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Att: Sam Gillett
Citra Cliffs
3525 Acadia Street
Halifax, NS B3K 3P3

RE: Traffic Impact Statement - Proposed Residential Development – Craigmore Drive Halifax

1.0 INTRODUCTION

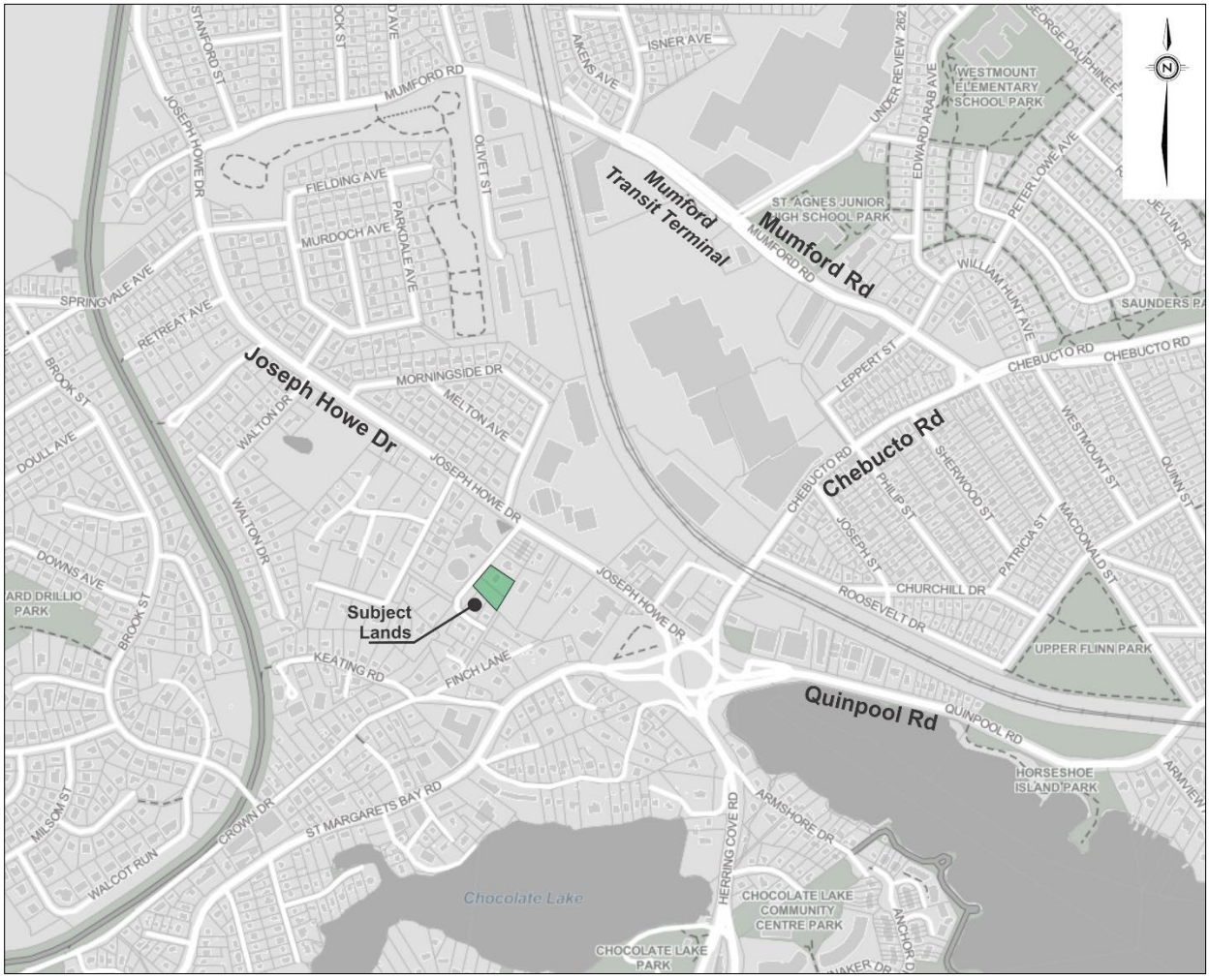
1.1 – Overview

At the request of *Citra Cliffs*, the GRIFFIN transportation group inc. (GRIFFIN) has carried out a qualitative Stage 1 Transportation Impact Assessment in support of the planning application being submitted to Halifax Regional Municipality (HRM) for a new medium density residential development on two properties located in the vicinity of the Armdale neighbourhood, in the community of Halifax, HRM. The subject properties have street frontage along Craigmore Drive, including PID's #00208280 (civic #34) and #40179202 (Lot 3B). The location of these lands is contained in *Figure 1*.

