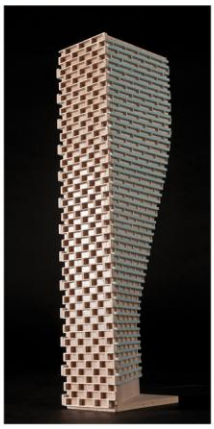
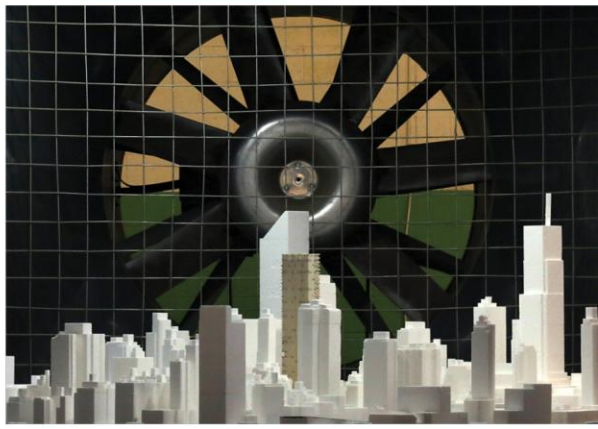
GRADIENTWIND
ENGINEERS & SCIENTISTS

ENVIRONMENTAL NOISE ASSESSMENT

2726 Moodie Drive
Ottawa, Ontario

REPORT: GW23-125-Stationary Noise





October 10, 2025

PREPARED FOR

1000198532 Ontario Inc.
1172 Walkley Road
Ottawa, ON
K1V 1P7

PREPARED BY

Doryan Saavedra, B.Eng., Junior Acoustic Scientist
Joshua Foster, P.Eng., Lead Engineer

EXECUTIVE SUMMARY

This report describes a stationary noise assessment performed for a proposed warehouse development located at 2726 Moodie Drive in Ottawa, Ontario. The development includes five warehouse buildings, all with rectangular planforms rising one storey. Additionally, each building includes outdoor parking spaces and several loading zones. Sources of stationary noise include rooftop air handling equipment, idling trucks, and moving trucks entering and exiting the facility. Figure 1 illustrates a site plan with the surrounding context. Figure 2 illustrates the location of all noise sources included in this study.

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 drawings provided by Kollaard Associates in September 2025.

The results of the current study indicate that noise levels at nearby points of reception are expected to fall below the NPC-300 and ENCG noise criteria, provided that the assumptions for noise control as outlined in Section 2.1 are followed and the suggested maximum permissible noise levels are followed for the selected equipment. As such, the proposed development is expected to be compatible with the existing and proposed noise-sensitive land uses and will satisfy all site plan conditions. A review of the final equipment selections and locations by a qualified acoustical engineer will be required prior to the installation of the equipment.

TABLE OF CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by 1000198532 Ontario Inc. to undertake a stationary noise assessment the proposed warehouse development located at 2726 Moodie Drive in Ottawa, Ontario. This report summarizes the methodology, results, and recommendations related to a stationary noise assessment.

The present scope of work involves assessing exterior noise levels generated by rooftop air handling equipment, idling trucks, and moving truck sources. The assessment was performed based on theoretical noise calculation methods conforming to the City of Ottawa[1] and Ministry of the Environment, Conservation and Parks (MECP) NPC-300[2] guidelines. Noise calculations were based on site plan drawings provided by Kollaard Associates in September 2025. The stationary noise assessment was based on mechanical information assumed by Gradient Wind based on experience with similar projects, surrounding street layouts obtained from the City of Ottawa, and recent site imagery.

2. TERMS OF REFERENCE

The focus of this stationary noise assessment is the proposed warehouse development located at 2726 Moodie Drive in Ottawa, Ontario. The study site is located on a parcel of land directly southwest of the Fallowfield Road and Moodie Drive intersection. The development includes five warehouse buildings, all with rectangular planforms rising one storey. Additionally, each building includes outdoor parking spaces, and several loading zones. The study site is surrounded by rural residential properties to the west and south, light industrial properties to the east, and parkland to the north. Figure 1 illustrates a complete site plan and the surrounding context.

