

**Noise Assessment Report -134
Robinson Avenue**

Project # 160401443



Prepared for:
Robinson Village III Limited
Partnership

Prepared by:
Stantec Consulting Ltd.

November 12, 2018

NOISE ASSESSMENT REPORT -134 ROBINSON AVENUE

Introduction
November 12, 2018

Table of Contents

1.0	INTRODUCTION	1
1.1	PURPOSE OF REPORT.....	1
1.2	LOCATION.....	1
2.0	NOISE LEVEL CRITERIA	3
2.1	GUIDELINES	3
3.0	OBSERVATIONS AND CALCULATIONS.....	6
3.1	NOISE LEVEL PREDICTIONS	6
3.2	ROAD TRAFFIC VOLUMES	6
3.3	PROJECTED NOISE LEVELS	7
4.0	CONCLUSIONS AND RECOMMENDATIONS.....	10
4.1	OUTDOOR NOISE IMPACTS	10
4.2	INDOOR NOISE IMPACTS	10
4.3	INDOOR NOISE MITIGATION – AIF METHOD.....	11

LIST OF TABLES

Table 1	Noise Criteria for Residential Land Use	3
Table 2	Combination of Road and Rail Noise Day-Time Outdoor, Ventilation and Warning Clause Requirements	4
Table 3	Combination of Road and Rail Noise, Night-Time Ventilation and Warning Clause Requirements.....	4
Table 4	Road and Rail Noise – Building Component Requirements	5
Table 5	Traffic Volumes, 4-Lane eastbound and westbound Highway.....	6
Table 6	Summary of Projected Unattenuated Noise Levels	7
Table 7	AIF Summary.....	12

LIST OF FIGURES

Figure 1	– 134 Robinson Avenue Development	2
Figure 2	Indoor Receivers.....	8
Figure 3	Outdoor Receiver.....	9

NOISE ASSESSMENT REPORT -134 ROBINSON AVENUE

Introduction
November 12, 2018

LIST OF APPENDICES

APPENDIX A NOISE LEVEL CALCULATIONS A.1
A.1 Indoor Receiver Stinson Reports A.2
A.2 Outdoor Receiver Stinson Report A.3

APPENDIX B FLOOR PLANS AND AIF CALCULATIONS.....B.1

APPENDIX C NOISE WARNING CLAUSE..... C.1

NOISE ASSESSMENT REPORT -134 ROBINSON AVENUE

Introduction
November 12, 2018

1.0 INTRODUCTION

1.1 PURPOSE OF REPORT

Stantec Consulting Ltd. has been retained by Robinson Village III Limited Partnership to prepare an environmental noise assessment for the proposed 3 storey building at 134 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 (MOECP) 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 MOECP'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 52 units and the site is located along the southern 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 417 Highway.

Surrounding land uses are as follows:

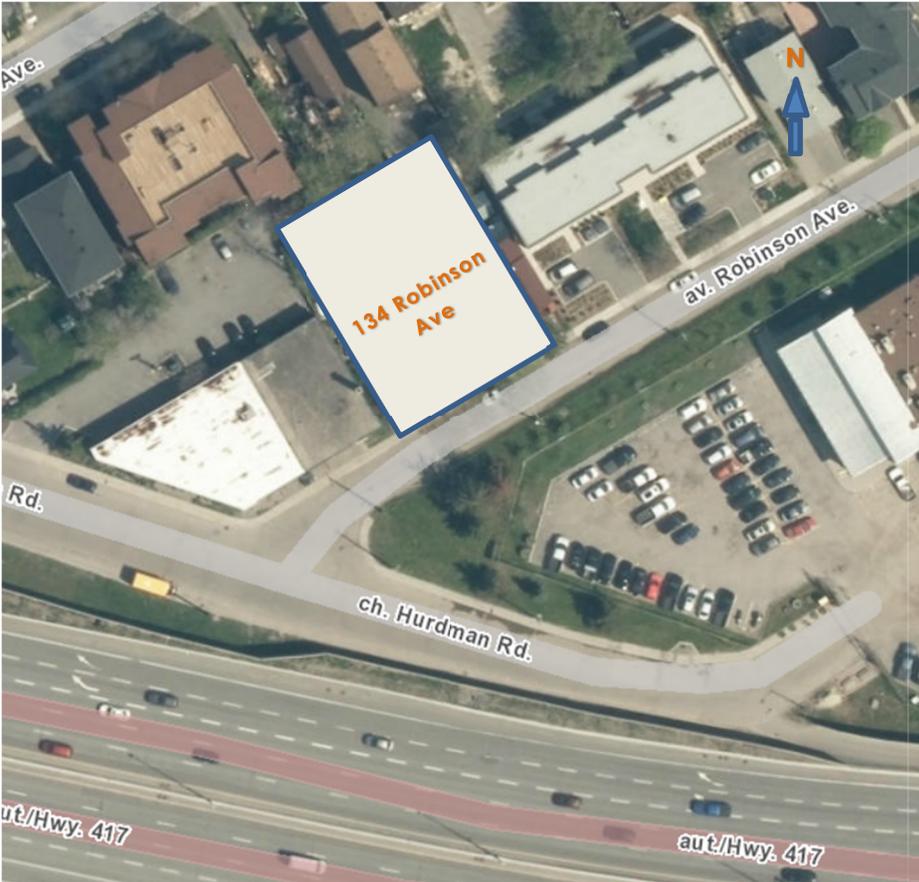
- north – existing park and residential;
- east – existing commercial and residential;
- south – existing commercial;
- west – existing commercial.

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" (2016).

NOISE ASSESSMENT REPORT - 134 ROBINSON AVENUE

Introduction
November 12, 2018

Figure 1 – 134 Robinson Avenue Development



NOISE ASSESSMENT REPORT -134 ROBINSON AVENUE

Noise Level Criteria
November 12, 2018

2.0 NOISE LEVEL CRITERIA

2.1 GUIDELINES

The Ontario Ministry of the Environment, Conservation and Parks (MOECP) 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.

NOISE ASSESSMENT REPORT -134 ROBINSON AVENUE

Noise Level Criteria
November 12, 2018

**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)

NOISE ASSESSMENT REPORT -134 ROBINSON AVENUE

Noise Level Criteria
November 12, 2018

The MOECP 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)

NOISE ASSESSMENT REPORT -134 ROBINSON AVENUE

Observations and Calculations
November 12, 2018

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 MOECP 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 and 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		

NOISE ASSESSMENT REPORT -134 ROBINSON AVENUE

Observations and Calculations
November 12, 2018

3.3 PROJECTED NOISE LEVELS

Using the MOECP 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 Rubin & Rotman 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.

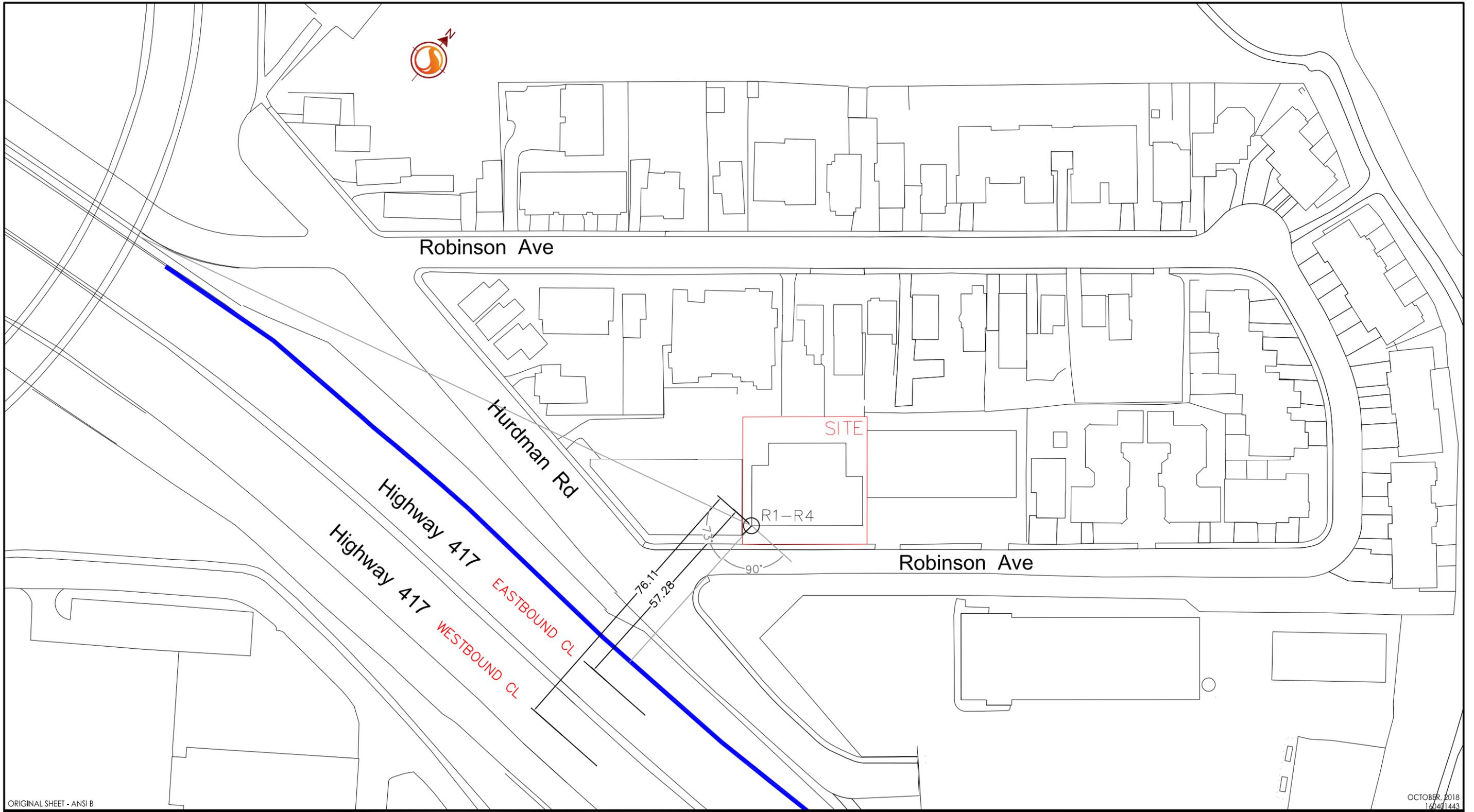
Upon assessing the developments noise exposure to the Highway 417 it was found that an embankment conceals the development from noise west of the Robinson Avenue overpass, and the Hurdman Yard garage and additional greenspace along the Rideau River shield the development east of the river. Moreover, an adjacent row of housing was considered to affect the indoor noise levels of the basement and first floor of the building as well as the outdoor amenity area. Such impacts were not considered for the receivers on the second and third floors of the building based on the height of the adjacent row of housing. The difference in the anticipated noise levels at each floor height is reflected in **Table 6**.