The civic #34 property is currently occupied by a detached residential home (R-1), while the adjacent Lot 3B property is vacant. The combined area of both properties is about 0.5 acres and they currently have a Single Family Dwelling (R-1) zone designation within the *Halifax Mainland Land Use By-Law* area.

The proponent has plans to redevelop these lands by removing the existing detached home, assembling the two PID's, and then constructing up to 20 new low-rise residential townhome units. A new private lane will extend into the subject lands and provide a link between Craigmore Drive and the individual driveways serving the new units. Additional details regarding the site layout concept are discussed later in this letter.

Figure 1: Location of Subject Lands



Source: HRM GIS Maps

1.2 – Terms of Reference

Our qualitative Stage 1 transportation impact assessment of the proposed development is discussed in the following Sections. Throughout the completion of this assessment GRIFFIN has followed HRM's latest transportation mobility and traffic impact study guidelines, as well as their Integrated Mobility Plan (IMP) policy, in what will become an increasingly dense urban area in the future. In addition, GRIFFIN has applied the latest guiding principles published by the Institute of Transportation Engineers (ITE), and Transportation Association of Canada (TAC).

2.0 STUDY AREA AND SITE CONTEXT

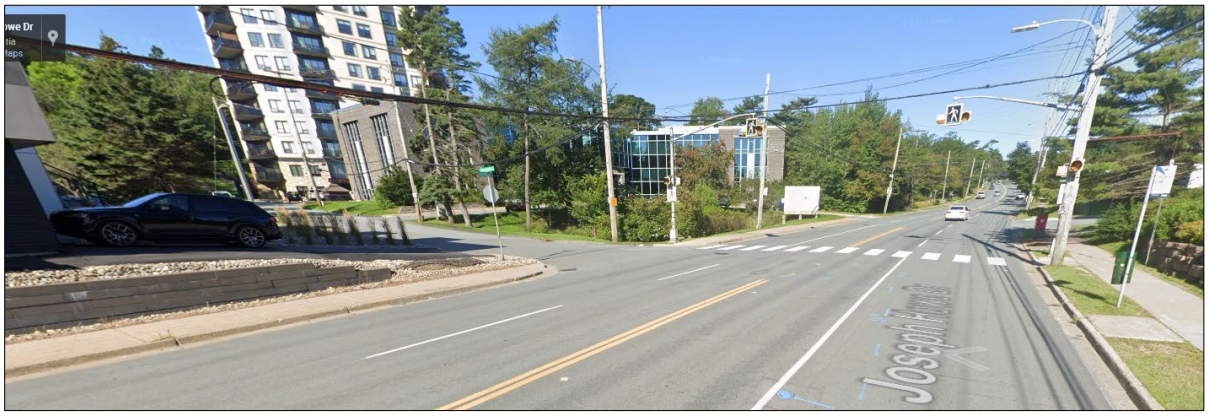
2.1 – Roadway Layout Overview

For the purposes of our assessment it is assumed that Craigmore Drive is generally aligned in an east-west direction. The subject lands have direct frontage along the south side of Craigmore Drive. Craigmore Drive is not a through street and terminates about 200m west of Joseph Howe Drive. Therefore, all current and future vehicle trips accessing Craigmore Drive will move to/from the Joseph Howe Drive corridor via the existing three-leg stop-controlled intersection. HRM has designated Craigmore Drive as an urban Local class street.

