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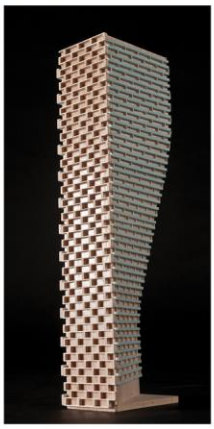
ENGINEERS & SCIENTISTS

DETAILED TRAFFIC NOISE STUDY

150 Dun Skipper Drive
Ottawa, Ontario

REPORT: GW24-238-Detailed Traffic Noise Study



April 22, 2025

PREPARED FOR
Maverick Development Corporation
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PREPARED BY
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EXECUTIVE SUMMARY

This report describes a detailed traffic noise study performed for the proposed development located at 150 Dun Skipper Drive in Ottawa, Ontario. The residential development comprises two residential buildings rising six storeys with 'L' shaped planforms and outdoor parking. The major contributor to traffic noise is Bank Street.

The assessment is based on theoretical noise calculation methods conforming to the City of Ottawa[1] and Ministry of the Environment, Conservation and Parks (MECP) NPC-300[2] guidelines, site plan drawings provided by PMA Architectes in December 2024, with future roadway traffic volumes corresponding with the City of Ottawa's Official Plan (OP) roadway classifications and the Ministry of Transportation Ontario (MTO).

The results of the current analysis indicate that noise levels will range between 50 and 64 dBA during the daytime period (07:00-23:00) and between 42 and 57 dBA during the nighttime period (23:00-07:00). The highest noise level (64 dBA) occurs along the southeast façade of building 1 and the northeast façade of building 2, which is nearest and most exposed to Bank Street.

The noise levels predicted due to transportation noise are less than 65 dBA at both building's façades, standard building components in compliance with Ontario Building Code standards will be sufficient to attenuate noise levels indoors when windows are closed.

Results of the calculations indicate that both buildings in the development will require central air conditioning, or a similar mechanical system, which will allow occupants to keep windows closed and maintain a comfortable living environment. In addition to ventilation requirements, a Type D Warning Clause will be required in all Agreements of Purchase and Sale and Lease Agreements, as summarized in Section 6.

[1] City of Ottawa Environmental Noise Control Guidelines, January 2016
[2] Ministry of the Environment, Conservation and Parks (MECP), Environmental Noise Guideline – Publication NPC-300, August 2013

Gradient conducted a satellite review of the area and found out that there is some mechanical equipment on the rooftop of the nearby Home Hardware building. However, due to the distance between this building and the study site, the equipment is not anticipated to adversely impact the proposed development.

The proposed development will have central air conditioning or a similar mechanical system. Regarding stationary noise impacts from the development on the surroundings, these can be minimized by judicious placement of mechanical equipment such as its placement on the central area of a high roof or in a mechanical penthouse, or the incorporation of silencers and noise screens as necessary. Due to the size and nature of the development, the HVAC equipment is expected to be located in the mechanical penthouses. The building will be designed to comply with the ENCG Sound Level Limits and the City of Ottawa Noise By-Law No. 2017-255.

While the subject site is inside the Airport Vicinity Development Zone, it is outside the composite contour 25 for Noise Exposure Forecast (NEF) / Noise Exposure Prediction (NEP). While noise levels due to aircraft flyovers are expected to be low, an aircraft noise warning clause should also be added to all Agreements of Purchase and Sale and Lease Agreements, as summarized in Section 6.

TABLE OF CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Zayoun Group on behalf of Maverick Development Corporation to undertake a detailed transportation noise study for the proposed residential development, located at 150 Dun Skipper Drive in Ottawa, Ontario. This report summarizes the methodology, results, and recommendations related to a detailed traffic noise study.

The present scope of work involves assessing exterior noise levels at the study site generated by the surrounding transportation sources. The assessment was performed based on theoretical noise calculation methods conforming to the City of Ottawa[3] and Ministry of the Environment, Conservation and Parks (MECP) NPC-300[4] guidelines, site plan drawings provided by PMA Architectes in December 2024, with future roadway traffic volumes corresponding with the City of Ottawa's Official Plan (OP) roadway classifications.

2. TERMS OF REFERENCE

The focus of this transportation noise assessment is the proposed residential development located at 150 Dun Skipper Drive in Ottawa, Ontario. The subject site is situated on a rectangular parcel of land bounded by Bank Street to the east, Cedar Creek Drive to the west, Dun Skipper Drive to the south, and open space to the north. The proposed residential development comprises two residential buildings rising six storeys with 'L' shaped planforms and outdoor parking.

The primary source of traffic noise is Bank Street. Nearby local roads such as Dun Skipper Drive were deemed insignificant, due to their low traffic volumes. The study site is surrounded by a low-rise residential subdivision to the west and a home improvement store and south. An empty lot is located to the north, with a wooded area and scattered buildings to the east. Figure 1 illustrates a complete site plan with the surrounding context.

[3] City of Ottawa Environmental Noise Control Guidelines, January 2016
[4] Ministry of the Environment, Conservation and Parks (MECP), Environmental Noise Guideline – Publication NPC-300, August 2013

The subject site is near the Ottawa Macdonald-Cartier International Airport, which is a source of noise due to aircraft flyovers. Noise related to aircraft noise is determined through noise exposure forecast (NEF) contours made available by the airport authorities. As per Schedule C14 of the City of Ottawa's Official Plan, the subject site is outside the NEF 25 noise contour, and as such noise impacts from aircraft flyovers will be minimal[5]. Figure 5 illustrates the NEF contours for the Ottawa Macdonald-Cartier International Airport. While the site is outside the NEF an aircraft noise warning clause will be required on all purchase sale and lease agreements, as summarized in Section 6.

2.1 Stationary noise

Gradient conducted a satellite review of the area and found that there is some mechanical equipment on the rooftop of the nearby Home Hardware building. However, due to the distance between this building and the study site, the equipment is not anticipated to adversely impact the proposed development. No other existing commercial or industrial facilities are within the area.

Moreover, the proposed development will have upgraded building components and central air conditioning or a similar mechanical system. Regarding stationary noise impacts from the development on the surroundings, these can be minimized by judicious placement of mechanical equipment such as its placement on the central area of a high roof or in a mechanical penthouse, or the incorporation of silencers and noise screens as necessary. Due to the size and nature of the development, the HVAC equipment is expected to be located in the mechanical penthouses. The building will be designed to comply with the ENCG Sound Level Limits and the City of Ottawa Noise By-Law No. 2017-255.

3. OBJECTIVES

The main goals of this work are to (i) calculate the future noise levels on the study site produced by local transportation, (ii) ensure that interior noise levels do not exceed the allowable limits specified by the City of Ottawa's Environmental Noise Control Guidelines as outlined in Section 4 of this report.

[5] https://tc.canada.ca/en/aviation/operating-airports-aerodromes/managing-noise-aircraft/noise-exposure-forecast-related-programs

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.

TABLE 1: INDOOR SOUND LEVEL CRITERIA [6]

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 centers, 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[7]. 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[8].

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[9]. Average Annual Daily Traffic (AADT) volumes are then based on data in Table B1 of the ENCG for each roadway classification. The two-kilometre widening of Bank Street from two to four lanes is planned from Leitrim

[6] Adapted from Table C-2, Part C, Section 3.2.3 of NPC-300
[7] Burberry, P.B. (2014). Mitchell's Environment and Services. Routledge, Page 125
[8] MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3
[9] City of Ottawa Transportation Master Plan, November 2013

Road to the south of Blais Road. Therefore, Bank Street is taken as a 4-lane urban arterial in this study. Table 2 (below) summarizes the AADT values used for each roadway included in this assessment.

TABLE 2: ROADWAY TRAFFIC DATA

Segment	Roadway Class	Speed Limit (km/h)	Ultimate AADT	Day/Night Split	Truck Volume Percentages	
					Medium Truck	Heavy Truck
Bank Street	4-Lane Urban Arterial Divided (4-UAD)	80	**35,000**	92/8	7	5

4.2.3 Theoretical Traffic Noise Predictions

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

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

- Vehicle parameters used in the study, such as truck traffic volume percentages, posted speed limits, and day/night split, are summarized in Table 2.
- Default ground surfaces were taken to be absorptive due to the presence of lawn and foliage.
- Topography was assumed to be a flat/gentle slope surrounding the study building.
- Noise receptors were strategically placed at 10 locations around the study building (see Figure 2).
- For select sources, where appropriate, the proposed and existing buildings were considered barriers partially or fully obstructing exposure of receptors to the source.
- Receptor distances and exposure angles are illustrated in Figures 3 and 4.

5. RESULTS

5.1 Roadway Traffic Noise Levels

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

TABLE 3: EXTERIOR NOISE LEVELS DUE TO ROADWAY TRAFFIC SOURCES

Receptor Number	Receptor Height Above Grade (m)	Receptor Location	STAMSON Roadway Noise Level (dBA)	
			Day	Night
1	16.5	POW - Building 1 - Level 6 Southeast Façade	64	57
2	16.5	POW - Building 1 - Level 6 Northeast Façade	62	54
3	16.5	POW - Building 1 - Level 6 North Façade	58	50
4	16.5	POW - Building 1 - Level 6 West Façade	50	43
5	16.5	POW - Building 1 - Level 6 South Façade	60	53
6	16.5	POW - Building 2 - Level 6 South Façade	59	51
7	16.5	POW - Building 2 - Level 6 Southeast Façade	61	53
8	16.5	POW - Building 2 - Level 6 Northeast Façade	64	56
9	16.5	POW - Building 2 - Level 6 North Façade	59	52
10	16.5	POW - Building 2 - Level 6 West Façade	50	42

*Nighttime noise levels not considered as per ENCG

The results of the current analysis indicate that noise levels will range between 50 and 64 dBA during the daytime period (07:00-23:00) and between 42 and 57 dBA during the nighttime period (23:00-07:00). The highest noise level (64 dBA) occurs along the southeast façade of building 1 and the northeast façade of building 2, which is nearest and most exposed to Bank Street.

5.2 Noise Control Measures

The noise levels predicted due to transportation noise are less than 65 dBA at both building's façades, standard building components in compliance with Ontario Building Code standards will be sufficient to attenuate noise levels indoors when windows are closed.

Results of the calculations indicate that both buildings in the development will require central air conditioning, or a similar system, which will allow occupants to keep windows closed and maintain a comfortable living environment. In addition to ventilation requirements, a Type D Warning Clause will also be required in all Agreements of Purchase and Sale and Lease Agreements, as summarized in Section 6.

6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels will range between 50 and 64 dBA during the daytime period (07:00-23:00) and between 42 and 57 dBA during the nighttime period (23:00-07:00). The highest noise level (64 dBA) occurs along the southeast façade of building 1 and the northeast façade of building 2, which is nearest and most exposed to Bank Street. Standard building components in compliance with Ontario Building Code standards will be sufficient to attenuate noise levels indoors when windows are closed.

Results of the calculations also indicate that both buildings in the development will require central air conditioning, or a similar system, which will allow occupants to keep windows closed and maintain a comfortable living environment. A Type D Warning Clause will also be required in all Lease, Purchase and Sale Agreements, as summarized below:

Type D:

> *"This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment."*

Gradient conducted a satellite review of the area and found out that there is some mechanical equipment on the rooftop of the nearby Home Hardware building. However, due to the distance between this building and the study site, the equipment is not anticipated to adversely impact the proposed development.

The proposed development will have central air conditioning or a similar mechanical system. Regarding stationary noise impacts from the development on the surroundings, these can be minimized by judicious placement of mechanical equipment such as its placement on the central area of a high roof or in a

mechanical penthouse, or the incorporation of silencers and noise screens as necessary. Due to the size and nature of the development, the HVAC equipment is expected to be located in the mechanical penthouses. The building will be designed to comply with the ENCG Sound Level Limits and the City of Ottawa Noise By-Law No. 2017-255.

While the subject site is inside the Airport Vicinity Development Zone, it is outside the composite contour 25 for Noise Exposure Forecast (NEF) / Noise Exposure Prediction (NEP). While noise levels due to aircraft flyovers are expected to be low, an aircraft noise warning clause, as outlined below should also be added to all purchase, sale, and lease agreements:

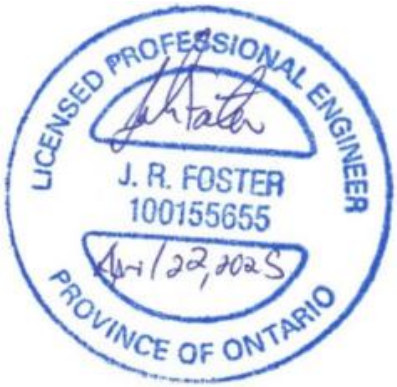
Aircraft:

> *"Purchasers/tenants are advised that due to the proximity of the airport, noise from the airport and individual aircraft may at times interfere with outdoor or indoor activities."*

This concludes our 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.



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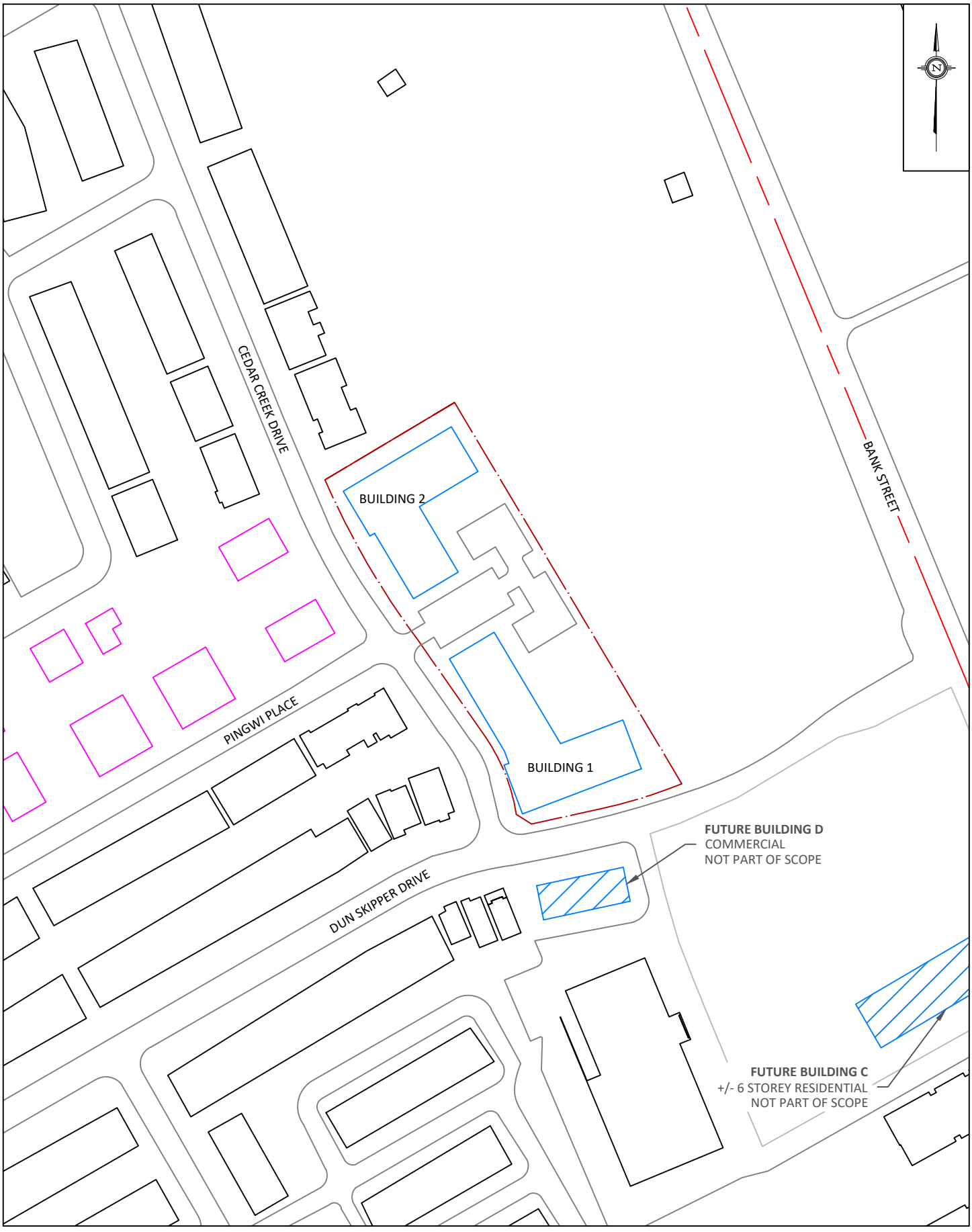
Gradient Wind File #24-238 – Detailed Traffic Noise Study



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PROJECT	150 DUN SKIPPER DRIVE, OTTAWA TRANSPORTATION NOISE ASSESSMENT
SCALE	1:2000 (APPROX.)
DRAWING NO.	24-238-1
DATE	APRIL 22, 2025
DRAWN BY	B.P.

DESCRIPTION

FIGURE 1:
PROPERTY LINE AND SURROUNDING CONTEXT

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DRAWING NO.	24-238-2
DATE	APRIL 22, 2025
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DESCRIPTION

FIGURE 2:
RECEPTOR LOCATIONS

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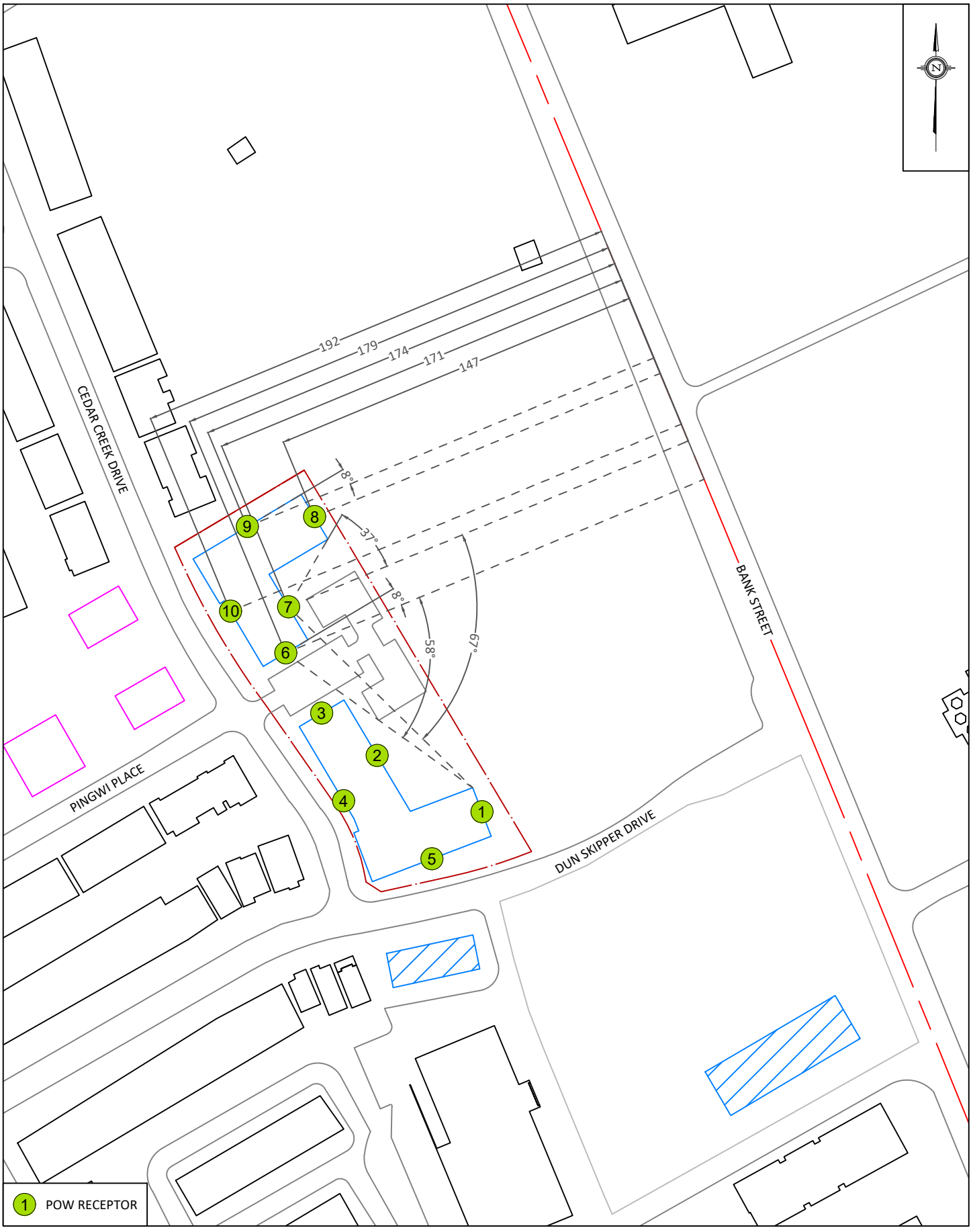
DRAWING NO.	24-238-3
DATE	APRIL 22, 2025
DRAWN BY	B.P.

