

Geotechnical
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Engineering

Hydrogeology

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Materials Testing

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Noise and Vibration
Studies

Environmental Noise Control Study

Proposed Semi-Detached Dwelling
3 Bassano Street, Ottawa

Prepared For

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Report: PG6169-1

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1.0 Introduction

Paterson Group (Paterson) was commissioned by HP Urban Inc. to conduct an environmental noise control study for the proposed semi-detached dwelling to be located at 3 Bassano Street, 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 Proposed Development

It is understood that the proposed development will consist of a semi-detached dwelling. The dwelling has two (2) stories and rises approximately 7 metres above grade. One (1) basement level is anticipated at the dwelling. No outdoor living area is identified on the proposed site plan.

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

Surface roadway traffic noise, equivalent to sound level energy L_{eq} , provides a measure of the time varying noise level over a period of time. For roadways, the L_{eq} is commonly calculated on the basis of 16-hour (L_{eq16}) daytime (07:00-23:00) and 8-hour (L_{eq8}) nighttime (23:00-7:00) split to assess its impact on residential, commercial and institutional buildings.

The City of Ottawa's Official Plan dictates 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 Environmental Noise Guidelines for Stationary and Transportation Sources – NPC-300 outlines the limitations of noise levels in relation to the location of the receptors. These can be found in the following tables:

Table 1 – Noise Level Limit for Outdoor Living Areas	
Time Period	L_{eq} Level (dBA)
Daytime, 7:00-23:00	55
➤ Standard taken from Table 2.2a; Sound Level Limit for Outdoor Living Areas – Road and Rail	

Table 2 – Noise Level Limits for Indoor Living Areas			
Type of Space	Time Period	L_{eq} Level (dBA)	
		Road	Rail
General offices, reception areas, retail stores, etc.	Daytime 7:00-23:00	50	45
Theatres, places of worship, libraries, individual or semi-private offices, conference rooms, reading rooms, etc.	Daytime 7:00-23:00	45	40
Living/dining/den areas of residences , hospitals, nursing/retirement homes, schools, day-care centres	Daytime 7:00-23:00	45	40
Living/dining/den areas of residences , hospitals, nursing/retirement homes etc. (except schools or day-care centres)	Nighttime 23:00-7:00	45	40
Sleeping quarters of hotels/motels	Nighttime 23:00-7:00	45	40
Sleeping quarters of residences , hospitals, nursing/retirement homes, etc.	Nighttime 23:00-7:00	40	35
➤ Standards taken from Table 2.2b, Sound Level Limit for Indoor Living Areas – Road and Rail and Table 2.2c, Supplementary Sound Level Limits for Indoor Spaces – Road and Rail			

Predicted noise levels at the pane of window dictate the action required to achieve recommended noise levels. It is noted in ENCG that the limits outlined in Table 2 are for the noise levels on the interior of the window glass pane. An open window is considered to provide a 10 dBA noise reduction, while a standard closed window is capable to provide a minimum 20 dBA noise reduction. Therefore, where noise levels exceed 55 dBA daytime and 50 dBA nighttime, the ventilation for the building should consider the provision for central air conditioning. Where noise levels exceed 65 dBA daytime and 60 dBA nighttime, central air conditioning will be required, and the building components will require higher levels of sound attenuation.

If the noise level limits are exceeded, the following Warning Clauses should be included in related deeds of sale:

Table 3 – Warning Clauses for Noise Level Exceedances	
Warning Clause	Description
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."
➤ Clauses taken from section C8 Warning Clauses; Environmental Noise Guidelines for Stationary and Transportation Sources - 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 dwelling is bordered to the north by residential dwellings followed by Baseline Road, residential dwellings, and Ainsley Park, to the east by Bassano Street followed by residential dwellings, to the south by Granton Avenue followed by residential dwellings and Chippewa Avenue, and to the west by residential dwellings. Baseline Road, Bassano Street, Granton Avenue, and Chippewa Avenue are identified within the 100 m radius of proposed dwelling.

Based on the City of Ottawa’s Official Plan, Schedule E, Baseline Road is considered a 4 lane urban arterial road – divided (4-UAD). Other roads within the 100 m radius of the proposed development are not classified as either arterial, collector or major collector roads and therefore are not included in this study. The major source of traffic noise is due to the Baseline Road to the north of the proposed dwelling.

All noise sources are presented in Drawing PG6169-3 - 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 classification. 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.

Table 4 – Traffic and Road Parameters						
Segment	Roadway Classification	AADT Veh/Day	Speed Limit (km/h)	Day/Night Split %	Medium Truck %	Heavy Truck %
Baseline Road	4-UAD	35000	60	92/8	7	5
➤ Data obtained from the City of Ottawa document ENCG						

Two (2) 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.

