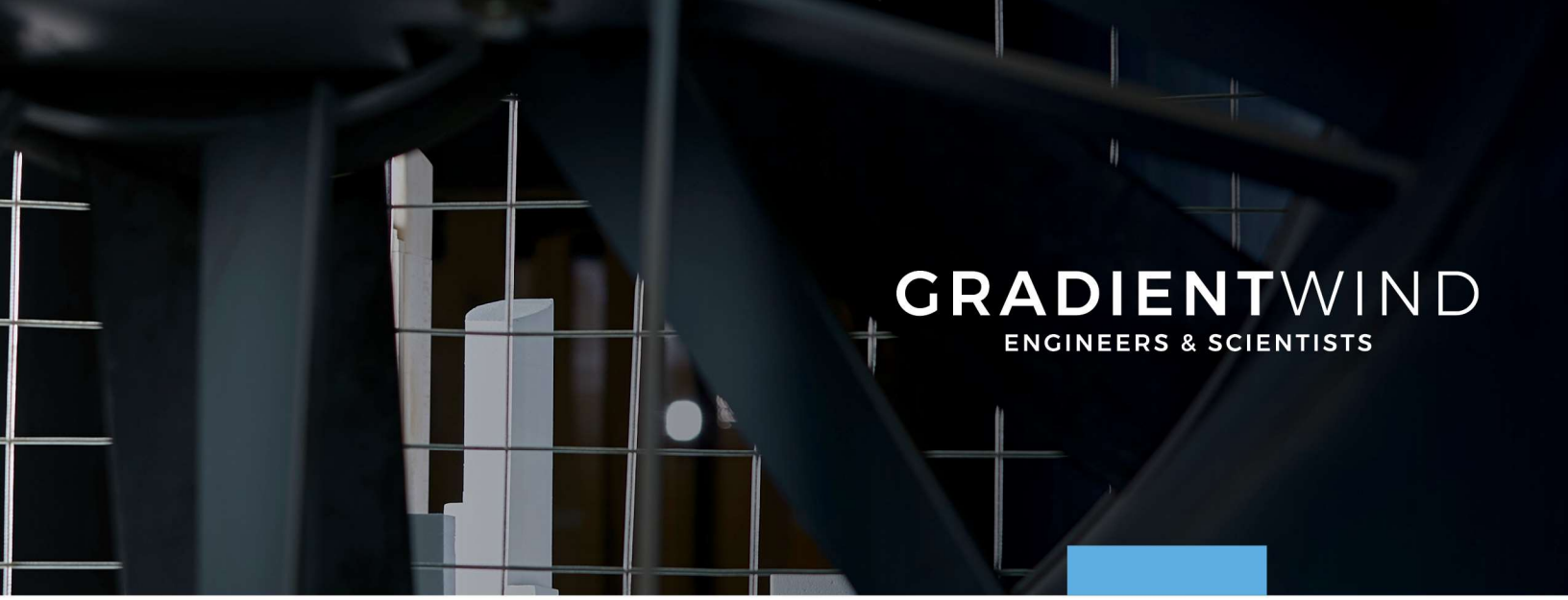

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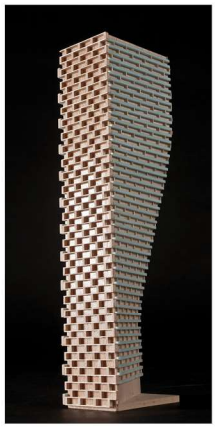
STATIONARY NOISE STUDY

2180 Montreal Road & 972 Shefford
Ottawa, Ontario

REPORT: 25-233 – Stationary Noise Study



April 1, 2026

PREPARED FOR
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EXECUTIVE SUMMARY

This report describes a stationary noise study to support Zoning By-Law (ZBA) and Site Plan Control (SPA) applications for the proposed gas station expansion of the development located at 2180 Montreal Road & 972 Shefford in Ottawa, Ontario. The study site is located on the corner of Montreal Road and Shefford Road, bounded by Montreal Road to the northwest, and Shefford Road to the northeast. The major sources of stationary noise impacting the surrounding buildings include a Make-up Air Unit (MAU) and exhaust fan on the roof of the new convenience store and restaurant, an existing carwash, and idling cars in queue at the drive-thru and carwash. Figure 1 illustrates a site plan with the surrounding context.

