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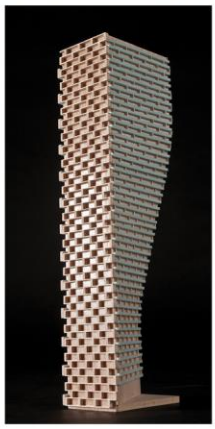
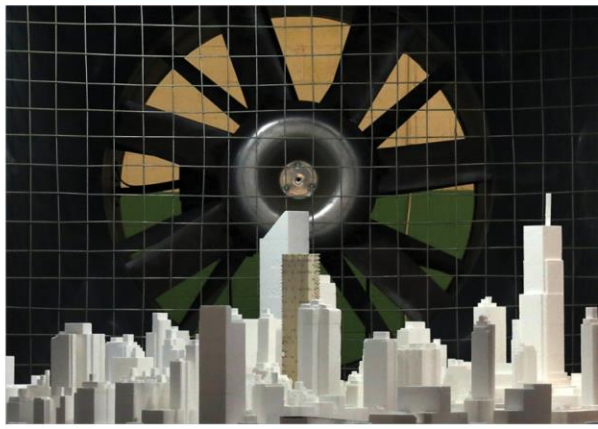
TRAFFIC NOISE FEASIBILITY ASSESSMENT

591-595 March Road
Ottawa, Ontario

Report: 23-028- Traffic Noise Feasibility





December 15th, 2023

PREPARED FOR

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PREPARED BY

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EXECUTIVE SUMMARY

This report describes a roadway traffic noise feasibility assessment undertaken to satisfy the requirements for a Draft Plan of Subdivision application submission for the proposed multi-use subdivision development located at 555, 591, 595, and 603 March Road in Ottawa, Ontario. The primary sources of noise are roadway traffic along March Road, Terry Fox Drive and Hines Road. Figure 1 illustrates a complete site plan with surrounding context.

The assessment is based on (i) theoretical noise prediction methods that conform to the Ministry of the Environment, Conservation and Parks (MECP) NPC-300, Ministry of Transportation Ontario (MTO), and City of Ottawa Environmental Noise Control Guidelines (ENCG) guidelines; (ii) future vehicular traffic volumes corresponding to roadway classification and theoretical roadway capacities; and (iii) a concept plan received in December 2023.

The results of the current analysis indicate that noise levels will range 48 and 72 dBA during the daytime period (07:00-23:00) and between 40 and 64 dBA during the nighttime period (23:00-07:00). The highest noise level (72 dBA) occurs at the north of the study site, which is nearest and most exposed to the March Road – Terry Fox Drive intersection.

Upgraded building components and central air conditioning will be required for buildings fronting March Road and Terry Fox Drive as noise levels predicted due to roadway traffic exceed the criteria of 65 dBA during the daytime. For all other buildings, standard building components in compliance with OBC will be sufficient in reducing indoor noise levels at or below the ENCG criterion for noise sensitive spaces. These buildings will also require forced air heating with provisions for air conditioning. Warning Clauses will be required in all Lease, Purchase and Sale Agreements, as summarized in Section 6.

Acoustic mitigation in the form of noise barriers will be required at select podium roofs if they are used as terraces or outdoor amenity space, in order to reduce noise levels as close as possible to 55 dBA. This recommendation may be revised and fine-tuned at the site plan stage.

A detailed traffic noise study will be required at the time of the site plan control application for each block to determine specific noise control measures. .

Stationary noise impacts from surroundings onto the proposed development are expected to be minimal as the site is not in close proximity to any large mechanical equipment or industrial facilities. The single-family homes to the north of the development have small HVAC units that do not pose a concern in regard to noise. Furthermore, the setback distance from the existing commercial buildings is sufficient to attenuate noise from the rooftop units.

A stationary noise study is recommended for each block during the detailed design stage once mechanical plans become available. This study would assess impacts of stationary noise from rooftop mechanical units serving the proposed block onto surrounding noise sensitive areas. This study will include recommendations for any noise control measures that may be necessary to ensure noise levels fall below NPC-300 limits. As the mechanical equipment is expected to reside primarily in the mechanical level located on the high roof on each building, noise levels on the surrounding noise sensitive properties are expected to be negligible. Noise impacts can generally be minimized by judicious selection and placement of the equipment.

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1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by March & Main Developments Inc. to undertake a roadway traffic noise feasibility assessment, to satisfy the requirements for a Draft Plan of Subdivision application submission for the proposed multi-use development located at 591-595 March Road in Ottawa, Ontario. This report summarizes the methodology, results, and recommendations related to the assessment of exterior noise levels generated by local transportation traffic.

This assessment is based on theoretical noise calculation methods conforming to the Ministry of the Environment, Conservation and Parks (MECP) NPC-300[1], Ministry of Transportation Ontario (MTO)[2], and City of Ottawa Environmental Noise Control Guidelines (ENCG)[3] guidelines. Noise calculations were based on draft plan of subdivision dated November 2023 and a concept plan received in December 2023, with future traffic volumes corresponding to roadway classification and theoretical roadway capacities, and recent satellite imagery.

2. TERMS OF REFERENCE

The masterplan development is located at four civic addresses: 555, 591, 595, and 603 March Road in Ottawa; situated at the south intersection of March Road and Terry Fox Drive, on a 5.55 hectares (ha) parcel of land bounded by Terry Fox Drive to the northwest, March Road to the northeast, low-rise commercial buildings to the southeast and southwest, and Hines Road to the southwest. Throughout this report, March Road is referred to as project north.