Table 5 – Elevations of Reception Points			
Floor Number	Elevation at Centre of Window (m)	Floor Use	Daytime / Nighttime Analysis
First Floor	1.5	Living Area/Bedroom	Daytime / Nighttime
Second Floor	4.8	Living Area/Bedroom	Daytime / Nighttime

For this analysis, a reception point was taken at the centre of each floor, at the first floor and top floor. Reception points are detailed on Drawing PG6169-2 - 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 roadway was analyzed where it intersected the 100 m buffer zone, which is reflected in the local angles described in Paterson Drawings PG6169-3A to 3C - Site Geometry in Appendix 1.

Table 7 - 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 ENGC.

The subject site is gently sloping downward to the west and at grade with the neighbouring roads within 100 m radius.

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 Noise

The primary descriptors are the 16-hour daytime (7:00-23:00) and the 8-hour nighttime (23:00-7:00) equivalent sound levels, $L_{eq(16)}$ and $L_{eq(8)}$ for City roads.

The exterior noise levels due to roadway traffic sources were analyzed with the STAMSON version 5.04 software at all reception points. The input and output data of the STAMSON modeling can be found in Appendix 2, and the summary of the results can be found in Table 6.

Table 6: Exterior Noise Levels due to Roadway Traffic Sources				
Reception Point	Height Above Grade (m)	Receptor Location	Daytime $L_{eq(16)}$ (dBA)	Nighttime $L_{eq(8)}$ (dBA)
REC 1-1	1.5	Northern Elevation, 1st Floor	63	55
REC 1-2	4.8	Northern Elevation, 2nd Floor	64	56
REC 2-1	1.5	Eastern Elevation, 1st Floor	58	51
REC 2-2	4.8	Eastern Elevation, 2nd Floor	59	51
REC 3-1	1.5	Western Elevation, 1st Floor	58	51
REC 3-2	4.8	Western Elevation, 2nd Floor	59	51

6.0 Discussion and Recommendations

6.1 Outdoor Living Areas

No outdoor living areas were identified for this development.

6.2 Indoor Living Areas and Ventilation

The results of the STAMSON modeling indicate that the noise levels will range between 58 dBA and 64 dBA during the daytime period (07:00-23:00) and between 51 dBA and 56 dBA during the nighttime period (23:00-7:00). The noise levels on northern, eastern, and western elevations will exceed the limit for the exterior of the pane of glass (55 dBA) specified by the ENCG. Therefore, both units of this dwelling should be designed with the provision for adding a central air conditioning unit, along with the warning clause Type C, as outlined in Table 3. It is also noted that the results of STAMSON modeling indicate that the noise levels will be 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 3 Bassano Street, in the City of Ottawa. It is understood that the proposed development will consist of a semi-detached dwelling. The dwelling has two (2) stories and rises approximately 7 metres above grade. There is one major source of surface transportation noise to the proposed dwelling: Baseline Road.

It is noted that there is no outdoor living area at this development.

Several reception points were selected for the surface transportation noise analysis, consisting of the centre of first level and top level. The results of STAMSON modeling indicate that the anticipated noises at northern, eastern, and western elevations of proposed dwelling are expected to exceed the 55 dBA threshold specified by the ENCG. Therefore, the design with the provision for a central air conditioning unit, along with a warning clause Type C, will be required for both units of this dwelling. It is also noted that the results of STAMSON modeling indicate that the noise levels will be below 65 dBA, and therefore standard building materials are acceptable to provide adequate soundproofing.

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 HP Urban Inc. or their 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.



Yolanda Tang, M.Sc.Eng



Stephanie A. Boisvenue, P.Eng.

Report Distribution:

- HP Urban Inc. (email copy)
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APPENDIX 1

TABLE 7 - SUMMARY OF RECEPTION POINTS AND GEOMETRY

DRAWING PG6169-1 - SITE PLAN

DRAWING PG6169-2 - RECEPTOR LOCATION PLAN

DRAWING PG6169-3 - SITE GEOMETRY

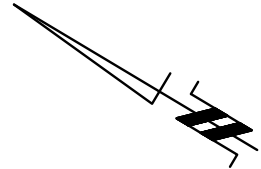
DRAWING PG6169-3A - SITE GEOMETRY (REC 1-1 and REC 1-2)

DRAWING PG6169-3B - SITE GEOMETRY (REC 2-1 and REC 2-2)

DRAWING PG6169-3C - SITE GEOMETRY (REC 3-1 and REC 3-2)

