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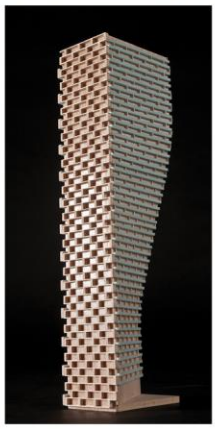
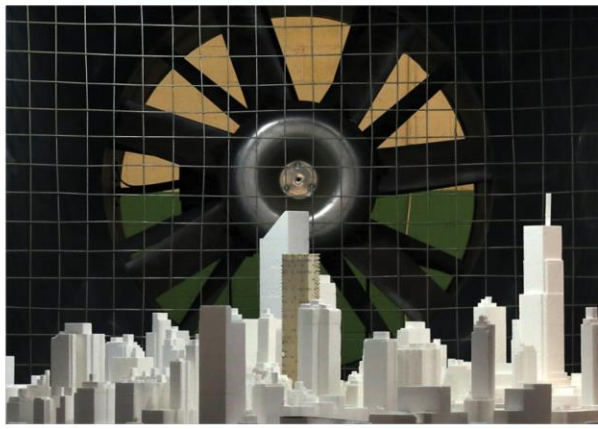
ROADWAY TRAFFIC NOISE ASSESSMENT

2370 Tenth Line Road Orléans
Ottawa, Ontario

Report: 21-331–Traffic Noise





December 9, 2021

PREPARED FOR

Mattamy Homes
50 Hines Road, Suite 100
Ottawa ON Canada

PREPARED BY

Efser Kara, MSc, LEED GA, Acoustic Scientist
Joshua Foster, P.Eng., Lead Engineer

EXECUTIVE SUMMARY

This report describes a traffic noise assessment undertaken for a proposed subdivision development located at 2370 Tenth Line Road in Ottawa, Ontario. The subdivision is situated on a rectangular parcel of land bounded by Brian Coburn Boulevard to the north, Tenth Line Road to the east, Promenade Décoeur Drive to the south, and residential and educational parcels of lands to the west.

The proposed development comprises 16 blocks with a total of 236 dwelling units, two outdoor amenity and open parking spaces areas provided at grade. Blocks 1 to 12 accommodate 12 dwelling units each while Block A, B, C, and D accommodate 28, 28, 20, and 16 dwelling units, respectively.

The primary sources of traffic noise on the residential subdivision are Brian Coburn Boulevard, Tenth Line Road and Promenade Décoeur Drive. 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) 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 provided by Mattamy Homes, dated October 12, 2021.

The results of the current analysis indicated that noise levels at Plane of Window (POW) receptors will range between 69 and 50 dBA during the daytime period (07:00-23:00) and between 61 and 43 dBA during the nighttime period (23:00-07:00). The highest noise level (68 dBA) occurs at the east façades of the blocks which are nearest and most exposed to Brian Coburn Boulevard and Tenth Line Road. Figures 6 and 7 illustrate daytime and nighttime noise contours at a height of 4.5 m above grade, and Figures 8 and 9 illustrate daytime and nighttime noise contours at a height of 1.5 m above grade.

Upgraded building components will be required where noise levels exceed 65 dBA as illustrated in Figure 5. Building components compliant with the Ontario Building Code (OBC 2012) will be sufficient for the remaining dwellings of the development.

The results of the analysis also indicated that for Block A, B, D, and 12 central air conditioning or a similar ventilation system, which will allow occupants to keep windows closed and maintain a comfortable living environment, will be required. For Blocks 1, 5, and C, forced air heating with provision for the installation of central air conditioning will be required (see Figure 4). Warning Clauses will also be required to be placed on all Lease, Purchase and Sale Agreements for the development, as summarized in Section 6.

TABLE OF CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Mattamy Homes to undertake a roadway traffic noise assessment for a proposed subdivision development located at 2370 Tenth Line 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 site plans provided by Mattamy Homes, dated October 12, 2021, with future traffic volumes corresponding to the City of Ottawa's Official Plan (OP) roadway classifications and theoretical capacities.

2. TERMS OF REFERENCE

The focus of this traffic noise assessment is a proposed subdivision development located at 2370 Tenth Line Road in Ottawa, Ontario. The subdivision is situated on a rectangular parcel of land bounded by Brian Coburn Boulevard to the north, Tenth Line Road to the east, Promenade Décoeur Drive to the south, and residential and educational parcels of lands to the west.

The proposed development comprises 16 blocks with a total of 236 dwelling units, two outdoor amenity and open parking spaces areas provided at grade. Blocks 1 to 12 accommodate 12 dwelling units each while Block A, B, C, and D accommodate 28, 28, 20, and 16 dwelling units, respectively. The two amenity areas, one located to the south of the study site and one located to the north, are planned as park areas and were not considered outdoor living areas (OLAs) as they are not readily accessible from the buildings.

The primary sources of roadway traffic noise on the residential subdivision are Brian Coburn Boulevard, Tenth Line Road and Promenade Décoeur Drive. Figure 1 illustrates the site location with the surrounding context.

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

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) [3]

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[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].

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 but are less than 60 dBA, mitigation should be provided to reduce noise levels where technically and administratively feasible to acceptable levels at or below the criterion. Where noise levels exceed 60 dBA noise mitigation is required. If these measures are not provided, prospective purchasers or tenants should be informed of potential noise problems by a warning clause.

