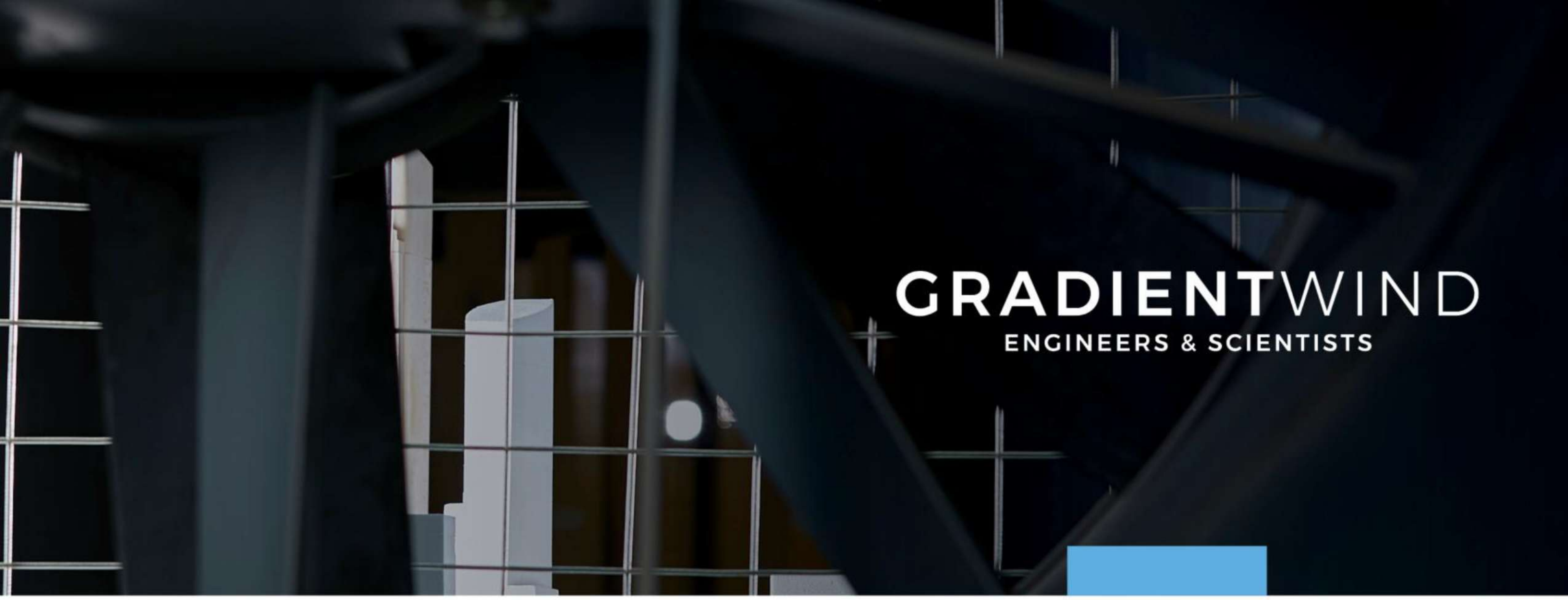
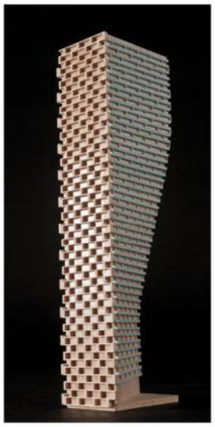


ROADWAY TRAFFIC NOISE AND VIBRATION ASSESSMENT

Wateridge Block 12
Ottawa, Ontario

Report: 23-130 – Roadway Traffic Noise



July 20, 2026

PREPARED FOR

Mattamy Homes Canada
50 Hines Road, Suite 100
Ottawa ON K2K 2M5

PREPARED BY

Sunny Kang, B.A.S., Project Coordinator
Joshua Foster, P.Eng., Lead Engineer

127 WALGREEN ROAD, OTTAWA, ON, CANADA K0A 1L0 | 613 836 0934
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EXECUTIVE SUMMARY

This report describes a roadway traffic noise and vibration assessment undertaken in support of a Site Plan Control (SPA) application for Block 12 of the proposed master plan development located directly south of Tawadina Road and west of Bareille-Snow Street in Ottawa, Ontario. The proposed development comprises three 2-storey back-to-back townhomes as well as an at-grade amenity area. The major source of roadway traffic noise impacting the development is Hemlock Road. Figure 1 illustrates the site location with the surrounding context.

The assessment is based on (i) theoretical noise prediction methods that conform to the Ministry of the Environment, Conservation and Parks (MECP), Ministry of Transportation of Ontario (MTO), and City of Ottawa requirements; (ii) noise level criteria as specified by the City of Ottawa's Environmental Noise Control Guidelines (ENCG); (iii) future vehicular traffic volumes based on the City of Ottawa's Official Plan roadway classifications; and (iv) site plan drawings provided by Korsiak Urban Planning in May 2023.

The results of the current analysis indicated that noise levels will range between 45 and 50 dBA during the daytime period (07:00-23:00) and between 37 and 42 dBA during the nighttime period (23:00-07:00). The highest noise level (50 dBA) occurs at the south façade of Building 3, which is nearest and most exposed to Hemlock Road. Since noise levels are less than 55 dBA at all the building façades, standard building components in compliance with Ontario Building Code standards will be sufficient to attenuate noise levels indoors when windows are closed for Buildings 1, 2, and 3.

In addition, Buildings 1, 2, and 3 will not require ventilation for noise mitigation purposes. However, the building is expected to have air conditioning for occupant comfort purposes. Furthermore, no Warning Clauses are required to be registered on title. As for the at-grade amenity area, noise levels are expected to be below the noise level criteria for OLAs. Therefore, no acoustic mitigation is required for this area.

The study site is located approximately 637 m (property line to property line) southeast of Rockcliffe Airport. Rockcliffe Airport is classified as a small-scale airport primarily used by general aviation supporting a flight school, and private aviation activity and programs related to the Canada Aviation Museum. As this facility does not have a Noise Exposure Forecast (NEF) contour associated with Annex 10 of the City of

Ottawa's Official Plan (OP) this facility is not classified as a noise source. As such, noise generated at the airport is not expected to be a concern.

