

Geotechnical  
Engineering

Environmental  
Engineering

Hydrogeology

Geological  
Engineering

Materials Testing

Building Science

Archaeological Services

## Environmental Noise Control Study

Proposed Multi-Storey Residential Building  
61 Pinehurst Avenue, Ottawa

Prepared For

Mr. Ali Karimi

### Paterson Group Inc.

Consulting Engineers  
154 Colonnade Road South  
Ottawa (Nepean), Ontario  
Canada K2E 7J5

Tel: (613) 226-7381

Fax: (613) 226-6344

[www.patersongroup.ca](http://www.patersongroup.ca)

April 19, 2021

Report: PG5723-1

<b>Table of Contents</b>	<b>Page</b>
<b>1.0 Introduction.....</b>	<b>1</b>
<b>2.0 Background.....</b>	<b>1</b>
<b>3.0 Methodology and Noise Assessment Criteria.....</b>	<b>2</b>
<b>4.0 Analysis .....</b>	<b>5</b>
<b>5.0 Results .....</b>	<b>8</b>
<b>6.0 Discussion and Recommendations</b>	
6.1 Outdoor Living Areas.....	9
6.2 Indoor Living Areas and Ventilation.....	9
<b>7.0 Summary of Findings.....</b>	<b>10</b>
<b>8.0 Statement of Limitations .....</b>	<b>11</b>

## **Appendices**

Appendix 1    Table 8 - Summary of Reception Points and Geometry  
                  Drawing PG5723-1 - Site Plan  
                  Drawing PG5723-2 - Receptor Location Plan  
                  Drawing PG5723-3 - Site Geometry  
                  Drawing PG5723-3A - Site Geometry (REC 1-1 and REC 1-3)  
                  Drawing PG5723-3B - Site Geometry (REC 2-1 and REC 2-3)  
                  Drawing PG5723-3C - Site Geometry (REC 3-1 and REC 3-3)  
                  Drawing PG5723-3D - Site Geometry (REC 4-1 and REC 4-3)  
                  Drawing PG5723-3E - Site Geometry (REC 5)

Appendix 2    STAMSON Results

## 1.0 Introduction

Paterson Group (Paterson) was commissioned by Mr. Ali Karimi to conduct an environmental noise control study for the proposed residential building to be located at 61 Pinehurst Avenue, in the City of Ottawa.

The objective of the current study is to:

- ❑ Determine the primary noise sources impacting the site and compare the projected sound levels to guidelines set out by the Ministry of Environment and Climate Change (MOECC) and the City of Ottawa.
- ❑ Review the projected noise levels and offer recommendations regarding warning classes, construction materials or alternative sound barriers.

The following report has been prepared specifically and solely for the aforementioned project which is described herein. It contains our findings and includes acoustical recommendations pertaining to the design and construction of the subject development as they are understood at the time of writing this report.

This study has been conducted according to City of Ottawa document - Engineering Noise Control Guidelines (ENCG), dated January 2016, and the Ontario Ministry of the Environment Guideline NPC-300.

## 2.0 Background

It is understood that the proposed project will consist of a three storey residential building. Associated at-grade walkways, parking areas and landscaped areas are also anticipated. A rooftop patio is further anticipated at the building.

### 3.0 Methodology and Noise Assessment Criteria

The City of Ottawa outlines three (3) sources of environmental noise that must be analyzed separately:

- ☐ Surface Transportation Noise
- ☐ Stationary Noise
  - ☐ new noise-sensitive development applications (noise receptors) in proximity to existing or approved stationary sources of noise, and
  - ☐ new stationary sources of noise (noise generating) in proximity to existing or approved noise-sensitive developments
- ☐ Aircraft noise

#### Surface Transportation Noise

The City of Ottawa's Official Plan, in addition to the ENCG dictate that the influence area must contain any of following conditions to classify as a surface transportation noise source for a subject site:

- ☐ Within 100 m of the right-of-way of an existing or proposed arterial, collector or major collector road; a light rail transit corridor; bus rapid transit, or transit priority corridor
- ☐ Within 250 m of the right-of-way for an existing or proposed highway or secondary rail line
- ☐ Within 300 m from the right of way of a proposed or existing rail corridor or a secondary main railway line
- ☐ Within 500 m of an existing 400 series provincial highway, freeway or principle main railway line.

The NPC-300 outlines the limitations of the stationary and environmental noise levels in relation to the location of the receptors. These can be found in the following tables:

Table 1 - Sound Level Limits for Outdoor Living Areas	
Time Period	Required $L_{eq(16)}$ (dBA)
16-hour, 7:00-23:00	55
<input type="checkbox"/> Standards taken from Table 2.2a; Sound Level Limit for Outdoor Living Areas - Road and Rail	

<b>Table 2 - Sound Level Limits for Indoor Living Area</b>			
<b>Type of Space</b>	<b>Time Period</b>	<b>Required <math>L_{eq}</math> (dBA)</b>	
		<b>Road</b>	<b>Rail</b>
Living/Dining, den areas of residences, hospitals, nursing homes, schools, daycare centres, etc	7:00-23:00	45	40
Theaters, place of worship, libraries, individual or semi-private offices, conference rooms, reading rooms	23:00-7:00	45	40
Sleeping quarters	7:00-23:00	45	40
	23:00-7:00	40	35
<input type="checkbox"/> Standards taken from Table 2.2b; Sound Level Limit for Indoor Living Areas - Road and Rail			

It is noted in the ENCG that the limits outlined in Table 2 are for the sound levels on the interior of the glass pane. The ENCG further goes on to state that the limit for the exterior of the pane of glass will be 55 dBA.

If the sound level limits are exceeded at the window panes for the indoor living areas, the following Warning Clauses may be referenced:

<b>Table 3 - Warning Clauses for Sound Level Exceedances</b>	
<b>Warning Clause</b>	<b>Description</b>
Warning Clause Type A	"Purchasers/tenants are advised that sound levels due to increasing road traffic (rail traffic) (air traffic) may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment."
Warning Clause Type B	"Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road traffic (rail traffic) (air traffic) may on occasions interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment."
Warning Clause Type C	"This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning by the occupant in low and medium density developments will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment."
Warning Clause Type D	"This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment."
<input type="checkbox"/> Clauses taken from section C8 Warning Clauses; Environmental Noise Guidelines - NPC-300	

## Stationary Noise

Stationary noise sources include sources or facilities that are fixed or mobile and can cause a combination of sound and vibration levels emitted beyond the property line. These sources may include commercial air conditioner units, generators and fans. Facilities that may contribute to stationary noise may include car washes, snow disposal sites, transit stations and manufacturing facilities.

The subject site is not in proximity to existing or approved stationary sources of noise. Therefore, a stationary noise analysis will not be required.

## Aircraft/Airport Noise

The subject site is not located within the Airport Vicinity Development Zone. Therefore this project will not require an aircraft/airport noise analysis. No warning clauses regarding aircraft or airport noise will be required.

## 4.0 Analysis

### Surface Transportation Noise

The subject building is bordered to the north by residential dwellings and commercial buildings, followed by Scott Street and the Confederation Rail Line, to the east by residential dwellings and Hinchey Avenue, to the west by Pinehurst Avenue followed by residential dwellings, commercial buildings and Parkdale Avenue, and to the south by residential dwellings followed by Bullman Street. Scott Street, Hinchey Avenue, Bullman Street, Pinehurst Avenue and Parkdale Avenue are identified within the 100 m radius of proposed development.

Based on the City of Ottawa Official Plan, Schedule F, Scott Street is considered a 4 lane urban arterial road undivided (4-UAU). Parkdale Avenue is considered a 2 lane urban arterial road (2-UAU). Other roads within the 100 m radius of the development are not classified as either arterial, collector or major collector roads and are therefore not included in this study.

The Confederation Rail Line is located within 300 m of the proposed development. It is understood the Confederation Rail Line is used by O-Train Rail. Based on a phone discussion with OC Transpo personnel, the method to determine the volume of trains along the rail line is to count the number of departures off of the train schedule. The copy of train schedule is included in Appendix 3. It was further confirmed by OC Transpo that each O-Train consists of an electric locomotive pulling 1 car.

All noise sources are presented in Drawing PG5723-3 - Site Geometry located in Appendix 1.

The noise levels from road traffic are provided by the City of Ottawa, taking into consideration the right-of-way width and the implied roadway class. It is understood that these values represent the maximum allowable capacity of the proposed roadways. The parameters to be used for sound level predictions can be found below.

<b>Table 4 - Traffic and Road Parameters</b>						
<b>Road</b>	<b>Implied Roadway</b>	<b>AADT (Veh/day)</b>	<b>Posted Speed (km/h)</b>	<b>Day/Night Split %</b>	<b>Medium Truck %</b>	<b>Heavy Truck %</b>
Scott Street	4-UAU	30000	50	92/8	7	5
Parkdale Avenue	2-UAU	15000	40	92/8	7	5
<input type="checkbox"/> Data obtained from the City of Ottawa document ENCG or calculated from OC Transpo online schedules						

<b>Table 5 - Rail Parameters</b>				
<b>Rail Line</b>	<b>Engine Type</b>	<b>Maximum Speed (km/hr)</b>	<b>Number of Trips/day</b>	<b>Length of Train</b>
O-Train Rail	Electric	80	468	2

Three (3) levels of reception points were selected for this analysis. The following elevations were selected from the heights provided on the survey plan for the subject building.

<b>Table 6 - Elevation of Reception Points</b>			
<b>Floor Number</b>	<b>Elevation at Centre of Window (m)</b>	<b>Floor Use</b>	<b>Daytime/Nighttime Analysis</b>
Ground Floor	1.5	Living Area/Bedroom	daytime/nighttime
Third Floor	7.5	Living Area/Bedroom	daytime/nighttime
Rooftop	10.5	--	Outdoor Living Area

For this analysis, a reception point was taken at the centre of each floor, at the ground floor and third floor. An outdoor living area - rooftop patio is anticipated at the proposed building. A reception point in the centre of rooftop, 10.5 m high, was selected for the analysis of this area. Reception points are detailed on Drawing PG5723-2 - Receptor Locations presented in Appendix 1.

All horizontal distances have been measured from the reception point to the edge of the right-of-way. The rail line was analyzed where it intersects the 300 m buffer zone, the roadways were analyzed where they intersected the 100 m buffer zone, which is reflected in the local angles described in Paterson Drawings PG5723-3A to 3E - Site Geometry in Appendix 1.

Table 8 - Summary of Reception Points and Geometry, located in Appendix 1, provides a summary of the points of reception and their geometry with respect to the noise sources. The analysis is completed so that no effects of sound reflection off of the building facade are considered, as stipulated by the ENCG.

The subject site is gently sloping downward to north and at grade with the neighbouring roads within 100 m radius. It should be noted that the rail line is located within a trench that is 2 m lower than the neighbouring properties and roads.

The analysis was completed using STAMSON version 5.04, a computer program which uses the road and rail traffic noise prediction methods using ORNAMENT (Ontario Road Noise Analysis Method for Environment and Transportation) and STEAM (Sound from Trains Environment Analysis Method), publications from the Ontario Ministry of Environment and Energy.

## 5.0 Results

### Surface Transportation

The primary descriptors are the 16-hour daytime and the 8-hour night time equivalent sound levels,  $L_{eq(16)}$  and the  $L_{eq(8)}$  for City roads.

The proposed traffic noise levels were analyzed at all reception points. The results of the STAMSON software can be located in Appendix 2, and the summary of the results can be noted in Table 7.

<b>Table 7 - Proposed Noise Levels</b>				
<b>Reception Point</b>	<b>Description</b>	<b>OLA (dBA)</b>	<b>Daytime at Facade <math>L_{EQ(16)}</math> (dBA)</b>	<b>Nighttime at Facade <math>L_{eq(8)}</math> (dBA)</b>
REC 1-1	Eastern Elevation, 1st Floor	--	54.59	46.47
REC 1-3	Eastern Elevation, 3rd Floor	--	55.86	47.70
REC 2-1	Southern Elevation, 1st Floor	--	41.59	34.00
REC 2-3	Southern Elevation, 3rd Floor	--	43.11	35.52
REC 3-1	Western Elevation, 1st Floor	--	57.71	49.78
REC 3-3	Western Elevation, 3rd Floor	--	58.93	50.97
REC 4-1	Northern Elevation, 1st Floor	--	59.98	52.05
REC 4-3	Northern Elevation, 3rd Floor	--	61.10	53.10
REC 5	Rooftop Patio	61.68	--	--

## 6.0 Discussion and Recommendations

### 6.1 Outdoor Living Areas

A roof top patio is anticipated in the centre of the proposed building. One (1) receptor point was selected for the analysis at outdoor living area (REC 5). It is assumed that the roof top patio will only be utilized as an outdoor living area provided that the proposed building is constructed. The proposed  $L_{eq(16)}$  at the roof top patio will be 61.68 dBA, which exceeds the 55 dBA threshold value specified by the ENCG.

