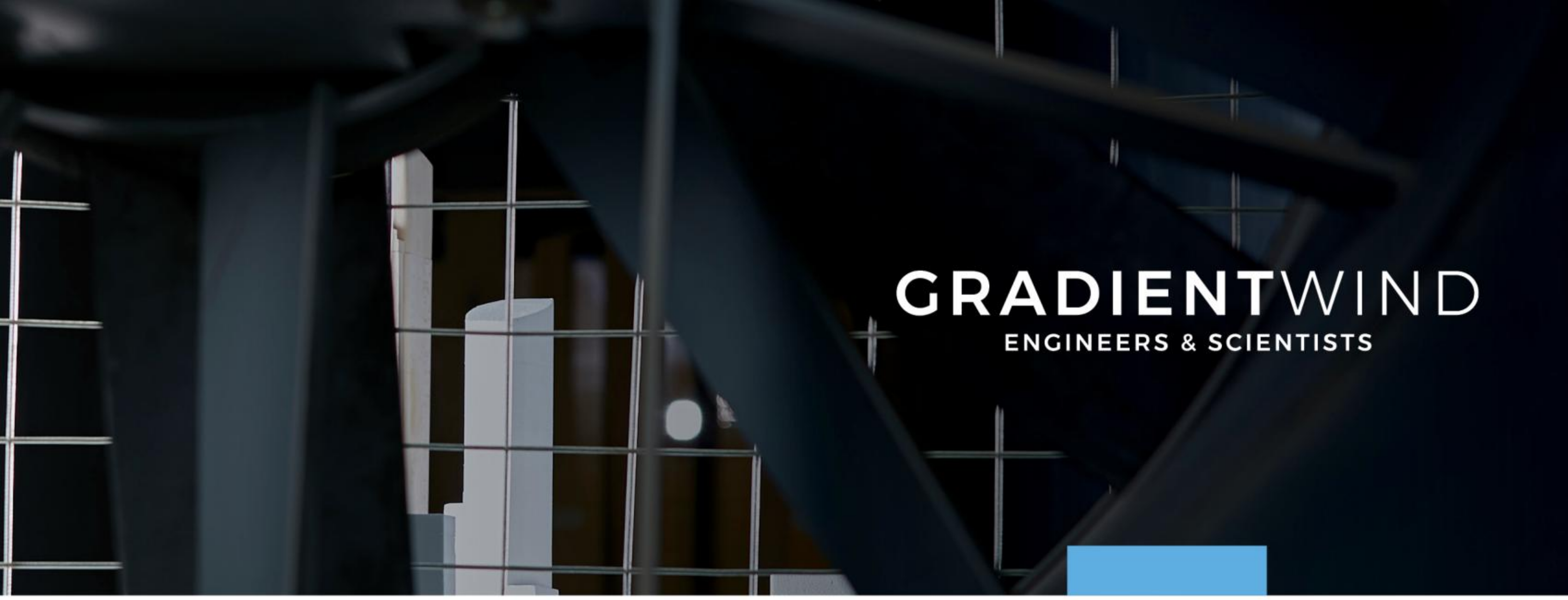
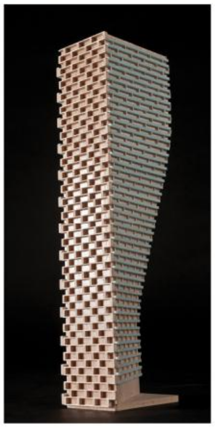


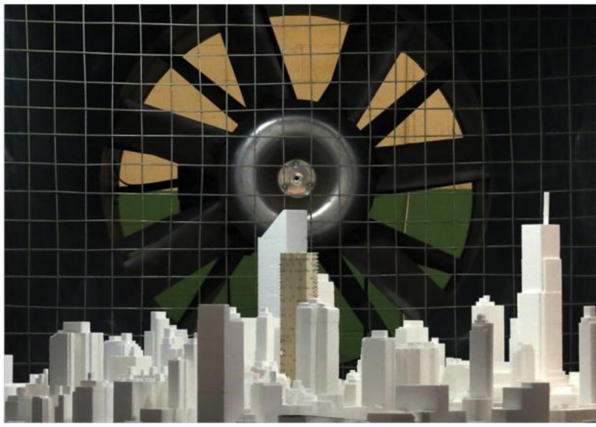
GRADIENTWIND
ENGINEERS & SCIENTISTS

TRANSPORTATION NOISE STUDY

3750 Bowesville Road
Ottawa, Ontario

REPORT: 22-077 – Transportation Noise Study





July 6, 2026

PREPARED FOR
3750 N. Bowesville Limited Partnership
141 Laurier Avenue West, Suite 402
Ottawa, ON K1P 5J3

PREPARED BY
Michael Pantano, M.A.Sc. Junior Acoustical Scientist
Joshua Foster, P.Eng., Lead Engineer

EXECUTIVE SUMMARY

This report describes a transportation noise study performed for a proposed two phase residential development located at 3750 Bowesville Road in Ottawa, Ontario.

The major sources of transportation noise associated with the site are Uplands Drive, Riverside Drive, and aircraft noise generated by the Ottawa MacDonald-Cartier International Airport. The site is located on Bowesville Road, which is classified as a local road. Of the roadways considered as surface transportation noise sources in this report, Uplands Drive is classified as a 2-lane collector, and Riverside Drive is classified as a 4-lane divided arterial.

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); and (iii) site plan, elevation, and floor plans drawings provided by Hobin Architects in June 2026.

The results of the current analysis indicate that noise levels due to roadway traffic will range between 54 and 65 dBA during the daytime period (07:00-23:00) and between 48 and 58 dBA during the nighttime period (23:00-07:00). The highest noise level (65 dBA) occurs at the north façade of the north Phase 2 Building, which is most exposed and closest to both Riverside Drive and Uplands Drive. General aircraft noise levels are expected to be about 57 dBA, in accordance ith the subject site's location within the NEF/NEP-25 contour.The indoor noise calculations summarized in Section 5.3.1 show that the combined impact of the roadway and aircraft noise result in the minimum required STC rating for windows on all façades to be 30.

The development will incorporate central air conditioning, or similar mechanical ventilation, which will allow occupants to keep windows closed to maintain a comfortable indoor environment. Type D and Aircraft Noise Warning Clauses, as summarized in Section 6, will also be required to be placed on all Lease, Purchase and Sale Agreements.

The predicted noise levels at the rooftop OLA for the North Phase 2 building exceeded 60 dBA. A noise barrier investigation showed that a 1.5 m tall noise barrier in the location illustrated in Figure 3 shalll attenuate the noise levels at that OLA down to 55 dBA. The noise barrier must be solid with no gaps, and have a surface density of 20 kg/m^2.

With regards to off-site stationary noise impacts, Gradient Wind conducted a survey of the site using aerial imagery and no significant off-site sources of stationary noise were identified. While the commercial property to the west of the subject site (3755 Riverside Drive) does have visible mechanical equipment on its rooftop, said equipment is placed in an open roof portion of the building's MPH, blocking most of the noise emissions.

The buildings will be designed to comply with the NPC-300 sound level limits for stationary noise impacts on the surroundings and itself. This will be accomplished though judicial selection of the Heating Ventilation and Air Conditioning equipment and locating it away form sensitive areas. Where necessary noise screens, silencers and other forms of mitigation can be incorporated into the design. Once the mechanical equipment is selected, it is recommended to be reviewed by a qualified acoustic consultant.

TABLE OF CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by 3750 N. Bowesville Limited Partnership to undertake a transportation noise study in support of a Site Plan Application (SPA) for the proposed development located at 3750 Bowesville Road in Ottawa, Ontario. This report summarizes the methodology, results, and recommendations related to the assessment of exterior and interior noise levels generated by local transportation noise sources.

Our work is based on theoretical noise calculation methods conforming to the City of Ottawa[1] and Ministry of the Environment, Conservation and Parks (MECP)[2] guidelines. Noise calculations were determined with the help of site plan, elevation, and floor plans drawings provided by Hobin Architects in June 2026, with future traffic volumes corresponding to the City of Ottawa's Official Plan (OP) roadway classifications.

2. TERMS OF REFERENCE

The subject site is located at 3750 North Bowesville Road in Ottawa, situated on a parcel of land bordered by North Bowesville Road to the east, the Ottawa Hunt and Golf Club to the south, and 3755 Riverside Drive to the west and north. The existing low-rise commercial building at 3750 North Bowesville Road is to be demolished. Throughout this report, North Bowesville Road is considered as project east.

The proposed development comprises two nearly rectangular 14-storey buildings in two phases: Phase 1 includes the South Building and Phase 2 includes the North Building, situated to the south and north of the subject site, respectively. Both towers are topped with a mechanical penthouse. The two buildings are connected by a central 1-storey podium link, which provides an indoor amenity area on the ground floor. Primary building access points are located near the northeast corner of the South Building, near the southeast corner of the North Building, and along the east elevation of the podium link. Access to the noted primary building access points is provided by a laneway to the east of the subject site from North Bowesville Road. Lounge terraces are situated to the west of the podium link. A parking ramp near the southeast corner of the South Building provides access to the parking garage. Setbacks are situated along

[1] City of Ottawa Environmental Noise Control Guidelines, January 2016
[2] Ontario Ministry of the Environment and Climate Change – Environmental Noise Guidelines, Publication NPC-300, Queens Printer for Ontario, Toronto, 2013

the west, north, and east elevations at Level 2 of the South Building while setbacks are situated along the east, south, and west elevations at Level 2 of the North Building. Both buildings step back from the east and west elevations at Level 8, from the east elevation at Levels 9 and 10, and from all elevations at Level 11.

