

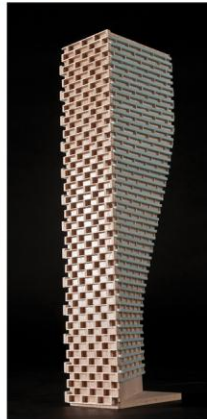
GRADIENTWIND

ENGINEERS & SCIENTISTS

TRANSPORTATION NOISE ASSESSMENT

Cardinal Creek Village Phase 8
Ottawa, Ontario

REPORT: GW26-059-Transportation Noise



July 9, 2026

PREPARED FOR

Taggart Investments
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PREPARED BY

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EXECUTIVE SUMMARY

This report describes a transportation noise assessment undertaken for the proposed subdivision development referred to as Cardinal Creek Phase 8, located at 900 Geographe Terrace in Ottawa, Ontario. The subdivision comprises one single family home lot and 23 blocks of semi-detached homes. The major source of roadway traffic noise impacting the development is Famille-Laporte Avenue. Figure 1 illustrates a complete site plan with surrounding context.

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

The results of the current analysis indicate that noise levels will range between 45 and 63 dBA during the daytime period (07:00-23:00) and between 37 and 55 dBA during the nighttime period (23:00-07:00). The highest noise level (63 dBA) occurs at the house façades fronting Famille-Laporte Avenue.

The noise levels predicted due to roadway traffic do not exceed the criteria listed in Section 4.2 for building components. Therefore, standard building components, compliant with the Ontario building Code (2024) will be sufficient to attenuate indoor sound levels to appropriate indoor criteria.

The results indicate that noise levels fall between 55 dBA and 65 dBA during the daytime period, and between 50 dBA and 60 dBA during the nighttime period at Lot 1 and Blocks 2, 3-5, and 17-18. As such, each affected lot and block of the development will require forced air heating systems with provisions for central air conditioning, as a minimum requirement as shown on Figure 3. If air conditioning is installed it will allow occupants to keep windows closed and maintain a comfortable living environment. In addition to the ventilation requirements, a Type C Warning Clause will be required on all Lease, Purchase and Sale Agreements, as summarized in Section 6.



Noise levels at the Block 17 and Block 18 backyards fall between 55 dBA and 60 dBA during the daytime period. If these areas are to be used as outdoor living areas, a Type A Warning Clause will be required on all Lease, Purchase and Sale Agreements, as summarized in Section 6.

Noise levels at the backyards associated with all remaining lots and blocks fall below 55 dBA, in compliance with ENCG criteria.

A review of satellite imagery confirmed there are no significant sources of stationary noise surrounding the site. The dominant source of noise impacting the development is from transportation noise sources.

TABLE OF CONTENTS

1.	INTRODUCTION.....	1
2.	TERMS OF REFERENCE	1
3.	OBJECTIVES	1
4.	METHODOLOGY	2
4.1	Background.....	2
4.2	Roadway Traffic Noise.....	2
4.2.1	Criteria for Roadway Traffic Noise	2
4.2.2	Theoretical Roadway Noise Predictions	4
4.2.3	Roadway Traffic Volumes.....	5
4.3	Indoor Noise Calculations	6
5.	RESULTS AND DISCUSSION	7
5.1	Roadway Traffic Noise Levels.....	7
5.2	Noise Control Measures	9
6.	CONCLUSIONS AND RECOMMENDATIONS	10

FIGURES

APPENDICES

Appendix A – STAMSON 5.04 Input and Output Data

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Taggart Investments to undertake a transportation noise assessment for a proposed subdivision development referred to as Cardinal Creek Phase 8, located at 900 Geographe Terrace 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 Ottawa¹ and Ministry of the Environment, Conservation and Parks (MECP)² guidelines. Noise calculations were based on site plan drawings prepared by Stantec in July 2026, a preliminary grading plan prepared by DSEL in June 2026, and future traffic volumes corresponding to the City of Ottawa's Official Plan (OP) roadway classifications.

