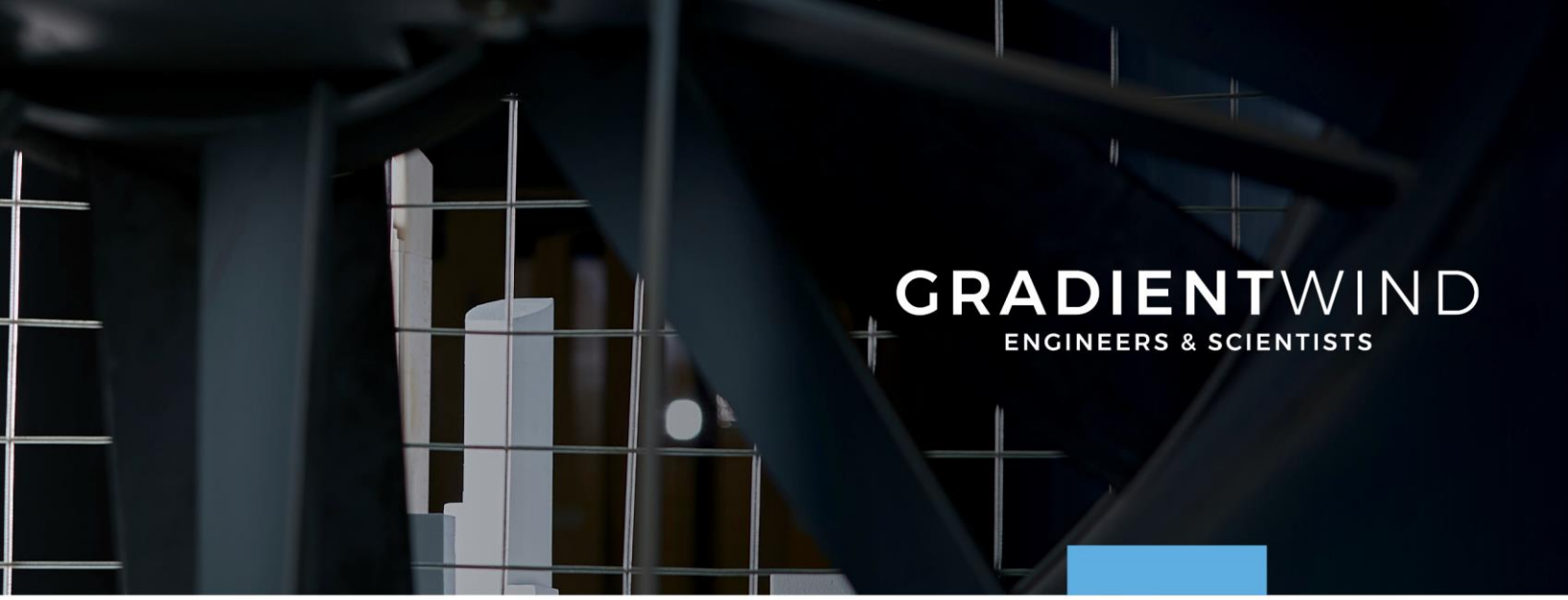

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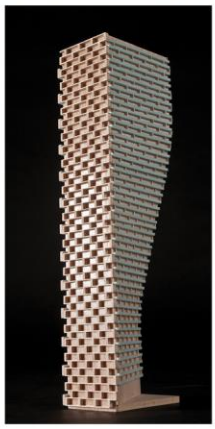
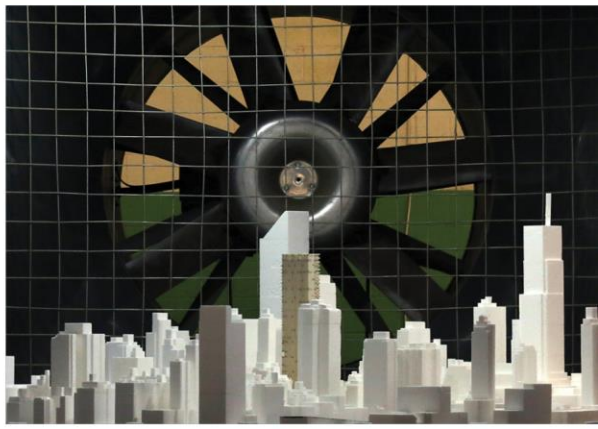
ROADWAY TRAFFIC NOISE ASSESSMENT

3030 St. Joseph Boulevard
Ottawa, Ontario

REPORT: 23-137 – Traffic Noise





June 13th, 2023

PREPARED FOR

Theberge Homes
205-1600 Laperriere Avenue
Ottawa, ON K1Z 8P5

PREPARED BY

Essraa Alqassab, BASc, Junior Environmental Scientist
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EXECUTIVE SUMMARY

This report describes a roadway traffic noise assessment undertaken to satisfy the requirements for a concurrent Zoning By-law Amendment (ZBA) and Site Plan Control (SPA) application submission for a proposed mixed-use 18-storey development located at 3030 St. Joseph Boulevard in Ottawa, Ontario. The primary sources of roadway traffic noise include St. Joseph Boulevard to the north and Duford Drive to the south and east. 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 provided by RLA Architecture, provided in May 2023.

The results of the current analysis indicate that POW noise levels will range between 64 and 67 dBA during the daytime period (07:00-23:00) and between 56 and 62 dBA during the nighttime period (23:00-07:00). The highest noise level (67 dBA) occurs at the north and east façades, which are nearest and most exposed to St. Joseph Boulevard or the combined influence of St. Joseph Boulevard and Dunford Avenue. Building components with a higher Sound Transmission Class (STC) rating will be required where exterior noise levels exceed 65 dBA, as indicated in 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. Warning Clauses will also be required be placed on all Lease, Purchase and Sale Agreements, as summarized in Section 6 of this report.

Noise levels at the 1-storey podium rooftop communal terrace, and the southeastern private patio are expected exceed the OLA noise criterion without a noise barrier. Therefore, noise control measures are required to reduce noise levels as close as possible to 55 dBA where technically and administratively feasible. Results of the noise barrier investigation proved that noise levels can be reduced to 60 dBA at the 1-storey podium rooftop communal terrace with a 2.5 m high noise barrier. The additional height required to meet the 55 dBA criterion is not considered technically and administratively feasible.

Therefore, a Type B Warning Clause will also be required on all Lease, Purchase, and Sale Agreements. Noise levels are successfully reduced to under 55 dBA at the southwestern private patio with 2.5 m noise barriers.

The stationary noise impacts from the environment onto the study building are expected to be negligible. The building is mainly surrounded by low-rise retail/commercial buildings, which are served by small mechanical equipment. The setback distance between the roof top units serving Farm Boy and the Place d'Orleans mall is expected to be sufficient in attenuating noise. The noise from St. Joseph Boulevard is expected to be the dominant source, over the noise emissions from the above-mentioned mechanical equipment.

With regard to stationary noise impacts, a stationary noise study is recommended for the site during the detailed design once mechanical plans for the proposed building become available. This study would assess impacts of stationary noise from rooftop mechanical units serving the proposed building on surrounding noise-sensitive areas. This study will include recommendations for any noise control measures that may be necessary to ensure noise levels fall below ENCG limits. Noise impacts can generally be minimized by judicious selection and placement of the equipment.

TABLE OF CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Theberge Homes to undertake a roadway traffic noise assessment to satisfy the requirements for Zoning By-Law Amendment and Site Plan Control (SPA) applications submission for a proposed residential development located at 3030 St. Joseph Boulevard in Ottawa, Ontario. This report summarizes the methodology, results, and recommendations related to the assessment of exterior and interior noise levels generated by local roadway traffic.

