Stationary Noise Feasibility Assessment

2983 and 3053 Navan Road

Orleans, Ontario

REPORT: GWE18-089 - Stationary Noise

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EXECUTIVE SUMMARY

This document describes a stationary noise feasibility assessment performed for a proposed commercial development located at 2983 and 3053 Navan Road in Orleans, Ontario. The development comprises six single-storey buildings including a grocery store, a retail building divided into several units, three restaurants including one fast-food drive-through, and a gas station. Sources of stationary noise include rooftop air handling equipment, idling reefer trucks, idling cars, speaker boxes and a car wash. 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 and Climate Change (MOECC) and City of Ottawa requirements; (ii) noise level criteria as specified by the City of Ottawa's Environmental Noise Control Guidelines (ENCG); and (iii) architectural drawings prepared by Hobin Architecture in May 2018.

Our stationary noise feasibility assessment for the proposed commercial development indicates that, provided our assumptions for noise control in Section 2.1 are adhered to in the detailed design process, noise levels at nearby points of reception are expected to fall below the ENCG noise criteria. 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 final equipment selection and locations by a qualified acoustical engineer will be required prior to installation of the equipment.

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1. INTRODUCTION

Gradient Wind Engineering Inc. (GWE) was retained by Taggart Realty Management to undertake a stationary noise feasibility assessment of a proposed commercial development located at 2983 and 3053 Navan Road in Orleans, Ontario. This report summarizes the methodology, results, and recommendations related to a stationary noise feasibility assessment. GWE's scope of work involved assessing exterior noise levels generated by rooftop air handling equipment, idling reefer trucks, idling cars, speaker boxes and a car wash. The assessment was performed based on theoretical noise calculation methods conforming to the City of Ottawa[1] and Ministry of the Environment and Climate Change (MOECC) NPC-300[2] guidelines. This study is based on architectural drawings prepared by Hobin Architecture dated May 2018, mechanical information assumed by GWE based on experience with similar projects and surrounding street layouts obtained from the City of Ottawa and recent site imagery.

2. TERMS OF REFERENCE

The proposed development comprises six buildings, a gas station, two restaurants, two retail buildings and a grocery store. The development is located at the corner of Brian Colburn Boulevard and Navan Road surrounded by low-rise single-family homes to the east, south and west, and a future park and ride to the north. The proposed buildings would lie along the perimeter of Navan Road and Brian Colburn Boulevard, with parking spaces located centrally. The nearest points of reception are the adjacent dwellings along Navan Road and Page Road. Figure 1 illustrates the site plan and surrounding context.

The facility 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, idling cars, speaker boxes and a car wash. Figure 2 illustrates the location of all noise sources included in this study.

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

[2] Ministry of the Environment and Climate Change (MOECC), Environmental Noise Guideline – Publication NPC-300, August 2013

2.1 Assumptions

Preliminary mechanical information for the development has been assumed based on GWE's experience with similar developments. A review of final equipment selection and locations by a qualified acoustical engineer will be required prior to installation of the equipment. The following assumptions have been included in the analysis:

(i) Idling reefer truck at loading dock for thirty minutes per hour during daytime period (07:00 – 23:00). No idling truck at loading dock during 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 per hour during the daytime period (07:00 – 23:00).

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

(iii) The locations, quantity and tonnage of rooftop units has been assumed based on GWE's experience with similar developments.

(iv) Sound data for rooftop units is based on manufacture's data.

(v) Sound data for reefer units, truck movements, car wash, and idling cars is based on GWE's past experience.

(vi) 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.

(vii) The car wash operates for 30 minutes per hour during daytime period, and 6 minutes per hour during nighttime period.

(viii) Screening effects of parapets have been conservatively excluded in the modelling.

(ix) A 3-metre-high noise barrier has been assumed along the grocery store loading bay and along the rear property line of several dwellings, as per Figure 4.

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 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 MOECC as part of Environmental Compliance Approvals applications. Twelve receptor locations were chosen around the 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 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 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"[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 site is considered to be in a Class 1 area because it is at the intersection of two arterial roadways. Furthermore, a bus rapid transit and park and ride are planned near the site. This would indicated the sound field is dominated by man made sources.

TABLE 1: EXCLUSIONARY LIMITS FOR CLASS 1 AREA

Time of Day	Outdoor Points of Reception	Plane of Window
7:00 – 19:00	50	50
19:00 – 23:00	50	50
23:00 – 7:00	N/A	45

4.3 Determination of Noise Source Power Levels

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

[4] NPC – 300, page 14

TABLE 2: EQUIPMENT SOUND POWER LEVELS (dBA)

Source ID	Description	Height Above Grade/Roof (m)	Sound Power (dBA – re: picowatt)								
			63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	Total
S1	RTU	0.65	54	66	73	77	78	75	75	68	83
S2-3	Idling Cars	0.75	55	65	57	65	66	63	62	54	72
S4	Exhaust Fan	0.25	39	53	64	61	59	55	49	42	67
S5	Entrance Door	3					92				
S6	Exit Door	3					96				
S7-8	RTU	1.7	41	51	63	74	76	74	69	60	80
S9	Exhaust Fan	1	38	53	63	63	61	58	54	47	68
S10	RTU	1.3	48	60	67	71	72	69	69	62	77
S11-12	Speaker Box	1	69	68	66	72	79	76	67	58	82
S13-23	Idling Cars	0.75	55	65	57	65	66	63	62	54	72
S24-30	RTU	1.5	54	66	73	77	78	75	75	68	83
S31	RTU	1.7	37	47	57	67	71	69	63	52	75
S32-33	RTU	1.7	47	57	72	83	84	79	74	66	88
S34	Dry Coolers	2					89				
S35	DC	2					85				
S36	RTU	1.7	78	83	86	91	89	87	84	81	96
S37	RTU	1.7	41	51	63	74	76	74	69	60	80
S38	Garbage Compactor	0.5					95				
S39	Reefer Unit	2.7					101				
S40	Truck Movement	2.7	80	90	97	101	102	97	91	82	106

4.4 Stationary Source Noise Predictions

The impact of the 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 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 and Climate Change (MOECC) as part of Environmental Compliance Approvals applications.

