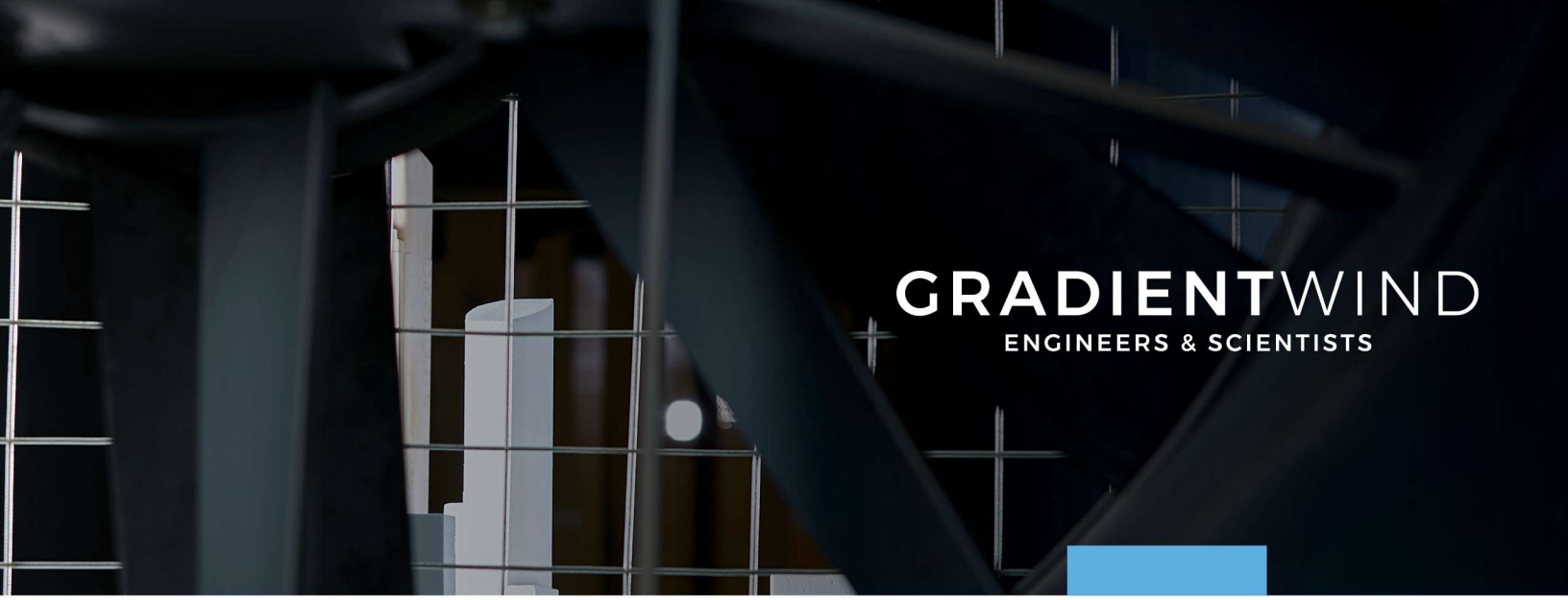

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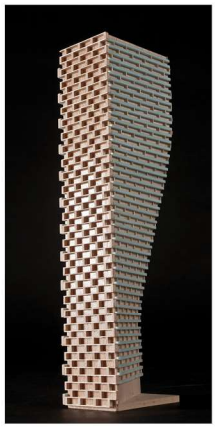
STATIONARY NOISE ASSESSMENT

Crown Pointe - Phase 3
Ottawa, Ontario

REPORT: GW18-136 - Stationary Noise



October 27, 2021

PREPARED FOR

900 Watters Road Crown Pointe - Phase 3
Crown Pointe Co-Tenancy
225 Metcalfe Street, Suite 708
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K2P 1P9

PREPARED BY

Tanyon Matheson-Fitchett, B.Eng., Junior Environmental Scientist
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EXECUTIVE SUMMARY