Our work is based on 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 site plan drawings provided by RLA Architecture in May 2023, 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 assessment is a proposed residential / commercial development located at 3030 St Joseph Boulevard in Ottawa, Ontario. The proposed development is situated on an irregular-shaped parcel of land at the intersection of St. Joseph Boulevard and Duford Drive. The site is surrounded by low-rise commercial properties to the south, west, and north, and residential dwellings to the east, across from Duford Drive.

The development comprises an 18-storey mixed-use building with a nominally rectangular planform. The ground level features a seating area fronting St Joseph Boulevard to the north and a circular ramp extending to from St. Joseph Boulevard to Duford Drive. The building steps back at levels 2, 3, 5, and 18. Level 2 features a communal terrace to the west, and the Level 3 suites accommodate private patios facing the south. In this assessment, the 4-storey podium east and west rooftops, as well as the Level 17 rooftop were considered as potential Outdoor Living Areas (OLAs), which is a classification that covers common amenity spaces and terraces that are greater than 4 m in depth.

[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

3. OBJECTIVES

The principal objectives of this study are to (i) calculate the future noise levels on the study building produced by local roadway traffic, 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 (that is relevant to this study) is 50, 45 and 40 dBA for retail, living rooms and sleeping quarters respectively for roadway as listed in Table 1.

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

Type of Space	Time Period	L_{eq} (dBA)
General offices, reception areas, retail stores, etc.	07:00 – 23:00	50
Living/dining/den areas of **residences**, hospitals, schools, nursing/retirement homes, day-care 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 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 (OLA) is 55 dBA, which applies during the daytime (07:00 to 23:00). When noise levels exceed 55 dBA, mitigation should be provided to reduce noise levels where technically and administratively feasible to acceptable levels at or below the criterion. Furthermore, noise levels at the OLA must not exceed 60 dBA if mitigation can be technically and administratively achieved.

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

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.
- The study site was treated as having flat or gently sloping topography. The grading provided in the site plan was considered in the noise calculations.
- Noise receptors were strategically placed at 9 locations around the study area (see Figure 2).
- Receptor distances and exposure angles are illustrated in Figures A1-A4

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.

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

TABLE 2: ROADWAY TRAFFIC DATA

Segment	Roadway Traffic Data	Speed Limit (km/h)	Traffic Volumes
St. Joseph Boulevard	4-Lane Urban Arterial Undivided (4-UAU)	50	**30,000**
Duford Drive	2-Lane Urban Collector (2-UCU)	40	**8,000**

4.3 Indoor Noise Calculations

The difference between outdoor and indoor noise levels is the noise attenuation provided by the building envelope. According to common industry practice, complete walls and individual wall elements are rated according to the Sound Transmission Class (STC). The STC ratings of common residential walls built in conformance with the Ontario Building Code (2012) typically exceed STC 35, depending on exterior cladding, thickness and interior finish details. For example, brick veneer walls can achieve STC 50 or more. Standard commercially sided exterior metal stud walls have around STC 45. 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 road sources at the plane of the window exceed 65 dBA, calculations must be performed to evaluate the sound transmission quality of the building components to ensure acceptable indoor noise levels. The calculation procedure[8] 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

[8] Building Practice Note: Controlling Sound Transmission into Buildings by J.D. Quirt, National Research Council of Canada, September 1985

- Indoor sound level criteria, which varies according to the intended use of a space

Based on published research[9], 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 estimated based on the overall noise reduction required for each intended use of space (STC = outdoor noise level – targeted indoor noise levels).

[9] CMHC, Road & Rail Noise: Effects on Housing

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.

TABLE 3: EXTERIOR NOISE LEVELS DUE TO ROAD TRAFFIC

Receptor Number	Receptor Height Above Grade (m)	Receptor Location	STAMSON 5.04 Noise Level (dBA)	
			Day	Night
1	52.5	POW / Level 18 East Façade	67	59
2	52.5	POW / Level 18 South Façade	64	56
3	49.5	POW / Level 17 West Façade	66	59
4	52.5	POW / Level 18 North Façade	67	62
5	52.5	OLA / Level 17 Terrace (potential)	48	N/A
6	1.5*	OLA / 1-Storey Podium West Amenity Terrace	60	N/A
7	1.5*	OLA /1-Storey Podium Private Patio (West side)	61	N/A
8	13.5	OLA / 4-Storey Podium Rooftop Terraces (potential) - East	53	N/A
9	13.5	OLA / 4-Storey Podium Rooftop Terraces (potential) - West	47	N/A

N/A: Noise levels at an OLA during the nighttime period are not considered as per ENCG
* - above podium roof slab

The results of the current analysis indicate that POW noise levels will range between 64 and 67 dBA during the daytime period (07:00-23:00) and between 56 and 62 dBA during the nighttime period (23:00-07:00). The highest noise level (67 dBA) occurs at the north and east façades, which are nearest and most exposed to St. Joseph Boulevard or the combined influence of St. Joseph Boulevard and Dunford Avenue.

5.2 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. The STC requirements for the windows are summarized below for various units within the development (see Figure 3):

- **Bedroom Windows**

(i) Bedroom windows facing north, and east will require a minimum STC of 30.

(ii) Bedroom windows facing west will require a minimum STC of 29.

(iii) All other bedroom windows are to satisfy Ontario Building Code (OBC 2020) requirements.

- **Living Room Windows**

(i) Living room windows facing north and east will require a minimum STC of 25.

(ii) Living room windows facing west will require a minimum STC of 24.

(iii) All other living room windows are to satisfy Ontario Building Code (OBC 2020) requirements.

- **Retail Windows**

(iv) Retail windows facing north, and east will require a minimum STC of 20.

(v) All other retail windows are to satisfy Ontario Building Code (OBC 2020) requirements.

- **Exterior Walls**

(i) Exterior wall components on the north, west, and east facades will require a minimum STC of 45, which will be achieved with brick cladding or an acoustical equivalent according to NRC test data[10].

The STC requirements 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

[10] 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 in all Lease, Purchase and Sale Agreements, as summarized in Section 6.

5.3 Noise Barrier Calculation

Noise levels at the 1-storey podium rooftop communal terrace, and the southeastern private patio are expected exceed the OLA noise criterion without a noise barrier. Therefore, noise control measures are required to reduce noise levels as close as possible to 55 dBA where technically and administratively feasible. Further analysis investigated the noise mitigating impact of noise barriers of various heights along the perimeter of the above-mentioned areas. Results of the investigation proved that noise levels can be reduced to 60 dBA at the 1-storey podium rooftop communal terrace with a 2.5 m high noise barrier. The additional height required to meet the 55 dBA criterion is not considered technically and administratively feasible. Therefore, a Type B Warning Clause will also be required on all Lease, Purchase, and Sale Agreements.

Noise levels are successfully reduced to under 55 dBA at the southwestern private patio with 2.5 m noise barriers. Table 4 detailed the results of the noise barrier investigation. Figure 4 shows the locations of the noise barriers.