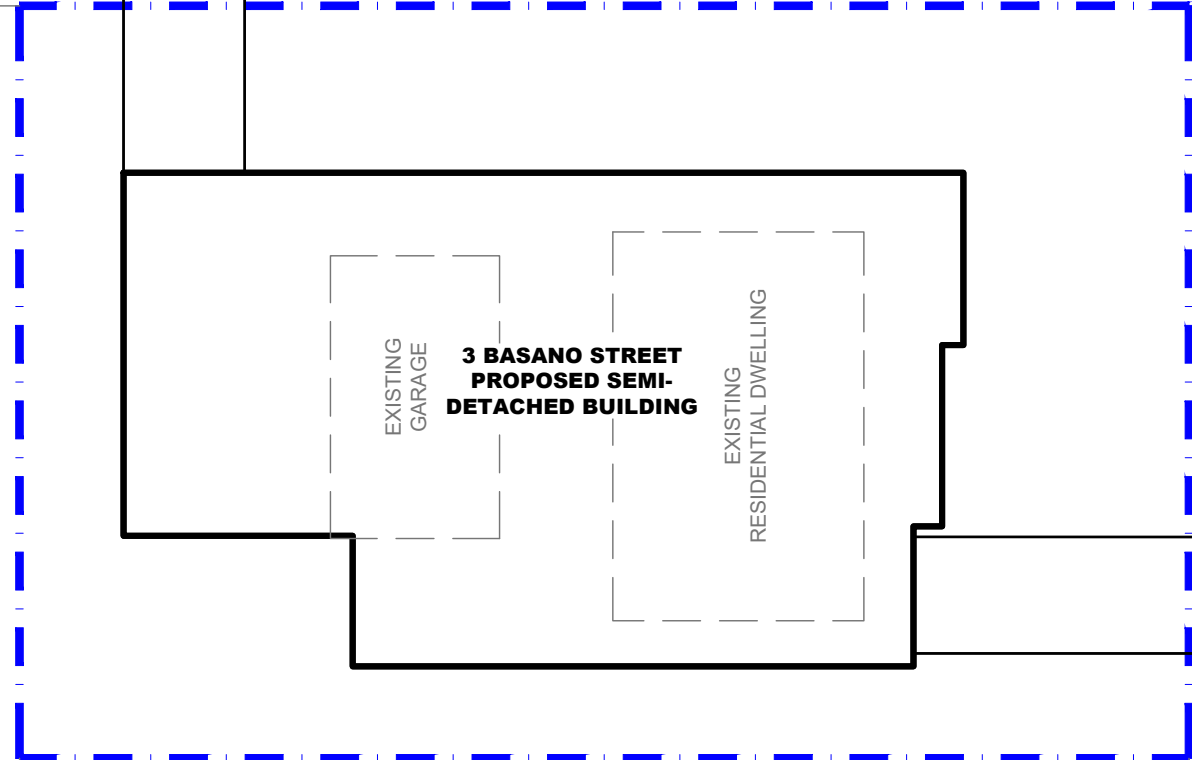
**Table 7 - Summary of Reception Points and Geometry
3 Bassano Street**

Point of Reception	Location	Leq Day (dBA)	Baseline Road					Number of Rows of Houses	Density (%)	[Diagrammatic Representation]					
			Horizontal (m)	Vertical (m)	Total (m)	Local Angle (degree)	[Diagrammatic Representation]								
REC 1-1	Northern Elevation, 1st Floor	63	45	1.5	45.0	-70, 69	1	20	[Diagrammatic Representation]						
REC 1-2	Northern Elevation, 2nd Floor	64	45	4.8	45.3	-70, 69	1	20	[Diagrammatic Representation]						
REC 2-1	Eastern Elevation, 1st Floor	58	55	1.5	55.0	0, 62	1	20	[Diagrammatic Representation]						
REC 2-2	Eastern Elevation, 2nd Floor	59	55	4.8	55.2	0, 62	1	20	[Diagrammatic Representation]						
REC 3-1	Western Elevation, 1st Floor	58	55	1.5	55.0	-63, 0	1	20	[Diagrammatic Representation]						
REC 3-2	Western Elevation, 2nd Floor	59	55	4.8	55.2	-63, 0	1	20	[Diagrammatic Representation]						



BASSANO STREET

1624 BASELINE ROAD

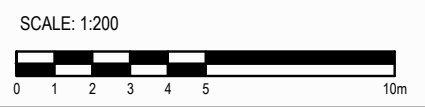


79 GRANTON AVENUE

GRANTON AVENUE

5 BASSANO STREET

82 GRANTON AVENUE



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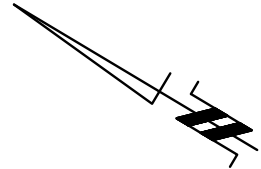
HP URBAN
NOISE ATTENUATION STUDY
PROPOSED SEMI-DETACHED BUILDING
3 BASSANO STREET

