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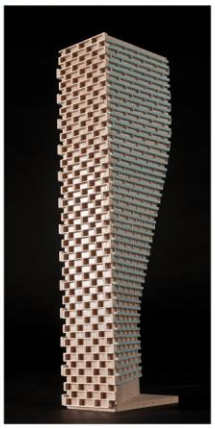
STATIONARY NOISE ASSESSMENT

1015 Dairy Drive
Ottawa, Ontario

REPORT: 23-098 – Stationary Noise R2



November 12, 2024

PREPARED FOR

TSL-Dairy LP
50 King Street East,
Hamilton, ON L8N 1A6

PREPARED BY

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EXECUTIVE SUMMARY

This report describes a stationary noise assessment performed for a proposed development located at 1015 Dairy Drive in Ottawa, Ontario. The proposed development consists of two (2) two-storey self-storage buildings (Building A and B), two (2) one-storey buildings comprising industrial units (Building C and D), and surface parking areas. The major sources of stationary noise are rooftop units (RTU) servicing the storage and office areas located at Buildings A and B, rooftop units (RTU) servicing the industrial units, idling trucks and truck traffic in the development. The stationary noise sources were assessed for their potential impact on the nearby noise-sensitive buildings. Figure 1 illustrates a complete site plan with the surrounding context.

The assessment is based on (i) theoretical noise prediction methods that conform to the City of Ottawa's Environmental Noise Control Guidelines (ENCG) and the Ministry of the Environment, Conservation and Parks (MECP) requirements; (ii) architectural drawings provided by Sam Esposto Architect Inc., provided in October 2024; (iii) sound power data of the rooftop units (RTU), idling and moving trucks were based on Gradient Wind's past experience with similar developments.

The results of the stationary noise analysis indicate that noise levels at Plane of Window (POW) will range between 45 dBA and 48 dBA during the daytime and evening period (07:00-23:00) and 42 dBA and 43 dBA during the nighttime period (23:00-07:00). The highest noise levels occur at the north Plane of Window (POW) receptor at 11 Aveia Private which is directly across the truck route of the proposed development.

All noise levels are expected to fall below limits specified by the ENCG for a Class 1 area, therefore, no mitigation for stationary noise sources on the proposed building is required. The proposed building is expected to be compatible with existing noise-sensitive land uses.

TABLE OF CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by TSL-Dairy LP to undertake a stationary noise assessment for the proposed self-storage facility located at 1015 Dairy Drive in Ottawa, Ontario. This report summarizes the methodology, results, and recommendations related to the assessment of noise levels generated by on-site stationary noise sources at neighbouring developments.

The present scope of work involves assessing the noise impact of exterior noise levels generated by the rooftop unit (RTU) servicing the storage and office areas located at Buildings A and B, rooftop units (RTU) servicing the industrial units, idling trucks and truck traffic in the development. This assessment is based on (i) theoretical noise prediction methods that conform to the City of Ottawa's Environmental Noise Control Guidelines (ENCG) and the Ministry of the Environment, Conservation and Parks (MECP) requirements; (ii) architectural drawings provided by Sam Esposto Architect Inc., provided in October 2024; (iii) sound power data of the rooftop unit (RTU), idling and moving trucks were based on Gradient Wind's past experience with similar developments.

2. TERMS OF REFERENCE

This report describes a stationary noise assessment performed for a proposed self-storage development located at 1015 Dairy Drive in Ottawa, Ontario. The study site is located on a quasi-rectangular-shaped parcel of land bounded by Dairy Drive to the west and Old Montreal Road to the south. The development consists of two (2) two-storey self-storage buildings (Building A and B), two (2) one-storey buildings comprising industrial units (Building C and D), and surface parking areas.

The major sources of stationary noise impacting the surrounding buildings are a rooftop unit (RTU) atop Building A, where the office area is located, moving trucks, and idling trucks. Figure 1 illustrates a complete site plan with the surrounding context. Figure 2 illustrates the locations of receptors as well as the stationary noise sources.