For the purposes of this study, massing of the buildings was considered as per the concept plan received in December 2023. The development is to comprise of mid to high-rise mixed-use residential and office buildings. The two office buildings are situated to the northwest and northeast corners of the property parcel, comprising of 8 and 7-storeys, respectively. A 30-storey residential tower is fronting March Road, connected to a 25-storey building by a 6-storey podium. Directly east of that building is a 27-storey

[1] Ontario Ministry of the Environment and Climate Change – Environmental Noise Guidelines, Publication NPC-300, Queens Printer for Ontario, Toronto, 2013
[2] Ministry of Transportation Ontario, "*Environmental Guide for Noise*", August 2021
[3] City of Ottawa Environmental Noise Control Guidelines, January 2016

residential tower connected to a 24-storey building by a 6-storey podium. To the east of the property parcel, directly south of the 7-storey office building, are a 24-storey tower and a 7-storey building connected by a 4-storey podium. To the southeast corner of the property parcel is an 8-storey residential building with a 6-storey podium. A public park sits between two residential buildings, fronting Hines Road. To the west of the park are two 8 and 6-storey buildings connected by a 2-storey podium. The southwest and west corners of the site include two 6-and 8 storey buildings connected by a 2-storey podium, fronting Terry Fox Drive. Select podium roofs were assumed to be potential outdoor amenity areas, to determine whether the use of noise barriers will be required.

Stationary noise impacts from surroundings onto the proposed development are expected to be minimal as the site is not in close proximity to any large mechanical equipment. The single-family homes to the west of the development have small HVAC units that do not pose a concern in regard to noise. Furthermore, the setback distance from the northern office buildings is sufficient to attenuate noise from the rooftop units. Noise from March Road is expected to be dominant, over any impacts from the mechanical equipment serving the office buildings to the north.

A stationary noise study is recommended for each block during the detailed design stage once mechanical plans become available. This study would assess impacts of stationary noise from rooftop mechanical units serving the proposed block onto surrounding noise sensitive areas. This study will include recommendations for any noise control measures that may be necessary to ensure noise levels fall below NPC-300 limits. As the mechanical equipment is expected to reside primarily in the mechanical level located on the high roof on each building, noise levels on the surrounding noise sensitive properties are expected to be negligible. Noise impacts can generally be minimized by judicious selection and placement of the equipment.

3. OBJECTIVES

The principal objectives of this study are to (i) calculate the future noise levels on the study building produced by local traffic sources, and (ii) explore potential noise mitigation where required.

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. NPC-300 specifies that the recommended indoor noise limit range (that is relevant to this study) is 50, 45 and 40 dBA for retail/office/indoor amenity space, living rooms, and sleeping quarters, respectively, as listed in Table 1.

TABLE 1: INDOOR SOUND LEVEL CRITERIA (ROAD) [4]

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[5]. A closed window due to a ventilation requirement will bring noise levels down to achieve an acceptable indoor environment[6]. 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[7].

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 should be provided to reduce noise levels where technically and administratively feasible to acceptable levels at or below the criterion.

[4] MOECP, Environmental Noise Guidelines, NPC 300 – Part C, Table C-9
[5] Burberry, P.B. (2014). Mitchell's Environment and Services. Routledge, Page 125
[6] MOECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.8
[7] MOECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3

4.2.2 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. 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	Traffic Volume
March Road	6-Lane Arterial Divided	80	**50,000**
Terry Fox Drive (South of March Road)	4-Lane Arterial Divided	60	**35,000**
Terry Fox Drive (North of March Road)	Major Collector	50	**12,000**
Hines Road	Collector	50	**8,000**

*Daytime/Nighttime volumes

4.2.3 Theoretical Roadway Traffic Noise Predictions

The impact of traffic 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, 2022 by the Ministry of Transportation (MTO)[9]. 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

[8] City of Ottawa Transportation Master Plan, November 2013
[9] Ministry of Transportation Ontario, "*Environmental Guide for Noise*", February 2022.

and multiple screening elements, and curved road geometry. A total of 11 receptor locations were identified around the site, as illustrated in Figure 2.

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

- Truck traffic on all roadways was taken to comprise 5% heavy trucks and 7% medium trucks, as per ENCG requirements for noise level predictions. The 7% medium trucks account for future 500 buses per day using the proposed bus rapid transit system down March Road.
- The day/night split for all roads was taken to be 92% / 8%, respectively.
- Default ground surfaces were taken to be reflective due to the presence of hard (paved) ground.
- Topography was assumed to be a flat/gentle slope surrounding the study building.
- Noise receptors were strategically placed at 11 locations around the study area (see Figure 2).

5. RESULTS

5.1 Transportation Traffic Noise Levels

The results of the transportation traffic noise calculations are summarized in Table 3 below. Receptor locations are briefly described below as locations can be seen in Figure 2.

The results of the current analysis indicate that noise levels will range 48 and 72 dBA during the daytime period (07:00-23:00) and between 40 and 64 dBA during the nighttime period (23:00-07:00). The highest noise level (72 dBA) occurs at the north of the study site, which is nearest and most exposed to the March Road – Terry Fox Drive intersection. Figures 3 – 6 illustrate daytime and nighttime noise contours of the site 1.5 m and 20 m above grade.

TABLE 3: EXTERIOR NOISE LEVELS DUE TO TRANSPORTATION TRAFFIC SOURCES

Receptor Number	Receptor Height Above Grade/Roof (m)	Receptor Location	Traffic Noise Level (dBA)	
			Day	Night
R1	22.5	POW / Office Building Level 8 North Façade	72	64
R2	22.5	POW / Office Building Level 8 West Façade	69	61
R3	1.5	OLA / Residential Tower 6-storey Podium Roof (**Potential Outdoor Amenity)**	59	51
R4	88.5	POW / Residential Tower Level 30 North Façade	71	64
R5	88.5	POW / Residential Tower Level 30 East Façade	67	59
R6	1.5	OLA / Residential Tower 6-storey Podium Roof (**Potential Outdoor Amenity)**	48	40
R7	22.5	POW / Residential Tower Level 8 South Façade	63	56
R8	1.5	OLA / Residential Tower 6-storey Podium Roof (**Potential Outdoor Amenity)**	58	51
R9	1.5	OLA / Residential Tower 2-storey Podium Roof (**Potential Outdoor Amenity)**	57	50
R10	16.6	POW / Residential Tower Level 6 West Façade	69	61
R11	16.5	POW / Residential Tower Level 6 West Façade	68	60
R12	19.5	POW / Residential Tower Level 7 East Facade	65	58

*Above podium roof

Table 4 shows a comparison in results between Predictor-Lima 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 ±0-3 dBA. STAMSON input parameters are shown in Figure A1.

