

# Noise Impact Assessment Report

Proposed: 2 New 3 Storey Semi-detached Dwellings

65A and 65B Acacia Avenue, Ottawa. ON



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#### 1.0 INTRODUCTION AND SUMMARY

W. Elias & Associates Consulting Engineers was retained to investigate the potential impact of environmental noise and vibration on the proposed 2 new 3-storey semi-detached residential development located at 65A and 65B Acacia Avenue situated close to the intersection of Acacia Avenue and Rideau Terrace, Ottawa, Ontario.

The assessment is based on the proposed development, existing and future noise and vibration sources, the environmental noise and vibration guidelines of the Ministry of Environment and Climate Change ("MOECC") and the City of Ottawa Environmental Noise Control Guideline ("ENCG"). A noise and vibration study is required by the municipality as part of the planning and approvals process.

The proposed development consists of 2 new 3-storey semi-detached residential located at 65A and 65B Acacia Avenue. The site is bounded by residential to the west, south and north.

Figure 1 shows the proposed site including the surrounding area. Zoning maps for the surrounding area are attached in Appendix A.

#### 2.0 ENVIRONMENTAL NOISE ASSESSMENT

The main environmental noise sources external to the project which were identified and have the potential to adversely affect the development are motor vehicle traffic noise on Acacia Avenue which is identified as collector road in City of Ottawa Transportation master plan.

## 2.1 Traffic Noise Sources

#### 2.1.1 Road Traffic

The traffic counts for Acacia Avenue was obtained from the City of Ottawa Environmental Noise Study Guideline. Based on the physical location and residential density of the street, it was conservatively assumed the minimum traffic counts available in modeling software as recommended by the City of



Ottawa "Environmental Noise Control Guidelines." In addition, a yearly growth rate of 2.5% was used to calculate the traffic data. In order to calculate the fully developed road traffic volumes, numbers were grown to the year 2031. Traffic data was split into daytime/nighttime and autos/medium/heavy using City of Ottawa "Environmental Noise Control Guidelines." Posted speed limits were used in the analysis. Data used in the noise modelling are found in Table 1.

Table 1: Road Traffic Data Used in Analysis

Street	Time of the Day	Vehicles	Medium Trucks	Heavy Trucks
Acacia Avenue	0700-2300	8000	7%	5%

#### 2.1.2 Rail Traffic

There is no rail traffic within the zone of influence as per City of Ottawa Noise Protocol. Therefore, no further assessment was performed.

#### 2.1.3 Air Traffic

Proposed project is located out of the zone of influence from the Airport Operating Influence Zone (AOIZ) and NEF/NEP contours lines. Therefore, no further assessment was performed.

#### 2.2 Stationary Noise Sources

Based on investigation of the surrounding areas, there are no potential stationary industrial sources of noise in the vicinity of the proposed development. The City of Ottawa Environmental Noise Control Guideline ("ENCG") were utilised as guidance for recommended separation distances and other control measures for land use planning proposals to prevent or minimize 'adverse effects' from the encroachment of incompatible land uses where a facility either exists or is proposed. Since no industrial sources are located in the vicinity of the proposed development, it was not considered further in this study.



#### 3.0 TRAFFIC NOISE IMPACT

#### 3.1 Applicable Noise Guideline

The City of Ottawa Environmental Noise Control Guideline ("ENCG") for transportation noise impacting residential developments was utilised for this study. A summary of the City of Ottawa noise requirements is provided Table 2 below.

Table 2: City of Ottawa Noise Control Guidelines – Road Traffic Noise Requirements

		Road Traffic			
Receiver Category	Time Period	Criterion Averaged over Time Period <sup>[1]</sup>		Requirements	
		Leq (dBA)	Applies at		
		55 [2]		None	
		56 to 60		Warning Clause	
Outdoor 0700-2300		> 60	OLA	Alternative Land Use Alternative Layout Berm or barrier Possible Warning Clause	
Plane of Window 2300-0700	55 to 65	Plane of Window	Provision for central air conditioning + warning clause		
	> 65 <sup>[3]</sup>	VVIIIGOV	Central air conditioning is required.		
	2300-0700	50 to 60 <sup>[3]</sup>	Plane of	Provision for central air conditioning + warning clause	
		> 60 [3]	Window	Central air conditioning + warning clause	
Indoor	0700-2300	45	Living Area	If Central AC is required, facade must be designed to meet these levels	
	2300-0700	40	Sleeping Area		

Notes: [1] Cumulative Impacts

For OLAs, a design goal of 55 dBA Leq,day is required. An unmitigated sound exposure due to road traffic of up to 60 dBA is considered a minor excess and is permissible, provided a warning clause advising the occupant of the potential noise levels is used. A sound exposure greater than 60 dBA must

<sup>[2]</sup> The criterion may be exceeded by an amount not greater than 5 dBA, subject to justification and use of a Warning Clause.

