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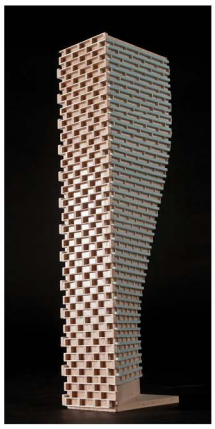
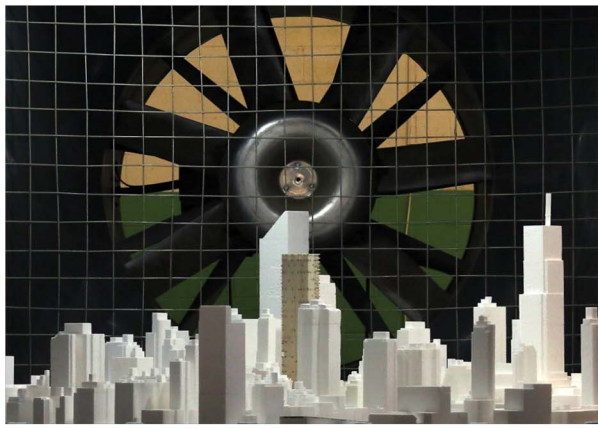
TRAFFIC NOISE FEASIBILITY ASSESSMENT

81 Slater Street
Ottawa, Ontario

REPORT: GWE19-030 – Traffic Noise





March 5, 2019

DRAFT

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EXECUTIVE SUMMARY

This report describes a roadway traffic noise feasibility assessment undertaken in support of a Zoning By-law Amendment (ZBA) submission for a proposed mixed-use development at 81 Slater Street in Ottawa, Ontario. The development is a twenty-four-storey rectangular planform residential and retail building with parking spaces, a lobby, recycling room and a retail unit at grade. Additional parking is found on the mezzanine floor in addition to indoor amenity spaces on the second floor. Residential suites occupy the remaining floors above. Outdoor amenity areas are provided on Floor 2, Floor 3 and on the building rooftop. Private balconies are present on Floor 3 through 12. Semi-private balconies are present on Floors 13 through 24. The major sources of traffic noise are Elgin Street, Slater Street, Metcalfe Street, and Albert Street. Figure 1 illustrates a complete site plan with surrounding context.

The assessment is based on (i) theoretical noise prediction methods that conform to the Ministry of the Environment, Conservation and Parks (MECP) 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; and (iv) site plan drawings prepared by RLA Architecture dated February 19, 2019.

The results of the current study indicate that noise levels due to roadway traffic over the site will range between approximately 44 and 69 dBA during the daytime period (07:00-23:00) and between 35 and 61 dBA during the nighttime period (23:00-07:00). The highest noise level (69 dBA) occurs at the south façade, which is nearest and most exposed to Slater Street.

Results of the calculations also indicate that units along the south and west façade will require central air conditioning, or a similar ventilation system, due to roadway traffic noise. However, it is recommended that all units of the development have central air conditioning, or similar ventilation system, which will allow occupants to keep windows closed and maintain a comfortable living environment.

The 2nd level amenity space will experience sound levels below 55 dBA during the daytime period, therefore, no mitigation is expected. However, it is recommended that outdoor living areas (OLA), including podium and rooftop terraces, be positioned away from the roadway to reduce noise levels. If the need arises for OLA noise mitigation, this can be addressed during site plan control. A detailed

roadway traffic noise study will be required at the time of site plan approval to determine specific noise control measures for the development.

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1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Gestion Immobilière Place Dorée Inc. to undertake a roadway traffic noise feasibility assessment in support of a Zoning By-law Amendment (ZBA) submission for a proposed mixed-use development at 81 Slater Street in Ottawa, Ontario. This report summarizes the methodology, results, and recommendations related to a roadway traffic noise feasibility assessment of exterior noise levels generated by local roadway traffic.

The assessment was performed on the basis of theoretical noise calculation methods conforming to the City of Ottawa[1] and Ministry of the Environment, Conservation and Parks (MECP)[2] guidelines. Noise calculations were based on architectural drawings prepared by RLA Architecture, dated February 19, 2019, with future traffic volumes corresponding to the City of Ottawa's Official Plan (OP) roadway classifications.

2. TERMS OF REFERENCE

The focus of this roadway traffic noise feasibility assessment is a proposed mixed-use development located at 81 Slater Street in Ottawa, Ontario. The study site is situated in the middle of a parcel of land bounded by Albert Street to the north, Elgin Street to the east, Slater Street to the south, and Metcalfe Street to the west. The proposed building is flanked by James Michael Flaherty Building (90 Elgin Street) to the east, 88 Albert Street to the north, and by 81 Metcalfe Street to the west. The proposed building rises 24 storeys to maximum height of 79.1 meters (m) above grade. The building plan form is rectangular with its long axis oriented parallel with Slater Street.

The main building access points are located on the south elevation. The Basement Floor provides indoor amenity and building services. The Ground Floor contains interior administration, parking, retail, and building services. The Mezzanine Floor contains parking spaces, with the entrance located on the north façade with access from Albert Street through the existing parking tunnel entrance. Floor 2 steps back along the north elevation in a 'C'-shape formation to accommodate a common outdoor rooftop terrace, while the interior is comprised of amenity areas. Floor 3 steps back from the north elevation to create

[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

private balconies and continues to Floor 12, while the interior is comprised of residential units up to the Mechanical Floor. Floor 13 steps out from the middle of the north façade to accommodate balconies at each floor up to Floor 23. Floor 24 steps back from the east and south elevations to accommodate a common outdoor rooftop terrace. The Mechanical Floor steps back from the north elevation, creating space for both residential units and mechanical equipment.

