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Att: Mr. Danny Holloway, P.Eng.
Principal
HGE Engineering Inc.
153 Sackville Drive
Lower Sackville, NS B4C 2R3

RE: A Traffic Impact Statement for proposed changes to civic #6590 Bayers Road

1.0 INTRODUCTION

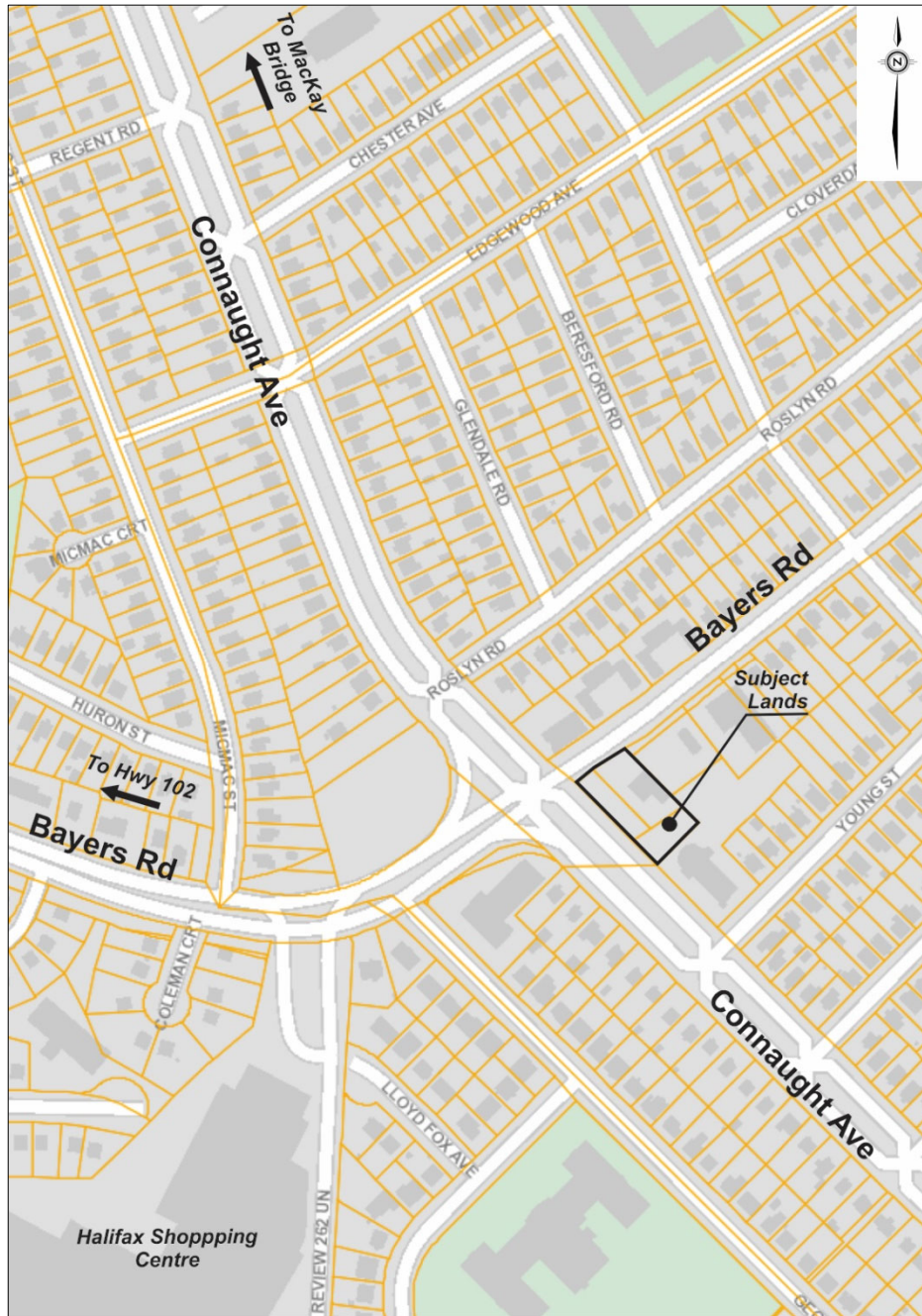
1.1 – Overview

At the request of *HGE Engineering Inc. (HGE)*, the GRIFFIN transportation group inc. has completed a qualitative Stage 1 Traffic Impact Assessment in support of a Development Agreement process underway between the land owner of civic #6590 Bayers Road and the Halifax Regional Municipality's Planning Department. The subject lands are comprised of three properties (PID's #00058768, #41233339, and #41233347) which are prominently located in the southeast quadrant of the Bayers Road / Connaught Avenue signalized intersection in the community of Halifax, Halifax Regional Municipality (HRM). These lands currently have a COR (Corridor) zone designation within the *Regional Centre Land Use By-Law* area. The location of the subject property is contained in *Figure 1*.

1.2 – The Proposed Changes to The Site Layout

