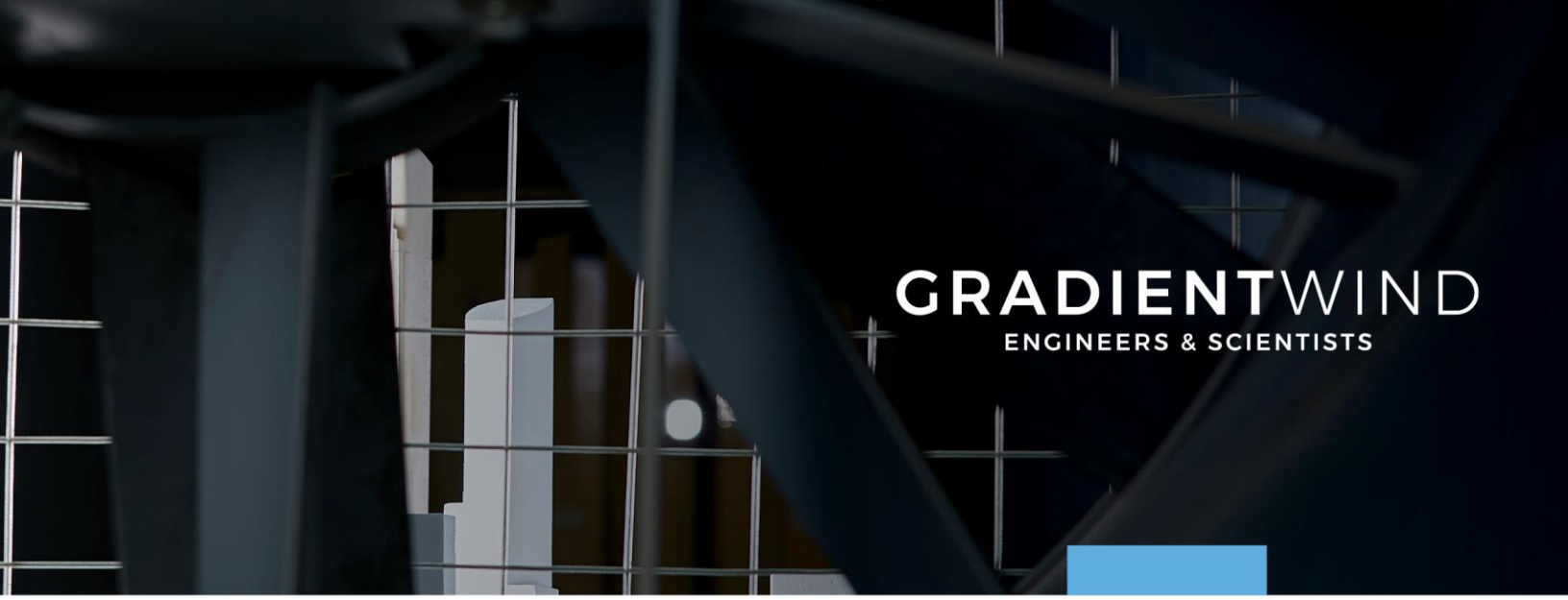

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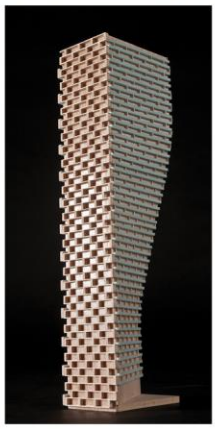
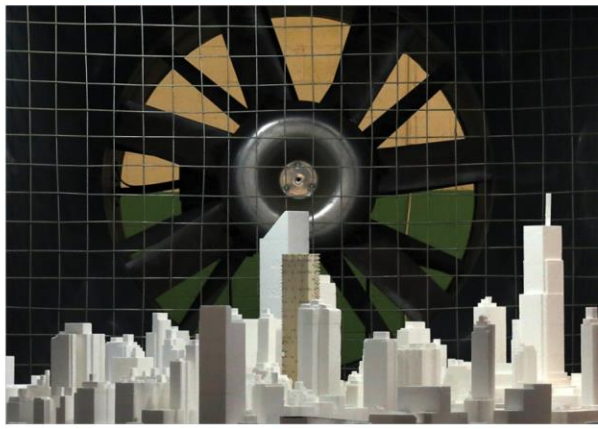
ROADWAY TRAFFIC NOISE FEASIBILITY ASSESSMENT