The major sources of traffic noise are urban arterial roadways such as Albert Street to the north, Elgin Street to the east, Slater Street to the south, and Metcalfe Street to the west. The site is surrounded by commercial high-rise buildings to the north, east, south and west. Figure 1 illustrates a complete site plan with surrounding context.

3. OBJECTIVES

The principal objectives of this study are to (i) calculate the future noise levels on the study buildings produced by local roadway traffic, and (ii) ensure that interior and exterior noise levels do not exceed the allowable limits specified by the City of Ottawa's Environmental Noise Control Guidelines as outlined in Section 4.2 of this report.

4. METHODOLOGY

4.1 Background

Noise can be defined as any obtrusive sound. It is created at a source, transmitted through a medium, such as air, and intercepted by a receiver. Noise may be characterized in terms of the power of the source or the sound pressure at a specific distance. While the power of a source is characteristic of that particular source, the sound pressure depends on the location of the receiver and the path that the noise takes to reach the receiver. Measurement of noise is based on the decibel unit, dBA, which is a logarithmic ratio referenced to a standard noise level (2×10^{-5} Pascals). The 'A' suffix refers to a weighting scale, which better represents how the noise is perceived by the human ear. With this scale, a doubling of power results in a 3 dBA increase in measured noise levels and is just perceptible to most people. An increase of 10 dBA is often perceived to be twice as loud.

4.2 Roadway Traffic Noise

4.2.1 Criteria for Roadway Traffic Noise

For surface roadway traffic noise, the equivalent sound energy level, L_{eq}, provides a measure of the time varying noise levels, which is well correlated with the annoyance of sound. It is defined as the continuous sound level, which has the same energy as a time varying noise level over a period of time. For roadways, the L_{eq} is commonly calculated on the basis of a 16-hour (L_{eq16}) daytime (07:00-23:00) / 8-hour (L_{eq8}) nighttime (23:00-07:00) split to assess its impact on residential buildings. The City of Ottawa's Environmental Noise Control Guidelines (ENCG) specifies that the recommended indoor noise limit range is 45 and 40 dBA for living rooms and sleeping quarters respectively for roadway, as listed in Table 1. Based on Gradient Wind's experience, more comfortable indoor noise levels should be targeted, towards 47, 42, and 37 dBA, respectively, to control peak noise and deficiencies in building envelope construction.

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

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

Predicted noise levels at the plane of window (POW) dictate the action required to achieve the recommended sound levels. An open window is considered to provide a 10 dBA reduction in noise, while a standard closed window is capable of providing a minimum 20 dBA noise reduction[4]. A closed window due to a ventilation requirement will bring noise levels down to achieve an acceptable indoor environment[5]. Therefore, where noise levels exceed 55 dBA daytime and 50 dBA nighttime, the ventilation

[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] MOECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.8

for the building should consider the need for having windows and doors closed, which triggers the need for forced air heating with provision for central air conditioning. Where noise levels exceed 65 dBA daytime and 60 dBA nighttime, air conditioning will be required and building components will require higher levels of sound attenuation[6].

The sound level criterion for outdoor living areas is 55 dBA, which applies during the daytime (07:00 to 23:00). When noise levels exceed 55 dBA, mitigation must be provided to reduce noise levels where technically and administratively feasible to acceptable levels at or below the criterion. Terraces and balconies are considered to be noise sensitive outdoor living areas (OLA) if they are greater than or equal to 4-meters in depth. Since the Level 2 terrace exceeds this criterion, it was the only amenity space considered as an outdoor living area in the assessment.

4.2.2 Theoretical Roadway Noise Predictions

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

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

- Truck traffic on all roadways was taken to comprise 5% heavy trucks and 7% medium trucks, as per ENCG requirements for noise level predictions.
- The day/night split for all streets was taken to be 92%/8%, respectively.
- Ground surfaces were taken to be reflective due to the presence of hard (paved) ground.
- Topography was assumed to be a flat/gentle slope surrounding the study building.
- Receptor height was taken to be 30 meters and 71.5 meters at Level 10 and Level 23 for the center of the plane of window (POW) respectively.
- The nearby buildings surrounding the site were considered as a noise barrier (Figure 3-5).
- Noise receptors were strategically placed at 7 locations around the study area (see Figure 2).
- Receptor distances and exposure angles are illustrated in Figures 3-5.

[6] MOECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3

4.2.3 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[7] which provide additional details on future roadway expansions. Average Annual Daily Traffic (AADT) volumes are then based on data in Table B1 of the ENCG for each roadway classification. Table 2 (below) summarizes the AADT values used for each roadway included in this assessment.

TABLE 2: ROADWAY TRAFFIC DATA

Segment	Roadway Traffic Data	Speed Limit (km/h)	Traffic Volumes
Elgin Street	4-Lane Urban Arterial Divided (4-UAD)	50	**35,000**
Slater Street	2-Lane Urban Arterial (2-UAU)	50	**15,000**
Metcalfe Street	2-Lane Urban Arterial (2-UAU)	50	**15,000**
Albert Street	2-Lane Urban Arterial (2-UAU)	50	**15,000**

5. RESULTS AND DISCUSSION

5.1 Roadway Traffic Noise Levels

The results of the roadway traffic noise calculations are summarized in Table 3 below. A complete set of input and output data from all STAMSON 5.04 calculations are available in Appendix A.

