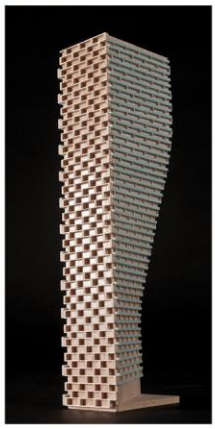
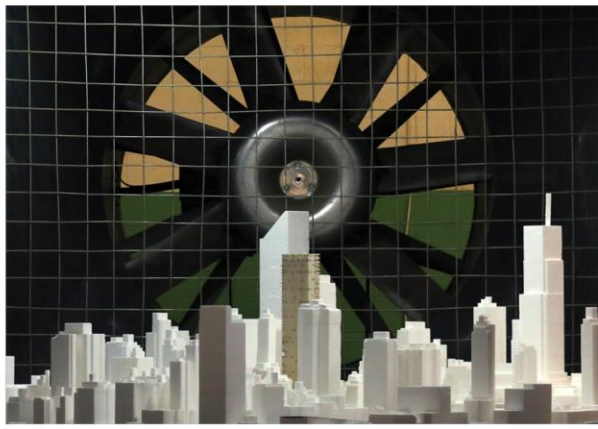
GRADIENTWIND
ENGINEERS & SCIENTISTS

STATIOANRY NOISE ASSESSMENT

36 Robinson Avenue
Ottawa, Ontario

GRADIENT WIND REPORT: 19-016 - Stationary Noise





July 19, 2019

PREPARED FOR

Bill Ritcey
Hobin Architecture Incorporated
63 Pamilla Street
Ottawa, Ontario
K1S 3K7

PREPARED BY

Cindy Hachem, Junior Environmental Scientist
Joshua Foster, P.Eng., Principal

EXECUTIVE SUMMARY

This report describes a stationary noise assessment performed for a proposed nine (9) storey residential development located at 36 Robinson Avenue in Ottawa, Ontario. The residential development comprises 197 units, where level 9 consists of protruding balconies and level 8 contains minor floorplate setbacks. An outdoor amenity area is featured on the roof of the building. Sources of stationary noise include an emergency generator, cooling towers, and a make-up air handling unit. Figure 1 illustrates the 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), and; (iii) architectural drawings prepared by Hobin Architecture on March 26th, 2019.

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 Hobin Architecture to undertake a stationary noise assessment for the proposed residential development at 36 Robinson Avenue in Ottawa, Ontario. This report summarizes the methodology, results and recommendations related to a stationary noise feasibility assessment.

The present scope of work involves assessing off-site exterior noise levels generated by HVAC equipment, emergency generators, cooling towers and make up air handling units associated with the development. 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, architectural drawings prepared by Hobin Architecture dated March 26th, 2019, 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 nine (9) storey residential development located at 36 Robinson Avenue in Ottawa, Ontario. The development is bounded by Robinson Avenue to the north and existing buildings to the east, south and west sides.

The residential development comprises 197 units, where level 9 consists of protruding balconies and level 8 contains minor floorplate setbacks. Underground parking is provided, accessed by a ramp from Robinson Avenue. An outdoor amenity area is featured on the roof of the building. The existing buildings to the east, south and west sides are the nearest points of reception. Figure 1 illustrates the site plan and surrounding context.

The equipment 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 an

[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

emergency generator, cooling towers, and a make-up air handling unit. Figure 2 illustrates the location of all noise sources included in this study.

2.1 Assumptions

Gradient Wind has assumed the preliminary mechanical information of the development based on experience with similar developments, and preliminary mechanical information provided by Smith and Andersen 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) The locations, quantity and tonnage of rooftop units are based on schematic designs provided by Smith and Andersen.
(ii) Sound data for the dry fluid coolers, generator and MUA are based on the manufacturer's data.
(iii) The dry fluid coolers and the MUA are assumed to operate continuously during the nighttime and daytime.
(iv) The generator is assumed to operate continuously over a 1-hour period during the daytime, and at will not be in operation during the nighttime period unless there is an emergency situation.
(v) The ground region was modelled as reflective due to the presence of hard (paved) ground.
(vi) The MUA intake will have either an induct silencer, acoustic lining or acoustic lover to provide a minimum 5 dB insertion loss.
(vii) Screening effects of the building and penthouse haves been excluded in the modelling.

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. Fourteen 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 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].

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

[3] NPC – 300, page 16

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 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 in a major population region at the 417 Highway. 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 provided by Smith and Andersen. Table 2 summarizes the sound power of each source used in the analysis.

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	Fluid Cooler	1	67	73	75	79	81	81	79	77	87
S2	Generator	1	-	-	-	-	100	-	-	-	100
S3	MUA-1	1	86	87	83	79	80	77	75	73	91

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-

[4] NPC – 300, page 14

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 14 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 3. All units were represented as point sources in the Predictor model, in exception to the MUA which was modelled as an emitting façade at the intake louver. 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 in Appendix A. Further modelling data is available upon request.