Similarly, the study site is not within 75 meters (m) of any existing or proposed LRT/HRT systems. Therefore, no adverse impacts from vibration sources onto the development are expected.

TABLE OF CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Mattamy Homes Canada to undertake a roadway traffic noise and vibration assessment for Block 12 of the proposed master plan development located directly south of Tawadina Road and west of Bareille-Snow Street in Ottawa, Ontario. This report summarizes the methodology, results, and recommendations related to the assessment of exterior and interior noise levels generated by local roadway traffic.

This assessment is based on theoretical noise calculation methods conforming to the Ministry of the Environment, Conservation and Parks (MECP) NPC-300[1], Ministry of Transportation Ontario (MTO)[2], and City of Ottawa Environmental Noise Control Guidelines (ENCG)[3] guidelines. Noise calculations were based on site plan drawings provided by Korsiak Urban Planning in May 2023, with future traffic volumes corresponding to the City of Ottawa's Official Plan (OP) roadway classifications.

2. TERMS OF REFERENCE

The focus of this roadway traffic noise and vibration assessment is a proposed mixed-use development, known as Wateridge Block 12, located in Ottawa, Ontario. The proposed Block 12 development comprises 52 stacked townhouse units, arranged in three separate blocks on the north side of the study site, adjacent to surface parking and a pedestrian walkway to a public park in the southwest corner of the site. There is also a proposed at-grade amenity area at the center of the site. Additionally, two separate nine-storey residential apartment buildings occupy the northwest and southeast corners of the study site, respectively.

The development is surrounded by mostly vacant land which is zoned as General Mixed-Use and Residential Use land as per Ottawa's Zoning By-Law[4]. Future mid-rise buildings are proposed to the immediate west and south of the subject site. A park is located to the southwest of the Codd's Road and Hemlock Road intersection. Low-rise residential buildings are located to the east and southeast. The major

---

[1] Ontario Ministry of the Environment and Climate Change – Environmental Noise Guidelines, Publication NPC-300, Queens Printer for Ontario, Toronto, 2013
[2] Ministry of Transportation Ontario, "*Environmental Guide for Noise*", February 2022
[3] City of Ottawa, Environmental Noise Control Guidelines, January 2016
[4] City of Ottawa, Zoning By-Law No. 2008-250

source of traffic noise impacting the site is Hemlock Road. Figure 1 illustrates the site location with the surrounding context.

The study site is located approximately 637 m (property line to property line) southeast of Rockcliffe Airport. Rockcliffe Airport is classified as a small-scale airport primarily used by general aviation supporting a flight school, and private aviation activity and programs related to the Canada Aviation Museum. As this facility does not have a Noise Exposure Forecast (NEF) contour associated with Annex 10 of the City of Ottawa's Official Plan (OP) this facility is not classified as a noise source. As such, noise generated at the airport is not expected to be a concern.

Similarly, the study site is not within 75 meters (m) of any existing or proposed LRT/HRT systems. Therefore, no adverse impacts from vibration sources onto the development are expected.

3. OBJECTIVES

The principal objectives of this study are to (i) calculate the future noise levels on the study buildings produced by local roadway traffic, and (ii) ensure that interior and exterior noise levels do not exceed the allowable limits specified by the City of Ottawa's Environmental Noise Control Guidelines as outlined in Section 4.2 of this report.

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 Roadway Traffic Noise

4.2.1 Criteria for Roadway Traffic Noise

For surface roadway traffic noise, the equivalent sound energy level, L_{eq}, provides a 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 period of time. For roadways, the L_{eq} is commonly calculated on the basis of a 16-hour (L_{eq16}) daytime (07:00-23:00) / 8-hour (L_{eq8}) nighttime (23:00-07:00) split to assess its impact on residential buildings. The City of Ottawa's Environmental Noise Control Guidelines (ENCG) specify that the recommended indoor noise limit range (that is relevant to this study) is 45 and 40 dBA for living rooms and sleeping quarters respectively for roadway as listed in Table 1.

TABLE 1: INDOOR SOUND LEVEL CRITERIA (ROAD) [5]

Type of Space	Time Period	L_{eq} (dBA)
General offices, reception areas, retail stores, etc.	07:00 – 23:00	50
Living/dining/den areas of **residences**, hospitals, schools, nursing/retirement homes, day-care centres, theatres, places of worship, libraries, individual or semi-private offices, conference rooms, etc.	07:00 – 23:00	45
Sleeping quarters of hotels/motels	23:00 – 07:00	45
Sleeping quarters of **residences**, hospitals, nursing/retirement homes, etc.	23:00 – 07:00	40

Predicted noise levels at the plane of window (POW) dictate the action required to achieve the recommended sound levels. An open window is considered to provide a 10 dBA reduction in noise, while a standard closed window is capable of providing a minimum 20 dBA noise reduction[6]. A closed window due to a ventilation requirement will bring noise levels down to achieve an acceptable indoor environment[7]. Therefore, where noise levels exceed 55 dBA daytime and 50 dBA nighttime, the ventilation

[5] Adapted from ENCG 2016 – Tables 2.2b and 2.2c
[6] Burberry, P.B. (2014). Mitchell's Environment and Services. Routledge, Page 125
[7] MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.8

for the building should consider the need for having windows and doors closed, which triggers the need for forced air heating with provision for central air conditioning. Where noise levels exceed 65 dBA daytime and 60 dBA nighttime, air conditioning will be required and building components will require higher levels of sound attenuation[8].

The sound level criterion for outdoor living areas (OLA) is 55 dBA, which applies during the daytime (07:00 to 23:00). When noise levels exceed 55 dBA, mitigation should be provided to reduce noise levels where technically and administratively feasible to acceptable levels at or below the criterion. Furthermore, noise levels at the OLA must not exceed 60 dBA if mitigation can be technically and administratively achieved.

