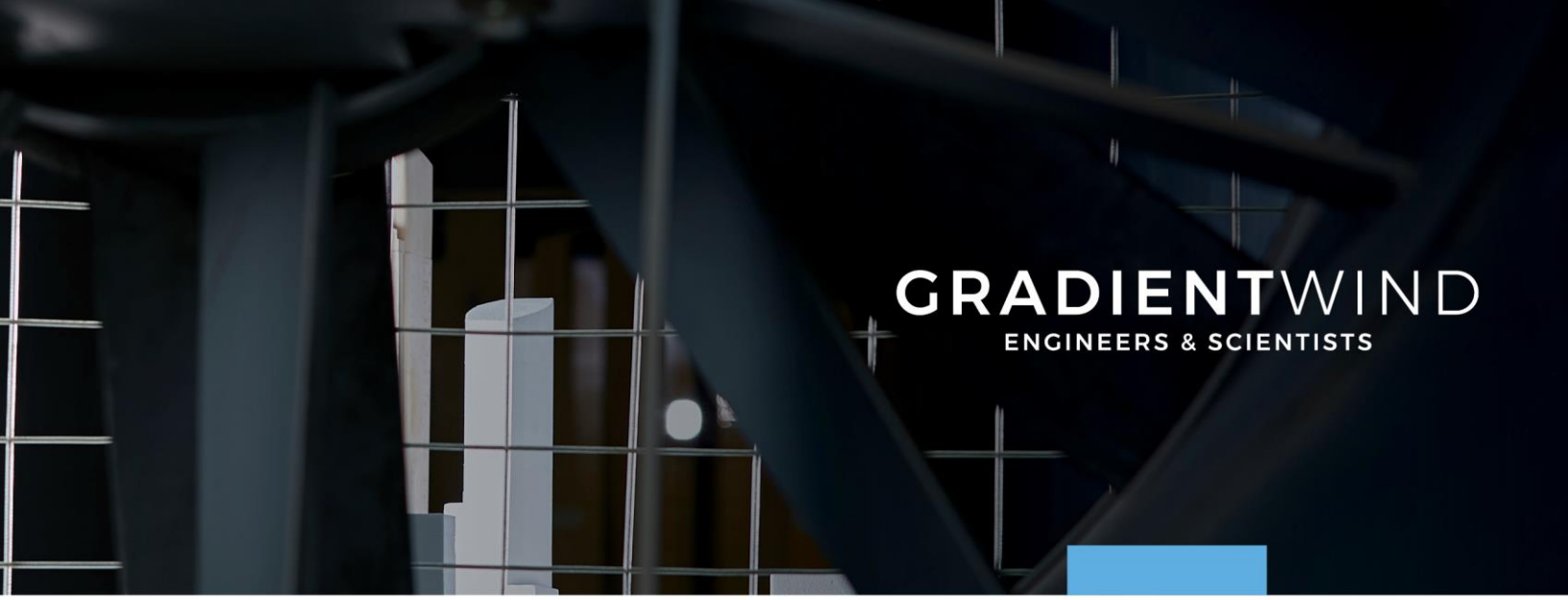

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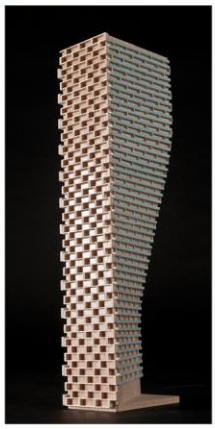
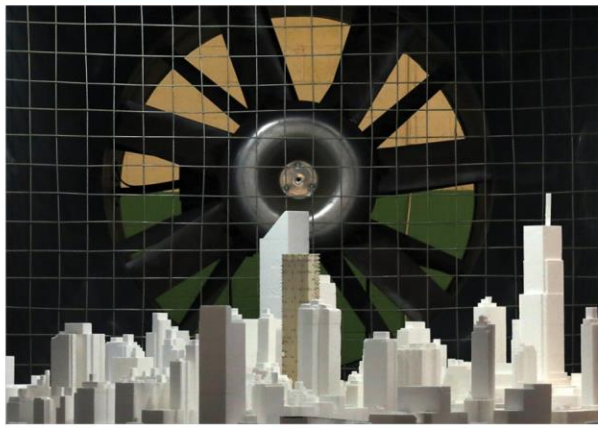
ROADWAY TRAFFIC NOISE ASSESSMENT

949 North River Road
Ottawa, Ontario

Report: 21-233-Traffic Noise





September 8, 2021

PREPARED FOR

Gemstone Corporation
252 Argyle Ave
Ottawa, ON K2P 1B9

PREPARED BY

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

127 WALGREEN ROAD, OTTAWA, ON, CANADA K0A 1L0 | 613 836 0934
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EXECUTIVE SUMMARY

This report describes a detailed roadway traffic noise assessment performed for the proposed residential development located at 949 North River Road Ottawa, Ontario.