3. OBJECTIVES

The principal objectives of this study are to (i) calculate the expected noise levels on existing noise-sensitive lands from proposed stationary sources, and (ii) where necessary provide appropriate mitigation strategies to ensure the noise levels at surrounding buildings remain compliant with the sound level limits defined by the ENCG.

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 Stationary Noise

4.2.1 Criteria for Stationary Noise

For stationary sources, the L_{eq} is commonly calculated on an hourly interval, while for roadways, the L_{eq} is calculated based on a 16-hour daytime/8-hour nighttime split. Noise criteria taken from NPC-300 apply to outdoor 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"[1]. This applies to the plane of window and outdoor amenity spaces serving the development. A POR can be located on 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, places of worship and daycare facilities.

[1] NPC – 300, page 14

The proposed development is located in an already-developed area and close to an arterial road (Old Montreal Road). As man-made noise sources are dominant, the area is classified as a Class 1 area. According to NPC-300, the recommended maximum noise level for an urban (Class 1) environment at a POR is either the lowest one-hour background noise level due to other sources, or the exclusionary limits outlined in Table 1, whichever is higher.

TABLE 1: EXCLUSIONARY LIMITS FOR CLASS 1 AREA

Time of Day	Class 1	
	Outdoor Points of Reception	Plane of Window
07:00 – 19:00	50	50
19:00 – 23:00	50	50
23:00 – 07:00	N/A	45

4.2.2 Assumptions

Sound power data of the rooftop units (RTU), idling and moving trucks were based on Gradient Wind's past experience with similar developments. The following assumptions have been made in the analysis:

(i) A total of five (5) rooftop units (RTU) were assumed to be located on the roofs of Building A and servicing the offices as well as the storage areas. The RTUs were modelled as point sources located 1.5 metres above the rooftop.

(ii) A rooftop unit (RTU) was also modelled as a point source located 1.5 metres above the rooftop of each industrial unit in Buildings C and D.

(iii) The moving truck traffic was modelled as a moving source whereas the idling trucks were modelled at point sources 2 metres above the walking surface.

(iv) The RTU is assumed to operate continuously over a 1 hour period during the daytime/evening period and for 50% of the time during the nighttime period.

(v) During the daytime, 10 moving trucks were assumed to enter and exit the storage facility per hour. During the nighttime, this assumption was reduced to 2 per hour. This is considered a conservative assumption as the client anticipates only 3-5 trucks per hour accessing the site. Furthermore, truck movements will be directed towards the west side of the site.

(vi) The screening effects of the buildings as well as reflections from the façades of the buildings have been considered in the analysis.

(vii) Default ground surfaces were taken to be absorptive while the hard ground surfaces such as pavement and concrete were modelled as reflective.

4.2.3 Determination of Noise Source Power Levels

Sound power data of the rooftop unit (RTU), idling and moving trucks were based on Gradient Wind's past experience with similar developments. Table 2 summarizes the sound power levels used for each source in the analysis. Figure 2 illustrates the location of these stationary noise sources.

TABLE 2: STATIONARY NOISE SOURCES SOUND POWER LEVELS (DBA)

Source ID	Description	Height Above Grade / Rooftop (m)	Frequency (Hz)								
			63	125	250	500	1000	2000	4000	8000	Lw(A)
S1-8*	RTU-1	1.5	75	86	86	89	89	86	83	78	95
S9-10**	RTU-2	1.5	65	76	76	79	79	76	73	68	85
S11-23***	RTU-3	1.5	60	71	71	74	74	71	67	63	80
S24	Moving Truck	2	65	72	76	85	90	89	83	74	94
S25-27	Idling Truck	2	63	76	85	91	91	89	86	81	96

*Servicing storage areas.
**Servicing offices
***Servicing industrial units

4.2.4 Stationary Source Noise Predictions

The impact of the surrounding stationary noise sources on the development was determined by computer modelling. Stationary noise source modelling is based on the software program *Predictor-Lima* developed from the International Standards Organization (ISO) standard 9613 Parts 1 and 2. This computer program is capable of representing three-dimensional surfaces and first reflections of sound waves over a suitable spectrum for human hearing. The methodology has been used on numerous assignments and has been accepted by the MECP as part of Environmental Compliance Approvals applications.