TABLE 4: RESULTS OF STAMSON/PREDICTOR-LIMA CORRELATION

Receptor ID	Receptor Height (m)	Receptor Location	STAMSON 5.04 Noise Level (dBA)		PREDICTOR-LIMA Noise Level (dBA)	
			Day	Night	Day	Night
R1	22.5	POW / Office Building Level 8 Northeast Façade	75	67	72	64
R7	22.5	POW / Residential Tower Level 8 South Façade	65	58	63	56
R11	16.5	POW / Residential Tower Level 6 Northwest Façade	71	63	68	60

5.1.1 Noise Control Measures

The results indicate that upgraded building components and central air conditioning will be required for buildings fronting March Road and Terry Fox Drive as noise levels predicted due to roadway traffic exceed the criteria of 65 dBA during the daytime. For all other buildings, standard building components in compliance with OBC will be sufficient in reducing indoor noise levels at or below the ENCG criterion for noise sensitive spaces. These buildings will also require forced air heating with provisions for air conditioning. Warning Clauses will be required in all Lease, Purchase and Sale Agreements, as summarized in Section 6. Noise control measures for buildings in this development are illustrated in Figure 7.

Acoustic mitigation in the form of noise barriers will be required at select podium roofs if they are used as terraces or outdoor amenity space, in order to reduce noise levels as close as possible to 55 dBA. This recommendation may be revised and fine-tuned at the site plan stage.

6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels will range 48 and 72 dBA during the daytime period (07:00-23:00) and between 40 and 64 dBA during the nighttime period (23:00-07:00). The highest noise level (72 dBA) occurs at the north of the study site, which is nearest and most exposed to the March Road – Terry Fox Drive intersection.

The results indicate that upgraded building components and central air conditioning will be required for buildings fronting March Road and Terry Fox Drive as noise levels predicted due to roadway traffic exceed the criteria of 65 dBA during the daytime. Additionally, a Type D Warning Clause will be required in all Lease, Purchase and Sale Agreements, as seen below:

Type D Warning Clause:

> *"Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road traffic may on occasions interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment."*

For all other buildings, standard building components in compliance with OBC will be sufficient in reducing indoor noise levels at or below the ENCG criterion for noise sensitive spaces. These buildings will also require forced air heating with provisions for air conditioning. A Type C Warning Clause will be required in all Lease, Purchase and Sale Agreements, as seen below:

Type C Warning Clause:

> *"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."*

Noise control measures for buildings in this development are illustrated in Figure 7.

Acoustic mitigation in the form of noise barriers will be required at select podium roofs if they are used as terraces or outdoor amenity space, in order to reduce noise levels as close as possible to 55 dBA. This recommendation may be revised and fine-tuned at the site plan stage.

A detailed traffic noise study will be required at the time of the site plan control application to determine specific noise control measures for each block.

Stationary noise impacts from surroundings onto the proposed development are expected to be minimal as the site is not in close proximity to any large mechanical equipment or industrial facilities. The single-family homes to the north of the development have small HVAC units that do not pose a concern in regard to noise. Furthermore, the setback distance from the existing commercial buildings is sufficient to attenuate noise from the rooftop units.

A stationary noise study is recommended for each block during the detailed design stage once mechanical plans become available. This study would assess impacts of stationary noise from rooftop mechanical units serving the proposed block onto surrounding noise sensitive areas. This study will include recommendations for any noise control measures that may be necessary to ensure noise levels fall below NPC-300 limits. As the mechanical equipment is expected to reside primarily in the mechanical level located on the high roof on each building, noise levels on the surrounding noise sensitive properties are expected to be negligible. Noise impacts can generally be minimized by judicious selection and placement of the equipment.

This concludes our roadway traffic noise and vibration feasibility 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.