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

TABLE 3: EXTERIOR NOISE LEVELS DUE TO ROAD TRAFFIC

Receptor Number	Receptor Height Above Grade/Roof (m)	Receptor Location	STAMSON 5.04 Noise Level (dBA)	
			Day	Night
1	30	POW – 10th Floor – South Façade	69	61
2	30	POW – 10th Floor – South Façade	68	60
3	71.5	POW – 30th Floor – West Façade	65	57
4	71.5	POW – 30th Floor – North Façade	43	35
5	71.5	POW – 30th Floor – South Façade	69	61
6	71.5	POW – 30th Floor – South Façade	68	60
7	1.5	OLA – Level 2 Outdoor Amenity Area	44	-

The results of the current analysis indicate that noise levels will range between 44 and 69 dBA during the daytime period (07:00-23:00) and between 35 and 61 dBA during the nighttime period (23:00-07:00). The highest noise level (69 dBA) occurs at the south façade, which is nearest and most exposed to Slater Street.

6. CONCLUSIONS AND RECOMMENDATIONS

The noise levels predicted due to roadway traffic exceed the criteria listed in ENCG for building components and upgraded building components will be required. Due to the limited information available at the time of the study, which was prepared for rezoning application, detailed STC calculations could not be performed at this time. A detailed review of the window and wall assemblies should be performed by a qualified engineer with expertise in acoustics during the detailed design stage of the building.

Results of the calculations also indicate that units along the south and west façade will require central air conditioning, or a similar ventilation system, due to roadway traffic noise. However, it is recommended that all units of the development have central air conditioning, or similar ventilation system, which will allow occupants to keep windows closed and maintain a comfortable living environment.

The 2nd level amenity space will experience sound levels below 55 dBA during the daytime period, therefore, no mitigation is expected. However, it is recommended that outdoor living areas (OLA),

including podium and rooftop terraces, be positioned away from the roadway to reduce noise levels. If the need arises for OLA noise mitigation, this can be addressed during site plan control. Furthermore, a detailed roadway traffic noise study will be required at the time of site plan approval to determine specific noise control measures for the development.

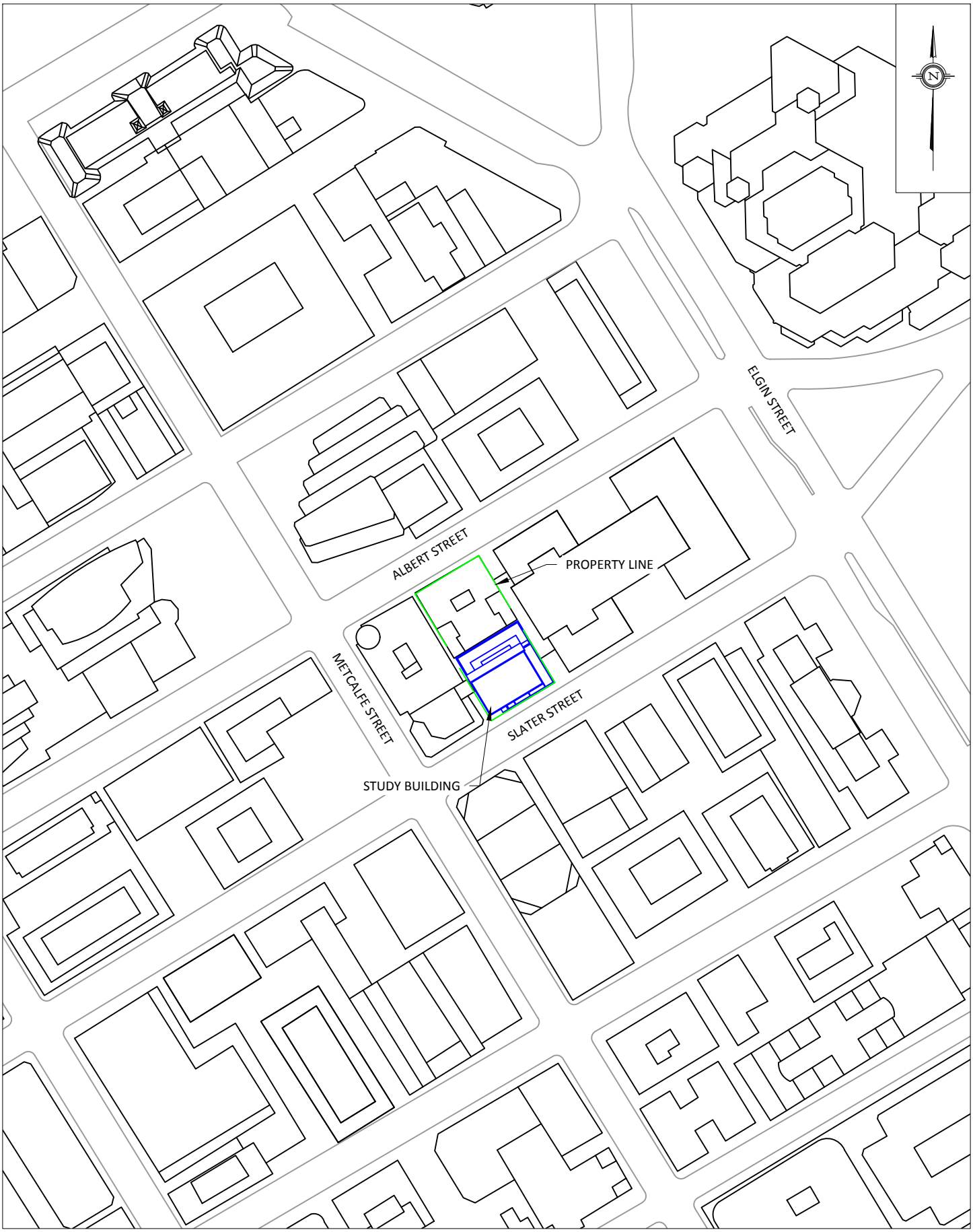
This concludes our traffic noise assessment and report. If you have any questions or wish to discuss our findings, please advise us. In the interim, we thank you for the opportunity to be of service.