It is understood that the HRM is in the process of purchasing land to widen the existing Bayers Road corridor right-of-way to accommodate future public transit priority lanes. HRM is therefore purchasing a 6-8 m strip of land along the north property boundary of civic #6590. This transaction precipitates the need for a new Development Agreement to be established between the land owner and HRM to ensure the gas station and convenience market are compliant with the latest zone designation and planning requirements for the subject lands.

Figure 1: Location of Subject Lands



Source: HRM GIS Maps

Further, the reduction in area of the property will impact the operations and functionality of the current business. The property owners will continue to operate the gas station and convenience market business; however, the location of the gas pumps and building will need to be reconfigured to ensure the long-term viability of the business.

A summary of the proposed changes to the business operations and site layout is provided in *Table 1*. A comparison of the current layout and the future configuration is contained in *Figure 2*. The proposed site layout changes are expected to improve the customer experience and improve traffic flow and safety as drivers patronize the business.

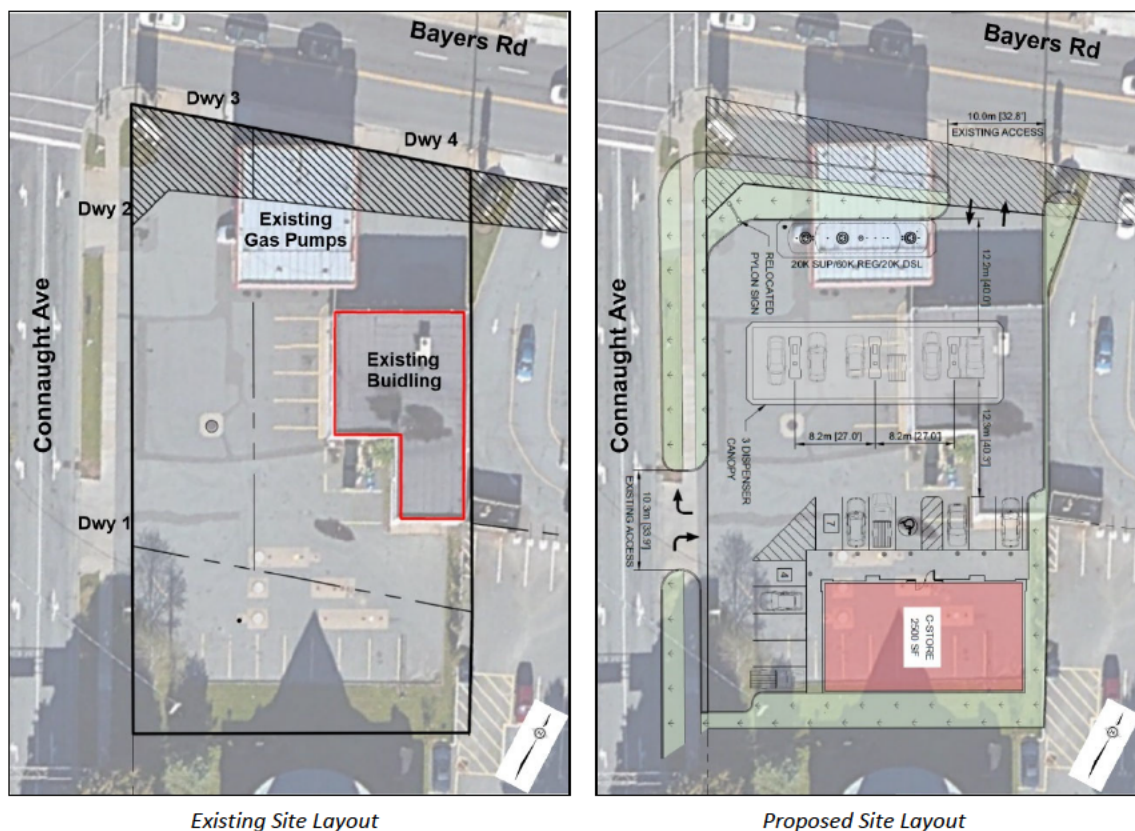
Table 1: Summary of Proposed Site Changes