The outdoor living area was designed as a roof top patio, which will increase the total distance between the noise and receptor points. Utilizing this type of outdoor living area, the exterior cladding of the building will act as a noise barrier, providing noise relief to the roof top patio. Utilizing the exterior of the building as a barrier, including the 1 m solid railing that will extend around the perimeter of the roof top patio, the proposed  $L_{eq(16)}$  at the roof top patio will be 60.62 dBA. Although the anticipated noise level is reduced by our mitigation measures, it still exceeds the 55 dBA threshold value specified by the ENCG. Therefore, a phase 2 analysis will be required to reduce the anticipated noise level to the 55 dBA threshold value specified by the ENCG.

### 6.2 Indoor Living Areas and Ventilation

The results of the STAMSON modeling indicates that the daytime  $L_{eq(16)}$  ranges between 41.59 dBA and 61.10 dBA. The ENCG states that the limits for the exterior of the pane of glass is 55 dBA. This value was exceeded at eastern, western and northern elevations. Therefore, units on the eastern, western and northern elevations should be designed with the provision for a central air conditioning unit. Additionally, warning clause Type C, as outlined in Table 3, is required for all units on the eastern, western and northern elevations of the building. It is also noted that the modeling indicates that the  $L_{eq(16)}$  is below 65 dBA, and therefore standard building materials are acceptable to provide adequate soundproofing.

## 7.0 Summary of Findings

The subject site is located at 61 Pinehurst Avenue in the City of Ottawa. It is understood that the proposed development will consist of a 3-storey residential building. The associated analysis identified three surface transportation noise sources: Scott Street, Parkdale Avenue, and the Confederation Corridor O-Train Rail Line.

A roof top patio is anticipated at the building. The preliminary analysis indicated that there was an exceedance at this reception point. After utilizing the mitigation measures, including maximizing the distance setback, the anticipated noise level at the outdoor living area is reduced, but it still exceeds the 55 dBA guideline specified by the ENCG. Therefore, a phase 2 analysis will be required to reduce the anticipated noise level to the 55 dBA guideline specified by the ENCG.

Several reception points were selected for the analysis, consisting of pane of glass reception points on both the first and top level. The northern, eastern and western elevations of the proposed building exceeded the 55 dBA guideline specified by the ENCG. Therefore, a warning clause Type C will be required for units on the eastern, western and northern elevations. Additionally, units on the eastern, western and northern elevations should be designed with the provision for a central air conditioning unit.

The following warning clause is to be included on all Offers of Purchase and Sale and/or lease agreements:

"This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning by the occupant in low and medium density developments will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment."

## 8.0 Statement of Limitations

The recommendations made in this report are in accordance with our present understanding of the project. Our recommendations should be reviewed when the project drawings and specifications are complete.

The present report applies only to the project described in this document. Use of this report for purposes other than those described herein or by person(s) other than Mr. Ali Karimi or his agent(s) is not authorized without review by this firm for the applicability of our recommendations to the altered use of the report.

### Paterson Group Inc.



Stephanie A. Boisvenue, P.Eng.



Scott S. Dennis, P.Eng.

### Report Distribution:

- ☐ Mr. Ali Karimi (3 copies)
- ☐ Paterson Group (1 copy)

# **APPENDIX 1**

## **TABLE 8 - SUMMARY OF RECEPTION POINTS AND GEOMETRY**

**DRAWING PG5723-1 - SITE PLAN**

**DRAWING PG5723-2 - RECEPTOR LOCATION PLAN**

**DRAWING PG5723-3 - SITE GEOMETRY**

**DRAWING PG5723-3A - SITE GEOMETRY (REC 1-1 and REC 1-3)**

**DRAWING PG5723-3B - SITE GEOMETRY (REC 2-1 and REC 2-3)**

**DRAWING PG5723-3C - SITE GEOMETRY (REC 3-1 and REC 3-3)**

**DRAWING PG5723-3D - SITE GEOMETRY (REC 4-1 and REC 4-3)**

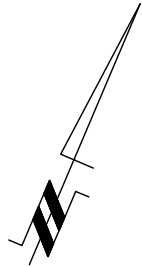
**DRAWING PG5723-3E - SITE GEOMETRY (REC 5)**

Table 8 - Summary of Reception Points and Geometry  
61 Pinehurst Avenue

Point of Reception	Location	Leq Day (dBA)	Scott Street						Parkdale Avenue					
			Horizontal (m)	Vertical (m)	Total (m)	Local Angle (degree)	Number of Rows of Houses	Density (%)	Horizontal (m)	Vertical (m)	Total (m)	Local Angle (degree)	Number of Rows of Houses	Density (%)
REC 1-1	Eastern Elevation, 1st Floor	54.59	60	1.5	60.02	0, 58	1	40	n/a	n/a	n/a	n/a	n/a	n/a
REC 1-3	Eastern Elevation, 3rd Floor	55.86	60	7.5	60.47	0, 58	1	40	n/a	n/a	n/a	n/a	n/a	n/a
REC 2-1	Southern Elevation, 1st Floor	41.59	n/a	n/a	n/a	n/a	n/a	n/a	100	1.5	100.01	-30, 0	2	40
REC 2-3	Southern Elevation, 3rd Floor	43.11	n/a	n/a	n/a	n/a	n/a	n/a	100	7.5	100.3	-30, 0	2	40
REC 3-1	Western Elevation, 1st Floor	57.71	50	1.5	50.02	-72, 0	1	20	95	1.5	95.01	-33, 34	2	40
REC 3-3	Western Elevation, 3rd Floor	58.93	50	7.5	50.56	-72, 0	1	20	95	7.5	95.3	-33, 34	2	40
REC 4-1	Northern Elevation, 1st Floor	59.98	45	1.5	45.02	-76, 62	1	40	100	1.5	100.01	0, 25	2	40
REC 4-3	Northern Elevation, 3rd Floor	61.10	45	7.5	45.62	-76, 62	1	40	100	7.5	100.3	0, 25	2	40
REC 5	Rooftop Patio	61.68	55	10.5	56.0	-74, 60	1	20	100	10.5	100.55	-28, 28	2	40

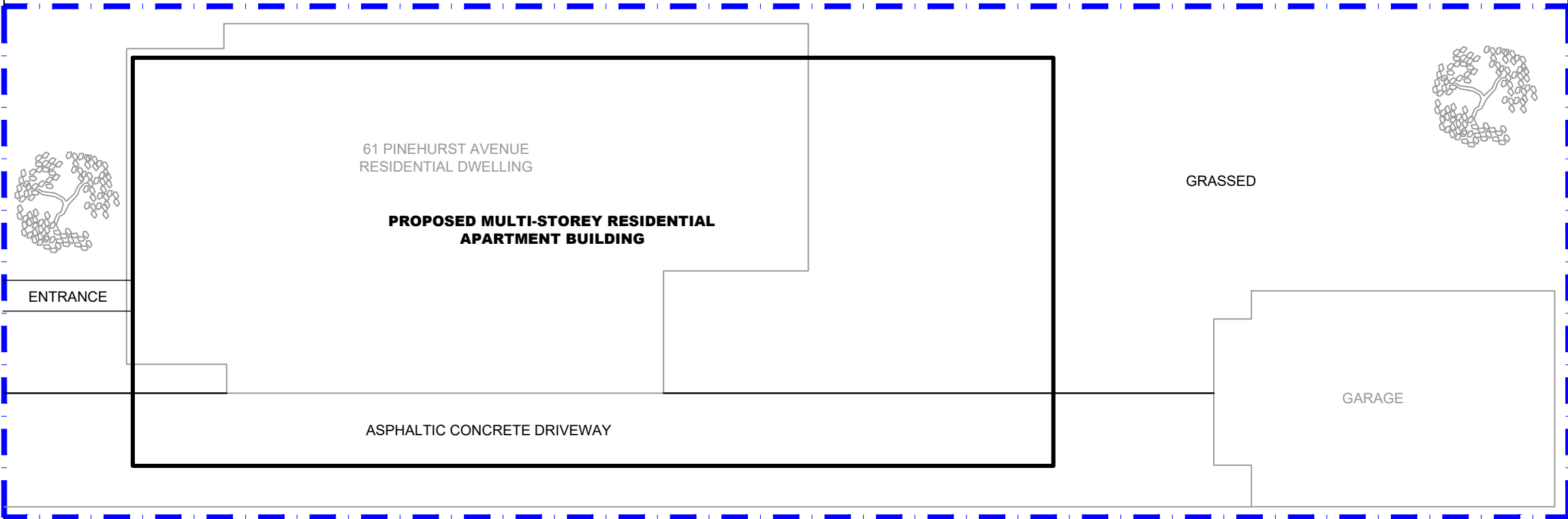
Table 8 - Summary of Reception Points and Geometry  
61 Pinehurst Avenue

Point of Reception	Location	Leq Day (dBA)	Confederation Rail Line											
			Horizontal (m)	Vertical (m)	Total (m)	Local Angle (degree)	Number of Rows of Houses	Density (%)						
REC 1-1	Eastern Elevation, 1st Floor	54.59	95	1.5	95.01	0, 68	1	40						
REC 1-3	Eastern Elevation, 3rd Floor	55.86	95	7.5	95.3	0, 68	1	40						
REC 2-1	Southern Elevation, 1st Floor	41.59	n/a	n/a	n/a	n/a	n/a	n/a						
REC 2-3	Southern Elevation, 3rd Floor	43.11	n/a	n/a	n/a	n/a	n/a	n/a						
REC 3-1	Western Elevation, 1st Floor	57.71	100	1.5	100.01	-83, 0	1	20						
REC 3-3	Western Elevation, 3rd Floor	58.93	100	7.5	100.3	-83, 0	1	20						
REC 4-1	Northern Elevation, 1st Floor	59.98	90	1.5	90.01	-84, 69	1	40						
REC 4-3	Northern Elevation, 3rd Floor	61.10	90	7.5	90.3	-84, 69	1	40						
REC 5	Rooftop Patio	61.68	95	10.5	95.6	-83, 69	1	20						