The focus of this study is the exterior noise levels generated by the stationary noise sources. The study 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) architectural drawings prepared by K Paul Architect dated November 2025; (iv) sound power data of similar mechanical equipment from J+B Engineering, and; (v) idling vehicles, and car wash entrance and exit activities estimated based on Gradient Wind's experience with similar projects.

Our stationary noise study indicates that noise levels at nearby points of reception are expected to fall below the ENCG noise criteria provided that the assumptions outlined in Section 2.1 and the sound power levels of the stationary noise sources do not exceed the levels shown in Table 2. As such, the proposed development is expected to be compatible with the existing noise-sensitive land uses.

A review of the equipment selections and locations that will form the requirements of the construction documents/contract should be made by a qualified acoustical engineer; final equipment selections will be verified to meet or exceed the performance requirements prior to the installation of the equipment.

TABLE OF CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Q9 Planning + Design to undertake a stationary noise study in support of a Site Plan Control (SPC) application for the proposed development located at 2180 Montreal Road & 972 Shefford in Ottawa, Ontario. This report summarizes the methodology, results, and recommendations related to a stationary noise study.

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 drawings provided by K Paul Architect dated November 2025, surrounding street layouts obtained from the City of Ottawa and recent site imagery, and stationary noise source data modelled based on mechanical data for similar units provided by J+B Engineering, and Gradient Wind's experience with similar projects.

2. TERMS OF REFERENCE

The focus of this stationary noise study is a proposed expansion of the site located at 2180 Montreal Road & 972 Shefford in Ottawa, Ontario. The study site occupies an irregular-shaped parcel of land at the intersection of Montreal Road and Shefford Road.

The existing development includes a carwash to the east, a tank nest to the northwest, a driveway running through the carwash, and a convenience store at the center. The site area has been expanded by the addition of a small rectangular parcel of land directly to the southwest with the address 972 Shefford Road. The partial redevelopment includes a new gas station building with a convenience store and restaurant, a reconfiguration of the queue for an existing drive-thru carwash, a drive-thru serving the restaurant, a new 8-channel compressed ACM canopy to the southeast of the tank nest, new curbs, a bike rack, and a patio area. This stationary noise study is based on drawings prepared by K Paul Architect Inc., dated November 25, 2025, and Gradient Wind's experience. The primary stationary noise sources are the car wash, rooftop units (RTU), idling cars in queue at the drive-thru and carwash.

[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

2.1 Assumptions

While mechanical equipment selection was not finalized prior to issuing this report, sound power data and unit locations from similar projects were provided by J+B Engineering and used to model the Make-up Air Unit (MAU) and exhaust fan (EF). Sound power data and locations of other stationary noise sources (car wash, idling cars) is based on Gradient Wind's previous experience with similar projects. A review of the equipment selections and locations that will form the requirements of the construction documents/contract will need to be made by a qualified acoustical engineer; final equipment selections will be verified to meet or exceed the performance requirements prior to the installation of the equipment. Locations of all noise sources can be seen in Figure 2.

The following assumptions have been made in the analysis:

(i) The rooftop air handling units are assumed to operate continuously over a 1-hour period during the daytime and evening periods and 50% operation during the nighttime period.

(ii) The ground was assumed to be flat, and the ground region was modelled as reflective except for the parks and grass areas which were modelled as absorptive.

(iii) The car wash entrance and exit doors were modelled as vertical area sources and were assumed to emit only when open for durations of 12 minutes per hour in the daytime and evening periods, and 5 minutes per hour during the nighttime period based on typical operational duty cycles. To further reduce car wash noise levels, silencers may be installed on dryer fans and other equipment where feasible.

(iv) A total of 10 idling cars were modelled within the site boundary as point sources, with 5 in the queue for the car wash and 5 in the queue for the drive-thru.

(v) A total of 15 receptors were strategically placed on existing noise-sensitive buildings surrounding the site. The location of the receptors can be seen in Figure 3.

3. OBJECTIVES

The main goals of this work are to (i) calculate the future noise levels on the surrounding noise-sensitive buildings produced by on-site stationary sources and (ii) ensure that exterior noise levels do not exceed the allowable limits specified by Ottawa's Environmental Noise Control Guidelines (ENCG), as outlined in Section 4.2 of this report.