	Current Business	Future Business
Building Size ^A	3,000 ft ²	2,500 ft ²
Vehicle Fuel Positions ^B	8 positions	6 positions
No. of Driveways	4 accesses	2 accesses

A – The existing building will be removed and a new one will be built in the southeast corner of the property.

B – The maximum number of vehicles that can simultaneously access fuel. Existing gas pumps to be removed.

Figure 2: The Current and Proposed Site Layout



1.2 – Terms of Reference

The qualitative Stage 1 traffic impact assessment associated with the proposed redevelopment is discussed in the following Sections. Throughout the completion of this study GRIFFIN has followed Halifax Regional Municipality (HRM) traffic impact study guidelines, as well as Institute of Transportation Engineers (ITE), and Transportation Association of Canada (TAC) guiding principles.

2.0 STUDY AREA AND SITE CONTEXT

2.1 – Street Layout Overview

The subject property is located in the southeast quadrant of the Bayers Road / Connaught Avenue signalized intersection. This junction is considered to be one of the major signalized intersections in HRM as Bayers Road is one of only five major transportation corridors connecting to the peninsula.

2.2 – Bayers Road

Bayers Road is generally aligned in an east-west direction and functions as an arterial street through a commercial area. This is a key transportation corridor that currently accommodates multiple modes of travel including commuter vehicles, public transit routes, and active transportation. In the vicinity of the subject property it has a three-lane cross-section including one inbound (eastbound) lane and two outbound (westbound) lanes. Pedestrian sidewalks are also located on both sides of the street.

Currently, two gas station driveways connect to Bayers Road. Both are full-movement driveways that accommodate left and right turning vehicles in/out of the site. However, the northwest driveway is located immediately adjacent to the signalized intersection with a very small corner clearance distance of about 1 m. This situation has the potential to create increased traffic flow turbulence and increases the likelihood of vehicle conflicts between turning vehicles at the intersection and the driveway.

2.3 – Connaught Avenue

Connaught Avenue is generally aligned in a north-south direction and functions as an arterial street. It has a wide raised centre median with periodic median openings at local residential streets. This corridor generally has a four-lane cross-section with localized widening at the Bayers Road signalized intersection to accommodate additional auxiliary turn lanes. This transportation corridor provides a key mobility connection between the University / Hospital district and the MacKay Bridge.

The raised centre median extends along the property frontage thus the two existing site driveways can only accommodate right-in, right-out vehicle movements (i.e. no left turns). As shown in *Figure 2*, the north driveway is in close proximity to the signalized intersection and has a very small corner clearance distance of less than 1 m. Since this driveway is functioning as a right-in, right-out driveway, the small corner clearance has less impact relative to a full movement driveway. However, the close proximity is still notable and an area of potential improvement.