OTTAWA, ONTARIO

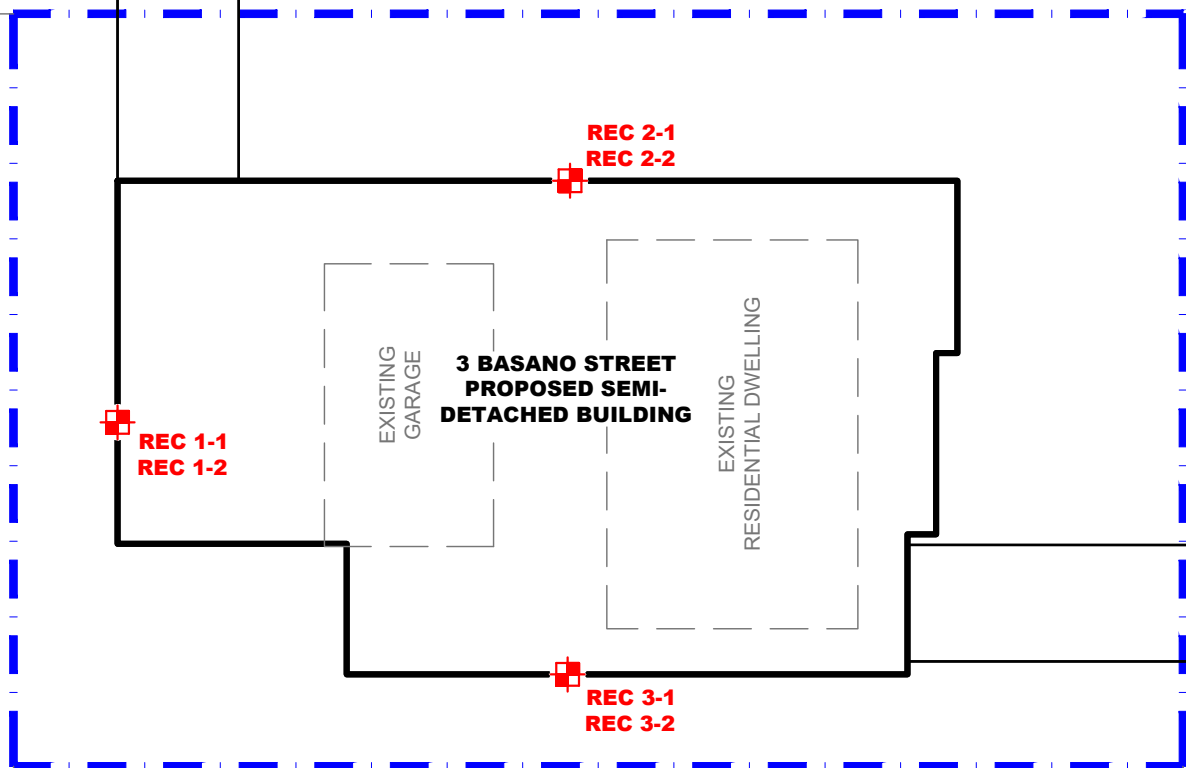
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Scale:	1:200	Date:	03/2022
Drawn by:	JM	Report No.:	PG6169-1
Checked by:	YT	Dwg. No.:	PG6169-1
Approved by:	SB	Revision No.:	

BASSANO STREET



1624 BASELINE ROAD



**3 BASANO STREET
PROPOSED SEMI-
DETACHED BUILDING**

EXISTING
GARAGE

EXISTING
RESIDENTIAL DWELLING

**REC 1-1
REC 1-2**

**REC 2-1
REC 2-2**

**REC 3-1
REC 3-2**

79 GRANTON AVENUE

GRANTON AVENUE

5 BASSANO STREET

82 GRANTON AVENUE

LEGEND:



RECEPTOR LOCATION

SCALE: 1:200



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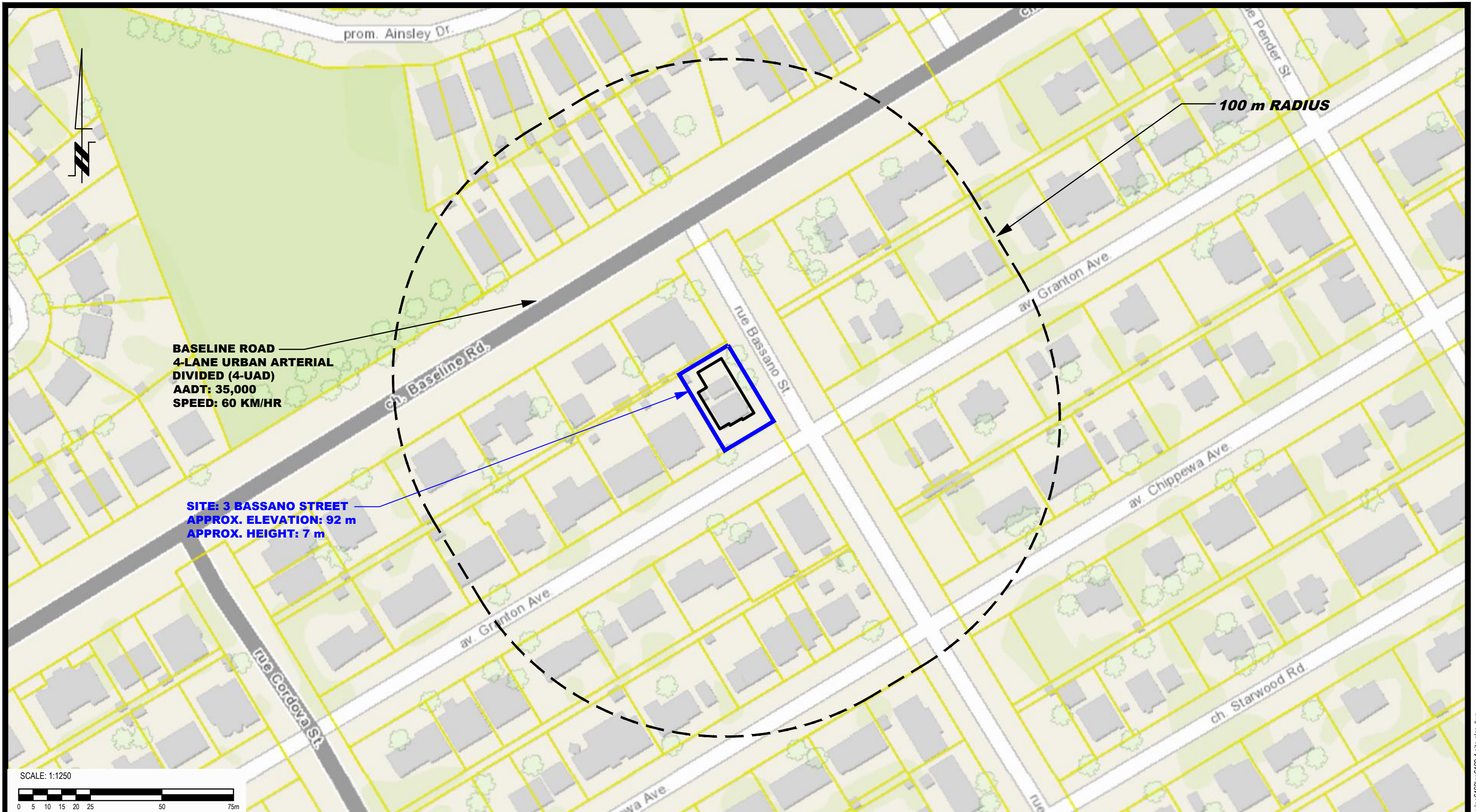
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NOISE ATTENUATION STUDY
PROPOSED SEMI-DETACHED BUILDING
3 BASSANO STREET
RECEPTOR LOCATION PLAN

ONTARIO

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Revision No.:	



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OTTAWA,
Title:

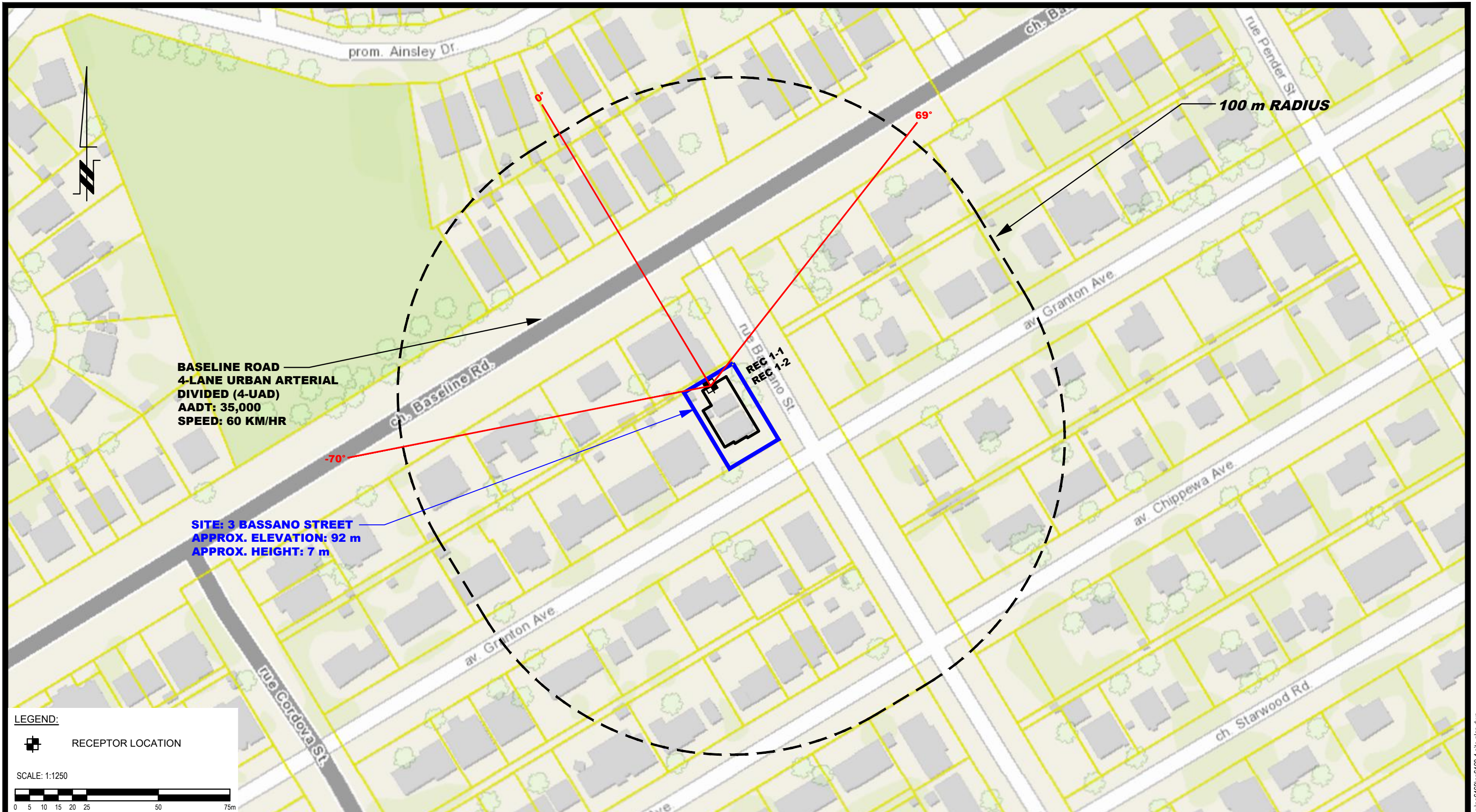
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PROPOSED SEMI-DETACHED BUILDING
3 BASSANO STREET