Sources of stationary noise include rooftop air handling equipment, idling trucks, and moving trucks entering and exiting the facility. Figure 2 illustrates the location of all noise sources included in this study.

[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

2.1 Assumptions

The following assumptions have been made in the analysis:

(i) 18 trucks idling at various loading docks for 60 minutes per hour during the daytime period (07:00 – 23:00) and 1 idling truck at the loading dock closest to the residential buildings during the evening/nighttime period (23:00 – 07:00).

(ii) 10 truck movements as they exit the facility occur per peak hour during the daytime period (07:00 – 23:00) and 1 movement per hour during the evening/nighttime period (23:00 – 07:00).

(iii) 8 truck movements as they enter the facility occur per peak hour during the daytime period (07:00 – 23:00) and 1 movement per hour during the evening/nighttime period (23:00 – 07:00).

(iv) The locations, quantity and tonnage of rooftop units have been assumed based on Gradient Wind's experience with similar developments.

(v) Sound data for air handling units, idling trucks, and truck movements are based on Gradient Wind's past experience.

(vi) The rooftop mechanical units are assumed to operate continuously over a 1-hour period during the daytime period (07:00 – 23:00) and at 50% operation during the nighttime period (23:00 – 07:00).

(vii) Screening effects of the proposed and existing buildings have been considered. Screening effects of parapets have been conservatively excluded in the modelling.

(viii) The ground region was modelled as reflective due to the presence of hard ground (pavement).

3. OBJECTIVES

The main goals of this work are to (i) calculate the future on-site and off-site noise levels produced by stationary sources and (ii) ensure that exterior noise levels do not exceed the allowable limits specified by the ENCG, as outlined in Section 4 of this report.

4. METHODOLOGY

The impact of the external stationary noise sources on the nearby residential areas was determined by computer modelling. Stationary noise source modelling is based on the software program *CadnaA* which uses the International Standards Organization (ISO) standard 9613 Parts 1 and 2. This computer program simulates three-dimensional surfaces and three orders of reflections of sound waves over a suitable spectrum for human hearing. This methodology has been used on numerous assignments and has been accepted by the MECP as part of Environmental Compliance Approvals applications. A total of 14 receptor locations were selected for the study site, as illustrated in Figure 3.

4.1 Perception of Noise

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 a characteristic of that 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.

Stationary sources are defined in NPC-300 as "a source of sound or combination of sources of sound that are included and normally operated within the property lines of a facility and includes the premises of a person as one stationary source, unless the dominant source of sound on those premises is construction"[3].

[3] NPC – 300, page 16

4.2 Stationary Noise Criteria

The equivalent sound energy level, L_{eq}, provides a weighted 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 selected period of time. For stationary sources, the L_{eq} is commonly calculated on an hourly interval, while for roadways, the L_{eq} is calculated on the basis of a 16-hour daytime/8-hour nighttime split.

Noise criteria taken from the ENCG and NPC-300 apply to points of reception (POR). A POR is defined under NPC-300 as "any location on a noise-sensitive land use where noise from a stationary source is received"[4]. A POR can be located on an existing or zoned for future use premises of permanent or seasonal residences, hotels/motels, nursing/retirement homes, rental residences, hospitals, campgrounds, and noise-sensitive buildings such as schools and places of worship. The recommended maximum noise levels for a Class 2 area in a suburban environment adjacent to arterial roadways at a POR are outlined in Table 1 below. The study site is considered to be Class 2 as background noise levels are dominated by human activities such as roadway and transit sources.