4.2.2 Theoretical Roadway Noise Predictions

The impact of transportation noise sources on the development was determined by two computer modelling programs. To provide a general sense of noise across the site, the employed software program was Predictor-Lima which utilizes the United States Federal Highway Administration's Traffic Noise Model (TNM) to represent the roadway line sources. The TNM model has been accepted as the preferred model as per the revised guideline titled "*Environmental Guide for Noise"* prepared by the Ministry of Transportation Ontario (MTO)[9]. This computer program can represent three-dimensional surfaces and the first reflections of sound waves over a suitable spectrum for human hearing. A set of comparative calculations were performed in the current Ontario traffic noise prediction model, STAMSON, for comparisons to Predictor simulation results.

The STAMSON model is, however, older and requires each receptor to be calculated separately. STAMSON also does not accurately account for building reflections and multiple screening elements, and curved road geometry. A total of 4 receptor locations were identified around the site, as illustrated in Figure 2.

Roadway noise calculations were performed by treating each road segment as separate line sources of noise, and by using existing and proposed building locations as noise barriers. In addition to the traffic volumes summarized in Table 2, theoretical noise predictions were based on the following parameters:

---

[8] MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3
[9] Environmental Guide for Noise, February 2022. Ministry of Transportation Ontario

- Truck traffic on all roadways was taken to comprise 5% heavy trucks and 7% medium trucks, as per ENCG requirements for noise level predictions.
- The day/night split was taken to be 92% / 8% respectively for all streets.
- The ground surface was modelled as hard (reflective) ground to account for the hard, packed soil present at the site. Where lawn is proposed, the ground surface was modelled as soft (absorptive) ground.
- The study site was treated as having flat or gently sloping topography.
- Massing associated with the study site and surrounding existing and proposed buildings were included as potential noise screening elements.
- 4 receptors were strategically placed throughout the study area, as shown in Figure 2.

4.2.3 Roadway Traffic Volumes

The ENCG dictates that noise calculations should consider future sound levels based on a roadway's classification at the mature state of development. Therefore, traffic volumes are based on the roadway classifications outlined in the City of Ottawa's Official Plan (OP) and Transportation Master Plan[10] which provide additional details on future roadway expansions. Average Annual Daily Traffic (AADT) volumes are then based on data in Table B1 of the ENCG for each roadway classification. Table 2 (below) summarizes the AADT values used for each roadway included in this assessment.

TABLE 2: ROADWAY TRAFFIC DATA

Segment	Roadway Traffic Data	Speed Limit (km/h)	Traffic Volumes
Hemlock Road	2-Lane Major Collector	50	**12,000**

[10] City of Ottawa Transportation Master Plan, November 2013

4.3 Indoor Noise Calculations

The difference between outdoor and indoor noise levels is the noise attenuation provided by the building envelope. According to common industry practice, complete walls and individual wall elements are rated according to the Sound Transmission Class (STC). The STC ratings of common residential walls built in conformance with the Ontario Building Code (2012) typically exceed STC 35, depending on exterior cladding, thickness and interior finish details. For example, brick veneer walls can achieve STC 50 or more. Standard commercially sided exterior metal stud walls have around STC 45. Standard good quality double-glazed non-operable windows can have STC ratings ranging from 25 to 40, depending on the window manufacturer, pane thickness and inter-pane spacing. As previously mentioned, the windows are the known weak point in a partition.

As per Section 4.2, when daytime noise levels from road sources at the plane of the window exceed 65 dBA, calculations must be performed to evaluate the sound transmission quality of the building components to ensure acceptable indoor noise levels are achieved. The calculation procedure[11] considers:

- Window type and total area as a percentage of total room floor area
- Exterior wall type and total area as a percentage of the total room floor area
- Acoustic absorption characteristics of the room
- Outdoor noise source type and approach geometry
- Indoor sound level criteria, which varies according to the intended use of a space

Based on published research[12], exterior walls possess specific sound attenuation characteristics that are used as a basis for calculating the required STC ratings of windows in the same partition. Due to the limited information available at the time of the study, detailed floor layouts have not been finalized; therefore, detailed STC calculations could not be performed at this time. As a guideline, the anticipated STC requirements for windows have been estimated based on the overall noise reduction required for each intended use of space (STC = Outdoor Noise Level – Targeted Indoor Noise Levels).

[11] Building Practice Note: Controlling Sound Transmission into Buildings by J.D. Quirt, National Research Council of Canada, September 1985

[12] CMHC, Road & Rail Noise: Effects on Housing

5. RESULTS

5.1 Roadway Traffic Noise Levels

The results of the roadway traffic noise calculations are summarized in Table 3 below.

TABLE 3: EXTERIOR NOISE LEVELS DUE TO ROADWAY TRAFFIC

Receptor Number	Receptor Height Above Grade (m)	Receptor Location	Predictor-Lima Noise Level (dBA)	
			Day	Night
R1	4.5	POW – Building 3 - South Facade	50	42
R2	4.5	POW – Building 2 - South Facade	46	39
R3	4.5	POW – Building 1 - South Facade	45	37
R4	1.5	OLA – At-Grade Amenity	48	N/a*

*Nighttime noise levels at the OLA are not considered as per ENCG.

The results of the current analysis indicated that noise levels will range between 45 and 50 dBA during the daytime period (07:00-23:00) and between 37 and 42 dBA during the nighttime period (23:00-07:00). The highest noise level (50 dBA) occurs at the south façade of Building 3, which is nearest and most exposed to Hemlock Road. Figures 3 and 4 illustrate daytime and nighttime noise contours throughout the site at a height of 10 m above grade.

Table 4 shows a comparison in results between Predictor-Lima and STAMSON. Noise levels calculated in STAMSON were found to have a good correlation with Predictor-Lima and variability between the two programs was within an acceptable level of ±0-3 dBA. Sample calculations are presented in Appendix A.

TABLE 4: RESULTS OF STAMSON/PREDICTOR-LIMA CORRELATION

Receptor ID	Receptor Location	Receptor Height (m)	STAMSON 5.04 Noise Level (dBA)		PREDICTOR-LIMA Noise Level (dBA)	
			Day	Night	Day	Night
R1	POW – Building 3 - South Facade	4.5	53	45	50	42
R4	OLA – At-Grade Amenity	1.5	49	N/a*	48	N/a*

*Nighttime noise levels at the OLA are not considered as per ENCG.

