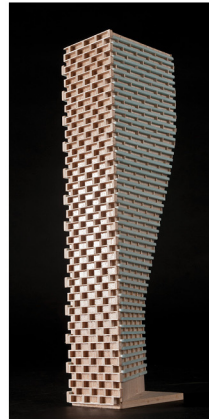


**ROADWAY TRAFFIC  
NOISE ASSESSMENT**

12-24 Hawthorne Avenue  
Ottawa, Ontario

Report: 22-262 – Traffic Noise



March 31, 2023

PREPARED FOR

**JBPA Developments Inc.**

107 Pretoria Avenue  
Ottawa, ON K1S 1W8

PREPARED BY

Efser Kara, MSc, LEED GA, Acoustic Scientist  
Joshua Foster, P.Eng., Lead Engineer

## **EXECUTIVE SUMMARY**

This report describes a detailed roadway traffic noise assessment performed in support of Zoning By-Law Amendment (ZBA) and Site Plan Control (SPC) applications for the proposed mixed-use development located at 12-24 Hawthorne Avenue in Ottawa, Ontario. The proposed development comprises a six-storey apartment building, containing 60 units and two levels of underground parking. The building is topped with a mechanical penthouse (MPH). The rooftop terraces located to the east and west of the MPH are assessed as outdoor living areas (OLA) in this study.

The primary sources of roadway traffic noise are Highway 417 and Hawthorne Avenue, which are located to the north of the study site, and Colonel By Drive to the west of the study site. The study site is bordered by Hawthorne Avenue to the south and low-rise residential buildings in all directions. Figure 1 illustrates the site plan with the 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) drawings prepared by RLA Architecture, dated September 2022.

The results of the current analysis indicate that noise levels will range between 58 and 74 dBA at Plane of Window (POW) receptors during the daytime period (07:00-23:00) and 51 and 66 dBA during the nighttime period (23:00-07:00). The highest noise levels occur along the north façade, which is most exposed to Highway 417.

The results of the calculations indicate that the north, west, and east facades of the building will require upgraded building components. Building components compliant with the Ontario Building Code (OBC 2020) will be sufficient for the south façade.



The results of the calculations also indicate that the building will require central air conditioning, or a similar ventilation system for the residential units, which will allow occupants to keep windows closed and maintain a comfortable working environment. In addition to upgraded building elements and ventilation requirements, a Type D Warning Clause will also be required in all Lease, Purchase and Sale Agreements, as summarized in Section 6.

The noise levels at the rooftop terraces (Receptors 5 and 6) exceed the 55 dBA criterion; therefore, a barrier investigation was conducted for these areas. Results of the investigation proved that noise levels can only be reduced to 60 and 63 dBA at Receptors 5 and 6, respectively. This marginal improvement would not justify the cost of installing such a high rail guard/noise screen. Therefore, it is recommended to use a 2-metre high rail guard/noise screen for the west side of the terrace where Receptor 5 is located (see Figure 6). The noise screen should be built with solid elements having a minimum surface mass of 20 kg/m<sup>2</sup> and should contain no gaps. The rail guard/noise screen can be built as a solid glass screen in order to allow daylight and access to view. The east side of the terrace, which is directly exposed to the roadway traffic noise generated by Highway 417, is not recommended to be used as an outdoor amenity area. In addition, a Type B warning clause will be required in all Lease, Purchase and Sale Agreements, as summarized in Section 6.

Gradient Wind conducted a survey of the study site, using the satellite view of the area; the study site is surrounded by low-rise residential buildings. Therefore, no significant stationary noise impact on the proposed development is anticipated.

With regards to the impacts of the proposed building on the surroundings and itself, by careful placing and judicious selection of noise-generating equipment like cooling towers, chillers, and generators, stationary noise impact from the proposed building can comply with the sound level limits defined in NPC-300. Where necessary, noise screens, silencers, and other noise control measures can be added.

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## **1. INTRODUCTION**

Gradient Wind Engineering Inc. (Gradient Wind) was retained by JBPA Developments Inc. to undertake a roadway traffic noise assessment for the proposed mixed-use development located at 12-24 Hawthorne Avenue in Ottawa, Ontario. This report summarizes the methodology, results and recommendations related to the assessment of exterior noise levels generated by local roadway traffic.

This assessment is based on theoretical noise calculation methods conforming to the City of Ottawa<sup>1</sup> and the Ministry of the Environment, Conservation and Parks (MECP)<sup>2</sup> guidelines. Noise calculations were based on drawings prepared by RLA Architecture, dated September 2022, with future traffic volumes corresponding to the City of Ottawa's Official Plan (OP) roadway classifications.

## **2. TERMS OF REFERENCE**

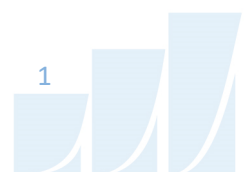
The study site is a proposed development at 12-24 Hawthorne Avenue in Ottawa, Ontario. The proposed development comprises a six-storey apartment building, containing 60 units and two levels of underground parking. A ramp to underground parking is found along the west elevation. At grade, a residential lobby area is featured to the north of the floor plan, with an indoor amenity immediately to the south of it. Residential units are located to the east. The southwest corner, adjacent to the indoor amenity area, serves a 1,294 square foot (sqft) raised amenity deck. The rest of Levels 2-6 contain residential occupancies. The building is topped with a mechanical penthouse (MPH). The rooftop terraces located to the east and west of the MPH are assessed as outdoor living areas (OLA) in this study.

The primary sources of roadway traffic noise are Highway 417 and Hawthorne Avenue, which are located to the north of the study site, and Colonel By Drive to the west of the study site. The study site is bordered by Hawthorne Avenue to the south and low-rise residential buildings in all directions. Figure 1 illustrates the site plan with the surrounding context.

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<sup>1</sup> City of Ottawa Environmental Noise Control Guidelines, January 2016

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



### **3. OBJECTIVES**

The principal objectives of this study are to (i) calculate the future noise levels on the study buildings 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 (ENCG) 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 level 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 sound pressure 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 vehicular traffic, 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 and LRT, 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) for roadways is 45 and 40 dBA for living rooms and sleeping quarters, respectively, and 50 for retail stores as listed in Table 1. Based on Gradient Wind’s experience, more comfortable indoor noise



levels should be targeted, towards 42 and 37, respectively, to control peak noise and deficiencies in building envelope construction.

**TABLE 1: INDOOR SOUND LEVEL CRITERIA**

Type of Space	Time Period	Leq (dBA)
General offices, reception areas, <b>retail stores</b> , etc.	07:00 – 23:00	50
<b>Living/dining/den areas of 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
<b>Sleeping quarters of 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>3</sup>. A closed window due to a ventilation requirement will bring noise levels down to achieve an acceptable indoor environment<sup>4</sup>. Therefore, where noise levels exceed 55 dBA daytime and 50 dBA nighttime, the ventilation 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>5</sup>.

The sound level criterion for outdoor living areas (OLA) is 55 dBA, which applies during the daytime period (07:00 to 23:00). When noise levels exceed 55 dBA and are less than or equal to 60 dBA, mitigation should be considered to reduce noise levels to as close to 55 dBA if technically, economically, and administratively feasible. If noise levels exceed 60 dBA, mitigation must be provided to reduce noise levels below 60 dBA.

<sup>3</sup> Burberry, P.B. (2014). Mitchell’s Environment and Services. Routledge, Page 125

<sup>4</sup> MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.8

<sup>5</sup> MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3





## 4.2.2 Theoretical Roadway Noise Predictions

Noise predictions were performed with the aid of the Ministry of the Environment, Conservations and Parks' (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 roads was taken to be 92% / 8%, respectively.
- Ground surfaces were taken to be reflective due to the presence of hard ground (pavement, concrete).
- Topography was assumed to be a flat/gentle slope surrounding the study site.
- Highway 417 was considered 7 metres above the study site in the calculations.
- A total of six (6) receptor locations were chosen around the study site; four (4) of them are at the facades of the building as Plane of Window (POW) receptors and two (2) of them are on the rooftop terrace as Outdoor Living Area (OLA) receptors (see Figure 2).
- POW receptor heights were taken to be at the centre of the highest-level windows of the related façade. The OLA receptor heights were taken at 19.5 m above grade; 1.5 metres above the 6-floor podium rooftop.
- The receptor distances to roadway traffic and exposure angles are illustrated in Figures 3-4.

## 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. Therefore, traffic volumes are based on the roadway classifications outlined in the City of Ottawa's Official Plan (OP) and Transportation Master Plan<sup>6</sup> which provide additional details on future roadway expansions. Average Annual Daily Traffic (AADT) volumes

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<sup>6</sup> City of Ottawa Transportation Master Plan, November 2013



are then based on data in Table B1 of the ENCG for each roadway classification. Table 2 (below) summarizes the AADT values used for each roadway included in this assessment.