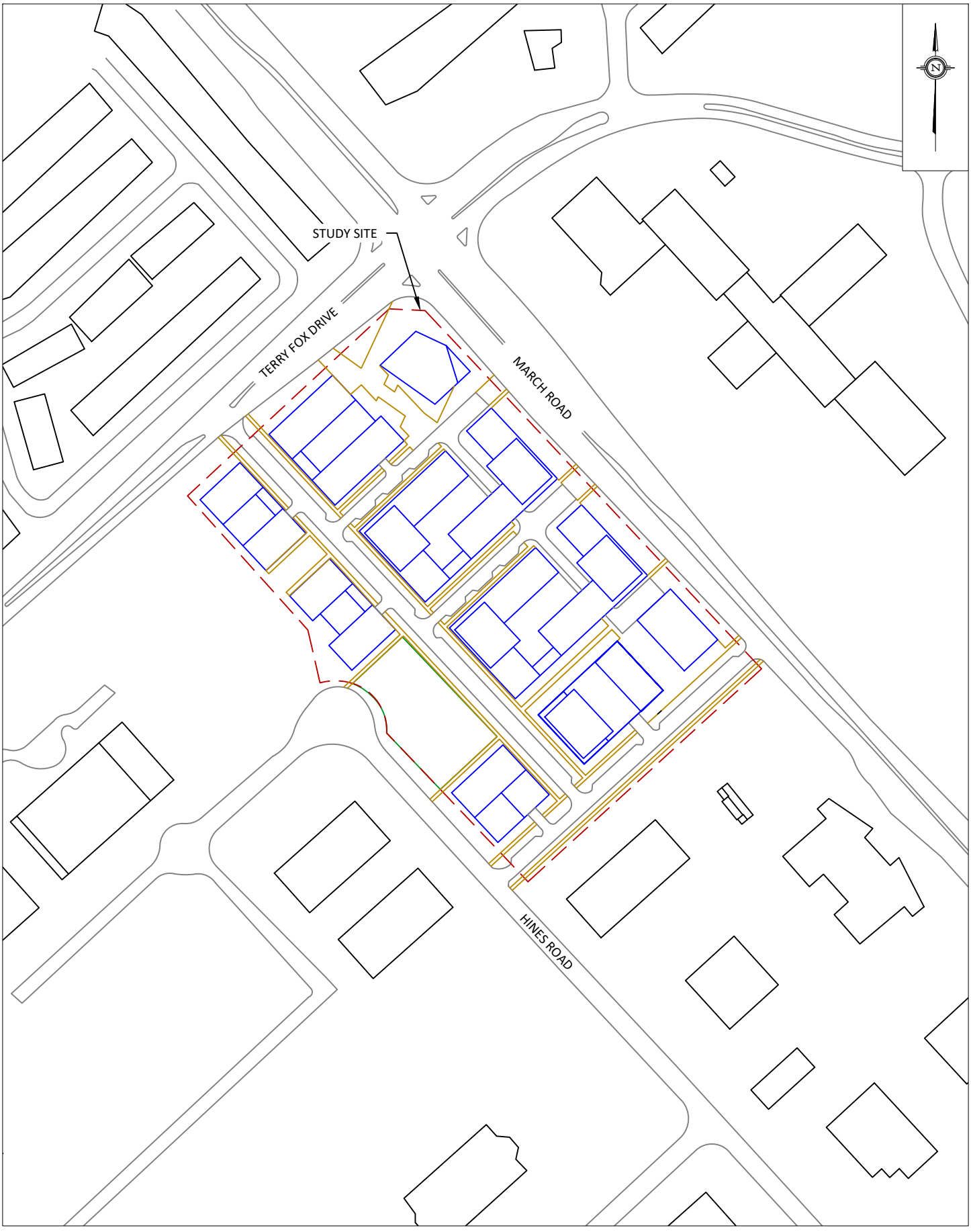
Sincerely,

fGradient Wind Engineering Inc.

Essraa Alqassab, BASc
Junior Environmental Scientist

Joshua Foster, P.Eng.
Lead Engineer

Gradient Wind File 23-028- Traffic Noise Feasibility



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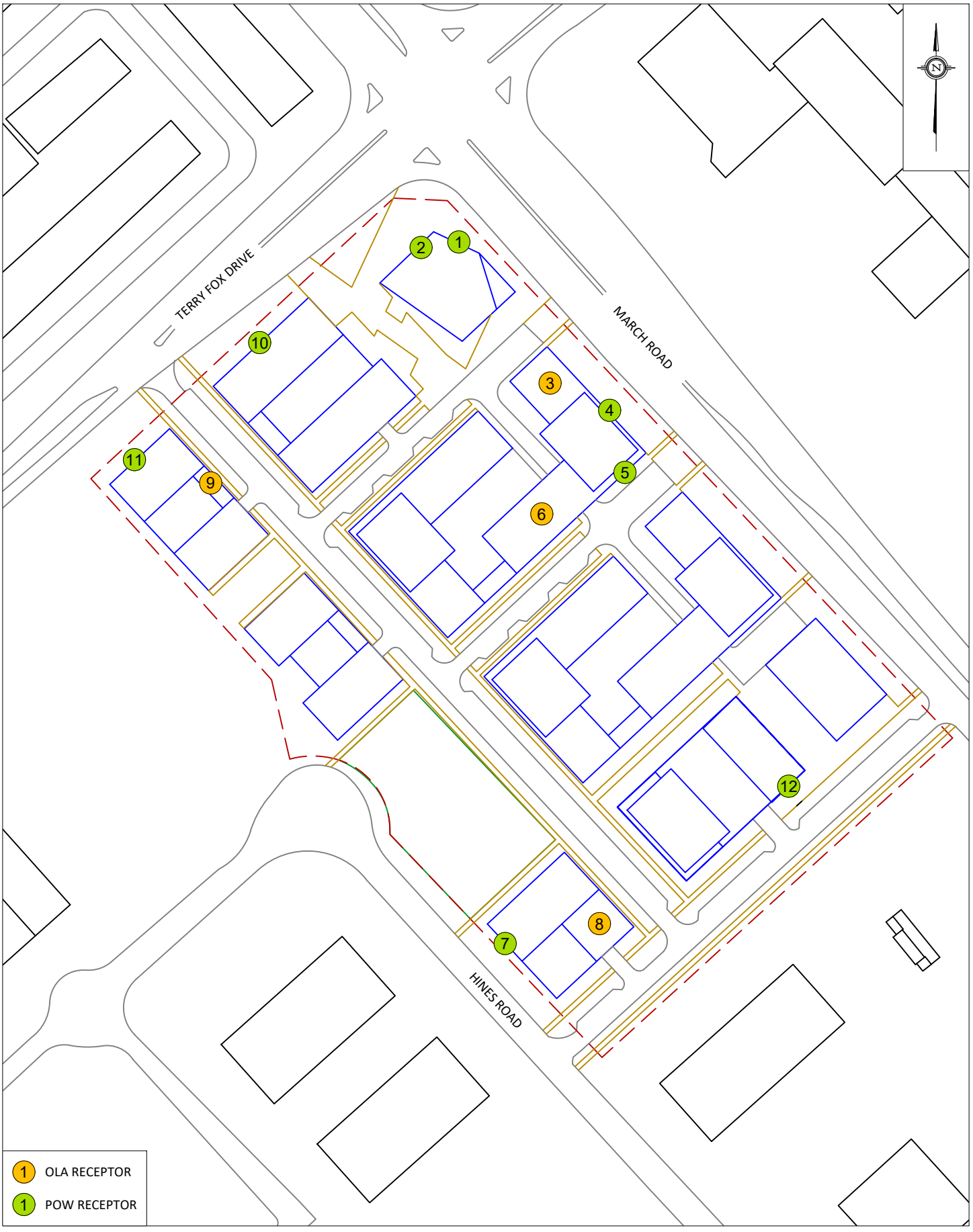
PROJECT	591-595 MARCH ROAD, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT		DESCRIPTION
SCALE	1:3,000 (APPROX.)	DRAWING NO.	GW23-028-1
DATE	DECEMBER 15, 2023	DRAWN BY	E.A.