TABLE 4: RESULTS OF NOISE BARRIER INVESTIGATION

#	Receptor Location	Daytime L_{eq} Noise Levels (dBA)				
		No Barrier	With 1.1 m Barrier	With 1.3 m Barrier	With 1.5 m Barrier	With 2 m Barrier
6	1-storey podium rooftop communal terrace	60	59	58	58	57
7	southwestern private patio	61	61	61	56	54

6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that POW noise levels will range between 64 and 67 dBA during the daytime period (07:00-23:00) and between 56 and 62 dBA during the nighttime period (23:00-07:00). The highest noise level (67 dBA) occurs at the north and east façades, which are nearest and most exposed to St. Joseph Boulevard or the combined influence of St. Joseph Boulevard and Dunford Avenue. Building components with a higher Sound Transmission Class (STC) rating will be required where exterior noise levels exceed 65 dBA, as indicated in 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. The following Warning Clause[11] will also be required be placed on all Lease, Purchase and Sale Agreements, as summarized below:

Type D:

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

Noise levels at the 1-storey podium rooftop communal terrace, and the southeastern private patio are expected exceed the OLA noise criterion without a noise barrier. Therefore, noise control measures are required to reduce noise levels as close as possible to 55 dBA where technically and administratively

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

feasible. Results of the noise barrier investigation proved that noise levels can be reduced to 60 dBA at the 1-storey podium rooftop communal terrace with a 2.5 m high noise barrier. The additional height required to meet the 55 dBA criterion is not considered technically and administratively feasible. Therefore, a Type B Warning Clause will also be required on all Lease, Purchase, and Sale Agreements, as seen below:

Type B:

> *"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 road traffic may on occasions interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment."*

Noise levels are successfully reduced to under 55 dBA at the southwestern private patio with 2.5 m high noise barrier. The noise barriers must be constructed from materials having a minimum surface density of 20 kg/m^2 (STC rating of 30) and contain no gaps. Design of the guardrail will conform to the requirements outlined in Part 5 of the ENCG. The following information will be required by the City for review prior to installation of the barrier:

1. Shop drawings, signed and sealed by a qualified Professional Engineer licenced by the Professional Engineers of Ontario, showing the details of the acoustic barrier systems components, including material specifications.
2. Structural drawing(s), signed by a qualified Professional Engineer licenced by the Professional Engineers of Ontario, showing foundation details, and specifying design criteria, climatic design loads, as well as applicable geotechnical data used in the design.
3. Layout plan, and wall elevations, showing proposed colours and patterns.

The stationary noise impacts from the environment onto the study building are expected to be negligible. The building is mainly surrounded by low-rise retail/commercial buildings, which are served by small mechanical equipment. The setback distance between the roof top units of the Farm Boy and the Place d'Orleans mall is expected to be sufficient in attenuating noise. The noise from St. Joseph Boulevard is expected to be the dominant source, over the noise emissions from the above-mentioned mechanical equipment.

With regard to stationary noise impacts, a stationary noise study is recommended for the site during the detailed design once mechanical plans for the proposed building become available. This study would assess impacts of stationary noise from rooftop mechanical units serving the proposed building on surrounding noise-sensitive areas. This study will include recommendations for any noise control measures that may be necessary to ensure noise levels fall below ENCG limits. Noise impacts can generally be minimized by judicious selection and placement of the equipment.

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.

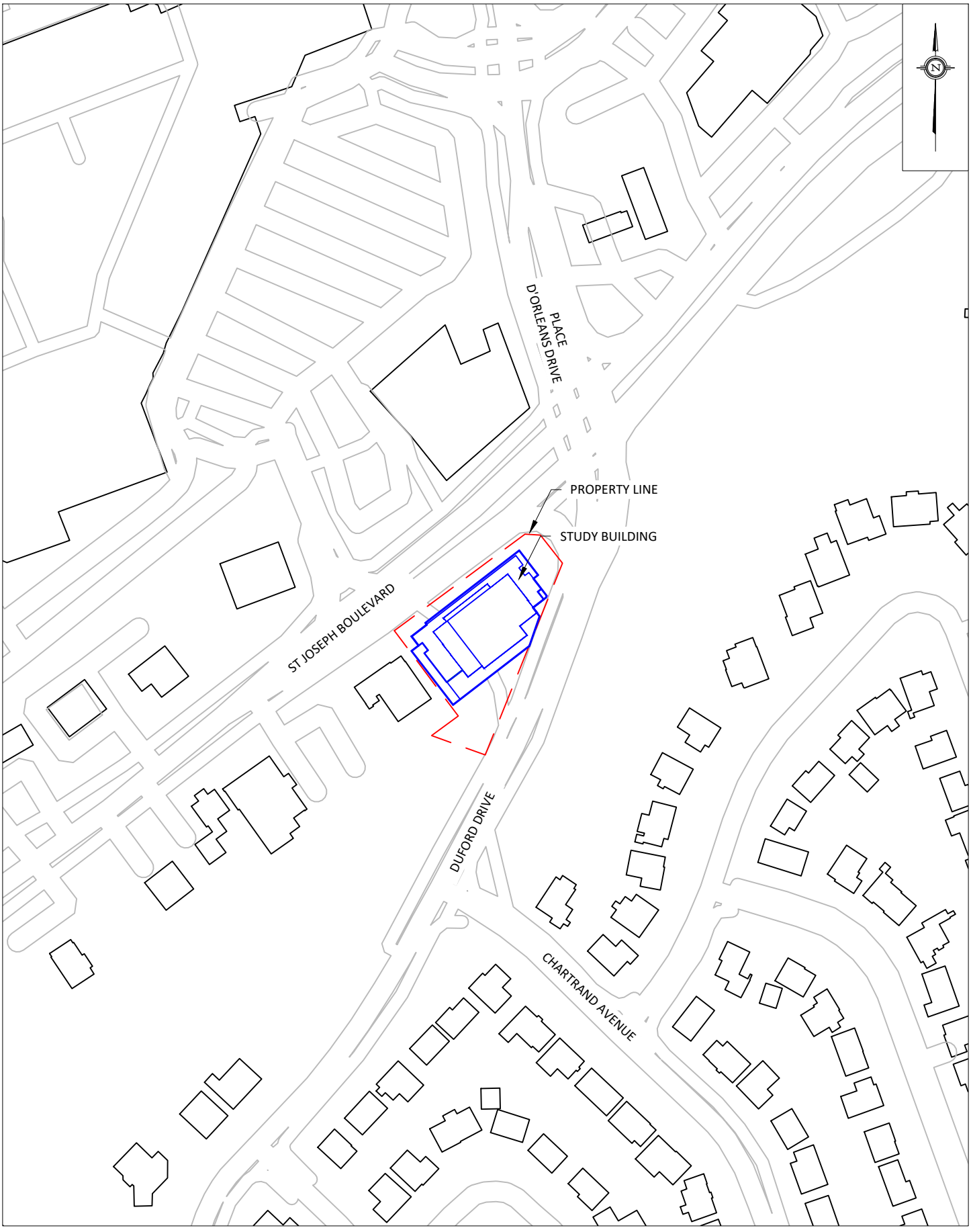
Sincerely,

Gradient Wind Engineering Inc.

Essraa Alqassab, BASc
Junior Environmental Scientist

Joshua Foster, P.Eng.
Lead Engineer

Gradient Wind File #23-137-Traffic Noise



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SCALE	1:2000 (APPROX.)	DRAWING NO.	GW23-137-1
DATE	JUNE 8, 2023	DRAWN BY	E.A.

