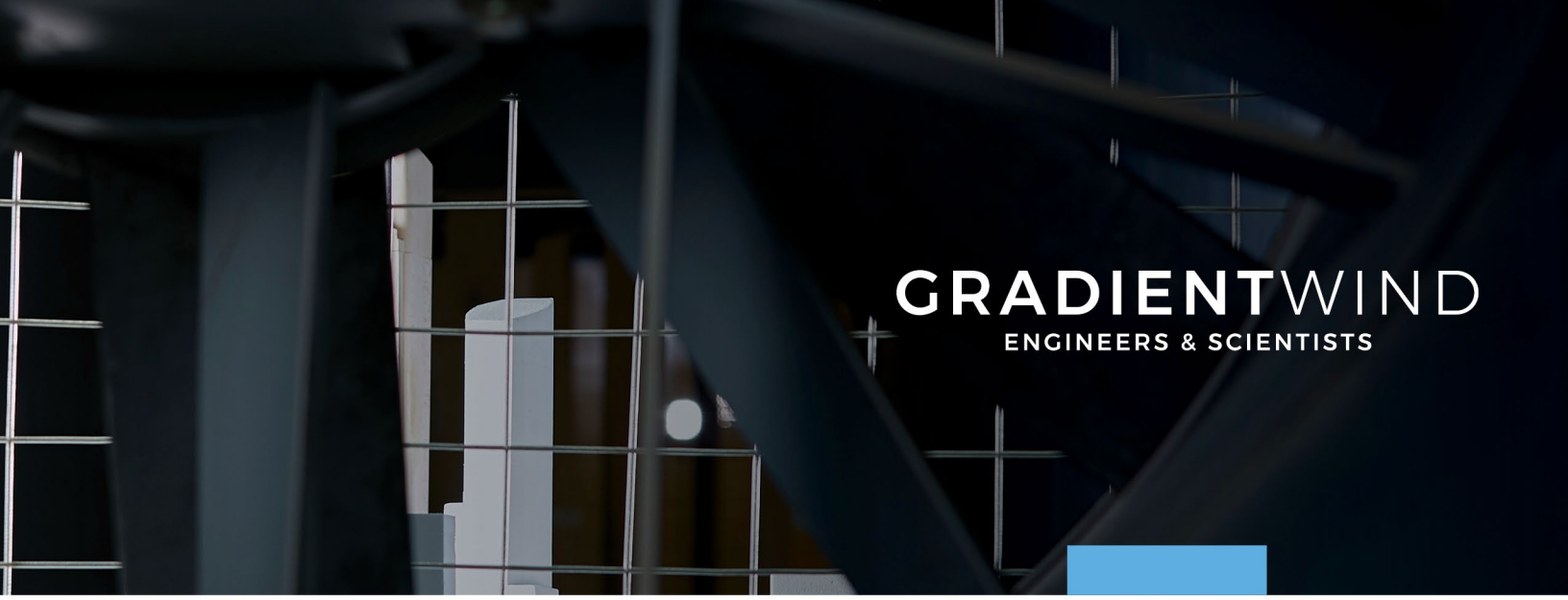

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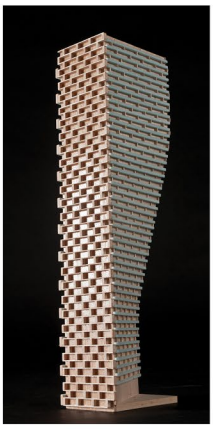
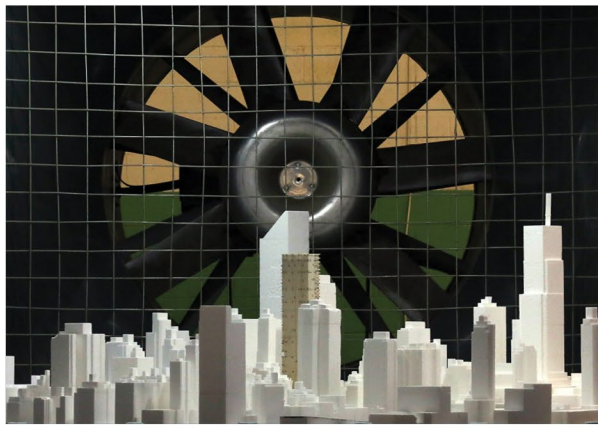
DETAILED TRAFFIC NOISE ASSESSMENT

1770 Heatherington Road,
Ottawa, Ontario

REPORT: 26-021 – Traffic Noise





March 18, 2026

PREPARED FOR

Colizza Bruni Architecture
76 Chamberlain Avenue
Ottawa, ON K1S 1V9

Attn: Anthony Bruni
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PREPARED BY

Michael Pantano, MASc., Junior Environmental Scientist
Joshua Foster, P.Eng., Lead Engineer

EXECUTIVE SUMMARY

This report describes a detailed transportation noise assessment undertaken to support a Site Plan Control (SPC) Application for a proposed development located at 1770 Heatherington Road in Ottawa, Ontario. The proposed development comprises two lots referred to as Block 1, located at the northeast corner of the site, and Block 13, located at the southeast corner. Each lot accommodates a four-storey residential building with 45 units and 20 surface parking stalls. The sources of transportation noise are Walkey and Heatherington Roads. Figure 1 illustrates a complete site plan with the surrounding context.

The assessment is based on (i) theoretical noise prediction methods that conform to the Ministry of the Environment, Conservation and Parks (MECP) and City of Ottawa requirements; (ii) noise level criteria as specified by the City of Ottawa's Environmental Noise Control Guidelines (ENCG); (iii) future vehicular traffic volumes based on the City of Ottawa's Official Plan roadway classifications; and (iv) drawings provided by CBA in February 2026.

The results of the current analysis indicate that noise levels will range between 44 and 65 dBA during the daytime period (07:00-23:00) and between 36 and 57 dBA during the nighttime period (23:00-07:00). The highest noise level (65 dBA) occurs at the east façade of the building occupying Lot 1, which is nearest and most exposed to Heatherington Road, and has some exposure to Walkley Road. Since the calculations show that no POW receptor exceeded 65 dBA, exterior building components that comply with the OBC (2024) will be sufficient.

The results of the calculations also indicate that both buildings will require a provision for central air conditioning or equivalent, which will allow occupants to keep windows closed and maintain a comfortable living environment. This typically requires a Type C Warning Clause. However, since the buildings are multi-unit apartments style residential dwellings, it is anticipated that the buildings will be constructed with a cooling system installed. In this event, a Type D Warning Clause will be required on all Lease, Purchase and Sale Agreements for the buildings on Lots 1 and 13. The Warning Clause is summarized in Section 6.

With regards to on-site stationary noise impacts of surroundings onto the study site, Gradient Wind conducted a survey of the site using aerial imagery and no significant off-site sources of stationary noise were identified. The surrounding consists of low rise residential, and a few restaurants to the south. The elementary school is too far to the southwest to have significant noise from its mechanical equipment. Noise from Walkley Road is expected to mask any residual stationary noise impacts. Coming from the restaurants to the north of the site.

