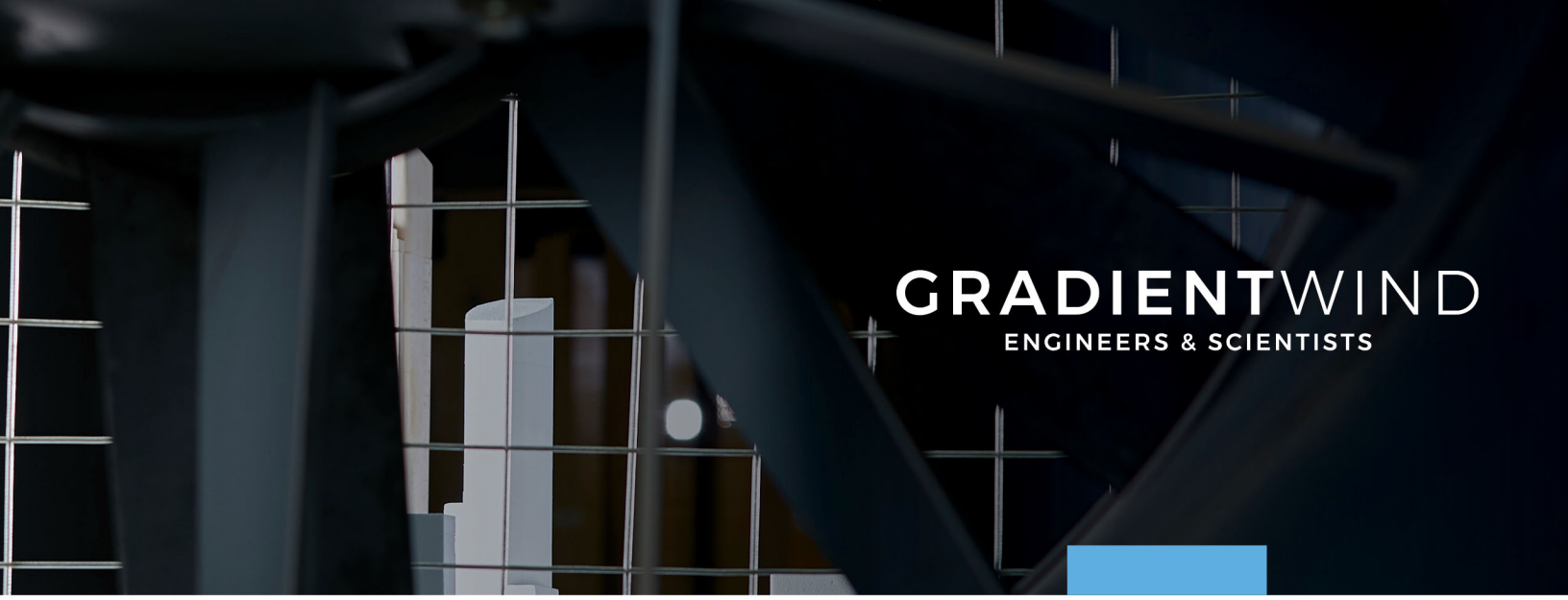
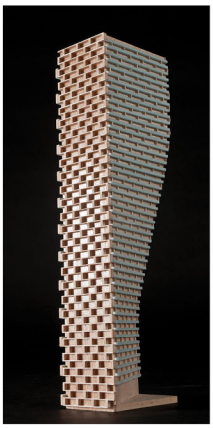


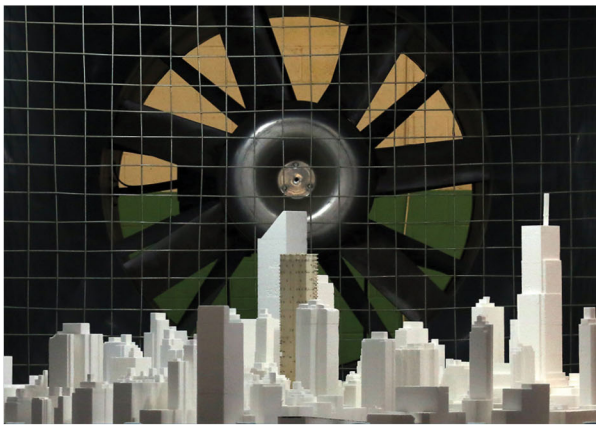
GRADIENTWIND
ENGINEERS & SCIENTISTS

TRANSPORTATION NOISE ASSESSMENT

955 Borbridge
Ottawa, Ontario

Report: 24-199-Transportation Noise





November 1, 2024

PREPARED FOR

Richcraft
2280 St. Laurent Boulevard, Suite 201
Ottawa, ON K1G 4K1

PREPARED BY

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

EXECUTIVE SUMMARY

This report describes a transportation noise assessment performed for a proposed development located at 955 Borbridge in Ottawa, Ontario (hereinafter referred to as the "subject site", "study site", or "proposed development").

