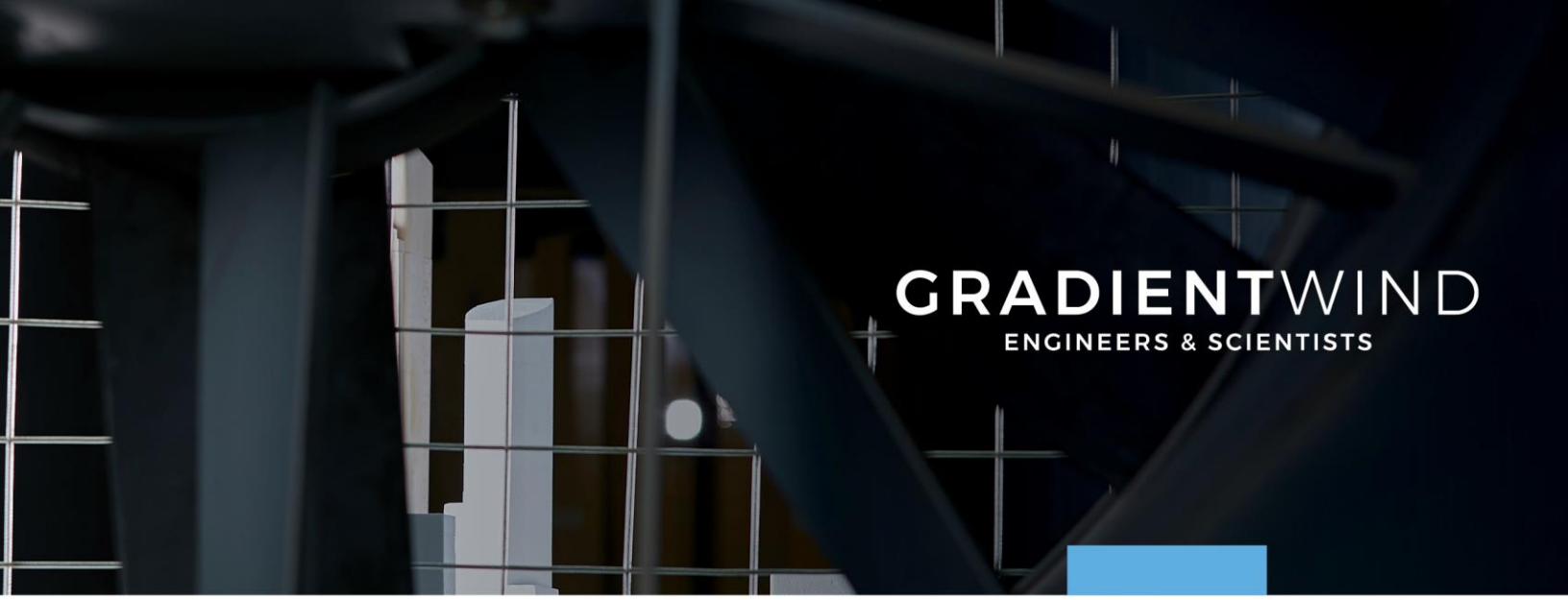
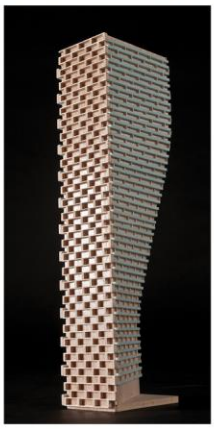


GRADIENTWIND
ENGINEERS & SCIENTISTS

ROADWAY TRAFFIC NOISE ASSESSMENT

368 Tweedsmuir Avenue
Ottawa, Ontario

REPORT: GW22-100– Traffic Noise



October 27, 2022

PREPARED FOR
13098931 Canada Inc.
Ottawa, ON K1P 0B6

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

EXECUTIVE SUMMARY

This report describes a roadway traffic noise assessment undertaken for a proposed development located at 368 Tweedsmuir Avenue in Ottawa, Ontario. The study site is situated on the west side of a parcel of land bounded by Tweedsmuir Avenue to the east, and low-rise residential and commercial buildings to all other directions.