Sincerely,

Gradient Wind Engineering Inc.

Giuseppe Garro, MASc.
Junior Environmental Scientist
GWE19-030 – Traffic Noise

Joshua Foster, P.Eng.
Principal



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PROJECT	81 SLATER- TRAFFIC NOISE FEASIBILITY STUDY
SCALE	1:2000 (APPROX.)
DRAWING NO.	GWE19-030
DATE	MARCH 5, 2019
DRAWN BY	G.G.

DESCRIPTION

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT

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SCALE	1:500 (APPROX.)	DRAWING NO.	GWE19-030
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FIGURE 2:
RECEPTOR LOCATIONS

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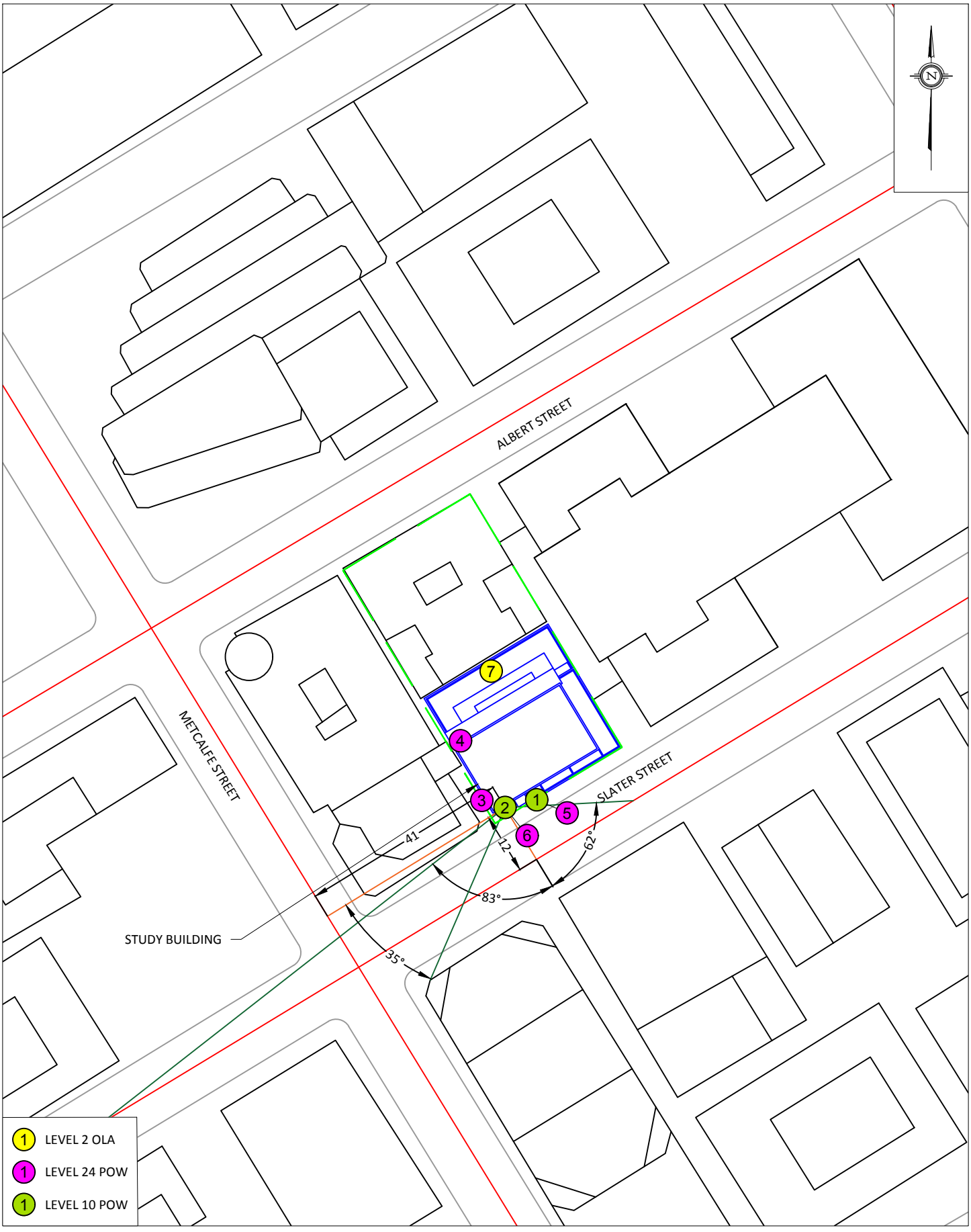
SCALE	1:1000 (APPROX.)	DRAWING NO.	GWE19-030
DATE	MARCH 5, 2019	DRAWN BY	G.G.