Regarding stationary noise impacts of the study site on its surroundings, the site's nature as a set of two four-storey residential buildings means that the mechanical equipment anticipated to be installed with the buildings is not expected to cause significant stationary noise impacts on its surroundings. However, a review may be warranted once further information about the mechanical equipment planned for the site is available.

TABLE OF CONTENTS

1. INTRODUCTION

This report describes a detailed transportation noise assessment undertaken to support a Site Plan Control (SPC) Application for a proposed development comprises of two four-storey residential buildings on the northeast and southeast areas of a larger site located at 1770 Heatherington Road 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.

Our work is based on theoretical noise calculation methods conforming to the City of Ottawa[1] and Ministry of the Environment, Conservation and Parks (MECP)[2] guidelines. Noise calculations were based on drawings provided by Colizza Bruni Architecture in February 2026, with future traffic volumes corresponding to the City of Ottawa's Official Plan (OP) roadway classifications.

2. TERMS OF REFERENCE

The focus of this detailed transportation noise assessment is a portion of a proposed Ottawa Community Housing site at 1770 Heatherington Road in Ottawa, Ontario. The proposed development comprises two lots referred to as Block 1, located at the northeast corner of the site, and Block 13, located at the southeast corner. Each lot accommodates a four-storey residential building with 45 units and 20 surface parking stalls. Figure 1 shows the proposed site and its surrounding context.

The sources of transportation noise are Walkley Road to the north and Heatherington Road to the east. The development is on either side of the Taggart Parkes Family Boys and Girls Club Clubhouse. Additionally, development is surrounded by Ottawa Community Housing (OCH) developments to its east and south, restaurants and a place of worship to its north, and an elementary school to the southwest.

[1] City of Ottawa Environmental Noise Control Guidelines, January 2016
[2] Ontario Ministry of the Environment and Climate Change – Environmental Noise Guidelines, Publication NPC-300, Queens Printer for Ontario, Toronto, 2013

There are two currently planned outdoor amenity areas. These two outdoor amenity areas are at grade. The Lot outdoor amenity is on the north side of its building, and the Lot 13 outdoor amenity is on the south side of its building. There are potential amenity space 'opportunities' directly adjacent to both planned outdoor amenities. As current planning stands, these opportunity amenities are not considered in the analysis.

3. OBJECTIVES

The principal objectives of this study are to (i) calculate the future noise levels on the study building 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) specifies 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, as listed in Table 1.

TABLE 1: INDOOR SOUND LEVEL CRITERIA (ROAD) [3]

Type of Space	Time Period	L_{eq} (dBA)
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[4]. A closed window due to a ventilation requirement will bring noise levels down to achieve an acceptable indoor environment[5]. Therefore, where noise levels exceed 55 dBA daytime and 50 dBA nighttime, the ventilation 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[6].

[3] Adapted from ENCG 2016 – Tables 2.2b and 2.2c
[4] Burberry, P.B. (2014). Mitchell's Environment and Services. Routledge, Page 125
[5] MOECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.8
[6] MOECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3

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. However, it should be noted there are no OLA associated with this development.

4.2.2 Theoretical Roadway Noise Predictions

The impact of transportation noise sources on the development was determined by computer modelling. Transportation noise source modelling is based on the software program *CadnaA,* which utilizes the United States Federal Highway Administration's Traffic Noise Model (TNM) to represent the roadway line sources. The TNM model is also being accepted in the updated Environmental Guide for Noise of Ontario, 2022 by the Ministry of Transportation (MTO) [7]. This computer program can represent three-dimensional surfaces and three orders of reflections of sound waves over a suitable spectrum for human hearing. The following were considered when determining roadway traffic and site surroundings:

- 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 for all streets was taken to be 92%/8%, respectively.
- Ground surfaces were taken to be reflective due to the lack of green space separating the subject site and the roadways.
- Topography was assumed to be a flat/gentle slope surrounding the study building.
- Noise receptors were strategically placed at 10 locations around the study area (see Figure 2).

Noise predictions were also correlated to STAMSON, a MECP computerized noise assessment program, for road analysis. Appendix A includes the STAMSON 5.04 input and output data. Traffic noise calculations were performed by treating each roadway segment as separate line sources of noise. The receptor distances to sources and exposure angles are portrayed in Figure A1.

[7] Ministry of Transportation Ontario, "*Environmental Guide for Noise*", August 2022, pg. 16

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[8] 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
Walkley Road	4-Lane Arterial Urban Divided (4-UAD)	50	**35,000**
Heatherington Road	Collector	50	**8,000**

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.

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

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. The calculation procedure[9] 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[10], 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, which was prepared for site plan approval, detailed floor layouts and building elevations 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 + safety factor).

[9] Building Practice Note: Controlling Sound Transmission into Buildings by J.D. Quirt, National Research Council of Canada, September 1985
[10] CMHC, Road & Rail Noise: Effects on Housing

5. RESULTS AND DISCUSSION

5.1 Roadway Traffic Noise Levels

The results of the roadway traffic noise calculations in CadnaA are summarized in Table 3 below. Figures 4 and 5 illustrate daytime and nighttime horizontal noise contours 4 m above grade.

TABLE 3: EXTERIOR NOISE LEVELS DUE TO ROAD TRAFFIC

Receptor Number	Receptor Height Above Grade (m)	Receptor Location	CadnaA Noise Level (dBA)	
			Day	Night
1	11.5	POW - Building 1 East Façade – Level 4	65	57
2	11.5	POW - Building 1 North Façade – Level 4	60	52
3	11.5	POW - Building 1 West Façade – Level 4	56	49
4	11.5	POW - Building 1 South Façade – Level 4	55	47
5	11.5	POW - Building 2 East Façade – Level 4	64	56
6	11.5	POW - Building 1 North Façade – Level 4	60	53
7	11.5	POW - Building 1 West Façade – Level 4	44	36
8	11.5	POW - Building 1 South Façade – Level 4	53	45
9	1.5	OLA – Building 1 at Grade Outdoor Amenity	56	N/A*
10	1.5	OLA – Building 2 at Grade Outdoor Amenity	60	N/A*

*Nighttime noise levels are not considered for OLAs, per NPC-300

The results of the current analysis indicate that noise levels will range between 44 and 65 dBA during the daytime period (07:00-23:00) and between 36 and 57 dBA during the nighttime period (23:00-07:00). The highest noise level (65 dBA) occurs at the east façade of the building occupying Lot 1, which is nearest and most exposed to Heatherington Road, and has some exposure to Walkley Road.

Table 4 below provides a comparison between *CadnaA* and STAMSON. Noise levels calculated in STAMSON are generally greater than in *CadnaA*, being within the range of ±3 dBA. These discrepancies are within reason. Due to the complicated geometry of the study site and its surroundings, STAMSON is not equipped to accurately analyse the sound. Thus, recommendations are made based on the *CadnaA* results.