DESCRIPTION

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT

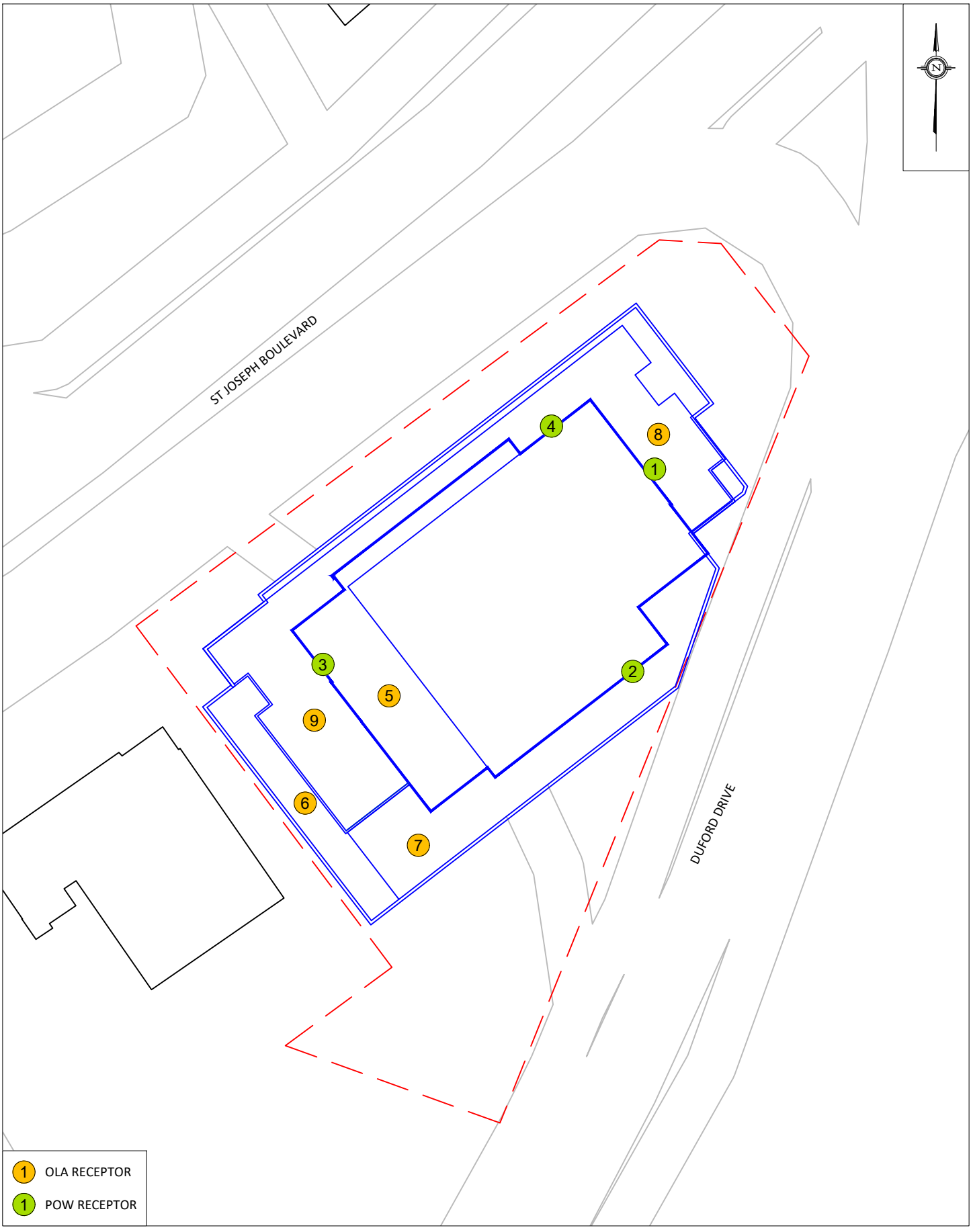

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FIGURE 2:
RECEPTOR LOCATION

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FIGURE 3:
STC RECOMMENDATIONS

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FIGURE 4:
NOISE BARRIER RECOMMENDATIONS

APPENDIX A

STAMSON CALCULATIONS

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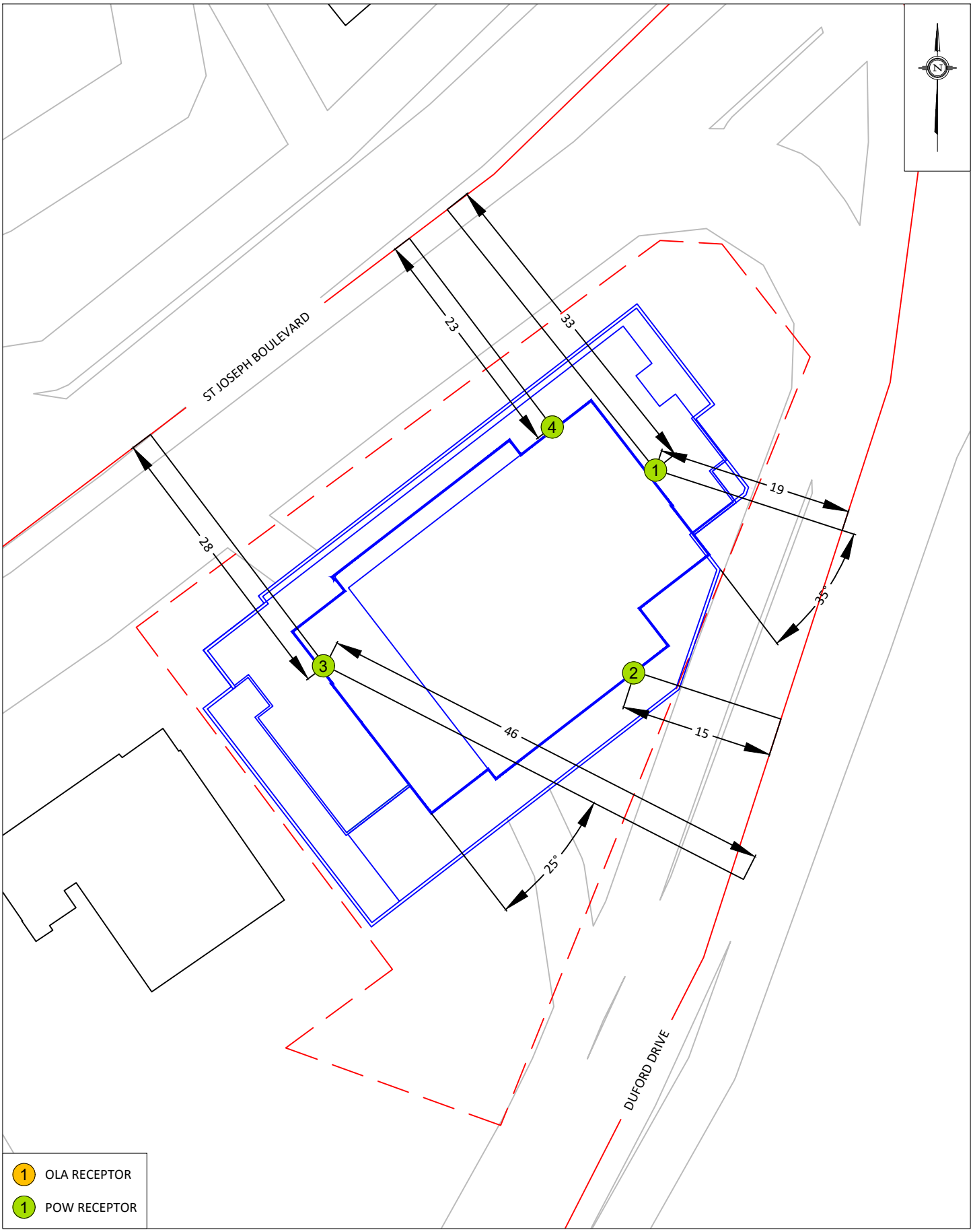

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SCALE	1:200 (APPROX.)	DRAWING NO.	GW23-137-A1
DATE	JUNE 8, 2023	DRAWN BY	E.A.

FIGURE A1:
STAMSON PARAMETERS (1)

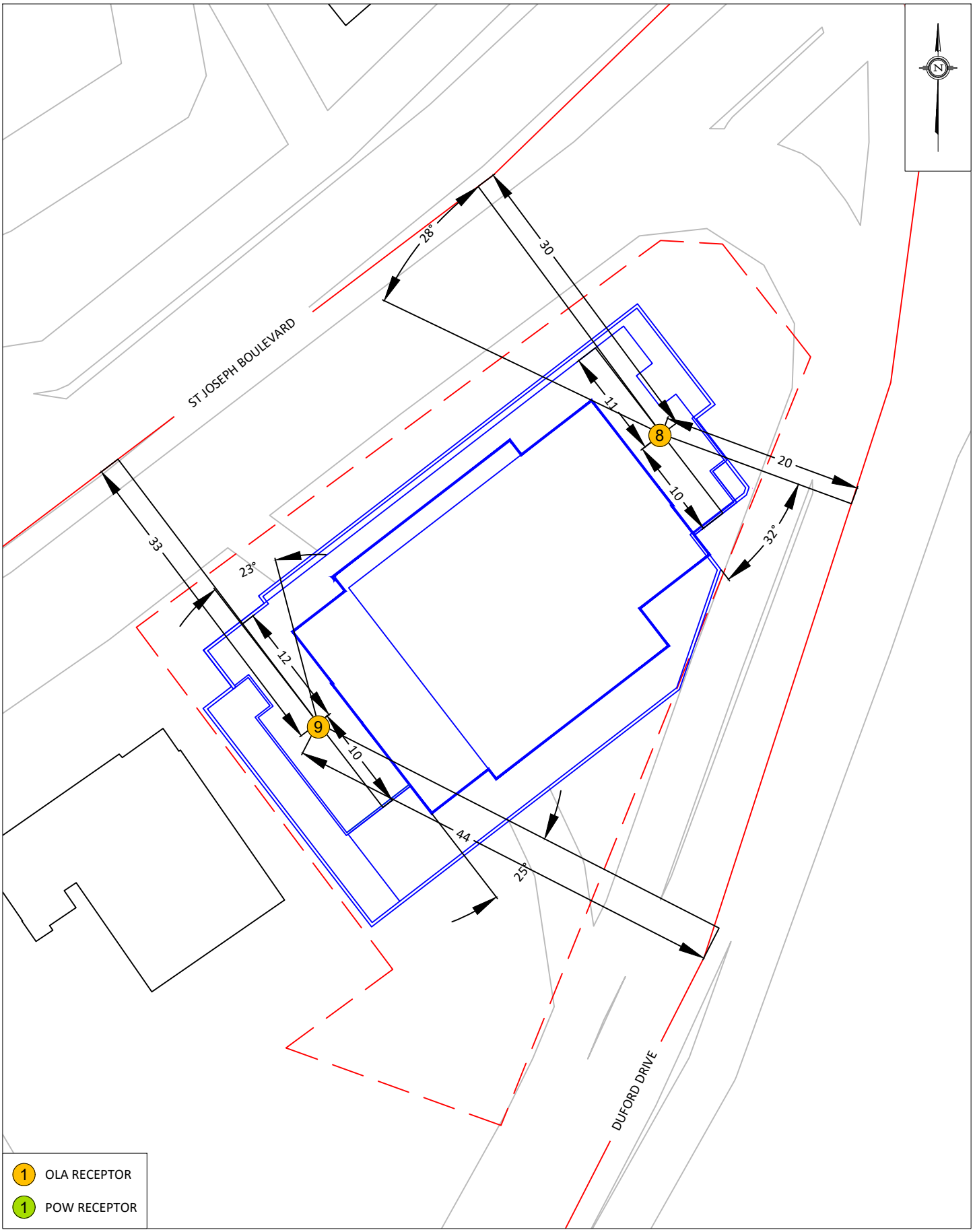

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FIGURE A2:
STAMSON PARAMETERS (2)

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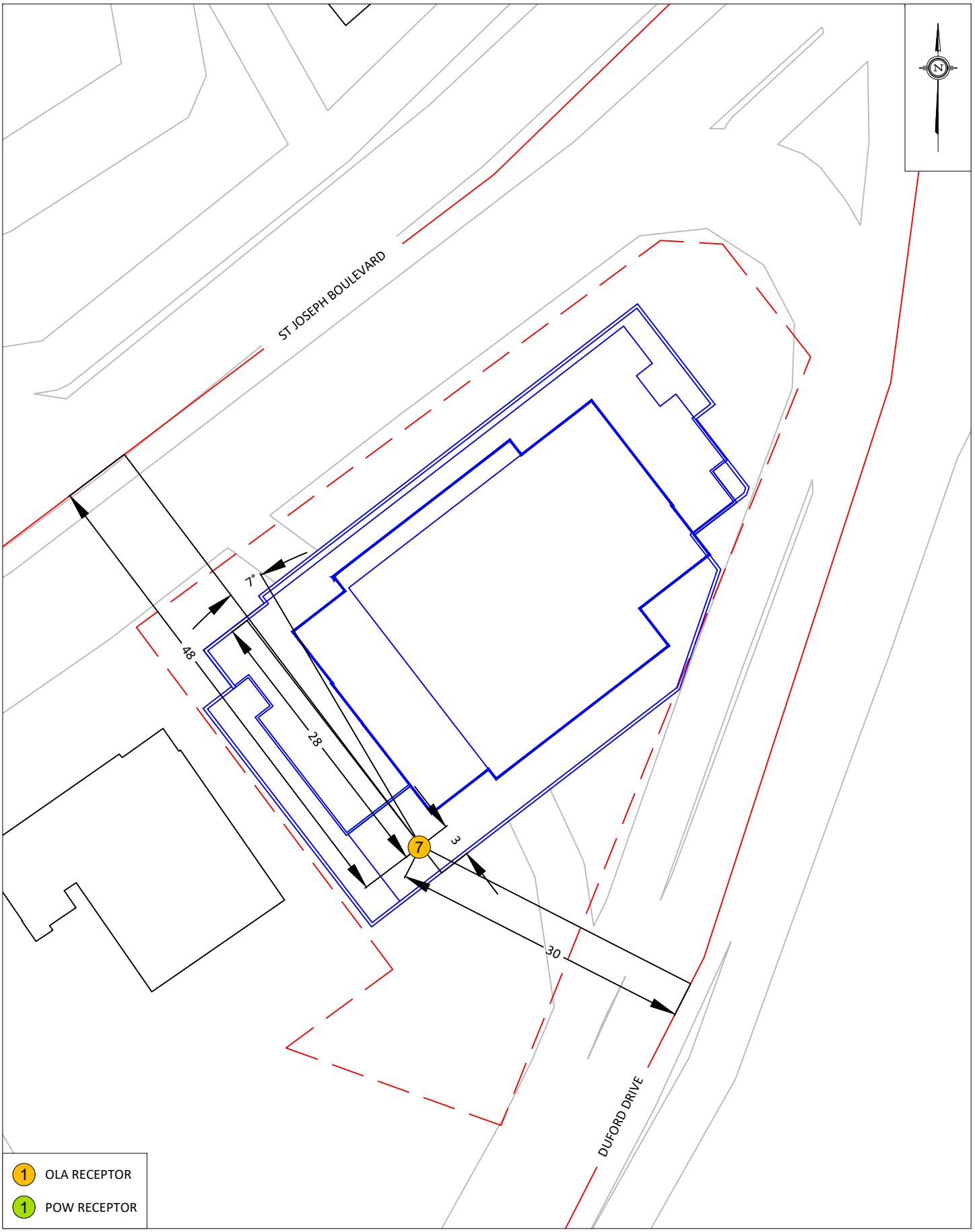
FIGURE A3:
STAMSON PARAMETERS (3)



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DESCRIPTION

FIGURE A4:
STAMSON PARAMETERS (4)

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STAMSON 5.0        COMPREHENSIVE REPORT        Date: 08-06-2023 09:46:46
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


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

Data for Segment # 1: St Joseph (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  :  33.00 / 33.00  m
Receiver height           :  52.50 / 52.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 2: Duford (day/night)
------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   8000
```

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

Data for Segment # 2: Duford (day/night)
-----------------------------------------
Angle1   Angle2           : -90.00 deg   35.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  19.00 / 19.00  m
Receiver height           :  52.50 / 52.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Segment # 1: St Joseph (day)
----------------------------

Source height = 1.50 m

ROAD (0.00 + 65.06 + 0.00) = 65.06 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
     0     90   0.00  71.49   0.00  -3.42  -3.01   0.00   0.00   0.00
65.06
-------------------------------------------------------------------------------
--

Segment Leq : 65.06 dBA


Segment # 2: Duford (day)
-------------------------

Source height = 1.50 m

ROAD (0.00 + 61.35 + 0.00) = 61.35 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     35   0.00  63.96   0.00  -1.03  -1.58   0.00   0.00   0.00
61.35
-------------------------------------------------------------------------------
--
```

```
Segment Leq : 61.35 dBA

Total Leq All Segments: 66.60 dBA


Segment # 1: St Joseph (night)
------------------------------

Source height = 1.50 m

ROAD (0.00 + 57.46 + 0.00) = 57.46 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0     90   0.00  63.89   0.00  -3.42  -3.01   0.00   0.00   0.00
57.46
-------------------------------------------------------------------------
--

Segment Leq : 57.46 dBA


Segment # 2: Duford (night)
---------------------------

Source height = 1.50 m

ROAD (0.00 + 53.75 + 0.00) = 53.75 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     35   0.00  56.36   0.00  -1.03  -1.58   0.00   0.00   0.00
53.75
-------------------------------------------------------------------------
--

Segment Leq : 53.75 dBA

Total Leq All Segments: 59.00 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 66.60
                           (NIGHT): 59.00
```

```
STAMSON 5.0        COMPREHENSIVE REPORT        Date: 08-06-2023 09:47:06
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: Dunford (day/night)
-------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Dunford (day/night)
-----------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  15.00 / 15.00  m
Receiver height           :  52.50 / 52.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Segment # 1: Dunford (day)
--------------------------

Source height = 1.50 m

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
-------------------------------------------------------------------------------
--
   -90     90    0.00  63.96   0.00   0.00   0.00   0.00   0.00   0.00
63.96
-------------------------------------------------------------------------------
--
```

```
Segment Leq : 63.96 dBA

Total Leq All Segments: 63.96 dBA


Segment # 1: Dunford (night)
----------------------------

Source height = 1.50 m

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
-------------------------------------------------------------------------
--
   -90     90   0.00  56.36   0.00   0.00   0.00   0.00   0.00   0.00
56.36
-------------------------------------------------------------------------
--

Segment Leq : 56.36 dBA

Total Leq All Segments: 56.36 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 63.96
                           (NIGHT): 56.36
```

```
STAMSON 5.0        COMPREHENSIVE REPORT        Date: 08-06-2023 09:47:43
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


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

Data for Segment # 1: St Joseph (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  :  28.00 / 28.00  m
Receiver height           :  49.50 / 49.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 2: Dunford (day/night)
-------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    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):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
```

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

Data for Segment # 2: Dunford (day/night)
-----------------------------------------
Angle1   Angle2           : -90.00 deg   -25.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  46.00 / 46.00  m
Receiver height           :  49.50 / 49.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Segment # 1: St Joseph (day)
----------------------------

Source height = 1.50 m

ROAD (0.00 + 65.77 + 0.00) = 65.77 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90      0   0.00  71.49   0.00  -2.71  -3.01   0.00   0.00   0.00
65.77
-------------------------------------------------------------------------
--

Segment Leq : 65.77 dBA


Segment # 2: Dunford (day)
--------------------------

Source height = 1.50 m

ROAD (0.00 + 56.46 + 0.00) = 56.46 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90    -25   0.00  65.75   0.00  -4.87  -4.42   0.00   0.00   0.00
56.46
-------------------------------------------------------------------------
--

Segment Leq : 56.46 dBA
```

```
Total Leq All Segments: 66.25 dBA


Segment # 1: St Joseph (night)
------------------------------

Source height = 1.50 m

ROAD (0.00 + 58.17 + 0.00) = 58.17 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90      0   0.00  63.89   0.00  -2.71  -3.01   0.00   0.00   0.00
58.17
-------------------------------------------------------------------------
--

Segment Leq : 58.17 dBA


Segment # 2: Dunford (night)
----------------------------

Source height = 1.50 m

ROAD (0.00 + 48.87 + 0.00) = 48.87 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90    -25   0.00  58.16   0.00  -4.87  -4.42   0.00   0.00   0.00
48.87
-------------------------------------------------------------------------
--

Segment Leq : 48.87 dBA

Total Leq All Segments: 58.65 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 66.25
                           (NIGHT): 58.65
```

```
STAMSON 5.0        COMPREHENSIVE REPORT        Date: 08-06-2023 09:49:53
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


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

Data for Segment # 1: St Joseph (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  :  23.00 / 23.00  m
Receiver height           :  49.50 / 49.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Segment # 1: St Joseph (day)
-----------------------------

Source height = 1.50 m

ROAD (0.00 + 69.63 + 0.00) = 69.63 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     90   0.00  71.49   0.00  -1.86   0.00   0.00   0.00   0.00
69.63
-------------------------------------------------------------------------
--

Segment Leq : 69.63 dBA

Total Leq All Segments: 69.63 dBA


Segment # 1: St Joseph (night)
------------------------------

Source height = 1.50 m

ROAD (0.00 + 62.04 + 0.00) = 62.04 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     90   0.00  63.89   0.00  -1.86   0.00   0.00   0.00   0.00
62.04
-------------------------------------------------------------------------
--

Segment Leq : 62.04 dBA

Total Leq All Segments: 62.04 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 69.63
                           (NIGHT): 62.04
```

```
STAMSON 5.0        NORMAL REPORT        Date: 08-06-2023 14:34:45
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


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

Data for Segment # 1: St Joseph (day/night)
--------------------------------------------
Angle1   Angle2           : -90.00 deg   11.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  34.00 / 34.00  m
Receiver height           :  52.50 / 52.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 11.00 deg
Barrier height            :  51.00 m
Barrier receiver distance :  11.00 / 11.00  m
Source elevation          :  69.28 m
Receiver elevation        :  72.84 m
Barrier elevation         :  72.84 m
Reference angle           :   0.00
```

```
Road data, segment # 2: Duford (day/night)
------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Duford (day/night)
----------------------------------------
Angle1   Angle2           :  26.00 deg   90.00 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           :  52.50 / 52.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  26.00 deg   Angle2 : 90.00 deg
Barrier height            :  51.00 m
Barrier receiver distance :  11.00 / 11.00  m
Source elevation          :  80.00 m
Receiver elevation        :  72.84 m
Barrier elevation         :  72.84 m
Reference angle           :   0.00


Results segment # 1: St Joseph (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 !       52.50 !       34.85 !       107.69

ROAD (0.00 + 47.49 + 0.00) = 47.49 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
```

```
-------------------------------------------------------------------------
--
   -90     11   0.00  71.49   0.00  -3.55  -2.51   0.00   0.00 -17.94
47.49
-------------------------------------------------------------------------
--

Segment Leq : 47.49 dBA


Results segment # 2: Duford (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 !       52.50 !       39.81 !       112.65

ROAD (0.00 + 39.15 + 0.00) = 39.15 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
    26     90   0.00  63.96   0.00  -4.04  -4.49   0.00   0.00 -16.28
39.15
-------------------------------------------------------------------------
--

Segment Leq : 39.15 dBA

Total Leq All Segments: 48.08 dBA


Results segment # 1: St Joseph (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 !       52.50 !       34.85 !       107.69