2. TERMS OF REFERENCE

The subdivision comprises one single family home lot and 23 blocks of semi-detached homes. The major source of roadway traffic noise impacting the development is Famille-Laporte Avenue. Figure 1 illustrates a complete site plan with surrounding context.

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.

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

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 dBA 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	Leq (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 reduction⁴. A closed window due to a ventilation requirement will bring noise levels down to achieve an acceptable indoor environment⁵. 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 attenuation⁶.

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 must be provided to reduce noise levels where technically and administratively feasible to acceptable levels at or below the criterion. Furthermore, noise levels may not exceed 60 dBA at the OLA's.

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 MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.8

⁶ MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3



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 analysis model has been recognized by the Ministry of Transportation Ontario (MTO) as the recommended noise model for transportation projects (ref. Environmental Guide for Noise, 2022, by the Ministry of Transportation (MTO)⁷). The Ministry of Environment, Conservation and Parks has also adopted the TMN model as per their "Draft Guideline Noise Pollution Control Publications 306 (NPC-306)"⁸.

A set of comparative calculations were performed in the current Ontario traffic noise prediction model STAMSON for comparisons to *CadnaA* 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 11 receptor locations were identified around the site, as illustrated in Figure 2.

Roadway noise calculations were performed by treating each 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:

- 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 roads was taken to be 92% / 8%, respectively.
- Default ground surfaces were taken to be reflective due to the presence of hard (paved) ground.
- Topography was assumed to be a flat/gentle slope surrounding the study building.
- Noise receptors were strategically placed at 11 locations around the study area (see Figure 2).
- Sample Receptor distances and exposure angles are illustrated in Figure A1.

⁷ Ministry of Transportation, Environmental Guide for Noise, 2022. Retrieved from [Environmental Guide for Noise 2022](#)

⁸ Ministry of Environment, Conservation and Parks, Ontario, "Methods to determine Sound Levels Due to Road and Rail Traffic", Draft February 12, 2020

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 Plan⁹ 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
Famille-Laporte Avenue	2-Lane Urban Collector (2-UCU)	50	8,000

⁹ 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 (2024) 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, or nighttime noise levels exceed 60 dBA, calculations must be performed to evaluate the sound transmission quality of the building components to ensure acceptable indoor noise levels. The calculation procedure¹⁰ 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 research¹¹, 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 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).

¹⁰ Building Practice Note: Controlling Sound Transmission into Buildings by J.D. Quirt, National Research Council of Canada, September 1985

¹¹ 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 are summarized in Table 3 below. The results of the current analysis indicate that noise levels will range between 45 and 63 dBA during the daytime period (07:00-23:00) and between 37 and 55 dBA during the nighttime period (23:00-07:00). The highest noise level (63 dBA) occurs at the house façades fronting Famille-Laporte Avenue. Noise contours 1.5 metres (m) and 4.5 m above grade for daytime and nighttime conditions are shown in Figures 4-6.

The results indicate that noise levels fall between 55 dBA and 65 dBA during the daytime period, and between 50 dBA and 60 dBA during the nighttime period at Lot 1 and Blocks 2, 3-5, and 17-18. As such, each affected Lot and block of the development will require forced air heating systems with provisions for central air conditioning, as a minimum requirement as shown on Figure 3. If air conditioning is installed it will allow occupants to keep windows closed and maintain a comfortable living environment. In addition to the ventilation requirements, a Type C Warning Clause will be required on all Lease, Purchase and Sale Agreements, as summarized in Section 6.

Noise levels at the Block 17 and Block 18 backyards are expected to exceed 55 dBA during the daytime period. If these areas are to be used as outdoor living areas, noise control measures are recommended as detailed in Section 5.2.