TABLE 3: RECEPTOR LOCATIONS

Receptor Number	Receptor Location	Height Above Grade (m)
R1	POW – 62 Robinson Avenue	11.5
R2	POW – 39 Robinson Avenue	10.5
R3	POW – 35 Robinson Avenue	10.5
R4	POW – 31 Robinson Avenue	4.5
R5	POW – 32 Robinson Avenue	8.5
R6	POW – 124 Robinson Avenue	6.5
R7	OPOR – 124 Robinson Avenue	1.5
R8	OPOR – 32 Robinson Avenue	1.5
R9	OPOR – 31 Robinson Avenue	1.5
R10	OPOR – 35 Robinson Avenue	1.5

R11	OPOR – 39 Robinson Avenue	1.5
R12	OPOR – 62 Robinson Avenue	1.5
R13	OPOR – 110 Robinson Avenue	1.5
R14	POW – 110 Robinson Avenue	8.5

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 4 Criteria	
		Day	Night	Day	Night	Day	Night
R1	POW – 62 Robinson Avenue	33	29	50	45	Yes	Yes
R2	POW – 39 Robinson Avenue	35	33	50	45	Yes	Yes
R3	POW – 35 Robinson Avenue	40	35	50	45	Yes	Yes
R4	POW – 31 Robinson Avenue	40	33	50	45	Yes	Yes
R5	POW – 32 Robinson Avenue	45	37	50	45	Yes	Yes
R6	POW – 124 Robinson Avenue	46	44	50	45	Yes	Yes
R7	OPOR – 124 Robinson Avenue	44	41	50	N/A	Yes	Yes
R8	OPOR – 32 Robinson Avenue	44	37	50	N/A	Yes	Yes

R9	OPOR – 31 Robinson Avenue	38	32	50	N/A	Yes	Yes
R10	OPOR – 35 Robinson Avenue	40	34	50	N/A	Yes	Yes
R11	OPOR – 39 Robinson Avenue	31	27	50	N/A	Yes	Yes
R12	OPOR – 62 Robinson Avenue	33	27	50	N/A	Yes	Yes
R13	OPOR – 110 Robinson Avenue	46	45	50	N/A	Yes	Yes
R14	POW – 110 Robinson Avenue	46	45	50	45	Yes	Yes

As Table 5 summarizes, noise levels fall below ENCG criteria at all receptors. Noise contours at 1.5 and 7.5 m above grade can be seen in Figures 4 - 7 for daytime and nighttime conditions, respectively. The loudest rooftop equipment should be located towards the centre of the rooftop, avoiding direct line of sight with sensitive areas if possible. With consideration of Gradient Wind's assumptions and 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.

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.

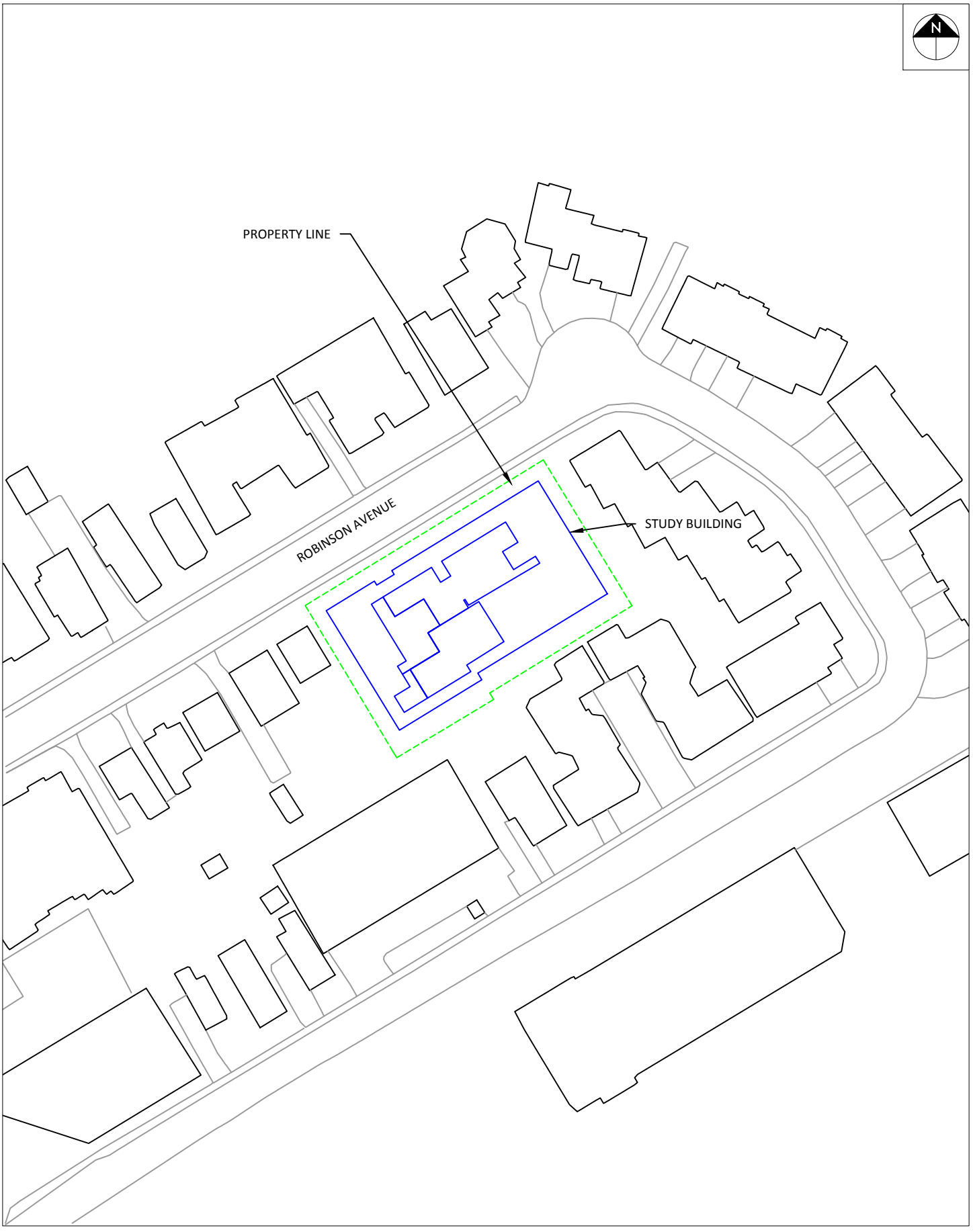
Sincerely,

Gradient Wind Engineering Inc.