The results of the analysis indicated that noise levels at Plane of Window (POW) receptors will range between 63 and 47 dBA during the daytime period (07:00-23:00) and between 55 and 39 dBA during the nighttime period (23:00-07:00). The highest noise level (63 dBA) occurs at the south façade of the study building which is nearest and most exposed to Richmond Road. As the noise level at the OLA receptor (R5) located in the backyard is lower than 55 dBA, noise mitigation measures will not be required.

The noise levels predicted due to roadway traffic are below the criteria listed in Section 4.2 for building components. Therefore, acoustically rated building components will not be required. As the noise levels at most POW receptors are above 55 during the daytime and above 50 during the nighttime, the study building should be designed with a provision for the installation of central air conditioning in the future, at the occupant's discretion. A Type C warning clause will also be required in all Lease, Purchase and Sale Agreements, as summarized in Section 6.

Gradient Wind conducted a survey of the study site, using the satellite view of the area; the study site is surrounded by low-rise residential and commercial buildings from south to east clockwise and a mid-rise mixed-use building to the southeast located at 236 Richmond Road. No stationary noise impacts, from the low-rise neighbouring buildings, are anticipated on the study building as the existing rooftop equipment is small. The rooftop equipment of the mixed-use development at 236 Richmond Road is relatively large. However, the equipment is not anticipated to have a negative impact on the study site as well, as the direct line of sight is mostly blocked by the building edge and the distance between the rooftop of the 236 Richmond Road building and the study building is more than 80 metres.

With regards to the impacts of the proposed building on the surroundings and itself, please refer to the Stationary Noise Assessment, dated May 20, 2022, conducted by Gradient Wind.

TABLE OF CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by 13098931 Canada Inc. to undertake a roadway traffic noise assessment for a proposed development located at 368 Tweedsmuir Avenue 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 Rosaline J. Hill Architect Inc., dated August 2022, 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 roadway traffic noise assessment is a proposed mid-rise mixed-use development located at 368 Tweedsmuir Avenue in Ottawa, Ontario. The proposed development is a 3-storey residential building located on a rectangular parcel of land.

ENCG considers balconies and elevated terraces (e.g., rooftops), with a minimum depth of 4 metres, as outdoor living areas (OLA). The building does not have terraces that fit this description and the rooftop will be used to accommodate the condenser units. However, the backyard of the building is assumed to be an OLA in this study and included in the calculations.

The proposed development is surrounded by low-rise residential and commercial buildings from south to east clockwise and a mid-rise mixed-use building to the southeast located at 236 Richmond Road. The primary source of roadway traffic noise impacting the study site is Richmond Road. Figure 1 illustrates the study site 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

Noise predictions were performed with the aid of the MECP computerized noise assessment program, STAMSON 5.04, for road analysis. Appendix A includes the STAMSON 5.04 input and output data.

Roadway traffic noise calculations were performed by treating each roadway segment as separate line sources of noise. 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 streets was taken to be 92%/8%, respectively.
- Ground surfaces were taken to be reflective due to the presence of hard ground (pavement and concrete).
- Noise receptors were strategically placed at 5 locations around the study area (see Figure 2).
- Plane of Window (POW) receptor heights were taken to be 8.5 metres at the centre of the highest-level window, based on ENCG recommendations.
- The OLA receptor in the backyard was positioned at 1.5 metres above grade.
- Receptor locations are illustrated in Figure 2 and distances and exposure angles are illustrated in Figures 3 and 4.

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.

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

TABLE 2: ROADWAY TRAFFIC DATA

Segment	Roadway Traffic Data	Speed Limit (km/hr)	Traffic Volumes
Richmond Road	2-Lane Urban Arterial (2-UAU)	50	15,000

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 analysis indicated that noise levels at Plane of Window (POW) receptors will range between 63 and 47 dBA during the daytime period (07:00-23:00) and between 55 and 39 dBA during the nighttime period (23:00-07:00). The highest noise level (63 dBA) occurs at the south façade of the study building which is nearest and most exposed to Richmond Road.

TABLE 3: EXTERIOR NOISE LEVELS DUE TO ROADWAY TRAFFIC

Receptor ID	Receptor Type / Location	Receptor Height (m)	STAMSON Noise Level (dBA)	
			Day	Night
R1	POW / South Façade	8.5	63	55
R2	POW / East Façade	8.5	60	52
R3	POW / North Façade	8.5	47	39
R4	POW / West Façade	8.5	59	51
R5	OLA / Backyard (West)	1.5	51	N/A*

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

As the noise level at the OLA receptor (R5) located in the backyard is lower than 55 dBA, noise mitigation measures will not be required.