This report describes a stationary noise assessment performed for a proposed commercial development located to the south of the intersection of Trim Road and Watters Road in Ottawa, Ontario. The development comprises a grocery store and a fast-food restaurant, sharing the parcel of land with two existing one-storey retail buildings to the southeast and southwest sides of the property. Sources of stationary noise include rooftop air handling equipment, idling reefer trucks, moving trucks, idling cars, and speaker boxes. Figure 1 illustrates a 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) architectural drawings prepared by Hobin Architecture; (iv) equipment location drawings and corresponding specsheets provided by Sobeys Inc.; (v) Gradient Wind's experience with similar projects; (vi) surrounding street layouts obtained from the City of Ottawa, and recent site imagery.

The results of the current assessment indicate that noise levels at nearby points of reception are expected to fall below the ENCG noise criteria, provided that the assumptions for noise control as outlined in Section 2.1 are adhered to during the detailed design process. As such, the proposed development is expected to be compatible with the existing 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 installation of the equipment.

TABLE OF CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Taggart Realty Management to undertake a stationary noise assessment for the proposed development at Trim Road and Watters Road in Ottawa, Ontario. This report summarizes the methodology, results and recommendations related to the assessment of exterior noise levels produced by mechanical equipment of the proposed development.

The present scope of work involves assessing exterior noise levels generated by rooftop air handling equipment, idling trucks, refrigerated trailer air conditioning units (reefers), moving trucks, idling cars, and speaker boxes. 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, site plan drawings prepared by Hobin Architecture, equipment location drawings and corresponding specsheets provided by Sobeys Inc., Gradient Wind's 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 development located to the south of the intersection of Trim Road and Watters Road in Ottawa, Ontario. The development is located on an irregular parcel of land bounded by Watters Road to the northwest, and Trim Road to the northeast.

The proposed development comprises a grocery store and a fast-food restaurant, sharing the parcel of land with two existing one-storey retail buildings to the southeast and southwest sides of the property. Surface parking is located centrally and to the north on the development site. The development site borders existing residential properties along Launay Avenue, Cookshire Crescent, and Everlasting Crescent which are the nearest points of reception. Figure 1 illustrates the site plan and surrounding context.

Equipment serving the facilities is expected to operate 24 hours a day. However, certain sources are likely to have reduced operation during the nighttime period between 23:00 and 07:00. Sources of stationary noise include rooftop air handling equipment, idling reefer trucks, truck movements, idling cars, and

[1] City of Ottawa Environmental Noise Control Guidelines, January 2016
[2] Ministry of the Environment, Conservation and Parks (MECP), Environmental Noise Guideline – Publication NPC-300, August 2013

speaker boxes. Figure 2 illustrates the location of all noise sources and points of reception included in this study.

2.1 Assumptions

Preliminary mechanical information of the development was based on drawings provided by Sobeys Inc. and Gradient Wind's experience with similar developments. Once the mechanical design progresses and equipment information becomes available, these should be forwarded to Gradient Wind for review. A review of the final equipment selections and locations by a qualified acoustical engineer will be required prior to installation of the equipment. The following assumptions have been made in the analysis:

(i) A reefer truck idles at the loading dock for thirty minutes per hour during the daytime period (07:00 – 23:00). No idling trucks are at the loading dock during the nighttime period (23:00 – 07:00). The City of Ottawa Noise By-law No.2017-255 prohibits deliveries during the nighttime period.

(ii) One truck movement occurs per hour during the daytime period (07:00 – 23:00).

(iii) The garbage compactor operates for six minutes per hour during the daytime period (07:00 – 23:00). No garbage compactor operation occurs during the nighttime period (23:00 – 07:00).

(iv) The locations, quantity and tonnage of rooftop units has been based on sound power data provided by Sobeys Inc. and Gradient Wind's experience with similar developments.

(v) Sound data for rooftop units are based on manufacturer's data.

(vi) Sound data for reefer units, truck movements, idling cars and speaker boxes are based on Gradient Wind's past experience.

(vii) The rooftop mechanical units are assumed to operate continuously over a 1-hour period during the daytime and at 50% operation during the nighttime period.

