GRADIENTWIND
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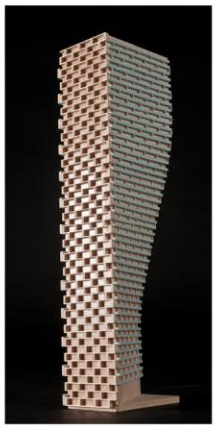
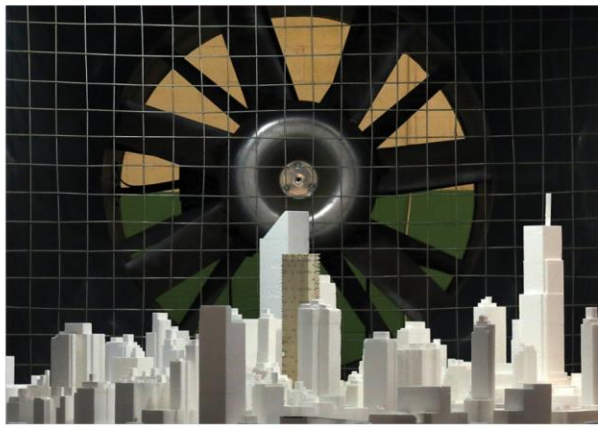
DETAILED TRAFFIC NOISE STUDY

Wateridge Village Block 105
615 Mikinak Road
Ottawa, Ontario

REPORT: GWE25-055 – Traffic Noise





April 30, 2025

PREPARED FOR

Mattamy Homes
50 Hines Road, Suite 100
Ottawa, Ontario
K2K 2M5

PREPARED BY

Sergio Nunez Andres, Junior Environmental Scientist
Joshua Foster, P.Eng., Lead Engineer

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

EXECUTIVE SUMMARY

This report describes a traffic noise assessment to support a Site Plan Control application (SPA), located south of Hemlock Road in Ottawa, Ontario, for Block 105 of the proposed development called Wateridge Village. The development located at 615 Mikinak Road comprises 16 blocks of rear lane townhome and back-to-back townhomes. At grade is a stormwater / snow storage to the southwest of the site. The major sources of roadway traffic noise include Hemlock Road and Codd's Road. 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 (MOECP) 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) site plan drawings prepared by Mattamy Homes dated March 2025.

The results of the current analysis indicate that noise levels will range between 31 and 62 dBA during the daytime period (07:00-23:00) and between 24 and 55 dBA during the nighttime period (23:00-07:00). The highest noise level (62 dBA) occurs at Blocks 1,2,3 and 4 north façades, which is nearest and most exposed to Hemlock Road.

Standard building components compliant with the Ontario Building Code (OBC) will be sufficient to attenuate indoor noise levels to acceptable levels. Forced air heating systems with provision for central air conditioning will be required and a Type C waring clause should be applied to purchase, sale and lease agreements, see section 6.

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1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Mattamy Homes to undertake a detailed traffic noise assessment for Block 105 of the proposed development, referred to as Wateridge Village, located at 615 Mikinak 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 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 (MOECP)[2] guidelines. Noise calculations were based on architectural drawings prepared by Mattamy Homes dated March 2025, with future traffic volumes corresponding to the City of Ottawa's Official Plan (OP) roadway classifications.

2. TERMS OF REFERENCE

The focus of this traffic noise assessment is Block 105 of the proposed development, referred to as Wateridge Village. The study site is located 615 Mikinak Road . The proposed development comprises a mix of stacked condominium and low-rise mixed-use buildings, separated by internal driveways. At grade-parking spaces serving the townhomes are accessed from internal driveways. The site is surrounded by low-rise residential building. There are no outdoor amenity spaces associated with this development.

The major sources of roadway traffic noise include Hemlock Road to the north and Codd's Road to the east. Figure 1 illustrates a complete site plan with surrounding context.

[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

3. OBJECTIVES

The principal objectives of this study are to (i) calculate the future noise levels on the study buildings produced by local roadway traffic, and (ii) ensure that interior and exterior noise levels do not exceed the allowable limits specified by the City of Ottawa's Environmental Noise Control Guidelines 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	Leq (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.	07:00 – 23:00	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].