LICENSED PROFESSIONAL ENGINEER
J. R. FOSTER
100155655
July 24, 2019
PROVINCE OF ONTARIO

Cindy Hachem
Junior Environmental Scientist
Gradient Wind File #19-016 – Stationary Noise

Joshua Foster, P.Eng.
Principal



GRADIENTWIND
ENGINEERS & SCIENTISTS

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

PROJECT	36 ROBINSON AVENUE - STATIONARY NOISE STUDY		DESCRIPTION
SCALE	1:1000 (APPROX.)	DRAWING NO.	GWE19-016-1
DATE	JULY 19, 2019	DRAWN BY	C.H.

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT

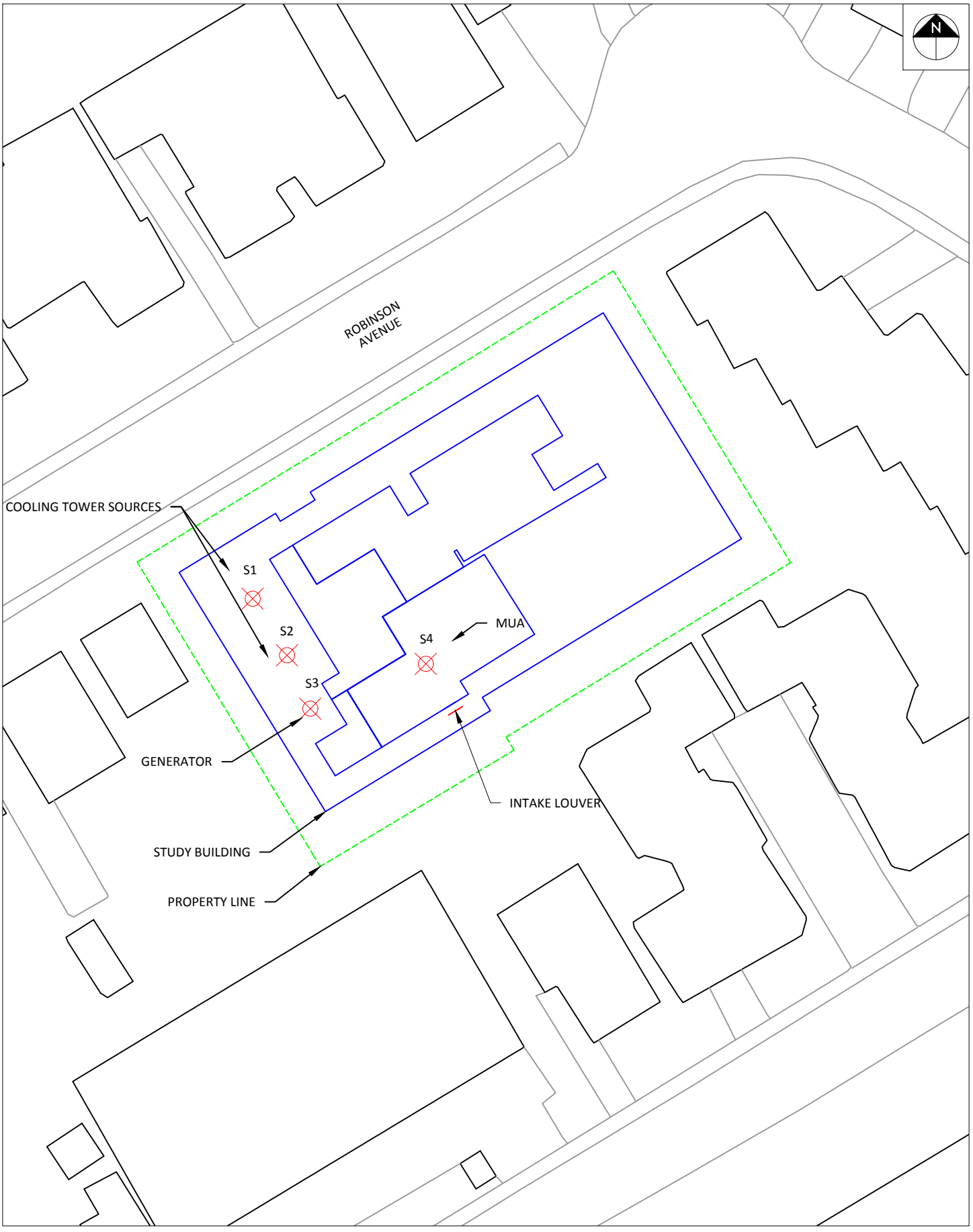
GRADIENTWIND
ENGINEERS & SCIENTISTS

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

PROJECT	36 ROBINSON AVENUE - STATIONARY NOISE STUDY		
SCALE	1:1000 (APPROX.)	DRAWING NO.	GWE19-016-2
DATE	JULY 19, 2019	DRAWN BY	C.H.