**TABLE 2: ROADWAY TRAFFIC DATA**

Segment	Roadway Traffic Data	Speed Limit (km/h)	Traffic Volumes
Highway 417	8-Lane Freeway	100	<b>146,664</b>
Hawthorne Avenue	4-Lane Urban Arterial (4-UAU)	50	<b>30,000</b>
Colonel By Drive	2-Lane Urban Arterial (2-UAU)	50	<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 points in a partition.

As per Section 4.2, when daytime noise levels from road sources at the plane of the window exceed 65 dBA, calculations must be performed to evaluate the sound transmission quality of the building components to ensure acceptable indoor noise levels are achieved. The calculation procedure<sup>7</sup> considers:

- Window type and total area as a percentage of total room floor area
- Exterior wall type and total area as a percentage of the total room floor area

<sup>7</sup> Building Practice Note: Controlling Sound Transmission into Buildings by J.D. Quirt, National Research Council of Canada, September 1985

- Acoustic absorption characteristics of the room
- Outdoor noise source type and approach geometry
- Indoor sound level criteria, which varies according to the intended use of a space

Based on published research<sup>8</sup>, exterior walls possess specific sound attenuation characteristics that are used as a basis for calculating the required STC ratings of windows in the same partition. Due to the limited information available at the time of the study, detailed floor layouts have not been finalized; therefore, detailed STC calculations could not be performed at this time. As a guideline, the anticipated STC requirements for windows have been estimated based on the overall noise reduction required for each intended use of space (STC = outdoor noise level – targeted indoor noise levels).

## 5. ROADWAY TRAFFIC NOISE 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.

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

Receptor Number	Receptor Height Above Grade (m)	Receptor Location	STAMSON 5.04 Noise Level (dBA)	
			Day	Night
1	16.5	POW North Façade – Level 6	74	66
2	16.5	POW East Façade – Level 6	70	62
3	16.5	POW South Façade – Level 6	58	51
4	16.5	POW West Façade – Level 6	71	64
5	19.5	OLA – West – Rooftop Terrace	65	N/A*
6	19.5	OLA – East – Rooftop Terrace	68	N/A*

\* OLA noise levels during the nighttime are not considered, as per the ENCG.

<sup>8</sup> CMHC, Road & Rail Noise: Effects on Housing

The results of the current analysis indicate that noise levels will range between 58 and 74 dBA at Plane of Window (POW) receptors during the daytime period (07:00-23:00) and 51 and 66 dBA during the nighttime period (23:00-07:00). The highest noise levels occur along the north façade, which is most exposed to Highway 417. The noise levels at the rooftop terraces (Receptors 5 and 6) exceed the 55 dBA criterion; if these areas are to be used for quiet enjoyment of the outdoors, noise mitigation measures are required.

The results of the calculations indicate that the north, west, and east facades of the building will require upgraded building components. Building components compliant with the Ontario Building Code (OBC 2020) will be sufficient for the south façade.

## 5.2 Noise Control Measures

The noise levels predicted due to roadway traffic exceed the criteria listed in Section 4.2 for building components. As discussed in Section 4.3, the anticipated STC requirements for windows and walls have been estimated based on the overall noise reduction required for each intended use of space (STC = outdoor noise level – targeted indoor noise levels). As per the City of Ottawa requirements, detailed STC calculations will be required to be completed prior to the building permit application. The STC requirements for the windows are summarized below for various units within the development (see Figure 5):

- **Bedroom Windows**
  - (i) Bedroom windows facing north will require a minimum STC of 37
  - (ii) Bedroom windows facing west and east will require a minimum STC of 34
  - (iii) All other bedroom windows are to satisfy Ontario Building Code (OBC 2020) requirements
  
- **Living Room Windows**
  - (i) Living room windows facing north will require a minimum STC of 32
  - (ii) Living room windows facing west and east will require a minimum STC of 29
  - (iii) All other living room windows are to satisfy Ontario Building Code (OBC 2020) requirements

- **Exterior Walls**

- (i) Exterior wall components on the south and east façades will require a minimum STC of 45, which will be achieved with brick cladding or an acoustical equivalent according to NRC test data<sup>9</sup>

The STC requirements apply to windows, doors, spandrel panels and curtainwall elements. Exterior wall components on these façades are recommended to have a minimum STC of 45, where punched window and wall system is used. A review of window supplier literature indicates that the specified STC ratings can be achieved by a variety of window systems that have a combination of glass thickness and inter-pane spacing. It is the responsibility of the manufacturer to ensure that the specified window achieves the required STC. This can only be assured by using window configurations that have been certified by laboratory testing. The requirements for STC ratings assume that the remaining components of the building are constructed and installed according to the minimum standards of the Ontario Building Code. The specified STC requirements also apply to swinging and/or sliding patio doors.

The results of the calculations also indicate that the building will require central air conditioning, or a similar ventilation system for the residential units, which will allow occupants to keep windows closed and maintain a comfortable working environment. In addition to ventilation requirements, warning clauses 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 terraces (Receptors 5 and 6) are expected to exceed the 55 dBA criterion during the daytime period. If these areas are to be used as outdoor living areas, noise control measures are required to reduce the  $L_{eq}$  to 55 dBA, where technically and administratively feasible. If this is not possible, the noise levels are required to be reduced to 60 dBA. Further analysis investigated the noise mitigating impact of raising the perimeter guards around the terraces from a standard height of 1.1 m (base case) to 3.0 m above the walking surface.

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<sup>9</sup> J.S. Bradley and J.A. Birta. Laboratory Measurements of the Sound Insulation of Building Façade Elements, National Research Council October 2000.

Results of the investigation proved that noise levels can only be reduced to 60 and 63 dBA at Receptors 5 and 6, respectively. This marginal improvement would not justify the cost of installing such a high rail guard/noise screen. Therefore, it is recommended to use a 2-metre high rail guard/noise screen for the west side of the terrace where Receptor 5 is located (see Figure 6). The noise screen should be built with solid elements having a minimum surface mass of 20 kg/m<sup>2</sup> and should contain no gaps. The rail guard/noise screen can be built as a solid glass screen in order to allow daylight and access to view. The east side of the terrace, which is directly exposed to the roadway traffic noise generated by Highway 417 is not recommended to be used as an outdoor amenity area.

In addition, a Type B warning clause will be required in all Lease, Purchase and Sale Agreements, as summarized in Section 6. Table 4 summarizes the results of the barrier investigation.

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

Reference Receptor	Barrier Height Above Walking Surface (m)	Receptor Location	Daytime L <sub>eq</sub> Noise Levels (dBA)	
			With Barrier	Without Barrier
5	1.1	OLA – West – Rooftop Terrace	61	65
	1.5		61	
	2.0		60	
	2.5		60	
	3.0		60	
6	1.1	OLA – East – Rooftop Terrace	68	68
	1.5		67	
	2.0		65	
	2.5		66	
	3.0		63	

## 6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels will range between 58 and 74 dBA at Plane of Window (POW) receptors during the daytime period (07:00-23:00) and 51 and 66 dBA during the nighttime period (23:00-07:00). The highest noise levels occur along the north façade, which is most exposed to Highway 417.

The results of the calculations indicate that the north, west, and east facades of the building will require upgraded building components. Building components compliant with the Ontario Building Code (OBC 2020) will be sufficient for the south façade.

The results of the calculations also indicate that the building will require central air conditioning, or a similar ventilation system for the residential units, which will allow occupants to keep windows closed and maintain a comfortable working environment. In addition to upgraded building elements and ventilation requirements, a Type D Warning Clause will also be required in all Lease, Purchase and Sale Agreements, as summarized below:

*"This dwelling unit has been supplied with a central air conditioning system which 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."*

The noise levels at the rooftop terraces (Receptors 5 and 6) exceed the 55 dBA criterion; therefore, a barrier investigation was conducted for these areas. Results of the investigation proved that noise levels can only be reduced to 60 and 63 dBA at Receptors 5 and 6, respectively. This marginal improvement would not justify the cost of installing such a high rail guard/noise screen. Therefore, it is recommended to use a 2-metre high rail guard/noise screen for the west side of the terrace where Receptor 5 is located (see Figure 6). The noise screen should be built with solid elements having a minimum surface mass of 20 kg/m<sup>2</sup> and should contain no gaps. The rail guard/noise screen can be built as a solid glass screen in order to allow daylight and access to view. The east side of the terrace, which is directly exposed to the roadway traffic noise generated by Highway 417 is not recommended to be used as an outdoor amenity area.