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT



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SCALE	1:3,000 (APPROX.)
DRAWING NO.	GW23-028-2
DATE	DECEMBER 15, 2023
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DESCRIPTION

FIGURE 2:
RECEPTOR LOCATIONS

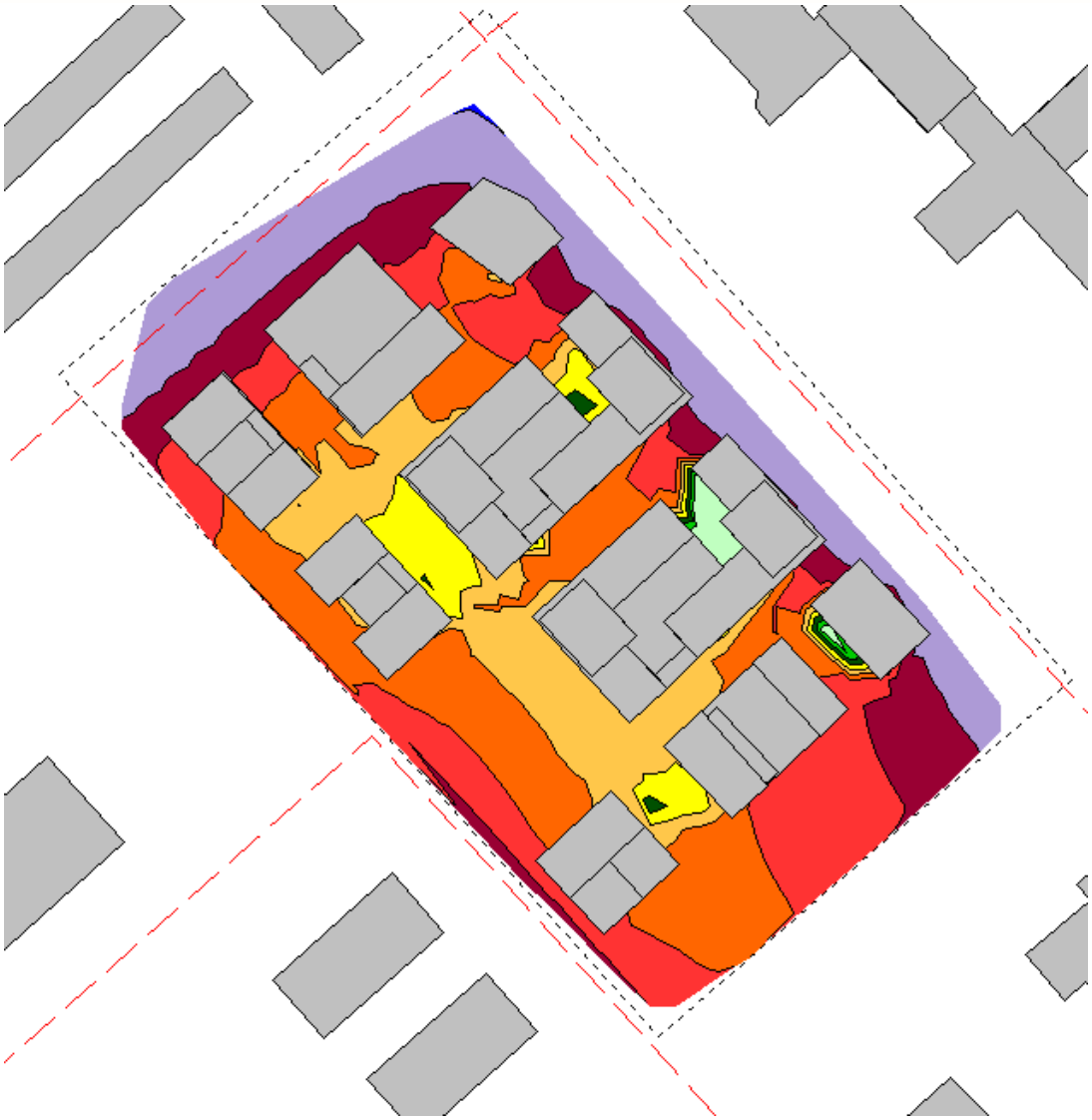

FIGURE 3: DAYTIME TRAFFIC NOISE CONTOURS (1.5 M ABOVE GRADE)