DESCRIPTION

FIGURE 2:
RECEPTOR LOCATIONS



GRADIENTWIND
ENGINEERS & SCIENTISTS

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

PROJECT	36 ROBINSON AVENUE - STATIONARY NOISE STUDY		
SCALE	1: 500 (APPROX.)	DRAWING NO.	GWE19-016-3
DATE	JULY 19, 2019	DRAWN BY	C.H.

DESCRIPTION

FIGURE 3:
STATIONARY NOISE SOURCE LOCATIONS

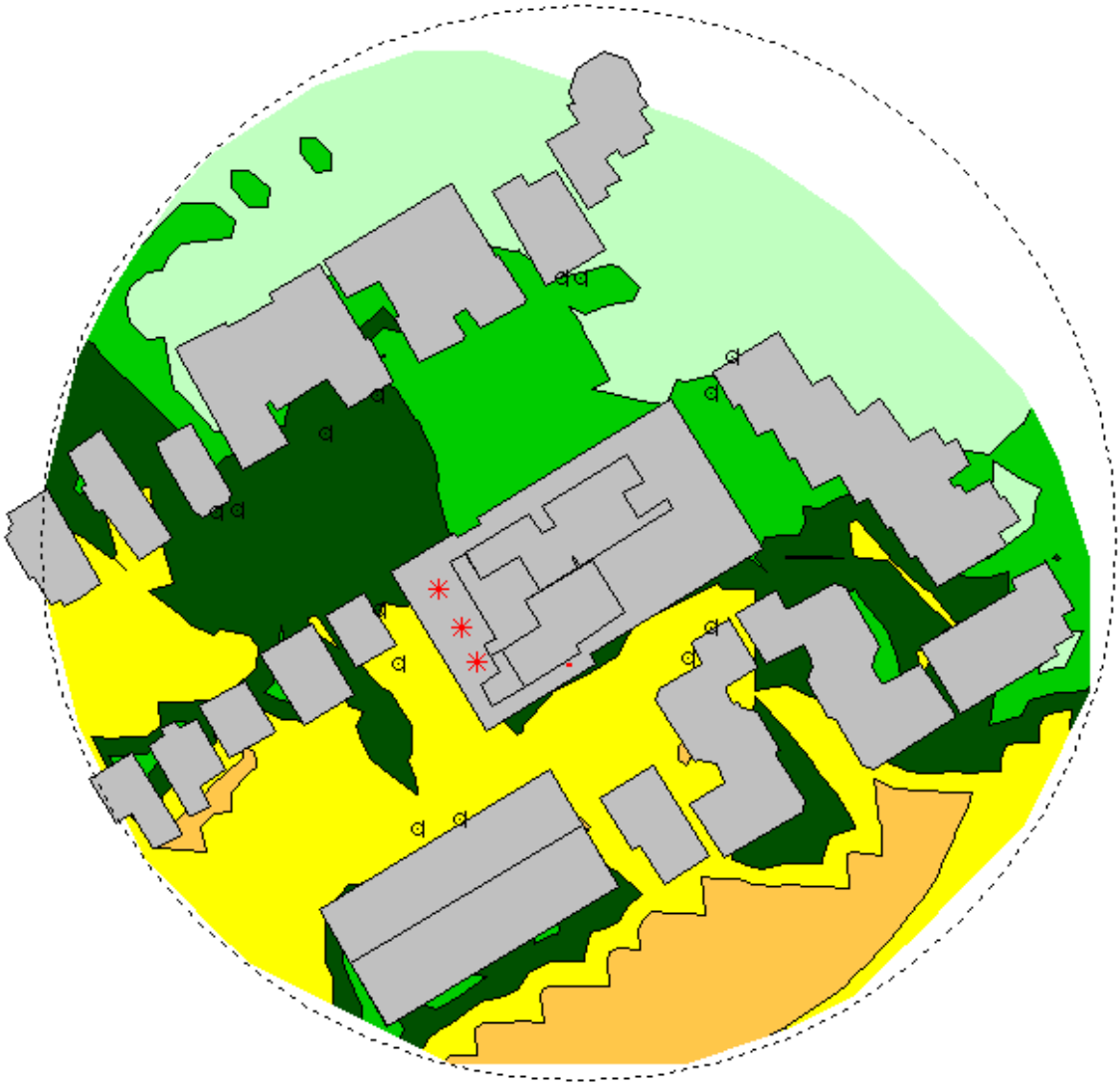
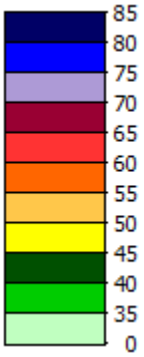


FIGURE 4: NOISE CONTOURS FOR THE SITE AT 7.5 M (DAYTIME PERIOD)