<sup>[3]</sup> If façade levels exceed these criteria, building components must be designed to meet Indoor Criteria.



be reduced to 60 dBA or less using physical mitigation methods such as berms or barriers, or combination of both.

A central air conditioning system as an alternative means of ventilation to open windows is required for dwellings where night-time sound levels outside bedroom windows exceed 60 dBA or where daytime sound levels outside living room windows exceed 65 dBA. Forced-air ventilation with ducts sized to accommodate the future installation of air conditioning is required when night-time sound levels at bedroom windows are in the range of 51 to 60 dBA or when daytime sound levels at living room windows are in the range of 56 to 65 dBA.

Building components such as walls, windows and doors must be designed to achieve indoor sound level criteria when the plane of window sound level is greater than 60 dBA or the daytime sound level is greater than 65 dBA due to road traffic noise and when the plane of window sound level is greater than 55 dBA. The use of warning clauses to notify future residents of possible excesses is also recommended.

#### 3.2 Traffic Noise Impact Assessment

Leq,night and Leq,day attributable to Acacia Avenue were calculated using STAMSON v5.0, the computerized road, rail, and transit traffic noise prediction model of the MOE. Since the City of Ottawa requires projected sound exposures be based on ultimate traffic volumes for roadways, sound exposure levels were based on 2027 (future) road traffic predictions. Screening due to surrounding buildings and terrain was accounted for in the analysis.

The proposed development will have four (4) floors. It was assumed, that if the noise impact levels at the first floor is acceptable (floors with larger exposure to Acacia Avenue traffic), the other floors of residential units will be satisfied as well.

Table 3 summarizes the predicted unmitigated daytime and nighttime sound exposures levels at predictable worst-case locations at the proposed development which is the ground floor windows facing east. Sample sound exposure calculation and analysis assumptions are included in Appendix C.



**Table 3: Predicted Unmitigated Road Traffic Sound Exposures** 

Floor	Façade	Street	Sound Level (dBA)	Total Sound Level (dBA)
			0700-2300	2300-0700
1 <sup>st</sup> floor	East	Acacia Avenue	63	55

#### 4.0 VIBRATION IMPACT

#### 4.1 Applicable Vibration Guideline

Since the Environmental Assessment Act and the Ministry of the Environment and Climate Change guidelines do not provide distance setbacks within or beyond which vibration assessments are to be prepared, the City is recommending that the necessary submissions address the vibration potential due to Light Rail Transit undertakings based on the following minimum areas of influence containing vibration sensitive receptors measured from the corridor right-of-way:

• 75 metres for its ground-borne vibration assessment

Generally, vibration assessment of the LRT is based on a set of draft protocols developed by the combined efforts of the Ministry of the Environment and Climate Change (MOECC) and the Toronto Transit Commission (TTC). The vibration impact criteria attempt to address two potential impacts from vibration generated by the LRT.

- First, the criteria consider perceptible vibration levels which address vibration that can be felt by
  occupants in a building. The limit for perceptible vibration levels has been set to 0.10 mm/s rms
  (root-mean-square) velocity.
- Secondly, the criteria document also mentions the sound from vibration (vibration induced noise) but does not set a limit.

### 4.2 Vibration Impact Assessment

The proposed development is located in the area with Light Rail Transit. Based on above and the fact that the proposed site is located 240m from future Light Rail project, from our engineering judgment, the vibration will have insignificant impact on proposed development.



#### 5.0 DISCUSION AND RECOMMENDATION

#### 5.1 Indoor Living Area

All floors of the proposed development have predicted night-time sound levels that are greater than 50 dBA but less than 60 dBA. To address these excesses, the City of Ottawa "Environmental Noise Control Guidelines" and MOE guidelines recommend that these dwelling units be equipped with a forced air ventilation systems with ducts sized to accommodate the future installation of air conditioning by the occupant.

Window or through-the-wall air conditioning units are not recommended for any residential units because of the noise they produce and because the units penetrate through the exterior wall which degrades the overall noise insulating properties of the envelope. The location, installation and sound ratings of the outdoor air conditioning devices should minimize noise impacts and comply with criteria of MOE publication NPC-216, Residential Air Conditioning Devices.

# 5.2 Building Façade Construction

All floors in the development will have night-time sound levels at the façade that are less than 60 dBA and daytime sound levels at the façade that are less than 65 dBA.

Therefore, any exterior wall, and double glazed window construction meeting the minimum requirements of the Ontario Building Code (OBC) will provide adequate sound insulation for the dwelling units.

### 5.4 Provision of Air Condition Installation

The results of the current analysis indicate that noise levels will range between 55 and 65 dBA during the daytime period (07:00-23:00) and less than 60 dBA during the nighttime period (23:00-07:00). Therefore, minimum building construction in all areas is required to satisfy the Ontario Building Code. Results of the calculations also indicate that the development will require forced air heating with provision for central air conditioning (or similar mechanical systems). In addition to ventilation



requirements, the following Warning Clause will also be required to be placed on all Lease, Purchase and Sale Agreements.