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.

[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

4.2.2 Theoretical Roadway Noise Predictions

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

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

- Truck traffic on all roadways was taken to comprise 5% heavy trucks and 7% medium trucks, as per ENCG requirements for noise level predictions.
- The day/night split was taken to be 92% / 8% respectively for all streets.
- Receptor heights taken to be 7.5 m and 4.5 m above grade, representative of the third level Plane of Window (POW).
- Absorptive and reflective intermediate ground surfaces based on specific source-receiver path ground characteristics.
- Noise receptors were strategically placed at 15 locations around the study area (see Figure 2).

4.2.1 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 Plan8 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. As for the BRT, volumes were used based on Gradient Wind's experience with similar developments. 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
Hemlock Road	2-Lane Urban Major Collector	40	**12,000**
Codd's Road	2-Lane Urban Collector	40	**8,000**

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[7] 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

[7] Building Practice Note: Controlling Sound Transmission into Buildings by J.D. Quirt, National Research Council of Canada, September 1985

Based on published research[8], 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. The results of the current analysis indicate that noise levels will range between 31 and 62 dBA during the daytime period (07:00-23:00) and between 24 and 55 dBA during the nighttime period (23:00-07:00). The highest noise level (62 dBA) occurs at Blocks 1,2,3 and 4 west façades, which is nearest and most exposed to Hemlock Road.

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

TABLE 3: EXTERIOR NOISE LEVELS DUE TO ROAD TRAFFIC

Receptor Number	Receptor Height Above Grade (m)	Receptor Location	STAMSON 5.04 Noise Level (dBA)	
			Day	Night
1	4.5	POW - Block 1- East Facade	57	49
	7.5		57	49
2	4.5	POW - Block 1- North Facade	62	54
	7.5		61	54
3	4.5	POW - Block 2- North Facade	62	54
	7.5		62	54
4	4.5	POW - Block 3- North Facade	62	54
	7.5		62	54
5	4.5	POW - Block 4- North Facade	62	55
	7.5		62	55
6	4.5	POW - Block 8- North Facade	47	40
	7.5		49	41
7	4.5	POW - Block 12- East Facade	50	42
	7.5		52	44
8	4.5	POW - Block 16- North Facade	48	41
	7.5		50	42
9	4.5	POW - Block 16- West Façade	51	44
	7.5		52	45
10	4.5	POW - Block 16- South Facade	44	37
	7.5		46	38
11	4.5	POW - Block 13- South Facade	36	28
	7.5		38	30
12	4.5	POW - Block 10- South Facade	34	26
	7.5		36	29
13	4.5	POW - Block 7- West Facade	31	24
	7.5		36	28
14	4.5	POW - Block 6- North Façade	38	30
	7.5		40	33
15	4.5	POW - Block 5- West Facade	49	42
	7.5		50	43

5.2 Noise Control Measures

As noise levels do not exceed 65 dBA daytime or 60 dBA nighttime, building components complement the Ontario Building Code, will be sufficient to attenuate indoor noise levels to the criteria noted in Tabel 1.

The buildings will required forced air heating systems which have provisions for air conditioning. If air conditioning installed, at the owner / tenants discretion, it will also windows to remain closed thus providing a quiet and comfortable indoor living environment.

6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels will range between 31 and 62 dBA during the daytime period (07:00-23:00) and between 24 and 55 dBA during the nighttime period (23:00-07:00). The highest noise level (62 dBA) occurs at Blocks 1,2,3 and 4 west façades, which is nearest and most exposed to Hemlock Road.