(viii) Screening effects a 45 cm parapet surrounding the rooftop of the grocery store has been included in the analysis. Screening effect of parapets surrounding the rooftop of the fast-food restaurant have been conservatively excluded from analysis in the absence of detailed rooftop drawings.

(ix) A 3-metre-tall noise barrier has been assumed near the grocery store loading bay along the edge of the asphalt area, as indicated in Figure 3. The base of the barrier is at an elevation of 88.15 m and the top at and elevation of 91.15 m. The length of the barrier is approximately 5.5 m longer than the semi-trailer transport trucks that use the loading docks.

3. OBJECTIVES

The main goals of this work are to (i) calculate the future noise levels on the surrounding dwellings 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 *Predictor-Lima* 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. Twelve receptor locations were selected for the study site, as illustrated in Figure 2.

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, camp grounds, and noise sensitive buildings such as schools and places of worship. The recommended maximum noise levels for a Class 1 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 in a Class 1 area because it is located at the intersection of two arterial roadways. These conditions indicate that the sound field is dominated by manmade sources.

TABLE 1: EXCLUSIONARY LIMITS FOR CLASS 1 AREA

Time of Day	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

4.3 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 sound power of each source used in the analysis.

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

TABLE 2: EQUIPMENT SOUND POWER LEVELS (dBA)

Source ID	Description	Height Above Grade (m)	Frequency (Hz)								
			63	125	250	500	1000	2000	4000	8000	Total
S1	RTU-1	1.0	74	77	80	85	85	82	80	75	90
S2	RTU-2	1.0	65	80	83	86	85	81	77	68	91
S3	RTU-3	1.0	66	80	83	86	85	81	77	68	91
S4	RTU-4	1.0	55	66	74	78	77	73	67	58	82
S5	RTU-5	1.0	74	77	80	85	85	82	80	75	90
S6 - S8	RTU	0.65	54	66	73	77	78	75	75	68	83
S9	COND-1	0.5	55	66	74	78	77	73	67	58	82
S10	COND-2	0.5	55	66	74	78	77	73	67	58	82
S11	EF-1	0.5	43	52	57	56	54	51	44	38	62
S12	EF-2	0.5	55	70	75	73	73	72	66	59	80
S13	EF-4	0.5	38	53	63	63	61	58	54	47	68
S14 - S18	EF	1	38	53	63	63	61	58	54	47	68
S19 - S33	Idling Cars	0.75	55	65	57	65	66	63	62	54	72
S36 - S37	Speaker Box	1	69	68	66	72	79	76	67	58	82
S38	Garbage Compactor	0.5	-	-	-	-	95	-	-	-	-
S39	Reefer Unit	2.5	-	-	-	-	101	-	-	-	-
S40	Truck Movement	2.5	80	90	97	101	102	97	91	82	106

4.4 Stationary Source Noise Predictions

The impact of stationary noise sources on nearby residential areas was determined by computer modelling using the software program Predictor-Lima. This program was developed from the International Standards Organization (ISO) standard 9613 Parts 1 and 2 and 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 Ministry of the Environment, Conservation and Parks (MECP) as part of Environmental Compliance Approval applications.

A total of 12 receptor locations were 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 adjacent residential properties. Sensor locations are described in Table 3 and illustrated in Figure 2. All units were represented as point sources in the Predictor model. Table 4 below contains Predictor-Lima 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 Predictor-Lima sample output is available upon request.

TABLE 3: RECEPTOR LOCATIONS

Receptor Number	Receptor Location	Height Above Grade (m)
R1	POW – 1451 Launay Avenue	4.5
R2	OPOR – 1451 Launay Avenue	1.5
R3	POW – 1447 Launay Avenue	4.5
R4	POW – 977 Cookshire Crescent	4.5
R5	OPOR – 977 Cookshire Crescent	1.5
R6	POW – 973 Cookshire Crescent	4.5
R7	OPOR – 973 Cookshire Crescent	1.5
R8	POW – 915 Watters Road	4.5
R9	POW – 604 Everlasting Crescent	4.5
R10	POW – 614 Everlasting Crescent	4.5
R11	OPOR – 614 Everlasting Crescent	1.5
R12	POW – 622 Everlasting Crescent	4.5

TABLE 4: CALCULATION SETTINGS

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

5. RESULTS AND DISCUSSION

Noise levels at nearby sensitive receptors fall below ENCG criteria for stationary noise, as summarized in Table 5 below. The sound levels listed in Table 5 are based on the assumptions outlined in Section 2.1.