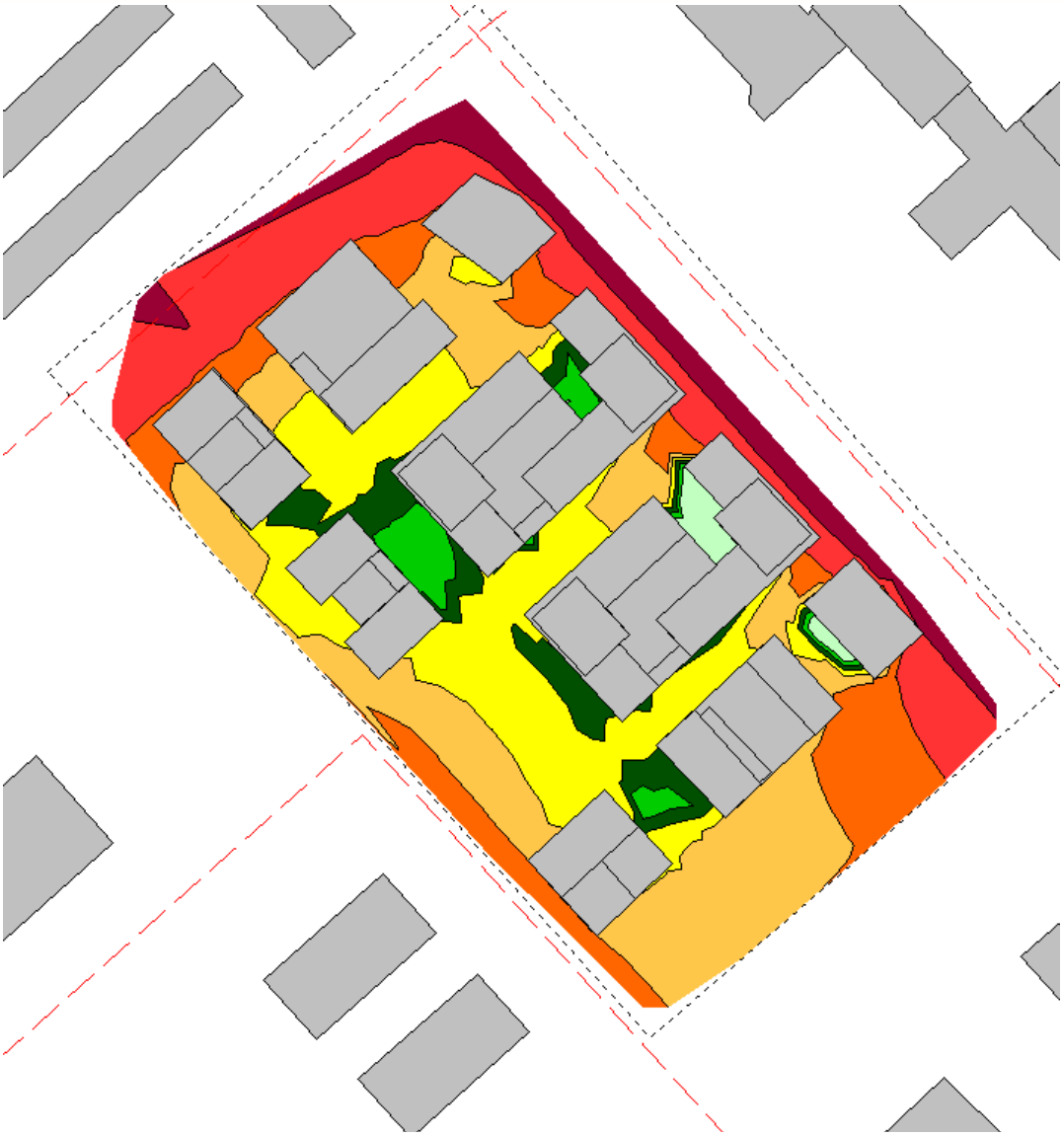

FIGURE 4: NIGHTTIME TRAFFIC NOISE CONTOURS (1.5 M ABOVE GRADE)

- *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 5: DAYTIME TRAFFIC NOISE CONTOURS (20 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*