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3.0 CHANGES TO VEHICLE TRIP GENERATION

In order to assess the change in traffic volumes on the study area streets under future conditions, a traffic impact assessment typically will 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. However, as noted earlier in this letter, the existing land use and business operations will generally not change under future conditions.

GRIFFIN reviewed the ITE's latest *Trip Generation Manual, 11th Edition* document and determined the most applicable land use type was associated with the Convenience Market / Gas Station (Land Use Code 945). One of ITE's independent variables for this land use that best describes the volume of traffic generated by this business type is the number of vehicle fueling positions. The ITE's empirical data suggests that the number of fueling positions directly correlates to the volume of site-generated traffic.

As noted earlier in this letter the number of vehicle fueling positions is expected to be reduced from the existing number of 8 down to 6. Therefore, the number of vehicles moving in/out of the site under future conditions is expected to be slightly reduced. Thus, there is expected to be little to no measurable traffic impacts on the surrounding streets and intersections associated with the proposed site redevelopment.

4.0 VEHICLE ACCESS TO THE SITE

4.1 – Existing Driveways

As shown in *Figure 2*, there are two right-in, right-out driveways along the west property boundary connecting to Connaught Avenue. There is good driver visibility along Connaught Avenue due to the relatively flat and straight street alignment. The two driveways along the north property boundary connecting to Bayers Road accommodate all turning movements and also have good driver visibility in both directions. Representative driver views of existing conditions are provided in *Figure 3*.

Typically, left turns exiting a business along an arterial street during peak travel periods experience long delays. However, since the subject property is located on the corner of a signalized intersection the outbound left turns can occur in multiple ways. Drivers can turn left out onto Bayers Road – if possible. Alternatively, drivers can turn right out onto Connaught Street and then turn left at the signalized intersection with Bayers Road. Under future conditions these choices will not change and drivers will continue to have multiple entering and exiting options to the gas station / convenience market business.

Figure 3: Existing Driver Views



Connaught Ave – looking north towards west driveways



Connaught Ave – looking south from south driveway,



Bayers Rd – looking west towards signalized intersection



Bayers Rd – looking east at north driveways

4.2 – Assessment of Driveway Changes

As noted earlier in this letter, the future site layout includes a reduction in the number of driveways. Two driveways will be closed including both accesses adjacent to the signalized intersection, in the northwest corner of the property. GRIFFIN conducted a qualitative traffic operation impact assessment associated with the two driveways that will remain open and a summary of the key findings is provided in *Table 2*.

Table 2: Proposed Changes to the Site Driveways

	Existing Driveways	Proposed Driveways
No. of Driveways	4	2
Corner Clearances:		
Bayers Road	<1 m	28-30 m
Connaught Avenue	1 m	20-22 m
Turning Conflicts	-	Reduced number of turning conflicts – reduced safety risks

Based on the key findings contained in *Table 2*, the proposed changes to the site driveways are expected to have the following positive traffic operational impacts:

- *Follows access management guidelines* – The research literature suggests that consolidating driveways reduces the potential for vehicle turbulence and improves traffic flow along adjacent streets.
- *Improves Corner Clearance Distances to the Intersection* – The proposed new driveways are located in a manner that maximizes the distance away from the signalized intersection. It is not possible to achieve the HRM's 30 m minimum corner clearance distance due to the limited property frontage. However, there is a notable improvement relative to existing conditions.
- *Reduces road safety risks* – A reduction in the total number of driveways minimizes the number of potential vehicle turning conflicts as drivers turn in/out of the site.

