# Environmental Noise Assessment

# 1705 Carling Avenue

# Ottawa, Ontario

REPORT: GWE18-056 – Environmental Noise

**Prepared For:**

Bruce Stewart
**The Founders Residences Ottawa LP**
20 Holly Street, Suite 300
Toronto ON
M4S 3B1

**Prepared By:**

Michael Lafortune, Environmental Scientist
Joshua Foster, P.Eng., Principal

April 20, 2018

127 Walgreen Road, Ottawa, Ontario K0A 1L0
T (613) 836-0934 ● www.gradientwind.com

# EXECUTIVE SUMMARY

This document describes an environmental noise assessment performed for a proposed mixed-use development with residential care facility and apartment dwelling occupancies, located at 1705 Carling Avenue in Ottawa, Ontario. The development comprises a new nine-storey building. The site is located northwest of the Carling Avenue and Clyde Avenue intersection. The site is surrounded by mixed-use land comprised primarily of residential and commercial zones. The major source of transportation noise is Carling Avenue, with minor influence from Highway 417. The major sources of stationary noise are from rooftop mechanical equipment atop the proposed building. Figure 1 illustrates a complete site plan with surrounding context.

The assessment is based on (i) theoretical noise prediction methods that conform to the Ministry of the Environment and Climate Change (MOECC) and City of Ottawa requirements; (ii) noise level criteria as specified by the City of Ottawa's Environmental Noise Control Guidelines (ENCG); (iii) future vehicular traffic volumes based on the City of Ottawa's Official Plan roadway classifications; (iv) architectural drawings received from RLA Architecture; and (v) mechanical information received from JAIN Consultants.

The results of the current analysis indicate that noise levels will range between 52 and 74 dBA during the daytime period (07:00-23:00) and between 45 and 67 dBA during the nighttime period (23:00-07:00). The highest noise levels (i.e. 74 dBA) occur along the development's south façade, which is nearest and most exposed to Carling Avenue. Noise levels at the 7$^{th}$ Floor terrace cannot be feasibly mitigated to 60 dBA, and as such the ground level green space is considered to be a protected outdoor living area. Building components with a higher Sound Transmission Class (STC) rating will be required where exterior noise levels exceed 65 dBA, as indicated on Figure 3.

Results of the calculations also indicate that the development will require central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. A Warning Clause will also be required be placed on all Lease, Purchase and Sale Agreements, as summarized in Section 6.

Results of the stationary noise assessment indicate that, provided our assumptions for noise control in Section 4.4.1 are adhered to in the detailed design process, noise levels at nearby points of reception are expected to fall below the ENCG noise criteria. As such, the proposed development is expected to be

compatible with the existing noise sensitive land uses. A review of final equipment selection and locations by a qualified acoustical engineer will be required prior to installation of the equipment.

# TABLE OF CONTENTS


1. INTRODUCTION 1

2. TERMS OF REFERENCE 1

3. OBJECTIVES 2

4. METHODOLOGY 2

4.1 Background 2

4.2 Roadway Traffic Noise 2

4.2.1 Criteria for Roadway Traffic Noise 2

4.2.1 Roadway Traffic Volumes 4

4.2.2 Theoretical Roadway Traffic Noise Predictions 4

4.3 Indoor Noise Calculations 5

4.4 Stationary Noise 6

4.4.1 Assumptions 6

4.4.2 Stationary Noise Source Assessment and Criteria 6

4.4.3 Determination of Noise Source Power Levels 7

4.4.4 Stationary Source Noise Predictions 7

5. RESULTS AND DISCUSSION 9

5.1 Roadway Traffic Noise Levels 9

5.1.1 Roadway Traffic Noise Control Measures 10

5.1.2 Noise Barrier Calculation 11

5.2 Stationary Noise Levels 12

6. CONCLUSIONS AND RECOMMENDATIONS 14

FIGURES

APPENDICES:

Appendix A – STAMSON 5.04 Input and Output Data

Appendix B – Predictor Lima Sample Output

# 1. INTRODUCTION

Gradient Wind Engineering Inc. (GWE) was retained by The Founders Residences Ottawa LP to undertake an environmental noise assessment of a proposed mixed-use development with residential care facility and apartment dwelling occupancies, located at 1705 Carling Avenue in Ottawa, Ontario. This report summarizes the methodology, results and recommendations related to an environmental noise assessment. GWE's scope of work involved assessing exterior and interior noise levels generated by local transportation sources, as well as consideration of off-site stationary noise impacts from proposed mechanical equipment associated with the development. The assessment was performed on the basis of theoretical noise calculation methods conforming to the City of Ottawa[1] and Ministry of the Environment and Climate Change (MOECC)[2] guidelines. Noise calculations were based on preliminary architectural drawings provided by Roderick Lahey Architect Inc. in April 2018, mechanical information received from JAIN Consultants, and future traffic volumes corresponding to the City of Ottawa's Official Plan (OP) roadway classifications.

# 2. TERMS OF REFERENCE

The focus of this environmental noise assessment is a proposed mixed-use development with residential care facility and apartment dwelling occupancies. The study site is located in the middle of a parcel of land bounded by Carling Avenue to the south, Cole Avenue to the east, Tillbury Avenue to the north, and Highland Avenue to the west. The site is surrounded by mixed-use land comprised primarily of residential and commercial zones. The major source of transportation noise is Carling Avenue, with minor influence from Highway 417 to the south. The major sources of stationary noise are from rooftop mechanical equipment atop the proposed building. Figure 1 illustrates a complete site plan with surrounding context.

The proposed development features a nine-storey building and will reach a maximum height of 32.1 metres, measured from grade to the top of the mechanical penthouse. The building planform is T-shaped with the top of the 'T' oriented along Carling Avenue. A landscaped courtyard is located at the northwest crook of the building. The ground floor contains a reception area in the northeast crook of the building, a lobby area, and shared building amenity spaces including a dining hall and recreational space. Level 2 and

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

above comprises residential units. The building planform remains constant until Level 7, where the floorplate sets back from the southwest corner of the west wing to create an outdoor amenity space. The floorplate also sets back at Level 8 on the northwest corner of the west wing and the north side of the north wing to create outdoor amenity spaces.

# 3. OBJECTIVES

The main goals of this work are to (i) calculate the future noise levels on the study building produced by local transportation sources, (ii) calculate the future noise levels on surrounding noise-sensitive properties produced by stationary noise sources associated with the development, and (iii) ensure that interior and exterior noise levels do not exceed the allowable limits specified by the City of Ottawa's Environmental Noise Control Guidelines as outlined in Section 4 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 City of Ottawa's Environmental Noise

Control Guidelines (ENCG) specifies that the recommended indoor noise limit range (that is relevant to this study) is 45 and 40 dBA for residence living rooms and sleeping quarters respectively, as listed in Table 1. To account for deficiencies in building construction, theses levels should be targeted toward 42 and 37 dBA.

**TABLE 1: INDOOR SOUND LEVEL CRITERIA (ROAD & RAIL)[3]**

| Type of Space | Time Period | $L_{eq}$ (dBA) | |
|---|---|---|---|
| | | Road | Rail |
| General offices, reception areas, retail stores, etc. | 07:00 – 23:00 | 50 | 45 |
| **Living/dining/den areas of residences**, hospitals, schools, **nursing/retirement homes**, day-care centres, theatres, places of worship, libraries, individual or semi-private offices, conference rooms, etc. | 07:00 – 23:00 | 45 | 40 |
| Sleeping quarters of hotels/motels | 23:00 – 07:00 | 45 | 40 |
| **Sleeping quarters of residences**, hospitals, **nursing/retirement homes**, etc. | 23:00 – 07:00 | 40 | 35 |

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[4]. Therefore, where noise levels exceed 55 dBA daytime and 50 dBA nighttime, the ventilation for the building should consider the need for having windows and doors closed, which normally triggers the need for central air conditioning. Where noise levels exceed 65 dBA daytime and 60 dBA nighttime, building components will require higher levels of sound attenuation[5].

The sound level criterion for outdoor living areas is 55 dBA, which applies during the daytime period (07:00 to 23:00). When noise levels exceed 55 dBA, mitigation must be provided to reduce noise levels where technically and administratively feasible to acceptable levels at or below the criterion.

[3] Adapted from ENCG 2016 – Tables 2.2b and 2.2c
[4] Burberry, P.B.. (2014). Mitchell's Environment and Services. Routledge, Page 125
[5] MOECC, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3

### 4.2.1 Roadway Traffic Volumes

The ENCG dictates that noise calculations should consider future sound levels based on a roadway's classification at the mature state of development. Therefore, traffic volumes are based on the roadway classifications outlined in the City of Ottawa's Official Plan (OP) and Transportation Master Plan[6] which provide additional details on future roadway expansions. Average Annual Daily Traffic (AADT) volumes 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 / Transit Class | Speed Limit (km/h) | Traffic Volumes |
|---|---|---|---|
| Carling Avenue | 6-UAD | 60 | **50,000** |
| Highway 417 WB | 8-Freeway | 100 | **73,333** |
| Highway 417 EB | | | **73,333** |

### 4.2.2 Theoretical Roadway Traffic Noise Predictions

Noise predictions were performed with the aid of the MOECC computerized noise assessment program, STAMSON 5.04, for road and rail analysis. Roadway traffic noise calculations were performed by treating each roadway segment as separate line sources of noise, and by using 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:

- Truck traffic on all roadways was taken to comprise 5% heavy trucks and 7% medium trucks, as per ENCG requirements for noise level predictions
- The day/night split was taken to be 92%/8% respectively for all streets
- Reflective intermediate ground surfaces used, pavement
- Topography considered in height parameters
- Surrounding buildings used as noise barriers for some receptors
- Highway 417 considered as two segments as it is a divided highway more than 4 lanes wide

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

Noise receptors were strategically identified at eight locations around the study area (see Figure 2). A complete set of input and output data from all STAMSON 5.04 calculations are available in Appendix A, and STAMSON input parameters are illustrated in Figure 5 to 9. Receptor heights are based on elevation drawings provided in Appendix A.

## 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 commercial 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, 6" metal stud walls with gypsum board sheathing can achieve STC 45 or more. 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.

As per Section 4.2, when daytime noise levels (from roadway traffic) 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[7] 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[8], 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, detailed floor layouts and building elevations have not been finalized; therefore, detailed STC calculations could not be performed at this time. As a guideline, the anticipated STC requirements for windows have been

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

estimated based on the overall noise reduction required for each intended use of space (STC = outdoor noise level – targeted indoor noise levels).

## 4.4 Stationary Noise

### 4.4.1 Assumptions

Preliminary mechanical information for the development has been based on information received from JAIN Consultants, as well as GWE's experience with similar developments. A review of final equipment selections and locations by a qualified acoustical engineer will be required prior to installation of the equipment. The following assumptions have been included in the analysis:

(i) The locations, quantity and tonnage of rooftop units have been assumed based on information received from JAIN Consultants.
(ii) The sound data of rooftop units is based on information received from JAIN Consultants and typical manufactures data.
(iii) During all hours of the day, the rooftop mechanical units (RTU) on the building are in full operation.
(iv) The emergency generator is only used for testing and maintenance purposes during the daytime period (07:00 – 23:00).
(v) Screening effects of buildings, parapets and roof overhangs have been considered in the modelling.

The equipment considered in the model consisted of:

(i) Make-up air unit [MUA] (S1-2) – Two units
(ii) Generator (S3) – One unit

### 4.4.2 Stationary Noise Source Assessment and Criteria

For stationary sources, the $L_{eq}$ is calculated on an hourly interval, while for roadways, the $L_{eq}$ is calculated on the basis of a 16-hour daytime / 8-hour nighttime split. Noise criteria taken from the ENCG apply to points of reception (POR). A POR is defined under ENCG as "any location on a noise sensitive land use where noise from a stationary source is received"; this can be an outdoor point of reception or at the plane of window. A POR can be located on an existing or zoned-for-future-use premises of permanent or seasonal residences, hotels/motels, nursing/retirement homes, rental residences, hospitals, camp

grounds, and noise sensitive buildings such as schools, places of worship and daycare facilities. According to the ENCG, the recommended maximum noise level for an urban (Class 1) environment at a POR is either the lowest one-hour background noise level due to other sources, or the exclusionary limits outlined in Table 3, whichever is higher. The site and surroundings are considered to be in an urban area as they are in close proximity to an arterial roadway (Carling Avenue).

**TABLE 3: EXCLUSIONARY LIMITS FOR CLASS 1 AREA**

| Time of Day | Outdoor Points of Reception | Plane of Window |
|---|---|---|
| 07:00 – 19:00 | 50 | 50 |
| 19:00 – 23:00 | 50 | 50 |
| 23:00 – 07:00 | N/A | 45 |

### 4.4.3 Determination of Noise Source Power Levels

Table 4 summarizes the sound power levels of each source assumed in our analysis. Source locations are illustrated in Figure 10. Rooftop equipment sound power data is from GWE experience.

**TABLE 4: EQUIPMENT SOUND POWER LEVELS (dBA)**

| Source ID | Height above roof/grade (m) | Description | Frequency (Hz) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | Total |
| S1-2 | 2 | MAU | 58 | 63 | 80 | 82 | 85 | 85 | 84 | 74 | 93 |
| S3 | 2 | Generator | 70 | 81 | 89 | 94 | 92 | 97 | 98 | 96 | 103 |

### 4.4.4 Stationary Source Noise Predictions

The impact of the stationary noise sources on the nearby residential areas was determined by computer modelling. Stationary noise source modelling is based on the software program Predictor-Lima developed from the International Standards Organization (ISO) standard 9613 Parts 1 and 2. This computer program is capable of representing three-dimensional surfaces and first reflections of sound waves over a suitable spectrum for human hearing. The methodology has been used on numerous assignments and has been accepted by the Ministry of the Environment and Climate Change (MOECC) as part of Environmental Compliance Approvals applications.

A total of 16 receptor locations were chosen off-site to measure the noise impact at points of reception (POR) during the daytime and evening period (07:00 – 23:00), as well as the nighttime period (23:00 – 07:00). POR locations included outdoor points of reception (OPOR) and the plane of windows (POW) of the adjacent residential properties. Sensor locations are described in Table 5 and illustrated in Figure 11. All units were represented as point sources in the Predictor model. Table 6 contains Predictor-Lima calculation settings. These settings are typical and have been based on ISO 9613 standards and guidance from the MOECC.

Ground absorption over the study area was determined based on topographical features (such as water, concrete, grassland, etc.). An absorption value of 0 is representative of hard ground, while a value of 1 represents grass, and similar soft surface conditions. Existing and proposed buildings were added to the model to account for screening and reflection effects from building façades. A Predictor-Lima sample output is available in Appendix B. Further modelling data is available upon request.

**TABLE 5: RECEPTOR LOCATIONS**

| Receptor Number | Location | Height Above Grade/Terrace (m) |
|---|---|---|
| R1 | OPOR – 461 Wellesley Avenue | 1.5 |
| R2 | POW – 461 Wellesley Avenue | 4.5 |
| R3 | OPOR – 463 Wellesley Avenue | 1.5 |
| R4 | POW – 463 Wellesley Avenue | 4.5 |
| R5 | OPOR – 454 Tillbury Avenue West | 1.5 |
| R6 | POW – 454 Tillbury Avenue West | 4.5 |
| R7 | OPOR – 1705 Carling Avenue | 1.5 |
| R8 | POW – 1705 Carling Avenue | 4.5 |
| R9 | POW – 432 Tillbury Avenue West | 4.5 |
| R10 | POW – 1703 Carling Avenue | 4.5 |
| R11 | OPOR – Study Building West Terrace | 1.5 |
| R12 | OPOR – Study Building West Terrace | 1.5 |
| R13 | OPOR – Study Building North Terrace | 1.5 |
| R14 | POW – Study Building East Façade | 27 |
| R15 | POW – Study Building North Façade | 27 |
| R16 | POW – Study Building West Façade | 27 |

**TABLE 6: CALCULATION SETTINGS**

| Parameter | Setting |
|---|---|
| Meteorological correction method | Single value for C0 |
| Value C0 | 2.0 |
| Default ground attenuation factor | 0 (Hard) |
| Ground attenuation factor for roadways and paved areas | 0 (Hard) |
| Temperature (K) | 283.15 |
| Pressure (kPa) | 101.33 |
| Air humidity (%) | 70 |

# 5. RESULTS AND DISCUSSION

## 5.1 Roadway Traffic Noise Levels

The results of the roadway traffic noise calculations are summarized in Table 7 below. A complete set of input and output data from all STAMSON 5.04 calculations are available in Appendix A and Figure 5 to 9.

**TABLE 7: EXTERIOR NOISE LEVELS DUE TO ROADWAY TRAFFIC SOURCES**

| Receptor Number | Receptor Height (m) | Plane of Window Receptor Location | Noise Level (dBA) | |
|---|---|---|---|---|
| | | | Day | Night |
| 1 | 1.5 | Ground Level – East Façade | 70 | 63 |
| 2 | 1.5 | Ground Level – South Façade | 74 | 66 |
| 3 | 1.5 | Ground Level – West Façade | 69 | 62 |
| 4 | 18 | 6$^{th}$ Floor – East Façade | 71 | 63 |
| 5 | 18 | 6$^{th}$ Floor – South Façade | 74 | 67 |
| 6 | 18 | 6$^{th}$ Floor – West Façade | 71 | 63 |
| 7 | 1.5 | Ground Level – Courtyard | 52 | 45 |
| 8 | 21 | 7$^{th}$ Floor – Terrace | 68 | 60 |

The results of the current analysis indicate that noise levels will range between 52 and 74 dBA during the daytime period (07:00-23:00) and between 45 and 67 dBA during the nighttime period (23:00-07:00). The highest noise levels (i.e. 74 dBA) occur along the development's south façade, which is nearest and most exposed to Carling Avenue.

