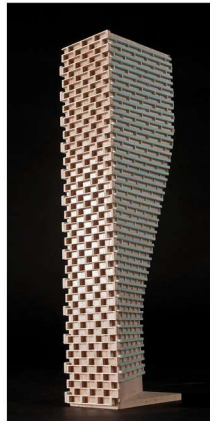


**TRANSPORTATION NOISE  
STUDY**

441 Echo Drive  
Ottawa, Ontario

REPORT: 26-010 – Transportation Noise Study



May 7, 2026

PREPARED FOR

**JB Holdings**

107 Pretoria Avenue  
Ottawa, ON K1S 1W8

PREPARED BY

Nick Cunnington-Bourbonniere, M.A.S.c., Jr. Acoustic Scientist  
Joshua Foster, P.Eng., Lead Engineer

## EXECUTIVE SUMMARY

This report describes a transportation noise study undertaken to satisfy the requirements for a Site Plan Control (SPA) application submission for a proposed residential development located at 441 Echo Drive in Ottawa, Ontario. The proposed development comprises a 6-storey residential building with a rectangular planform. The primary source of roadway traffic noise is Colonel By Drive, located to the west of the site. Figure 1 illustrates a complete site plan with surrounding context.

The assessment is based on (i) theoretical noise prediction methods that conform to the Ministry of the Environment, Conservation and Parks (MECP) and City of Ottawa requirements; (ii) noise level criteria as specified by the City of Ottawa's Environmental Noise Control Guidelines (ENCG); (iii) future vehicular traffic volumes based on the City of Ottawa's Official Plan roadway classifications; and (iv) architectural drawings provided by Project1 Studio in January 2026.

The results of the current analysis indicate that noise levels will range between 45 and 64 dBA during the daytime period (07:00-23:00) and between 38 and 55 dBA during the nighttime period (23:00-07:00). The highest noise level (64 dBA) occurs at the west façade, which is nearest and most exposed to Colonel By Drive. Since noise levels are less than 65 dBA at all the building façades, standard building components in compliance with Ontario Building Code standards will be sufficient to attenuate noise levels indoors when windows are closed.

Results of the calculations also indicate that the development will need forced air heating with provisions for central air conditioning as a minimum requirement which, if installed at the owner's discretion, will allow building occupants to keep windows closed and maintain a comfortable living environment. In addition to ventilation requirements, a Type C Warning Clause will also be required in all Lease, Purchase, and Sale Agreements, as summarized in Section 6.

Noise levels at the rooftop terrace (Receptor 5) are expected to be 59 dBA during the daytime period without a noise barrier. If this area is to be used as an outdoor living area, noise control measures are required to reduce noise levels as close as possible to 55 dBA where technically and administratively feasible. The architectural drawings include a 1-m-tall railing enclosing the rooftop terrace. When this feature was added as a 1-m-tall barrier in the analysis, noise levels at the rooftop terrace were decreased



to 55 dBA. The railing must be constructed from materials having a minimum surface density of 20 kg/m<sup>2</sup> (STC rating of 30) and contain no gaps. Design of the railing will conform to the requirements outlined in Part 5 of the ENCG and summarized in Section 6.

With regard to stationary noise impacts, a stationary noise study is recommended for the site during the detailed design once mechanical plans for the proposed building become available. This study would assess impacts of stationary noise from rooftop mechanical units serving the proposed building on surrounding noise-sensitive areas. This study will include recommendations for any noise control measures that may be necessary to ensure noise levels fall below ENCG limits. Noise impacts can generally be minimized by judicious selection and placement of the equipment. A review of aerial imagery surrounding the proposed development indicates that there are no existing stationary noise sources in the area that would be expected to result in adverse noise impacts at the site.

**Addendum:** The transportation noise study was completed based on architectural drawings prepared by Project1 Studio, dated January 20, 2026. Subsequent to the completion of the study, minor revisions to the architectural design have been advanced as part of ongoing coordination. The updated design includes minor adjustments to the building massing and layout, including slight refinements to the location of balcony and amenity spaces. These changes result in small shifts in façade geometry but do not materially alter the overall building form, orientation, or relationship to adjacent roadways. These changes are not expected to result in any meaningful change in predicted noise levels at the building façades or outdoor amenity areas.

Accordingly, the results, conclusions, and recommendations presented in this report remain representative of the current design. No formal updates to the transportation noise model or analysis are required.

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## 1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by JB Holdings to undertake a transportation noise study to satisfy the requirements for a Site Plan Control (SPA) application submission for a proposed residential development located at 441 Echo Drive in Ottawa, Ontario. This report summarizes the methodology, results, and recommendations related to the assessment of exterior and interior noise levels generated by local roadway traffic.



**ARCHITECTURAL RENDERING, WEST PERSPECTIVE (COURTESY OF PROJECT1 STUDIO)**

Our work is based on theoretical noise calculation methods conforming to the City of Ottawa<sup>1</sup> and Ministry of the Environment, Conservation and Parks (MECP)<sup>2</sup> guidelines. Noise calculations were based on architectural drawings provided by Project1 Studio in January 2026, with future traffic volumes corresponding to the City of Ottawa’s Official Plan (OP) roadway classifications.

## 2. TERMS OF REFERENCE

The focus of this transportation noise study is the proposed residential development located at 441 Echo Drive in Ottawa, Ontario. The subject site is located on a rectangular parcel of land fronting onto Echo Drive. For the purposes of this report, Echo Drive is referred to as the west elevation. Colonel By Drive is located further west of the site and is classified as a two-lane urban arterial undivided roadway under federal jurisdiction.

