James J. Copeland, P.Eng.
GRIFFIN transportation group inc.
30 Bonny View Drive
Fall River, NS B2T 1R2

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Andrew Forsythe, P.Eng.
Senior Engineer - Principal
DesignPoint Engineering & Surveying Ltd.
200 Waterfront Drive, Suite 100
Bedford, NS B4A 4J4

RE: A Traffic Impact Statement for a proposed development on Maple Street

Dear Mr. Forsythe:

1.0 INTRODUCTION

At the request of *DesignPoint Engineering & Surveying Ltd.*, 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 multi-unit residential development to be located at civic #46 Maple Street (PID 00043968), located in the Austenville neighbourhood of Dartmouth, Halifax Regional Municipality (HRM). It is understood that the proposed development will be comprised of 20 residential townhome units.

Assuming Maple Street is aligned in a general east-west direction, the subject lands are located in the northeast quadrant of the Thistle Street / Maple Street intersection. Currently, there is one building located on these lands and the majority of the 0.5 acre property has an asphalt surface that is used as a vehicle storage area for a local car dealership. The subject property has a DN (Downtown Neighbourhood Zone) Zoning designation and the site is located within HRM's Urban Service Area and the Downtown Dartmouth 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 in the northeast quadrant of the Thistle Street / Maple Street intersection. This three-leg intersection operates with all-way stop control and no auxiliary turn lanes. For the purposes of this qualitative assessment, Thistle Street was assumed to be generally aligned in a north-south direction. The following provides a description of the both streets:

- *Thistle Street*: It has a two-lane urban cross-section (two travel lanes in each direction) and a general asphalt width of 8.1m. There is varied vertical geometry along the corridor and both approaches to the Maple Street intersection have notable downhill grades. Thistle Street provides a key connection between the Victoria Street corridor and the residential neighbourhood surrounding the proposed development. It has a regulatory speed limit of 50 km/h.
- *Maple Street*: It has a two-lane urban cross-section (two travel lanes in each direction) and a general asphalt width of 7.9m. This street terminates at Thistle Street yet provides a key east-west connection between the Ochterlony Street and Thistle Street corridors. Maple

Street has a notable grade along its entire length with the highest elevation at Thistle Street. It also has a regulatory speed limit of 50 km/h.

Both streets are under the jurisdiction of the HRM.

2.2 Vehicle Access

There is one existing vehicle access serving the subject property which connects to Maple Street about 19m east of the corner radius curb return (i.e. a 19m corner clearance). The driveway opening measures about 8.5m wide and provides vehicle queue storage space for about 3 commuter cars along Maple Street between the stop bar the driveway opening. This location is near the east property boundary maximizing the available corner clearance along the property frontage. The driveway is currently gated, and therefore, it was assumed there is infrequent use of the site access and the number of vehicles moving in/out of the existing property is low.

As shown in *Figure 1*, the proposed vehicle access will shift to the west slightly. Based on the site plan drawing and field observations it appears that a utility pole and large mature tree will need to be removed. Further, the proposed location reduces the corner clearance to the subject intersection by about 8-9m. This distance will need to be confirmed during the site design process. There is a driver sight line limitation on the northeast corner of the intersection as a driver stopped at the southbound stop bar is not able to see a vehicle exiting the proposed driveway (and vice versa).

2.3 Pedestrian Facilities

During the site visit it was observed that concrete sidewalk is provided on both sides of Maple Street and Thistle Street in the vicinity of the subject intersection. This appears to offer good pedestrian facility connectivity in this predominantly residential neighbourhood.

At the intersection, only two unsignalized crosswalks are clearly identified by a standard two-line pedestrian crosswalk pavement marking scheme. This includes crossings of the north leg of Thistle Street and the east leg of Maple Street. HRM should give consideration to clearly identifying the third intersection crosswalk across the south leg of Thistle Street using pavement markings and signage consistent with TAC guidelines.

It was also observed that the crosswalk facilities are inadequate for mobility challenged persons. This includes the lack of, or narrow and mis-aligned curb cuts for assistive devices, as well as no tactile devices for the visually impaired. Further, the notable steep grades are challenging for all active transportation modes. Examples of these conditions are provided in *Figure 2*.

Figure 2: Existing Pedestrian Facility Conditions

Limited sidewalk width, mis-aligned crosswalk.

No curb cut.

2.4 Parking

The on-site, off-street parking associated with the proposed development should meet HRM By-law requirements for the appropriate residential land use type.

On-street parking is currently restricted along both sides of Maple Street, and therefore, there will be no impacts/changes to the on-street parking associated with the proposed driveway relocation. There are also on-street parking restrictions along both sides of Thistle Street on the immediate approaches to the intersection. However, on-street parking is available about 30m north of the intersection, on the east side of Thistle Street – immediately north of the existing transit stop. These on-street parking spaces could be utilized by residents and visitors of the new development.

3.0 EXISTING TRAFFIC CONDITIONS

Since the proposed development will be a residential land use type, is adjacent to other residential housing, and near the local junior high and high schools 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 Monday July 29th, 2019 to observe traffic volumes, driver behavior, existing vehicle access operations, pedestrian activity and so forth. During this time GRIFFIN also carried out a brief intersection turning movement count at the Thistle Street / Maple Street intersection and the hourly equivalent morning peak period volumes are provided in *Table 1*.