ONTARIO

SITE GEOMETRY

Scale: 1:1250
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Approved by: SB

Date: 03/2022
Report No.: PG6169-1
Dwg. No.: **PG6169-3**
Revision No.:



BASELINE ROAD
4-LANE URBAN ARTERIAL
DIVIDED (4-UAD)
AAVT: 35,000
SPEED: 60 KM/HR

SITE: 3 BASSANO STREET
APPROX. ELEVATION: 92 m
APPROX. HEIGHT: 7 m

LEGEND:

 RECEPTOR LOCATION

SCALE: 1:1250



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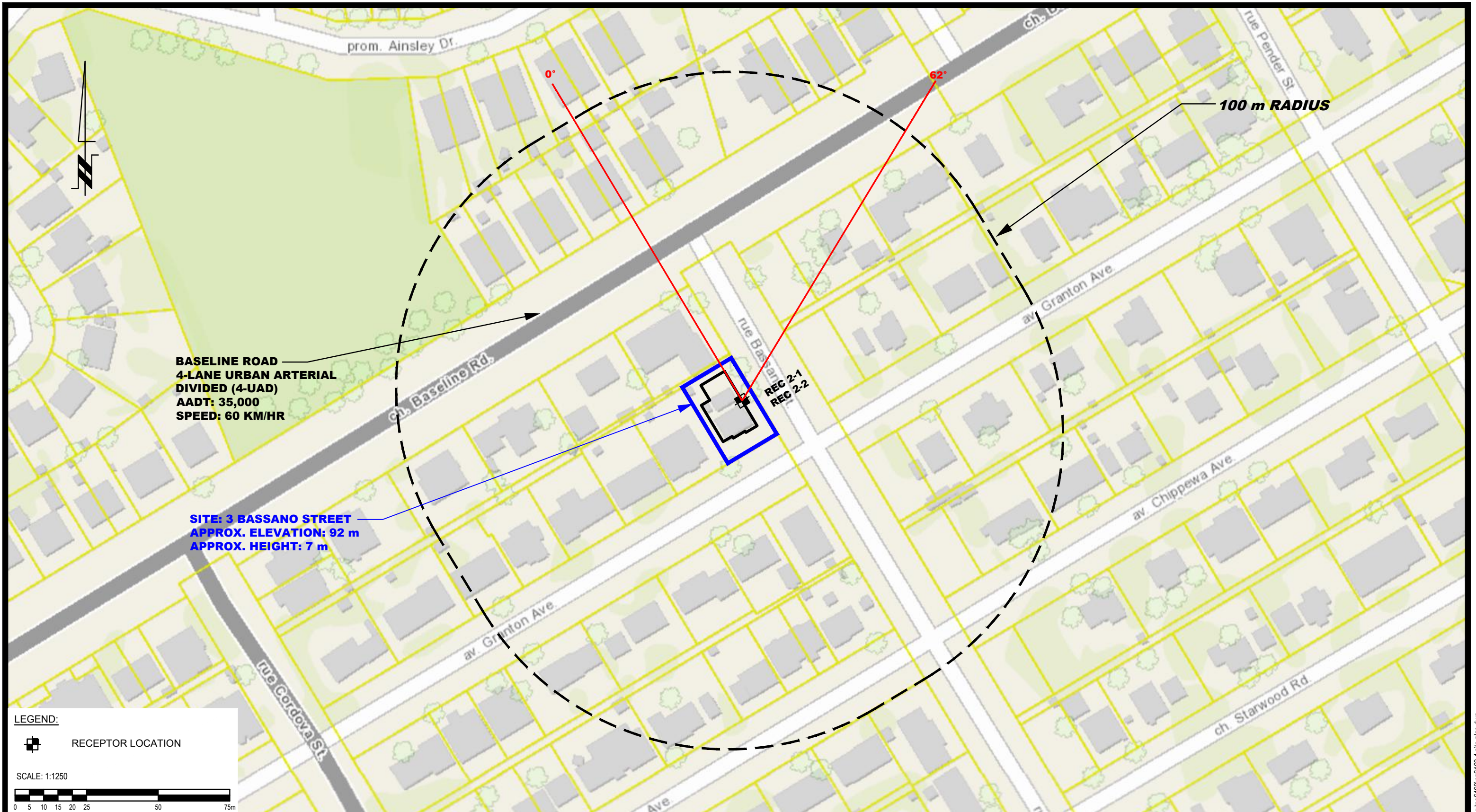
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HP URBAN
 NOISE ATTENUATION STUDY
 PROPOSED SEMI-DETACHED BUILDING
 3 BASSANO STREET
 ONTARIO