TABLE 1: EXCLUSIONARY LIMITS FOR CLASS 2 AREA

Time of Day	Outdoor Points of Reception (dBA)	Plane of Window (dBA)
07:00 – 19:00	50	50
19:00 – 23:00	45	50
23:00 – 07:00	N/A	45

[4] NPC – 300, page 14

4.3 Determination of Noise Source Power Levels

Preliminary mechanical information for the development has been based on Gradient Wind's experience with similar developments. Table 2 summarizes the unmitigated sound power of each source used in the analysis.

TABLE 2: EQUIPMENT SOUND POWER LEVELS (dBA)

Source	Description	Height Above Grade (m)	Correction Applied	Total Sound Power (dBA)
S1	Air Handling Unit	1.5	unmitigated	**90**
S2	Idling Truck	1.5	unmitigated	**95**
S3	Moving Truck	1.5	unmitigated	**101**

4.4 Stationary Source Noise Predictions

A total of 14 receptor location was chosen around the site to measure the noise impact at points of reception (POR) during the daytime/evening period (07:00 – 23:00), as well as during the nighttime period (23:00 – 07:00). POR locations include outdoor points of reception (OPOR) and the plane of windows (POW) of the nearby residential properties. Sensor locations are described in Table 4 and illustrated in Figure 3. All sources were represented as point sources in the *CadnaA* model. Table 3 below contains the *CadnaA* calculation settings. These are typical settings that have been based on ISO 9613 standards and guidance from the MECP.

Ground absorption over the study area was determined based on topographical features (such as water, concrete, grassland, etc.). An absorption value of 0 is representative of hard ground, while a value of 1 represents grass and similar soft surface conditions. Existing and proposed buildings were added to the model to account for screening and reflection effects from building façades.

TABLE 3: CALCULATION SETTINGS

Parameter	Setting
Meteorological correction method	Cmet
Value C0	2.0
Ground attenuation factor for lawn areas	1
Ground attenuation factor for roadways and paved areas	0
Temperature (K)	283.15
Pressure (kPa)	101.33
Air humidity (%)	70

TABLE 4: RECEPTOR LOCATIONS

Receptor Number	Receptor Location	Height Above Grade (m)
R1 / OPOR	4644 Fallowfield Road – Vacant Land	1.5
R2 / OPOR	4644 Fallowfield Road – Vacant Land	1.5
R3 / OPOR	4658 Fallowfield Road – Vacant Land	1.5
R4 / OPOR	4658 Fallowfield Road – Vacant Land	1.5
R5 / POW	4664 Fallowfield Road – Southeast Façade	2
R6 / OPOR	4664 Fallowfield Road – Backyard	1.5
R7 / POW	4670 Fallowfield Road – Southeast Façade	2
R8 / OPOR	4670 Fallowfield Road – Backyard	1.5
R9 / POW	4678 Fallowfield Road – Northeast Façade	2
R10 / OPOR	4678 Fallowfield Road – Backyard	1.5
R11 / POW	4688 Fallowfield Road – Northeast Façade	2
R12 / OPOR	4688 Fallowfield Road – Backyard	1.5
R13 / POW	2782 Moodie Drive – Northwest Façade	4.5
R14 / OPOR	2782 Moodie Drive – Backyard	1.5

5. RESULTS AND DISCUSSION

Noise levels on the surroundings produced by the mechanical equipment and trucks associated with the proposed development are presented in Table 5. The sound levels are based on the assumptions outlined in Section 2.1.