A total of 29 receptor locations were chosen around the site to measure the noise impact at points of reception (POR) during the daytime and evening period (07:00 – 23:00), as well as the nighttime period (23:00 – 07:00). POR locations included 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 3. All units were represented as point sources in the Predictor model. Table 4 below contains Predictor-Lima calculation settings. These settings are typical and have been based on ISO 9613 standards and guidance from the MOECC.

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 in Appendix A, further modelling data is available upon request.

TABLE 3: RECEPTOR LOCATIONS

Receptor Number	Location	Height Above Grade (m)
R1	POW – 712 Percifor Way	4.5
R2	OPOR – 712 Percifor Way	1.5
R3	POW – 2968 Navan Road	4.5
R4	POW – 2993 Navan Road	1.5
R5	OPOR – 2993 Navan Road	1.5
R6	POW – 2997 Navan Road	4.5
R7	OPOR – 2997 Navan Road	1.5
R8	POW – 3015 Navan Road	4.5
R9	OPOR – 3015 Navan Road	1.5
R10	POW – 3021 Navan Road	1.5
R11	OPOR – 3021 Navan Road	1.5
R12	POW – 3031 Navan Road	1.5
R13	OPOR – 3031 Navan Road	1.5
R14	POW – 3039 Navan Road	1.5
R15	OPOR – 3039 Navan Road	1.5
R16	POW – 2768 Page Road	1.5
R17	OPOR – 2768 Page Road	1.5
R18	POW – 2752 Page Road	1.5
R19	OPOR – 2752 Page Road	1.5
R20	POW – 2738 Page Road	1.5
R21	OPOR – 2738 Page Road	1.5
R22	POW – 2722 Page Road	1.5
R23	OPOR – 2722 Page Road	1.5
R24	POW – 2714 Page Road	4.5
R25	OPOR – 2714 Page Road	1.5
R26	POW – 2733 Page Road	4.5
R27	POW – 375 Trailsedge Way	4.5
R28	POW – 2131 Auburn Ridge Drive	4.5
R29	OPOR – 2131 Auburn Ridge Drive	1.5

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 are 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 Criteria	
		Day	Night	Day	Night	Day	Night
R1	POW – 712 Percifor Way	31	27	50	45	Yes	Yes
R2	OPOR – 712 Percifor Way	27	23	50	N/A	Yes	Yes
R3	POW – 2968 Navan Road	44	40	50	45	Yes	Yes
R4	POW – 2993 Navan Road	46	43	50	45	Yes	Yes
R5	OPOR – 2993 Navan Road	47	43	50	N/A	Yes	Yes
R6	POW – 2997 Navan Road	48	45	50	45	Yes	Yes
R7	OPOR – 2997 Navan Road	45	41	50	N/A	Yes	Yes
R8	POW – 3015 Navan Road	50	45	50	45	Yes	Yes
R9	OPOR – 3015 Navan Road	45	42	50	N/A	Yes	Yes
R10	POW – 3021 Navan Road	47	42	50	45	Yes	Yes
R11	OPOR – 3021 Navan Road	48	42	50	N/A	Yes	Yes
R12	POW – 3031 Navan Road	50	44	50	45	Yes	Yes
R13	OPOR – 3031 Navan Road	46	38	50	N/A	Yes	Yes
R14	POW – 3039 Navan Road	46	41	50	45	Yes	Yes
R15	OPOR – 3039 Navan Road	45	36	50	N/A	Yes	Yes
R16	POW – 2768 Page Road	46	39	50	45	Yes	Yes
R17	OPOR – 2768 Page Road	50	41	50	N/A	Yes	Yes
R18	POW – 2752 Page Road	45	41	50	45	Yes	Yes
R19	OPOR – 2752 Page Road	43	40	50	N/A	Yes	Yes
R20	POW – 2738 Page Road	46	43	50	45	Yes	Yes
R21	OPOR – 2738 Page Road	46	43	50	N/A	Yes	Yes
R22	POW – 2722 Page Road	47	44	50	45	Yes	Yes
R23	OPOR – 2722 Page Road	49	46	50	N/A	Yes	Yes
R24	POW – 2714 Page Road	49	45	50	45	Yes	Yes
R25	OPOR – 2714 Page Road	50	47	50	N/A	Yes	Yes
R26	POW – 2733 Page Road	46	43	50	45	Yes	Yes
R27	POW – 375 Trailsedge Way	41	37	50	45	Yes	Yes
R28	POW – 2131 Auburn Ridge Drive	42	37	50	45	Yes	Yes
R29	OPOR – 2131 Auburn Ridge Drive	40	36	50	N/A	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 5 and 6 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 GWE's recommendations, the proposed development is expected to be compatible with the existing land uses.