[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 *Predictor-Lima* 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, 2021 by the Ministry of Transportation (MTO)[7]. This computer program can represent three-dimensional surfaces and 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 twenty-six (26) 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:

- 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.
- The ground surface was modelled as absorptive where grass and foliage (soft ground) are present, and as reflective where pavement and concrete are present (hard ground).
- Topography was assumed to be a flat/gentle slope throughout the study site.
- Twenty-six (26) receptor locations were chosen at the façades of the dwellings as Plane of Window (POW) receptors at 4.5 metres above grade (see Figure 2).
- Four (4) POW receptors with direct exposure from Brian Cobourne Boulevard, Tenth Line Road, and Promenade Décoeur Drive were calculated in STAMSON in order to display the correlation

[7] Ministry of Transportation, Environmental Guide for Noise, 2021. Retrieved from https://prod-environmental-registry.s3.amazonaws.com/2021-08/Environmental%20Guide%20for%20Noise%20 2021%20%28Aug%202021%29.pdf

between the Predictor and STAMSON calculation results. The receptor distances to roadway traffic sources and exposure angles are illustrated in Figure 3.

- The intermediate surface in the STAMSON calculations was taken as absorptive or reflective depending on the path between the receptors and the roadway.

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. Brian Coburn Boulevard will be extended, therefore the traffic volumes were increased representing a 4-lane arterial road volume. 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/hr)	Traffic Volumes
Tenth Line Road	4-Lane Urban Arterial-Divided (4-UAD)	60	35,000
Brian Coburn Boulevard	4-Lane Urban Arterial-Divided (4-UAD)	70	35,000
Prom. Decoeur Drive	2-Lane Urban Collector (2-UCU)	50	8,000

[8] 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[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, 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).

[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

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 indicated that noise levels at Plane of Window (POW) receptors will range between 69 and 50 dBA during the daytime period (07:00-23:00) and between 61 and 43 dBA during the nighttime period (23:00-07:00). The highest noise level (68 dBA) occurs at the east façades of the blocks which are nearest and most exposed to Brian Coburn Boulevard and Tenth Line Road. Figures 6 and 7 illustrate daytime and nighttime noise contours at a height of 4.5 m above grade, and Figures 8 and 9 illustrate daytime and nighttime noise contours at a height of 1.5 m above grade.

TABLE 3: EXTERIOR NOISE LEVELS DUE TO ROADWAY TRAFFIC

Receptor ID	Receptor Location	Receptor Height (m)	PREDICTOR-LIMA Noise Level (dBA)	
			Day	Night
R1	POW-Block D -West Façade	4.5	63	56
R2	POW-Block D -North Façade	4.5	69	61
R3	POW-Block D -East Façade	4.5	64	56
R4	POW-Block 12 -West Façade	4.5	62	55
R5	POW-Block 12 -North Façade	4.5	67	60
R6	POW-Block 12 -East Façade	4.5	64	57
R7	POW-Block B -North Façade	4.5	64	57
R8	POW-Block B -East Façade	4.5	68	61
R9	POW-Block B -East Façade	4.5	68	61
R10	POW-Block B -South Façade	4.5	63	55
R11	POW-Block A -North Façade	4.5	63	55
R12	POW-Block A -East Façade	4.5	68	61

TABLE 3: EXTERIOR NOISE LEVELS DUE TO ROADWAY TRAFFIC (CONT.)

Receptor ID	Receptor Location	Receptor Height (m)	PREDICTOR-LIMA Noise Level (dBA)	
			Day	Night
R13	POW-Block A -East Façade	4.5	68	60
R14	POW-Block A -South Façade	4.5	63	56
R15	POW-Block 1 -East Façade	4.5	59	52
R16	POW-Block 1 -South Façade	4.5	59	52
R17	POW-Block 5 -East Façade	4.5	56	48
R18	POW-Block 5 -South Façade	4.5	57	50
R19	POW-Block C -East Façade	4.5	59	51
R20	POW-Block C -South Façade	4.5	62	54
R21	POW-Block C -West Façade	4.5	57	50
R22	POW-Block 4 -East Façade	4.5	61	53
R23	POW-Block 8 -East Façade	4.5	58	51
R24	POW-Block 9 -East Façade	4.5	50	43
R25	POW-Block 9 -South Façade	4.5	54	46
R26	POW-Block 9 -West Façade	4.5	52	44

* Outdoor Living Areas (OLA) during the nighttime are not considered as per the ENCG

Table 4 shows a comparison of results from Predictor 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 ±0-2 dBA.

TABLE 4: RESULT CORRELATION WITH STAMSON

Receptor ID	Receptor Location	Receptor Height (m)	STAMSON 5.04 Noise Level (dBA)		PREDICTOR-LIMA Noise Level (dBA)	
			Day	Night	Day	Night
R2	POW-Block D -North Façade	4.5	68	61	69	61
R9	POW-Block B -East Façade	4.5	69	61	68	61
R14	POW-Block A -South Façade	4.5	64	56	63	56
R20	POW-Block C -South Façade	4.5	63	55	62	54

Upgraded building components will be required where noise levels exceed 65 dBA (see Figure 5). Building components compliant with the Ontario Building Code (OBC 2012) will be sufficient for the remaining dwellings of the development.