A total of 9 receptor locations were chosen on the surrounding noise-sensitive buildings and outdoor areas. Receptor locations are described in Table 4 and illustrated in Figure 2. Also, a grid was defined in

the *Predictor-Lima* model which contained several hundred individual points at which, noise impacts were measured for the daytime and evening (07:00 – 23:00) and nighttime (23:00 – 07:00) periods, the results at the grid are displayed as a contour plot in Figures 3 and 4.

Air temperature, pressure and relative humidity were set to 10°C, 101.3 kPA and 70%, respectively. Ground absorption over the study area was determined based on topographical features (such as water, concrete, grassland, etc.). A coefficient of 0 was used for hard surfaces, such as concrete and paved areas, and 1 for soft surfaces, such as grass and vegetative areas. Existing and proposed buildings were added to the model to account for screening and reflection effects from building façades. Modelling data can be provided 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

5. STATIONARY NOISE RESULTS

5.1 Stationary Noise Levels

Table 4 shows the noise level results at the neighbouring noise-sensitive buildings.

TABLE 4: STATIONARY NOISE LEVELS (dBA)

Receptor Number	Receptor Height Above Grade (m)	Receptor Location	Stationary Noise Level (dBA)		Meets MECP Class 1 Criteria	
			Day*	Night	Day*	Night
R1	4.5	POW / 20 Aveia Private North Façade	46	41	YES	YES
R2	4.5	POW / 11 Aveia Private North Façade	48	42	YES	YES
R3	4.5	POW / 1057 Old Montréal Rd West Façade	45	42	YES	YES
R4	4.5	POW / 1079 Old Montréal Rd West Façade	47	43	YES	YES
R5	1.5	OPOR / 11 Aveia Private North	48	N/A**	YES	YES
R6	1.5	OPOR / 11 Aveia Private East	46	N/A**	YES	YES
R7	1.5	OPOR / 1057 Old Montréal Rd South	45	N/A**	YES	N/A**
R8	1.5	OPOR / 1057 Old Montréal Rd East	39	N/A**	YES	N/A**
R9	1.5	OPOR / 1079 Old Montréal Rd West	45	N/A**	YES	N/A**

* Day values also represent the evening values.
** OPOR noise levels during the nighttime are not considered as per ENCG

The results of the stationary noise analysis indicate that noise levels at Plane of Window (POW) will range between 45 dBA and 48 dBA during the daytime and evening period (07:00-23:00) and 42 dBA and 43 dBA during the nighttime period (23:00-07:00). The highest noise levels occur at the north Plane of Window (POW) receptor at 11 Aveia Private which is directly across the truck route of the proposed development.

Noise levels at all receptors, including Outdoor Points of Reception (OPORs), are below the MECP criteria for Class 1 areas.

6. CONCLUSIONS

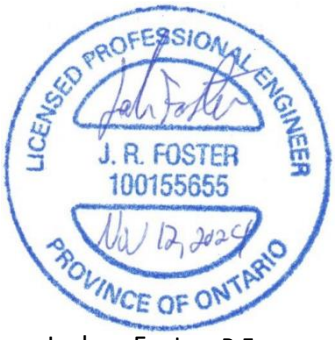
The results of the stationary noise analysis indicate that noise levels at Plane of Window (POW) will range between 45 dBA and 48 dBA during the daytime and evening period (07:00-23:00) and 42 dBA and 43 dBA during the nighttime period (23:00-07:00). The highest noise levels occur at the north Plane of Window (POW) receptor at 11 Aveia Private which is directly across the truck route of the proposed development.

All noise levels are expected to fall below limits specified by the ENCG for a Class 1 area, therefore, no mitigation for stationary noise sources on the proposed building is required. The proposed building is expected to be compatible with existing noise-sensitive land uses.

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.