TABLE 5: NOISE LEVELS FROM STATIONARY SOURCES

Receptor Number / Type	Receptor Location	Height Above Grade (m)	Noise Level (dBA)		Sound Level Limits		Meets ENCG Class 2 Criteria	
			Day	Night	Day	Night	Day	Night
R1 / OPOR	4644 Fallowfield Road – Vacant Land	1.5	45	41	50	45	**Yes**	**Yes**
R2 / OPOR	4644 Fallowfield Road – Vacant Land	1.5	47	43	50	45	**Yes**	**Yes**
R3 / OPOR	4658 Fallowfield Road – Vacant Land	1.5	43	40	50	45	**Yes**	**Yes**
R4 / OPOR	4658 Fallowfield Road – Vacant Land	1.5	43	40	50	45	**Yes**	**Yes**
R5 / POW	4664 Fallowfield Road – Southeast Façade	2	42	39	50	45	**Yes**	**Yes**
R6 / OPOR	4664 Fallowfield Road – Backyard	1.5	42	39	50	45	**Yes**	**Yes**
R7 / POW	4670 Fallowfield Road – Southeast Façade	2	42	38	50	45	**Yes**	**Yes**
R8 / OPOR	4670 Fallowfield Road – Backyard	1.5	41	38	50	45	**Yes**	**Yes**
R9 / POW	4678 Fallowfield Road – Northeast Façade	2	40	36	50	45	**Yes**	**Yes**
R10 / OPOR	4678 Fallowfield Road – Backyard	1.5	39	33	50	45	**Yes**	**Yes**
R11 / POW	4688 Fallowfield Road – Northeast Façade	2	39	34	50	45	**Yes**	**Yes**
R12 / OPOR	4688 Fallowfield Road – Backyard	1.5	40	34	50	45	**Yes**	**Yes**
R13 / POW	2782 Moodie Drive – Northwest Façade	4.5	43	36	50	45	**Yes**	**Yes**

TABLE 5: NOISE LEVELS FROM STATIONARY SOURCES (CONT.)

Receptor Number / Type	Receptor Location	Height Above Grade (m)	Noise Level (dBA)		Sound Level Limits		Meets ENCG Class 2 Criteria	
			Day	Night	Day	Night	Day	Night
R14 / OPOR	2782 Moodie Drive – Backyard	1.5	44	35	50	45	**Yes**	**Yes**

As Table 5 summarizes, noise levels fall below the ENCG criteria at all receptors. Noise contours at 1.5 m above grade can be seen in Figures 4 and 5 for daytime and nighttime conditions, respectively. The results indicate that different equipment and trucks will have a greater contribution to the noise impact at nearby façades depending on their position and orientation. It is recommended that the maximum permissible noise levels be used within the design, where noted, to ensure noise levels meet the criteria outlined in the NPC-300 and ENCG guidelines. This can be achieved by incorporating quieter units, installing silencers or noise barriers where required. As a general recommendation, rooftop equipment should be located toward the centre of the rooftop area, avoiding direct line of sight with noise-sensitive areas, if possible.

6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current study indicate that noise levels at nearby points of reception are expected to fall below the NPC-300 and ENCG noise criteria, provided that the assumptions for noise control as outlined in Section 2.1 are followed and the suggested maximum permissible noise levels are followed for the selected equipment.

As such, the proposed development is expected to be compatible with the existing and proposed noise-sensitive land uses and will satisfy all site plan conditions. A review of the final equipment selections and locations by a qualified acoustical engineer will be required prior to the installation of the equipment.

This concludes our stationary 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.

