# Noise Assessment Report - 29 Robinson Avenue

Project # 160401428

Prepared for:
Robinson Village II Limited Partnership

Prepared by:
Stantec Consulting Ltd.

August 26, 2019

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# 1.0 INTRODUCTION

## 1.1 PURPOSE OF REPORT

Stantec Consulting Ltd. has been retained by Robinson Village II Limited Partnership to prepare an environmental noise assessment for the proposed 4 storey building with a basement floor at 29 Robinson Avenue, located in the City of Ottawa. A site plan control application is being prepared and a Noise Assessment Study is required to address City policies regarding residential development adjacent to a 400-series highway.

The purpose of this report is to:

- outline the Ministry's guidelines and criteria for noise levels and residential land use;
- apply the noise level standards of the Ontario Ministry of the Environment, Conservation and Parks NPC-300 to the site in conjunction with the City of Ottawa document "Environmental Noise Control Guidelines" dated January 2016;
- determine the extent to which noise level contours will be of concern to future residents/institutional users of the proposed development, using the computerized version (STAMSON 5.03) of the MECP's noise model;
- outline recommendations for noise attenuation, as necessary, to achieve acceptable noise levels for future residents of the proposed development.

## 1.2 LOCATION

The proposed development consists of 46 units and the site is located along the northern section of Robinson Avenue, north of Hurdman Road. The proposed site is illustrated in **Figure 1**. This report will focus on the rooms with exposure to the Highway 417.

Surrounding land uses are as follows:

- north – existing park and residential;
- east – existing residential;
- south – existing residential;
- west – existing residential.

The main potential noise source that may impact the subject site is vehicular traffic along the Highway 417. The traffic volumes for these roadways are based on the City of Ottawa document "Environmental Noise Control Guidelines".

Additional noise sources considered for assessment in this report were the Hurdman Bus Station, the Ottawa Train Station, and the City of Ottawa municipal work yard. It was found that the Hurdman Bus Station falls outside of the required 300m distance from the proposed site set out by the City of Ottawa Environmental Noise Control Guidelines and was not assessed in this report. The railway alignment for the Lees Train Station is within 300m from the site, however, the alignment at that point has an obstructive grade differential due to its crossing under the 417 highway (as well as obstruction by the Lees interchange crossing over the 417) and was therefore not considered as a potential noise source. Lastly, the Ottawa municipal work yard, despite falling within the required 300m distance, has an anticipated use that was not deemed to be a stationary noise concern due to lack of an existing noise ECA, and work yard development taking place after existing residential buildings in proximity to the site, implying no significant changes to anticipated noise levels beyond background urban hum (as well as being shielded by existing residences to the south).

**Figure 1 29 Robinson Avenue Development**

# 2.0 NOISE LEVEL CRITERIA

## 2.1 GUIDELINES

The Ontario Ministry of the Environment, Conservation and Parks (MECP) has produced guidelines for noise levels for use in noise assessment and land use planning. Noise level criteria for residential land use are summarized in **Table 1** below. Noise levels in excess of the guidelines presented are acceptable under certain conditions and with certain provisions.

### Table 1 Noise Criteria for Residential Land Use

| Location | 7 a.m. - 11 p.m. | 11 p.m. - 7 a.m. |
|---|---|---|
| Outdoor Living Areas | 55 dBA | N/A |
| Indoor Living Areas | 55 dBA at plane of living room windows | 50 dBA at plane of bedroom windows |

**Table 2** and **Table 3** set out the required provisions to allow residential activity in locations where noise level criteria exceedances prior to mitigation are expected.

## Table 2 Combination of Road and Rail Noise Day-Time Outdoor, Ventilation and Warning Clause Requirements

| Location | Leq (16 hr) (dBA) | Ventilation Requirements | Outdoor Control Measures | Warning Clause |
|---|---|---|---|---|
| Outdoor Living Area | Leq16hr less than or equal to 55 dBA | N/A | None required | Not required |
| | Leq16hr greater than 55 dBA to less than or equal to 60 dBA | N/A | Control measures (barriers) may not be required but should be considered | Required if resultant Leq exceeds 55 dBA **Clause GO** |
| | Leq16hr greater than 60 dBA | N/A | Control measures (barriers) required to reduce the Leq to below 60 dBA and as close to 55 dBA as technically, economically and administratively feasible | Required if resultant Leq exceeds 60 dBA **Clause MO** |
| Plane of Living Room Window | Leq16hr less than or equal to 55 dBA | None required | N/A | Not required |
| | Leq16hr greater than 55 dBA to less than or equal to 65 dBA | Forced air heating with provision for central air conditioning | N/A | Required **Clause GI** |
| | Leq16hr greater than 65 dBA | Central air conditioning | N/A | Required **Clause MI** |

(Source: Ministry of the Environment Conservation and Parks, Environmental Noise Guideline – Stationary and Transportation Sources- Approval and Planning – Publication NPC-300, August 2013 and City of Ottawa, Environmental Noise Control Guidelines, January 2016)

## Table 3 Combination of Road and Rail Noise, Night-Time Ventilation and Warning Clause Requirements

| Location | Leq (8 hr) (dBA) | Ventilation Requirements | Outdoor Control Measures | Warning Clause |
|---|---|---|---|---|
| Plane of Bedroom Window | Leq8hr greater than 50 dBA to less or equal to 60 dBA | Forced air heating with provision for central air conditioning | N/A | Required **Clause GI** |
| | Leq8hr greater than 60 dBA | Central air conditioning | N/A | Required **Clause MI** |

(Source: Ministry of the Environment Conservation and Parks, Environmental Noise Guideline – Stationary and Transportation Sources- Approval and Planning – Publication NPC-300, August 2013 and City of Ottawa, Environmental Noise Control Guidelines, January 2016)

The MECP also specifies building component requirements when indoor noise levels exceed the criteria by certain levels. These requirements are summarized in **Table 4**.

## Table 4 Road and Rail Noise – Building Component Requirements

| Location | | Leq (16 hr) (dBA) | Building Component Requirements |
|---|---|---|---|
| Plane of Living Room Window – Daytime | Road | Less than or equal to 65 dBA | Building compliant with the Ontario Building Code |
| | | Greater than 65 dBA | Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria |
| | Rail | Less than or equal to 60 dBA | Building compliant with the Ontario Building Code |
| | | Greater than 60 dBA | Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria |
| Plane of Bedroom Window - Nighttime | Road | Less than or equal to 60 dBA | Building compliant with the Ontario Building Code |
| | | Greater than 60 dBA | Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria |
| | Rail | Less than or equal to 55 dBA | Building compliant with the Ontario Building Code |
| | | Greater than 55 dBA | Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria |

(Source: Ministry of the Environment Conservation and Parks, Environmental Noise Guideline - Stationary and Transportation Sources- Approval and Planning - Publication NPC-300, August 2013 and City of Ottawa, Environmental Noise Control Guidelines, January 2016)

# 3.0 OBSERVATIONS AND CALCULATIONS

## 3.1 NOISE LEVEL PREDICTIONS

Noise predictions in this report were completed using the computerized version (STAMSON 5.03) of the MECP noise model ORNAMENT to calculate noise levels from various sources. The program accepts variables related to noise sources and receivers, road traffic volumes, and the nature and extent of noise mitigation features, if required.

## 3.2 ROAD TRAFFIC VOLUMES

Traffic volume data for Highway 417 was provided by the City of Ottawa document "Environmental Noise Control Guidelines" dated January 2016. The document indicates that the average annual daily traffic volume for Highway 417 will be 18,333 vehicles per lane per day for a 4-lane eastbound and 4-lane westbound highway. Additional information regarding applicable assumptions and ratios for day/night traffic and car/ truck traffic is summarized as follows:

- heavy truck traffic for this segment is estimated to be 5% of total traffic volume;
- medium truck traffic for this segment is estimated to be 7% of total traffic volume; the rest is assumed to be car traffic;
- daytime (7 am – 11 pm) traffic is assumed to be 92%, with the remaining 8% at night (11 pm – 7 am); and
- the speed limit for Highway 417 is 100 km/hr

**Table 5** summarizes the traffic volumes used for calculations in this report.

**Table 5 Traffic Volumes, 4-Lane Eastbound Highway**

| | Day | Night | Total |
|---|---|---|---|
| Car | 59,370 | 5,163 | 64,532 |
| Medium Truck | 4,723 | 411 | 5,133 |
| Heavy Truck | 3,373 | 293 | 3,667 |
| TOTAL | 67,465 | 5,867 | 73,332 |
| Speed Limit | 100 km/h | | |
| Gradient | 1% | | |
| Surface | Asphalt | | |

**Table 6 Traffic Volumes, 4-Lane Westbound Highway**

| | Day | Night | Total |
|---|---|---|---|
| Car | 59,370 | 5,163 | 64,532 |
| Medium Truck | 4,723 | 411 | 5,133 |
| Heavy Truck | 3,373 | 293 | 3,667 |
| TOTAL | 67,465 | 5,867 | 73,332 |
| Speed Limit | 100 km/h | | |
| Gradient | 1% | | |
| Surface | Asphalt | | |

## 3.3 PROJECTED NOISE LEVELS

Using the MECP noise model ORNAMENT, noise levels were calculated for daytime and nighttime conditions at the point representing the anticipated building location based on the site plan prepared by Figurr Architects. The resulting receiver sites are illustrated in **Figure 2** and **Figure 3**.

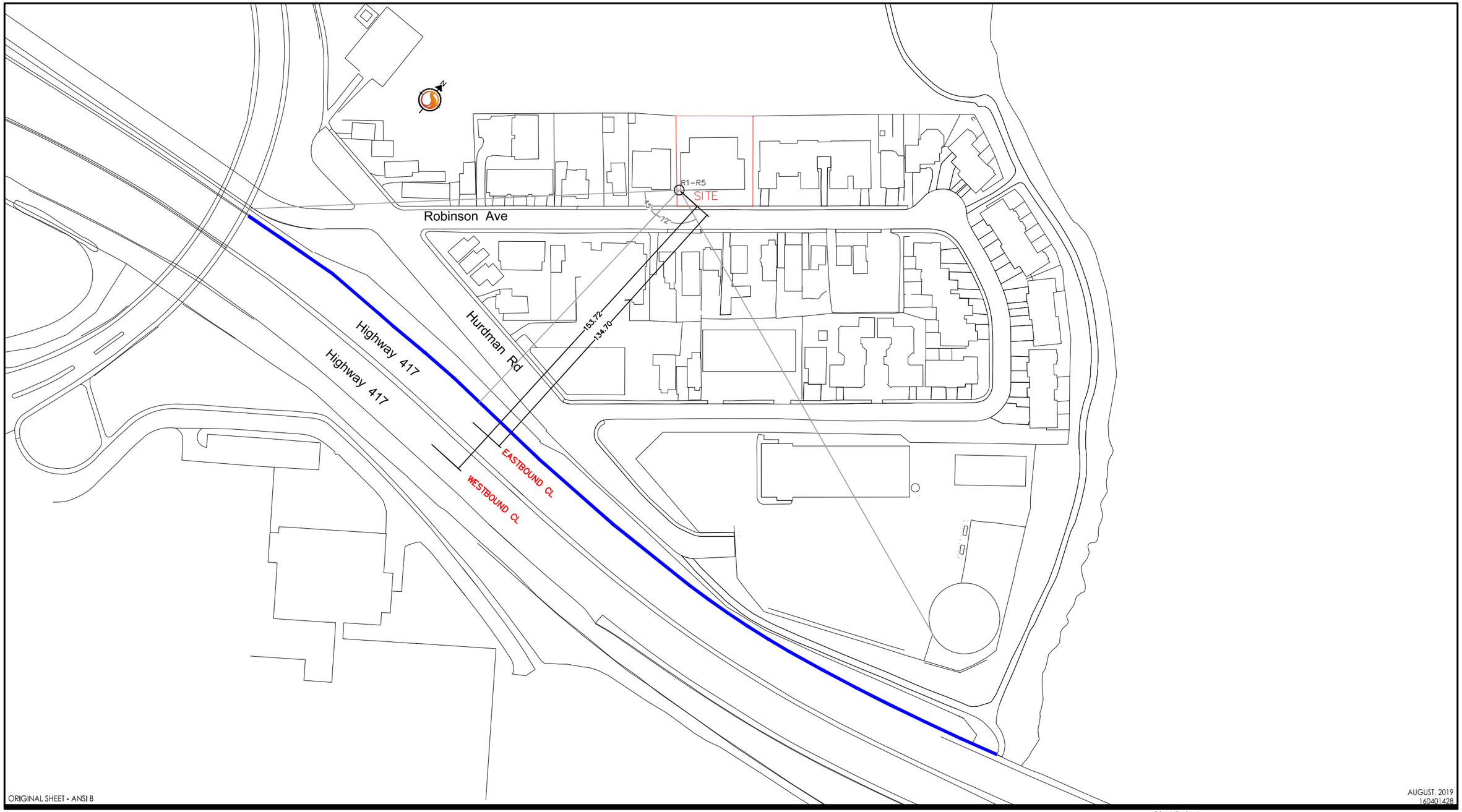
The receiver heights for indoor, daytime, and nighttime noise level calculations for the proposed buildings were assessed at the mid-height of each floor. Building elevation drawings are provided in **Appendix B** as well as the floor plans indicating the receiver locations.