6. CONCLUSIONS AND RECOMMENDATIONS

The results of the analysis indicated that noise levels at Plane of Window (POW) receptors will range between 63 and 47 dBA during the daytime period (07:00-23:00) and between 55 and 39 dBA during the nighttime period (23:00-07:00). The highest noise level (63 dBA) occurs at the south façade of the study building which is nearest and most exposed to Richmond Road.

The noise levels predicted due to roadway traffic are below the criteria listed in Section 4.2 for building components. Therefore, acoustically rated building components will not be required. As the noise levels at most POW receptors are above 55 during the daytime and above 50 during the nighttime, the study building should be designed with a provision for the installation of central air conditioning in the future, at the occupant's discretion. A Type C warning clause will also be required in 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."*

As the noise level at the OLA receptor (R5) located in the backyard is lower than 55 dBA, noise mitigation measures will not be required.

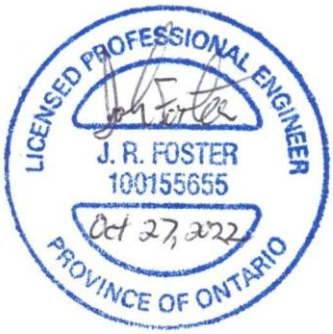
Gradient Wind conducted a survey of the study site, using the satellite view of the area; the study site is surrounded by low-rise residential and commercial buildings from south to east clockwise and a mid-rise mixed-use building to the southeast located at 236 Richmond Road. No stationary noise impacts, from the low-rise neighbouring buildings, are anticipated on the study building as the existing rooftop equipment is small. The rooftop equipment of the mixed-use development at 236 Richmond Road is relatively large. However, the equipment is not anticipated to have a negative impact on the study site as well, as the direct line of sight is mostly blocked by the building edge and the distance between the rooftop of the 236 Richmond Road building and the study building is more than 80 metres.

With regards to the impacts of the proposed building on the surroundings and itself, please refer to the Stationary Noise Assessment, dated May 20, 2022, conducted by Gradient Wind.

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,

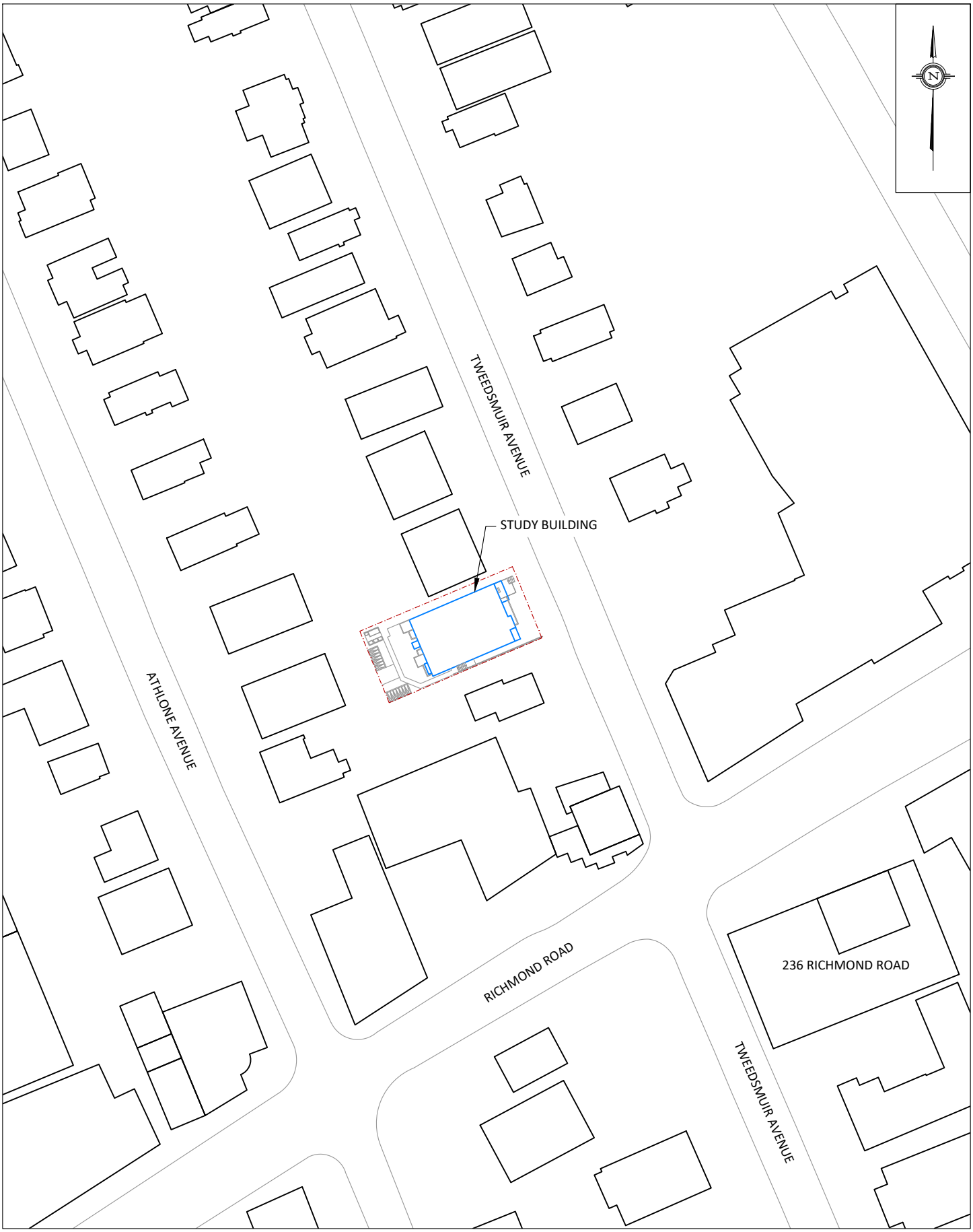
Gradient Wind Engineering Inc.