The proposed development comprises a six-storey residential building with a rectangular planform. At grade, the building includes a residential lobby, dwelling units, and a ramp providing access to an underground parking garage, with vehicular access provided from Echo Drive. The remaining floors consist of residential dwelling units. Private balconies are provided along portions of the south elevation at

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<sup>1</sup> City of Ottawa Environmental Noise Control Guidelines, July 2017

<sup>2</sup> Ontario Ministry of the Environment and Climate Change – Environmental Noise Guidelines, Publication NPC-300, Queens Printer for Ontario, Toronto, August 2013



Levels 2 through 5. Outdoor amenity space is provided in the form of a rooftop amenity terrace. The development massing also includes floorplate setbacks along the south elevation at Levels 4 and 6.

The near-field surroundings of the study site comprise primarily low-rise residential and commercial buildings in all directions. Three high-rise buildings are located to the west, and the Rideau Canal runs from the northwest to the south, approximately 65 metres (m) west of the site.

The primary source of roadway traffic noise impacting the site is Colonel By Drive. Based on a review of available mapping and rail infrastructure, the site is not located within 75 m of any existing or planned above- or below-grade rail corridors. As such, a ground-borne vibration assessment is not required for this study.

### **3. OBJECTIVES**

The principal objectives of this study are to (i) calculate the future noise levels on the study building produced by local roadway traffic, and (ii) ensure that interior and exterior noise levels do not exceed the allowable limits specified by the City of Ottawa's Environmental Noise Control Guidelines as outlined in Section 4.2 of this report.

### **4. METHODOLOGY**

#### **4.1 Background**

Noise can be defined as any obtrusive sound. It is created at a source, transmitted through a medium, such as air, and intercepted by a receiver. Noise may be characterized in terms of the power of the source or the sound pressure at a specific distance. While the power of a source is characteristic of that particular source, the sound pressure depends on the location of the receiver and the path that the noise takes to reach the receiver. Measurement of noise is based on the decibel unit, dBA, which is a logarithmic ratio referenced to a standard noise level ( $2 \times 10^{-5}$  Pascals). The 'A' suffix refers to a weighting scale, which better represents how the noise is perceived by the human ear. With this scale, a doubling of power results in a 3 dBA increase in measured noise levels and is just perceptible to most people. An increase of 10 dBA is often perceived to be twice as loud.

## 4.2 Roadway Traffic Noise

### 4.2.1 Criteria for Roadway Traffic Noise

For surface roadway traffic noise, the equivalent sound energy level,  $L_{eq}$ , provides a measure of the time varying noise levels, which is well correlated with the annoyance of sound. It is defined as the continuous sound level, which has the same energy as a time varying noise level over a period of time. For roadways, the  $L_{eq}$  is commonly calculated on the basis of a 16-hour ( $L_{eq16}$ ) daytime (07:00-23:00) / 8-hour ( $L_{eq8}$ ) nighttime (23:00-07:00) split to assess its impact on residential buildings. The City of Ottawa’s Environmental Noise Control Guidelines (ENCG) specifies that the recommended indoor noise limit range (that is relevant to this study) is 45 and 40 dBA for living rooms and sleeping quarters respectively for roadway as listed in Table 1.

**TABLE 1: INDOOR SOUND LEVEL CRITERIA (ROAD)<sup>3</sup>**

| Type of Space   | Time Period   | $L_{eq}$ (dBA) |
|---|---------------|----------------|
| General offices, reception areas, retail stores, etc.   | 07:00 – 23:00 | 50             |
| Living/dining/den areas of <b>residences</b> , hospitals, schools, nursing/retirement homes, day-care centres, theatres, places of worship, libraries, individual or semi-private offices, conference rooms, etc. | 07:00 – 23:00 | 45             |
| Sleeping quarters of hotels/motels  | 23:00 – 07:00 | 45             |
| Sleeping quarters of <b>residences</b> , hospitals, nursing/retirement homes, etc.  | 23:00 – 07:00 | 40             |

Predicted noise levels at the plane of window (POW) dictate the action required to achieve the recommended sound levels. An open window is considered to provide a 10 dBA reduction in noise, while a standard closed window is capable of providing a minimum 20 dBA noise reduction<sup>4</sup>. A closed window due to a ventilation requirement will bring noise levels down to achieve an acceptable indoor environment<sup>5</sup>. Therefore, where noise levels exceed 55 dBA daytime and 50 dBA nighttime, the ventilation

<sup>3</sup> Adapted from ENCG 2016 – Tables 2.2b and 2.2c

<sup>4</sup> Burberry, P.B. (2014). Mitchell’s Environment and Services. Routledge, Page 125

<sup>5</sup> MOECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.8

for the building should consider the need for having windows and doors closed, which triggers the need for forced air heating with provision for central air conditioning. Where noise levels exceed 65 dBA daytime and 60 dBA nighttime, air conditioning will be required and building components will require higher levels of sound attenuation<sup>6</sup>.

The sound level criterion for outdoor living areas (OLA) is 55 dBA, which applies during the daytime (07:00 to 23:00). When noise levels exceed 55 dBA, mitigation should be provided to reduce noise levels where technically and administratively feasible to acceptable levels at or below the criterion. Furthermore, noise levels at the OLA must not exceed 60 dBA if mitigation can be technically and administratively achieved.

#### **4.2.2 Theoretical Roadway Noise Predictions**

Noise predictions were performed with the aid of the MECP computerized noise assessment program, STAMSON 5.04, for road analysis. Appendix A includes the STAMSON 5.04 input and output data.

