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FINAL

Noise Impact Study Report

CCR Canada c/o Farmhouse Investments Inc.
20 Cope Drive, Ottawa, ON
K2M 2V8

Issued To:

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October 16, 2018

Pinchin File: 230393

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VERSION CONTROL

Rev	Date	Revision Description	Pinchin File	Author's Initials
0.0	October 16, 2018	Original Noise Impact Study Report	230393	ARM

EXECUTIVE SUMMARY

Pinchin Ltd. (Pinchin) was retained by CCR Canada c/o Farmhouse Investments Inc. to conduct a noise impact study for the proposed expansion and mechanical equipment relocation at 20 Cope Drive, Ottawa, ON. This report has been prepared to meet the requirements outlined by the City of Ottawa Planner in an email dated September 21, 2018.

A site visit was conducted by Pinchin on October 11, 2018. During the site visit, the only acoustically significant mechanical equipment relocated was the outdoor emergency generator and acoustic measurements were conducted to quantify the radiated sound. An acoustic model was developed to predict the impact of the source at selected points of reception.

The measurements and the analytical assessment indicate that the noise impact from the outdoor emergency generator meets the minimum MECP criteria at all identified existing off-site receptor locations. This assessment shows that the facility is in compliance with the MECP guidelines.

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APPENDICES

1.0 INTRODUCTION

Pinchin Ltd. (Pinchin) was retained by CCR Canada c/o Farmhouse Investments Inc. to conduct a noise impact study for the proposed expansion and mechanical equipment relocation at 20 Cope Drive, Ottawa, ON. This report has been prepared to meet the requirements outlined by the City of Ottawa Planner in an email dated September 21, 2018.

This report has been prepared in accordance with the guidance in the MECP document “Information to be Submitted for Approval of Stationary Sources of Sound” (NPC - 233) dated October 1995 [1]. Guidance regarding report format is taken from MECP Document, “Basic Comprehensive Certificates of Approval, User Guide v2.1, Appendix A, Supporting Information to be Submitted for an Acoustic Assessment Report or Vibration Assessment Report Required by a Basic Comprehensive C of A”, dated March 2011 [2].

Operations at the facility do not include large sources of vibration (e.g., stamping presses, large rotating equipment, etc.). Consequently, a detailed vibration impact assessment is not required. This assessment concentrates on potential noise impacts only.

2.0 FACILITY DESCRIPTION

2.1 Description of Facility

The facility at 20 Cope Drive in Ottawa is a two-storey multi-tenant commercial building. The facility is proposing an expansion to include a single-storey commercial warehouse building.

Figure 1, Appendix B shows the facility and nearby noise sensitive receptors. A site plan for this facility is presented in Figure 2, Appendix B.

2.2 Operating Schedule

The outdoor emergency generator is tested weekly between 8:00 am and 8:30 am (for 10 minutes) every Monday and is tested monthly on a Friday between 8:30 am and 10:00 am (for 1 hour).

3.0 NOISE SOURCE SUMMARY

3.1 Noise Source Summary Data

Noise source summary data are provided in the following Figure and Table:

- Appendix B, Figure 2: Site Plan, Showing Significant Noise Sources
- Appendix A, Table 1: Noise Source Summary Table

Locations of the existing steady-state significant noise sources are shown in Figure 2, Appendix B, and include the following:

- One (1) outdoor emergency generator radiator louvre (source GEN_RAD);
- One (1) outdoor emergency generator air intake louvre (source GEN_IN); and
- Two (2) outdoor emergency generator sides (sources GEN_SD1 and GEN_SD2).

3.2 Sound Power Level Estimates

The sound power level (PWL) estimates of the significant noise sources were based on sound level measurements conducted during the site visit. For sound pressure measurements, the measured sound pressure levels (SPLs) were converted into the PWLs based on measurement distances and the reflecting surface conditions. All measurements were consistent with ISO 3744:1994 [3] and the MECP Publication NPC-103 [4]. The measurement weather conditions and equipment information are summarized in Appendices D and E.