Joseph Howe Drive is generally aligned a north-south direction and is an important transportation corridor in this area of Halifax. It has an urban cross-section that is comprised of four travel lanes (i.e. two in each direction) that accommodate transit and commuter vehicles and concrete pedestrian sidewalks on both sides. There is currently no right-of-way space reserved for a cycling facility. Despite the lack of a cycling facility, Joseph Howe Drive is still considered to be a multi-modal travel corridor. HRM has designated Joseph Howe Drive as a being an Arterial class street. The regulatory speed limit is 50 km/h.

To the south, Joseph Howe Drive connects to the Armdale Roundabout providing access to the large employment areas and Universities situated on the Halifax Peninsula, as well as Highway 102 to the west.

Figure 2: Existing Joseph Howe Drive and Craigmore Drive Intersection (Looking North)



Source: Google Maps

2.3 – Other Travel Mode Options

The following is a summary of the current study area travel mode options other than the commuter vehicle:

- *Public Transit*: According to HRM's GIS mapping website only one Halifax Transit bus route services the Joseph Howe Drive corridor - Bus Route #24 (Leiblin Park) – with weekday and weekend service. Transit users can use Route 24 to take a short bus ride to the Mumford Transit Terminal and access many other transit routes serving the urban areas of HRM. Two HRM Transit bus stops are located only 100m from the proposed development. These stops include #7004 (southbound) and #7007 (northbound).
- *Sidewalks*: Currently there are no sidewalk facilities provided along Craigmore Drive. This appears to be consistent with HRM's policy for dead-end local residential streets; however, this is a neighbourhood that is experiencing an increase in population density. Since there are already high-rise residential buildings along Craigmore Drive it would appear prudent to have some form of active transportation facility in this area. It should be noted that Joseph Howe Drive has sidewalks provided along both sides of the street and there is an existing crosswalk facility at the Joseph Howe Drive / Craigmore Drive intersection that is marked with zebra pavement markings and a push-button activated flashing light (RA-5).
- *Bicycle Lanes*: There is no public right-of-way space reserved for a cycling facility in this area. Thus, it appears that travel via bicycles and other small-wheeled devices must either do so within the existing vehicle lanes or along the sidewalks – a situation that increases safety risk for road users.

In conclusion, there are multiple travel mode options available for current and future residents of Craigmore Drive; however, there are also opportunities to improve the facilities in this neighbourhood from a connectivity perspective. Investing in these types of travel improvements will align with HRM's Integrated Mobility Plan (IMP) policy as well as the on-going densification of this area.

3.0 THE PROPOSED DEVELOPMENT

3.1 - Overview

The proponent has plans to assemble and redevelop two properties along Craigmore Drive, including civic #34 and the adjacent Lot 3B, having a combined area of about 0.5 acres. This process will include the removal of the existing detached home situated on the civic #34 property and then consolidate both properties to accommodate the construction of up to 20 new low-rise residential townhome units. The completion of these new units will increase the residential density of the subject lands to about 40 units/acre and is consistent with the increasing residential density of the surrounding properties in this area of Halifax.

The proposed concept plan is contained in *Figure 2*. As shown, the proponent has plans to remove the existing residential driveway and build a new private lane that will extend from Craigmore

Drive into the subject lands. The individual driveways for the new units will connect to the new private lane and it is understood that no new driveways will connect directly to Craigmore Drive.

Figure 3: Proposed Site Layout

Source: Citra Cliffs

3.2 – Transportation Access and Connectivity

As shown in the site layout concept plan new residents will move in/out of the site via Craigmore Drive. From this point, residents will travel to/from the Joseph Howe Drive corridor.

GRIFFIN completed a driver visibility assessment of the new private lane connection to Craigmore Drive, generally following Transportation Association of Canada's (TAC) stopping sight distance (SSD) guidelines. The centre line of the new connection to Craigmore Drive was referenced from the site plan layout provided by *Citra Cliffs* and was assumed to be situated at the property boundary between civic #34 and Lot 3B, approximately 90m west of Joseph Howe Drive. GRIFFIN concluded there is adequate and sufficient visibility in both directions along Craigmore Drive due to the straight and flat alignment. Drivers have the ability to see to the Joseph Howe Drive intersection to the east, and the horizontal curve to the west – assuming there are no parked cars that would restrict visibility.