DESCRIPTION

FIGURE 3:
STAMSON RECEPTOR 1, 4, 5, AND 7 INPUT PARAMATERS



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DRAWING NO.	GWE19-030
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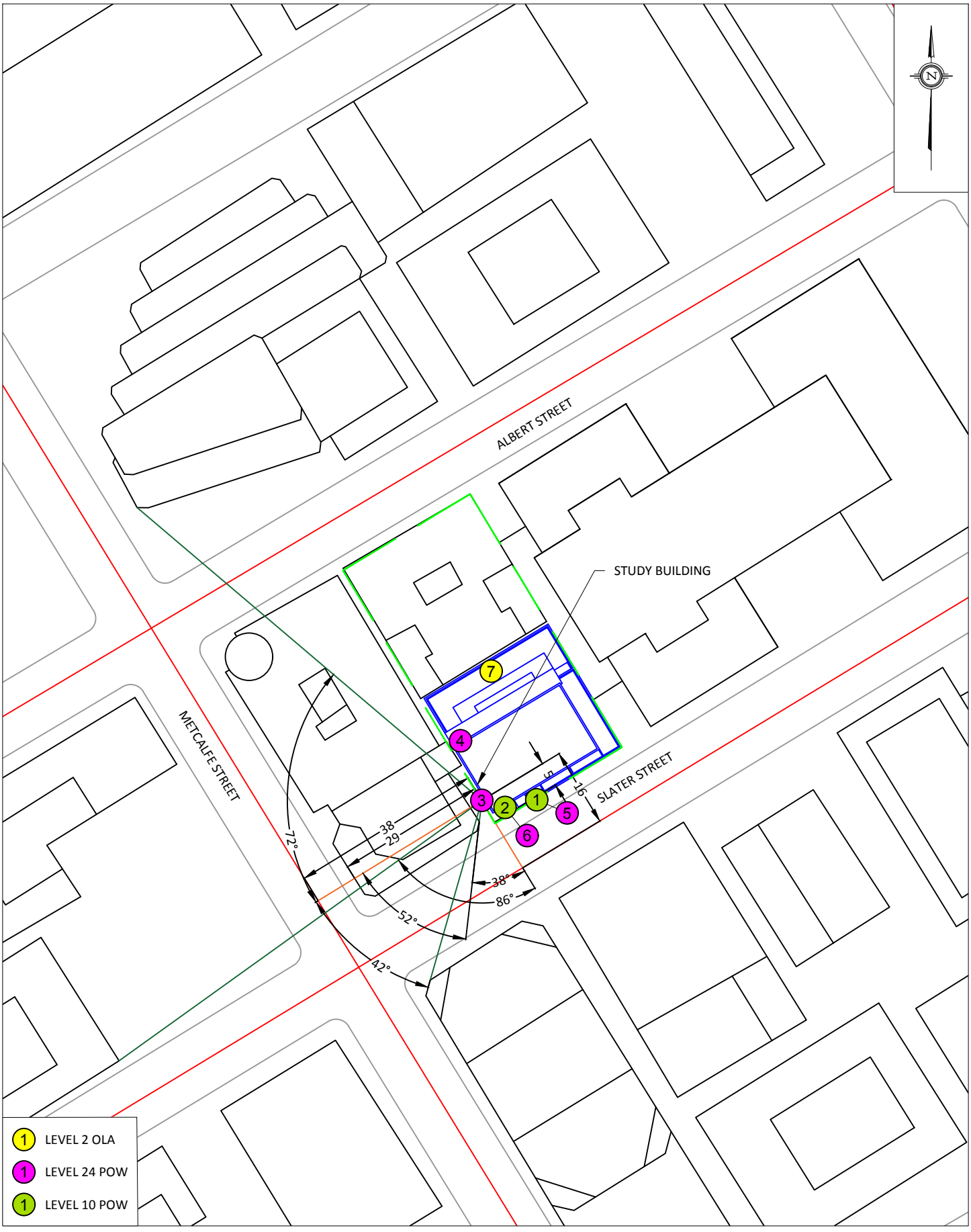
DESCRIPTION

FIGURE 4:
STAMSON RECEPTOR 2 AND 6 INPUT PARAMATERS



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PROJECT	81 SLATER- TRAFFIC NOISE FEASIBILITY STUDY		DESCRIPTION
SCALE	1:1000 (APPROX.)	DRAWING NO.	GWE19-030
DATE	MARCH 5, 2019	DRAWN BY	G.G.

FIGURE 5:
STAMSON RECEPTOR 3 INPUT PARAMATERS

APPENDIX A

STAMSON 5.04 – INPUT AND OUTPUT DATA

127 WALGREEN ROAD, OTTAWA, ON, CANADA K0A 1L0 | 613 836 0934
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```
STAMSON 5.0         NORMAL REPORT         Date: 04-03-2019 17:14:28
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: Elgin St (day/night)
----------------------------------------------
Car traffic volume  : 28336/2464  veh/TimePeriod  *
Medium truck volume :  2254/196   veh/TimePeriod  *
Heavy truck volume  :  1610/140   veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  35000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Elgin St (day/night)
----------------------------------------------
Angle1   Angle2           :   0.00 deg   8.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 140.00 / 140.00 m
Receiver height           :  30.00 / 30.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Road data, segment # 2: Slater St (day/night)
----------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  15000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Slater St (day/night)
-------------------------------------------
Angle1   Angle2           : -86.00 deg   88.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  15.00 / 15.00  m
Receiver height           :  30.00 / 30.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Road data, segment # 3: Metcalfe St (day/night)
------------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  15000
    Percentage of Annual Growth         :   0.00
    Number of Years of Growth           :   0.00
    Medium Truck % of Total Volume      :   7.00
    Heavy Truck  % of Total Volume      :   5.00
    Day (16 hrs) % of Total Volume      :  92.00