5.2 Noise Control Measures

The noise levels predicted due to roadway traffic exceed the criteria listed in Section 4.2 for building components. As discussed in Section 4.2.1, the anticipated STC requirements for windows and walls have been estimated based on the overall noise reduction required for each intended use of space (STC = Outdoor Noise Level – Targeted Indoor Noise Levels). The STC requirements for the windows are summarized below for various units within the development (see Figure 5):

- **Bedroom Windows**

  (i) Bedroom windows of Blocks D and 12 facing north, and Blocks A and B facing east will require a minimum STC of 32

  (ii) All other bedroom windows are to satisfy Ontario Building Code (OBC 2012) requirements

- **Living Room Windows**

  (i) Living room windows of Blocks D and 12 facing north, and Blocks A and B facing east will require a minimum STC of 27

  (ii) All other living room windows are to satisfy Ontario Building Code (OBC 2012) requirements

- **Exterior Walls**

  (i) Exterior wall components on the facades mentioned above will require a minimum STC of 45, which will be achieved with brick cladding or an acoustical equivalent according to NRC test data.[11]

Exterior wall components on these façades are recommended to have a minimum STC of 45, which is achievable with a wood frame exterior wall construction with resilient channel placed on the inside of the studs and using two layers of 16 mm gypsum board. Alternatively, a brick cladding could be used. A review of window supplier literature indicates that the specified STC ratings can be achieved by a variety of window systems that have a combination of glass thickness and inter-pane spacing. It is the responsibility of the manufacturer to ensure that the specified window achieves the required STC. This can only be assured by using window configurations that have been certified by laboratory testing. The requirements for STC ratings assume that the remaining components of the building are constructed and installed according to the minimum standards of the Ontario Building Code. The specified STC requirements also apply to swinging and/or sliding patio doors.

6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicated that noise levels at Plane of Window (POW) receptors will range between 69 and 50 dBA during the daytime period (07:00-23:00) and between 61 and 43 dBA during the nighttime period (23:00-07:00). The highest noise level (68 dBA) occurs at the east façades of the blocks which are nearest and most exposed to Brian Coburn Boulevard and Tenth Line Road. Figures 6 and 7 illustrate daytime and nighttime noise contours at a height of 4.5 m above grade, and Figures 8 and 9 illustrate daytime and nighttime noise contours at a height of 1.5 m above grade.

Upgraded building components will be required where noise levels exceed 65 dBA as illustrated in Figure 5. Building components compliant with the Ontario Building Code (OBC 2012) will be sufficient for the remaining dwellings of the development.

[11] J.S. Bradley and J.A. Birta. Laboratory Measurements of the Sound Insulation of Building Façade Elements, National Research Council October 2000.

The results of the analysis also indicated that for Block A, B, D, and 12 central air conditioning or a similar ventilation system, which will allow occupants to keep windows closed and maintain a comfortable living environment, will be required. For Blocks 1, 5, and C, forced air heating with provision for the installation of central air conditioning will be required (see Figure 4). Warning Clauses will also be required to be placed on all Lease, Purchase and Sale Agreements for the development.

Type D Warning Clauses will be required for Blocks A, B, D, and 12:

> *"This dwelling unit has been supplied with a central air conditioning system 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."*

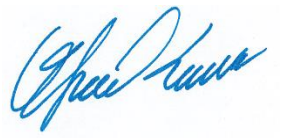
Type C Warning Clause will be required for Block 1, 4, 5, 8, and C:

> *"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."*

This concludes our roadway 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.



