# Noise Impact Study

## 40 Frank Nighbor Place, Kanata ON K2V 1B9

**401 Real Estate Trust**
Final report

February 15th, 2023
02211293.000-0401

# 401 Real Estate Trust
## 2225 Eagle Sreet North, Cambridge, ON N3H 4R7


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## Revisions and publications log

| REVISION No. | DATE | DESCRIPTION |
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| 00 | February 15th, 2023 | Final version published for submission to the City |

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## TABLES



## APPENDICES


# 1 Introduction

Englobe Corp has prepared the following Noise Impact Study (NIS) associated with the proposed hospitality developments (the Project) to be located at 40 Frank Nighbor Place in Kanata, Ontario. The Project consists of a 7,000 $m^2$, 6-storey hotel, with interior amenities on the first and second floors, and hotel rooms (approximately 115 suites) between the second and sixth floors. The property is currently vacant.

The main objective of the NIS is to assess the noise impact on the proposed hospitality development from nearby noise sources, and to provide recommendations for noise control to meet the requirements of the City of Ottawa's Environmental Noise Control Guidelines (ENCG).

## 1.1 Project Description

The Project is located at the western end of Frank Nighbor Place in Kanata, Ontario. Surrounding the Project are various commercial buildings, including existing Camp Mart and Home Depot businesses to the north, an existing Movati fitness club to the east, and various multi-use business developments to the southeast and southwest. There is also a proposed U-Haul commercial development to be built at 30 Frank Nighbor Place, located northwest of the Project. An aerial view of the project site is provided in Figure 1, Appendix A. Furthermore, a zoning map of the surrounding area is provided in Figure 2, Appendix A.

A site visit was undertaken by Englobe staff on February 2nd, 2023 in order to identify potentially significant stationary noise sources impacting the Project. No significant stationary noise sources were identified during the site visit. Transportation corridor noise impacts and stationary noise source impacts are addressed in Sections 2 and 3 of this NIS, respectively.


# 2 Transportation Corridor Noise Assessment

As per the City of Ottawa's ENCG, the following transportation corridor is assessed as part of this NIS due to its roadway classification and proximity to the Project:

— Highway 417

Of note, there are no rail corridors in proximity to the Project.

## 2.1 Noise Level Criteria - Roads

The ENCG provides guidelines for road traffic noise impacting hospitality developments, including noise level criteria.

### 2.1.1 Outdoor Noise Level Criterion

The ENCG does not call for the evaluation of traffic noise impacting an outdoor amenity area associated with hospitality developments.

### 2.1.2 Indoor Noise Level Criteria

The applicable indoor noise level criteria adopted by the ENCG for road sources are given in Table 1, below. These are supplementary noise level limits contained in Table 2.2c of the ENCG.

**Table 1: ENCG Indoor Noise Level Limit – Road Noise**

| Type of Space | Time Period | Noise Level Limit ($L_{eq}$) |
|---|---|---|
| Conference rooms, libraries, reading rooms | Daytime (07h00 to 23h00) | 45 dBA |
| Sleeping quarters of hotels | Night-time (23h00 to 07h00) | 45 dBA |

In addition to the noise level criteria shown in Table 1, the ENCG indicates that noise control measures shall be developed according to NPC-300. The requirements pertaining to noise control measures given in NPC-300 vary depending on the plane-of-window (outdoor) noise level, as shown in Table 2 and Table 3.

**Table 2: NPC-300 Minimum Ventilation and Warning Clause Requirements – Road Noise**

| Point of Assessment | Noise Level ($L_{eq}$) | Ventilation Requirements | Warning Clause |
|---|---|---|---|
| Conference room, library or reading room plane-of-window[1] Daytime (07h00 to 23h00) | 55 dBA < $L_{eq}$ ≤ 65 dBA | Forced-air heating with provision for central air conditioning | Type C |
| | 65 dBA < $L_{eq}$ | Central air conditioning | Type D |
| Hotel sleeping quarters plane-of-window[1] Night-time (23h00 to 07h00) | 55 dBA < $L_{eq}$ ≤ 65 dBA | Forced-air heating with provision for central air conditioning | Type C |
| | 65 dBA < $L_{eq}$ | Central air conditioning | Type D |

[1] Adapted from Section C7.1 of NPC-300, using space types and relative noise level limits provided for supplementary noise level limits provided in Table 2.2c of the ENCG.

**Table 3: NPC-300 Minimum Building Component Requirements – Road Noise**

| Point of Assessment | Noise Level ($L_{eq}$) | Building Façade Requirements |
|---|---|---|
| Conference room, library or reading room plane-of-window[1] Daytime (07h00 to 23h00) | $L_{eq}$ ≤ 65 dBA | Building façade constructions compliant with the Ontario Building Code (OBC) |
| | 65 dBA < $L_{eq}$ | Building façade constructions shall be designed such that the indoor noise level criteria are achieved |
| Hotel sleeping quarters plane-of-window[1] Night-time (23h00 to 07h00) | $L_{eq}$ ≤ 65 dBA | Building façade constructions compliant with the Ontario Building Code (OBC) |
| | 65 dBA < $L_{eq}$ | Building façade constructions shall be designed such that the indoor noise level criteria are achieved |

[1] Adapted from Section C7.1 of NPC-300, using space types and relative noise level limits provided for supplementary noise level limits provided in Table 2.2c of the ENCG.

## 2.2 Critical Points of Reception

Critical Points of Reception (POR) are receptors (located at the building's plane-of-window for this Project), which are most impacted by the transportation corridor noise sources identified in this NIS. For this Project, the critical PORs are those with maximum exposure to Highway 417, namely the north-

facing façade. The POR locations are shown in Figures 3 and 4, Appendix A, and summarized in Table 4.

**Table 4: Critical Points of Reception – Transportation Corridor Noise**

| Point of Reception | Location Description | POR Estimated Height Above Grade (m) |
|---|---|---|
| POR 1 | North façade of proposed building at the Board Room on the Ground Floor | 1.5 |
| POR 2 | North façade of proposed building at the Business Library on the Ground Floor | 1.5 |
| POR 3 | North façade of proposed building near west corner at 6th Floor hotel suite | 18.3 |
| POR 4 | North façade of proposed building near middle at 6th Floor hotel suite | 18.3 |
| POR 5 | North façade of proposed building near east corner at 6th Floor hotel suite | 18.3 |

## 2.3 Noise Level Predictions

### 2.3.1 Road Traffic Parameters

Annual Average Daily Traffic (AADT) values for Highway 417 contained in the ENCG were used for this NIS, along with the corresponding day/night traffic split and medium/heavy truck percentages, as summarized in Table 5, below. For our analysis, the roadway was split into two four-lane segments, eastbound and westbound, as recommended by the ENCG for improved calculation accuracy.

**Table 5: Road Traffic Data Summary**

| Road Segment | AADT | Day/Night % | Medium Trucks | Heavy Trucks | Speed Limit | Road Gradient |
|---|---|---|---|---|---|---|
| Highway 417 (Eastbound) | 73,332 | 92 % / 8 % | 7 % | 5 % | 100 km/h | 0 % |
| Highway 417 (Westbound) | 73,332 | 92 % / 8 % | 7 % | 5 % | 100 km/h | 0 % |

### 2.3.2 Noise Level Calculations

Noise level calculations were performed using STAMSON v5.04, the traffic noise prediction software package developed by the MECP. The intermediate terrain between the sources and receivers was modelled as reflective due to the high number of large paved areas, resulting in a conservative assessment. The following buildings were also included in the calculations for each POR as noise barriers (the height of each building, used as the height of the modelled noise barrier, is also provided, approximated from architectural drawings associated with the site plan applications for the respective developments):

- Home Depot (existing) at 10 Frank Nighbor Place – height of 7.3m (assumed similar to Camp Mart)
- Camp Mart (existing) at 20 Frank Nighbor Place – height of 7.3m
- U-Haul Buildings A and D (proposed) 30 Frank Nighbor Place – height of 15.2m

Figures 5 to 9, Appendix A, shows the source-receiver distances and exposure angles for each POR. Calculation results are given in Table 6; of note, only daytime results are considered for the Board Room and the Business Library, since they are not considered to have night-time usage. Similarly, only night-time results are considered for the hotel sleeping quarters, per ENCG Table 2.2c.

**Table 6: Calculated Noise Levels Due to Transportation Corridor Noise Sources**

| Point of Reception | Calculated Sound Pressure Level (dBA) - Road Noise | |
|---|---|---|
| | Daytime (07h00 to 23h00) | Night-time (23h00 to 07h00) |
| POR 1 | 67 | N/A |
| POR 2 | 66 | N/A |
| POR 3 | N/A | 61 |
| POR 4 | N/A | 61 |
| POR 5 | N/A | 61 |

## 2.4 Noise Control Recommendations – Transportation Corridors

Given the calculated noise levels in Table 6, noise control measures are recommended in order to comply with the noise level criteria given in Section 2.1. The noise control measures are discussed in the following section and summarized in Table 7.

