Report
Project: 115201-5.2.2

ENVIRONMENTAL NOISE IMPACT ASSESSMENT
380 ROLLING MEADOWS CRESCENT SPRING VALLEY - ZENS

Prepared for CLARIDGE HOMES
by IBI GROUP

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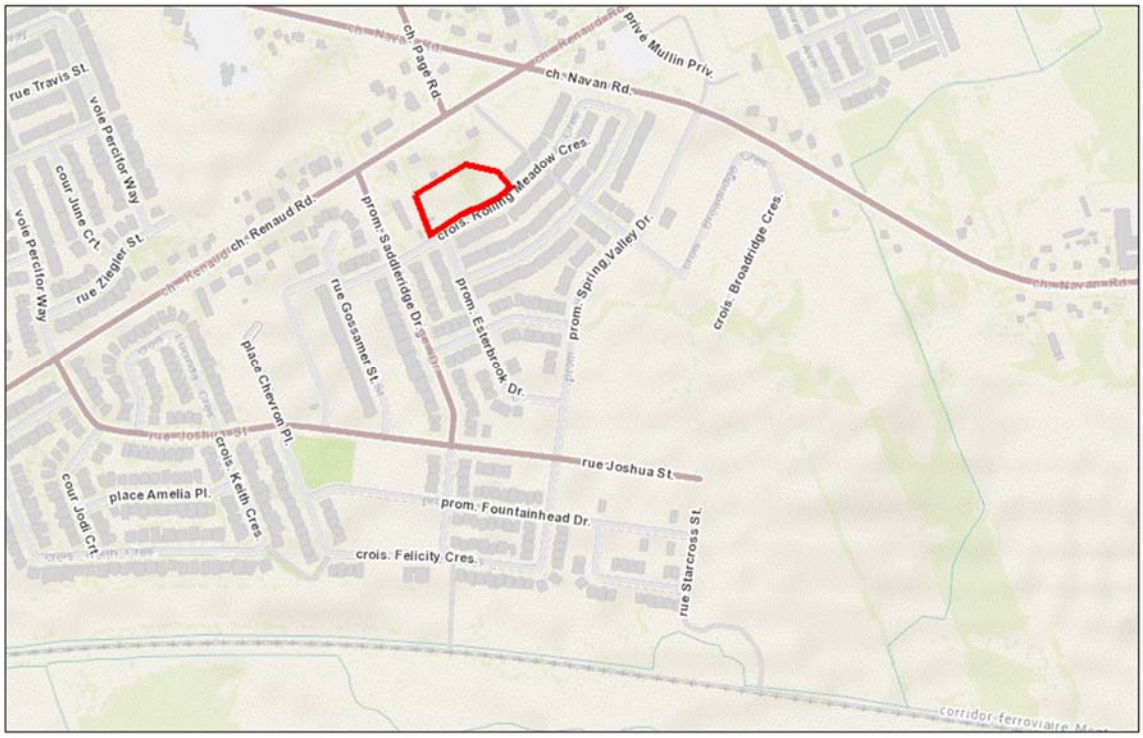
1 INTRODUCTION

On behalf of our client, a study has been prepared to determine the impact of the roadway traffic on the residential buildings located at 380 Rolling Meadow Crescent in the Spring Valley Trails Subdivision in the City of Ottawa. Figure 1.1 shows the location of the site. This report deals with the expected noise levels in the development and any required noise control measures.

Figure 1.1 Site Location



2 BACKGROUND

2.1 Noise Sources

The study area is primarily subject to road noise from Saddleridge Drive and Renaud Road and to an extent from Navan Road. Aircraft noise from the Ottawa International Airport and rail noise is not a factor as the airport and rail lines are not in close proximity to the study area.

2.2 Sound Level Limits for Road Traffic

Sound level criteria for road traffic is taken from the City of Ottawa Environmental Noise Control Guidelines hereafter referred to as the guidelines. Noise levels are expressed in the form Leq (T) which refers to a weighted level of a steady sound carrying the same total energy in the time period T (in hours) as the observed fluctuation sound.