The near-field surroundings, defined as an area within 200 metres (m) of the subject site, include two mid-rise commercial buildings to the southwest, low-rise buildings and surface parking from the southwest to the northeast, and green space for the remaining compass directions. Notably, 3755 Riverside Drive, comprised of two building mid-rise commercial buildings, is situated approximately 13 m to the southwest, and a 3-storey parking garage is situated approximately 10 m to the northwest. The Ottawa Hunt and Golf Club golf course borders the southeast perimeter of the proposed development and is across North Bowesville Road to the east.

The subject site and its surrounding context are illustrated in Figure 1. The northern edge of the Noise Exposure Forecast (NEF) / Noise Exposure Projection (NEP) - 25 contour for Ottawa International Airport (YOW) is shown just north of the subject site.

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, (ii) predict noise levels on the study building produced by aircraft flyover, and (iii) ensure that interior and exterior noise and vibration levels do not exceed the allowable limits specified by the City of Ottawa’s Environmental Noise Control Guidelines as outlined in Section 4.2.

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 (2×10^{-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 40 dBA for bedrooms at night, as outlined in Table 1. Based on Gradient Wind's experience, more comfortable indoor noise levels should be targeted, towards 37 dBA, , to control peak noise and deficiencies in building envelope construction.

TABLE 1: INDOOR SOUND LEVEL CRITERIA (ROAD) [3]

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 residences, 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 residences, 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[4]. A closed window due to a ventilation requirement will bring noise levels down to achieve an acceptable indoor environment[5]. 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[6].

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:

[3] Adapted from ENCG 2016 – Tables 2.2b and 2.2c
[4] Burberry, P.B. (2014). Mitchell's Environment and Services. Routledge, Page 125
[5] MOECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.8
[6] MOECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3

- 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 reflective due to the presence of hard (paved) ground.
- Topography was assumed to be a flat/gentle slope surrounding the study building.
- Noise receptors were strategically placed at 6 locations around the study area (see Figure 2).

4.2.1 Transportation 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[7] which provide additional details on future roadway expansions. Average Annual Daily Traffic (AADT) volumes 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: TRANSPORTATION TRAFFIC DATA

Segment	Roadway Traffic Data	Speed Limit (km/h)	AADT
Riverside Drive	4-Lane Urban Arterial-Divided (4-UAD)	60	**35,000**
Uplands Drive	2-Lane Collector (2-UCU)	50	**8,000**

[7] City of Ottawa Transportation Master Plan, November 2013

4.3 Aircraft Noise

4.3.1 Criteria for Aircraft Noise

The ENCG outlines the sound level criteria for aircraft noise based on a site's location near the Ottawa International Airport. The Ottawa Airport Vicinity Development Zone (OAVDZ) is a zone around the airport defined by NEF/NEP contour lines that follow fixed features, such as roads or lot boundaries. NEF/NEP contours reflect the predetermined noise levels which would impact sensitive areas around airports. These contours include the influences of noise levels from aircraft flight, take-off, and ground operations to specific urban areas. Noise generated from aircraft traffic is represented as Effective Perceived Noise Levels (EPNL), a unit of noise measurement that accounts for variations in the human perception of pure tones and noise duration. Recorded noise levels are plotted geographically to generate NEF/NEP contour maps, where lower NEF/NEP levels correspond to lower average outdoor noise levels.The Schedule C-14 Ottawa Official Plan Figure directly outlines the NEF/NEP-25 contour[8]. The Ottawa Airport Operating Influence Zone (OAOIZ), also shown on Figure C-14 represents the NEF/NEP 30 contour, where commercial air traffic may negatively influence noise-sensitive developments. Within the OAOIZ, noise-sensitive development is not permitted, although infill and redevelopment may occur in specific areas within the zone in keeping with the criteria set out in the Official Plan.

According to accepted research[9], Health and Welfare Canada states that people continuously exposed to NEF/NEP values less than 35 will not suffer adverse physical or psychological effects. Sociological surveys[10] have indicated that negative community reactions to noise levels may start at about NEF/NEP-25. Table 3 identifies the sound level criteria for relevant outdoor and indoor living spaces exposed to aircraft noise. Table 4.2a in Ottawa's ENCG states that the limit for the bedroom in a residence is an indoor NEF/NEP of 0. The dBA equivalent is 32 dBA.

[8] Schedule C14 - La nd Use Constraints Due to Aircraft Noise, City of Ottawa Official Plan, Approved November 4, 2022

[9] Report of the Special Meeting on Aircraft Noise in the Vicinity of Aerodromes, Montreal ICAO, 1969.

[10] Noise in Urban and Suburban Areas. Bolt, Beanik and Newman, Inc., Washington, January 1967.

TABLE 3: OUTDOOR AND INDOOR AIRCRAFT SOUND LEVEL CRITERIA[11]

Type of Space	NEF/NEP	Approximate L_{eq}(24)
Outdoor Point of Reception	30	62 dBA
General offices, reception areas, retail stores, etc.	15	47 dBA
Individual or semi-private offices, conference rooms, etc.	10	42 dBA
Living/dining areas of residences, sleeping quarters in hotels/motels, theatres, libraries, schools, day-care centres, places of worship, etc.	5	37 dBA
Sleeping quarters of residences, hospitals, nursing/retirement homes, etc.	0	32 dBA

4.4 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 (OBC, 2024) 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.

[11] Adapted from ENCG – Tables 4.2a, 4.2b

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. The calculation procedure[12] 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.
- 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[13], 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. Thus, some assumptions about the building's construction were made to approximate indoor noise calculations performed to prescribe minimum STC ratings for windows. Calculation methods adhering to the Building Practive Note No. 45 (BPN-56) published by the NRC were used to determine the required STC ratings of windows exposed to roadway and aircraft noise. Window STC calculations have therefore been based on the following assumptions:

- The bedrooms of the analysed units assumed to be 1/3 of the suite floor area and said bedrooms are assumed to have a high absorption coefficient of 1.25, due to the pressance of a mattress and drapery.
- Exterior walls were assumed to have an STC of 45 (Non combustible steel stud walls with 16 mm gypsum board, insulation, and gypsum sheathing.
- Windows are assumed to take up 1/2 of a unit's bedroom façade(s).
- Room, window, and wall dimensions are based on assumptions pertaining to the site, plans, and elevations drawings provided by Hobin Architects.

The relevant BPN-56 indoor-outdoor calculations are presented in Appendix B. These calculations inform the STC requirements for windows outlined in Section 5.3.1.

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[12] Building Practice Note: Controlling Sound Transmission into Buildings by J.D. Quirt, National Research Council of Canada, September 1985
[13] CMHC, Road & Rail Noise: Effects on Housing

STC recommendations for the windows are made on a combined basis shared between roadway and aircraft transportation noise levels. Section 5.3.1 summarizes the BPN-56 calculations undertaken to determine these STC recommendations.

5. RESULTS AND DISCUSSION

5.1 Roadway Transportation Noise Levels

The results of the roadway noise calculations using STAMSON 5.04 are summarized in Table 3 below. See Appendix A for the STAMSON 5.04 inputs and outputs.

TABLE 3: EXTERIOR NOISE LEVELS DUE TO ROADWAY SOURCES

Receptor Number	Receptor Height Above Grade (m)	Receptor Location	STAMSON 5.04 Noise Level (dBA)	
			Day	Night
1	18.1	POW –6th Floor Phase 2– East Façade	54	47
2	43.2	POW – 14th Floor Phase 2 – North Façade	65	58
3	27.6	POW – 9th Floor Phase 2 – West Façade	55	48
4	46.8	OLA – Phase 2 Rooftop Amenity – North Facing	64	N/A*
5	1.5	OLA – At Grade Loung Terraces	40	N/A*
6	43.2	POW – 14th Floor Phase 1 – North Façade	56	49

* OLA receptors do not need to be evaluated for the nighttime.

The results of the current analysis indicate that noise levels will range between 55 and 65 dBA during the daytime period (07:00-23:00) and between 48 and 58 dBA during the nighttime period (23:00-07:00). The highest noise level (65 dBA) occurs at the north façade of the Phase 2 North Building, which is most exposed to both Riverside Drive and Uplands Drive. Since the predicted POW noise levels are between 55-65 dBA, a provision for the installation of central air conditioning or a similar system that allows occupants to keep windows closed is required. However, due to the development's multi tenent status, air condiioning will be installed with within the suites. Air condtioign will also be required to address air carft noise. Furthermore, all Purchase, Sale, and Lease Agreements will be required to include a Type D Warning Clause, as summarized in Section 6.