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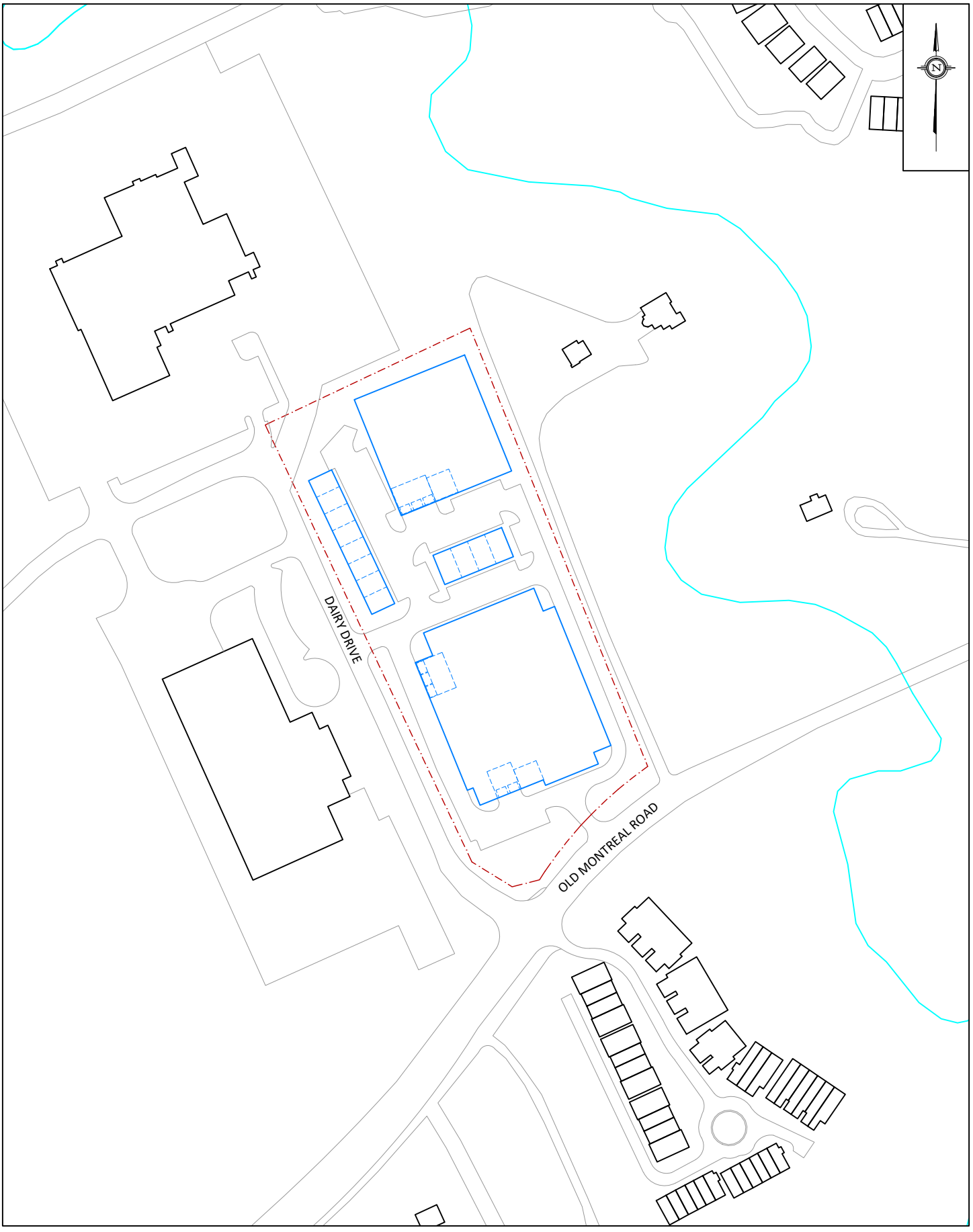
Gradient Wind File #23-098 – Stationary Noise R2