Building components in conformance with Ontario Building Coded (OBC) standards will be sufficient to attenuate indoor sound levels. The blocks will require a forced air heating systems, which as provisions for adding air conditioning by the owner. If air conditioning is installed it will allow windows to remain closed, thus providing a quiet and comfortable indoor environment. The following Warning Clause[9] Type C will also be required be placed on all Lease, Purchase and Sale Agreements, as summarized below:

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

[9] City of Ottawa Environmental Noise Control Guidelines, January 2016

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

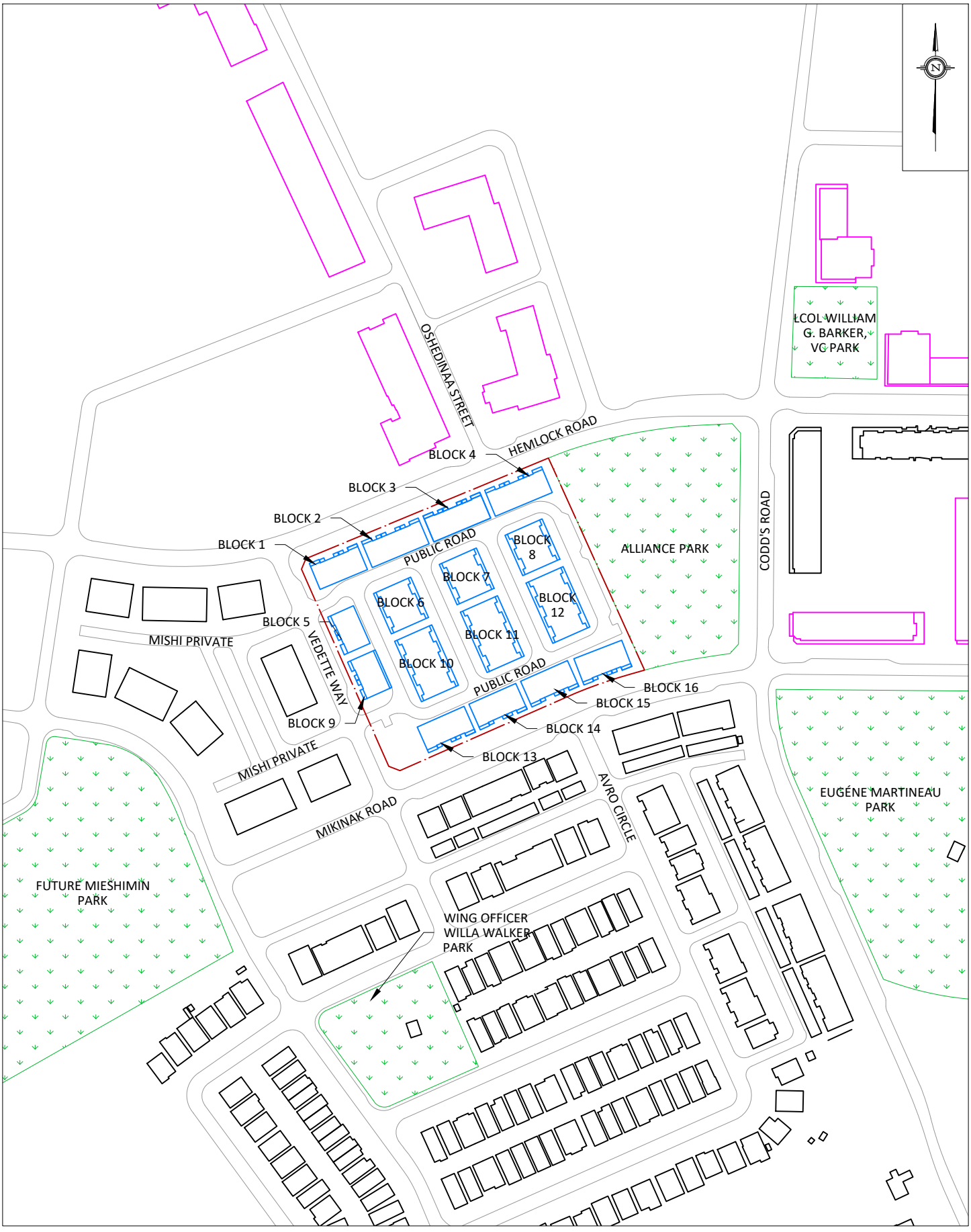
Sincerely,

Gradient Wind Engineering Inc.