**Table 7: Summary of Recommended Noise Control Measures**

| Point of Reception | Noise Barrier? | Ventilation Requirements | Building Component Requirements | Warning Clause |
|---|---|---|---|---|
| POR 1 | N/A | Central air conditioning | Building façade constructions shall be designed such that the indoor noise level criteria are achieved | Type D |
| POR 2 | N/A | Central air conditioning | Building façade constructions shall be designed such that the indoor noise level criteria are achieved | Type D |
| POR 3 | N/A | Forced-air heating w/ provision for central air conditioning | Compliant with OBC | Type C |
| POR 4 | N/A | Forced-air heating w/ provision for central air conditioning | Compliant with OBC | Type C |
| POR 5 | N/A | Forced-air heating w/ provision for central air conditioning | Compliant with OBC | Type C |

### 2.4.1 Ventilation Requirements

Per Table 6, noise levels at POR 1 and POR 2 are expected to exceed 65 dBA during daytime hours. Therefore, as outlined in Table 2, central air conditioning is required for the Board Room and Business Library in order for any exterior doors and windows to remain closed. A warning clause Type D is also required to be incorporated into the development.

Also, per Table 6, noise levels at POR 3 to POR 5 are expected to be between 55 dBA and 65 dBA during nighttime hours (worst-case scenario). Therefore, as outlined in Table 2, forced-air heating with provision for central air conditioning is required as a minimum for all north-facing hotel suites. A warning clause Type C is also required to be incorporated into the development.

### 2.4.2 Building Component Requirements

Per Table 6, noise levels at POR 1 and POR 2 are expected to exceed 65 dBA during daytime hours. Therefore, as outlined in Table 3, building façade constructions must be designed such that the indoor noise level criteria are achieved. Based on Architectural Drawings AP21 and AP30, the following parameters were used in order to calculate the Acoustic Insulation Factor (AIF) and resulting minimum building façade constructions:

— Number of exterior façade building components: 2 (exterior wall and fixed windows)

— Approximate floor areas:
  - Board Room: 30 $m^2$
  - Business Library: 27 $m^2$

— Approximate fixed window areas:
  - Board Room: 12 $m^2$
  - Business Library: 8 $m^2$

— Approximate exterior wall areas:
  - Board Room: 7 $m^2$
  - Business Library: 4 $m^2$

— Resulting daytime AIF requirement:
  - Board Room: 27
  - Business Library: 26

Based on the AIF requirements calculated above, building façade constructions (including both exterior walls and windows) compliant with the OBC are expected to achieve the indoor noise levels required for both the Board Room and the Business Library located on the Ground Level.

Per Table 6, noise levels at POR 3 to POR 5 are expected to be less than (or equal to) 65 dBA during night-time hours. Therefore, as outlined in Table 3, building façade constructions (including exterior walls and windows) compliant with the OBC are expected to achieve the indoor noise levels required for all north-facing hotel sleeping quarters.

### 2.4.3 Warning Clause Requirements

Warning clauses are required to be incorporated into all development agreements, registrations on title and inclusion in Agreement of Purchase and Sale associated with this Project. The warning clauses shall be drafted by a legal expert based on Section C8 of NPC-300 and/or Part 4, Appendix A of the ENCG, with wording adapted as applicable to this Project.


# 3 Stationary Noise Source Assessment

## 3.1 Noise Level Criteria – Stationary Noise Sources

The ENCG provides noise level criteria for stationary noise sources consistent with Part C of NPC-300. The noise criteria are either the exclusionary limits given in Table 8, or the minimum hourly background noise level ($L_{eq(1\text{-}hour)}$), whichever is higher. The Project is considered to be located in a Class 1 Area, which is characterized as having an acoustical environment typical of a major population centre.

**Table 8: Exclusion Limit Values for Stationary Noise Sources**

| Time Period | One-Hour Equivalent Sound Level Limits ($L_{eq(1\text{-}hour)}$) - Class 1 Area | |
|---|---|---|
| | Plane of Window of Noise Sensitive Spaces | Outdoor Points of Reception |
| Daytime (07h00 to 19h00) | 50 dBA | 50 dBA |
| Evening (19h00 to 23h00) | 50 dBA | 50 dBA |
| Night-time (23h00 to 07h00) | 45 dBA | N/A |

## 3.2 Existing Stationary Noise Sources

Based on a site visit performed on February 2nd, 2023, no significant stationary noise sources were observed in the area surrounding the Project.

## 3.3 Future Stationary Noise Sources

At this stage of the Project, potential stationary noise sources associated with the Project are unknown. Any future stationary noise sources associated with the Project must be selected to ensure compliance with the ENCG noise level limits at nearby points of reception.


# 4 Concluding Comments

With the inclusion of the noise control measures presented in Section 2.4 of this report, the noise impact of the transportation noise sources on the proposed development are expected to meet the City of Ottawa's ENCG noise guideline limits. The proposed development should therefore be approved from a noise perspective.

We trust the foregoing will satisfy your present requirements. If you have any questions regarding this matter, please do not hesitate to contact us.


# 5 References


— City of Ottawa, Environmental Noise Control Guidelines (ENCG), 2016.

— Ontario Ministry of the Environment, Conservation and Parks (MECP), Environmental Noise Guideline - Stationary and Transportation Sources - Approval and Planning (NPC-300), Queen's Printer for Ontario, Published: 2016. Updated: 2021

# Appendix A
# Supporting Figures

ENGLOBE


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: Site Location

| Revision | Date | Issue | Approval |
|---|---|---|---|
| 0 | 15/02/2023 | - | -- |

Client: -

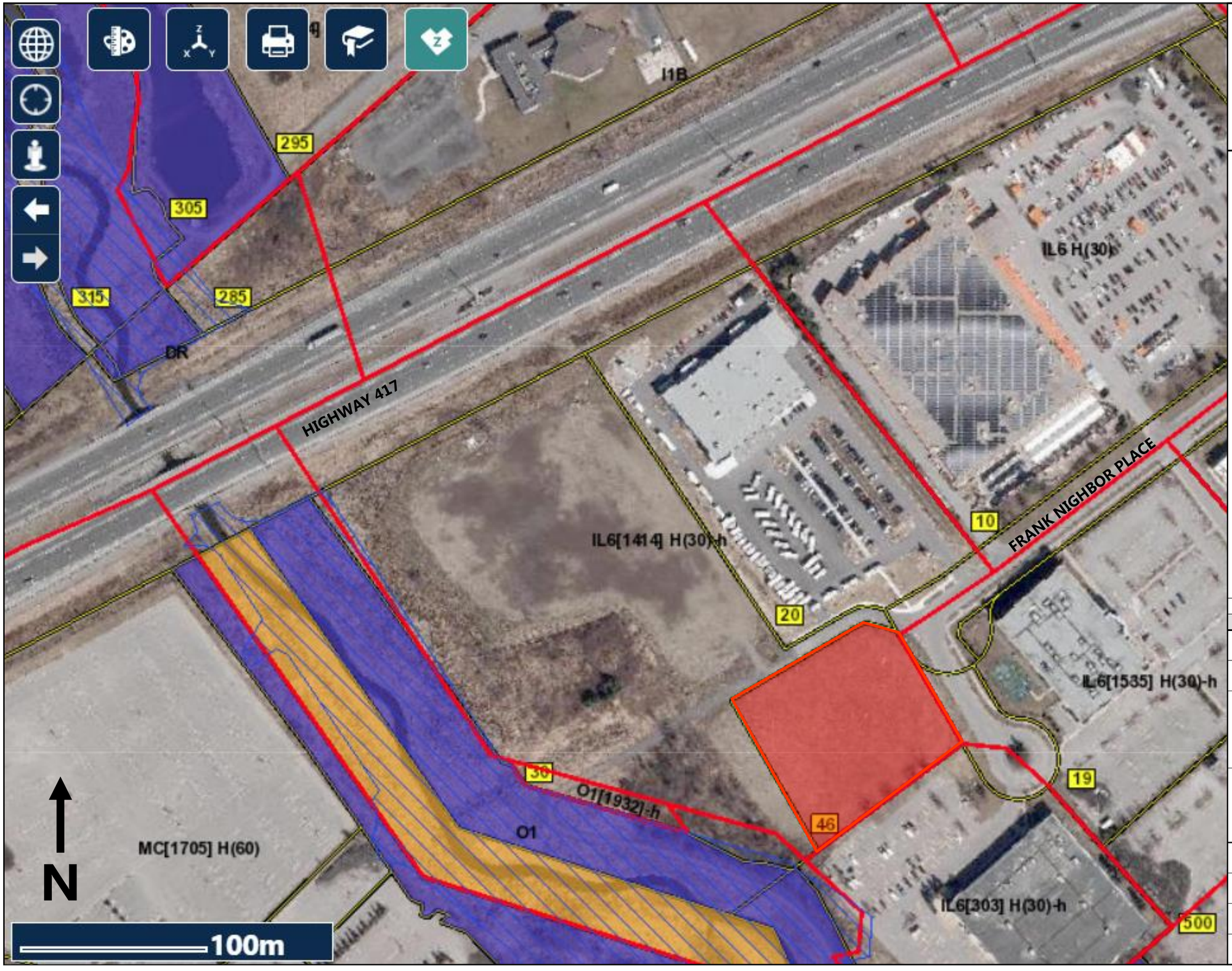
Site: 40 FRANK NIGHBOR PLACE

Report Title: NOISE IMPACT STUDY

Drawing Title: AERIAL VIEW OF SITE

| | |
|---|---|
| Designed By: MV | Scale: NOT TO SCALE |
| Drawn By: MV | Date: 15/02/2023 |
| Reviewed By: | Project No.: 02211293.000-0401 |