### 5.1.1 Roadway Traffic Noise Control Measures

The noise levels predicted due to roadway traffic exceed the criteria listed in Section 4.2 for building components. As discussed in Section 4.3, 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 city of Ottawa requirements, detailed STC calculations will be required to be completed prior to building permit application for each unit type, at which time shop drawings will be made available. The STC requirements for the windows are summarized below for various units within the development (see Figure 3):

- **Bedroom Windows**

(i) Bedroom windows facing south will require a minimum STC of 37

(ii) Bedroom windows facing east or west will require a minimum STC of 34

(iii) All other bedroom windows are to satisfy Ontario Building Code (OBC 2012) requirements

- **Living Room Windows**

(i) Living room windows facing south will require a minimum STC of 32

(ii) Living room windows facing east or west will require a minimum STC of 29

(iii) All other living room windows are to satisfy Ontario Building Code (OBC 2012) requirements

- **Exterior Walls**

(i) Exterior wall components on the north, south and west façades will require a minimum STC of 45, which will be achieved with brick cladding or an acoustical equivalent according to NRC test data[9]

The STC requirements would apply to windows, doors, spandrel panels and curtainwall elements. Exterior wall components on these façades are recommended to have a minimum STC of 45 where a window/wall system is used. A review of window supplier literature indicates that the specified STC ratings can be

[9] J.S. Bradley and J.A. Birta. Laboratory Measurements of the Sound Insulation of Building Façade Elements, National Research Council October 2000.

achieved by a variety of window systems having a combination of glass thickness and inter-pane spacing. We have specified an example window configuration, however several manufacturers and various combinations of window components, such as those proposed, will offer the necessary sound attenuation rating. It is the responsibility of the manufacturer to ensure that the specified window achieves the required STC. This can only be assured by using window configurations that have been certified by laboratory testing. The requirements for STC ratings assume that the remaining components of the building are constructed and installed according to the minimum standards of the Ontario Building Code. The specified STC requirements also apply to swinging and/or sliding patio doors.

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

### 5.1.2 Noise Barrier Calculation

Noise levels at the ground level green space (Receptor 7) are expected to fall under 55 dBA; therefore, no mitigation is required for this outdoor living area. Noise levels at 7$^{th}$ Floor terrace (Receptor 8) are expected to approach 68 dBA during the daytime period. According to the ENCG, if this area is to be used as an outdoor living area, noise control measures should be considered to reduce the $L_{eq}$ to 55 dBA, where technically and administratively feasible. Investigation into the application of a noise barrier surrounding the terrace (see Figure 4) found that a height of 4 m would be needed to reduce noise levels below 60 dBA, and a barrier height of 13.5 m would be needed to reduce noise levels to 55 dBA. The use of barriers as noise control for the space would be impractical given the required height exceeds the City of Ottawa's preferred height for noise barriers. Furthermore, barriers are counterintuitive to the programed function of the space as a rooftop terrace where views are desired. Although the resultant noise levels on the rooftop terrace are elevated, other outdoor living areas within the development comply with the ENCG and offer an alternative for residents to seek a quiet outdoor environment. Table 8 summarizes the results of the barrier investigation.

**TABLE 8: RESULTS OF BARRIER INVESTIGATION**

| Location | Reference Receptors | Barrier Height (m) | Daytime $L_{eq}$ Noise Levels (dBA) | |
|---|---|---|---|---|
| | | | Without Barrier | With Barrier |
| 7th Floor Terrace | 8 | 4 | 68 | 59 |
| | | 13.5 | | 55 |

## 5.2 Stationary Noise Levels

Noise levels at nearby sensitive receptors are below ENCG criteria for stationary noise, as summarized in Table 9 below. The noise levels listed in Table 9 are based on the assumptions outlined in Section 4.4.1. Since the generator is for emergency situations, it has been assessed separately from the other mechanical equipment, as per ENCG guidelines.

**TABLE 9: NOISE LEVELS FROM STATIONARY SOURCES**

| Receptor Number | Plane of Window Receptor Location | Noise Level (dBA) | | Sound Level Limits | | Meets ENCG Criteria | |
|---|---|---|---|---|---|---|---|
| | | Day | Night | Day | Night | Day | Night |
| R1 | OPOR – 461 Wellesley Avenue | 35 | 35 | 50 | N/A | Yes | Yes |
| R2 | POW – 461 Wellesley Avenue | 35 | 35 | 50 | 45 | Yes | Yes |
| R3 | OPOR – 463 Wellesley Avenue | 34 | 34 | 50 | N/A | Yes | Yes |
| R4 | POW – 463 Wellesley Avenue | 35 | 35 | 50 | 45 | Yes | Yes |
| R5 | OPOR – 454 Tillbury Avenue West | 31 | 31 | 50 | N/A | Yes | Yes |
| R6 | POW – 454 Tillbury Avenue West | 31 | 31 | 50 | 45 | Yes | Yes |
| R7 | OPOR – 1705 Carling Avenue | 35 | 35 | 50 | N/A | Yes | Yes |
| R8 | POW – 1705 Carling Avenue | 34 | 34 | 50 | 45 | Yes | Yes |
| R9 | POW – 432 Tillbury Avenue West | 36 | 36 | 50 | 45 | Yes | Yes |
| R10 | POW – 1703 Carling Avenue | 37 | 37 | 50 | 45 | Yes | Yes |
| R11 | OPOR – Study Building West Terrace | 35 | 35 | 50 | N/A | Yes | Yes |
| R12 | OPOR – Study Building West Terrace | 41 | 41 | 50 | N/A | Yes | Yes |
| R13 | OPOR – Study Building North Terrace | 46 | 46 | 50 | N/A | Yes | Yes |
| R14 | POW – Study Building East Façade | 46 | 46 | 50 | 45 | Yes | Yes |
| R15 | POW – Study Building North Façade | 45 | 45 | 50 | 45 | Yes | Yes |
| R16 | POW – Study Building West Façade | 45 | 45 | 50 | 45 | Yes | Yes |

As Table 9 summarizes, noise levels fall below ENCG criteria at all receptors. Noise contours at 4.5 m above grade can be seen in Figure 12 for daytime and nighttime conditions. The main contributor of noise at these locations is the MUA units.

**TABLE 10: NOISE LEVELS FROM EMERGENCY EQUIPMENT**

| Receptor Number | Plane of Window Receptor Location | Noise Level (dBA) | Sound Level Limits | Meets ENCG Criteria |
|---|---|---|---|---|
| | | Day | Day | Day |
| R1 | OPOR – 461 Wellesley Avenue | 38 | 55 | Yes |
| R2 | POW – 461 Wellesley Avenue | 38 | 55 | Yes |
| R3 | OPOR – 463 Wellesley Avenue | 36 | 55 | Yes |
| R4 | POW – 463 Wellesley Avenue | 37 | 55 | Yes |
| R5 | OPOR – 454 Tillbury Avenue West | 34 | 55 | Yes |
| R6 | POW – 454 Tillbury Avenue West | 34 | 55 | Yes |
| R7 | OPOR – 1705 Carling Avenue | 40 | 55 | Yes |
| R8 | POW – 1705 Carling Avenue | 41 | 55 | Yes |
| R9 | POW – 432 Tillbury Avenue West | 41 | 55 | Yes |
| R10 | POW – 1703 Carling Avenue | 49 | 55 | Yes |
| R11 | OPOR – Study Building West Terrace | 45 | 55 | Yes |
| R12 | OPOR – Study Building West Terrace | 46 | 55 | Yes |
| R13 | OPOR – Study Building North Terrace | 44 | 55 | Yes |
| R14 | POW – Study Building East Façade | 50 | 55 | Yes |
| R15 | POW – Study Building North Façade | 54 | 55 | Yes |
| R16 | POW – Study Building West Façade | 47 | 55 | Yes |

Noise levels from the emergency generator fall below ENCG criteria during the daytime period, as shown in Table 10. Since the generator is an emergency unit, the noise criteria in Section 4.4.2 can be increased by 5 dB as outlined in the ENCG. With consideration of GWE's recommendations, the proposed development is expected to be compatible with the existing land uses.

# 6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels will range between 52 and 74 dBA during the daytime period (07:00-23:00) and between 45 and 67 dBA during the nighttime period (23:00-07:00). The highest noise levels (i.e. 74 dBA) occur along the development's south façade, which is nearest and most exposed to Carling Avenue. Noise levels at the 7th Floor terrace cannot be feasibly mitigated to 60 dBA, and as such the ground level green space is considered to be a protected outdoor living area. Building components with a higher Sound Transmission Class (STC) rating will be required where exterior noise levels exceed 65 dBA, as indicated on Figure 3.

Results of the calculations also indicate that the development will require central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. Inclusion of the following Warning Clause[10] will also be required for all Lease, Purchase and Sale Agreements, as summarized below:

> *"Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing roadway traffic may, on occasion, interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the City and the Ministry of the Environment and Climate Change. To help address the need for sound attenuation, this development includes:*
>
> - *STC rated multi-pane glazing elements and spandrel panels*
>  - *South façade bedroom/living room: STC 37/32*
>  - *East and west façade bedroom/living room: STC 34/29*
> - *STC rated exterior walls*
>  - *East, south and west façade: STC 45*
>
> *This dwelling unit has also been designed with air conditioning. Air conditioning will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the City and the Ministry of the Environment and Climate Change.*

[10] City of Ottawa Environmental Noise Control Guidelines, January 2016

*To ensure that provincial sound level limits are not exceeded, it is important to maintain these sound attenuation features."*

Results of the stationary noise assessment indicate that, provided our assumptions for noise control in Section 4.4.1 are adhered to in the detailed design process, noise levels at nearby points of reception are expected to fall below the ENCG noise criteria. As such, the proposed development is expected to be compatible with the existing noise sensitive land uses. A review of final equipment selections and locations by a qualified acoustical engineer will be required prior to installation of the equipment.

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.

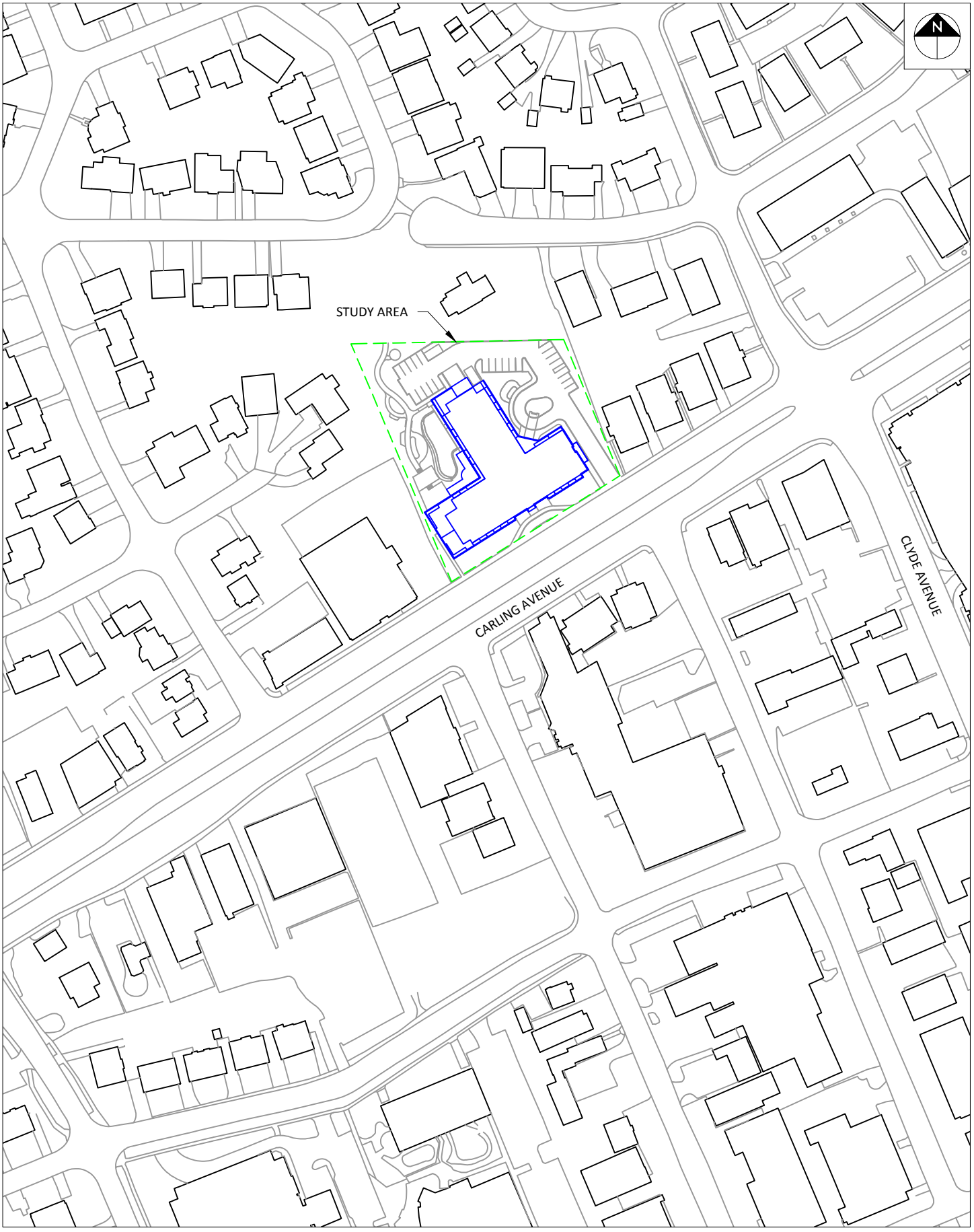
Yours truly,

***Gradient Wind Engineering Inc.***

LICENSED PROFESSIONAL ENGINEER
J. R. FOSTER
100155655
PROVINCE OF ONTARIO

Michael Lafortune
Environmental Scientist
*GWE18-056 – Environmental Noise*

Joshua Foster, P.Eng.
Principal

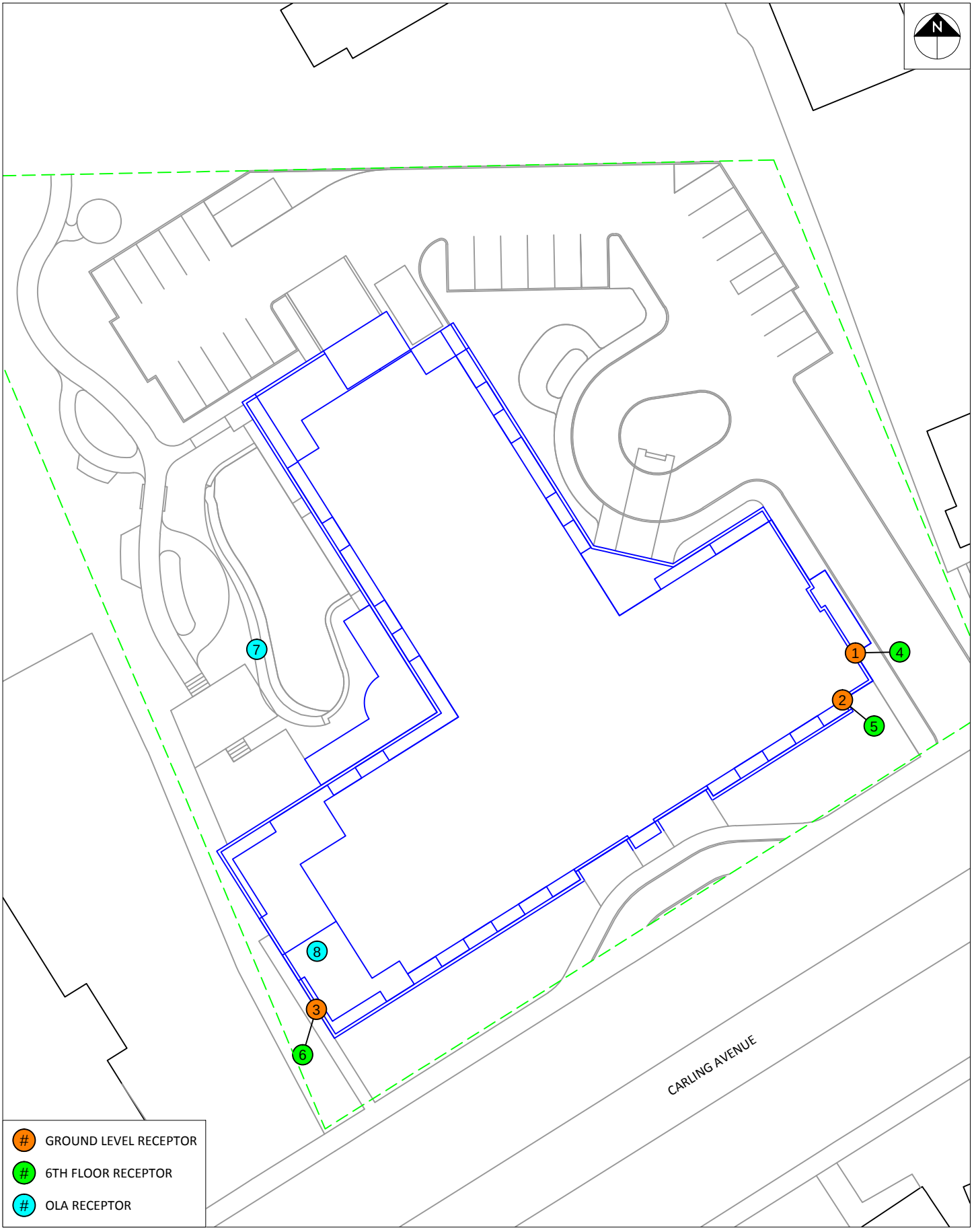



127 Walgreen Road
Ottawa, Ontario
(613) 836 0934

GRADIENT WIND ENGINEERING INC

| | | | |
|---|---|---|---|
| PROJECT | 1705 CARLING AVENUE<br>ENVIRONMENTAL NOISE ASSESSMENT | | DESCRIPTION |
| SCALE | 1:2000 (APPROX.) | DRAWING NO. | GWE18-056-1 |
| DATE | APRIL 17, 2018 | DRAWN BY | M.L. |