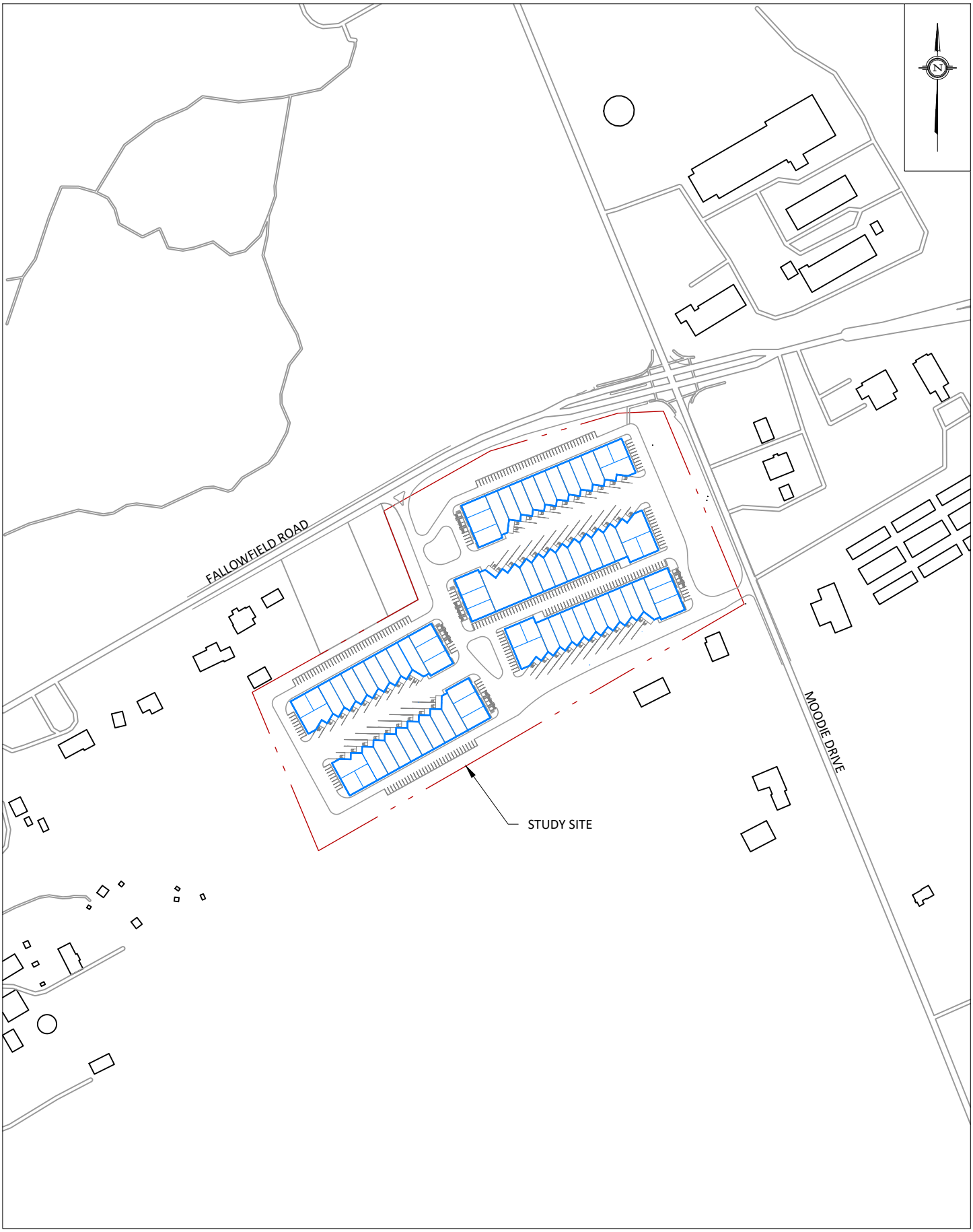
Sincerely,

Gradient Wind Engineering Inc.