6. CONCLUSIONS AND RECOMMENDATIONS

Our stationary noise feasibility assessment for the proposed commercial development indicates that, provided our assumptions for noise control in Section 2.1 are adhered to in the detailed design process, noise levels at nearby points of reception are expected to fall below the ENCG noise criteria. 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 final equipment selection 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 measures are recoded:

- Noise walls approximately 3 m tall will be located along the south property line and adjacent to the loading dock as indicated in Figure X. The noise wall 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 during detailed design once proposed grades of the site are known.

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.

Yours truly,

Gradient Wind Engineering Inc.

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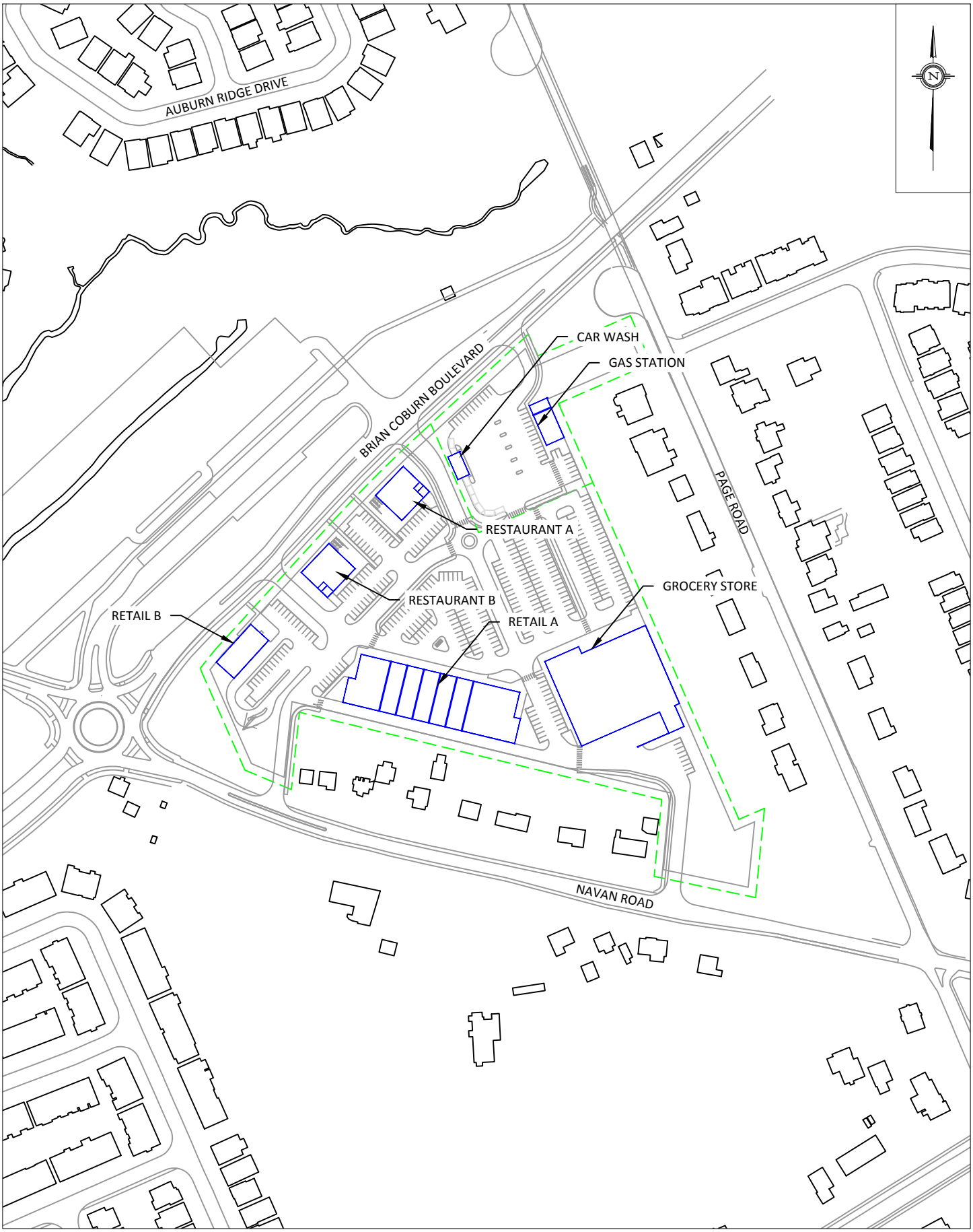
GWE18-089 – Stationary Noise