The proposed development consists of a 5-storey residential building located at the northeast corner of the intersection between North River Road and Ontario Street. The study site is surrounded by mid-rise residential buildings from north to south clockwise and bordered by North River Road to the west. The major source of roadway traffic noise is North River Road which runs along the west side of the study site and Donald Street which is located to the south. Figure 1 illustrates the site plan with the surrounding context.

The assessment is based on (i) theoretical noise prediction methods that conform to the Ministry of the Environment, Conservation and Parks (MECP) and City of Ottawa requirements; (ii) noise level criteria as specified by the City of Ottawa's Environmental Noise Control Guidelines (ENCG); (iii) future vehicular traffic volumes based on the City of Ottawa's Official Plan roadway classifications; and (iv) architectural drawings prepared by Figurr Architects Collective, dated June 2, 2021.

The results of the current analysis indicate that noise levels will range between 53 and 64 dBA during the daytime period (07:00-23:00) and between 45 and 56 dBA during the nighttime period (23:00-07:00). The highest noise level (64 dBA) occurs at the west façade, which is nearest and most exposed to North River Road.

As the results indicate, the noise levels at Plane of Window receptors do not exceed 65 dBA during daytime and 60 dBA during nighttime, therefore, upgraded building components will not be required. Building components compliant with the Ontario Building Code will be sufficient.

The noise levels at OLA receptor (R6) at the rooftop amenity area also meets the ENCG criterion. Therefore, no mitigation measure is required.

The results of the calculations also indicate that the proposed building should be designed with forced air heating and provisions for the installation of central air conditioning. In addition to ventilation requirements, warning clauses will also be required to be placed on all Lease, Purchase and Sale Agreements, as summarized in Section 6.

TABLE OF CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Gemstone Corporation to undertake a detailed roadway traffic noise study for the proposed development located at 949 North River Road in Ottawa, Ontario. This report summarizes the methodology, results, and recommendations related to the assessment of exterior noise levels generated by local roadway traffic.

This assessment is based on theoretical noise calculation methods conforming to the City of Ottawa[1] and the Ministry of the Environment, Conservation and Parks (MECP)[2] guidelines. Noise calculations were based on architectural drawings prepared by Figurr Architects Collective, dated June 2, 2021, with future traffic volumes corresponding to the City of Ottawa's Official Plan (OP) roadway classifications.

2. TERMS OF REFERENCE

The proposed subdivision development consists of a 5-storey residential building on an L-shaped parcel of land. The building features an open amenity area on the rooftop of the 5th floor and is topped with a mechanical penthouse. The development is located at the northeast corner of the intersection between North River Road and Ontario Street. The study site is surrounded by mid-rise residential buildings from north to south clockwise and bordered by North River Road to the west.

The major source of roadway traffic noise is North River Road which runs along the west side of the study site and Donald Street which is located to the south. Figure 1 illustrates the site plan with the surrounding context.

[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

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 (ENCG) 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 level 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 sound pressure 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 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 and LRT, the L_{eq} is commonly calculated on the basis of a 16-hour (L_{eq16}) daytime (07:00-23:00) / 8-hour (L_{eq8}) nighttime (23:00-07:00) split to assess its impact on residential buildings. The City of Ottawa's Environmental Noise Control Guidelines (ENCG) specifies that the recommended indoor noise limit range (that is relevant to this study) is 45 and 40 dBA for living rooms and sleeping quarters respectively for roadway, as listed in Table 1. Based on Gradient Wind's experience, more comfortable indoor noise levels should be targeted, towards 42 and 37, respectively, to control peak noise and deficiencies in building envelope construction.

TABLE 1: INDOOR SOUND LEVEL CRITERIA

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[3]. A closed window due to a ventilation requirement will bring noise levels down to achieve an acceptable indoor environment[4]. 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[5].

The sound level criterion for outdoor living areas 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. If these measures are not provided, prospective purchasers or tenants should be informed of potential noise problems by a warning clause.

[3] Burberry, P.B. (2014). Mitchell's Environment and Services. Routledge, Page 125
[4] MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.8
[5] 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 MOECP 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 (paved) ground.
- Topography was assumed to be a flat/gentle slope surrounding the study building.
- Five (5) receptor locations were chosen at the façades of the study building as Plane of Window (POW) receptors and one (1) receptor location was chosen as an Outdoor Living Area (OLA) receptor (see Figure 2).
- Receptor heights were taken to be 13.5 metres at Level 5 for the centre of the window (height to 4th-floor slab + 1.5 metres), and 16.5 m for rooftop outdoor living area (OLA) receptor.
- Surrounding buildings were considered as barriers blocking line of sight with surrounding roadway sources where applicable.
- For select sources, where appropriate, the proposed building was considered as a barrier, partially or fully obstructing exposure to the source.
- Receptor distances and exposure angles are illustrated in Figures 3-5.