In order to assess the directional nature of the sound from both the radiator and air intake louvres, from the outdoor emergency generator unit, measurements were taken from 0, 45 and 90 degrees from the face of the louvres. Directional corrections resulting from these measurements were included in the acoustic model. The orientation of the outdoor emergency generator enclosure is include in Figure 2.

Under the MECP Publication NPC-104 [5] noise guidelines, additional penalties apply to sound sources of an annoying nature such as tonal, cyclic variation, quasi-steady impulsive sounds. There were no noise sources with tonal, cyclic variation, quasi-steady impulsive characteristics identified during the site visit.

Based on discussions with the Client the mechanical system for the warehouse has not been designed yet. However, it is anticipated that the warehouse will utilize internal heating and ventilation from existing mechanical equipment in the office building with probable addition of new interior equipment. No new rooftop units, or exterior pad-mounted equipment are anticipated.

4.0 POINT OF RECEPTION NOISE IMPACT CALCULATIONS

4.1 Point of Reception Description

Points of reception for a noise assessment are those locations identified to be noise sensitive. The facility-attributable sound level is the sum of the individual source contributions at each point of reception. A point of reception, as defined in MOE Publication NPC-300 [7], may be located on a property used for residential, noise sensitive commercial or institutional purposes.

The facility is located in a business park industrial zoned land (IP5 zoning). To the west and south of the facility are residential zoned lands (R3 zoning). To the north and east of the facility are arterial mainstream zoned lands (AM zoning). Eagleson Road is approximately 150 m to the east of the facility. The nearest noise sensitive receptors are residential homes located approximately 50 m to the south of the proposed warehouse expansion.

Three noise sensitive receptors (R1 to R3) were selected from the nearby residential areas. Receptors R1 and R2 are two-storey houses located approximately 50 m to the south of the proposed warehouse expansion. Receptor R3 is a two-storey townhouse located approximately100 m to the southeast of the proposed warehouse expansion.

The land surrounding the facility and noise sensitive receptors is essentially flat. A copy of the zoning map and classifications were obtained from the City of Ottawa and are included in Appendix C.

4.2 Procedure and Parameters Used to Assess Noise Impacts

An acoustic model of the facility was prepared using CadnaA (Version 2018.MR1). CadnaA calculates sound levels surrounding the facility according to the ISO standard 9613-2 [7], “Acoustics – Attenuation of Sound during Propagation Outdoors.” The ISO calculation method, considered conservative, accounts for reduction in sound level with distance due to geometrical spreading, air absorption, ground attenuation, and acoustical shielding. Calculation parameters were set in accordance with the ISO standard, and detailed protocols can be provided upon request.

The following parameters were used in the acoustic model:

- Ground absorption was set to 1.0 for porous grounds. For reflecting surfaces (e.g. roads and parking lots), ground absorption was assigned to 0.0;
- 1st order reflection was taken into account;
- Temperature of 10 ºC and relative humidity of 70%;
- Barrier coefficients: C1: 3.0; C2: 20.0; C3: 0.0;
- All sources were spectral unless otherwise specified; and
- All buildings and structures had a reflection loss of one (1) dB.

5.0 NOISE IMPACT STUDY SUMMARY

5.1 Noise Impact Study Summary Table

The predicted contributions of each source at the noise sensitive receptors are summarized in Table 2. Table 3 summarizes the compliance status of the Facility at each receptor location. Noise impact contour map is presented in Figure 3.

5.2 Rationale for Selecting Applicable Noise Guideline Limits

The applicable guidelines used for this facility are the MECP “Stationary Source” guidelines for Class 1 areas, as set out in MECP Publication NPC-300 [6]. These guidelines state that the one-hour sound exposures (1hr-Leq) from stationary noise sources in Class 1 areas shall not exceed:

- the higher of 50 dBA or background noise between 0700h and 1900h.

As per NPC-300 the sound level limit for the testing of the emergency generator is 5 dBA greater than the applicable daytime sound level limit. Therefore he MECP’s minimum daytime sound level limits of 55 dBA, has been used as the applicable criterion.