Sergio Nunez Andres

Sergio Nunez Andres, B.Eng,
Junior Environmental Scientist
GWE 25-055

Joshua Foster, P.Eng.
Lead Engineer



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127 WALGREEN ROAD, OTTAWA, ON
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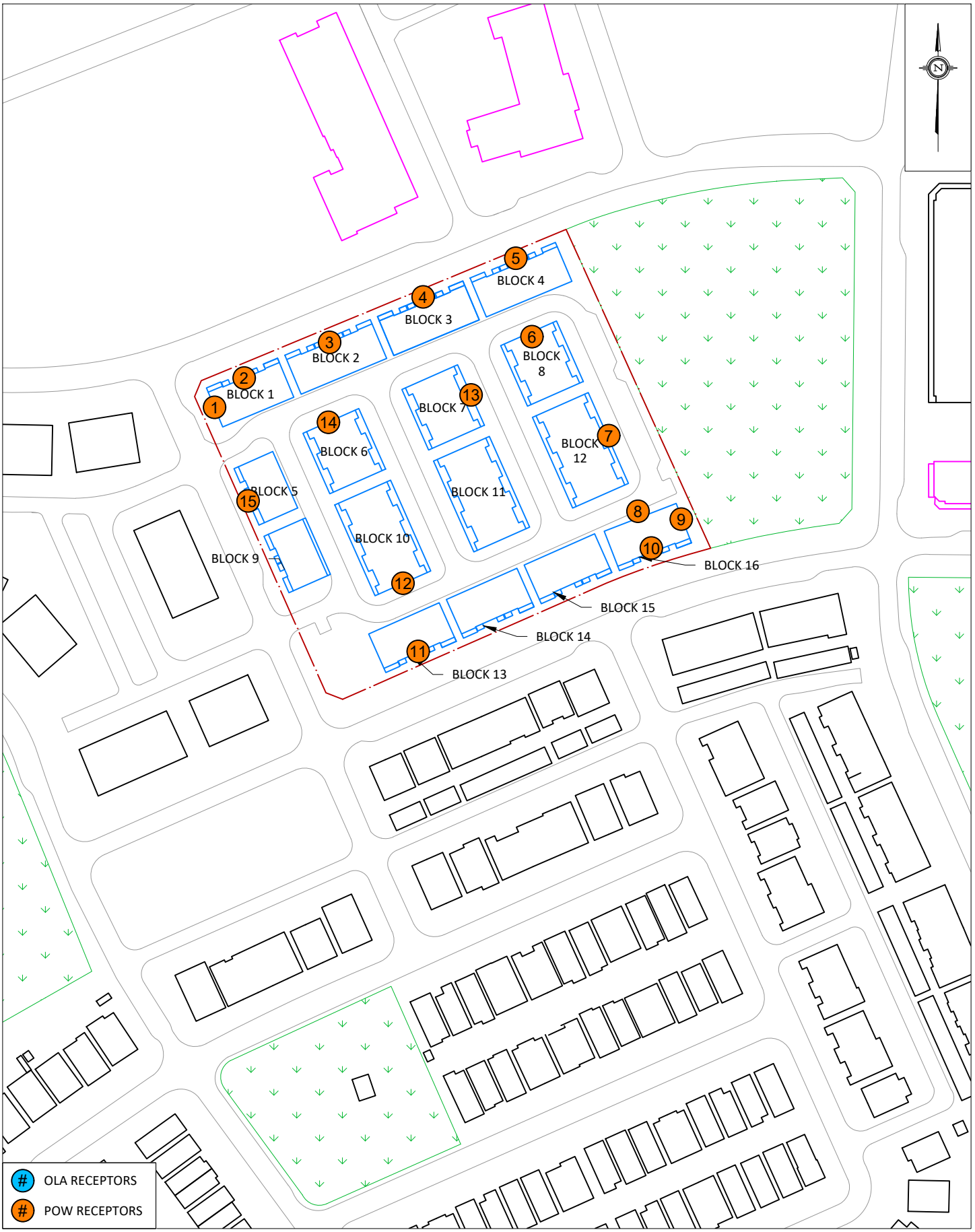
PROJECT	WATERIDGE BLOCK 105, OTTAWA TRANSPORTATION NOISE AND VIBRATION STUDY
SCALE	1:3000 (APPROX.)
DRAWING NO.	25-055-ANV-1
DATE	APRIL 4, 2025
DRAWN BY	N.M.P.