5.2 Aircraft Transportation Noise Levels

As per NPC-300[14], the aircraft noise exposure was evaluated by converting the NEF/NEP contours to 24-hour equivalent sound pressure level ($L_{eq\ (24)}$). The following equation is used for the conversion:

L_{eq24}=NEF+32 dBA

L_{eq24}=25+32=57 dBA

Per the calculations above, the proposed building will be exposed to an aircraft noise level of 57 dBA (L_{eq24}), which is lower than the roadway traffic noise levels. Per the NPC-300 guidelines, the minimum STC requirements were determined by combining the minimum STC for roadway and aircraft noise exposure.

The subject site is a residential development. As such, indoor sound levels in the bedrooms should not exceed 32 dBA. Since the study site is within the NEF/NEP contour of 25, the aircraft noise level means that the site should be designed with a provision for central air conditioning. This provision leads to a Type C Warning Clause recommendation. However, due to the planned development's multi tennent nature, it is planned to include central air conditioning. A Type D Warning Clause (summarized in Section 6) is recommended, as noted in Secion 5.1.

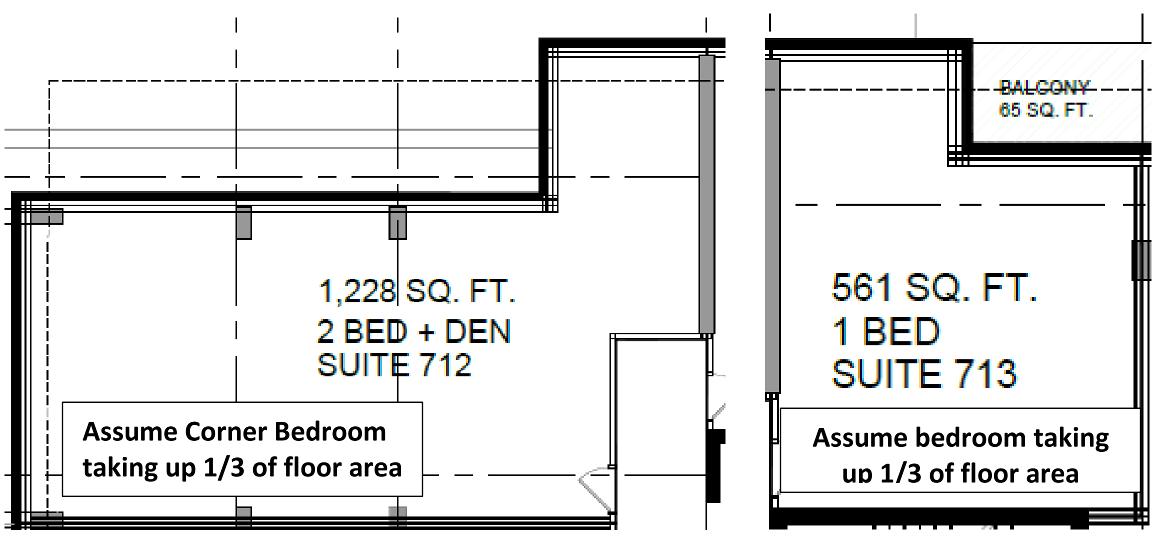
[14] Environmental Noise Guideline - Stationary and Transportation Sources - Approval and Planning (NPC-300), August 2013

5.3 Noise Control Measures

The NPC-300 guidelines dictate that the assessment of the indoor sound levels, and the requirements for the acoustical performance of building components should be done separately for road noise, rail noise and aircraft noise. The resultant sound isolation parameters should be subsequently combined logarithmically (on an energy basis) to determine the overall acoustical parameter. Selection of the required components should be based on the overall combined acoustical parameter. The maximum surface transportation noise at the POW (65 dBA) does not overcome the threshold that requires exterior building components to be designed to ensure that indoor sound levels comply with the sound level limits in Table 1. To meet the indoor sound level criteria due to aircraft noise for a bedroom of 32 dBA, an approximately 28 dBA reduction would be required based on the $L_{eq}(24)$ of 57 dBA, and a safety factor. To evaluate a combined acoustic parameter detailed BPN-56 calculations were performed to fulfill the combined acoustic parameter requirement. Section 5.3.1 below summarizes the result of the calculations, which may be seen in detail in Appendix B.

5.3.1 Indoor Noise Calculations

The image below outlines the two rooms considered in the BPN calculation. One of the rooms is a possible corner bedroom on the Phase 2 North Building, which experiences the highest roadway noise. The other analyzed room is an assumed bedroom on the Phase 1 South Building.



ROOM AREA OF PHASE 2 CORNER BEDROOM AND PHASE 1 BEDROOM

The results of the BPN-56 calculations (see Appendix B) show that the north façade and the western façade of a possible northwest corner bedroom on the Phase 2 North Building require windows with an STC rating of at least 28. The BPN-56 caluclation for the sample bedroom on the north façade of the Phase 1 South Building requires to have an STC rating of at least 26. Most standard windows are able to achieve an STC 30, therefore Gradient Wind recommends that all windows have a minimum STC rating of 30, which would satisfy the noise requirements of both roadway and aircraft noise.

5.3.2 Noise Barrier Investigation

One of the OLA's, receptor 2, exceeds 60 dBA. Thus, noise mitigation measures must be investigated with the aim of reducing sound levels to at most 55 dBA. A noise barrier investigation was conducted to get the predicted sound levels on the rooftop OLA on the Phase 2 North Building down to 55 dBA. The results of the investigation are presented in Table 4.

TABLE 4: RESULTS OF NOISE BARRIER INVESTIGATION

Receptor Number	Receptor Height Above Roof (m)	Receptor Location	Daytime L_{eq} Noise Levels (dBA)			
			No Barrier	With 1.1 m Barrier	With 1.5m Barrier	With 2.0 m Barrier
R2	46.8	OLA – Phase 2 Rooftop Amenity – North Facing	64	58	**55**	53

The results presented in Table 4 show that a 1.5 m tall noise barrier sufficiently attenuates sound levels. The noise barrier must be solid, have no gaps, and have a surface density of 20 kg/m^2. See Figure 3 for the location of the potential noise barrier.

6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels due to roadway traffic will range between 54 and 65 dBA during the daytime period (07:00-23:00) and between 48 and 58 dBA during the nighttime period (23:00-07:00). The highest noise level (65 dBA) occurs at the north façade of the north Phase 2 Building, which is most exposed and closest to both Riverside Drive and Uplands Drive. General aircraft noise levels are expected to be about 57 dBA, in accordance ith the subject site's location within the NEF/NEP-25 contour.

It is recommended that the development install central air conditioning, or similar mechanical ventilation, which will allow occupants to keep windows closed to maintain a comfortable indoor environment. A Type D Warning Clause will also be required to be placed on all Lease, Purchase and Sale Agreements, as summarized below:

Type D:

> *"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 indoor noise calculations summarized in Section 5.3.1 show that the combined impact of the roadway and aircraft noise result in the minimum required STC rating for all window to be 30. Furthermore, for all units in the development the Warning Clause (Type Aircraft[15]) must be included in all Agreements of Lease, Purchase and Sale.

---

[15] Appendix D, ENCG

"Purchasers/building occupants are forewarned that this development is located in a noise sensitive area due to its proximity to Ottawa Macdonald-Cartier International Airport. In order to reduce the impact of aircraft noise in the indoor spaces, the unit has been designed and built to meet provincial standards for noise control by the use of components and building systems that provide sound attenuation. In addition to the building components (i.e. walls, windows, doors, ceiling-roof), since the benefit of sound attenuation is lost when windows or doors are left open, this unit has been fitted with a forced air heating system, all components of which are sized to accommodate the future installation of central air conditioning-by the owner/occupant.

Despite the inclusion of noise control features within the development, noise due to aircraft operations may continue to interfere with some indoor activities and with outdoor activities, particularly during the summer months. The purchaser/building occupant is further advised that the Airport is open and operates 24 hours a day and that changes to operations or expansion of the airport facilities, including the construction of new runways, may affect the living environment of the residents of this property/area.

The Ottawa MacDonald-Cartier International Airport Authority, its acoustical consultants and the Municipality are not responsible if, regardless of the implementation of noise control features, the purchaser/occupant of this development finds that the indoor noise levels due to aircraft operations continue to be of concern or are offensive."

The predicted noise levels at the rooftop OLA for the North Phase 2 building exceeded 60 dBA. A noise barrier investigation showed that a 1.5 m tall noise barrier in the location illustrated in Figure 3 shalll attenuate the noise levels at that OLA down to 55 dBA. The noise barrier must be solid with no gaps, and have a surface density of 20 kg/m^2.

With regards to off-site stationary noise impacts, Gradient Wind conducted a survey of the site using aerial imagery and no significant off-site sources of stationary noise were identified. While the commercial property to the west of the subject site (3755 Riverside Drive) does have visible mechanical equipment on its rooftop, said equipment is placed in an open roof portion of the building's MPH, blocking most of the noise emissions.