Upon assessing the developments noise exposure to the Highway 417 it was found that the embankment conceals the development from noise west of the Robinson Avenue overpass, and the Hurdman Yard garage and the greenspace along the Rideau River shield the development east of the river. However, such impacts were adjusted for the receiver on the third to fourth floors of the building based on the varying heights of the adjacent row of housing. The difference in the noise levels at each floor height is reflected in **Table 7**.

The unattenuated receiver noise levels have been summarized in **Table 7,** and noise level calculations are provided in **Appendix A** for sound levels at daytime and nighttime building face.

## Table 7 Summary of Projected Unattenuated Noise Levels

| Receiver Site | Location | Elevation (m) | Daytime-Building Face (dBA) | Nighttime-Building Face (dBA) | Outdoor Amenity Area (dBA) |
|---|---|---|---|---|---|
| R1 | South Building Face – Basement Floor | 0 | 55.3 | 47.7 | - |
| R2 | South Building Face – 1st Floor | 4 | 56.5 | 48.9 | - |
| R3 | South Building Face – 2nd Floor | 6.8 | 57.6 | 54.3 | - |
| R4 | South Building Face – 3rd Floor | 9.6 | 60.8 | 53.2 | - |
| R5 | South Building Face – 4th Floor | 12.4 | 63.4 | 55.8 | |
| ROUT | Outdoor Amenity Area | 1.5 | - | - | 52.5 |
| RROOF | Rooftop Amenity Area | 15.2 | - | - | 64.6 |

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AUGUST, 2019
160401428

Stantec

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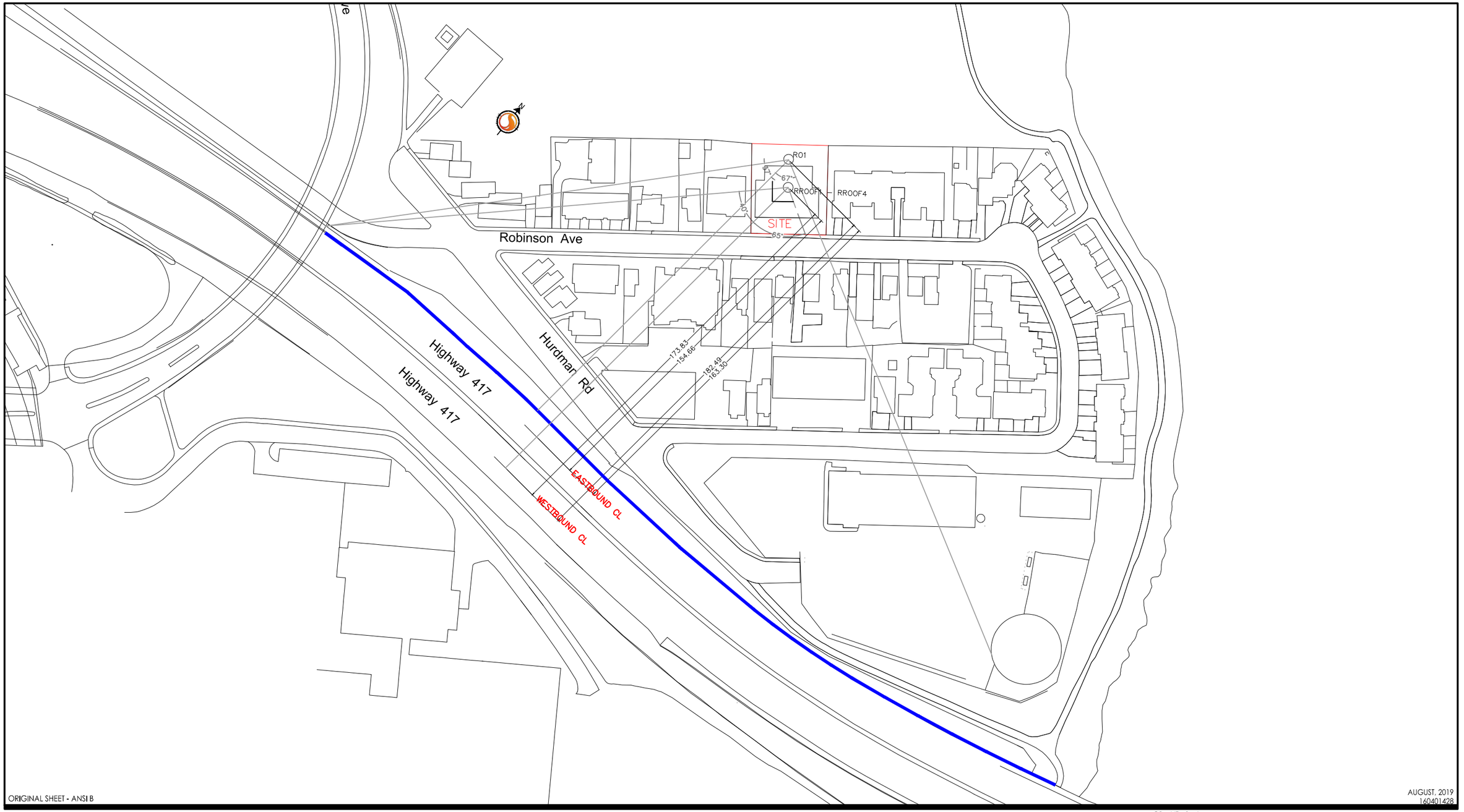
— EXISTING NOISE WALL–5m

Client/Project
ROBINSON VILLAGE II LIMITED PARTNERSHIP
29 ROBINSON AVENUE
NOISE ASSESSMENT REPORT

Figure No.
2.0

Title
INDOOR RECEIVERS
PLAN VIEW

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— **PROPOSED NOISE WALL–1.5m**

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29 ROBINSON AVENUE
NOISE ASSESSMENT REPORT

Figure No.
3.0

Title
OUTDOOR RECEIVER
PLAN VIEW

# 4.0 CONCLUSIONS AND RECOMMENDATIONS

## 4.1 OUTDOOR NOISE IMPACTS

Predicted noise levels lie within City of Ottawa and MECP criteria at the outdoor living area for the potential building with exposure to Highway 417.

The predicted noise level for the outdoor ground floor amenity area located at the rear of the proposed building is 52.5 dBA. This falls within the accepted City of Ottawa and MECP criteria noise level standards and therefore there are no additional measures required for outdoor noise mitigation.

A sensitivity analysis was conducted for the rooftop amenity area with the intent to reduce the resulting noise levels to below the 55dBA threshold via noise walls with a minimum surface density of 20kg/m². The rooftop terrace would require noise barriers with heights above 2.5m to attenuate noise levels in the OLA to 55dBA, and reduction of noise levels to 60 dBA is unachievable at the 2.5m maximum wall height. Due to limitations in the STAMSON software which only allows one barrier to be modeled, the existing 5.0m noise barrier along Highway 417 was not included in this model scenario.

Three noise wall heights surrounding the terrace were modeled to compare the anticipated attenuated noise level. A summary of the attenuated noise generated can be found in **Table 8**. A noise barrier of 1.5 m is currently proposed to mitigate the outdoor noise levels on the rooftop to provide noise reduction beyond background levels.

**Table 8 Summary of Projected Attenuated Outdoor Living Area Noise Levels**

| Receiver | Unattenuated Noise Level (dBA) | Noise Wall Height (m) | Attenuated Noise Level (dBA) | Δ Noise Level (dBA) |
|---|---|---|---|---|
| **RROOF2** | **64.6** | 1.5 | **62.8** | 1.8 |
| **RROOF3** | **64.6** | 2 | **61.9** | 2.7 |
| **RROOF4** | **64.6** | 2.5 | **61.1** | 3.5 |

## 4.2 INDOOR NOISE IMPACTS

Predicted noise levels are above City of Ottawa and MECP criteria at the daytime building face and the nighttime building face for potential units with exposure to the Highway 417.

The following summarizes the measures required by the City of Ottawa and MECP criteria for the development to occur within accepted standards:

- Based on the predicted noise levels proposed all units within 29 Robinson Avenue fall under the noise warning clause Generic Indoor Noise Mitigation (GI) that requires the provision for a central air conditioning system to be installed.

- On all offers of purchase for units with noise warning clause GI, the following information is required to be disclosed:

    - "Installation of central air conditioning will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the City of Ottawa and the Ministry of the Environment Conservation and Parks."

Noise warning clauses are provided in **Appendix C**.

The consideration of these measures will allow the residential development to proceed in accordance with City of Ottawa's planning approval process and form the basis for meeting the City of Ottawa's and MECP criteria with respect to environmental noise.

Respectfully submitted by:

Cameron Odam

Engineering Intern

Dustin Thiffault, P.Eng.,

Project Engineer

# Appendix A NOISE LEVEL CALCULATIONS

# A.1 INDOOR RECEIVER STAMSON REPORTS

STAMSON 5.0 NORMAL REPORT Date: 26-08-2019 13:39:52
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r1.te Time Period: Day/Night 16/8 hours
Description: R1 Indoor Receiver

Road data, segment # 1: East 417 (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 : 1 %
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: East 417 (day/night)
---
Angle1 Angle2 : -45.00 deg 72.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 2
House density : 90 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 134.70 / 134.70 m
Receiver height : 0.00 / 0.00 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -45.00 deg Angle2 : 72.00 deg
Barrier height : 5.00 m
Barrier receiver distance : 126.42 / 126.42 m
Source elevation : 60.20 m
Receiver elevation : 59.79 m
Barrier elevation : 60.00 m
Reference angle : 0.00

Road data, segment # 2: West 417 (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 : 1 %
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: West 417 (day/night)
---
Angle1 Angle2 : -45.00 deg 72.00 deg
Wood depth : 0 (No woods.)
No of house rows : 2 / 2
House density : 90 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 153.72 / 153.72 m
Receiver height : 0.00 / 0.00 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -45.00 deg Angle2 : 72.00 deg
Barrier height : 5.00 m
Barrier receiver distance : 126.42 / 126.42 m
Source elevation : 60.20 m
Receiver elevation : 59.79 m
Barrier elevation : 60.00 m
Reference angle : 0.00

Results segment # 1: East 417 (day)
---

Source height = 1.50 m

Barrier height for grazing incidence
---
| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.50 | 0.00 | 1.58 | 61.58 |