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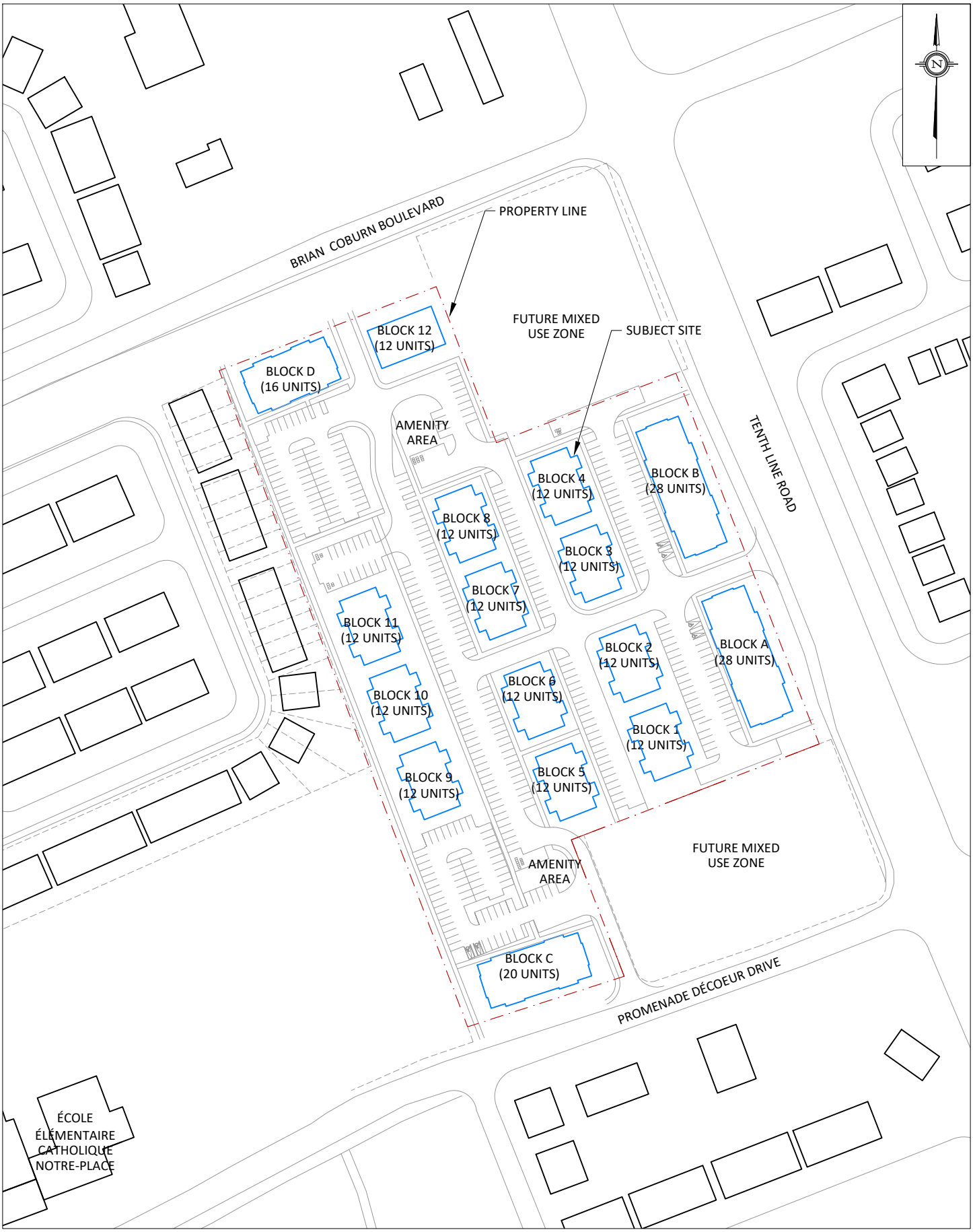
Gradient Wind File #21-331-Traffic Noise



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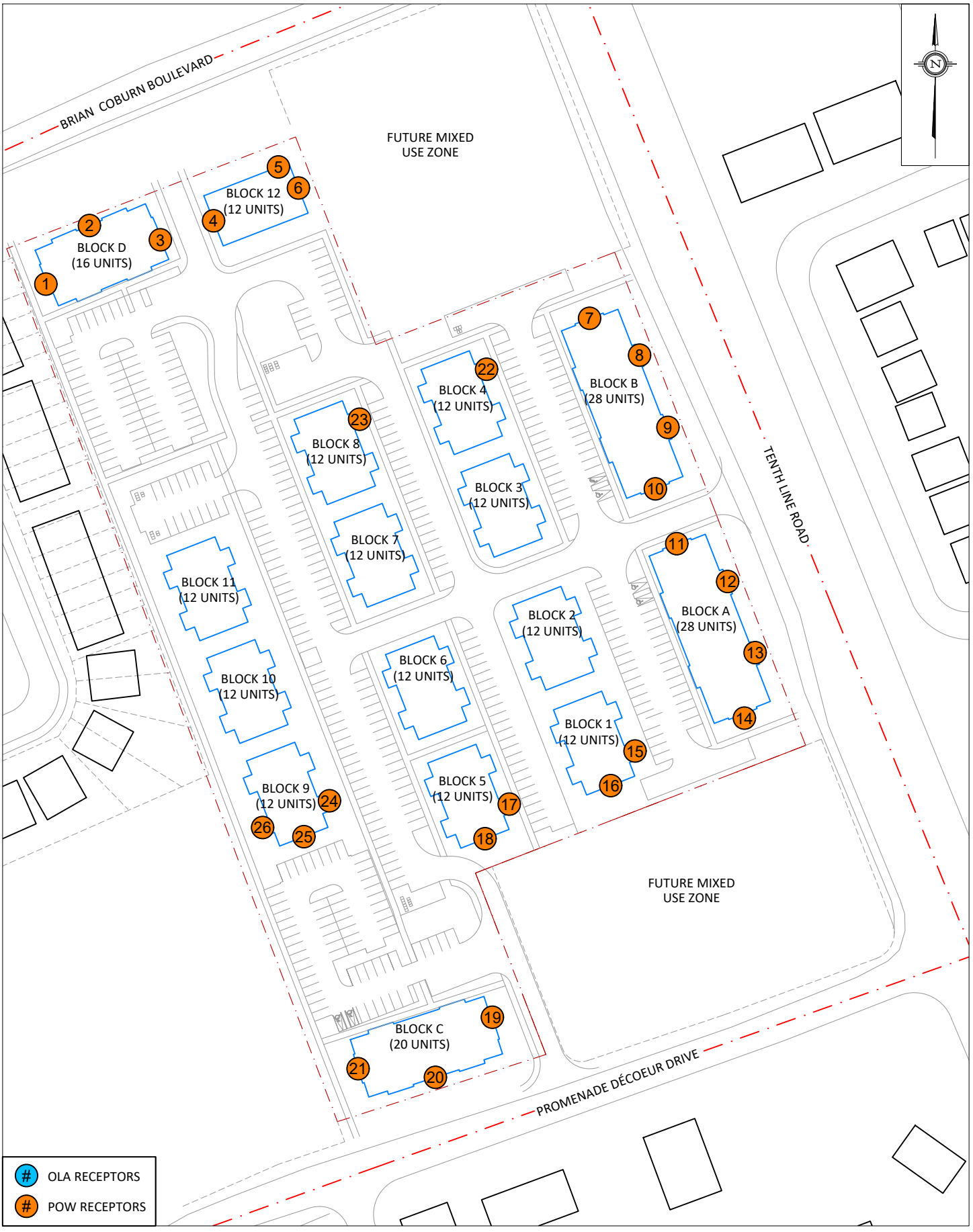
PROJECT	2370 TENTH LINE ROAD, ORLÉANS OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT		
SCALE	1:2000 (APPROX.)	DRAWING NO.	GW21-331-1
DATE	OCTOBER 26, 2021	DRAWN BY	E.K.