5.2 Noise Control Measures

The noise levels predicted due to roadway traffic are expected to fall below 55 dBA for all buildings. Since noise levels are less than 55 dBA at all the building façades, standard building components in compliance with Ontario Building Code standards will be sufficient to attenuate noise levels indoors when windows are closed for Buildings 1, 2, and 3. In addition, Buildings 1, 2, and 3 will not require ventilation for noise mitigation purposes. However, the building is expected to have air conditioning for occupant comfort purposes. Furthermore, no Warning Clauses are required to be registered on title.

As for the at-grade amenity area, noise levels are expected to be below the noise level criteria for OLAs. Therefore, no acoustic mitigation is required for this area.

6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicated that noise levels will range between 45 and 50 dBA during the daytime period (07:00-23:00) and between 37 and 42 dBA during the nighttime period (23:00-07:00). The highest noise level (50 dBA) occurs at the south façade of Building 3, which is nearest and most exposed to Hemlock Road. Since noise levels are less than 55 dBA at all the building façades, standard building components in compliance with Ontario Building Code standards will be sufficient to attenuate noise levels indoors when windows are closed for Buildings 1, 2, and 3.

In addition, Buildings 1, 2, and 3 will not require ventilation for noise mitigation purposes. However, the building is expected to have air conditioning for occupant comfort purposes. Furthermore, no Warning Clauses are required to be registered on title.

As for the at-grade amenity area, noise levels are expected to be below the noise level criteria for OLAs. Therefore, no acoustic mitigation is required for this area.

This concludes our roadway traffic noise and vibration 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,

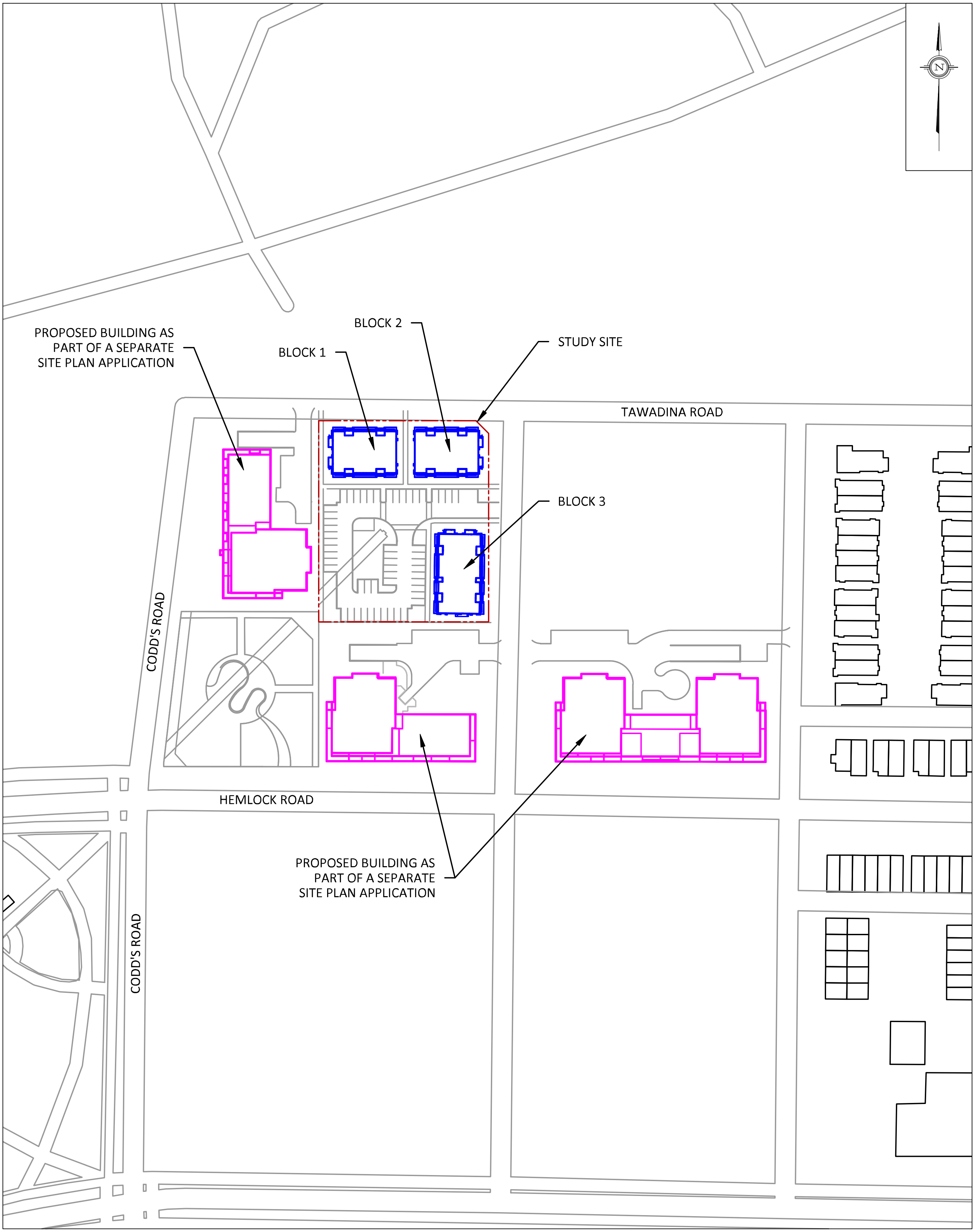
Gradient Wind Engineering Inc.