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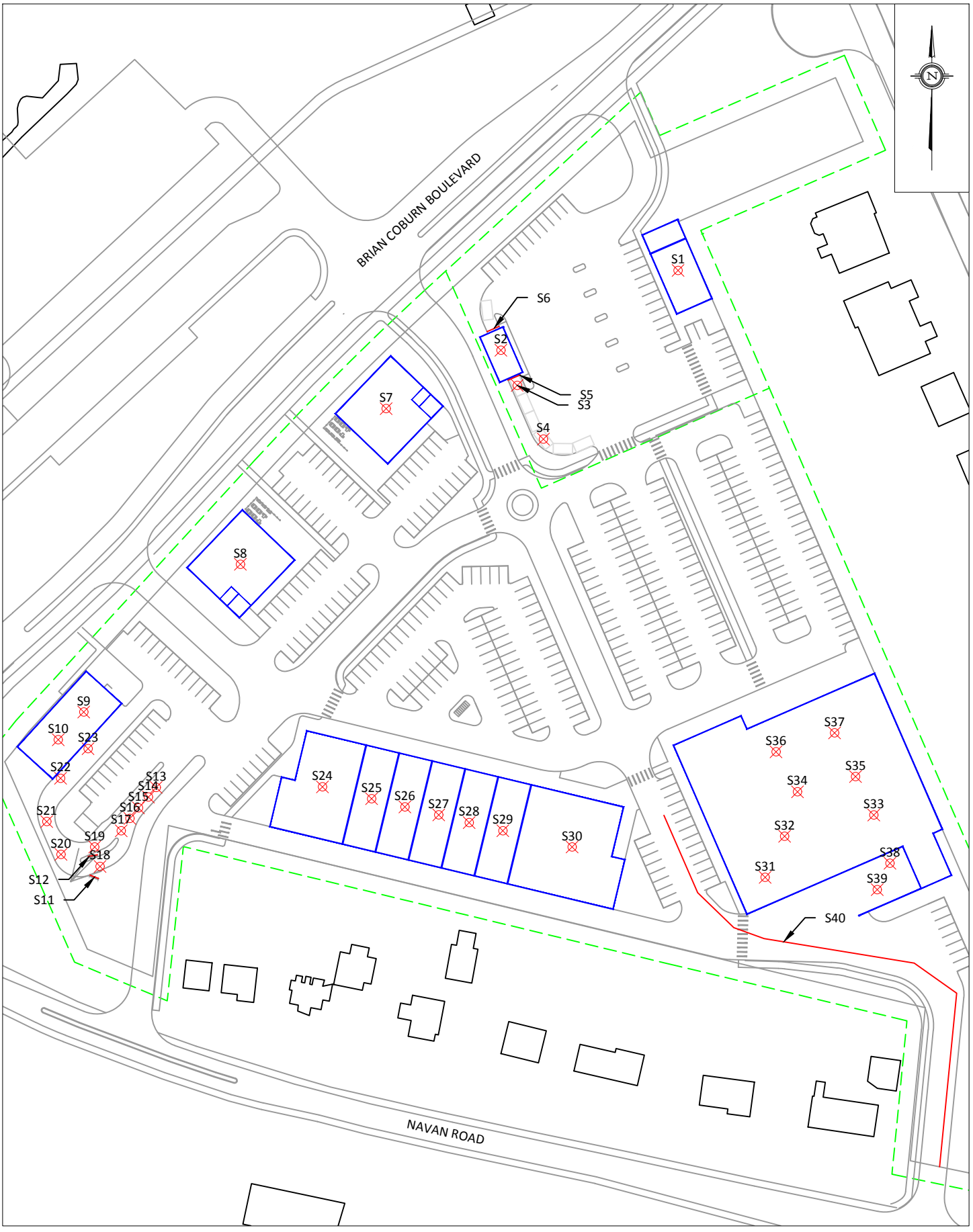
GRADIENT WIND ENGINEERING INC

PROJECT	2983 & 3053 NAVAN ROAD STATIONARY NOISE FEASIBILITY ASSESSMENT		DESCRIPTION
SCALE	1:3000 (APPROX.)	DRAWING NO.	GWE18-089-1
DATE	JUNE 14, 2018	DRAWN BY	M.L.

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT



GRADIENT WIND ENGINEERING INC
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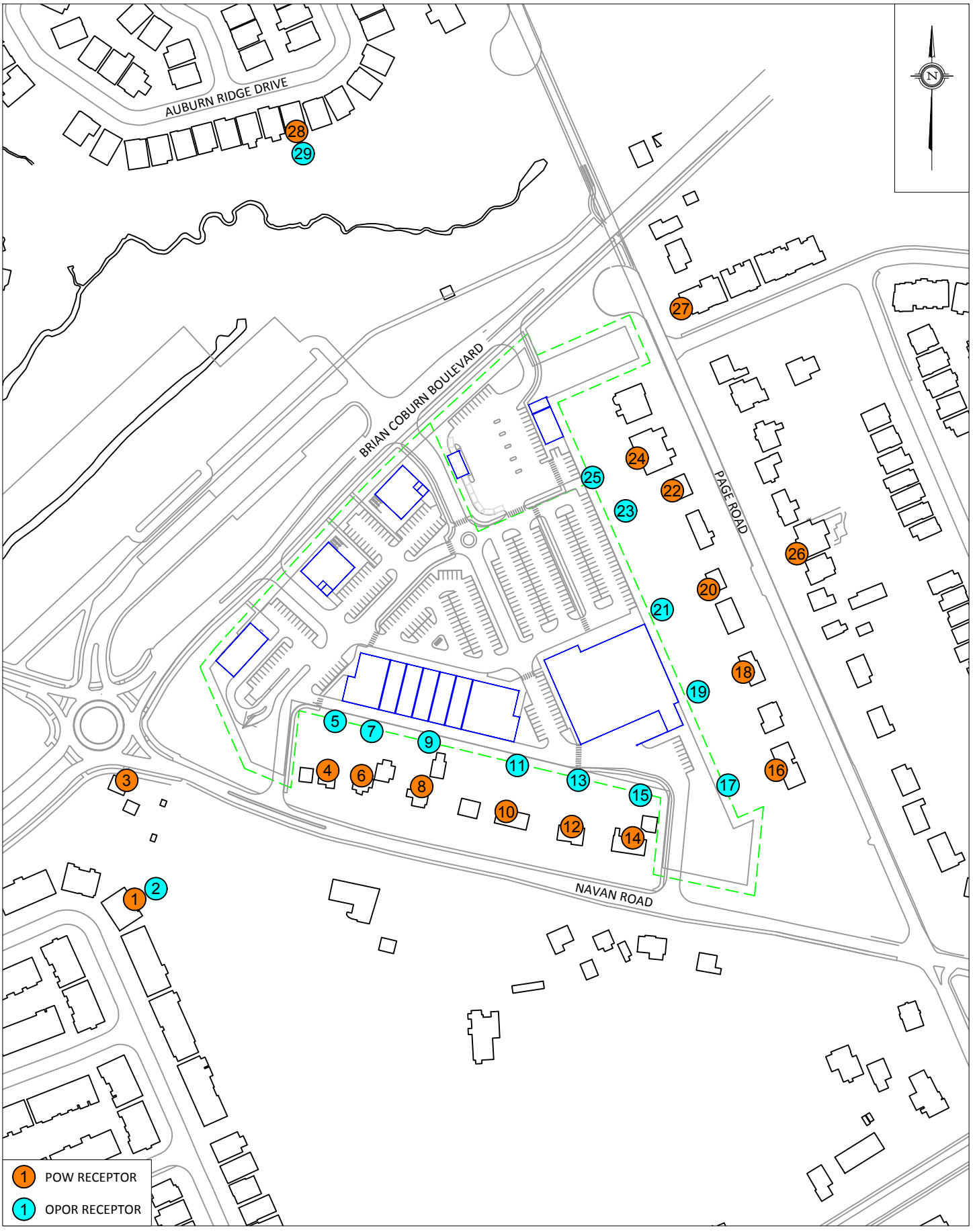
PROJECT	2983 & 3053 NAVAN ROAD STATIONARY NOISE FEASIBILITY ASSESSMENT		DESCRIPTION
SCALE	1:1500 (APPROX.)	DRAWING NO.	GWE18-089-2
DATE	JUNE 14, 2018	DRAWN BY	M.L.