The buildings will be designed to comply with the NPC-300 sound level limits for stationary noise impacts on the surroundings and itself. This will be accomplished though judicial selection of the Heating Ventilation and Air Conditioning equipment and locating it away form sensitive areas. Where necessary noise screens, silencers and other forms of mitigation can be incorporated into the design. Once the mechanical equipment is selected, it is recommended to be reviewed by a qualified acoustic consultant.

This concludes our transportation noise study. 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,

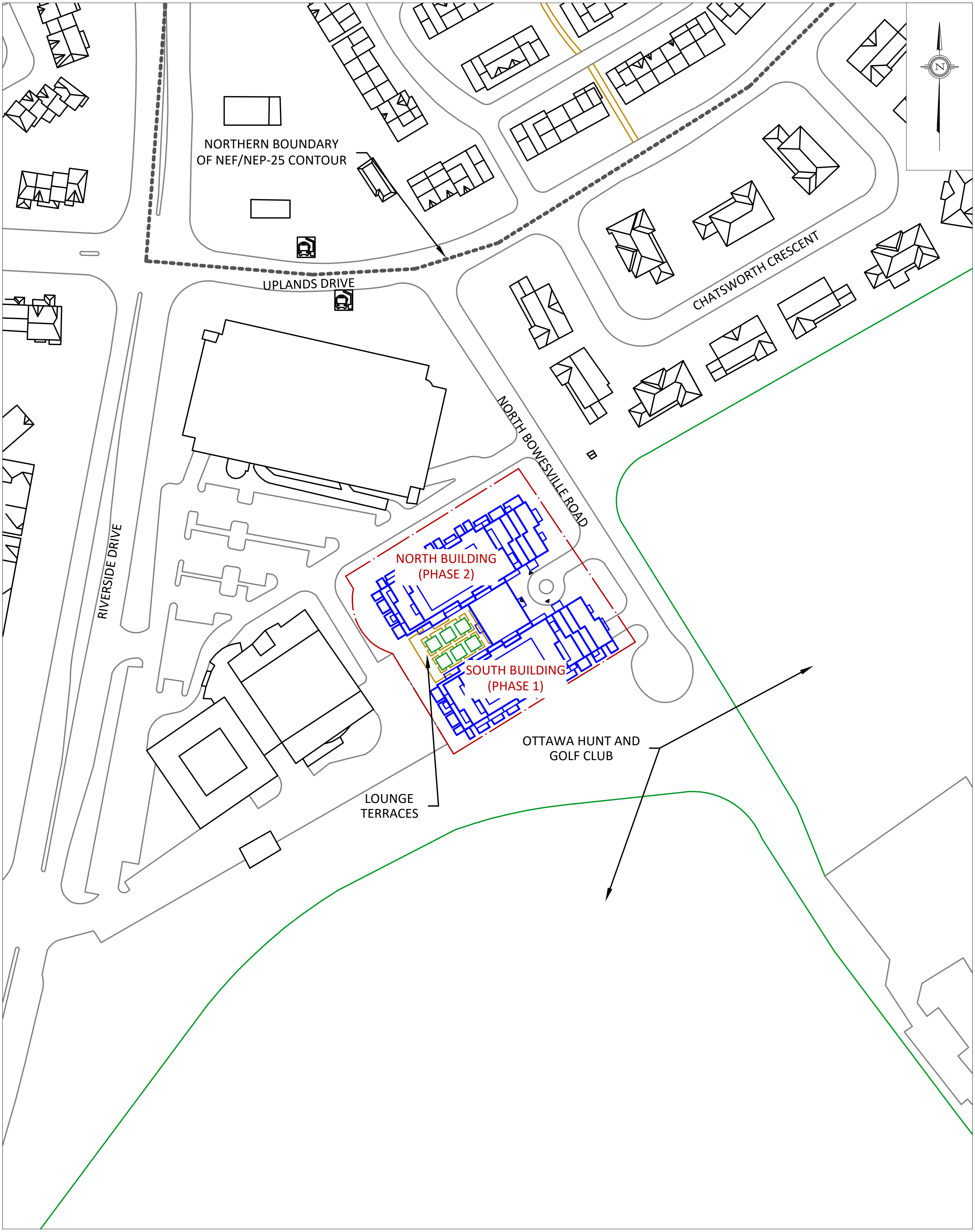
Gradient Wind Engineering Inc.

LICENSED PROFESSIONAL ENGINEER
J. R. FOSTER
100155655
2026-07-06
PROVINCE OF ONTARIO

Michael Pantano, M.A.Sc.
Junior ANVl Scientist

Joshua Foster, P.Eng.
Lead Engineer

Gradient Wind File #22-077-Transportation Noise Study



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

PROJECT	3750 BOWESVILLE ROAD, OTTAWA TRANSPORTATION NOISE STUDY		
SCALE	1:2000	DRAWING NO.	22-077-ANV-1
DATE	JUNE 18, 2026	DRAWN BY	M.P.

DESCRIPTION

FIGURE 1:
PROPOSED SITE PLAN AND SURROUNDING CONTEXT

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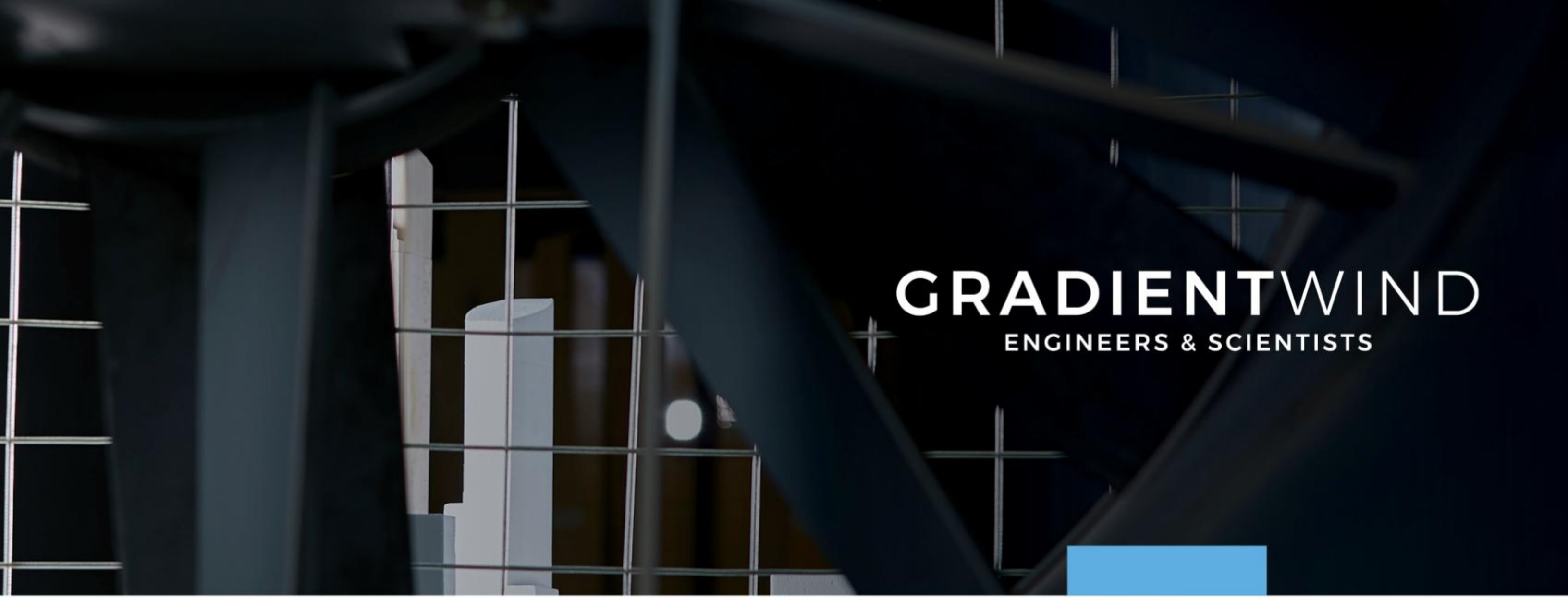
PROJECT	3750 BOWESVILLE ROAD, OTTAWA TRANSPORTATION NOISE STUDY		
SCALE	1:600	DRAWING NO.	22-077-ANV-2
DATE	JUNE 19, 2026	DRAWN BY	M.P.

DESCRIPTION

FIGURE 2:
RECEPTOR LOCATIONS

GRADIENTWIND ENGINEERS & SCIENTISTS 127 WALGREEN ROAD, OTTAWA, ON 613 836 0934 • GRADIENTWIND.COM	PROJECT: 3750 BOWESVILLE ROAD, OTTAWA TRANSPORTATION NOISE STUDY		DESCRIPTION: FIGURE 3: NOISE BARRIER LOCATION
	SCALE: 1:600	DRAWING NO. 22-077-ANV-3	
	DATE: JUNE 19, 2026	DRAWN BY: M.P.	