Roadway traffic noise calculations were performed by treating each roadway segment as separate line sources of noise. In addition to the traffic volumes summarized in Table 2, theoretical noise predictions were based on the following parameters:

- Truck traffic on all roadways was taken to comprise 5% heavy trucks and 7% medium trucks, as per ENCG requirements for noise level predictions.
- The day/night split for all streets was taken to be 92%/8%, respectively.
- Ground surfaces were taken to be absorptive due to the presence of grass between the study site and Colonel By Drive.
- Topography was assumed to be a flat/gentle slope surrounding the study building.
- Receptor distances and exposure angles are illustrated in Figure A1.
- Noise receptors were strategically placed at 5 locations around the study area (see Figure 2).

#### **4.2.3 Roadway Traffic Volumes**

The ENCG dictates that noise calculations should consider future sound levels based on a roadway's classification at the mature state of development. Accordingly, traffic volumes were established based on

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<sup>6</sup> MOECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3

roadway classifications outlined in the City of Ottawa Official Plan (OP) and Transportation Master Plan, which provide guidance on ultimate roadway function and potential future expansions. Average Annual Daily Traffic (AADT) volumes were then selected based on the corresponding roadway classification using Table B1 of the ENCG. Colonel By Drive is a federally owned roadway and does not have a directly published AADT value within municipal planning datasets. As such, a conservative approach was adopted whereby Colonel By Drive was treated as a 2-Lane Urban Arterial Undivided roadway for the purposes of traffic noise assessment, consistent with assumptions applied in previous Gradient Wind studies of this corridor. Table 2 (below) summarizes the AADT value used for the roadway included in this study.

**TABLE 2: ROADWAY TRAFFIC DATA**

| Segment          | Roadway Traffic Data                    | Speed Limit (km/h) | AADT          |
|------------------|---|--------------------|---------------|
| Colonel By Drive | 2-Lane Urban Arterial Undivided (2-UAU) | 40                 | <b>15,000</b> |

### 4.3 Indoor Noise Calculations

The difference between outdoor and indoor noise levels is the noise attenuation provided by the building envelope. According to common industry practice, complete walls and individual wall elements are rated according to the Sound Transmission Class (STC). The STC ratings of common residential walls built in conformance with the Ontario Building Code (2020) typically exceed STC 35, depending on exterior cladding, thickness and interior finish details. For example, brick veneer walls can achieve STC 50 or more. Standard commercially sided exterior metal stud walls have around STC 45. Standard good quality double-glazed non-operable windows can have STC ratings ranging from 25 to 40, depending on the window manufacturer, pane thickness and inter-pane spacing. As previously mentioned, the windows are the known weak point in a partition.

Based on the predicted exterior sound levels, which do not exceed 65 dBA at any building façade, upgraded façade construction or specialized glazing assemblies are not required. Building envelope components designed and constructed in accordance with the minimum requirements of the Ontario Building Code (2020) are expected to provide sufficient sound attenuation to achieve the applicable indoor noise criteria of the City of Ottawa Environmental Noise Control Guidelines (ENCG).

## 5. RESULTS AND DISCUSSION

### 5.1 Roadway Traffic Noise Levels

The results of the roadway traffic noise calculations are summarized in Table 3 below. A complete set of input and output data from all STAMSON 5.04 calculations are available in Appendix A. The results of the current analysis indicate that noise levels will range between 45 and 64 dBA during the daytime period (07:00-23:00) and between 38 and 55 dBA during the nighttime period (23:00-07:00). The highest noise level (64 dBA) occurs at the west façade, which is nearest and most exposed to Colonel By Drive.

**TABLE 3: EXTERIOR NOISE LEVELS DUE TO ROAD TRAFFIC**

| Receptor Number | Receptor Height Above Grade/Roof (m) | Receptor Location        | STAMSON 5.04 Noise Level (dBA) |       |
|-----------------|--------------------------------------|--------------------------|--------------------------------|-------|
|                 |                                      |                          | Day                            | Night |
| 1               | 7.5                                  | 3rd Floor - West Façade  | 64                             | 55    |
| 2               | 7.5                                  | 3rd Floor - North Façade | 60                             | 52    |
| 3               | 7.5                                  | 3rd Floor - East Façade  | 45                             | 38    |
| 4               | 7.5                                  | 3rd Floor - South Façade | 57                             | 49    |
| 5               | 1.5                                  | OLA – Rooftop Terrace    | 55                             | N/A   |

N/A: Noise levels at an OLA during the nighttime period are not considered as per ENCG

### 5.2 Noise Control Measures

The noise levels predicted due to roadway traffic are expected to fall between 55 dBA and 65 dBA for the north, west, and south façades and below 55 dBA for the east façade. Since noise levels are less than 65 dBA at all the building façades, standard building components in compliance with Ontario Building Code standards will be sufficient to attenuate noise levels indoors when windows are closed. However, the proposed development will need forced air heating with provisions for central air conditioning as a minimum requirement which, if installed at the owner’s discretion, will allow building occupants to keep windows closed and maintain a comfortable living environment. In addition to ventilation requirements, a Type C Warning Clause will also be required in all Lease, Purchase, and Sale Agreements, as summarized in Section 6.