TABLE 4: CADNAA RESULTS CORRELATION WITH STAMSON

Receptor Number	Receptor Height Above Grade (m)	Receptor Location	CadnaA Noise Level (dBA)		STAMSON 5.04 Noise Level (dBA)	
			Day	Night	Day	Night
R1*	11.5	POW - Building 1 East Façade – Level 4	65	57	66	59
R2	11.5	POW - Building 1 North Façade – Level 4	60	52	62	55
R5*	11.5	POW - Building 2 East Façade – Level 4	64	56	66	58
R10	1.5	OLA – Building 2 at Grade Outdoor Amenity	60	N/A**	63	N/A**

*Distance to Heatherington Road set to 15 m in STAMSON due to it being the minimum source-receiver distance

*Nighttime noise levels are not considered for OLAs, per NPC-300

5.2 Noise Control Measures

The noise levels predicted due to roadway traffic do not exceed the criteria listed in Section 4.2 for building components. As discussed in Section 4.3, 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 + safety factor). Due to the results not exceeding 65 dBA, ensuring that all components of the building are constructed and installed according to the minimum standards of the OBC (2024) will be sufficient.

Results of the calculations also indicate that due to exceedances of 55 dBA at the POW, both buildings will require a provision for central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. However, since the proposed buildings are apartment style multi-unit housing, it is anticipated that air conditioning will be provided by the builder. This anticipated installation alters the Warning Clauses that will be required in all Lease, Purchase and Sale Agreements, as summarized in Section 6.

Both OLAs exceed 55 dBA. However, since neither exceeds 60 dBA, there are two options for addressing the sound level. Either all Purchase, Sale and Lease Agreements may be required to have a Type A Warning Clause, which is summarized in Section 6, or mitigation measures are required to reduce the sound level at the OLAs to 55 dBA or below. Table 5 below outlines the noise barrier heights necessary to reduce the sound levels to or below 55 dBA for both OLAs. The OLA at receptor 9, which represents the Lot 1 OLA, needs a 1.1 m barrier. The OLA at receptor 10, which represents the Lot 13 OLA, needs a 2 m barrier. Figure 3 outlines the locations of the barriers. The barriers must be constructed of materials having a minimum surface density of 20kg/m^2, contain no gaps, and have a minimum STC rating of 30

TABLE 5: RESULTS OF NOISE BARRIER INVESTIGATION

Receptor Number	Receptor Height Above Grade (m)	Receptor Location	Daytime L_{eq} Noise Levels (dBA)			
			No Barrier	With 1.1 m Barrier	With 1.5 m Barrier	With 2 m Barrier
9	1.5	OLA – Building 1 at Grade Outdoor Amenity	56	**55**	-	-
10	1.5	OLA – Building 2 at Grade Outdoor Amenity	60	59	58	**52**

6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels will range between 44 and 65 dBA during the daytime period (07:00-23:00) and between 36 and 57 dBA during the nighttime period (23:00-07:00). The highest noise level (65 dBA) occurs at the east façade of the building occupying Lot 1, which is nearest and most exposed to Heatherington Road, and has some exposure to Walkley Road. As noise levels were not shown to exceed 65 dBA, building components which comply with OBC (2024) will be sufficient.

The results indicate that both buildings will require a provision for central air conditioning or equivalent, which will allow occupants to keep windows closed and maintain a comfortable living environment. This typically requires a Type C Warning Clause. However, since the buildings are multi-unit apartments style residential dwellings, it is anticipated that the buildings will be constructed with air conditioning installed. In this event, a Type D Warning Clause will be required on all Lease, Purchase and Sale Agreements for the buildings on Lots 1 and 13, as summarized below:

Type D:

> *"This dwelling unit has been supplied with a central air conditioning system or equivalent which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment."*

With regards to on-site stationary noise impacts of surroundings onto the study site, Gradient Wind conducted a survey of the site using aerial imagery and no significant off-site sources of stationary noise were identified. The surrounding consists of low rise residential, and a few restaurants to the south. The elementary school is too far to the southwest to have significant noise from its mechanical equipment. Noise from Walkley Road is expected to mask any residual stationary noise impacts. Coming from the restaurants to the north of the site.

Regarding stationary noise impacts of the study site on its surroundings, the site's nature as a set of two four-storey residential buildings means that the mechanical equipment anticipated to be installed with the buildings is not expected to cause significant stationary noise impacts on its surroundings. However, a review may be warranted once further information about the mechanical equipment planned for the site is available.

This concludes our traffic noise assessment and report. If you have any questions or wish to discuss our findings, please advise us. In the interim, we thank you for the opportunity to be of service.

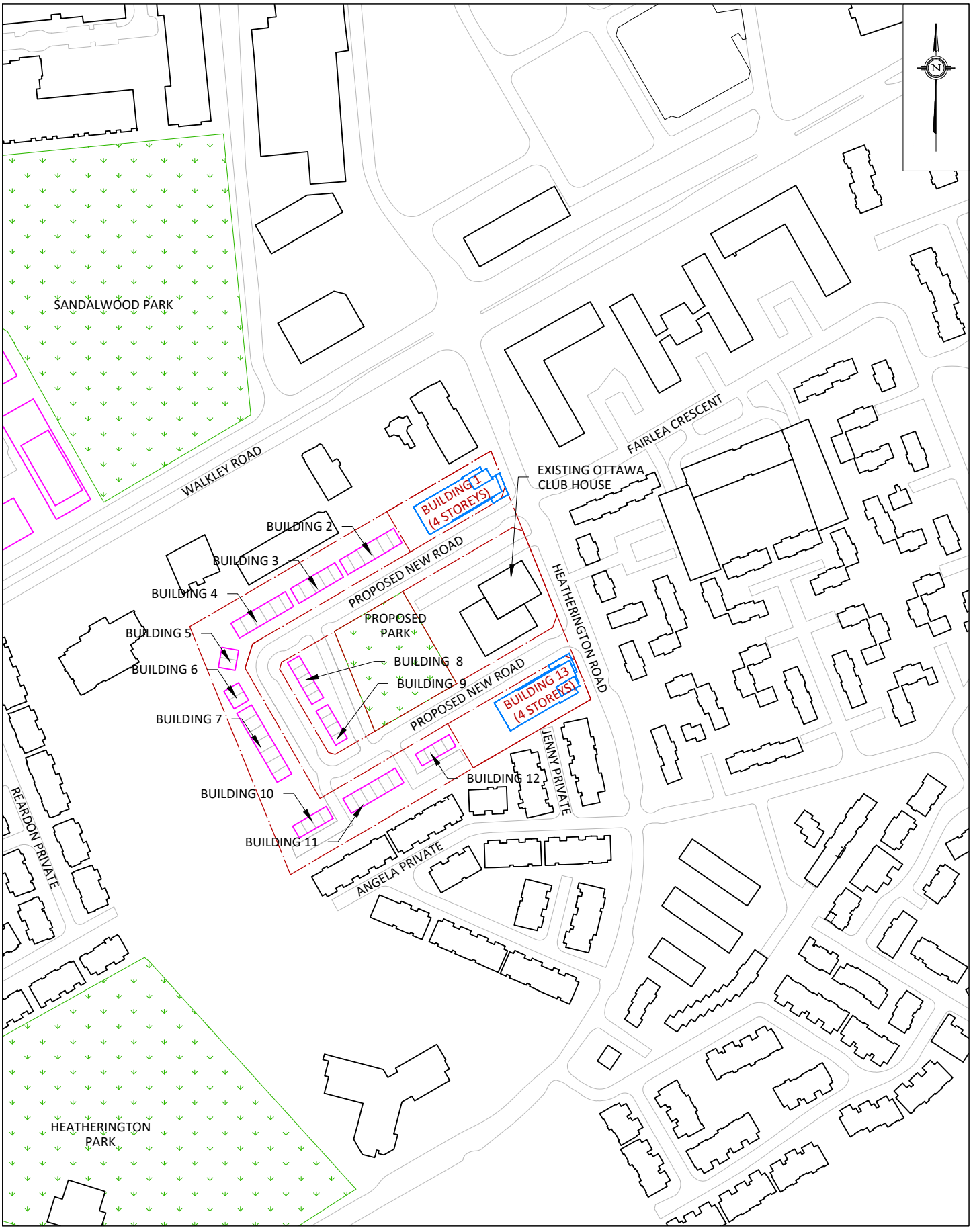
Sincerely,

Gradient Wind Engineering Inc.