178-200 Isabella Street
Ottawa, Ontario

Report: 20-139-Traffic Noise





January 26, 2026

PREPARED FOR

Isatoria Limited Partnership by its general partner, Minto (IP) GP Inc.
200-180 Kent Street
Ottawa, ON K1P 0B6

PREPARED BY

Sergio Nunez Andres, B.Eng., Junior Environmental Scientist
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EXECUTIVE SUMMARY

This report describes a roadway traffic noise feasibility assessment undertaken to satisfy Site Plan Control application submission requirements for the proposed residential development located at 200 Isabella Street in Ottawa, Ontario (hereinafter referred to as "subject site" or "proposed development"). The proposed development is a residential building comprising a nominally rectangular 19-storey tower inclusive of a 6-storey podium and topped with a mechanical penthouse (MPH). The major sources of roadway traffic noise are Highway 417, Isabella Street and Bank Street. Figure 1 illustrates a complete site plan with surrounding context.

The assessment is based on (i) theoretical noise prediction methods that conform to the Ministry of the Environment, Conservation and Parks (MECP) and City of Ottawa requirements; (ii) noise level criteria as specified by the City of Ottawa's Environmental Noise Control Guidelines (ENCG); (iii) future vehicular traffic volumes based on the City of Ottawa's Official Plan roadway classifications; and (iv) architectural concept drawings prepared by Project 1 Studio Inc. in November 2025.

The noise levels predicted due to roadway traffic exceed the criteria listed in the ENCG for building components and upgraded building components will be required.

Results of the calculations also indicate that the development will require central air conditioning, or a similar ventilation system, which will allow occupants to keep windows closed and maintain a comfortable living environment. Warning Clauses will also be required in all Lease, Purchase and Sale Agreements.

Noise levels at the rooftop receptors (Receptor 5 and 6) are expected to approach 77 and 75 dBA during the daytime period. If this area is to be used as an outdoor living area, noise control measures are required to reduce the L_{eq} to 55 dBA, or as close to as technically and economically feasible. Further analysis investigated the noise mitigating impact of raising the north and west perimeter guards from a standard height of 1.1 m (base case) to 3.0 m above the surface. Results of the investigation proved that noise levels can only be reduced to 63 and 72 dBA. This marginal improvement would not justify the cost of installing such a high wall, and reducing noise levels to 55 dBA would require excessive barrier heights that would not be feasible. The following Warning Clause Type B will also be required be placed on all Lease, Purchase and Sale Agreements, as summarized on section 6.

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Appendix A – STAMSON 5.04 Input and Output Data and Supporting Information

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Isatoria Limited Partnership by its general partner, Minto (IP) GP Inc. to undertake a detailed traffic noise study to satisfy Site Plan Control application submission requirements for the proposed residential development located at 200 Isabella Street in Ottawa. This report summarizes the methodology, results, and recommendations related to the assessment of exterior noise levels generated by local roadway traffic.

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 based on architectural concept drawings prepared by Project 1 Studio Inc. in November 2025, 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 200 Isabella Street in Ottawa, situated on a parcel of land bordered by Isabella Street followed by Highway 417 to the north, surface parking lots followed by low-rise commercial massing to the east and west, and low-rise residential dwellings to the south. The proposed development is a residential building comprising a nominally rectangular 19-storey tower inclusive of a 6-storey podium and topped with a mechanical penthouse (MPH).

Above the underground parking levels, the ground floor includes an indoor amenity space along the north elevation, a lobby to the northeast, a loading area and building support spaces to the southeast, and residential units to the south and southwest. A drive aisle extends south from Isabella Street along the east elevation of the subject site beneath the podium, providing access to surface parking to the east, a parking ramp to the southwest, and the loading area and primary building access point to the east. An outdoor amenity garden is proposed along the south elevation of the subject site to the southwest and is accessible via a proposed walkway that extends along the west elevation from Isabella Street.

