GRIFFIN transportation group inc.
traffic engineering | transportation planning

[redacted]

March 23, 2020

Laura Masching
Planner
[redacted]

RE: A Traffic Impact Statement for a proposed re-zoning on Hines Road

1.0 INTRODUCTION

At the request of *Armco Capital (Armco)*, the GRIFFIN transportation group inc. has completed a qualitative Stage 1 - Traffic Impact Assessment in support of the planning application process for the proposed re-zoning of your property located on Hines Road, in the community of Eastern Passage, Halifax Regional Municipality (HRM).

The subject properties owned by *Armco* (PID #40103806, #40103780, #40103772, #40103798) are located on the southeast side of Hines Road, generally between Autoport Avenue and the Shearwater Air Base. These lands are located in the Eastern Passage/Cow Bay Land Use By-Law area. Currently, the subject lands have multiple zoning designations, including an R-1 (Single unit dwelling) zone and EC (Environmental conservation) zone. It is understood that *Armco* is preparing a planning application to request the R-1 zone lands be changed to an I-1 (Light industry) zone, as shown in *Figure 1*.

The subject lands are currently undeveloped and no vehicles enter/exit the properties considered to be part of the proposed rezoning application. Based on information provided by *Armco*, a new vehicle access is proposed to be built on the small piece of land frontage connecting to Hines Road, between civics #147 and #149. The suggested access provides a direct connection between Hines Road and the lands proposed for rezoning. The overall site context and study area is generally illustrated in *Figure 2*, which includes the approximate boundary of the existing R1 lands proposed for rezoning as well as the developable lands assumed to be used as a vehicle storage / parking lot for the Autoport Limited (Autoport) business.

Figure 1: Location of Lands Proposed for Rezoning

Figure 2: Study Area and Site Context

Source: Google

2.0 STUDY AREA AND SITE CONTEXT

Hines Road is generally aligned in a northeast-southwest direction with a two-lane rural cross-section (one travel lane in each direction), very narrow gravel shoulders and open ditches. The roadway is under the jurisdiction of the Halifax Regional Municipality (HRM). This section of Hines Road appears to function as a collector road that provides a connection between Main Road and Caldwell Road.

The Hines Road elevation increases as you travel from Main Road, past the proposed access, and towards the Shearwater Air Base. There are several vertical curves along this section of Hines Road, but generally the horizontal alignment is relatively straight in the vicinity of the proposed access. It currently has a regulatory speed limit of 50 km/h. The visibility along Hines Road in the location of the proposed site access is shown in the Figures below.

Looking southeast from proposed access

Looking northwest from proposed access

3.0 EXISTING TRAFFIC CONDITIONS

3.1 Traffic Volume Data

A site visit was carried out on Friday January 24th, 2020 to observe traffic volumes, driver behaviour, pedestrian activity, existing signage and so forth. During the site visit GRIFFIN gathered two-way traffic volumes on Hines Road in the vicinity of the proposed site access during the late-morning off-peak time to gain an understanding of the existing flow along this roadway. A summary of the existing volumes is provided in *Table 1*.

Table 1: Weekday Morning Off-peak Hourly Traffic Volumes on Hines Road

	Hourly Volumes (vph)		
	Southwest-bound (inbound)	**Northeast-bound (outbound)**	**Two-way**
January 2020[A] *Observed off-peak hourly flow*	58	74	132

A – Volume on Hines Road in vicinity of proposed site access.
vph – vehicles per hour.

Based on the available information, the current two-way hourly flows on Hines Road is expected to be about 130-140 vehicles/hour (vph) during a typical weekday off-peak hour. This level of vehicle demand is considered to be well below the capacity of a typical two-lane street. Based on expected temporal distributions for this type of roadway, the weekday afternoon peak hour is anticipated to experience about twice as much vehicle demand relative to a late morning off-peak hour. If this were to be the case for Hines Road, the expected peak hour demand is expected to also be well below the actual capacity of the street. It was concluded that there is likely to be a considerable amount of residual peak hour capacity to accommodate future traffic growth along Hines Road.

3.2 Vehicle Speed Data

GRIFFIN gathered vehicle operating speed data along Hines Road in the vicinity of the proposed site access on January 24th, 2020. These data only included free-flow vehicle speeds not influenced by slowing/turning vehicles at adjacent intersections or driveways. All of the speed recordings were assembled and an 85th percentile vehicle speed was calculated. This value has been identified as a reasonable "design" speed that is used by many road agencies across North America to set regulatory speed limits on roadways. In the case of this assessment, the 85th percentile vehicle operating speed was used for the stopping sight distance review.