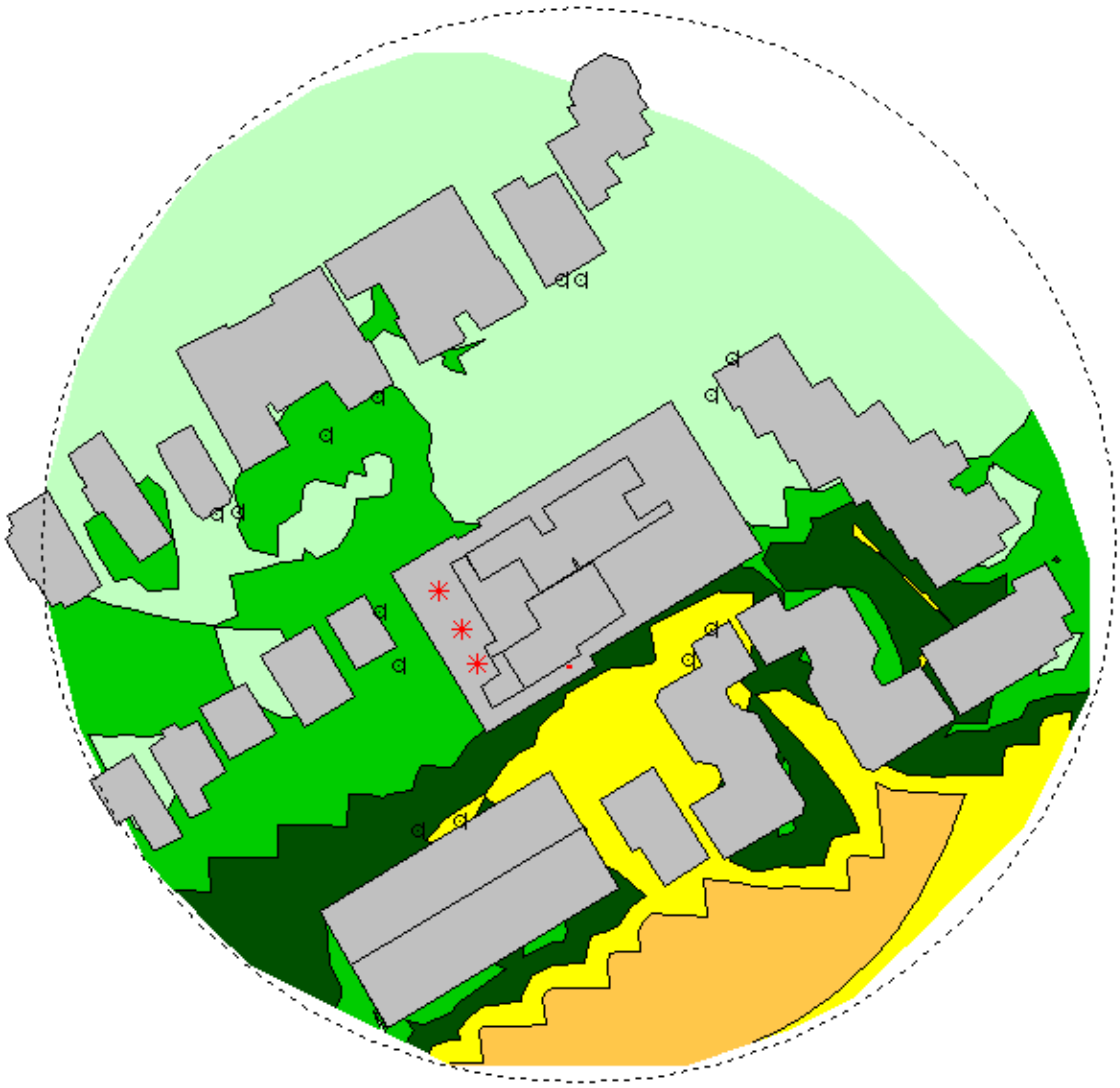


FIGURE 5: NOISE CONTOURS FOR THE SITE AT 7.5 M (NIGHTTIME PERIOD)