Table 1: Thistle Street and Maple Street Intersection Morning Hourly-equivalent Traffic Volumes

Thistle Street South (vph)		Thistle Street North (vph)		Maple Street (vph)	
NB Thru	**NB Right**	**SB Thru**	**SB Left**	**WB Left**	**WB Right**
56	188	80	4	288	8
Entry = 244 vph		**Entry = 84 vph**		**Entry = 296 vph**	

vph – vehicles per hour.

The hourly-equivalent volumes contained in *Table 1* suggest that the peak period two-way volumes on Maple Street are likely between 450-550 vph, and 600-700 vph on the south leg of Thistle Street. Although the peak hour volumes are nearing the capacity of the south leg of Thistle Street, it was also observed during the field review that there are numerous and lengthy gaps in the traffic flow during the shoulder-peak and off-peak periods of a typical weekday.

4.0 ACCESS SIGHTLINE 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. The concept site plan shown in *Figure 1* locates the vehicle access point near the northwest corner of the Thistle Street / Maple Street intersection. In this particular corner of the intersection there is a concrete retaining wall, vegetation and a steel beam barrier located behind the sidewalk that reduces a driver's visibility. Photos contained in *Figure 4*, taken during the site visit, demonstrate the sight distance limitation.

Figure 3: Driver Sight Distance Limitation – Northeast Corner

View of sight distance obstruction in northeast corner.

View from southbound approach stop bar on Thistle Street.

It should be noted that this sight distance limitation creates a vehicle turning conflict between a southbound left turning vehicle (i.e. from Thistle onto Maple), and a left turning vehicle exiting the subject property onto Maple Street. Of course, both turns are most likely occurring from a stopped

position and therefore any conflict is likely to occur at low speed. However, the site design process should make an attempt to improve the sight distance limitation in the northeast corner of the intersection.

In the opposite direction, the available driver sight distance and visibility from the proposed site driveway to/from the east along Maple Street appears to exceed the minimum stopping sight distance requirements for a 50 km/h posted speed limit due to the straight horizontal alignment and no crest vertical curves. The provision of adequate driver sight lines to/from the future driveway location will need to be confirmed during the detailed site design process to ensure adequate sight lines are maintained, and if necessary, By-Law corner clearances and sight triangle requirements are also met.

5.0 SITE TRIP GENERATION

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.

ITE's land Use 220 – Multifamily Housing (Low-Rise) – appeared to be the most appropriate for the two-story townhomes being proposed. 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 2*.

Table 2: Site Trip Generation for the Proposed Mixed-use 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
		AM Peak Total Trips	**2**	**8**	**10**
PM Peak Hour					
Multifamily Housing (Code 220)	20 Units	0.70/unit[A]	9 (63%)	5 (37%)	14
		PM Peak Total Trips	**9**	**5**	**14**

A – ITE's regression formula used.

Based on the results contained in *Table 2*, the proposed medium density residential development is expected to generate 10 new vehicle trips/hour (2 inbound and 8 outbound) during the weekday morning peak period and 14 new vehicle trips/hour (9 inbound and 5 outbound) during the weekday afternoon peak period. This generally equates to adding one new vehicle trip to the study area streets every 4-6 minutes – on average. These trips will be further split in the east and west travel directions along Maple Street and the north-south direction along Thistle Street.

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.

In summary, the proposed 20-unit residential development is forecast to generate a small number of new vehicle trips and these are expected to have little to no operational impact on the Maple Street / Thistle Street intersection. 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.

6.0 TRAFFIC IMPACTS ON SURROUNDING STREETS

The addition of the proposed site-generated traffic associated with the proposed 20-unit residential development is expected to have a negligible impact on weekday peak period traffic operations. Based on the trip generation calculation results contained in *Table 2*, there is expected to be an overall increase in traffic at the subject intersection. However, the technical evidence suggests the increase in vehicle trips is forecast to be small and negligible. Further, the net increase in site-generated trips is less than the HRM TIS guideline threshold that requires a quantitative traffic impact study to be completed.

7.0 FINDINGS & CONCLUSIONS

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

- The proposed residential development will be comprised of 20 medium density units, and each building unit will have two floors (i.e. low-rise). This is estimated to generate 10 trips/hour (2 inbound and 8 outbound) during the weekday morning peak period and 14 trips/hour (9 inbound and 5 outbound) during the weekday afternoon peak period.
- The qualitative traffic operational assessment suggests that the Thistle Street / Maple Street intersection – with all-way stop control – has some residual capacity but is likely nearing capacity during the peak periods of the day. This suggests that there are some gaps in the traffic flow to accommodate additional vehicles. 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 either Maple or Thistle Streets.
- The existing vehicle access serving the subject property connects to Maple Street with a corner clearance distance of about 19m. Under future conditions, the access will continue to connect to Maple Street, but will be shifted closer to the subject intersection by about 8-9m – reducing the corner clearance distance. Given the low volume of traffic moving in/out of the proposed development it is likely to have no traffic operational concerns. However, the driver sight distance limitations located in the northeast corner of the intersection raise some concerns and should be addressed during the site design process.

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

- That the design of the proposed vehicle accesses 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 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 both the new site access location and to/from the Thistle Street / Maple Street intersection.
- That HRM carry out a review of the pedestrian facility needs at the Thistle Street / Maple Street intersection to ensure there are adequate provisions for all pedestrians, including those with mobility challenges.

8.0 CLOSING

The findings flowing from this qualitative traffic impact statement indicate the new trips generated by the proposed development located at civic #46 Maple Street 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.