SITE GEOMETRY - REC 1-1 & REC 1-2

Scale: 1:1250
 Drawn by: JM
 Checked by: YT
 Approved by: SB

Date: 03/2022
 Report No.: PG6169-1
 Dwg. No.: **PG6169-3A**
 Revision No.:



LEGEND:

 RECEPTOR LOCATION

SCALE: 1:1250



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PROPOSED SEMI-DETACHED BUILDING
3 BASSANO STREET
ONTARIO

SITE GEOMETRY - REC 2-1 & REC 2-2

Scale: 1:1250
Drawn by: JM
Checked by: YT
Approved by: SB

Date: 03/2022
Report No.: PG6169-1
Dwg. No.: **PG6169-3B**
Revision No.:

APPENDIX 2

STAMSON RESULTS

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

Road data, segment # 1: Baseline Rd (day/night)

 Car traffic volume : 28336/2464 veh/TimePeriod *
 Medium truck volume : 2254/196 veh/TimePeriod *
 Heavy truck volume : 1610/140 veh/TimePeriod *
 Posted speed limit : 60 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): 35000
 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: Baseline Rd (day/night)

 Angle1 Angle2 : -70.00 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 : 45.00 / 45.00 m
 Receiver height : 1.50 / 1.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

↑
 Results segment # 1: Baseline Rd (day)

 Source height = 1.50 m

ROAD (0.00 + 62.96 + 0.00) = 62.96 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-70	69	0.66	73.68	0.00	-7.92	-1.90	0.00	-0.90	0.00	62.96

Segment Leq : 62.96 dBA

Total Leq All Segments: 62.96 dBA

↑

Results segment # 1: Baseline Rd (night)

Source height = 1.50 m

ROAD (0.00 + 55.36 + 0.00) = 55.36 dBA

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

-70	69	0.66	66.08	0.00	-7.92	-1.90	0.00	-0.90	0.00	55.36
-----	----	------	-------	------	-------	-------	------	-------	------	-------

Segment Leq : 55.36 dBA

Total Leq All Segments: 55.36 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 62.96
(NIGHT): 55.36

↑

↑

Filename: rec12.te Time Period: Day/Night 16/8 hours
 Description: Receptor Point 1-2

Road data, segment # 1: Baseline Rd (day/night)

 Car traffic volume : 28336/2464 veh/TimePeriod *
 Medium truck volume : 2254/196 veh/TimePeriod *
 Heavy truck volume : 1610/140 veh/TimePeriod *
 Posted speed limit : 60 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): 35000
 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: Baseline Rd (day/night)

 Angle1 Angle2 : -70.00 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 : 45.00 / 45.00 m
 Receiver height : 4.80 / 4.80 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

↑
 Results segment # 1: Baseline Rd (day)

 Source height = 1.50 m

ROAD (0.00 + 63.54 + 0.00) = 63.54 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-70	69	0.56	73.68	0.00	-7.45	-1.79	0.00	-0.90	0.00	63.54

 Segment Leq : 63.54 dBA

Total Leq All Segments: 63.54 dBA

↑

Results segment # 1: Baseline Rd (night)

Source height = 1.50 m

ROAD (0.00 + 55.94 + 0.00) = 55.94 dBA

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

-70 69 0.56 66.08 0.00 -7.45 -1.79 0.00 -0.90 0.00 55.94

Segment Leq : 55.94 dBA

Total Leq All Segments: 55.94 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 63.54
(NIGHT): 55.94

↑

↑

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

Road data, segment # 1: Baseline Rd (day/night)