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT

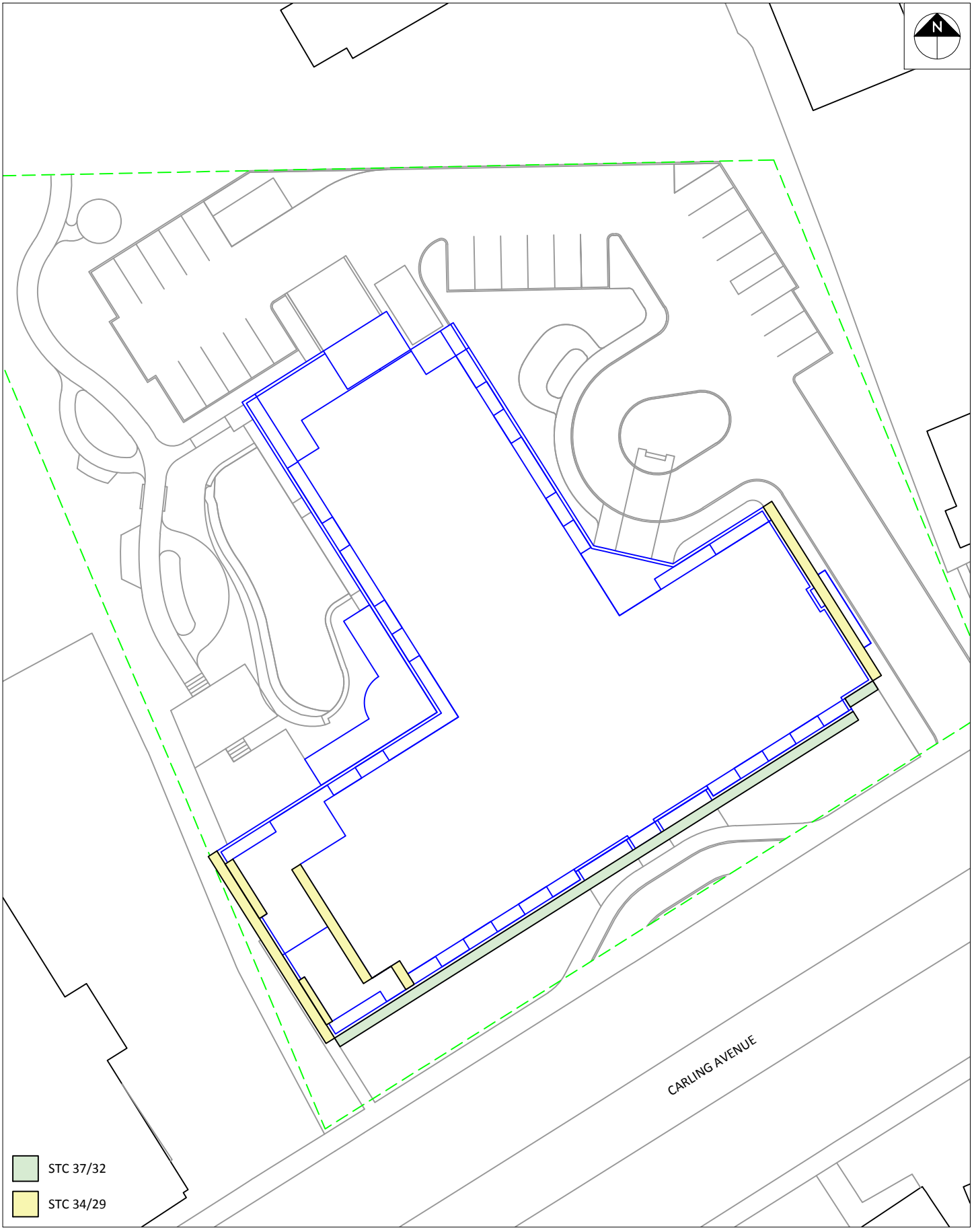



127 Walgreen Road
Ottawa, Ontario
(613) 836 0934
GRADIENT WIND ENGINEERING INC

| | |
|---|---|
| PROJECT | 1705 CARLING AVENUE<br>ENVIRONMENTAL NOISE ASSESSMENT |
| SCALE | 1:500 (APPROX.) |
| DRAWING NO. | GWE18-056-2 |
| DATE | APRIL 17, 2018 |
| DRAWN BY | M.L. |

DESCRIPTION

FIGURE 2:
ROADWAY TRAFFIC NOISE RECEPTOR LOCATIONS



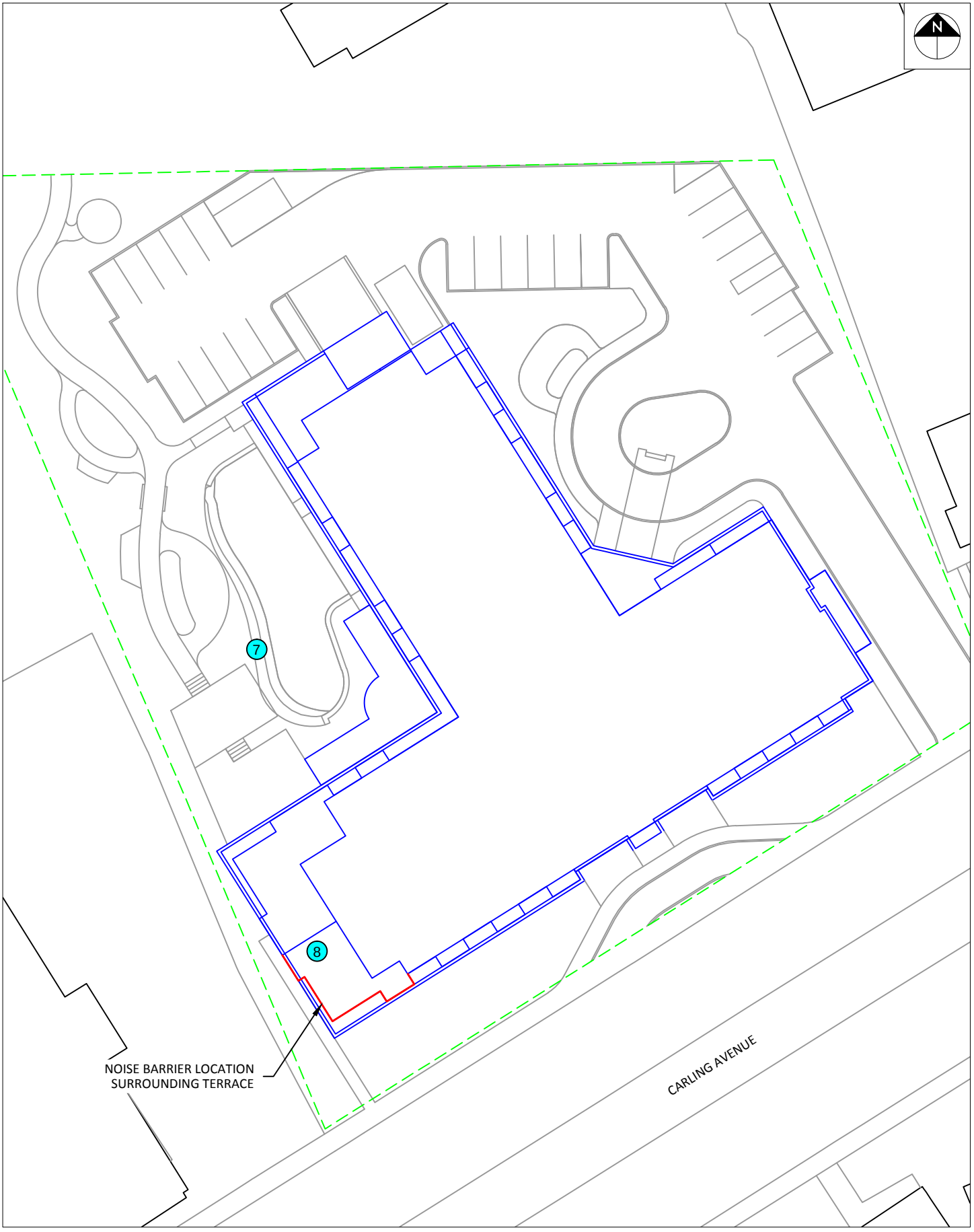

127 Walgreen Road
Ottawa, Ontario
(613) 836 0934

GRADIENT WIND ENGINEERING INC

| | | | |
|---|---|---|---|
| PROJECT | 1705 CARLING AVENUE<br>ENVIRONMENTAL NOISE ASSESSMENT | | |
| SCALE | 1:500 (APPROX.) | DRAWING NO. | GWE18-056-3 |
| DATE | APRIL 17, 2018 | DRAWN BY | M.L. |

DESCRIPTION

FIGURE 3:
BEDROOM/LIVING ROOM WINDOW STC REQUIREMENTS



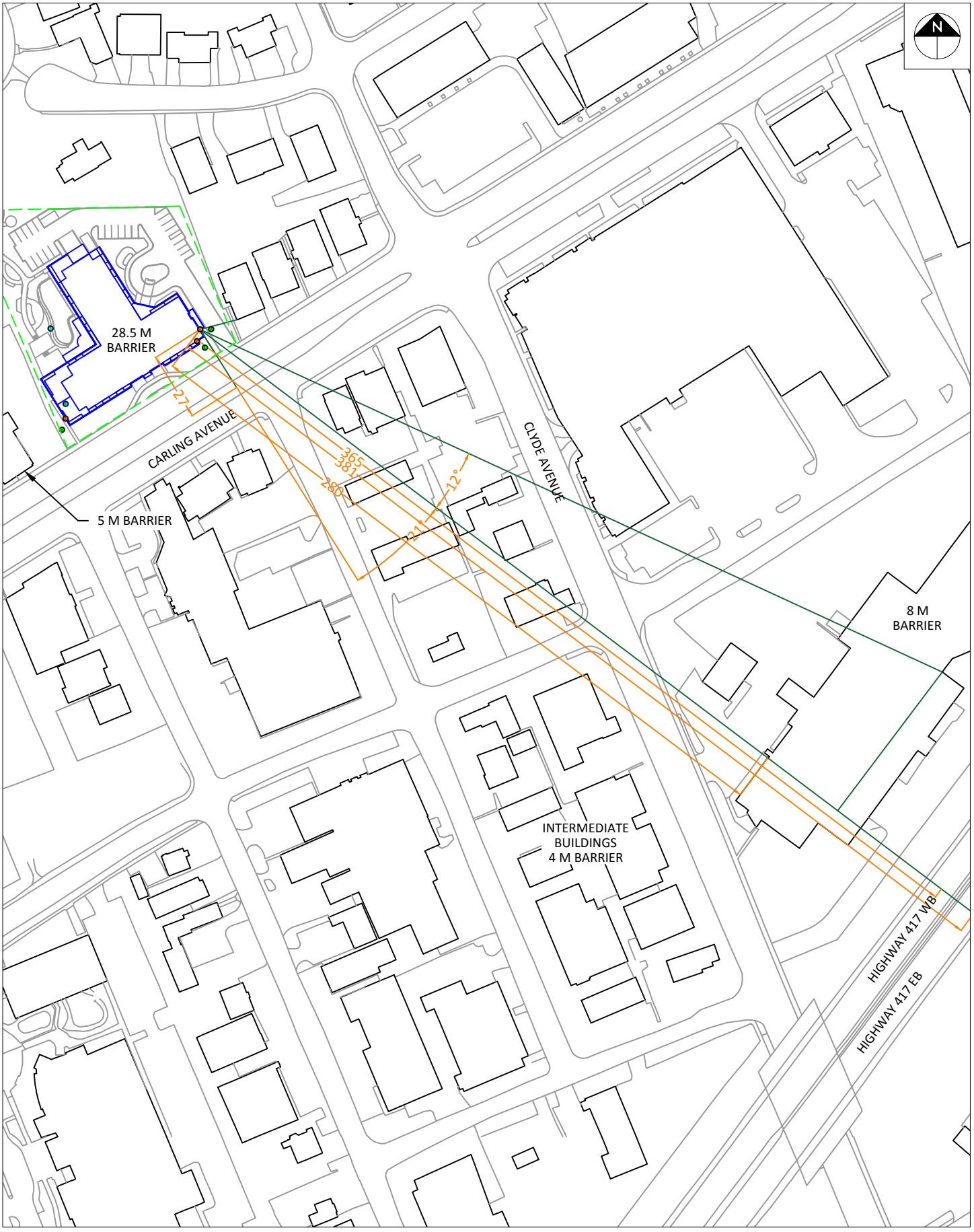

127 Walgreen Road
Ottawa, Ontario
(613) 836 0934

GRADIENT WIND ENGINEERING INC

| | |
|---|---|
| PROJECT | 1705 CARLING AVENUE<br>ENVIRONMENTAL NOISE ASSESSMENT |
| SCALE | 1:500 (APPROX.) |
| DRAWING NO. | GWE18-056-4 |
| DATE | APRIL 17, 2018 |
| DRAWN BY | M.L. |

DESCRIPTION

FIGURE 4:
NOISE BARRIER INVESTIGATION LOCATION



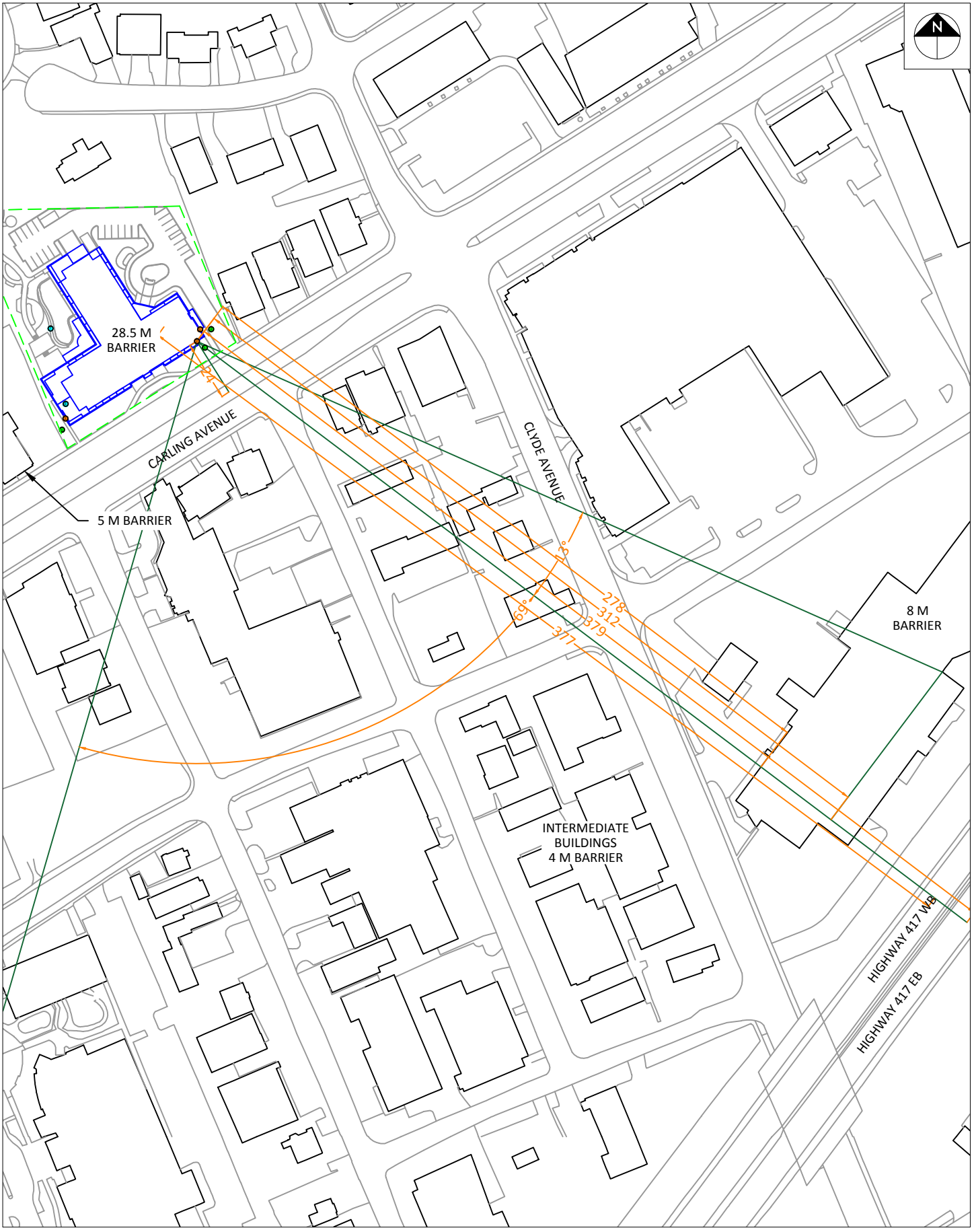

127 Walgreen Road
Ottawa, Ontario
(613) 836 0934

GRADIENT WIND ENGINEERING INC

| | |
|---|---|
| PROJECT | 1705 CARLING AVENUE<br>ENVIRONMENTAL NOISE ASSESSMENT |
| SCALE | 1:2000 (APPROX.) |
| DRAWING NO. | GWE18-056-5 |
| DATE | APRIL 17, 2018 |
| DRAWN BY | M.L. |