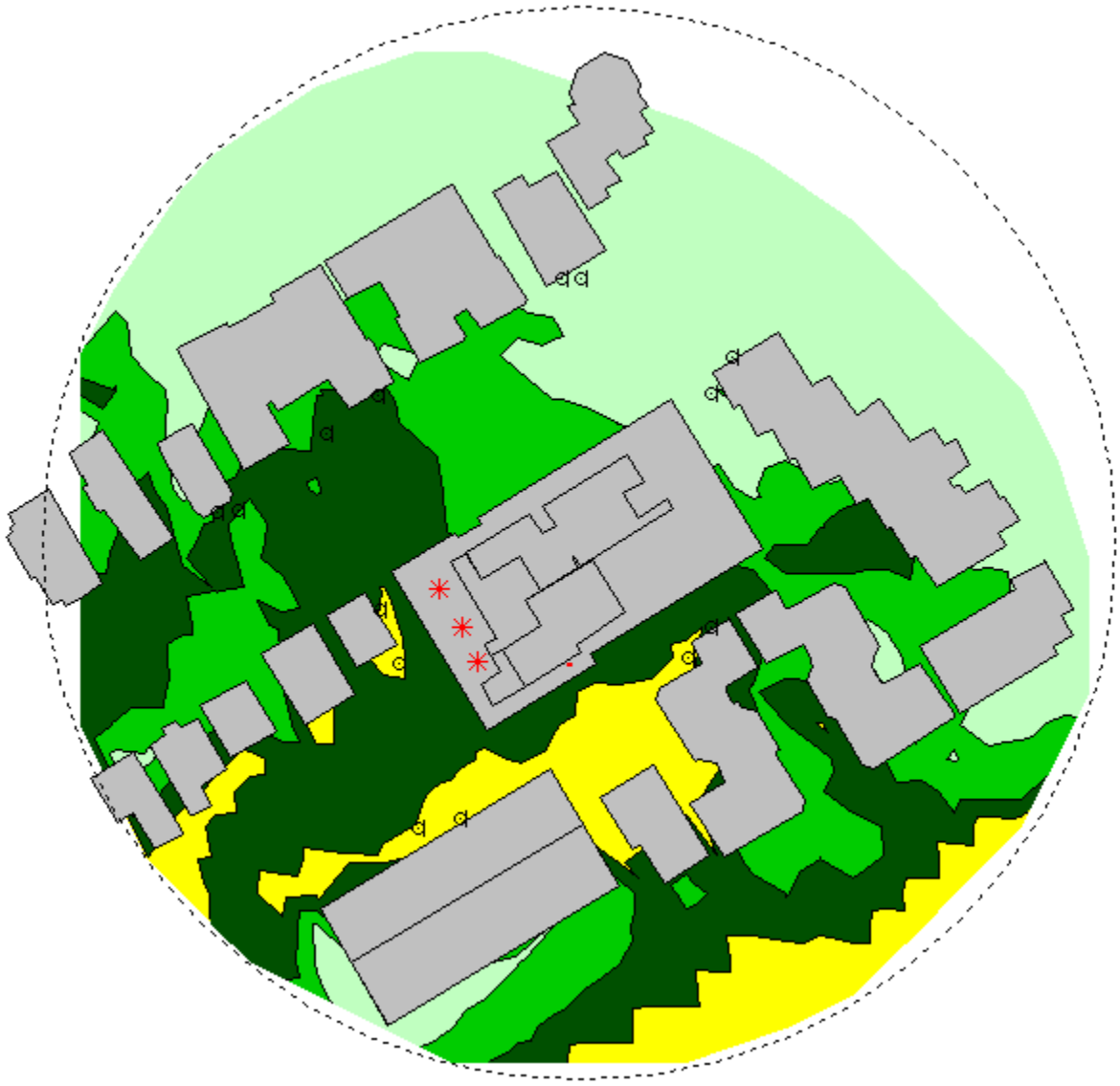
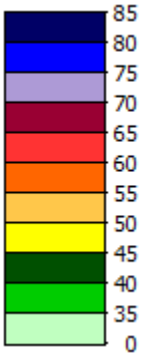


FIGURE 6: NOISE CONTOURS FOR THE SITE AT 1.5 M (DAYTIME PERIOD)