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[6] which provide additional details on future roadway expansions. Average Annual Daily Traffic (AADT) volumes

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

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
North River Road	2-Lane Urban Collector (2-UCU)	40	**8,000**
Donald Street	2-Lane Urban Collector (2-UCU)	40	**8,000**

5. ROADWAY TRAFFIC NOISE RESULTS AND DISCUSSION

5.1 Roadway Traffic Noise Levels

The results of the roadway traffic noise calculations are summarized in Table 3 below. A complete set of input and output data from all STAMSON 5.04 calculations are available in Appendix A.

TABLE 3: EXTERIOR NOISE LEVELS DUE TO ROAD TRAFFIC

Receptor Number	Receptor Height Above Grade (m)	Receptor Location	STAMSON 5.04 Noise Level (dBA)	
			Day	Night
1	13.5	POW – 5th Floor – West Façade	64	56
2	13.5	POW – 5th Floor – West Façade	63	56
3	13.5	POW – 5th Floor – South Façade	62	54
4	13.5	POW – 5th Floor – East Façade	53	45
5	13.5	POW – 5th Floor – North Façade	57	50
6	16.5	POW – 6th Floor – Rooftop Amenity	53	N/A*

*N/A: OLA noise levels during the nighttime period are not considered as per ENCG.

The results of the current analysis indicate that noise levels will range between 53 and 64 dBA during the daytime period (07:00-23:00) and between 45 and 56 dBA during the nighttime period (23:00-07:00). The highest noise level (64 dBA) occurs at the west façade, which is nearest and most exposed to North River Road.

5.2 Noise Control Measures

As the results indicate, the noise levels at Plane of Window receptors do not exceed 65 dBA during daytime and 60 dBA during nighttime, therefore, upgraded building components will not be required. Building components compliant with the Ontario Building Code will be sufficient.

The noise levels at OLA receptor (R6) at the rooftop amenity area also meets the ENCG criterion. Therefore, no mitigation measure is required.

The results of the calculations also indicate that the proposed building should be designed with forced air heating and provisions for the installation of central air conditioning. In addition to ventilation requirements, warning clauses will also be required to be placed on all Lease, Purchase and Sale Agreements, as summarized in Section 6.

6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels will range between 53 and 64 dBA during the daytime period (07:00-23:00) and between 45 and 56 dBA during the nighttime period (23:00-07:00). The highest noise level (64 dBA) occurs at the west façade, which is nearest and most exposed to North River Road.

As the results indicate, the noise levels at Plane of Window receptors do not exceed 65 dBA during daytime and 60 dBA during nighttime, therefore, upgraded building components will not be required. Building components compliant with the Ontario Building Code will be sufficient.

The noise levels at OLA receptor (R6) at the rooftop amenity area also meets the ENCG criterion. Therefore, no mitigation measure is required.

The results of the calculations also indicate that the proposed building should be designed with forced air heating and provisions for the installation of central air conditioning. In addition to ventilation requirements, warning clauses will also be required to be placed on all Lease, Purchase and Sale Agreements, as summarized below:

> *"This dwelling unit has also been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the City and the Ministry of the Environment."*

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

Sincerely,

Gradient Wind Engineering Inc.

Efser Kara, MSc, LEED GA
Acoustic Scientist

Joshua Foster, P.Eng.
Principal

Gradient Wind File 21-233-Traffic Noise

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PROJECT	949 NORTH RIVER ROAD, OTTAWA ROADWAY TRAFFIC NOISE STUDY		DESCRIPTION
SCALE	1:2000 (APPROX.)	DRAWING NO.	21-233- 1
DATE	JULY 8, 2021	DRAWN BY	E.K.