Figure No.: 1

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: Site Location

**DR** :Development Reserve Zone
**I1** :Minor Institutional Zone
**O1** :Parks and Open Space Zone
**MC** :Mixed Use Centre Zone
**IL** :Light Industrial Zone

| Revision | Date | Issue | Approval |
|---|---|---|---|
| 0 | 15/02/2023 | - | -- |

Client: -

Site: **40 FRANK NIGHBOR PLACE**

Report Title: **NOISE IMPACT STUDY**

Drawing Title: **ZONING MAP OF AREA AROUND SITE**

| | |
|---|---|
| Designed By: MV | Scale: NOT TO SCALE |
| Drawn By: MV | Date: 15/02/2023 |
| Reviewed By: | Project No.: 02211293.000-0401 |
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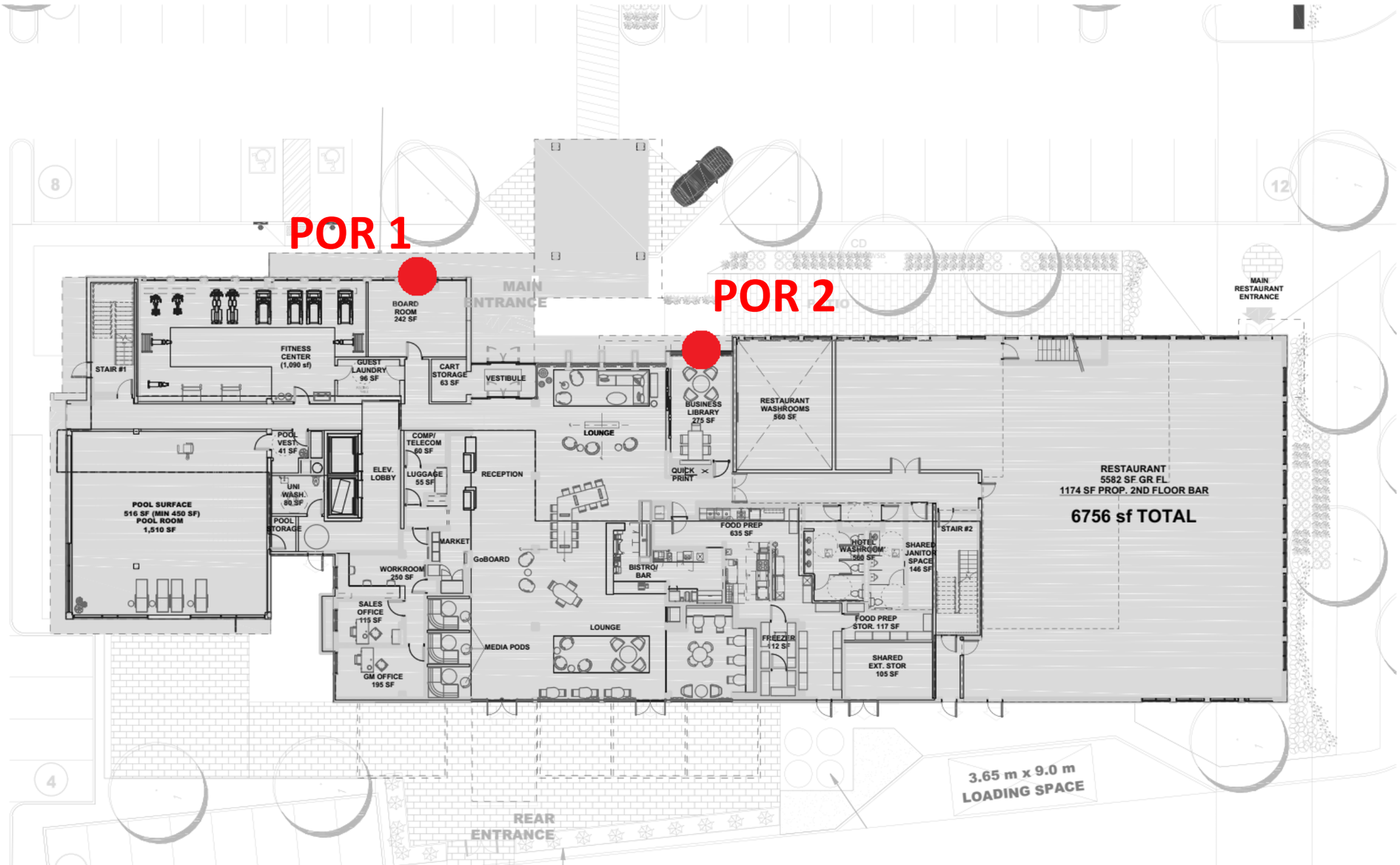


1 AP 21 GROUND FLOOR WORKING PLAN.
3/32" = 1'-0"

N

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Legend

: POR / OLA Location

| Revision | Date | Issue | Approval |
|---|---|---|---|
| 0 | 15/02/2023 | - | -- |

Client: -

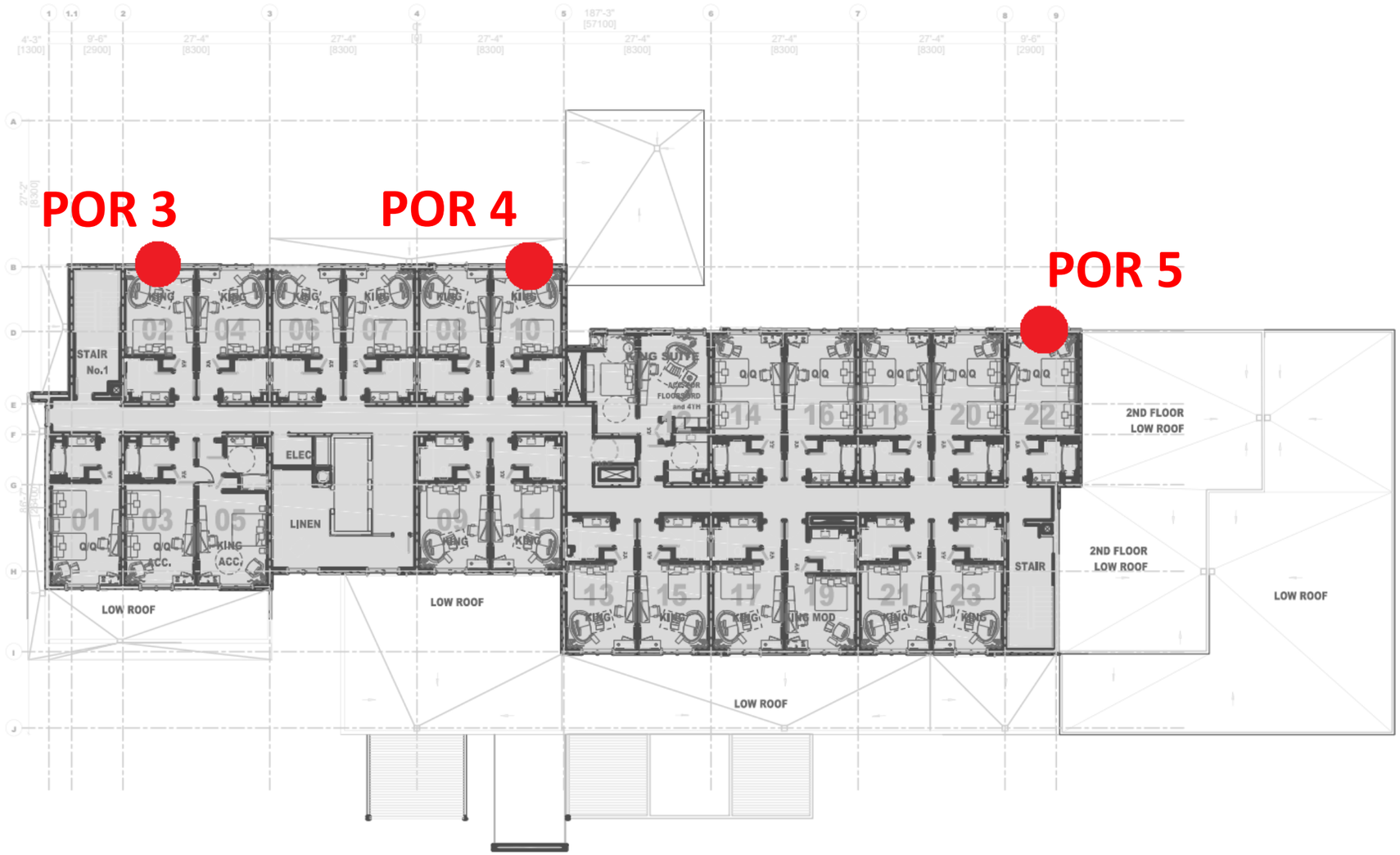
Site: 40 FRANK NIGHBOR PLACE

Report Title: NOISE IMPACT STUDY

Drawing Title: POINTS OF RECEPTION (GROUND FLOOR)

| Designed By | Scale |
|---|---|
| MV | NOT TO SCALE |
| **Drawn By** | **Date** |
| MV | 15/02/2023 |
| **Reviewed By** | **Project No.** |
| | 02211293.000-0401 |