GRIFFIN also reviewed the intersection corner clearance distance between the proposed private lane and the Joseph Howe Drive intersection. As noted above, there is a substantial separation distance between these two junctions and the corner clearance distance exceeds both TAC and HRM minimum requirements.

Transit stops are currently situated at the Joseph Howe / Craigmore intersection, only 100m walking distance away from the proposed development. It should be noted; however, as identified earlier in this letter there are no sidewalk facilities provided along Craigmore Drive. Given the existing high-rise, high-density residential buildings situated at civic #1 Craigmore Drive it would have been prudent for HRM to have already installed sidewalk facilities to connect these buildings to the adjacent transit stops. As this neighbourhood continues to become more densely populated, HRM should invest in these types of facilities to ensure good quality connectivity between the walking and transit modes.

3.3 – Proposed Parking

Parking for residents will be provided via the individual driveways serving each residential unit. It is recommended that the proponent ensure that HRM parking requirements are met.

Currently, on-street parking is permitted along the Craigmore Drive property frontage. Although Craigmore Drive is considered to be a low-speed driving environment the presence of these parked vehicles will limit driver sight lines for vehicles turning in/out of the proposed new private lane. Therefore, it is recommended that HRM install regulatory "No Parking" signs along the south side of Craigmore Drive, specifically along the subject property frontage to preserve adequate driver visibility in this area.

4.0 NEW SITE-GENERATED TRIPS

4.1 – Overview

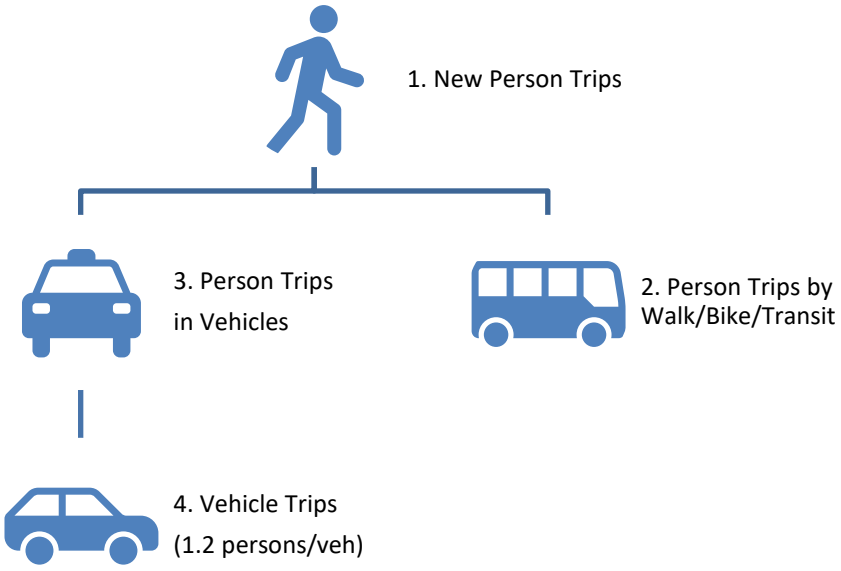
As discussed in the previous Section, the proponent has plans to construct up to 20 new low-rise residential townhomes along Craigmore Drive. Thus, GRIFFIN has followed HRM's traffic impact and latest mobility analysis guidelines to evaluate and assess the expected transportation impacts of these new residential units. To remain conservative in our assessment, and use slightly worse-case assumptions, GRIFFIN has not included the removal of the trips associated with the existing residential unit on the civic #34 property and only considered the additional site-generated trips associated with the proposed development.

The trip generation process begins with quantifying the number of new person trips expected to move in/out of the proposed development, then identifying the estimated amount of travel by each mode. For the purposes of this impact assessment, GRIFFIN has divided the travel modes into two categories:

- Travel via walking/biking/public transit (W/B/T), and
- Travel via commuter cars.

GRIFFIN followed industry best practices and Institute of Transportation Engineers (ITE) recommended guidelines to quantify the amount of total person trips and the travel expected by these two modal categories. The process applied to this review is generally illustrated in *Figure 4*.

Figure 4: Trip Generation Calculation Process



GRIFFIN utilized empirical formulas to quantify the number of new trips by each travel mode. This information is published by the Institute of Transportation Engineers (ITE) and contained in their most recent *Trip Generation Manual, 11th Edition, Volume 2* document.