### 5.3 Noise Barrier Calculation

Noise levels at the rooftop terrace (Receptor 5) are expected to reach 59 dBA during the daytime period without a noise barrier. If this area is to be used as an outdoor living area, noise control measures are required to reduce noise levels as close as possible to 55 dBA where technically and administratively feasible. The design currently incorporates a 1-m-tall railing enclosing the rooftop terrace, as specified in the architectural drawings dated January 20, 2026. When the railing was added to the analysis as a 1-m-tall barrier, the noise level at the rooftop terrace was reduced to 55 dBA. In order to achieve this noise reduction, the railing must be constructed from materials having a minimum surface density of 20 kg/m<sup>2</sup> (STC rating of 30), contain no gaps, and conform to the requirements outlined in Part 5 of the ENCG and summarized in Section 6.

**TABLE 4: RESULTS OF NOISE BARRIER INVESTIGATION**

| Receptor Number | Receptor Height Above Roof (m) | Receptor Location     | Daytime Noise Levels (dBA) |                  |
|-----------------|--------------------------------|-----------------------|----------------------------|------------------|
|                 |                                |                       | No Barrier                 | With 1-m Barrier |
| 5               | 1.5                            | OLA – Rooftop Terrace | 59                         | 55               |

## 6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels will range between 45 and 64 dBA during the daytime period (07:00-23:00) and between 38 and 55 dBA during the nighttime period (23:00-07:00). The highest noise level (64 dBA) occurs at the west façade, which is nearest and most exposed to Colonel By Drive. Since noise levels are less than 65 dBA at all the building façades, standard building components in compliance with Ontario Building Code standards will be sufficient to attenuate noise levels indoors when windows are closed.

The proposed development will need forced air heating with provisions for central air conditioning as a minimum requirement which, if installed at the owner’s discretion, will allow building occupants to keep windows closed and maintain a comfortable living environment. In addition to ventilation requirements, a Type C Warning Clause<sup>7</sup> will also be required in all Lease, Purchase, and Sale Agreements, as summarized below:

---

<sup>7</sup> City of Ottawa Environmental Noise Control Guidelines, January 2016



## Type C

*"This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning by the occupant in low and medium density developments will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment, Conservation and Parks."*

Noise levels at the rooftop terrace (Receptor 5) are expected to reach 59 dBA during the daytime period without a noise barrier. If this area is to be used as an outdoor living area, noise control measures are required to reduce noise levels as close as possible to 55 dBA where technically and administratively feasible. The architectural drawings include a 1-m-tall railing enclosing the rooftop terrace. When this feature was added as a 1-m-tall barrier in the analysis, noise levels at the rooftop terrace were decreased to 55 dBA.

The railing must be constructed from materials having a minimum surface density of 20 kg/m<sup>2</sup> (STC rating of 30) and contain no gaps. Design of the railing will conform to the requirements outlined in Part 5 of the ENCG. The following information will be required by the City for review prior to installation of the barrier:

1. Shop drawings, signed and sealed by a qualified Professional Engineer licensed by the Professional Engineers of Ontario, showing the details of the acoustic barrier systems components, including material specifications.
2. Structural drawing(s), signed by a qualified Professional Engineer licensed by the Professional Engineers of Ontario, showing foundation details, and specifying design criteria, climatic design loads, as well as applicable geotechnical data used in the design.
3. Layout plan, and wall elevations, showing proposed colours and patterns.

Moreover, the stationary noise impacts of the buildings on the surroundings would be considered at a future stage once the mechanical design has progressed and equipment has been selected. Stationary noise sources associated with the development could include rooftop air handling units, cooling towers or dry coolers, and emergency generators. Should noise levels from these units exceed the criteria established in NPC-300 and ENCG, noise from these sources can be controlled to acceptable limits by judicious selection of the equipment, locating the equipment on a high roof away from nearby residential receptors, and where necessary, installing silencers or noise screens.

This concludes our transportation noise study 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,