TABLE 5: NOISE LEVELS FROM STATIONARY SOURCES

Receptor Number	Plane of Window Receptor Location	Noise Level (dBA)		Sound Level Limits		Meets ENCG Class 1 Criteria	
		Day	Night	Day	Night	Day	Night
R1	POW – 1451 Launay Avenue	47	35	50	45	Yes	Yes
R2	OPOR – 1451 Launay Avenue	49	37	50	N/A	Yes	Yes
R3	POW – 1447 Launay Avenue	45	35	50	45	Yes	Yes
R4	POW – 977 Cookshire Crescent	45	39	50	45	Yes	Yes
R5	OPOR – 977 Cookshire Crescent	43	37	50	N/A	Yes	Yes
R6	POW – 973 Cookshire Crescent	44	40	50	45	Yes	Yes
R7	OPOR – 973 Cookshire Crescent	44	40	50	N/A	Yes	Yes
R8	POW – 915 Watters Road	41	38	50	45	Yes	Yes
R9	POW – 604 Everlasting Crescent	41	37	50	45	Yes	Yes
R10	POW – 614 Everlasting Crescent	41	37	50	45	Yes	Yes
R11	OPOR – 614 Everlasting Crescent	43	39	50	N/A	Yes	Yes
R12	POW – 622 Everlasting Crescent	40	36	50	45	Yes	Yes

As Table 5 summarizes, noise levels fall below ENCG criteria at all receptors. Noise contours at 1.5 m above grade can be seen in Figure 4 and 5 for daytime and nighttime conditions, respectively. The main contributor of noise at these locations is the reefer unit and truck route. The loudest rooftop equipment should be located toward the centre of the rooftop, avoiding direct line of sight with sensitive areas if possible. With consideration of Gradient Wind's recommendations, the proposed development is expected to be compatible with the existing land uses.

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 ENCG noise criteria, provided that the assumptions for noise control as outlined in Section 2.1 are adhered to during the detailed design process. As such, the proposed development is expected to be compatible with the existing 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 installation of the equipment.

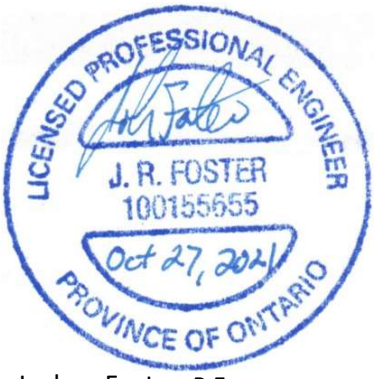
To ensure compliance with the ENCG, the following noise control measure is recorded:

- 3.0-metre-tall noise barrier will be installed to the southwest of the grocery store loading dock region, enclosing the loading dock area, as illustrated in Figure 3. The barriers must be of solid construction with no gaps along the length of the wall. The panels must be constructed of materials having and overall surface density of 20 kg/m^2 or a sound transmission class rating of 30. The design of barrier should be reviewed by a qualified acoustic engineer prior to installation.