4. METHODOLOGY

The impact of the external stationary noise sources on the nearby noise-sensitive areas was determined by computer modelling. Stationary noise source modelling is based on the software program *CadnaA* developed from the International Standards Organization (ISO) standard 9613 Parts 1 and 2. This computer program simulates three-dimensional surfaces and first 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. 15 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 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. Its measurement 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 represents the noise perceived by the human ear. With this scale, a doubling of sound power at the source results in a 3 dBA increase in measured noise levels at the receiver 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 the ENCG as "all sources of sound and vibration, whether fixed or mobile, that exist or operate on a premises, property or facility, the combined sound and vibration levels of which are emitted beyond the property boundary of the premises, property or facility, unless the source(s) is (are) due to construction" [3].

[3] City of Ottawa Environmental Noise Control Guidelines, page 10

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 the ENCG 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 daycares. As the site is in an urban environment, the area is considered a Class 1 area as per the ENCG. The recommended maximum noise levels for a Class 1 area at a POR are outlined in Table 1 below.

TABLE 1: EXCLUSIONARY LIMITS FOR CLASS 1 AREA

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

[4] City of Ottawa Environmental Noise Guidelines, page 9

4.3 Determination of Noise Source Power Levels

Table 2 summarizes the maximum permissible sound power level for each source used in the analysis. The stationary noise source locations can be seen in Figure 2.

TABLE 2: MAXIMUM PERMISSIBLE SOUND POWER LEVELS (DBA)

Source ID	Source Description	Height Above Grade/Roof (m)	Frequency (Hz)								
			63	125	250	500	1000	2000	4000	8000	Total
S1	MAU-1	1	84	87	83	80	80	73	74	75	**84**
S2	EF-1	1	74	78	84	73	67	65	60	54	**77**
S3	Idling Cars	0.75	55	65	57	65	66	63	62	54	**72**
S4	Car Wash Entrance	4x3*	49	57	62	78	79	79	77	74	**85**
S5	Car Wash Exit	3x3*	53	65	69	84	85	84	79	70	**90**

** Emitting façade (Length x Height)*

4.4 Stationary Source Noise Predictions

A total of 15 receptor locations were chosen on the surrounding noise-sensitive buildings to measure the noise impact at the outdoor point of reception (OPOR) and plane of window (POW) receptors during the daytime/evening period (07:00 – 23:00), as well as during the nighttime period (23:00 – 07:00). Receptor locations are described in Table 4 and illustrated in Figure 3. RTUs and idling cars were represented as point sources in the model while the car wash entrance and exit were represented as vertical area sources. Table 3 below contains 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. A CadnaA sample output is available upon request.

TABLE 3: CALCULATION SETTINGS

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

TABLE 4: RECEPTOR LOCATIONS

Receptor Number	Receptor Type	Receptor Location	Height Above Grade (m)
R1	POW	976 Shefford Road – North Façade	4
R2	POW	976 Shefford Road – West Facade	4
R3	OPOR	976 Shefford Road – Backyard	1.5
R4	POW	980 Shefford Road – North Façade	4
R5	POW	980 Shefford Road – West Façade	4
R6	OPOR	5149 Lerner Way – Backyard	1.5
R7	POW	5149 Lerner Way – Northeast Façade	4
R8	POW	5147 Lerner Way – North Façade	4
R9	POW	5145 Lerner Way – North Façade	4
R10	POW	5139 Lerner Way – North Façade	4
R11	POW	2111 Montreal Road – South Façade	4
R12	POW	2111 Montreal Road – South Façade	4
R13	POW	2111 Montreal Road – East Façade	4
R14	POW	2201 Montreal Road – Southwest Façade	16.5
R15	POW	977 Shefford Road – West Facade	4

5. RESULTS AND DISCUSSION

Noise levels at nearby points of reception are below ENCG and NPC-300 criteria for stationary noise, as summarized in Table 5 below. The sound levels listed are based on the assumptions outlined in Section 2.1.

TABLE 5: NOISE LEVELS DUE TO STATIONARY NOISE SOURCES

Receptor Number	Receptor Type	Height Above Grade (m)	Noise Level (dBA)		Sound Level Limits (dBA)		Meets ENCG Class 1 Criteria	
			Day	Night	Day	Night	Day	Night
R1	POW	4	47	45	50	45	Yes	Yes
R2	POW	4	47	45	50	45	Yes	Yes
R3	OPOR	1.5	47	N/A	50	N/A	Yes	N/A
R4	POW	4	45	42	50	45	Yes	Yes
R5	POW	4	44	41	50	45	Yes	Yes
R6	OPOR	1.5	46	N/A	50	N/A	Yes	N/A
R7	POW	4	46	43	50	45	Yes	Yes
R8	POW	4	46	44	50	45	Yes	Yes
R9	POW	4	46	44	50	45	Yes	Yes
R10	POW	4	44	41	50	45	Yes	Yes
R11	POW	4	48	44	50	45	Yes	Yes
R12	POW	4	49	45	50	45	Yes	Yes
R13	POW	4	49	45	50	45	Yes	Yes
R14	POW	16.5	41	37	50	45	Yes	Yes
R15	POW	4	41	39	50	45	Yes	Yes

N/A: Nighttime values for OPOR are not considered per NPC-300.