Michael Pantano, MASc.
Junior Environmental Scientist

Joshua Foster, P.Eng.
Lead Engineer

Gradient Wind File #26-021-Transportation Noise



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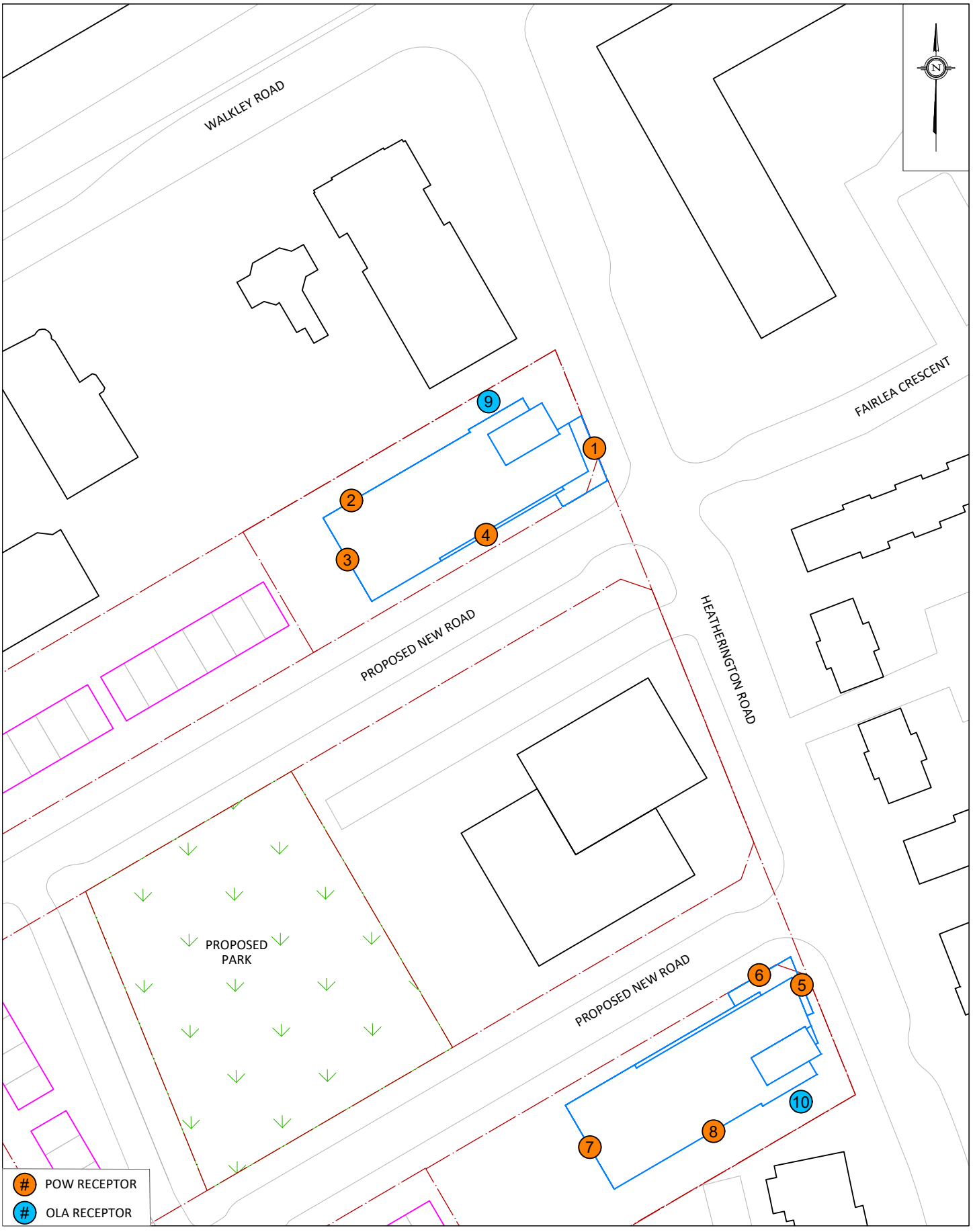
PROJECT	1770 HEATHERINGTON ROAD, OTTAWA TRANSPORTATION NOISE STUDY		DESCRIPTION
SCALE	1:3000 (APPROX.)	DRAWING NO.	26-021-ANV-1
DATE	FEBUARY 9, 2026	DRAWN BY	N.M.P.