The unattenuated receiver noise levels have been summarized in **Table 6**, and noise level calculations are provided in **Appendix A** for sound levels at daytime and nighttime building face.

Table 6 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	0.7	65.4	57.8	-
R2	South Building Face - 1st Floor	3.1	66.7	59.1	-
R3	South Building Face - 2nd Floor	6.9	69.1	61.5	-
R4	South Building Face - 3rd Floor	9.7	70.3	62.7	-
ROUT	Outdoor Amenity Area	1.5	-	-	54

W:\active\160401443_134-138 Robinson Ave\design\report\Noise\DWG\160401443 - NA-2018-10-26.dwg
2018/10/29 11:13 AM By: Odam, Cameron



ORIGINAL SHEET - ANSI B

OCTOBER, 2018
160401443



Stantec Consulting Ltd.
400 - 1331 Clyde Avenue
Ottawa ON
Tel. 613-724-4420
www.stantec.com

— EXISTING NOISE WALL - 5m

Client/Project
ROBINSON VILLAGE III LIMITED PARTNERSHIP
134 ROBINSON AVENUE
NOISE ASSESSMENT REPORT

Figure No.

2.0

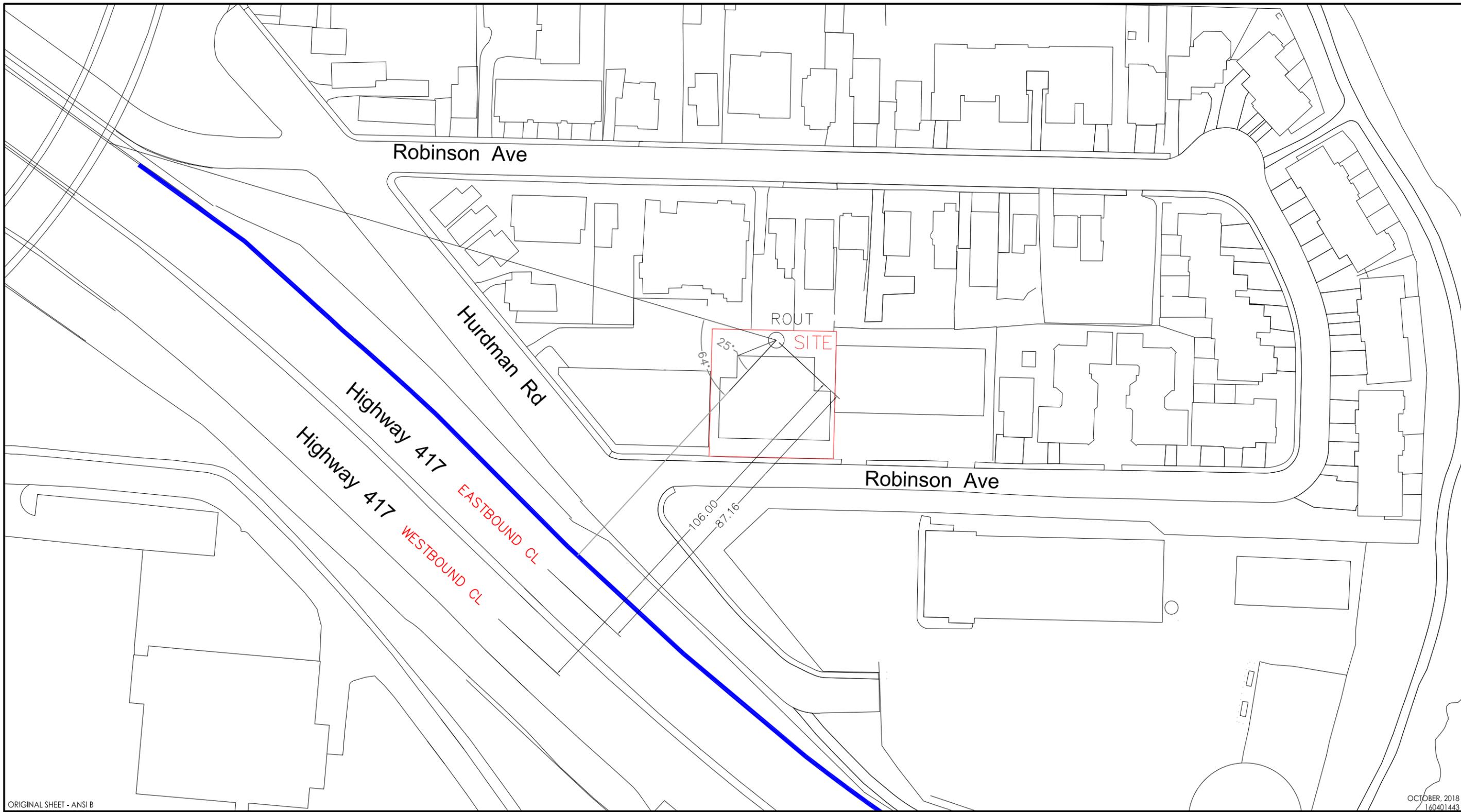
Title

INDOOR RECEIVERS
PLAN VIEW

W:\active\160401443_134-138 Robinson Ave\design\report\Noise\DWG\160401443 - NA-2018-11-12.dwg
2018/11/12 1:11 PM By: Odam, Cameron

ORIGINAL SHEET - ANSI B

OCTOBER, 2018
160401443



Stantec Consulting Ltd.
400 - 1331 Clyde Avenue
Ottawa ON
Tel. 613-724-4420
www.stantec.com

— EXISTING NOISE WALL—5m

Client/Project
ROBINSON VILLAGE III LIMITED PARTNERSHIP
134 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 MOECP criteria at the outdoor living area for the potential building with exposure to Highway 417.

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

- The predicted noise level for the outdoor amenity area located at the rear of the proposed building is 54 dBA. This falls within the accepted noise level standards and therefore there are no additional measures required for outdoor noise mitigation.

4.2 INDOOR NOISE IMPACTS

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

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

- Based on the predicted noise levels proposed units within 134 Robinson Avenue on the basement floor units 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."
- Based on the predicted noise levels proposed units within 134 Robinson Avenue on the first, second and third floor fall under the noise warning clause Extensive Indoor Noise Mitigation (MI). These units require the installation of a central air conditioning system to be installed and attenuation features as a part of the building construction that should reduce the noise levels to accepted standards, see Table 7.

NOISE ASSESSMENT REPORT -134 ROBINSON AVENUE

Conclusions and Recommendations

November 12, 2018

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

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

4.3 INDOOR NOISE MITIGATION – AIF METHOD

The following building components will apply based on the Acoustical Insulation Factor (AIF) method, as per “Environmental Noise Assessment in Land Use Planning Manual”, 1999. The AIF value and minimum building component were based off the preliminary unit floor plans. The calculated noise levels requiring mitigation were 70.3 dBA at the west side of the building during the daytime and 62.7 dBA during the nighttime. These noise levels were used to determine the typical building components required for the building façade.

Table 7 summarizes the AIF values and minimum building components and **Appendix B** provides the floor plans and sample calculations.

NOISE ASSESSMENT REPORT -134 ROBINSON AVENUE

Conclusions and Recommendations
November 12, 2018

Table 7 AIF Summary

Floor	Room	Wall	AIF Value	Type of Window Glazing	Type of Exterior Wall	Type of Door	
1 st , 2nd and 3rd Floor	Unit 101, 201 and 301	1	32	2 (35) 2	EW1	-	
	Units 101, 201 and 301 Bedroom	1	32	2 (15) 2	EW1	-	
	Units 102, 202 and 302	1	32	2 (22) 2	EW1	-	
	Units 103-106, 203-206 and 303-306	1	32	2 (18) 2	EW1	-	
	Units 107, 207 and 307		1	35	2 (42) 2	EW1	-
			2	35	2 (42) 2	EW1	-
	Units 107, 207 and 307 Bedroom	2	32	2 (18) 2	EW2	-	
	Units 107, 207 and 307 Bathroom	2	29	-	EW1	-	
	Stairwell	2	29	-	EW1	-	
	Units 108, 208 and 308	2	32	2 (22) 2	EW1	-	
	Units 108, 208 and 308 Bedroom	2	29	-	EW1	-	

As the noise levels exceed the MOECP Criteria, building components including walls and windows are to be designed so the indoor sound levels comply with MOECP noise criteria by using EW1 and EW2 as illustrated above. In this situation, double glazed windows with 2mm and 3mm thickness and various spacing outlined above would be required. The building windows with an equivalent AIF may be substituted for the recommended thickness, glazing and spacing. E.g. a double glazed 3mm pane with 6mm spacing may be substituted for double glazed 2mm panes with 15mm spacing.