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT

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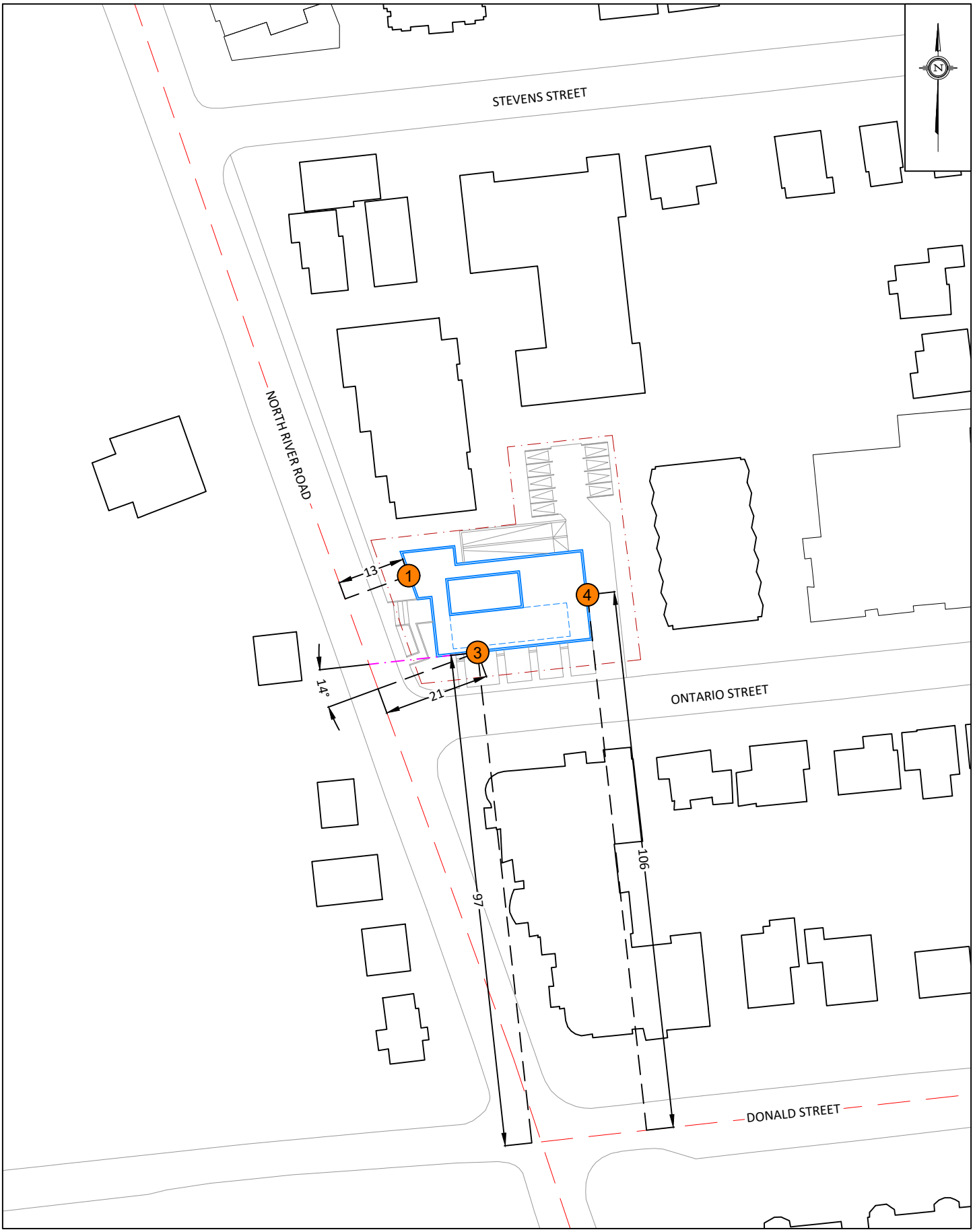
PROJECT	949 NORTH RIVER ROAD, OTTAWA ROADWAY TRAFFIC NOISE STUDY		DESCRIPTION
SCALE	1:500 (APPROX.)	DRAWING NO. 21-233- 2	FIGURE 2: RECEPTOR LOCATIONS
DATE	JULY 8, 2021	DRAWN BY E.K.	