DESCRIPTION

FIGURE 5:
STAMSON INPUT DATA - RECEPTOR 1 AND 4



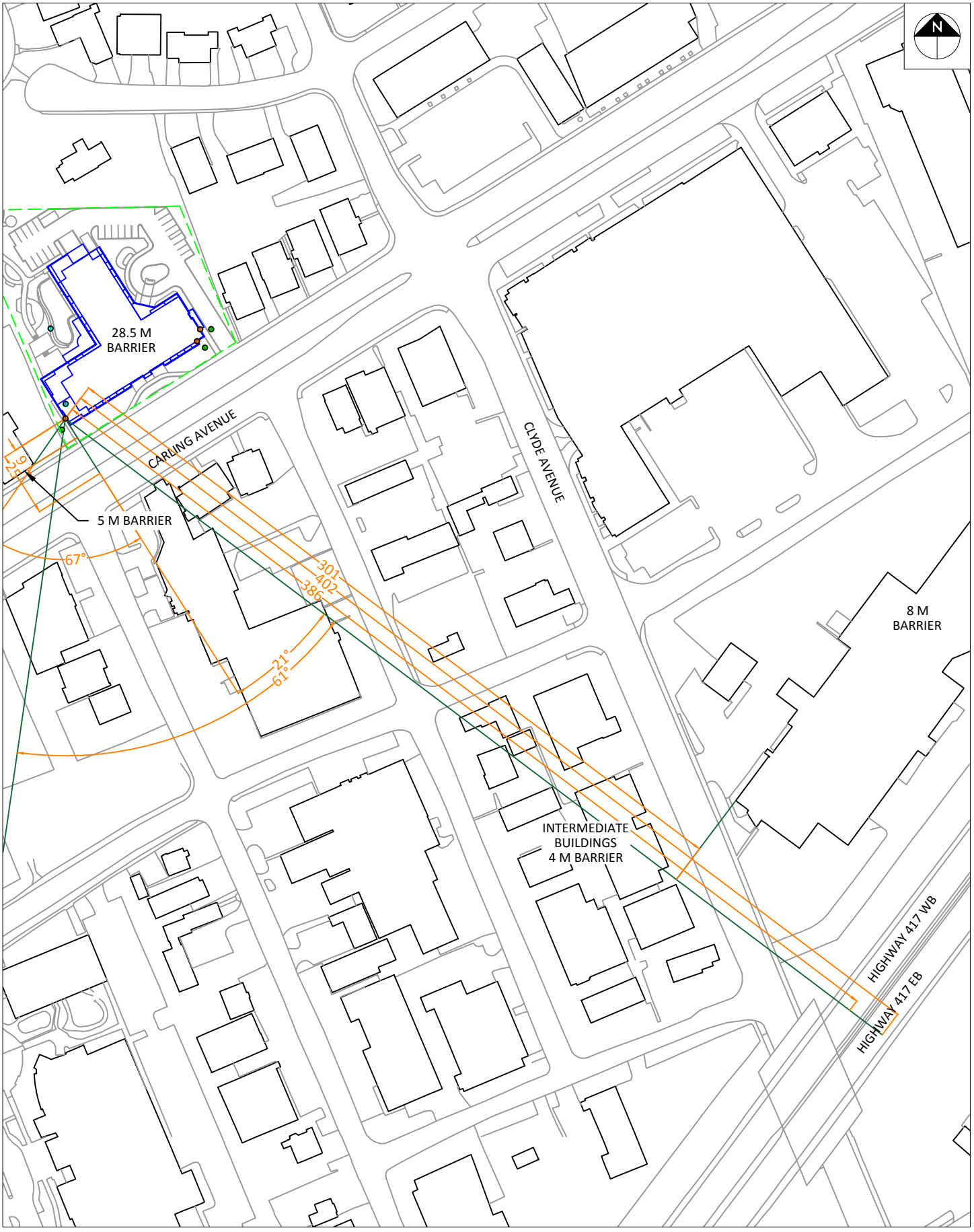

127 Walgreen Road
Ottawa, Ontario
(613) 836 0934

GRADIENT WIND ENGINEERING INC

| | |
|---|---|
| PROJECT | 1705 CARLING AVENUE<br>ENVIRONMENTAL NOISE ASSESSMENT |
| SCALE | 1:2000 (APPROX.) |
| DRAWING NO. | GWE18-056-6 |
| DATE | APRIL 17, 2018 |
| DRAWN BY | M.L. |

DESCRIPTION

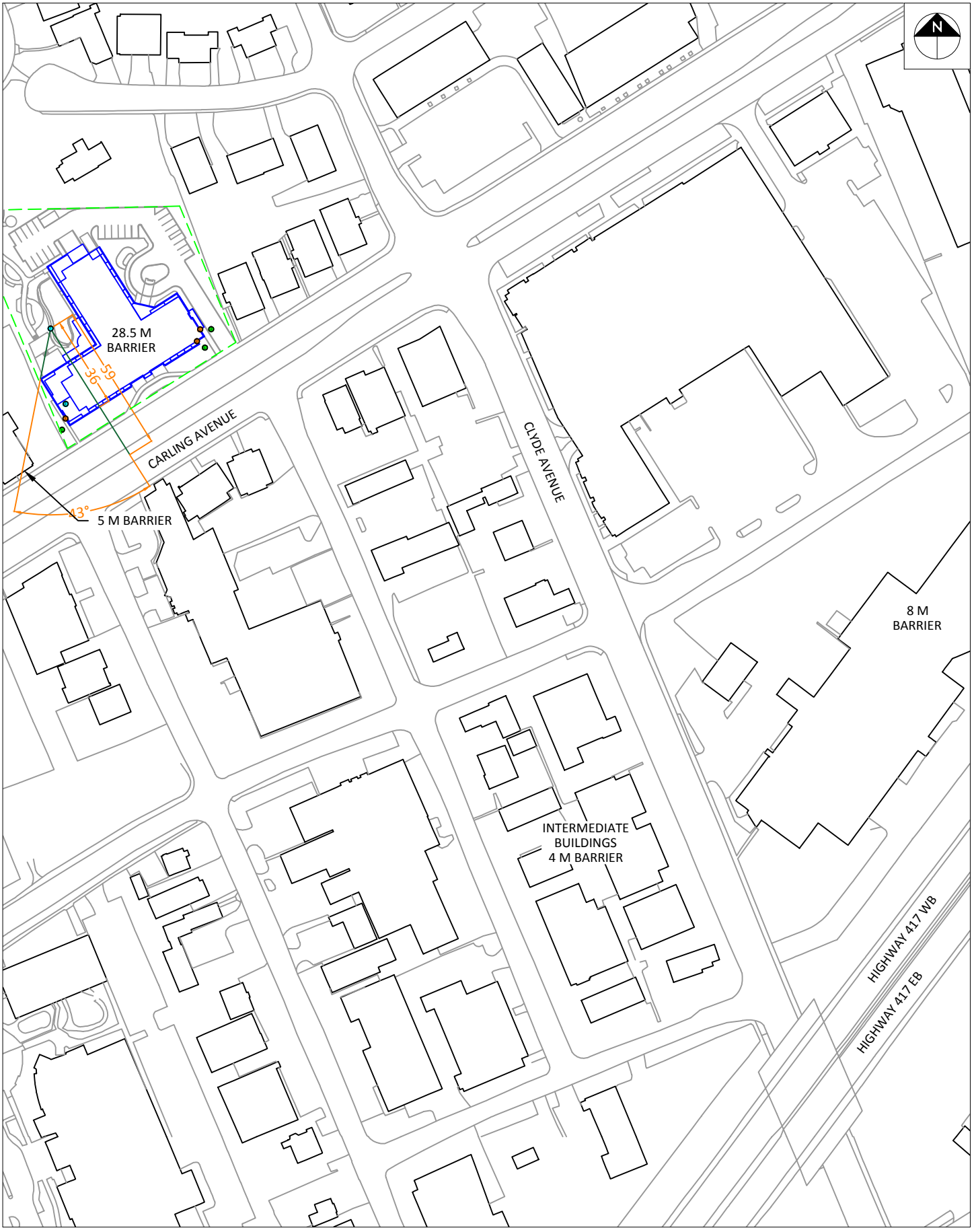
FIGURE 6:
STAMSON INPUT DATA - RECEPTOR 2 AND 5





GRADIENT WIND ENGINEERING INC
127 Walgreen Road
Ottawa, Ontario
(613) 836 0934


| | |
|---|---|
| PROJECT | 1705 CARLING AVENUE<br>ENVIRONMENTAL NOISE ASSESSMENT |
| SCALE | 1:2000 (APPROX.) |
| DRAWING NO. | GWE18-056-7 |
| DATE | APRIL 17, 2018 |
| DRAWN BY | M.L. |
| DESCRIPTION | FIGURE 7:<br>STAMSON INPUT DATA - RECEPTOR 3 AND 6 |

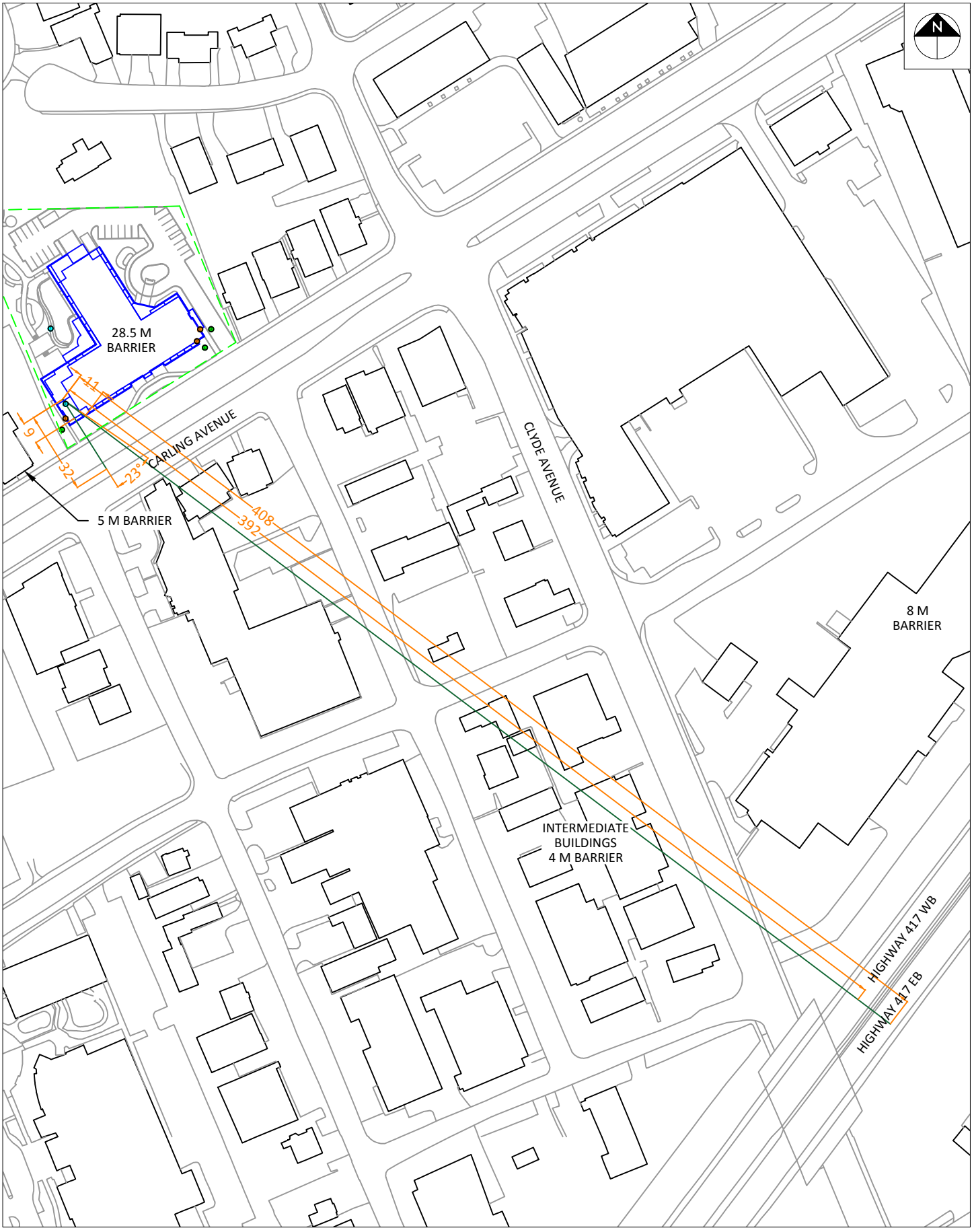



127 Walgreen Road
Ottawa, Ontario
(613) 836 0934

GRADIENT WIND ENGINEERING INC

| | | | |
|---|---|---|---|
| PROJECT | 1705 CARLING AVENUE<br>ENVIRONMENTAL NOISE ASSESSMENT | | DESCRIPTION |
| SCALE | 1:2000 (APPROX.) | DRAWING NO. | GWE18-056-8 |
| DATE | APRIL 17, 2018 | DRAWN BY | M.L. |

FIGURE 8:
STAMSON INPUT DATA - RECEPTOR 7

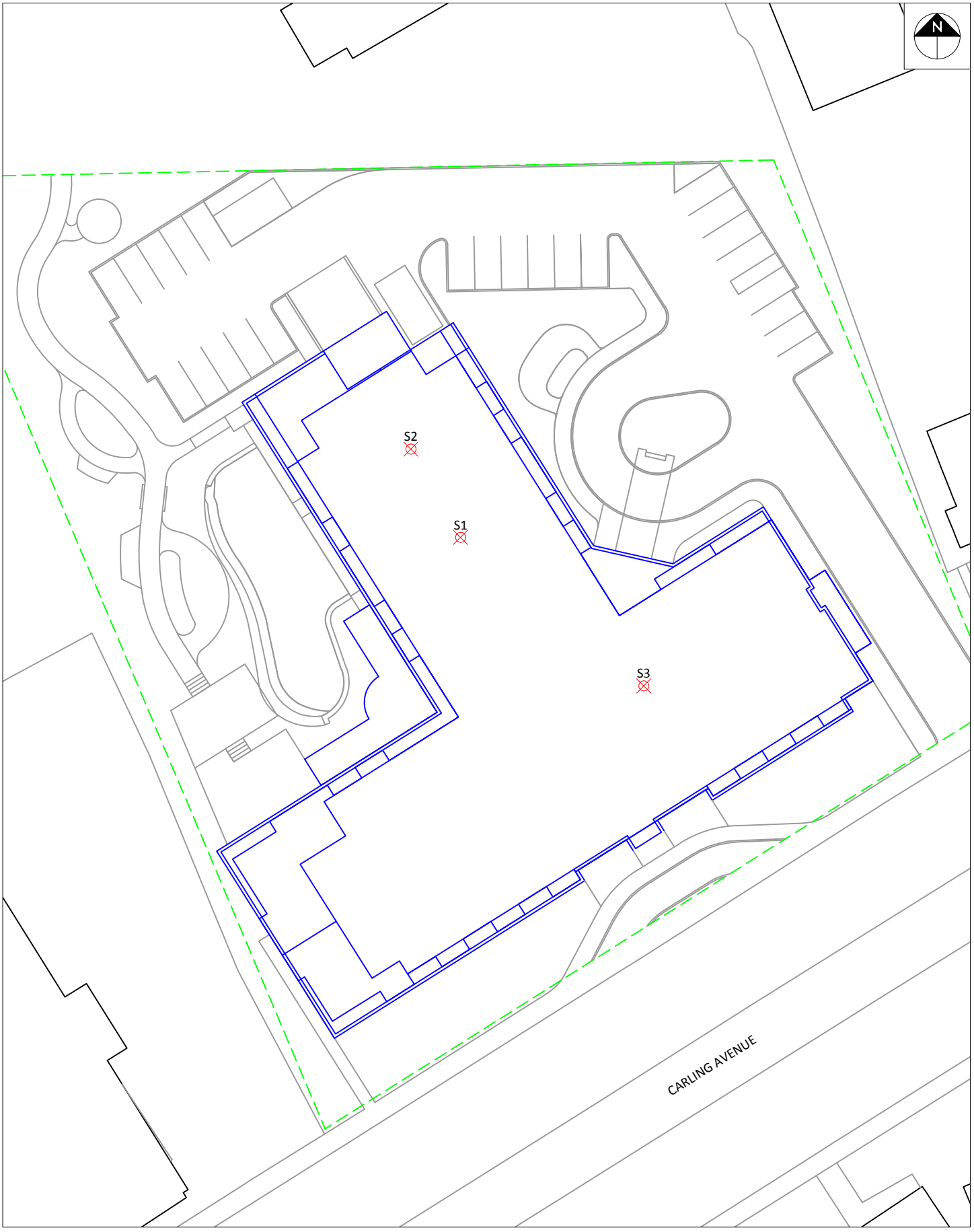




127 Walgreen Road
Ottawa, Ontario
(613) 836 0934

GRADIENT WIND ENGINEERING INC

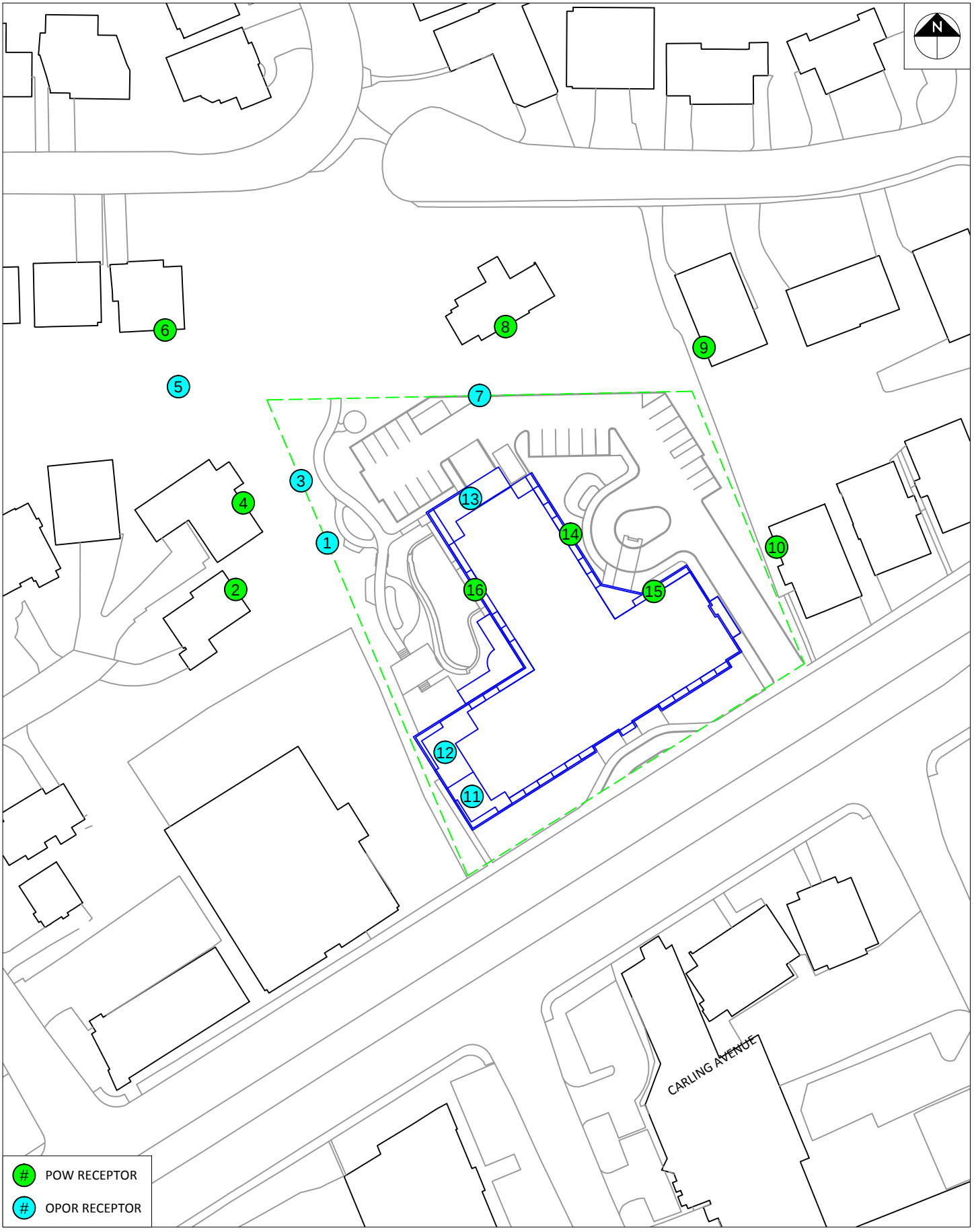

| | |
|---|---|
| PROJECT | 1705 CARLING AVENUE<br>ENVIRONMENTAL NOISE ASSESSMENT |
| SCALE | 1:2000 (APPROX.) |
| DRAWING NO. | GWE18-056-9 |
| DATE | APRIL 17, 2018 |
| DRAWN BY | M.L. |
| DESCRIPTION | FIGURE 9:<br>STAMSON INPUT DATA - RECEPTOR 8 |




127 Walgreen Road
Ottawa, Ontario
(613) 836 0934

GRADIENT WIND ENGINEERING INC

| | | | |
|---|---|---|---|
| PROJECT | 1705 CARLING AVENUE<br>ENVIRONMENTAL NOISE ASSESSMENT | | DESCRIPTION |
| SCALE | 1:500 (APPROX.) | DRAWING NO. GWE18-056-10 | FIGURE 10:<br>STATIONARY NOISE SOURCE LOCATIONS |
| DATE | APRIL 17, 2018 | DRAWN BY M.L. | |




127 Walgreen Road
Ottawa, Ontario
(613) 836 0934
GRADIENT WIND ENGINEERING INC

| | |
|---|---|
| PROJECT | 1705 CARLING AVENUE<br>ENVIRONMENTAL NOISE ASSESSMENT |
| SCALE | 1:1000 (APPROX.) |
| DRAWING NO. | GWE18-056-11 |
| DATE | APRIL 17, 2018 |
| DRAWN BY | M.L. |

DESCRIPTION

FIGURE 11:
STATIONARY NOISE RECEPTOR LOCATIONS

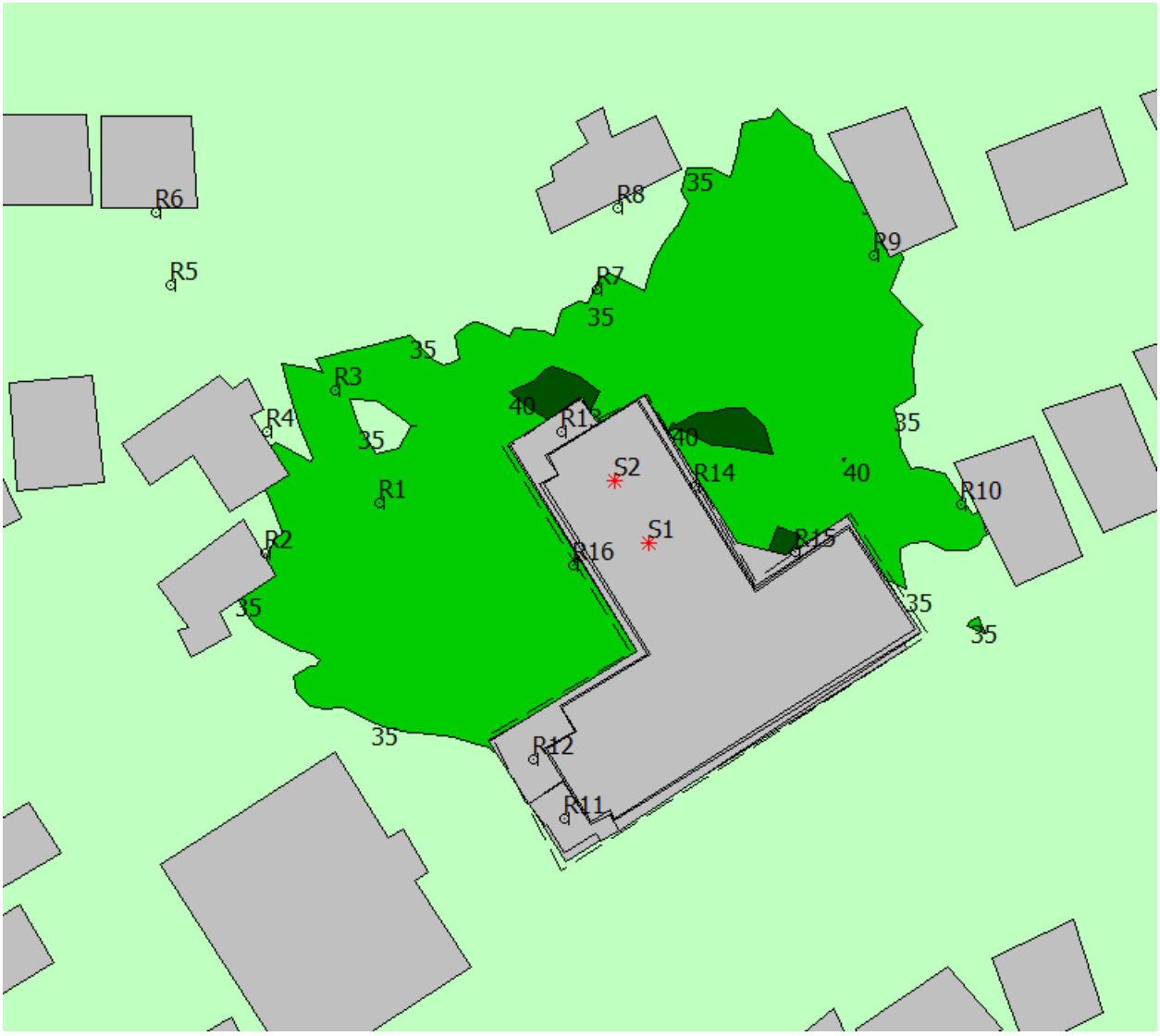
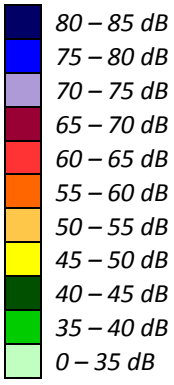



**FIGURE 12: DAYTIME AND NIGHTTIME STATIONARY NOISE CONTOURS (4.5 METERS ABOVE GRADE)**



# APPENDIX A

# STAMSON 5.04 - INPUT AND OUTPUT DATA

```
STAMSON 5.0        NORMAL REPORT        Date: 16-04-2018 34:01:51
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: Carling (day/night)
-------------------------------------------
Car traffic volume  : 40480/3520  veh/TimePeriod  *
Medium truck volume :  3220/280   veh/TimePeriod  *
Heavy truck volume  :  2300/200   veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  50000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Carling (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  :  27.00 / 27.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Road data, segment # 2: 417WB1 (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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: 417WB1 (day/night)
----------------------------------------
Angle1   Angle2           : -90.00 deg   -12.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 365.00 / 365.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -12.00 deg
Barrier height            :   8.00 m
Barrier receiver distance : 314.00 / 314.00 m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 3: 417WB2 (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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: 417WB2 (day/night)
----------------------------------------
Angle1   Angle2           : -12.00 deg   21.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 365.00 / 365.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -12.00 deg   Angle2 : 21.00 deg
Barrier height            :   4.00 m
Barrier receiver distance : 280.00 / 280.00 m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 4: 417EB1 (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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 # 4: 417EB1 (day/night)
----------------------------------------
Angle1   Angle2           : -90.00 deg   -12.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 381.00 / 381.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -12.00 deg
Barrier height            :   8.00 m
Barrier receiver distance : 314.00 / 314.00 m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 5: 417EB2 (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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 # 5: 417EB2 (day/night)
----------------------------------------
Angle1   Angle2           : -12.00 deg   21.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 381.00 / 381.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -12.00 deg   Angle2 : 21.00 deg
Barrier height            :   4.00 m
Barrier receiver distance : 280.00 / 280.00 m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

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

Source height = 1.50 m

ROAD (0.00 + 69.66 + 0.00) = 69.66 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90      0   0.00  75.22   0.00  -2.55  -3.01   0.00   0.00   0.00
69.66
-------------------------------------------------------------------------
--

Segment Leq : 69.66 dBA
```

```
Results segment # 2: 417WB1 (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 !        1.50 !        4.08 !         4.08

ROAD (0.00 + 55.56 + 0.00) = 55.56 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -12   0.00  81.40   0.00 -13.86  -3.63   0.00   0.00  -8.34
55.56
-------------------------------------------------------------------------------
--

Segment Leq : 55.56 dBA
```

```
Results segment # 3: 417WB2 (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 !        1.50 !        3.80 !         3.80

ROAD (0.00 + 55.15 + 0.00) = 55.15 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -12     21   0.00  81.40   0.00 -13.86  -7.37   0.00   0.00  -5.02
55.15
-------------------------------------------------------------------------------
--

Segment Leq : 55.15 dBA
```

```
Results segment # 4: 417EB1 (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 !        1.50 !        3.97 !         3.97

ROAD (0.00 + 55.75 + 0.00) = 55.75 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -12   0.00  81.40   0.00 -14.05  -3.63   0.00   0.00  -7.97
55.75
-------------------------------------------------------------------------------
--

Segment Leq : 55.75 dBA
```

```
Results segment # 5: 417EB2 (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 !        1.50 !        3.70 !         3.70

ROAD (0.00 + 54.95 + 0.00) = 54.95 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -12     21   0.00  81.40   0.00 -14.05  -7.37   0.00   0.00  -5.03
54.95
-------------------------------------------------------------------------------
--

Segment Leq : 54.95 dBA

Total Leq All Segments: 70.26 dBA
```

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

Source height = 1.50 m

ROAD (0.00 + 62.07 + 0.00) = 62.07 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90      0   0.00  67.63   0.00  -2.55  -3.01   0.00   0.00   0.00
62.07
-------------------------------------------------------------------------
--

Segment Leq : 62.07 dBA
```

```
Results segment # 2: 417WB1 (night)
----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !        1.50 !        4.08 !         4.08

ROAD (0.00 + 47.97 + 0.00) = 47.97 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -12   0.00  73.80   0.00 -13.86  -3.63   0.00   0.00  -8.34
47.97
-------------------------------------------------------------------------------
--

Segment Leq : 47.97 dBA
```

```
Results segment # 3: 417WB2 (night)
----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !        1.50 !        3.80 !         3.80

ROAD (0.00 + 47.55 + 0.00) = 47.55 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -12     21   0.00  73.80   0.00 -13.86  -7.37   0.00   0.00  -5.02
47.55
-------------------------------------------------------------------------------
--

Segment Leq : 47.55 dBA
```

```
Results segment # 4: 417EB1 (night)
-----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !        1.50 !        3.97 !         3.97

ROAD (0.00 + 48.15 + 0.00) = 48.15 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -12   0.00  73.80   0.00 -14.05  -3.63   0.00   0.00  -7.97
48.15
-------------------------------------------------------------------------------
--

Segment Leq : 48.15 dBA
```

```
Results segment # 5: 417EB2 (night)
-----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !        1.50 !        3.70 !         3.70

ROAD (0.00 + 47.35 + 0.00) = 47.35 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -12     21   0.00  73.80   0.00 -14.05  -7.37   0.00   0.00  -5.03
47.35
-------------------------------------------------------------------------------
--

Segment Leq : 47.35 dBA

Total Leq All Segments: 62.67 dBA
```

```
TOTAL Leq FROM ALL SOURCES (DAY): 70.26
                           (NIGHT): 62.67
```

```
STAMSON 5.0        NORMAL REPORT        Date: 16-04-2018 34:01:57
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: Carling (day/night)
-------------------------------------------
Car traffic volume  : 40480/3520  veh/TimePeriod  *
Medium truck volume :  3220/280   veh/TimePeriod  *
Heavy truck volume  :  2300/200   veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  50000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Carling (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  :  24.00 / 24.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Road data, segment # 2: 417WB1 (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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: 417WB1 (day/night)
----------------------------------------
Angle1   Angle2           : -90.00 deg   -13.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 363.00 / 363.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -13.00 deg
Barrier height            :   8.00 m
Barrier receiver distance : 312.00 / 312.00 m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 3: 417WB2 (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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: 417WB2 (day/night)
----------------------------------------
Angle1   Angle2           : -13.00 deg   69.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 363.00 / 363.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -13.00 deg   Angle2 : 69.00 deg
Barrier height            :   4.00 m
Barrier receiver distance : 278.00 / 278.00 m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 4: 417EB1 (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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 # 4: 417EB1 (day/night)
----------------------------------------
Angle1   Angle2           : -90.00 deg   -13.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 379.00 / 379.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -13.00 deg
Barrier height            :   8.00 m
Barrier receiver distance : 312.00 / 312.00 m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 5: 417EB2 (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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 # 5: 417EB2 (day/night)
----------------------------------------
Angle1   Angle2           : -13.00 deg   69.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 379.00 / 379.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -13.00 deg   Angle2 : 69.00 deg
Barrier height            :   4.00 m
Barrier receiver distance : 278.00 / 278.00 m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

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

Source height = 1.50 m

ROAD (0.00 + 73.18 + 0.00) = 73.18 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     90   0.00  75.22   0.00  -2.04   0.00   0.00   0.00   0.00
73.18
-------------------------------------------------------------------------
--

Segment Leq : 73.18 dBA
```

```
Results segment # 2: 417WB1 (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 !        1.50 !        4.07 !         4.07

ROAD (0.00 + 55.55 + 0.00) = 55.55 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -13   0.00  81.40   0.00 -13.84  -3.69   0.00   0.00  -8.32
55.55
-------------------------------------------------------------------------------
--

Segment Leq : 55.55 dBA
```

```
Results segment # 3: 417WB2 (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 !        1.50 !        3.79 !         3.79

ROAD (0.00 + 59.13 + 0.00) = 59.13 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -13     69   0.00  81.40   0.00 -13.84  -3.41   0.00   0.00  -5.01
59.13
-------------------------------------------------------------------------------
--

Segment Leq : 59.13 dBA
```

```
Results segment # 4: 417EB1 (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 !        1.50 !        3.97 !         3.97

ROAD (0.00 + 55.73 + 0.00) = 55.73 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -13   0.00  81.40   0.00 -14.03  -3.69   0.00   0.00  -7.95
55.73
-------------------------------------------------------------------------------
--

Segment Leq : 55.73 dBA
```

```
Results segment # 5: 417EB2 (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 !        1.50 !        3.70 !         3.70

ROAD (0.00 + 58.93 + 0.00) = 58.93 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -13     69   0.00  81.40   0.00 -14.03  -3.41   0.00   0.00  -5.03
58.93
-------------------------------------------------------------------------------
--