EW1 construction consists of:

- 12.7 mm gypsum board, vapour barrier, and 38x89 studs with 50 mm mineral wool or glass fibre batts in inner stud cavities. As well as sheathing and wood siding or metal siding and fibre backer board.

NOISE ASSESSMENT REPORT -134 ROBINSON AVENUE

Conclusions and Recommendations
November 12, 2018

EW2 construction consists of:

- 12.7 mm gypsum board, vapour barrier, and 38x89 studs with 50 mm mineral wool or glass fibre batts in inner stud cavities. As well as rigid insulation(25-30mm) and wood siding or metal siding and fibre backer board.

Should the actual floor plans differ from the plans shown in **Appendix B**, updated calculations must be performed prior to the issuance of building permits.

The inclusion of these measures will allow the residential development to proceed in accordance with MOECP criteria with respect to environmental noise.

Respectfully submitted by:



Cameron Odam
Engineering Intern



Dustin Thiffault, P.Eng.,
Project Engineer

NOISE ASSESSMENT REPORT -134 ROBINSON AVENUE

Appendix A Noise Level Calculations
November 12, 2018

Appendix A NOISE LEVEL CALCULATIONS

NOISE ASSESSMENT REPORT -134 ROBINSON AVENUE

Appendix A Noise Level Calculations
November 12, 2018

A.1 INDOOR RECEIVER STAMSON REPORTS

STAMSON 5.0 NORMAL REPORT Date: 02-11-2018 14:56:30
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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 : -73.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 1 / 1
 House density : 50 %
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 57.28 / 57.28 m
 Receiver height : 0.70 / 0.70 m
 Topography : 2 (Flat/gentle slope; with barrier)
 Barrier angle1 : -73.00 deg Angle2 : 90.00 deg
 Barrier height : 5.00 m
 Barrier receiver distance : 49.20 / 49.20 m
 Source elevation : 60.20 m
 Receiver elevation : 60.67 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 : -73.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 1 / 1
 House density : 50 %
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 76.11 / 76.11 m
 Receiver height : 0.70 / 0.70 m
 Topography : 2 (Flat/gentle slope; with barrier)
 Barrier angle1 : -73.00 deg Angle2 : 90.00 deg
 Barrier height : 5.00 m
 Barrier receiver distance : 49.20 / 49.20 m
 Source elevation : 60.20 m
 Receiver elevation : 60.67 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 ! Receiver ! Barrier ! Elevation of
 Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)

 1.50 ! 0.70 ! 1.65 ! 61.65

ROAD (0.00 + 61.55 + 0.00) = 61.55 dBA

Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

 -73 90 0.00 81.40 0.00 -5.82 -0.43 0.00 -2.71 0.00
 72.44
 -73 90 0.00 81.40 0.00 -5.82 -0.43 0.00 -13.60
 61.55

Segment Leq : 61.55 dBA

Segment Leq : 53.95 dBA

Results segment # 2: West 417 (day)

Results segment # 2: West 417 (night)

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	0.70	1.58	61.58

ROAD (0.00 + 63.14 + 0.00) = 63.14 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

-73	90	0.00	81.40	0.00	-7.05	-0.43	0.00	-2.67	0.00
71.24									
-73	90	0.00	81.40	0.00	-7.05	-0.43	0.00	0.00	-10.77
63.14									

Segment Leq : 63.14 dBA

Total Leq All Segments: 65.43 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	0.70	1.65	61.65

ROAD (0.00 + 53.95 + 0.00) = 53.95 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

-73	90	0.00	73.80	0.00	-5.82	-0.43	0.00	-2.71	0.00
64.84									
-73	90	0.00	73.80	0.00	-5.82	-0.43	0.00	0.00	-13.60
53.95									

Results segment # 2: West 417 (day)

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	0.70	1.58	61.58

ROAD (0.00 + 55.54 + 0.00) = 55.54 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

-73	90	0.00	73.80	0.00	-7.05	-0.43	0.00	-2.67	0.00
63.64									
-73	90	0.00	73.80	0.00	-7.05	-0.43	0.00	0.00	-10.77
55.54									

Segment Leq : 55.54 dBA

Total Leq All Segments: 57.83 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	0.70	1.65	61.65

ROAD (0.00 + 53.95 + 0.00) = 53.95 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

-73	90	0.00	73.80	0.00	-5.82	-0.43	0.00	-2.71	0.00
64.84									
-73	90	0.00	73.80	0.00	-5.82	-0.43	0.00	0.00	-13.60
53.95									

TOTAL Leq FROM ALL SOURCES (DAY) : 65.43
(NIGHT) : 57.83

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

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 : -73.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 1 / 1
 House density : 50 %
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 57.28 / 57.28 m
 Receiver height : 3.10 / 3.10 m
 Topography : 2 (Flat/gentle slope, with barrier)
 Barrier angle1 : -73.00 deg Angle2 : 90.00 deg
 Barrier height : 5.00 m
 Barrier receiver distance : 49.20 / 49.20 m
 Source elevation : 60.67 m
 Receiver 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 : -73.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 1 / 1
 House density : 50 %
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 76.11 / 76.11 m
 Receiver height : 3.10 / 3.10 m
 Topography : 2 (Flat/gentle slope, with barrier)
 Barrier angle1 : -73.00 deg Angle2 : 90.00 deg
 Barrier height : 5.00 m
 Barrier receiver distance : 49.20 / 49.20 m
 Source elevation : 60.20 m
 Receiver elevation : 60.67 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	3.10	1.99	61.99

ROAD (0.00 + 62.32 + 0.00) = 62.32 dBA

Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

-73	90	0.00	81.40	0.00	-5.82	-0.43	0.00	-2.71	0.00
72.44	-73	90	0.00	81.40	0.00	-5.82	-0.43	0.00	-12.83
62.32									

Segment Leq : 62.32 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 ! 3.10 ! 2.43 ! 62.43
 ROAD (0.00 + 64.79 + 0.00) = 64.79 dBA
 Angle1 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

 -73 90 0.00 81.40 0.00 -7.05 -0.43 0.00 -2.67 0.00
 71.24
 -73 90 0.00 81.40 0.00 -7.05 -0.43 0.00 0.00 -9.13
 64.79

Segment Leq : 64.79 dBA

 Total Leq All Segments: 66.74 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 ! 3.10 ! 2.43 ! 61.99
 ROAD (0.00 + 54.72 + 0.00) = 54.72 dBA
 Angle1 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

 -73 90 0.00 73.80 0.00 -5.82 -0.43 0.00 -2.71 0.00
 64.84
 -73 90 0.00 73.80 0.00 -5.82 -0.43 0.00 0.00 -12.83
 54.72

Segment Leq : 57.19 dBA

 Total Leq All Segments: 59.14 dBA

TOTAL Leq FROM ALL SOURCES (DAY) : 66.74
 (NIGHT) : 59.14

Segment Leq : 54.72 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 ! 3.10 ! 2.43 ! 62.43
 ROAD (0.00 + 57.19 + 0.00) = 57.19 dBA
 Angle1 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

 -73 90 0.00 73.80 0.00 -7.05 -0.43 0.00 -2.67 0.00
 63.64
 -73 90 0.00 73.80 0.00 -7.05 -0.43 0.00 0.00 -9.13
 57.19

STAMSON 5.0 NORMAL REPORT Date: 02-11-2018 14:59:53
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r3.te Time Period: Day/Night 16/8 hours
 Description: R3 Indoor Receiver - Second Floor

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 : -73.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 57.28 / 57.28 m
 Receiver height : 6.90 / 6.90 m
 Topography : 2 (Flat/gentle slope; with barrier)
 Barrier angle1 : -73.00 deg Angle2 : 90.00 deg
 Barrier height : 5.00 m
 Barrier receiver distance : 49.20 / 49.20 m
 Source elevation : 60.20 m
 Receiver elevation : 60.67 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 : -73.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 76.11 / 76.11 m
 Receiver height : 6.90 / 6.90 m
 Topography : 2 (Flat/gentle slope; with barrier)
 Barrier angle1 : -73.00 deg Angle2 : 90.00 deg
 Barrier height : 5.00 m
 Barrier receiver distance : 49.20 / 49.20 m
 Source elevation : 60.20 m
 Receiver elevation : 60.67 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 ! Receiver ! Barrier ! Elevation of
 Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)

 1.50 ! 6.90 ! 2.52 ! 62.52

ROAD (0.00 + 63.69 + 0.00) = 63.69 dBA
 Angle1 Angle2 Alpha ReflEq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

 -73 90 0.00 81.40 0.00 -5.82 -0.43 0.00 0.00 -11.46
 63.69

Segment Leq : 63.69 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	6.90	3.77	63.77

ROAD (0.00 + 67.57 + 0.00) = 67.57 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

-73	90	0.00	81.40	0.00	-7.05	-0.43	0.00	0.00	0.00	-6.34
-----	----	------	-------	------	-------	-------	------	------	------	-------

Segment Leq : 67.57 dBA

Total Leq All Segments: 69.06 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	6.90	2.52	62.52

ROAD (0.00 + 56.09 + 0.00) = 56.09 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

-73	90	0.00	73.80	0.00	-5.82	-0.43	0.00	0.00	0.00	-11.46
-----	----	------	-------	------	-------	-------	------	------	------	--------

Segment Leq : 56.09 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	6.90	3.77	63.77