ROAD (0.00 + 50.67 + 0.00) = 50.67 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.66 | 81.40 | 0.00 | -15.82 | -2.50 | 0.00 | -7.33 | 0.00 | 55.75 |
| -45 | 72 | 0.41 | 81.40 | 0.00 | -13.39 | -2.27 | 0.00 | 0.00 | -15.06 | 50.67 |

Segment Leq : 50.67 dBA

Results segment # 2: West 417 (day)
---

Source height = 1.50 m

Barrier height for grazing incidence
---
| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.50 | 0.00 | 1.36 | 61.36 |

ROAD (0.00 + 53.39 + 0.00) = 53.39 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.66 | 81.40 | 0.00 | -16.78 | -2.50 | 0.00 | -8.73 | 0.00 | 53.39 |
| -45 | 72 | 0.41 | 81.40 | 0.00 | -14.20 | -2.27 | 0.00 | 0.00 | -11.47 | 53.46 |

Segment Leq : 53.39 dBA

Total Leq All Segments: 55.25 dBA

Results segment # 1: East 417 (night)
---

Source height = 1.49 m

Barrier height for grazing incidence
---
| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.49 | 0.00 | 1.58 | 61.58 |

ROAD (0.00 + 43.07 + 0.00) = 43.07 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.66 | 73.80 | 0.00 | -15.82 | -2.50 | 0.00 | -8.83 | 0.00 | 46.65 |
| -45 | 72 | 0.41 | 73.80 | 0.00 | -13.39 | -2.27 | 0.00 | 0.00 | -15.06 | 43.07 |

Segment Leq : 43.07 dBA

Results segment # 2: West 417 (night)
---

Source height = 1.49 m

Barrier height for grazing incidence
---
| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.49 | 0.00 | 1.36 | 61.36 |

ROAD (0.00 + 45.79 + 0.00) = 45.79 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.66 | 73.80 | 0.00 | -16.78 | -2.50 | 0.00 | -8.73 | 0.00 | 45.79 |
| -45 | 72 | 0.41 | 73.80 | 0.00 | -14.20 | -2.27 | 0.00 | 0.00 | -11.47 | 45.86 |

Segment Leq : 45.79 dBA

Total Leq All Segments: 47.65 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.25
(NIGHT): 47.65

STAMSON 5.0 NORMAL REPORT Date: 26-08-2019 13:41:35
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r2.te Time Period: Day/Night 16/8 hours
Description: R2 Indoor Receiver

Road data, segment # 1: East 417 (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 : 1 %
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: East 417 (day/night)
---
Angle1 Angle2 : -45.00 deg 72.00 deg
Wood depth : 0 (No woods.)
No of house rows : 2 / 2
House density : 90 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 134.70 / 134.70 m
Receiver height : 4.00 / 4.00 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -45.00 deg Angle2 : 72.00 deg
Barrier height : 5.00 m
Barrier receiver distance : 126.42 / 126.42 m
Source elevation : 60.20 m
Receiver elevation : 59.79 m
Barrier elevation : 60.00 m
Reference angle : 0.00

Road data, segment # 2: West 417 (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 : 1 %
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: West 417 (day/night)
---
Angle1 Angle2 : -45.00 deg 72.00 deg
Wood depth : 0 (No woods.)
No of house rows : 2 / 2
House density : 90 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 153.72 / 153.72 m
Receiver height : 4.00 / 4.00 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -45.00 deg Angle2 : 72.00 deg
Barrier height : 5.00 m
Barrier receiver distance : 126.42 / 126.42 m
Source elevation : 60.20 m
Receiver elevation : 59.79 m
Barrier elevation : 60.00 m
Reference angle : 0.00

Results segment # 1: East 417 (day)
---

Source height = 1.50 m

Barrier height for grazing incidence
---
| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.50 | 4.00 | 1.82 | 61.82 |

ROAD (0.00 + 52.57 + 0.00) = 52.57 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.59 | 81.40 | 0.00 | -15.11 | -2.43 | 0.00 | -8.83 | 0.00 | 55.03 |
| -45 | 72 | 0.29 | 81.40 | 0.00 | -12.25 | -2.16 | 0.00 | 0.00 | -14.42 | 52.57 |

Segment Leq : 52.57 dBA

Results segment # 2: West 417 (day)
---

Source height = 1.50 m

Barrier height for grazing incidence
---
| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.50 | 4.00 | 2.07 | 62.07 |

ROAD (0.00 + 54.21 + 0.00) = 54.21 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.59 | 81.40 | 0.00 | -16.02 | -2.43 | 0.00 | -8.73 | 0.00 | 54.21 |
| -45 | 72 | 0.29 | 81.40 | 0.00 | -12.99 | -2.16 | 0.00 | 0.00 | -9.97 | 56.28 |

Segment Leq : 54.21 dBA

Total Leq All Segments: 56.48 dBA

Results segment # 1: East 417 (night)
---

Source height = 1.49 m

Barrier height for grazing incidence
---
| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.49 | 4.00 | 1.82 | 61.82 |

ROAD (0.00 + 44.97 + 0.00) = 44.97 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.59 | 73.80 | 0.00 | -15.11 | -2.43 | 0.00 | -8.83 | 0.00 | 47.43 |
| -45 | 72 | 0.29 | 73.80 | 0.00 | -12.25 | -2.16 | 0.00 | 0.00 | -14.42 | 44.97 |

Segment Leq : 44.97 dBA

Results segment # 2: West 417 (night)
---

Source height = 1.49 m

Barrier height for grazing incidence
---
| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.49 | 4.00 | 2.07 | 62.07 |

ROAD (0.00 + 46.61 + 0.00) = 46.61 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.59 | 73.80 | 0.00 | -16.02 | -2.43 | 0.00 | -8.73 | 0.00 | 46.61 |
| -45 | 72 | 0.29 | 73.80 | 0.00 | -12.99 | -2.16 | 0.00 | 0.00 | -9.97 | 48.68 |

Segment Leq : 46.61 dBA

Total Leq All Segments: 48.88 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 56.48
(NIGHT): 48.88

STAMSON 5.0 NORMAL REPORT Date: 23-08-2019 14:51:43
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R3.te Time Period: Day/Night 16/8 hours
Description: R3 INDOOR RECEIVER

Road data, segment # 1: East 417 (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 : 1 %
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: East 417 (day/night)
---
Angle1 Angle2 : -45.00 deg 72.00 deg
Wood depth : 0 (No woods.)
No of house rows : 2 / 2
House density : 90 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 134.70 / 134.70 m
Receiver height : 6.80 / 6.80 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -45.00 deg Angle2 : 72.00 deg
Barrier height : 5.00 m
Barrier receiver distance : 126.42 / 126.42 m
Source elevation : 60.20 m
Receiver elevation : 59.79 m
Barrier elevation : 60.00 m
Reference angle : 0.00

Road data, segment # 2: West 417 (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 : 1 %
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: West 417 (day/night)
---
Angle1 Angle2 : -45.00 deg 72.00 deg
Wood depth : 0 (No woods.)
No of house rows : 2 / 2
House density : 90 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 153.72 / 153.72 m
Receiver height : 6.80 / 6.80 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -45.00 deg Angle2 : 72.00 deg
Barrier height : 5.00 m
Barrier receiver distance : 126.42 / 126.42 m
Source elevation : 60.20 m
Receiver elevation : 59.79 m
Barrier elevation : 60.00 m
Reference angle : 0.00

Results segment # 1: East 417 (day)
---

Source height = 1.50 m

Barrier height for grazing incidence
---
| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.50 | 6.80 | 2.00 | 62.00 |

ROAD (0.00 + 53.93 + 0.00) = 53.93 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.50 | 81.40 | 0.00 | -14.31 | -2.36 | 0.00 | -8.83 | 0.00 | 55.90 |
| -45 | 72 | 0.20 | 81.40 | 0.00 | -11.45 | -2.08 | 0.00 | 0.00 | -13.94 | 53.93 |

Segment Leq : 53.93 dBA

Results segment # 2: West 417 (day)
---

Source height = 1.50 m

Barrier height for grazing incidence
---
| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.50 | 6.80 | 2.56 | 62.56 |

ROAD (0.00 + 55.14 + 0.00) = 55.14 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.50 | 81.40 | 0.00 | -15.17 | -2.36 | 0.00 | -8.73 | 0.00 | 55.14 |
| -45 | 72 | 0.20 | 81.40 | 0.00 | -12.14 | -2.08 | 0.00 | 0.00 | -8.87 | 58.32 |

Segment Leq : 55.14 dBA

Total Leq All Segments: 57.59 dBA

Results segment # 1: East 417 (night)
---

Source height = 1.49 m

Barrier height for grazing incidence
---
| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.49 | 6.80 | 2.00 | 62.00 |

ROAD (0.00 + 46.33 + 0.00) = 46.33 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.50 | 73.80 | 0.00 | -14.31 | -2.36 | 0.00 | -8.83 | 0.00 | 48.30 |
| -45 | 72 | 0.20 | 73.80 | 0.00 | -11.45 | -2.08 | 0.00 | 0.00 | -13.94 | 46.33 |

Segment Leq : 46.33 dBA

Results segment # 2: West 417 (night)
---

Source height = 1.49 m

Barrier height for grazing incidence
---
| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.49 | 6.80 | 2.56 | 62.56 |

ROAD (0.00 + 47.54 + 0.00) = 47.54 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.50 | 73.80 | 0.00 | -15.17 | -2.36 | 0.00 | -8.73 | 0.00 | 47.54 |
| -45 | 72 | 0.20 | 73.80 | 0.00 | -12.14 | -2.08 | 0.00 | 0.00 | -8.87 | 50.72 |

Segment Leq : 47.54 dBA

Total Leq All Segments: 49.99 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 57.59
(NIGHT): 49.99

STAMSON 5.0 NORMAL REPORT Date: 26-08-2019 14:09:47
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R4.te Time Period: Day/Night 16/8 hours
Description: R4 INDOOR RECEIVER

Road data, segment # 1: East 417 (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 : 1 %
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: East 417 (day/night)
---
Angle1 Angle2 : -45.00 deg 72.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 1
House density : 80 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 134.70 / 134.70 m
Receiver height : 9.60 / 9.60 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -45.00 deg Angle2 : 72.00 deg
Barrier height : 5.00 m
Barrier receiver distance : 126.42 / 126.42 m
Source elevation : 60.20 m
Receiver elevation : 59.79 m
Barrier elevation : 60.00 m
Reference angle : 0.00

Road data, segment # 2: West 417 (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 : 1 %
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: West 417 (day/night)
---
Angle1 Angle2 : -45.00 deg 72.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 1
House density : 80 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 153.72 / 153.72 m
Receiver height : 9.60 / 9.60 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -45.00 deg Angle2 : 72.00 deg
Barrier height : 5.00 m
Barrier receiver distance : 126.42 / 126.42 m
Source elevation : 60.20 m
Receiver elevation : 59.79 m
Barrier elevation : 60.00 m
Reference angle : 0.00

Results segment # 1: East 417 (day)
---

Source height = 1.50 m

Barrier height for grazing incidence
---

| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.50 | 9.60 | 2.17 | 62.17 |

ROAD (0.00 + 55.32 + 0.00) = 55.32 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.42 | 81.40 | 0.00 | -13.51 | -2.28 | 0.00 | -5.56 | 0.00 | 60.04 |
| -45 | 72 | 0.12 | 81.40 | 0.00 | -10.65 | -1.99 | 0.00 | 0.00 | -13.44 | 55.32 |

Segment Leq : 55.32 dBA

Results segment # 2: West 417 (day)
---

Source height = 1.50 m

Barrier height for grazing incidence
---
| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.50 | 9.60 | 3.06 | 63.06 |

ROAD (0.00 + 59.28 + 0.00) = 59.28 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.42 | 81.40 | 0.00 | -14.32 | -2.28 | 0.00 | -5.52 | 0.00 | 59.28 |
| -45 | 72 | 0.12 | 81.40 | 0.00 | -11.29 | -1.99 | 0.00 | 0.00 | -7.75 | 60.37 |