2.2.1 Indoor sound level criterion

Similar to outdoor noise levels, the recommended indoor sound level criteria from Table 2.2b of the guidelines are:

- bedrooms – 23:00 to 07:00 – 40 dBA Leq (8)
- other areas – 07:00 to 23:00– 45 dBA Leq (16)

For the purpose of assessing indoor sound levels, the outdoor sound levels are observed at the plane of the living room window at 2.5m above the ground for daytime noise and at the plane of the bedroom window 4.5 metres above the ground for nighttime noise.

When the outdoor sound levels are less than or equal to 65dBA at the living room window and/or less than or equal to 60dBA at the bedroom level then the building must be compliant with the Ontario Building Code. Should the outdoor sound levels exceed this criteria then the building component (walls windows etc.) must be designed to achieve indoor sound level criteria.

When the outdoor noise levels at the living room are greater than 55dBA and less than or equal to 65dBA and/or greater then 50dBA and less than or equal to 60dBA at the bedroom window then a warning clause is required and forced air heating with provision for central air conditioning is required. Should the outdoor sound levels exceed the criteria central air conditions is mandatory and a warning clause is required.

2.2.2 Outdoor Sound Level Criterion

As per Table 2.2a of the guidelines the sound level criterion for the outdoor living area (OLA) for the daytime period between 07:00 and 23:00 hours is 55 dBA Leq (16). Sound levels for the OLA are calculated 3 meters from the building face at the centre of the unit or within the centre of the OLA at a height of 1.5m above the ground.

If the Leq sound level is less than or equal to the above criteria then no further action is required by the developer. If the sound level exceeds the criteria by less than 5 dBA then the developer may either provide a warning clause to prospective purchasers or install physical attenuation. For sound levels greater than 5 dBA above the criteria control measures are required to reduce the noise levels as close to 55 dBA as technically, economically and administratively possible. Should the sound levels with the barrier in place exceed 55 dBA a warning clause is also required.

3 ROADWAY NOISE

3.1 Traffic Volume Data

The site is exposed to the traffic from Saddleridge Drive, Renaud Road and Navan Road.

Renaud Road is presently a two lane undivided road with a posted speed limit of 50 km/hr. in the vicinity of this site. Saddleridge Drive is considered an urban collector roadway. Navan Road is currently a 2 lane rural road with a posted speed limit of 60 km/hr, allowance for a future widening to four lanes is included in the noise analysis. Traffic parameters are taken from Table B.1 of the guidelines, Saddleridge Drive is a 2-UCU while Renaud Road is a 2-UAU and Navan Road is a 4-UAU. Table 3.1 summarizes the traffic and road data used in this report.

TABLE 3.1
TRAFFIC AND ROAD DATA SUMMARY

	SADDLERIDGE DRIVE	RENAUD ROAD	NAVAN ROAD
Annual Average Daily Traffic (AADT)	8,000	15,000	30,000
Posted Speed Limit (per/hr)	50	50	60
% Medium Trucks	7%	7%	7%
% Heavy Trucks	5%	5%	6%
% Daytime Traffic	92%	92%	92%

3.2 Calculation Methods

Roadway noise was calculated using the STAMSON 5.04 computer program from the Ontario Ministry of the Environment.

The site consists of four walk-up buildings with each building containing 12 units. As there is no Outdoor Living Area (OLA) as defined in the guidelines, only indoor noise levels are evaluated in this report. There are two critical locations for noise reception, one is at the northwest corner of building ‘C’ which receives noise from both Saddleridge Drive and Renaud Road. As there are existing buildings between the two noise sources, the STAMSON calculation uses an allowance for a row of houses between the receiver and source. For Saddleridge Drive, the density of the row is assumed at 50% based on the geo Ottawa site while the Renaud Road density is 25%.

The other critical location is at the north east corner of building ‘A’ which receives noise from Renaud Road and Navan Road. As there are less existing buildings east of the development there is no allowance for houses between the receiver and source in the STAMSON calculation. Several other locations were used to determine noise levels that are shown on the Noise Plan, Figure 3.1.

TABLE 3.2
UNATTENUATED NOISE LEVELS AT BUILDING FACE (INDOOR)

LOCATION	ROADWAY	DISTANCE (M)	LEFT ANGLE	RIGHT ANGLE	DAYTIME NOISE (DBA)	NIGHTTIME NOISE (DBA)
A	Saddleridge	67.5	-60	45	55.36	49.92
	Renaud	77.5	-70	90		
B	Saddleridge	102.0	-5	35	54.18	48.59
	Renaud	77.5	-70	90		
C	Saddleridge	67.5	-55	55	50.30	45.36
D	Renaud	108.0	-60	70	55.25	48.62
	Navan	178.0	-90	30		
E	Renaud	110.0	-70	70	55.76	49.13
	Navan	157.5	-90	30		

As indicated in Table 3.2 the recommended sound levels are exceeded for several of the locations.

