2019-11-04

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2677321 Ontario Inc. – 261-265 Columbus Avenue
Site Plan Application Noise Study

Dear Alfred,

We are pleased to present the following Noise Study for the new development at 261-265 Columbus Ave. in Ottawa, required as a part of the Site Plan Application (SPA) process to the City of Ottawa. This noise study is compliant with the Environmental Noise Control Guidelines 2016 (ENCG), which follow the Ministry of Environment's NPC-300.

This study considered two different acoustic concerns: The acoustic impact this new development will have on the surrounding environment; and the noise generated from Donald Street to the plane of window and outdoor living area of the new development.

The summary of our results may be found in section 5.0 along with our acoustical recommendations.

If you have any questions, please do not hesitate to contact us.

Regards,

Alexandre Fortier, B.Sc.
Acoustical Consultant

1.0 Introduction

State of the Art Acoustik Inc. was commissioned by 2677321 Ontario Inc. to complete a SPA noise study as required by the City of Ottawa for the proposed 3.5 storey apartment building development at 261-265 Columbus Avenue in Ottawa. We have followed the 2016 Environmental Noise Control Guidelines, which are compliant with the Ministry of Environment's NPC-300.

Below, in section 2.0 of this report, we provide a description of the site and the relevant factors to this noise study. In section 3.0, we evaluate the impact of the rooftop mechanical units to the nearby residential areas and in section 4.0, we calculate and present the impact of the traffic noise onto the site. A summary of this report may be found in section 5.0

2.0 Project Description

The proposed development consists of a 3.5 storey residential rental space. The proposed development is located at 261-265 Columbus Avenue in Ottawa, ON. The site is surrounded on all sides by noise sensitive residential areas. Figure 2.1, below, shows the current site plan of the building. On this figure, several elements are identified: The planned Outdoor Living Area of the building, the nearest noise sensitive residential buildings and the only street to be considered for a traffic noise evaluation.