DESCRIPTION

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT



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PROJECT	WATERIDGE BLOCK 105, OTTAWA TRANSPORTATION NOISE AND VIBRATION STUDY
SCALE	1:2000
DRAWING NO.	25-055-ANV-2
DATE	APRIL 4, 2025
DRAWN BY	N.M.P

DESCRIPTION

FIGURE 2:
RECEPTOR LOCATIONS

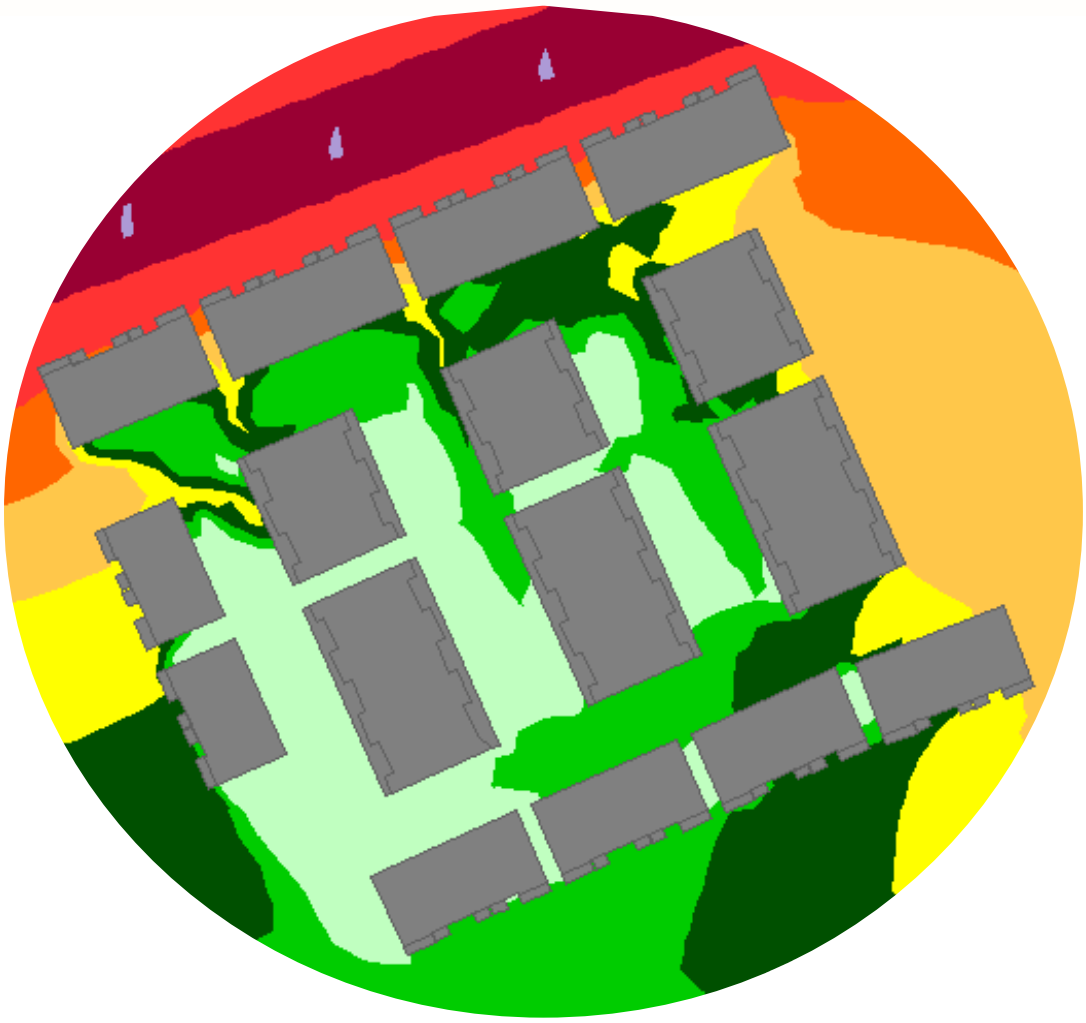

FIGURE 3: DAYTIME TRAFFIC NOISE CONTOURS (1.5 M ABOVE GRADE)