In addition, a Type B warning clause will be required in all Lease, Purchase and Sale Agreements, as summarized 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 road and rail traffic may on occasions interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment.”*

Gradient Wind conducted a survey of the study site, using the satellite view of the area; the study site is surrounded by low-rise residential buildings. Therefore, no significant stationary noise impact on the proposed development is anticipated.

With regards to the impacts of the proposed building on the surroundings and itself, by careful placing and judicious selection of noise-generating equipment like cooling towers, chillers, and generators, stationary noise impact from the proposed building can comply with the sound level limits defined in NPC-300. Where necessary, noise screens, silencers, and other noise control measures can be added.

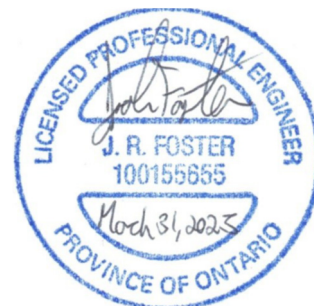
This concludes our traffic noise assessment and report. If you have any questions or wish to discuss our findings, please advise us. In the interim, we thank you for the opportunity to be of service.

Sincerely,

**Gradient Wind Engineering Inc.**

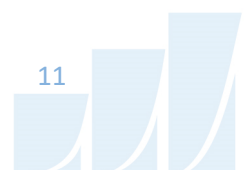


Efser Kara, MSc, LEED GA  
Acoustic Scientist

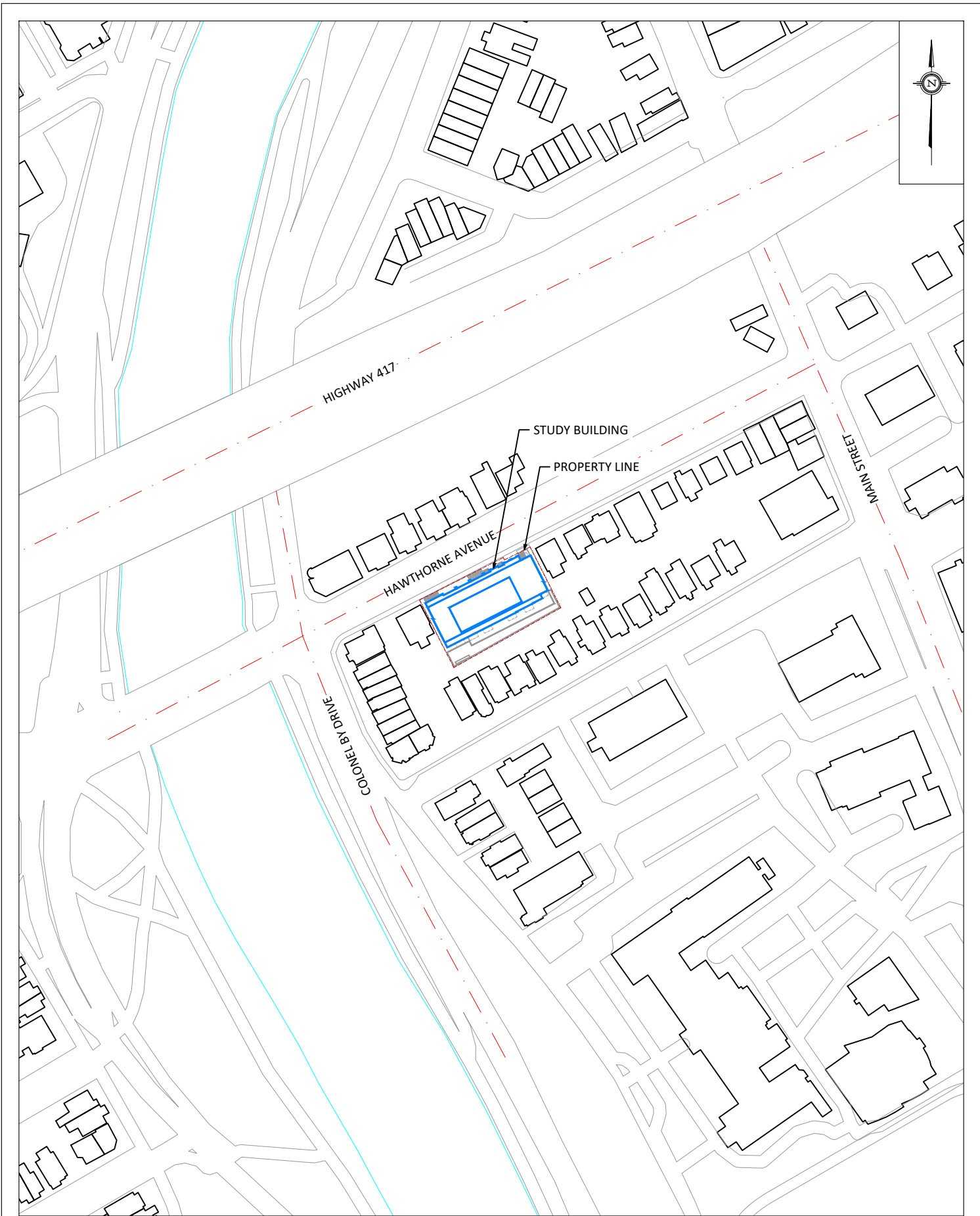


Joshua Foster, P.Eng.  
Lead Engineer

Gradient Wind File #22-262 – Detailed Traffic Noise







**GRADIENTWIND**

ENGINEERS & SCIENTISTS

127 WALGREEN ROAD, OTTAWA, ON  
613 836 0934 • GRADIENTWIND.COM

PROJECT

12-24 HAWTHORNE AVENUE, OTTAWA  
ROADWAY TRAFFIC NOISE ASSESSMENT

SCALE

1:2000 (APPROX.)

DRAWING NO.

22-262- 1

DATE

SEPTEMBER 14, 2022

DRAWN BY

E.K.

DESCRIPTION

FIGURE 1:  
SITE PLAN AND SURROUNDING CONTEXT



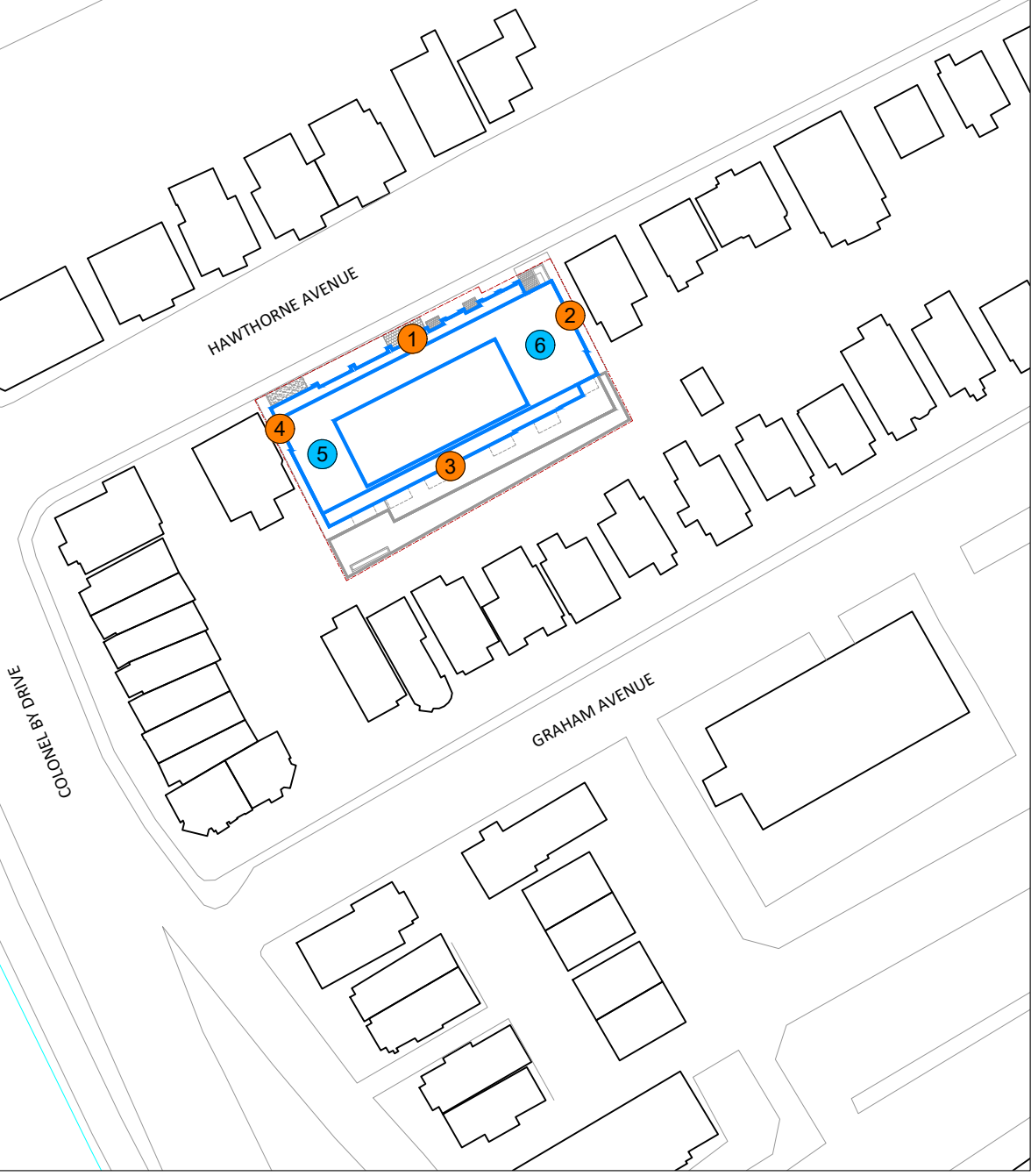
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HAWTHORNE AVENUE