ROAD (0.00 + 39.89 + 0.00) = 39.89 dBA
```

```
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     11   0.00  63.89   0.00  -3.55  -2.51   0.00   0.00 -17.94
39.89
-------------------------------------------------------------------------
--

Segment Leq : 39.89 dBA


Results segment # 2: Duford (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 !       52.50 !       39.81 !       112.65

ROAD (0.00 + 31.55 + 0.00) = 31.55 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
    26     90   0.00  56.36   0.00  -4.04  -4.49   0.00   0.00 -16.28
31.55
-------------------------------------------------------------------------
--

Segment Leq : 31.55 dBA

Total Leq All Segments: 40.48 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 48.08
                           (NIGHT): 40.48
```

```
STAMSON 5.0        NORMAL REPORT        Date: 08-06-2023 14:35:52
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


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

Data for Segment # 1: St Joseph (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  :  38.00 / 38.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 0.00 deg
Barrier height            :   0.00 m
Barrier receiver distance :  14.00 / 14.00  m
Source elevation          :  69.00 m
Receiver elevation        :  74.92 m
Barrier elevation         :  74.92 m
Reference angle           :   0.00


Road data, segment # 2: Duford (day/night)
------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)
```

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

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Duford (day/night)
-----------------------------------------
Angle1   Angle2           :  19.00 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           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  19.00 deg   Angle2 : 90.00 deg
Barrier height            :   0.00 m
Barrier receiver distance :  14.00 / 14.00  m
Source elevation          :  80.00 m
Receiver elevation        :  74.92 m
Barrier elevation         :  74.92 m
Reference angle           :   0.00


Results segment # 1: St Joseph (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 !       -0.68 !        74.24

ROAD (0.00 + 58.66 + 0.00) = 58.66 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90      0   0.00  71.49   0.00  -4.04  -3.01   0.00   0.00  -5.78
58.66
-------------------------------------------------------------------------
--

Segment Leq : 58.66 dBA
```

```
Results segment # 2: Duford (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 !        3.19 !        78.11

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
-------------------------------------------------------------------------
--
    19     90   0.00  63.96   0.00  -4.47  -4.04   0.00   0.00  -0.20
55.25*
    19     90   0.00  63.96   0.00  -4.47  -4.04   0.00   0.00   0.00
55.44
-------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 55.44 dBA

Total Leq All Segments: 60.35 dBA


Results segment # 1: St Joseph (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 !       -0.68 !        74.24

ROAD (0.00 + 51.07 + 0.00) = 51.07 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
```

```
   -90      0   0.00  63.89   0.00  -4.04  -3.01   0.00   0.00  -5.78
51.07
-------------------------------------------------------------------------
--

Segment Leq : 51.07 dBA


Results segment # 2: Duford (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 !        3.19 !        78.11

ROAD (0.00 + 47.85 + 0.00) = 47.85 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
    19     90   0.00  56.36   0.00  -4.47  -4.04   0.00   0.00  -0.20
47.65*
    19     90   0.00  56.36   0.00  -4.47  -4.04   0.00   0.00   0.00
47.85
-------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 47.85 dBA

Total Leq All Segments: 52.76 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 60.35
                           (NIGHT): 52.76
```

```
STAMSON 5.0        NORMAL REPORT        Date: 08-06-2023 14:36:22
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r6b.te               Time Period: Day/Night 16/8 hours
Description:


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

Data for Segment # 1: St Joseph (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  :  38.00 / 38.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 0.00 deg
Barrier height            :   2.50 m
Barrier receiver distance :  14.00 / 14.00  m
Source elevation          :  69.00 m
Receiver elevation        :  74.92 m
Barrier elevation         :  74.92 m
Reference angle           :   0.00


Road data, segment # 2: Duford (day/night)
------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
```

```
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Duford (day/night)
-----------------------------------------
Angle1   Angle2           :  19.00 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           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  19.00 deg   Angle2 : 90.00 deg
Barrier height            :   2.50 m
Barrier receiver distance :  14.00 / 14.00  m
Source elevation          :  80.00 m
Receiver elevation        :  74.92 m
Barrier elevation         :  74.92 m
Reference angle           :   0.00


Results segment # 1: St Joseph (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 !       -0.68 !        74.24

ROAD (0.00 + 52.74 + 0.00) = 52.74 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90      0   0.00  71.49   0.00  -4.04  -3.01   0.00   0.00 -11.70
52.74
-------------------------------------------------------------------------------
--
```

```
Segment Leq : 52.74 dBA


Results segment # 2: Duford (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 !        3.19 !        78.11

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
-------------------------------------------------------------------------
--
    19     90   0.00  63.96   0.00  -4.47  -4.04   0.00   0.00  -4.19
51.25*
    19     90   0.00  63.96   0.00  -4.47  -4.04   0.00   0.00   0.00
55.44
-------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 55.44 dBA

Total Leq All Segments: 57.31 dBA


Results segment # 1: St Joseph (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 !       -0.68 !        74.24

ROAD (0.00 + 45.15 + 0.00) = 45.15 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
```

```
   -90      0   0.00  63.89   0.00  -4.04  -3.01   0.00   0.00 -11.70
45.15
-------------------------------------------------------------------------
--

Segment Leq : 45.15 dBA


Results segment # 2: Duford (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 !        3.19 !        78.11

ROAD (0.00 + 47.85 + 0.00) = 47.85 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
    19     90   0.00  56.36   0.00  -4.47  -4.04   0.00   0.00  -4.19
43.66*
    19     90   0.00  56.36   0.00  -4.47  -4.04   0.00   0.00   0.00
47.85
-------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 47.85 dBA

Total Leq All Segments: 49.72 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 57.31
                           (NIGHT): 49.72
```

```
STAMSON 5.0        NORMAL REPORT        Date: 08-06-2023 14:36:47
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


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

Data for Segment # 1: St Joseph (day/night)
-------------------------------------------
Angle1   Angle2           : -90.00 deg   7.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  48.00 / 48.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 7.00 deg
Barrier height            :   0.00 m
Barrier receiver distance :  28.00 / 28.00  m
Source elevation          :  69.00 m
Receiver elevation        :  77.80 m
Barrier elevation         :  86.98 m
Reference angle           :   0.00


Road data, segment # 2: Duford (day/night)
------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)
```

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

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Duford (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  :  30.00 / 20.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :   0.00 m
Barrier receiver distance :   3.00 / -7.00  m
Source elevation          :  80.00 m
Receiver elevation        :  77.80 m
Barrier elevation         :  77.80 m
Reference angle           :   0.00


Results segment # 1: St Joseph (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 !      -12.82 !        74.16

ROAD (0.00 + 45.45 + 0.00) = 45.45 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90      7   0.00  71.49   0.00  -5.05  -2.69   0.00   0.00 -18.31
45.45
-------------------------------------------------------------------------
--

Segment Leq : 45.45 dBA
```

```
Results segment # 2: Duford (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 !        1.72 !        79.52

ROAD (0.00 + 60.95 + 0.00) = 60.95 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     90   0.00  63.96   0.00  -3.01   0.00   0.00   0.00  -0.16
60.79*
   -90     90   0.00  63.96   0.00  -3.01   0.00   0.00   0.00   0.00
60.95
-------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 60.95 dBA

Total Leq All Segments: 61.07 dBA


Results segment # 1: St Joseph (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 !      -12.82 !        74.16

ROAD (0.00 + 37.85 + 0.00) = 37.85 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
```

```
   -90      7   0.00  63.89   0.00  -5.05  -2.69   0.00   0.00 -18.31
37.85
-------------------------------------------------------------------------
--

Segment Leq : 37.85 dBA


Results segment # 2: Duford (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 !        0.73 !        78.53