4 ABATEMENT MEASURES

4.1 Indoor Sound Levels

In Building ‘A’, ‘B’ and ‘C’ the north facing units have daytime noise level at the building face exceeds 55 dBA and is less than 65 dBA. Alternative means of ventilation is required for these units comprising of a forced air heating system with provision for central air conditioning, a Type ‘C’ warning clause is also required in the Agreement of Purchase and Sale.

5 SUMMARY OF ATTENUATION MEASURES

5.1 Warning Clauses

A clause regarding noise must appear on the Agreement of Purchase and Sale on the title of the units shown on the Noise Plan and listed below:

Type 'C'	Building 'A', 'B' & 'C'	All north facing units

The following are the warning clauses:

Type 'C'	"This dwelling unit has been fitted with a forced air heating system and the ducting, etc. was sized to accommodate central air conditioning. Installation of central air conditioning by the occupant will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the City's and the Ministry of the Environment's noise criteria. (Note: The location and installation of the outdoor air conditioning device should be done so as to comply with noise criteria of MOE Publication NPC-216, Residential Air Conditioning Devices and thus minimize the noise impacts both on and in the immediate vicinity of the subject property."

5.2 Ventilation Requirements

All units requiring a Type 'C' warning clause listed in Section 5.1 requires a forced air heating system sized to accommodate central air conditioning.

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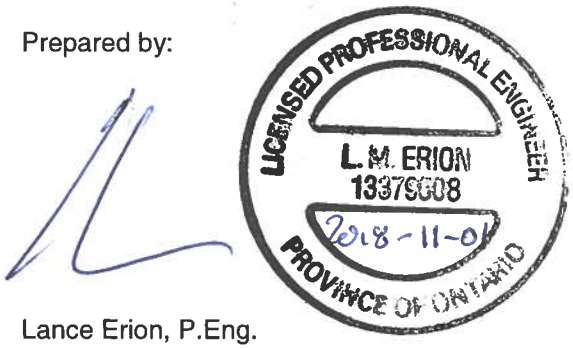