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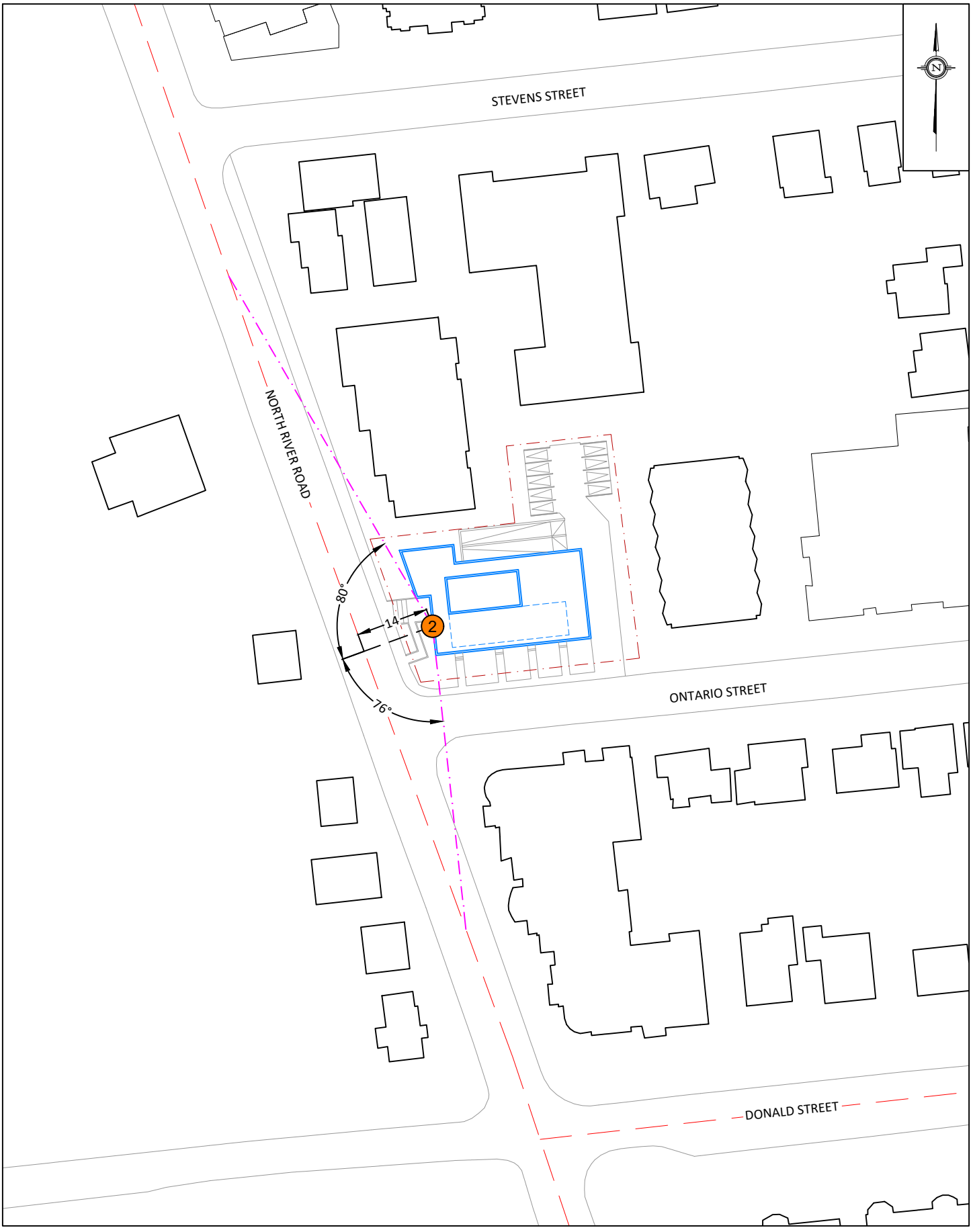
PROJECT	949 NORTH RIVER ROAD, OTTAWA ROADWAY TRAFFIC NOISE STUDY		DESCRIPTION
SCALE	1:1000 (APPROX.)	DRAWING NO.	21-233- 3
DATE	JULY 8, 2021	DRAWN BY	E.K.

FIGURE 3:
STAMSON INPUT DATA FOR
RECEPTORS 1, 3, & 4



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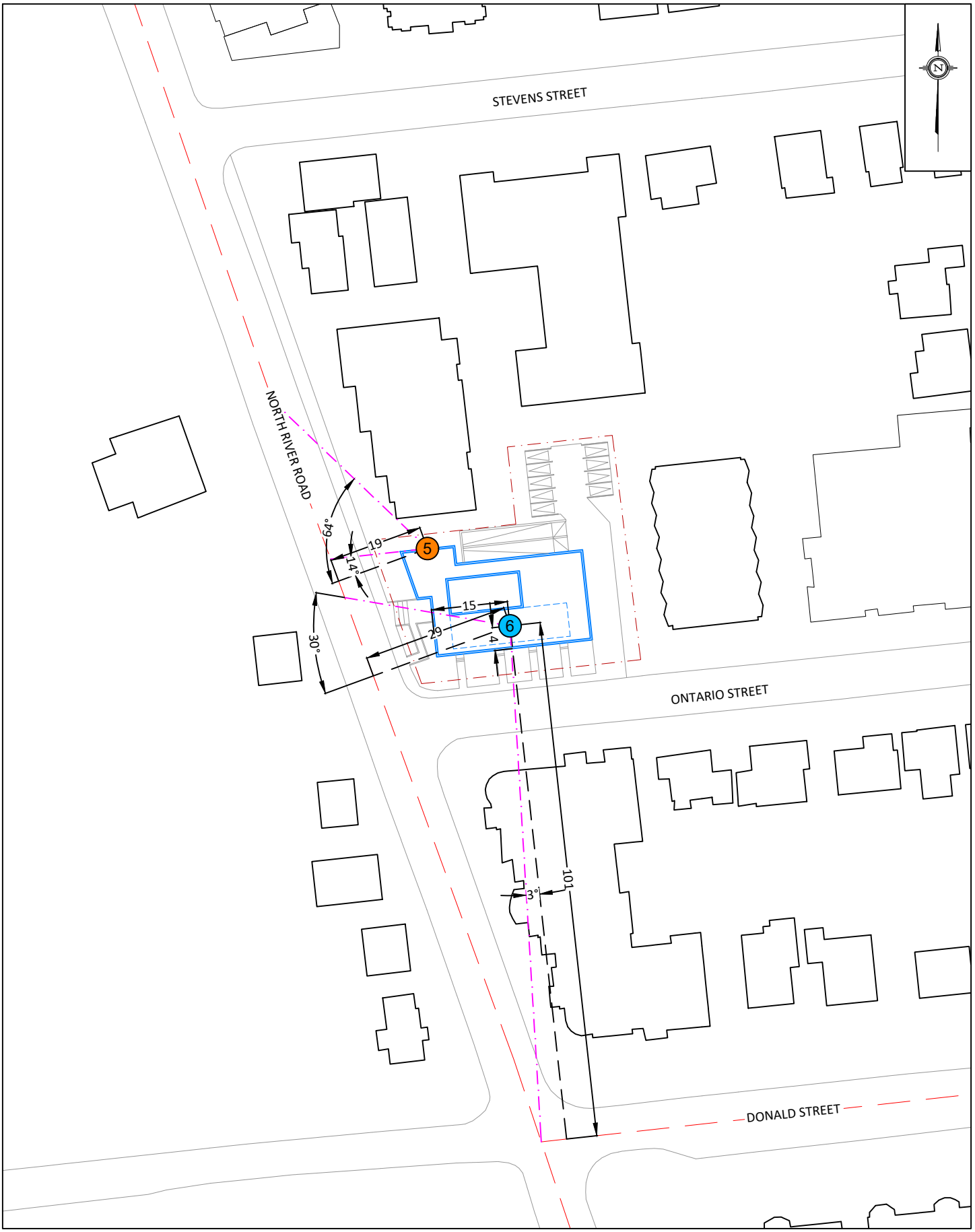
PROJECT	949 NORTH RIVER ROAD, OTTAWA ROADWAY TRAFFIC NOISE STUDY
SCALE	1:1000 (APPROX.)
DRAWING NO.	21-233- 4
DATE	JULY 8, 2021
DRAWN BY	E.K.