DESCRIPTION

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT



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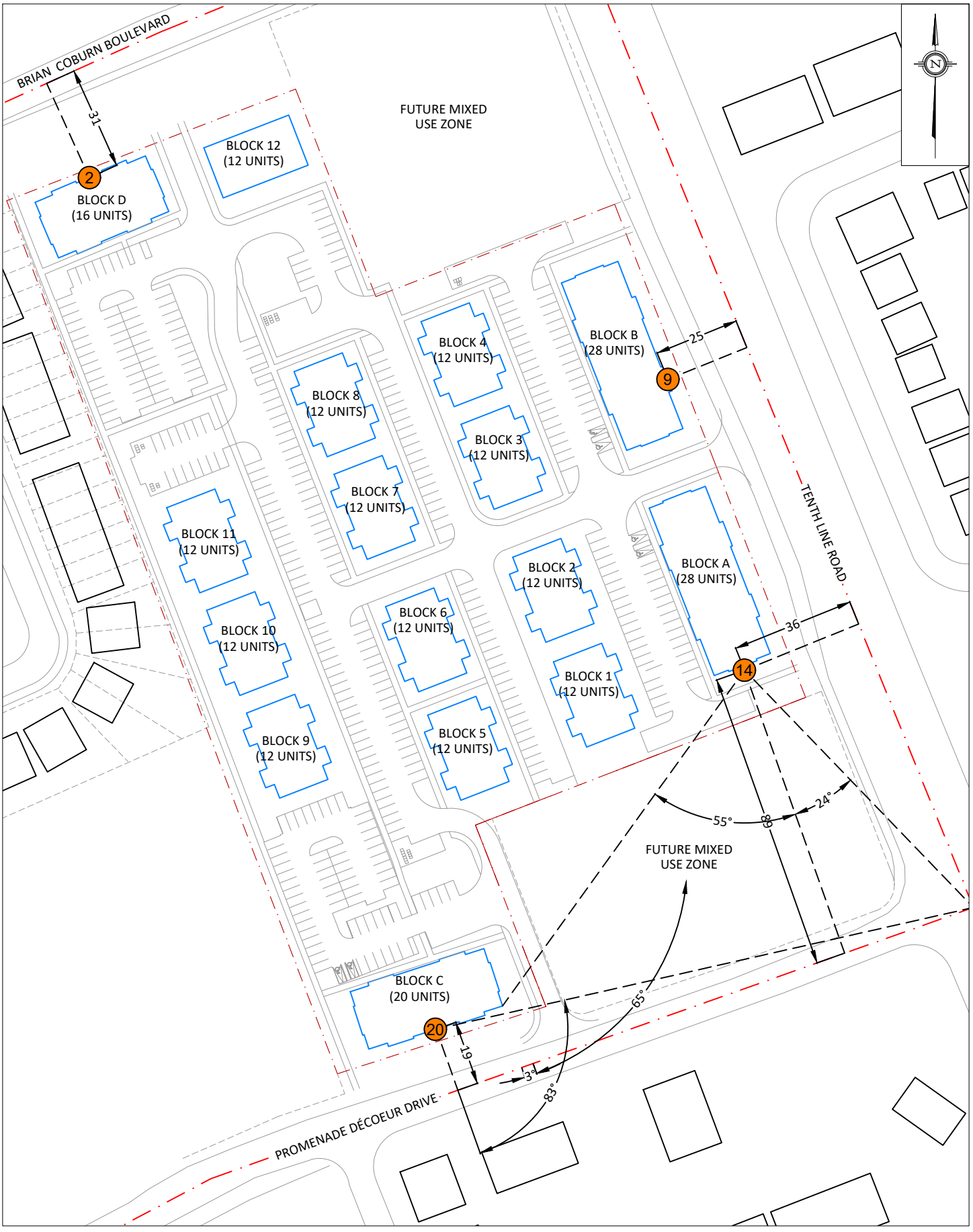
PROJECT	2370 TENTH LINE ROAD, ORLÉANS OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT
SCALE	1:1500 (APPROX.)
DRAWING NO.	GW21-331-2
DATE	OCTOBER 26, 2021
DRAWN BY	E.K.
DESCRIPTION	FIGURE 2: RECEPTOR LOCATIONS



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PROJECT	2370 TENTH LINE ROAD, ORLÉANS OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT
SCALE	1:1500 (APPROX.)
DRAWING NO.	GW21-331-3
DATE	OCTOBER 26, 2021
DRAWN BY	E.K.