The calculated 85th percentile vehicle operating speed on Hines Road was determined to be 68 km/h and included vehicles traveling in both directions. In order to remain conservative, a 70 km/h

was chosen as the design speed for the sight distance assessment discussed below. The regulatory speed limit along this section of Hines Road is 50 km/h and the calculated 85th percentile operating speeds are nearly 20 km/h higher.

4.0 DRIVER STOPPING SIGHT DISTANCE REVIEW

A stopping sight distance review was carried out in the location of the proposed new site access on Hines Road and was based on the guidelines contained in the latest Transportation Association of Canada's (TAC) Geometric Design Guide for Canadian Roads document (2017). At this early stage of the planning process only the minimum requirement for vehicles approaching the new access was assessed. This is referred to as stopping sight distance (SSD). The provision of adequate SSD for vehicles traveling on the main roadway – in this case Hines Road – ensures that drivers have sufficient forward visibility to identify a hazard in the roadway, and if needed, bring their vehicle to a stop.

The field measurements were carried out by GRIFFIN and followed TAC guidelines including a driver eye height of 1.05 m and an object/hazard height of 0.60 m. The 0.60 m object was placed at the approximate centre of the proposed new access connection, on the southeast edge of the outbound travel lane. A summary of the field measured sight distances relative to the minimum requirements for a 70 km/h operating speed is provided in *Table 2*.

Table 2: Summary of Stopping Sight Distance Measurements (70 km/h)

Location	Travel Direction	Available SSD	TAC Required SSD		**Does Available Exceed Required?**
			Base[A]	Slope Adjusted	
Between Civics #147 & #149	Southwest-bound	195 m	105 m (70 km/h)	105 m (<2%)[B]	Yes
	Northeast-bound	146 m		105 m (<2%)[B]	Yes

A – TAC Chapter 2, Table 2.5.2 (June 2017)

B – An estimate of the actual slope along Hines Road on the approaches to the site access.

Based on the site conditions, the available stopping sight distances along Hines Road exceed TAC minimum requirements for a 70 km/h vehicle operating speed. Therefore, the proposed access appears to meet the minimum design guidelines. Following the planning approval process associated with the proposed re-zoning, the site designers will need to confirm the final location of the site access and that minimum driver sight distances, intersection corner clearances and sight triangles are provided.

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 number of new vehicles that would be entering and exiting the proposed site access. 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), which are contained in the most recent *Trip Generation, 10th Edition* document. However, based on information provided by *Armco*, the subject lands that comprise the re-zoning application will be used as a vehicle storage / parking lot for the Autoport Limited (Autoport) business. Since this is an uncommon land use type it is not contained within the ITE's trip generation document. Therefore, GRIFFIN used a first-principles approach to estimate the vehicle demand entering/exiting the subject lands.

Armco has indicated that only a portion of the entire subject lands are developable due to environmental and topographical constraints. The developable area is shown in *Figure 2* and was assumed to contain vehicle parking for the Autoport. *Armco* carried out a review of this developable area and determined it could accommodate up to 1,111 parked vehicles.

GRIFFIN also held discussions with a former driver who moved vehicles on behalf of the Autoport in order to gain a better understanding of their operations and apply this information to the trip generation estimates. The following information was gleaned from this discussion:

- Stevedores must move cars on and off the vehicle carrier ships to the vehicle parking area on the pier. Autoport then hires drivers to move cars to/from the pier. Their destination could include railway cars, transport trucks or an external parking lot located on the opposite side of Main Road.
- Hired drivers work shifts up to 12-hours in length and will continuously move vehicles on an as needed basis. Hired drivers moving cars to/from an external parking area require about 30 minutes for a round-trip. A shuttle bus, holding about 20-30 drivers, will transport drivers back to the start of their route. This will continue until all required cars are successfully moved.
- *Armco* has determined that the subject lands serving as an external parking lot could contain a maximum of 1,111 cars.

The key information required for the trip generation estimation process is summarized in *Table 3*.

Table 3: Site Trip Generation – Key Information

Parameter	Value
Parking Lot Capacity[A]	1,111 Autoport cars
Number of drivers assigned to parking lot	30 drivers
Driver round trip length	0.5 hours
Total hourly car movements to/from Parking Lot	60 Autoport cars / hour
Total shuttle bus movements to/from Parking Lot	4 bus trips / hour

A – Information provided by Armco based on an assessment of developable land area.