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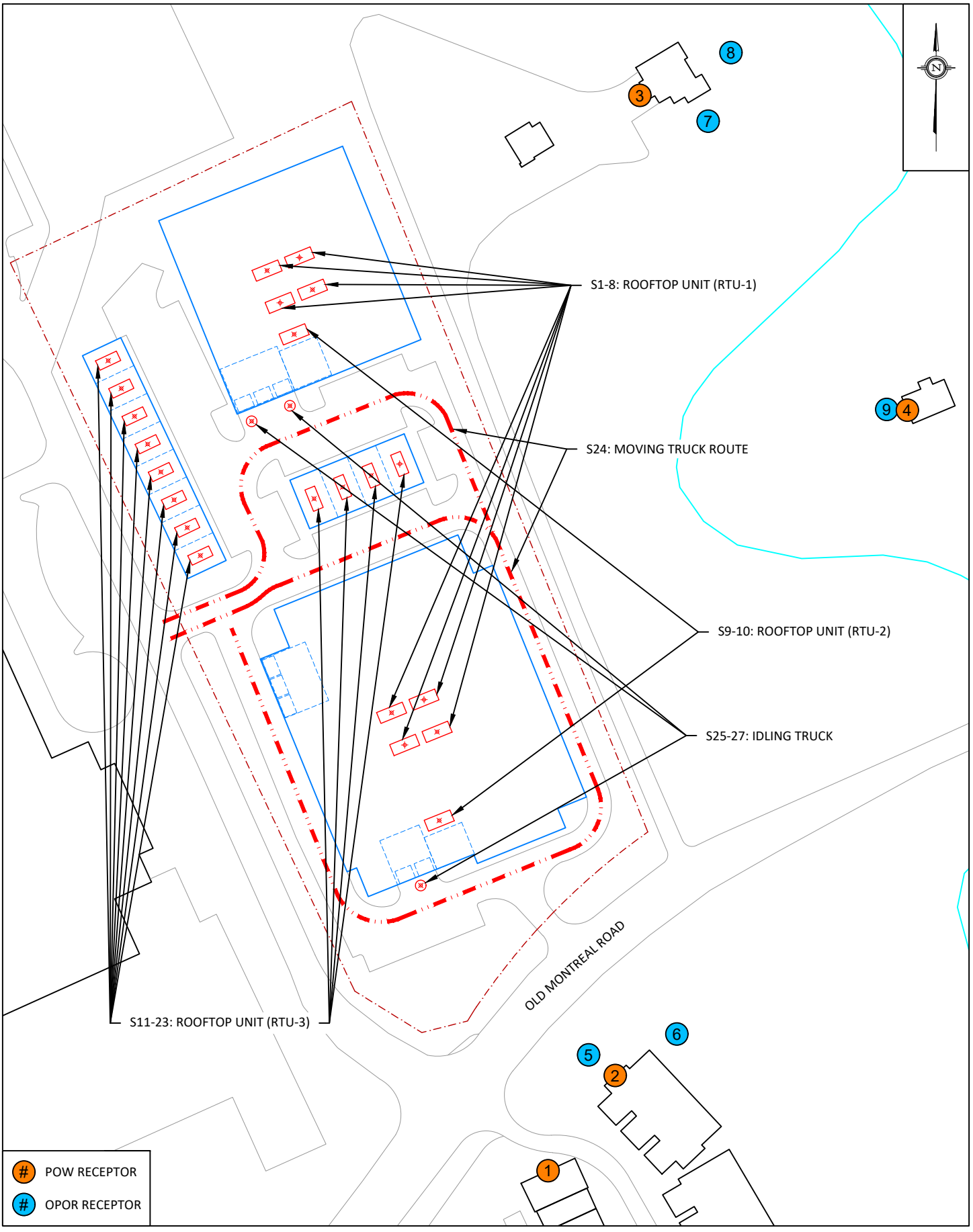
PROJECT	1015 DAIRY DRIVE, OTTAWA STATIONARY NOISE ASSESSMENT
SCALE	1:2500 (APPROX.)
DRAWING NO.	23-098-1
DATE	OCTOBER 29, 2024
DRAWN BY	T.K.

DESCRIPTION

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT



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PROJECT	1015 DAIRY DRIVE, OTTAWA STATIONARY NOISE ASSESSMENT
SCALE	1:1500 (APPROX.)
DRAWING NO.	23-098-2
DATE	NOVEMBER 4, 2024
DRAWN BY	E.K.