GRAHAM AVENUE

COLONEL BYRNE DRIVE

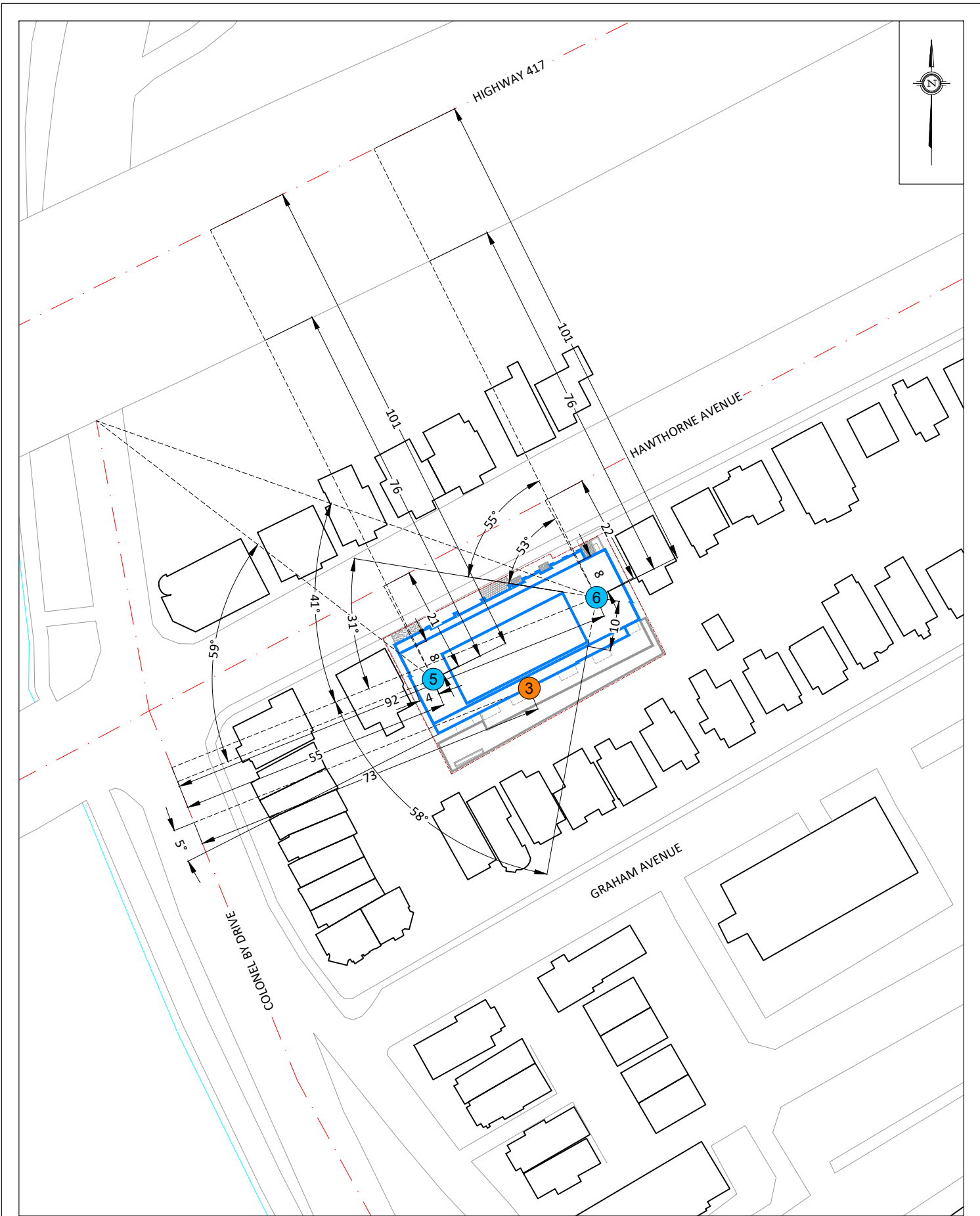
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- POW RECEPTORS



PROJECT	12-24 HAWTHORNE AVENUE, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT	
SCALE	1:1000 (APPROX.)	DRAWING NO. 22-262- 2
DATE	SEPTEMBER 14, 2022	DRAWN BY E.K.

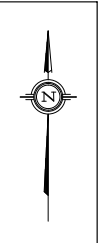


<b>GRADIENTWIND</b> ENGINEERS & SCIENTISTS 127 WALGREEN ROAD, OTTAWA, ON 613 836 0934 • GRADIENTWIND.COM	PROJECT	12-24 HAWTHORNE AVENUE, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT	DESCRIPTION	FIGURE 3: STAMSON INPUT DATA FOR RECEPTORS 1, 2 & 4	
	SCALE	1:1000 (APPROX.)	DRAWING NO.		22-262- 3
	DATE	SEPTEMBER 14, 2022	DRAWN BY		E.K.



PROJECT	12-24 HAWTHORNE AVENUE, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT	
SCALE	1:1000 (APPROX.)	DRAWING NO. 22-262-4
DATE	SEPTEMBER 14, 2022	DRAWN BY E.K.

DESCRIPTION	FIGURE 4: STAMSON INPUT DATA FOR RECEPTORS 3, 5 & 6
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HAWTHORNE AVENUE



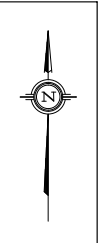
- BEDROOM/LIVING ROOM WINDOWS STC 37/32
- BEDROOM/LIVING ROOM WINDOWS STC 34/29

PROJECT	12-24 HAWTHORNE AVENUE, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT	
SCALE	1:500 (APPROX.)	DRAWING NO. 22-262- 5
DATE	SEPTEMBER 14, 2022	DRAWN BY E.K.



HAWTHORNE AVENUE

2-METRE HIGH GUARD RAIL / NOISE SCREEN



PROJECT	12-24 HAWTHORNE AVENUE, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT	
SCALE	1:500 (APPROX.)	DRAWING NO. 22-262- 6
DATE	SEPTEMBER 14, 2022	DRAWN BY E.K.



# GRADIENTWIND

ENGINEERS & SCIENTISTS



## APPENDIX A

### STAMSON INPUT-OUTPUT DATA



**STAMSON 5.0    NORMAL REPORT    Date: 15-09-2022 09:25:04**  
**MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT**

**Filename: r1.te                    Time Period: Day/Night 16/8 hours**  
**Description:**

Road data, segment # 1: Highway 417 (day/night)

-----  
Car traffic volume : 118739/10325 veh/TimePeriod \*  
Medium truck volume : 9445/821 veh/TimePeriod \*  
Heavy truck volume : 6747/587 veh/TimePeriod \*  
Posted speed limit : 100 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): 146664  
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: Highway 417 (day/night)

-----  
Angle1 Angle2 : -90.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 91.00 / 91.00 m  
Receiver height : 16.50 / 16.50 m  
Topography : 4 (Elevated; with barrier)  
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg  
Barrier height : 1.00 m  
Elevation : 7.00 m  
Barrier receiver distance : 66.00 / 66.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 7.00 m  
Reference angle : 0.00



Road data, segment # 2: Hawthorne Av (day/night)

-----  
Car traffic volume : 28336/2464 veh/TimePeriod \*  
Medium truck volume : 2254/196 veh/TimePeriod \*  
Heavy truck volume : 1610/140 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): 35000  
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 # 2: Hawthorne Av (day/night)

-----  
Angle1 Angle2 : -90.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 15.00 / 15.00 m  
Receiver height : 16.50 / 16.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00

Road data, segment # 3: Colonel By D (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 : 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): 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 # 3: Colonel By D (day/night)

-----  
Angle1 Angle2 : -5.00 deg 45.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 75.00 / 75.00 m  
Receiver height : 16.50 / 16.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00



Results segment # 1: Highway 417 (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	16.50	-1.38	5.62