ROAD (0.00 + 59.98 + 0.00) = 59.98 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

-73	90	0.00	73.80	0.00	-7.05	-0.43	0.00	0.00	0.00	-6.34
-----	----	------	-------	------	-------	-------	------	------	------	-------

Segment Leq : 59.98 dBA

Total Leq All Segments: 61.47 dBA

TOTAL Leq FROM ALL SOURCES (DAY) : 69.06 (NIGHT) : 61.47

STAMSON 5.0 NORMAL REPORT Date: 02-11-2018 15:01:27
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
 Filename: r4.te Time Period: Day/Night 16/8 hours
 Description: R4 Indoor Receiver - Third floor

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 : -73.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 57.28 / 57.28 m
 Receiver height : 9.70 / 9.70 m
 Topography : 2 (Flat/gentle slope; with barrier)
 Barrier angle1 : -73.00 deg Angle2 : 90.00 deg
 Barrier height : 5.00 m
 Barrier receiver distance : 49.20 / 49.20 m
 Source elevation : 60.20 m
 Receiver elevation : 60.67 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 : -73.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 76.11 / 76.11 m
 Receiver height : 9.70 / 9.70 m
 Topography : 2 (Flat/gentle slope; with barrier)
 Barrier angle1 : -73.00 deg Angle2 : 90.00 deg
 Barrier height : 5.00 m
 Barrier receiver distance : 49.20 / 49.20 m
 Source elevation : 60.20 m
 Receiver elevation : 60.67 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 ! Receiver ! Barrier ! Elevation of
 Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)

 1.50 ! 9.70 ! 2.92 ! 62.92

ROAD (0.00 + 64.83 + 0.00) = 64.83 dBA
 Angle1 Angle2 Alpha ReflEq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

 -73 90 0.00 81.40 0.00 -5.82 -0.43 0.00 0.00 -10.32
 64.83

Segment Leq : 64.83 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	9.70	4.76	64.76

ROAD (0.00 + 68.85 + 0.00) = 68.85 dBA

Angle	Ref	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
90	0.00	81.40	0.00	-7.05	-0.43	0.00	-5.06

68.85

Segment Leq : 68.85 dBA

Total Leq All Segments: 70.30 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	9.70	2.92	62.92

ROAD (0.00 + 57.23 + 0.00) = 57.23 dBA

Angle	Ref	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
90	0.00	73.80	0.00	-5.82	-0.43	0.00	-10.32

57.23

Segment Leq : 57.23 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	9.70	4.76	64.76

ROAD (0.00 + 61.26 + 0.00) = 61.26 dBA

Angle	Ref	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
90	0.00	73.80	0.00	-7.05	-0.43	0.00	-5.06

61.26

Segment Leq : 61.26 dBA

Total Leq All Segments: 62.71 dBA

TOTAL Leq FROM ALL SOURCES (DAY) : 70.30 (NIGHT) : 62.71

NOISE ASSESSMENT REPORT -134 ROBINSON AVENUE

Appendix A Noise Level Calculations
November 12, 2018

A.2 OUTDOOR RECEIVER STAMSON REPORT

STAMSON 5.0 NORMAL REPORT Date: 12-11-2018 13:18:19
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
 Filename: rol.te Time Period: Day/Night 16/8 hours
 Description: Outdoor Receiver 1 - Outdoor Amenity Area

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 : 25.00 deg 64.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 1 / 1
 House density : 90 %
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 87.16 / 87.16 m
 Receiver height : 1.50 / 1.50 m
 Topography : 2 (Flat/gentle slope; with barrier)
 Barrier angle1 : 25.00 deg Angle2 : 64.00 deg
 Barrier height : 5.00 m
 Barrier receiver distance : 78.96 / 78.96 m
 Source elevation : 60.20 m
 Receiver elevation : 61.00 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 : 25.00 deg 64.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 1 / 1
 House density : 90 %
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 106.00 / 106.00 m
 Receiver height : 1.50 / 1.50 m
 Topography : 2 (Flat/gentle slope; with barrier)
 Barrier angle1 : 25.00 deg Angle2 : 64.00 deg
 Barrier height : 5.00 m
 Barrier receiver distance : 78.96 / 78.96 m
 Source elevation : 60.20 m
 Receiver elevation : 61.00 m
 Reference angle : 0.00

Results segment # 1: East 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 ! 1.77 ! 61.77

ROAD (0.00 + 49.52 + 0.00) = 49.52 dBA

Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeg

 25 64 0.66 81.40 0.00 -12.69 -7.69 0.00 -7.67 0.00
 53.35
 25 64 0.36 81.40 0.00 -10.39 -7.22 0.00 0.00 -14.26
 49.52

Segment Leg : 49.52 dBA

Segment Leq : 41.92 dBA

Results segment # 2: West 417 (day)

Results segment # 2: West 417 (night)

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	1.90	61.90

ROAD (0.00 + 52.10 + 0.00) = 52.10 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

25	64	0.66	81.40	0.00	-14.10	-7.69	0.00	-7.52	0.00
52.10	25	64	0.36	81.40	0.00	-11.55	-7.22	0.00	0.00 -10.27
52.36									

Segment Leq : 52.10 dBA

Total Leq All Segments: 54.01 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	1.50	1.77	61.77

ROAD (0.00 + 41.92 + 0.00) = 41.92 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

25	64	0.66	73.80	0.00	-12.69	-7.69	0.00	-7.67	0.00
45.75	25	64	0.36	73.80	0.00	-10.39	-7.22	0.00	0.00 -14.26
41.92									

Segment Leq : 41.92 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	1.50	1.90	61.90

ROAD (0.00 + 44.50 + 0.00) = 44.50 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

25	64	0.66	73.80	0.00	-14.10	-7.69	0.00	-7.52	0.00
44.50	25	64	0.36	73.80	0.00	-11.55	-7.22	0.00	0.00 -10.27
44.76									

Segment Leq : 44.50 dBA

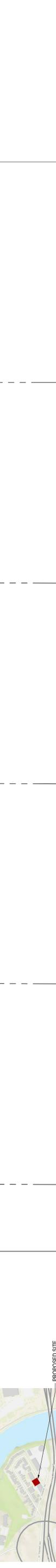
Total Leq All Segments: 46.41 dBA

TOTAL Leq FROM ALL SOURCES (DAY) : 54.01 (NIGHT) : 46.41

NOISE ASSESSMENT REPORT -134 ROBINSON AVENUE

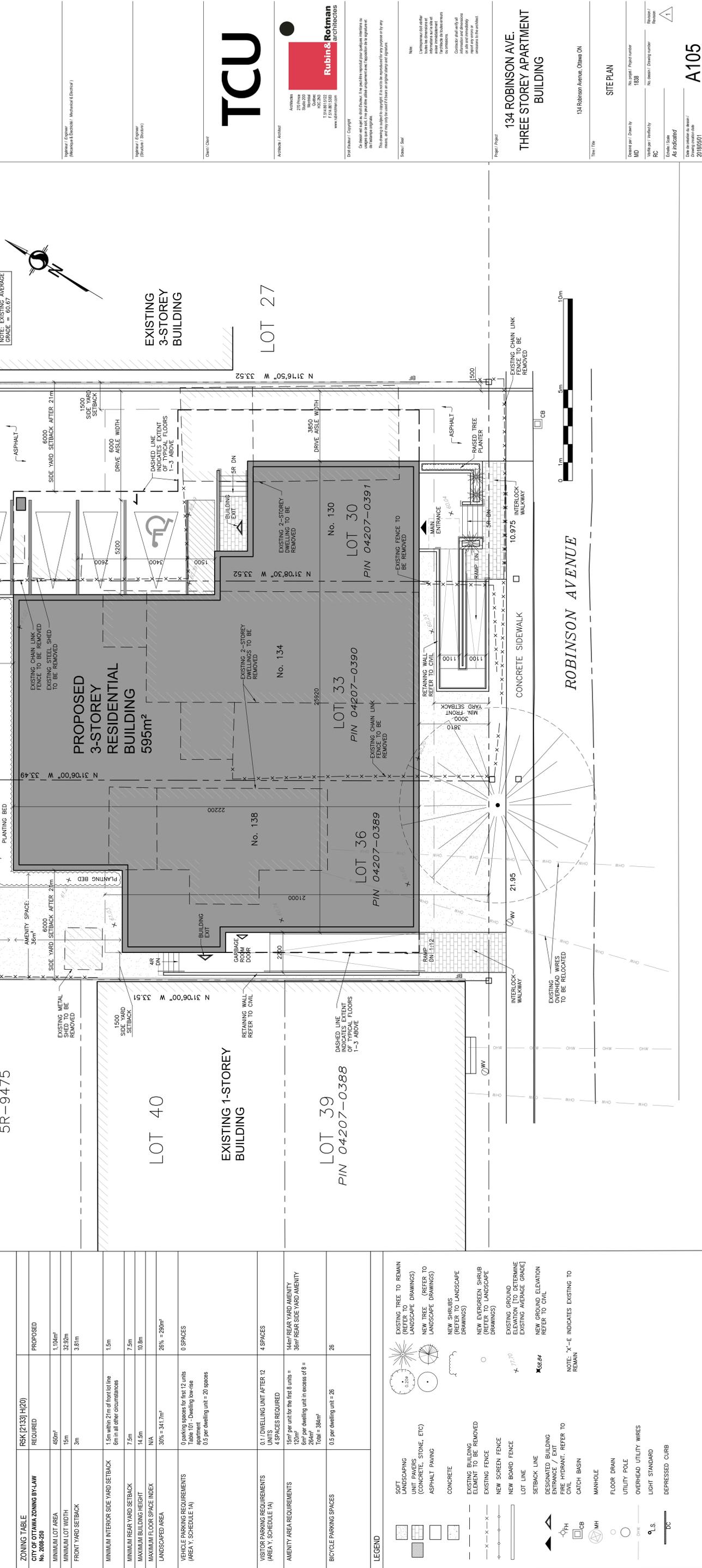
Appendix B FLOOR PLANS AND AIF CALCULATIONS
November 12, 2018