DESCRIPTION

FIGURE 2:
STATIONARY NOISE SOURCE & RECEIVER LOCATIONS

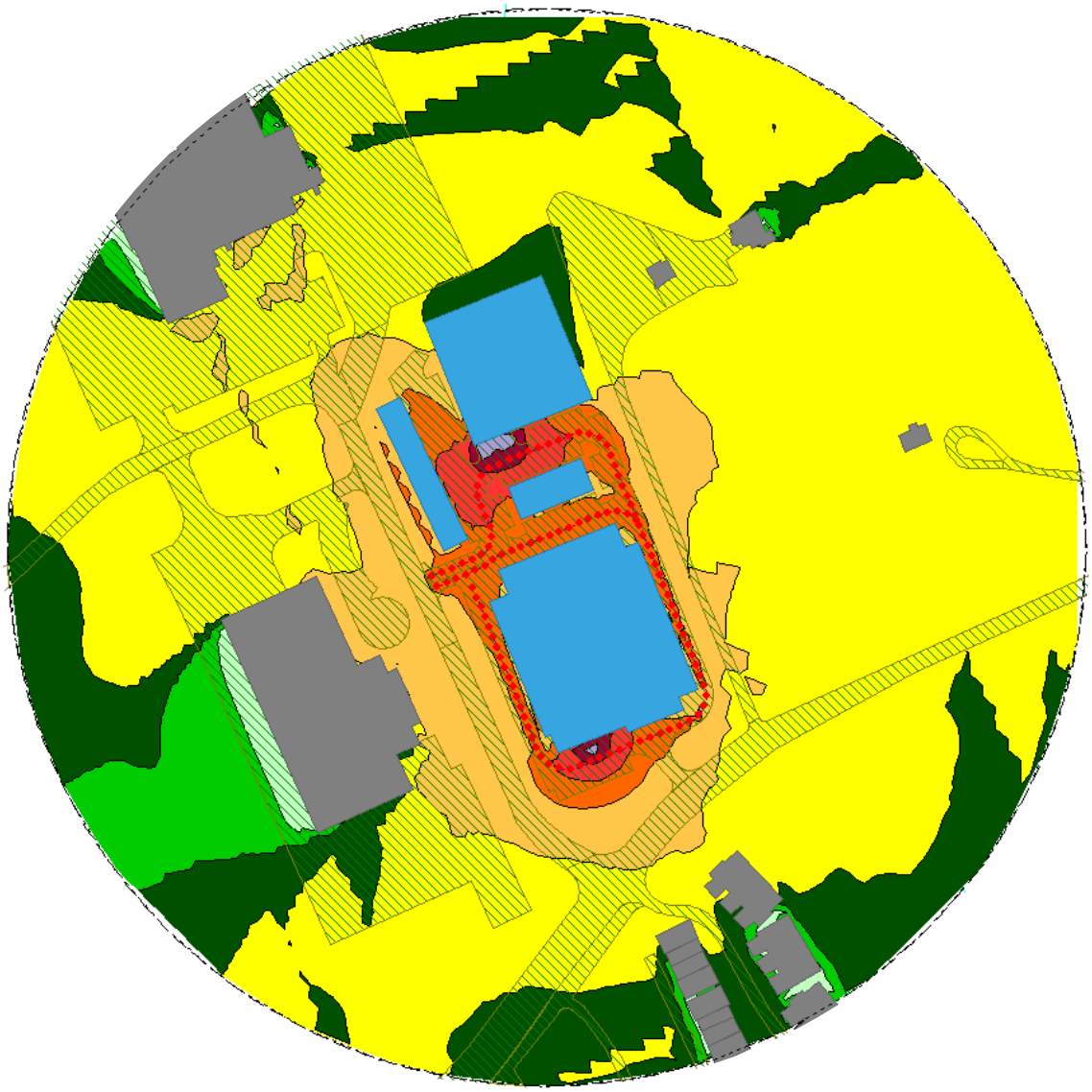
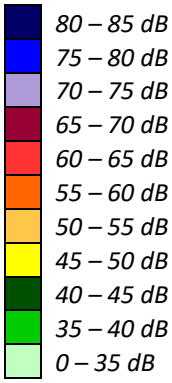