Lance Erion, P.Eng.
Associate

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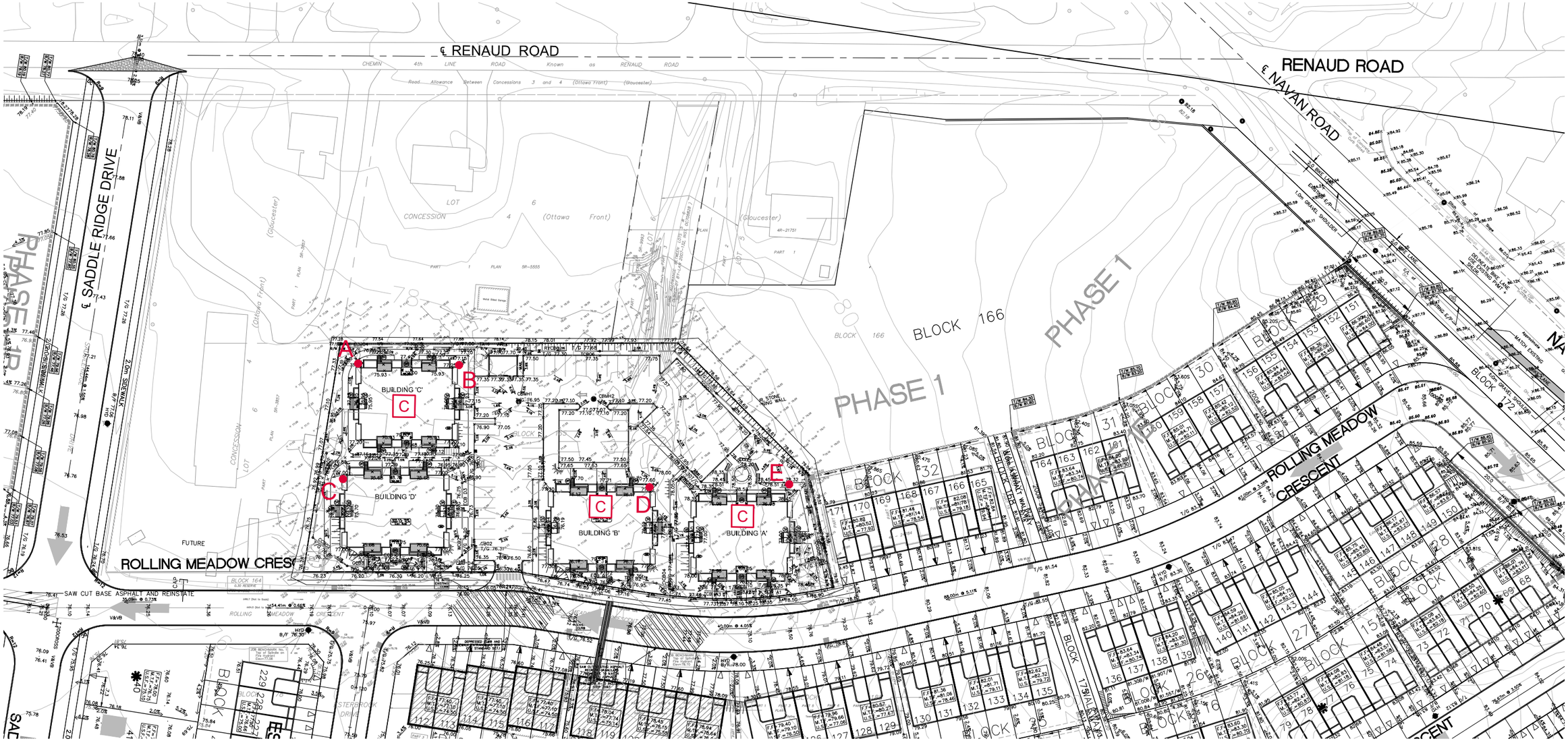
J:\115201_SVTWalkups\5.9 Drawings\59civil\layouts\NOISE PLAN.dwg Layout Name: Layout1 Plot Scale: 1:5.13 Plotted At: 11/1/2018 Last Saved By: dsiurna Last Saved At: Nov. 1, 18

LEGEND:

- •E — NOISE RECEIVER
- C — NOISE WARNING CLAUSE



Scale	Project Title	Drawing Title	Sheet No.
NTS	SPRING VALLEY ZENS	NOISE PLAN	FIGURE 3.1

APPENDIX

STAMSON 5.0 NORMAL REPORT Date: 01-11-2018 11:07:45
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: spzbub.te Time Period: Day/Night 16/8 hours
Description: Location A indoor

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

Car traffic volume	: 6477/563	veh/TimePeriod *
Medium truck volume	: 515/45	veh/TimePeriod *
Heavy truck volume	: 368/32	veh/TimePeriod *
Posted speed limit	: 50 km/h	
Road gradient	: 1 %	
Road pavement	: 1 (Typical asphalt or concrete)	

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

24 hr Traffic Volume (AADT or SADT)	: 8000
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: Saddleridge (day/night)

Angle1 Angle2	: -60.00 deg	45.00 deg
Wood depth	: 0	(No woods.)
No of house rows	: 1 / 0	
Surface	: 1	(Absorptive ground surface)
Receiver source distance	: 67.50 / 67.50	m
Receiver height	: 1.50 / 4.50	m
Topography	: 1	(Flat/gentle slope; no barrier)
Reference angle	: 0.00	

Road data, segment # 2: Renaud (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 : 50 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 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: Renaud (day/night)

Angle1 Angle2 : -70.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 77.50 / 77.50 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Saddleridge (day)

Source height = 1.50 m

ROAD (0.00 + 50.12 + 0.00) = 50.12 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-60	45	0.66	65.75	0.00	-10.84	-2.79	0.00	-2.00	0.00	50.12

Segment Leq : 50.12 dBA

Results segment # 2: Renaud (day)

Source height = 1.50 m

ROAD (0.00 + 53.81 + 0.00) = 53.81 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-70	90	0.66	68.48	0.00	-11.84	-1.66	0.00	-1.17	0.00	53.81

Segment Leq : 53.81 dBA

Total Leq All Segments: 55.36 dBA

Results segment # 1: Saddleridge (night)

Source height = 1.50 m

ROAD (0.00 + 45.17 + 0.00) = 45.17 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-60	45	0.57	58.16	0.00	-10.26	-2.73	0.00	0.00	0.00	45.17

Segment Leq : 45.17 dBA

Results segment # 2: Renaud (night)

Source height = 1.50 m

ROAD (0.00 + 48.15 + 0.00) = 48.15 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-70	90	0.57	60.88	0.00	-11.20	-1.54	0.00	0.00	0.00	48.15

Segment Leq : 48.15 dBA

Total Leq All Segments: 49.92 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.36
(NIGHT): 49.92

STAMSON 5.0 COMPREHENSIVE REPORT Date: 01-11-2018 11:10:31
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: b.te Time Period: Day/Night 16/8 hours
Description: Location B indoor

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

Car traffic volume	6477/563	veh/TimePeriod *
Medium truck volume	515/45	veh/TimePeriod *
Heavy truck volume	368/32	veh/TimePeriod *
Posted speed limit	50 km/h	
Road gradient	1 %	
Road pavement	1 (Typical asphalt or concrete)	

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

24 hr Traffic Volume (AADT or SADT)	8000
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: Saddleridge (day/night)

Angle1 Angle2	-5.00 deg	35.00 deg
Wood depth	0	(No woods.)
No of house rows	1 / 0	
Surface	1	(Absorptive ground surface)
Receiver source distance	102.00 / 102.00 m	
Receiver height	1.50 / 4.50 m	
Topography	1	(Flat/gentle slope; no barrier)
Reference angle	0.00	

Road data, segment # 2: Renaud (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 : 50 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 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: Renaud (day/night)

Angle1 Angle2 : -70.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 77.50 / 77.50 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Segment # 1: Saddleridge (day)

Source height = 1.50 m

ROAD (0.00 + 43.24 + 0.00) = 43.24 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-5	35	0.66	65.75	0.00	-13.82	-6.69	0.00	-2.00	0.00	43.24

Segment Leq : 43.24 dBA

Segment # 2: Renaud (day)

Source height = 1.50 m

ROAD (0.00 + 53.81 + 0.00) = 53.81 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-70	90	0.66	68.48	0.00	-11.84	-1.66	0.00	-1.17	0.00	53.81

Segment Leq : 53.81 dBA

Total Leq All Segments: 54.18 dBA

Segment # 1: Saddleridge (night)

Source height = 1.50 m

ROAD (0.00 + 38.42 + 0.00) = 38.42 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-5	35	0.57	58.16	0.00	-13.07	-6.67	0.00	0.00	0.00	38.42

Segment Leq : 38.42 dBA

Segment # 2: Renaud (night)

Source height = 1.50 m

ROAD (0.00 + 48.15 + 0.00) = 48.15 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-70	90	0.57	60.88	0.00	-11.20	-1.54	0.00	0.00	0.00	48.15

Segment Leq : 48.15 dBA

Total Leq All Segments: 48.59 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 54.18
(NIGHT): 48.59

STAMSON 5.0 COMPREHENSIVE REPORT Date: 01-11-2018 11:12:51
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: b.te Time Period: Day/Night 16/8 hours
Description: Location C indoor

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

Car traffic volume	6477/563	veh/TimePeriod *
Medium truck volume	515/45	veh/TimePeriod *
Heavy truck volume	368/32	veh/TimePeriod *
Posted speed limit	50 km/h	
Road gradient	1 %	
Road pavement	1 (Typical asphalt or concrete)	

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

24 hr Traffic Volume (AADT or SADT)	8000
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: Saddleridge (day/night)

Angle1 Angle2	-55.00 deg	55.00 deg
Wood depth	0	(No woods.)
No of house rows	1 / 0	
Surface	1	(Absorptive ground surface)
Receiver source distance	67.50 / 67.50	m
Receiver height	1.50 / 4.50	m
Topography	1	(Flat/gentle slope; no barrier)
Reference angle	0.00	

Segment # 1: Saddleridge (day)

Source height = 1.50 m

ROAD (0.00 + 50.30 + 0.00) = 50.30 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-55	55	0.66	65.75	0.00	-10.84	-2.61	0.00	-2.00	0.00	50.30

Segment Leq : 50.30 dBA

Total Leq All Segments: 50.30 dBA

Segment # 1: Saddleridge (night)