Appendix B FLOOR PLANS AND AIF CALCULATIONS



PROPERTY DESCRIPTION	TCU - THREE STOREY RESIDENTIAL BUILDING
CITY OF OTTAWA PIN NUMBER	04207 0389, 0390, 0391
MUNICIPAL ADDRESS	134 Robinson Avenue
SITE INFORMATION	
LOT AREA	1,104m ²
LOT FRONTAGE	32.92m
LOT DEPTH	33.5m
BUILDING INFORMATION	
BUILDING FLOOR AREA	595m ²
BUILDING FLOOR AREA	1,785m ²
PROPOSED USE:	APARTMENT DWELLING, LOW-RISE
UNIT BREAKDOWN:	
FIRST FLOOR	10 UNITS
SECOND FLOOR	14 UNITS
THIRD FLOOR	14 UNITS
TOTAL	38 UNITS

ZONING TABLE	RSK [2133] H(20)	PROPOSED
CITY OF OTTAWA ZONING BY-LAW No. 2008-250		
MINIMUM LOT AREA	450m ²	1,104m ²
MINIMUM LOT WIDTH	15m	32.92m
FRONT YARD SETBACK	3m	3.81m
MINIMUM INTERIOR SIDE YARD SETBACK	1.5m within 21m of front lot line 6m in all other circumstances	1.5m
MINIMUM REAR YARD SETBACK	7.5m	7.5m
MAXIMUM BUILDING HEIGHT	14.5m	10.8m
MAXIMUM FLOOR SPACE INDEX	N/A	
LANDSCAPED AREA	30% = 341.7m ²	26% = 290m ²
VEHICLE PARKING REQUIREMENTS (AREA Y, SCHEDULE 1A)	0 parking spaces for first 12 units Table 101 - Dwelling low-rise apartment 0.5 per dwelling unit = 20 spaces	0 SPACES
VISITOR PARKING REQUIREMENTS (AREA Y, SCHEDULE 1A)	0.1 DWELLING UNIT AFTER 12 UNITS 4 SPACES REQUIRED	4 SPACES
AMENITY AREA REQUIREMENTS	15m ² per unit for the first 6 units = 90m ² 120m ² per dwelling unit in excess of 6 = 264m ² Total = 384m ²	144m ² REAR YARD AMENITY 36m ² REAR SIDE YARD AMENITY Total = 384m ²
BICYCLE PARKING SPACES	0.5 per dwelling unit = 26	26



TCU

Architect: Rubbin & Rotman architects
 Address: 134 Robinson Avenue, Ottawa, ON K1R 6S5
 Phone: (613) 833-1333
 Website: www.rubbinrotman.com

Project: TCU - THREE STOREY RESIDENTIAL BUILDING
City: OTTAWA
Municipal Address: 134 Robinson Avenue

Engineer: Michael A. Schmitt
 License No.: 10020
 Date: 2018-09-13

Project: TCU - THREE STOREY RESIDENTIAL BUILDING
City: OTTAWA
Municipal Address: 134 Robinson Avenue

Client: TCU
Architect: Rubbin & Rotman architects
Address: 134 Robinson Avenue, Ottawa, ON K1R 6S5
Phone: (613) 833-1333
Website: www.rubbinrotman.com

Engineer: Michael A. Schmitt
 License No.: 10020
 Date: 2018-09-13

Project: TCU - THREE STOREY RESIDENTIAL BUILDING
City: OTTAWA
Municipal Address: 134 Robinson Avenue

Client: TCU
Architect: Rubbin & Rotman architects
Address: 134 Robinson Avenue, Ottawa, ON K1R 6S5
Phone: (613) 833-1333
Website: www.rubbinrotman.com

No.	Date	Change Order
1	08/09/25	COORDINATION
2	08/09/25	COORDINATION

APPROVED REFUSED
 THIS DAY OF _____, 20____
 DOUGLAS JAMES MCIR, PPS, MANAGER
 DEVELOPMENT REVIEW CENTRAL
 PLANNING, INFRASTRUCTURE AND

Professional Engineer
 Registration Number: 14494
 Mechanical/Electrical

Professional Engineer
 Registration Number: 14494
 Mechanical/Electrical

Client/Owner



Rubin & Rotman
 architects

ADDRESS
 2100 W. 13th St.
 Suite 200
 Dallas, TX 75244
 214.881.8222
 www.rubinrotman.com

THIS DOCUMENT IS THE PROPERTY OF RUBIN & ROTMAN ARCHITECTS. IT IS TO BE USED ONLY FOR THE PROJECT AND SITE SPECIFICALLY IDENTIFIED HEREIN. IT IS NOT TO BE REPRODUCED, COPIED, REPRODUCED, OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF RUBIN & ROTMAN ARCHITECTS.

NOTES:
 1. UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN FEET AND INCHES.
 2. DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
 3. FINISHES ARE TO BE AS NOTED.
 4. REFER TO ALL APPLICABLE SPECIFICATIONS AND SCHEDULES FOR MATERIALS AND METHODS OF CONSTRUCTION.
 5. VERIFY ALL CONDITIONS AND CONDITIONS OF WORK BEFORE BEGINNING WORK.
 6. VERIFY ALL CONDITIONS AND CONDITIONS OF WORK BEFORE BEGINNING WORK.

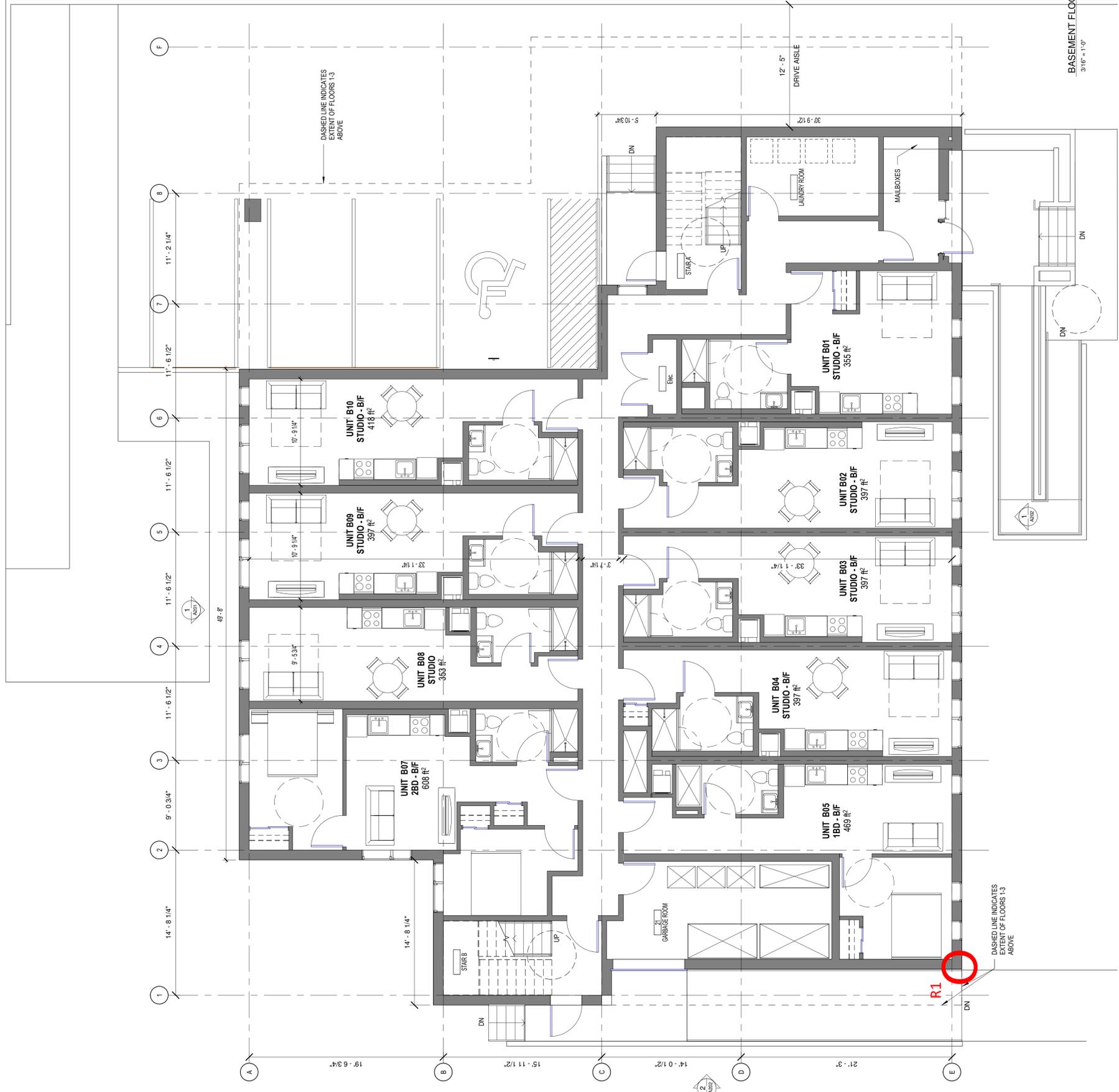
134 ROBINSON AVE. THREE
 STOREY APARTMENT
 BUILDING

134 Robinson Ave, Ottawa ON

BASEMENT PLAN

Author: J. [Name]
 Designer: J. [Name]
 Checker: J. [Name]
 Scale: 3/16" = 1'-0"
 Drawing Number: 6005R1B

A120



BASEMENT FLOOR PLAN
 3/16" = 1'-0"

APPROVED REFUSED
 THIS DAY OF _____, 20____
 DOUGLAS JAMES MCIR, PPS MANAGER
 DEVELOPMENT REVIEW CENTRAL
 PLANNING, INFRASTRUCTURE AND

Professional Engineer
 Mechanical Electrical Plumbing

Professional Engineer
 Electrical (20080)

Client/Owner



Architect/Architect
Rubin & Rotman
 architects
 ADDRESS: 134 Robinson Ave., Suite 300, Dallas, TX 75244
 PHONE: 214.881.8200
 WWW: www.rubinrotman.com

THIS PLAN IS TO BE USED ONLY FOR THE PROJECT AND SITE SPECIFICALLY IDENTIFIED ON THE PLANS. IT IS NOT TO BE USED FOR ANY OTHER PROJECT OR SITE. THE ARCHITECT ASSUMES NO LIABILITY FOR THE ACCURACY OF THE INFORMATION PROVIDED HEREON. THE ARCHITECT DOES NOT WARRANT THE ACCURACY OF THE INFORMATION PROVIDED HEREON. THE ARCHITECT DOES NOT WARRANT THE ACCURACY OF THE INFORMATION PROVIDED HEREON.