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT



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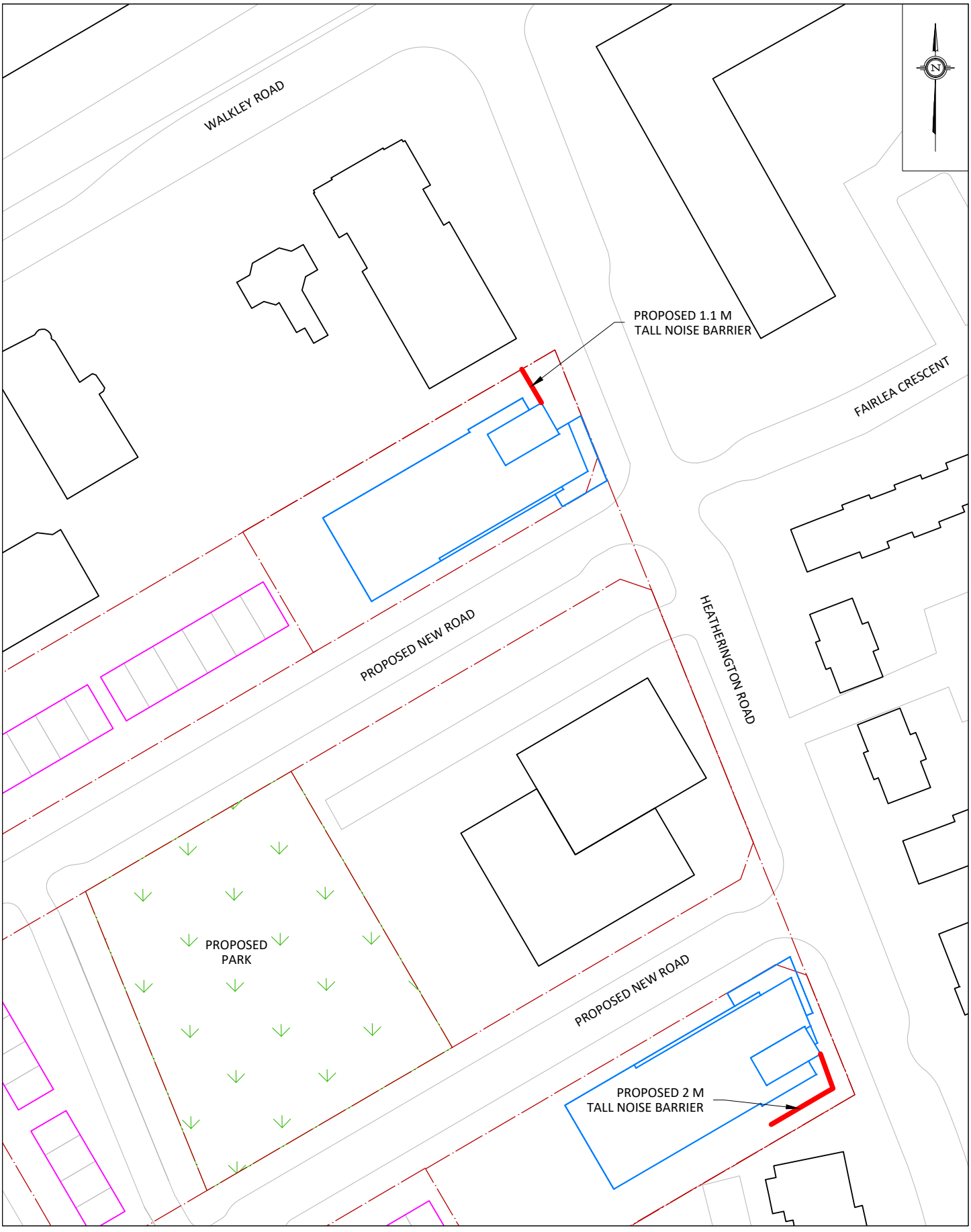
PROJECT	1770 HEATHERINGTON ROAD, OTTAWA TRANSPORTATION NOISE STUDY		DESCRIPTION
SCALE	1:1000 (APPROX.)	DRAWING NO.	26-021-ANV-2
DATE	FEBUARY 27, 2026	DRAWN BY	M.P.

FIGURE 2:
RECEPTOR LOCATIONS



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PROJECT	1770 HEATHERINGTON ROAD, OTTAWA TRANSPORTATION NOISE STUDY		DESCRIPTION
SCALE	1:1000 (APPROX.)	DRAWING NO. 26-021-ANV-3	FIGURE 3: PROPOSED NOISE BARRIER LOCATIONS
DATE	FEBUARY 27, 2026	DRAWN BY M.P.	

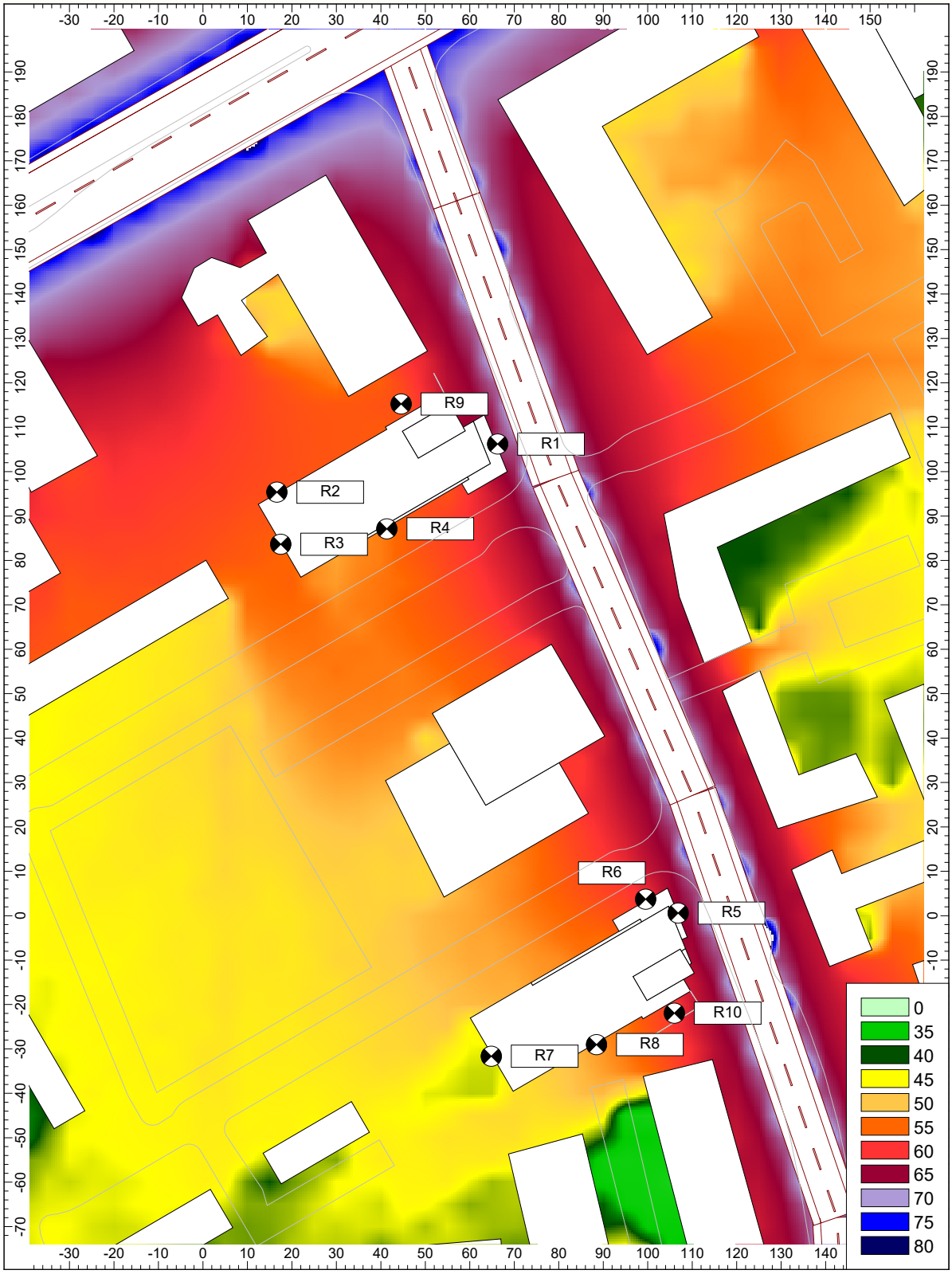


FIGURE 4: DAYTIME HORIZONTAL NOISE CONTOURS (4 M ABOVE GRADE)