The study site is bordered by Borbridge Avenue to the north, Ralph Hennesy Avenue and low-rise development in the west and south directions, respectively. The proposed development consists of 8 blocks of stacked dwelling units, an amenity building, an outdoor amenity area, and surface parking. The major sources of noise are Borbridge Avenue and Ralph Hennessy Avenue.

The results of the current analysis indicate that noise levels will range between 46 and 64 dBA during the daytime period (07:00-23:00) and between 39 and 56 dBA during the nighttime period (23:00-07:00) at POW receptors. The highest noise level (64 dBA) occurs at the north façade of Block 6. As the noise levels do not exceed 65 dBA ENCG criterion, standard exterior building components compliant with the Ontario Building Code will be sufficient to attenuate indoor noise levels.

The results of the analysis indicate that the buildings will require provision for forced air heating and central air conditioning or a similar mechanical system. If installed air conditioning would allow windows to be closed thus providing a quiet and comfortable indoor environment. Richcraft plans to provide air conditioning for the units. Therefore, a Type D warning clause will be required in all Lease, Purchase and Sale Agreements, as summarized in Section 6.

The noise levels within the outdoor amenity areas are well below the ENCG criteria. No mitigation will be required for this area.

No major pieces of mechanical equipment are expected to be associated with the development, thus impacts of stationary noise sources on the surroundings and the development itself will be negligible.

The surroundings comprise existing and future low-rise residential buildings and as such no existing sources of noise were identified around the site.

TABLE OF CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Richcraft to undertake a transportation noise assessment for the proposed residential development located at 955 Borbridge in Ottawa, Ontario, in support of a Site Plan (SPA) application. This report summarizes the methodology, results, and recommendations related to the assessment of exterior noise levels generated by local transportation.

This assessment is based on theoretical noise calculation methods conforming to the Ministry of the Environment, Conservation and Parks (MECP) Noise Control Guidelines (NPC-300) [1], and the City of Ottawa's Environmental Noise Control Guidelines. (ENCG). Noise calculations were based on architectural drawings prepared by M. David Blakeley Architects Inc. in October 2024, with future traffic volumes corresponding to the ENCG Appendix B.

2. TERMS OF REFERENCE

The focus of this transportation noise study is a proposed stack townhouse development located at 955 Borbridge in Ottawa, Ontario. The proposed development comprises 8 blocks of stacked dwelling units, at-grade surface parking, an amenity building, and an outdoor amenity area south of the amenity building.

Balconies of less than 4 m in depth are not considered points of reception, as per the ENCG. The primary points of reception in this report are the building façades (plane of window-POW) and the amenity area (outdoor living area-OLA) south of the amenity building.

The major sources of noise are Borbridge Avenue which is classified as a major collector and Ralph Hennessy Avenue which is a collector roadway.

3. OBJECTIVES

The principal objectives of this study are to (i) calculate the future noise and vibration levels on the study buildings produced by local transportation, and (ii) determine whether exterior noise levels exceed the allowable limits specified by the ENCG as outlined in Section 4.2 of this report.

[1] 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 Transportation Noise

4.2.1 Criteria for Transportation Traffic Noise

For vehicular traffic, 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 ENCG guidelines specify the recommended indoor noise limits, as listed in Table 1.

TABLE 1: INDOOR SOUND LEVEL CRITERIA

Type of Space	Time Period	Road
		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[2]. A closed window due to a ventilation requirement will bring noise levels down to achieve an acceptable indoor environment[3]. 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 normally triggers the requirement for central air conditioning. Where noise levels exceed 65 dBA daytime and 60 dBA nighttime, building components will require higher levels of sound attenuation[4].