DESCRIPTION

FIGURE 3:
STAMSON INPUT DATA
FOR RECEPTORS 2, 9, 14, & 20

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SCALE	1:1500 (APPROX.)
DRAWING NO.	GW21-331-4
DATE	OCTOBER 26, 2021
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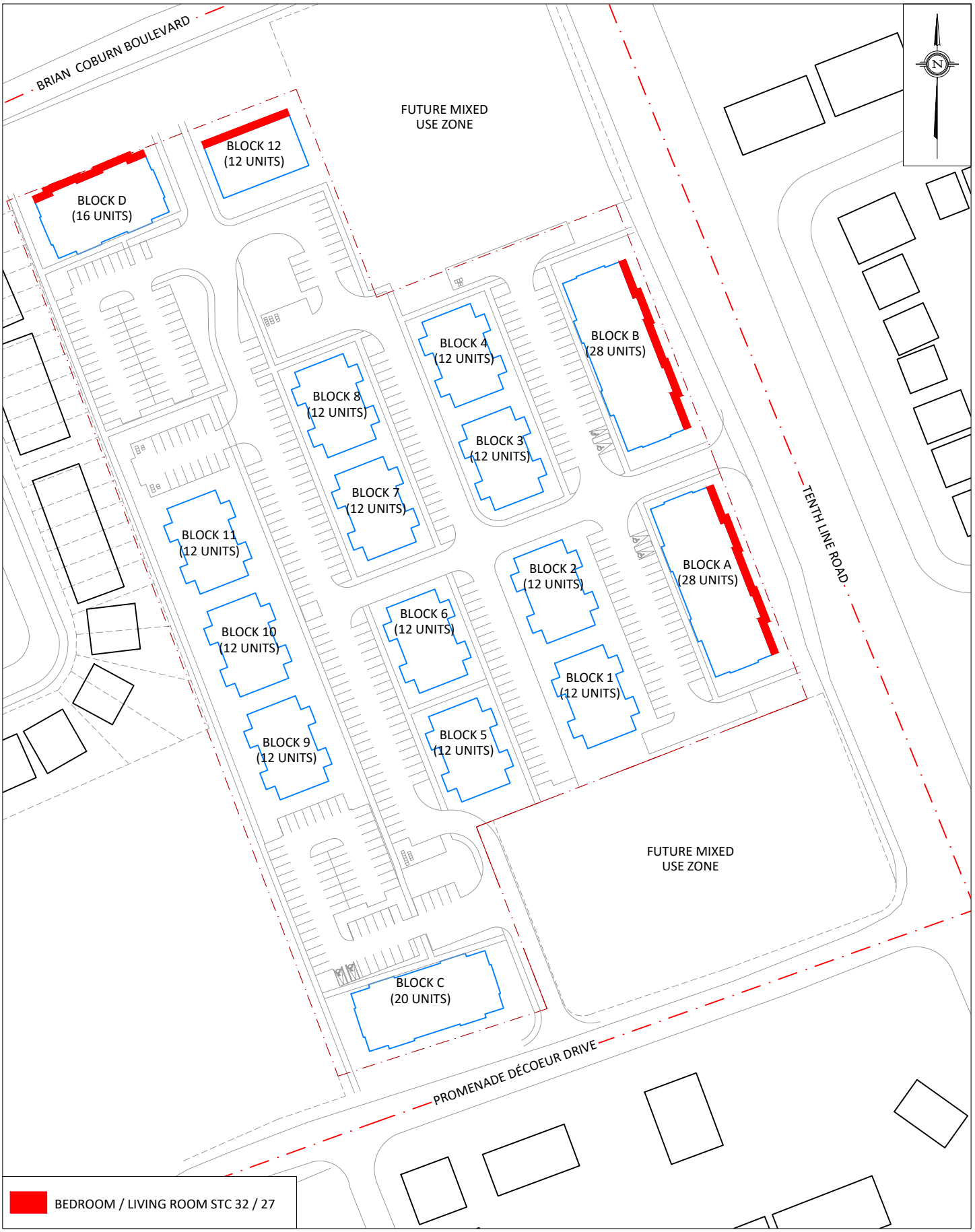

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SCALE	1:1500 (APPROX.)
DRAWING NO.	GW21-331-5
DATE	OCTOBER 26, 2021
DRAWN BY	E.K.
DESCRIPTION	FIGURE 5: STC REQUIREMENTS