PINEHURST AVENUE

SIDEWALK



**patersongroup**  
consulting engineers

154 Colonnade Road South  
Ottawa, Ontario K2E 7J5  
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL

MR. ALI KARIMI

NOISE ATTENUATION STUDY

PROPOSED MULTI-STOREY RESIDENTIAL BUILDING

61 PINEHURST AVENUE

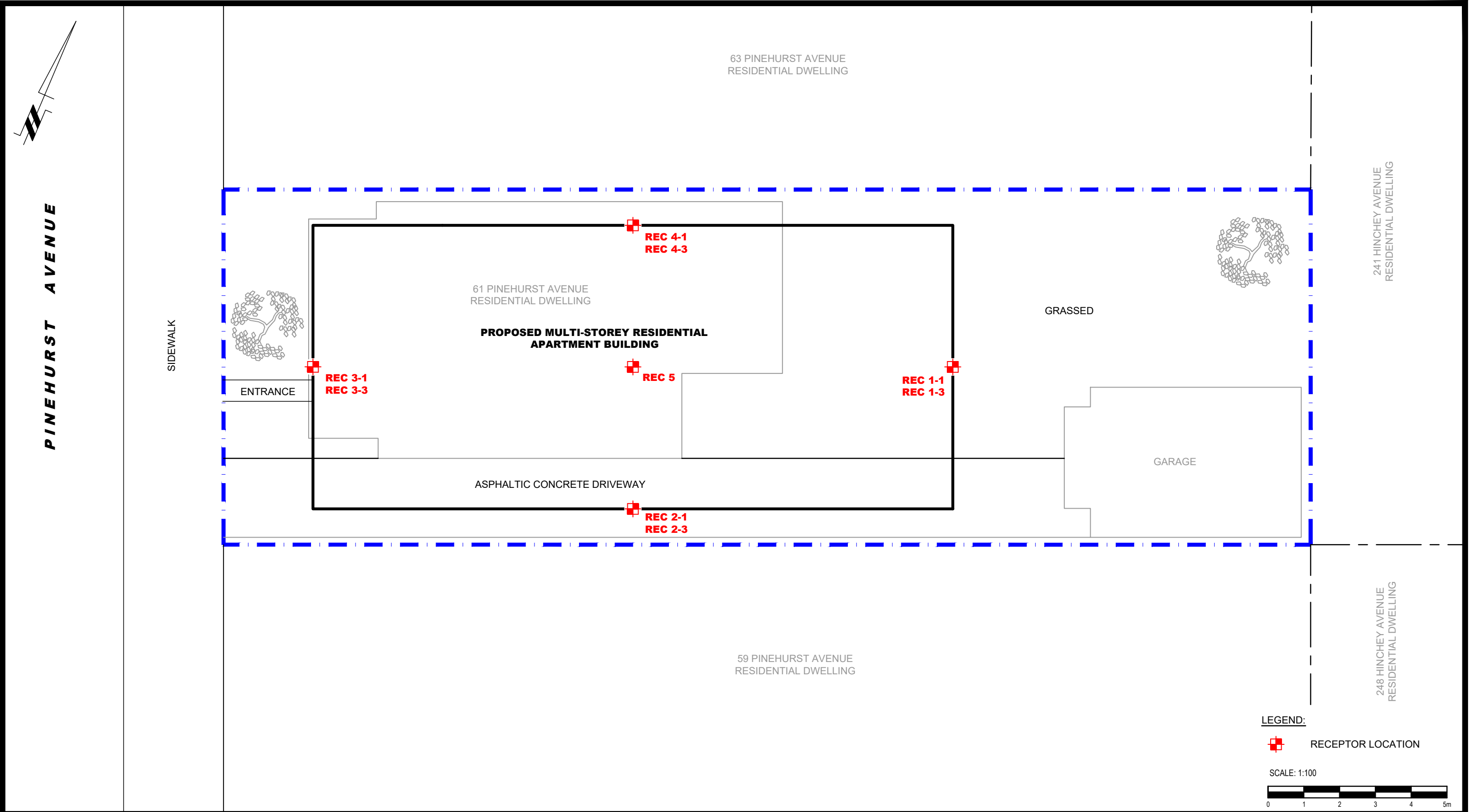
OTTAWA, ONTARIO

Title:

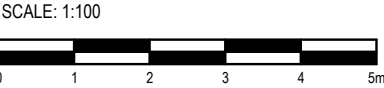
SITE PLAN

Scale:	1:100	Date:	02/2021
Drawn by:	YA	Report No.:	PG5723-1
Checked by:	SB	Dwg No.:	PG5723-1
Approved by:	DJG	Revision No.:	

p:\autocad drawings\geotechnical\pg5723\pg5723-1-site plan.dwg



LEGEND:  
 RECEPTOR LOCATION



**pater**songroup  
consulting engineers

154 Colonnade Road South  
Ottawa, Ontario K2E 7J5  
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL

MR.ALI KARIMI

NOISE ATTENUATION STUDY

PROPOSED MULTI-STOREY RESIDENTIAL BUILDING

61 PINEHURST AVENUE

ONTARIO

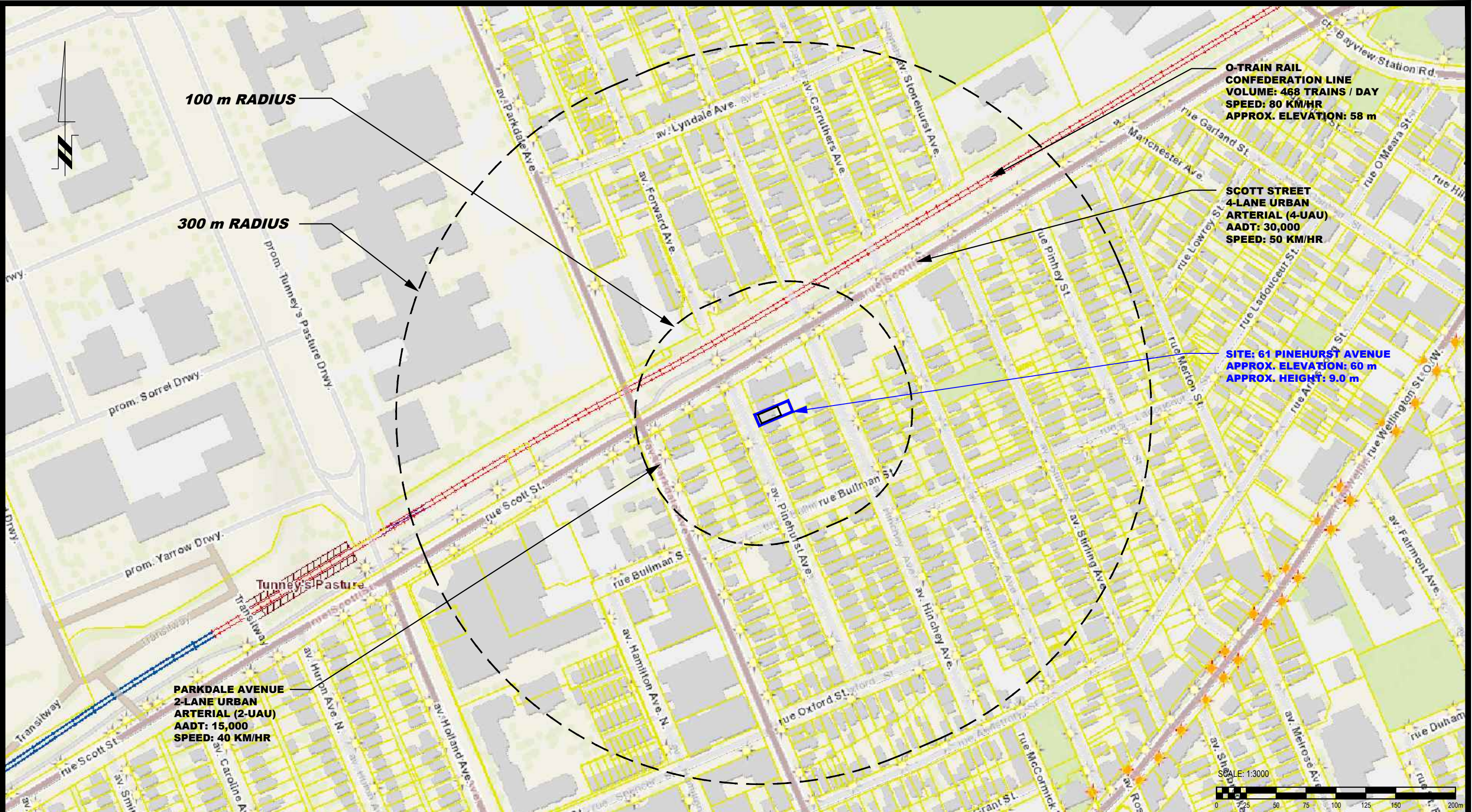
OTTAWA,

Title:

RECEPTOR LOCATION PLAN

Scale:	1:100	Date:	02/2021
Drawn by:	YA	Report No.:	PG5723-1
Checked by:	SB	Dwg No.:	PG5723-2
Approved by:	DJG	Revision No.:	

p:\autocad drawings\geotechnical\pg5723\pg5723-2-receptor location plan.dwg



**patersongroup**  
consulting engineers

154 Colonnade Road South  
Ottawa, Ontario K2E 7J5  
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL

OTTAWA,  
Title:

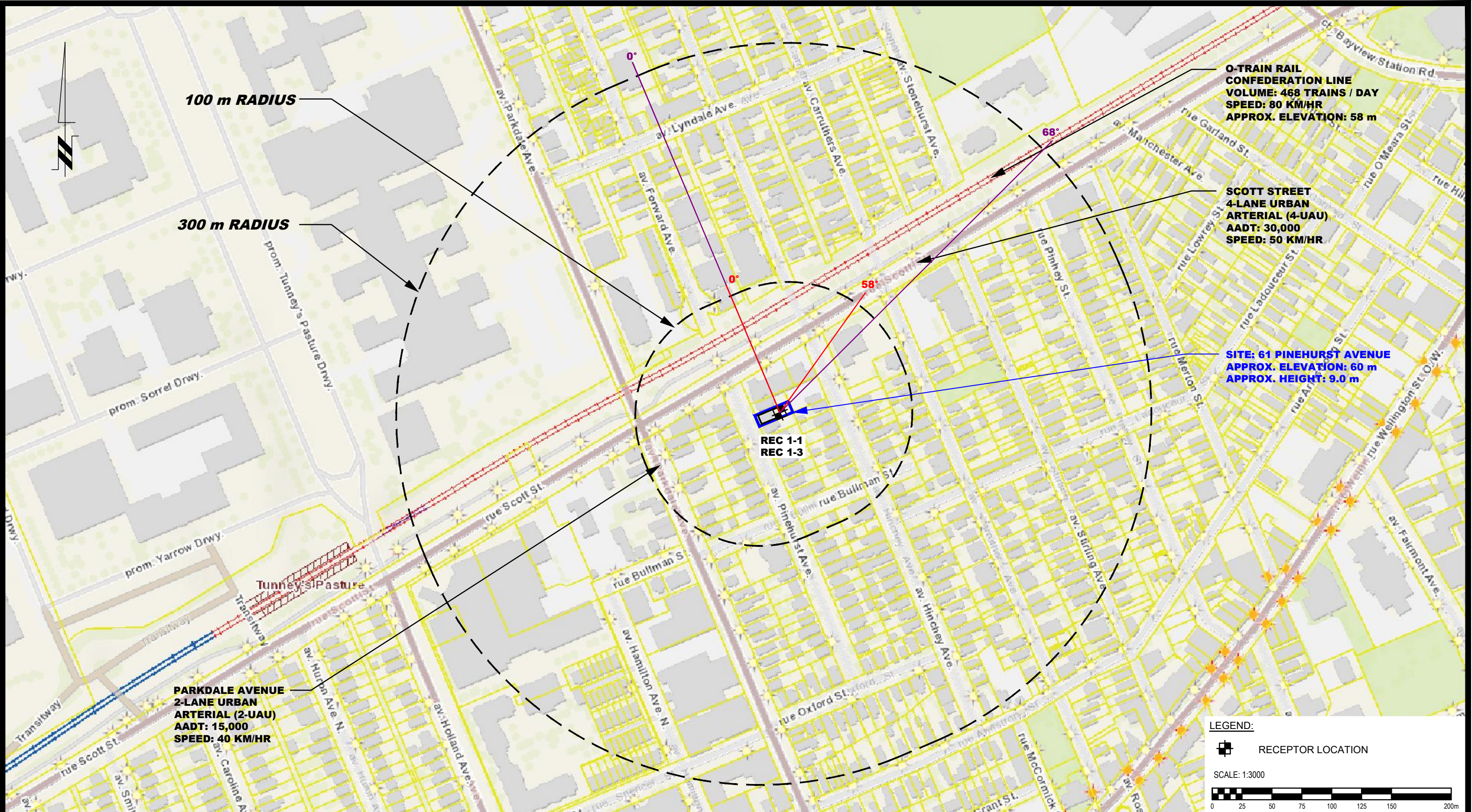
MR.ALI KARIMI  
NOISE ATTENUATION STUDY  
PROPOSED MULTI-STOREY RESIDENTIAL BUILDING  
61 PINEHURST AVENUE

ONTARIO

**SITE GEOMETRY**

Scale: 1:3000  
Drawn by: YA  
Checked by: SB  
Approved by: DJG

Date: 02/2021  
Report No.: PG5723-1  
Dwg No.: **PG5723-3**  
Revision No.:



**patersongroup**  
consulting engineers

154 Colonnade Road South  
Ottawa, Ontario K2E 7J5  
Tel: (613) 226-7381 Fax: (613) 226-6344

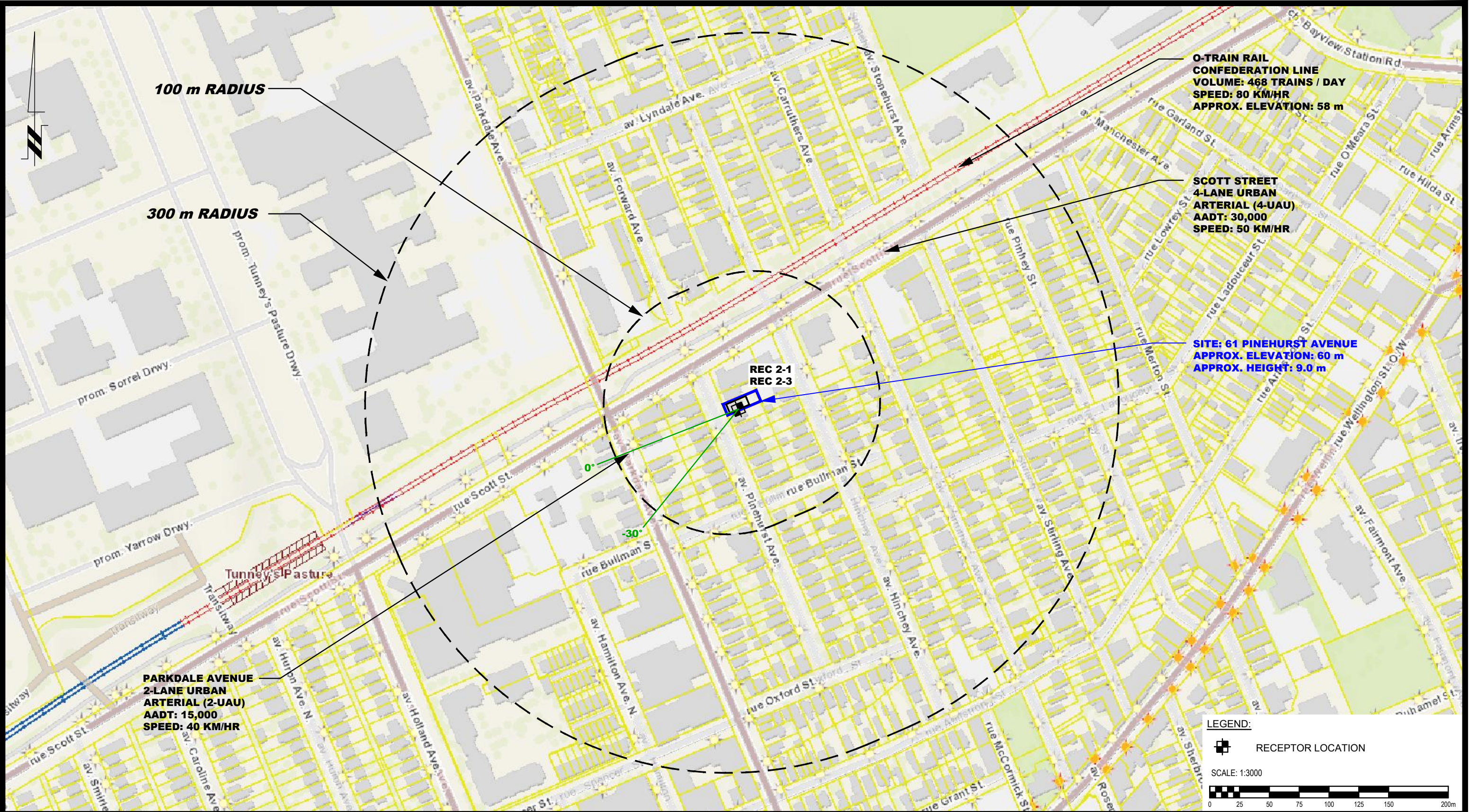
NO.	REVISIONS	DATE	INITIAL

MR.ALI KARIMI  
NOISE ATTENUATION STUDY  
PROPOSED MULTI-STOREY RESIDENTIAL BUILDING  
61 PINEHURST AVENUE  
ONTARIO

OTTAWA,  
Title:  
**SITE GEOMETRY - REC 1-1 AND REC 1-3**

Scale:	1:3000	Date:	02/2021
Drawn by:	YA	Report No.:	PG5723-1
Checked by:	SB	Dwg No.:	<b>PG5723-3A</b>
Approved by:	DJG	Revision No.:	

p:\autocad\drawings\geotechnical\pg5723\pg5723-3-site geometry.dwg



**patersongroup**  
consulting engineers

154 Colonnade Road South  
Ottawa, Ontario K2E 7J5  
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL

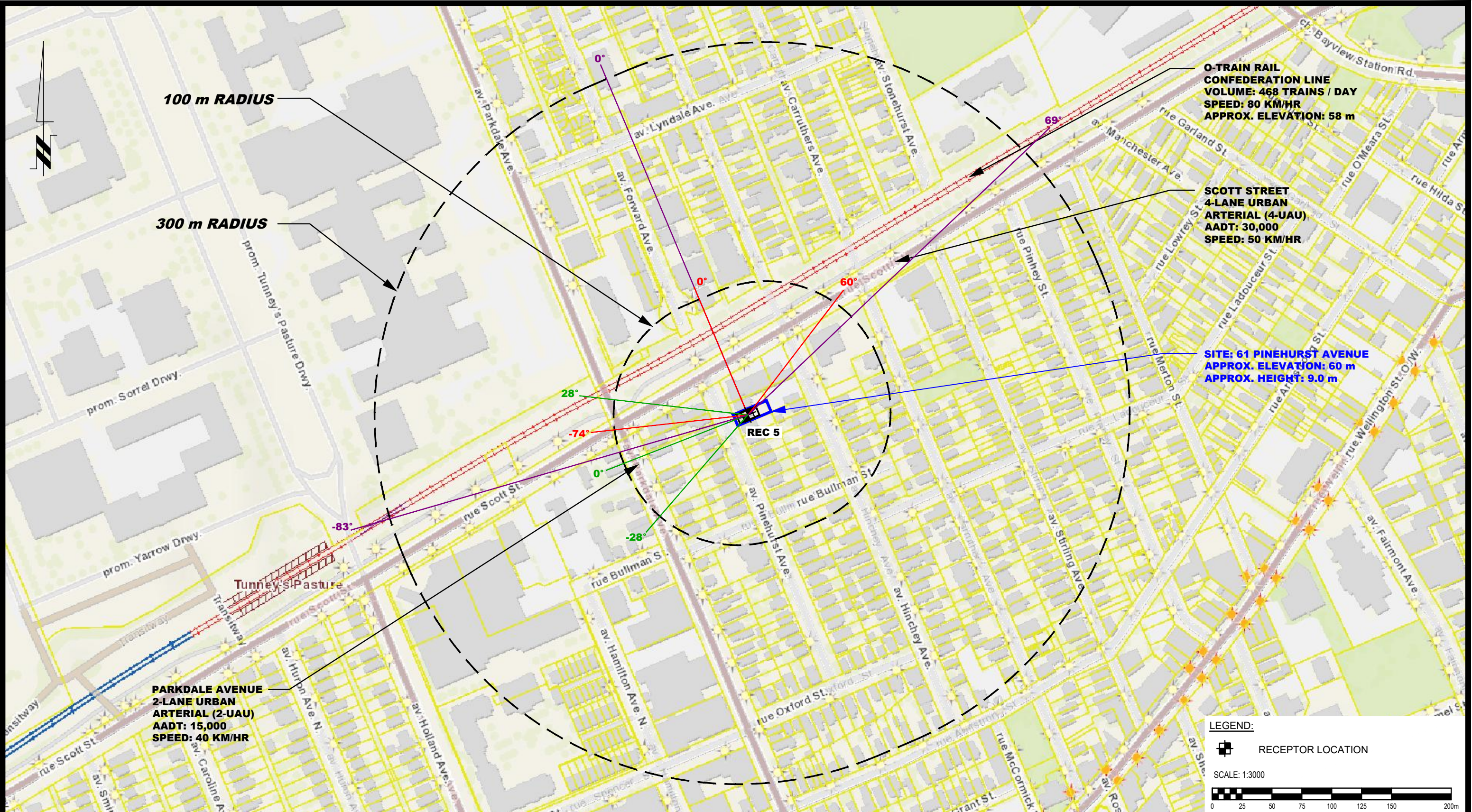
MR.ALI KARIMI  
NOISE ATTENUATION STUDY  
PROPOSED MULTI-STOREY RESIDENTIAL BUILDING  
61 PINEHURST AVENUE  
OTTAWA, ONTARIO  
Title: **SITE GEOMETRY - REC 2-1 AND REC 2-3**

Scale:	1:3000	Date:	02/2021
Drawn by:	YA	Report No.:	PG5723-1
Checked by:	SB	Dwg No.:	<b>PG5723-3B</b>
Approved by:	DJG	Revision No.:	

p:\autocad\drawings\geotechnical\pg5723\pg5723-3-site geometry.dwg







O-TRAIN RAIL  
CONFEDERATION LINE  
VOLUME: 468 TRAINS / DAY  
SPEED: 80 KM/HR  
APPROX. ELEVATION: 58 m

SCOTT STREET  
4-LANE URBAN  
ARTERIAL (4-UAU)  
AADT: 30,000  
SPEED: 50 KM/HR

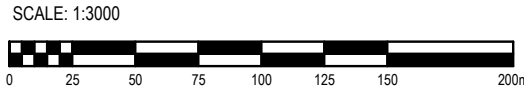
SITE: 61 PINEHURST AVENUE  
APPROX. ELEVATION: 60 m  
APPROX. HEIGHT: 9.0 m

100 m RADIUS

300 m RADIUS

PARKDALE AVENUE  
2-LANE URBAN  
ARTERIAL (2-UAU)  
AADT: 15,000  
SPEED: 40 KM/HR

LEGEND:  
RECEPTOR LOCATION



**patersongroup**  
consulting engineers

154 Colonnade Road South  
Ottawa, Ontario K2E 7J5  
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL

MR.ALI KARIMI

NOISE ATTENUATION STUDY

PROPOSED MULTI-STOREY RESIDENTIAL BUILDING

61 PINEHURST AVENUE

ONTARIO

OTTAWA,

Title:

SITE GEOMETRY - REC 5

Scale:	1:3000	Date:	02/2021
Drawn by:	YA	Report No.:	PG5723-1
Checked by:	SB	Dwg No.:	PG5723-3E
Approved by:	DJG	Revision No.:	

p:\autocad\drawings\geotechnical\pg5723\pg5723-3-site geometry.dwg

# **APPENDIX 2**

## **STAMSON RESULTS**

STAMSON 5.0                      NORMAL REPORT                      Date: 22-02-2021 11:28:00  
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec11.te                      Time Period: Day/Night 16/8 hours  
 Description: Reception Point 1-1

Rail data, segment # 1: O-Train Rail (day/night)

Train Type	! Trains	! Speed (km/h)	!# loc /Train	!# Cars /Train	! Eng type	!Cont weld
1. O-Train	468.0/1.0	80.0	1.0	1.0	Elec	Yes

Data for Segment # 1: O-Train Rail (day/night)

Angle1    Angle2                      :    0.00 deg    68.00 deg  
 Wood depth                      :        0        (No woods.)  
 No of house rows                :        1 / 1  
 House density                    :        40 %  
 Surface                            :        1        (Absorptive ground surface)  
 Receiver source distance        :    95.00 / 95.00    m  
 Receiver height                 :    1.50 / 1.50       m  
 Topography                       :        2        (Flat/gentle slope; with barrier)  
 No Whistle  
 Barrier angle1                    :    0.00 deg    Angle2 : 68.00 deg  
 Barrier height                    :        2.00 m  
 Barrier receiver distance        :    93.00 / 93.00    m  
 Source elevation                 :        58.00 m  
 Receiver elevation               :        60.00 m  
 Barrier elevation                :        58.00 m  
 Reference angle                  :        0.00

↑

Results segment # 1: O-Train Rail (day)

Barrier height for grazing incidence

Source Height (m)	! Receiver Height (m)	! Barrier Height (m)	! Elevation of Barrier Top (m)
4.00	1.50	3.99	61.99
0.50	1.50	0.56	58.56

LOCOMOTIVE (0.00 + 44.85 + 0.00) = 44.85 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	68	0.58	64.44	-12.71	-4.89	0.00	-2.00	0.00	44.85
0	68	0.47	64.44	-11.74	-4.76	0.00	0.00	0.00	47.94*

0	68	0.58	64.44	-12.71	-4.89	0.00	0.00	0.00	46.85
---	----	------	-------	--------	-------	------	------	------	-------

---

\* Bright Zone !