4.2 – New Peak Hour Person Trips

GRIFFIN reviewed the ITE's latest documentation and identified the most suitable land use type for the low-rise residential development as being *Multifamily Housing (Low-Rise) Not Close to Rail Transit – Land Use Code 220*.

Since the proposed development is in the vicinity of the Armdale neighbourhood and this area is expected to become more densely populated – it appeared appropriate to utilize ITE's published trip rates contained in their Volume 2 document which contains empirical data for increasingly dense urban areas. ITE has assembled a reasonable number of research data gathered across North America to be able to quantify estimates for various modes, including walking, cycling, public transit, and vehicles.

The detailed person trip generation calculations for the proposed units in an urban area are provided in *Table 1*. The proposed development is expected to generate the following new peak hour person trips:

- *Weekday AM Peak Hour*: 14 new person trips/hour (3 inbound and 11 outbound)
- *Weekday PM Peak Hour*: 10 new person trips/hour (7 inbound and 3 outbound)

Table 1: Trip Generation for the Proposed Residential Development – Person Trips

	Size	Person Trip Rate	New Person Trips / Hour		
			In	Out	Total
AM Peak Hour					
Person Trips: ITE LUC 220 (Volume 2)	20 units	0.70/unit[A]	3 (19%)	11 (81%)	14
AM Peak Total Person Trips			**3**	**11**	**14**
PM Peak Hour					
Person Trips: ITE LUC 220 (Volume 2)	20 units	0.50/unit[A]	7 (66%)	3 (34%)	10
PM Peak Total Person Trips			**7**	**3**	**10**

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

These person trips are expected to predominantly move via public transit, walking, cycling and other small-wheeled devices, commuter cars as drivers and passengers, and ride-share services.

4.3 – Modal Breakdown of Peak Hour Person Trips

A breakdown of the estimated peak hour modal share was then prepared using ITE's empirical data for the two key travel categories. As noted earlier, our assessment has only focused on the

most common modes of travel as residents move to/from the new development. A breakdown of the estimated demand via the common modes of travel is contained in *Table 2*.

Table 2: Person Trips by Travel Mode

	Size	Person Trip Rate	New Person Trips / Hour		
			In	Out	Total
AM Peak Hour					
Total Person Trips (Table 1)			**3**	**11**	**14**
Walk/Bike/Transit Trips: ITE LUC 220 (Volume 2)	20 units	0.25/unit[A]	1 (25%)	4 (75%)	5
AM Peak – Person Trips by Vehicle			**2**	**7**	**9**
PM Peak Hour					
Total Person Trips (Table 1)			**7**	**3**	**10**
Walk/Bike/Transit Trips: ITE LUC 220 (Volume 2)	320 units	0.20/unit[A]	3 (46%)	1 (54%)	4
PM Peak – Person Trips by Vehicle			**4**	**2**	**6**

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

The number of person trips using the walking/biking/transit modes were calculated using ITE's empirical regression formulas. These values were then subtracted from the total person-trips, quantified in the previous Section (*Table 2*). The remainder of the person-trips were assumed to travel by vehicle as a driver or passenger.

Based on ITE's empirical data for a low-rise residential development we can expect about 35-40% of the person trips moving to/from the site to be comprised of the walking, biking, and public transit modes. Thus, a slightly larger portion of the person-trips are expected to travel by vehicle, either as a driver, as a passenger (rideshare), or by hired drivers (i.e. taxi, Uber, etc.). Of course, for these multi-modal splits to be achieved there is a need for increased and continuous investment in public transit service and active transportation facility connectivity throughout the greater Halifax community.

4.4 – New Peak Hour Vehicle Trips

The next step in the trip generation process involved the calculation of the number of new vehicles that will move in/out of the proposed development. GRIFFIN reviewed research data regarding the typical expected vehicle occupancy – or the number of persons that travel within a car during peak commuter times – and applied this information to this assessment. Generally, commuter vehicles contain an approximate average of 1.2 persons per vehicle during peak times of the day. This value has also been used by HRM in the past as part of regional transportation modelling efforts.