FIGURE 2:
SOURCE LOCATIONS



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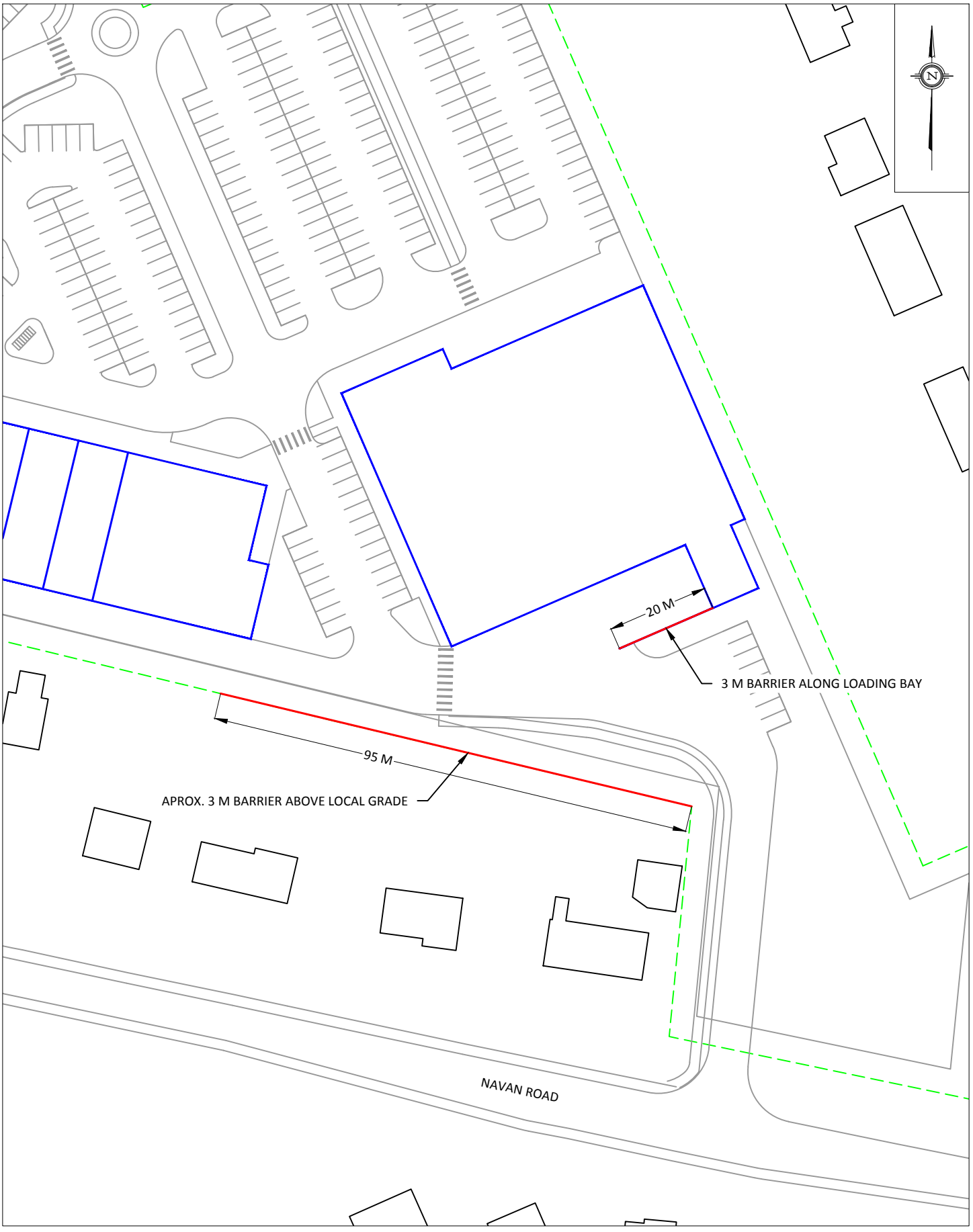
PROJECT	2983 & 3053 NAVAN ROAD STATIONARY NOISE FEASIBILITY ASSESSMENT		DESCRIPTION
SCALE	1:3000 (APPROX.)	DRAWING NO. GWE18-089-3	FIGURE 3: RECEPTOR LOCATIONS
DATE	JUNE 14, 2018	DRAWN BY M.L.	