Figure No. 3




1 AP 23 TYPICAL FLOOR PLAN (3RD TO 6TH)
3/32" = 1'-0"

N

ENGLOBE

Legend

: POR / OLA Location

| Revision | Date | Issue | Approval |
|---|---|---|---|
| 0 | 15/02/2023 | - | -- |

Client: -

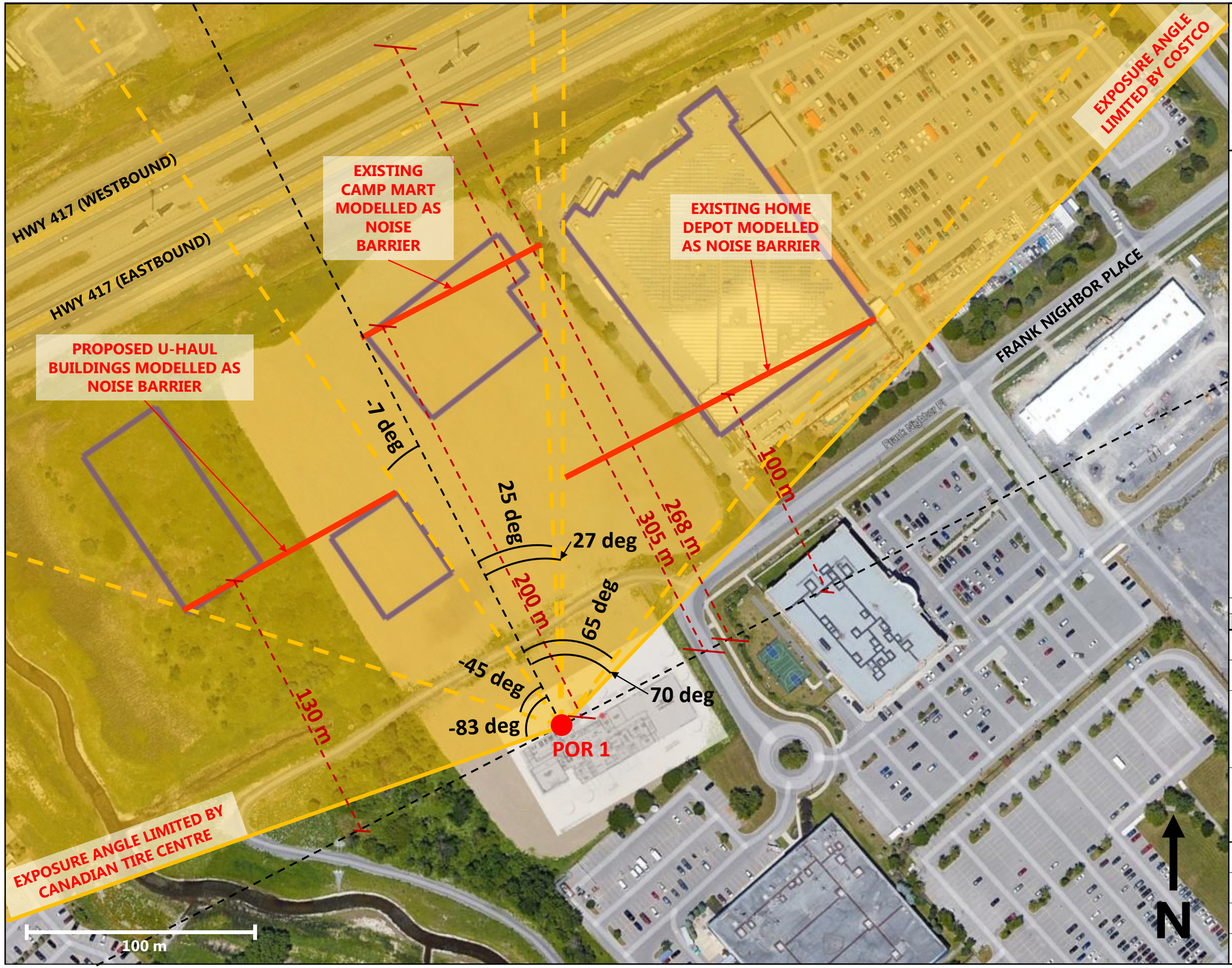
Site: **40 FRANK NIGHBOR PLACE**

Report Title: **NOISE IMPACT STUDY**

Drawing Title: **POINTS OF RECEPTION (6th FLOOR)**

| | |
|---|---|
| Designed By: MV | Scale: NOT TO SCALE |
| Drawn By: MV | Date: 15/02/2023 |
| Reviewed By: | Project No.: 02211293.000-0401 |

Figure No.: 4

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| Revision | Date | Issue | Approval |
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| 0 | 15/02/2023 | - | -- |

Client: -

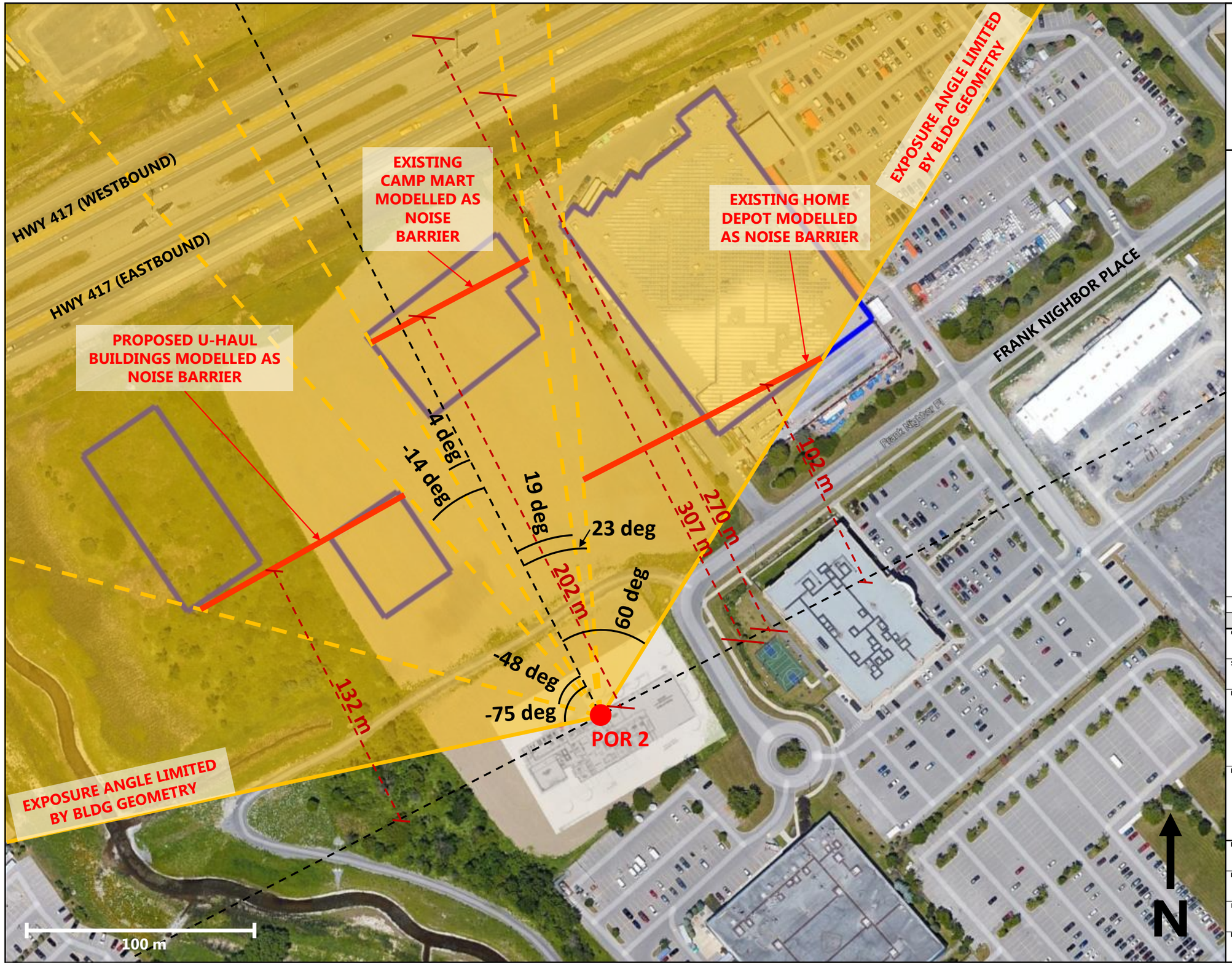
Site: 40 FRANK NIGHBOR PLACE

Report Title: NOISE IMPACT STUDY

Drawing Title: POR 1 SOURCE-RECEIVER DISTANCES AND EXPOSURE ANGLES

| | |
|---|---|
| Designed By: MV | Scale: NOT TO SCALE |
| Drawn By: MV | Date: 15/02/2023 |
| Reviewed By: | Project No.: 02211293.000-0401 |