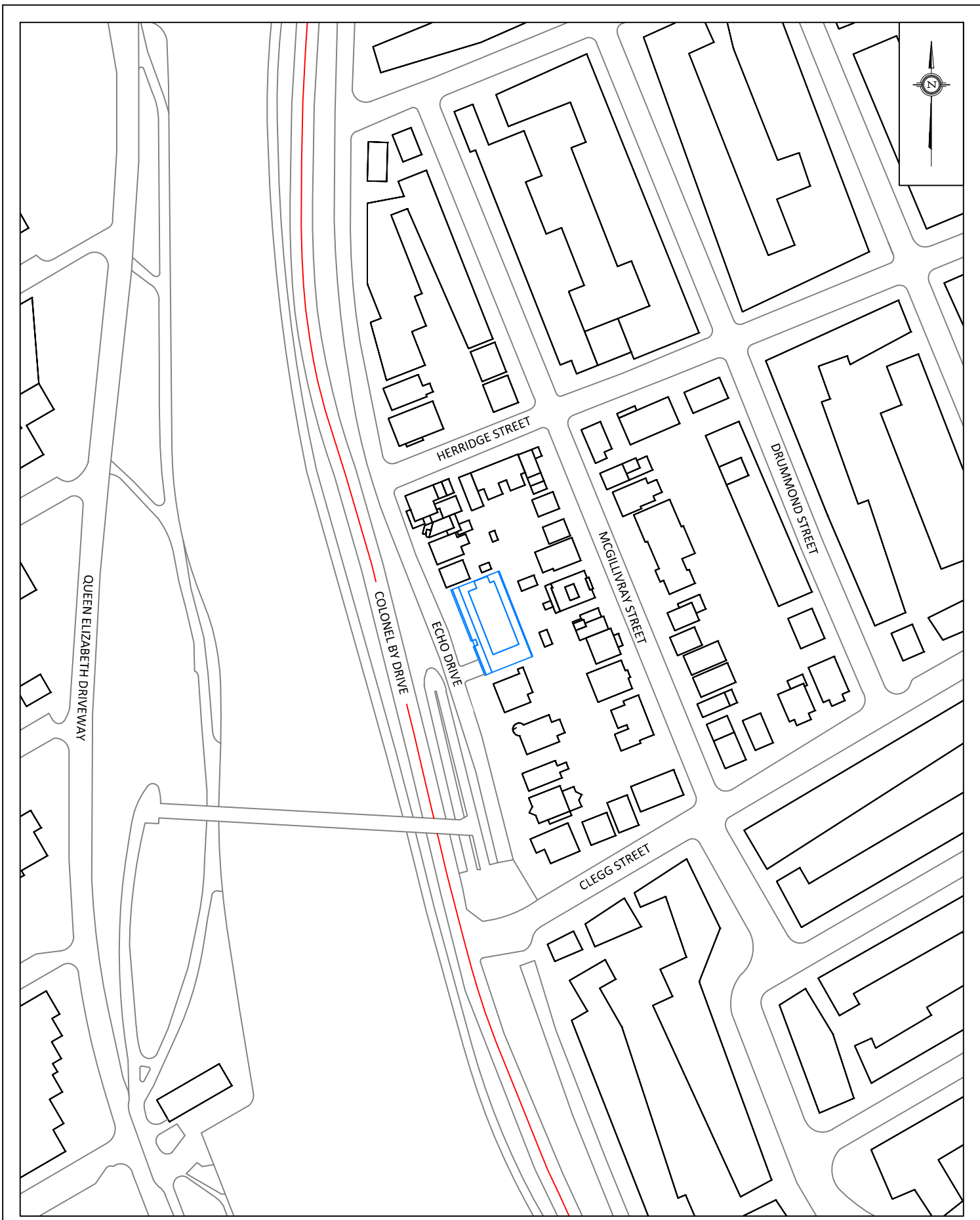
***Gradient Wind Engineering Inc.***

*Nick Cunnington-Bourbonniere*

Nick Cunnington-Bourbonniere, M.A.S.c.  
Jr. Acoustic Scientist

Joshua Foster, P.Eng.  
Lead Engineer

*Gradient Wind File #26-010-Transportation Noise Study*



|         |   |                      |
|---------|---|----------------------|
| PROJECT | 443 ECHO DRIVE, OTTAWA<br>TRANSPORTATION NOISE ASSESSMENT |                      |
| SCALE   | 1:2000  | DRAWING NO. 26-010-1 |
| DATE    | FEBRUARY 6, 2026  | DRAWN BY N.C.B.      |

|             |  |
|-------------|--|
| DESCRIPTION | FIGURE 1:<br>PROPERTY LINE AND SURROUNDING CONTEXT |
|-------------|--|

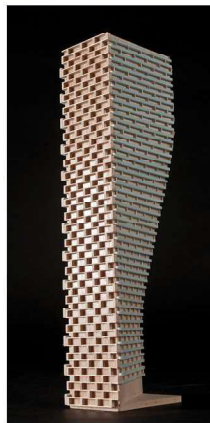


- 1 OLA RECEPTOR
- 1 POW RECEPTOR

|   |   |                      |   |
|---|---|----------------------|---|
| <b>GRADIENTWIND</b><br>ENGINEERS & SCIENTISTS<br>127 WALGREEN ROAD, OTTAWA, ON<br>613 836 0934 • GRADIENTWIND.COM | PROJECT 443 ECHO DRIVE, OTTAWA<br>TRANSPORTATION NOISE ASSESSMENT |                      | DESCRIPTION<br><br><b>FIGURE 2:<br/>         RECEPTOR LOCATIONS</b> |
|   | SCALE 1:1000  | DRAWING NO. 26-010-2 |   |
|   | DATE FEBRUARY 6, 2026   | DRAWN BY N.C.B.      |   |