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

Levels 2-18 are reserved for residential occupancy and outdoor amenity terraces are proposed at Level 19 to the north and south of the MPH. The podium extends to the east at Level 3 to overhang the drive aisle below and the tower steps back from the east elevation at Level 10.

The site is surrounded by low-rise commercial buildings to the west, low and medium-rise residential buildings to the east and south, with the Highway 417 corridor to the north. The major sources of roadway traffic noise are Highway 417, Isabella Street and Bank Street. Figure 1 illustrates a complete site plan with surrounding context.

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 exterior noise levels do not exceed the allowable limits specified by the City of Ottawa's Environmental Noise Control Guidelines as outlined in Section 4.2 of this report.

4. METHODOLOGY

4.1 Background

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

4.2 Roadway Traffic Noise

4.2.1 Criteria for Roadway Traffic Noise

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

TABLE 1: INDOOR SOUND LEVEL CRITERIA (ROAD) [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

[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] MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.8

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].

The sound level criterion for outdoor living areas is 55 dBA, which applies during the daytime (07:00 to 23:00). When noise levels exceed 55 dBA, mitigation must be provided to reduce noise levels where technically and administratively feasible to acceptable levels at or below the criterion.

4.2.2 Theoretical Roadway Noise Predictions

The impact of transportation noise sources on the development was determined by computer modelling. Transportation noise source modelling is based on the software program *CadnaA,* which utilizes the United States Federal Highway Administration's Traffic Noise Model (TNM) to represent the roadway line sources.

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

- Truck traffic on all roadways was taken to comprise 5% heavy trucks and 7% medium trucks, as per ENCG requirements for noise level predictions.
- The day/night split for all streets was taken to be 92%/8%, respectively.
- Ground surfaces were taken to be reflective due to the presence of hard (paved) ground.
- Topography was assumed to be a flat/gentle slope surrounding the study building. Highway 417 is elevated approximately 4 m above local grade.
- Noise receptors were strategically placed at 7 locations around the study area (see Figure 2).

[6] MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3

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[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: ROADWAY TRAFFIC DATA

Segment	Roadway Traffic Data	Speed Limit (km/h)	Traffic Volumes
Highway 417	6-Lane Freeway	100	**110,000**
Isabella Street	2-Lane Urban Arterial (2-UAU)	50	**15,000**
Bank Street	4-Lane Urban Arterial (2-UAU)	40	**30,000**

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 (2012) 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.

As per Section 4.2, when daytime noise levels (from road and rail 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[8] considers:

[7] City of Ottawa Transportation Master Plan, November 2013
[8] Building Practice Note: Controlling Sound Transmission into Buildings by J.D. Quirt, National Research Council of Canada, September 1985

- 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[9], 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, which was prepared for site plan approval, detailed floor layouts and building elevations 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 + safety factor).

5. RESULTS AND DISCUSSION

5.1 Roadway Traffic Noise Levels

The results of the roadway traffic noise calculations are summarized in Table 3 below.

TABLE 3: EXTERIOR NOISE LEVELS DUE TO ROAD TRAFFIC

Receptor Number	Receptor Height Above Grade (m)	Receptor Location	Noise Levels (dBA)	
			Day	Night
1	30	POW – North Façade	76	70
2	15	POW – East Façade	76	69
3	15	POW – South Façade	75	68
4	12	POW – West Façade	76	70
5	58	OLA – North Rooftop Outdoor Amenity Area	77	N/A
6	58	OLA – South Rooftop Outdoor Amenity Area	75	N/A
7	1.5	OLA – Ground Floor Outdoor Amenity Area	73	N/A

[9] CMHC, Road & Rail Noise: Effects on Housing

The results of the current analysis indicate that noise levels will range between 75 and 77 dBA during the daytime period (07:00-23:00) and between 68 and 70 dBA during the nighttime period (23:00-07:00). The highest noise levels (76 dBA) occur at the north façade, which is nearest and most exposed to Highway 417.