Figure No.: 5

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| Revision | Date | Issue | Approval |
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| 0 | 15/02/2023 | - | -- |

Client: -

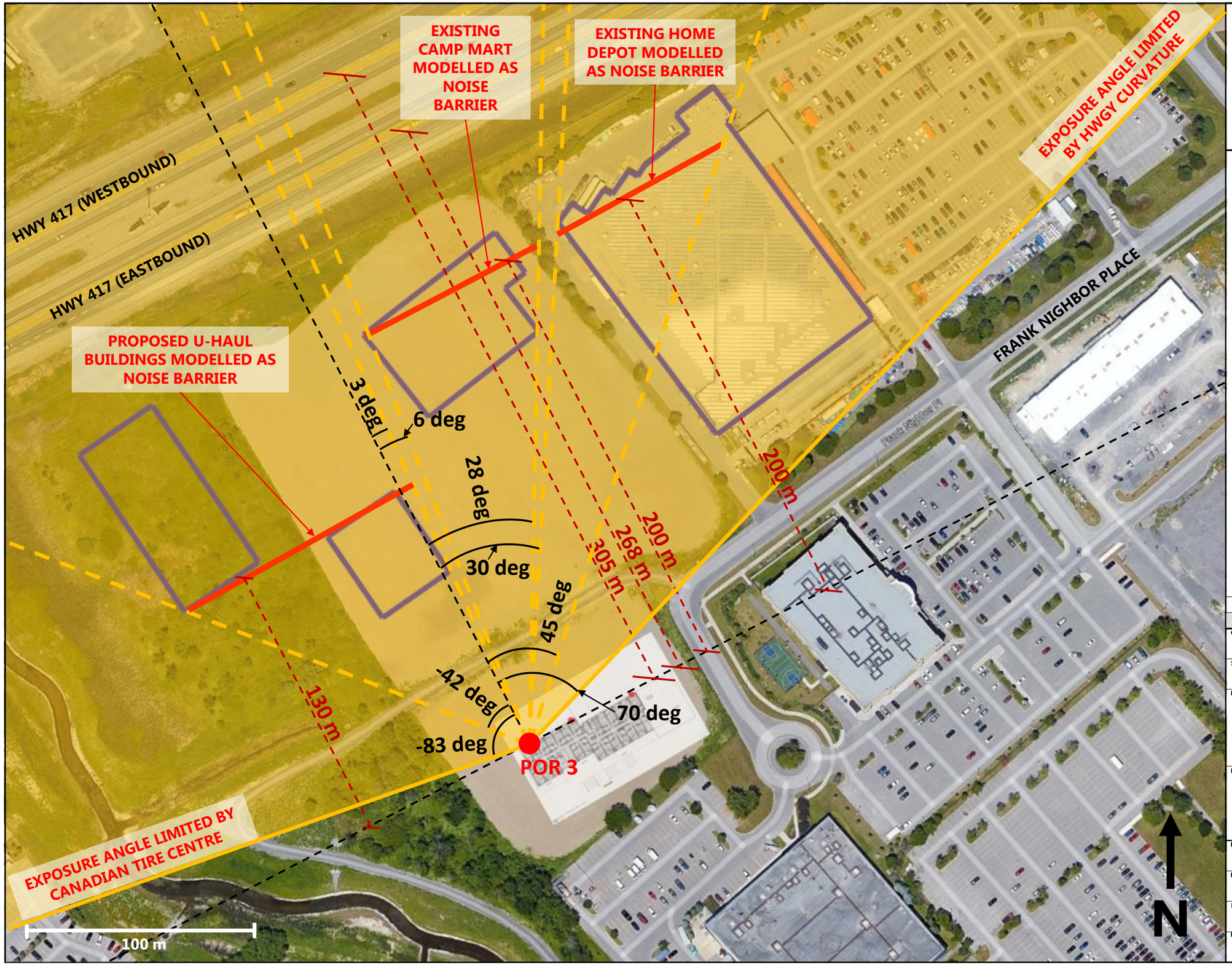
Site: 40 FRANK NIGHBOR PLACE

Report Title: NOISE IMPACT STUDY

Drawing Title: POR 2 SOURCE-RECEIVER DISTANCES AND EXPOSURE ANGLES

| | |
|---|---|
| Designed By: MV | Scale: NOT TO SCALE |
| Drawn By: MV | Date: 15/02/2023 |
| Reviewed By: | Project No.: 02211293.000-0401 |

Figure No.: 6

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| Revision | Date | Issue | Approval |
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| 0 | 15/02/2023 | - | -- |

Client: -

Site: 40 FRANK NIGHBOR PLACE

Report Title: NOISE IMPACT STUDY

Drawing Title: POR 3 SOURCE-RECEIVER DISTANCES AND EXPOSURE ANGLES

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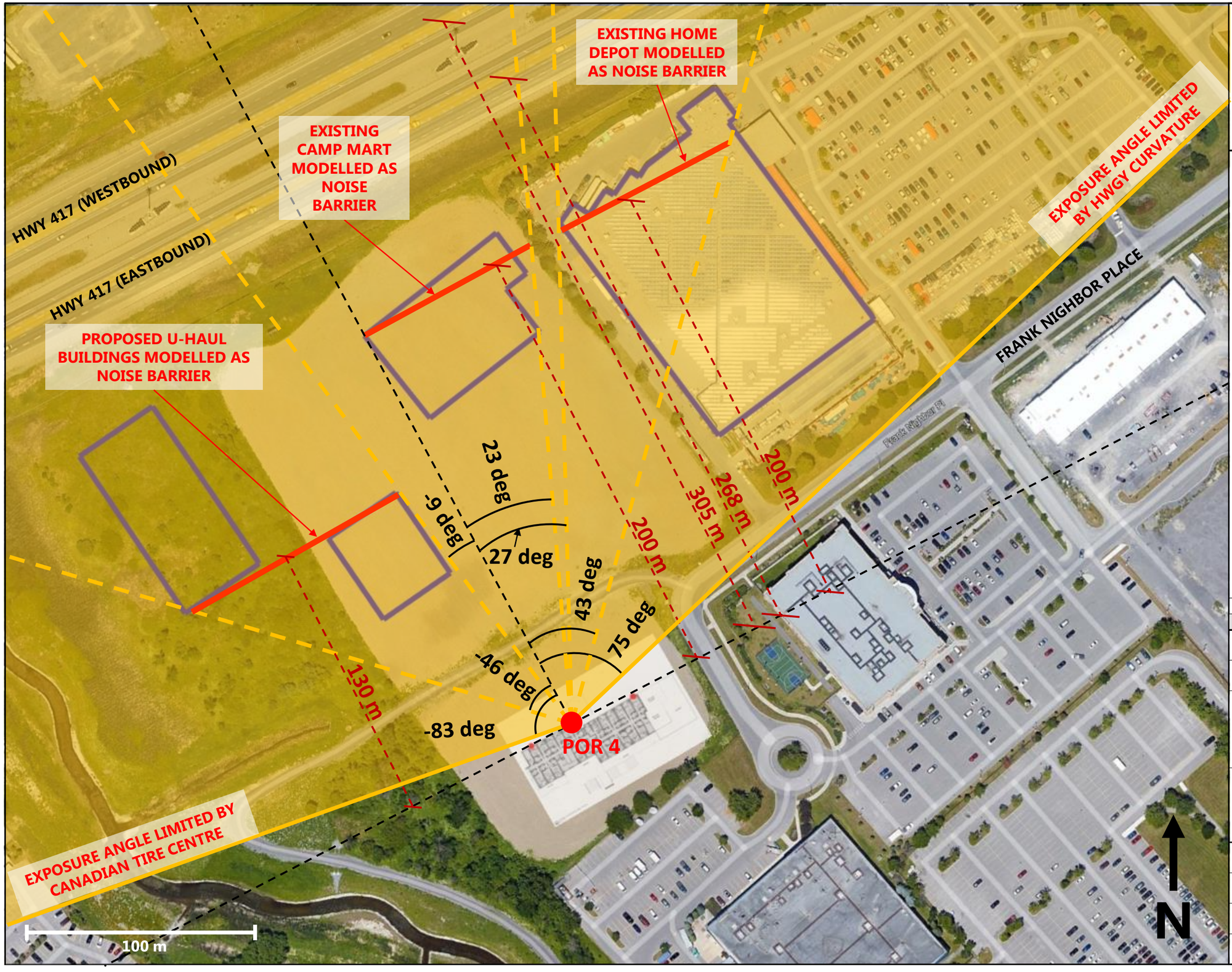
| Designed By: MV | Scale: NOT TO SCALE |
| Drawn By: MV | Date: 15/02/2023 |
| Reviewed By: | Project No.: 02211293.000-0401 |