6. CONCLUSIONS AND RECOMMENDATIONS

Our stationary noise study indicates that noise levels at nearby points of reception are expected to fall below the ENCG noise criteria provided that the assumptions outlined in Section 2.1 and the sound power levels of the stationary noise sources do not exceed the levels shown in Table 2. As such, the proposed development is expected to be compatible with the existing noise-sensitive land uses.

A review of the equipment selections and locations that will form the requirements of the construction documents/contract should be made by a qualified acoustical engineer; final equipment selections will be verified to meet or exceed the performance requirements prior to the installation of the equipment.

This concludes our stationary noise study 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.

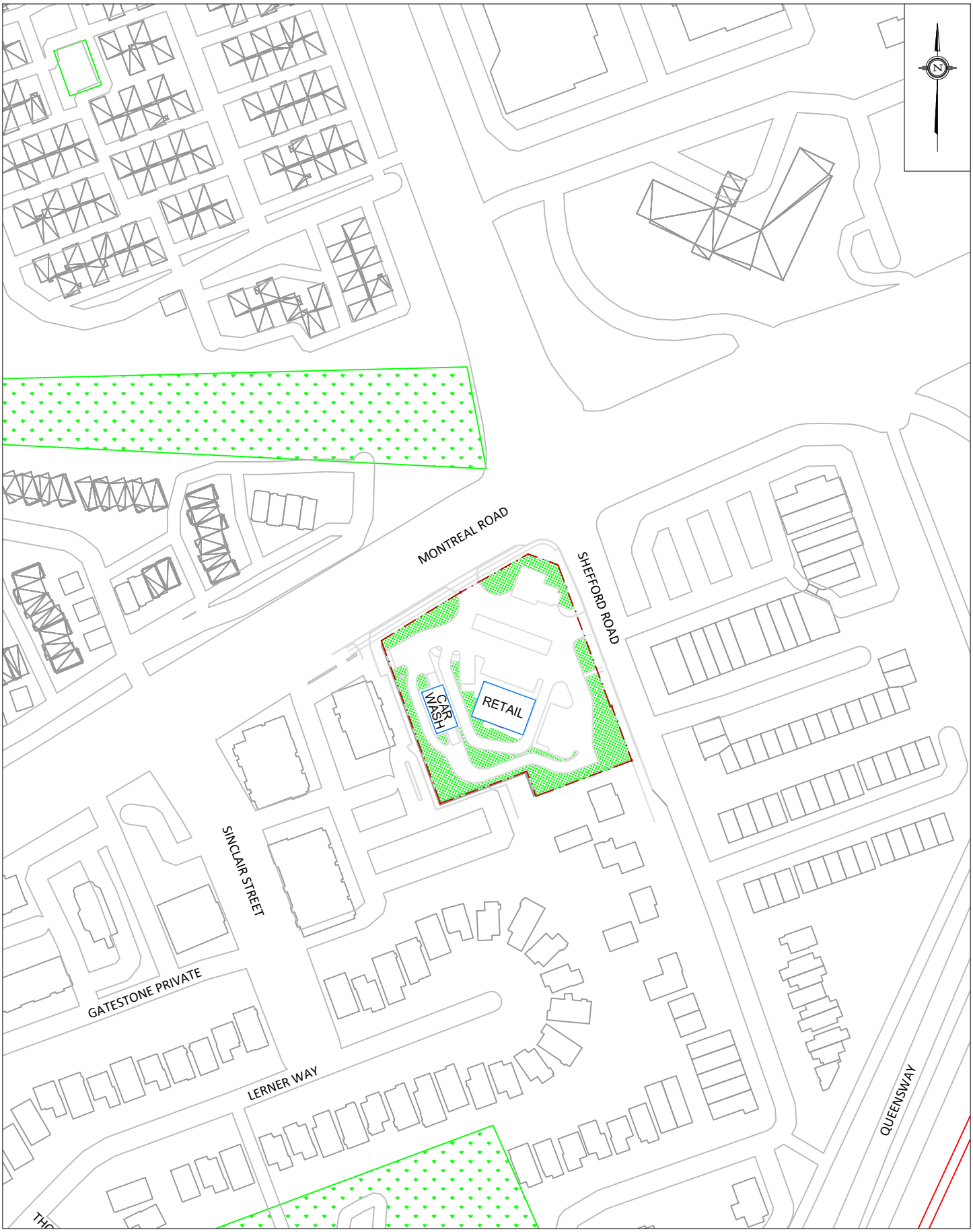
Sincerely,

Gradient Wind Engineering Inc.

Nick Cunnington-Bourbonniere, M.A.Sc.
Junior Acoustical Scientist

Joshua Foster, P.Eng.
Lead Engineer

Gradient Wind File #25-233-Stationary Noise Study



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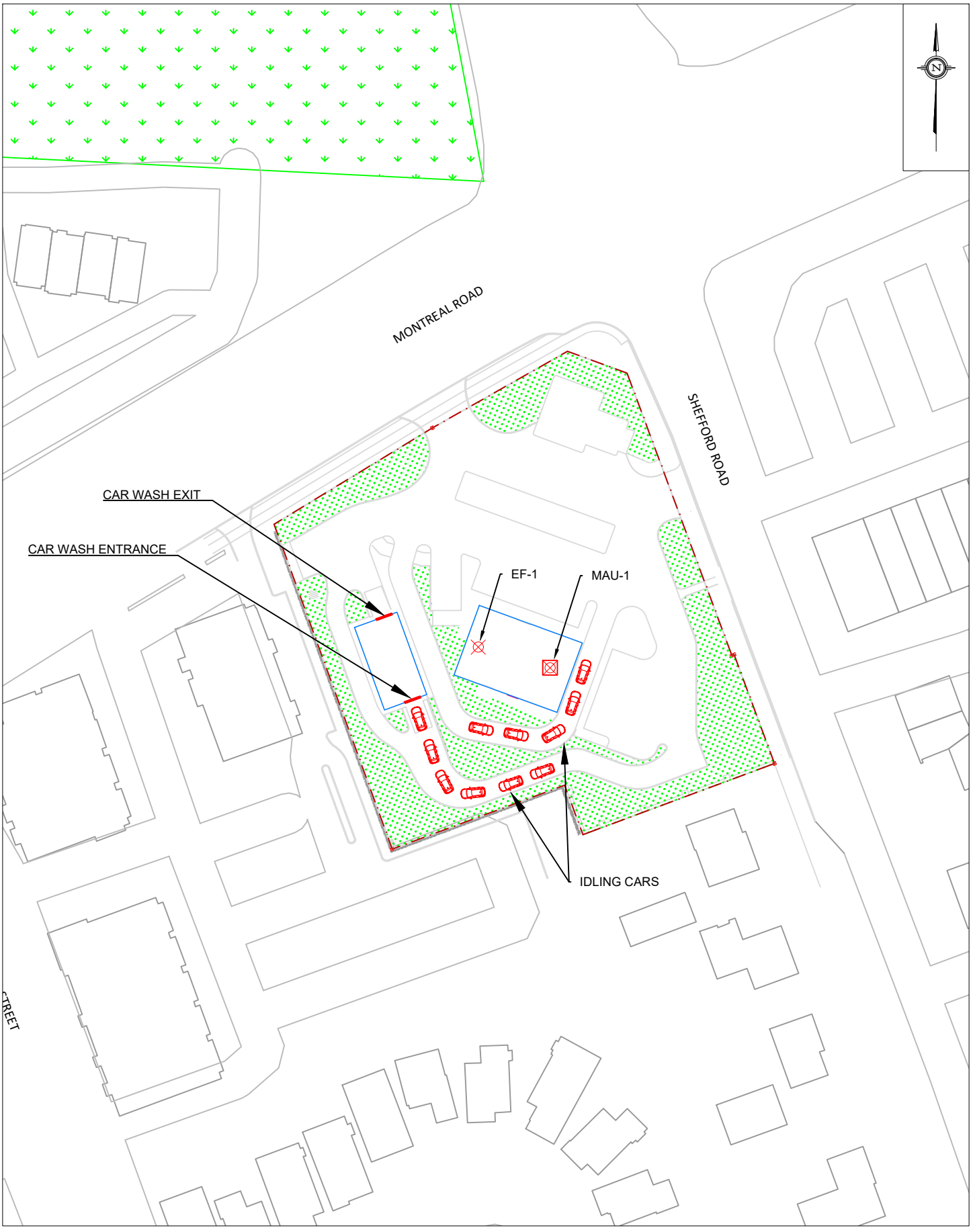
PROJECT	2180 MONTREAL ROAD & 972 SHEFFORD ROAD, OTTAWA STATIONARY NOISE STUDY
SCALE	1:1000 (APPROX.)
DRAWING NO.	GW25-233-1
DATE	MARCH 5, 2026
DRAWN BY	N.C.B.