The sound level criterion for OLAs 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. Mitigation measures include earth berms, noise barriers, or a combination of both for at-grade outdoor areas. Parapet walls, solid glass screens, planters, or a combination of these can be used at the perimeter of OLAs such as amenity terraces as noise barriers.

[2] Burberry, P.B. (2014). Mitchell's Environment and Services. Routledge, Page 125
[3] MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.8
[4] MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3

If mitigation measures for OLAs are not provided, prospective purchasers or tenants should be informed of potential noise problems by a warning clause.

4.2.2 Theoretical Transportation 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 analysis model has been recognized by the Ministry of Transportation Ontario (MTO) as the recommended noise model for transportation projects (Environmental Guide for Noise, 2022 by the MTO[5]). The MECP has also adopted the TNM model as per their "Draft Guideline Noise Pollution Control Publications 306 (NPC-306)[6].

The *Predictor-Lima* computer program can represent three-dimensional surfaces and the first reflection of sound waves over a suitable spectrum for human hearing. Calculations were performed for receptors around the study site to determine the noise impact from roadway and railway sources.

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

- Topography was assumed to be a flat/gentle slope.
- Noise receptors were strategically placed at 11 locations (10 POW and 1 OLA) around the study area (see Figure 2).
- The ground surface was modelled as reflective due to the presence of pavement and concrete in the proximity of the study site.
- The day/night split was taken to be 92%/8% respectively for all roadways.
- Truck traffic on all roadways was taken to comprise 5% heavy trucks and 7% medium trucks.

[5] Ministry of Transportation, Environmental Guide for Noise, 2022. Retrieved from Environmental Guide for Noise 2022
[6] 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 Plan[7] 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: TRANSPORTATION TRAFFIC DATA

Segment	Roadway Traffic Data	Speed Limit (km/h)	Traffic Volumes
Borbridge Avenue	2 Lane Major Collector	50	**12,000**
Ralph Hennessy Avenue	2-Lane Collector	50	**8,000**

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

5. TRANSPORTATION NOISE RESULTS

5.1 Transportation Noise Levels

The results of the transportation noise calculations are summarized in Table 3.

TABLE 3: EXTERIOR NOISE LEVELS DUE TO TRANSPORTATION SOURCES

Receptor Number / Type	Receptor Location	Receptor Height Above Grade (m)	Roadway Noise Levels (dBA)	
			Day	Night
R1	Block 1 – West Facade	1.5	59	51
		4.5	59	52
R2	Block 1 – North Facade	1.5	63	56
		4.5	64	56
R3	Block 5 – North Facade	1.5	63	55
		4.5	63	55
R4	Block 6 – North Facade	1.5	64	56
		4.5	64	56
R5	Block 6 – East Facade	1.5	62	55
		4.5	63	55
R6	Block 7 – North Facade	1.5	57	49
		4.5	58	50
R7	Block 7 – East Facade	1.5	61	54
		4.5	62	54
R8	Block 7 – South Facade	1.5	58	50
		4.5	58	50
R9	Block 8 – South Facade	1.5	49	42
		4.5	53	45
R10	Block 4 – East Façade	1.5	46	39
		4.5	50	42
R11	Outdoor Amenity	1.5	44	N/A*

* OLA noise levels during the nighttime are not considered, as per NPC-300.

The results of the current analysis indicate that noise levels will range between 46 and 64 dBA during the daytime period (07:00-23:00) and between 39 and 56 dBA during the nighttime period (23:00-07:00) at POW receptors. The highest noise level (64 dBA) occurs at the north façade of Block 6.

The noise levels at the outdoor amenity areas are well below the ENCG criteria. No mitigation will be required for this area.

6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels will range between 46 and 64 dBA during the daytime period (07:00-23:00) and between 39 and 56 dBA during the nighttime period (23:00-07:00) at POW receptors. The highest noise level (64 dBA) occurs at the north façade of Block 6. As the noise levels do not exceed 65 dBA ENCG criterion, standard exterior building components compliant with the Ontario Building Code will be sufficient to attenuate indoor noise levels.

The results of the analysis indicate that the buildings will require provision for forced air heating and central air conditioning or a similar mechanical system. If installed air conditioning would allow windows to be closed thus providing a quiet and comfortable indoor environment. Richcraft plans to provide air conditioning for the units. Therefore, a Type D warning clause will be required in all Lease, Purchase and Sale Agreements, as summarized below:

Type D

> *"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."*

The noise levels within the outdoor amenity areas are well below the ENCG criteria. No mitigation will be required for this area.