Figure No.: 7

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| Revision | Date | Issue | Approval |
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| 0 | 15/02/2023 | - | -- |

Client: -

Site: 40 FRANK NIGHBOR PLACE

Report Title: NOISE IMPACT STUDY

Drawing Title: POR 4 SOURCE-RECEIVER DISTANCES AND EXPOSURE ANGLES

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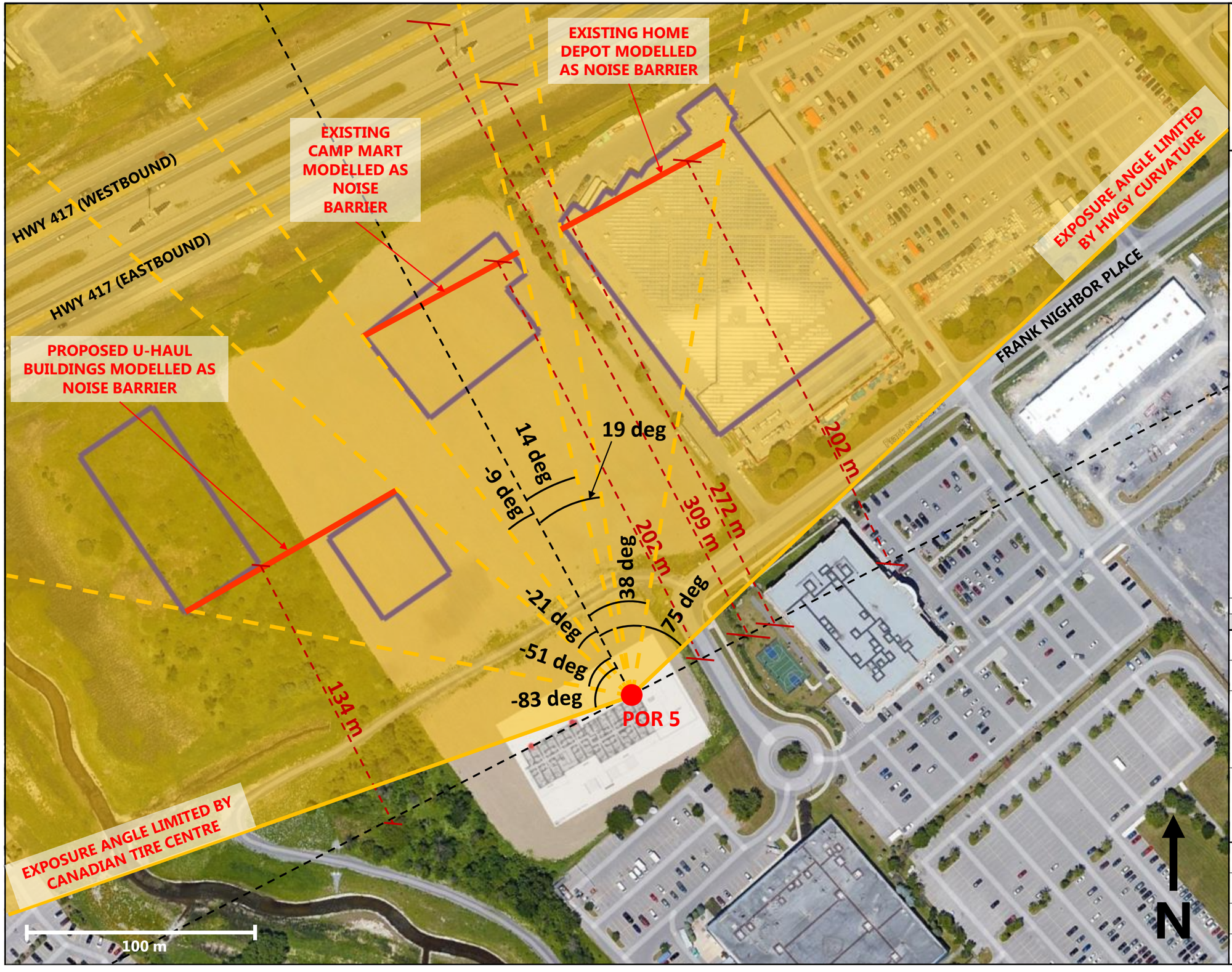
|---|---|
| Designed By: MV | Scale: NOT TO SCALE |
| Drawn By: MV | Date: 15/02/2023 |
| Reviewed By: | Project No.: 02211293.000-0401 |

Figure No.: 8

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| Revision | Date | Issue | Approval |
|---|---|---|---|
| 0 | 15/02/2023 | - | -- |

Client: -

Site: 40 FRANK NIGHBOR PLACE

Report Title: NOISE IMPACT STUDY

Drawing Title: POR 5 SOURCE-RECEIVER DISTANCES AND EXPOSURE ANGLES

| | |
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| Designed By: MV | Scale: NOT TO SCALE |
| Drawn By: MV | Date: 15/02/2023 |
| Reviewed By: | Project No.: 02211293.000-0401 |

Figure No.: 9

# Appendix B
# STAMSON Calculations

ENGLOBE

STAMSON 5.0 SUMMARY REPORT Date: 14-02-2023 09:46:53
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 46fn_p1.te Time Period: Day/Night 16/8 hours
Description: **Sound level prediction at POR1.**

Road data, segment # 1: 417EB_(west) (day/night)
---
Car traffic volume : 59370/5163 veh/TimePeriod *
Medium truck volume : 4723/411 veh/TimePeriod *
Heavy truck volume : 3373/293 veh/TimePeriod *
Posted speed limit : 100 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 73332
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: 417EB_(west) (day/night)
---
Angle1 Angle2 : -83.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 268.00 / 268.00 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -45.00 deg Angle2 : -7.00 deg
Barrier height : 15.20 m
Barrier receiver distance : 130.00 / 130.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Road data, segment # 2: 417WB_(west) (day/night)
---
Car traffic volume : 59370/5163 veh/TimePeriod *
Medium truck volume : 4723/411 veh/TimePeriod *
Heavy truck volume : 3373/293 veh/TimePeriod *
Posted speed limit : 100 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 73332
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

```
Data for Segment # 2: 417WB_(west) (day/night)
----------------------------------------------
Angle1   Angle2           : -83.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 305.00 / 305.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -45.00 deg   Angle2 : -7.00 deg
Barrier height            :  15.20 m
Barrier receiver distance : 130.00 / 130.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 3: 417EB_(ctr) (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: 417EB_(ctr) (day/night)
---------------------------------------------
Angle1   Angle2           :   0.00 deg   27.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 268.00 / 268.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :   0.00 deg   Angle2 : 25.00 deg
Barrier height            :   7.30 m
Barrier receiver distance : 200.00 / 200.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 4: 417WB_(ctr) (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
```

```
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 4: 417WB_(ctr) (day/night)
-----------------------------------------------
Angle1   Angle2           :   0.00 deg   27.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 305.00 / 305.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :   0.00 deg   Angle2 : 25.00 deg
Barrier height            :   7.30 m
Barrier receiver distance : 200.00 / 200.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 5: 417EB_(east) (day/night)
-------------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 5: 417EB_(east) (day/night)
-----------------------------------------------
Angle1   Angle2           :  27.00 deg   70.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 268.00 / 268.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  27.00 deg   Angle2 : 65.00 deg
Barrier height            :   7.30 m
```

```
Barrier receiver distance : 100.00 / 100.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 6: 417WB_(east) (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 6: 417WB_(east) (day/night)
----------------------------------------------
Angle1   Angle2           :  27.00 deg   70.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 305.00 / 305.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  27.00 deg   Angle2 : 65.00 deg
Barrier height            :   7.30 m
Barrier receiver distance : 100.00 / 100.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Result summary (day)
--------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+----------+----------+----------
 1.417EB_(west)     !     1.50 !    62.91 !    62.91
 2.417WB_(west)     !     1.50 !    62.35 !    62.35
 3.417EB_(ctr)      !     1.50 !    51.51 !    51.51
 4.417WB_(ctr)      !     1.50 !    51.46 !    51.46
 5.417EB_(east)     !     1.50 !    55.52 !    55.52
 6.417WB_(east)     !     1.50 !    55.06 !    55.06
--------------------+----------+----------+----------
                      Total                  66.66 dBA
```