TABLE 3: EXTERIOR NOISE LEVELS DUE TO ROADWAY TRAFFIC

Receptor Number / Type	Receptor Height Above Grade (m)	Receptor Location	CadnaA Noise Level (dBA)	
			Day	Night
R1 / POW	4.5	Block 19 – Level 2 East Façade	53	46
R2 / POW	4.5	Block 18 – Level 2 East Façade	60	53
R3 / POW	4.5	Block 18 – Level 2 North Façade	63	55
R4 / POW	4.5	Block 17 – Level 2 West Façade	60	52
R5 / POW	4.5	Block 5 – Level 2 Northeast Façade	59	51
R6 / POW	4.5	Block 5 – Level 2 Northwest Façade	63	55
R7 / POW	4.5	Block 2 – Level 2 Southwest Façade	59	52
R8 / POW	4.5	Block 7 – Level 2 West Façade	45	37
R9 / OLA	1.5	Block 17 and Block 18 - Backyards	59	N/A*
R10 / OLA	1.5	Block 5 – Backyard	46	N/A*
R11 / OLA	1.5	Block 7 – Backyard	46	N/A*

*Noise levels during the nighttime are not considered for OLAs

Table 4 shows a comparison of results between CadnaA and STAMSON. Noise levels calculated in STAMSON were found to have a good correlation with CadnaA and variability between the two programs was within an acceptable level of $\pm 0-1$ dBA. STAMSON inputs and output data are provided in Appendix A and Figure A1.

TABLE 4: RESULTS OF STAMSON/CADNAA CORRELATION

Receptor Number	Receptor Height (m)	Receptor Location	STAMSON 5.04 Noise Level (dBA)		CadnaA Noise Level (dBA)	
			Day	Night	Day	Night
R2 / POW	4.5	Block 18 – Level 2 East Façade	61	54	60	53



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. Therefore, standard building components, compliant with the Ontario building Code (2024) will be sufficient to attenuate indoor sound levels to appropriate indoor criteria.

Results of the calculations also indicate that some dwellings will require forced air heating with provisions for central air conditioning. In addition to ventilation requirements, Type C Warning Clauses will also be required in all Lease, Purchase and Sale Agreements, as summarized in Section 6. Table 5 summarizes the affected dwellings.

TABLE 5: VENTILATION AND WARNING CLAUSE REQUIREMENTS

Ventilation	Warning Clause	Applicable Dwellings
Forced Air Heating with Provisions for AC	Type C	Lot 1 and Blocks 2, 3-5, and 17-18

Noise levels at the Block 17 and Block 18 backyards fall between 55 dBA and 60 dBA during the daytime period. If these areas are to be used as outdoor living areas, a Type A Warning Clause will be required on all Lease, Purchase and Sale Agreements, as summarized below.



6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels will range between 45 and 63 dBA during the daytime period (07:00-23:00) and between 37 and 55 dBA during the nighttime period (23:00-07:00). The highest noise level (63 dBA) occurs at the house façades fronting Famille-Laporte Avenue.

The noise levels predicted due to roadway traffic do not exceed the criteria listed in Section 4.2 for building components. Therefore, standard building components, compliant with the Ontario building Code (2024) will be sufficient to attenuate indoor sound levels to appropriate indoor criteria.

The results indicate that noise levels fall between 55 dBA and 65 dBA during the daytime period, and between 50 dBA and 60 dBA during the nighttime period at Lot 1 and Blocks 2, 3-5, and 17-18. As such, each affected lot and block of the development will require forced air heating systems with provisions for central air conditioning, as a minimum requirement as shown on Figure 3. If air conditioning is installed it will allow occupants to keep windows closed and maintain a comfortable living environment. In addition to the ventilation requirements, a Type C Warning Clause will be required on all Lease, Purchase and Sale Agreements, as summarized below.

Type C

"This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning by the occupant in low and medium density developments 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, Conservation and Parks."

Noise levels at the Block 17 and Block 18 backyards fall between 55 dBA and 60 dBA during the daytime period. If these areas are to be used as outdoor living areas, a Type A Warning Clause will be required on all Lease, Purchase and Sale Agreements, as summarized below.