-----+-----+-----+-----

ROAD (0.00 + 68.37 + 0.00) = 68.37 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	84.41	0.00	-7.83	0.00	0.00	0.00	-8.21	68.37

-----

Segment Leq : 68.37 dBA

Results segment # 2: Hawthorne Av (day)

-----

Source height = 1.50 m

ROAD (0.00 + 72.16 + 0.00) = 72.16 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	72.16	0.00	0.00	0.00	0.00	0.00	0.00	72.16

-----

Segment Leq : 72.16 dBA



Results segment # 3: Colonel By D (day)

Source height = 1.50 m

ROAD (0.00 + 55.93 + 0.00) = 55.93 dBA

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

-5	45	0.00	68.48	0.00	-6.99	-5.56	0.00	0.00	0.00	55.93
----	----	------	-------	------	-------	-------	------	------	------	-------

Segment Leq : 55.93 dBA

Total Leq All Segments: 73.75 dBA

Results segment # 1: Highway 417 (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	16.50	-1.38	5.62
------	-------	-------	------

ROAD (0.00 + 60.77 + 0.00) = 60.77 dBA

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

-90	90	0.00	76.81	0.00	-7.83	0.00	0.00	0.00	-8.21	60.77
-----	----	------	-------	------	-------	------	------	------	-------	-------

Segment Leq : 60.77 dBA

Results segment # 2: Hawthorne Av (night)

-----

Source height = 1.50 m

ROAD (0.00 + 64.56 + 0.00) = 64.56 dBA

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

-----

-90	90	0.00	64.56	0.00	0.00	0.00	0.00	0.00	0.00	64.56
-----	----	------	-------	------	------	------	------	------	------	-------

-----

Segment Leq : 64.56 dBA

Results segment # 3: Colonel By D (night)

-----

Source height = 1.50 m

ROAD (0.00 + 48.33 + 0.00) = 48.33 dBA

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

-----

-5	45	0.00	60.88	0.00	-6.99	-5.56	0.00	0.00	0.00	48.33
----	----	------	-------	------	-------	-------	------	------	------	-------

-----

Segment Leq : 48.33 dBA

Total Leq All Segments: 66.15 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 73.75  
(NIGHT): 66.15



**STAMSON 5.0    NORMAL REPORT    Date: 15-09-2022 09:14:17**  
**MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT**

**Filename: r2.te                    Time Period: Day/Night 16/8 hours**  
**Description:**

Road data, segment # 1: Highway 417 (day/night)

-----  
Car traffic volume : 118739/10325 veh/TimePeriod \*  
Medium truck volume : 9445/821 veh/TimePeriod \*  
Heavy truck volume : 6747/587 veh/TimePeriod \*  
Posted speed limit : 100 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): 146664  
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: Highway 417 (day/night)

-----  
Angle1 Angle2 : 0.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 99.00 / 99.00 m  
Receiver height : 16.50 / 16.50 m  
Topography : 4 (Elevated; with barrier)  
Barrier angle1 : 0.00 deg Angle2 : 90.00 deg  
Barrier height : 1.00 m  
Elevation : 7.00 m  
Barrier receiver distance : 74.00 / 74.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 7.00 m  
Reference angle : 0.00





Road data, segment # 2: Hawthorne Av (day/night)

-----  
Car traffic volume : 28336/2464 veh/TimePeriod \*  
Medium truck volume : 2254/196 veh/TimePeriod \*  
Heavy truck volume : 1610/140 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): 35000  
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 # 2: Hawthorne Av (day/night)

-----  
Angle1 Angle2 : 0.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 20.00 / 20.00 m  
Receiver height : 16.50 / 16.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00



Results segment # 1: Highway 417 (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)

-----+-----+-----+-----

1.50 ! 16.50 ! -1.72 ! 5.28

ROAD (0.00 + 64.46 + 0.00) = 64.46 dBA

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

-----

0 90 0.00 84.41 0.00 -8.20 -3.01 0.00 0.00 -8.74 64.46

-----

Segment Leq : 64.46 dBA

Results segment # 2: Hawthorne Av (day)

-----

Source height = 1.50 m

ROAD (0.00 + 67.90 + 0.00) = 67.90 dBA

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

-----

0 90 0.00 72.16 0.00 -1.25 -3.01 0.00 0.00 0.00 67.90

-----

Segment Leq : 67.90 dBA

Total Leq All Segments: 69.52 dBA

Results segment # 1: Highway 417 (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source ! Receiver ! Barrier ! Elevation of  
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)

-----+-----+-----+-----  
1.50 ! 16.50 ! -1.72 ! 5.28

ROAD (0.00 + 56.86 + 0.00) = 56.86 dBA

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

-----  
0 90 0.00 76.81 0.00 -8.20 -3.01 0.00 0.00 -8.74 56.86  
-----

Segment Leq : 56.86 dBA

Results segment # 2: Hawthorne Av (night)

Source height = 1.50 m

ROAD (0.00 + 60.30 + 0.00) = 60.30 dBA

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

-----  
0 90 0.00 64.56 0.00 -1.25 -3.01 0.00 0.00 0.00 60.30  
-----

Segment Leq : 60.30 dBA

Total Leq All Segments: 61.92 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 69.52  
(NIGHT): 61.92



**STAMSON 5.0    NORMAL REPORT    Date: 15-09-2022 09:18:53**  
**MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT**

**Filename: r3.te                    Time Period: Day/Night 16/8 hours**  
**Description:**

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

-----  
Angle1 Angle2 : -90.00 deg -5.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 73.00 / 73.00 m  
Receiver height : 16.50 / 16.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00

Results segment # 1: Colonel By D (day)

-----

Source height = 1.50 m

ROAD (0.00 + 58.35 + 0.00) = 58.35 dBA

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

-----

-90 -5 0.00 68.48 0.00 -6.87 -3.26 0.00 0.00 0.00 58.35

-----

Segment Leq : 58.35 dBA

Total Leq All Segments: 58.35 dBA

Results segment # 1: Colonel By D (night)

-----

Source height = 1.50 m

ROAD (0.00 + 50.75 + 0.00) = 50.75 dBA

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

-----

-90 -5 0.00 60.88 0.00 -6.87 -3.26 0.00 0.00 0.00 50.75

-----

Segment Leq : 50.75 dBA

Total Leq All Segments: 50.75 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 58.35

(NIGHT): 50.75



**STAMSON 5.0    NORMAL REPORT    Date: 15-09-2022 09:24:29**  
**MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT**

**Filename: r4.te                    Time Period: Day/Night 16/8 hours**  
**Description:**

Road data, segment # 1: Highway 417 (day/night)

-----  
Car traffic volume : 118739/10325 veh/TimePeriod \*  
Medium truck volume : 9445/821 veh/TimePeriod \*  
Heavy truck volume : 6747/587 veh/TimePeriod \*  
Posted speed limit : 100 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): 146664  
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: Highway 417 (day/night)

-----  
Angle1 Angle2 : -90.00 deg 0.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 95.00 / 95.00 m  
Receiver height : 16.50 / 16.50 m  
Topography : 4 (Elevated; with barrier)  
Barrier angle1 : -90.00 deg Angle2 : 0.00 deg  
Barrier height : 1.00 m  
Elevation : 7.00 m  
Barrier receiver distance : 70.00 / 70.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 7.00 m  
Reference angle : 0.00



Road data, segment # 2: Hawthorne Av (day/night)

-----  
Car traffic volume : 28336/2464 veh/TimePeriod \*  
Medium truck volume : 2254/196 veh/TimePeriod \*  
Heavy truck volume : 1610/140 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): 35000  
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 # 2: Hawthorne Av (day/night)

-----  
Angle1 Angle2 : -90.00 deg 0.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 15.00 / 15.00 m  
Receiver height : 16.50 / 16.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00



Road data, segment # 3: Colonel By D (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 : 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): 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 # 3: Colonel By D (day/night)

-----  
Angle1 Angle2 : -90.00 deg 64.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 51.00 / 51.00 m  
Receiver height : 16.50 / 16.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00





Results segment # 1: Highway 417 (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)

-----+-----+-----+-----

1.50 ! 16.50 ! -1.56 ! 5.44

ROAD (0.00 + 64.89 + 0.00) = 64.89 dBA

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

-----

-90 0 0.00 84.41 0.00 -8.02 -3.01 0.00 0.00 -8.49 64.89

-----

Segment Leq : 64.89 dBA

Results segment # 2: Hawthorne Av (day)

-----

Source height = 1.50 m

ROAD (0.00 + 69.15 + 0.00) = 69.15 dBA

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

-----

-90 0 0.00 72.16 0.00 0.00 -3.01 0.00 0.00 0.00 69.15

-----

Segment Leq : 69.15 dBA



Results segment # 3: Colonel By D (day)