DESCRIPTION

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT



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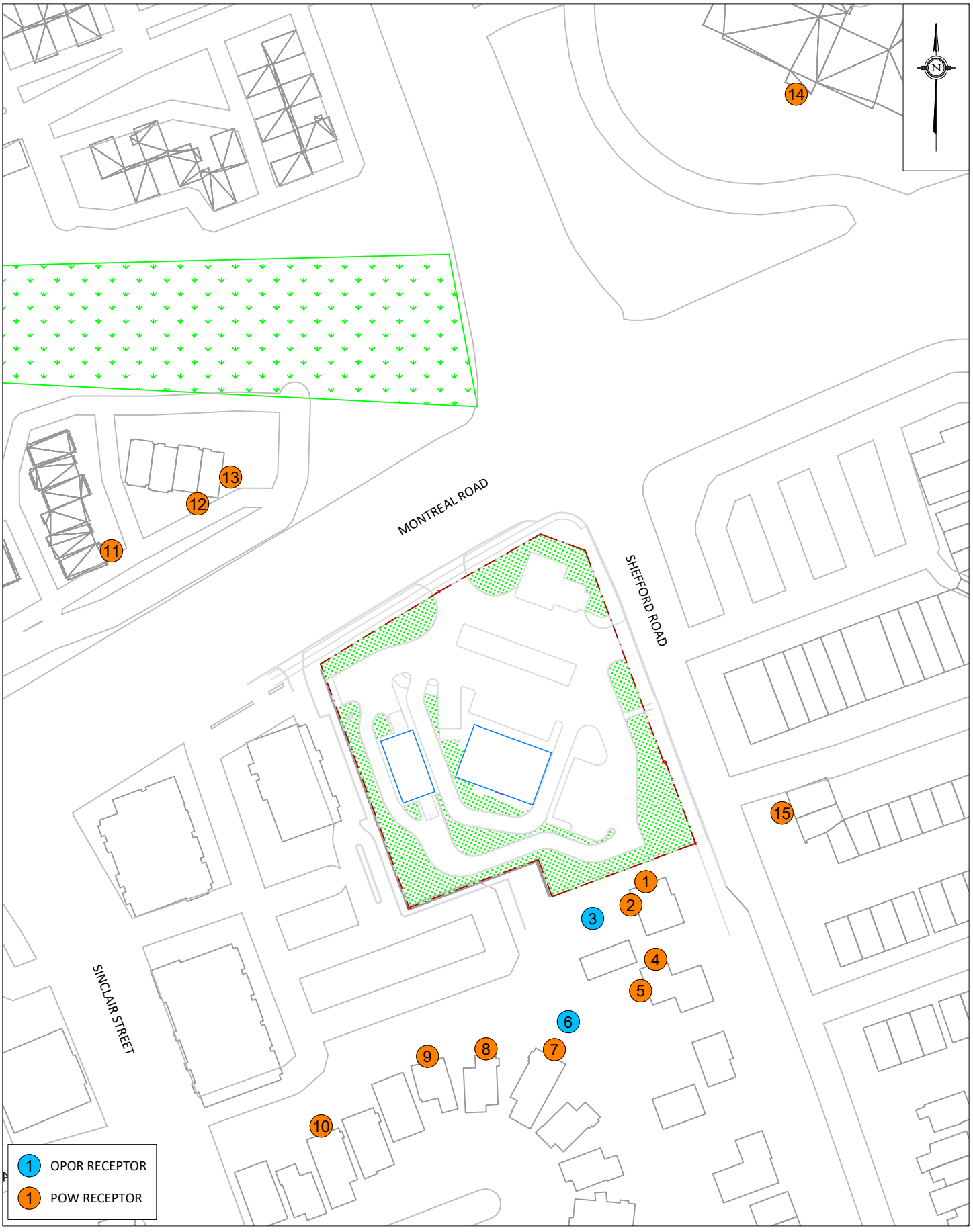
DATE	MARCH 5, 2026	DRAWN BY	N.C.B.