DESCRIPTION

FIGURE 3:
STAMSON 5.04 INPUT DATA



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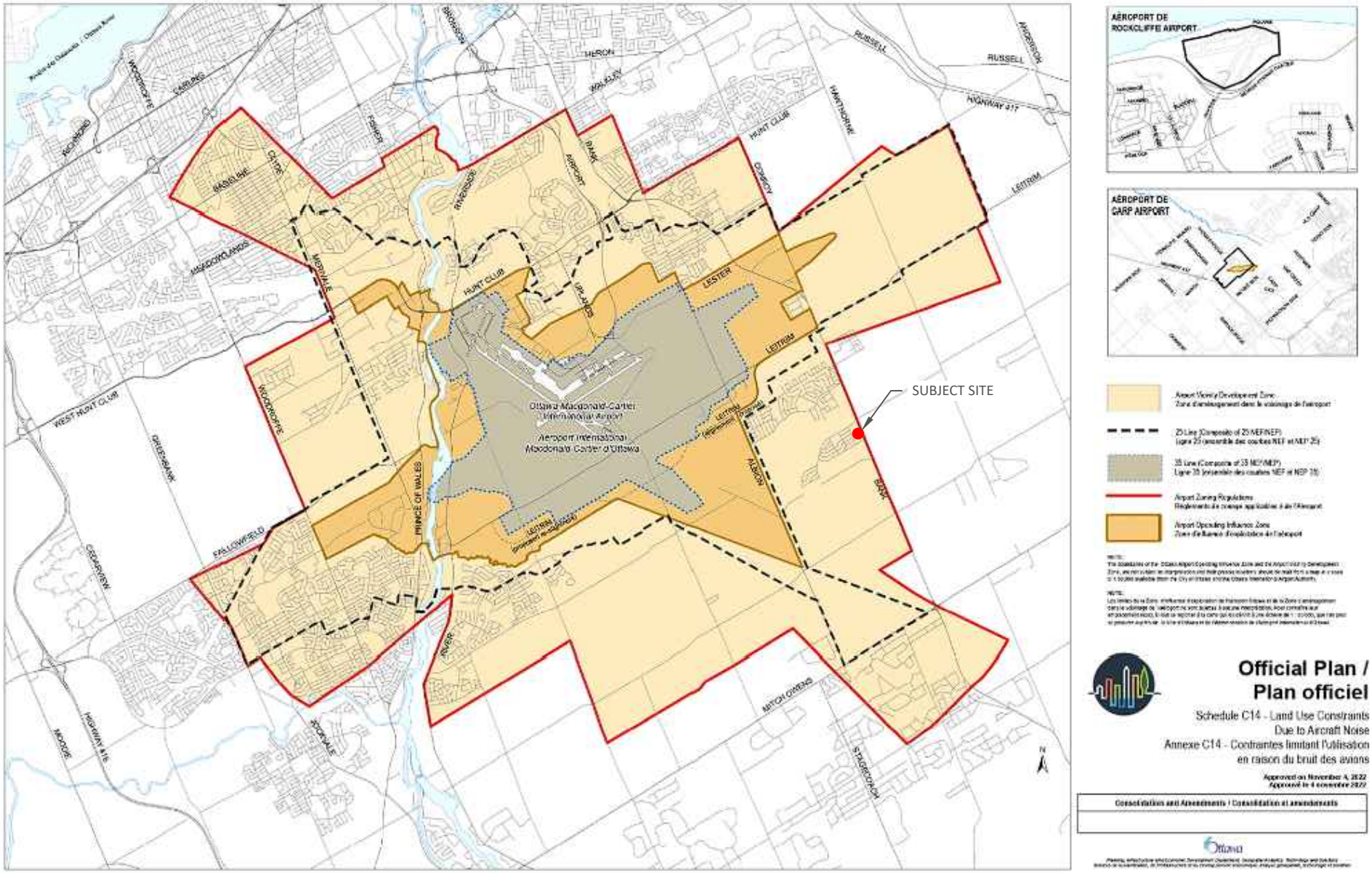
PROJECT	150 DUN SKIPPER DRIVE, OTTAWA TRANSPORTATION NOISE ASSESSMENT
SCALE	1:2000 (APPROX.)
DRAWING NO.	24-238-4
DATE	APRIL 22, 2025
DRAWN BY	B.P.

DESCRIPTION

FIGURE 4:
STAMSON 5.04 INPUT DATA



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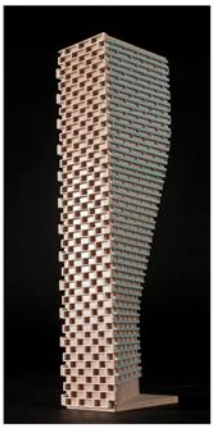
PROJECT	150 DUN SKIPPER DRIVE, OTTAWA TRANSPORTATION NOISE ASSESSMENT		
SCALE	N/A	DRAWING NO.	24-238-5
DATE	APRIL 22, 2025	DRAWN BY	B.P.

DESCRIPTION

FIGURE 5:
NEF CONTOURS - OTTAWA MACDONALD-CARTIER INTERNATIONAL AIRPORT



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: 24-03-2025 11:48:49
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

Road data, segment # 1: Bank St (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 : 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): 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: Bank St (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 : 131.00 / 131.00 m
Receiver height : 16.50 / 16.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Bank St (day)

Source height = 1.50 m

ROAD (0.00 + 64.22 + 0.00) = 64.22 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.21	76.17	0.00	-11.39	-0.56	0.00	0.00	0.00	64.22

Segment Leq : 64.22 dBA

Total Leq All Segments: 64.22 dBA

```
Results segment # 1: Bank St (night)
------------------------------------

Source height = 1.50 m

ROAD (0.00 + 56.62 + 0.00) = 56.62 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.21  68.57   0.00 -11.39  -0.56   0.00   0.00   0.00  56.62
-------------------------------------------------------------------------------

Segment Leq : 56.62 dBA

Total Leq All Segments: 56.62 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 64.22
                           (NIGHT): 56.62
```