DESCRIPTION

FIGURE 4:
STAMSON INPUT DATA FOR
RECEPTOR 2



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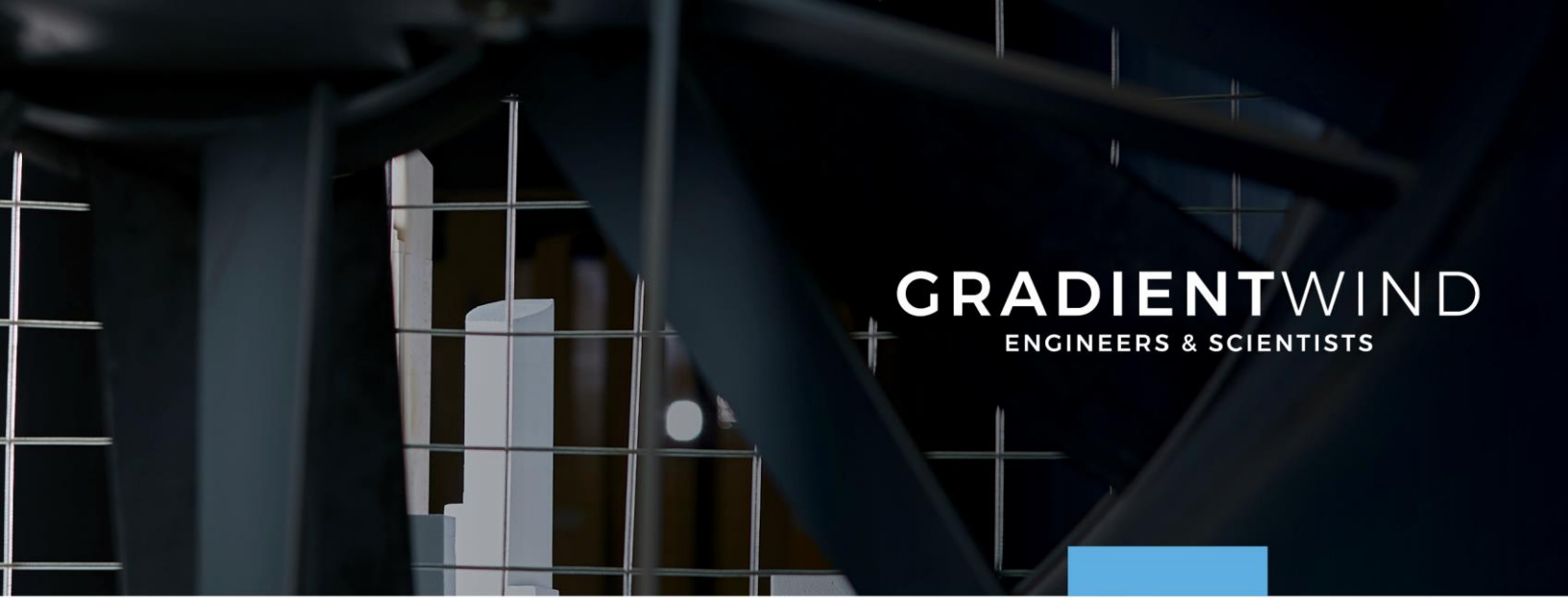
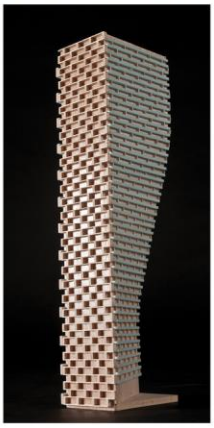
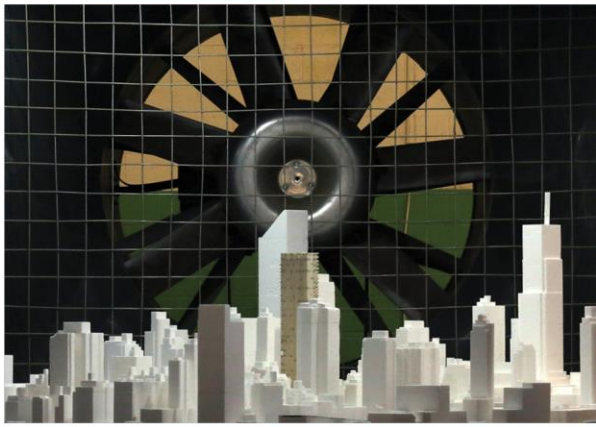
PROJECT	949 NORTH RIVER ROAD, OTTAWA ROADWAY TRAFFIC NOISE STUDY		
SCALE	1:1000 (APPROX.)	DRAWING NO.	21-233- 5
DATE	JULY 8, 2021	DRAWN BY	E.K.