LICENSED PROFESSIONAL ENGINEER
J. R. FOSTER
100155655
2026-07-20
PROVINCE OF ONTARIO

Sunny Kang, B.A.S.
Project Coordinator

Joshua Foster, P.Eng.
Lead Engineer

Gradient Wind File #23-130



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ENGINEERS & SCIENTISTS
127 WALGREEN ROAD , OTTAWA, ON
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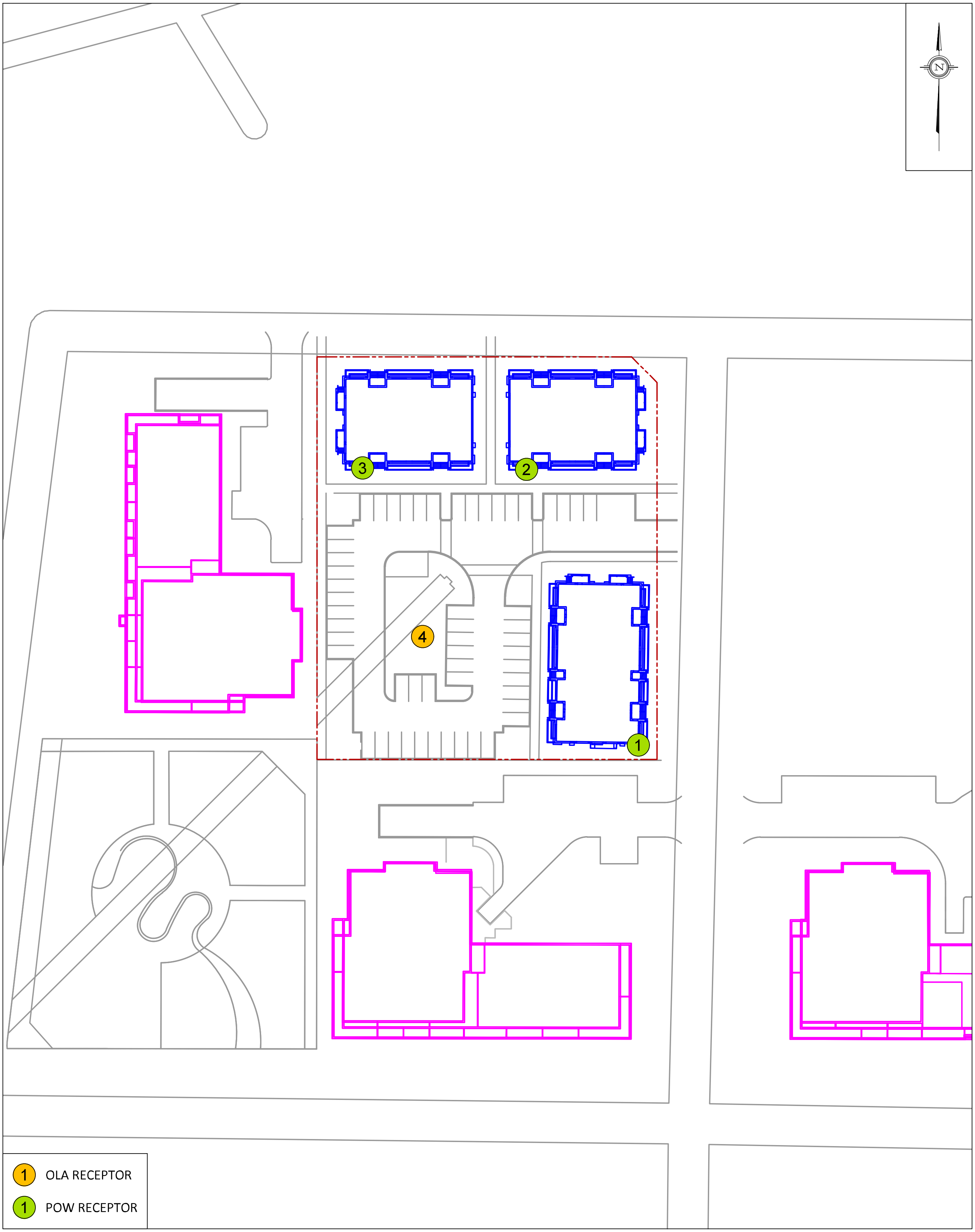
PROJECT	WATERIDGE BLOCK 12, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT
SCALE	1:2000 (APPROX.)
DRAWING NO.	GW23-130-1
DATE	JUNE 6, 2023
DRAWN BY	G.G.
DESCRIPTION	FIGURE 1: SITE PLAN AND SURROUNDING CONTEXT



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PROJECT	WATERIDGE BLOCK 12, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT		
SCALE	1:1000 (APPROX.)	DRAWING NO.	GW23-130-2
DATE	JUNE 6, 2023	DRAWN BY	G.G.

DESCRIPTION

FIGURE 2:
RECEPTOR LOCATIONS

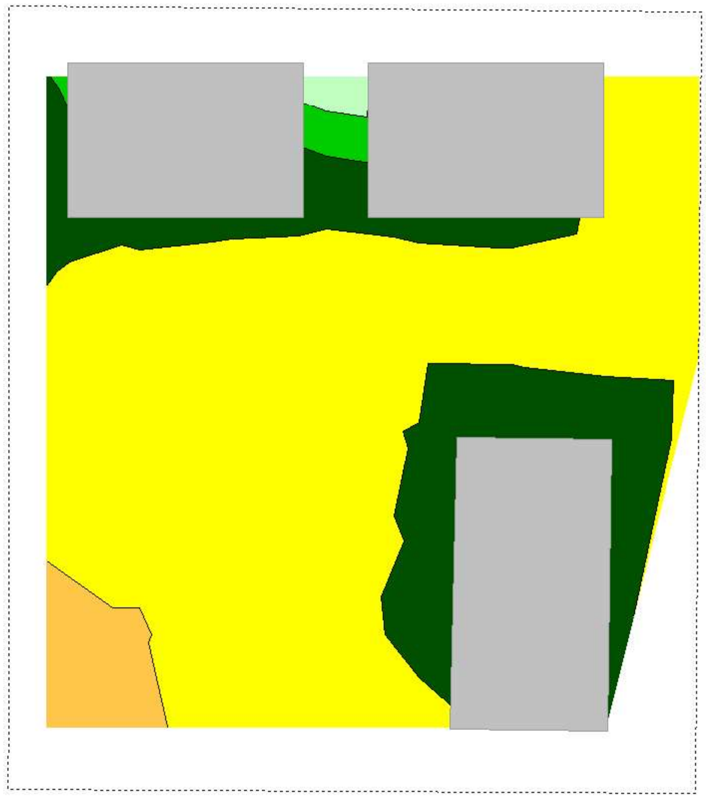


FIGURE 3: DAYTIME TRAFFIC NOISE CONTOURS (10 M ABOVE GRADE)