This concludes our 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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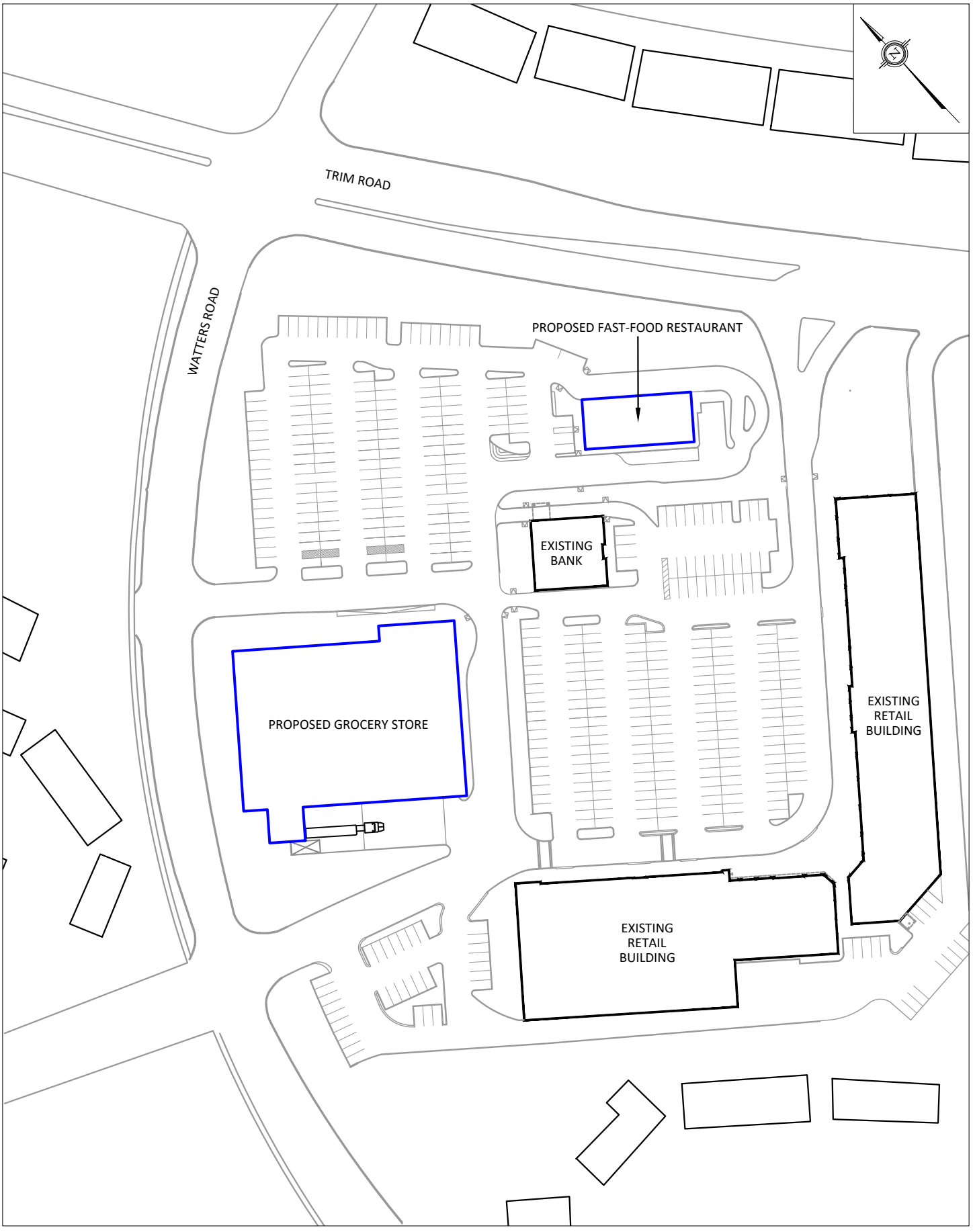
Gradient Wind File No. 18-136 - Stationary Noise