FIGURE 3: DAYTIME STATIONARY NOISE CONTOURS (4.5 M)



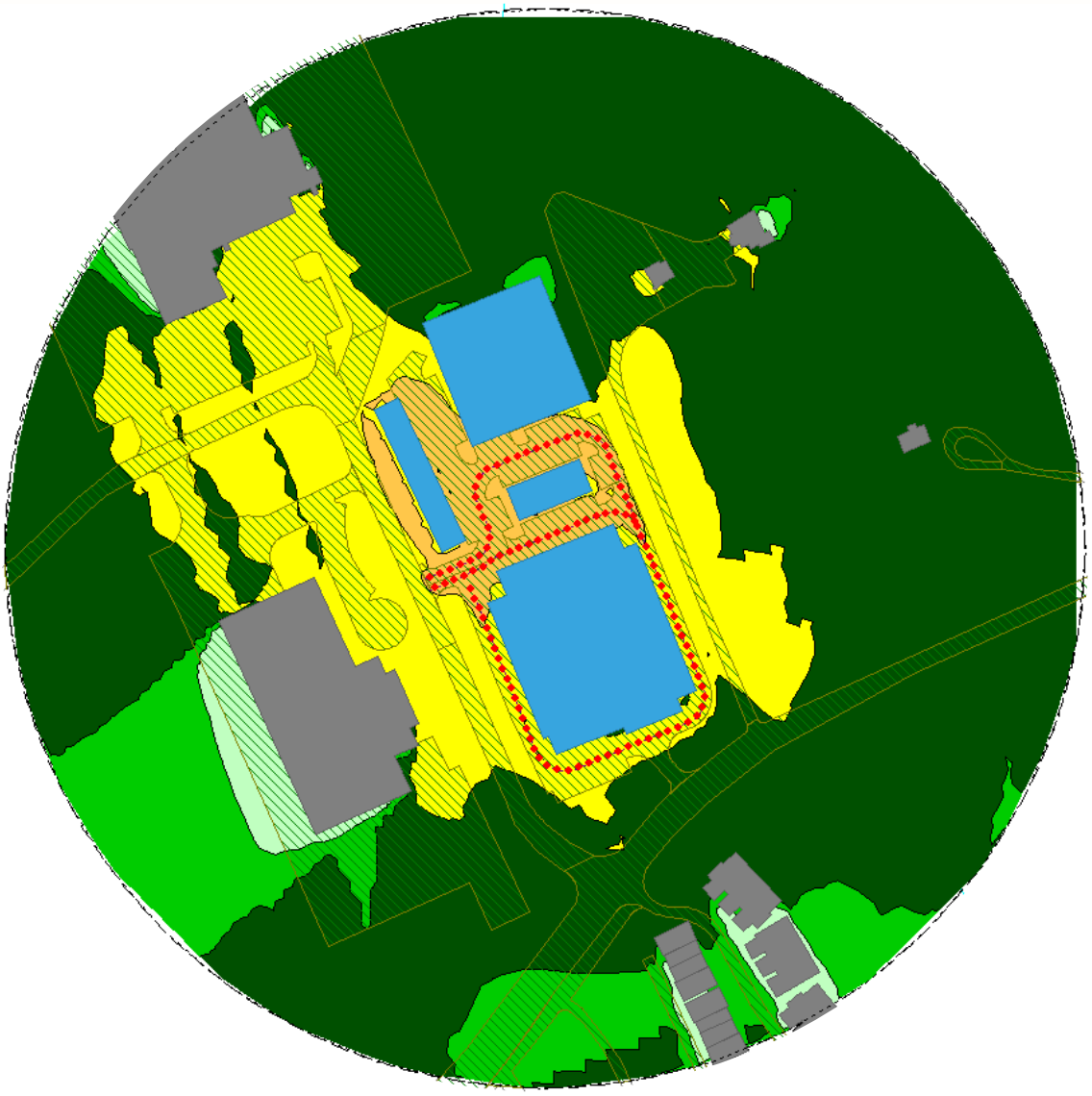


FIGURE 4: NIGHTTIME STATIONARY NOISE CONTOURS (4.5 M)

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