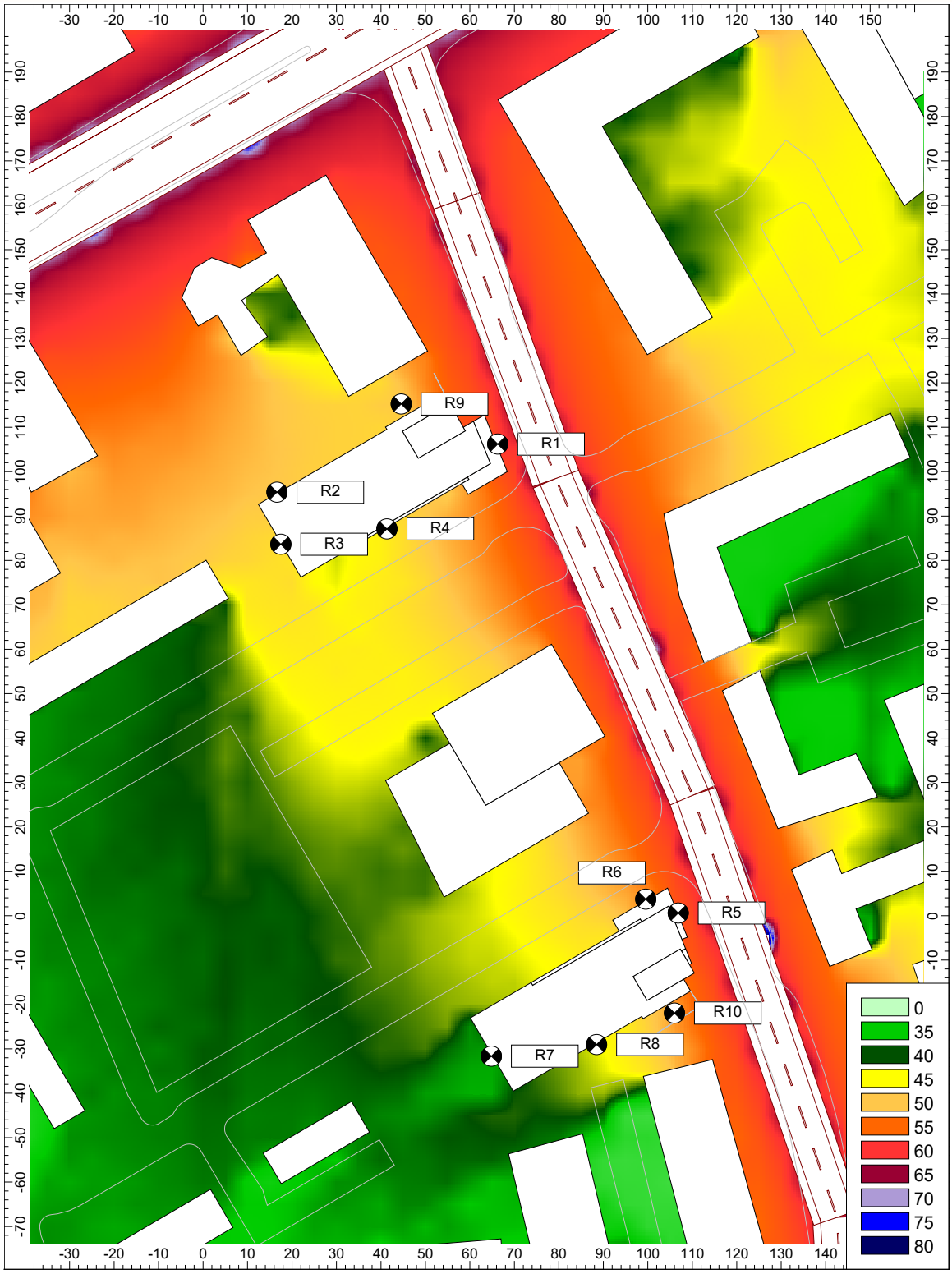
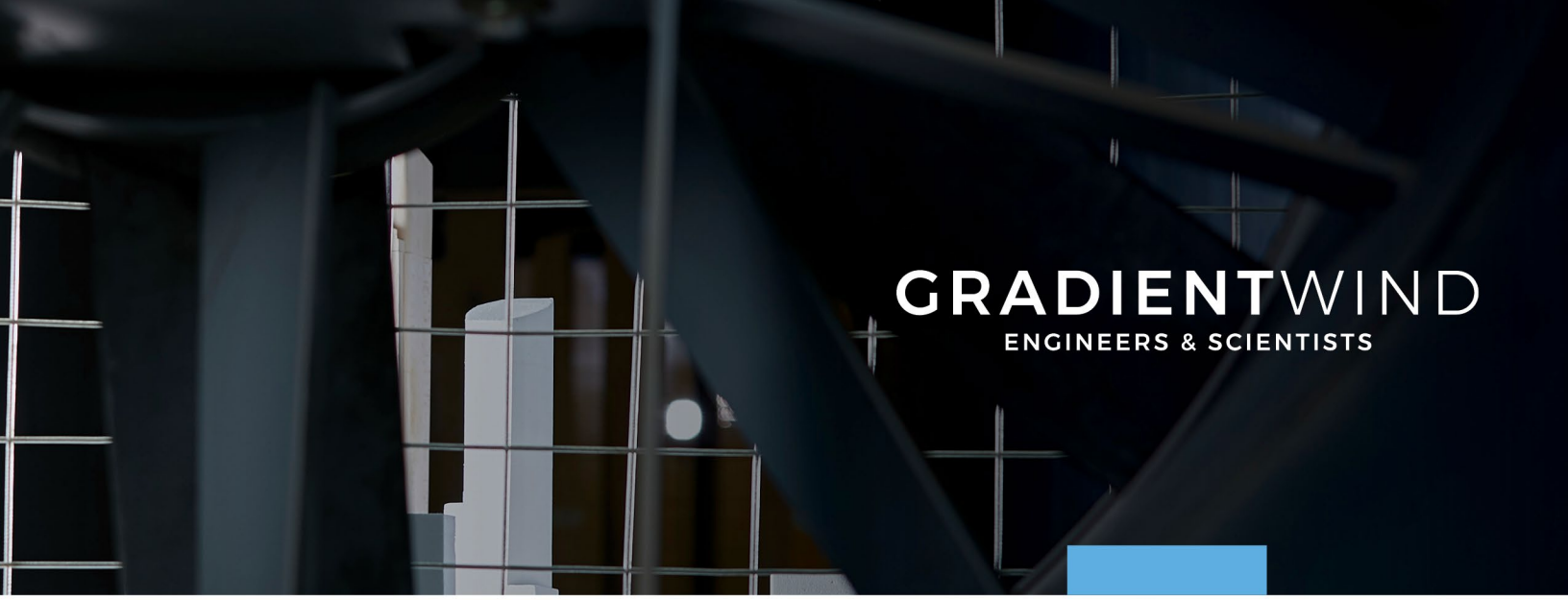


FIGURE 5: NIGHTTIME HORIZONTAL NOISE CONTOURS (4 M ABOVE GRADE)



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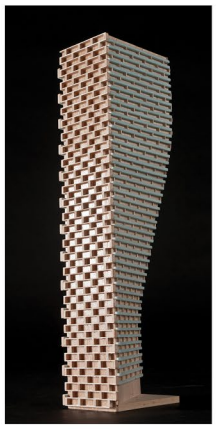

