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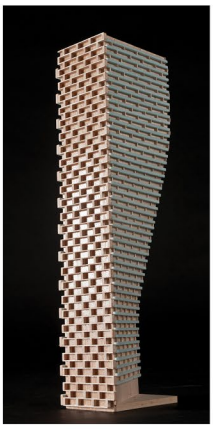
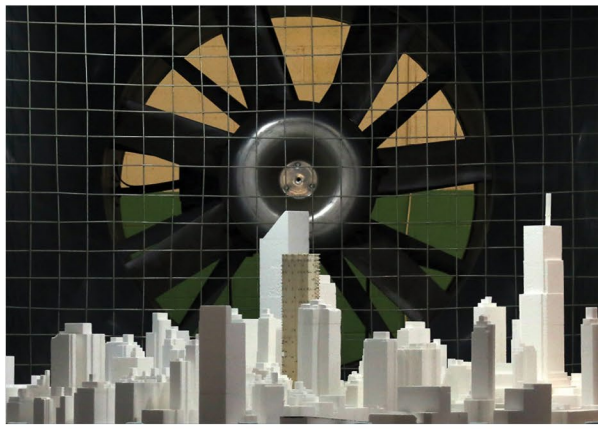
# DETAILED TRAFFIC NOISE STUDY

110 O'Connor Street
Ottawa, Ontario

REPORT: GW24-056-Detailed Traffic Noise Study





May 24th, 2024

PREPARED FOR
**MACH**
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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 110 O'Connor Street in Ottawa, Ontario. The mixed-use development comprises of a single, rectilinear tower spanning 25 floors on a 6 floor, L-shaped podium. The major contributors of traffic noise are O'Connor Street, Laurier Avenue, and Slater 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 Geiger Huot Architects dated February 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 60 and 67 dBA during the daytime period (07:00-23:00) and between 53 and 60 dBA during the nighttime period (23:00-07:00). The highest noise level (67 dBA) occurs along the north and east façades of the building, which are nearest and most exposed to all roadway sources. Building components with a higher Sound Transmission Class (STC) rating will be required where exterior noise levels exceed 65 dBA, indicated in Figure 3 and Table 4.

Results of the calculations also indicate that the building will require forced air heating systems with central air conditioning, or similar mechanical system, which will allow occupants to keep windows closed and maintain a comfortable living/working environment. The following Type D Warning Clause[3] will be required on all Lease, Purchase and Sale Agreements, as summarized in Section 6.

Regarding stationary noise impacts from the development on the surroundings, these can be minimized by judicious placement mechanical equipment such as its placement on a 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 City of Ottawa Noise By-Law No. 2017-255.

[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
[3] MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 8

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# 1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by MACH to undertake a detailed traffic noise study for the proposed mixed-use development, located at 110 O'Connor Street 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[4] and Ministry of the Environment, Conservation and Parks (MECP) NPC-300[5] guidelines, site plan drawings received from Geiger Huot Architects dated February 2024, with future roadway traffic volumes corresponding with the City of Ottawa's Official Plan (OP) roadway classifications.

# 2. TERMS OF REFERENCE

The proposed mixed-use development comprises of a single, rectilinear tower spanning 25 floors on a 6 floor, L-shaped podium. There are outdoor amenity areas on the south rear end of the building at grade level, and at the north side of the podium. Other than commercial space located on the ground floor, the development is residential. Underground parking is also present in the development.

The major contributors of traffic noise are O'Connor Street, Slater Street, and Laurier Avenue. The study site is surrounded predominantly by high-rise buildings, and parking structures, with a few hotels and apartment buildings. Figure 1 illustrates a complete site plan with surrounding context.

Other sources of traffic noise such as Albert and Bank Streets were deemed insignificant due to the development's lack of exposure to them caused by the downtown infrastructure. Additionally, nearby local roads such as Gloucester Street were deemed insignificant, due to their low traffic volumes.

Regarding stationary noise impacts from the development on the surroundings, these can be minimized by judicious placement mechanical equipment such as its placement on a roof or in a mechanical

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

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 and comply with the ENCG Sound Level Limits and 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.

# 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 ($2\times10^{-5}$ 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.

**TABLE 1: INDOOR SOUND LEVEL CRITERIA (ROAD)** [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

[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

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].

For designated Outdoor Living Areas (OLAs), the sound level limit is 55 dBA during the daytime period. An excess above the limit, between 55 dBA and 60 dBA, is acceptable only in cases where the required noise control measures are not feasible for technical, economic, or administrative reasons. Furthermore, balconies and terraces less than 4m in depth from the façade do not require consideration as Outdoor Living Areas and were excluded from the analysis.

### 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, all 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. 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 |
| O'Connor Street | 2-Lane Urban Arterial | 40 | **15,000** | 92/8 | **7** | **5** |
| Slater Street | 2-Lane Urban Arterial | 40 | **15,000** | 92/8 | **7** | **5** |
| Laurier Avenue | 2-Lane Urban Arterial | 40 | **15,000** | 92/8 | **7** | **5** |

[8] MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3
[9] City of Ottawa Transportation Master Plan, November 2013

### 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 such as truck traffic volume percentages, posted speed limit, and day/night split are summarized in Table 2.
- 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 8 locations around the study area (see Figure 2).
- For select sources where appropriate, receptors considered the proposed and existing building as a barrier partially or fully obstructing exposure to the source.
- Due to STAMSON software limitations, when receptors were measured less than 15m away from roadway sources, distances were modelled as 15m.
- Receptor distances and exposure angles are illustrated in Figures A1-A3.