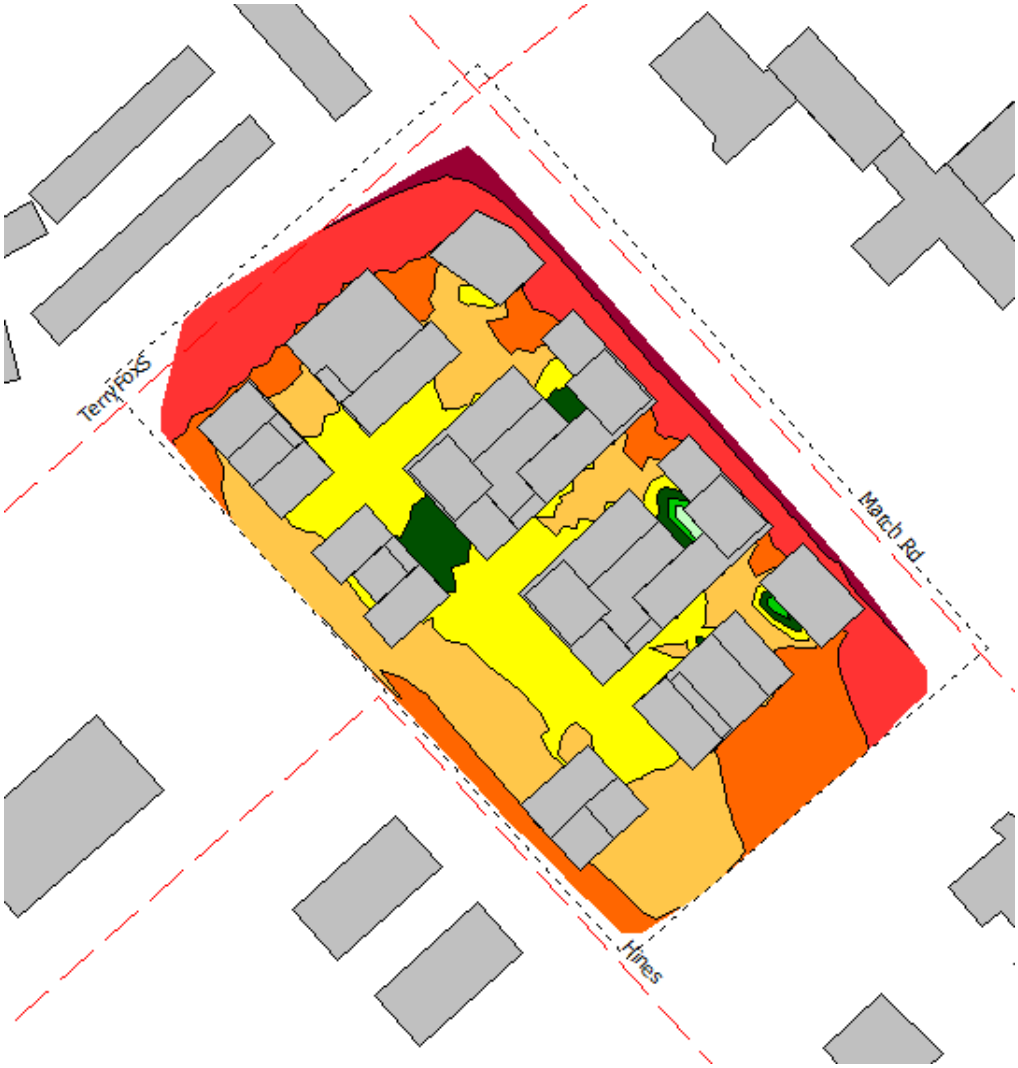

FIGURE 6: NIGHTTIME TRAFFIC NOISE CONTOURS (20 M ABOVE GRADE)

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SCALE	1:3,000 (APPROX.)
DRAWING NO.	GW23-028-7
DATE	DECEMBER 15, 2023
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DESCRIPTION

FIGURE 7:
NOISE CONTROL MEASURES

APPENDIX A

SUPPOURTING INFORMATION

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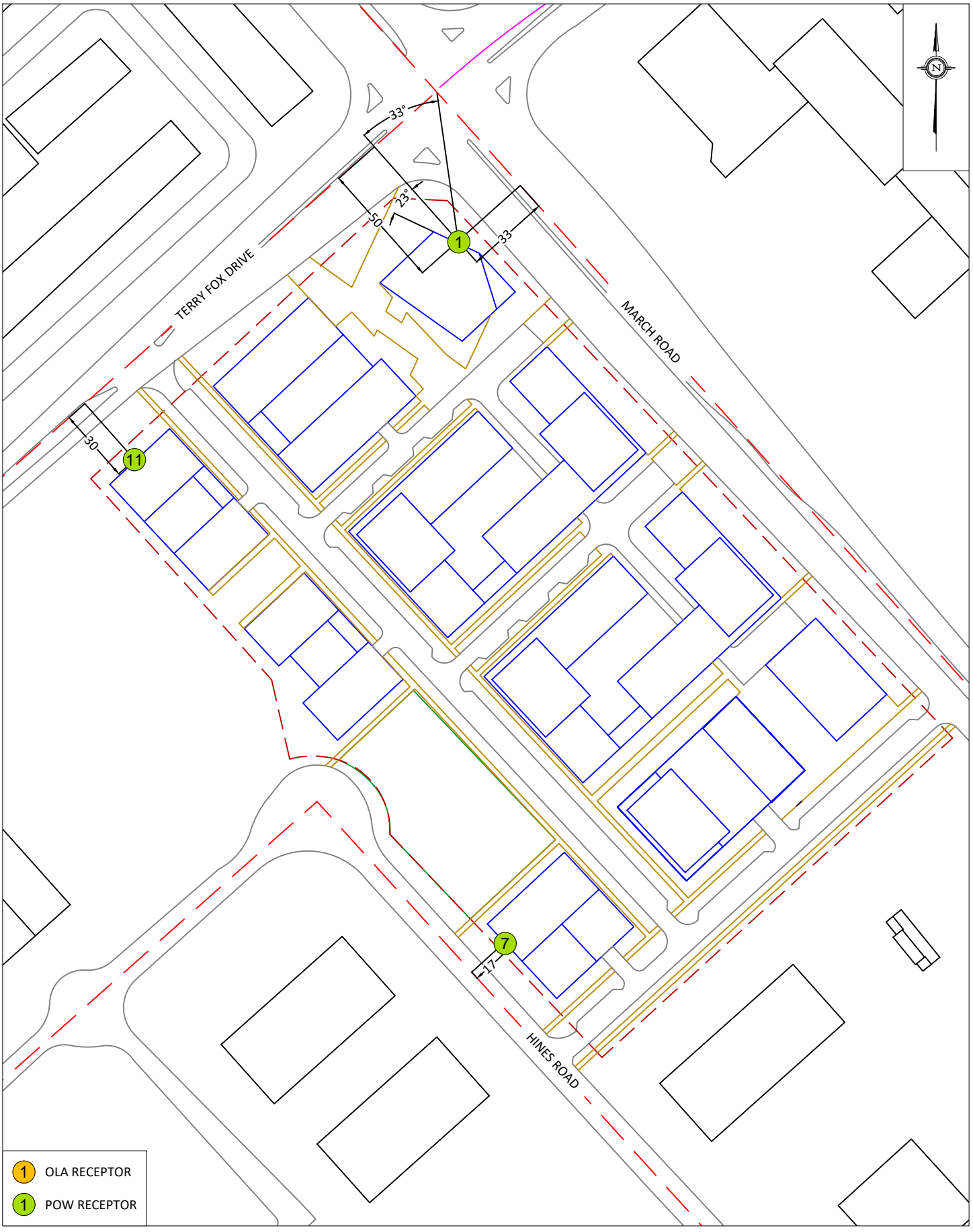

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PROJECT	591-595 MARCH ROAD, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT		DESCRIPTION
SCALE	1:3,000 (APPROX.)	DRAWING NO.	GW23-028-A1
DATE	DECEMBER 15, 2023	DRAWN BY	E.A.