STAMSON 5.0 NORMAL REPORT Date: 24-03-2025 11:49:20
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Angle1 Angle2 : -80.00 deg 41.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 161.00 / 161.00 m
Receiver height : 16.50 / 16.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Bank St (day)

Source height = 1.50 m

ROAD (0.00 + 61.69 + 0.00) = 61.69 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-80	41	0.21	76.17	0.00	-12.47	-2.00	0.00	0.00	0.00	61.69

Segment Leq : 61.69 dBA

Total Leq All Segments: 61.69 dBA

```
Results segment # 1: Bank St (night)
------------------------------------

Source height = 1.50 m

ROAD (0.00 + 54.10 + 0.00) = 54.10 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -80     41   0.21  68.57   0.00 -12.47  -2.00   0.00   0.00   0.00  54.10
-------------------------------------------------------------------------------

Segment Leq : 54.10 dBA

Total Leq All Segments: 54.10 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 61.69
                           (NIGHT): 54.10
```

STAMSON 5.0 NORMAL REPORT Date: 24-03-2025 11:49:57
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

```
Road data, segment # 1: Bank St (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  :    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):  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: Bank St (day/night)
-----------------------------------------
Angle1   Angle2           : -65.00 deg   -8.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 175.00 / 175.00 m
Receiver height           :  16.50 / 16.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Bank St (day)
----------------------------------

Source height = 1.50 m

ROAD (0.00 + 58.00 + 0.00) = 58.00 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -65     -8   0.21  76.17   0.00 -12.91  -5.25   0.00   0.00   0.00  58.00
-------------------------------------------------------------------------------

Segment Leq : 58.00 dBA

Total Leq All Segments: 58.00 dBA
```

```
Results segment # 1: Bank St (night)
------------------------------------

Source height = 1.50 m

ROAD (0.00 + 50.41 + 0.00) = 50.41 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -65     -8   0.21  68.57   0.00 -12.91  -5.25   0.00   0.00   0.00  50.41
-------------------------------------------------------------------------------

Segment Leq : 50.41 dBA

Total Leq All Segments: 50.41 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 58.00
                           (NIGHT): 50.41
```

STAMSON 5.0 NORMAL REPORT Date: 24-03-2025 11:50:21
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

Road data, segment # 1: Bank St (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 : 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): 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: Bank St (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 : 180.00 / 180.00 m
Receiver height : 16.50 / 16.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
Barrier height : 18.00 m
Barrier receiver distance : 0.01 / 0.01 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

```
Results segment # 1: Bank 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 !       16.50 !        16.50

ROAD (0.00 + 50.11 + 0.00) = 50.11 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  76.17   0.00 -10.79   0.00   0.00   0.00 -15.27  50.11
-------------------------------------------------------------------------------

Segment Leq : 50.11 dBA

Total Leq All Segments: 50.11 dBA

Results segment # 1: Bank 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 !       16.50 !        16.50

ROAD (0.00 + 42.51 + 0.00) = 42.51 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  68.57   0.00 -10.79   0.00   0.00   0.00 -15.27  42.51
-------------------------------------------------------------------------------

Segment Leq : 42.51 dBA

Total Leq All Segments: 42.51 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 50.11
                           (NIGHT): 42.51
```

STAMSON 5.0 NORMAL REPORT Date: 24-03-2025 11:50:57
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

Road data, segment # 1: Bank St (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 : 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): 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: Bank St (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 : 156.00 / 156.00 m
Receiver height : 16.50 / 16.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Bank St (day)

Source height = 1.50 m

ROAD (0.00 + 60.29 + 0.00) = 60.29 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.21	76.17	0.00	-12.31	-3.57	0.00	0.00	0.00	60.29

Segment Leq : 60.29 dBA

Total Leq All Segments: 60.29 dBA

```
Results segment # 1: Bank St (night)
------------------------------------

Source height = 1.50 m

ROAD (0.00 + 52.69 + 0.00) = 52.69 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     90   0.21  68.57   0.00 -12.31  -3.57   0.00   0.00   0.00  52.69
-------------------------------------------------------------------------------

Segment Leq : 52.69 dBA

Total Leq All Segments: 52.69 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.29
                           (NIGHT): 52.69
```

STAMSON 5.0 NORMAL REPORT Date: 24-03-2025 11:51:24
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Angle1 Angle2 : -8.00 deg 58.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 179.00 / 179.00 m
Receiver height : 16.50 / 16.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Bank St (day)

Source height = 1.50 m

ROAD (0.00 + 58.63 + 0.00) = 58.63 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-8	58	0.21	76.17	0.00	-13.03	-4.51	0.00	0.00	0.00	58.63