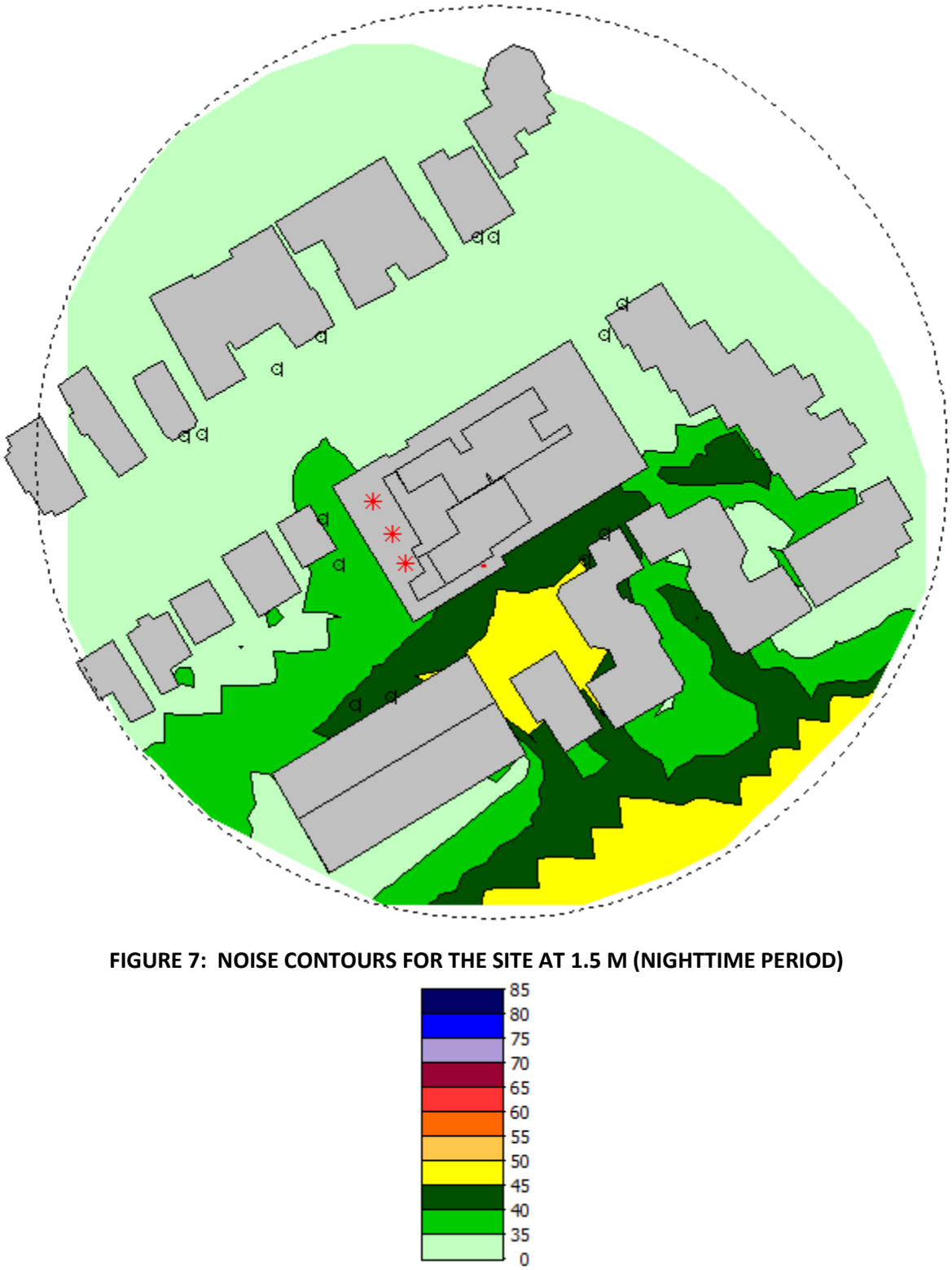


FIGURE 7: NOISE CONTOURS FOR THE SITE AT 1.5 M (NIGHTTIME PERIOD)

APPENDIX A

PREDICTOR-LIMA SAMPLE INPUT AND OUTPUT DATA

127 WALGREEN ROAD, OTTAWA, ON, CANADA K0A 1L0 | 613 836 0934
GRADIENTWIND.COM

```
================================================================================
Testfile openend: 24/07/2019 11:44:12 AM
================================================================================


--------------------------------------------------------------------------------
Cross section for receiver R14 (Id=-3712) and source S4 (Id=-4853)

ItemType        Id            Distance           X           Y     Hgrnd    Height  GrndFact
Cluster
Receiver        R14              0.000   370093.77  5031264.69     59.53      8.50      0.00
Heightline      LWPOLYLINE       2.681   370091.18  5031264.02     59.50      0.00      0.00
Building        LWPOLYLINE      18.172   370076.19  5031260.11     59.00     27.00      0.00
19
Pointsource     S4              21.965   370072.52  5031259.15     86.00      0.91      0.00
--------------------------------------------------------------------------------
L(wr)                --   86.00   87.00   83.00   79.00   80.00   77.00   75.00   73.00
A(ground)         -3.00   -3.00   -3.00   -3.00   -3.00   -3.00   -3.00   -3.00   -3.00

A(barrier)         8.91    9.81   11.17   13.05   15.36   17.98   20.00   20.00   20.00
A(veg)             0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
A(sit)             0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
A(bld)             0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
A(air)             0.00    0.00    0.01    0.03    0.06    0.11    0.28    0.95    3.39
A(geo)            40.23   40.23   40.23   40.23   40.23   40.23   40.23   40.23   40.23
D(i)               3.00    3.00    3.00    3.00    3.00    3.00    3.00    3.00    3.00
C(meteo)           0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
--------------------------------------------------------------------------------
L(p)                 --   41.96   41.59   35.69   29.35   27.69   22.49   19.82   15.38 |
45.51

--------------------------------------------------------------------------------
Cross section for receiver R14 (Id=-3712) and source S2 (Id=13945)

ItemType        Id            Distance           X           Y     Hgrnd    Height  GrndFact
Cluster
Receiver        R14              0.000   370093.77  5031264.69     59.53      8.50      0.00
Heightline      LWPOLYLINE       1.267   370092.51  5031264.69     59.50      0.00      0.00
Heightline      LWPOLYLINE       6.836   370086.94  5031264.70     59.00      0.00      0.00
Building        LWPOLYLINE      11.149   370082.63  5031264.70     59.00     27.00      0.00
19
Building        LWPOLYLINE      16.048   370077.73  5031264.71     86.00      4.00      0.00
19
Heightline      LWPOLYLINE      22.880   370070.89  5031264.71     59.00      0.00      0.00
Building        LWPOLYLINE      25.630   370068.14  5031264.72     86.00      4.00      0.00
19
Building        LWPOLYLINE      25.630   370068.14  5031264.72     86.00      4.00      0.00
19
Building        LWPOLYLINE      33.041   370060.73  5031264.72     86.00      4.00      0.00
19
Pointsource     S2              37.103   370056.67  5031264.73     86.00      1.00      0.00
--------------------------------------------------------------------------------
L(wr)                --   66.80   72.90   75.40   78.80   81.00   81.20   79.00   76.90
A(ground)         -3.00   -3.00   -3.00   -3.00   -3.00   -3.00   -3.00   -3.00   -3.00

A(barrier)        15.85   19.41   23.73   25.00   25.00   25.00   25.00   25.00   25.00
A(veg)             0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
A(sit)             0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
A(bld)             0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
A(air)             0.00    0.01    0.02    0.04    0.08    0.15    0.40    1.37    4.87
A(geo)            43.39   43.39   43.39   43.39   43.39   43.39   43.39   43.39   43.39
D(i)               0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
C(meteo)           0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
--------------------------------------------------------------------------------
L(p)                 --    6.99    8.77    9.97   13.33   15.46   15.41   12.25    6.64 |
21.31

--------------------------------------------------------------------------------
```

Cross section for receiver R14 (Id=-3712) and source S1 (Id=13946)