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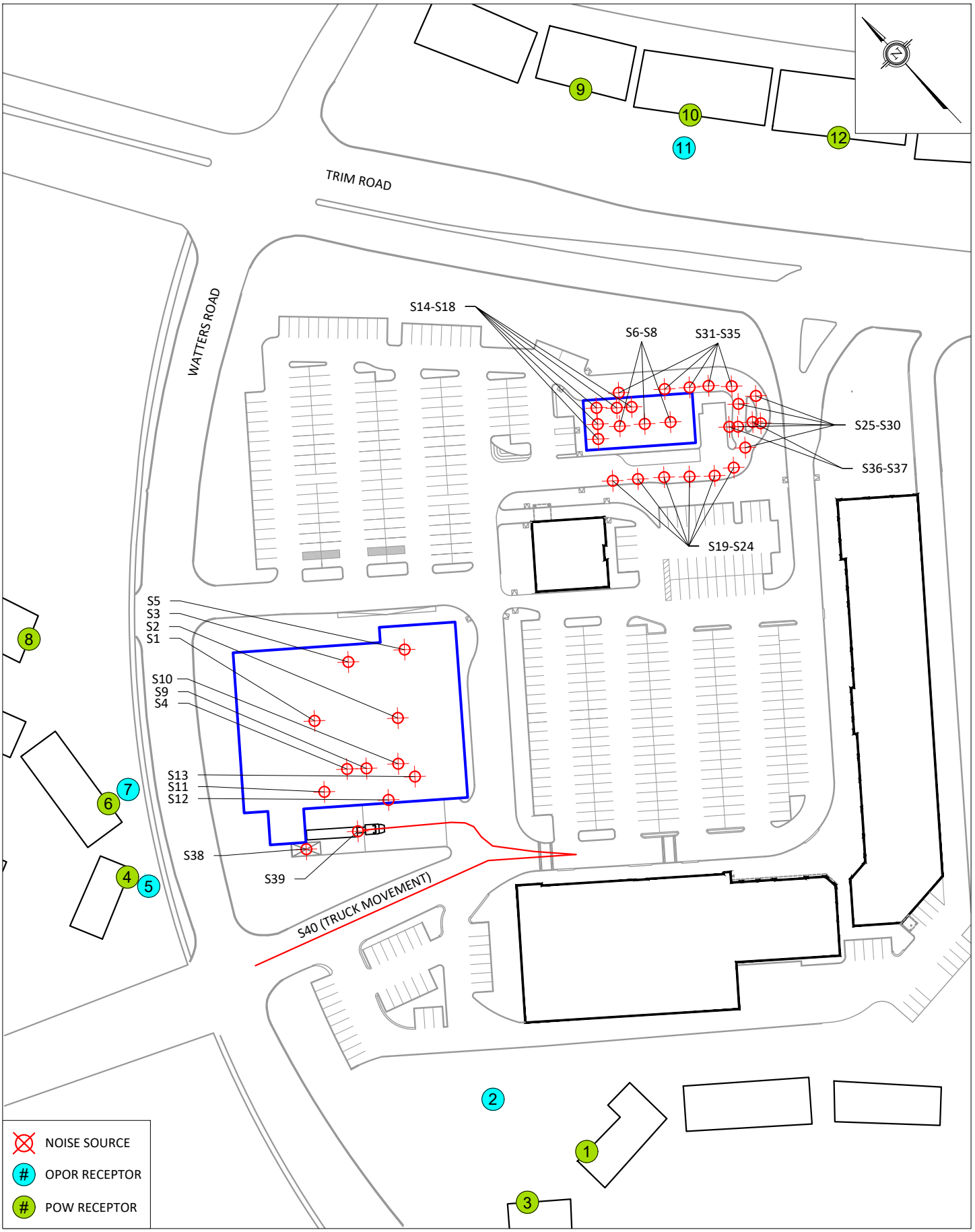
PROJECT	TRIM ROAD AND WATTERS ROAD, OTTAWA STATIONARY NOISE ASSESSMENT		
SCALE	1:1500 (APPROX.)	DRAWING NO.	GW18-136-1
DATE	OCTOBER 27, 2021	DRAWN BY	T.M.F.