Source height = 1.50 m

ROAD (0.00 + 45.36 + 0.00) = 45.36 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-55	55	0.57	58.16	0.00	-10.26	-2.54	0.00	0.00	0.00	45.36

Segment Leq : 45.36 dBA

Total Leq All Segments: 45.36 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 50.30
(NIGHT): 45.36

STAMSON 5.0 COMPREHENSIVE REPORT Date: 01-11-2018 11:30:05
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: spzbua.te Time Period: Day/Night 16/8 hours
Description: Location D indoor

Road data, segment # 1: Renaud (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 : 50 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 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: Renaud (day/night)

Angle1 Angle2 : -60.00 deg 70.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 108.00 / 108.00 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Navan (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	: 60	km/h
Road gradient	: 1	%
Road pavement	: 1	(Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT)	:	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 # 2: Navan (day/night)

Angle1 Angle2	: -90.00 deg	30.00 deg
Wood depth	: 0	(No woods.)
No of house rows	: 0 / 0	
Surface	: 1	(Absorptive ground surface)
Receiver source distance	: 178.00 / 178.00	m
Receiver height	: 1.50 / 4.50	m
Topography	: 1	(Flat/gentle slope; no barrier)
Reference angle	: 0.00	

Segment # 1: Renaud (day)

Source height = 1.50 m

ROAD (0.00 + 52.15 + 0.00) = 52.15 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-60	70	0.66	68.48	0.00	-14.23	-2.10	0.00	0.00	0.00	52.15

Segment Leq : 52.15 dBA

Segment # 2: Navan (day)

Source height = 1.50 m

ROAD (0.00 + 52.33 + 0.00) = 52.33 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	30	0.66	73.01	0.00	-17.83	-2.85	0.00	0.00	0.00	52.33

Segment Leq : 52.33 dBA

Total Leq All Segments: 55.25 dBA

Segment # 1: Renaud (night)

Source height = 1.50 m

ROAD (0.00 + 45.41 + 0.00) = 45.41 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-60	70	0.57	60.88	0.00	-13.46	-2.01	0.00	0.00	0.00	45.41

Segment Leq : 45.41 dBA

Segment # 2: Navan (night)

Source height = 1.50 m

ROAD (0.00 + 45.81 + 0.00) = 45.81 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	30	0.57	65.41	0.00	-16.87	-2.74	0.00	0.00	0.00	45.81

Segment Leq : 45.81 dBA

Total Leq All Segments: 48.62 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.25
(NIGHT): 48.62

STAMSON 5.0 COMPREHENSIVE REPORT Date: 01-11-2018 11:34:40
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: spzbua.te Time Period: Day/Night 16/8 hours
Description: Location E indoor

Road data, segment # 1: Renaud (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 : 50 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 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: Renaud (day/night)

Angle1 Angle2 : -70.00 deg 70.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 110.00 / 110.00 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Navan (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 : 60 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 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 # 2: Navan (day/night)

Angle1 Angle2 : -90.00 deg 30.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 157.50 / 157.50 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Segment # 1: Renaud (day)

Source height = 1.50 m

ROAD (0.00 + 52.24 + 0.00) = 52.24 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-70	70	0.66	68.48	0.00	-14.36	-1.88	0.00	0.00	0.00	52.24

Segment Leq : 52.24 dBA

Segment # 2: Navan (day)

Source height = 1.50 m

ROAD (0.00 + 53.21 + 0.00) = 53.21 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	30	0.66	73.01	0.00	-16.95	-2.85	0.00	0.00	0.00	53.21

Segment Leq : 53.21 dBA

Total Leq All Segments: 55.76 dBA

Segment # 1: Renaud (night)

Source height = 1.50 m

ROAD (0.00 + 45.52 + 0.00) = 45.52 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-70	70	0.57	60.88	0.00	-13.59	-1.78	0.00	0.00	0.00	45.52

Segment Leq : 45.52 dBA

Segment # 2: Navan (night)

Source height = 1.50 m

ROAD (0.00 + 46.64 + 0.00) = 46.64 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	30	0.57	65.41	0.00	-16.03	-2.74	0.00	0.00	0.00	46.64

Segment Leq : 46.64 dBA

Total Leq All Segments: 49.13 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.76
(NIGHT): 49.13