Segment Leq : 59.28 dBA

Total Leq All Segments: 60.75 dBA

Results segment # 1: East 417 (night)
---

Source height = 1.49 m

Barrier height for grazing incidence
---
| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.49 | 9.60 | 2.17 | 62.17 |

ROAD (0.00 + 47.72 + 0.00) = 47.72 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.42 | 73.80 | 0.00 | -13.51 | -2.28 | 0.00 | -5.56 | 0.00 | 52.44 |
| -45 | 72 | 0.12 | 73.80 | 0.00 | -10.65 | -1.99 | 0.00 | 0.00 | -13.44 | 47.72 |

Segment Leq : 47.72 dBA

Results segment # 2: West 417 (night)
---

Source height = 1.49 m

Barrier height for grazing incidence
---
| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.49 | 9.60 | 3.06 | 63.06 |

ROAD (0.00 + 51.68 + 0.00) = 51.68 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.42 | 73.80 | 0.00 | -14.32 | -2.28 | 0.00 | -5.52 | 0.00 | 51.68 |
| -45 | 72 | 0.12 | 73.80 | 0.00 | -11.29 | -1.99 | 0.00 | 0.00 | -7.75 | 52.77 |

Segment Leq : 51.68 dBA

Total Leq All Segments: 53.15 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.75
(NIGHT): 53.15

STAMSON 5.0 NORMAL REPORT Date: 26-08-2019 14:06:37
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R5.te Time Period: Day/Night 16/8 hours
Description: R5 INDOOR RECEIVER

Road data, segment # 1: East 417 (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 : 1 %
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: East 417 (day/night)
---
Angle1 Angle2 : -45.00 deg 72.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 134.70 / 134.70 m
Receiver height : 12.40 / 12.40 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -45.00 deg Angle2 : 72.00 deg
Barrier height : 5.00 m
Barrier receiver distance : 126.42 / 126.42 m
Source elevation : 60.20 m
Receiver elevation : 59.79 m
Barrier elevation : 60.00 m
Reference angle : 0.00

Road data, segment # 2: West 417 (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 : 1 %
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: West 417 (day/night)
---
Angle1 Angle2 : -45.00 deg 72.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 153.72 / 153.72 m
Receiver height : 12.40 / 12.40 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -45.00 deg Angle2 : 72.00 deg
Barrier height : 5.00 m
Barrier receiver distance : 126.42 / 126.42 m
Source elevation : 60.20 m
Receiver elevation : 59.79 m
Barrier elevation : 60.00 m
Reference angle : 0.00

Results segment # 1: East 417 (day)
---

Source height = 1.50 m

Barrier height for grazing incidence
---
| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.50 | 12.40 | 2.34 | 62.34 |

ROAD (0.00 + 56.73 + 0.00) = 56.73 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.03 | 81.40 | 0.00 | -9.85 | -1.91 | 0.00 | 0.00 | -12.92 | 56.73 |

Segment Leq : 56.73 dBA

Results segment # 2: West 417 (day)
---

Source height = 1.50 m

Barrier height for grazing incidence
---

| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.50 | 12.40 | 3.56 | 63.56 |

ROAD (0.00 + 62.37 + 0.00) = 62.37 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.03 | 81.40 | 0.00 | -10.44 | -1.91 | 0.00 | 0.00 | -6.68 | 62.37 |

Segment Leq : 62.37 dBA

Total Leq All Segments: 63.42 dBA

Results segment # 1: East 417 (night)
---

Source height = 1.49 m

Barrier height for grazing incidence
---

| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.49 | 12.40 | 2.34 | 62.34 |

ROAD (0.00 + 49.13 + 0.00) = 49.13 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.03 | 73.80 | 0.00 | -9.85 | -1.91 | 0.00 | 0.00 | -12.92 | 49.13 |

Segment Leq : 49.13 dBA

Results segment # 2: West 417 (night)
---

Source height = 1.49 m

Barrier height for grazing incidence
---

| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.49 | 12.40 | 3.56 | 63.56 |

ROAD (0.00 + 54.77 + 0.00) = 54.77 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.03 | 73.80 | 0.00 | -10.44 | -1.91 | 0.00 | 0.00 | -6.68 | 54.77 |

Segment Leq : 54.77 dBA

Total Leq All Segments: 55.82 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.42
(NIGHT): 55.82

# A.2 OUTDOOR RECEIVER STAMSON REPORT

STAMSON 5.0 NORMAL REPORT Date: 23-08-2019 14:56:17
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: RO1.te Time Period: Day/Night 16/8 hours
Description: RO1 OUTDOOR RECEIVER

Road data, segment # 1: East 417 (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 : 1 %
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: East 417 (day/night)
---
Angle1 Angle2 : -37.00 deg 67.00 deg
Wood depth : 0 (No woods.)
No of house rows : 3 / 3
House density : 95 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 163.30 / 163.30 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -37.00 deg Angle2 : 67.00 deg
Barrier height : 5.00 m
Barrier receiver distance : 154.91 / 154.91 m
Source elevation : 60.20 m
Receiver elevation : 59.70 m
Barrier elevation : 60.00 m
Reference angle : 0.00

Road data, segment # 2: West 417 (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 : 1 %
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: West 417 (day/night)
---
Angle1 Angle2 : -37.00 deg 67.00 deg
Wood depth : 0 (No woods.)
No of house rows : 3 / 3
House density : 95 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 182.49 / 182.49 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -37.00 deg Angle2 : 67.00 deg
Barrier height : 5.00 m
Barrier receiver distance : 154.91 / 154.91 m
Source elevation : 60.20 m
Receiver elevation : 59.70 m
Barrier elevation : 60.00 m
Reference angle : 0.00

Results segment # 1: East 417 (day)
---

Source height = 1.50 m

Barrier height for grazing incidence
---
| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.50 | 1.50 | 1.67 | 61.67 |

ROAD (0.00 + 49.66 + 0.00) = 49.66 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -37 | 67 | 0.66 | 81.40 | 0.00 | -17.21 | -2.91 | 0.00 | -11.31 | 0.00 | 49.96 |
| -37 | 67 | 0.36 | 81.40 | 0.00 | -14.10 | -2.68 | 0.00 | 0.00 | -14.95 | 49.66 |

Segment Leq : 49.66 dBA

```
Results segment # 2: West 417 (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 !        1.62 !        61.62

ROAD (0.00 + 49.29 + 0.00) = 49.29 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -37     67   0.66  81.40   0.00 -18.01  -2.91   0.00 -11.18   0.00
49.29
   -37     67   0.36  81.40   0.00 -14.76  -2.68   0.00   0.00 -10.95
53.01
-------------------------------------------------------------------------
---

Segment Leq : 49.29 dBA

Total Leq All Segments: 52.49 dBA


Results segment # 1: East 417 (night)
-----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
-----------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !        1.50 !        1.67 !        61.67

ROAD (0.00 + 42.06 + 0.00) = 42.06 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -37     67   0.66  73.80   0.00 -17.21  -2.91   0.00 -11.31   0.00
42.37
   -37     67   0.36  73.80   0.00 -14.10  -2.68   0.00   0.00 -14.95
42.06
-------------------------------------------------------------------------
---

Segment Leq : 42.06 dBA


Results segment # 2: West 417 (night)
-----------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
-----------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !        1.50 !        1.62 !        61.62

ROAD (0.00 + 41.69 + 0.00) = 41.69 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -37     67   0.66  73.80   0.00 -18.01  -2.91   0.00 -11.18   0.00
41.69
   -37     67   0.36  73.80   0.00 -14.76  -2.68   0.00   0.00 -10.95
45.41
-------------------------------------------------------------------------
---

Segment Leq : 41.69 dBA

Total Leq All Segments: 44.89 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 52.49
                           (NIGHT): 44.89
```

STAMSON 5.0 NORMAL REPORT Date: 26-08-2019 14:49:17
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: RROOF1.te Time Period: Day/Night 16/8 hours
Description: ROOF RECEIVER UNATTENUATED

Road data, segment # 1: East 417 (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 : 1 %
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: East 417 (day/night)
---
Angle1 Angle2 : -45.00 deg 72.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 134.70 / 134.70 m
Receiver height : 15.20 / 12.40 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -45.00 deg Angle2 : 72.00 deg
Barrier height : 5.00 m
Barrier receiver distance : 126.42 / 126.42 m
Source elevation : 60.20 m
Receiver elevation : 59.79 m
Barrier elevation : 60.00 m
Reference angle : 0.00

Road data, segment # 2: West 417 (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 : 1 %
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: West 417 (day/night)
---
Angle1 Angle2 : -45.00 deg 72.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 153.72 / 153.72 m
Receiver height : 15.20 / 12.40 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -45.00 deg Angle2 : 72.00 deg
Barrier height : 5.00 m
Barrier receiver distance : 126.42 / 126.42 m
Source elevation : 60.20 m
Receiver elevation : 59.79 m
Barrier elevation : 60.00 m
Reference angle : 0.00

Results segment # 1: East 417 (day)
---

Source height = 1.50 m

Barrier height for grazing incidence
---
| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.50 | 15.20 | 2.51 | 62.51 |

ROAD (0.00 + 57.63 + 0.00) = 57.63 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.00 | 81.40 | 0.00 | -9.53 | -1.87 | 0.00 | 0.00 | -12.37 | 57.63 |

Segment Leq : 57.63 dBA

Results segment # 2: West 417 (day)
---

Source height = 1.50 m

Barrier height for grazing incidence
---

| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.50 | 15.20 | 4.06 | 64.06 |

ROAD (0.00 + 63.64 + 0.00) = 63.64 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.00 | 81.40 | 0.00 | -10.11 | -1.87 | 0.00 | 0.00 | -5.78 | 63.64 |

Segment Leq : 63.64 dBA

Total Leq All Segments: 64.61 dBA

Results segment # 1: East 417 (night)
---

Source height = 1.49 m

Barrier height for grazing incidence
---

| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.49 | 12.40 | 2.34 | 62.34 |

ROAD (0.00 + 49.13 + 0.00) = 49.13 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.03 | 73.80 | 0.00 | -9.85 | -1.91 | 0.00 | 0.00 | -12.92 | 49.13 |

Segment Leq : 49.13 dBA

Results segment # 2: West 417 (night)
---

Source height = 1.49 m

Barrier height for grazing incidence
---

| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.49 | 12.40 | 3.56 | 63.56 |

ROAD (0.00 + 54.77 + 0.00) = 54.77 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.03 | 73.80 | 0.00 | -10.44 | -1.91 | 0.00 | 0.00 | -6.68 | 54.77 |

Segment Leq : 54.77 dBA

Total Leq All Segments: 55.82 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 64.61
(NIGHT): 55.82

STAMSON 5.0 NORMAL REPORT Date: 26-08-2019 15:08:45
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: RROOF2.te Time Period: Day/Night 16/8 hours
Description: ROOF2 RECEIVER ATTENUATED

Road data, segment # 1: East 417 (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 : 1 %
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: East 417 (day/night)
---
Angle1 Angle2 : -45.00 deg 72.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 134.70 / 134.70 m
Receiver height : 15.20 / 12.40 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -45.00 deg Angle2 : 72.00 deg
Barrier height : 5.00 m
Barrier receiver distance : 126.42 / 126.42 m
Source elevation : 60.20 m
Receiver elevation : 59.79 m
Barrier elevation : 60.00 m
Reference angle : 0.00