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 have been estimated based on the overall noise reduction required for each intended use of space (STC = outdoor noise level – targeted indoor noise levels +safety factor). As per city of Ottawa requirements, detailed STC calculations will be required to be completed prior to building permit application for each unit type. The STC requirements for the windows are summarized below:

- **Bedroom Windows**

(i) Bedroom windows will require a minimum STC of 39

- **Living Room Windows**

(i) Living room windows will require a minimum STC of 34

- **Exterior Walls**

(i) Exterior wall components will require a minimum STC of 45, which will be achieved with brick cladding or an acoustical equivalent according to NRC test data[10]

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 a window/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 having a combination of glass thickness and inter-pane spacing. We have specified an example window configuration, however several manufacturers and various combinations of window components, such as those proposed, will offer the necessary sound attenuation rating. 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

[10] J.S. Bradley and J.A. Birta. Laboratory Measurements of the Sound Insulation of Building Façade Elements, National Research Council October 2000.

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.

Results of the calculations also indicate that the development will require central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living 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 Investigation

Noise levels at the rooftop receptors (Receptor 5 and 6) are expected to approach 77 and 75 dBA during the daytime period. If this area is to be used as an outdoor living area, noise control measures are required to reduce the L_{eq} to 55 dBA. Further analysis investigated the noise mitigating impact of raising the north and west perimeter guards from a standard height of 1.1 m (base case) to 3.0 m above the walking surface. Results of the investigation proved that noise levels can only be reduced to 63 dBA. This marginal improvement would not justify the cost of installing such a high wall, and reducing noise levels to 55 dBA would require excessive barrier heights that would not be feasible. Table 4 summarizes the results of the barrier investigation.

TABLE 4: RESULTS OF NOISE BARRIER INVESTIGATION

Receptor Number	Barrier Height (m)	Daytime Leq Noise Levels (dBA)			
		With 1.1 m Barrier	With 2 m Barrier	With 3 m Barrier	Without Barrier
5	OLA – North Rooftop Outdoor Amenity Area	63	63	63	77
6	OLA – South Rooftop Outdoor Amenity Area	72	72	72	75

6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels will range between 75 and 77 dBA during the daytime period (07:00-23:00) and between 68 and 70 dBA during the nighttime period (23:00-07:00). The highest noise levels (76 dBA) occurs at the north façade, which is nearest and most exposed to Highway 417.

The noise levels predicted due to roadway traffic exceed the criteria listed in the ENCG for building components and upgraded building components will be required.

Results of the calculations also indicate that the development will require central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. The following Warning Clause will also be required be placed on all Lease, Purchase and Sale Agreements, as summarized below:

Type D (Warning Clause)

"This building 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."

Noise levels at the rooftop receptors (Receptor 5 and 6) are expected to approach 77 and 75 dBA during the daytime period. If this area is to be used as an outdoor living area, noise control measures are required to reduce the L_{eq} to 55 dBA. Further analysis investigated the noise mitigating impact of raising the north and west perimeter guards from a standard height of 1.1 m (base case) to 3.0 m above the surface. Results of the investigation proved that noise levels can only be reduced to 63 and 72 dBA. This marginal improvement would not justify the cost of installing such a high wall, and reducing noise levels to 55 dBA would require excessive barrier heights that would not be feasible. The following Warning Clause will also be required be placed on all Lease, Purchase and Sale Agreements, as summarized below:

Type B (Warning Clause)

"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 traffic (rail traffic) (air 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."

This concludes our traffic noise feasibility 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.