Segment Leq : 58.63 dBA

Total Leq All Segments: 58.63 dBA

```
Results segment # 1: Bank St (night)
------------------------------------

Source height = 1.50 m

ROAD (0.00 + 51.03 + 0.00) = 51.03 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    -8     58   0.21  68.57   0.00 -13.03  -4.51   0.00   0.00   0.00  51.03
-------------------------------------------------------------------------------

Segment Leq : 51.03 dBA

Total Leq All Segments: 51.03 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 58.63
                           (NIGHT): 51.03
```

STAMSON 5.0 NORMAL REPORT Date: 24-03-2025 11:52:00
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Angle1 Angle2 : -37.00 deg 67.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 171.00 / 171.00 m
Receiver height : 16.50 / 16.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Bank St (day)

Source height = 1.50 m

ROAD (0.00 + 60.82 + 0.00) = 60.82 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-37	67	0.21	76.17	0.00	-12.79	-2.56	0.00	0.00	0.00	60.82

Segment Leq : 60.82 dBA

Total Leq All Segments: 60.82 dBA

```
Results segment # 1: Bank St (night)
------------------------------------

Source height = 1.50 m

ROAD (0.00 + 53.22 + 0.00) = 53.22 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -37     67   0.21  68.57   0.00 -12.79  -2.56   0.00   0.00   0.00  53.22
-------------------------------------------------------------------------------

Segment Leq : 53.22 dBA

Total Leq All Segments: 53.22 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.82
                           (NIGHT): 53.22
```

STAMSON 5.0 NORMAL REPORT Date: 24-03-2025 11:52:50
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R8.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Bank St (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 : 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): 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: Bank St (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 : 147.00 / 147.00 m
Receiver height : 16.50 / 16.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Bank St (day)

Source height = 1.50 m

ROAD (0.00 + 63.61 + 0.00) = 63.61 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.21	76.17	0.00	-12.00	-0.56	0.00	0.00	0.00	63.61

Segment Leq : 63.61 dBA

Total Leq All Segments: 63.61 dBA

```
Results segment # 1: Bank St (night)
------------------------------------

Source height = 1.50 m

ROAD (0.00 + 56.01 + 0.00) = 56.01 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.21  68.57   0.00 -12.00  -0.56   0.00   0.00   0.00  56.01
-------------------------------------------------------------------------------

Segment Leq : 56.01 dBA

Total Leq All Segments: 56.01 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.61
                           (NIGHT): 56.01
```

STAMSON 5.0 NORMAL REPORT Date: 24-03-2025 11:53:34
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R9.te Time Period: Day/Night 16/8 hours
Description:

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

Angle1 Angle2 : -90.00 deg -8.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 174.00 / 174.00 m
Receiver height : 16.50 / 16.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Bank St (day)

Source height = 1.50 m

ROAD (0.00 + 59.25 + 0.00) = 59.25 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-8	0.21	76.17	0.00	-12.88	-4.04	0.00	0.00	0.00	59.25

Segment Leq : 59.25 dBA

Total Leq All Segments: 59.25 dBA

```
Results segment # 1: Bank St (night)
------------------------------------

Source height = 1.50 m

ROAD (0.00 + 51.65 + 0.00) = 51.65 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     -8   0.21  68.57   0.00 -12.88  -4.04   0.00   0.00   0.00  51.65
-------------------------------------------------------------------------------

Segment Leq : 51.65 dBA

Total Leq All Segments: 51.65 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 59.25
                           (NIGHT): 51.65
```

STAMSON 5.0 NORMAL REPORT Date: 24-03-2025 11:54:39
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R10.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Bank St (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 : 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): 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: Bank St (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 : 192.00 / 192.00 m
Receiver height : 16.50 / 16.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
Barrier height : 18.00 m
Barrier receiver distance : 0.01 / 0.01 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

```
Results segment # 1: Bank 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 !       16.50 !        16.50

ROAD (0.00 + 49.84 + 0.00) = 49.84 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  76.17   0.00 -11.07   0.00   0.00   0.00 -15.25  49.84
-------------------------------------------------------------------------------

Segment Leq : 49.84 dBA

Total Leq All Segments: 49.84 dBA

Results segment # 1: Bank 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 !       16.50 !        16.50

ROAD (0.00 + 42.25 + 0.00) = 42.25 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  68.57   0.00 -11.07   0.00   0.00   0.00 -15.25  42.25
-------------------------------------------------------------------------------

Segment Leq : 42.25 dBA

Total Leq All Segments: 42.25 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 49.84
                           (NIGHT): 42.25
```