FIGURE A1:
STAMSON PARAMETERS

```
STAMSON 5.0        NORMAL REPORT        Date: 13-12-2023 14:26:30
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r1.te                Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: March (day/night)
----------------------------------------
Car traffic volume  : 40480/3520  veh/TimePeriod  *
Medium truck volume :  3220/280   veh/TimePeriod  *
Heavy truck volume  :  2300/200   veh/TimePeriod  *
Posted speed limit  :    80 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):  50000
    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: March (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  :  33.00 / 33.00  m
Receiver height           :  22.50 / 22.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 2: TerryFox1 (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 # 2: TerryFox1 (day/night)
-------------------------------------------
Angle1   Angle2           : -23.00 deg   33.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  50.00 / 50.00  m
Receiver height           :  22.50 / 22.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 3: TerryFox2 (day/night)
-------------------------------------------
Car traffic volume  :  9715/845   veh/TimePeriod  *
Medium truck volume :   773/67    veh/TimePeriod  *
Heavy truck volume  :   552/48    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):  12000
    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 # 3: TerryFox2 (day/night)
-------------------------------------------
Angle1   Angle2           :  33.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  50.00 / 50.00  m
Receiver height           :  22.50 / 22.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Results segment # 1: March (day)
--------------------------------
```

```
Source height = 1.50 m

ROAD (0.00 + 74.29 + 0.00) = 74.29 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     90   0.00  77.72   0.00  -3.42   0.00   0.00   0.00   0.00
74.29
-------------------------------------------------------------------------
--

Segment Leq : 74.29 dBA


Results segment # 2: TerryFox1 (day)
-----------------------------------

Source height = 1.50 m

ROAD (0.00 + 63.38 + 0.00) = 63.38 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -23     33   0.00  73.68   0.00  -5.23  -5.07   0.00   0.00   0.00
63.38
-------------------------------------------------------------------------
--

Segment Leq : 63.38 dBA


Results segment # 3: TerryFox2 (day)
-----------------------------------

Source height = 1.50 m

ROAD (0.00 + 57.29 + 0.00) = 57.29 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
    33     90   0.00  67.51   0.00  -5.23  -4.99   0.00   0.00   0.00
57.29
-------------------------------------------------------------------------
--

Segment Leq : 57.29 dBA

Total Leq All Segments: 74.71 dBA
```

```
Results segment # 1: March (night)
----------------------------------

Source height = 1.50 m

ROAD (0.00 + 66.69 + 0.00) = 66.69 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     90   0.00  70.12   0.00  -3.42   0.00   0.00   0.00   0.00
66.69
-------------------------------------------------------------------------
--

Segment Leq : 66.69 dBA


Results segment # 2: TerryFox1 (night)
--------------------------------------

Source height = 1.50 m

ROAD (0.00 + 55.78 + 0.00) = 55.78 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -23     33   0.00  66.08   0.00  -5.23  -5.07   0.00   0.00   0.00
55.78
-------------------------------------------------------------------------
--

Segment Leq : 55.78 dBA


Results segment # 3: TerryFox2 (night)
--------------------------------------

Source height = 1.50 m

ROAD (0.00 + 49.69 + 0.00) = 49.69 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
    33     90   0.00  59.91   0.00  -5.23  -4.99   0.00   0.00   0.00
49.69
```

```
--------------------------------------------------------------------------------
--

Segment Leq : 49.69 dBA

Total Leq All Segments: 67.11 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 74.71
                           (NIGHT): 67.11
```

```
STAMSON 5.0        NORMAL REPORT        Date: 13-12-2023 16:28:40
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R7.te                Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: Hines 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  :    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: Hines 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  :  17.00 / 17.00  m
Receiver height           :  22.50 / 22.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Results segment # 1: Hines Rd (day)
----------------------------------

Source height = 1.50 m

ROAD (0.00 + 65.21 + 0.00) = 65.21 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     90    0.00  65.75   0.00  -0.54   0.00   0.00   0.00   0.00
65.21
-------------------------------------------------------------------------------
--
```

```
Segment Leq : 65.21 dBA

Total Leq All Segments: 65.21 dBA


Results segment # 1: Hines Rd (night)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 57.61 + 0.00) = 57.61 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     90   0.00  58.16   0.00  -0.54   0.00   0.00   0.00   0.00
57.61
-------------------------------------------------------------------------------
--

Segment Leq : 57.61 dBA

Total Leq All Segments: 57.61 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 65.21
                           (NIGHT): 57.61
```

```
STAMSON 5.0         NORMAL REPORT         Date: 13-12-2023 12:02:06
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r11.te                Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: TerryFox (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: TerryFox (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  :  30.00 / 30.00  m
Receiver height           :  16.50 / 16.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Results segment # 1: TerryFox (day)
-----------------------------------

Source height = 1.50 m

ROAD (0.00 + 70.67 + 0.00) = 70.67 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     90    0.00  73.68   0.00  -3.01   0.00   0.00   0.00   0.00
70.67
-------------------------------------------------------------------------------
--
```

```
Segment Leq : 70.67 dBA

Total Leq All Segments: 70.67 dBA


Results segment # 1: TerryFox (night)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 63.07 + 0.00) = 63.07 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     90   0.00  66.08   0.00  -3.01   0.00   0.00   0.00   0.00
63.07
-------------------------------------------------------------------------------
--

Segment Leq : 63.07 dBA

Total Leq All Segments: 63.07 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 70.67
                           (NIGHT): 63.07
```