#### 5.5 Warning Clauses

The City of Ottawa "Environmental Noise Control Guidelines" and MOE guidelines recommend that warning clauses be included in the property and tenancy agreements and offers of purchase and sale for dwelling units with anticipated traffic sound level excesses. Suggested wording, to be on title, for future dwelling units is given below;

"Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing roadway traffic may, on occasion, interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the City and the Ministry of the Environment and Climate Change.

To ensure that provincial sound level limits are not exceeded, this dwelling unit has been designed with forced air heating and the provision for central air conditioning (or similar mechanical systems). The installation of central air conditioning will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the City and the Ministry of the Environment and Climate Change."

#### 6.0 CONCLUSION

The noise feasibility study was conducted to meet the noise guidelines developed by City of Ottawa Environmental Noise Control Guideline ("ENCG") and the MOE under Guideline NPC-300. Noise impacts at the proposed development have been evaluated and are predicted to meet MOE and City of Ottawa noise requirements. Noise abatement measures are not required to mitigate potential impacts. However, warning clauses advising the future occupants of the potential noise impacts will be required. Similarly, the vibration feasibility study was conducted to meet the MOE and TTC draft protocol. It was determined that no further vibration abatement measures are required to mitigate potential impacts.

The development is considered feasible from an environmental noise and vibration impact perspective.



This concludes our assessment and report. If you have any questions or wish to discuss our findings please advise us. In the interim, we thank you for the opportunity to be of service.

Sincerely,

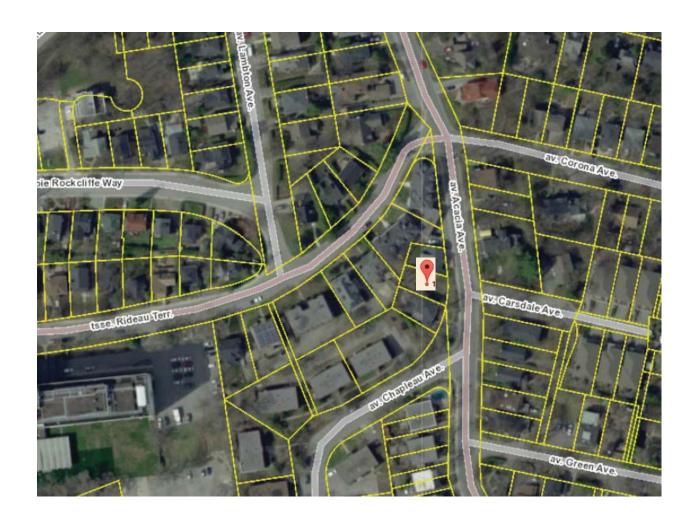
Wissam Elias, P.Eng

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Senior project manager



Figure 1
Proposed Development Site Location





# Appendix A

#### **Land-Use Zoning Maps**





# Appendix B

STAMSON 5.0 NORMAL REPORT Date: 25-09-2017 20:48:46

MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: Acacia.te Time Period: Day/Night 16/8 hours

Description:

Road data, segment # 1: Acacia (day/night)

\_\_\_\_\_

Car traffic volume : 8291/721 veh/TimePeriod \*
Medium truck volume : 659/57 veh/TimePeriod \*
Heavy truck volume : 471/41 veh/TimePeriod \*

Posted speed limit : 50 km/h Road gradient : 0 %

Road pavement : 1 (Typical asphalt or concrete)

\* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8000 Percentage of Annual Growth : 2.50 Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Acacia (day/night)

: -90.00 deg 90.00 deg Angle1 Angle2 : 0 (No woods.) Wood depth

No of house rows :

0 / 0 1 Surface (Absorptive ground surface)

Receiver source distance : 20.00 / 20.00 mReceiver height : 3.50 / 3.50 m

Topography : 1 (Flat/gentle slope; no

barrier)

Reference angle : 0.00



Results segment # 1: Acacia (day) \_\_\_\_\_

Source height = 1.50 m

ROAD (0.00 + 63.47 + 0.00) = 63.47 dBA

Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

\_\_\_\_\_

-90 90 0.60 66.82 0.00 -2.00 -1.36 0.00 0.00 0.00 63.47

\_\_\_\_\_\_

Segment Leq: 63.47 dBA

Total Leq All Segments: 63.47 dBA

Results segment # 1: Acacia (night)

Source height = 1.50 m

ROAD (0.00 + 55.87 + 0.00) = 55.87 dBA

Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj

SubLeq

\_\_\_\_\_\_

90 0.60 59.22 0.00 -2.00 -1.36 0.00 0.00 0.00 -90

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Segment Leq: 55.87 dBA

Total Leg All Segments: 55.87 dBA

TOTAL Leg FROM ALL SOURCES (DAY): 63.47

(NIGHT): 55.87



# **Appendix C**

**Proposed Development Floor and Elevation Plans** 

EX. DECIDOUS TREE TO REMAIN

GENERAL PLUMBING & ELECTRIC NOTES:

