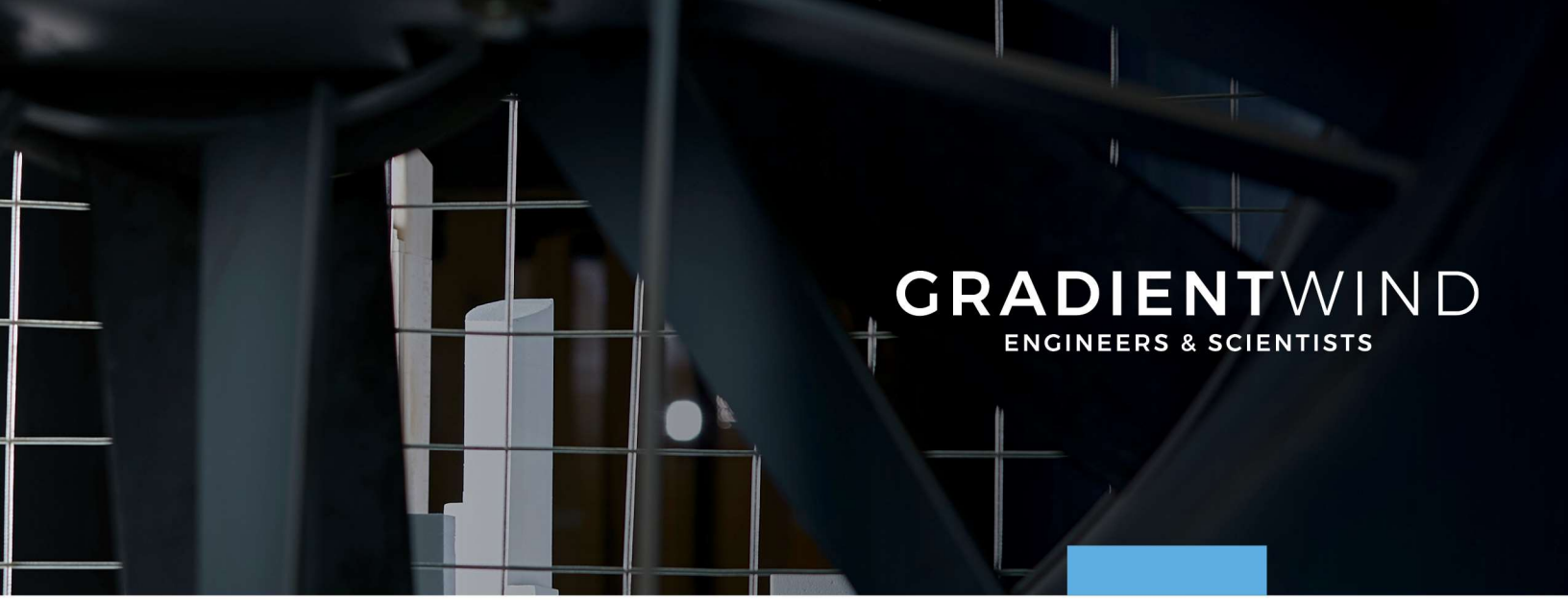

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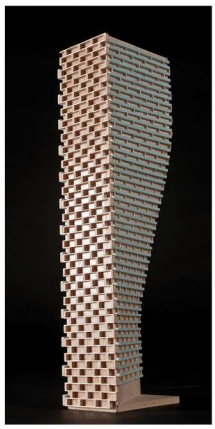
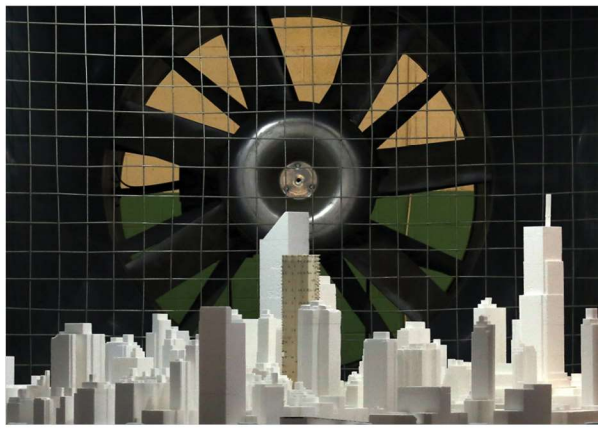
ENGINEERS & SCIENTISTS

ROADWAY TRAFFIC NOISE ASSESSMENT

637 Cummings Avenue
Ottawa, Ontario

Report: 22-139 – Traffic Noise





June 13, 2022

PREPARED FOR

Jawan Properties Inc.
470 Grey Seal Circle
Ottawa, ON K1V 2H7

PREPARED BY

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EXECUTIVE SUMMARY

This report describes a roadway traffic noise assessment in support of concurrent Zoning By-law Amendment and Site Plan Control application requirements for the proposed residential development located at 637 Cummings Avenue in Ottawa, Ontario. The proposed development comprises a 3-storey residential rental apartment, containing 29 units, with some units in the basement level of the building next to an existing 2-storey building west of the proposed development. The primary sources of roadway traffic noise include Aviation Parkway, Montreal Road, and Cummings Avenue. Figure 1 illustrates the site location 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) and Ministry of Transportation of Ontario (MTO) requirements; (ii) future vehicular traffic volumes corresponding to roadway classification and theoretical capacities; and (iii) architectural drawings provided by Jawan Properties Inc. in December 2021.

The results of the current analysis indicate that noise levels will range between 60 and 65 dBA during the daytime period (07:00-23:00) and between 52 and 58 dBA during the nighttime period (23:00-07:00). The highest noise level (65 dBA) occurs at the east façade, which is nearest and most exposed to Aviation Parkway. As the exterior noise level remains less than or equal to 65 dBA and 60 dBA in the daytime and nighttime periods, standard building components will be sufficient. Results of the calculations also indicate that the development will require forced air heating with the provision for central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. A Type C Warning Clause will be required in all Lease, Purchase and Sale Agreements, as summarized in Section 6.

Due to the size of the development, stationary noise impact on the surroundings is expected to be minimal. The building will likely have small internal Energy Recovery Ventilators or Heat Pump systems, with small residential sized air conditioning units on the roof. The mechanical system would be required to comply with MECP's Publication NPC-216 Residential Air Conditioning Devices.

A review of aerial imagery shows that the surrounding building comprise of small 2 and 3 storey apartment buildings. These buildings have small rooftop air handling equipment. As such, no significant existing sources of noise were identified.

TABLE OF CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Jawan Properties Inc. to undertake a roadway traffic noise study in support of a Zoning By-Law Amendment (ZBA) and Site Plan Control (SPA) applications for the proposed 3-storey residential rental apartment located at 637 Cummings Avenue in Ottawa, Ontario. This report summarizes the methodology, results, and recommendations related to the assessment of exterior noise generated by local transportation sources.

This assessment is based on theoretical noise calculation methods conforming to the Ministry of the Environment, Conservation and Parks (MECP)[1] and Environmental Noise Control Guidelines (ENCG). Noise calculations were based on architectural drawings provided by Jawan Properties Inc., dated December 2021, with future traffic volumes corresponding to roadway classification and theoretical roadway capacities.

2. TERMS OF REFERENCE

The focus of this roadway traffic noise assessment is the proposed 3-storey residential rental apartment building located at 637 Cummings Avenue in Ottawa, Ontario. The subject site is situated on a narrow parcel of land bounded by Aviation parkway to the east, Cummings Avenue to the west, and Montreal Road to the north. The study building is located next to an existing 2-storey building west of the proposed development, located on the same parcel of land. A concrete porch with a canopy leads to the front entrance of the apartment with a parking lot west of the study site. The site is surrounded by low-rise residential buildings in all directions. The primary sources of roadway traffic noise include Aviation Parkway, Montreal Road, and Cummings Avenue.

Stationary noise impact on the surroundings is expected to be minimal due to the size of the development. The building will likely contain small internal Energy Recovery Ventilators or Heat Pump systems, with small air conditioning units on the roof. Furthermore, aerial imagery show that surrounding buildings contain small rooftop air handling equipment that do not act as significant sources of noise.

[1] 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 building produced by local roadway traffic, (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, and (iii) provide commentary on stationary noise impacts.

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 vehicle traffic, the equivalent sound energy level, L_{eq}, provides a measure of the time varying noise levels, which is well correlated with the annoyance of sound. It is defined as the continuous sound level, which has the same energy as a time varying noise level over a period of time. For roadways, the L_{eq} is commonly calculated on the basis of a 16-hour (L_{eq16}) daytime (07:00-23:00)/8-hour (L_{eq8}) nighttime (23:00-07:00) split to assess its impact on residential buildings. The NPC-300 guidelines specify that the recommended indoor noise limit range (that is relevant to this study) is 45 and 40 dBA for residence living rooms and sleeping quarters, respectively, as listed in Table 1. However, to account for deficiencies in building construction and to control peak noise, these levels should be targeted toward 42, and 37 dBA, respectively.

TABLE 1: INDOOR SOUND LEVEL CRITERIA (ROAD) [2]

Type of Space	Time Period	L_{eq} (dBA)
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 can provide a minimum 20 dBA noise reduction[3]. Therefore, where noise levels exceed 55 dBA daytime and 50 dBA nighttime, the ventilation for the building should consider the need for having windows and doors closed, which normally triggers the need for central air conditioning (or similar systems). Where noise levels exceed 65 dBA daytime, and 60 dBA nighttime building components will require higher levels of sound attenuation[4].

[2] Adapted from Table C-2, Part C, Section 3.2.3 of NPC-300
[3] Burberry, P.B. (2014). Mitchell's Environment and Services. Routledge, Page 125
[4] MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3

4.2.2 Roadway Traffic Volumes

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 (paved) ground.
- Topography was assumed to be a flat/gentle slope surrounding the study building to the north, east, and south.
- One row of houses with 48% density was considered to the west, and one row of houses with 28% density was considered to the north.
- Noise receptors were strategically placed at 4 locations around the study area (see Figure 2).
- Receptor distances and exposure angles are illustrated in Figure 3.

4.2.3 Transportation Noise Predictions

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[5] 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.

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

TABLE 2: ROADWAY TRAFFIC DATA

Segment	Roadway Class	Speed Limit (km/h)	Traffic Volumes
Aviation Parkway	4-Lane Urban Arterial divided (Federally Owned)	60	**35,000**
Montreal Roadway	4-Lane Urban Arterial undivided	60	**30,000**
Cummings Avenue	2-Lane Urban Collector	40	**8,000**

5. RESULTS

5.1 Roadway Traffic Noise Levels

The results of the roadway traffic noise calculations are summarized in Table 3 below.

TABLE 3: EXTERIOR NOISE LEVELS DUE TO ROADWAY TRAFFIC SOURCES

Receptor Number	Receptor Height Above Grade/Roof (m)	Receptor Location	STAMSON 5.04 Noise Level (dBA)	
			Day	Night
PLANE OF WINDOW				
1	10.5	Tower POW – West Facade	60	52
2	10.5	Tower POW– North Facade	64	57
3	10.5	Tower POW– East Facade	65	58
4	10.5	Tower POW- South Facade	61	54

The results of the current analysis indicate that noise levels will range between 60 and 65 dBA during the daytime period (07:00-23:00) and between 52 and 58 dBA during the nighttime period (23:00-07:00). The highest noise level (65 dBA) occurs at the east façade, which is nearest and most exposed to Aviation Parkway.

5.2 Noise Control Measures

The noise levels predicted due to roadway traffic do not exceed the criteria listed in Section 4.2 for building components. As such, standard building components can satisfy the Ontario Building Code (OBC 2020) requirements. Results of the calculations also indicate that the development will require forced air heating with the provision for central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. In addition to ventilation requirements, Warning Clauses will also be required in all Agreements of Purchase and Sale and Lease Agreements, as summarized in Section 6.

6. DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels will range between 60 and 65 dBA during the daytime period (07:00-23:00) and between 52 and 58 dBA during the nighttime period (23:00-07:00). The highest noise level (65 dBA) occurs at the east façade, which is nearest and most exposed to Aviation Parkway. Standard building components will be able to satisfy the Ontario Building Code (OBC 2020) requirements as sound level do not exceed 65 dBA.

Results of the calculations also indicate that the development will require forced air heating with the provision for central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. 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."*

Stationary noise impact on the surroundings is expected to be minimal due to the size of the development. The building will likely contain small internal Energy Recovery Ventilators or Heat pump systems, with small air conditioning condoners on the roof. Furthermore, aerial imagery show that surrounding buildings contain small rooftop air handling equipment that do not act as significant sources of noise.

This concludes our roadway traffic noise 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.

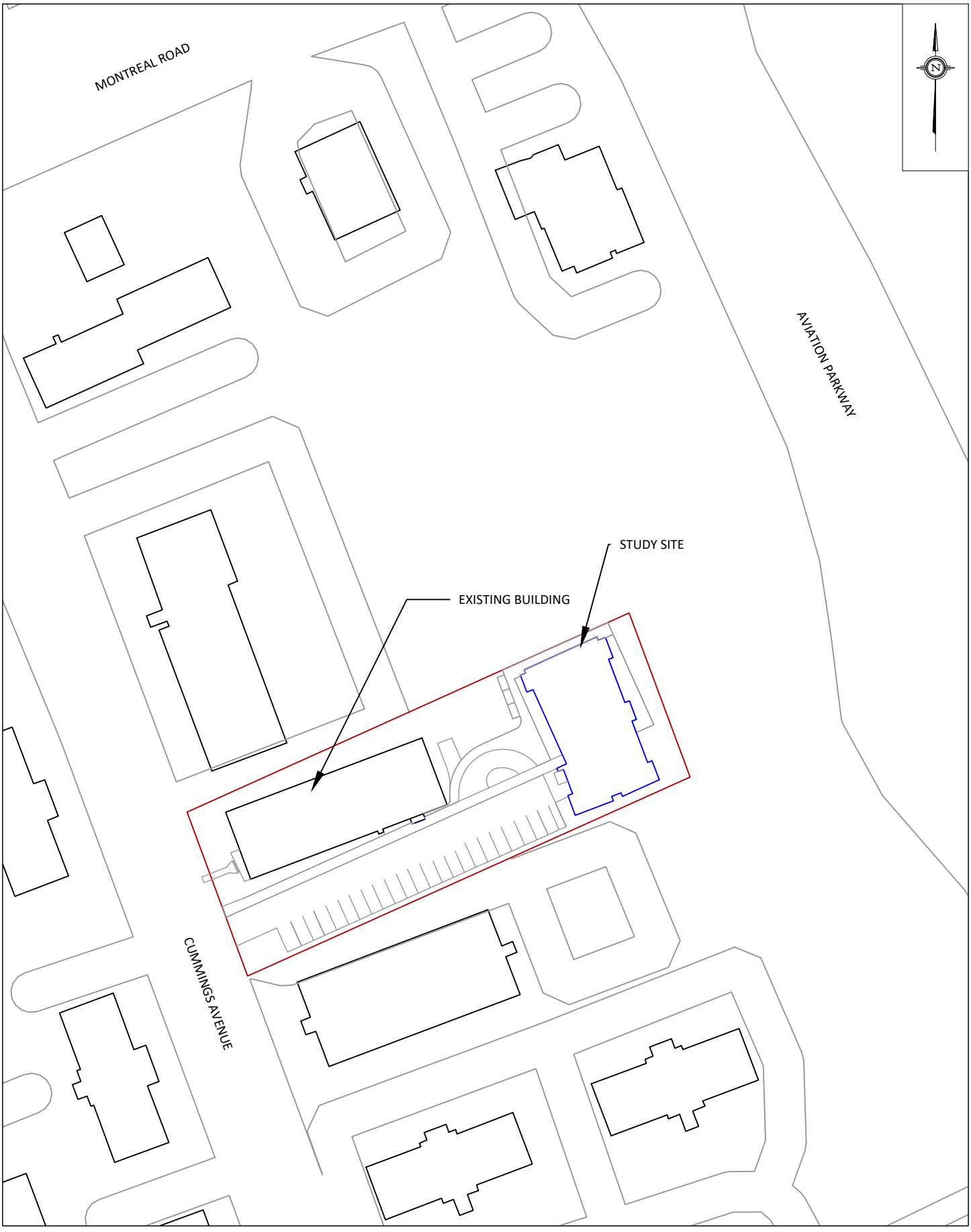
Sincerely,

Gradient Wind Engineering Inc.

Essraa Alqassab, BASc
Junior Environmental Scientist

Joshua Foster, P.Eng.
Lead Engineer

Gradient Wind File #22-139-Traffic Noise



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PROJECT	637 CUMMINGS AVE., OTTAWA ROADWAY TRAFFIC/STATIONARY NOISE ASSESSMENT		DESCRIPTION
SCALE	1:1000 (APPROX.)	DRAWING NO.	GW22-139-1
DATE	JUNE 15, 2022	DRAWN BY	E.A.

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT

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PROJECT	637 CUMMINGS AVE., OTTAWA ROADWAY TRAFFIC/STATIONARY NOISE ASSESSMENT		DESCRIPTION
SCALE	1:400 (APPROX.)	DRAWING NO.	GW22-139-2
DATE	JUNE 15, 2022	DRAWN BY	E.A.

FIGURE 2:
RECEPTOR LOCATIONS

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PROJECT	637 CUMMINGS AVE., OTTAWA ROADWAY TRAFFIC/STATIONARY NOISE ASSESSMENT		DESCRIPTION
SCALE	1:1000 (APPROX.)	DRAWING NO.	GW22-139-3
DATE	JUNE 15, 2022	DRAWN BY	E.A.

FIGURE 3:
STAMSON INPUT PARAMETERS

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: 02-06-2022 09:32:07
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: Cummings Ave (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: Cummings Ave (day/night)
----------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1 / 1
House density             :     48 %
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  83.56 / 83.56  m
Receiver height           :  10.50 / 10.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Montreal Rd (day/night)
----------------------------------------------
Car traffic volume  : 24288/2112  veh/TimePeriod  *
Medium truck volume :  1932/168   veh/TimePeriod  *
Heavy truck volume  :  1380/120   veh/TimePeriod  *
Posted speed limit  :    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):  30000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
```

```
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Montreal Rd (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1 / 1
House density             :     28 %
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 170.00 / 170.00 m
Receiver height           :  10.50 / 10.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Cummings Ave (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 53.96 + 0.00) = 53.96 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  -7.46   0.00   0.00  -2.54   0.00
53.96
-------------------------------------------------------------------------
--

Segment Leq : 53.96 dBA

Results segment # 2: Montreal Rd (day)
--------------------------------------

Source height = 1.50 m

ROAD (0.00 + 58.20 + 0.00) = 58.20 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90      0   0.00  73.01   0.00 -10.54  -3.01   0.00  -1.25   0.00
58.20
-------------------------------------------------------------------------
--

Segment Leq : 58.20 dBA

Total Leq All Segments: 59.59 dBA
```

```
Results segment # 1: Cummings Ave (night)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 46.36 + 0.00) = 46.36 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  -7.46   0.00   0.00  -2.54   0.00
46.36
-------------------------------------------------------------------------
--

Segment Leq : 46.36 dBA

Results segment # 2: Montreal Rd (night)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 50.60 + 0.00) = 50.60 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90      0   0.00  65.41   0.00 -10.54  -3.01   0.00  -1.25   0.00
50.60
-------------------------------------------------------------------------
--

Segment Leq : 50.60 dBA

Total Leq All Segments: 51.99 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 59.59
                           (NIGHT): 51.99
STAMSON 5.0        NORMAL REPORT        Date: 02-06-2022 09:53:28
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
```

```
Filename: r2.te                 Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: Montreal (day/night)
----------------------------------------
Car traffic volume  : 24288/2112  veh/TimePeriod  *
Medium truck volume :  1932/168   veh/TimePeriod  *
Heavy truck volume  :  1380/120   veh/TimePeriod  *
Posted speed limit  :    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):  30000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Montreal (day/night)
----------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1 / 1
House density             :     28 %
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 145.50 / 145.50 m
Receiver height           :  10.50 / 10.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Aviation (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: Aviation (day/night)
------------------------------------------
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  72.30 / 72.30  m
Receiver height           :  10.50 / 10.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

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

Source height = 1.50 m

ROAD (0.00 + 61.87 + 0.00) = 61.87 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     90   0.00  73.01   0.00  -9.87   0.00   0.00  -1.27   0.00
61.87
-------------------------------------------------------------------------
--

Segment Leq : 61.87 dBA

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

Source height = 1.50 m

ROAD (0.00 + 60.21 + 0.00) = 60.21 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90      0   0.39  73.68   0.00  -9.50  -3.97   0.00   0.00   0.00
60.21
-------------------------------------------------------------------------
--

Segment Leq : 60.21 dBA

Total Leq All Segments: 64.13 dBA

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

```
Source height = 1.50 m

ROAD (0.00 + 54.27 + 0.00) = 54.27 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     90   0.00  65.41   0.00  -9.87   0.00   0.00  -1.27   0.00
54.27
-------------------------------------------------------------------------
--

Segment Leq : 54.27 dBA

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

Source height = 1.50 m

ROAD (0.00 + 52.61 + 0.00) = 52.61 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90      0   0.39  66.08   0.00  -9.50  -3.97   0.00   0.00   0.00
52.61
-------------------------------------------------------------------------
--

Segment Leq : 52.61 dBA

Total Leq All Segments: 56.53 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 64.13
                           (NIGHT): 56.53
STAMSON 5.0        NORMAL REPORT        Date: 01-06-2022 16:33:36
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
```

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


Road data, segment # 1: Aviation Par (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: Aviation Par (day/night)
----------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  63.50 / 63.50  m
Receiver height           :  10.50 / 10.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Montreal RD (day/night)
-----------------------------------------------
Car traffic volume  : 24288/2112  veh/TimePeriod  *
Medium truck volume :  1932/168   veh/TimePeriod  *
Heavy truck volume  :  1380/120   veh/TimePeriod  *
Posted speed limit  :    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):  30000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00
```

```
Data for Segment # 2: Montreal RD (day/night)
-----------------------------------------
Angle1   Angle2           :   0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1 / 1
House density             :     28 %
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 155.00 / 155.00 m
Receiver height           :  10.50 / 10.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Aviation Par (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 64.00 + 0.00) = 64.00 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     90   0.39  73.68   0.00  -8.71  -0.96   0.00   0.00   0.00
64.00
-------------------------------------------------------------------------
--

Segment Leq : 64.00 dBA

Results segment # 2: Montreal RD (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 58.59 + 0.00) = 58.59 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0     90   0.00  73.01   0.00 -10.14  -3.01   0.00  -1.26   0.00
58.59
-------------------------------------------------------------------------
--

Segment Leq : 58.59 dBA

Total Leq All Segments: 65.10 dBA

Results segment # 1: Aviation Par (night)
-----------------------------------------
```

```
Source height = 1.50 m

ROAD (0.00 + 56.41 + 0.00) = 56.41 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     90   0.39  66.08   0.00  -8.71  -0.96   0.00   0.00   0.00
56.41
-------------------------------------------------------------------------
--

Segment Leq : 56.41 dBA

Results segment # 2: Montreal RD (night)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 50.99 + 0.00) = 50.99 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0     90   0.00  65.41   0.00 -10.14  -3.01   0.00  -1.26   0.00
50.99
-------------------------------------------------------------------------
--

Segment Leq : 50.99 dBA

Total Leq All Segments: 57.51 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.10
                           (NIGHT): 57.51
STAMSON 5.0        NORMAL REPORT        Date: 02-06-2022 09:55:19
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
```

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


Road data, segment # 1: Aviation Pck (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: Aviation Pck (day/night)
----------------------------------------------
Angle1   Angle2           :   0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  70.60 / 70.60  m
Receiver height           :  10.50 / 10.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Cummings (day/night)
--------------------------------------------
Car traffic volume  :  1600/800   veh/TimePeriod
Medium truck volume :   320/160   veh/TimePeriod
Heavy truck volume  :   160/80    veh/TimePeriod
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 2: Cummings (day/night)
------------------------------------------
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1 / 1
House density             :     28 %
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  94.40 / 94.40  m
Receiver height           :  10.50 / 10.50  m
```

```
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Aviation Pck (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 60.35 + 0.00) = 60.35 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0     90   0.39  73.68   0.00  -9.35  -3.97   0.00   0.00   0.00
60.35
-------------------------------------------------------------------------
--

Segment Leq : 60.35 dBA

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

Source height = 1.67 m

ROAD (0.00 + 48.11 + 0.00) = 48.11 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90      0   0.00  60.41   0.00  -7.99  -3.01   0.00  -1.30   0.00
48.11
-------------------------------------------------------------------------
--

Segment Leq : 48.11 dBA

Total Leq All Segments: 60.60 dBA

Results segment # 1: Aviation Pck (night)
-----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 52.76 + 0.00) = 52.76 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0     90   0.39  66.08   0.00  -9.35  -3.97   0.00   0.00   0.00
52.76
```

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

Segment Leq : 52.76 dBA

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

Source height = 1.67 m

ROAD (0.00 + 48.11 + 0.00) = 48.11 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90      0   0.00  60.41   0.00  -7.99  -3.01   0.00  -1.30   0.00
48.11
-------------------------------------------------------------------------------
--

Segment Leq : 48.11 dBA

Total Leq All Segments: 54.04 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.60
                           (NIGHT): 54.04
```