WHEEL (0.00 + 33.93 + 0.00) = 33.93 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	68	0.66	64.45	-13.31	-4.97	0.00	-2.00	0.00	44.18
0	68	0.57	64.45	-12.59	-4.87	0.00	0.00	-13.06	33.93

---

Segment Leq : 45.19 dBA

Total Leq All Segments: 45.19 dBA



Results segment # 1: O-Train Rail (night)

---

Barrier height for grazing incidence

---

Source Height (m)	! Receiver ! Height (m)	! Barrier ! Height (m)	! Elevation of ! Barrier Top (m)
4.00 !	1.50 !	3.99 !	61.99
0.50 !	1.50 !	0.56 !	58.56

LOCOMOTIVE (0.00 + 21.15 + 0.00) = 21.15 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	68	0.58	40.75	-12.71	-4.89	0.00	-2.00	0.00	21.15
0	68	0.47	40.75	-11.74	-4.76	0.00	0.00	0.00	24.24*
0	68	0.58	40.75	-12.71	-4.89	0.00	0.00	0.00	23.15

---

\* Bright Zone !

WHEEL (0.00 + 10.24 + 0.00) = 10.24 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	68	0.66	40.76	-13.31	-4.97	0.00	-2.00	0.00	20.49
0	68	0.57	40.76	-12.59	-4.87	0.00	0.00	-13.06	10.24

---

Segment Leq : 21.49 dBA

Total Leq All Segments: 21.49 dBA



Road data, segment # 1: Scott Street (day/night)

-----  
Car traffic volume : 24288/2112 veh/TimePeriod \*  
Medium truck volume : 1932/168 veh/TimePeriod \*  
Heavy truck volume : 1380/120 veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 30000  
Percentage of Annual Growth : 0.00  
Number of Years of Growth : 0.00  
Medium Truck % of Total Volume : 7.00  
Heavy Truck % of Total Volume : 5.00  
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Scott Street (day/night)

-----  
Angle1 Angle2 : 0.00 deg 58.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 1 / 1  
House density : 40 %  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 60.00 / 60.00 m  
Receiver height : 1.50 / 1.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00

↑

Results segment # 1: Scott Street (day)

-----  
Source height = 1.50 m

ROAD (0.00 + 54.06 + 0.00) = 54.06 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	58	0.66	71.49	0.00	-9.99	-5.44	0.00	-2.00	0.00	54.06

-----

Segment Leq : 54.06 dBA

Total Leq All Segments: 54.06 dBA

↑

Results segment # 1: Scott Street (night)

-----

Source height = 1.50 m

ROAD (0.00 + 46.46 + 0.00) = 46.46 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	58	0.66	63.89	0.00	-9.99	-5.44	0.00	-2.00	0.00	46.46

Segment Leq : 46.46 dBA

Total Leq All Segments: 46.46 dBA

⬆

TOTAL Leq FROM ALL SOURCES (DAY): 54.59  
(NIGHT): 46.47

⬆

⬆

STAMSON 5.0                      NORMAL REPORT                      Date: 22-02-2021 11:28:58  
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec13.te                      Time Period: Day/Night 16/8 hours  
 Description: Reception Point 1-3

Rail data, segment # 1: O-Train Rail (day/night)

Train Type	! Trains	! Speed (km/h)	!# loc /Train	!# Cars /Train	! Eng type	!Cont weld
1. O-Train	468.0/1.0	80.0	1.0	1.0	Elec	Yes

Data for Segment # 1: O-Train Rail (day/night)

Angle1    Angle2                      :    0.00 deg    68.00 deg  
 Wood depth                      :            0            (No woods.)  
 No of house rows                :            1 / 1  
 House density                    :            40 %  
 Surface                            :            1            (Absorptive ground surface)  
 Receiver source distance        :    95.00 / 95.00    m  
 Receiver height                  :    7.50 / 7.50       m  
 Topography                        :            2            (Flat/gentle slope; with barrier)  
 No Whistle  
 Barrier angle1                    :    0.00 deg    Angle2 : 68.00 deg  
 Barrier height                    :            2.00 m  
 Barrier receiver distance        :    93.00 / 93.00    m  
 Source elevation                  :            58.00 m  
 Receiver elevation                :            60.00 m  
 Barrier elevation                 :            58.00 m  
 Reference angle                  :            0.00

↑

Results segment # 1: O-Train Rail (day)

Barrier height for grazing incidence

Source Height (m)	! Receiver Height (m)	! Barrier Height (m)	! Elevation of Barrier Top (m)
4.00	7.50	4.12	62.12
0.50	7.50	0.69	58.69

LOCOMOTIVE (0.00 + 46.48 + 0.00) = 46.48 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	68	0.41	64.44	-11.26	-4.70	0.00	-2.00	0.00	46.48
0	68	0.28	64.44	-10.30	-4.56	0.00	0.00	0.00	49.58*

0	68	0.41	64.44	-11.26	-4.70	0.00	0.00	0.00	48.48
---	----	------	-------	--------	-------	------	------	------	-------

---

\* Bright Zone !

WHEEL (0.00 + 36.39 + 0.00) = 36.39 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	68	0.51	64.45	-12.10	-4.81	0.00	-2.00	0.00	45.54
0	68	0.39	64.45	-11.14	-4.68	0.00	0.00	-12.24	36.39

---

Segment Leq : 46.89 dBA

Total Leq All Segments: 46.89 dBA



Results segment # 1: O-Train Rail (night)

---

Barrier height for grazing incidence

---

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00 !	7.50 !	4.12 !	62.12
0.50 !	7.50 !	0.69 !	58.69

LOCOMOTIVE (0.00 + 22.79 + 0.00) = 22.79 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	68	0.41	40.75	-11.26	-4.70	0.00	-2.00	0.00	22.79
0	68	0.28	40.75	-10.30	-4.56	0.00	0.00	0.00	25.89*
0	68	0.41	40.75	-11.26	-4.70	0.00	0.00	0.00	24.79

---

\* Bright Zone !

WHEEL (0.00 + 12.70 + 0.00) = 12.70 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	68	0.51	40.76	-12.10	-4.81	0.00	-2.00	0.00	21.85
0	68	0.39	40.76	-11.14	-4.68	0.00	0.00	-12.24	12.70

---

Segment Leq : 23.20 dBA

Total Leq All Segments: 23.20 dBA



Road data, segment # 1: Scott Street (day/night)

-----  
Car traffic volume : 24288/2112 veh/TimePeriod \*  
Medium truck volume : 1932/168 veh/TimePeriod \*  
Heavy truck volume : 1380/120 veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 30000  
Percentage of Annual Growth : 0.00  
Number of Years of Growth : 0.00  
Medium Truck % of Total Volume : 7.00  
Heavy Truck % of Total Volume : 5.00  
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Scott Street (day/night)

-----  
Angle1 Angle2 : 0.00 deg 58.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 1 / 1  
House density : 40 %  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 60.00 / 60.00 m  
Receiver height : 7.50 / 7.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00

↑

Results segment # 1: Scott Street (day)

-----  
Source height = 1.50 m

ROAD (0.00 + 55.27 + 0.00) = 55.27 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	58	0.48	71.49	0.00	-8.91	-5.30	0.00	-2.00	0.00	55.27

-----

Segment Leq : 55.27 dBA

Total Leq All Segments: 55.27 dBA

↑

Results segment # 1: Scott Street (night)

-----

Source height = 1.50 m

ROAD (0.00 + 47.68 + 0.00) = 47.68 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	58	0.48	63.89	0.00	-8.91	-5.30	0.00	-2.00	0.00	47.68

Segment Leq : 47.68 dBA

Total Leq All Segments: 47.68 dBA

⬆

TOTAL Leq FROM ALL SOURCES (DAY): 55.86  
(NIGHT): 47.70

⬆

⬆

STAMSON 5.0            NORMAL REPORT            Date: 22-02-2021 11:51:08  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec21.te            Time Period: Day/Night 16/8 hours  
Description: Reception Point 2-1

Road data, segment # 1: Parkdale Ave (day/night)

-----  
Car traffic volume : 12144/1056    veh/TimePeriod    \*  
Medium truck volume : 966/84    veh/TimePeriod    \*  
Heavy truck volume : 690/60    veh/TimePeriod    \*  
Posted speed limit : 40 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

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

Data for Segment # 1: Parkdale Ave (day/night)

-----  
Angle1    Angle2 : -30.00 deg    0.00 deg  
Wood depth : 0    (No woods.)  
No of house rows : 2 / 2  
House density : 40 %  
Surface : 1    (Absorptive ground surface)  
Receiver source distance : 100.00 / 100.00 m  
Receiver height : 1.50 / 1.50 m  
Topography : 1    (Flat/gentle slope; no barrier)  
Reference angle : 0.00

↑

Results segment # 1: Parkdale Ave (day)

-----  
Source height = 1.50 m

ROAD (0.00 + 41.59 + 0.00) = 41.59 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-30	0	0.66	66.69	0.00	-13.68	-7.91	0.00	-3.50	0.00	41.59

-----

Segment Leq : 41.59 dBA

Total Leq All Segments: 41.59 dBA

↑

Results segment # 1: Parkdale Ave (night)

-----

Source height = 1.50 m

ROAD (0.00 + 34.00 + 0.00) = 34.00 dBA

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

-----

-30	0	0.66	59.09	0.00	-13.68	-7.91	0.00	-3.50	0.00	34.00
-----	---	------	-------	------	--------	-------	------	-------	------	-------

-----

Segment Leq : 34.00 dBA

Total Leq All Segments: 34.00 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 41.59  
(NIGHT): 34.00

↑

↑

STAMSON 5.0            NORMAL REPORT            Date: 22-02-2021 11:51:48  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec23.te            Time Period: Day/Night 16/8 hours  
Description: Reception Point 2-3

Road data, segment # 1: Parkdale Ave (day/night)

-----  
Car traffic volume : 12144/1056    veh/TimePeriod    \*  
Medium truck volume : 966/84    veh/TimePeriod    \*  
Heavy truck volume : 690/60    veh/TimePeriod    \*  
Posted speed limit : 40 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

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

Data for Segment # 1: Parkdale Ave (day/night)

-----  
Angle1    Angle2 : -30.00 deg    0.00 deg  
Wood depth : 0    (No woods.)  
No of house rows : 2 / 2  
House density : 40 %  
Surface : 1    (Absorptive ground surface)  
Receiver source distance : 100.00 / 100.00 m  
Receiver height : 7.50 / 7.50 m  
Topography : 1    (Flat/gentle slope; no barrier)  
Reference angle : 0.00

↑

Results segment # 1: Parkdale Ave (day)

-----  
Source height = 1.50 m

ROAD (0.00 + 43.11 + 0.00) = 43.11 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-30	0	0.48	66.69	0.00	-12.19	-7.88	0.00	-3.50	0.00	43.11

-----

Segment Leq : 43.11 dBA

Total Leq All Segments: 43.11 dBA

↑

Results segment # 1: Parkdale Ave (night)

-----

Source height = 1.50 m

ROAD (0.00 + 35.52 + 0.00) = 35.52 dBA

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

-----

-30	0	0.48	59.09	0.00	-12.19	-7.88	0.00	-3.50	0.00	35.52
-----	---	------	-------	------	--------	-------	------	-------	------	-------

-----

Segment Leq : 35.52 dBA

Total Leq All Segments: 35.52 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 43.11

(NIGHT): 35.52

↑

↑

STAMSON 5.0                      NORMAL REPORT                      Date: 22-02-2021 11:36:32  
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec31.te                      Time Period: Day/Night 16/8 hours  
 Description: Reception Point 3-1

Rail data, segment # 1: O-Train Rail (day/night)

Train Type	! Trains	! Speed (km/h)	!# loc /Train	!# Cars /Train	! Eng type	!Cont weld
1. O-Train	468.0/1.0	80.0	1.0	1.0	Elec	Yes

Data for Segment # 1: O-Train Rail (day/night)

Angle1    Angle2                      : -83.00 deg    0.00 deg  
 Wood depth                      :        0        (No woods.)  
 No of house rows                :        1 / 1  
 House density                    :        20 %  
 Surface                            :        1        (Absorptive ground surface)  
 Receiver source distance        : 100.00 / 100.00 m  
 Receiver height                  :    1.50 / 1.50    m  
 Topography                        :        2        (Flat/gentle slope; with barrier)  
 No Whistle  
 Barrier angle1                    : -83.00 deg    Angle2 : 0.00 deg  
 Barrier height                    :        2.00 m  
 Barrier receiver distance        : 98.00 / 98.00    m  
 Source elevation                  :    58.00 m  
 Receiver elevation                :    60.00 m  
 Barrier elevation                 :    58.00 m  
 Reference angle                  :        0.00

↑

Results segment # 1: O-Train Rail (day)

Barrier height for grazing incidence

Source Height (m)	! Receiver Height (m)	! Barrier Height (m)	! Elevation of Barrier Top (m)
4.00	1.50	3.99	61.99
0.50	1.50	0.56	58.56

LOCOMOTIVE (0.00 + 46.06 + 0.00) = 46.06 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-83	0	0.58	64.44	-13.06	-4.43	0.00	-0.90	0.00	46.06
-83	0	0.47	64.44	-12.07	-4.23	0.00	0.00	0.00	48.14*

-83	0	0.58	64.44	-13.06	-4.43	0.00	0.00	0.00	46.96
-----	---	------	-------	--------	-------	------	------	------	-------

\* Bright Zone !