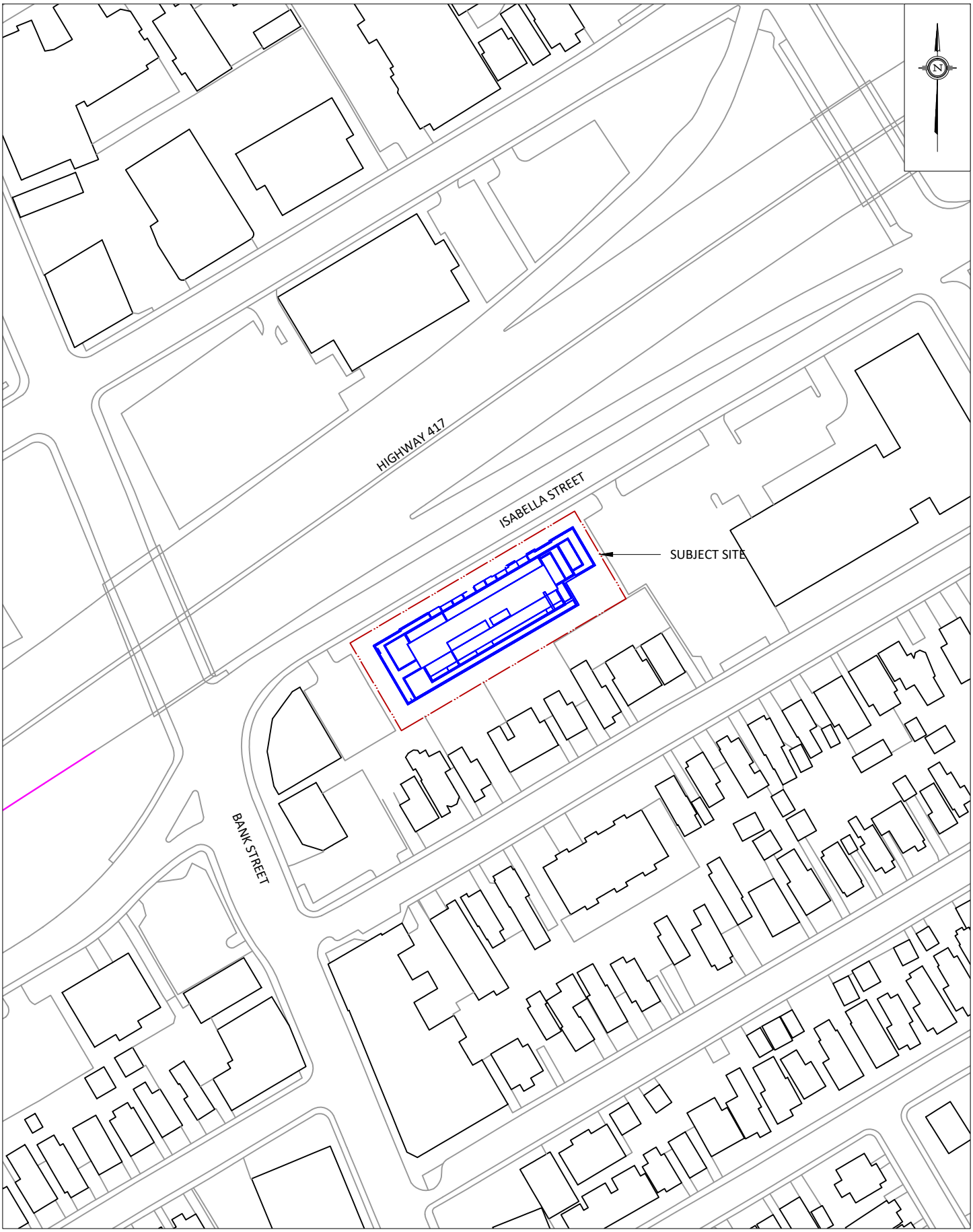
Sincerely,

Gradient Wind Engineering Inc.