Type A

"Purchasers/tenants are advised that sound levels due to increasing road traffic may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment, Conservation and Parks."

Noise levels at the backyards associated with all remaining lots and blocks fall below 55 dBA, in compliance with ENCG criteria.

A review of satellite imagery confirmed there are no significant sources of stationary noise surrounding the site. The dominant source of noise impacting the development is from transportation noise sources.

This concludes our transportation 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.



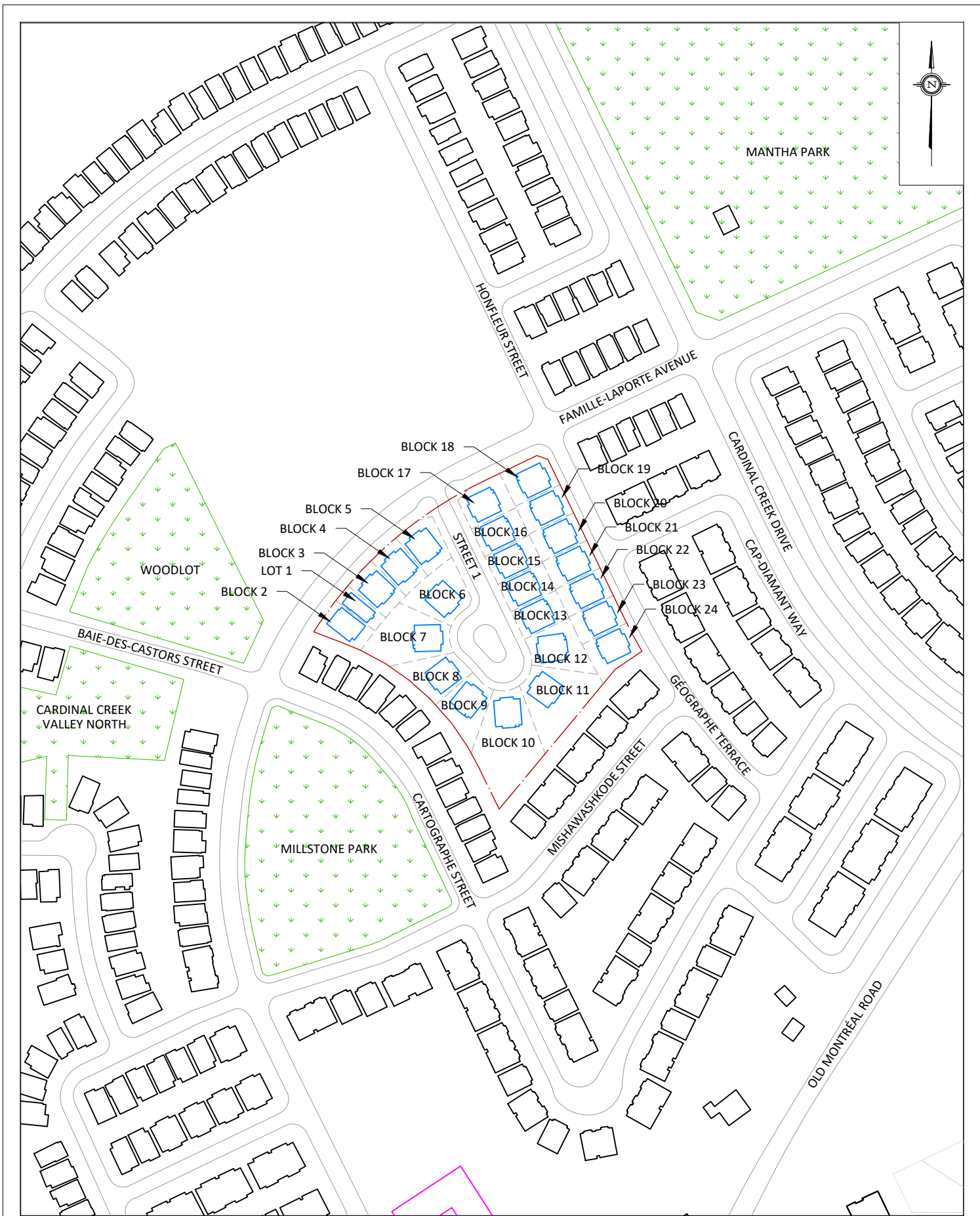
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Junior Acoustic Scientist