APPENDIX A

STAMSON INPUT AND OUTPUT DATA

127 WALGREEN ROAD, OTTAWA, ON, CANADA K0A 1L0 | 613 836 0934
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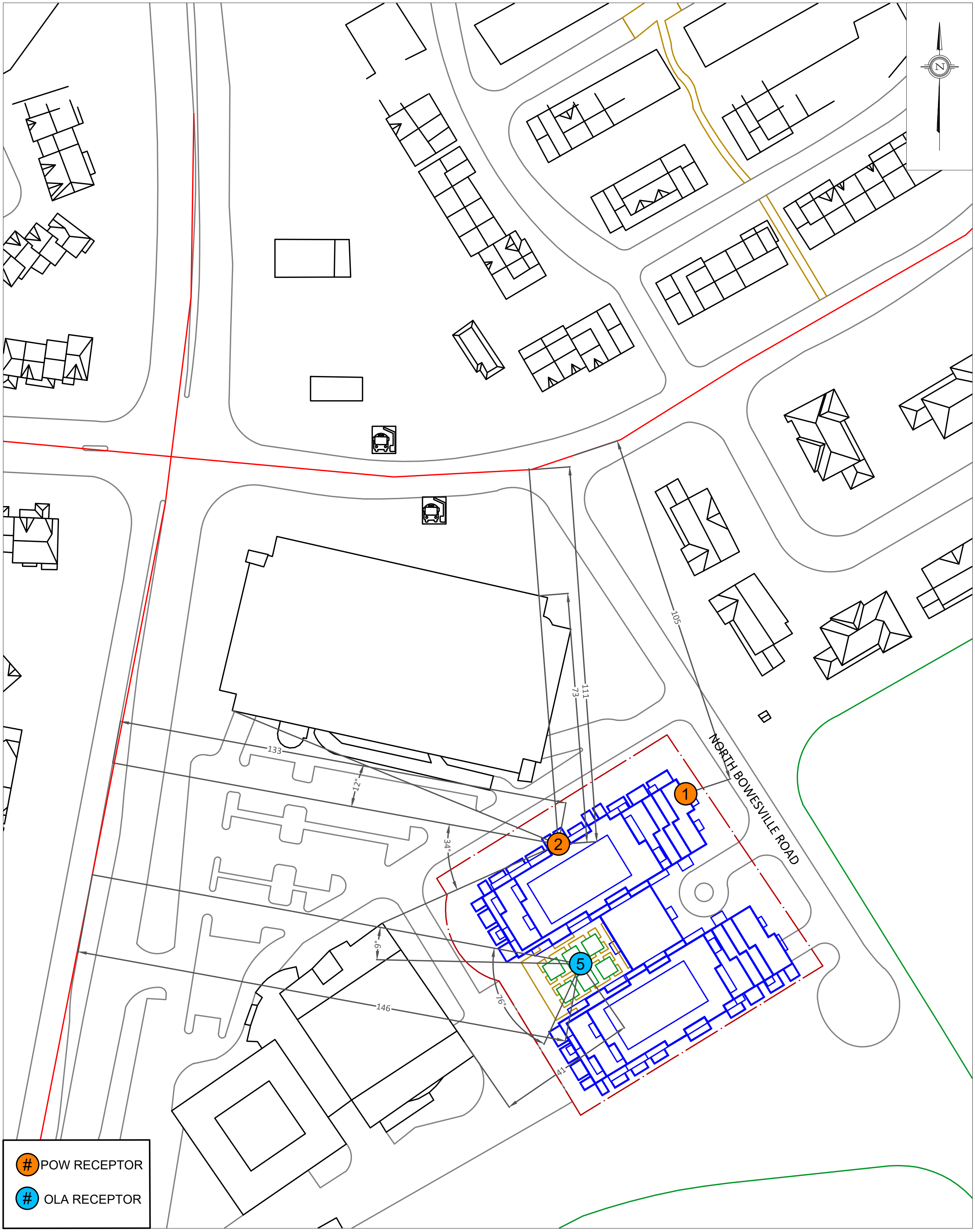

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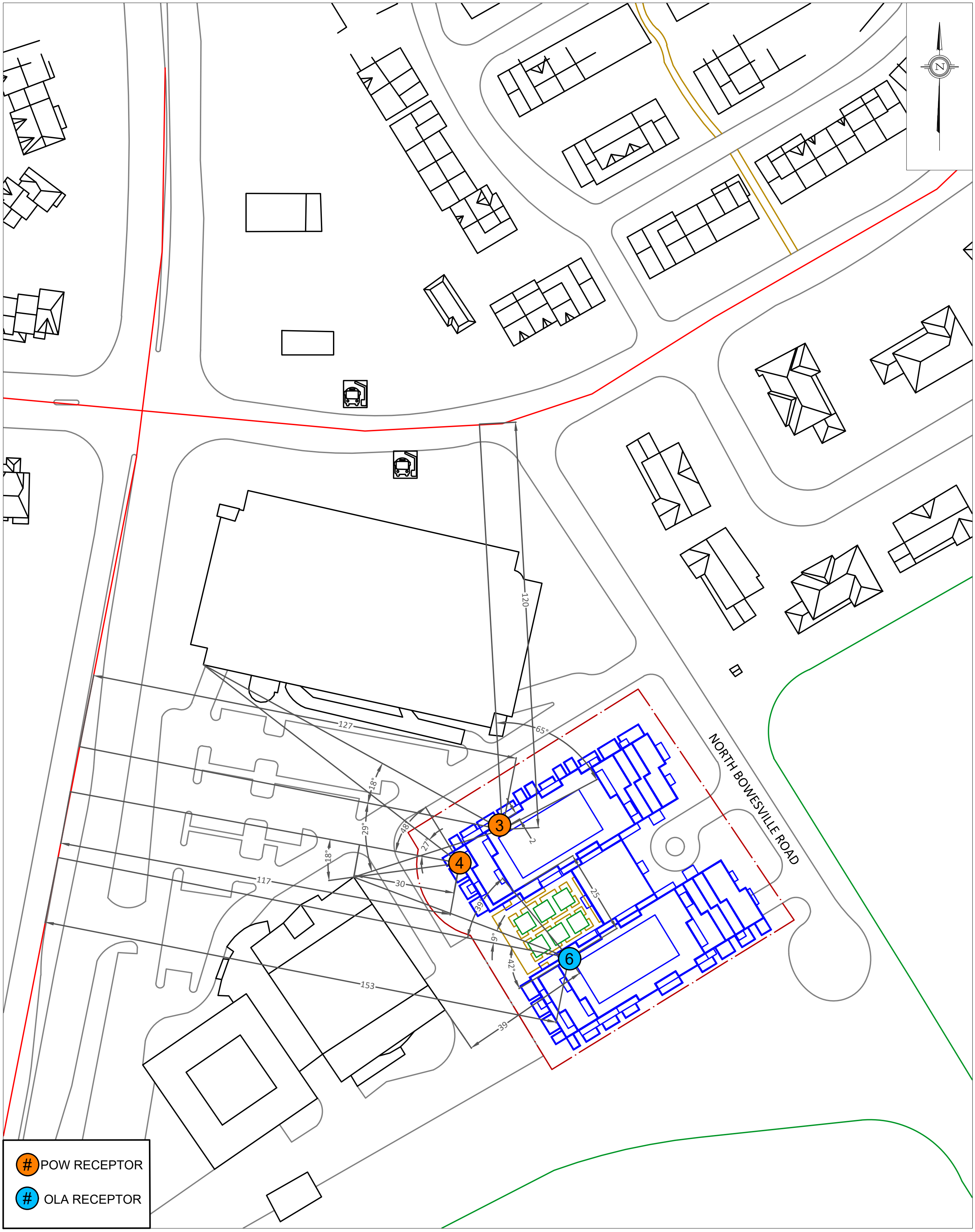
PROJECT	3750 BOWESVILLE ROAD, OTTAWA TRANSPORTATION NOISE STUDY		
SCALE	1:1500	DRAWING NO.	22-077-ANV-A1
DATE	JUNE 19, 2026	DRAWN BY	M.P.

DESCRIPTION

FIGURE A1:
STAMSON PARAMETERS FOR R1, R2, R5



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PROJECT	3750 BOWESVILLE ROAD, OTTAWA TRANSPORTATION NOISE STUDY		
SCALE	1:1500	DRAWING NO.	22-077-ANV-A2
DATE	JUNE 19, 2026	DRAWN BY	M.P.

