peak periods and these new trips are expected to have little to no operational impact on the Kingswood Drive corridor, the adjacent commercial retail driveways or the signalized intersection with Hammonds Plains Road. The number of new vehicle trips expected to be generated by this new development is well below HRM's Traffic Impact Study threshold which would normally trigger the need for a Stage 2, quantitative traffic impact study assessment.

7.0 FINDINGS & CONCLUSIONS

The following conclusions were gleaned from the qualitative traffic impact assessment of the proposed residential development located on Kingswood Drive:

- The proposed residential development will be comprised of 20 medium density units, and a supporting 900 ft^2 of office space. Assuming each of the units are occupied by families – as opposed to independent-living seniors – the forecast new vehicle trips is estimated to be 12 trips/hour (4 inbound and 8 outbound) during the weekday morning peak period and 17 trips/hour (10 inbound and 7 outbound) during the weekday afternoon peak period. This is a worse-than-expected vehicle trip forecast compared to a scenario where the new units are occupied by independent-living seniors.
- The qualitative traffic operational assessment suggests that the Kingswood Drive corridor has residual capacity and can accommodate future traffic growth. This suggests that there are an adequate number of gaps in the traffic flow to accommodate additional vehicles turning in and out of the proposed site access. Given the fact that the proposed development will only generate a very small number of new vehicle trips, it is expected that there will be no negative traffic operational impact to the Kingswood Drive corridor.
- The proposed vehicle access location serving the subject property connects to Kingswood Drive in a location with good driver visibility. It was determined that the available stopping sight distance (SSD) in both directions along Kingswood Drive exceeds minimum requirements for an 80 km/h operating speed combined with a 3% downgrade. The current regulatory posted speed limit is 50 km/h.

Based on the findings of this qualitative review the following steps are recommended:

- That the design of the proposed vehicle access follow the latest Transportation Association of Canada (TAC) and HRM design guidelines contained in the most recent edition of their Municipal Design Guidelines document. This includes the accommodation of an appropriate municipal truck design vehicle (i.e. garbage truck or emergency vehicle).
- That HRM By-law requirements for corner clearance and sight triangles are met (if necessary) to ensure both approaching and departing driver sightlines are maintained at the new site access location.
- That a review be carried out to determine if there is an opportunity to provide an active transportation or pedestrian connection between the proposed development and the retail stores located immediately to the north. The provision of such a connection has the potential to reduce the number of vehicle trips moving in/out of the proposed site driveway.

8.0 CLOSING

The findings flowing from this qualitative traffic impact statement suggest the new vehicle trips generated by the proposed development located at civics #5-#7 Kingswood Drive are expected to have a negligible impact on the traffic operational performance of the study area streets and intersections. I would be happy to provide you with additional information or clarification regarding these matters and can be reached anytime by phone at (902) 266-9436 or by email at jcopeland@griffininc.ca.

Sincerely,

ORIGINAL SIGNED

James J. Copeland, P.Eng.
Managing Principal – Traffic & Road Safety Engineer
GRIFFIN transportation group inc.