GRADIENT WIND ENGINEERING INC
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PROJECT	2983 & 3053 NAVAN ROAD STATIONARY NOISE FEASIBILITY ASSESSMENT
SCALE	1:1000 (APPROX.)
DRAWING NO.	GWE18-089-4
DATE	JUNE 14, 2018
DRAWN BY	M.L.

DESCRIPTION

FIGURE 4:
PROPOSED BARRIER LOCATION

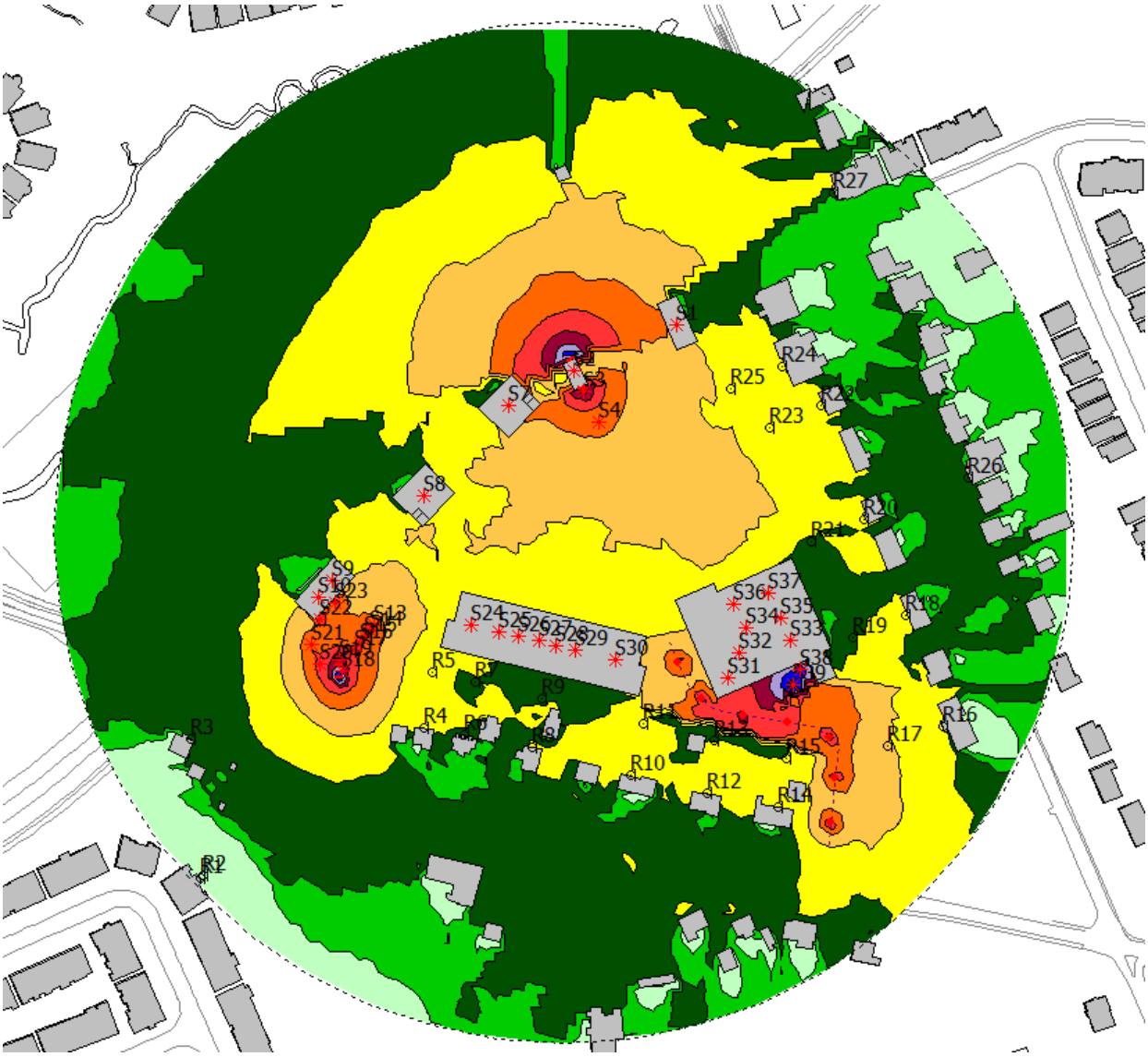
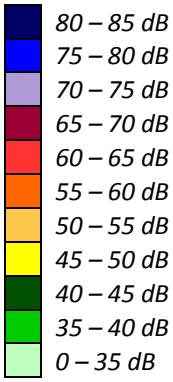


FIGURE 5: DAYTIME STATIONARY NOISE CONTOURS (1.5 METERS ABOVE GRADE)