-----

Source height = 1.50 m

ROAD (0.00 + 62.49 + 0.00) = 62.49 dBA

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

-----

-90	64	0.00	68.48	0.00	-5.31	-0.68	0.00	0.00	0.00	62.49
-----	----	------	-------	------	-------	-------	------	------	------	-------

-----

Segment Leq : 62.49 dBA

Total Leq All Segments: 71.17 dBA

Results segment # 1: Highway 417 (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	16.50	-1.56	5.44
------	-------	-------	------

ROAD (0.00 + 57.29 + 0.00) = 57.29 dBA

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

-----

-90	0	0.00	76.81	0.00	-8.02	-3.01	0.00	0.00	-8.49	57.29
-----	---	------	-------	------	-------	-------	------	------	-------	-------

-----

Segment Leq : 57.29 dBA



Results segment # 2: Hawthorne Av (night)

-----

Source height = 1.50 m

ROAD (0.00 + 61.55 + 0.00) = 61.55 dBA

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

-----

-90 0 0.00 64.56 0.00 0.00 -3.01 0.00 0.00 0.00 61.55

-----

Segment Leq : 61.55 dBA

Results segment # 3: Colonel By D (night)

-----

Source height = 1.50 m

ROAD (0.00 + 54.89 + 0.00) = 54.89 dBA

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

-----

-90 64 0.00 60.88 0.00 -5.31 -0.68 0.00 0.00 0.00 54.89

-----

Segment Leq : 54.89 dBA

Total Leq All Segments: 63.57 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 71.17  
(NIGHT): 63.57



**STAMSON 5.0    NORMAL REPORT    Date: 15-09-2022 11:32:19**  
**MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT**

**Filename: r5.te                    Time Period: Day/Night 16/8 hours**  
**Description:**

Road data, segment # 1: Highway 417 (day/night)

-----  
Car traffic volume : 118739/10325 veh/TimePeriod \*  
Medium truck volume : 9445/821 veh/TimePeriod \*  
Heavy truck volume : 6747/587 veh/TimePeriod \*  
Posted speed limit : 100 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): 146664  
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: Highway 417 (day/night)

-----  
Angle1 Angle2 : -90.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 101.00 / 101.00 m  
Receiver height : 19.50 / 19.50 m  
Topography : 4 (Elevated; with barrier)  
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg  
Barrier height : 18.00 m  
Elevation : 7.00 m  
Barrier receiver distance : 8.00 / 8.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 7.00 m  
Reference angle : 0.00



Road data, segment # 2: Hawthorne Av (day/night)

-----  
Car traffic volume : 28336/2464 veh/TimePeriod \*  
Medium truck volume : 2254/196 veh/TimePeriod \*  
Heavy truck volume : 1610/140 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): 35000  
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 # 2: Hawthorne Av (day/night)

-----  
Angle1 Angle2 : -90.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 21.00 / 21.00 m  
Receiver height : 19.50 / 19.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg  
Barrier height : 18.00 m  
Barrier receiver distance : 8.00 / 8.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00

Road data, segment # 3: Colonel By D (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 : 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): 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 # 3: Colonel By D (day/night)

-----  
Angle1 Angle2 : -90.00 deg 59.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 55.00 / 55.00 m  
Receiver height : 19.50 / 19.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : -90.00 deg Angle2 : 59.00 deg  
Barrier height : 18.00 m  
Barrier receiver distance : 4.00 / 4.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00

Results segment # 1: Highway 417 (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	19.50	11.07	18.07

ROAD (0.00 + 59.24 + 0.00) = 59.24 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	84.41	0.00	-8.28	0.00	0.00	0.00	-16.89	59.24

Segment Leq : 59.24 dBA

Results segment # 2: Hawthorne Av (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	19.50	12.64	12.64

ROAD (0.00 + 55.74 + 0.00) = 55.74 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	72.16	0.00	-1.46	0.00	0.00	0.00	-14.96	55.74

Segment Leq : 55.74 dBA

Results segment # 3: Colonel By D (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	19.50	18.19	18.19

ROAD (0.00 + 62.02 + 0.00) = 62.02 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	59	0.00	68.48	0.00	-5.64	-0.82	0.00	0.00	-4.84	57.18*
-90	59	0.00	68.48	0.00	-5.64	-0.82	0.00	0.00	0.00	62.02

\* Bright Zone !

Segment Leq : 62.02 dBA

Total Leq All Segments: 64.48 dBA

Results segment # 1: Highway 417 (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	19.50	11.07	18.07

ROAD (0.00 + 51.64 + 0.00) = 51.64 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	76.81	0.00	-8.28	0.00	0.00	0.00	-16.89	51.64

Segment Leq : 51.64 dBA





Results segment # 2: Hawthorne Av (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	19.50	12.64	12.64

ROAD (0.00 + 48.14 + 0.00) = 48.14 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	64.56	0.00	-1.46	0.00	0.00	0.00	-14.96	48.14

-90 90 0.00 64.56 0.00 -1.46 0.00 0.00 0.00 -14.96 48.14

Segment Leq : 48.14 dBA

Results segment # 3: Colonel By D (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source ! Receiver ! Barrier ! Elevation of  
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)

-----+-----+-----+-----  
1.50 ! 19.50 ! 18.19 ! 18.19

ROAD (0.00 + 54.42 + 0.00) = 54.42 dBA

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

-----  
-90 59 0.00 60.88 0.00 -5.64 -0.82 0.00 0.00 -4.84 49.58\*  
-90 59 0.00 60.88 0.00 -5.64 -0.82 0.00 0.00 0.00 54.42  
-----

\* Bright Zone !

Segment Leq : 54.42 dBA

Total Leq All Segments: 56.88 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 64.48  
(NIGHT): 56.88



**STAMSON 5.0    NORMAL REPORT    Date: 15-09-2022 14:23:22**  
**MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT**

**Filename: r6.te                    Time Period: Day/Night 16/8 hours**  
**Description:**

Road data, segment # 1: Highway 417 (day/night)

-----  
Car traffic volume : 118739/10325 veh/TimePeriod \*  
Medium truck volume : 9445/821 veh/TimePeriod \*  
Heavy truck volume : 6747/587 veh/TimePeriod \*  
Posted speed limit : 100 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): 146664  
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: Highway 417 (day/night)

-----  
Angle1 Angle2 : -55.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 101.00 / 101.00 m  
Receiver height : 19.50 / 19.50 m  
Topography : 4 (Elevated; with barrier)  
Barrier angle1 : -55.00 deg Angle2 : 90.00 deg  
Barrier height : 1.00 m  
Elevation : 7.00 m  
Barrier receiver distance : 76.00 / 76.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 7.00 m  
Reference angle : 0.00



Road data, segment # 2: Hawthorne Av (day/night)

-----  
Car traffic volume : 28336/2464 veh/TimePeriod \*  
Medium truck volume : 2254/196 veh/TimePeriod \*  
Heavy truck volume : 1610/140 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): 35000  
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 # 2: Hawthorne Av (day/night)

-----  
Angle1 Angle2 : -53.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 21.00 / 21.00 m  
Receiver height : 19.50 / 19.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : -53.00 deg Angle2 : 90.00 deg  
Barrier height : 18.00 m  
Barrier receiver distance : 8.00 / 8.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00

Road data, segment # 3: Colonel ByD1 (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 : 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): 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 # 3: Colonel ByD1 (day/night)

-----  
Angle1 Angle2 : -90.00 deg -58.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 92.00 / 92.00 m  
Receiver height : 19.50 / 19.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : -90.00 deg Angle2 : -58.00 deg  
Barrier height : 18.00 m  
Barrier receiver distance : 10.00 / 10.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00



Road data, segment # 4: Colonel ByD2 (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 : 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): 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 # 4: Colonel ByD2 (day/night)

-----  
Angle1 Angle2 : 31.00 deg 41.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 92.00 / 92.00 m  
Receiver height : 19.50 / 19.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : 31.00 deg Angle2 : 41.00 deg  
Barrier height : 18.00 m  
Barrier receiver distance : 10.00 / 10.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00



Results segment # 1: Highway 417 (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)

-----+-----+-----+-----  
1.50 ! 19.50 ! -1.05 ! 5.95

ROAD (0.00 + 67.33 + 0.00) = 67.33 dBA

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

-----  
-55 90 0.00 84.41 0.00 -8.28 -0.94 0.00 0.00 -7.85 67.33  
-----

Segment Leq : 67.33 dBA

Results segment # 2: Hawthorne Av (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)

-----+-----+-----+-----  
1.50 ! 19.50 ! 12.64 ! 12.64

ROAD (0.00 + 53.74 + 0.00) = 53.74 dBA

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

-----  
-53 90 0.00 72.16 0.00 -1.46 -1.00 0.00 0.00 -15.96 53.74  
-----

Segment Leq : 53.74 dBA



Results segment # 3: Colonel ByD1 (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)