Efser Kara, MSc, LEED GA
Acoustic Scientist

Joshua Foster, P.Eng.
Lead Engineer

Gradient Wind File #22-100-Traffic Noise



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127 WALGREEN ROAD , OTTAWA, ON
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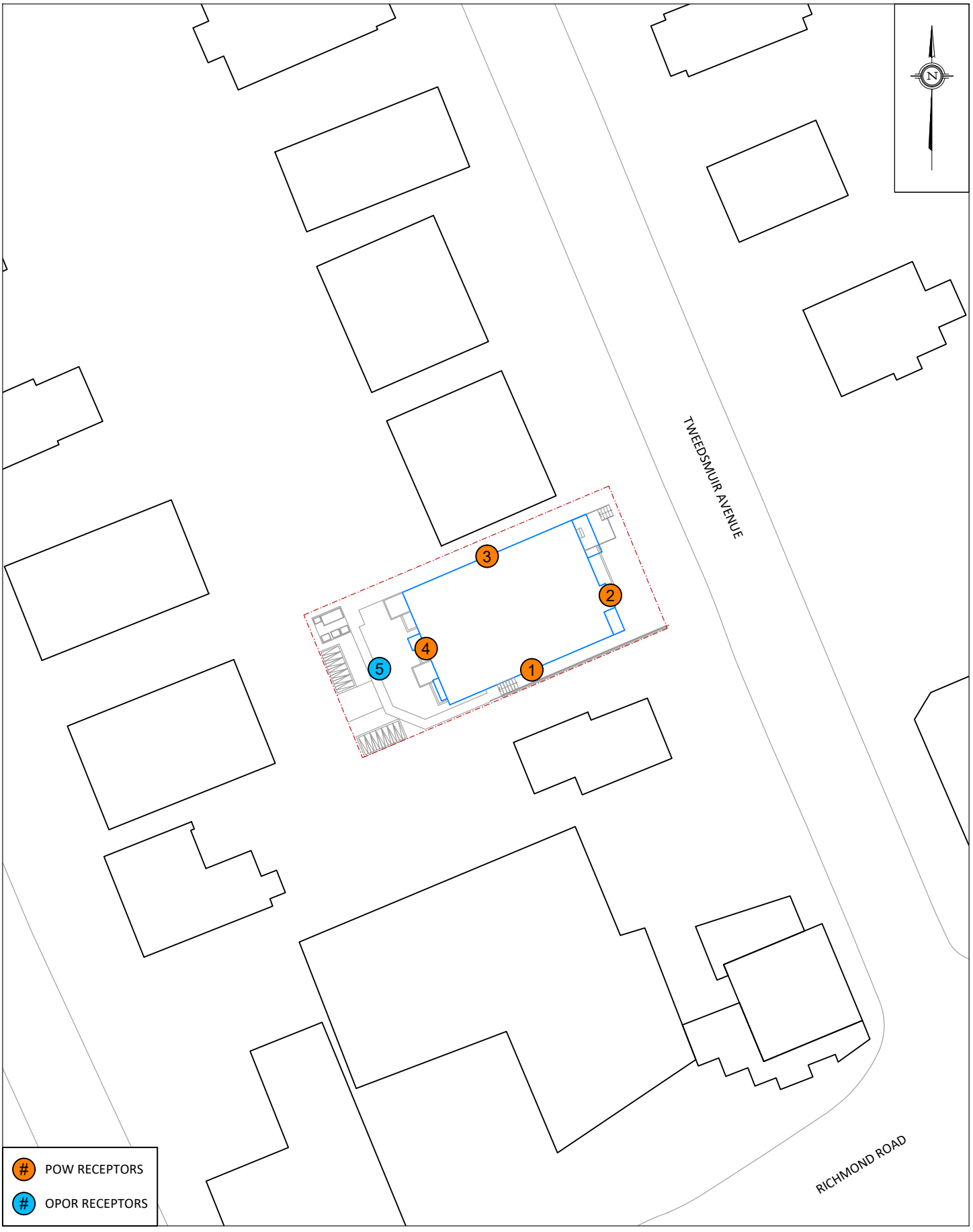
PROJECT	368 TWEEDSMUIR AVENUE ROADWAY TRAFFIC NOISE ASSESSMENT		
SCALE	1:1000 (APPROX.)	DRAWING NO.	GW22-100-1
DATE	OCTOBER 25, 2022	DRAWN BY	E.K.