Sergio Nunez Andres, B.Eng.
Junior Environmental Scientist

Joshua Foster, P.Eng.
Lead Engineer

Gradient Wind File #20-139-Traffic Noise



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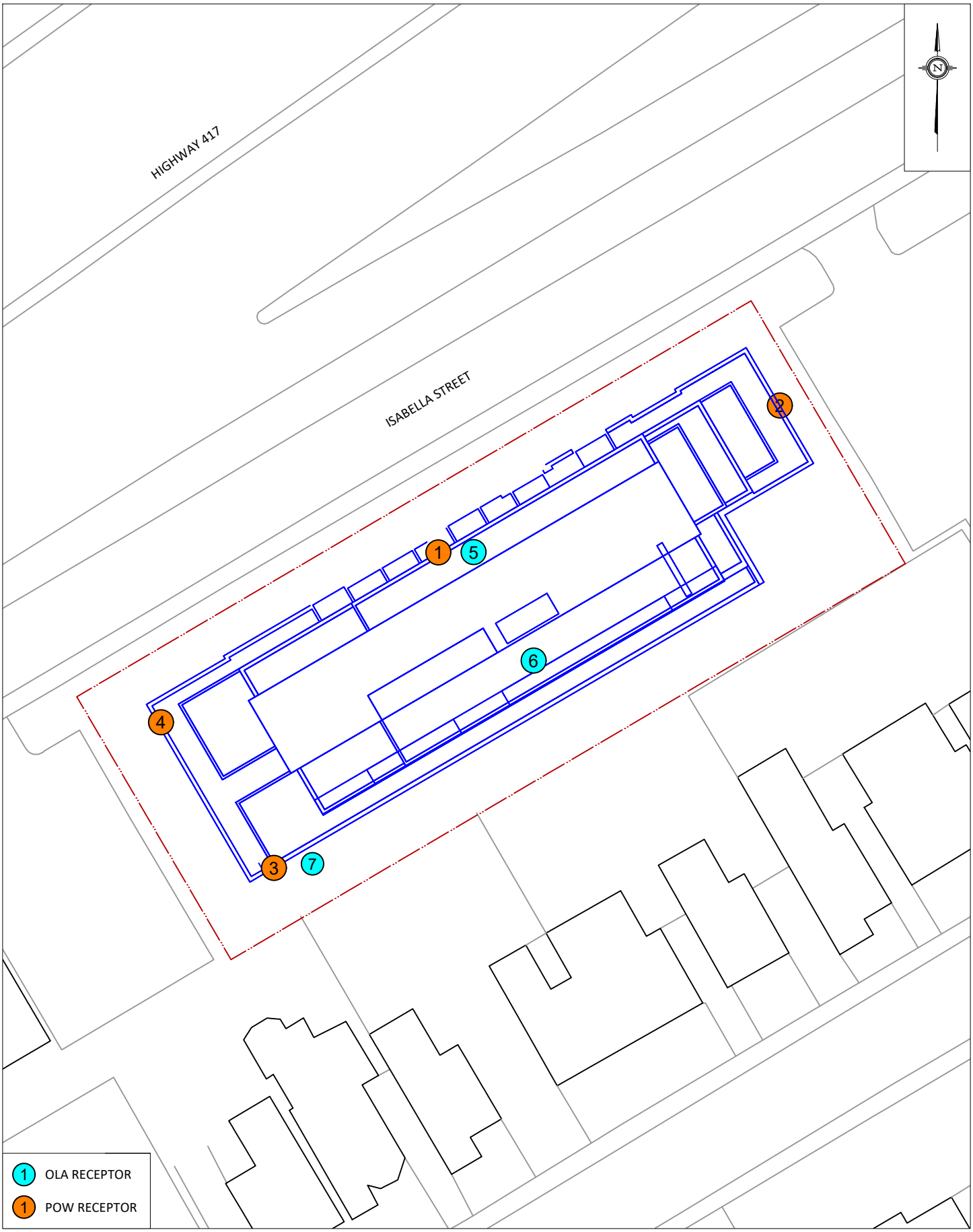
PROJECT	178-200 ISABELLA STREET, OTTAWA DETAILED TRAFFIC NOISE STUDY
SCALE	1:1500 (APPROX.)
DRAWING NO.	GW20-139-1
DATE	NOVEMBER 25, 2025
DRAWN BY	S.N.

DESCRIPTION

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT



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PROJECT	178-200 ISABELLA STREET, OTTAWA DETAILED TRAFFIC NOISE STUDY		DESCRIPTION
SCALE	1:500 (APPROX.)	DRAWING NO. GW20-139-2	FIGURE 2: RECEPTOR LOCATIONS
DATE	NOVEMBER 25, 2025	DRAWN BY S.N.	