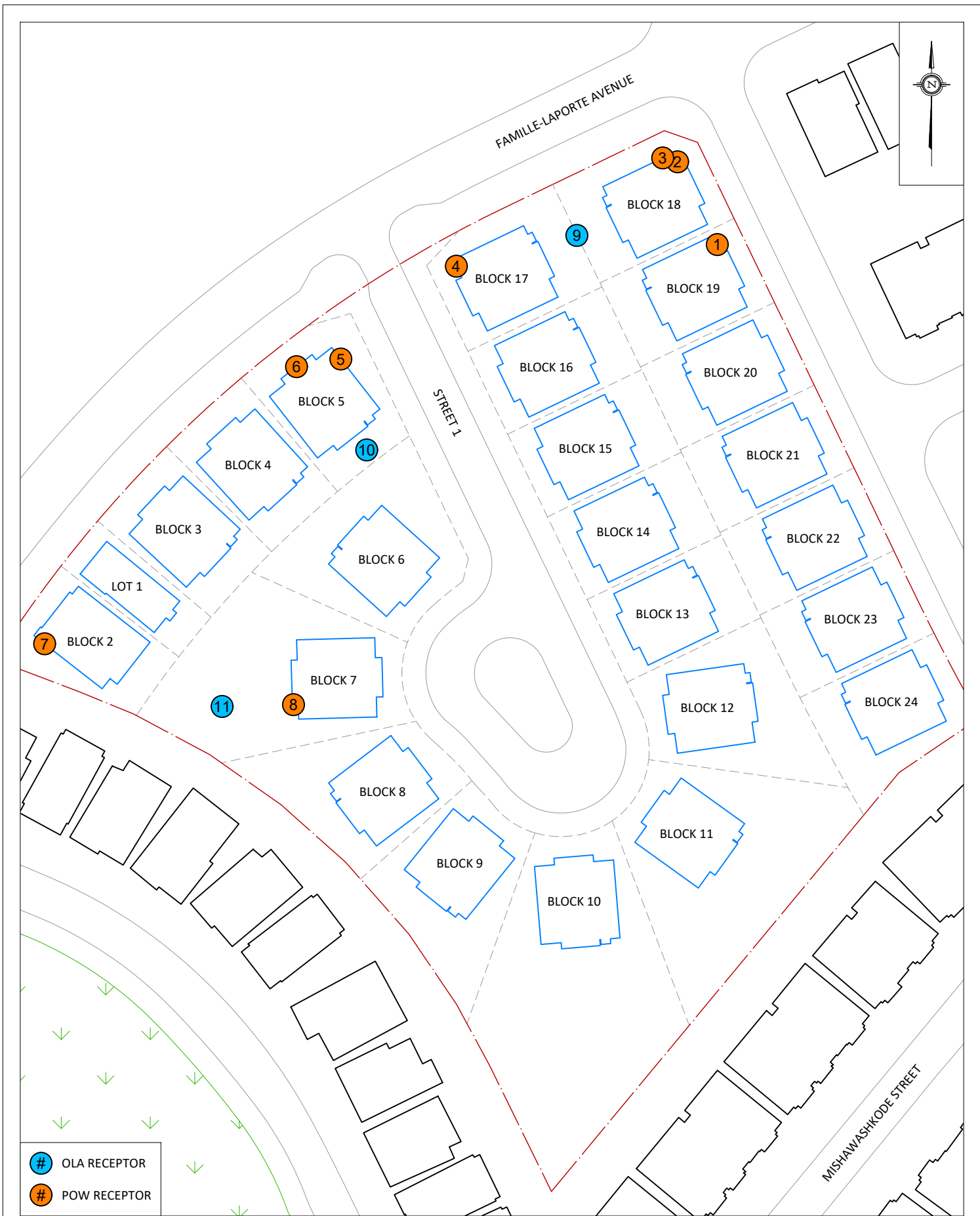


Joshua Foster, P.Eng.
Lead Engineer

Gradient Wind File #26-059-Transportation Noise







GRADIENTWIND ENGINEERS & SCIENTISTS 127 WALGREEN ROAD, OTTAWA, ON 613 836 0934 • GRADIENTWIND.COM	PROJECT CARDINAL CREEK VILLAGE PHASE 8 TRANSPORTATION NOISE STUDY		DESCRIPTION FIGURE 2: RECEPTOR LOCATIONS
	SCALE 1:1000 _(APPROX.)	DRAWING NO. 26-059-ANV-2	
	DATE JULY 6, 2026	DRAWN BY N.M.P.	



GRADIENTWIND ENGINEERS & SCIENTISTS 127 WALGREEN ROAD, OTTAWA, ON 613 836 0934 • GRADIENTWIND.COM	PROJECT		CARDINAL CREEK VILLAGE PHASE 8 TRANSPORTATION NOISE STUDY		DESCRIPTION
	SCALE	1:1000 _(APPROX.)	DRAWING NO.	26-059-ANV-3	
	DATE	JULY 6, 2026	DRAWN BY	N.M.P.	
	FIGURE 3: VENTILATION REQUIREMENTS				