In summary, the proposed number of driveways and their locations are expected to improve the traffic operational and road safety risk environment in the vicinity of the subject property. It was also concluded there are no vehicle capacity concerns under future conditions where only two driveways serve the site. Having only two future driveways will still provide sufficient operational capacity into the future.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 - Conclusions

The following conclusions were gleaned from the qualitative traffic impact assessment of the proposed redevelopment:

- *Precipitating Change*: The HRM is purchasing a narrow 6-8m strip of property along the north boundary of the subject lands to accommodate the planned widening of the Bayers Road right-of-way to implement public transit priority lanes. The current business operations on site include a gas station and convenience market. Although the business

- operations will remain, the reduction in area and space will negatively impact the business operations and customer experience. As such, the land owners are planning to reconfigure the building and gas pumps to improve functionality and traffic flow.
- *The need for a TIS:* To comply with HRM's current land use and zoning By-Laws a Development Agreement is required to facilitate the proposed redevelopment. As part of this process, the HRM's Planning Department has requested that a qualitative Stage 1 traffic impact statement letter be prepared to assess future traffic conditions.
 - *Business Operational Changes:* The following changes to the existing businesses at civic #6590 are being proposed:
 - *Convenience market:* Remove the existing 3,000 ft² building and construct a new 2,500 ft² building in the southeast corner of the property.
 - *Gas station:* Remove the existing gas pumps near the north property boundary and construct new pumps generally in the middle of the property. The total number of vehicle fueling positions will be reduced from 8 down to 6.
 - *Driveways:* Reduce and consolidate the number of driveways serving the site. The two driveways adjacent to the signalized intersection will be closed. This will result in only two future driveways being open, including one driveway along Connaught Ave and one driveway connecting to Bayers Road.
 - *Trip Generation:* A review of the future vehicle trip generation associated with the new site layout was completed. Based on the future site configuration noted above we understand that there will be a reduction in both the number of vehicle fueling positions and the size of the store. Thus, the net change in site-generated trips moving in/out of the civic #6590 site is expected to be less than current conditions.
 - *Driveway Changes:* The number of driveways will be reduced from four to two. However, there are no traffic capacity or operational concerns due to the following:
 - There is considerable residual vehicle capacity under current conditions.
 - A reduction in the number of right-in, right-out driveways connecting to Connaught Avenue from two to one is expected to result in very little change in capacity and operational performance issues for drivers.
 - The vehicle demand moving in/out of the site is expected to be less in the future since the number of fueling positions and store size will be reduced.
 - The adjacent traffic signal will continue to create gaps in the adjacent street traffic flow, providing sufficient capacity for patrons entering/exiting the civic #6590 property.

- The proposed driveway locations are located in a manner that maximizes the available corner clearance distances and will improve traffic flow and reduce the likelihood of turning conflicts.

Although HRM's property acquisition from civic #6590 will precipitate a new site layout and driveway configuration, the total volume of traffic moving in and out of the site is expected to be less than current conditions. Therefore, the proposed site layout changes are expected to have little to no measurable impact on traffic flow on or through the adjacent streets and intersections.

5.2 – Recommendations

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

- *Driveway Design:* That the geometric design of the two site driveways follow the latest HRM and Transportation Association of Canada (TAC) guidelines. This process (carried out by others) should include the use of an appropriate design vehicle and also give consideration to HRM's future street design along Bayers Road.
- *Internal Truck Circulation:* That the internal site planning and design process (carried out by others) include the turning / swept path needs of a typical fuel delivery truck. The design vehicle should be confirmed with HRM.
- *Active Transportation:* That the HRM ensure appropriate and adequate pedestrian facilities be designed and implemented in the southeast corner of the Bayers Road / Connaught Avenue intersection as part of the planned Bayers Road widening project. It is suggested that HRM give consideration to such things as relocating the utility pole out of the sidewalk, installing curb ramps with tactile surfaces and appropriate widths, and installing assistive devices such as audible pedestrian signals (APS).

6.0 CLOSING

The findings flowing from this qualitative Stage 1 traffic impact statement suggest the net difference in the before / after traffic operating conditions around the civic #6590 property will be negligible – and could potentially result in a traffic operational improvement. 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,



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