DESCRIPTION

FIGURE 5:
STAMSON INPUT DATA FOR
RECEPTORS 5 & 6







APPENDIX A

STAMSON INPUT-OUTPUT DATA

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STAMSON 5.0 NORMAL REPORT Date: 09-07-2021 11:01:25
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

Road data, segment # 1: N River Rd (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 : 40 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: N River 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 : 15.00 / 15.00 m
Receiver height : 13.50 / 13.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: N River Rd (day)

Source height = 1.50 m

ROAD (0.00 + 63.96 + 0.00) = 63.96 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	63.96	0.00	0.00	0.00	0.00	0.00	0.00	63.96

Segment Leq : 63.96 dBA

Total Leq All Segments: 63.96 dBA

Results segment # 1: N River Rd (night)

Source height = 1.50 m

ROAD (0.00 + 56.36 + 0.00) = 56.36 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	56.36	0.00	0.00	0.00	0.00	0.00	0.00	56.36

Segment Leq : 56.36 dBA

Total Leq All Segments: 56.36 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.96
(NIGHT): 56.36

STAMSON 5.0 NORMAL REPORT Date: 09-07-2021 11:11:04
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

Road data, segment # 1: N River Rd (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 : 40 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: N River Rd (day/night)

Angle1 Angle2 : -76.00 deg 80.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 15.00 / 15.00 m
Receiver height : 13.50 / 13.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: N River Rd (day)

Source height = 1.50 m

ROAD (0.00 + 63.33 + 0.00) = 63.33 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-76	80	0.00	63.96	0.00	0.00	-0.62	0.00	0.00	0.00	63.33

Segment Leq : 63.33 dBA

Total Leq All Segments: 63.33 dBA

Results segment # 1: N River Rd (night)

Source height = 1.50 m

ROAD (0.00 + 55.74 + 0.00) = 55.74 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-76	80	0.00	56.36	0.00	0.00	-0.62	0.00	0.00	0.00	55.74

Segment Leq : 55.74 dBA

Total Leq All Segments: 55.74 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.33
(NIGHT): 55.74

STAMSON 5.0 NORMAL REPORT Date: 09-07-2021 11:25:37
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R3.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: N River Rd (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 : 40 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: N River Rd (day/night)

Angle1 Angle2 : -90.00 deg 14.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 21.00 / 21.00 m
Receiver height : 13.50 / 13.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Donald St (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 : 40 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: Donald St (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 : 97.00 / 97.00 m
Receiver height : 13.50 / 13.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: N River Rd (day)

Source height = 1.50 m

ROAD (0.00 + 60.11 + 0.00) = 60.11 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	14	0.00	63.96	0.00	-1.46	-2.38	0.00	0.00	0.00	60.11

Segment Leq : 60.11 dBA

Results segment # 2: Donald St (day)

Source height = 1.50 m

ROAD (0.00 + 55.85 + 0.00) = 55.85 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	63.96	0.00	-8.11	0.00	0.00	0.00	0.00	55.85