## 4.3 Indoor Noise Calculations

The difference between outdoor and indoor noise levels is the noise attenuation provided by the building envelope. According to common industry practice, complete walls and individual wall elements are rated according to the Sound Transmission Class (STC). The STC ratings of common residential walls built in conformance with the Ontario Building Code (2012) typically exceed STC 35, depending on exterior cladding, thickness, and interior finish details. For example, concrete and masonry walls can achieve STC 50 or more. Curtainwall systems typically provide around STC 35, depending on the glazing elements. Standard good quality double-glazed non-operable windows can have STC ratings ranging from 25 to 40 depending on the window manufacturer, pane thickness and inter-pane spacing. As previously mentioned, the windows are the known weak point in a partition.

According to the ENCG, when daytime noise levels (from road and rail sources) at the plane of the window exceed 65 dBA, calculations must be performed to evaluate the sound transmission quality of the building components to ensure acceptable indoor noise levels. The calculation procedure[10] considers:

- Window type and total area as a percentage of total room floor area
- Exterior wall type and total area as a percentage of the total room floor area
- Acoustic absorption characteristics of the room
- Outdoor noise source type and approach geometry
- Indoor sound level criteria, which varies according to the intended use of a space.

Based on published research[11], exterior walls possess specific sound attenuation characteristics that are used as a basis for calculating the required STC ratings of windows in the same partition. Due to the limited information available at the time of the study, which was prepared for site plan approval, final detailed floor layouts and building elevations were unavailable and therefore detailed STC calculations could not be performed at this time. As a guideline, the anticipated STC requirements for windows have been estimated based on the overall noise reduction required for each intended use of space (STC = outdoor noise level – targeted indoor noise levels + safety factor).

# 5. RESULTS

## 5.1 Roadway Traffic Noise Levels

The results of the current analysis indicate that noise levels will range between 60 and 67 dBA during the daytime period (07:00-23:00) and between 53 and 60 dBA during the nighttime period (23:00-07:00). The highest noise level (67 dBA) occurs along the north and east façades of the building, which are nearest and most exposed to all roadway sources.

[10] Building Practice Note: Controlling Sound Transmission into Buildings by J.D. Quirt, National Research Council of Canada, September 1985
[11] CMHC, Road & Rail Noise: Effects on Housing

### 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 | 18.5 | POW – L6 Podium North Façade | 67 | 60 |
| 2 | 18.5 | POW – L6 Podium East Façade | 67 | 60 |
| 3 | 75.5 | POW – L25 Tower North Façade | 67 | 59 |
| 4 | 75.5 | POW – L25 Tower East Façade | 67 | 59 |
| 5 | 75.5 | POW – L25 Tower South Façade | 65 | 57 |
| 6 | 75.5 | POW – L25 Tower West Façade | 60 | 53 |
| 7 | 1.5 | OLA – Rear Outdoor Amenity | 54 | N/A* |
| 8 | 21.5 | OLA – L7 Outdoor Amenity | 54 | N/A* |

**Noise levels during the nighttime are not considered for OLAs*

## 5.2 Noise Control Measures

The noise levels predicted due to roadway traffic exceed the criteria listed in Section 4.2 for building components for the development. As discussed in Section 4.2, the anticipated STC requirements for windows have been estimated based on the overall noise reduction required for each intended use of space (STC = outdoor noise level – targeted indoor noise levels). As per NPC-300 requirements, detailed STC calculations will be required to be completed prior to building permit application for each unit type. The STC requirements for the windows are summarized below for various units within the development (see Figure 3). Where specific updated building components are not identified, bedroom/living room/retail windows are to satisfy Ontario Building Code (OBC) requirements.

### TABLE 4: NOISE CONTROL REQUIREMENTS

| Façade | Floor Number | Bedroom Window STC | Exterior Wall STC | Warning Clauses | A/C |
|---|---|---|---|---|---|
| North, East, South | 1-25 | 30 | 45 | D | Yes |

# 6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels will range between 60 and 67 dBA during the daytime period (07:00-23:00) and between 53 and 60 dBA during the nighttime period (23:00-07:00). The highest noise level (67 dBA) occurs along the north and east façades of the building, which are nearest and most exposed to all roadway sources. Building components with a higher Sound Transmission Class (STC) rating will be required where exterior noise levels exceed 65 dBA, indicated in Figure 3 and Table 4.

Results of the calculations also indicate that the building will require forced air heating systems with central air conditioning, or similar mechanical system, which will allow occupants to keep windows closed and maintain a comfortable living/working environment. The following Type D Warning Clause[12] will be required on 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."*

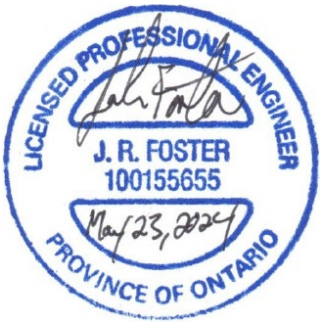
Regarding stationary noise impacts from the development on the surroundings, these can be minimized by judicious placement mechanical equipment such as its placement on a roof or in a mechanical penthouse, or the incorporation of silencers and noise screens as necessary. Due to the size and nature of 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 City of Ottawa Noise By-Law No. 2017-255.