Segment Leq : 58.93 dBA

Total Leq All Segments: 73.64 dBA
```

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

Source height = 1.50 m

ROAD (0.00 + 65.59 + 0.00) = 65.59 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     90   0.00  67.63   0.00  -2.04   0.00   0.00   0.00   0.00
65.59
-------------------------------------------------------------------------
--

Segment Leq : 65.59 dBA
```

```
Results segment # 2: 417WB1 (night)
----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !        1.50 !        4.07 !         4.07

ROAD (0.00 + 47.95 + 0.00) = 47.95 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -13   0.00  73.80   0.00 -13.84  -3.69   0.00   0.00  -8.32
47.95
-------------------------------------------------------------------------------
--

Segment Leq : 47.95 dBA
```

```
Results segment # 3: 417WB2 (night)
----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !        1.50 !        3.79 !         3.79

ROAD (0.00 + 51.53 + 0.00) = 51.53 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -13     69   0.00  73.80   0.00 -13.84  -3.41   0.00   0.00  -5.01
51.53
-------------------------------------------------------------------------------
--

Segment Leq : 51.53 dBA
```

```
Results segment # 4: 417EB1 (night)
----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !        1.50 !        3.97 !         3.97

ROAD (0.00 + 48.13 + 0.00) = 48.13 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -13   0.00  73.80   0.00 -14.03  -3.69   0.00   0.00  -7.96
48.13
-------------------------------------------------------------------------------
--

Segment Leq : 48.13 dBA
```

```
Results segment # 5: 417EB2 (night)
-----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !        1.50 !        3.70 !         3.70

ROAD (0.00 + 51.33 + 0.00) = 51.33 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -13     69   0.00  73.80   0.00 -14.03  -3.41   0.00   0.00  -5.03
51.33
-------------------------------------------------------------------------------
--

Segment Leq : 51.33 dBA

Total Leq All Segments: 66.05 dBA
```

```
TOTAL Leq FROM ALL SOURCES (DAY): 73.64
                           (NIGHT): 66.05
```

```
STAMSON 5.0        NORMAL REPORT        Date: 16-04-2018 34:02:02
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: Carling1 (day/night)
----------------------------------------------
Car traffic volume  : 40480/3520  veh/TimePeriod  *
Medium truck volume :  3220/280   veh/TimePeriod  *
Heavy truck volume  :  2300/200   veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  50000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Carling1 (day/night)
-------------------------------------------
Angle1   Angle2           :   0.00 deg   67.00 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           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Road data, segment # 2: Carling2 (day/night)
------------------------------------------
Car traffic volume  : 40480/3520  veh/TimePeriod  *
Medium truck volume :  3220/280   veh/TimePeriod  *
Heavy truck volume  :  2300/200   veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  50000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Carling2 (day/night)
------------------------------------------
Angle1   Angle2           :  67.00 deg   90.00 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           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  67.00 deg   Angle2 : 90.00 deg
Barrier height            :   5.00 m
Barrier receiver distance :   9.00 / 9.00   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 3: 417WB (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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: 417WB (day/night)
---------------------------------------
Angle1   Angle2           :  21.00 deg   61.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 386.00 / 386.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  21.00 deg   Angle2 : 61.00 deg
Barrier height            :   4.00 m
Barrier receiver distance : 301.00 / 301.00 m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 4: 417EB (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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 # 4: 417EB (day/night)
---------------------------------------
Angle1   Angle2           :  21.00 deg   61.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 402.00 / 402.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  21.00 deg   Angle2 : 61.00 deg
Barrier height            :   4.00 m
Barrier receiver distance : 301.00 / 301.00 m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Results segment # 1: Carling1 (day)
----------------------------------

Source height = 1.50 m

ROAD (0.00 + 68.71 + 0.00) = 68.71 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0     67   0.00  75.22   0.00  -2.22  -4.29   0.00   0.00   0.00
68.71
-------------------------------------------------------------------------
--

Segment Leq : 68.71 dBA
```

```
Results segment # 2: Carling2 (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 !        1.50 !        1.50 !         1.50

ROAD (0.00 + 54.17 + 0.00) = 54.17 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
    67     90   0.00  75.22   0.00  -2.22  -8.94   0.00   0.00  -9.90
54.17
-------------------------------------------------------------------------------
--

Segment Leq : 54.17 dBA
```

```
Results segment # 3: 417WB (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 !        1.50 !        3.84 !         3.84

ROAD (0.00 + 55.75 + 0.00) = 55.75 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
    21     61   0.00  81.40   0.00 -14.10  -6.53   0.00   0.00  -5.01
55.75
-------------------------------------------------------------------------------
--

Segment Leq : 55.75 dBA
```

```
Results segment # 4: 417EB (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 !        1.50 !        3.74 !         3.74

ROAD (0.00 + 55.57 + 0.00) = 55.57 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
    21     61   0.00  81.40   0.00 -14.28  -6.53   0.00   0.00  -5.02
55.57
-------------------------------------------------------------------------------
--

Segment Leq : 55.57 dBA

Total Leq All Segments: 69.26 dBA
```

```
Results segment # 1: Carling1 (night)
-----------------------------------

Source height = 1.50 m

ROAD (0.00 + 61.12 + 0.00) = 61.12 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
     0     67   0.00  67.63   0.00  -2.22  -4.29   0.00   0.00   0.00
61.12
-------------------------------------------------------------------------------
--

Segment Leq : 61.12 dBA
```

```
Results segment # 2: Carling2 (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 !        1.50 !        1.50 !         1.50

ROAD (0.00 + 46.58 + 0.00) = 46.58 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
    67     90    0.00  67.63   0.00  -2.22  -8.94   0.00   0.00  -9.90
46.58
-------------------------------------------------------------------------------
--

Segment Leq : 46.58 dBA
```

```
Results segment # 3: 417WB (night)
----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !        1.50 !        3.84 !         3.84

ROAD (0.00 + 48.15 + 0.00) = 48.15 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
    21     61   0.00  73.80   0.00 -14.10  -6.53   0.00   0.00  -5.01
48.15
-------------------------------------------------------------------------------
--

Segment Leq : 48.15 dBA
```

```
Results segment # 4: 417EB (night)
----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !        1.50 !        3.74 !         3.74

ROAD (0.00 + 47.97 + 0.00) = 47.97 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
    21     61   0.00  73.80   0.00 -14.28  -6.53   0.00   0.00  -5.02
47.97
-------------------------------------------------------------------------------
--

Segment Leq : 47.97 dBA

Total Leq All Segments: 61.67 dBA
```

```
TOTAL Leq FROM ALL SOURCES (DAY): 69.26
                           (NIGHT): 61.67
```

```
STAMSON 5.0        NORMAL REPORT        Date: 16-04-2018 34:02:08
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: Carling (day/night)
-------------------------------------------
Car traffic volume  : 40480/3520  veh/TimePeriod  *
Medium truck volume :  3220/280   veh/TimePeriod  *
Heavy truck volume  :  2300/200   veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  50000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Carling (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  :  27.00 / 27.00  m
Receiver height           :  18.00 / 18.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Road data, segment # 2: 417WB1 (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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: 417WB1 (day/night)
----------------------------------------
Angle1   Angle2           : -90.00 deg   -12.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 365.00 / 365.00 m
Receiver height           :  18.00 / 18.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -12.00 deg
Barrier height            :   8.00 m
Barrier receiver distance : 314.00 / 314.00 m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 3: 417WB2 (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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: 417WB2 (day/night)
----------------------------------------
Angle1   Angle2           : -12.00 deg   21.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 365.00 / 365.00 m
Receiver height           :  18.00 / 18.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -12.00 deg   Angle2 : 21.00 deg
Barrier height            :   4.00 m
Barrier receiver distance : 280.00 / 280.00 m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 4: 417EB1 (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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 # 4: 417EB1 (day/night)
----------------------------------------
Angle1   Angle2           : -90.00 deg   -12.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 381.00 / 381.00 m
Receiver height           :  18.00 / 18.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -12.00 deg
Barrier height            :   8.00 m
Barrier receiver distance : 314.00 / 314.00 m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 5: 417EB2 (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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 # 5: 417EB2 (day/night)
----------------------------------------
Angle1   Angle2           : -12.00 deg   21.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 381.00 / 381.00 m
Receiver height           :  18.00 / 18.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -12.00 deg   Angle2 : 21.00 deg
Barrier height            :   4.00 m
Barrier receiver distance : 280.00 / 280.00 m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

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

Source height = 1.50 m

ROAD (0.00 + 69.66 + 0.00) = 69.66 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90      0   0.00  75.22   0.00  -2.55  -3.01   0.00   0.00   0.00
69.66
-------------------------------------------------------------------------
--

Segment Leq : 69.66 dBA
```

```
Results segment # 2: 417WB1 (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 !       18.00 !        6.38 !         6.38

ROAD (0.00 + 58.08 + 0.00) = 58.08 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -12   0.00  81.40   0.00 -13.86  -3.63   0.00   0.00  -5.82
58.08
-------------------------------------------------------------------------------
--

Segment Leq : 58.08 dBA
```

```
Results segment # 3: 417WB2 (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 !       18.00 !        7.64 !         7.64

ROAD (0.00 + 60.17 + 0.00) = 60.17 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -12     21   0.00  81.40   0.00 -13.86  -7.37   0.00   0.00   0.00
60.17*
   -12     21   0.00  81.40   0.00 -13.86  -7.37   0.00   0.00   0.00
60.17
-------------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 60.17 dBA
```

```
Results segment # 4: 417EB1 (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 !       18.00 !        6.87 !         6.87

ROAD (0.00 + 58.38 + 0.00) = 58.38 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -12   0.00  81.40   0.00 -14.05  -3.63   0.00   0.00  -5.34
58.38
-------------------------------------------------------------------------------
--

Segment Leq : 58.38 dBA
```

```
Results segment # 5: 417EB2 (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 !       18.00 !        8.08 !         8.08

ROAD (0.00 + 59.98 + 0.00) = 59.98 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -12     21   0.00  81.40   0.00 -14.05  -7.37   0.00   0.00   0.00
59.98*
   -12     21   0.00  81.40   0.00 -14.05  -7.37   0.00   0.00   0.00
59.98
-------------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 59.98 dBA

Total Leq All Segments: 71.01 dBA
```

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

Source height = 1.50 m

ROAD (0.00 + 62.07 + 0.00) = 62.07 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90      0   0.00  67.63   0.00  -2.55  -3.01   0.00   0.00   0.00
62.07
-------------------------------------------------------------------------
--

Segment Leq : 62.07 dBA
```

```
Results segment # 2: 417WB1 (night)
----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       18.00 !        6.38 !         6.38

ROAD (0.00 + 50.48 + 0.00) = 50.48 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -12   0.00  73.80   0.00 -13.86  -3.63   0.00   0.00  -5.82
50.48
-------------------------------------------------------------------------------
--

Segment Leq : 50.48 dBA
```

```
Results segment # 3: 417WB2 (night)
-----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       18.00 !        7.64 !         7.64

ROAD (0.00 + 52.57 + 0.00) = 52.57 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -12     21   0.00  73.80   0.00 -13.86  -7.37   0.00   0.00   0.00
52.57*
   -12     21   0.00  73.80   0.00 -13.86  -7.37   0.00   0.00   0.00
52.57
-------------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 52.57 dBA
```

```
Results segment # 4: 417EB1 (night)
----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       18.00 !        6.87 !         6.87

ROAD (0.00 + 50.78 + 0.00) = 50.78 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -12   0.00  73.80   0.00 -14.05  -3.63   0.00   0.00  -5.34
50.78
-------------------------------------------------------------------------------
--

Segment Leq : 50.78 dBA
```

```
Results segment # 5: 417EB2 (night)
-----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       18.00 !        8.07 !         8.07

ROAD (0.00 + 52.38 + 0.00) = 52.38 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -12     21   0.00  73.80   0.00 -14.05  -7.37   0.00   0.00   0.00
52.38*
   -12     21   0.00  73.80   0.00 -14.05  -7.37   0.00   0.00   0.00
52.38
-------------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 52.38 dBA

Total Leq All Segments: 63.42 dBA
```

```
TOTAL Leq FROM ALL SOURCES (DAY): 71.01
                           (NIGHT): 63.42
```

```
STAMSON 5.0        NORMAL REPORT        Date: 16-04-2018 34:02:13
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: Carling (day/night)
-------------------------------------------
Car traffic volume  : 40480/3520  veh/TimePeriod  *
Medium truck volume :  3220/280   veh/TimePeriod  *
Heavy truck volume  :  2300/200   veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  50000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Carling (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  :  24.00 / 24.00  m
Receiver height           :  18.00 / 18.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Road data, segment # 2: 417WB1 (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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: 417WB1 (day/night)
----------------------------------------
Angle1   Angle2           : -90.00 deg   -13.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 363.00 / 363.00 m
Receiver height           :  18.00 / 18.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -13.00 deg
Barrier height            :   8.00 m
Barrier receiver distance : 312.00 / 312.00 m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 3: 417WB2 (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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: 417WB2 (day/night)
----------------------------------------
Angle1   Angle2           : -13.00 deg   69.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 363.00 / 363.00 m
Receiver height           :  18.00 / 18.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -13.00 deg   Angle2 : 69.00 deg
Barrier height            :   4.00 m
Barrier receiver distance : 278.00 / 278.00 m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 4: 417EB1 (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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 # 4: 417EB1 (day/night)
----------------------------------------
Angle1   Angle2           : -90.00 deg   -13.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 379.00 / 379.00 m
Receiver height           :  18.00 / 18.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -13.00 deg
Barrier height            :   8.00 m
Barrier receiver distance : 312.00 / 312.00 m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 5: 417EB2 (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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 # 5: 417EB2 (day/night)
----------------------------------------
Angle1   Angle2           : -13.00 deg   69.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 379.00 / 379.00 m
Receiver height           :  18.00 / 18.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -13.00 deg   Angle2 : 69.00 deg
Barrier height            :   4.00 m
Barrier receiver distance : 278.00 / 278.00 m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

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

Source height = 1.50 m

ROAD (0.00 + 73.18 + 0.00) = 73.18 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     90   0.00  75.22   0.00  -2.04   0.00   0.00   0.00   0.00
73.18
-------------------------------------------------------------------------
--

Segment Leq : 73.18 dBA
```

```
Results segment # 2: 417WB1 (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 !       18.00 !        6.39 !         6.39

ROAD (0.00 + 58.06 + 0.00) = 58.06 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -13   0.00  81.40   0.00 -13.84  -3.69   0.00   0.00  -5.81
58.06
-------------------------------------------------------------------------------
--

Segment Leq : 58.06 dBA
```

```
Results segment # 3: 417WB2 (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 !       18.00 !        7.66 !         7.66

ROAD (0.00 + 64.14 + 0.00) = 64.14 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -13     69   0.00  81.40   0.00 -13.84  -3.41   0.00   0.00  -0.27
63.88*
   -13     69   0.00  81.40   0.00 -13.84  -3.41   0.00   0.00   0.00
64.14
-------------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 64.14 dBA
```

```
Results segment # 4: 417EB1 (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 !       18.00 !        6.88 !         6.88

ROAD (0.00 + 58.35 + 0.00) = 58.35 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -13   0.00  81.40   0.00 -14.03  -3.69   0.00   0.00  -5.33
58.35
-------------------------------------------------------------------------------
--

Segment Leq : 58.35 dBA
```

```
Results segment # 5: 417EB2 (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 !       18.00 !        8.09 !         8.09

ROAD (0.00 + 63.96 + 0.00) = 63.96 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -13     69   0.00  81.40   0.00 -14.03  -3.41   0.00   0.00  -0.19
63.77*
   -13     69   0.00  81.40   0.00 -14.03  -3.41   0.00   0.00   0.00
63.96
-------------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 63.96 dBA