Applying a 1.2 persons/vehicle factor to the results in *Table 2* provides the following new vehicle estimates associated with the new development:

- *Weekday AM Peak Hour*: 9 new vehicle trips/hour (2 inbound and 7 outbound)
- *Weekday PM Peak Hour*: 6 new vehicle trips/hour (4 inbound and 2 outbound)

This volume of new vehicles equates to adding about one new vehicle to the study area roads and intersections approximately every 7-10 minutes during peak times of the day. Therefore, only a limited and acceptable impact is expected on the operational performance of traffic flow along Craigmore Drive and Joseph Howe Drive. Further, the operational impacts at the Joseph Howe Drive / Craigmore Drive intersection are expected to be minor and no changes to the existing traffic control or addition of new auxiliary turn lanes are necessary to accommodate the relatively minor increase in vehicular traffic.

5.0 CONCLUDING THOUGHTS

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

- The proponent has plans to assemble and redevelop two properties (PID's #00208280 and #40179202) on Craigmore Drive, in the vicinity of the Armdale neighbourhood, and within the Halifax Land Use By-Law area. The redevelopment process will require the removal of the existing detached home on the civic #34 property (PID # #00208280), and construction of up to 20 low-rise townhome units. The combined area of the subject lands is approximately 0.5 acres and the proposed redevelopment is expected to increase the density to about 40 units/acre.
- To complete the transportation technical assessment, GRIFFIN has followed the general procedures contained in HRM's Mobility Analysis guidelines to quantify the total person trips estimated to be generated by a new residential development. GRIFFIN utilized ITE's person trip rates contained in their *11th Edition Trip Generation Manual*, *Volume 2* document to first understand the magnitude of person trips that could be generated, then calculated the number of trips via walking/biking/public transit. The remaining person trips were assumed to travel by vehicle. In summary, the proposed new residential development is expected to generate up to **14 new person trips/hour** (3 inbound and 11 outbound) during the weekday morning peak period, and **10 new person trips/hour** (7 inbound and 3 outbound) during the weekday afternoon peak period. Using ITE empirical data, it is expected that approximately 60% of these person-trips will travel by vehicle and the remaining 40% will move via the walk/bike/public transit modes.
- The number of new peak hour vehicle trips generated by the proposed residential development will be less than the total person trips noted above, and less than the 100 vehicles/hour threshold utilized by HRM to warrant a detailed Stage 2 analytical impact

assessment. Thus, our qualitative evaluation has determined that the low number of new site-generated trips will only have a minor and acceptable traffic operational impacts on the study area roads and intersections. The impacts of the new site-generated vehicle trips will be further diminished as they split between the available travel directions which include northbound and southbound along Joseph Howe Drive. In addition, the set of traffic signals to the north at the Joseph Howe Drive / Mumford Road intersection will create gaps in the Joseph Howe Drive traffic flow and these gaps are expected to provide sufficient capacity to accommodate the expected increases in site-generated vehicle trips turning in and out of Craigmore Drive.

- The proposed development is located adjacent to the Joseph Howe Drive multi-modal travel corridor which is served by public transit, pedestrian facilities, and vehicle lanes. There are opportunities to improve the active transportation infrastructure in this area; however, which could include the provision of bicycle facilities along Joseph Howe Drive (i.e. a multi-use path or MUP), a pedestrian sidewalk along Craigmore Drive, and fully accessible connectivity between active travel and public transit modes. HRM's continued investment in new active transportation facilities in this area of Halifax will help incentivize the use of travel modes other than the single-occupant commuter vehicles.
- Lastly, it is recommended that regulatory "No Parking" signs be installed along the south side of Craigmore Street in the vicinity of the subject property frontage to preserve sufficient driver sight lines as residents turn in/out of the new private lane.

6.0 CLOSING

The findings flowing from this qualitative traffic impact statement suggest the increase in site-generated vehicle trips moving in/out of the proposed development will be relatively minor and have a small impact on the traffic flow and operations along the Joseph Howe Drive corridor. 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 has been signed & stamped]

James J. Copeland, P.Eng., RSP1
Managing Principal – Traffic & Road Safety Engineer
GRIFFIN transportation group inc.