Data for Segment # 3: Metcalfe St (day/night)
------------------------------------------------
Angle1   Angle2           : -28.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  47.00 / 47.00  m
Receiver height           :  30.00 / 30.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


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

Source height = 1.50 m

ROAD (0.00 + 48.94 + 0.00) = 48.94 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
     0      8   0.00  72.16   0.00  -9.70 -13.52   0.00   0.00   0.00
48.94
-------------------------------------------------------------------------------
--

Segment Leq : 48.94 dBA
```

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

Source height = 1.50 m

ROAD (0.00 + 68.33 + 0.00) = 68.33 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -86     88   0.00  68.48   0.00   0.00  -0.15   0.00   0.00   0.00
68.33
-------------------------------------------------------------------------
--

Segment Leq : 68.33 dBA


Results segment # 3: Metcalfe St (day)
--------------------------------------

Source height = 1.50 m

ROAD (0.00 + 55.44 + 0.00) = 55.44 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -28      0   0.00  68.48   0.00  -4.96  -8.08   0.00   0.00   0.00
55.44
-------------------------------------------------------------------------
--

Segment Leq : 55.44 dBA

Total Leq All Segments: 68.59 dBA
```

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

Source height = 1.50 m

ROAD (0.00 + 41.34 + 0.00) = 41.34 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0      8   0.00  64.56   0.00  -9.70 -13.52   0.00   0.00   0.00
41.34
-------------------------------------------------------------------------
--

Segment Leq : 41.34 dBA


Results segment # 2: Slater St (night)
--------------------------------------

Source height = 1.50 m

ROAD (0.00 + 60.74 + 0.00) = 60.74 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -86     88   0.00  60.88   0.00   0.00  -0.15   0.00   0.00   0.00
60.74
-------------------------------------------------------------------------
--

Segment Leq : 60.74 dBA
```

```
Results segment # 3: Metcalfe St (night)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 47.84 + 0.00) = 47.84 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -28      0   0.00  60.88   0.00  -4.96  -8.08   0.00   0.00   0.00
47.84
-------------------------------------------------------------------------------
--

Segment Leq : 47.84 dBA

Total Leq All Segments: 61.00 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 68.59
                           (NIGHT): 61.00
```

```
STAMSON 5.0        NORMAL REPORT        Date: 04-03-2019 17:14:45
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: Slater St (day/night)
----------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  15000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Slater St (day/night)
--------------------------------------------
Angle1   Angle2           : -62.00 deg   83.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  15.00 / 15.00  m
Receiver height           :  30.00 / 30.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Road data, segment # 2: Metcalfe St (day/night)
-----------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  15000
    Percentage of Annual Growth         :   0.00
    Number of Years of Growth           :   0.00
    Medium Truck % of Total Volume      :   7.00
    Heavy Truck  % of Total Volume      :   5.00
    Day (16 hrs) % of Total Volume      :  92.00

Data for Segment # 2: Metcalfe St (day/night)
---------------------------------------------
Angle1   Angle2           : -35.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  41.00 / 41.00  m
Receiver height           :  30.00 / 30.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


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

Source height = 1.50 m

ROAD (0.00 + 67.54 + 0.00) = 67.54 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -62     83   0.00  68.48   0.00   0.00  -0.94   0.00   0.00   0.00
67.54
-------------------------------------------------------------------------------
--

Segment Leq : 67.54 dBA
```

```
Results segment # 2: Metcalfe St (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 57.00 + 0.00) = 57.00 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -35      0   0.00  68.48   0.00  -4.37  -7.11   0.00   0.00   0.00
57.00
-------------------------------------------------------------------------
--

Segment Leq : 57.00 dBA

Total Leq All Segments: 67.91 dBA


Results segment # 1: Slater St (night)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 59.94 + 0.00) = 59.94 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -62     83   0.00  60.88   0.00   0.00  -0.94   0.00   0.00   0.00
59.94
-------------------------------------------------------------------------
--

Segment Leq : 59.94 dBA
```

```
Results segment # 2: Metcalfe St (night)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 49.40 + 0.00) = 49.40 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -35      0   0.00  60.88   0.00  -4.37  -7.11   0.00   0.00   0.00
49.40
-------------------------------------------------------------------------------
--

Segment Leq : 49.40 dBA

Total Leq All Segments: 60.31 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 67.91
                           (NIGHT): 60.31
```

```
STAMSON 5.0        NORMAL REPORT        Date: 04-03-2019 17:15:00
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: Slater St (day/night)
----------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  15000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Slater St (day/night)
--------------------------------------------
Angle1   Angle2           :   0.00 deg   86.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  16.00 / 16.00  m
Receiver height           :  71.50 / 71.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  38.00 deg   Angle2 : 86.00 deg
Barrier height            :  42.00 m
Barrier receiver distance :   5.00 / 5.00   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: Metcalfe St (day/night)
------------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  15000
    Percentage of Annual Growth         :   0.00
    Number of Years of Growth           :   0.00
    Medium Truck % of Total Volume      :   7.00
    Heavy Truck  % of Total Volume      :   5.00
    Day (16 hrs) % of Total Volume      :  92.00

Data for Segment # 2: Metcalfe St (day/night)
---------------------------------------------
Angle1   Angle2           : -42.00 deg   72.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  38.00 / 38.00  m
Receiver height           :  71.50 / 71.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -42.00 deg   Angle2 : 72.00 deg
Barrier height            :  42.00 m
Barrier receiver distance :  29.00 / 29.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Results segment # 1: Slater St (day)
-----------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-----------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       71.50 !       49.62 !        49.62

ROAD (61.44 + 62.46 + 0.00) = 64.99 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
     0     38   0.00  68.48   0.00  -0.28  -6.75   0.00   0.00   0.00
61.44
-------------------------------------------------------------------------------
--
    38     86   0.00  68.48   0.00  -0.28  -5.74   0.00   0.00  -2.26
60.20*
    38     86   0.00  68.48   0.00  -0.28  -5.74   0.00   0.00   0.00
62.46
-------------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 64.99 dBA
```

```
Results segment # 2: Metcalfe St (day)
-------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       71.50 !       18.08 !        18.08

ROAD (0.00 + 42.62 + 0.00) = 42.62 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -42     72   0.00  68.48   0.00  -4.04  -1.98   0.00   0.00 -19.84
42.62
-------------------------------------------------------------------------------
--

Segment Leq : 42.62 dBA

Total Leq All Segments: 65.02 dBA
```

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

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       71.50 !       49.62 !        49.62

ROAD (53.85 + 54.86 + 0.00) = 57.40 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
     0     38   0.00  60.88   0.00  -0.28  -6.75   0.00   0.00   0.00
53.85
-------------------------------------------------------------------------------
--
    38     86   0.00  60.88   0.00  -0.28  -5.74   0.00   0.00  -2.26
52.61*
    38     86   0.00  60.88   0.00  -0.28  -5.74   0.00   0.00   0.00
54.86
-------------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 57.40 dBA
```

```
Results segment # 2: Metcalfe St (night)
----------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       71.50 !       18.08 !        18.08

ROAD (0.00 + 35.02 + 0.00) = 35.02 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -42     72   0.00  60.88   0.00  -4.04  -1.98   0.00   0.00 -19.84
35.02
-------------------------------------------------------------------------------
--

Segment Leq : 35.02 dBA

Total Leq All Segments: 57.43 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 65.02
                           (NIGHT): 57.43
```

```
STAMSON 5.0        NORMAL REPORT        Date: 04-03-2019 17:15:09
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: Metcalfe St (day/night)
-----------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  15000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Metcalfe St (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  :  40.00 / 40.00  m
Receiver height           :  71.50 / 71.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :   0.00 deg   Angle2 : 67.00 deg
Barrier height            :  42.00 m
Barrier receiver distance :  32.00 / 32.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: Albert St (day/night)
----------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  15000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Albert St (day/night)
-------------------------------------------
Angle1   Angle2           : -52.00 deg   39.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  50.00 / 50.00  m
Receiver height           :  71.50 / 71.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -52.00 deg   Angle2 : 39.00 deg
Barrier height            :  34.00 m
Barrier receiver distance :  41.00 / 41.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Results segment # 1: Metcalfe St (day)
---------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       71.50 !       15.50 !        15.50

ROAD (0.00 + 39.93 + 0.00) = 39.93 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
     0     67   0.00  68.48   0.00  -4.26  -4.29   0.00   0.00 -20.00
39.93
-------------------------------------------------------------------------------
--

Segment Leq : 39.93 dBA


Results segment # 2: Albert St (day)
---------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       71.50 !       14.10 !        14.10

ROAD (0.00 + 40.29 + 0.00) = 40.29 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -52     39   0.00  68.48   0.00  -5.23  -2.96   0.00   0.00 -20.00
40.29
-------------------------------------------------------------------------------
--

Segment Leq : 40.29 dBA

Total Leq All Segments: 43.12 dBA
```

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

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       71.50 !       15.50 !        15.50

ROAD (0.00 + 32.33 + 0.00) = 32.33 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
     0     67   0.00  60.88   0.00  -4.26  -4.29   0.00   0.00 -20.00
32.33
-------------------------------------------------------------------------------
--

Segment Leq : 32.33 dBA

Results segment # 2: Albert St (night)
--------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       71.50 !       14.10 !        14.10

ROAD (0.00 + 32.69 + 0.00) = 32.69 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -52     39   0.00  60.88   0.00  -5.23  -2.96   0.00   0.00 -20.00
32.69
-------------------------------------------------------------------------------
--

Segment Leq : 32.69 dBA

Total Leq All Segments: 35.52 dBA
TOTAL Leq FROM ALL SOURCES (DAY): 43.12
                           (NIGHT): 35.52
```

```
STAMSON 5.0         NORMAL REPORT         Date: 04-03-2019 17:15:18
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: Elgin St (day/night)
----------------------------------------------
Car traffic volume  : 28336/2464  veh/TimePeriod  *
Medium truck volume :  2254/196   veh/TimePeriod  *
Heavy truck volume  :  1610/140   veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  35000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Elgin St (day/night)
----------------------------------------------
Angle1   Angle2           :   0.00 deg   8.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 140.00 / 140.00 m
Receiver height           :  71.50 / 71.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Road data, segment # 2: Slater St (day/night)
----------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  15000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Slater St (day/night)
-------------------------------------------
Angle1   Angle2           : -86.00 deg   88.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  15.00 / 15.00  m
Receiver height           :  71.50 / 71.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Road data, segment # 3: Metcalfe St (day/night)
------------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  15000
    Percentage of Annual Growth         :   0.00
    Number of Years of Growth           :   0.00
    Medium Truck % of Total Volume      :   7.00
    Heavy Truck  % of Total Volume      :   5.00
    Day (16 hrs) % of Total Volume      :  92.00