DESCRIPTION

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT



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PROJECT	368 TWEEDSMUIR AVENUE ROADWAY TRAFFIC NOISE ASSESSMENT		DESCRIPTION
SCALE	1:500 (APPROX.)	DRAWING NO.	GW22-100-2
DATE	OCTOBER 25, 2022	DRAWN BY	E.K.

FIGURE 2:
RECEPTOR LOCATIONS

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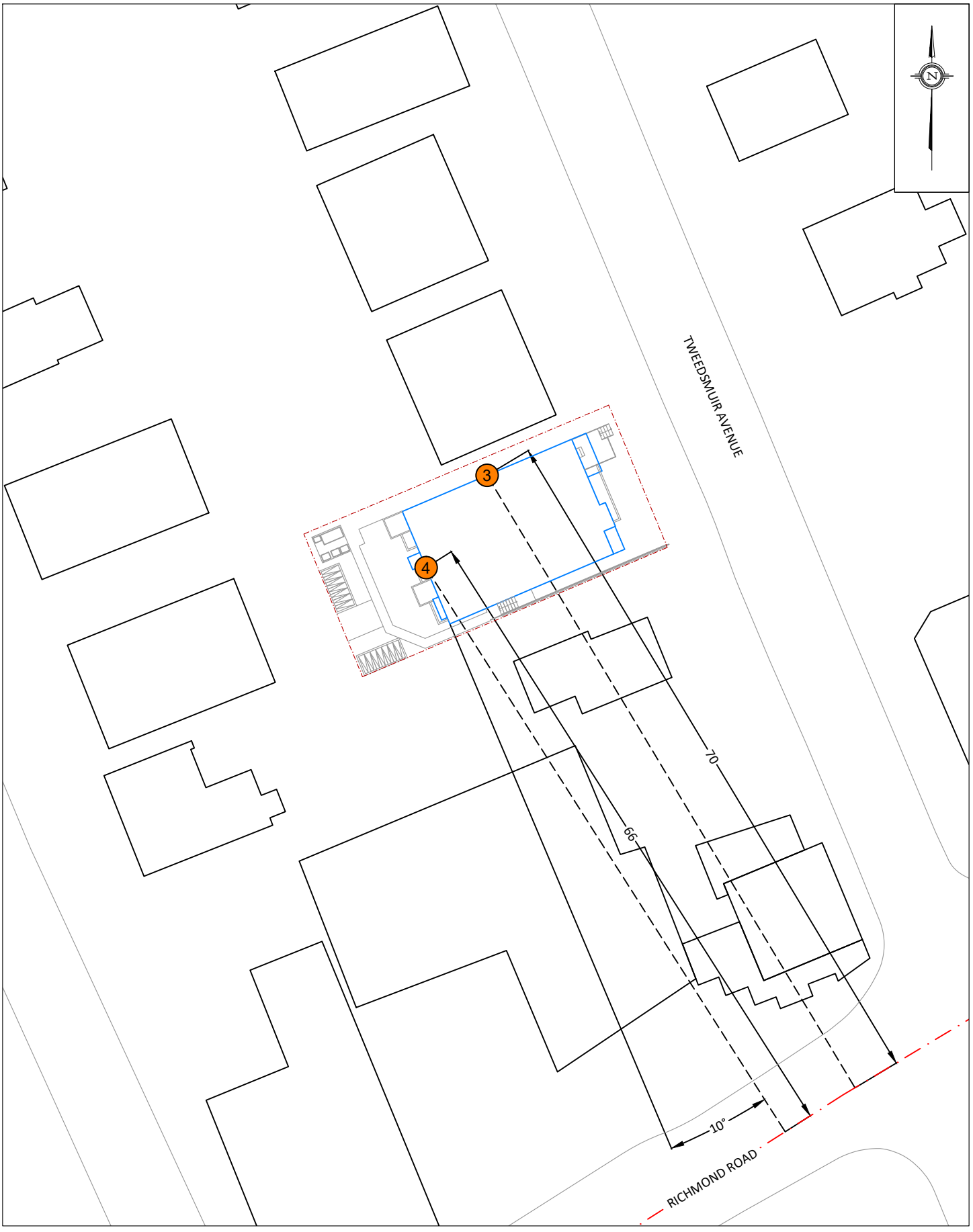
PROJECT	368 TWEEDSMUIR AVENUE ROADWAY TRAFFIC NOISE ASSESSMENT
SCALE	1:500 (APPROX.)
DRAWING NO.	GW22-100-3
DATE	OCTOBER 25, 2022
DRAWN BY	E.K.

DESCRIPTION

FIGURE 3:
STAMSON INPUT DATA
FOR RECEPTORS 1, 2, & 5



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PROJECT	368 TWEEDSMUIR AVENUE ROADWAY TRAFFIC NOISE ASSESSMENT		DESCRIPTION
SCALE	1:500 (APPROX.)	DRAWING NO.	GW22-100-4
DATE	OCTOBER 25, 2022	DRAWN BY	E.K.

FIGURE 4:
STAMSON INPUT DATA
FOR RECEPTORS 3 & 4

APPENDIX A

STAMSON 5.04 – INPUT AND OUTPUT DATA

127 WALGREEN ROAD, OTTAWA, ON, CANADA K0A 1L0 | 613 836 0934
GRADIENTWIND.COM

STAMSON 5.0 NORMAL REPORT Date: 25-10-2022 10:26:00
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R1.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Richmond Rd (day/night)

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 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): 15000
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: Richmond Rd (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 : 59.00 / 59.00 m
Receiver height : 8.50 / 8.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Richmond Rd (day)

Source height = 1.50 m

ROAD (0.00 + 62.53 + 0.00) = 62.53 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.48	0.00	-5.95	0.00	0.00	0.00	0.00	62.53

Segment Leq : 62.53 dBA

Total Leq All Segments: 62.53 dBA

Results segment # 1: Richmond Rd (night)

Source height = 1.50 m

ROAD (0.00 + 54.94 + 0.00) = 54.94 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	60.88	0.00	-5.95	0.00	0.00	0.00	0.00	54.94

Segment Leq : 54.94 dBA

Total Leq All Segments: 54.94 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 62.53
(NIGHT): 54.94

STAMSON 5.0 NORMAL REPORT Date: 25-10-2022 10:29:36
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

Road data, segment # 1: Richmond Rd (day/night)

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 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): 15000
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: Richmond Rd (day/night)