Result summary (night)
---

| | source height (m) | Road Leq (dBA) | Total Leq (dBA) |
|---|---|---|---|
| 1.417EB_(west) | 1.49 | 55.31 | 55.31 |
| 2.417WB_(west) | 1.49 | 54.75 | 54.75 |
| 3.417EB_(ctr) | 1.49 | 43.92 | 43.92 |
| 4.417WB_(ctr) | 1.49 | 43.86 | 43.86 |
| 5.417EB_(east) | 1.49 | 47.93 | 47.93 |
| 6.417WB_(east) | 1.49 | 47.46 | 47.46 |
| Total | | | 59.06 dBA |

TOTAL Leq FROM ALL SOURCES (DAY): 66.66
(NIGHT): 59.06

STAMSON 5.0 SUMMARY REPORT Date: 14-02-2023 09:56:22
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 46fn_p2.te Time Period: Day/Night 16/8 hours
Description: **Sound level prediction at POR2.**

Road data, segment # 1: 417EB_(west) (day/night)
---
Car traffic volume : 59370/5163 veh/TimePeriod *
Medium truck volume : 4723/411 veh/TimePeriod *
Heavy truck volume : 3373/293 veh/TimePeriod *
Posted speed limit : 100 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 73332
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: 417EB_(west) (day/night)
---
Angle1 Angle2 : -75.00 deg -4.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 270.00 / 270.00 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -48.00 deg Angle2 : -14.00 deg
Barrier height : 15.20 m
Barrier receiver distance : 132.00 / 132.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Road data, segment # 2: 417WB_(west) (day/night)
---
Car traffic volume : 59370/5163 veh/TimePeriod *
Medium truck volume : 4723/411 veh/TimePeriod *
Heavy truck volume : 3373/293 veh/TimePeriod *
Posted speed limit : 100 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 73332
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

```
Data for Segment # 2: 417WB_(west) (day/night)
----------------------------------------------
Angle1   Angle2           : -75.00 deg   -4.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 307.00 / 307.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -48.00 deg   Angle2 : -14.00 deg
Barrier height            :  15.20 m
Barrier receiver distance : 132.00 / 132.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 3: 417EB_(ctr) (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: 417EB_(ctr) (day/night)
---------------------------------------------
Angle1   Angle2           :  -4.00 deg   23.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 270.00 / 270.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  -4.00 deg   Angle2 : 19.00 deg
Barrier height            :   7.30 m
Barrier receiver distance : 202.00 / 202.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 4: 417WB_(ctr) (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
```

```
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 4: 417WB_(ctr) (day/night)
-------------------------------------------
Angle1   Angle2           :  -4.00 deg   23.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 307.00 / 307.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  -4.00 deg   Angle2 : 19.00 deg
Barrier height            :   7.30 m
Barrier receiver distance : 202.00 / 202.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 5: 417EB_(east) (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 5: 417EB_(east) (day/night)
-----------------------------------------------
Angle1   Angle2           :  23.00 deg   60.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 270.00 / 270.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  23.00 deg   Angle2 : 60.00 deg
Barrier height            :   7.30 m
```

```
Barrier receiver distance : 102.00 / 102.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 6: 417WB_(east) (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 6: 417WB_(east) (day/night)
----------------------------------------------
Angle1   Angle2           :  23.00 deg   60.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 307.00 / 307.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  23.00 deg   Angle2 : 60.00 deg
Barrier height            :   7.30 m
Barrier receiver distance : 102.00 / 102.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Result summary (day)
--------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+----------+----------+----------
 1.417EB_(west)     !     1.50 !    62.03 !    62.03
 2.417WB_(west)     !     1.50 !    61.48 !    61.48
 3.417EB_(ctr)      !     1.50 !    53.44 !    53.44
 4.417WB_(ctr)      !     1.50 !    53.18 !    53.18
 5.417EB_(east)     !     1.50 !    51.13 !    51.13
 6.417WB_(east)     !     1.50 !    50.82 !    50.82
--------------------+----------+----------+----------
                      Total                  65.66 dBA
```

Result summary (night)
---

| | source height (m) | Road Leq (dBA) | Total Leq (dBA) |
|---|---|---|---|
| 1.417EB_(west) | 1.49 | 54.43 | 54.43 |
| 2.417WB_(west) | 1.49 | 53.88 | 53.88 |
| 3.417EB_(ctr) | 1.49 | 45.84 | 45.84 |
| 4.417WB_(ctr) | 1.49 | 45.59 | 45.59 |
| 5.417EB_(east) | 1.49 | 43.53 | 43.53 |
| 6.417WB_(east) | 1.49 | 43.22 | 43.22 |
| Total | | | 58.06 dBA |

TOTAL Leq FROM ALL SOURCES (DAY): 65.66
(NIGHT): 58.06

STAMSON 5.0 SUMMARY REPORT Date: 14-02-2023 10:28:07
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 46fn_p3.te Time Period: Day/Night 16/8 hours
Description: **Sound level prediction at POR3.**

Road data, segment # 1: 417EB_(west) (day/night)
---
Car traffic volume : 59370/5163 veh/TimePeriod *
Medium truck volume : 4723/411 veh/TimePeriod *
Heavy truck volume : 3373/293 veh/TimePeriod *
Posted speed limit : 100 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 73332
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: 417EB_(west) (day/night)
---
Angle1 Angle2 : -83.00 deg 3.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 268.00 / 268.00 m
Receiver height : 18.30 / 18.30 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -42.00 deg Angle2 : 3.00 deg
Barrier height : 15.20 m
Barrier receiver distance : 130.00 / 130.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Road data, segment # 2: 417WB_(west) (day/night)
---
Car traffic volume : 59370/5163 veh/TimePeriod *
Medium truck volume : 4723/411 veh/TimePeriod *
Heavy truck volume : 3373/293 veh/TimePeriod *
Posted speed limit : 100 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 73332
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

```
Data for Segment # 2: 417WB_(west) (day/night)
-----------------------------------------------
Angle1   Angle2           : -83.00 deg   3.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 305.00 / 305.00 m
Receiver height           :  18.30 / 18.30  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -42.00 deg   Angle2 : 3.00 deg
Barrier height            :  15.20 m
Barrier receiver distance : 130.00 / 130.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 3: 417EB_(ctr) (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: 417EB_(ctr) (day/night)
-----------------------------------------------
Angle1   Angle2           :   3.00 deg   30.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 268.00 / 268.00 m
Receiver height           :  18.30 / 18.30  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :   6.00 deg   Angle2 : 28.00 deg
Barrier height            :   7.30 m
Barrier receiver distance : 200.00 / 200.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 4: 417WB_(ctr) (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
```

```
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 4: 417WB_(ctr) (day/night)
-----------------------------------------------
Angle1   Angle2           :   3.00 deg   30.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 305.00 / 305.00 m
Receiver height           :  18.30 / 18.30  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :   6.00 deg   Angle2 : 28.00 deg
Barrier height            :   7.30 m
Barrier receiver distance : 200.00 / 200.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 5: 417EB_(east) (day/night)
-------------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 5: 417EB_(east) (day/night)
-----------------------------------------------
Angle1   Angle2           :  30.00 deg   75.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 268.00 / 268.00 m
Receiver height           :  18.30 / 18.30  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  30.00 deg   Angle2 : 45.00 deg
Barrier height            :   7.30 m
```

```
Barrier receiver distance : 200.00 / 200.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 6: 417WB_(east) (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 6: 417WB_(east) (day/night)
----------------------------------------------
Angle1   Angle2           :  30.00 deg   75.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 305.00 / 305.00 m
Receiver height           :  18.30 / 18.30  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  30.00 deg   Angle2 : 45.00 deg
Barrier height            :   7.30 m
Barrier receiver distance : 200.00 / 200.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Result summary (day)
--------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+----------+----------+----------
 1.417EB_(west)     !     1.50 !    62.86 !    62.86
 2.417WB_(west)     !     1.50 !    62.48 !    62.48
 3.417EB_(ctr)      !     1.50 !    56.51 !    56.51
 4.417WB_(ctr)      !     1.50 !    56.54 !    56.54
 5.417EB_(east)     !     1.50 !    61.62 !    61.62
 6.417WB_(east)     !     1.50 !    61.17 !    61.17
--------------------+----------+----------+----------
                      Total                  68.67 dBA
```

Result summary (night)
---

| | source height (m) | Road Leq (dBA) | Total Leq (dBA) |
|---|---|---|---|
| 1.417EB_(west) | 1.49 | 55.26 | 55.26 |
| 2.417WB_(west) | 1.49 | 54.88 | 54.88 |
| 3.417EB_(ctr) | 1.49 | 48.91 | 48.91 |
| 4.417WB_(ctr) | 1.49 | 48.94 | 48.94 |
| 5.417EB_(east) | 1.49 | 54.02 | 54.02 |
| 6.417WB_(east) | 1.49 | 53.57 | 53.57 |
| Total | | | 61.07 dBA |