DESCRIPTION

FIGURE 2:
STATIONARY NOISE SOURCE LOCATIONS



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SCALE	1:1000 (APPROX.)
DRAWING NO.	GW25-233-3
DATE	MARCH 5, 2026
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DESCRIPTION

FIGURE 3:
RECEPTOR LOCATIONS

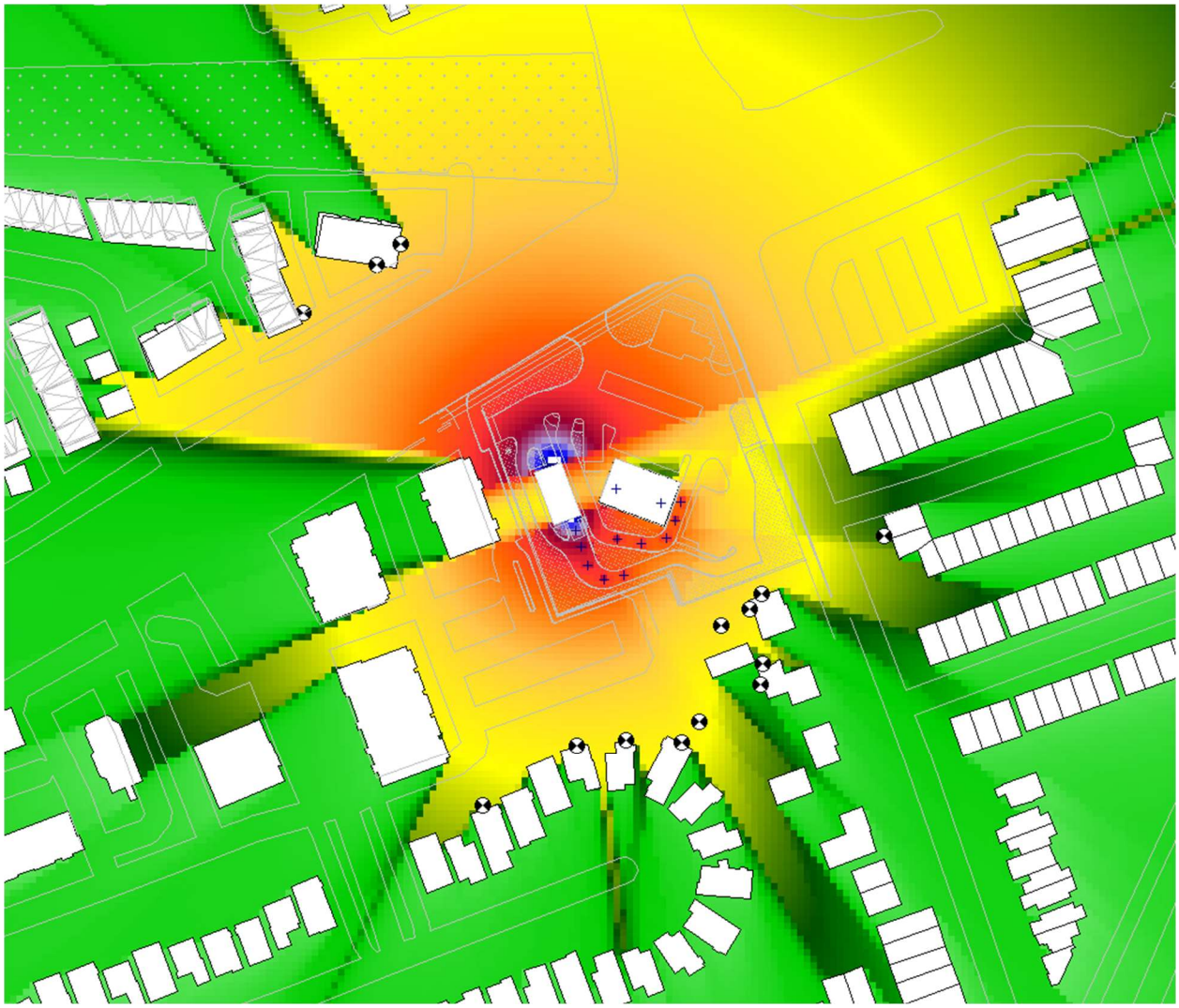
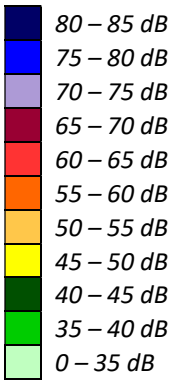