No major pieces of mechanical equipment are expected to be associated with the development, thus impacts of stationary noise sources on the surroundings and the development itself will be negligible.

The surroundings comprise existing and future low-rise residential buildings and as such no existing sources of noise were identified around the site.

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.

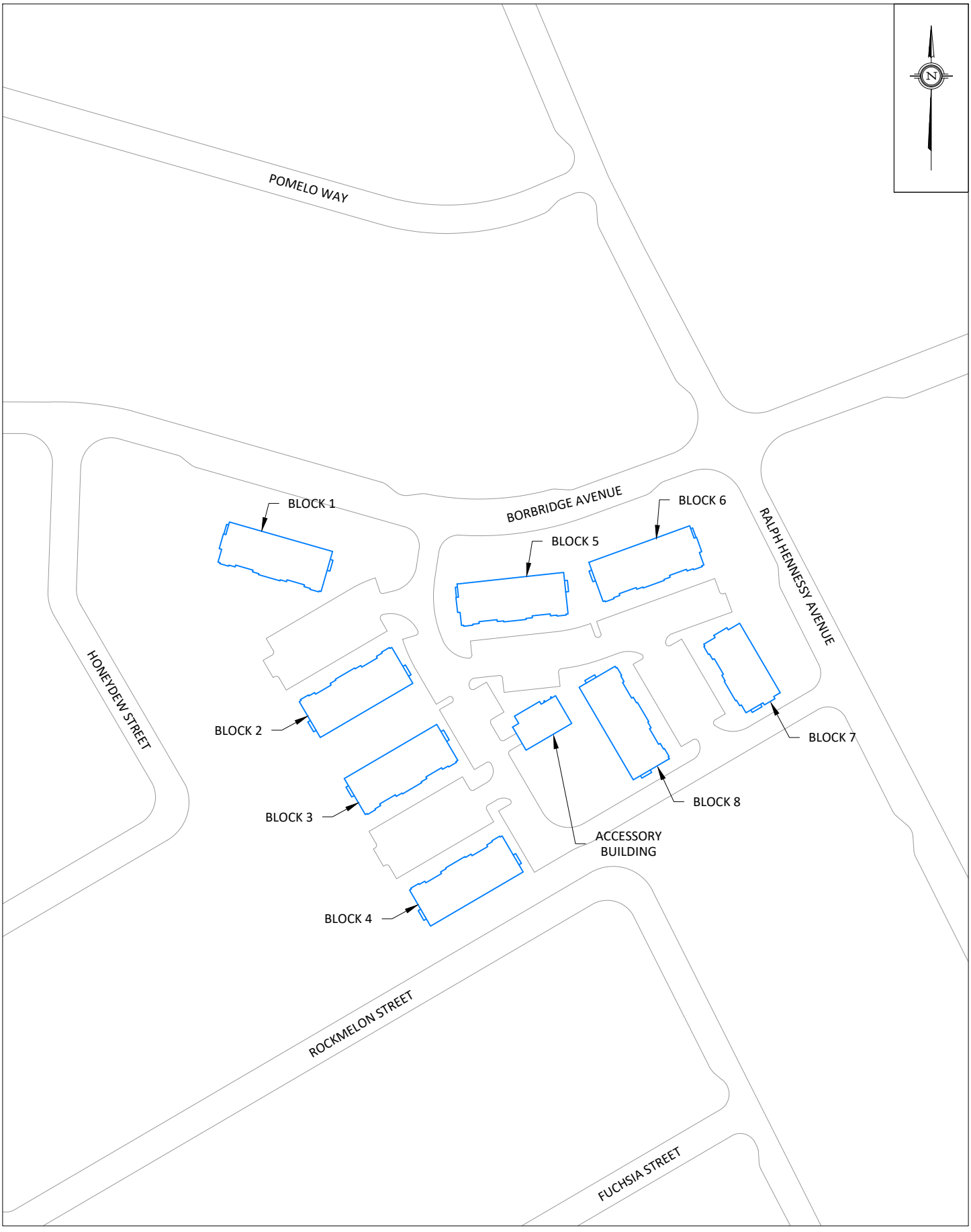
Sincerely,

Gradient Wind Engineering Inc.