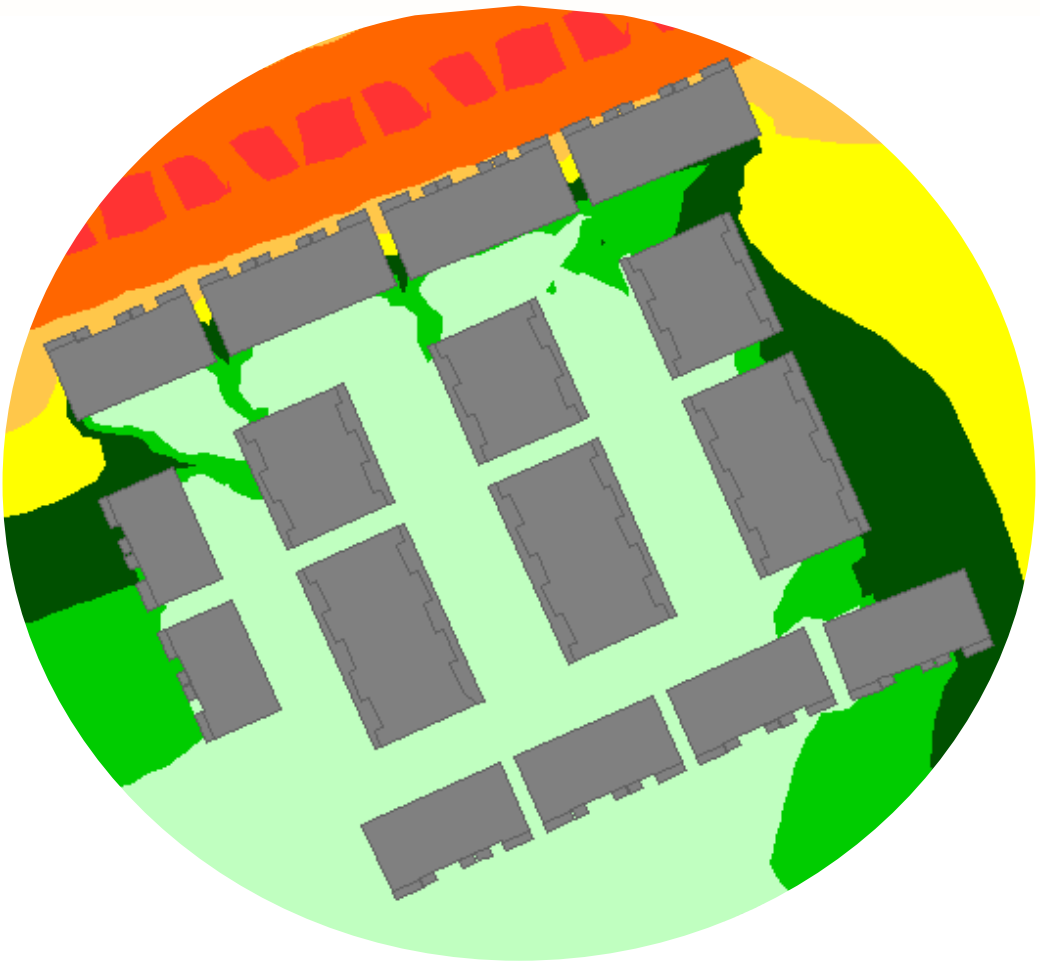

FIGURE 4: NIGHTTIME TRAFFIC NOISE CONTOURS (1.5 M ABOVE GRADE)