DESCRIPTION

FIGURE A2:
STAMSON PARAMETERS FOR R3, R4, R6

```
STAMSON 5.0        NORMAL REPORT        Date: 19-06-2026 10:53:43
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: Uplands (day/night)
-------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Uplands (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  : 105.00 / 105.00 m
Receiver height           :  16.10 / 18.10  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

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

Source height = 1.50 m

ROAD (0.00 + 54.29 + 0.00) = 54.29 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
     0     90   0.00  65.75   0.00  -8.45  -3.01   0.00   0.00   0.00  54.29
----------------------------------------------------------------------------

Segment Leq : 54.29 dBA

Total Leq All Segments: 54.29 dBA
```

```
Results segment # 1: Uplands (night)
------------------------------------

Source height = 1.50 m

ROAD (0.00 + 46.70 + 0.00) = 46.70 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
     0     90   0.00  58.16   0.00  -8.45  -3.01   0.00   0.00   0.00  46.70
----------------------------------------------------------------------------

Segment Leq : 46.70 dBA

Total Leq All Segments: 46.70 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 54.29
                         (NIGHT): 46.70
```

```
STAMSON 5.0        NORMAL REPORT        Date: 19-06-2026 11:23:33
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: Uplands (day/night)
-------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Uplands (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  : 111.00 / 111.00 m
Receiver height           :  43.20 / 43.20  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :   7.00 m
Barrier receiver distance :  73.00 / 73.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: Riverside (day/night)
---------------------------------------------
Car traffic volume  : 46156/4014  veh/TimePeriod  *
Medium truck volume :  3672/319   veh/TimePeriod  *
Heavy truck volume  :  2623/228   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):  35000
    Percentage of Annual Growth       :   5.00
    Number of Years of Growth         :  10.00
    Medium Truck % of Total Volume    :   7.00
    Heavy Truck  % of Total Volume    :   5.00
    Day (16 hrs) % of Total Volume    :  92.00

Data for Segment # 2: Riverside (day/night)
-------------------------------------------
Angle1   Angle2            : -34.00 deg   90.00 deg
Wood depth                 :      0       (No woods.)
No of house rows           :      0 / 0
Surface                    :      2       (Reflective ground surface)
Receiver source distance   : 133.00 / 133.00 m
Receiver height            :  43.20 / 43.20  m
Topography                 :      2       (Flat/gentle slope; with barrier)
Barrier angle1             :  12.00 deg   Angle2 : 90.00 deg
Barrier height             :   7.00 m
Barrier receiver distance  : 100.00 / 100.00 m
Source elevation           :   0.00 m
Receiver elevation         :   0.00 m
Barrier elevation          :   0.00 m
Reference angle            :   0.00
```

```
Results segment # 1: Uplands (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 !       43.20 !       15.77 !        15.77

ROAD (0.00 + 57.06 + 0.00) = 57.06 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -90     90   0.00  65.75   0.00  -8.69   0.00   0.00   0.00  -0.06  56.99*
   -90     90   0.00  65.75   0.00  -8.69   0.00   0.00   0.00   0.00  57.06
----------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 57.06 dBA

Results segment # 2: Riverside (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 !       43.20 !       11.84 !        11.84

ROAD (60.39 + 62.69 + 0.00) = 64.70 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -34     12   0.00  75.80   0.00  -9.48  -5.93   0.00   0.00   0.00  60.39
----------------------------------------------------------------------------
    12     90   0.00  75.80   0.00  -9.48  -3.63   0.00   0.00  -0.23  62.46*
    12     90   0.00  75.80   0.00  -9.48  -3.63   0.00   0.00   0.00  62.69
----------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 64.70 dBA

Total Leq All Segments: 65.39 dBA
```

```
Results segment # 1: Uplands (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 !       43.20 !       15.77 !        15.77

ROAD (0.00 + 49.46 + 0.00) = 49.46 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -90     90   0.00  58.16   0.00  -8.69   0.00   0.00   0.00  -0.06  49.40*
   -90     90   0.00  58.16   0.00  -8.69   0.00   0.00   0.00   0.00  49.46
----------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 49.46 dBA

Results segment # 2: Riverside (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 !       43.20 !       11.84 !        11.84

ROAD (52.79 + 55.09 + 0.00) = 57.10 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -34     12   0.00  68.20   0.00  -9.48  -5.93   0.00   0.00   0.00  52.79
----------------------------------------------------------------------------
    12     90   0.00  68.20   0.00  -9.48  -3.63   0.00   0.00  -0.23  54.86*
    12     90   0.00  68.20   0.00  -9.48  -3.63   0.00   0.00   0.00  55.09
----------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 57.10 dBA

Total Leq All Segments: 57.79 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 65.39
                         (NIGHT): 57.79
```

```
STAMSON 5.0        NORMAL REPORT        Date: 19-06-2026 11:35:54
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: Riverside 1 (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  :    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):  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 # 1: Riverside 1 (day/night)
---------------------------------------------
Angle1   Angle2           : -18.00 deg   48.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 117.00 / 117.00 m
Receiver height           :  27.60 / 27.60  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -18.00 deg   Angle2 : 48.00 deg
Barrier height            :   7.00 m
Barrier receiver distance :  95.00 / 95.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: Riverside 2 (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  :    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):  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: Riverside 2 (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   -18.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 117.00 / 117.00 m
Receiver height           :  27.60 / 27.60  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -18.00 deg
Barrier height            :  40.00 m
Barrier receiver distance :  30.00 / 30.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

Results segment # 1: Riverside 1 (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 !        27.60 !         6.40 !          6.40

ROAD (0.00 + 54.97 + 0.00) = 54.97 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-----------------------------------------------------------------------------
   -18     48   0.00  73.68   0.00  -8.92  -4.36   0.00   0.00  -5.43  54.97
-----------------------------------------------------------------------------

Segment Leq : 54.97 dBA
```

```
Results segment # 2: Riverside 2 (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 !        27.60 !        20.91 !         20.91

ROAD (0.00 + 42.57 + 0.00) = 42.57 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -90    -18   0.00  73.68   0.00  -8.92  -3.98   0.00   0.00 -18.21  42.57
----------------------------------------------------------------------------

Segment Leq : 42.57 dBA

Total Leq All Segments: 55.21 dBA

Results segment # 1: Riverside 1 (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 !        27.60 !         6.40 !          6.40

ROAD (0.00 + 47.37 + 0.00) = 47.37 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -18     48   0.00  66.08   0.00  -8.92  -4.36   0.00   0.00  -5.43  47.37
----------------------------------------------------------------------------

Segment Leq : 47.37 dBA
```

```
Results segment # 2: Riverside 2 (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 !       27.60 !       20.91 !        20.91

ROAD (0.00 + 34.97 + 0.00) = 34.97 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -90    -18   0.00  66.08   0.00  -8.92  -3.98   0.00   0.00 -18.21  34.97
----------------------------------------------------------------------------

Segment Leq : 34.97 dBA

Total Leq All Segments: 47.61 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 55.21
                         (NIGHT): 47.61
```

```
STAMSON 5.0        NORMAL REPORT        Date: 19-06-2026 11:47:44
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: Riverside (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  :    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):  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 # 1: Riverside (day/night)
-------------------------------------------
Angle1   Angle2           : -29.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 127.00 / 127.00 m
Receiver height           :  46.80 / 46.80  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -29.00 deg   Angle2 : 90.00 deg
Barrier height            :  45.30 m
Barrier receiver distance :   2.00 / 2.00   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: Uplands (day/night)
-------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    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):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Uplands (day/night)
-----------------------------------------
Angle1   Angle2            : -90.00 deg   65.00 deg
Wood depth                 :      0       (No woods.)
No of house rows           :      0 / 0
Surface                    :      2       (Reflective ground surface)
Receiver source distance   : 120.00 / 120.00 m
Receiver height            :  46.80 / 46.80  m
Topography                 :      2       (Flat/gentle slope; with barrier)
Barrier angle1             : -90.00 deg   Angle2 : 65.00 deg
Barrier height             :  45.30 m
Barrier receiver distance  :   2.00 / 2.00   m
Source elevation           :   0.00 m
Receiver elevation         :   0.00 m
Barrier elevation          :   0.00 m
Reference angle            :   0.00
```

```
Results segment # 1: Riverside (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 !       46.80 !       46.09 !        46.09

ROAD (0.00 + 62.60 + 0.00) = 62.60 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -29     90   0.00  73.68   0.00  -9.28  -1.80   0.00   0.00  -0.60  62.00*
   -29     90   0.00  73.68   0.00  -9.28  -1.80   0.00   0.00   0.00  62.60
----------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 62.60 dBA

Results segment # 2: Uplands (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 !       46.80 !       46.04 !        46.04

ROAD (0.00 + 57.59 + 0.00) = 57.59 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -90     65   0.00  67.27   0.00  -9.03  -0.65   0.00   0.00  -0.63  56.95*
   -90     65   0.00  67.27   0.00  -9.03  -0.65   0.00   0.00   0.00  57.59
----------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 57.59 dBA

Total Leq All Segments: 63.79 dBA
```

```
Results segment # 1: Riverside (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 !        46.80 !        46.09 !         46.09

ROAD (0.00 + 55.00 + 0.00) = 55.00 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -29     90   0.00  66.08   0.00  -9.28  -1.80   0.00   0.00  -0.60  54.41*
   -29     90   0.00  66.08   0.00  -9.28  -1.80   0.00   0.00   0.00  55.00
----------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 55.00 dBA

Results segment # 2: Uplands (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 !        46.80 !        46.04 !         46.04

ROAD (0.00 + 49.99 + 0.00) = 49.99 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -90     65   0.00  59.67   0.00  -9.03  -0.65   0.00   0.00  -0.63  49.36*
   -90     65   0.00  59.67   0.00  -9.03  -0.65   0.00   0.00   0.00  49.99
----------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 49.99 dBA

Total Leq All Segments: 56.19 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 63.79
                         (NIGHT): 56.19
```

```
STAMSON 5.0        NORMAL REPORT        Date: 19-06-2026 11:49:58
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r4b.te               Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: Riverside (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  :    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):  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 # 1: Riverside (day/night)
-------------------------------------------
Angle1   Angle2           : -29.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 127.00 / 127.00 m
Receiver height           :  46.80 / 46.80  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -29.00 deg   Angle2 : 90.00 deg
Barrier height            :  46.40 m
Barrier receiver distance :   2.00 / 2.00   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: Uplands (day/night)
-------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Uplands (day/night)
-----------------------------------------
Angle1   Angle2           : -90.00 deg   65.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 120.00 / 120.00 m
Receiver height           :  46.80 / 46.80  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 65.00 deg
Barrier height            :  46.40 m
Barrier receiver distance :   2.00 / 2.00   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

Results segment # 1: Riverside (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 !        46.80 !        46.09 !        46.09

ROAD (0.00 + 56.85 + 0.00) = 56.85 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -29     90   0.00  73.68   0.00  -9.28  -1.80   0.00   0.00  -5.76  56.85
----------------------------------------------------------------------------

Segment Leq : 56.85 dBA
```

```
Results segment # 2: Uplands (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 !       46.80 !       46.04 !        46.04

ROAD (0.00 + 50.14 + 0.00) = 50.14 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -90     65   0.00  65.75   0.00  -9.03  -0.65   0.00   0.00  -5.93  50.14
----------------------------------------------------------------------------

Segment Leq : 50.14 dBA

Total Leq All Segments: 57.69 dBA

Barrier table for segment # 1: Riverside (day)
----------------------------------------------

Barrier ! Elev of !  Road   ! Tot Leq !
Height  ! Barr Top! dBA     !   dBA   !
--------+---------+---------+---------+
  46.80 !   46.80 !   54.57 !   54.57 !
  47.30 !   47.30 !   51.74 !   51.74 !
  47.80 !   47.80 !   49.57 !   49.57 !
  48.30 !   48.30 !   47.93 !   47.93 !
  48.80 !   48.80 !   46.64 !   46.64 !

Barrier table for segment # 2: Uplands (day)
--------------------------------------------

Barrier ! Elev of !  Road   ! Tot Leq !
Height  ! Barr Top! dBA     !   dBA   !
--------+---------+---------+---------+
  46.80 !   46.80 !   47.78 !   47.78 !
  47.30 !   47.30 !   44.88 !   44.88 !
  47.80 !   47.80 !   42.64 !   42.64 !
  48.30 !   48.30 !   40.93 !   40.93 !
  48.80 !   48.80 !   39.59 !   39.59 !
```

```
Results segment # 1: Riverside (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 !       46.80 !       46.09 !        46.09

ROAD (0.00 + 49.25 + 0.00) = 49.25 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -29     90   0.00  66.08   0.00  -9.28  -1.80   0.00   0.00  -5.76  49.25
----------------------------------------------------------------------------

Segment Leq : 49.25 dBA

Results segment # 2: Uplands (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 !       46.80 !       46.04 !        46.04

ROAD (0.00 + 42.55 + 0.00) = 42.55 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -90     65   0.00  58.16   0.00  -9.03  -0.65   0.00   0.00  -5.93  42.55
----------------------------------------------------------------------------

Segment Leq : 42.55 dBA

Total Leq All Segments: 50.09 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 57.69
                         (NIGHT): 50.09
```

```
STAMSON 5.0        NORMAL REPORT        Date: 19-06-2026 11:28:34
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: Riverside (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  :    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):  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 # 1: Riverside (day/night)
-------------------------------------------
Angle1   Angle2           : -76.00 deg   -9.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 146.00 / 146.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -76.00 deg   Angle2 : -9.00 deg
Barrier height            :  40.00 m
Barrier receiver distance :  41.00 / 41.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

Results segment # 1: Riverside (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 !        1.50 !        1.50 !         1.50
```

```
ROAD (0.00 + 39.50 + 0.00) = 39.50 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
   -76     -9   0.00  73.68   0.00  -9.88  -4.29   0.00   0.00 -20.00  39.50
--------------------------------------------------------------------------

Segment Leq : 39.50 dBA

Total Leq All Segments: 39.50 dBA

Results segment # 1: Riverside (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 !        1.50 !        1.50 !         1.50

ROAD (0.00 + 31.90 + 0.00) = 31.90 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
   -76     -9   0.00  66.08   0.00  -9.88  -4.29   0.00   0.00 -20.00  31.90
--------------------------------------------------------------------------

Segment Leq : 31.90 dBA

Total Leq All Segments: 31.90 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 39.50
                         (NIGHT): 31.90
```

```
STAMSON 5.0        NORMAL REPORT        Date: 19-06-2026 17:43:21
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: Riverside 1 (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  :    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):  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 # 1: Riverside 1 (day/night)
---------------------------------------------
Angle1   Angle2           : -42.00 deg   39.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 153.00 / 153.00 m
Receiver height           :  43.20 / 43.20  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -42.00 deg   Angle2 : 9.00 deg
Barrier height            :  40.00 m
Barrier receiver distance :  39.00 / 39.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: Riverside 2 (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  :    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):  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: Riverside 2 (day/night)
---------------------------------------------
Angle1   Angle2            :  39.00 deg   90.00 deg
Wood depth                 :      0       (No woods.)
No of house rows           :      0 / 0
Surface                    :      2       (Reflective ground surface)
Receiver source distance   : 153.00 / 153.00 m
Receiver height            :  43.20 / 43.20  m
Topography                 :      2       (Flat/gentle slope; with barrier)
Barrier angle1             :  39.00 deg   Angle2 : 90.00 deg
Barrier height             :  51.50 m
Barrier receiver distance  :  25.00 / 25.00  m
Source elevation           :   0.00 m
Receiver elevation         :   0.00 m
Barrier elevation          :   0.00 m
Reference angle            :   0.00

Results segment # 1: Riverside 1 (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 !       43.20 !       32.57 !        32.57

ROAD (0.00 + 41.41 + 55.81) = 55.96 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -42      9   0.00  73.68   0.00 -10.09  -5.48   0.00   0.00 -16.70  41.41
----------------------------------------------------------------------------
     9     39   0.00  73.68   0.00 -10.09  -7.78   0.00   0.00   0.00  55.81
----------------------------------------------------------------------------

Segment Leq : 55.96 dBA
```

```
Results segment # 2: Riverside 2 (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 !       43.20 !       36.39 !        36.39

ROAD (0.00 + 41.29 + 0.00) = 41.29 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
    39     90   0.00  73.68   0.00 -10.09  -5.48   0.00   0.00 -16.82  41.29
--------------------------------------------------------------------------------

Segment Leq : 41.29 dBA

Total Leq All Segments: 56.11 dBA

Results segment # 1: Riverside 1 (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 !       43.20 !       32.57 !        32.57

ROAD (0.00 + 33.81 + 48.21) = 48.37 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -42      9   0.00  66.08   0.00 -10.09  -5.48   0.00   0.00 -16.70  33.81
--------------------------------------------------------------------------------
     9     39   0.00  66.08   0.00 -10.09  -7.78   0.00   0.00   0.00  48.21
--------------------------------------------------------------------------------

Segment Leq : 48.37 dBA
```

```
Results segment # 2: Riverside 2 (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 !       43.20 !       36.39 !        36.39

ROAD (0.00 + 33.69 + 0.00) = 33.69 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
    39     90   0.00  66.08   0.00 -10.09  -5.48   0.00   0.00 -16.82  33.69
----------------------------------------------------------------------------

Segment Leq : 33.69 dBA

Total Leq All Segments: 48.52 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 56.11
                         (NIGHT): 48.52
```