-----+-----+-----+-----

1.50 ! 19.50 ! 17.54 ! 17.54

ROAD (0.00 + 47.94 + 0.00) = 47.94 dBA

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

-----

-90 -58 0.00 68.48 0.00 -7.88 -7.50 0.00 0.00 -5.16 47.94

-----

Segment Leq : 47.94 dBA

Results segment # 4: Colonel ByD2 (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)

-----+-----+-----+-----

1.50 ! 19.50 ! 17.54 ! 17.54

ROAD (0.00 + 42.59 + 0.00) = 42.59 dBA

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

-----

31 41 0.00 68.48 0.00 -7.88 -12.55 0.00 0.00 -5.46 42.59

-----

Segment Leq : 42.59 dBA

Total Leq All Segments: 67.58 dBA





Results segment # 1: Highway 417 (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	19.50	-1.05	5.95

ROAD (0.00 + 59.74 + 0.00) = 59.74 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-55	90	0.00	76.81	0.00	-8.28	-0.94	0.00	0.00	-7.85	59.74

Segment Leq : 59.74 dBA

Results segment # 2: Hawthorne Av (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	19.50	12.64	12.64

ROAD (0.00 + 46.15 + 0.00) = 46.15 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-53	90	0.00	64.56	0.00	-1.46	-1.00	0.00	0.00	-15.96	46.15

Segment Leq : 46.15 dBA



Results segment # 3: Colonel ByD1 (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	19.50	17.54	17.54

ROAD (0.00 + 40.35 + 0.00) = 40.35 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-58	0.00	60.88	0.00	-7.88	-7.50	0.00	0.00	-5.16	40.35

Segment Leq : 40.35 dBA

Results segment # 4: Colonel ByD2 (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	19.50	17.54	17.54
------	-------	-------	-------

ROAD (0.00 + 34.99 + 0.00) = 34.99 dBA

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

31	41	0.00	60.88	0.00	-7.88	-12.55	0.00	0.00	-5.46	34.99
----	----	------	-------	------	-------	--------	------	------	-------	-------

Segment Leq : 34.99 dBA

Total Leq All Segments: 59.99 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 67.58  
(NIGHT): 59.99

**STAMSON 5.0    NORMAL REPORT    Date: 15-09-2022 15:53:10**  
**MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT**

**Filename: r5b.te            Time Period: Day/Night 16/8 hours**  
**Description:**

Road data, segment # 1: Highway 417 (day/night)

-----  
Car traffic volume : 118739/10325 veh/TimePeriod \*  
Medium truck volume : 9445/821 veh/TimePeriod \*  
Heavy truck volume : 6747/587 veh/TimePeriod \*  
Posted speed limit : 100 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): 146664  
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: Highway 417 (day/night)

-----  
Angle1 Angle2 : -90.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 101.00 / 101.00 m  
Receiver height : 19.50 / 19.50 m  
Topography : 4 (Elevated; with barrier)  
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg  
Barrier height : 19.10 m  
Elevation : 7.00 m  
Barrier receiver distance : 8.00 / 8.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 7.00 m  
Reference angle : 0.00



Road data, segment # 2: Hawthorne Av (day/night)

-----  
Car traffic volume : 28336/2464 veh/TimePeriod \*  
Medium truck volume : 2254/196 veh/TimePeriod \*  
Heavy truck volume : 1610/140 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): 35000  
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 # 2: Hawthorne Av (day/night)

-----  
Angle1 Angle2 : -90.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 21.00 / 21.00 m  
Receiver height : 19.50 / 19.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg  
Barrier height : 19.10 m  
Barrier receiver distance : 8.00 / 8.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00



Road data, segment # 3: Colonel By D (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 : 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): 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 # 3: Colonel By D (day/night)

-----  
Angle1 Angle2 : -90.00 deg 59.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 55.00 / 55.00 m  
Receiver height : 19.50 / 19.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : -90.00 deg Angle2 : 59.00 deg  
Barrier height : 19.10 m  
Barrier receiver distance : 4.00 / 4.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00



Results segment # 1: Highway 417 (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	19.50	11.07	18.07

ROAD (0.00 + 58.67 + 0.00) = 58.67 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	84.41	0.00	-8.28	0.00	0.00	0.00	-17.45	58.67

Segment Leq : 58.67 dBA

Results segment # 2: Hawthorne Av (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	19.50	12.64	12.64

ROAD (0.00 + 54.57 + 0.00) = 54.57 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	72.16	0.00	-1.46	0.00	0.00	0.00	-16.13	54.57

Segment Leq : 54.57 dBA



Results segment # 3: Colonel By D (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	19.50	18.19	18.19
------	-------	-------	-------

ROAD (0.00 + 54.26 + 0.00) = 54.26 dBA

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

-90	59	0.00	68.48	0.00	-5.64	-0.82	0.00	0.00	-7.76	54.26
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Segment Leq : 54.26 dBA

Total Leq All Segments: 61.10 dBA

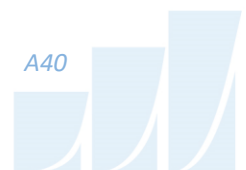




Barrier table for segment # 1: Highway 417 (day)

-----

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
19.10	26.10	58.67	58.67
19.20	26.20	58.63	58.63
19.30	26.30	58.59	58.59
19.40	26.40	58.54	58.54
19.50	26.50	58.50	58.50
19.60	26.60	58.47	58.47
19.70	26.70	58.43	58.43
19.80	26.80	58.39	58.39
19.90	26.90	58.36	58.36
20.00	27.00	58.32	58.32
20.10	27.10	58.29	58.29
20.20	27.20	58.25	58.25
20.30	27.30	58.22	58.22
20.40	27.40	58.19	58.19
20.50	27.50	58.16	58.16
20.60	27.60	58.13	58.13
20.70	27.70	58.10	58.10
20.80	27.80	58.07	58.07
20.90	27.90	58.05	58.05
21.00	28.00	58.02	58.02



Barrier table for segment # 2: Hawthorne Av (day)

-----

Barrier Height	Elev of Barr Top!	Road dBA	Tot Leq dBA
19.10	19.10	54.57	54.57
19.20	19.20	54.48	54.48
19.30	19.30	54.40	54.40
19.40	19.40	54.31	54.31
19.50	19.50	54.23	54.23
19.60	19.60	54.15	54.15
19.70	19.70	54.08	54.08
19.80	19.80	54.00	54.00
19.90	19.90	53.93	53.93
20.00	20.00	53.86	53.86
20.10	20.10	53.80	53.80
20.20	20.20	53.73	53.73
20.30	20.30	53.67	53.67
20.40	20.40	53.61	53.61
20.50	20.50	53.55	53.55
20.60	20.60	53.49	53.49
20.70	20.70	53.43	53.43
20.80	20.80	53.38	53.38
20.90	20.90	53.33	53.33
21.00	21.00	53.27	53.27

Barrier table for segment # 3: Colonel By D (day)

-----

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
19.10	19.10	54.26	54.26
19.20	19.20	53.80	53.80
19.30	19.30	53.35	53.35
19.40	19.40	52.90	52.90
19.50	19.50	52.46	52.46
19.60	19.60	52.03	52.03
19.70	19.70	51.62	51.62
19.80	19.80	51.22	51.22
19.90	19.90	50.84	50.84
20.00	20.00	50.47	50.47
20.10	20.10	50.11	50.11
20.20	20.20	49.77	49.77
20.30	20.30	49.44	49.44
20.40	20.40	49.13	49.13
20.50	20.50	48.82	48.82
20.60	20.60	48.53	48.53
20.70	20.70	48.24	48.24
20.80	20.80	47.97	47.97
20.90	20.90	47.71	47.71
21.00	21.00	47.45	47.45



Results segment # 1: Highway 417 (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	19.50	11.07	18.07

ROAD (0.00 + 51.07 + 0.00) = 51.07 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	76.81	0.00	-8.28	0.00	0.00	0.00	-17.45	51.07

Segment Leq : 51.07 dBA

Results segment # 2: Hawthorne Av (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	19.50	12.64	12.64

ROAD (0.00 + 46.97 + 0.00) = 46.97 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	64.56	0.00	-1.46	0.00	0.00	0.00	-16.13	46.97

Segment Leq : 46.97 dBA



Results segment # 3: Colonel By D (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	19.50	18.19	18.19

ROAD (0.00 + 46.66 + 0.00) = 46.66 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	59	0.00	60.88	0.00	-5.64	-0.82	0.00	0.00	-7.76	46.66

Segment Leq : 46.66 dBA

Total Leq All Segments: 53.50 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 61.10  
(NIGHT): 53.50