Total Leq All Segments: 74.35 dBA
```

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

Source height = 1.50 m

ROAD (0.00 + 65.59 + 0.00) = 65.59 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     90   0.00  67.63   0.00  -2.04   0.00   0.00   0.00   0.00
65.59
-------------------------------------------------------------------------
--

Segment Leq : 65.59 dBA
```

```
Results segment # 2: 417WB1 (night)
----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       18.00 !        6.39 !         6.39

ROAD (0.00 + 50.47 + 0.00) = 50.47 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -13   0.00  73.80   0.00 -13.84  -3.69   0.00   0.00  -5.81
50.47
-------------------------------------------------------------------------------
--

Segment Leq : 50.47 dBA
```

```
Results segment # 3: 417WB2 (night)
----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       18.00 !        7.66 !         7.66

ROAD (0.00 + 56.55 + 0.00) = 56.55 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -13     69   0.00  73.80   0.00 -13.84  -3.41   0.00   0.00  -0.27
56.28*
   -13     69   0.00  73.80   0.00 -13.84  -3.41   0.00   0.00   0.00
56.55
-------------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 56.55 dBA
```

```
Results segment # 4: 417EB1 (night)
----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       18.00 !        6.88 !         6.88

ROAD (0.00 + 50.76 + 0.00) = 50.76 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -13   0.00  73.80   0.00 -14.03  -3.69   0.00   0.00  -5.33
50.76
-------------------------------------------------------------------------------
--

Segment Leq : 50.76 dBA
```

```
Results segment # 5: 417EB2 (night)
-----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       18.00 !        8.09 !         8.09

ROAD (0.00 + 56.36 + 0.00) = 56.36 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -13     69   0.00  73.80   0.00 -14.03  -3.41   0.00   0.00  -0.19
56.17*
   -13     69   0.00  73.80   0.00 -14.03  -3.41   0.00   0.00   0.00
56.36
-------------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 56.36 dBA

Total Leq All Segments: 66.76 dBA
```

```
TOTAL Leq FROM ALL SOURCES (DAY): 74.35
                           (NIGHT): 66.76
```

```
STAMSON 5.0        NORMAL REPORT        Date: 16-04-2018 34:02:18
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: Carling1 (day/night)
----------------------------------------------
Car traffic volume  : 40480/3520  veh/TimePeriod  *
Medium truck volume :  3220/280   veh/TimePeriod  *
Heavy truck volume  :  2300/200   veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  50000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Carling1 (day/night)
-------------------------------------------
Angle1   Angle2           :   0.00 deg   67.00 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           :  18.00 / 18.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Road data, segment # 2: Carling2 (day/night)
------------------------------------------
Car traffic volume  : 40480/3520  veh/TimePeriod  *
Medium truck volume :  3220/280   veh/TimePeriod  *
Heavy truck volume  :  2300/200   veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  50000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Carling2 (day/night)
------------------------------------------
Angle1   Angle2           :  67.00 deg   90.00 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           :  18.00 / 18.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  67.00 deg   Angle2 : 90.00 deg
Barrier height            :   5.00 m
Barrier receiver distance :   9.00 / 9.00   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 3: 417WB (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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: 417WB (day/night)
---------------------------------------
Angle1   Angle2           :  21.00 deg   61.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 386.00 / 386.00 m
Receiver height           :  18.00 / 18.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  21.00 deg   Angle2 : 61.00 deg
Barrier height            :   4.00 m
Barrier receiver distance : 301.00 / 301.00 m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 4: 417EB (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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 # 4: 417EB (day/night)
---------------------------------------
Angle1   Angle2           :  21.00 deg   61.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 402.00 / 402.00 m
Receiver height           :  18.00 / 18.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  21.00 deg   Angle2 : 61.00 deg
Barrier height            :   4.00 m
Barrier receiver distance : 301.00 / 301.00 m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Results segment # 1: Carling1 (day)
----------------------------------

Source height = 1.50 m

ROAD (0.00 + 68.71 + 0.00) = 68.71 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0     67   0.00  75.22   0.00  -2.22  -4.29   0.00   0.00   0.00
68.71
-------------------------------------------------------------------------
--

Segment Leq : 68.71 dBA
```

```
Results segment # 2: Carling2 (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 !       18.00 !       12.06 !        12.06

ROAD (0.00 + 64.07 + 0.00) = 64.07 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
    67     90   0.00  75.22   0.00  -2.22  -8.94   0.00   0.00  -0.14
63.93*
    67     90   0.00  75.22   0.00  -2.22  -8.94   0.00   0.00   0.00
64.07
-------------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 64.07 dBA
```

```
Results segment # 3: 417WB (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 !       18.00 !        7.47 !         7.47

ROAD (0.00 + 60.76 + 0.00) = 60.76 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
    21     61   0.00  81.40   0.00 -14.10  -6.53   0.00   0.00  -0.42
60.34*
    21     61   0.00  81.40   0.00 -14.10  -6.53   0.00   0.00   0.00
60.76
-------------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 60.76 dBA
```

```
Results segment # 4: 417EB (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 !       18.00 !        7.89 !         7.89

ROAD (0.00 + 60.58 + 0.00) = 60.58 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
    21     61   0.00  81.40   0.00 -14.28  -6.53   0.00   0.00  -0.24
60.34*
    21     61   0.00  81.40   0.00 -14.28  -6.53   0.00   0.00   0.00
60.58
-------------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 60.58 dBA

Total Leq All Segments: 70.91 dBA
```

```
Results segment # 1: Carling1 (night)
-----------------------------------

Source height = 1.50 m

ROAD (0.00 + 61.12 + 0.00) = 61.12 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0     67   0.00  67.63   0.00  -2.22  -4.29   0.00   0.00   0.00
61.12
-------------------------------------------------------------------------
--

Segment Leq : 61.12 dBA
```

```
Results segment # 2: Carling2 (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 !       18.00 !       12.06 !        12.06

ROAD (0.00 + 56.47 + 0.00) = 56.47 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
    67     90   0.00  67.63   0.00  -2.22  -8.94   0.00   0.00  -0.14
56.33*
    67     90   0.00  67.63   0.00  -2.22  -8.94   0.00   0.00   0.00
56.47
-------------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 56.47 dBA
```

```
Results segment # 3: 417WB (night)
----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       18.00 !        7.47 !         7.47

ROAD (0.00 + 53.16 + 0.00) = 53.16 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
    21     61   0.00  73.80   0.00 -14.10  -6.53   0.00   0.00  -0.42
52.75*
    21     61   0.00  73.80   0.00 -14.10  -6.53   0.00   0.00   0.00
53.16
-------------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 53.16 dBA
```

```
Results segment # 4: 417EB (night)
----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       18.00 !        7.89 !         7.89

ROAD (0.00 + 52.99 + 0.00) = 52.99 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
    21     61   0.00  73.80   0.00 -14.28  -6.53   0.00   0.00  -0.24
52.75*
    21     61   0.00  73.80   0.00 -14.28  -6.53   0.00   0.00   0.00
52.99
-------------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 52.99 dBA

Total Leq All Segments: 63.31 dBA
```

```
TOTAL Leq FROM ALL SOURCES (DAY): 70.91
                           (NIGHT): 63.31
```

```
STAMSON 5.0        NORMAL REPORT        Date: 16-04-2018 34:02:23
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: Carling1 (day/night)
----------------------------------------------
Car traffic volume  : 40480/3520  veh/TimePeriod  *
Medium truck volume :  3220/280   veh/TimePeriod  *
Heavy truck volume  :  2300/200   veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  50000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Carling1 (day/night)
-------------------------------------------
Angle1   Angle2           : -90.00 deg   43.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  59.00 / 59.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 43.00 deg
Barrier height            :  28.50 m
Barrier receiver distance :  36.00 / 36.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: Carling2 (day/night)
-------------------------------------------
Car traffic volume  : 40480/3520  veh/TimePeriod  *
Medium truck volume :  3220/280   veh/TimePeriod  *
Heavy truck volume  :  2300/200   veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  50000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Carling2 (day/night)
-------------------------------------------
Angle1   Angle2           :  43.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  59.00 / 59.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  43.00 deg   Angle2 : 90.00 deg
Barrier height            :   5.00 m
Barrier receiver distance :  36.00 / 36.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Results segment # 1: Carling1 (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 !        1.50 !        1.50 !         1.50

ROAD (0.00 + 48.37 + 0.00) = 48.37 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     43   0.00  75.22   0.00  -5.95  -1.31   0.00   0.00 -19.59
48.37
-------------------------------------------------------------------------------
--

Segment Leq : 48.37 dBA
```

```
Results segment # 2: Carling2 (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 !        1.50 !        1.50 !         1.50

ROAD (0.00 + 50.14 + 0.00) = 50.14 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
    43     90   0.36  75.22   0.00  -8.09  -7.55   0.00   0.00  -9.45
50.14
-------------------------------------------------------------------------------
--

Segment Leq : 50.14 dBA

Total Leq All Segments: 52.35 dBA
```

```
Results segment # 1: Carling1 (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 !        1.50 !        1.50 !         1.50

ROAD (0.00 + 40.78 + 0.00) = 40.78 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     43   0.00  67.63   0.00  -5.95  -1.31   0.00   0.00 -19.59
40.78
-------------------------------------------------------------------------------
--

Segment Leq : 40.78 dBA
```

```
Results segment # 2: Carling2 (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 !        1.50 !        1.50 !         1.50

ROAD (0.00 + 42.55 + 0.00) = 42.55 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
    43     90   0.36  67.63   0.00  -8.09  -7.55   0.00   0.00  -9.45
42.55
-------------------------------------------------------------------------------
--

Segment Leq : 42.55 dBA

Total Leq All Segments: 44.76 dBA
```

```
TOTAL Leq FROM ALL SOURCES (DAY): 52.35
                           (NIGHT): 44.76
```

```
STAMSON 5.0        NORMAL REPORT        Date: 16-04-2018 34:02:28
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: Carling1 (day/night)
----------------------------------------------
Car traffic volume  : 40480/3520  veh/TimePeriod  *
Medium truck volume :  3220/280   veh/TimePeriod  *
Heavy truck volume  :  2300/200   veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  50000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Carling1 (day/night)
-------------------------------------------
Angle1   Angle2           : -90.00 deg   -23.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  32.00 / 32.00  m
Receiver height           :  21.00 / 21.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -23.00 deg
Barrier height            :  28.50 m
Barrier receiver distance :   9.00 / 9.00   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: 417WB1 (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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: 417WB1 (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  : 392.00 / 392.00 m
Receiver height           :  21.00 / 21.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 0.00 deg
Barrier height            :  28.50 m
Barrier receiver distance :  11.00 / 11.00  m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 3: 417WB2 (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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: 417WB2 (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  : 392.00 / 392.00 m
Receiver height           :  21.00 / 21.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :   0.00 deg   Angle2 : 90.00 deg
Barrier height            :  19.50 m
Barrier receiver distance :  11.00 / 11.00  m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 4: 417EB1 (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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 # 4: 417EB1 (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  : 408.00 / 408.00 m
Receiver height           :  21.00 / 21.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 0.00 deg
Barrier height            :  28.50 m
Barrier receiver distance :  11.00 / 11.00  m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 5: 417EB2 (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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 # 5: 417EB2 (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  : 408.00 / 408.00 m
Receiver height           :  21.00 / 21.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :   0.00 deg   Angle2 : 90.00 deg
Barrier height            :  19.50 m
Barrier receiver distance :  11.00 / 11.00  m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 6: Carling2 (day/night)
-------------------------------------------
Car traffic volume  : 40480/3520  veh/TimePeriod  *
Medium truck volume :  3220/280   veh/TimePeriod  *
Heavy truck volume  :  2300/200   veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  50000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 6: Carling2 (day/night)
-------------------------------------------
Angle1   Angle2           : -23.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  32.00 / 32.00  m
Receiver height           :  21.00 / 21.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -23.00 deg   Angle2 : 90.00 deg
Barrier height            :  19.50 m
Barrier receiver distance :   9.00 / 9.00   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Results segment # 1: Carling1 (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 !       21.00 !       15.51 !        15.51

ROAD (0.00 + 49.22 + 0.00) = 49.22 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -23   0.00  75.22   0.00  -3.29  -4.29   0.00   0.00 -18.43
49.22
-------------------------------------------------------------------------------
--

Segment Leq : 49.22 dBA
```

```
Results segment # 2: 417WB1 (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 !       21.00 !       20.54 !        20.54

ROAD (0.00 + 47.58 + 0.00) = 47.58 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90      0   0.00  81.40   0.00 -14.17  -3.01   0.00   0.00 -16.63
47.58
-------------------------------------------------------------------------------
--

Segment Leq : 47.58 dBA
```

```
Results segment # 3: 417WB2 (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 !       21.00 !       20.54 !        20.54

ROAD (0.00 + 64.21 + 0.00) = 64.21 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
     0     90   0.00  81.40   0.00 -14.17  -3.01   0.00   0.00  -2.82
61.39*
     0     90   0.00  81.40   0.00 -14.17  -3.01   0.00   0.00   0.00
64.21
-------------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 64.21 dBA
```

```
Results segment # 4: 417EB1 (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 !       21.00 !       20.56 !        20.56

ROAD (0.00 + 47.43 + 0.00) = 47.43 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90      0   0.00  81.40   0.00 -14.35  -3.01   0.00   0.00 -16.62
47.43
-------------------------------------------------------------------------------
--

Segment Leq : 47.43 dBA
```

```
Results segment # 5: 417EB2 (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 !       21.00 !       20.56 !        20.56

ROAD (0.00 + 64.04 + 0.00) = 64.04 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
     0     90   0.00  81.40   0.00 -14.35  -3.01   0.00   0.00  -2.72
61.32*
     0     90   0.00  81.40   0.00 -14.35  -3.01   0.00   0.00   0.00
64.04
-------------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 64.04 dBA
```

```
Results segment # 6: Carling2 (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 !       21.00 !       15.51 !        15.51

ROAD (0.00 + 56.31 + 0.00) = 56.31 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -23     90   0.00  75.22   0.00  -3.29  -2.02   0.00   0.00 -13.61
56.31
-------------------------------------------------------------------------------
--

Segment Leq : 56.31 dBA

Total Leq All Segments: 67.63 dBA
```

```
Results segment # 1: Carling1 (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 !       21.00 !       15.51 !        15.51

ROAD (0.00 + 41.62 + 0.00) = 41.62 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -23   0.00  67.63   0.00  -3.29  -4.29   0.00   0.00 -18.43
41.62
-------------------------------------------------------------------------------
--

Segment Leq : 41.62 dBA
```

```
Results segment # 2: 417WB1 (night)
-----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       21.00 !       20.54 !        20.54

ROAD (0.00 + 39.99 + 0.00) = 39.99 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90      0   0.00  73.80   0.00 -14.17  -3.01   0.00   0.00 -16.63
39.99
-------------------------------------------------------------------------------
--

Segment Leq : 39.99 dBA
```

```
Results segment # 3: 417WB2 (night)
----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       21.00 !       20.54 !        20.54

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
-------------------------------------------------------------------------------
--
     0     90   0.00  73.80   0.00 -14.17  -3.01   0.00   0.00  -2.83
53.79*
     0     90   0.00  73.80   0.00 -14.17  -3.01   0.00   0.00   0.00
56.62
-------------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 56.62 dBA
```

```
Results segment # 4: 417EB1 (night)
-----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       21.00 !       20.56 !        20.56

ROAD (0.00 + 39.83 + 0.00) = 39.83 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90      0   0.00  73.80   0.00 -14.35  -3.01   0.00   0.00 -16.62
39.83
-------------------------------------------------------------------------------
--

Segment Leq : 39.83 dBA
```

```
Results segment # 5: 417EB2 (night)
-----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       21.00 !       20.56 !        20.56

ROAD (0.00 + 56.44 + 0.00) = 56.44 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
     0     90   0.00  73.80   0.00 -14.35  -3.01   0.00   0.00  -2.72
53.72*
     0     90   0.00  73.80   0.00 -14.35  -3.01   0.00   0.00   0.00
56.44
-------------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 56.44 dBA
```

```
Results segment # 6: Carling2 (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 !       21.00 !       15.51 !        15.51

ROAD (0.00 + 48.71 + 0.00) = 48.71 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -23     90   0.00  67.63   0.00  -3.29  -2.02   0.00   0.00 -13.61
48.71
-------------------------------------------------------------------------------
--

Segment Leq : 48.71 dBA

Total Leq All Segments: 60.04 dBA
```

```
TOTAL Leq FROM ALL SOURCES (DAY): 67.63
                           (NIGHT): 60.04
```

```
STAMSON 5.0        NORMAL REPORT        Date: 16-04-2018 34:02:34
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r8b.te               Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: Carling1 (day/night)
----------------------------------------------
Car traffic volume  : 40480/3520  veh/TimePeriod  *
Medium truck volume :  3220/280   veh/TimePeriod  *
Heavy truck volume  :  2300/200   veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  50000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Carling1 (day/night)
-------------------------------------------
Angle1   Angle2           : -90.00 deg   -23.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  32.00 / 32.00  m
Receiver height           :  21.00 / 21.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -23.00 deg
Barrier height            :  28.50 m
Barrier receiver distance :   9.00 / 9.00   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: 417WB1 (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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: 417WB1 (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  : 392.00 / 392.00 m
Receiver height           :  21.00 / 21.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 0.00 deg
Barrier height            :  28.50 m
Barrier receiver distance :  11.00 / 11.00  m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 3: 417WB2 (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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: 417WB2 (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  : 392.00 / 392.00 m
Receiver height           :  21.00 / 21.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :   0.00 deg   Angle2 : 90.00 deg
Barrier height            :  23.50 m
Barrier receiver distance :  11.00 / 11.00  m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 4: 417EB1 (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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 # 4: 417EB1 (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  : 408.00 / 408.00 m
Receiver height           :  21.00 / 21.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 0.00 deg
Barrier height            :  28.50 m
Barrier receiver distance :  11.00 / 11.00  m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 5: 417EB2 (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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 # 5: 417EB2 (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  : 408.00 / 408.00 m
Receiver height           :  21.00 / 21.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :   0.00 deg   Angle2 : 90.00 deg
Barrier height            :  23.50 m
Barrier receiver distance :  11.00 / 11.00  m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 6: Carling2 (day/night)
-------------------------------------------
Car traffic volume  : 40480/3520  veh/TimePeriod  *
Medium truck volume :  3220/280   veh/TimePeriod  *
Heavy truck volume  :  2300/200   veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  50000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 6: Carling2 (day/night)
-------------------------------------------
Angle1   Angle2           : -23.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  32.00 / 32.00  m
Receiver height           :  21.00 / 21.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -23.00 deg   Angle2 : 90.00 deg
Barrier height            :  23.50 m
Barrier receiver distance :   9.00 / 9.00   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Results segment # 1: Carling1 (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 !       21.00 !       15.51 !        15.51

ROAD (0.00 + 49.22 + 0.00) = 49.22 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -23   0.00  75.22   0.00  -3.29  -4.29   0.00   0.00 -18.43
49.22
-------------------------------------------------------------------------------
--

Segment Leq : 49.22 dBA
```

```
Results segment # 2: 417WB1 (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 !       21.00 !       20.54 !        20.54

ROAD (0.00 + 47.58 + 0.00) = 47.58 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90      0   0.00  81.40   0.00 -14.17  -3.01   0.00   0.00 -16.63
47.58
-------------------------------------------------------------------------------
--

Segment Leq : 47.58 dBA
```

```
Results segment # 3: 417WB2 (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 !       21.00 !       20.54 !        20.54

ROAD (0.00 + 53.44 + 0.00) = 53.44 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
     0     90   0.00  81.40   0.00 -14.17  -3.01   0.00   0.00 -10.78
53.44
-------------------------------------------------------------------------------
--

Segment Leq : 53.44 dBA
```

```
Results segment # 4: 417EB1 (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 !       21.00 !       20.56 !        20.56

ROAD (0.00 + 47.43 + 0.00) = 47.43 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90      0   0.00  81.40   0.00 -14.35  -3.01   0.00   0.00 -16.62
47.43
-------------------------------------------------------------------------------
--

Segment Leq : 47.43 dBA
```

```
Results segment # 5: 417EB2 (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 !       21.00 !       20.56 !        20.56

ROAD (0.00 + 53.30 + 0.00) = 53.30 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
     0     90   0.00  81.40   0.00 -14.35  -3.01   0.00   0.00 -10.74
53.30
-------------------------------------------------------------------------------
--

Segment Leq : 53.30 dBA
```

```
Results segment # 6: Carling2 (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 !       21.00 !       15.51 !        15.51

ROAD (0.00 + 52.18 + 0.00) = 52.18 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -23     90   0.00  75.22   0.00  -3.29  -2.02   0.00   0.00 -17.74
52.18
-------------------------------------------------------------------------------
--

Segment Leq : 52.18 dBA

Total Leq All Segments: 59.01 dBA
```

```
Results segment # 1: Carling1 (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 !       21.00 !       15.51 !        15.51

ROAD (0.00 + 41.62 + 0.00) = 41.62 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -23   0.00  67.63   0.00  -3.29  -4.29   0.00   0.00 -18.43
41.62
-------------------------------------------------------------------------------
--

Segment Leq : 41.62 dBA
```

```
Results segment # 2: 417WB1 (night)
----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       21.00 !       20.54 !        20.54

ROAD (0.00 + 39.99 + 0.00) = 39.99 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90      0   0.00  73.80   0.00 -14.17  -3.01   0.00   0.00 -16.63
39.99
-------------------------------------------------------------------------------
--

Segment Leq : 39.99 dBA
```

```
Results segment # 3: 417WB2 (night)
----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       21.00 !       20.54 !        20.54

ROAD (0.00 + 45.84 + 0.00) = 45.84 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
     0     90   0.00  73.80   0.00 -14.17  -3.01   0.00   0.00 -10.78
45.84
-------------------------------------------------------------------------------
--

Segment Leq : 45.84 dBA
```

```
Results segment # 4: 417EB1 (night)
-----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       21.00 !       20.56 !        20.56

ROAD (0.00 + 39.83 + 0.00) = 39.83 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90      0   0.00  73.80   0.00 -14.35  -3.01   0.00   0.00 -16.62
39.83
-------------------------------------------------------------------------------
--

Segment Leq : 39.83 dBA
```

```
Results segment # 5: 417EB2 (night)
-----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       21.00 !       20.56 !        20.56

ROAD (0.00 + 45.71 + 0.00) = 45.71 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
     0     90   0.00  73.80   0.00 -14.35  -3.01   0.00   0.00 -10.74
45.71
-------------------------------------------------------------------------------
--

Segment Leq : 45.71 dBA
```

```
Results segment # 6: Carling2 (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 !       21.00 !       15.51 !        15.51

ROAD (0.00 + 44.58 + 0.00) = 44.58 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -23     90   0.00  67.63   0.00  -3.29  -2.02   0.00   0.00 -17.74
44.58
-------------------------------------------------------------------------------
--

Segment Leq : 44.58 dBA

Total Leq All Segments: 51.41 dBA
```

```
TOTAL Leq FROM ALL SOURCES (DAY): 59.01
                           (NIGHT): 51.41
```

```
STAMSON 5.0        NORMAL REPORT        Date: 16-04-2018 34:02:39
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r8b2.te              Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: Carling1 (day/night)
----------------------------------------------
Car traffic volume  : 40480/3520  veh/TimePeriod  *
Medium truck volume :  3220/280   veh/TimePeriod  *
Heavy truck volume  :  2300/200   veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  50000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Carling1 (day/night)
-------------------------------------------
Angle1   Angle2           : -90.00 deg   -23.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  32.00 / 32.00  m
Receiver height           :  21.00 / 21.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -23.00 deg
Barrier height            :  33.00 m
Barrier receiver distance :   9.00 / 9.00   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: 417WB1 (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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: 417WB1 (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  : 392.00 / 392.00 m
Receiver height           :  21.00 / 21.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 0.00 deg
Barrier height            :  33.00 m
Barrier receiver distance :  11.00 / 11.00  m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 3: 417WB2 (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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: 417WB2 (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  : 392.00 / 392.00 m
Receiver height           :  21.00 / 21.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :   0.00 deg   Angle2 : 90.00 deg
Barrier height            :  33.00 m
Barrier receiver distance :  11.00 / 11.00  m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 4: 417EB1 (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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 # 4: 417EB1 (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  : 408.00 / 408.00 m
Receiver height           :  21.00 / 21.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 0.00 deg
Barrier height            :  33.00 m
Barrier receiver distance :  11.00 / 11.00  m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 5: 417EB2 (day/night)
------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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 # 5: 417EB2 (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  : 408.00 / 408.00 m
Receiver height           :  21.00 / 21.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :   0.00 deg   Angle2 : 90.00 deg
Barrier height            :  33.00 m
Barrier receiver distance :  11.00 / 11.00  m
Source elevation          :   3.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 6: Carling2 (day/night)
-------------------------------------------
Car traffic volume  : 40480/3520  veh/TimePeriod  *
Medium truck volume :  3220/280   veh/TimePeriod  *
Heavy truck volume  :  2300/200   veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  50000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 6: Carling2 (day/night)
-------------------------------------------
Angle1   Angle2           : -23.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  32.00 / 32.00  m
Receiver height           :  21.00 / 21.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -23.00 deg   Angle2 : 90.00 deg
Barrier height            :  33.00 m
Barrier receiver distance :   9.00 / 9.00   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Results segment # 1: Carling1 (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 !       21.00 !       15.51 !        15.51

ROAD (0.00 + 48.63 + 0.00) = 48.63 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -23   0.00  75.22   0.00  -3.29  -4.29   0.00   0.00 -19.01
48.63
-------------------------------------------------------------------------------
--

Segment Leq : 48.63 dBA
```

```
Results segment # 2: 417WB1 (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 !       21.00 !       20.54 !        20.54

ROAD (0.00 + 46.05 + 0.00) = 46.05 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90      0   0.00  81.40   0.00 -14.17  -3.01   0.00   0.00 -18.16
46.05
-------------------------------------------------------------------------------
--

Segment Leq : 46.05 dBA
```

```
Results segment # 3: 417WB2 (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 !       21.00 !       20.54 !        20.54

ROAD (0.00 + 46.05 + 0.00) = 46.05 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
     0     90   0.00  81.40   0.00 -14.17  -3.01   0.00   0.00 -18.16
46.05
-------------------------------------------------------------------------------
--

Segment Leq : 46.05 dBA
```

```
Results segment # 4: 417EB1 (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 !       21.00 !       20.56 !        20.56

ROAD (0.00 + 45.89 + 0.00) = 45.89 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90      0   0.00  81.40   0.00 -14.35  -3.01   0.00   0.00 -18.15
45.89
-------------------------------------------------------------------------------
--

Segment Leq : 45.89 dBA
```

```
Results segment # 5: 417EB2 (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 !       21.00 !       20.56 !        20.56

ROAD (0.00 + 45.89 + 0.00) = 45.89 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
     0     90   0.00  81.40   0.00 -14.35  -3.01   0.00   0.00 -18.15
45.89
-------------------------------------------------------------------------------
--

Segment Leq : 45.89 dBA
```

```
Results segment # 6: Carling2 (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 !       21.00 !       15.51 !        15.51

ROAD (0.00 + 50.53 + 0.00) = 50.53 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -23     90   0.00  75.22   0.00  -3.29  -2.02   0.00   0.00 -19.39
50.53
-------------------------------------------------------------------------------
--

Segment Leq : 50.53 dBA

Total Leq All Segments: 55.37 dBA
```

```
Results segment # 1: Carling1 (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 !       21.00 !       15.51 !        15.51

ROAD (0.00 + 41.04 + 0.00) = 41.04 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -23   0.00  67.63   0.00  -3.29  -4.29   0.00   0.00 -19.01
41.04
-------------------------------------------------------------------------------
--

Segment Leq : 41.04 dBA
```

```
Results segment # 2: 417WB1 (night)
----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       21.00 !       20.54 !        20.54

ROAD (0.00 + 38.46 + 0.00) = 38.46 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90      0   0.00  73.80   0.00 -14.17  -3.01   0.00   0.00 -18.16
38.46
-------------------------------------------------------------------------------
--

Segment Leq : 38.46 dBA
```

```
Results segment # 3: 417WB2 (night)
-----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       21.00 !       20.54 !        20.54

ROAD (0.00 + 38.46 + 0.00) = 38.46 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
     0     90   0.00  73.80   0.00 -14.17  -3.01   0.00   0.00 -18.16
38.46
-------------------------------------------------------------------------------
--

Segment Leq : 38.46 dBA
```

```
Results segment # 4: 417EB1 (night)
-----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       21.00 !       20.56 !        20.56

ROAD (0.00 + 38.29 + 0.00) = 38.29 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90      0   0.00  73.80   0.00 -14.35  -3.01   0.00   0.00 -18.15
38.29
-------------------------------------------------------------------------------
--

Segment Leq : 38.29 dBA
```

```
Results segment # 5: 417EB2 (night)
-----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       21.00 !       20.56 !        20.56

ROAD (0.00 + 38.29 + 0.00) = 38.29 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
     0     90   0.00  73.80   0.00 -14.35  -3.01   0.00   0.00 -18.15
38.29
-------------------------------------------------------------------------------
--

Segment Leq : 38.29 dBA
```

```
Results segment # 6: Carling2 (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 !       21.00 !       15.51 !        15.51

ROAD (0.00 + 42.93 + 0.00) = 42.93 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -23     90   0.00  67.63   0.00  -3.29  -2.02   0.00   0.00 -19.39
42.93
-------------------------------------------------------------------------------
--

Segment Leq : 42.93 dBA

Total Leq All Segments: 47.77 dBA
```

```
TOTAL Leq FROM ALL SOURCES (DAY): 55.37
                           (NIGHT): 47.77
```