ROAD (0.00 + 55.11 + 0.00) = 55.11 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     90   0.00  56.36   0.00  -1.25   0.00   0.00   0.00  99.00
154.11
   -90     90   0.00  56.36   0.00  -1.25   0.00   0.00   0.00   0.00
55.11
-------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 55.11 dBA

Total Leq All Segments: 55.19 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 61.07
                           (NIGHT): 55.19
```

```
STAMSON 5.0        NORMAL REPORT        Date: 08-06-2023 14:37:06
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r7b.te               Time Period: Day/Night 16/8 hours
Description:


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

Data for Segment # 1: St Joseph (day/night)
-------------------------------------------
Angle1   Angle2           : -90.00 deg   7.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  48.00 / 48.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 7.00 deg
Barrier height            :   0.00 m
Barrier receiver distance :  28.00 / 28.00  m
Source elevation          :  69.00 m
Receiver elevation        :  77.80 m
Barrier elevation         :  86.98 m
Reference angle           :   0.00


Road data, segment # 2: Duford (day/night)
------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
```

```
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Duford (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  :  30.00 / 15.00  m
Receiver height           :   1.50 / 30.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :   2.50 m
Barrier receiver distance :   3.00 / -12.00 m
Source elevation          :  80.00 m
Receiver elevation        :  77.80 m
Barrier elevation         :  77.80 m
Reference angle           :   0.00


Results segment # 1: St Joseph (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 !      -12.82 !        74.16

ROAD (0.00 + 45.45 + 0.00) = 45.45 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90      7   0.00  71.49   0.00  -5.05  -2.69   0.00   0.00 -18.31
45.45
-------------------------------------------------------------------------------
--
```

```
Segment Leq : 45.45 dBA


Results segment # 2: Duford (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 !        1.72 !        79.52

ROAD (0.00 + 53.37 + 0.00) = 53.37 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     90   0.00  63.96   0.00  -3.01   0.00   0.00   0.00  -7.58
53.37
-------------------------------------------------------------------------------
--

Segment Leq : 53.37 dBA

Total Leq All Segments: 54.02 dBA


Results segment # 1: St Joseph (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 !      -12.82 !        74.16

ROAD (0.00 + 37.85 + 0.00) = 37.85 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90      7   0.00  63.89   0.00  -5.05  -2.69   0.00   0.00 -18.31
37.85
-------------------------------------------------------------------------------
--
```

```
Segment Leq : 37.85 dBA


Results segment # 2: Duford (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 !       30.00 !       51.04 !       128.84

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
-------------------------------------------------------------------------------
--
   -90     90   0.00  56.36   0.00   0.00   0.00   0.00   0.00  99.00
155.36
   -90     90   0.00  56.36   0.00   0.00   0.00   0.00   0.00   0.00
56.36
-------------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 56.36 dBA

Total Leq All Segments: 56.42 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 54.02
                           (NIGHT): 56.42
```

```
STAMSON 5.0        NORMAL REPORT        Date: 08-06-2023 14:44:41
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: Duford (day/night)
-----------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Duford (day/night)
----------------------------------------
Angle1   Angle2           : -90.00 deg   32.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  18.00 / 18.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 32.00 deg
Barrier height            :   0.00 m
Barrier receiver distance :  10.00 / 10.00  m
Source elevation          :  75.00 m
Receiver elevation        :  86.92 m
Barrier elevation         :  86.92 m
Reference angle           :   0.00


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

Data for Segment # 2: St Joseph (day/night)
-------------------------------------------
Angle1   Angle2           : -28.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  30.00 / 30.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -28.00 deg   Angle2 : 90.00 deg
Barrier height            :   0.00 m
Barrier receiver distance :  10.00 / 10.00  m
Source elevation          :  69.95 m
Receiver elevation        :  86.92 m
Barrier elevation         :  86.92 m
Reference angle           :   0.00


Results segment # 1: Duford (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 !       -5.12 !        81.80

ROAD (0.00 + 45.41 + 0.00) = 45.41 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     32   0.00  63.96   0.00  -0.79  -1.69   0.00   0.00 -16.07
45.41
-------------------------------------------------------------------------------
--

Segment Leq : 45.41 dBA
```

```
Results segment # 2: St Joseph (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 !       -4.16 !        82.76

ROAD (0.00 + 52.67 + 0.00) = 52.67 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -28     90   0.00  71.49   0.00  -3.01  -1.83   0.00   0.00 -13.97
52.67
-------------------------------------------------------------------------
--

Segment Leq : 52.67 dBA

Total Leq All Segments: 53.42 dBA


Results segment # 1: Duford (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 !       -5.12 !        81.80

ROAD (0.00 + 37.82 + 0.00) = 37.82 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     32   0.00  56.36   0.00  -0.79  -1.69   0.00   0.00 -16.07
37.82
-------------------------------------------------------------------------
--
```

```
Segment Leq : 37.82 dBA


Results segment # 2: St Joseph (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 !       -4.16 !        82.76

ROAD (0.00 + 45.08 + 0.00) = 45.08 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -28     90   0.00  63.89   0.00  -3.01  -1.83   0.00   0.00 -13.97
45.08
-------------------------------------------------------------------------------
--

Segment Leq : 45.08 dBA

Total Leq All Segments: 45.83 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 53.42
                           (NIGHT): 45.83
```

```
STAMSON 5.0        NORMAL REPORT        Date: 08-06-2023 14:44:09
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r9.te                Time Period: Day/Night 16/8 hours
Description:


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

Data for Segment # 1: St Joseph (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  :  33.00 / 33.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 23.00 deg
Barrier height            :  12.00 m
Barrier receiver distance :  12.00 / 12.00  m
Source elevation          :  69.00 m
Receiver elevation        :  86.92 m
Barrier elevation         :  86.92 m
Reference angle           :   0.00


Road data, segment # 2: Duford (day/night)
------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    40 km/h
Road gradient       :     0 %
```

```
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Duford (day/night)
-----------------------------------------
Angle1   Angle2           : -25.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  44.00 / 44.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -25.00 deg   Angle2 : 90.00 deg
Barrier height            :  12.00 m
Barrier receiver distance :  10.00 / 10.00  m
Source elevation          :  80.00 m
Receiver elevation        :  86.92 m
Barrier elevation         :  86.92 m
Reference angle           :   0.00


Results segment # 1: St Joseph (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 !       -5.02 !        81.90

ROAD (0.00 + 46.77 + 0.00) = 46.77 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     23   0.00  71.49   0.00  -3.42  -2.02   0.00   0.00 -19.27
46.77
-------------------------------------------------------------------------------
--
```

```
Segment Leq : 46.77 dBA


Results segment # 2: Duford (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 !       -0.07 !        86.85

ROAD (0.00 + 38.48 + 0.00) = 38.48 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -25     90   0.00  63.96   0.00  -4.67  -1.95   0.00   0.00 -18.85
38.48
-------------------------------------------------------------------------------
--

Segment Leq : 38.48 dBA

Total Leq All Segments: 47.37 dBA


Results segment # 1: St Joseph (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 !       -5.02 !        81.90

ROAD (0.00 + 39.18 + 0.00) = 39.18 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     23   0.00  63.89   0.00  -3.42  -2.02   0.00   0.00 -19.27
39.18
-------------------------------------------------------------------------------
--
```

```
Segment Leq : 39.18 dBA


Results segment # 2: Duford (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 !       -0.07 !        86.85

ROAD (0.00 + 30.89 + 0.00) = 30.89 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -25     90   0.00  56.36   0.00  -4.67  -1.95   0.00   0.00 -18.85
30.89
-------------------------------------------------------------------------------
--

Segment Leq : 30.89 dBA

Total Leq All Segments: 39.78 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 47.37
                           (NIGHT): 39.78
```