**STAMSON 5.0    NORMAL REPORT    Date: 15-09-2022 15:53:44**  
**MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT**

**Filename: r6b.te            Time Period: Day/Night 16/8 hours**  
**Description:**

Road data, segment # 1: Highway 417 (day/night)

-----  
Car traffic volume : 118739/10325 veh/TimePeriod \*  
Medium truck volume : 9445/821 veh/TimePeriod \*  
Heavy truck volume : 6747/587 veh/TimePeriod \*  
Posted speed limit : 100 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): 146664  
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: Highway 417 (day/night)

-----  
Angle1 Angle2 : -55.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 101.00 / 101.00 m  
Receiver height : 19.50 / 19.50 m  
Topography : 4 (Elevated; with barrier)  
Barrier angle1 : -55.00 deg Angle2 : 90.00 deg  
Barrier height : 19.10 m  
Elevation : 7.00 m  
Barrier receiver distance : 8.00 / 8.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00

Road data, segment # 2: Hawthorne Av (day/night)

-----  
Car traffic volume : 28336/2464 veh/TimePeriod \*  
Medium truck volume : 2254/196 veh/TimePeriod \*  
Heavy truck volume : 1610/140 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): 35000  
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 # 2: Hawthorne Av (day/night)

-----  
Angle1 Angle2 : -53.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 21.00 / 21.00 m  
Receiver height : 19.50 / 19.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : -53.00 deg Angle2 : 90.00 deg  
Barrier height : 19.10 m  
Barrier receiver distance : 8.00 / 8.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00



Road data, segment # 3: Colonel ByD1 (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 : 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): 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 # 3: Colonel ByD1 (day/night)

-----  
Angle1 Angle2 : -90.00 deg -58.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 92.00 / 92.00 m  
Receiver height : 19.50 / 19.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : -90.00 deg Angle2 : -58.00 deg  
Barrier height : 19.10 m  
Barrier receiver distance : 10.00 / 10.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00



Road data, segment # 4: Colonel ByD2 (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 : 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): 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 # 4: Colonel ByD2 (day/night)

-----  
Angle1 Angle2 : 31.00 deg 41.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 92.00 / 92.00 m  
Receiver height : 19.50 / 19.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : 31.00 deg Angle2 : 41.00 deg  
Barrier height : 19.10 m  
Barrier receiver distance : 10.00 / 10.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00



Results segment # 1: Highway 417 (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)

-----+-----+-----+-----  
1.50 ! 19.50 ! 18.07 ! 18.07

ROAD (0.00 + 68.11 + 0.00) = 68.11 dBA

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

-----  
-55 90 0.00 84.41 0.00 -8.28 -0.94 0.00 0.00 -7.08 68.11  
-----

Segment Leq : 68.11 dBA

Results segment # 2: Hawthorne Av (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)

-----+-----+-----+-----  
1.50 ! 19.50 ! 12.64 ! 12.64

ROAD (0.00 + 52.53 + 0.00) = 52.53 dBA

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

-----  
-53 90 0.00 72.16 0.00 -1.46 -1.00 0.00 0.00 -17.17 52.53  
-----

Segment Leq : 52.53 dBA

Results segment # 3: Colonel ByD1 (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)

-----+-----+-----+-----

1.50 ! 19.50 ! 17.54 ! 17.54

ROAD (0.00 + 46.59 + 0.00) = 46.59 dBA

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

-----

-90 -58 0.00 68.48 0.00 -7.88 -7.50 0.00 0.00 -6.51 46.59

-----

Segment Leq : 46.59 dBA

Results segment # 4: Colonel ByD2 (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)

-----+-----+-----+-----

1.50 ! 19.50 ! 17.54 ! 17.54

ROAD (0.00 + 39.10 + 0.00) = 39.10 dBA

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

-----

31 41 0.00 68.48 0.00 -7.88 -12.55 0.00 0.00 -8.95 39.10

-----

Segment Leq : 39.10 dBA

Total Leq All Segments: 68.26 dBA



Barrier table for segment # 1: Highway 417 (day)

-----

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
19.10	19.10	68.11	68.11
19.20	19.20	67.78	67.78
19.30	19.30	67.45	67.45
19.40	19.40	67.12	67.12
19.50	19.50	66.79	66.79
19.60	19.60	66.46	66.46
19.70	19.70	66.14	66.14
19.80	19.80	65.82	65.82
19.90	19.90	65.51	65.51
20.00	20.00	65.20	65.20
20.10	20.10	64.91	64.91
20.20	20.20	64.62	64.62
20.30	20.30	64.34	64.34
20.40	20.40	64.06	64.06
20.50	20.50	63.80	63.80
20.60	20.60	63.54	63.54
20.70	20.70	63.29	63.29
20.80	20.80	63.04	63.04
20.90	20.90	62.81	62.81
21.00	21.00	62.57	62.57



Barrier table for segment # 2: Hawthorne Av (day)

-----

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
19.10	19.10	52.53	52.53
19.20	19.20	52.45	52.45
19.30	19.30	52.37	52.37
19.40	19.40	52.30	52.30
19.50	19.50	52.24	52.24
19.60	19.60	52.17	52.17
19.70	19.70	52.11	52.11
19.80	19.80	52.05	52.05
19.90	19.90	51.99	51.99
20.00	20.00	51.94	51.94
20.10	20.10	51.89	51.89
20.20	20.20	51.84	51.84
20.30	20.30	51.79	51.79
20.40	20.40	51.74	51.74
20.50	20.50	51.70	51.70
20.60	20.60	51.65	51.65
20.70	20.70	51.61	51.61
20.80	20.80	51.57	51.57
20.90	20.90	51.53	51.53
21.00	21.00	51.49	51.49



Barrier table for segment # 3: Colonel ByD1 (day)

-----

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
19.10	19.10	46.59	46.59
19.20	19.20	46.43	46.43
19.30	19.30	46.27	46.27
19.40	19.40	46.10	46.10
19.50	19.50	45.94	45.94
19.60	19.60	45.77	45.77
19.70	19.70	45.61	45.61
19.80	19.80	45.44	45.44
19.90	19.90	45.28	45.28
20.00	20.00	45.11	45.11
20.10	20.10	44.95	44.95
20.20	20.20	44.79	44.79
20.30	20.30	44.63	44.63
20.40	20.40	44.47	44.47
20.50	20.50	44.31	44.31
20.60	20.60	44.15	44.15
20.70	20.70	44.00	44.00
20.80	20.80	43.85	43.85
20.90	20.90	43.70	43.70
21.00	21.00	43.55	43.55



Barrier table for segment # 4: Colonel ByD2 (day)

-----

Barrier Height	Elev of Barr Top!	Road dBA	Tot Leq dBA
19.10	19.10	39.10	39.10
19.20	19.20	38.73	38.73
19.30	19.30	38.37	38.37
19.40	19.40	38.00	38.00
19.50	19.50	37.65	37.65
19.60	19.60	37.30	37.30
19.70	19.70	36.95	36.95
19.80	19.80	36.62	36.62
19.90	19.90	36.29	36.29
20.00	20.00	35.97	35.97
20.10	20.10	35.65	35.65
20.20	20.20	35.35	35.35
20.30	20.30	35.05	35.05
20.40	20.40	34.76	34.76
20.50	20.50	34.47	34.47
20.60	20.60	34.20	34.20
20.70	20.70	33.93	33.93
20.80	20.80	33.66	33.66
20.90	20.90	33.41	33.41
21.00	21.00	33.16	33.16



Results segment # 1: Highway 417 (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	19.50	18.07	18.07

ROAD (0.00 + 60.51 + 0.00) = 60.51 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-55	90	0.00	76.81	0.00	-8.28	-0.94	0.00	0.00	-7.08	60.51

Segment Leq : 60.51 dBA

Results segment # 2: Hawthorne Av (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	19.50	12.64	12.64

ROAD (0.00 + 44.93 + 0.00) = 44.93 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-53	90	0.00	64.56	0.00	-1.46	-1.00	0.00	0.00	-17.17	44.93

Segment Leq : 44.93 dBA





Results segment # 3: Colonel ByD1 (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	19.50	17.54	17.54

ROAD (0.00 + 38.99 + 0.00) = 38.99 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-58	0.00	60.88	0.00	-7.88	-7.50	0.00	0.00	-6.51	38.99

Segment Leq : 38.99 dBA

Results segment # 4: Colonel ByD2 (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	19.50	17.54	17.54

ROAD (0.00 + 31.50 + 0.00) = 31.50 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
31	41	0.00	60.88	0.00	-7.88	-12.55	0.00	0.00	-8.95	31.50

Segment Leq : 31.50 dBA

Total Leq All Segments: 60.66 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 68.26  
(NIGHT): 60.66