# APPENDIX B

# PREDICTOR LIMA SAMPLE OUTPUT

==========

Testfile openend: ######## 4:16:55 PM

==========

---

Cross section for receiver R6 and source S2

| ItemType | Id | Distance | X | Y | Hgrnd | Height |
|---|---|---|---|---|---|---|
| Receiver | R6 | 0 | 363317 | 5026877 | 0 | 1.5 |
| Cluster | 2 | 64.839 | 363373 | 5026844 | 0 | 19.5 |
| Cluster | 3 | 64.839 | 363373 | 5026844 | 0 | 22.5 |
| Cluster | 1 | 64.839 | 363373 | 5026844 | 0 | 4.5 |
| Cluster | 4 | 69.71 | 363377.2 | 5026842 | 0 | 28.5 |
| Barrier | B1 | 69.968 | 363377.4 | 5026842 | 28.5 | 3.5 |
| Pointsourc | S2 | 79.552 | 363385.7 | 5026837 | 28.5 | 2 |

---

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| L(wr) | 44.6 | 57.8 | 62.9 | 80.4 | 81.8 | 85 | 85.2 | 84 | 73.9 | |
| A(ground) | -3 | -3 | -3 | -3 | -3 | -3 | -3 | -3 | -3 | |
| A(barrier) | 7.02 | 8.67 | 10.74 | 13.21 | 15.92 | 18.78 | 20 | 20 | 20 | |
| A(veg) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| A(sit) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| A(bld) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| A(air) | 0 | 0.01 | 0.03 | 0.09 | 0.16 | 0.31 | 0.82 | 2.8 | 9.96 | |
| A(geo) | 49.55 | 49.55 | 49.55 | 49.55 | 49.55 | 49.55 | 49.55 | 49.55 | 49.55 | |
| C(meteo) | 1.17 | 1.17 | 1.17 | 1.17 | 1.17 | 1.17 | 1.17 | 1.17 | 1.17 | |

---

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| L(p) | -10.14 | 1.4 | 4.4 | 19.38 | 18 | 18.2 | 16.66 | 13.49 | -3.78 | \| | 24.61 |

---

Cross section for receiver R6 and source S2
Reflection calculation in facade 1st Floor

| ItemType | Id | Distance | X | Y | Hgrnd | Height |
|---|---|---|---|---|---|---|
| Receiver | R6 | 0 | 363317 | 5026877 | 0 | 1.5 |
| Building(R) | 1st Floor | 1.273 | 363318.1 | 5026878 | 0 | 4.5 |
| Cluster | 2 | 65.618 | 363373.2 | 5026844 | 0 | 19.5 |
| Cluster | 3 | 65.618 | 363373.2 | 5026844 | 0 | 22.5 |
| Cluster | 1 | 65.618 | 363373.2 | 5026844 | 0 | 4.5 |
| Cluster | 4 | 70.456 | 363377.4 | 5026842 | 0 | 28.5 |
| Barrier | B1 | 70.71 | 363377.6 | 5026842 | 28.5 | 3.5 |
| Pointsourc | S2 | 80.222 | 363385.7 | 5026837 | 28.5 | 2 |

---

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| L(wr) | 44.6 | 57.8 | 62.9 | 80.4 | 81.8 | 85 | 85.2 | 84 | 73.9 | |
| A(ground) | -3 | -3 | -3 | -3 | -3 | -3 | -3 | -3 | -3 | |
| A(barrier) | 6.99 | 8.63 | 10.69 | 13.15 | 15.86 | 18.71 | 20 | 20 | 20 | |
| A(veg) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| A(sit) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| A(bld) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| A(air) | 0 | 0.01 | 0.04 | 0.09 | 0.16 | 0.31 | 0.83 | 2.82 | 10.04 | |
| A(geo) | 49.61 | 49.61 | 49.61 | 49.61 | 49.61 | 49.61 | 49.61 | 49.61 | 49.61 | |
| A(refl) | -- | -- | -- | -0.97 | -0.97 | -0.97 | -0.97 | -0.97 | -0.97 | |
| C(meteo) | 1.17 | 1.17 | 1.17 | 1.17 | 1.17 | 1.17 | 1.17 | 1.17 | 1.17 | |

---

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| L(p) | -- | -- | -- | 18.41 | 17.03 | 17.22 | 15.62 | 12.43 | -4.89 | \| | 23.56 |

---

Cross section for receiver R6 and source S2
Reflection calculation in facade B1

| ItemType | Id | Distance | X | Y | Hgrnd | Height |
|---|---|---|---|---|---|---|
| Receiver | R6 | 0 | 363317 | 5026877 | 0 | 1.5 |
| Cluster | 1 | 96.325 | 363385.7 | 5026809 | 0 | 4.5 |
| Cluster | 2 | 96.325 | 363385.7 | 5026809 | 0 | 19.5 |
| Cluster | 3 | 96.325 | 363385.7 | 5026809 | 0 | 22.5 |
| Cluster | 4 | 97.531 | 363386.5 | 5026809 | 0 | 28.5 |
| Barrier | B1 | 97.753 | 363386.7 | 5026808 | 28.5 | 3.5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Barrier(R) | B1 | 116.301 | 363399.9 | 5026795 | 28.5 | 3.5 |
| Pointsourc | S2 | 160.141 | 363385.7 | 5026837 | 28.5 | 2 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| L(wr) | | 44.6 | 57.8 | 62.9 | 80.4 | 81.8 | 85 | 85.2 | 84 | 73.9 |
| A(ground) | | -4.06 | -4.06 | -4.06 | -4.06 | -4.06 | -4.06 | -4.06 | -4.06 | -4.06 |
| A(barrier) | | 6.1 | 8.13 | 10.49 | 13.13 | 15.95 | 18.88 | 20 | 20 | 20 |
| A(veg) | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| A(sit) | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| A(bld) | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| A(air) | | 0.01 | 0.02 | 0.07 | 0.17 | 0.31 | 0.59 | 1.58 | 5.37 | 19.15 |
| A(geo) | | 55.22 | 55.22 | 55.22 | 55.22 | 55.22 | 55.22 | 55.22 | 55.22 | 55.22 |
| A(refl) | | -0.97 | -0.97 | -0.97 | -0.97 | -0.97 | -0.97 | -0.97 | -0.97 | -0.97 |
| C(meteo) | | 1.17 | 1.17 | 1.17 | 1.17 | 1.17 | 1.17 | 1.17 | 1.17 | 1.17 |
| L(p) | | -14.81 | -3.65 | -0.95 | 13.8 | 12.24 | 12.22 | 10.32 | 5.33 | -18.55 | 18.62 |

Cross section for receiver R6 and source S2

| ItemType | Id | Distance | X | Y | Hgrnd | Height |
|---|---|---|---|---|---|---|
| Receiver | R6 | 0 | 363317 | 5026877 | 0 | 4.5 |
| Cluster | 2 | 64.839 | 363373 | 5026844 | 0 | 19.5 |
| Cluster | 3 | 64.839 | 363373 | 5026844 | 0 | 22.5 |
| Cluster | 1 | 64.839 | 363373 | 5026844 | 0 | 4.5 |
| Cluster | 4 | 69.71 | 363377.2 | 5026842 | 0 | 28.5 |
| Barrier | B1 | 69.968 | 363377.4 | 5026842 | 28.5 | 3.5 |
| Pointsourc | S2 | 79.552 | 363385.7 | 5026837 | 28.5 | 2 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| L(wr) | | 44.6 | 57.8 | 62.9 | 80.4 | 81.8 | 85 | 85.2 | 84 | 73.9 |
| A(ground) | | -3 | -3 | -3 | -3 | -3 | -3 | -3 | -3 | -3 |
| A(barrier) | | 6.78 | 8.33 | 10.32 | 12.72 | 15.39 | 18.22 | 20 | 20 | 20 |
| A(veg) | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| A(sit) | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| A(bld) | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| A(air) | | 0 | 0.01 | 0.03 | 0.09 | 0.16 | 0.31 | 0.81 | 2.76 | 9.85 |
| A(geo) | | 49.45 | 49.45 | 49.45 | 49.45 | 49.45 | 49.45 | 49.45 | 49.45 | 49.45 |
| C(meteo) | | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 |
| L(p) | | -9.09 | 2.55 | 5.64 | 20.69 | 19.35 | 19.57 | 17.48 | 14.33 | -2.85 | 25.83 |

Cross section for receiver R6 and source S2
Reflection calculation in facade B1

| ItemType | Id | Distance | X | Y | Hgrnd | Height |
|---|---|---|---|---|---|---|
| Receiver | R6 | 0 | 363317 | 5026877 | 0 | 4.5 |
| Cluster | 1 | 96.325 | 363385.7 | 5026809 | 0 | 4.5 |
| Cluster | 2 | 96.325 | 363385.7 | 5026809 | 0 | 19.5 |
| Cluster | 3 | 96.325 | 363385.7 | 5026809 | 0 | 22.5 |
| Cluster | 4 | 97.531 | 363386.5 | 5026809 | 0 | 28.5 |
| Barrier | B1 | 97.753 | 363386.7 | 5026808 | 28.5 | 3.5 |
| Barrier(R) | B1 | 116.301 | 363399.9 | 5026795 | 28.5 | 3.5 |
| Pointsourc | S2 | 160.141 | 363385.7 | 5026837 | 28.5 | 2 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| L(wr) | | 44.6 | 57.8 | 62.9 | 80.4 | 81.8 | 85 | 85.2 | 84 | 73.9 |
| A(ground) | | -3 | -3 | -3 | -3 | -3 | -3 | -3 | -3 | -3 |
| A(barrier) | | 5.81 | 7.71 | 9.95 | 12.52 | 15.29 | 18.19 | 20 | 20 | 20 |
| A(veg) | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| A(sit) | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| A(bld) | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| A(air) | | 0.01 | 0.02 | 0.07 | 0.17 | 0.31 | 0.59 | 1.58 | 5.36 | 19.09 |
| A(geo) | | 55.2 | 55.2 | 55.2 | 55.2 | 55.2 | 55.2 | 55.2 | 55.2 | 55.2 |
| A(refl) | | -0.97 | -0.97 | -0.97 | -0.97 | -0.97 | -0.97 | -0.97 | -0.97 | -0.97 |
| C(meteo) | | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 |
| L(p) | | -14.84 | -3.55 | -0.75 | 14.08 | 12.57 | 12.59 | 10 | 5.02 | -18.81 | 18.83 |

| Height | Source | Per | LAeq | 32 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.5 | S2 | 1 | 27.7 | -8.86 | 2.59 | 5.51 | 22.55 | 21.15 | 21.32 | 19.71 | 16.36 | -1.21 |
| 1.5 | S2 | 2 | 27.7 | -8.86 | 2.59 | 5.51 | 22.55 | 21.15 | 21.32 | 19.71 | 16.36 | -1.21 |
| 1.5 | S2 | 3 | 27.7 | -8.86 | 2.59 | 5.51 | 22.55 | 21.15 | 21.32 | 19.71 | 16.36 | -1.21 |
| 1.5 | S2 | 4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 4.5 | S2 | 1 | 26.62 | -8.07 | 3.51 | 6.54 | 21.55 | 20.17 | 20.36 | 18.19 | 14.81 | -2.75 |
| 4.5 | S2 | 2 | 26.62 | -8.07 | 3.51 | 6.54 | 21.55 | 20.17 | 20.36 | 18.19 | 14.81 | -2.75 |
| 4.5 | S2 | 3 | 26.62 | -8.07 | 3.51 | 6.54 | 21.55 | 20.17 | 20.36 | 18.19 | 14.81 | -2.75 |
| 4.5 | S2 | 4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

| Height | Per | LAeq | 32 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.5 | 1 | 27.7 | -8.86 | 2.59 | 5.51 | 22.55 | 21.15 | 21.32 | 19.71 | 16.36 | -1.21 |
| 1.5 | 2 | 27.7 | -8.86 | 2.59 | 5.51 | 22.55 | 21.15 | 21.32 | 19.71 | 16.36 | -1.21 |
| 1.5 | 3 | 27.7 | -8.86 | 2.59 | 5.51 | 22.55 | 21.15 | 21.32 | 19.71 | 16.36 | -1.21 |
| 1.5 | 4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 4.5 | 1 | 26.62 | -8.07 | 3.51 | 6.54 | 21.55 | 20.17 | 20.36 | 18.19 | 14.81 | -2.75 |
| 4.5 | 2 | 26.62 | -8.07 | 3.51 | 6.54 | 21.55 | 20.17 | 20.36 | 18.19 | 14.81 | -2.75 |
| 4.5 | 3 | 26.62 | -8.07 | 3.51 | 6.54 | 21.55 | 20.17 | 20.36 | 18.19 | 14.81 | -2.75 |
| 4.5 | 4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

Testfile closed: ######## 4:16:55 PM