 Car traffic volume : 28336/2464 veh/TimePeriod *
 Medium truck volume : 2254/196 veh/TimePeriod *
 Heavy truck volume : 1610/140 veh/TimePeriod *
 Posted speed limit : 60 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): 35000
 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: Baseline Rd (day/night)

 Angle1 Angle2 : 0.00 deg 62.00 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 : 1.50 / 1.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

↑
 Results segment # 1: Baseline Rd (day)

 Source height = 1.50 m

ROAD (0.00 + 58.18 + 0.00) = 58.18 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	62	0.66	73.68	0.00	-9.37	-5.23	0.00	-0.90	0.00	58.18

Segment Leq : 58.18 dBA

Total Leq All Segments: 58.18 dBA

↑

Results segment # 1: Baseline Rd (night)

Source height = 1.50 m

ROAD (0.00 + 50.58 + 0.00) = 50.58 dBA

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

0	62	0.66	66.08	0.00	-9.37	-5.23	0.00	-0.90	0.00	50.58
---	----	------	-------	------	-------	-------	------	-------	------	-------

Segment Leq : 50.58 dBA

Total Leq All Segments: 50.58 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 58.18

(NIGHT): 50.58

↑

↑

Filename: rec22.te Time Period: Day/Night 16/8 hours
 Description: Receptor Point 2-2

Road data, segment # 1: Baseline Rd (day/night)

 Car traffic volume : 28336/2464 veh/TimePeriod *
 Medium truck volume : 2254/196 veh/TimePeriod *
 Heavy truck volume : 1610/140 veh/TimePeriod *
 Posted speed limit : 60 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): 35000
 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: Baseline Rd (day/night)

 Angle1 Angle2 : 0.00 deg 62.00 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 : 4.80 / 4.80 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

↑
 Results segment # 1: Baseline Rd (day)

 Source height = 1.50 m

ROAD (0.00 + 58.82 + 0.00) = 58.82 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	62	0.56	73.68	0.00	-8.81	-5.15	0.00	-0.90	0.00	58.82

Segment Leq : 58.82 dBA

Total Leq All Segments: 58.82 dBA

↑

Results segment # 1: Baseline Rd (night)

Source height = 1.50 m

ROAD (0.00 + 51.22 + 0.00) = 51.22 dBA

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

0	62	0.56	66.08	0.00	-8.81	-5.15	0.00	-0.90	0.00	51.22
---	----	------	-------	------	-------	-------	------	-------	------	-------

Segment Leq : 51.22 dBA

Total Leq All Segments: 51.22 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 58.82

(NIGHT): 51.22

↑

↑

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

Road data, segment # 1: Baseline Rd (day/night)

```
-----
Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 veh/TimePeriod *
Posted speed limit : 60 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): 35000
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: Baseline Rd (day/night)

```
-----
Angle1 Angle2 : -63.00 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 : 55.00 / 55.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00
```

↑
 Results segment # 1: Baseline Rd (day)

Source height = 1.50 m

ROAD (0.00 + 58.22 + 0.00) = 58.22 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-63	0	0.66	73.68	0.00	-9.37	-5.18	0.00	-0.90	0.00	58.22

Segment Leq : 58.22 dBA

Total Leq All Segments: 58.22 dBA

↑

Results segment # 1: Baseline Rd (night)

Source height = 1.50 m

ROAD (0.00 + 50.63 + 0.00) = 50.63 dBA

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

-63 0 0.66 66.08 0.00 -9.37 -5.18 0.00 -0.90 0.00 50.63

Segment Leq : 50.63 dBA

Total Leq All Segments: 50.63 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 58.22
(NIGHT): 50.63

↑

↑

Filename: rec32.te Time Period: Day/Night 16/8 hours
 Description: Receptor Point 3-2

Road data, segment # 1: Baseline Rd (day/night)

 Car traffic volume : 28336/2464 veh/TimePeriod *
 Medium truck volume : 2254/196 veh/TimePeriod *
 Heavy truck volume : 1610/140 veh/TimePeriod *
 Posted speed limit : 60 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): 35000
 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: Baseline Rd (day/night)

 Angle1 Angle2 : -63.00 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 : 55.00 / 55.00 m
 Receiver height : 4.80 / 4.80 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

↑
 Results segment # 1: Baseline Rd (day)

 Source height = 1.50 m

ROAD (0.00 + 58.87 + 0.00) = 58.87 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-63	0	0.56	73.68	0.00	-8.81	-5.10	0.00	-0.90	0.00	58.87

Segment Leq : 58.87 dBA

Total Leq All Segments: 58.87 dBA

↑

Results segment # 1: Baseline Rd (night)

Source height = 1.50 m

ROAD (0.00 + 51.27 + 0.00) = 51.27 dBA

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

-63 0 0.56 66.08 0.00 -8.81 -5.10 0.00 -0.90 0.00 51.27

Segment Leq : 51.27 dBA

Total Leq All Segments: 51.27 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 58.87
(NIGHT): 51.27

↑

↑