WHEEL (0.00 + 35.09 + 0.00) = 35.09 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-83	0	0.66	64.45	-13.68	-4.54	0.00	-0.90	0.00	45.34
-83	0	0.57	64.45	-12.94	-4.40	0.00	0.00	-12.02	35.09

Segment Leq : 46.39 dBA

Total Leq All Segments: 46.39 dBA



Results segment # 1: O-Train Rail (night)

Barrier height for grazing incidence

Source Height (m)	! Receiver ! Height (m)	! Barrier ! Height (m)	! Elevation of ! Barrier Top (m)
4.00 !	1.50 !	3.99 !	61.99
0.50 !	1.50 !	0.56 !	58.56

LOCOMOTIVE (0.00 + 22.37 + 0.00) = 22.37 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-83	0	0.58	40.75	-13.06	-4.43	0.00	-0.90	0.00	22.37
-83	0	0.47	40.75	-12.07	-4.23	0.00	0.00	0.00	24.45*
-83	0	0.58	40.75	-13.06	-4.43	0.00	0.00	0.00	23.27

\* Bright Zone !

WHEEL (0.00 + 11.40 + 0.00) = 11.40 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-83	0	0.66	40.76	-13.68	-4.54	0.00	-0.90	0.00	21.64
-83	0	0.57	40.76	-12.94	-4.40	0.00	0.00	-12.02	11.40

Segment Leq : 22.70 dBA

Total Leq All Segments: 22.70 dBA



Road data, segment # 1: Scott Street (day/night)

-----  
Car traffic volume : 24288/2112 veh/TimePeriod \*  
Medium truck volume : 1932/168 veh/TimePeriod \*  
Heavy truck volume : 1380/120 veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 30000  
Percentage of Annual Growth : 0.00  
Number of Years of Growth : 0.00  
Medium Truck % of Total Volume : 7.00  
Heavy Truck % of Total Volume : 5.00  
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Scott Street (day/night)

-----  
Angle1 Angle2 : -72.00 deg 0.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 1 / 1  
House density : 20 %  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 50.00 / 50.00 m  
Receiver height : 1.50 / 1.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00

↑

Road data, segment # 2: Parkdale Ave (day/night)

-----  
Car traffic volume : 12144/1056 veh/TimePeriod \*  
Medium truck volume : 966/84 veh/TimePeriod \*  
Heavy truck volume : 690/60 veh/TimePeriod \*  
Posted speed limit : 40 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

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

Data for Segment # 2: Parkdale Ave (day/night)

```

-----
Angle1   Angle2       : -33.00 deg   34.00 deg
Wood depth      :      0      (No woods.)
No of house rows :      2 / 2
House density   :     40 %
Surface        :      1      (Absorptive ground surface)
Receiver source distance : 95.00 / 95.00 m
Receiver height :    1.50 / 1.50 m
Topography     :      1      (Flat/gentle slope; no barrier)
Reference angle :     0.00

```

↑

Results segment # 1: Scott Street (day)

Source height = 1.50 m

ROAD (0.00 + 57.09 + 0.00) = 57.09 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-72	0	0.66	71.49	0.00	-8.68	-4.82	0.00	-0.90	0.00	57.09

Segment Leq : 57.09 dBA

↑

Results segment # 2: Parkdale Ave (day)

Source height = 1.50 m

ROAD (0.00 + 45.42 + 0.00) = 45.42 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-33	34	0.66	66.69	0.00	-13.31	-4.46	0.00	-3.50	0.00	45.42

Segment Leq : 45.42 dBA

Total Leq All Segments: 57.38 dBA

↑

Results segment # 1: Scott Street (night)

Source height = 1.50 m

ROAD (0.00 + 49.49 + 0.00) = 49.49 dBA

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

-72	0	0.66	63.89	0.00	-8.68	-4.82	0.00	-0.90	0.00	49.49
-----	---	------	-------	------	-------	-------	------	-------	------	-------

---

Segment Leq : 49.49 dBA



Results segment # 2: Parkdale Ave (night)

---

Source height = 1.50 m

ROAD (0.00 + 37.82 + 0.00) = 37.82 dBA

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

---

-33	34	0.66	59.09	0.00	-13.31	-4.46	0.00	-3.50	0.00	37.82
-----	----	------	-------	------	--------	-------	------	-------	------	-------

---

Segment Leq : 37.82 dBA

Total Leq All Segments: 49.78 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 57.71  
(NIGHT): 49.78



STAMSON 5.0                      NORMAL REPORT                      Date: 22-02-2021 11:38:16  
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec33.te                      Time Period: Day/Night 16/8 hours  
 Description: Reception Point 3-3

Rail data, segment # 1: O-Train Rail (day/night)

Train Type	! Trains	! Speed (km/h)	!# loc /Train	!# Cars /Train	! Eng type	!Cont weld
1. O-Train	468.0/1.0	80.0	1.0	1.0	Elec	Yes

Data for Segment # 1: O-Train Rail (day/night)

Angle1    Angle2                      : -83.00 deg    0.00 deg  
 Wood depth                            :        0        (No woods.)  
 No of house rows                      :        1 / 1  
 House density                          :        20 %  
 Surface                                :        1        (Absorptive ground surface)  
 Receiver source distance               : 100.00 / 100.00 m  
 Receiver height                        :        7.50 / 7.50    m  
 Topography                            :        2        (Flat/gentle slope; with barrier)  
 No Whistle  
 Barrier angle1                         : -83.00 deg    Angle2 : 0.00 deg  
 Barrier height                         :        2.00 m  
 Barrier receiver distance               : 98.00 / 98.00    m  
 Source elevation                       :        58.00 m  
 Receiver elevation                      :        60.00 m  
 Barrier elevation                       :        58.00 m  
 Reference angle                        :        0.00

↑

Results segment # 1: O-Train Rail (day)

Barrier height for grazing incidence

Source Height (m)	! Receiver Height (m)	! Barrier Height (m)	! Elevation of Barrier Top (m)
4.00	7.50	4.11	62.11
0.50	7.50	0.68	58.68

LOCOMOTIVE (0.00 + 47.83 + 0.00) = 47.83 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-83	0	0.41	64.44	-11.58	-4.13	0.00	-0.90	0.00	47.83
-83	0	0.28	64.44	-10.59	-3.92	0.00	0.00	0.00	49.93*

-83	0	0.41	64.44	-11.58	-4.13	0.00	0.00	0.00	48.73
-----	---	------	-------	--------	-------	------	------	------	-------

\* Bright Zone !

WHEEL (0.00 + 37.56 + 0.00) = 37.56 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-83	0	0.51	64.45	-12.44	-4.31	0.00	-0.90	0.00	46.80
-83	0	0.39	64.45	-11.45	-4.11	0.00	0.00	-11.33	37.56

Segment Leq : 48.22 dBA

Total Leq All Segments: 48.22 dBA



Results segment # 1: O-Train Rail (night)

Barrier height for grazing incidence

Source Height (m)	! Receiver ! Height (m)	! Barrier ! Height (m)	! Elevation of ! Barrier Top (m)
4.00 !	7.50 !	4.11 !	62.11
0.50 !	7.50 !	0.68 !	58.68

LOCOMOTIVE (0.00 + 24.14 + 0.00) = 24.14 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-83	0	0.41	40.75	-11.58	-4.13	0.00	-0.90	0.00	24.14
-83	0	0.28	40.75	-10.59	-3.92	0.00	0.00	0.00	26.24*
-83	0	0.41	40.75	-11.58	-4.13	0.00	0.00	0.00	25.04

\* Bright Zone !

WHEEL (0.00 + 13.87 + 0.00) = 13.87 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-83	0	0.51	40.76	-12.44	-4.31	0.00	-0.90	0.00	23.11
-83	0	0.39	40.76	-11.45	-4.11	0.00	0.00	-11.33	13.87

Segment Leq : 24.53 dBA

Total Leq All Segments: 24.53 dBA



Road data, segment # 1: Scott Street (day/night)

-----  
Car traffic volume : 24288/2112 veh/TimePeriod \*  
Medium truck volume : 1932/168 veh/TimePeriod \*  
Heavy truck volume : 1380/120 veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 30000  
Percentage of Annual Growth : 0.00  
Number of Years of Growth : 0.00  
Medium Truck % of Total Volume : 7.00  
Heavy Truck % of Total Volume : 5.00  
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Scott Street (day/night)

-----  
Angle1 Angle2 : -72.00 deg 0.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 1 / 1  
House density : 20 %  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 50.00 / 50.00 m  
Receiver height : 7.50 / 7.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00

↑

Road data, segment # 2: Parkdale Ave (day/night)

-----  
Car traffic volume : 12144/1056 veh/TimePeriod \*  
Medium truck volume : 966/84 veh/TimePeriod \*  
Heavy truck volume : 690/60 veh/TimePeriod \*  
Posted speed limit : 40 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

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

Data for Segment # 2: Parkdale Ave (day/night)

```

-----
Angle1   Angle2       : -33.00 deg   34.00 deg
Wood depth      :      0      (No woods.)
No of house rows :      2 / 2
House density    :     40 %
Surface         :      1      (Absorptive ground surface)
Receiver source distance : 95.00 / 95.00 m
Receiver height  :    7.50 / 7.50 m
Topography      :      1      (Flat/gentle slope; no barrier)
Reference angle  :     0.00

```

↑

Results segment # 1: Scott Street (day)

Source height = 1.50 m

ROAD (0.00 + 58.24 + 0.00) = 58.24 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-72	0	0.48	71.49	0.00	-7.74	-4.61	0.00	-0.90	0.00	58.24

Segment Leq : 58.24 dBA

↑

Results segment # 2: Parkdale Ave (day)

Source height = 1.50 m

ROAD (0.00 + 46.91 + 0.00) = 46.91 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-33	34	0.48	66.69	0.00	-11.87	-4.41	0.00	-3.50	0.00	46.91

Segment Leq : 46.91 dBA

Total Leq All Segments: 58.55 dBA

↑

Results segment # 1: Scott Street (night)

Source height = 1.50 m

ROAD (0.00 + 50.65 + 0.00) = 50.65 dBA

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

-72	0	0.48	63.89	0.00	-7.74	-4.61	0.00	-0.90	0.00	50.65
-----	---	------	-------	------	-------	-------	------	-------	------	-------

---

Segment Leq : 50.65 dBA



Results segment # 2: Parkdale Ave (night)

---

Source height = 1.50 m

ROAD (0.00 + 39.31 + 0.00) = 39.31 dBA

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

---

-33	34	0.48	59.09	0.00	-11.87	-4.41	0.00	-3.50	0.00	39.31
-----	----	------	-------	------	--------	-------	------	-------	------	-------

---

Segment Leq : 39.31 dBA

Total Leq All Segments: 50.96 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 58.93  
(NIGHT): 50.97



STAMSON 5.0                      NORMAL REPORT                      Date: 22-02-2021 11:17:44  
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec41.te                      Time Period: Day/Night 16/8 hours  
 Description: Reception Point 4-1

Rail data, segment # 1: O-Train Rail (day/night)

Train Type	! Trains	! Speed (km/h)	!# loc /Train	!# Cars /Train	! Eng type	!Cont weld
1. O-Train	468.0/1.0	80.0	1.0	1.0	Elec	Yes

Data for Segment # 1: O-Train Rail (day/night)

Angle1    Angle2                      : -84.00 deg    69.00 deg  
 Wood depth                      :            0            (No woods.)  
 No of house rows                :            1 / 1  
 House density                    :            40 %  
 Surface                          :            1            (Absorptive ground surface)  
 Receiver source distance        : 90.00 / 90.00 m  
 Receiver height                 : 1.50 / 1.50 m  
 Topography                      :            2            (Flat/gentle slope; with barrier)  
 No Whistle  
 Barrier angle1                   : -84.00 deg    Angle2 : 69.00 deg  
 Barrier height                   :            2.00 m  
 Barrier receiver distance       : 88.00 / 88.00 m  
 Source elevation                : 58.00 m  
 Receiver elevation               : 60.00 m  
 Barrier elevation                : 58.00 m  
 Reference angle                 :            0.00

↑

Results segment # 1: O-Train Rail (day)

Barrier height for grazing incidence

Source Height (m)	! Receiver Height (m)	! Barrier Height (m)	! Elevation of Barrier Top (m)
4.00	1.50	3.99	61.99
0.50	1.50	0.57	58.57

LOCOMOTIVE (0.00 + 48.50 + 0.00) = 48.50 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-84	69	0.58	64.44	-12.33	-1.61	0.00	-2.00	0.00	48.50
-84	69	0.47	64.44	-11.40	-1.45	0.00	0.00	0.00	51.60*

-84	69	0.58	64.44	-12.33	-1.61	0.00	0.00	0.00	50.50
-----	----	------	-------	--------	-------	------	------	------	-------

\* Bright Zone !