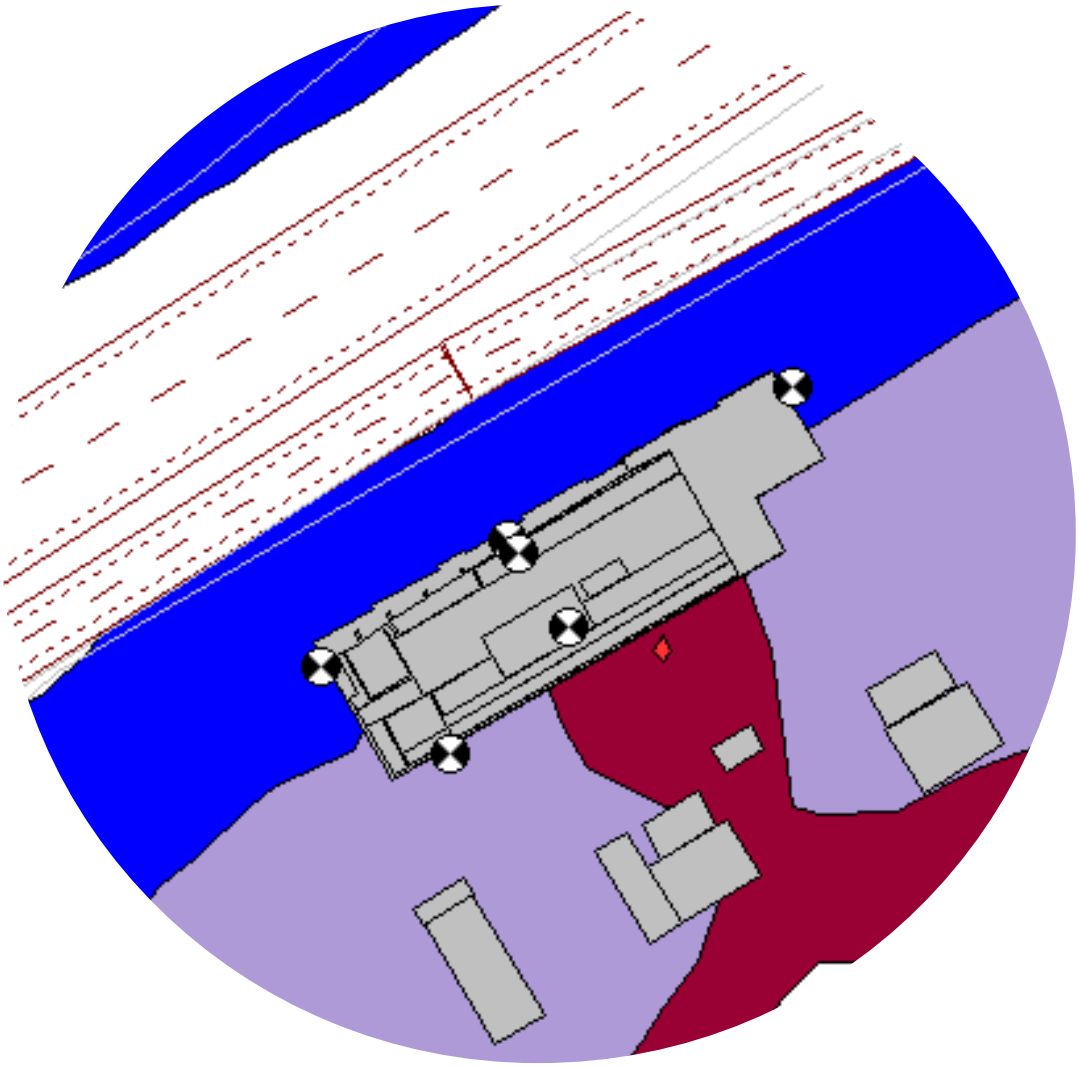

FIGURE 3: DAYTIME ROADWAY TRAFFIC NOISE CONTOURS (4.5 M ABOVE GRADE)

80 – 85 dB
75 – 80 dB
70 – 75 dB
65 – 70 dB
60 – 65 dB
55 – 60 dB
50 – 55 dB
45 – 50 dB
40 – 45 dB
35 – 40 dB
0 – 35 dB