Efser Kara, MSc, LEED GA
Acoustic Scientist

Joshua Foster, P.Eng.
Lead Engineer

Gradient Wind File 24-199-Transportation Noise



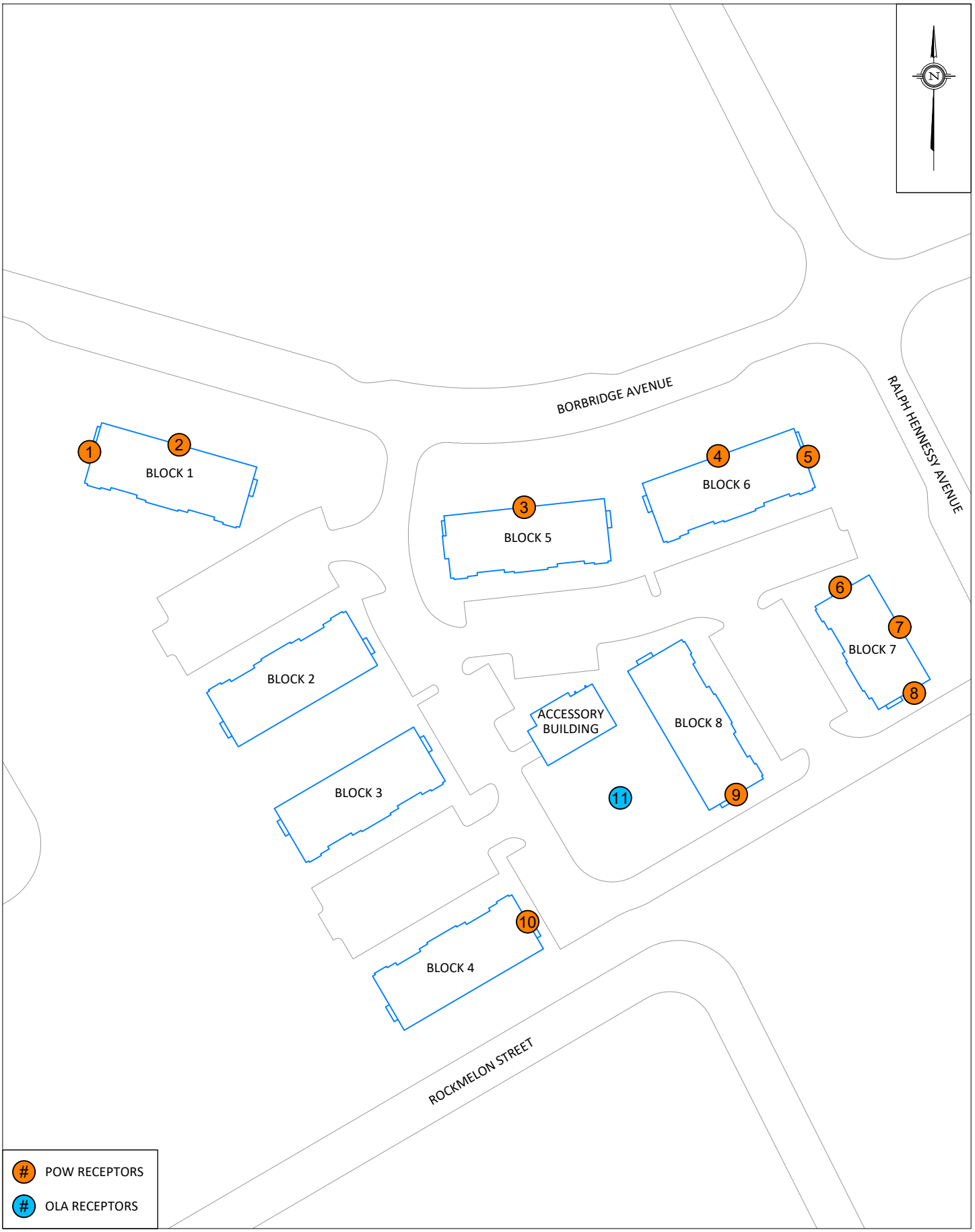
GRADIENTWIND
ENGINEERS & SCIENTISTS

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

PROJECT	955 BORBRIDGE AVENUE, OTTAWA TRAFFIC NOISE FEASIBILITY ASSESSMENT		
SCALE	1:1500 (APPROX.)	DRAWING NO.	GW24-199-1
DATE	OCTOBER 30, 2024	DRAWN BY	S.K.