Doryan Saavedra, B.Eng.
Junior Acoustic Scientist

Joshua Foster, P.Eng.
Lead Engineer

Gradient Wind File #23-125 - Stationary Noise

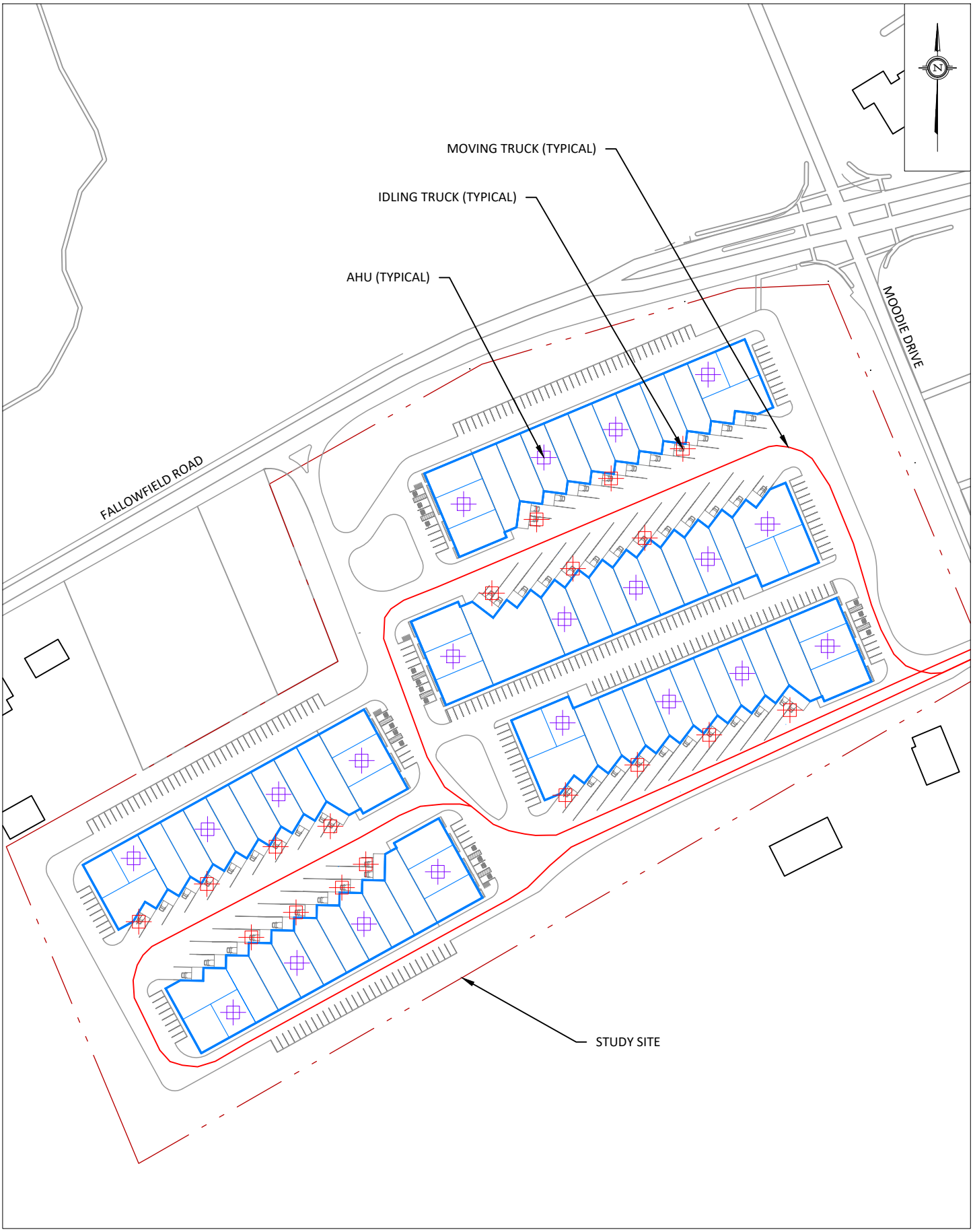


GRADIENTWIND
ENGINEERS & SCIENTISTS

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

PROJECT	2726 MOODIE DRIVE, OTTAWA STATIONARY NOISE ASSESSMENT		DESCRIPTION
SCALE	1:4000 (APPROX.)	DRAWING NO.	GW23-125-1
DATE	SEPTEMBER 17, 2025	DRAWN BY	D.S.