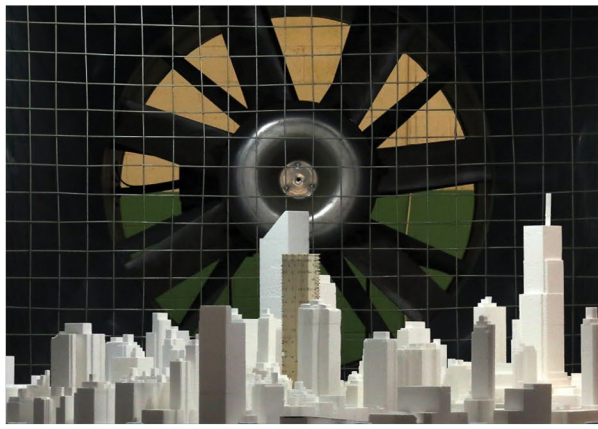

APPENDIX A

STAMSON 5.04 – INPUT AND OUTPUT DATA

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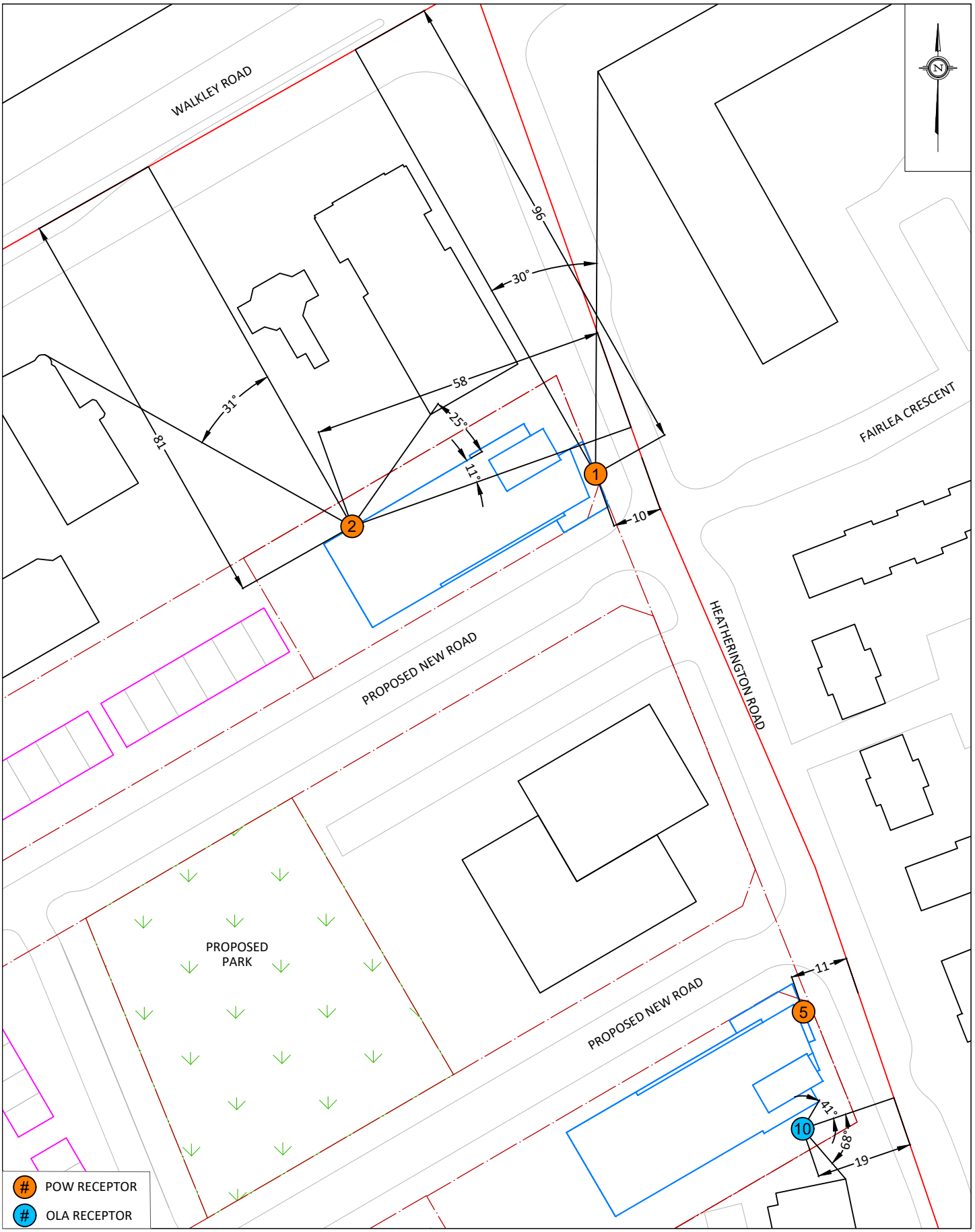

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PROJECT	1770 HEATHERINGTON ROAD, OTTAWA TRANSPORTATION NOISE STUDY		DESCRIPTION
SCALE	1:1000 (APPROX.)	DRAWING NO.	26-021-ANV-A1
DATE	FEBUARY 27, 2026	DRAWN BY	M.P.

FIGURE A1:
STAMSON PARAMETERS

STAMSON 5.0 NORMAL REPORT Date: 27-02-2026 17:03:52
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

```
Road data, segment # 1: Walkley (day/night)
-------------------------------------------
Car traffic volume  : 28658/2492  veh/TimePeriod  *
Medium truck volume :  2254/196   veh/TimePeriod  *
Heavy truck volume  :  1288/112   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):  35000
    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     :   4.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Walkley (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  :  96.00 / 96.00  m
Receiver height           :  11.50 / 11.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  30.00 deg   Angle2 : 90.00 deg
Barrier height            :   5.00 m
Barrier receiver distance :  70.00 / 70.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: Heather (day/night)
------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    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):   8000
    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: Heather (day/night)
-----------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  15.00 / 15.00  m
Receiver height           :  11.50 / 11.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

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

Source height = 1.41 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.41 !       11.50 !        4.15 !         4.15

ROAD (55.75 + 53.31 + 0.00) = 57.71 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     30   0.00  71.59   0.00  -8.06  -7.78   0.00   0.00   0.00  55.75
-------------------------------------------------------------------------------
    30     90   0.00  71.59   0.00  -8.06  -4.77   0.00   0.00  -5.45  53.31
-------------------------------------------------------------------------------

Segment Leq : 57.71 dBA
```

```
Results segment # 2: Heather (day)
----------------------------------

Source height = 1.50 m

ROAD (0.00 + 65.75 + 0.00) = 65.75 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  65.75   0.00   0.00   0.00   0.00   0.00   0.00  65.75
-------------------------------------------------------------------------------

Segment Leq : 65.75 dBA

Total Leq All Segments: 66.38 dBA

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

Source height = 1.41 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.41 !       11.50 !        4.15 !         4.15

ROAD (48.15 + 45.71 + 0.00) = 50.11 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     30   0.00  64.00   0.00  -8.06  -7.78   0.00   0.00   0.00  48.15
-------------------------------------------------------------------------------
    30     90   0.00  64.00   0.00  -8.06  -4.77   0.00   0.00  -5.45  45.71
-------------------------------------------------------------------------------
Segment Leq : 50.11 dBA

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

Source height = 1.50 m

ROAD (0.00 + 58.16 + 0.00) = 58.16 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  58.16   0.00   0.00   0.00   0.00   0.00   0.00  58.16
-------------------------------------------------------------------------------

Segment Leq : 58.16 dBA

Total Leq All Segments: 58.79 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 66.38
                           (NIGHT): 58.79
```