DESCRIPTION

FIGURE 1:
SITE PLAN AND THE SURROUNDING CONTEXT



GRADIENTWIND
ENGINEERS & SCIENTISTS

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

PROJECT	955 BORBRIDGE AVENUE, OTTAWA TRAFFIC NOISE FEASIBILITY ASSESSMENT		
SCALE	1:1000 (APPROX.)	DRAWING NO.	GW24-199-2
DATE	OCTOBER 30, 2024	DRAWN BY	E.K.

DESCRIPTION

FIGURE 2:
RECEPTOR LOCATIONS

FIGURE 3: DAYTIME NOISE CONTOURS (4.5 M ABOVE GRADE)

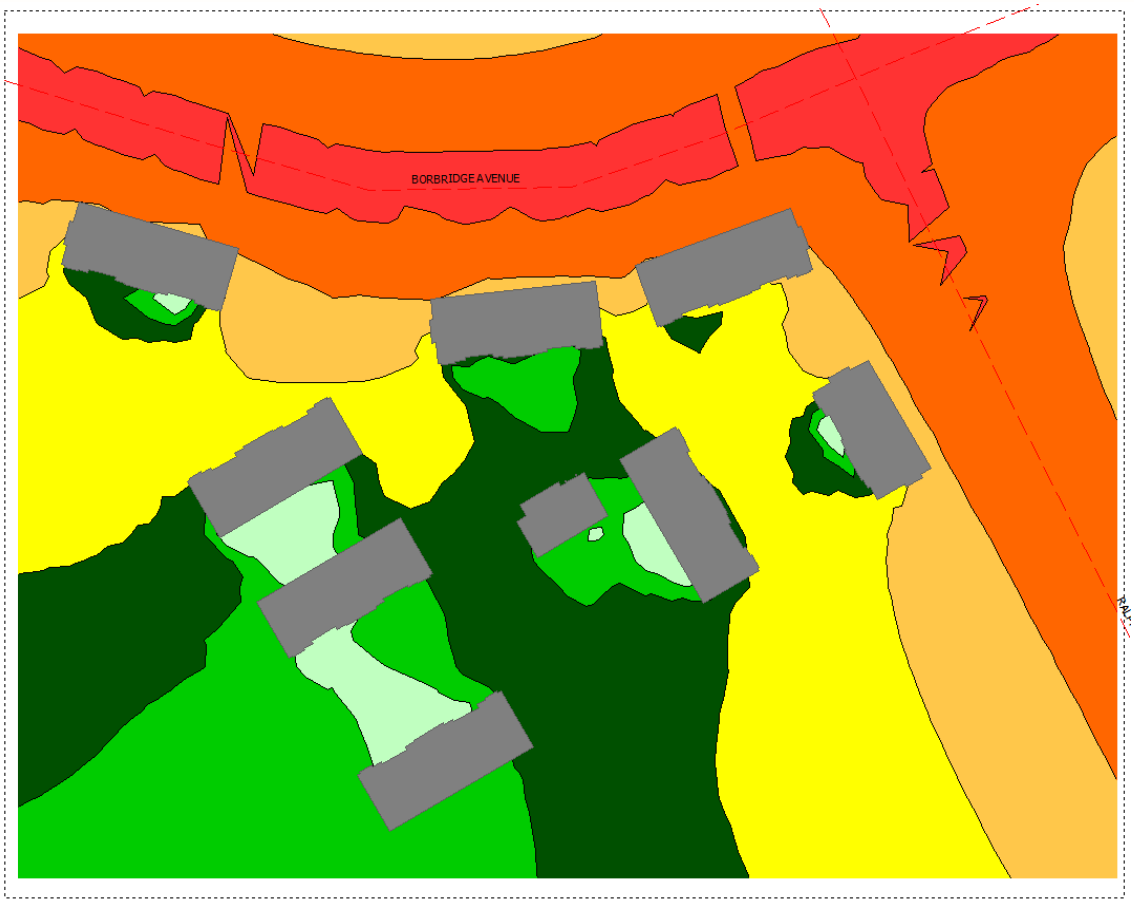


FIGURE 4: NIGHTTIME NOISE CONTOURS (4.5 M ABOVE GRADE)