WHEEL (0.00 + 38.29 + 0.00) = 38.29 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-84	69	0.66	64.45	-12.92	-1.71	0.00	-2.00	0.00	47.82
-84	69	0.57	64.45	-12.22	-1.59	0.00	0.00	-12.36	38.29

Segment Leq : 48.90 dBA

Total Leq All Segments: 48.90 dBA



Results segment # 1: O-Train Rail (night)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	1.50	3.99	61.99
0.50	1.50	0.57	58.57

LOCOMOTIVE (0.00 + 24.80 + 0.00) = 24.80 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-84	69	0.58	40.75	-12.33	-1.61	0.00	-2.00	0.00	24.80
-84	69	0.47	40.75	-11.40	-1.45	0.00	0.00	0.00	27.90*
-84	69	0.58	40.75	-12.33	-1.61	0.00	0.00	0.00	26.80

\* Bright Zone !

WHEEL (0.00 + 14.59 + 0.00) = 14.59 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-84	69	0.66	40.76	-12.92	-1.71	0.00	-2.00	0.00	24.13
-84	69	0.57	40.76	-12.22	-1.59	0.00	0.00	-12.36	14.59

Segment Leq : 25.20 dBA

Total Leq All Segments: 25.20 dBA



Road data, segment # 1: Scott Street (day/night)

-----  
Car traffic volume : 24288/2112 veh/TimePeriod \*  
Medium truck volume : 1932/168 veh/TimePeriod \*  
Heavy truck volume : 1380/120 veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 30000  
Percentage of Annual Growth : 0.00  
Number of Years of Growth : 0.00  
Medium Truck % of Total Volume : 7.00  
Heavy Truck % of Total Volume : 5.00  
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Scott Street (day/night)

-----  
Angle1 Angle2 : -76.00 deg 62.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 1 / 1  
House density : 40 %  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 45.00 / 45.00 m  
Receiver height : 1.50 / 1.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00

↑

Road data, segment # 2: Parkdale Ave (day/night)

-----  
Car traffic volume : 12144/1056 veh/TimePeriod \*  
Medium truck volume : 966/84 veh/TimePeriod \*  
Heavy truck volume : 690/60 veh/TimePeriod \*  
Posted speed limit : 40 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

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

Data for Segment # 2: Parkdale Ave (day/night)



-76      62      0.66    63.89      0.00    -7.92    -1.95      0.00    -2.05      0.00    51.98

---

Segment Leq : 51.98 dBA

↑

Results segment # 2: Parkdale Ave (night)

---

Source height = 1.50 m

ROAD (0.00 + 33.25 + 0.00) = 33.25 dBA

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

---

0	25	0.66	59.09	0.00	-13.68	-8.67	0.00	-3.50	0.00	33.25
---	----	------	-------	------	--------	-------	------	-------	------	-------

---

Segment Leq : 33.25 dBA

Total Leq All Segments: 52.04 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 59.98  
(NIGHT): 52.05

↑

↑

STAMSON 5.0                      NORMAL REPORT                      Date: 22-02-2021 11:20:19  
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec43.te                      Time Period: Day/Night 16/8 hours  
 Description: Reception Point 4-3

Rail data, segment # 1: O-Train Rail (day/night)

Train Type	! Trains	! Speed (km/h)	!# loc /Train	!# Cars /Train	! Eng type	!Cont weld
1. O-Train	468.0/1.0	80.0	1.0	1.0	Elec	Yes

Data for Segment # 1: O-Train Rail (day/night)

Angle1    Angle2                      : -84.00 deg    69.00 deg  
 Wood depth                      :        0        (No woods.)  
 No of house rows                :        1 / 1  
 House density                    :        40 %  
 Surface                            :        1        (Absorptive ground surface)  
 Receiver source distance        : 90.00 / 90.00 m  
 Receiver height                  : 7.50 / 7.50 m  
 Topography                        :        2        (Flat/gentle slope; with barrier)  
 No Whistle  
 Barrier angle1                    : -84.00 deg    Angle2 : 69.00 deg  
 Barrier height                    :        2.00 m  
 Barrier receiver distance        : 88.00 / 88.00 m  
 Source elevation                  : 58.00 m  
 Receiver elevation                : 60.00 m  
 Barrier elevation                 : 58.00 m  
 Reference angle                  :        0.00

↑

Results segment # 1: O-Train Rail (day)

Barrier height for grazing incidence

Source Height (m)	! Receiver Height (m)	! Barrier Height (m)	! Elevation of Barrier Top (m)
4.00	7.50	4.12	62.12
0.50	7.50	0.70	58.70

LOCOMOTIVE (0.00 + 50.15 + 0.00) = 50.15 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-84	69	0.41	64.44	-10.93	-1.36	0.00	-2.00	0.00	50.15
-84	69	0.28	64.44	-10.00	-1.18	0.00	0.00	0.00	53.26*

-84	69	0.41	64.44	-10.93	-1.36	0.00	0.00	0.00	52.15
-----	----	------	-------	--------	-------	------	------	------	-------

\* Bright Zone !

WHEEL (0.00 + 40.74 + 0.00) = 40.74 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-84	69	0.51	64.45	-11.75	-1.51	0.00	-2.00	0.00	49.19
-84	69	0.39	64.45	-10.82	-1.34	0.00	0.00	-11.55	40.74

Segment Leq : 50.62 dBA

Total Leq All Segments: 50.62 dBA



Results segment # 1: O-Train Rail (night)

Barrier height for grazing incidence

Source Height (m)	! Receiver ! Height (m)	! Barrier ! Height (m)	! Elevation of ! Barrier Top (m)
4.00 !	7.50 !	4.12 !	62.12
0.50 !	7.50 !	0.70 !	58.70

LOCOMOTIVE (0.00 + 26.46 + 0.00) = 26.46 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-84	69	0.41	40.75	-10.93	-1.36	0.00	-2.00	0.00	26.46
-84	69	0.28	40.75	-10.00	-1.18	0.00	0.00	0.00	29.57*
-84	69	0.41	40.75	-10.93	-1.36	0.00	0.00	0.00	28.46

\* Bright Zone !

WHEEL (0.00 + 17.05 + 0.00) = 17.05 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-84	69	0.51	40.76	-11.75	-1.51	0.00	-2.00	0.00	25.50
-84	69	0.39	40.76	-10.82	-1.34	0.00	0.00	-11.55	17.05

Segment Leq : 26.93 dBA

Total Leq All Segments: 26.93 dBA



Road data, segment # 1: Scott Street (day/night)

-----  
Car traffic volume : 24288/2112 veh/TimePeriod \*  
Medium truck volume : 1932/168 veh/TimePeriod \*  
Heavy truck volume : 1380/120 veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 30000  
Percentage of Annual Growth : 0.00  
Number of Years of Growth : 0.00  
Medium Truck % of Total Volume : 7.00  
Heavy Truck % of Total Volume : 5.00  
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Scott Street (day/night)

-----  
Angle1 Angle2 : -76.00 deg 62.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 1 / 1  
House density : 40 %  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 45.00 / 45.00 m  
Receiver height : 7.50 / 7.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00

↑

Road data, segment # 2: Parkdale Ave (day/night)

-----  
Car traffic volume : 12144/1056 veh/TimePeriod \*  
Medium truck volume : 966/84 veh/TimePeriod \*  
Heavy truck volume : 690/60 veh/TimePeriod \*  
Posted speed limit : 40 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

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

Data for Segment # 2: Parkdale Ave (day/night)

```

-----
Angle1   Angle2       :   0.00 deg   25.00 deg
Wood depth      :           0      (No woods.)
No of house rows :           2 / 2
House density    :          40 %
Surface         :           1      (Absorptive ground surface)
Receiver source distance : 100.00 / 100.00 m
Receiver height  :           7.50 / 7.50 m
Topography      :           1      (Flat/gentle slope; no barrier)
Reference angle  :           0.00

```

↑

Results segment # 1: Scott Street (day)

Source height = 1.50 m

ROAD (0.00 + 60.63 + 0.00) = 60.63 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-76	62	0.48	71.49	0.00	-7.06	-1.75	0.00	-2.05	0.00	60.63

Segment Leq : 60.63 dBA

↑

Results segment # 2: Parkdale Ave (day)

Source height = 1.50 m

ROAD (0.00 + 42.35 + 0.00) = 42.35 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	25	0.48	66.69	0.00	-12.19	-8.64	0.00	-3.50	0.00	42.35

Segment Leq : 42.35 dBA

Total Leq All Segments: 60.69 dBA

↑

Results segment # 1: Scott Street (night)

Source height = 1.50 m

ROAD (0.00 + 53.03 + 0.00) = 53.03 dBA

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

-76      62      0.48   63.89      0.00   -7.06   -1.75      0.00   -2.05      0.00   53.03

---

Segment Leq : 53.03 dBA

↑

Results segment # 2: Parkdale Ave (night)

---

Source height = 1.50 m

ROAD (0.00 + 34.75 + 0.00) = 34.75 dBA

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

---

0	25	0.48	59.09	0.00	-12.19	-8.64	0.00	-3.50	0.00	34.75
---	----	------	-------	------	--------	-------	------	-------	------	-------

---

Segment Leq : 34.75 dBA

Total Leq All Segments: 53.09 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 61.10  
(NIGHT): 53.10

↑

↑

STAMSON 5.0                      NORMAL REPORT                      Date: 22-02-2021 11:56:40  
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec5.te                      Time Period: Day/Night 16/8 hours  
 Description: Reception Point 5

Rail data, segment # 1: O-Train Rail (day/night)

Train Type	! Trains	! Speed (km/h)	!# loc /Train	!# Cars /Train	! Eng type	!Cont weld
1. O-Train	468.0/1.0	80.0	1.0	1.0	Elec	Yes

Data for Segment # 1: O-Train Rail (day/night)

Angle1    Angle2                      : -83.00 deg    69.00 deg  
 Wood depth                            :            0            (No woods.)  
 No of house rows                      :            1 / 1  
 House density                          :            20 %  
 Surface                                :            1            (Absorptive ground surface)  
 Receiver source distance               : 95.00 / 95.00 m  
 Receiver height                        : 10.50 / 10.50 m  
 Topography                            :            2            (Flat/gentle slope; with barrier)  
 No Whistle  
 Barrier angle1                         : -83.00 deg    Angle2 : 69.00 deg  
 Barrier height                         :            2.00 m  
 Barrier receiver distance               : 93.00 / 93.00 m  
 Source elevation                       : 58.00 m  
 Receiver elevation                      : 60.00 m  
 Barrier elevation                       : 58.00 m  
 Reference angle                        :            0.00

↑

Results segment # 1: O-Train Rail (day)

Barrier height for grazing incidence

Source Height (m)	! Receiver Height (m)	! Barrier Height (m)	! Elevation of Barrier Top (m)
4.00	10.50	4.18	62.18
0.50	10.50	0.75	58.75

LOCOMOTIVE (0.00 + 51.76 + 0.00) = 51.76 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-83	69	0.31	64.44	-10.54	-1.24	0.00	-0.90	0.00	51.76
-83	69	0.19	64.44	-9.58	-1.06	0.00	0.00	0.00	53.80*

-83	69	0.31	64.44	-10.54	-1.24	0.00	0.00	0.00	52.66
-----	----	------	-------	--------	-------	------	------	------	-------

\* Bright Zone !