[12] MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 8

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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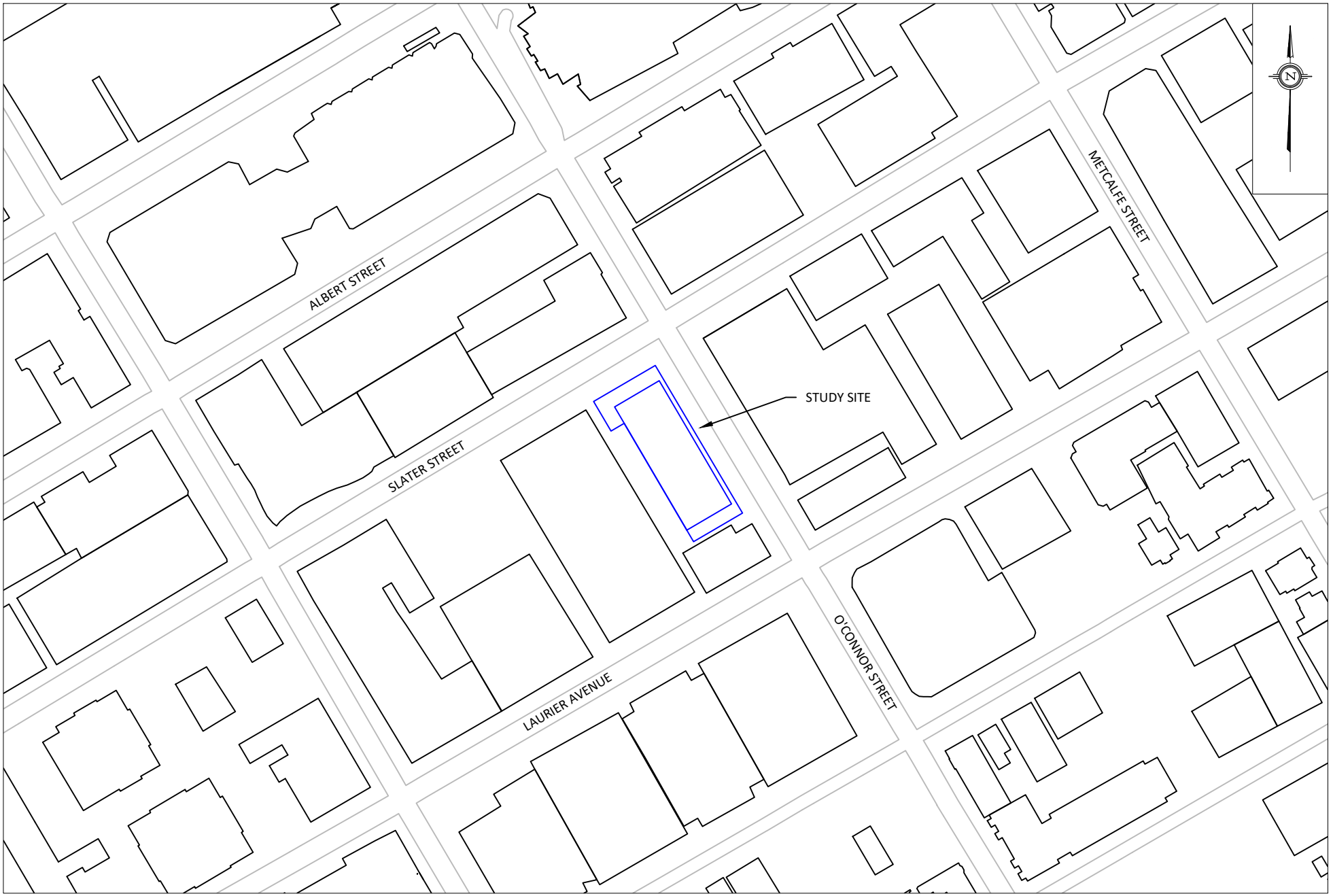
*Gradient Wind File #24-056 – Detailed Traffic Noise Study*

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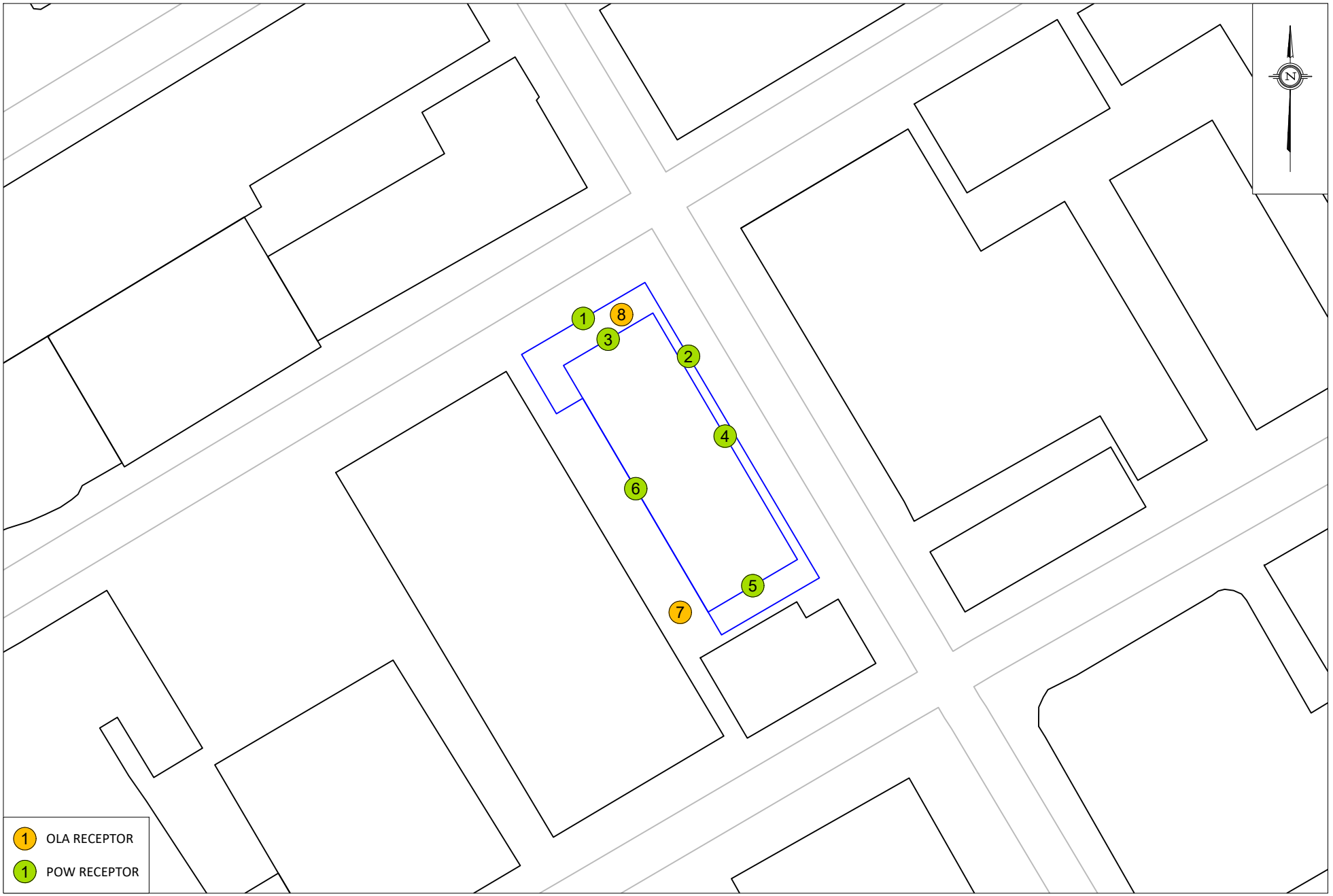
| SCALE | 1:1500 (APPROX.) |
| DRAWING NO. | GW24-056-1 |
| DATE | MAY 9, 2024 |
| DRAWN BY | A.B. |

DESCRIPTION

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT

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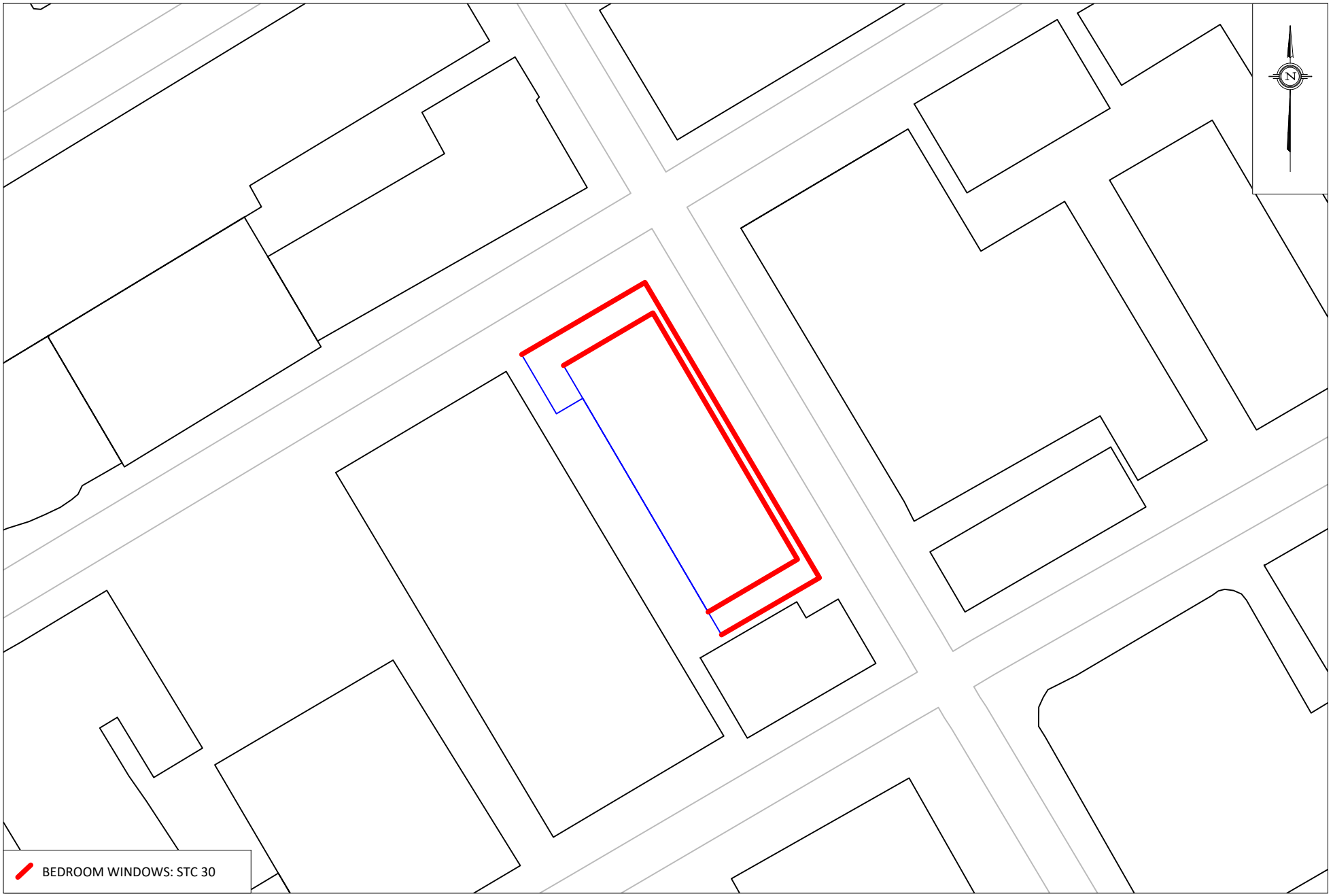
| DRAWN BY | A.B. |

DESCRIPTION

FIGURE 2:
TRAFFIC NOISE RECEPTOR LOCATIONS

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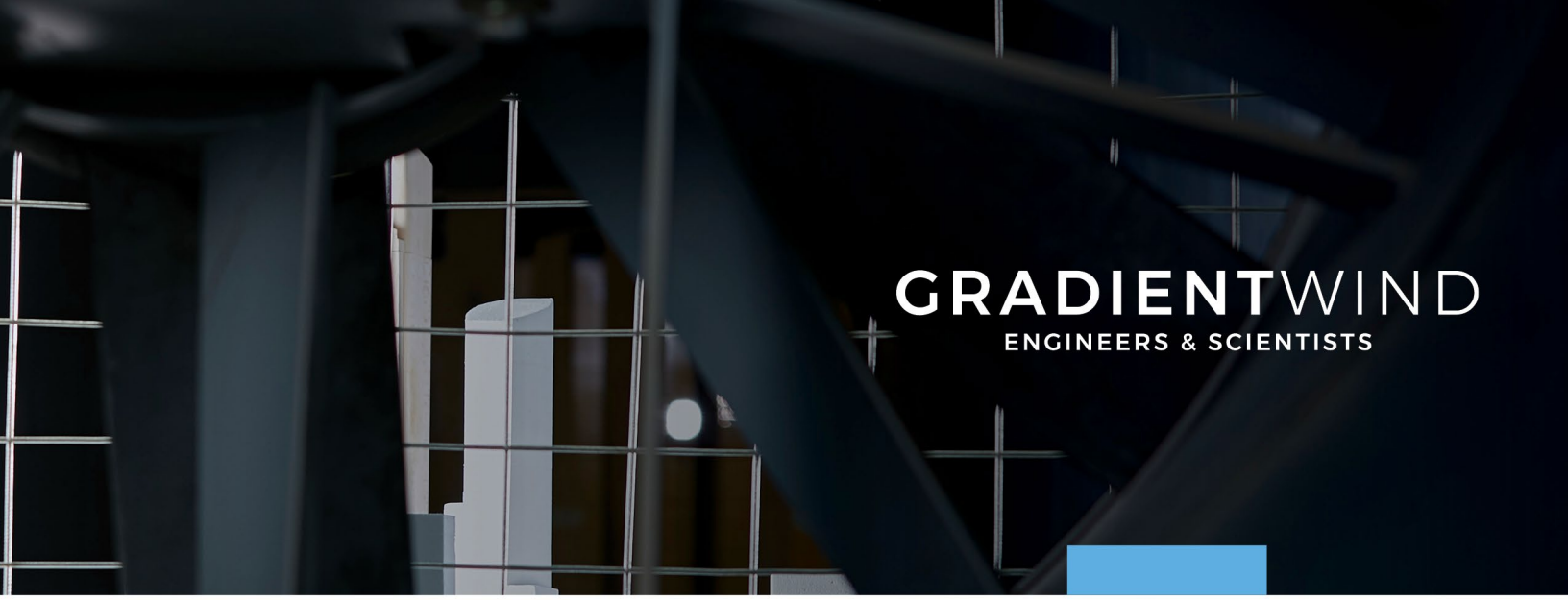
DESCRIPTION

FIGURE 3:
WINDOW STC REQUIREMENTS



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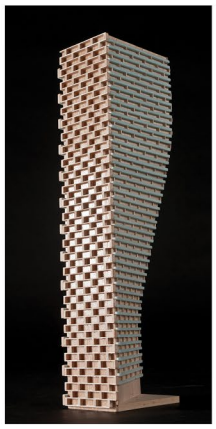

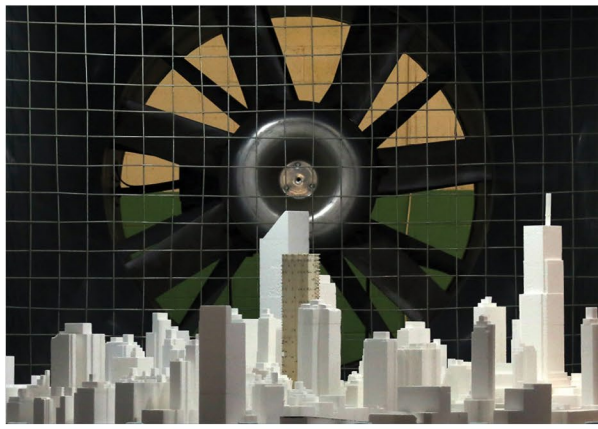

# APPENDIX A

## STAMSON 5.04 – INPUT AND OUTPUT DATA

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DESCRIPTION

FIGURE A1:
RECEPTOR DISTANCES AND EXPOSURE ANGLES


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| SCALE | 1:1000 (APPROX.) | DRAWING NO. | GW24-056-A2 |
| DATE | MAY 9, 2024 | DRAWN BY | A.B. |

FIGURE A2:
RECEPTOR DISTANCES AND EXPOSURE ANGLES


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| SCALE | 1:1000 (APPROX.) | DRAWING NO. | GW24-056-A3 |
| DATE | MAY 9, 2024 | DRAWN BY | A.B. |

FIGURE A3:
RECEPTOR DISTANCES AND EXPOSURE ANGLES

**STAMSON 5.0 NORMAL REPORT Date: 07-05-2024 15:10:23**
**MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT**

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

```
Road data, segment # 1: O'Connor (day/night)
---------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    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):  15000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: O'Connor (day/night)
---------------------------------------------
Angle1   Angle2           : -57.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  25.00 / 25.00  m
Receiver height           :  18.50 / 18.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Slater (day/night)
---------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    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):  15000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00
```

```
Data for Segment # 2: Slater (day/night)
----------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  15.00 / 15.00  m
Receiver height           :  18.50 / 18.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: O'Connor (day)
----------------------------------

Source height = 1.50 m

ROAD (0.00 + 59.47 + 0.00) = 59.47 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -57      0   0.00  66.69   0.00  -2.22  -4.99   0.00   0.00   0.00  59.47
-------------------------------------------------------------------------------

Segment Leq : 59.47 dBA

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

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  66.69   0.00   0.00   0.00   0.00   0.00   0.00  66.69
-------------------------------------------------------------------------------

Segment Leq : 66.69 dBA

Total Leq All Segments: 67.44 dBA

Results segment # 1: O'Connor (night)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 51.88 + 0.00) = 51.88 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -57      0   0.00  59.09   0.00  -2.22  -4.99   0.00   0.00   0.00  51.88
-------------------------------------------------------------------------------

Segment Leq : 51.88 dBA

Results segment # 2: Slater (night)
```

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

Source height = 1.50 m

ROAD (0.00 + 59.09 + 0.00) = 59.09 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  59.09   0.00   0.00   0.00   0.00   0.00   0.00  59.09
-------------------------------------------------------------------------------

Segment Leq : 59.09 dBA

Total Leq All Segments: 59.85 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 67.44
                           (NIGHT): 59.85
```

**STAMSON 5.0 NORMAL REPORT Date: 07-05-2024 15:05:57**
**MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT**

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

```
Road data, segment # 1: O'Connor (day/night)
----------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    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):  15000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: O'Connor (day/night)
----------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  15.00 / 15.00  m
Receiver height           :  18.50 / 18.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Laurier (day/night)
----------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    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):  15000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00
```

```
Data for Segment # 2: Laurier (day/night)
-----------------------------------------
Angle1   Angle2           : -17.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  80.00 / 80.00  m
Receiver height           :  18.50 / 18.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 3: Slater (day/night)
------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    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):  15000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Slater (day/night)
----------------------------------------
Angle1   Angle2           :   0.00 deg   53.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  29.00 / 29.00  m
Receiver height           :  18.50 / 18.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: O'Connor (day)
-----------------------------------

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  66.69   0.00   0.00   0.00   0.00   0.00   0.00  66.69
-------------------------------------------------------------------------------

Segment Leq : 66.69 dBA
```

```
Results segment # 2: Laurier (day)
----------------------------------

Source height = 1.50 m

ROAD (0.00 + 49.17 + 0.00) = 49.17 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -17      0   0.00  66.69   0.00  -7.27 -10.25   0.00   0.00   0.00  49.17
-------------------------------------------------------------------------------

Segment Leq : 49.17 dBA

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

Source height = 1.50 m

ROAD (0.00 + 58.51 + 0.00) = 58.51 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     53   0.00  66.69   0.00  -2.86  -5.31   0.00   0.00   0.00  58.51
-------------------------------------------------------------------------------

Segment Leq : 58.51 dBA

Total Leq All Segments: 67.37 dBA

Results segment # 1: O'Connor (night)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 59.09 + 0.00) = 59.09 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  59.09   0.00   0.00   0.00   0.00   0.00   0.00  59.09
-------------------------------------------------------------------------------

Segment Leq : 59.09 dBA

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

Source height = 1.50 m

ROAD (0.00 + 41.57 + 0.00) = 41.57 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -17      0   0.00  59.09   0.00  -7.27 -10.25   0.00   0.00   0.00  41.57
-------------------------------------------------------------------------------

Segment Leq : 41.57 dBA
```

```
Results segment # 3: Slater (night)
-----------------------------------

Source height = 1.50 m

ROAD (0.00 + 50.92 + 0.00) = 50.92 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     53   0.00  59.09   0.00  -2.86  -5.31   0.00   0.00   0.00  50.92
-------------------------------------------------------------------------------

Segment Leq : 50.92 dBA

Total Leq All Segments: 59.77 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 67.37
                           (NIGHT): 59.77
```

**STAMSON 5.0 NORMAL REPORT Date: 07-05-2024 15:12:25**
**MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT**

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

```
Road data, segment # 1: O'Connor (day/night)
----------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    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):  15000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: O'Connor (day/night)
----------------------------------------------
Angle1   Angle2           : -67.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  23.00 / 23.00  m
Receiver height           :  75.50 / 75.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Slater (day/night)
----------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    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):  15000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00
```

```
Data for Segment # 2: Slater (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  :  18.00 / 18.00  m
Receiver height           :  75.50 / 75.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: O'Connor (day)
-----------------------------------

Source height = 1.50 m

ROAD (0.00 + 60.54 + 0.00) = 60.54 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -67      0   0.00  66.69   0.00  -1.86  -4.29   0.00   0.00   0.00  60.54
-------------------------------------------------------------------------------

Segment Leq : 60.54 dBA

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

Source height = 1.50 m

ROAD (0.00 + 65.89 + 0.00) = 65.89 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  66.69   0.00  -0.79   0.00   0.00   0.00   0.00  65.89
-------------------------------------------------------------------------------

Segment Leq : 65.89 dBA

Total Leq All Segments: 67.00 dBA

Results segment # 1: O'Connor (night)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 52.94 + 0.00) = 52.94 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -67      0   0.00  59.09   0.00  -1.86  -4.29   0.00   0.00   0.00  52.94
-------------------------------------------------------------------------------