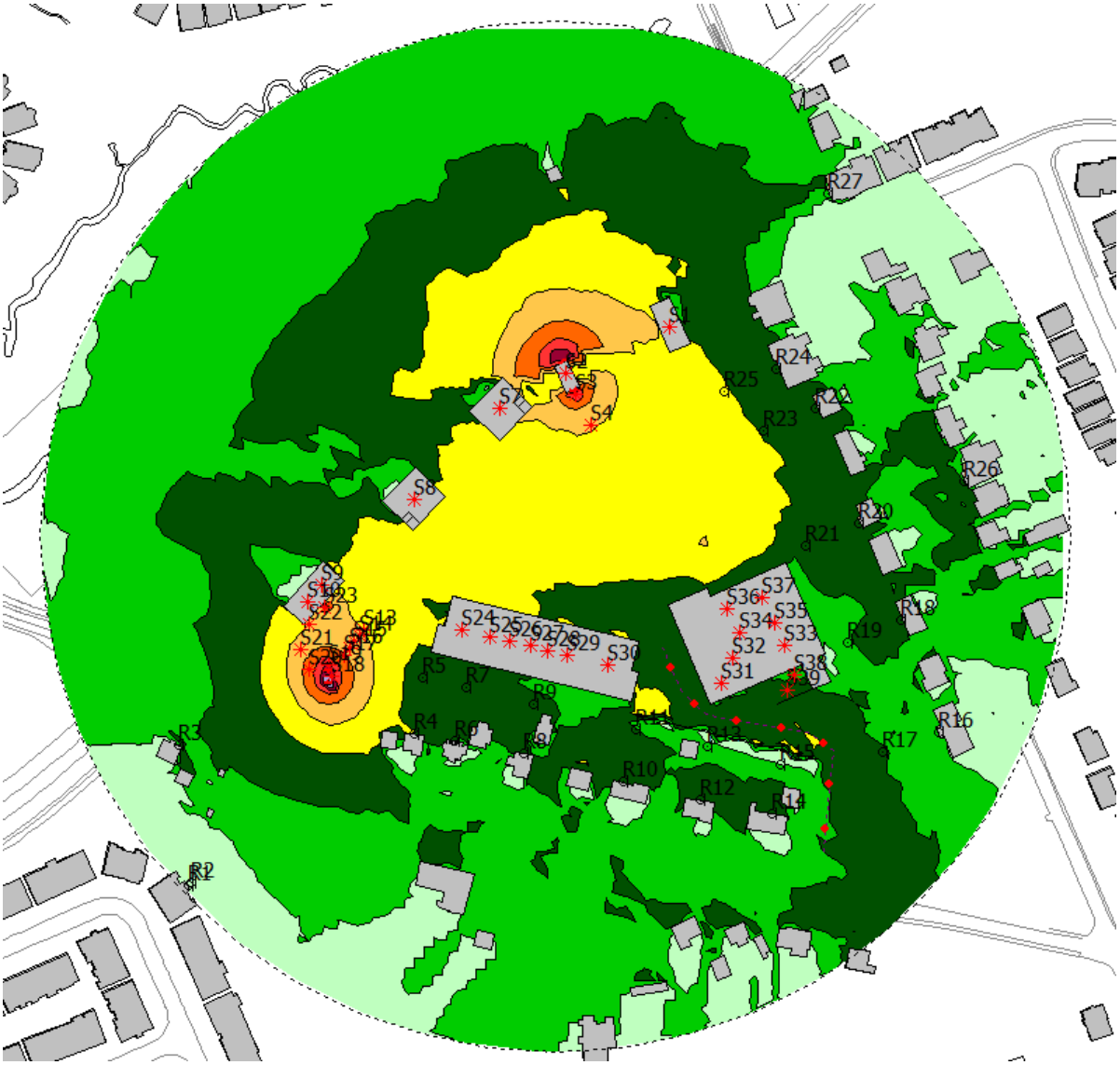
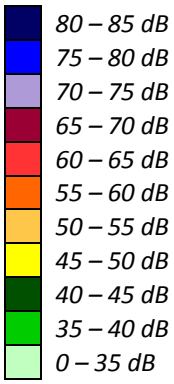


FIGURE 6: NIGHTTIME STATIONARY NOISE CONTOURS (1.5 METERS ABOVE GRADE)