NOTES:
 1. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS OF EXISTING CONDITIONS.
 2. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS OF EXISTING CONDITIONS.
 3. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS OF EXISTING CONDITIONS.

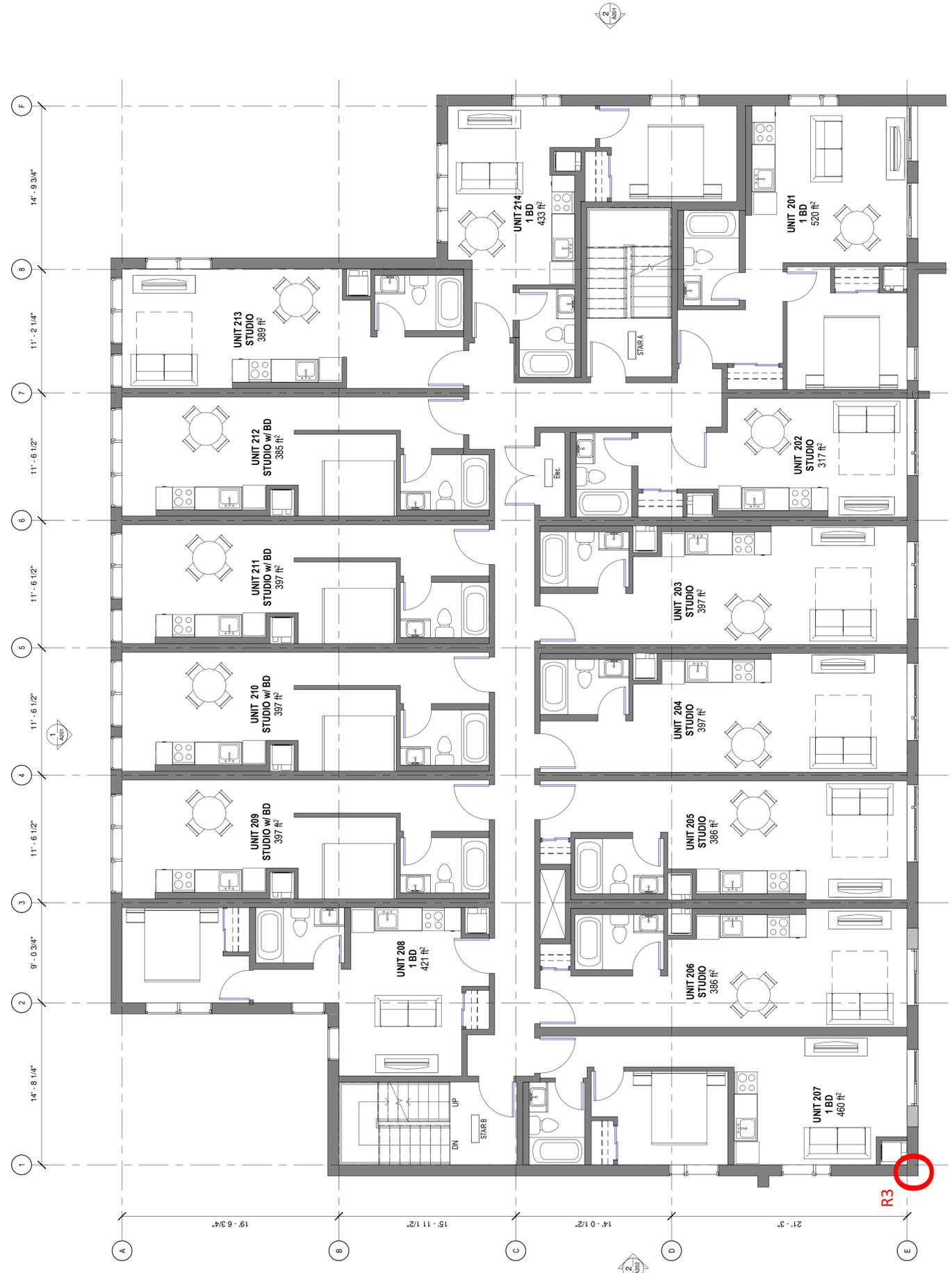
Project Name:
134 ROBINSON AVE. THREE STOREY APARTMENT BUILDING

134 Robinson Ave., Dallas, TX

SECOND FLOOR PLAN

Author: [Name]
 Designer: [Name]
 Checker: [Name]
 Date: 3/16/2020
 Scale: 3/16" = 1'-0"
 Drawing Number: 600518

A122



SECOND FLOOR PLAN
 3/16" = 1'-0"

APPROVED REFUSED
 THIS DAY OF _____, 20____
 DOUGLAS JAMES MCIR, PPS, MANAGER
 DEVELOPMENT REVIEW CENTRAL
 PLANNING, INFRASTRUCTURE AND

Professional Engineer (Mechanical/Electrical)
 Douglas James McIvor

Professional Engineer (Structural)
 Douglas James McIvor

Client/Owner



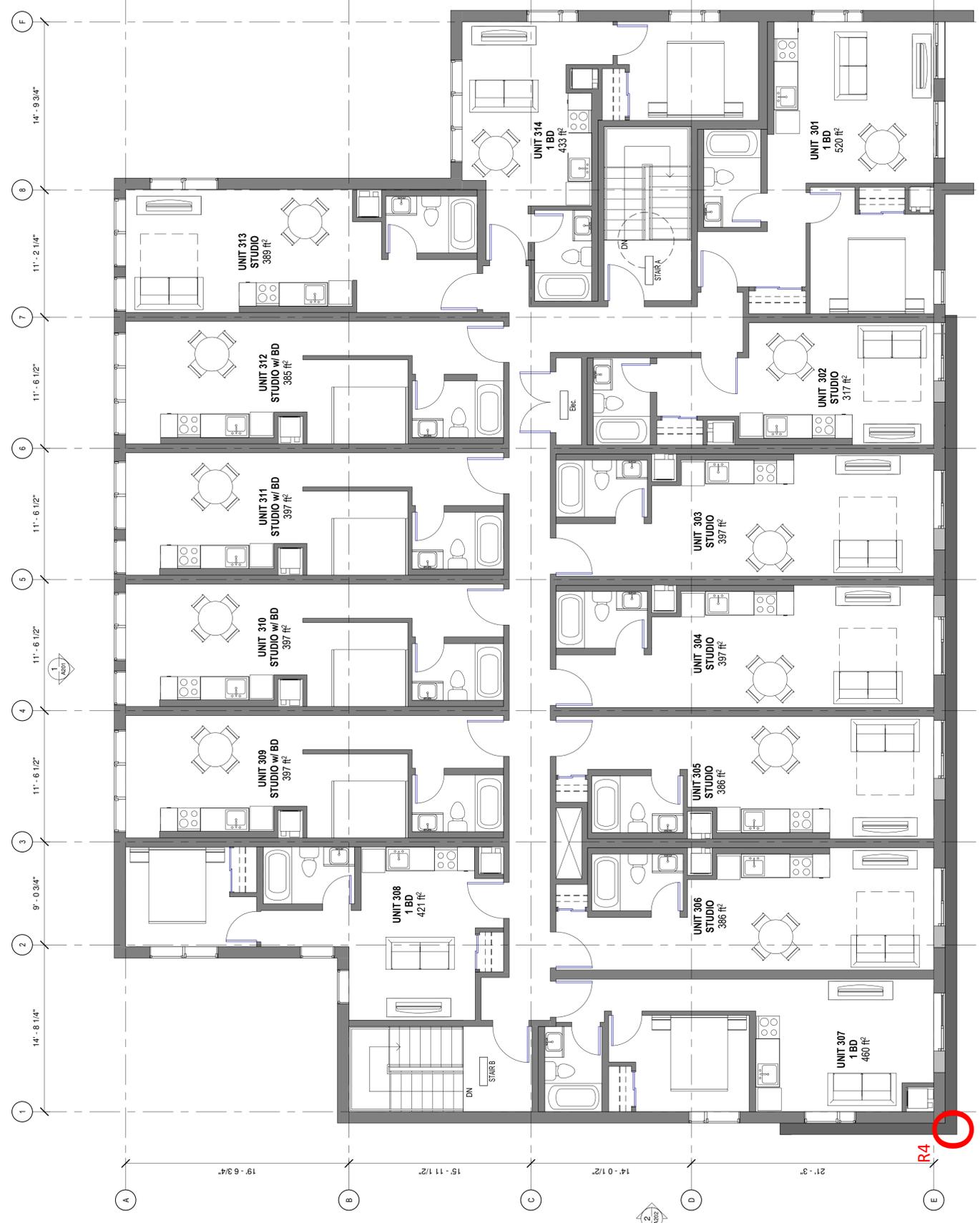
ADDRESS
 134 Robinson Ave.
 Dallas, TX 75201
 214.488.1233
 www.rubinrotman.com