Road data, segment # 2: West 417 (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 : 1 %
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: West 417 (day/night)
---
Angle1 Angle2 : -45.00 deg 72.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 153.72 / 153.72 m
Receiver height : 1.50 / 12.40 m
Topography : 4 (Elevated; with barrier)
Barrier angle1 : -45.00 deg Angle2 : 72.00 deg
Barrier height : 1.50 m
Elevation : 13.80 m
Barrier receiver distance : 9.25 / 9.25 m
Source elevation : 60.20 m
Receiver elevation : 73.59 m
Barrier elevation : 73.59 m
Reference angle : 0.00

Results segment # 1: East 417 (day)
---

Source height = 1.50 m

Barrier height for grazing incidence
---
| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.50 | 15.20 | 2.51 | 62.51 |

ROAD (0.00 + 57.63 + 0.00) = 57.63 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.00 | 81.40 | 0.00 | -9.53 | -1.87 | 0.00 | 0.00 | -12.37 | 57.63 |

Segment Leq : 57.63 dBA

Results segment # 2: West 417 (day)
---

Source height = 1.50 m

Barrier height for grazing incidence
---

| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.50 | 1.50 | 0.69 | 74.28 |

ROAD (0.00 + 61.28 + 0.00) = 61.28 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.16 | 81.40 | 0.00 | -11.68 | -2.03 | 0.00 | 0.00 | -6.40 | 61.28 |

Segment Leq : 61.28 dBA

Total Leq All Segments: 62.84 dBA

Results segment # 1: East 417 (night)
---

Source height = 1.49 m

Barrier height for grazing incidence
---

| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.49 | 12.40 | 2.34 | 62.34 |

ROAD (0.00 + 49.13 + 0.00) = 49.13 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.03 | 73.80 | 0.00 | -9.85 | -1.91 | 0.00 | 0.00 | -12.92 | 49.13 |

Segment Leq : 49.13 dBA

Results segment # 2: West 417 (night)
---

Source height = 1.49 m

Barrier height for grazing incidence
---

| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.49 | 12.40 | 10.94 | 84.53 |

ROAD (0.00 + 61.82 + 0.00) = 61.82 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.00 | 73.80 | 0.00 | -10.11 | -1.87 | 0.00 | 0.00 | 0.00 | 61.82* |
| -45 | 72 | 0.00 | 73.80 | 0.00 | -10.11 | -1.87 | 0.00 | 0.00 | 0.00 | 61.82 |

* Bright Zone !

Segment Leq : 61.82 dBA

Total Leq All Segments: 62.05 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 62.84
(NIGHT): 62.05

STAMSON 5.0 NORMAL REPORT Date: 26-08-2019 15:11:01
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: RROOF3.te Time Period: Day/Night 16/8 hours
Description: ROOF3 RECEIVER ATTENUATED

Road data, segment # 1: East 417 (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 : 1 %
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: East 417 (day/night)
---
Angle1 Angle2 : -45.00 deg 72.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 134.70 / 134.70 m
Receiver height : 15.20 / 12.40 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -45.00 deg Angle2 : 72.00 deg
Barrier height : 5.00 m
Barrier receiver distance : 126.42 / 126.42 m
Source elevation : 60.20 m
Receiver elevation : 59.79 m
Barrier elevation : 60.00 m
Reference angle : 0.00

Road data, segment # 2: West 417 (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 : 1 %
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: West 417 (day/night)
---
Angle1 Angle2 : -45.00 deg 72.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 153.72 / 153.72 m
Receiver height : 1.50 / 12.40 m
Topography : 4 (Elevated; with barrier)
Barrier angle1 : -45.00 deg Angle2 : 72.00 deg
Barrier height : 2.00 m
Elevation : 13.80 m
Barrier receiver distance : 9.25 / 9.25 m
Source elevation : 60.20 m
Receiver elevation : 73.59 m
Barrier elevation : 73.59 m
Reference angle : 0.00

Results segment # 1: East 417 (day)
---

Source height = 1.50 m

Barrier height for grazing incidence
---
| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.50 | 15.20 | 2.51 | 62.51 |

ROAD (0.00 + 57.63 + 0.00) = 57.63 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.00 | 81.40 | 0.00 | -9.53 | -1.87 | 0.00 | 0.00 | -12.37 | 57.63 |

Segment Leq : 57.63 dBA

Results segment # 2: West 417 (day)
---

Source height = 1.50 m

Barrier height for grazing incidence
---

| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.50 | 1.50 | 0.69 | 74.28 |

ROAD (0.00 + 59.90 + 0.00) = 59.90 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.13 | 81.40 | 0.00 | -11.38 | -2.00 | 0.00 | 0.00 | -8.11 | 59.90 |

Segment Leq : 59.90 dBA

Total Leq All Segments: 61.92 dBA

Results segment # 1: East 417 (night)
---

Source height = 1.49 m

Barrier height for grazing incidence
---

| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.49 | 12.40 | 2.34 | 62.34 |

ROAD (0.00 + 49.13 + 0.00) = 49.13 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.03 | 73.80 | 0.00 | -9.85 | -1.91 | 0.00 | 0.00 | -12.92 | 49.13 |

Segment Leq : 49.13 dBA

Results segment # 2: West 417 (night)
---

Source height = 1.49 m

Barrier height for grazing incidence
---

| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.49 | 12.40 | 10.94 | 84.53 |

ROAD (0.00 + 61.82 + 0.00) = 61.82 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.00 | 73.80 | 0.00 | -10.11 | -1.87 | 0.00 | 0.00 | 0.00 | 61.82* |
| -45 | 72 | 0.00 | 73.80 | 0.00 | -10.11 | -1.87 | 0.00 | 0.00 | 0.00 | 61.82 |

* Bright Zone !

Segment Leq : 61.82 dBA

Total Leq All Segments: 62.05 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 61.92
(NIGHT): 62.05

STAMSON 5.0 NORMAL REPORT Date: 26-08-2019 15:12:54
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: RROOF4.te Time Period: Day/Night 16/8 hours
Description: ROOF4 RECEIVER ATTENUATED

Road data, segment # 1: East 417 (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 : 1 %
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: East 417 (day/night)
---
Angle1 Angle2 : -45.00 deg 72.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 134.70 / 134.70 m
Receiver height : 15.20 / 12.40 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -45.00 deg Angle2 : 72.00 deg
Barrier height : 5.00 m
Barrier receiver distance : 126.42 / 126.42 m
Source elevation : 60.20 m
Receiver elevation : 59.79 m
Barrier elevation : 60.00 m
Reference angle : 0.00

Road data, segment # 2: West 417 (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 : 1 %
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: West 417 (day/night)
---
Angle1 Angle2 : -45.00 deg 72.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 153.72 / 153.72 m
Receiver height : 1.50 / 12.40 m
Topography : 4 (Elevated; with barrier)
Barrier angle1 : -45.00 deg Angle2 : 72.00 deg
Barrier height : 2.50 m
Elevation : 13.80 m
Barrier receiver distance : 9.25 / 9.25 m
Source elevation : 60.20 m
Receiver elevation : 73.59 m
Barrier elevation : 73.59 m
Reference angle : 0.00

Results segment # 1: East 417 (day)
---

Source height = 1.50 m

Barrier height for grazing incidence
---
| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.50 | 15.20 | 2.51 | 62.51 |

ROAD (0.00 + 57.63 + 0.00) = 57.63 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.00 | 81.40 | 0.00 | -9.53 | -1.87 | 0.00 | 0.00 | -12.37 | 57.63 |

Segment Leq : 57.63 dBA

Results segment # 2: West 417 (day)
---

Source height = 1.50 m

Barrier height for grazing incidence
---

| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.50 | 1.50 | 0.69 | 74.28 |

ROAD (0.00 + 58.44 + 0.00) = 58.44 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.10 | 81.40 | 0.00 | -11.08 | -1.97 | 0.00 | 0.00 | -9.91 | 58.44 |

Segment Leq : 58.44 dBA

Total Leq All Segments: 61.06 dBA

Results segment # 1: East 417 (night)
---

Source height = 1.49 m

Barrier height for grazing incidence
---

| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.49 | 12.40 | 2.34 | 62.34 |

ROAD (0.00 + 49.13 + 0.00) = 49.13 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.03 | 73.80 | 0.00 | -9.85 | -1.91 | 0.00 | 0.00 | -12.92 | 49.13 |

Segment Leq : 49.13 dBA

Results segment # 2: West 417 (night)
---

Source height = 1.49 m

Barrier height for grazing incidence
---

| Source Height (m) | Receiver Height (m) | Barrier Height (m) | Elevation of Barrier Top (m) |
|---|---|---|---|
| 1.49 | 12.40 | 10.94 | 84.53 |

ROAD (0.00 + 61.82 + 0.00) = 61.82 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 72 | 0.00 | 73.80 | 0.00 | -10.11 | -1.87 | 0.00 | 0.00 | 0.00 | 61.82* |
| -45 | 72 | 0.00 | 73.80 | 0.00 | -10.11 | -1.87 | 0.00 | 0.00 | 0.00 | 61.82 |

* Bright Zone !

Segment Leq : 61.82 dBA

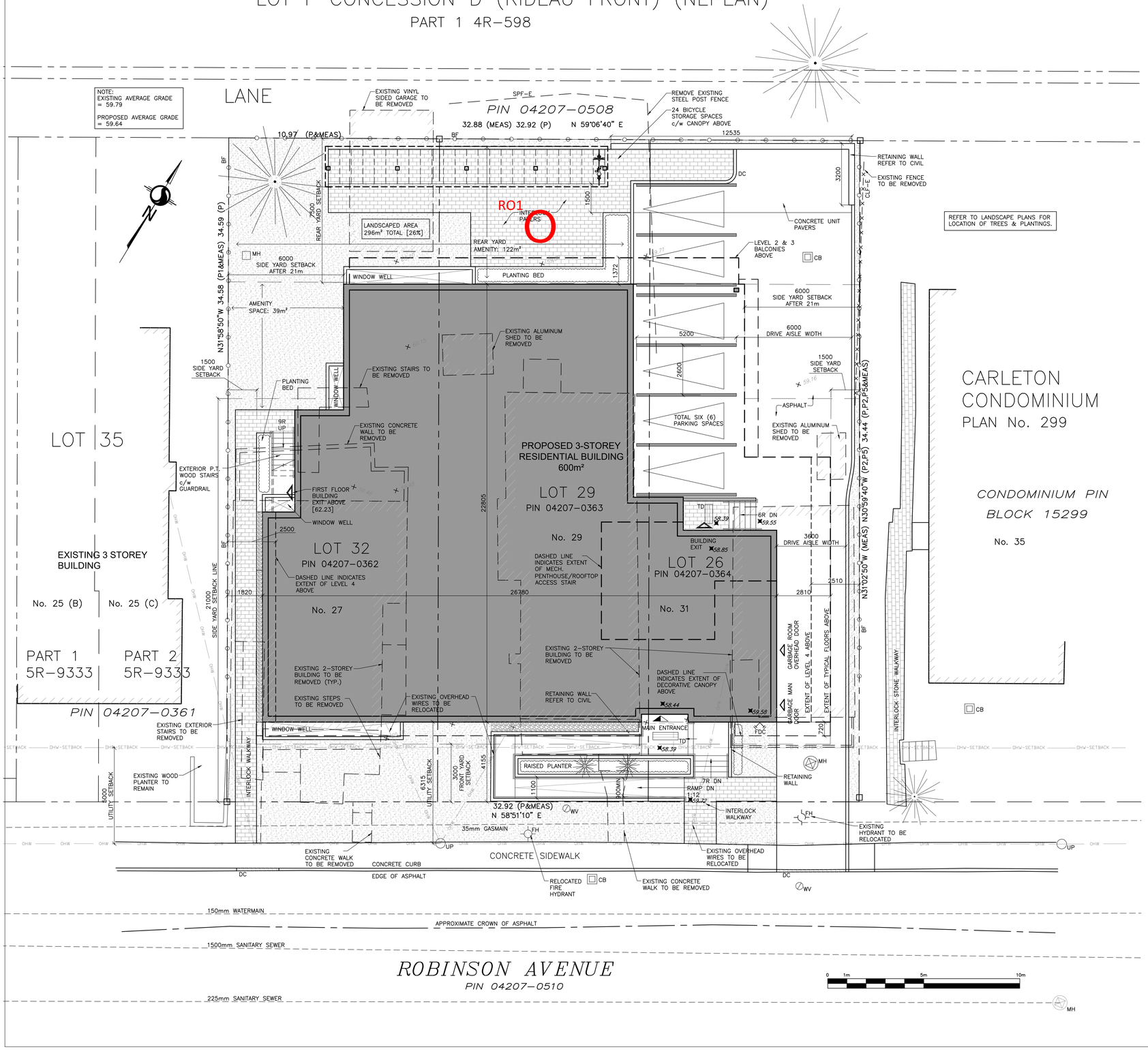
Total Leq All Segments: 62.05 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 61.06
(NIGHT): 62.05

# Appendix B SITE AND FLOOR PLANS

# LOT F CONCESSION D (RIDEAU FRONT) (NEPEAN)
## PART 1 4R–598

PROPERTY BOUNDARY INFORMATION DERIVED FROM SURVEY PLAN COMPLETED BY STANTEC GEOMATICS LTD. DATED APRIL 12, 2018.