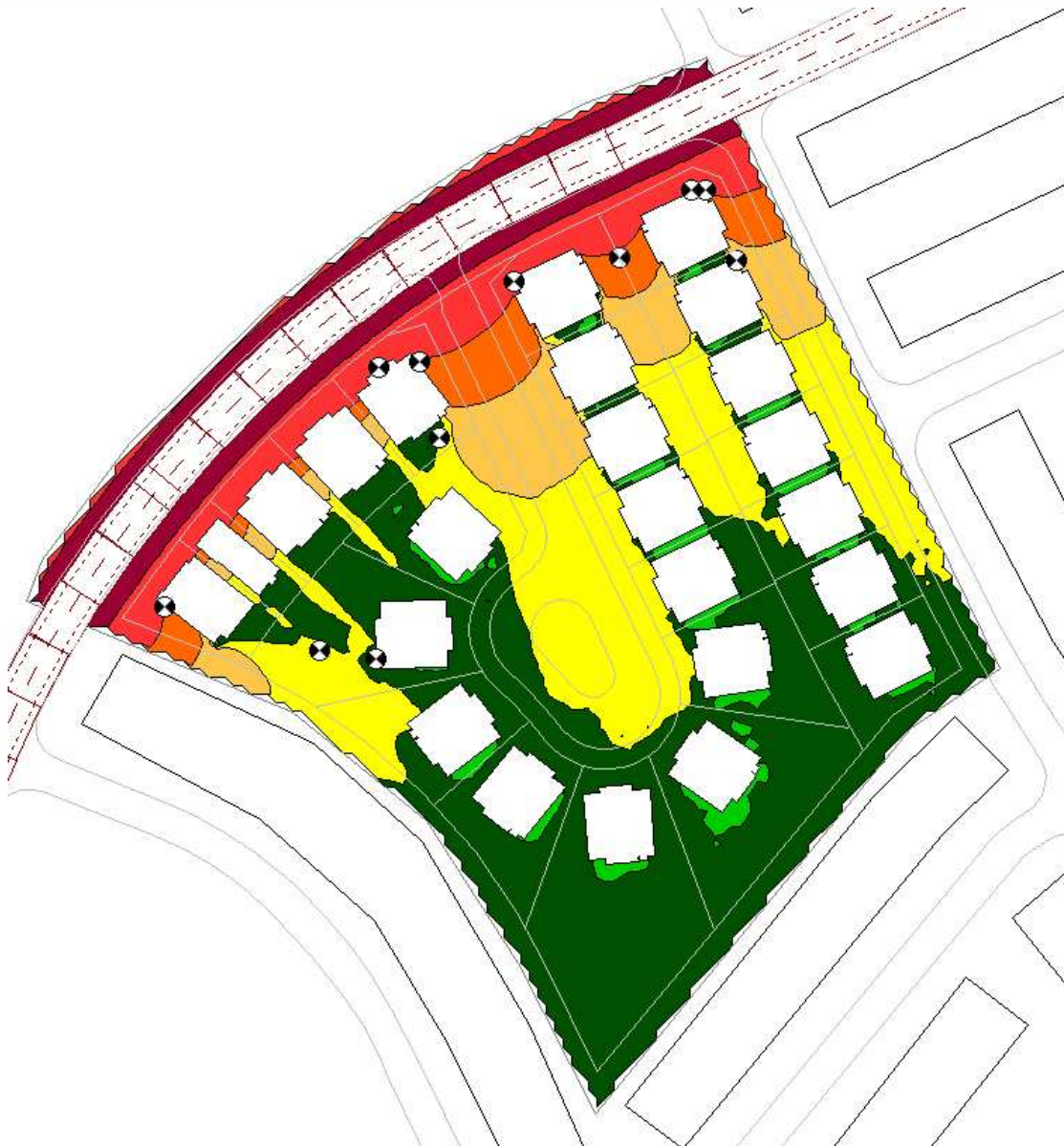


FIGURE 4: DAYTIME TRAFFIC NOISE CONTOUR (4.5 M ABOVE GRADE)

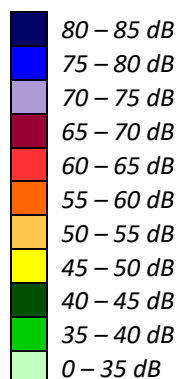




FIGURE 5: NIGHTTIME TRAFFIC NOISE CONTOUR (4.5 M ABOVE GRADE)

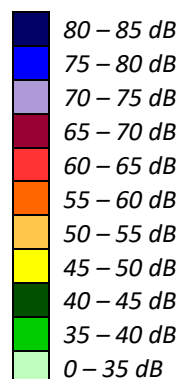
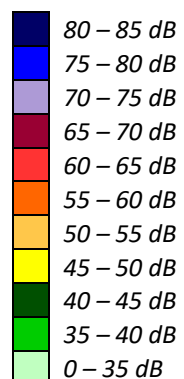




FIGURE 6: DAYTIME TRAFFIC NOISE CONTOUR (1.5 M ABOVE GRADE)



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APPENDIX A

STAMSON 5.04 – SAMPLE NOISE CALCULATIONS

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STAMSON 5.0 NORMAL REPORT Date: 22-06-2026 13:44:50
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r2.te Time Period: Day/Night 16/8 hours
Description: POW - Level 2 East Facade

Road data, segment # 1: F-L Ave (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: F-L Ave (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 : 20.00 / 20.00 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00



Results segment # 1: F-L Ave (day)

Source height = 1.50 m

ROAD (0.00 + 61.49 + 0.00) = 61.49 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.00	65.75	0.00	-1.25	-3.01	0.00	0.00	0.00	61.49

Segment Leq : 61.49 dBA

Total Leq All Segments: 61.49 dBA

Results segment # 1: F-L Ave (night)

Source height = 1.50 m

ROAD (0.00 + 53.90 + 0.00) = 53.90 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.00	58.16	0.00	-1.25	-3.01	0.00	0.00	0.00	53.90

Segment Leq : 53.90 dBA

Total Leq All Segments: 53.90 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 61.49
(NIGHT): 53.90





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	SCALE	1:1000 _(APPROX.)	DRAWING NO.	26-059-ANV-A1	
	DATE	JULY 6, 2026	DRAWN BY	N.M.P.	
FIGURE A1: STAMSON INPUT PARAMETERS RECEPTOR #2					