Data for Segment # 3: Metcalfe St (day/night)
---------------------------------------------
Angle1   Angle2           : -28.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  47.00 / 47.00  m
Receiver height           :  71.50 / 71.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

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

Source height = 1.50 m

ROAD (0.00 + 48.94 + 0.00) = 48.94 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
     0      8   0.00  72.16   0.00  -9.70 -13.52   0.00   0.00   0.00
48.94
-------------------------------------------------------------------------------
--

Segment Leq : 48.94 dBA
```

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

Source height = 1.50 m

ROAD (0.00 + 68.33 + 0.00) = 68.33 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -86     88   0.00  68.48   0.00   0.00  -0.15   0.00   0.00   0.00
68.33
-------------------------------------------------------------------------
--

Segment Leq : 68.33 dBA

Results segment # 3: Metcalfe St (day)
--------------------------------------

Source height = 1.50 m

ROAD (0.00 + 55.44 + 0.00) = 55.44 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -28      0   0.00  68.48   0.00  -4.96  -8.08   0.00   0.00   0.00
55.44
-------------------------------------------------------------------------
--

Segment Leq : 55.44 dBA

Total Leq All Segments: 68.59 dBA
```

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

Source height = 1.50 m

ROAD (0.00 + 41.34 + 0.00) = 41.34 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0      8   0.00  64.56   0.00  -9.70 -13.52   0.00   0.00   0.00
41.34
-------------------------------------------------------------------------
--

Segment Leq : 41.34 dBA


Results segment # 2: Slater St (night)
--------------------------------------

Source height = 1.50 m

ROAD (0.00 + 60.74 + 0.00) = 60.74 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -86     88   0.00  60.88   0.00   0.00  -0.15   0.00   0.00   0.00
60.74
-------------------------------------------------------------------------
--

Segment Leq : 60.74 dBA
```

```
Results segment # 3: Metcalfe St (night)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 47.84 + 0.00) = 47.84 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -28      0   0.00  60.88   0.00  -4.96  -8.08   0.00   0.00   0.00
47.84
-------------------------------------------------------------------------
--

Segment Leq : 47.84 dBA

Total Leq All Segments: 61.00 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 68.59
                           (NIGHT): 61.00
```

```
STAMSON 5.0         NORMAL REPORT         Date: 04-03-2019 17:15:31
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: Slater St (day/night)
----------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  15000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Slater St (day/night)
--------------------------------------------
Angle1   Angle2           : -62.00 deg   83.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  15.00 / 15.00  m
Receiver height           :  71.50 / 71.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Road data, segment # 2: Metcalfe St (day/night)
------------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  15000
    Percentage of Annual Growth         :   0.00
    Number of Years of Growth           :   0.00
    Medium Truck % of Total Volume      :   7.00
    Heavy Truck  % of Total Volume      :   5.00
    Day (16 hrs) % of Total Volume      :  92.00

Data for Segment # 2: Metcalfe St (day/night)
------------------------------------------------
Angle1   Angle2           : -35.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  41.00 / 41.00  m
Receiver height           :  71.50 / 71.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


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

Source height = 1.50 m

ROAD (0.00 + 67.54 + 0.00) = 67.54 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -62     83   0.00  68.48   0.00   0.00  -0.94   0.00   0.00   0.00
67.54
-------------------------------------------------------------------------------
--

Segment Leq : 67.54 dBA
```

```
Results segment # 2: Metcalfe St (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 57.00 + 0.00) = 57.00 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -35      0   0.00  68.48   0.00  -4.37  -7.11   0.00   0.00   0.00
57.00
-------------------------------------------------------------------------
--

Segment Leq : 57.00 dBA

Total Leq All Segments: 67.91 dBA


Results segment # 1: Slater St (night)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 59.94 + 0.00) = 59.94 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -62     83   0.00  60.88   0.00   0.00  -0.94   0.00   0.00   0.00
59.94
-------------------------------------------------------------------------
--

Segment Leq : 59.94 dBA
```

```
Results segment # 2: Metcalfe St (night)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 49.40 + 0.00) = 49.40 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -35      0   0.00  60.88   0.00  -4.37  -7.11   0.00   0.00   0.00
49.40
-------------------------------------------------------------------------
--

Segment Leq : 49.40 dBA

Total Leq All Segments: 60.31 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 67.91
                           (NIGHT): 60.31
```

```
STAMSON 5.0        NORMAL REPORT        Date: 04-03-2019 17:15:40
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: Albert St (day/night)
----------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  15000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Albert St (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  :  42.00 / 42.00  m
Receiver height           :   7.45 / 7.45   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :  34.00 m
Barrier receiver distance :  32.00 / 32.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Results segment # 1: Albert St (day)
-----------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
-----------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !        7.45 !        2.91 !         2.91

ROAD (0.00 + 44.40 + 0.00) = 44.40 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     90   0.00  68.48   0.00  -4.47   0.00   0.00   0.00 -19.61
44.40
-------------------------------------------------------------------------------
--

Segment Leq : 44.40 dBA

Total Leq All Segments: 44.40 dBA
```

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

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !        7.45 !        2.91 !         2.91

ROAD (0.00 + 36.81 + 0.00) = 36.81 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     90   0.00  60.88   0.00  -4.47   0.00   0.00   0.00 -19.61
36.81
-------------------------------------------------------------------------------
--

Segment Leq : 36.81 dBA

Total Leq All Segments: 36.81 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 44.40
                           (NIGHT): 36.81
```