APPENDIX B

BPN-56 STC REQUIREMENTS CALCULATIONS

127 WALGREEN ROAD, OTTAWA, ON, CANADA K0A 1L0 | 613 836 0934
GRADIENTWIND.COM

CALCULATIONS TO REDUCE INTERIOR AIRCRAFT & ROAD TRAFFIC NOISE NORTH FACING BEDROOM

		Aircraft	Road	
Outdoor Sound Level	=	57	49	dBA
Source Geometry Correction:	=	3	2	dBA
Correction For Surface Reflection:	=	3	3	dBA
Target Indoor Noise Level:	=	32	40	dBA
Required Noise Reduction:	=	31	14	dBA

Façade Area	10.73	10.73
	Aircraft	Road
Wall Area	5.365	5.365
Room Floor Area	17	17
Window Area	5.365	5.365
Wall Spectrum Type	d	d
Window Spectrum Type	b	b
Noise Source Type	B	D
Absorption Level	Intermediate	

Absorption Coefficient	0.5	1.25	Hard
	0.8		Intermediate
	1.25		Very Absorptive

		Noise Source Specturm Type					
		Large Aircraft Landing	Average Aircraft Noise, Railway Wheel Noise	Railway Wheel Noise Screened By Barrier	Mixed Road Traffic, Distant Aircraft	Road Traffic Screened By Barrier	Diesel Railway Locomotive
Building Component		A	B	C	D	E	F
Single Exterior Door	a	-1	0	0	1	1	1
Double Exterior Door, Single Glazed Window, Openable Thin Window	b	0	1	2	2	3	3
Sealed Thin Window, Openable Thick Window	c	0	1	3	4	6	6
Sealed Thick Window, Exterior Wall, Roof/Ceiling	d	0	2	5	7	9	10