APPENDIX A

SAMPLE CALCULATION INPUT/OUTPUT

```
================================================================================
Testfile  openend:  ########  4:42:14 PM
================================================================================


--------------------------------------------------------------------------------
Cross  section  for  receiver  R14  (Id=-32671 and  source  S39  (Id=533)

L(wr)  --  --  --  --  --  101 --  --  --
A(ground)  -3  -3  -0.2  3.98  1.51  -0.85  -1.18  -1.18  -1.18

A(barrier)  5.46  6.06  7.04  4.54  9  12.9  15.56  18.38  20
A(veg)  0  0  0  0  0  0  0  0  0
A(sit)  0  0  0  0  0  0  0  0  0
A(bld)  0  0  0  0  0  0  0  0  0
A(air)  0  0.01  0.03  0.07  0.12  0.23  0.61  2.06  7.34
A(geo)  46.95  46.95  46.95  46.95  46.95  46.95  46.95  46.95  46.95
C(meteo)  0  0  0  0  0  0  0  0  0
--------------------------------------------------------------------------------
L(p)  --  --  --  --  --  41.77 --  --  --  |  41.77

--------------------------------------------------------------------------------
Cross  section  for  receiver  R14  (Id=-32671 and  source  S39  (Id=533)
[Reflection in  facade  POLYLINE  (Id=113)]

L(wr)  --  --  --  --  --  101 --  --  --
A(ground)  -5.47  -5.47  3.51  5.41  1.6  -0.96  -1.3  -1.3  -1.3

A(barrier)  10.12  12.47  11.56  12.47  19.19  23.74  25  25  25
A(veg)  0  0  0  0  0  0  0  0  0
A(sit)  0  0  0  0  0  0  0  0  0
A(bld)  0  0  0  0  0  0  0  0  0
A(air)  0.02  0.09  0.29  0.74  1.37  2.59  6.84  23.2  82.76
A(geo)  67.99  67.99  67.99  67.99  67.99  67.99  67.99  67.99  67.99
A(refl)  --  --  --  --  --  --  --  --  -0.97
C(meteo)  0  0  0  0  0  0  0  0  0
--------------------------------------------------------------------------------
L(p)  --  --  --  --  --  --  --  --  --  |  -200

--------------------------------------------------------------------------------
Cross  section  for  receiver  R14  (Id=-32671 and  source  S39  (Id=533)
[Reflection in  facade  POLYLINE  (Id=181)]

L(wr)  --  --  --  --  --  101 --  --  --
A(ground)  -3.81  -3.81  0.58  5.95  2.08  -0.88  -1.29  -1.29  -1.29

A(barrier)  9.58  12.3  14.46  11.94  18.72  23.76  25  25  25
A(veg)  0  0  0  0  0  0  0  0  0
A(sit)  0  0  0  0  0  0  0  0  0
A(bld)  0  0  0  0  0  0  0  0  0
A(air)  0.01  0.02  0.07  0.18  0.33  0.63  1.67  5.67  20.22
A(geo)  55.75  55.75  55.75  55.75  55.75  55.75  55.75  55.75  55.75
A(refl)  --  --  --  --  --  -0.97  -0.97  -0.97  -0.97
C(meteo)  0  0  0  0  0  0  0  0  0
--------------------------------------------------------------------------------
L(p)  --  --  --  --  --  20.76 --  --  --  |  20.76

--------------------------------------------------------------------------------
Cross  section  for  receiver  R14  (Id=-32671 and  source  S39  (Id=533)
[Reflection in  facade  POLYLINE  (Id=184)]

L(wr)  --  --  --  --  --  101 --  --  --
A(ground)  -4.68  -4.68  1  5.53  1.67  -1.06  -1.43  -1.43  -1.43

A(barrier)  9.87  12.35  13.99  12.27  19.04  23.66  25  25  25
A(veg)  0  0  0  0  0  0  0  0  0
A(sit)  0  0  0  0  0  0  0  0  0
```

A(bld)	0	0	0	0	0	0	0	0	0
A(air)	0.01	0.03	0.12	0.3	0.55	1.05	2.78	9.42	33.59
A(geo)	60.16	60.16	60.16	60.16	60.16	60.16	60.16	60.16	60.16
A(refl)	--	--	--	--	--	--	--	-0.97	-0.97
C(meteo)	0	0	0	0	0	0	0	0	0

L(p) -- -- -- -- -- -- -- -- -- | -200

Cross section for receiver R14 (Id=-32671 and source S39 (Id=533)
[Reflection in facade POLYLINE (Id=296)]

L(wr)	--	--	--	--	--	101	--	--	--
A(ground)	-5.65	-5.65	2.51	4.36	2.31	-2.01	-2.67	-2.67	-2.67
A(barrier)	10.29	12.66	12.76	13.74	18.69	23.96	25	25	25
A(veg)	0	0	0	0	0	0	0	0	0
A(sit)	0	0	0	0	0	0	0	0	0
A(bld)	0	0	0	0	0	0	0	0	0
A(air)	0.04	0.13	0.45	1.14	2.11	4	10.56	35.82	127.78
A(geo)	71.77	71.77	71.77	71.77	71.77	71.77	71.77	71.77	71.77
A(refl)	--	--	--	--	--	--	--	--	--
C(meteo)	0	0	0	0	0	0	0	0	0

L(p) -- -- -- -- -- -- -- -- -- | -200

Cross section for receiver R14 (Id=-32671 and source S39 (Id=533)
[Reflection in facade LWPOLYLIN (Id=485)]

L(wr)	--	--	--	--	--	101	--	--	--
A(ground)	-3	-3	-0.31	4.16	1.69	-0.92	-1.3	-1.3	-1.3
A(barrier)	5.33	5.82	6.65	3.79	8.08	12.04	14.62	17.4	20
A(veg)	0	0	0	0	0	0	0	0	0
A(sit)	0	0	0	0	0	0	0	0	0
A(bld)	0	0	0	0	0	0	0	0	0
A(air)	0	0.01	0.03	0.08	0.15	0.29	0.76	2.56	9.15
A(geo)	48.86	48.86	48.86	48.86	48.86	48.86	48.86	48.86	48.86
A(refl)	--	--	--	-0.97	-0.97	-0.97	-0.97	-0.97	-0.97
C(meteo)	0	0	0	0	0	0	0	0	0

L(p) -- -- -- -- -- 39.76 -- -- -- | 39.76

==========

Height	Source	Per	LAeq	32	63	125	250	500	1000	2000	4000	8000
1.5	S39	1	40.9	--	--	--	--	--	40.9	--	--	--
1.5	S39	2	--	--	--	--	--	--	--	--	--	--
1.5	S39	3	--	--	--	--	--	--	--	--	--	--
1.5	S39	4	--	--	--	--	--	--	--	--	--	--

==========

Height	Per	LAeq	32	63	125	250	500	1000	2000	4000	8000
1.5	1	40.9	--	--	--	--	--	40.9	--	--	--
1.5	2	--	--	--	--	--	--	--	--	--	--
1.5	3	--	--	--	--	--	--	--	--	--	--
1.5	4	--	--	--	--	--	--	--	--	--	--

0.0001; 260; 0.0000005; TTimerSet - overhead
0.0007; 130; 0.0000054; WriteTestString

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