DESCRIPTION

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT



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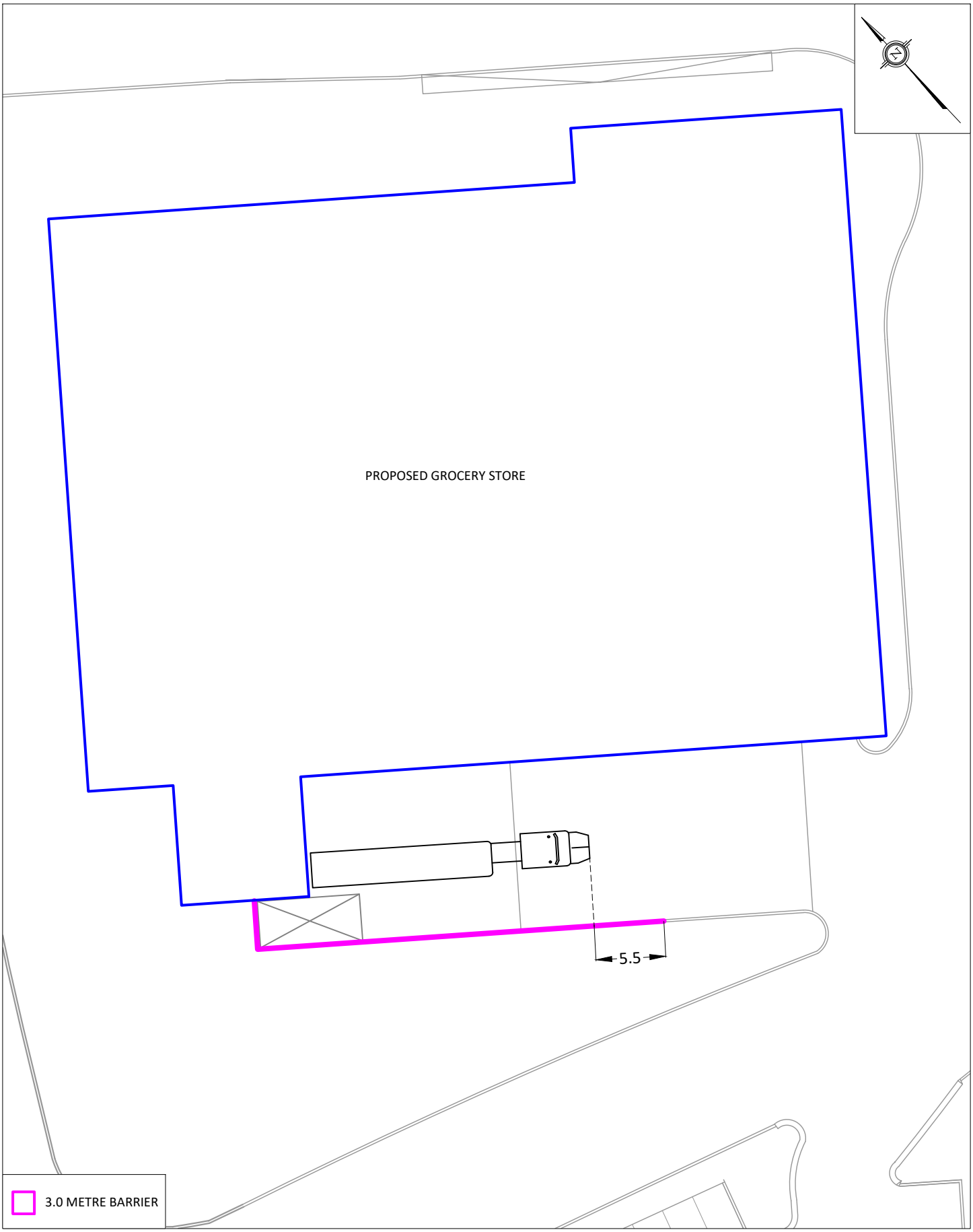
SCALE	1:1500 (APPROX.)	DRAWING NO.	GW18-136-2
DATE	OCTOBER 27, 2021	DRAWN BY	T.M.F.

DESCRIPTION

FIGURE 2:
NOISE SOURCE AND RECEPTOR LOCATIONS



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SCALE	1:400 (APPROX.)	DRAWING NO.	GW18-136-3
DATE	OCTOBER 27, 2021	DRAWN BY	T.M.F.