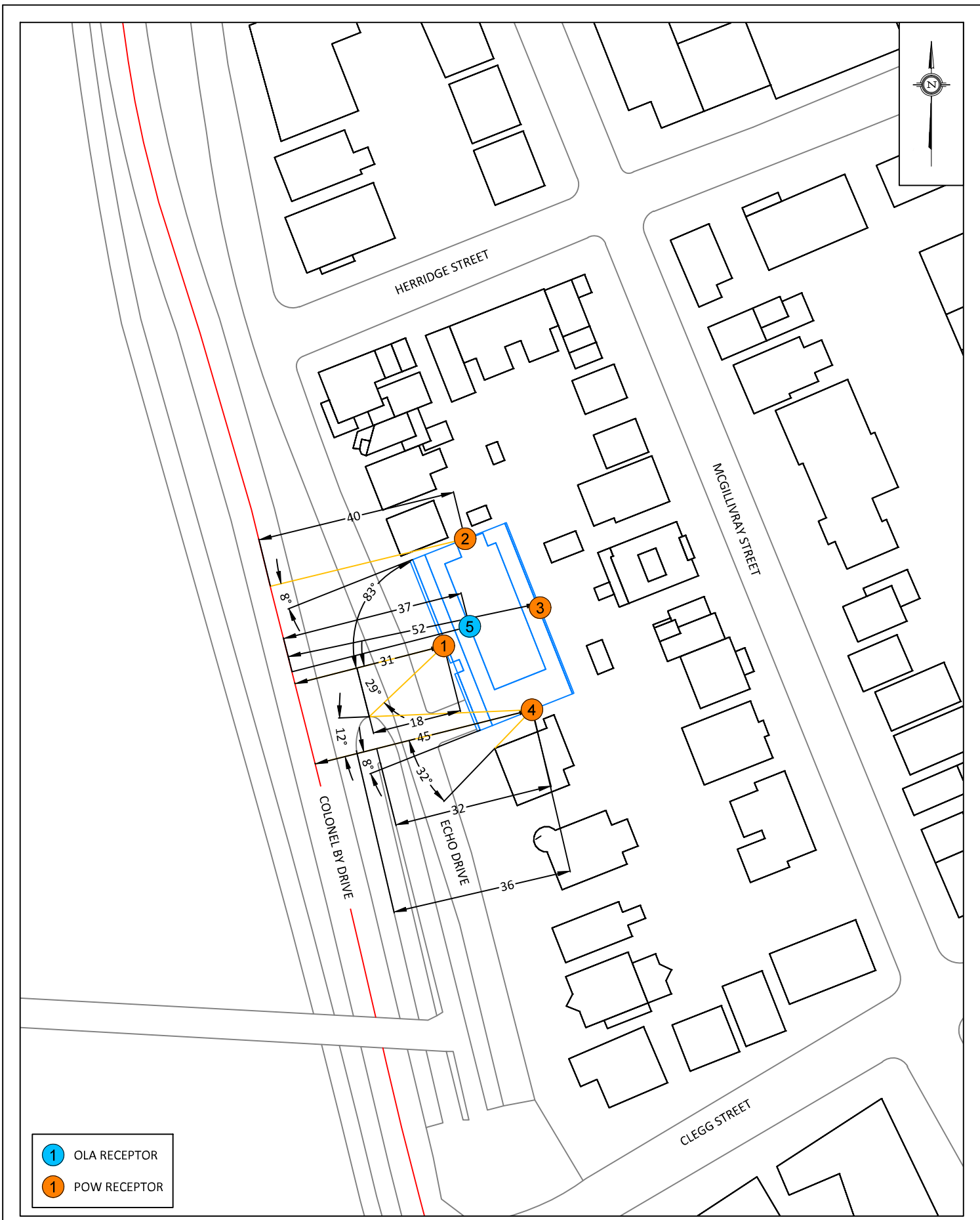
# GRADIENTWIND

ENGINEERS & SCIENTISTS



## APPENDIX A

### STAMSON 5.04 – INPUT AND OUTPUT DATA



- 1 OLA RECEPTOR
- 1 POW RECEPTOR

|  |   |                              |  |
|--|---|------------------------------|--|
| <p><b>GRADIENTWIND</b><br/>ENGINEERS &amp; SCIENTISTS</p> <p>127 WALGREEN ROAD, OTTAWA, ON<br/>613 836 0934 • GRADIENTWIND.COM</p> | <p>PROJECT 443 ECHO DRIVE, OTTAWA<br/>TRANSPORTATION NOISE ASSESSMENT</p> |                              | <p>DESCRIPTION</p> <p style="text-align: center;">FIGURE A1:<br/>STAMSON 5.04 INPUT PARAMETERS</p> |
|  | <p>SCALE 1:1000</p>   | <p>DRAWING NO. 26-010-A1</p> |  |
|  | <p>DATE FEBRUARY 6, 2026</p>  | <p>DRAWN BY N.C.B.</p>       |  |

# GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0                      NORMAL REPORT                      Date: 03-02-2026 16:36:24  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r1.te                      Time Period: Day/Night 16/8 hours  
Description: R1 - Echo Drive

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

-----  
Car traffic volume : 12144/1056 veh/TimePeriod \*  
Medium truck volume : 966/84 veh/TimePeriod \*  
Heavy truck volume : 690/60 veh/TimePeriod \*  
Posted speed limit : 60 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): 15000  
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: Colonel By (day/night)

-----  
Angle1 Angle2 : -83.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 31.00 / 31.00 m  
Receiver height : 7.50 / 4.50 m  
Topography : 4 (Elevated; with barrier)  
Barrier angle1 : 29.00 deg Angle2 : 90.00 deg  
Barrier height : 3.00 m  
Elevation : 1.00 m  
Barrier receiver distance : 18.00 / 18.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00



Results segment # 1: Colonel By (day)

---

Source height = 1.50 m

Barrier height for grazing incidence

---

| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|-------------------|---------------------|--------------------|------------------------------|
| 1.50              | 7.50                | 4.01               | 4.01                         |

ROAD (62.73 + 59.08 + 0.00) = 64.28 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|-------|--------|
| -83    | 29     | 0.45  | 70.00  | 0.00  | -4.57 | -2.70 | 0.00  | 0.00  | 0.00  | 62.73  |
| 29     | 90     | 0.27  | 70.00  | 0.00  | -4.00 | -5.75 | 0.00  | 0.00  | -2.81 | 57.43* |
| 29     | 90     | 0.45  | 70.00  | 0.00  | -4.57 | -6.35 | 0.00  | 0.00  | 0.00  | 59.08  |

\* Bright Zone !