REFER TO LANDSCAPE PLANS FOR LOCATION OF TREES & PLANTINGS.

CARLETON CONDOMINIUM
PLAN No. 299

CONDOMINIUM PIN
BLOCK 15299

No. 35

## KEY PLAN


## PROPERTY DESCRIPTION

| | |
|---|---|
| THREE STOREY RESIDENTIAL BUILDING | |
| CITY OF OTTAWA PIN NUMBER | 04207 0362, 0363, 0364 |
| MUNICIPAL ADDRESS | 29 Robinson Avenue |

## SITE INFORMATION

| | |
|---|---|
| LOT AREA: | 1,139m² |
| LOT FRONTAGE: | 32.92m |
| LOT DEPTH: | 34.59m |

## BUILDING INFORMATION

| | |
|---|---|
| BUILDING AREA: | 595m² |
| BUILDING FLOOR AREA: | 2,840m² |
| PROPOSED USE: | APARTMENT DWELLING, LOW-RISE |

UNIT BREAKDOWN:

| | | |
|---|---|---|
| BASEMENT: | 6 UNITS | 3- STUDIO, 1- 1 BD, 2- 2 BD |
| FIRST FLOOR: | 10 UNITS | 4- STUDIO, 2- 1 BD, 4- 2BD |
| SECOND FLOOR: | 10 UNITS | 4- STUDIO, 2- 1 BD, 4- 2BD |
| THIRD FLOOR: | 10 UNITS | 4- STUDIO, 2- 1 BD, 4- 2BD |
| FOURTH FLOOR: | 10 UNITS | 5- STUDIO, 1- 1BD, 4- 2BD |
| TOTAL: | 46 UNITS | 20- STUDIO, 8- 1 BD, 18- 2 BD |

| ZONING TABLE | R5K [2133] H(20) | |
|---|---|---|
| **CITY OF OTTAWA ZONING BY-LAW No. 2008-250** | REQUIRED | PROPOSED |
| MINIMUM LOT AREA | 450m² | 1,139m² |
| MINIMUM LOT WIDTH | 15m | 32.92m |
| FRONT YARD SETBACK | 3m | 4.76m |
| MINIMUM INTERIOR SIDE YARD SETBACK | within 21m of front lot line:<br><11m building height = 1.5m<br>>11m building height = 2.5m<br>greater than 21m from front lot line: 6m | 1.5m - Levels 1 to 3<br>2.5m - Level 4 |
| MINIMUM REAR YARD SETBACK | 7.5m | 7.5m |
| MAXIMUM BUILDING HEIGHT | 20m | 14m |
| MAXIMUM FLOOR SPACE INDEX | N/A | |
| LANDSCAPED AREA | 30% = 341.7m² | 26% = 296m² |
| VEHICLE PARKING REQUIREMENTS (AREA Y, SCHEDULE 1A) | 0 parking spaces for first 12 units<br>Table 101 - Dwelling low-rise apartment<br>0.5 per dwelling unit = 17 spaces | 3 SPACES |
| VISITOR PARKING REQUIREMENTS (AREA Y, SCHEDULE 1A) | 0.1 / DWELLING UNIT AFTER 12 UNITS<br>3.4 SPACES REQUIRED | 3 SPACES |
| AMENITY AREA REQUIREMENTS | 15m² per unit for the first 8 units = 120m²<br>6m² per dwelling unit in excess of 8 = 228m²<br>Total = 348m² | -122m² REAR YARD AMENITY<br>-49m² REAR SIDE YARD AMENITY [116m² SOFT LANDSCAPING (71%)]<br>-44m² INTERIOR AMENITY ROOM<br>-148m² ROOFTOP AMENITY<br>-83m² BALCONIES<br>TOTAL = 446m² |
| BICYCLE PARKING SPACES | 0.5 per dwelling unit = 23 | 24 |

## LEGEND

- SOFT LANDSCAPING
- UNIT PAVERS REFER TO LANDSCAPE
- ASPHALT PAVING
- CONCRETE
- RIVERSTONE REFER TO LANDSCAPE
- EXISTING BUILDING ELEMENT TO BE REMOVED
- EXISTING FENCE
- NEW BOARD FENCE REFER TO LANDSCAPE
- LOT LINE
- SETBACK LINE
- DESIGNATED BUILDING ENTRANCE / EXIT
- FH — FIRE HYDRANT. REFER TO CIVIL
- CB CB — CATCH BASIN
- MH — MANHOLE
- FD — FLOOR DRAIN
- UP — UTILITY POLE
- OHW — OVERHEAD UTILITY WIRES
- L.S. — LIGHT STANDARD
- DC — DEPRESSED CURB
- EXISTING TREE TO REMAIN (REFER TO LANDSCAPE DRAWINGS)
- NEW TREE (REFER TO LANDSCAPE DRAWINGS)
- NEW SHRUBS (REFER TO LANDSCAPE DRAWINGS)
- NEW EVERGREEN SHRUB (REFER TO LANDSCAPE DRAWINGS)
- 77.70 — EXISTING GROUND ELEVATION [TO DETERMINE EXISTING AVERAGE GRADE]
- 58.84 — NEW GROUND ELEVATION REFER TO CIVIL

NOTE: 'X'–E INDICATES EXISTING TO REMAIN

| No. | Date | Émis pour / Object |
|---|---|---|
| 1 | 2018–07–09 | COORDINATION |
| 2 | 2018–07–13 | COORDINATION |
| 3 | 2018–09–17 | COORDINATION |
| 4 | 2018–10–26 | SITE PLAN CONTROL |
| 5 | 2019–03–15 | COORDINATION |
| 6 | 2019–05–27 | COORDINATION |

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Ingénieur / Engineer (Structure / Structure )

Architecte/ Architect (paysagiste / Landscape)

Ingénieur / Engineer (Civil / Civil )

Stantec

Client / Client

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fig. 2
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*Contractor shall verify all information and dimensions on site and immediately report any errors or omissions to the architect.*

Projet / Project

# THREE STOREY APARTMENT BUILDING

29 Robinson Avenue, Ottawa ON

Titre / Title

## SITE PLAN

| | |
|---|---|
| Dessiné par / Drawn by: MD | No. projet / Project number: 1821 |
| Vérifié par / Verified by: RC | No. dessin / Drawing number: A105 |
| Échelle / Scale: *As indicated* | Révision / Revision: 5 |
| Date de création du dessin / Drawing creation date: 2018/05/01 | |

D07-12-18-0164

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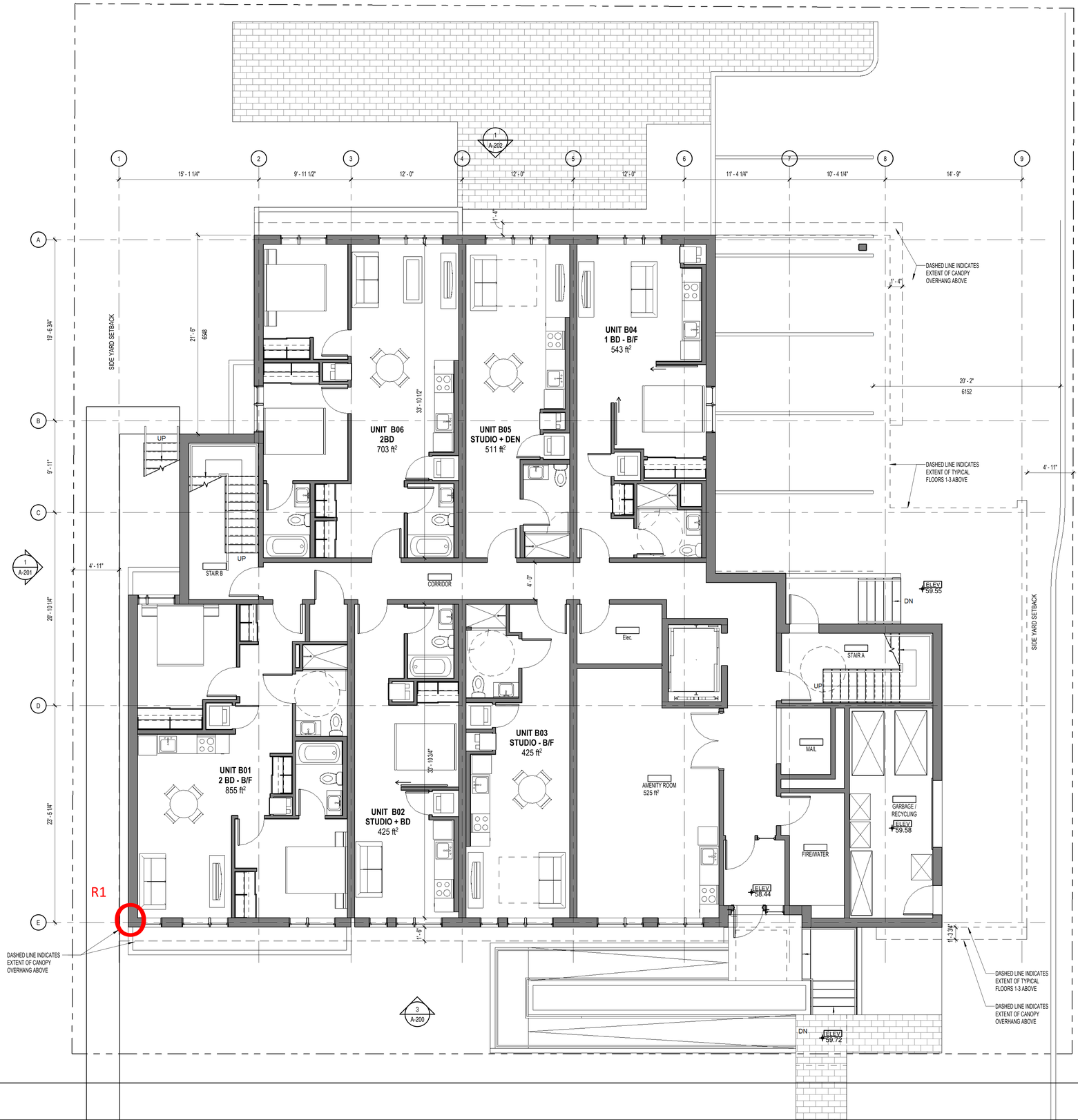


1 A-120 BASEMENT PLAN
3/16" = 1'-0"

| No. | Date | Émis pour / Object |
|---|---|---|
| 1 | 2018-05-28 | CLIENT REVIEW |
| 2 | 2018-09-18 | COORDINATION |
| 3 | 2018-10-26 | SITE PLAN CONTROL |