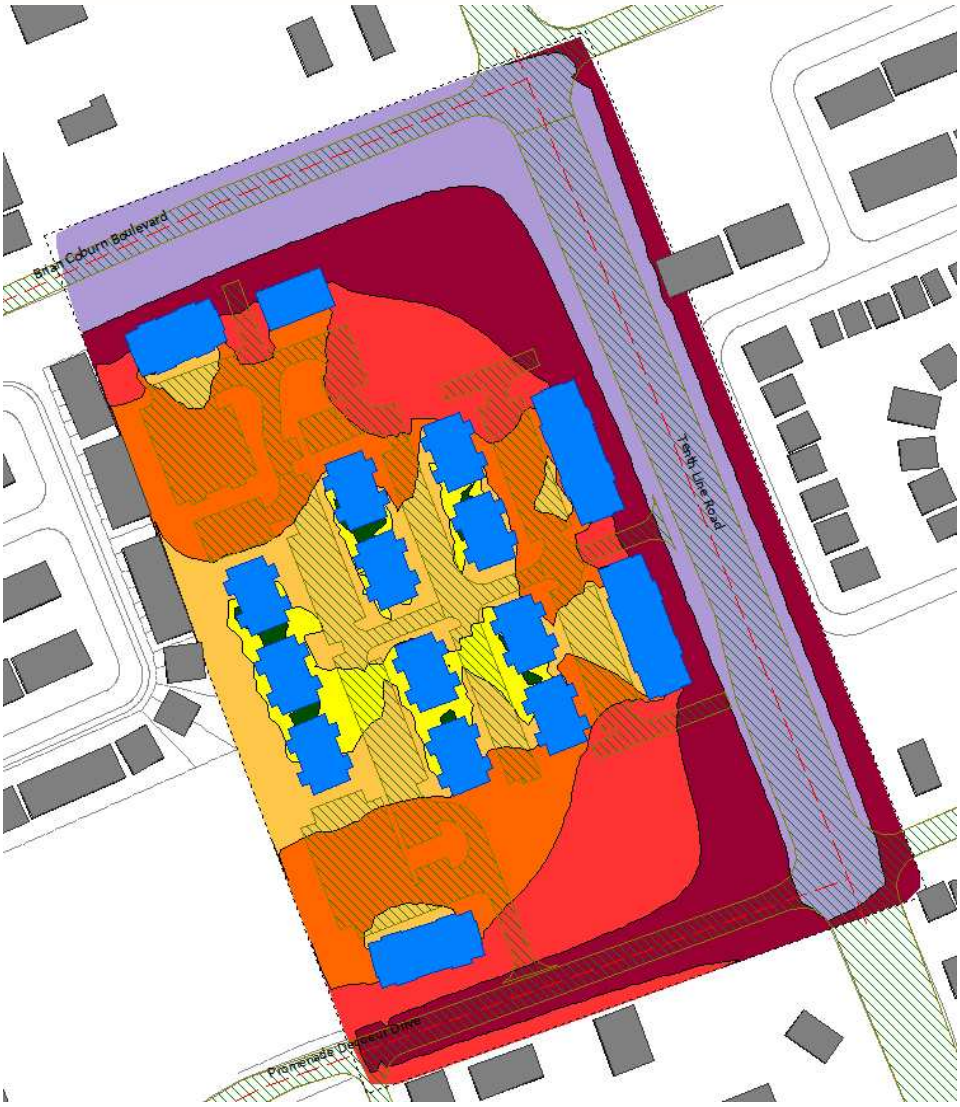

FIGURE 6: DAYTIME TRAFFIC NOISE CONTOURS (4.5 M ABOVE GRADE)

FIGURE 7: NIGHTTIME TRAFFIC NOISE CONTOURS (4.5 M ABOVE GRADE)

FIGURE 8: DAYTIME TRAFFIC NOISE CONTOURS (1.5 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*