TOTAL Leq FROM ALL SOURCES (DAY): 68.67
(NIGHT): 61.07

STAMSON 5.0 SUMMARY REPORT Date: 14-02-2023 11:33:00
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 46fn_p4.te Time Period: Day/Night 16/8 hours
Description: **Sound level prediction at POR4.**

Road data, segment # 1: 417EB_(west) (day/night)
---
Car traffic volume : 59370/5163 veh/TimePeriod *
Medium truck volume : 4723/411 veh/TimePeriod *
Heavy truck volume : 3373/293 veh/TimePeriod *
Posted speed limit : 100 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 73332
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: 417EB_(west) (day/night)
---
Angle1 Angle2 : -83.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 268.00 / 268.00 m
Receiver height : 18.30 / 18.30 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -46.00 deg Angle2 : -9.00 deg
Barrier height : 15.20 m
Barrier receiver distance : 130.00 / 130.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Road data, segment # 2: 417WB_(west) (day/night)
---
Car traffic volume : 59370/5163 veh/TimePeriod *
Medium truck volume : 4723/411 veh/TimePeriod *
Heavy truck volume : 3373/293 veh/TimePeriod *
Posted speed limit : 100 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 73332
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

```
Data for Segment # 2: 417WB_(west) (day/night)
-----------------------------------------------
Angle1   Angle2           : -83.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 305.00 / 305.00 m
Receiver height           :  18.30 / 18.30  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -46.00 deg   Angle2 : -9.00 deg
Barrier height            :  15.20 m
Barrier receiver distance : 130.00 / 130.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 3: 417EB_(ctr) (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: 417EB_(ctr) (day/night)
-----------------------------------------------
Angle1   Angle2           :   0.00 deg   27.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 268.00 / 268.00 m
Receiver height           :  18.30 / 18.30  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :   0.00 deg   Angle2 : 23.00 deg
Barrier height            :   7.30 m
Barrier receiver distance : 200.00 / 200.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 4: 417WB_(ctr) (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
```

```
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 4: 417WB_(ctr) (day/night)
-----------------------------------------------
Angle1   Angle2           :   0.00 deg   27.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 305.00 / 305.00 m
Receiver height           :  18.30 / 18.30  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :   0.00 deg   Angle2 : 23.00 deg
Barrier height            :   7.30 m
Barrier receiver distance : 200.00 / 200.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 5: 417EB_(east) (day/night)
-------------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 5: 417EB_(east) (day/night)
-----------------------------------------------
Angle1   Angle2           :  27.00 deg   75.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 268.00 / 268.00 m
Receiver height           :  18.30 / 18.30  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  27.00 deg   Angle2 : 43.00 deg
Barrier height            :   7.30 m
```

```
Barrier receiver distance : 200.00 / 200.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 6: 417WB_(east) (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 6: 417WB_(east) (day/night)
----------------------------------------------
Angle1   Angle2           :  27.00 deg   75.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 305.00 / 305.00 m
Receiver height           :  18.30 / 18.30  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  27.00 deg   Angle2 : 43.00 deg
Barrier height            :   7.30 m
Barrier receiver distance : 200.00 / 200.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Result summary (day)
--------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+----------+----------+----------
 1.417EB_(west)     !     1.50 !    63.26 !    63.26
 2.417WB_(west)     !     1.50 !    62.84 !    62.84
 3.417EB_(ctr)      !     1.50 !    56.17 !    56.17
 4.417WB_(ctr)      !     1.50 !    56.28 !    56.28
 5.417EB_(east)     !     1.50 !    61.90 !    61.90
 6.417WB_(east)     !     1.50 !    61.45 !    61.45
--------------------+----------+----------+----------
                      Total                  68.93 dBA
```

Result summary (night)
---

| | source height (m) | Road Leq (dBA) | Total Leq (dBA) |
|---|---|---|---|
| 1.417EB_(west) | 1.49 | 55.67 | 55.67 |
| 2.417WB_(west) | 1.49 | 55.24 | 55.24 |
| 3.417EB_(ctr) | 1.49 | 48.57 | 48.57 |
| 4.417WB_(ctr) | 1.49 | 48.68 | 48.68 |
| 5.417EB_(east) | 1.49 | 54.30 | 54.30 |
| 6.417WB_(east) | 1.49 | 53.85 | 53.85 |
| Total | | | 61.34 dBA |

TOTAL Leq FROM ALL SOURCES (DAY): 68.93
(NIGHT): 61.34

STAMSON 5.0 SUMMARY REPORT Date: 14-02-2023 11:54:36
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 46fn_p5.te Time Period: Day/Night 16/8 hours
Description: **Sound level prediction at POR5.**

Road data, segment # 1: 417EB_(west) (day/night)
---
Car traffic volume : 59370/5163 veh/TimePeriod *
Medium truck volume : 4723/411 veh/TimePeriod *
Heavy truck volume : 3373/293 veh/TimePeriod *
Posted speed limit : 100 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 73332
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: 417EB_(west) (day/night)
---
Angle1 Angle2 : -83.00 deg -9.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 272.00 / 272.00 m
Receiver height : 18.30 / 18.30 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -51.00 deg Angle2 : -21.00 deg
Barrier height : 15.20 m
Barrier receiver distance : 134.00 / 134.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Road data, segment # 2: 417WB_(west) (day/night)
---
Car traffic volume : 59370/5163 veh/TimePeriod *
Medium truck volume : 4723/411 veh/TimePeriod *
Heavy truck volume : 3373/293 veh/TimePeriod *
Posted speed limit : 100 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 73332
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

```
Data for Segment # 2: 417WB_(west) (day/night)
----------------------------------------------
Angle1   Angle2           : -83.00 deg   -9.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 309.00 / 309.00 m
Receiver height           :  18.30 / 18.30  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -51.00 deg   Angle2 : -21.00 deg
Barrier height            :  15.20 m
Barrier receiver distance : 134.00 / 134.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 3: 417EB_(ctr) (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: 417EB_(ctr) (day/night)
---------------------------------------------
Angle1   Angle2           :  -9.00 deg   19.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 272.00 / 272.00 m
Receiver height           :  18.30 / 18.30  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  -9.00 deg   Angle2 : 14.00 deg
Barrier height            :   7.30 m
Barrier receiver distance : 204.00 / 204.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 4: 417WB_(ctr) (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
```

```
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 4: 417WB_(ctr) (day/night)
-------------------------------------------
Angle1   Angle2           :  -9.00 deg   19.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 309.00 / 309.00 m
Receiver height           :  18.30 / 18.30  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  -9.00 deg   Angle2 : 14.00 deg
Barrier height            :   7.30 m
Barrier receiver distance : 204.00 / 204.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 5: 417EB_(east) (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 5: 417EB_(east) (day/night)
-----------------------------------------------
Angle1   Angle2           :  19.00 deg   75.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 272.00 / 272.00 m
Receiver height           :  18.30 / 18.30  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  19.00 deg   Angle2 : 38.00 deg
Barrier height            :   7.30 m
```

```
Barrier receiver distance : 204.00 / 204.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 6: 417WB_(east) (day/night)
-----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 6: 417WB_(east) (day/night)
----------------------------------------------
Angle1   Angle2           :  19.00 deg   75.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 309.00 / 309.00 m
Receiver height           :  18.30 / 18.30  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  19.00 deg   Angle2 : 38.00 deg
Barrier height            :   7.30 m
Barrier receiver distance : 204.00 / 204.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Result summary (day)
--------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+----------+----------+----------
 1.417EB_(west)     !     1.50 !    62.97 !    62.97
 2.417WB_(west)     !     1.50 !    62.54 !    62.54
 3.417EB_(ctr)      !     1.50 !    56.48 !    56.48
 4.417WB_(ctr)      !     1.50 !    56.59 !    56.59
 5.417EB_(east)     !     1.50 !    62.46 !    62.46
 6.417WB_(east)     !     1.50 !    62.04 !    62.04
--------------------+----------+----------+----------
                      Total                  69.05 dBA
```

Result summary (night)
---

| | source height (m) | Road Leq (dBA) | Total Leq (dBA) |
|---|---|---|---|
| 1.417EB_(west) | 1.49 | 55.37 | 55.37 |
| 2.417WB_(west) | 1.49 | 54.94 | 54.94 |
| 3.417EB_(ctr) | 1.49 | 48.88 | 48.88 |
| 4.417WB_(ctr) | 1.49 | 49.00 | 49.00 |
| 5.417EB_(east) | 1.49 | 54.86 | 54.86 |
| 6.417WB_(east) | 1.49 | 54.44 | 54.44 |
| Total | | | 61.45 dBA |

TOTAL Leq FROM ALL SOURCES (DAY): 69.05
(NIGHT): 61.45