	Aircraft	Road
Window Value	1	2
Wall Value	2	7

0 = Perpendicular To Surface	Correction
60 to 90 degrees	3
40 to 90 degrees	2
30 to 90 degrees	1
0 to 90 degrees	0
Value	2

Aircraft

COMPONENT: Wall A - Spandral		STC Is:		45	
Noise Spectrum Type	B				
Component Category	d	Correction: (Table 5)	2		
Room Floor Area:	17 m²			-2	dBA
Component Area:	5.365 m²				
Component / Floor (%):	32 %				
Room Absorption Category:	Intermediate	Correction: (Table 4 Equation)	-6		dBA
				6	
Noise Reduction If Only This Component Transmits Sound Energy:				49	dBA
		Required Noise Reduction:		31	dBA
Surplus noise reduction for comparison to Table 3				18	
Component Transmits	2 % Of Sound				

COMPONENT: Surface A Window		Required Noise Reduction Is:	31	dBA
Percentage Of Sound Energy Transmitted:	98 %	Correction: (Table 3 Equation)	0	
Room Floor Area:	17 m²			
Component Area:	5.365 m²			
Component / Floor (%):	32 %			
Room Absortion Category:	Intermediate	Correction: (Table 4 Equation)	-6	dBA
Noise Spectrum	B			
Component Category	b	Correction: (Table 5)	1	dBA
		Required STC Is:	26	

Road

COMPONENT: Wall A - Spandral		STC Is:		45	
Noise Spectrum Type	D				
Component Category	d	Correction: (Table 5)	7		
Room Floor Area:	17 m²			-7	dBA
Component Area:	5.365 m²				
Component / Floor (%):	32 %				
Room Absorption Category:	Intermediate	Correction: (Table 4 Equation)	-6		dBA
				6	
Noise Reduction If Only This Component Transmits Sound Energy:				44	dBA
		Required Noise Reduction:		14	dBA
Surplus noise reduction for comparison to Table 3				30	
Component Transmits	0 % Of Sound				

COMPONENT: Surface A Window		Required Noise Reduction Is:	14	dBA
Percentage Of Sound Energy Transmitted:	100 %	Correction: (Table 3 Equation)	0	
Room Floor Area:	17 m²			
Component Area:	5.365 m²			
Component / Floor (%):	32 %			
Room Absortion Category:	Intermediate	Correction: (Table 4 Equation)	-6	dBA
Noise Spectrum	D			
Component Category	b	Correction: (Table 5)	2	dBA
		Required STC Is:	10	

	Aircraft	Road	Combined
Combined Window STC	26	10	**26**

CALCULATIONS TO REDUCE INTERIOR AIRCRAFT & ROAD TRAFFIC NOISE
NORTHWEST FACING BEDROOM

		Aircraft		Road		
		Surface N	Surface W	Surface N	Surface W	
Outdoor Sound Level	=	57	57	58	48	dBA
Source Geometry Correction:	=	3	3	2	2	dBA
Correction For Surface Reflection:	=	3	3	3	3	dBA
Target Indoor Noise Level:	=	32	32	40	40	dBA
Required Noise Reduction:	=	31	31	23	13	dBA

	NORTH	WEST
Façade Area	15.66	21.17
	Surface N	Surface E
Wall Area	7.83	10.59
Room Floor Area	38	38
Window Area	7.83	10.59
Wall Spectrum Type	d	d
Window Spectrum Type	b	b
Noise Source Type (Aircraft)	B	B
Noise Source Type (Road)	D	D

Absorption Level: Intermediate

Absorption Coefficient	0.5	1.25	Hard
	0.8		Intermediate
	1.25		Very Absorptive

Building Component		Noise Source Specturm Type: Large Aircraft Landing	Average Aircraft Noise, Railway Wheel Noise	Railway Wheel Noise Screened By Barrier	Mixed Road Traffic, Distant Aircraft	Road Traffic Screened By Barrier	Diesel Railway Locomotive
		A	B	C	D	E	F
Single Exterior Door	a	-1	0	0	1	1	1
Double Exterior Door, Single Glazed Window, Openable Thin Window	b	0	1	2	2	3	3
Sealed Thin Window, Openable Thick Window	c	0	1	3	4	6	6
Sealed Thick Window, Exterior Wall, Roof/Ceiling	d	0	2	5	7	9	10

	Aircraft	Road
Window Value	1	2
Wall Value	2	7

Enter Value From Table Into Box

0 = Perpendicular To Surface	Correction
60 to 90 degrees	3
40 to 90 degrees	2
30 to 90 degrees	1
0 to 90 degrees	0
Value	2

NORTH — Aircraft

COMPONENT: Wall N - Spandral				STC Is:	45	
Noise Spectrum Type	B					
Component Category	d	Correction:	2			
Room Floor Area:	38 m²				-2	dBA
Component Area:	7.83 m²					
Component / Floor (%):	21 %					
Room Absorption Category:	Intermediate	Correction:	-8			dBA
					8	
Noise Reduction If Only This Component Transmits Sound Energy:					51	dBA
				Required Noise Reduction:	31	dBA
Surplus noise reduction for comparison to Table 3					20	
Component Transmits	1 % Of Sound					

COMPONENT: Surface N Window		Required Noise Reduction Is:	31	dBA
Percentage Of Sound Energy Transmitted:	99 %	Correction:	0	
Room Floor Area:	38 m²			
Component Area:	7.83 m²			
Component / Floor (%):	21 %			
Room Absortion Category:	Intermediate	Correction:	-8	dBA
Noise Spectrum	B			
Component Category	b	Correction:	1	dBA
		Required STC Is:	24	

NORTH — Road

COMPONENT: Wall N - Spandral				STC Is:	45	
Noise Spectrum Type	D					
Component Category	d	Correction:	7			
Room Floor Area:	38 m²				-7	dBA
Component Area:	7.83 m²					
Component / Floor (%):	21 %					
Room Absorption Category:	Intermediate	Correction:	-8			dBA
					8	
Noise Reduction If Only This Component Transmits Sound Energy:					46	dBA
				Required Noise Reduction:	23	dBA
Surplus noise reduction for comparison to Table 3					23	
Component Transmits	1 % Of Sound					

COMPONENT: Surface N Window		Required Noise Reduction Is:	23	dBA
Percentage Of Sound Energy Transmitted:	99 %	Correction:	0	
Room Floor Area:	38 m²			
Component Area:	7.83 m²			
Component / Floor (%):	21 %			
Room Absortion Category:	Intermediate	Correction:	-8	dBA
Noise Spectrum	D			
Component Category	b	Correction:	2	dBA
		Required STC Is:	17	

WEST — Aircraft

COMPONENT: Wall W - Spandral				STC Is:	50	
Noise Spectrum Type	B					
Component Category	d	Correction:	2			
Room Floor Area:	38 m²				-2	dBA
Component Area:	10.59 m²					
Component / Floor (%):	28 %					
Room Absorption Category:	Intermediate	Correction:	-7			dBA
					7	
Noise Reduction If Only This Component Transmits Sound Energy:					55	dBA
				Required Noise Reduction:	31	dBA
Surplus noise reduction for comparison to Table 3					24	
Component Transmits	0 % Of Sound					

COMPONENT: Surface W Window		Required Noise Reduction Is:	31	dBA
Percentage Of Sound Energy Transmitted:	100 %	Correction:	0	
Room Floor Area:	38 m²			
Component Area:	10.59 m²			
Component / Floor (%):	28 %			
Room Absortion Category:	Intermediate	Correction:	-6.5	dBA
Noise Spectrum	B			
Component Category	b	Correction:	1	dBA
		Required STC Is:	25	

WEST — Road

COMPONENT: Wall W - Spandral				STC Is:	50	
Noise Spectrum Type	D					
Component Category	d	Correction:	7			
Room Floor Area:	38 m²				-7	dBA
Component Area:	10.59 m²					
Component / Floor (%):	28 %					
Room Absorption Category:	Intermediate	Correction:	-7			dBA
					7	
Noise Reduction If Only This Component Transmits Sound Energy:					50	dBA
				Required Noise Reduction:	13	dBA
Surplus noise reduction for comparison to Table 3					37	
Component Transmits	0 % Of Sound					

COMPONENT: Surface W Window		Required Noise Reduction Is:	13	dBA
Percentage Of Sound Energy Transmitted:	100 %	Correction:	0	
Room Floor Area:	38 m²			
Component Area:	10.59 m²			
Component / Floor (%):	28 %			
Room Absortion Category:	Intermediate	Correction:	-7	dBA
Noise Spectrum	D			
Component Category	b	Correction:	2	dBA
		Required STC Is:	8	

	Aircraft	Road	Combined
Combined Window STC	28	18	**28**