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT

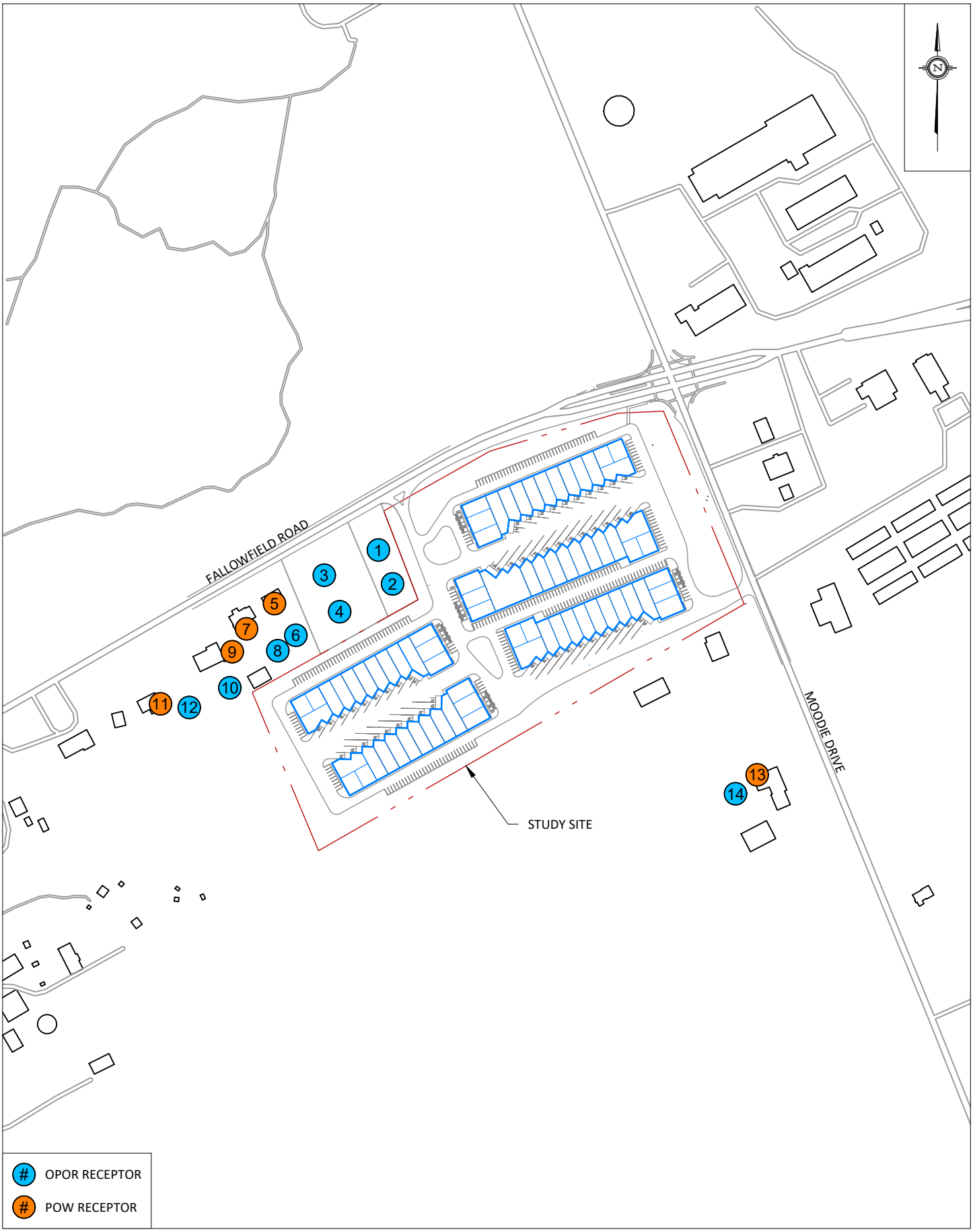


GRADIENTWIND
ENGINEERS & SCIENTISTS

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

PROJECT	2726 MOODIE DRIVE, OTTAWA STATIONARY NOISE ASSESSMENT		DESCRIPTION
SCALE	1:2000 (APPROX.)	DRAWING NO.	GW23-125-2
DATE	SEPTEMBER 17, 2025	DRAWN BY	D.S.

FIGURE 2:
STATIONARY NOISE SOURCES



GRADIENTWIND
ENGINEERS & SCIENTISTS

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

PROJECT	2726 MOODIE DRIVE, OTTAWA STATIONARY NOISE ASSESSMENT
SCALE	1:4000 (APPROX.)
DRAWING NO.	GW23-125-3
DATE	SEPTEMBER 17, 2025
DRAWN BY	D.S.