Segment Leq : 55.85 dBA

Total Leq All Segments: 61.49 dBA

Results segment # 1: N River Rd (night)

Source height = 1.50 m

ROAD (0.00 + 52.52 + 0.00) = 52.52 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	14	0.00	56.36	0.00	-1.46	-2.38	0.00	0.00	0.00	52.52

Segment Leq : 52.52 dBA

Results segment # 2: Donald St (night)

Source height = 1.50 m

ROAD (0.00 + 48.26 + 0.00) = 48.26 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	56.36	0.00	-8.11	0.00	0.00	0.00	0.00	48.26

Segment Leq : 48.26 dBA

Total Leq All Segments: 53.90 dBA

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

STAMSON 5.0 NORMAL REPORT Date: 09-07-2021 11:27:19
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R4.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Donald St (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 : 40 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: Donald St (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 106.00 / 106.00 m
Receiver height : 13.50 / 13.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Donald St (day)

Source height = 1.50 m

ROAD (0.00 + 52.45 + 0.00) = 52.45 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	63.96	0.00	-8.49	-3.01	0.00	0.00	0.00	52.45

Segment Leq : 52.45 dBA

Total Leq All Segments: 52.45 dBA

Results segment # 1: Donald St (night)

Source height = 1.50 m

ROAD (0.00 + 44.86 + 0.00) = 44.86 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	56.36	0.00	-8.49	-3.01	0.00	0.00	0.00	44.86

Segment Leq : 44.86 dBA

Total Leq All Segments: 44.86 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 52.45
(NIGHT): 44.86

STAMSON 5.0 NORMAL REPORT Date: 09-07-2021 11:30:25
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R5.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: N River St (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 : 40 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: N River St (day/night)

Angle1 Angle2 : 14.00 deg 64.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 19.00 / 19.00 m
Receiver height : 13.50 / 13.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: N River St (day)

Source height = 1.50 m

ROAD (0.00 + 57.37 + 0.00) = 57.37 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
14	64	0.00	63.96	0.00	-1.03	-5.56	0.00	0.00	0.00	57.37

Segment Leq : 57.37 dBA

Total Leq All Segments: 57.37 dBA

Results segment # 1: N River St (night)

Source height = 1.50 m

ROAD (0.00 + 49.77 + 0.00) = 49.77 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
14	64	0.00	56.36	0.00	-1.03	-5.56	0.00	0.00	0.00	49.77

Segment Leq : 49.77 dBA

Total Leq All Segments: 49.77 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 57.37
(NIGHT): 49.77

STAMSON 5.0 NORMAL REPORT Date: 09-07-2021 11:40:06
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R6.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: N River St (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 : 40 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: N River St (day/night)

Angle1 Angle2 : -90.00 deg 30.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 29.00 / 29.00 m
Receiver height : 16.50 / 16.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 30.00 deg
Barrier height : 15.00 m
Barrier receiver distance : 15.00 / 15.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Road data, segment # 2: Donald St (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 : 40 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: Donald St (day/night)

Angle1 Angle2 : -90.00 deg 3.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 101.00 / 101.00 m
Receiver height : 16.50 / 16.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 3.00 deg
Barrier height : 15.00 m
Barrier receiver distance : 4.00 / 4.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Results segment # 1: N River St (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 ! 16.50 ! 8.74 ! 8.74

ROAD (0.00 + 42.95 + 0.00) = 42.95 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 30 0.00 63.96 0.00 -2.86 -1.76 0.00 0.00 -16.38 42.95

Segment Leq : 42.95 dBA

Results segment # 2: Donald St (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 ! 16.50 ! 15.91 ! 15.91

ROAD (0.00 + 52.81 + 0.00) = 52.81 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 3 0.00 63.96 0.00 -8.28 -2.87 0.00 0.00 -0.93 51.88*
-90 3 0.00 63.96 0.00 -8.28 -2.87 0.00 0.00 0.00 52.81
---

* Bright Zone !

Segment Leq : 52.81 dBA

Total Leq All Segments: 53.24 dBA

Results segment # 1: N River St (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 ! 16.50 ! 8.74 ! 8.74

ROAD (0.00 + 35.36 + 0.00) = 35.36 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 30 0.00 56.36 0.00 -2.86 -1.76 0.00 0.00 -16.38 35.36

Segment Leq : 35.36 dBA

Results segment # 2: Donald St (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 ! 16.50 ! 15.91 ! 15.91

ROAD (0.00 + 45.21 + 0.00) = 45.21 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	3	0.00	56.36	0.00	-8.28	-2.87	0.00	0.00	-0.93	44.28*
-90	3	0.00	56.36	0.00	-8.28	-2.87	0.00	0.00	0.00	45.21

* Bright Zone !

Segment Leq : 45.21 dBA

Total Leq All Segments: 45.64 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 53.24
(NIGHT): 45.64