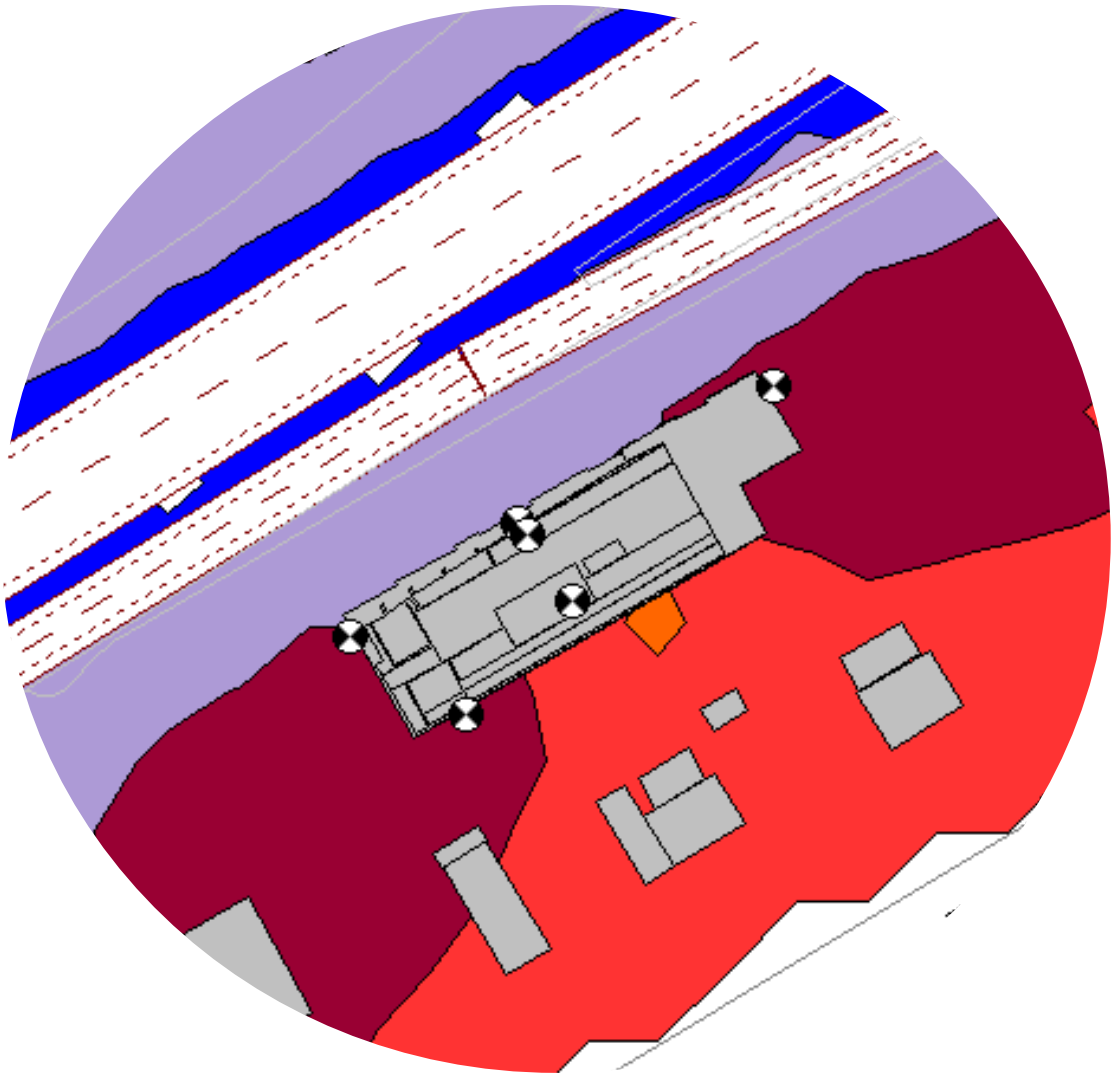

FIGURE 4: NIGHTTIME ROADWAY TRAFFIC NOISE CONTOURS (4.5 M ABOVE GRADE)