Segment Leq : 52.94 dBA

Results segment # 2: Slater (night)
```

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

Source height = 1.50 m

ROAD (0.00 + 58.30 + 0.00) = 58.30 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  59.09   0.00  -0.79   0.00   0.00   0.00   0.00  58.30
-------------------------------------------------------------------------------

Segment Leq : 58.30 dBA

Total Leq All Segments: 59.41 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 67.00
                           (NIGHT): 59.41
```

**STAMSON 5.0 NORMAL REPORT Date: 07-05-2024 15:07:38**
**MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT**

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

```
Road data, segment # 1: O'Connor (day/night)
---------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    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):  15000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: O'Connor (day/night)
-------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  15.00 / 15.00  m
Receiver height           :  75.50 / 75.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Laurier (day/night)
---------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    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):  15000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00
```

```
Data for Segment # 2: Laurier (day/night)
-----------------------------------------
Angle1   Angle2           : -23.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  63.00 / 63.00  m
Receiver height           :  75.50 / 75.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 3: Slater (day/night)
------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    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):  15000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Slater (day/night)
----------------------------------------
Angle1   Angle2           :   0.00 deg   33.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  46.00 / 46.00  m
Receiver height           :  75.50 / 75.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: O'Connor (day)
-----------------------------------

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  66.69   0.00   0.00   0.00   0.00   0.00   0.00  66.69
-------------------------------------------------------------------------------

Segment Leq : 66.69 dBA
```

```
Results segment # 2: Laurier (day)
----------------------------------

Source height = 1.50 m

ROAD (0.00 + 51.52 + 0.00) = 51.52 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -23      0   0.00  66.69   0.00  -6.23  -8.94   0.00   0.00   0.00  51.52
-------------------------------------------------------------------------------

Segment Leq : 51.52 dBA

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

Source height = 1.50 m

ROAD (0.00 + 54.45 + 0.00) = 54.45 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     33   0.00  66.69   0.00  -4.87  -7.37   0.00   0.00   0.00  54.45
-------------------------------------------------------------------------------

Segment Leq : 54.45 dBA

Total Leq All Segments: 67.06 dBA

Results segment # 1: O'Connor (night)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 59.09 + 0.00) = 59.09 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  59.09   0.00   0.00   0.00   0.00   0.00   0.00  59.09
-------------------------------------------------------------------------------

Segment Leq : 59.09 dBA

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

Source height = 1.50 m

ROAD (0.00 + 43.92 + 0.00) = 43.92 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -23      0   0.00  59.09   0.00  -6.23  -8.94   0.00   0.00   0.00  43.92
-------------------------------------------------------------------------------

Segment Leq : 43.92 dBA
```

```
Results segment # 3: Slater (night)
-----------------------------------

Source height = 1.50 m

ROAD (0.00 + 46.85 + 0.00) = 46.85 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     33   0.00  59.09   0.00  -4.87  -7.37   0.00   0.00   0.00  46.85
-------------------------------------------------------------------------------

Segment Leq : 46.85 dBA

Total Leq All Segments: 59.46 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 67.06
                           (NIGHT): 59.46
```

**STAMSON 5.0 NORMAL REPORT Date: 07-05-2024 15:14:04**
**MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT**

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

```
Road data, segment # 1: O'Connor (day/night)
---------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    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):  15000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: O'Connor (day/night)
-------------------------------------------
Angle1   Angle2           :   0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  23.00 / 23.00  m
Receiver height           :  75.50 / 75.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Laurier (day/night)
---------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    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):  15000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00
```

```
Data for Segment # 2: Laurier (day/night)
-----------------------------------------
Angle1   Angle2           : -70.00 deg   53.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  35.00 / 35.00  m
Receiver height           :  75.50 / 75.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: O'Connor (day)
-----------------------------------

Source height = 1.50 m

ROAD (0.00 + 61.82 + 0.00) = 61.82 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     90   0.00  66.69   0.00  -1.86  -3.01   0.00   0.00   0.00  61.82
-------------------------------------------------------------------------------

Segment Leq : 61.82 dBA

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

Source height = 1.50 m

ROAD (0.00 + 61.35 + 0.00) = 61.35 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -70     53   0.00  66.69   0.00  -3.68  -1.65   0.00   0.00   0.00  61.35
-------------------------------------------------------------------------------

Segment Leq : 61.35 dBA

Total Leq All Segments: 64.60 dBA

Results segment # 1: O'Connor (night)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 54.22 + 0.00) = 54.22 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     90   0.00  59.09   0.00  -1.86  -3.01   0.00   0.00   0.00  54.22
-------------------------------------------------------------------------------

Segment Leq : 54.22 dBA

Results segment # 2: Laurier (night)
```

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

Source height = 1.50 m

ROAD (0.00 + 53.76 + 0.00) = 53.76 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -70     53   0.00  59.09   0.00  -3.68  -1.65   0.00   0.00   0.00  53.76
-------------------------------------------------------------------------------

Segment Leq : 53.76 dBA

Total Leq All Segments: 57.01 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 64.60
                           (NIGHT): 57.01
```

**STAMSON 5.0 NORMAL REPORT Date: 07-05-2024 15:15:49**
**MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT**

**Filename: r6.te Time Period: Day/Night 16/8 hours**
**Description:**

```
Road data, segment # 1: Laurier (day/night)
-------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    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):  15000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Laurier (day/night)
-----------------------------------------
Angle1   Angle2           :   0.00 deg   47.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  63.00 / 63.00  m
Receiver height           :  75.50 / 75.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Slater (day/night)
------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    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):  15000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00
```