FIGURE 4: DAYTIME STATIONARY NOISE CONTOURS (1.5 METERS ABOVE GRADE)



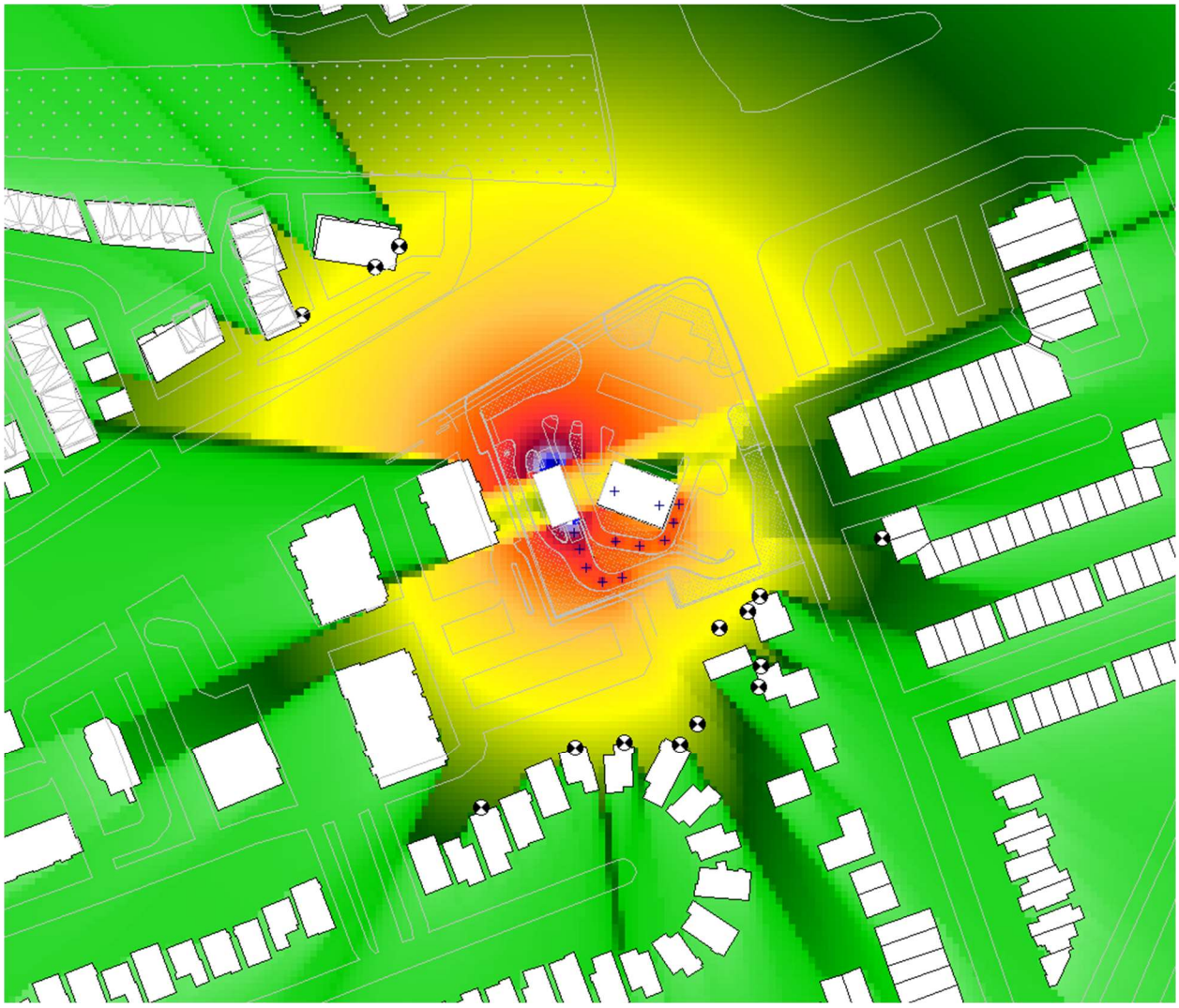


FIGURE 5: NIGHTTIME STATIONARY NOISE CONTOURS (1.5 METERS ABOVE GRADE)