DATE OF DRAWING/REVISION
 10/07/18
 1. 10/07/18
 2. 10/07/18
 3. 10/07/18
 4. 10/07/18
 5. 10/07/18
 6. 10/07/18
 7. 10/07/18
 8. 10/07/18
 9. 10/07/18
 10. 10/07/18
 11. 10/07/18
 12. 10/07/18
 13. 10/07/18
 14. 10/07/18
 15. 10/07/18
 16. 10/07/18
 17. 10/07/18
 18. 10/07/18
 19. 10/07/18
 20. 10/07/18

Project Name
 134 ROBINSON AVE. THREE
 STOREY APARTMENT
 BUILDING
 134 Robinson Ave, Dallas TX

THIRD FLOOR PLAN
 3/16" = 1'-0"
 1007118

A123



THIRD FLOOR PLAN
 3/16" = 1'-0"

APPROVED REFUSED
 THIS DAY OF _____, 20____
DOUGLAS JAMES MCIR, PRR MANAGER
 DEVELOPMENT REVIEW CENTRAL
 PLANNING, INFRASTRUCTURE AND

Registered Engineer
 Mechanical & Electrical (Electrical)

Registered Engineer
 (Structural / Structural)



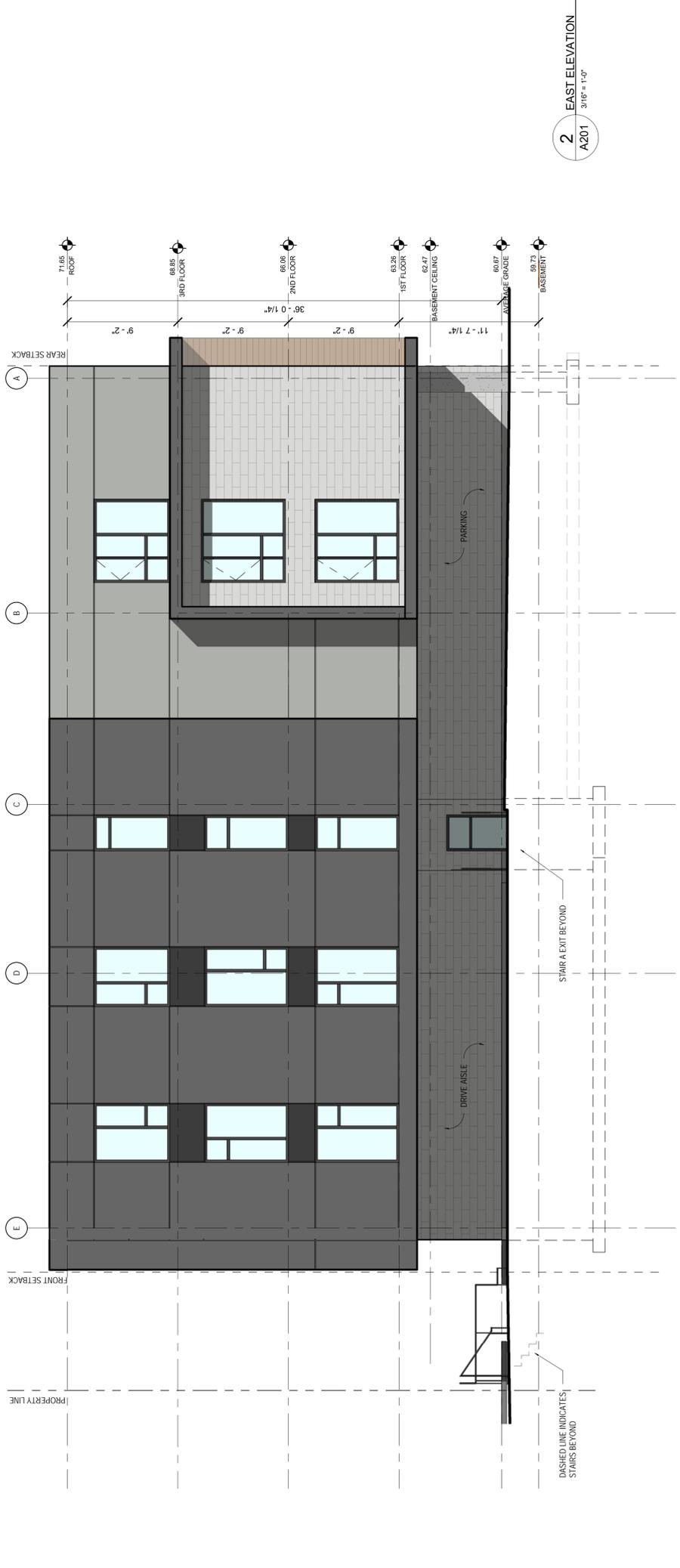
Architects
 1334 Robinson Ave.
 Ottawa, ON K1R 6L5
 Tel: 613-237-1111
 Fax: 613-237-1112
 www.rubinrotman.com

Total Project Copyright
 Ce document est un produit de l'architecte et ne peut être reproduit pour quelque raison que ce soit sans la permission écrite de l'architecte. Toute réimpression ou utilisation non autorisée sans la permission écrite de l'architecte est formellement interdite.
 This drawing is subject to copyright. Its use to be reproduced for any purpose or by any means, and may only be used if done so in original form and signed.

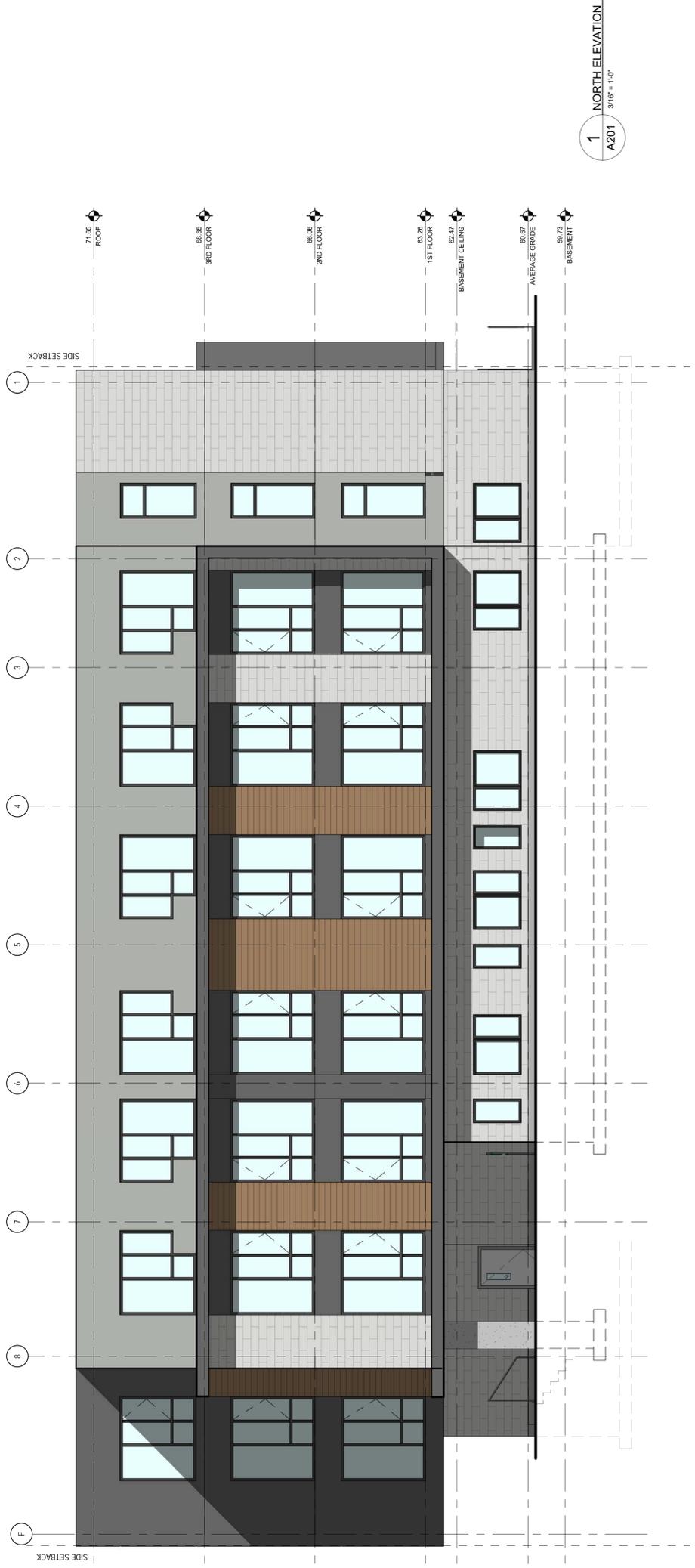
Project Name
134 ROBINSON AVE. THREE STOREY APARTMENT BUILDING

134 Robinson Ave., Ottawa ON
 Exterior Elevations
 Drawing created date: 05/18/18
 Drawing created date: 05/18/18

2 EAST ELEVATION
 A201 3/16" = 1'-0"



1 NORTH ELEVATION
 A201 3/16" = 1'-0"



APPROVED REFUSED
 THIS DAY OF 20
 DOUGLAS JAMES MCIR RPP MANAGER
 DEVELOPMENT REVIEW CENTRAL
 PLANNING, INFRASTRUCTURE AND

Registered Engineer
 (Mechanical Electrical)

Registered Engineer
 (Structural)

Client/Drawn

TCU

Architect/Architect
 Rublin & Rotman
 Architects
 2048 205
 Avenue
 1H2 2N1
 1 14 88 133
 1 14 88 133
 www.rublinrotman.com

Total Elevation Copyright
 Ce document est un produit de notre bureau d'architecture et est protégé par la loi sur le droit de la propriété intellectuelle. Toute réimpression ou utilisation non autorisée sans la permission écrite de la firme est formellement interdite. Toute réimpression ou utilisation non autorisée sans la permission écrite de la firme est formellement interdite. Toute réimpression ou utilisation non autorisée sans la permission écrite de la firme est formellement interdite.