Segment Leq : 64.28 dBA

Total Leq All Segments: 64.28 dBA

Results segment # 1: Colonel By (night)

---

Source height = 1.50 m

Barrier height for grazing incidence

---

| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|-------------------|---------------------|--------------------|------------------------------|
| 1.50              | 4.50                | 2.76               | 2.76                         |

ROAD (54.74 + 46.95 + 0.00) = 55.41 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|-------|--------|
| -83    | 29     | 0.54  | 62.40  | 0.00  | -4.86 | -2.80 | 0.00  | 0.00  | 0.00  | 54.74  |
| 29     | 90     | 0.36  | 62.40  | 0.00  | -4.29 | -6.06 | 0.00  | 0.00  | -5.10 | 46.95  |

Segment Leq : 55.41 dBA

Total Leq All Segments: 55.41 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 64.28  
(NIGHT): 55.41



**STAMSON 5.0**                      **NORMAL REPORT**                      **Date: 03-02-2026 16:42:31**  
**MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT**

Filename: r2.te                                      Time Period: Day/Night 16/8 hours  
 Description: R2 - Echo Drive

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

---

Car traffic volume : 12144/1056 veh/TimePeriod \*  
 Medium truck volume : 966/84 veh/TimePeriod \*  
 Heavy truck volume : 690/60 veh/TimePeriod \*  
 Posted speed limit : 60 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): 15000  
 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: Colonel By (day/night)

---

Angle1 Angle2 : -90.00 deg 8.00 deg  
 Wood depth : 0 (No woods.)  
 No of house rows : 0 / 0  
 Surface : 1 (Absorptive ground surface)  
 Receiver source distance : 40.00 / 40.00 m  
 Receiver height : 7.50 / 4.50 m  
 Topography : 4 (Elevated; with barrier)  
 Barrier angle1 : -90.00 deg Angle2 : 0.00 deg  
 Barrier height : 3.00 m  
 Elevation : 1.00 m  
 Barrier receiver distance : 1.00 / 1.00 m  
 Source elevation : 0.00 m  
 Receiver elevation : 0.00 m  
 Barrier elevation : 0.00 m  
 Reference angle : 0.00

Results segment # 1: Colonel By (day)

---

Source height = 1.50 m

Barrier height for grazing incidence

---

| Source     | ! Receiver   | ! Barrier    | ! Elevation of    |
|------------|--------------|--------------|-------------------|
| Height (m) | ! Height (m) | ! Height (m) | ! Barrier Top (m) |
| -----      | -----        | -----        | -----             |
| +          | +            | +            | +                 |



# GRADIENTWIND

ENGINEERS & SCIENTISTS

1.50 !                    7.50 !                    7.35 !                    7.35

ROAD (0.00 + 59.73 + 50.29) = 60.20 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj  | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|--------|-------|-------|-------|--------|
| -90    | 0      | 0.27  | 70.00  | 0.00  | -5.41 | -3.71  | 0.00  | 0.00  | -0.03 | 60.85* |
| -90    | 0      | 0.45  | 70.00  | 0.00  | -6.18 | -4.09  | 0.00  | 0.00  | 0.00  | 59.73  |
| 0      | 8      | 0.45  | 70.00  | 0.00  | -6.18 | -13.53 | 0.00  | 0.00  | 0.00  | 50.29  |

\* Bright Zone !

Segment Leq : 60.20 dBA

Total Leq All Segments: 60.20 dBA

Results segment # 1: Colonel By (night)

Source height = 1.50 m

Barrier height for grazing incidence

| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|-------------------|---------------------|--------------------|------------------------------|
| 1.50 !            | 4.50 !              | 4.42 !             | 4.42                         |

ROAD (0.00 + 51.58 + 42.31) = 52.06 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj  | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|--------|-------|-------|-------|--------|
| -90    | 0      | 0.36  | 62.40  | 0.00  | -5.79 | -3.91  | 0.00  | 0.00  | -0.11 | 52.58* |
| -90    | 0      | 0.54  | 62.40  | 0.00  | -6.56 | -4.26  | 0.00  | 0.00  | 0.00  | 51.58  |
| 0      | 8      | 0.54  | 62.40  | 0.00  | -6.56 | -13.53 | 0.00  | 0.00  | 0.00  | 42.31  |

\* Bright Zone !

Segment Leq : 52.06 dBA

Total Leq All Segments: 52.06 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.20  
(NIGHT): 52.06



# GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0                      NORMAL REPORT                      Date: 03-02-2026 16:59:44  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r3.te                      Time Period: Day/Night 16/8 hours  
Description: R3 - Echo Drive

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

-----  
Car traffic volume : 12144/1056 veh/TimePeriod \*  
Medium truck volume : 966/84 veh/TimePeriod \*  
Heavy truck volume : 690/60 veh/TimePeriod \*  
Posted speed limit : 60 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): 15000  
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: Colonel By (day/night)

-----  
Angle1 Angle2 : -90.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 52.00 / 52.00 m  
Receiver height : 7.50 / 7.50 m  
Topography : 4 (Elevated; with barrier)  
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg  
Barrier height : 21.00 m  
Elevation : 1.00 m  
Barrier receiver distance : 0.50 / 0.50 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00



Results segment # 1: Colonel By (day)

Source height = 1.50 m

Barrier height for grazing incidence

| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|-------------------|---------------------|--------------------|------------------------------|
| 1.50              | 7.50                | 7.44               | 7.44                         |

ROAD (0.00 + 45.37 + 0.00) = 45.37 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj  | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|--------|--------|
| -90    | 90     | 0.00  | 70.00  | 0.00  | -5.40 | 0.00  | 0.00  | 0.00  | -19.23 | 45.37  |

Segment Leq : 45.37 dBA

Total Leq All Segments: 45.37 dBA

Results segment # 1: Colonel By (night)

Source height = 1.50 m

Barrier height for grazing incidence

| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|-------------------|---------------------|--------------------|------------------------------|
| 1.50              | 7.50                | 7.44               | 7.44                         |

ROAD (0.00 + 37.77 + 0.00) = 37.77 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj  | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|--------|--------|
| -90    | 90     | 0.00  | 62.40  | 0.00  | -5.40 | 0.00  | 0.00  | 0.00  | -19.23 | 37.77  |