DESCRIPTION

FIGURE 3:
REQUIRED 3.0 METRE NOISE BARRIER LOCATION

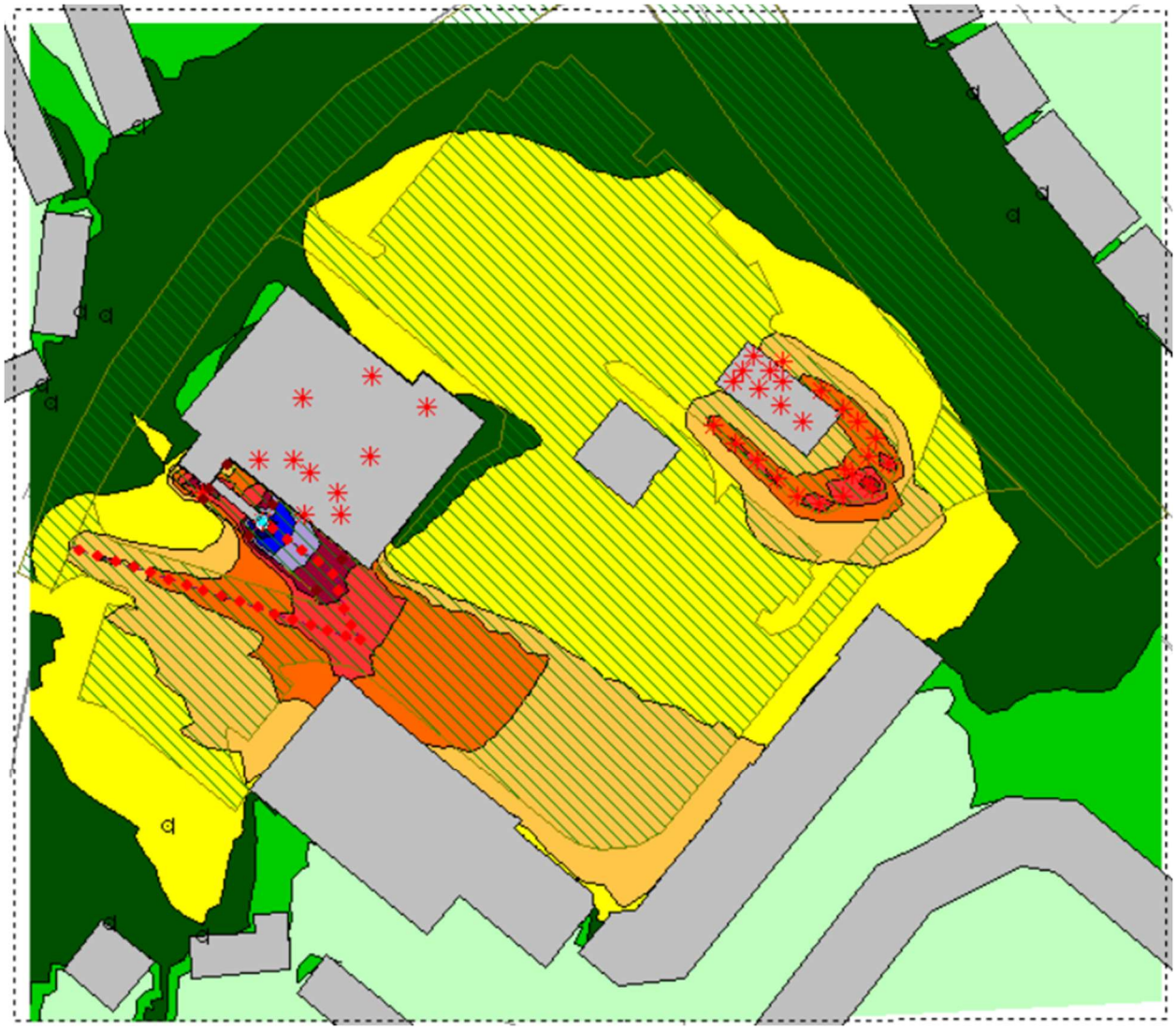

FIGURE 4: DAYTIME STATIONARY NOISE CONTOURS (1.5 M ABOVE GRADE)

- *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 5: NIGHTTIME STATIONARY NOISE CONTOURS (1.5 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*