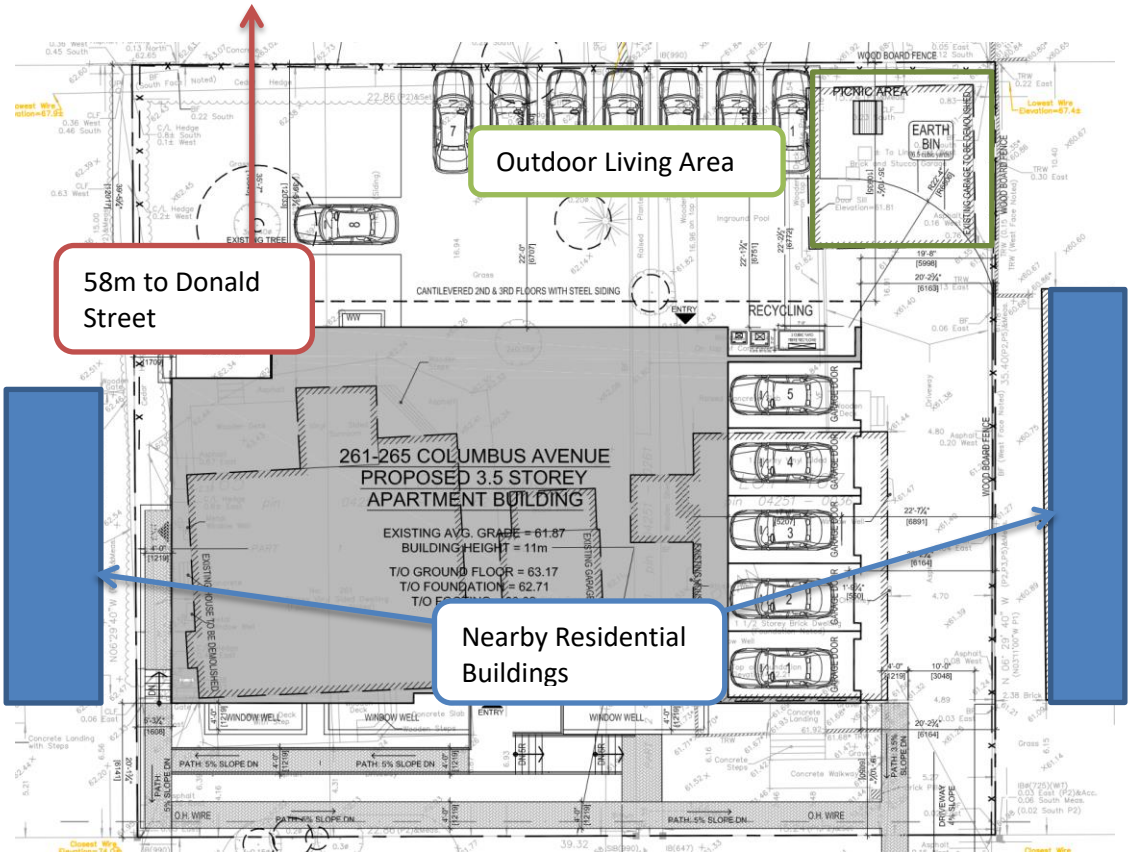


Figure 2.1 – Site Plan Location provided by Rosaline J. Hill Architect Inc.

This site is located in a Class 2 area, therefore the noise generated by the building must not exceed 50 dBA during the day and 45 dBA at night.

2.1 Outdoor Living Areas (OLA)

There is a single planned outdoor living area on the North side of the building, as identified in figure 2.1. This terrace is adjacent to the parking lot and north face of the building. The requirements for Outdoor Living Areas are such that the noise levels must not exceed 55 dBA.

3.0 Stationary Noise Source Evaluation

3.1 Approximate Maximum Sound Power Levels

In order to be under the City of Ottawa ENCG maximum noise levels (50 dBA during the day and 45 dBA at night) on the property of the nearby residents we have calculated the approximate sound power levels for the equipment on the roof, based on their distance to the nearest receivers.

As the building is surrounded on all sides by noise sensitive developments, we recommend centralizing all rooftop mechanical units. This will create the largest distance between the mechanical units and houses as well as allow the building edge to provide some shielding to the nearest residential buildings.

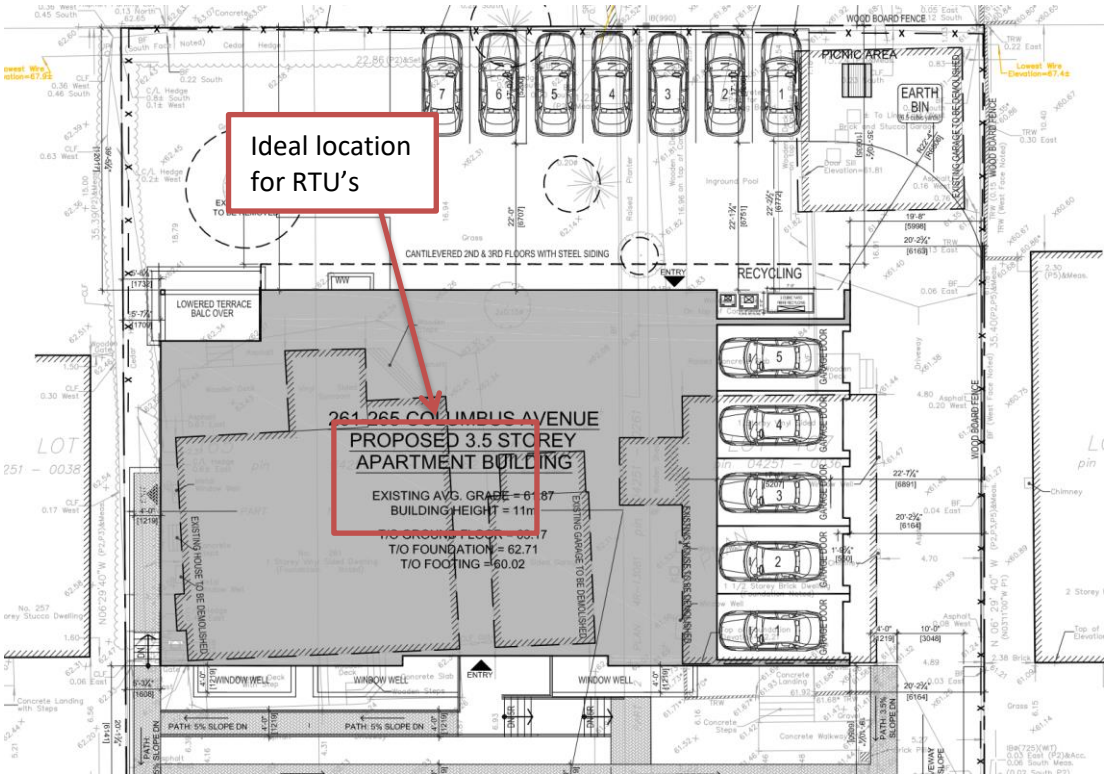


Figure 3.1 – Scaled area location plan showing the new development and ideal location for rooftop equipment.