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

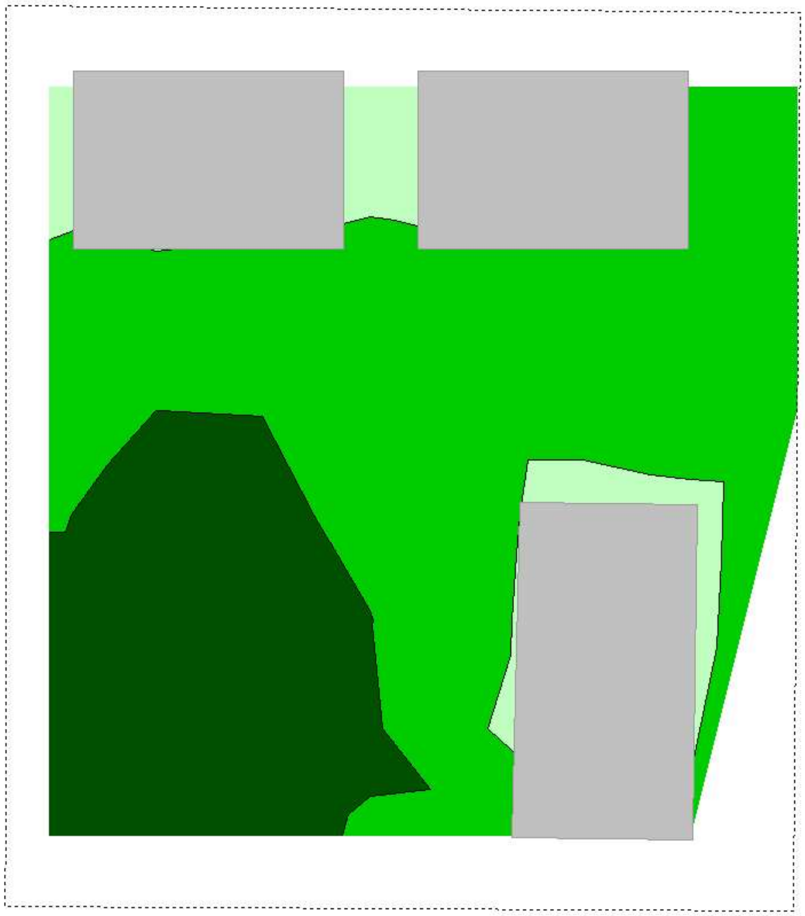
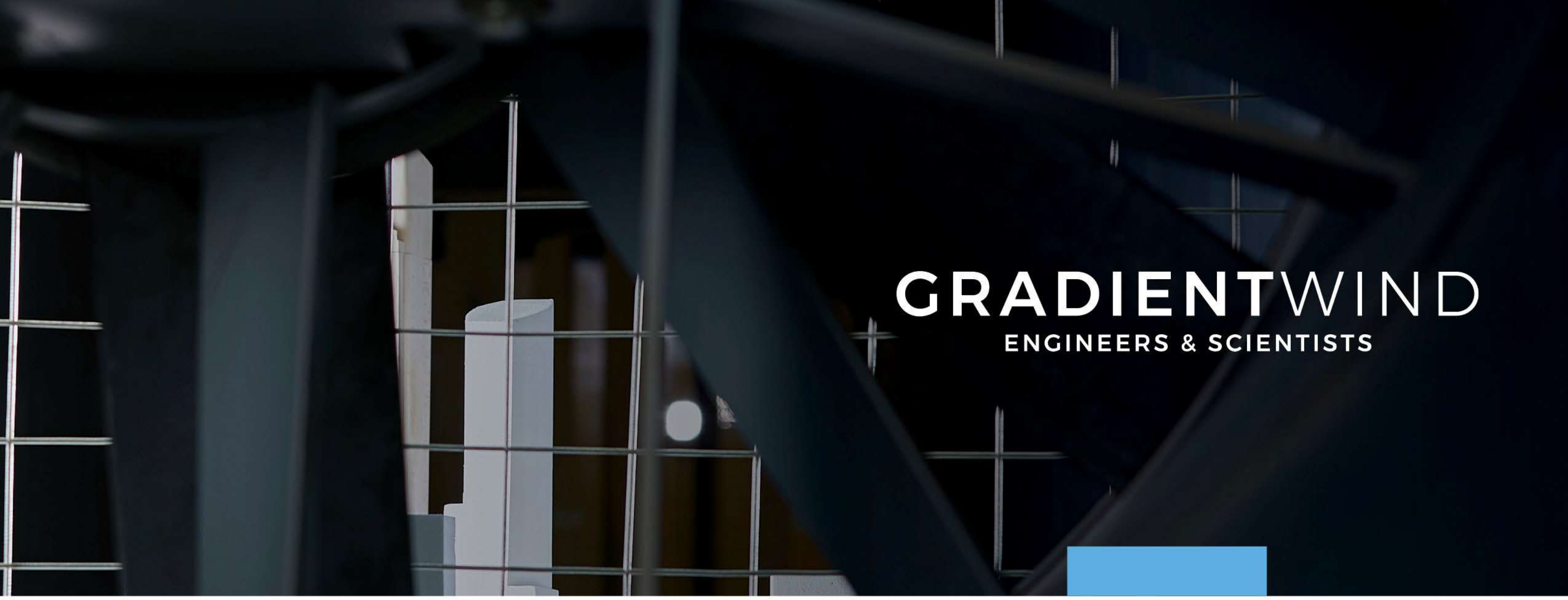
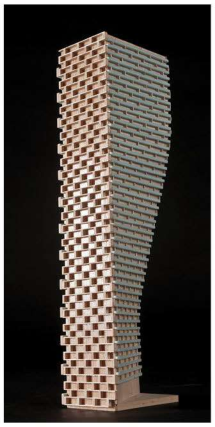
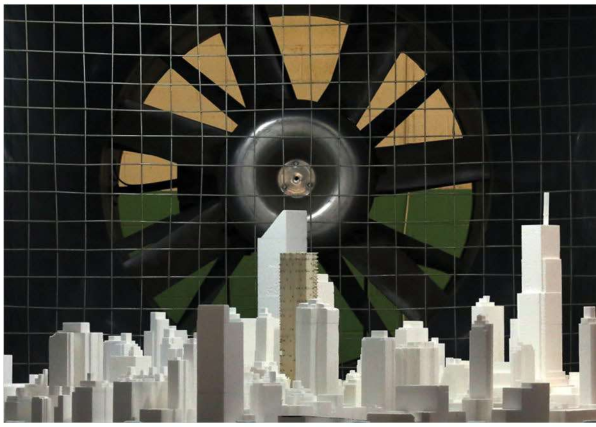