Angle1 Angle2 : -90.00 deg 8.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 61.00 / 61.00 m
Receiver height : 8.50 / 8.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Richmond Rd (day)

Source height = 1.50 m

ROAD (0.00 + 59.75 + 0.00) = 59.75 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	8	0.00	68.48	0.00	-6.09	-2.64	0.00	0.00	0.00	59.75

Segment Leq : 59.75 dBA

Total Leq All Segments: 59.75 dBA

Results segment # 1: Richmond Rd (night)

Source height = 1.50 m

ROAD (0.00 + 52.15 + 0.00) = 52.15 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	8	0.00	60.88	0.00	-6.09	-2.64	0.00	0.00	0.00	52.15

Segment Leq : 52.15 dBA

Total Leq All Segments: 52.15 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 59.75
(NIGHT): 52.15

STAMSON 5.0 COMPREHENSIVE REPORT Date: 25-10-2022 10:46:20
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r3.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Richmond Rd (day/night)

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 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): 15000
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: Richmond Rd (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 : 70.00 / 70.00 m
Receiver height : 8.50 / 8.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
Barrier height : 10.00 m
Barrier receiver distance : 0.10 / 0.10 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Segment # 1: Richmond Rd (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 ! 8.50 ! 8.49 ! 8.49

ROAD (0.00 + 46.64 + 0.00) = 46.64 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 90 0.00 68.48 0.00 -6.69 0.00 0.00 0.00 -15.15 46.64

Segment Leq : 46.64 dBA

Total Leq All Segments: 46.64 dBA

Segment # 1: Richmond Rd (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 ! 8.50 ! 8.49 ! 8.49

ROAD (0.00 + 39.04 + 0.00) = 39.04 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 90 0.00 60.88 0.00 -6.69 0.00 0.00 0.00 -15.15 39.04

Segment Leq : 39.04 dBA

Total Leq All Segments: 39.04 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 46.64
(NIGHT): 39.04

STAMSON 5.0 COMPREHENSIVE REPORT Date: 25-10-2022 10:47:22
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

Road data, segment # 1: Richmond Rd (day/night)

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 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): 15000
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: Richmond Rd (day/night)

Angle1 Angle2 : 10.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 66.00 / 66.00 m
Receiver height : 8.50 / 8.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Segment # 1: Richmond Rd (day)

Source height = 1.50 m

ROAD (0.00 + 58.52 + 0.00) = 58.52 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
10	90	0.00	68.48	0.00	-6.43	-3.52	0.00	0.00	0.00	58.52

Segment Leq : 58.52 dBA

Total Leq All Segments: 58.52 dBA

Segment # 1: Richmond Rd (night)

Source height = 1.50 m

ROAD (0.00 + 50.93 + 0.00) = 50.93 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
10	90	0.00	60.88	0.00	-6.43	-3.52	0.00	0.00	0.00	50.93

Segment Leq : 50.93 dBA

Total Leq All Segments: 50.93 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 58.52
(NIGHT): 50.93

STAMSON 5.0 NORMAL REPORT Date: 25-10-2022 12:29:03
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

Road data, segment # 1: Richmond Rd (day/night)

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 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): 15000
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: Richmond Rd (day/night)

Angle1 Angle2 : -30.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 67.00 / 67.00 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -30.00 deg Angle2 : 90.00 deg
Barrier height : 4.00 m
Barrier receiver distance : 22.00 / 22.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Results segment # 1: Richmond Rd (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source ! Receiver ! Barrier ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)
---+---+---+---
1.50 ! 1.50 ! 1.50 ! 1.50

ROAD (0.00 + 50.78 + 0.00) = 50.78 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-30 90 0.00 68.48 0.00 -6.50 -1.76 0.00 0.00 -9.44 50.78

Segment Leq : 50.78 dBA

Total Leq All Segments: 50.78 dBA

Results segment # 1: Richmond Rd (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source ! Receiver ! Barrier ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)
---+---+---+---
1.50 ! 1.50 ! 1.50 ! 1.50

ROAD (0.00 + 43.18 + 0.00) = 43.18 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-30 90 0.00 60.88 0.00 -6.50 -1.76 0.00 0.00 -9.44 43.18

Segment Leq : 43.18 dBA

Total Leq All Segments: 43.18 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 50.78
(NIGHT): 43.18