The calculation for maximum noise levels assumes the majority of the noise producing equipment will be located in the area shown in figure 3.1 on the rooftop.

The nearest point of reception is located approximately 13m to the West from the ideal rooftop equipment location. The maximum sound power is calculated to ensure that target noise levels are not exceeded at this point. If the regulations are met at this nearest receptor, all other receptors will also be within the limits. The ENCG (and NPC-300) states that the maximum noise level for plane of window during the day (7am-11pm) is 50 dBA and, at night (11pm-7am) is 45 dBA. In order to achieve these levels, the sum of all sound power levels of the mechanical equipment on the roof cannot exceed 75 dBA at night and 80 dBA during the day. These results are based on point source sound power level propagation from a hemi-spherical radiation at 13 meters. The results are summarized in table 3.1.

3.2 Summary of Maximum Allowable Sound Power Levels

Table 3.1 summarizes the maximum allowable sound power levels of the sum of all mechanical equipment on this building.

Maximum Sound Power Level (SWL)		
Equipment	**Day/Night**	**SWL (dBA)**
Sum of Rooftop equipment	Day	80
	Night	75

Table 3.1 – Predicted maximum sound power levels of rooftop equipment.

At this time, the exact number of pieces of mechanical equipment on the roof is unknown. The sum of their Sound Power levels must not exceed the values given in table 3.1. Thus, to meet both daytime and nighttime levels, the sum of the sound powers of all mechanical devices must not exceed 75 dBA SWL.

Note that this is a very low allowable sound power level. Typically, small residential RTUs are approximately 72 SWL, therefore the allowable limit could be exceeded with more than two total units. If the sound levels are exceeded, an acoustical barrier may be required. Due to the proximity to the neighbouring buildings, we recommend a more detailed mechanical noise study when a mechanical plan set is available.

4.0 Surface Transportation Study

The following section describes our analysis of the road noise impact on the proposed development at 261-265 Columbus Avenue.

4.1 Road Traffic Information

For this study, one transportation noise source is considered: Donald Street. This is the only noise source to be considered for this development, based on the requirements of the ENCG.

Table 4.1 below summarizes the roadway's parameters obtained from Table B1 on p. 75 of The City of Ottawa Environmental Noise Control Guidelines 2016, "Appendix B: Table of Traffic and Road Parameters To Be Used For Sound Level Predictions" for the respective roadway class.

Roadway	Implied Roadway Class	Annual Average Daily Traffic (AADT) Veh/Day	Posted Speed	Day/Night Split (%)	Medium Trucks (%)	Heavy Trucks (%)
Donald Street	2-Lane Urban Collector	8,000	50km/h	92/8	7	5

Table 4.1 – Summary of Major Roadway Noise Sources.

4.2 Procedure Used for Roadway Noise Analysis

In order to calculate the road noise impact at the proposed development, we utilized the Ministry of Environment's STAMSON modeling software version 5.04. This program allows us to input variables of a road or railway such as traffic volume, types of vehicles, speed, barrier locations and topography to determine the environmental noise impact at a point of reception.

4.3 Points of Reception

To determine the worst case noise impact on the façade of the building, we have chosen the point of reception (POR1) on the North face of the building, which is closest to the road noise source. The position of this point of reception is shown in figure 4.1. POR2 is chosen as the outdoor living area on the north side of the building.