FIGURE 4: NIGHTTIME TRAFFIC NOISE CONTOURS (10 M ABOVE GRADE)

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







APPENDIX A

STAMSON 5.04 – INPUT AND OUTPUT DATA

127 WALGREEN ROAD, OTTAWA, ON, CANADA K0A 1L0 | 613 836 0934
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```
STAMSON 5.0        NORMAL REPORT        Date: 06-06-2023 15:27:11
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r1.te                Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: HR 1 (day/night)
----------------------------------------
Car traffic volume  :  9715/845   veh/TimePeriod  *
Medium truck volume :   773/67    veh/TimePeriod  *
Heavy truck volume  :   552/48    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  12000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: HR 1 (day/night)
--------------------------------------
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  75.00 / 75.00  m
Receiver height           :   4.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -28.00 deg
Barrier height            :  29.00 m
Barrier receiver distance :  57.00 / 57.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: HR 2 (day/night)
----------------------------------------
Car traffic volume  :  9715/845   veh/TimePeriod  *
Medium truck volume :   773/67    veh/TimePeriod  *
Heavy truck volume  :   552/48    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  12000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: HR 2 (day/night)
--------------------------------------
Angle1   Angle2           :   0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  75.00 / 75.00  m
Receiver height           :   4.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :   0.00 deg   Angle2 : 90.00 deg
Barrier height            :  20.00 m
Barrier receiver distance :  57.00 / 57.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Results segment # 1: HR 1 (day)
-------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source       ! Receiver     ! Barrier      ! Elevation of
Height   (m) ! Height   (m) ! Height   (m) ! Barrier Top  (m)
-------------+--------------+--------------+---------------
       1.50 !        4.50 !        2.22 !         2.22

ROAD (0.00 + 36.79 + 52.44) = 52.56 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
```

```
--------------------------------------------------------------------------
--
   -90    -28   0.00  67.51   0.00  -6.99  -4.63   0.00   0.00 -19.10
36.79
--------------------------------------------------------------------------
--
   -28      0   0.00  67.51   0.00  -6.99  -8.08   0.00   0.00   0.00
52.44
--------------------------------------------------------------------------
--

Segment Leq : 52.56 dBA


Results segment # 2: HR 2 (day)
-------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !        4.50 !        2.22 !         2.22

ROAD (0.00 + 38.72 + 0.00) = 38.72 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
--------------------------------------------------------------------------
--
     0     90   0.00  67.51   0.00  -6.99  -3.01   0.00   0.00 -18.79
38.72
--------------------------------------------------------------------------
--

Segment Leq : 38.72 dBA

Total Leq All Segments: 52.74 dBA


Results segment # 1: HR 1 (night)
---------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
```

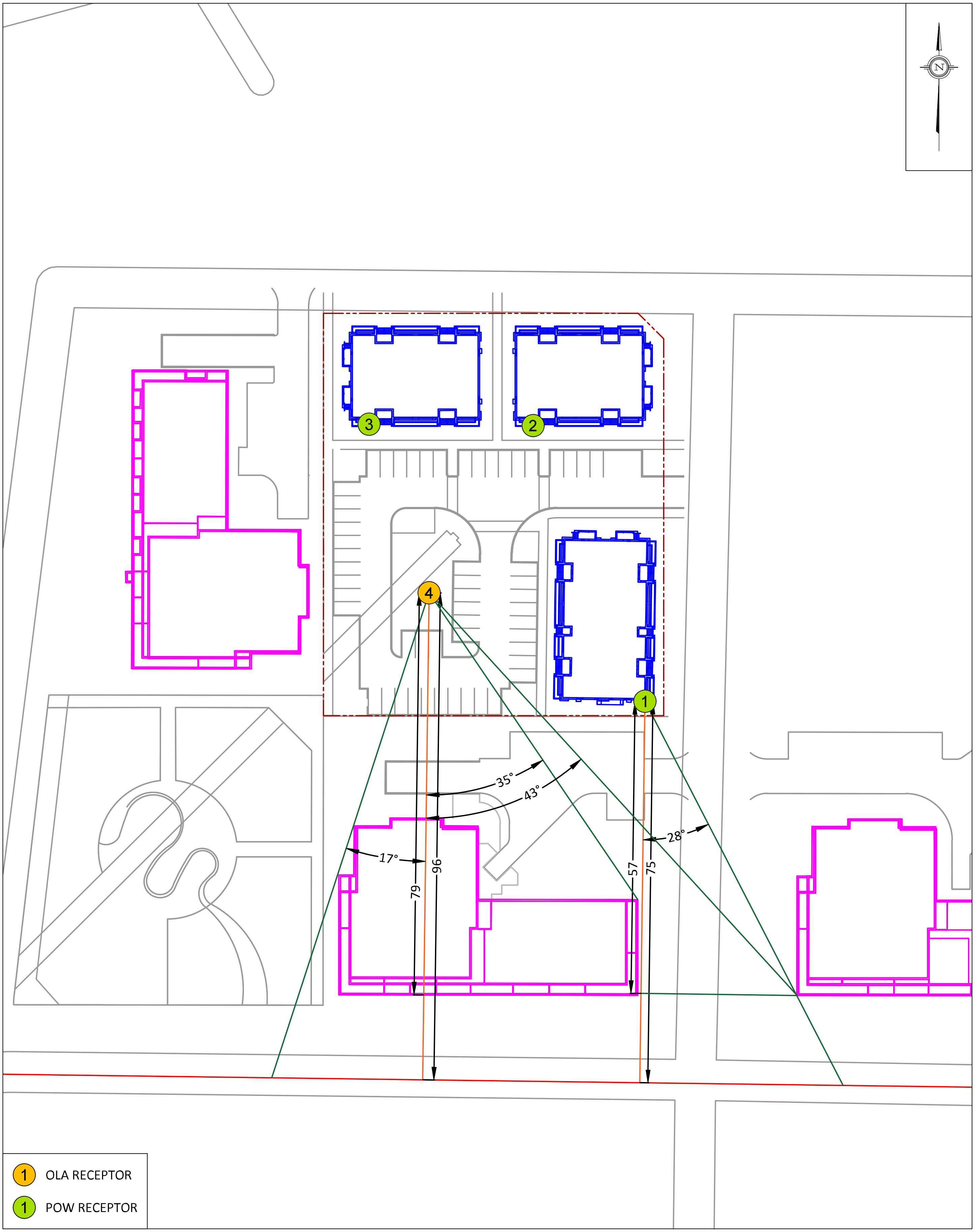
```
      1.50 !        4.50 !        2.22 !         2.22