Segment Leq : 37.77 dBA

Total Leq All Segments: 37.77 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 45.37  
(NIGHT): 37.77



# GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0                      NORMAL REPORT                      Date: 03-02-2026 16:57:04  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r2.te                      Time Period: Day/Night 16/8 hours  
Description: R4 - Echo Drive

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

-----  
Car traffic volume : 12144/1056 veh/TimePeriod \*  
Medium truck volume : 966/84 veh/TimePeriod \*  
Heavy truck volume : 690/60 veh/TimePeriod \*  
Posted speed limit : 60 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): 15000  
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: Colonel By (day/night)

-----  
Angle1 Angle2 : 8.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 45.00 / 45.00 m  
Receiver height : 7.50 / 7.50 m  
Topography : 4 (Elevated; with barrier)  
Barrier angle1 : 32.00 deg Angle2 : 90.00 deg  
Barrier height : 3.00 m  
Elevation : 1.00 m  
Barrier receiver distance : 36.00 / 36.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00



Results segment # 1: Colonel By (day)

---

Source height = 1.50 m

Barrier height for grazing incidence

---

| Source<br>Height (m) | ! Receiver<br>! Height (m) | ! Barrier<br>! Height (m) | ! Elevation of<br>! Barrier Top (m) |
|----------------------|----------------------------|---------------------------|-------------------------------------|
| 1.50                 | !                          | 7.50                      | !                                   |
|                      |                            | 2.70                      | !                                   |
|                      |                            |                           | 2.70                                |

ROAD (54.19 + 52.77 + 0.00) = 56.55 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|-------|--------|
| 8      | 32     | 0.45  | 70.00  | 0.00  | -6.92 | -8.89 | 0.00  | 0.00  | 0.00  | 54.19  |
| 32     | 90     | 0.27  | 70.00  | 0.00  | -6.06 | -6.02 | 0.00  | 0.00  | -5.15 | 52.77  |

Segment Leq : 56.55 dBA

Total Leq All Segments: 56.55 dBA

Results segment # 1: Colonel By (night)

---

Source height = 1.50 m

Barrier height for grazing incidence

---

| Source<br>Height (m) | ! Receiver<br>! Height (m) | ! Barrier<br>! Height (m) | ! Elevation of<br>! Barrier Top (m) |
|----------------------|----------------------------|---------------------------|-------------------------------------|
| 1.50                 | !                          | 7.50                      | !                                   |
|                      |                            | 2.70                      | !                                   |
|                      |                            |                           | 2.70                                |

ROAD (46.59 + 45.17 + 0.00) = 48.95 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|-------|--------|
| 8      | 32     | 0.45  | 62.40  | 0.00  | -6.92 | -8.89 | 0.00  | 0.00  | 0.00  | 46.59  |
| 32     | 90     | 0.27  | 62.40  | 0.00  | -6.06 | -6.02 | 0.00  | 0.00  | -5.15 | 45.17  |

Segment Leq : 48.95 dBA

Total Leq All Segments: 48.95 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 56.55  
(NIGHT): 48.95



# GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0                      COMPREHENSIVE REPORT                      Date: 06-02-2026 09:43:23  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r5.te                      Time Period: Day/Night 16/8 hours  
Description: R5 - Echo Drive

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

---

Car traffic volume : 12144/1056 veh/TimePeriod \*  
Medium truck volume : 966/84 veh/TimePeriod \*  
Heavy truck volume : 690/60 veh/TimePeriod \*  
Posted speed limit : 60 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): 15000  
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: Colonel By (day/night)

---

Angle1 Angle2 : -55.00 deg 80.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 37.00 / 37.00 m  
Receiver height : 1.50 / 4.50 m  
Topography : 4 (Elevated; with barrier)  
Barrier angle1 : -55.00 deg Angle2 : 80.00 deg  
Barrier height : 1.00 m  
Elevation : 20.00 m  
Barrier receiver distance : 3.00 / 3.00 m  
Source elevation : 0.00 m  
Receiver elevation : 20.00 m  
Barrier elevation : 20.00 m  
Reference angle : 0.00



# GRADIENTWIND

ENGINEERS & SCIENTISTS

Segment # 1: Colonel By (day)

Source height = 1.50 m

Barrier height for grazing incidence

| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|-------------------|---------------------|--------------------|------------------------------|
| 1.50              | 1.50                | -0.12              | 19.88                        |

ROAD (0.00 + 55.36 + 0.00) = 55.36 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|-------|--------|
| -55    | 80     | 0.00  | 70.00  | 0.00  | -3.92 | -1.25 | 0.00  | 0.00  | -9.46 | 55.36  |

Segment Leq : 55.36 dBA

Total Leq All Segments: 55.36 dBA

Segment # 1: Colonel By (night)

Source height = 1.50 m

Barrier height for grazing incidence

| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|-------------------|---------------------|--------------------|------------------------------|
| 1.50              | 4.50                | 2.63               | 22.63                        |

ROAD (0.00 + 57.23 + 0.00) = 57.23 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|--------|--------|-------|--------|-------|-------|-------|-------|-------|-------|--------|
| -55    | 80     | 0.00  | 62.40  | 0.00  | -3.92 | -1.25 | 0.00  | 0.00  | -0.05 | 57.18* |
| -55    | 80     | 0.00  | 62.40  | 0.00  | -3.92 | -1.25 | 0.00  | 0.00  | 0.00  | 57.23  |

\* Bright Zone !

Segment Leq : 57.23 dBA

Total Leq All Segments: 57.23 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.36  
(NIGHT): 57.23