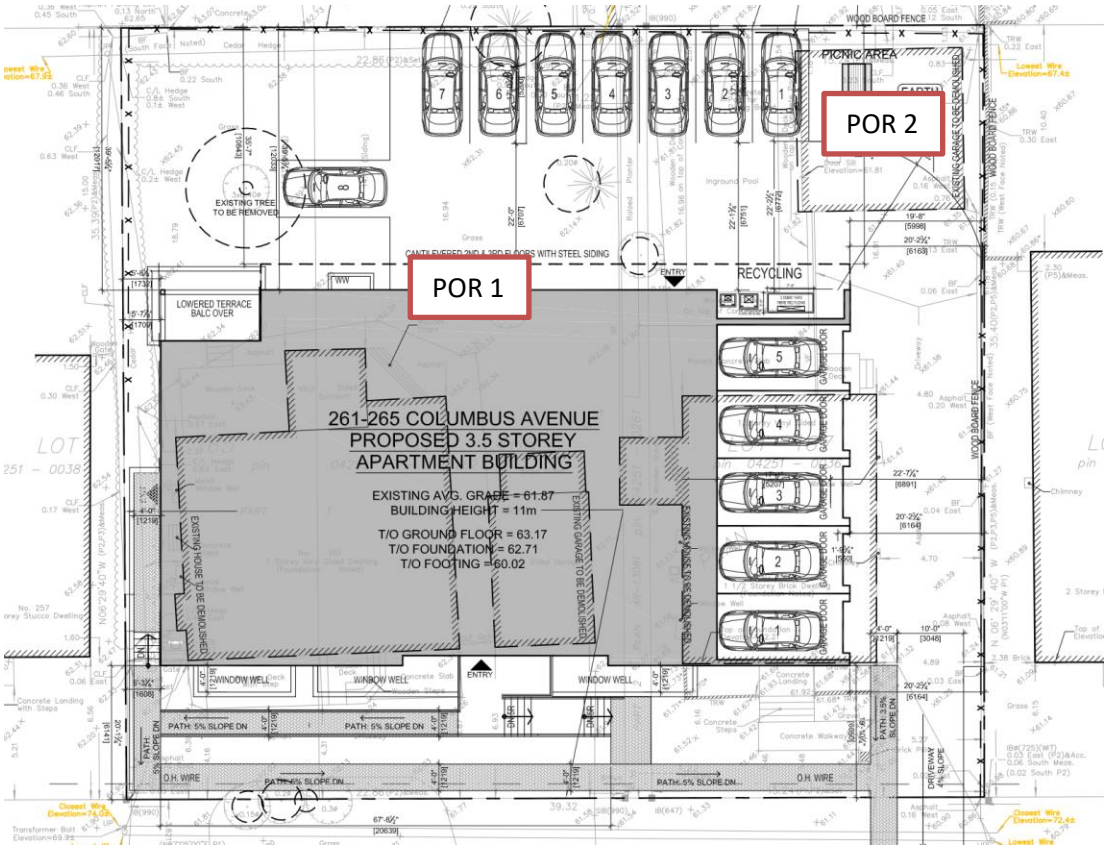


Figure 4.1 – Parameters used in STAMSON model

4.4 Parameters Used for Analysis

The parameters used in STAMSON to assess the noise impact at POR1 and POR2 are shown below in Table 4.2 and 4.3.

Parameter	Values Used
Roadway:	**Donald Street**
Time Period	16h/8h
Topography	Flat/gentle slope with no barrier
Rows of Houses	1
Density of Houses	50%
Intermediate Surface	Reflective
Receiver Height (m)	1.5m
Source Receiver Distance (m)	60.0m
Angle 1/Angle 2	-90°/90°

Table 4.2 – Parameters used in STAMSON model for POR1

Parameter	Values Used
Roadway:	**Donald Street**
Time Period	16h/8h
Topography	Flat/gentle slope with no barrier
Rows of Houses	1
Density of Houses	50%
Intermediate Surface	Reflective
Receiver Height (m)	1.5m
Source Receiver Distance (m)	55.0m
Angle 1/Angle 2	-90°/90°

Table 4.3 – Parameters used in STAMSON model for POR2

4.5 Surface Transportation Noise Levels

Table 4.4 shows the predicted sound pressure levels at the plane of window for the worst case scenario point of reception on the 261-265 Columbus Avenue development and the POR at the outdoor living area. These results are from the STAMSON environmental noise software calculation (Appendix A).

Sound Pressure Levels L_{eq} (dBA) due to Surface Transportation Noise		
POR 1	Day	52.3
	Night	44.7
POR 2	Day	52.9
	Night	N/A

Table 4.4 – Predicted Road Noise at the Point of Reception

The Background sound during the day, or 16h L_{eq}, at the point of reception located on the northern-eastern corner of the building is 52.3 dBA and 44.0 dBA over the 8h L_{eq} at night. This noise level is not high enough to warrant an acoustic selection of building envelope components. The levels at the outdoor point of reception are 52.9 dBA, well below the 55 dBA limit for OLA's.