ItemType	Id	Distance	X	Y	Hgrnd	Height	GrndFact
Cluster							
Receiver	R14	0.000	370093.77	5031264.69	59.53	8.50	0.00
Heightline	LWPOLYLINE	1.008	370092.78	5031264.83	59.50	0.00	0.00
Heightline	LWPOLYLINE	5.480	370088.35	5031265.44	59.00	0.00	0.00
Building	LWPOLYLINE	9.193	370084.67	5031265.95	59.00	27.00	0.00
19							
Building	LWPOLYLINE	13.298	370080.60	5031266.52	86.00	4.00	0.00
19							
Heightline	LWPOLYLINE	22.485	370071.50	5031267.78	59.00	0.00	0.00
Building	LWPOLYLINE	27.963	370066.08	5031268.53	86.00	4.00	0.00
19							
Building	LWPOLYLINE	27.963	370066.08	5031268.53	86.00	4.00	0.00
19							
Building	LWPOLYLINE	36.427	370057.69	5031269.69	86.00	4.00	0.00
19							
Pointsource	S1	40.874	370053.29	5031270.30	86.00	1.00	0.00

L(wr)	--	66.80	72.90	75.40	78.80	81.00	81.20	79.00	76.90
A(ground)	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00
A(barrier)	16.69	20.56	24.90	25.00	25.00	25.00	25.00	25.00	25.00
A(veg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A(sit)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A(bld)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A(air)	0.00	0.01	0.02	0.05	0.09	0.16	0.44	1.48	5.27
A(geo)	44.07	44.07	44.07	44.07	44.07	44.07	44.07	44.07	44.07
D(i)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C(meteo)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
L(p)	--	5.17	6.92	9.28	12.64	14.77	14.70	11.45	5.56 |
20.50									

Cross section for receiver R14 (Id=-3712) and source S3 (Id=13950)

ItemType	Id	Distance	X	Y	Hgrnd	Height	GrndFact
Cluster							
Receiver	R14	0.000	370093.77	5031264.69	59.53	8.50	0.00
Heightline	LWPOLYLINE	1.817	370091.98	5031264.42	59.50	0.00	0.00
Heightline	LWPOLYLINE	9.658	370084.22	5031263.26	59.00	0.00	0.00
Heightline	LWPOLYLINE	11.256	370082.64	5031263.02	59.00	0.00	0.00
Building	LWPOLYLINE	14.952	370078.99	5031262.48	59.00	27.00	0.00
19							
Building	LWPOLYLINE	19.987	370074.01	5031261.73	86.00	4.00	0.00
19							
Building	LWPOLYLINE	30.823	370063.29	5031260.12	86.00	4.00	0.00
19							
Building	LWPOLYLINE	30.823	370063.29	5031260.12	90.00	4.00	0.00
19							
Building	LWPOLYLINE	32.744	370061.39	5031259.84	90.00	4.00	0.00
19							
Pointsource	S3	35.199	370058.96	5031259.47	86.00	1.00	0.00

L(wr)	--	--	--	--	--	100.00	--	--	--
A(ground)	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00
A(barrier)	16.87	20.36	24.65	25.00	25.00	25.00	25.00	25.00	25.00
A(veg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A(sit)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A(bld)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A(air)	0.00	0.00	0.02	0.04	0.08	0.15	0.39	1.31	4.67
A(geo)	43.03	43.03	43.03	43.03	43.03	43.03	43.03	43.03	43.03
D(i)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C(meteo)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

```
L(p)                --      --      --      --      --   34.82      --      --      -- |
34.82

================================================================================================

  Height      Source  Per      LAeq        32        63       125       250       500      1000
2000      4000      8000
    8.50          S2    1     21.31        --      6.99      8.77      9.97     13.33     15.46
15.41     12.25      6.64
    8.50          S2    2        --        --        --        --        --        --        --
--        --        --
    8.50          S2    3     21.31        --      6.99      8.77      9.97     13.33     15.46
15.41     12.25      6.64
    8.50          S2    4        --        --        --        --        --        --        --
--        --        --
    8.50          S1    1     20.50        --      5.17      6.92      9.28     12.64     14.77
14.70     11.45      5.56
    8.50          S1    2        --        --        --        --        --        --        --
--        --        --
    8.50          S1    3     20.50        --      5.17      6.92      9.28     12.64     14.77
14.70     11.45      5.56
    8.50          S1    4        --        --        --        --        --        --        --
--        --        --
    8.50          S3    1     34.82        --        --        --        --        --     34.82
--        --        --
    8.50          S3    2        --        --        --        --        --        --        --
--        --        --
    8.50          S3    3        --        --        --        --        --        --        --
--        --        --
    8.50          S3    4        --        --        --        --        --        --        --
--        --        --
    8.50          S4    1     45.51        --     41.96     41.59     35.69     29.35     27.69
22.49     19.82     15.38
    8.50          S4    2        --        --        --        --        --        --        --
--        --        --
    8.50          S4    3     45.51        --     41.96     41.59     35.69     29.35     27.69
22.49     19.82     15.38
    8.50          S4    4        --        --        --        --        --        --        --
--        --        --

================================================================================================

  Height                Per      LAeq        32        63       125       250       500      1000
2000      4000      8000
    8.50                1     45.90        --     41.96     41.59     35.71     29.55     35.67
23.83     21.03     16.31
    8.50                2        --        --        --        --        --        --        --
--        --        --
    8.50                3     45.54        --     41.96     41.59     35.71     29.55     28.14
23.83     21.03     16.31
    8.50                4        --        --        --        --        --        --        --
--        --        --

------------------------------------------------------------------------------------------------
      0.0000;        292;    0.0000001; "TTimerSet - overhead"
      0.0009;        146;    0.0000058; "WriteTestString"
------------------------------------------------------------------------------------------------


================================================================================================
Testfile closed: 24/07/2019 11:44:12 AM
================================================================================================
```