```
Data for Segment # 2: Slater (day/night)
----------------------------------------
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  46.00 / 46.00  m
Receiver height           :  75.50 / 75.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

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

Source height = 1.50 m

ROAD (0.00 + 54.62 + 0.00) = 54.62 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     47   0.00  66.69   0.00  -6.23  -5.83   0.00   0.00   0.00  54.62
-------------------------------------------------------------------------------

Segment Leq : 54.62 dBA

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

Source height = 1.50 m

ROAD (0.00 + 58.81 + 0.00) = 58.81 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90      0   0.00  66.69   0.00  -4.87  -3.01   0.00   0.00   0.00  58.81
-------------------------------------------------------------------------------

Segment Leq : 58.81 dBA

Total Leq All Segments: 60.21 dBA

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

Source height = 1.50 m

ROAD (0.00 + 47.02 + 0.00) = 47.02 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     47   0.00  59.09   0.00  -6.23  -5.83   0.00   0.00   0.00  47.02
-------------------------------------------------------------------------------

Segment Leq : 47.02 dBA

Results segment # 2: Slater (night)
```

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

Source height = 1.50 m

ROAD (0.00 + 51.21 + 0.00) = 51.21 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90      0   0.00  59.09   0.00  -4.87  -3.01   0.00   0.00   0.00  51.21
-------------------------------------------------------------------------------

Segment Leq : 51.21 dBA

Total Leq All Segments: 52.61 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.21
                           (NIGHT): 52.61
```

**STAMSON 5.0 NORMAL REPORT Date: 07-05-2024 15:17:28**
**MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT**

**Filename: r7.te Time Period: Day/Night 16/8 hours**
**Description:**

```
Road data, segment # 1: Laurier (day/night)
-------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    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):  15000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Laurier (day/night)
-----------------------------------------
Angle1   Angle2           :   0.00 deg   21.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  38.00 / 38.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Slater (day/night)
------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    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):  15000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00
```

```
Data for Segment # 2: Slater (day/night)
----------------------------------------
Angle1   Angle2           :  -4.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  71.00 / 71.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

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

Source height = 1.50 m

ROAD (0.00 + 53.32 + 0.00) = 53.32 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     21   0.00  66.69   0.00  -4.04  -9.33   0.00   0.00   0.00  53.32
-------------------------------------------------------------------------------

Segment Leq : 53.32 dBA

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

Source height = 1.50 m

ROAD (0.00 + 43.40 + 0.00) = 43.40 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    -4      0   0.00  66.69   0.00  -6.75 -16.53   0.00   0.00   0.00  43.40
-------------------------------------------------------------------------------

Segment Leq : 43.40 dBA

Total Leq All Segments: 53.74 dBA

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

Source height = 1.50 m

ROAD (0.00 + 45.72 + 0.00) = 45.72 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     21   0.00  59.09   0.00  -4.04  -9.33   0.00   0.00   0.00  45.72
-------------------------------------------------------------------------------

Segment Leq : 45.72 dBA

Results segment # 2: Slater (night)
```

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

Source height = 1.50 m

ROAD (0.00 + 35.81 + 0.00) = 35.81 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    -4      0   0.00  59.09   0.00  -6.75 -16.53   0.00   0.00   0.00  35.81
-------------------------------------------------------------------------------

Segment Leq : 35.81 dBA

Total Leq All Segments: 46.14 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 53.74
                           (NIGHT): 46.14
```

```
STAMSON 5.0        NORMAL REPORT        Date: 07-05-2024 15:20:14
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r8.te                 Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: O'Connor (day/night)
----------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    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):  15000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: O'Connor (day/night)
----------------------------------------------
Angle1   Angle2           : -80.00 deg   28.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  18.00 / 18.00  m
Receiver height           :  21.50 / 21.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -80.00 deg   Angle2 : 28.00 deg
Barrier height            :  20.00 m
Barrier receiver distance :   5.00 / 5.00   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

Road data, segment # 2: Slater (day/night)
----------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    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):  15000
```

```
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Slater (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  :  16.00 / 16.00  m
Receiver height           :  21.50 / 21.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :  20.00 m
Barrier receiver distance :   5.00 / 5.00   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

Results segment # 1: O'Connor (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 !       21.50 !       15.94 !        15.94

ROAD (0.00 + 48.24 + 0.00) = 48.24 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -80     28   0.00  66.69   0.00  -0.79  -2.22   0.00   0.00 -15.44  48.24
-------------------------------------------------------------------------------

Segment Leq : 48.24 dBA

Results segment # 2: Slater (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 !       21.50 !       15.25 !        15.25

ROAD (0.00 + 52.40 + 0.00) = 52.40 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  66.69   0.00  -0.28   0.00   0.00   0.00 -14.01  52.40
-------------------------------------------------------------------------------

Segment Leq : 52.40 dBA

Total Leq All Segments: 53.81 dBA

Results segment # 1: O'Connor (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 !       21.50 !       15.94 !        15.94

ROAD (0.00 + 40.64 + 0.00) = 40.64 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -80     28   0.00  59.09   0.00  -0.79  -2.22   0.00   0.00 -15.44  40.64
-------------------------------------------------------------------------------

Segment Leq : 40.64 dBA

Results segment # 2: Slater (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 !       21.50 !       15.25 !        15.25

ROAD (0.00 + 44.80 + 0.00) = 44.80 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  59.09   0.00  -0.28   0.00   0.00   0.00 -14.01  44.80
-------------------------------------------------------------------------------

Segment Leq : 44.80 dBA

Total Leq All Segments: 46.21 dBA
```

```
TOTAL Leq FROM ALL SOURCES (DAY): 53.81
                           (NIGHT): 46.21
```