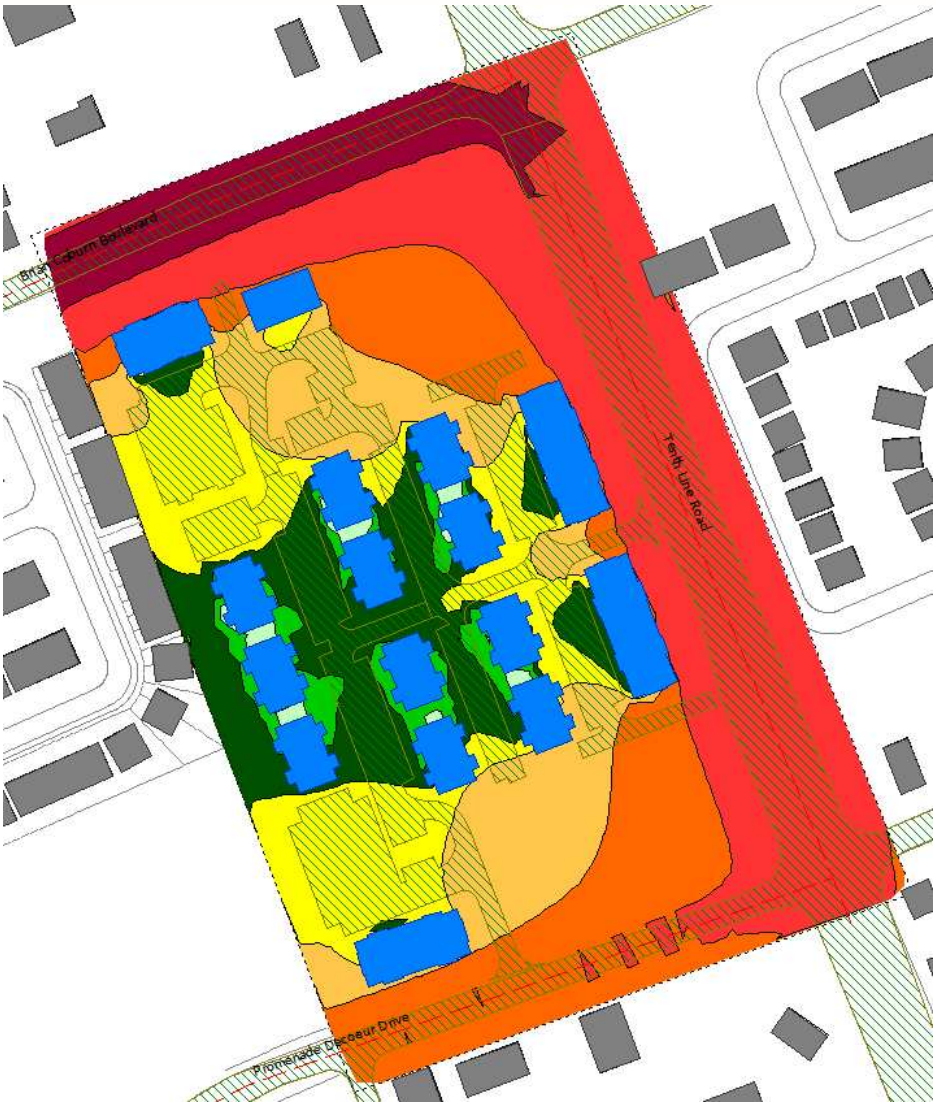

FIGURE 9: NIGHTTIME TRAFFIC NOISE CONTOURS (1.5 M ABOVE GRADE)

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: 19-10-2021 15:23:51
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R2.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Brian Coburn (day/night)

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 veh/TimePeriod *
Posted speed limit : 70 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): 30000
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: Brian Coburn (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 31.00 / 31.00 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Brian Coburn (day)

Source height = 1.50 m

ROAD (0.00 + 68.07 + 0.00) = 68.07 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	74.33	0.00	-4.95	-1.30	0.00	0.00	0.00	68.07

Segment Leq : 68.07 dBA

Total Leq All Segments: 68.07 dBA

Results segment # 1: Brian Coburn (night)

Source height = 1.50 m

ROAD (0.00 + 60.48 + 0.00) = 60.48 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	66.73	0.00	-4.95	-1.30	0.00	0.00	0.00	60.48

Segment Leq : 60.48 dBA

Total Leq All Segments: 60.48 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 68.07
(NIGHT): 60.48

STAMSON 5.0 NORMAL REPORT Date: 19-10-2021 15:30:56
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R9.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Tenth Line (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 : 60 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: Tenth Line (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 25.00 / 25.00 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Tenth Line (day)

Source height = 1.50 m

ROAD (0.00 + 68.89 + 0.00) = 68.89 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	73.68	0.00	-3.48	-1.30	0.00	0.00	0.00	68.89

Segment Leq : 68.89 dBA

Total Leq All Segments: 68.89 dBA

Results segment # 1: Tenth Line (night)

Source height = 1.50 m

ROAD (0.00 + 61.29 + 0.00) = 61.29 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	66.08	0.00	-3.48	-1.30	0.00	0.00	0.00	61.29

Segment Leq : 61.29 dBA

Total Leq All Segments: 61.29 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 68.89
(NIGHT): 61.29

STAMSON 5.0 NORMAL REPORT Date: 19-10-2021 15:38:32
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r14.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Tenth Line (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 : 60 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: Tenth Line (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 : 36.00 / 36.00 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Decoeur Dr (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: Decoeur Dr (day/night)

Angle1 Angle2 : -24.00 deg 55.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 89.00 / 89.00 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Tenth Line (day)

Source height = 1.50 m

ROAD (0.00 + 63.39 + 0.00) = 63.39 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.57	73.68	0.00	-5.97	-4.31	0.00	0.00	0.00	63.39

Segment Leq : 63.39 dBA

Results segment # 2: Decoeur Dr (day)

Source height = 1.50 m

ROAD (0.00 + 49.73 + 0.00) = 49.73 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-24	55	0.57	65.75	0.00	-12.14	-3.88	0.00	0.00	0.00	49.73

Segment Leq : 49.73 dBA

Total Leq All Segments: 63.57 dBA

Results segment # 1: Tenth Line (night)

Source height = 1.50 m

ROAD (0.00 + 55.80 + 0.00) = 55.80 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.57	66.08	0.00	-5.97	-4.31	0.00	0.00	0.00	55.80

Segment Leq : 55.80 dBA

Results segment # 2: Decoeur Dr (night)

Source height = 1.50 m

ROAD (0.00 + 42.14 + 0.00) = 42.14 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-24	55	0.57	58.16	0.00	-12.14	-3.88	0.00	0.00	0.00	42.14

Segment Leq : 42.14 dBA

Total Leq All Segments: 55.98 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.57
(NIGHT): 55.98

STAMSON 5.0 NORMAL REPORT Date: 19-10-2021 15:43:13
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r20.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Decoeur Dr (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: Decoeur Dr (day/night)

Angle1 Angle2 : -83.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 19.00 / 19.00 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Decoeur Dr (day)

Source height = 1.50 m

ROAD (0.00 + 62.79 + 0.00) = 62.79 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-83	90	0.57	65.75	0.00	-1.61	-1.35	0.00	0.00	0.00	62.79

Segment Leq : 62.79 dBA

Total Leq All Segments: 62.79 dBA

Results segment # 1: Decoeur Dr (night)

Source height = 1.50 m

ROAD (0.00 + 55.20 + 0.00) = 55.20 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-83	90	0.57	58.16	0.00	-1.61	-1.35	0.00	0.00	0.00	55.20

Segment Leq : 55.20 dBA

Total Leq All Segments: 55.20 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 62.79
(NIGHT): 55.20