DESCRIPTION

FIGURE 3:
STATIONARY NOISE RECEPTOR LOCATIONS

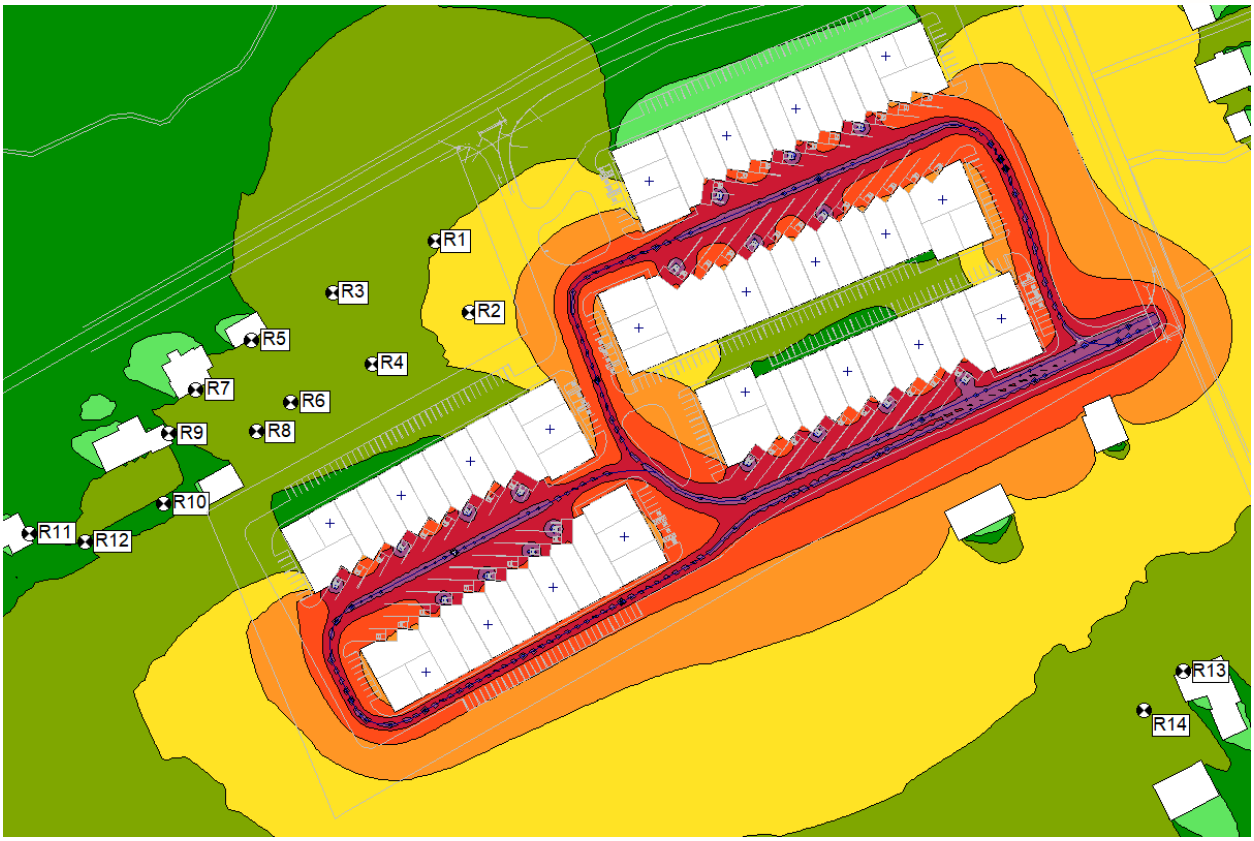


FIGURE 4: DAYTIME STATIONARY NOISE CONTOURS (1.5 M ABOVE GRADE)

FIGURE 5: NIGHTTIME STATIONARY NOISE CONTOURS (1.5 M ABOVE GRADE)