STAMSON 5.0 NORMAL REPORT Date: 27-02-2026 17:11:40
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r2.te Time Period: Day/Night 16/8 hours
Description:

```
Road data, segment # 1: Walkley 1 (day/night)
----------------------------------------------
Car traffic volume  : 28336/2464  veh/TimePeriod  *
Medium truck volume :  2254/196   veh/TimePeriod  *
Heavy truck volume  :  1610/140   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):  35000
    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: Walkley 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  :  81.00 / 81.00  m
Receiver height           :  11.50 / 11.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -31.00 deg
Barrier height            :   5.00 m
Barrier receiver distance :  70.00 / 70.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: Heather (day/night)
------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    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):   8000
    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: Heather (day/night)
-----------------------------------------
Angle1   Angle2           : -90.00 deg   -11.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  58.00 / 58.00  m
Receiver height           :  11.50 / 11.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -25.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :  25.00 / 25.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 3: Walkley 2 (day/night)
---------------------------------------------
Car traffic volume  : 28336/2464  veh/TimePeriod  *
Medium truck volume :  2254/196   veh/TimePeriod  *
Heavy truck volume  :  1610/140   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):  35000
    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 # 3: Walkley 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  :  81.00 / 81.00  m
Receiver height           :  11.50 / 11.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :   0.00 deg   Angle2 : 90.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :  20.00 / 20.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

Results segment # 1: Walkley 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 !       11.50 !        2.85 !         2.85

ROAD (0.00 + 51.56 + 57.20) = 58.25 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90    -31   0.00  72.16   0.00  -7.32  -4.84   0.00   0.00  -8.43  51.56
-------------------------------------------------------------------------------
   -31      0   0.00  72.16   0.00  -7.32  -7.64   0.00   0.00   0.00  57.20
-------------------------------------------------------------------------------

Segment Leq : 58.25 dBA
```

```
Results segment # 2: Heather (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 !       11.50 !        7.19 !         7.19

ROAD (0.00 + 55.45 + 48.78) = 56.30 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90    -25   0.00  65.75   0.00  -5.87  -4.42   0.00   0.00  -3.44  52.02*
   -90    -25   0.00  65.75   0.00  -5.87  -4.42   0.00   0.00   0.00  55.45
-------------------------------------------------------------------------------
   -25    -11   0.00  65.75   0.00  -5.87 -11.09   0.00   0.00   0.00  48.78
-------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 56.30 dBA

Results segment # 3: Walkley 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 !       11.50 !        9.03 !         9.03

ROAD (0.00 + 58.29 + 0.00) = 58.29 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     90   0.00  72.16   0.00  -7.32  -3.01   0.00   0.00  -0.29  61.54*
     0     90   0.36  72.16   0.00  -9.96  -3.91   0.00   0.00   0.00  58.29
-------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 58.29 dBA

Total Leq All Segments: 62.48 dBA
```

```
Results segment # 1: Walkley 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 !       11.50 !        2.85 !         2.85

ROAD (0.00 + 43.96 + 49.60) = 50.65 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90    -31   0.00  64.56   0.00  -7.32  -4.84   0.00   0.00  -8.43  43.96
-------------------------------------------------------------------------------
   -31      0   0.00  64.56   0.00  -7.32  -7.64   0.00   0.00   0.00  49.60
-------------------------------------------------------------------------------

Segment Leq : 50.65 dBA

Results segment # 2: Heather (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 !       11.50 !        7.19 !         7.19

ROAD (0.00 + 47.86 + 41.19) = 48.71 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90    -25   0.00  58.16   0.00  -5.87  -4.42   0.00   0.00  -3.44  44.42*
   -90    -25   0.00  58.16   0.00  -5.87  -4.42   0.00   0.00   0.00  47.86
-------------------------------------------------------------------------------
   -25    -11   0.00  58.16   0.00  -5.87 -11.09   0.00   0.00   0.00  41.19
-------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 48.71 dBA
```

```
Results segment # 3: Walkley 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 !       11.50 !        9.03 !          9.03

ROAD (0.00 + 50.69 + 0.00) = 50.69 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     90   0.00  64.56   0.00  -7.32  -3.01   0.00   0.00  -0.29  53.94*
     0     90   0.36  64.56   0.00  -9.96  -3.91   0.00   0.00   0.00  50.69
-------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 50.69 dBA

Total Leq All Segments: 54.88 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 62.48
                           (NIGHT): 54.88
```

STAMSON 5.0 NORMAL REPORT Date: 27-02-2026 17:16:06
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r5.te Time Period: Day/Night 16/8 hours
Description:

```
Road data, segment # 1: Heather (day/night)
-------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    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):   8000
    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: Heather (day/night)
-----------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  15.00 / 15.00  m
Receiver height           :  11.50 / 11.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

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

Source height = 1.50 m

ROAD (0.00 + 65.75 + 0.00) = 65.75 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  65.75   0.00   0.00   0.00   0.00   0.00   0.00  65.75
-------------------------------------------------------------------------------

Segment Leq : 65.75 dBA

Total Leq All Segments: 65.75 dBA
```

```
Results segment # 1: Heather (night)
------------------------------------

Source height = 1.50 m

ROAD (0.00 + 58.16 + 0.00) = 58.16 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  58.16   0.00   0.00   0.00   0.00   0.00   0.00  58.16
-------------------------------------------------------------------------------

Segment Leq : 58.16 dBA

Total Leq All Segments: 58.16 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 65.75
                           (NIGHT): 58.16
```

STAMSON 5.0 NORMAL REPORT Date: 27-02-2026 17:27:44
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r10.te Time Period: Day/Night 16/8 hours
Description:

```
Road data, segment # 1: Heather (day/night)
-------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    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):   8000
    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: Heather (day/night)
-----------------------------------------
Angle1   Angle2           : -41.00 deg   68.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  19.00 / 19.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

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

Source height = 1.50 m

ROAD (0.00 + 62.54 + 0.00) = 62.54 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -41     68   0.00  65.75   0.00  -1.03  -2.18   0.00   0.00   0.00  62.54
-------------------------------------------------------------------------------

Segment Leq : 62.54 dBA

Total Leq All Segments: 62.54 dBA
```

```
Results segment # 1: Heather (night)
------------------------------------

Source height = 1.50 m

ROAD (0.00 + 54.95 + 0.00) = 54.95 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -41     68   0.00  58.16   0.00  -1.03  -2.18   0.00   0.00   0.00  54.95
-------------------------------------------------------------------------------

Segment Leq : 54.95 dBA

Total Leq All Segments: 54.95 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 62.54
                           (NIGHT): 54.95
```