It was assumed that the Autoport would assign 30 drivers to move cars in/out of the proposed *Armco* external parking lot and this would equate to 60 Autoport cars being moved in one hour. In terms of vehicle operations at the future site access on Hines Road, it is expected that the critical direction would be the outbound movement of cars – cars exiting the parking lot onto Hines Road and traveling towards the Autoport pier. GRIFFIN then estimated the site-generated vehicle trips using these worst-case scenario assumptions and the results are contained in *Table 4*.

Table 4: Site Trip Generation – Proposed External Parking Lot

	Size	Trip Rate	New Vehicle Trips / Hour		
			In	Out	Total
AM Peak Hour					
External Parking Lot	1,111 cars	60 / hour	0 (0%)	60 (100%)	60
	1 shuttle bus	4 /hour	2 (50%)	2 (50%)	4
AM Peak Total Trips[A]			**2**	**62**	**64**
PM Peak Hour					
External Parking Lot	1,111 cars	60 / hour	0 (0%)	60 (100%)	60
	1 shuttle bus	4 /hour	2 (50%)	2 (50%)	4
PM Peak Total Trips[A]			**2**	**62**	**64**

A – New trips equal total site trips, no discounts for pass-by traffic applied.

Based on the results contained in *Table 4*, the expected site-generated vehicle trips moving to/from Hines Road is expected to be about 64 vph. This magnitude of site-generated vehicle trips generally equates to one additional vehicle trip added to the Hines Road corridor every minute – not only during peak hours of the day but potentially over the course of an entire day. This is considered to be a very small increase in volume in the Hines Road corridor.

When interpreting these results, one should also keep in mind that the above-noted assumptions represent a worst-case scenario that will only occur periodically – and will be influenced in large part by the shipping schedule. It is expected that a worst-case scenario will only occur over 1-2

days per week – in the hours leading up to, during, and after a ship has docked. This suggests that the impacts on Hines Road due to the site-generated traffic are not a daily occurrence and diminishes the overall operational impacts.

6.0 TRAFFIC IMPACTS ON SURROUNDING STREETS

Based on the information gleaned from the trip generation discussions, the increase in traffic volumes on Hines Road is only expected to occur periodically. As such, the parking lot may remain empty, or conversely, remain full for several days with no vehicle activity at the new site access. Although these periods of inactivity will occur, the assumed worst-case scenario, as shown in *Table 4*, indicates that the increase in volume on Hines Road is expected to have a negligible impact on weekday traffic operations.

The total site-generated trips moving in/out of the site is forecast to be about 64 vph, and all of these trips will be moving to/from the southeast along Hines Road. Based on the information gleaned during the trip generation discussions these vehicles will not likely cross the railway tracks on Hines Road and it is anticipated that all Autoport vehicles will be moved along Hines Road, then along Autoport Avenue/Clarence Avenue, and then along Morris Avenue.

Given the fact that typical weekday hourly traffic volumes on Hines Road are considered to be below its capacity there are expected to be numerous gaps in the traffic stream for traffic turning to/from the proposed new access. As such, the new access intersection with Hines Road is expected to operate with acceptable levels of service over the course of a typical weekday and only require stop-control on the minor leg.

7.0 FINDINGS & RECOMMENDATIONS

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

1. That the design of the proposed new access and its intersection with Hines Road follow Transportation Association of Canada (TAC) and HRM geometric design guidelines. This includes the accommodation of an appropriate design vehicle. The identification of an appropriate design vehicle should be discussed with HRM early in the site design process.
2. That all municipal and road agency By-law/Policy requirements for corner clearance, sight triangles and driver visibility are met to ensure driver sight distances are maintained throughout the planning, design and construction phases of this project.

3. That the road agency carry out a review of the existing signage and pavement markings along Hines Road to ensure all required signs and/or pavement markings are installed following the latest guidelines contained in TAC's Manual of Uniform Traffic Control Devices for Canada (MUTCDC) document.

4. That HRM Traffic Management holds discussions with the appropriate police agency(s) regarding the vehicle operating speeds within the 50 km/h speed zone along Hines Road. Despite the fact that the existing driver visibility at the proposed access exceeds the minimum SSD requirement for a 70 km/h operating speed, GRIFFIN recommends that a speed management assessment be carried out to ensure that an appropriate solution is implemented – one that considers managing speeds in this corridor given the existing roadway design characteristics and surrounding land uses.

8.0 CLOSING

The findings flowing from this qualitative traffic impact statement suggest the new trips generated by the proposed re-zoning are expected to have a minimal impact on the existing traffic operations in the Hines Road corridor, assuming the lands are used as an external parking lot for the Autoport. Given the periodic and intermittent use of the proposed site access connecting to Hines Road, it is expected to operate with acceptable operational parameters with stop-control on the minor leg and no auxiliary turn lanes. 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.