Notes:
 1. Les dimensions des murs et des ouvertures sont en millimètres.
 2. Les dimensions des murs et des ouvertures sont en millimètres.
 3. Les dimensions des murs et des ouvertures sont en millimètres.
 4. Les dimensions des murs et des ouvertures sont en millimètres.
 5. Les dimensions des murs et des ouvertures sont en millimètres.

Project/Project
 134 ROBINSON AVE. THREE
 STOREY APARTMENT
 BUILDING

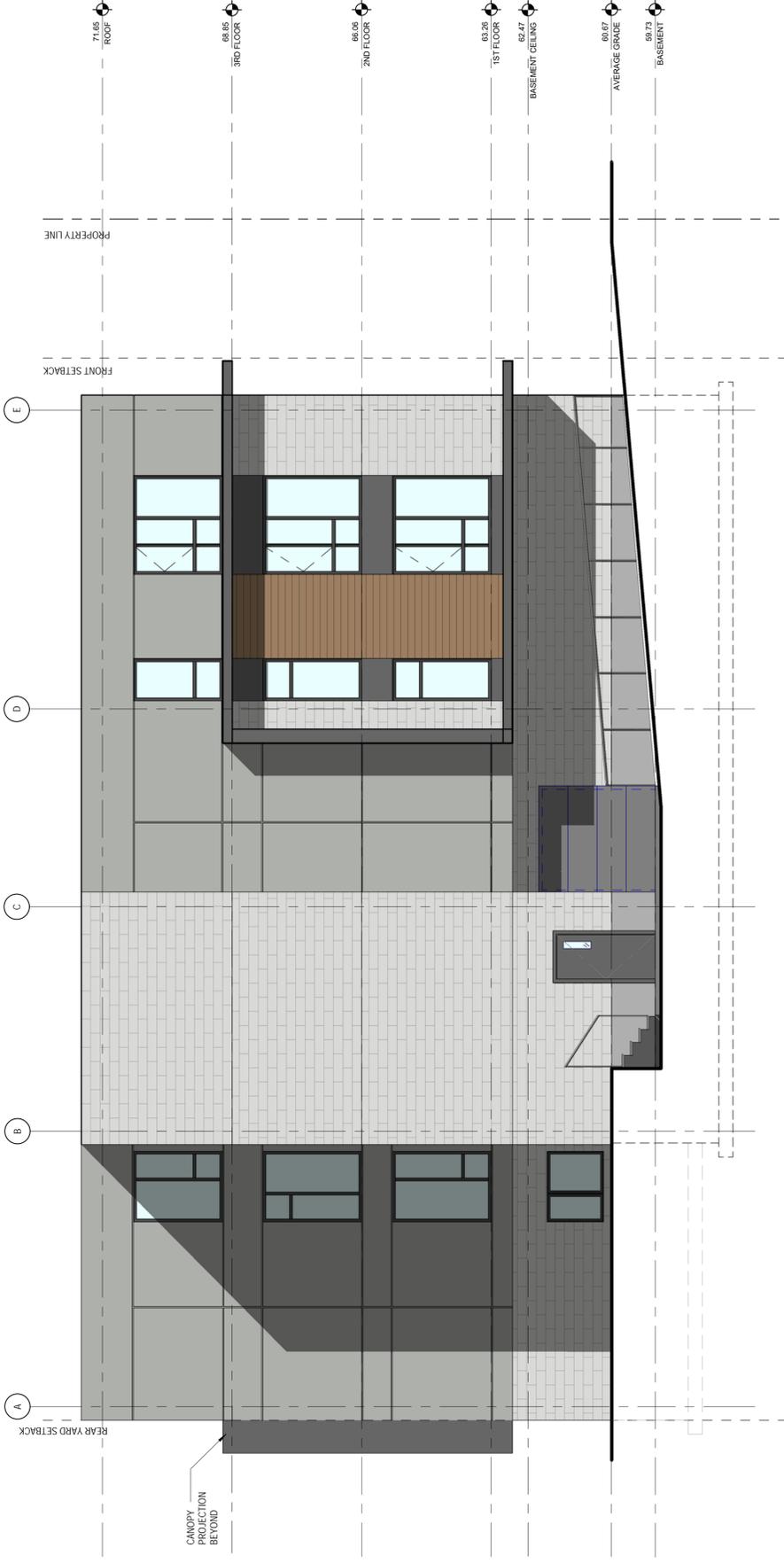
The File
 134 Robinson Ave, Ottawa ON

EXTERIOR ELEVATIONS

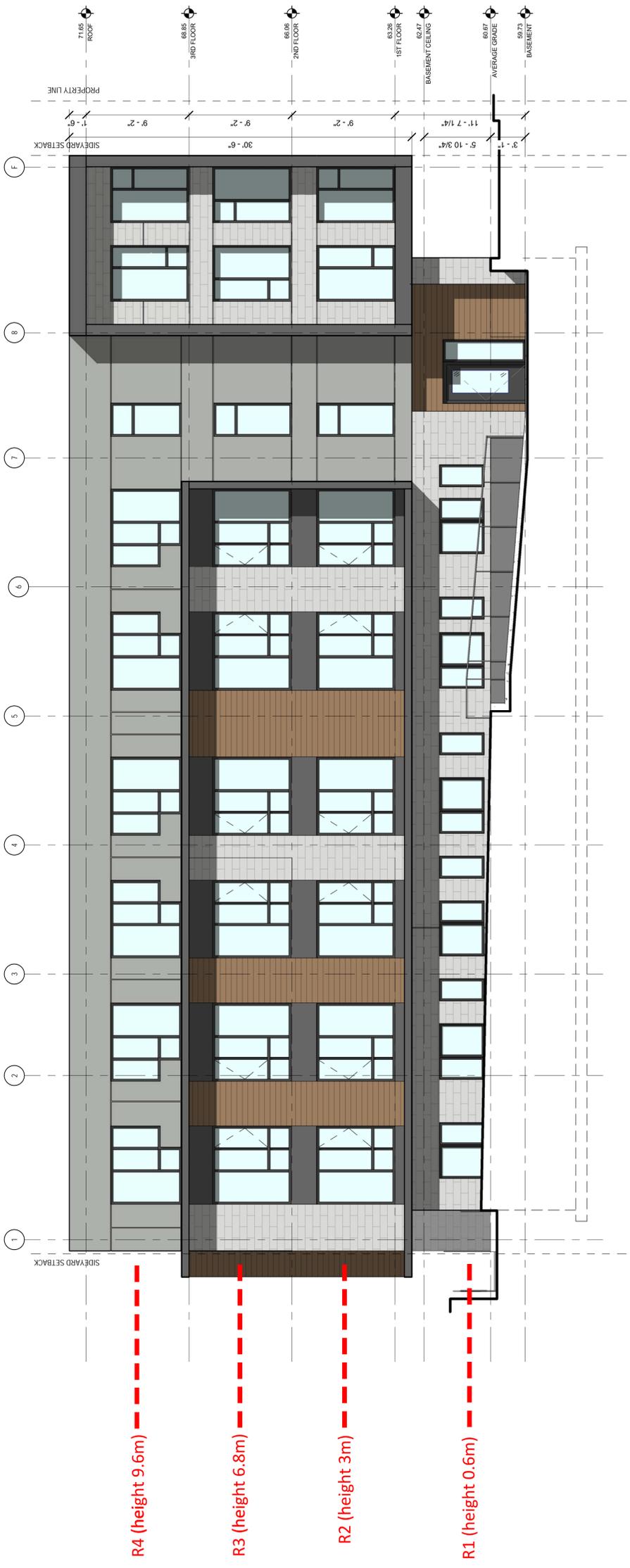
Author/Author No. Project/Project number
 1358
 Verifier/Verifier No. Room/Room number
 Checker/Checker
 Scale/Scale
 3/16" = 1'-0"

Title of elevation in french /
 Dessin creation date
 09/05/18

A202



2 WEST ELEVATION
 A202 3/16" = 1'-0"



1 SOUTH ELEVATION
 A202 3/16" = 1'-0"

NOISE ASSESSMENT REPORT -134 ROBINSON AVENUE

Appendix C NOISE WARNING CLAUSE
November 12, 2018

Appendix C NOISE WARNING CLAUSE

NOISE ASSESSMENT REPORT -134 ROBINSON AVENUE

Appendix C NOISE WARNING CLAUSE
November 12, 2018

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

NOISE ASSESSMENT REPORT -134 ROBINSON AVENUE

Appendix C NOISE WARNING CLAUSE
November 12, 2018

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."

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 include 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."

NOISE ASSESSMENT REPORT -134 ROBINSON AVENUE

Appendix C NOISE WARNING CLAUSE
November 12, 2018

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.