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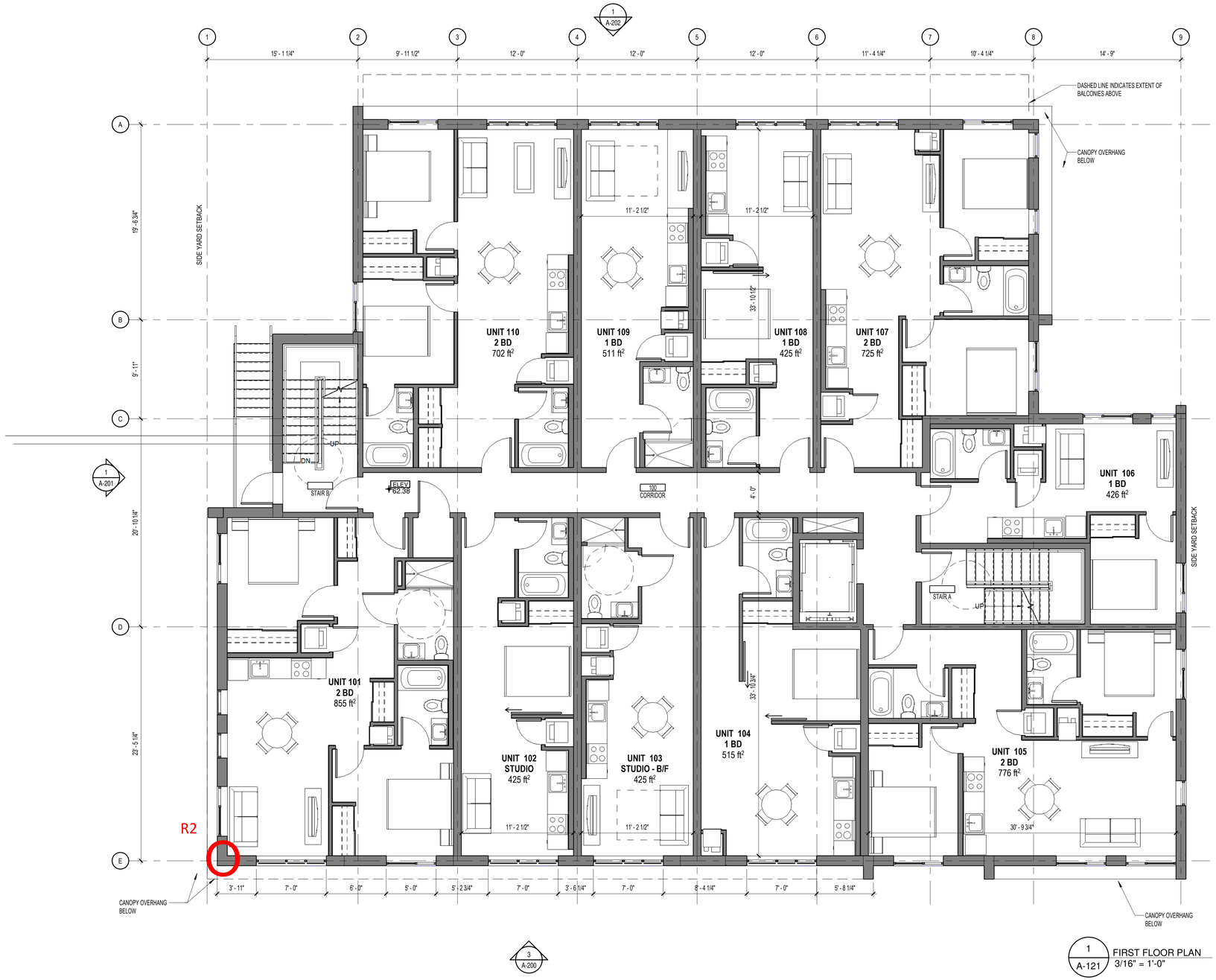
THREE STOREY APARTMENT BUILDING

29 Robinson Avenue, Ottawa, ON

*Titre / Title*

BASEMENT FLOOR PLAN

| | |
|---|---|
| Dessiné par / Drawn by: MD, LB, SB | No. projet / Project number: 1821 |
| Vérifié par / Verified by: RC | No. dessin / Drawing number: A-120 |
| Échelle / Scale: 3/16" = 1'-0" | Révision / Revision: 3 |
| Date de création du dessin / Drawing creation date: 02/11/10 | |




| No. | Date | Émis pour / Object |
|---|---|---|
| 1 | 2018-05-28 | CLIENT REVIEW |
| 2 | 2018-09-18 | COORDINATION |
| 3 | 2018-10-26 | SITE PLAN CONTROL |

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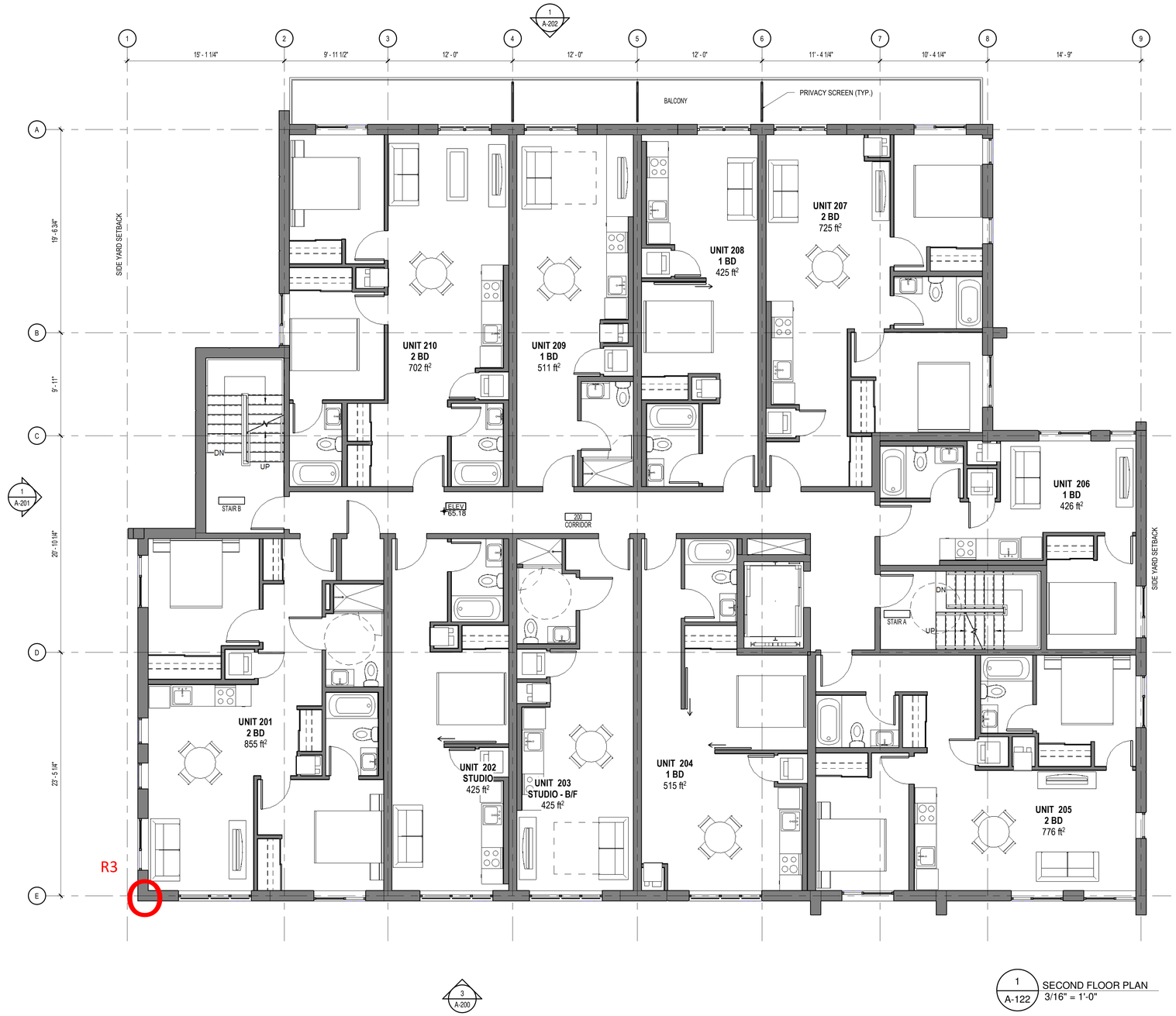
THREE STOREY APARTMENT BUILDING

29 Robinson Avenue, Ottawa, ON

*Titre / Title*

FIRST FLOOR PLAN

| | |
|---|---|
| Dessiné par / Drawn by: MD, LB, SB | No. projet / Project number: 1821 |
| Vérifié par / Verified by: RC | No. dessin / Drawing number: A-121 |
| Échelle / Scale: 3/16" = 1'-0" | Révision / Revision: 3 |
| Date de création du dessin / Drawing creation date: 01/09/12 | |




| No. | Date | Émis pour / Object |
|---|---|---|
| 2 | 2018-09-18 | COORDINATION |
| 3 | 2018-10-26 | SITE PLAN CONTROL |

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# THREE STOREY APARTMENT BUILDING

29 Robinson Avenue, Ottawa, ON

*Titre / Title*

## SECOND FLOOR PLAN

| | | |
|---|---|---|
| Dessiné par / Drawn by: MD, LB, SB | No. projet / Project number: 1821 | |
| Vérifié par / Verified by: RC | No. dessin / Drawing number | Révision / Revision: 3 |
| Échelle / Scale: 3/16" = 1'-0" | | |
| Date de création du dessin / Drawing creation date: 07/13/18 | A-122 | |


| No. | Date | Émis pour / Object |
|---|---|---|
| 2 | 2018-09-18 | COORDINATION |
| 3 | 2018-10-26 | SITE PLAN CONTROL |

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*(Structure / Structure)*

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THREE STOREY APARTMENT BUILDING

29 Robinson Avenue, Ottawa, ON

*Titre / Title*

THIRD FLOOR PLAN

| | |
|---|---|
| *Dessiné par / Drawn by* MD, LB, SB | *No. projet / Project number* 1821 |
| *Vérifié par / Verified by* RC | *No. dessin / Drawing number* A-123 |
| *Echelle / Scale* 3/16" = 1'-0" | *Révision / Revision* 3 |
| *Date de création du dessin / Drawing creation date* 04/04/18 | |


1 A-124 FOURTH FLOOR PLAN
3/16" = 1'-0"

| No. | Date | Émis pour / Object |
|---|---|---|
| 3 | 2018-10-26 | SITE PLAN CONTROL |