WHEEL (0.00 + 41.54 + 0.00) = 41.54 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-83	69	0.42	64.45	-11.38	-1.39	0.00	-0.90	0.00	50.77
-83	69	0.30	64.45	-10.42	-1.22	0.00	0.00	-11.27	41.54

Segment Leq : 52.15 dBA

Total Leq All Segments: 52.15 dBA



Results segment # 1: O-Train Rail (night)

Barrier height for grazing incidence

Source Height (m)	! Receiver ! Height (m)	! Barrier ! Height (m)	! Elevation of ! Barrier Top (m)
4.00 !	10.50 !	4.18 !	62.18
0.50 !	10.50 !	0.75 !	58.75

LOCOMOTIVE (0.00 + 28.07 + 0.00) = 28.07 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-83	69	0.31	40.75	-10.54	-1.24	0.00	-0.90	0.00	28.07
-83	69	0.19	40.75	-9.58	-1.06	0.00	0.00	0.00	30.11*
-83	69	0.31	40.75	-10.54	-1.24	0.00	0.00	0.00	28.97

\* Bright Zone !

WHEEL (0.00 + 17.85 + 0.00) = 17.85 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-83	69	0.42	40.76	-11.38	-1.39	0.00	-0.90	0.00	27.08
-83	69	0.30	40.76	-10.42	-1.22	0.00	0.00	-11.27	17.85

Segment Leq : 28.46 dBA

Total Leq All Segments: 28.46 dBA



Road data, segment # 1: Scott Street (day/night)

-----  
Car traffic volume : 24288/2112 veh/TimePeriod \*  
Medium truck volume : 1932/168 veh/TimePeriod \*  
Heavy truck volume : 1380/120 veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 30000  
Percentage of Annual Growth : 0.00  
Number of Years of Growth : 0.00  
Medium Truck % of Total Volume : 7.00  
Heavy Truck % of Total Volume : 5.00  
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Scott Street (day/night)

-----  
Angle1 Angle2 : -74.00 deg 60.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 1 / 1  
House density : 20 %  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 55.00 / 55.00 m  
Receiver height : 10.50 / 10.50 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00

↑

Road data, segment # 2: Parkdale Ave (day/night)

-----  
Car traffic volume : 12144/1056 veh/TimePeriod \*  
Medium truck volume : 966/84 veh/TimePeriod \*  
Heavy truck volume : 690/60 veh/TimePeriod \*  
Posted speed limit : 40 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

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

Data for Segment # 2: Parkdale Ave (day/night)

```

-----
Angle1   Angle2       : -28.00 deg   28.00 deg
Wood depth      :      0      (No woods.)
No of house rows :      2 / 2
House density    :     40 %
Surface         :      1      (Absorptive ground surface)
Receiver source distance : 100.00 / 100.00 m
Receiver height  :   10.50 / 10.50 m
Topography      :      1      (Flat/gentle slope; no barrier)
Reference angle  :     0.00

```

↑

Results segment # 1: Scott Street (day)

Source height = 1.50 m

ROAD (0.00 + 61.01 + 0.00) = 61.01 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-74	60	0.39	71.49	0.00	-7.84	-1.74	0.00	-0.90	0.00	61.01

Segment Leq : 61.01 dBA

↑

Results segment # 2: Parkdale Ave (day)

Source height = 1.50 m

ROAD (0.00 + 46.59 + 0.00) = 46.59 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-28	28	0.39	66.69	0.00	-11.45	-5.14	0.00	-3.50	0.00	46.59

Segment Leq : 46.59 dBA

Total Leq All Segments: 61.16 dBA

↑

Results segment # 1: Scott Street (night)

Source height = 1.50 m

ROAD (0.00 + 53.41 + 0.00) = 53.41 dBA

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

-74	60	0.39	63.89	0.00	-7.84	-1.74	0.00	-0.90	0.00	53.41
-----	----	------	-------	------	-------	-------	------	-------	------	-------

---

Segment Leq : 53.41 dBA

↑

Results segment # 2: Parkdale Ave (night)

---

Source height = 1.50 m

ROAD (0.00 + 39.00 + 0.00) = 39.00 dBA

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

---

-28	28	0.39	59.09	0.00	-11.45	-5.14	0.00	-3.50	0.00	39.00
-----	----	------	-------	------	--------	-------	------	-------	------	-------

---

Segment Leq : 39.00 dBA

Total Leq All Segments: 53.56 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 61.68  
(NIGHT): 53.58

↑

↑

STAMSON 5.0                      NORMAL REPORT                      Date: 22-02-2021 12:09:00  
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec5tr.te                      Time Period: Day/Night 16/8 hours  
 Description: Reception Point 5tr

Rail data, segment # 1: O-Train Rail (day/night)

Train Type	! Trains	! Speed (km/h)	!# loc /Train	!# Cars /Train	! Eng type	!Cont weld
1. O-Train	468.0/1.0	80.0	1.0	1.0	Elec	Yes

Data for Segment # 1: O-Train Rail (day/night)

Angle1    Angle2                      : -83.00 deg    69.00 deg  
 Wood depth                      :        0        (No woods.)  
 No of house rows                :        1 / 1  
 House density                    :        20 %  
 Surface                            :        1        (Absorptive ground surface)  
 Receiver source distance        : 95.00 / 95.00 m  
 Receiver height                  : 10.50 / 10.50 m  
 Topography                        :        4        (Elevated; with barrier)  
 No Whistle  
 Barrier angle1                    : -83.00 deg    Angle2 : 69.00 deg  
 Barrier height                    : 10.00 m  
 Elevation                          : 2.00 m  
 Barrier receiver distance        : 5.00 / 5.00 m  
 Source elevation                  : 58.00 m  
 Receiver elevation                : 60.00 m  
 Barrier elevation                 : 60.00 m  
 Reference angle                  : 0.00

↑  
 Results segment # 1: O-Train Rail (day)

Barrier height for grazing incidence

Source Height (m)	! Receiver Height (m)	! Barrier Height (m)	! Elevation of Barrier Top (m)
4.00	10.50	10.05	70.05
0.50	10.50	9.87	69.87

LOCOMOTIVE (0.00 + 52.33 + 0.00) = 52.33 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-83	69	0.25	64.44	-10.06	-1.15	0.00	-0.90	0.00	52.33

-83	69	0.00	64.44	-8.02	-0.73	0.00	0.00	-4.99	50.70*
-83	69	0.25	64.44	-10.06	-1.15	0.00	0.00	0.00	53.23

\* Bright Zone !

WHEEL (0.00 + 50.63 + 0.00) = 50.63 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-83	69	0.36	64.45	-10.90	-1.31	0.00	-0.90	0.00	51.34
-83	69	0.00	64.45	-8.02	-0.73	0.00	0.00	-5.07	50.63

Segment Leq : 54.57 dBA

Total Leq All Segments: 54.57 dBA



Results segment # 1: O-Train Rail (night)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00 !	10.50 !	10.05 !	70.05
0.50 !	10.50 !	9.87 !	69.87

LOCOMOTIVE (0.00 + 28.64 + 0.00) = 28.64 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-83	69	0.25	40.75	-10.06	-1.15	0.00	-0.90	0.00	28.64
-83	69	0.00	40.75	-8.02	-0.73	0.00	0.00	-4.99	27.01*
-83	69	0.25	40.75	-10.06	-1.15	0.00	0.00	0.00	29.54

\* Bright Zone !

WHEEL (0.00 + 26.94 + 0.00) = 26.94 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-83	69	0.36	40.76	-10.90	-1.31	0.00	-0.90	0.00	27.65
-83	69	0.00	40.76	-8.02	-0.73	0.00	0.00	-5.07	26.94

Segment Leq : 30.88 dBA

Total Leq All Segments: 30.88 dBA



Road data, segment # 1: Scott Street (day/night)

-----  
Car traffic volume : 24288/2112 veh/TimePeriod \*  
Medium truck volume : 1932/168 veh/TimePeriod \*  
Heavy truck volume : 1380/120 veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 30000  
Percentage of Annual Growth : 0.00  
Number of Years of Growth : 0.00  
Medium Truck % of Total Volume : 7.00  
Heavy Truck % of Total Volume : 5.00  
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Scott Street (day/night)

-----  
Angle1 Angle2 : -74.00 deg 60.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 1 / 1  
House density : 20 %  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 55.00 / 55.00 m  
Receiver height : 10.50 / 10.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : -74.00 deg Angle2 : 60.00 deg  
Barrier height : 10.00 m  
Barrier receiver distance : 5.00 / 5.00 m  
Source elevation : 60.00 m  
Receiver elevation : 60.00 m  
Barrier elevation : 60.00 m  
Reference angle : 0.00



Road data, segment # 2: Parkdale Ave (day/night)

-----  
Car traffic volume : 12144/1056 veh/TimePeriod \*  
Medium truck volume : 966/84 veh/TimePeriod \*  
Heavy truck volume : 690/60 veh/TimePeriod \*  
Posted speed limit : 40 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 15000

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

Data for Segment # 2: Parkdale Ave (day/night)

-----  
 Angle1 Angle2 : -28.00 deg 28.00 deg  
 Wood depth : 0 (No woods.)  
 No of house rows : 2 / 2  
 House density : 40 %  
 Surface : 1 (Absorptive ground surface)  
 Receiver source distance : 100.00 / 100.00 m  
 Receiver height : 10.50 / 10.50 m  
 Topography : 2 (Flat/gentle slope; with barrier)  
 Barrier angle1 : -28.00 deg Angle2 : 28.00 deg  
 Barrier height : 10.00 m  
 Barrier receiver distance : 10.00 / 10.00 m  
 Source elevation : 60.00 m  
 Receiver elevation : 60.00 m  
 Barrier elevation : 60.00 m  
 Reference angle : 0.00

↑

Results segment # 1: Scott Street (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 !	10.50 !	9.68 !	69.68

ROAD (0.00 + 59.14 + 0.00) = 59.14 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-74	60	0.39	71.49	0.00	-7.84	-1.74	0.00	-0.90	0.00	61.01
-74	60	0.00	71.49	0.00	-5.64	-1.28	0.00	0.00	-5.43	59.14
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Segment Leq : 59.14 dBA

↑

Results segment # 2: Parkdale Ave (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 !          10.50 !          9.60 !          69.60
```

ROAD (0.00 + 46.59 + 0.00) = 46.59 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-28	28	0.39	66.69	0.00	-11.45	-5.14	0.00	-3.50	0.00	46.59
-28	28	0.00	66.69	0.00	-8.24	-5.07	0.00	0.00	-5.43	47.94

Segment Leq : 46.59 dBA

Total Leq All Segments: 59.37 dBA

↑

Results segment # 1: Scott Street (night)

Source height = 1.50 m

Barrier height for grazing incidence

```
-----
Source      ! Receiver      ! Barrier      ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)
-----+-----+-----+-----
          1.50 !          10.50 !          9.68 !          69.68
```

ROAD (0.00 + 51.54 + 0.00) = 51.54 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-74	60	0.39	63.89	0.00	-7.84	-1.74	0.00	-0.90	0.00	53.41
-74	60	0.00	63.89	0.00	-5.64	-1.28	0.00	0.00	-5.43	51.54

Segment Leq : 51.54 dBA

↑

Results segment # 2: Parkdale Ave (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source	!	Receiver	!	Barrier	!	Elevation of
Height (m)	!	Height (m)	!	Height (m)	!	Barrier Top (m)
-----+-----+-----+-----						
1.50	!	10.50	!	9.60	!	69.60

ROAD (0.00 + 39.00 + 0.00) = 39.00 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-----										
-28	28	0.39	59.09	0.00	-11.45	-5.14	0.00	-3.50	0.00	39.00
-28	28	0.00	59.09	0.00	-8.24	-5.07	0.00	0.00	-5.43	40.35
-----										

Segment Leq : 39.00 dBA

Total Leq All Segments: 51.78 dBA

⬆

TOTAL Leq FROM ALL SOURCES (DAY): 60.62  
(NIGHT): 51.81

⬆

⬆