ROAD (0.00 + 29.19 + 44.84) = 44.96 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
--------------------------------------------------------------------------
--
   -90    -28   0.00  59.91   0.00  -6.99  -4.63   0.00   0.00 -19.10
29.19
--------------------------------------------------------------------------
--
   -28      0   0.00  59.91   0.00  -6.99  -8.08   0.00   0.00   0.00
44.84
--------------------------------------------------------------------------
--

Segment Leq : 44.96 dBA

Results segment # 2: HR 2 (night)
---------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
      1.50 !        4.50 !        2.22 !         2.22

ROAD (0.00 + 31.12 + 0.00) = 31.12 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
--------------------------------------------------------------------------
--
     0     90   0.00  59.91   0.00  -6.99  -3.01   0.00   0.00 -18.79
31.12
--------------------------------------------------------------------------
--

Segment Leq : 31.12 dBA

Total Leq All Segments: 45.14 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 52.74
                         (NIGHT): 45.14
```

```
STAMSON 5.0        NORMAL REPORT        Date: 06-06-2023 15:28:02
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r4.te                 Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: HR 1 (day/night)
----------------------------------------
Car traffic volume  :  9715/845   veh/TimePeriod  *
Medium truck volume :   773/67    veh/TimePeriod  *
Heavy truck volume  :   552/48    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  12000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: HR 1 (day/night)
--------------------------------------
Angle1   Angle2           : -43.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  96.00 / 96.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -35.00 deg   Angle2 : 0.00 deg
Barrier height            :  20.00 m
Barrier receiver distance :  79.00 / 79.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 2: HR 2 (day/night)
----------------------------------------
Car traffic volume  :  9715/845   veh/TimePeriod  *
Medium truck volume :   773/67    veh/TimePeriod  *
Heavy truck volume  :   552/48    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)
```

```
* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  12000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: HR 2 (day/night)
--------------------------------------
Angle1   Angle2           :   0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  96.00 / 96.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :   0.00 deg   Angle2 : 17.00 deg
Barrier height            :  29.00 m
Barrier receiver distance :  79.00 / 79.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Results segment # 1: HR 1 (day)
-------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+---------------
       1.50 !        1.50 !        1.50 !         1.50

ROAD (39.88 + 32.34 + 0.00) = 40.59 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
--------------------------------------------------------------------------
--
   -43    -35   0.66  67.51   0.00 -13.38 -14.25   0.00   0.00   0.00
39.88
--------------------------------------------------------------------------
--
   -35      0   0.00  67.51   0.00  -8.06  -7.11   0.00   0.00 -20.00
32.34
```

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

Segment Leq : 40.59 dBA


Results segment # 2: HR 2 (day)
-------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source       ! Receiver     ! Barrier      ! Elevation of
Height   (m) ! Height   (m) ! Height   (m) ! Barrier Top   (m)
-------------+--------------+--------------+---------------
       1.50 !         1.50 !         1.50 !          1.50

ROAD (0.00 + 29.20 + 48.34) = 48.40 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
--------------------------------------------------------------------------
--
     0     17   0.00  67.51   0.00  -8.06 -10.25   0.00   0.00 -20.00
29.20
--------------------------------------------------------------------------
--
    17     90   0.66  67.51   0.00 -13.38  -5.78   0.00   0.00   0.00
48.34
--------------------------------------------------------------------------
--

Segment Leq : 48.40 dBA

Total Leq All Segments: 49.07 dBA


Results segment # 1: HR 1 (night)
---------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source       ! Receiver     ! Barrier      ! Elevation of
Height   (m) ! Height   (m) ! Height   (m) ! Barrier Top   (m)
-------------+--------------+--------------+---------------
       1.50 !         1.50 !         1.50 !          1.50

ROAD (32.28 + 24.74 + 0.00) = 32.99 dBA
```

```
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
------------------------------------------------------------------------
--
   -43    -35   0.66  59.91   0.00 -13.38 -14.25   0.00   0.00   0.00
32.28
------------------------------------------------------------------------
--
   -35      0   0.00  59.91   0.00  -8.06  -7.11   0.00   0.00 -20.00
24.74
------------------------------------------------------------------------
--

Segment Leq : 32.99 dBA


Results segment # 2: HR 2 (night)
---------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source       ! Receiver     ! Barrier      ! Elevation of
Height   (m) ! Height   (m) ! Height   (m) ! Barrier Top  (m)
-------------+--------------+--------------+---------------
       1.50 !        1.50 !        1.50 !         1.50

ROAD (0.00 + 21.60 + 40.74) = 40.80 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
------------------------------------------------------------------------
--
     0     17   0.00  59.91   0.00  -8.06 -10.25   0.00   0.00 -20.00
21.60
------------------------------------------------------------------------
--
    17     90   0.66  59.91   0.00 -13.38  -5.78   0.00   0.00   0.00
40.74
------------------------------------------------------------------------
--

Segment Leq : 40.80 dBA

Total Leq All Segments: 41.47 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 49.07
                         (NIGHT): 41.47
```



GRADIENTWIND ENGINEERS & SCIENTISTS 127 WALGREEN ROAD , OTTAWA, ON 613 836 0934 • GRADIENTWIND.COM	PROJECT WATERIDGE BLOCK 12, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT		DESCRIPTION FIGURE A1: STAMSON INPUT PARAMETERS
	SCALE 1:1000 (APPROX.)	DRAWING NO. GW23-130-A1	
	DATE JUNE 6, 2023	DRAWN BY G.G.	