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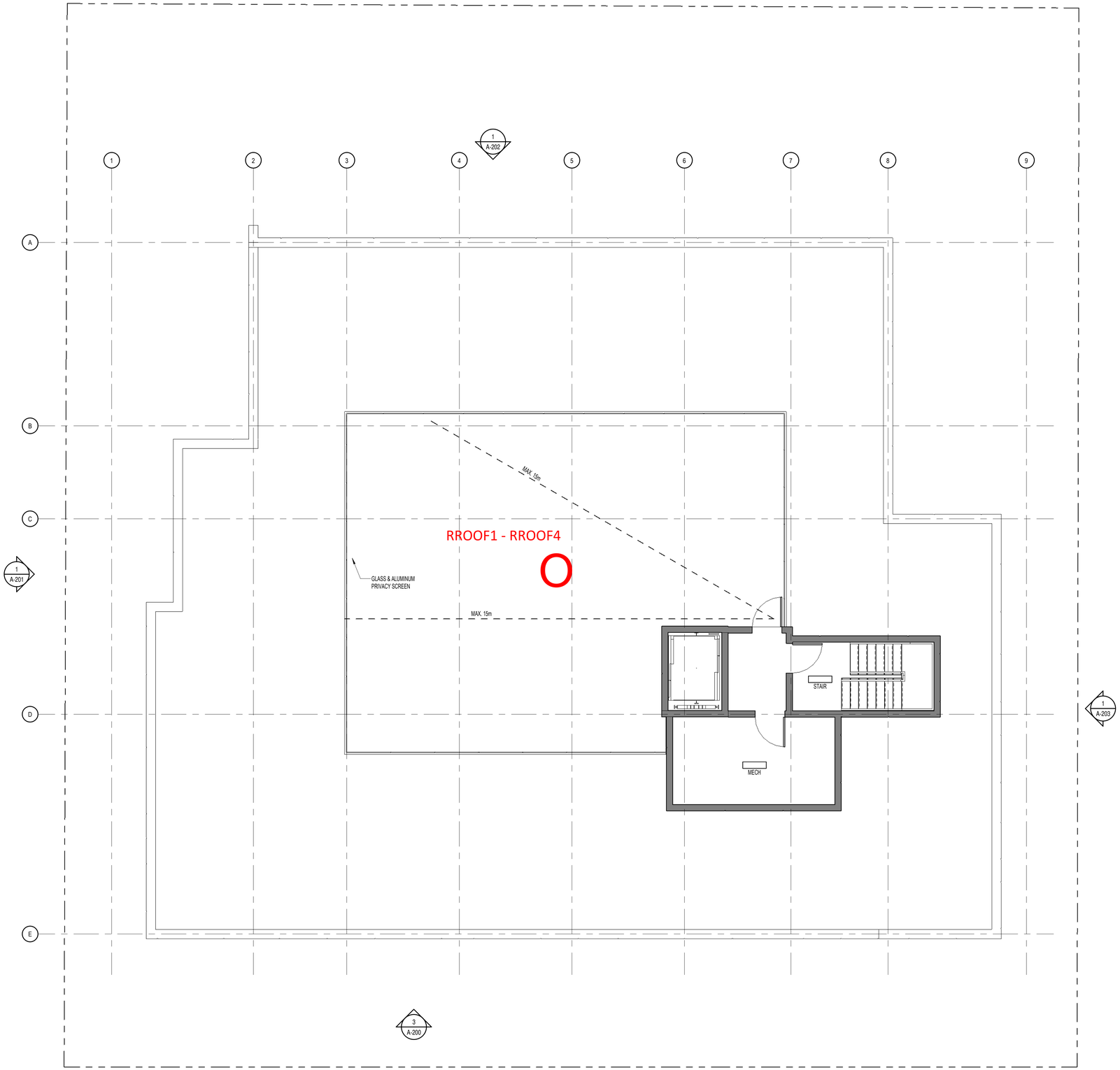
THREE STOREY APARTMENT BUILDING

29 Robinson Avenue, Ottawa, ON

*Titre / Title*

FOURTH FLOOR PLAN

| Dessiné par / Drawn by | No. projet / Project number | |
|---|---|---|
| MD, SB | 1821 | |
| Vérifié par / Verified by | No. dessin / Drawing number | Révision / Revision |
| RC | | 3 |
| Échelle / Scale | | |
| 3/16" = 1'-0" | | |
| Date de création du dessin / Drawing creation date | | |
| 01/09/12 | A-124 | |




No. Date Émis pour / Object

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THREE STOREY APARTMENT BUILDING

29 Robinson Avenue, Ottawa, ON

*Titre / Title*

ROOF PLAN

*Dessiné par / Drawn by*
MD, SB, TS

*No. projet / Project number*
1621

*Vérifié par / Verified by*
RC

*No. dessin / Drawing number*
A-130

*Révision / Revision*

*Échelle / Scale*
3/16" = 1'-0"

*Date de création du dessin / Drawing creation date*
07/30/19


3 / A-200 SOUTH ELEVATION
3/16" = 1'-0"

## LEGEND - MATERIALS

1. **FIBER CEMENT PANELS**
   COLOUR: DARK GREY
2. **ALUMINUM SPANDREL PANELS**
   COLOUR: DARK GREY
3. **FIBER CEMENT PANELS**
   COLOUR: LIGHT GREY
4. **FIBER CEMENT PANELS HORIZONTAL**
   COLOUR: MEDIUM GREY
5. **MASONRY UNITS**
   COLOUR: RED
6. **GLASS GUARDRAIL**
7. **PRIVACY SCREEN**
8. **PRIVACY SCREEN - ROOFTOP TERRACE**

| No. | Date | Émis pour / Object |
|---|---|---|
| 2 | 2018-09-18 | COORDINATION |
| 3 | 2018-10-26 | SITE PLAN CONTROL |

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*(Mécanique & Électricité / Mechanical & Electrical)*

*Ingénieur / Engineer*
*(Structure / Structure)*

*Client / Client*

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*Projet / Project*

# THREE STOREY APARTMENT BUILDING

29 Robinson Avenue, Ottawa, ON

*Titre / Title*

## SOUTH ELEVATION

| | | |
|---|---|---|
| Dessiné par / *Drawn by*<br>MD, LB, TS | No. projet / *Project number*<br>1821 | |
| Vérifié par / *Verified by*<br>RC | No. dessin / *Drawing number* | Révision / Revision<br>3 |
| Échelle / *Scale*<br>As indicated | | |
| Date de création du dessin / *Drawing creation date*<br>01/09/12 | A-200 | |


1 / A-201 WEST ELEVATION
3/16" = 1'-0"

## LEGEND - MATERIALS

1. **FIBER CEMENT PANELS**
   COLOUR: DARK GREY
2. **ALUMINUM SPANDREL PANELS**
   COLOUR: DARK GREY
3. **FIBER CEMENT PANELS**
   COLOUR: LIGHT GREY
4. **FIBER CEMENT PANELS HORIZONTAL**
   COLOUR: MEDIUM GREY
5. **MASONRY UNITS**
   COLOUR: RED
6. **GLASS GUARDRAIL**
7. **PRIVACY SCREEN**
8. **PRIVACY SCREEN - ROOFTOP TERRACE**

No. Date Émis pour / Object

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THREE STOREY APARTMENT BUILDING

29 Robinson Avenue, Ottawa, ON

*Titre / Title*

WEST ELEVATION

| | |
|---|---|
| Dessiné par / Drawn by: Author | No. projet / Project number: 1821 |
| Vérifié par / Verified by: Checker | No. dessin / Drawing number: A-201 |
| Échelle / Scale: As indicated | Révision / Revision: △ |
| Date de création du dessin / Drawing creation date: 07/30/19 | |


1 / A-202 NORTH ELEVATION
3/16" = 1'-0"

## LEGEND - MATERIALS

1. **FIBER CEMENT PANELS**
   COLOUR: DARK GREY
2. **ALUMINUM SPANDREL PANELS**
   COLOUR: DARK GREY
3. **FIBER CEMENT PANELS**
   COLOUR: LIGHT GREY
4. **FIBER CEMENT PANELS HORIZONTAL**
   COLOUR: MEDIUM GREY
5. **MASONRY UNITS**
   COLOUR: RED
6. **GLASS GUARDRAIL**
7. **PRIVACY SCREEN**
8. **PRIVACY SCREEN - ROOFTOP TERRACE**

| No. | Date | Émis pour / Object |
|---|---|---|
| 2 | 2018-09-18 | COORDINATION |
| 3 | 2018-10-26 | SITE PLAN CONTROL |

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*Ingénieur / Engineer*
*(Structure / Structure)*

*Client / Client*

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# THREE STOREY APARTMENT BUILDING

29 Robinson Avenue, Ottawa, ON

*Titre / Title*

## NORTH ELEVATION

| | |
|---|---|
| *Dessiné par / Drawn by* MD, LB | *No. projet / Project number* 1821 |
| *Vérifié par / Verified by* RC | *No. dessin / Drawing number* A-202 |
| *Échelle / Scale* As indicated | *Révision / Revision* 3 |
| *Date de création du dessin / Drawing creation date* 07/20/18 | |


1 / A-203 EAST ELEVATION
3/16" = 1'-0"

## LEGEND - MATERIALS

1. **FIBER CEMENT PANELS**
   COLOUR: DARK GREY
2. **ALUMINUM SPANDREL PANELS**
   COLOUR: DARK GREY
3. **FIBER CEMENT PANELS**
   COLOUR: LIGHT GREY
4. **FIBER CEMENT PANELS HORIZONTAL**
   COLOUR: MEDIUM GREY
5. **MASONRY UNITS**
   COLOUR: RED
6. **GLASS GUARDRAIL**
7. **PRIVACY SCREEN**
8. **PRIVACY SCREEN - ROOFTOP TERRACE**

No. Date Émis pour / Object

Ingénieur / Engineer
(Mécanique & Électricité / Mechanical & Electrical)

Ingénieur / Engineer
(Structure / Structure)

Client / Client

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Projet / Project

# THREE STOREY APARTMENT BUILDING

29 Robinson Avenue, Ottawa, ON

Titre / Title

## EAST ELEVATION

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| Dessiné par / Drawn by: Author | No. projet / Project number: 1821 |
| Vérifié par / Verified by: Checker | No. dessin / Drawing number: A-203 |
| Échelle / Scale: As indicated | Révision / Revision: |
| Date de création du dessin / Drawing creation date: 07/30/19 | |

# Appendix C NOISE WARNING CLAUSE

**NOISE ASSESSMENT REPORT -**
**29 ROBINSON AVENUE**

Appendix C NOISE WARNING CLAUSE
August 26, 2019

**WARNING CLAUSES**

The following warning clauses may be used individually or in combination:

**Generic Mitigation of Indoor Area (GI):**

Indoor environment - $L_{eq}$(16) greater than 55 dBA and less than or equal to 65 dBA or ($L_{eq}$(8) greater than 50dBA and less than or equal to 60 dBA

To help address the need for sound attenuation this development has been designed so as to provide an indoor environment that is within provincial guidelines. Measures for sound attenuation include:

- a setback of buildings from the noise source;
- the provision for adding central air conditioning at the occupant's discretion.

To be included in all offers of purchase:

"Installation of central air conditioning will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the City of Ottawa and the Ministry of the Environment Conservation and Parks."

**Extensive Mitigation of Indoor Area (MI):**

Indoor environment - $L_{eq}$(16) greater than 65 dBA or ($L_{eq}$(8) greater than 60dBA

To help address the need for sound attenuation this development has been designed so as to provide an indoor environment that is within provincial guidelines. Measures for sound attenuation include:

- multi-pane glass;
- exterior wall insulation;
- a forced central air conditioning system.

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

To be included in all offers of purchase:

> "This dwelling unit has been supplied with a forced central air conditioning system and other measures 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 City of Ottawa and the Ministry of the Environment Conservation and Parks."

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To be included in all offers of purchase:

**Generic Mitigation of Outdoor Amenity Area (GO):**

Outdoor amenity areas- $L_{eq}(16)$ in the OLA greater than 55 dBA and less than or equal to 60 dBA.

To help address the need for outdoor sound attenuation occupants are to be informed this development may potentially require the inclusion of:

- an acoustic barrier.

To be included in all offers of purchase:

> "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 occasion, interfere with some activities of the dwelling occupants in their outdoor amenity area as the sound levels exceed the sound level limits of the City of Ottawa and the Ministry of the Environment and Conservation and Parks."

**Extensive Mitigation of Outdoor Amenity Area (MO):**

Outdoor amenity areas- $L_{eq}(16)$ in the OLA greater than 60 dBA.

To help address the need for outdoor sound attenuation this development is to includes outdoor noise attenuation with the use of:

- an acoustic barrier.

To be included in all offers of purchase:

> "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 occasion, interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the City of Ottawa and the Ministry of the Environment Conservation and Parks."

*Source: City of Ottawa - Environmental Noise Control Guidelines, January 2016 and Ontario Ministry of the Environment Conservation and Parks, Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning Publication NPC-300, Queen's Printer for Ontario, 2013.*