5.0 Conclusion and Summary

We have followed the City of Ottawa Environmental Noise Control Guidelines (2016) and have prepared this Site Plan Application noise study for the development at 261-265 Columbus Avenue. This study considered two different acoustic concerns: The acoustic impact this new development will have on the surrounding environment and the traffic noise generated from Donald Street to the plane of window and Outdoor Living Area of the new development.

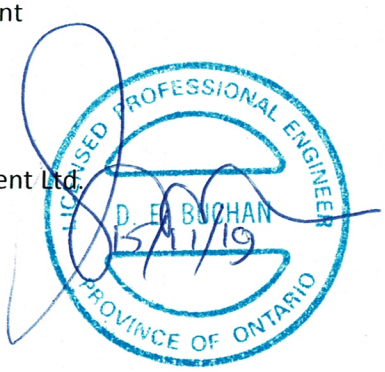
For the acoustic impact to the environment, in order to avoid surpassing the noise permitted by the City of Ottawa, the mechanical equipment must not exceed a total sound power level of 80 dBA during the day and 75 dBA at night. More specific recommendations, such as ideal equipment location, may be found in section 3. Due to the proximity to the neighbouring residential buildings, we recommend a more detailed mechanical noise study when a plan is available to ensure the allowable noise levels are not exceeded.

Our traffic noise calculations using STAMSON have showed that the traffic noise from Donald Street do not exceed the maximum levels of the ENCG and therefore no detailed analysis of building components, for acoustics, is required

Regards,

Alexandre Fortier, B.Sc.
Acoustical Consultant

Approved by :
Don Buchan, P.Eng.
Buchan Lawton Parent Ltd.
Principal



Appendix A
Stamson Calculations

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STAMSON 5.0        NORMAL REPORT        Date: 05-11-2019 14:21:37
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename:                      Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1:  (day/night)
-----------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    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        :   0.00
    Number of Years of Growth          :   0.00
    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:  (day/night)
---------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1 / 1
House density             :     50 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  60.00 / 60.00  m
Receiver height           :   4.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

FF
Results segment # 1:  (day)
---------------------------

Source height = 1.50 m

ROAD (0.00 + 52.29 + 0.00) = 52.29 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.57  65.75   0.00  -9.45  -1.30   0.00  -2.70   0.00  52.29
-------------------------------------------------------------------------------

Segment Leq : 52.29 dBA

Total Leq All Segments: 52.29 dBA

FF
Results segment # 1:  (night)
-----------------------------

Source height = 1.50 m

ROAD (0.00 + 44.70 + 0.00) = 44.70 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.57  58.16   0.00  -9.45  -1.30   0.00  -2.70   0.00  44.70
-------------------------------------------------------------------------------

Segment Leq : 44.70 dBA

Total Leq All Segments: 44.70 dBA
```

FF

TOTAL Leq FROM ALL SOURCES (DAY): 52.29
(NIGHT): 44.70

FF

FF

```
STAMSON 5.0        NORMAL REPORT        Date: 05-11-2019 14:30:46
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename:                      Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1:  (day/night)
-----------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    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        :   0.00
    Number of Years of Growth          :   0.00
    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:  (day/night)
---------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1 / 1
House density             :     50 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  55.00 / 60.00  m
Receiver height           :   4.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

FF
Results segment # 1:  (day)
---------------------------

Source height = 1.50 m

ROAD (0.00 + 52.87 + 0.00) = 52.87 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.57  65.75   0.00  -8.86  -1.30   0.00  -2.72   0.00  52.87
-------------------------------------------------------------------------------

Segment Leq : 52.87 dBA

Total Leq All Segments: 52.87 dBA

FF
Results segment # 1:  (night)
-----------------------------

Source height = 1.50 m

ROAD (0.00 + 44.70 + 0.00) = 44.70 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.57  58.16   0.00  -9.45  -1.30   0.00  -2.70   0.00  44.70
-------------------------------------------------------------------------------

Segment Leq : 44.70 dBA

Total Leq All Segments: 44.70 dBA
```

FF

TOTAL Leq FROM ALL SOURCES (DAY): 52.87
(NIGHT): 44.70

FF

FF