5.3 Predictable Worse Case Impacts Operating Scenario

According to NPC-300, the assessment of noise impact requires the determination of the “predictable worst case” impact. In order to determine the largest excessive level, the worst case one hour equivalent sound level (L_{eq}, 1hr) has been predicted based on the following conditions that all equipment was assumed operating continuously for one (1) hour.

6.0 CONCLUSIONS

An assessment of the facility outdoor emergency generator attributable sound levels was completed by modelling the individual contributions of the significant noise sources. Predicted worst-case facility noise levels are shown to be below the applicable NPC-300 Class 1 guideline limits for daytime operations at all of the receptors. Therefore, the facility outdoor emergency generator is expected to be in compliance with the MECP noise requirements.

7.0 REFERENCES

1. Ministry of the Environment Publication NPC-233, "Information to be Submitted for Approval of Stationary Sources of Sound", October 1995.
2. Ministry of the Environment, "Basic Comprehensive Certificates of Approval User Guide", Version 2.1, March 2011.
3. ISO 3744: 1994, Acoustics — Determination of Sound Power Levels of Noise Sources Using Sound Pressure — Engineering Method in an Essentially Free Field Over a Reflecting Plane.
4. Ministry of the Environment Publication NPC-103, "Procedures", published under the Model Municipal Noise Control Bylaw, 1977.
5. Ministry of the Environment Publication NPC-104, "Sound Level Adjustments", published under the Model Municipal Noise Control Bylaw, 1977.
6. Ministry of the Environment Publication NPC-300, "Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning", August 2013.
7. ISO 9613-2: 1996, Acoustics –Attenuation of Sound During Propagation outdoors. Part 2 – General Method of Calculation.

APPENDIX A

Tables

(4 Pages)

Table 1: Noise Source Summary Table

Source ID [1]	Source Description	1/1 Octave Band Sound Power Level (dB, Ref. 10-12 W) [2]										Source Location [3]	Sound Characteristics [4]	Noise Control Measures [5]	Source of Data [6]
		31.5	63	125	250	500	1000	2000	4000	8000	L_w(A)				
GEN_RAD	Outdoor Emergency Generator - Radiator Louvre	108	113	113	106	94	91	87	87	79	**102**	O	S	E	Mea
GEN_IN	Outdoor Emergency Generator - Air Intake Louvre	103	104	108	96	88	87	81	78	72	**95**	O	S	E	Mea
GEN_SD1	Outdoor Emergency Generator - Side	104	111	105	93	86	79	75	71	65	**92**	O	S	E	Mea
GEN_SD2	Outdoor Emergency Generator - Side	107	112	107	93	87	80	75	71	66	**93**	O	S	E	Mea

Notes:

[1] Wherever possible, the Source ID is identical with that used in the ESDM report.

[2] Sound Power Levels of continuous noise sources, in dBA, do not include sound characteristic adjustments per NPC-104. Values are unadjusted, unmitigated PWLs.
Sound Power Levels of impulsive noise sources, in dBAI, are A-weighted incorporating an impulsive time weighting.

[3] Source Location:
O - located/installed outside the building, including on the roof
I - located/installed inside the building

[4] Sound Characteristic

S = Steady	I = Impulsive	T = Tonal
Q = Quasi-Steady Impulsive	B = Buzzing	C = Cyclic

[5] Noise Control Measures

S = Silencer/Muffler	L = Lagging	O = other
A = Acoustic lining, plenum	E = acoustic enclosure	U = uncontrolled
B = Barrier, berm, screening		

[6] Mea - Measured
Man - Manufacturer's Data
Cal = Engineering Calculations
- Same as ID

Table 2: Point of Reception Noise Impact Table

Source ID [1]	Source Description	Point of Reception R1 [2]		Point of Reception R2 [2]		Point of Reception R3 [2]	
		Distance (m)	Sound Level at POR [3]	Distance (m)	Sound Level at POR [3]	Distance (m)	Sound Level at POR [3]
GEN_RAD	Outdoor Emergency Generator - Radiator Louvre	68	41	52	44	105	50
GEN_IN	Outdoor Emergency Generator - Air Intake Louvre	64	50	51	48	110	34
GEN_SD1	Outdoor Emergency Generator - Side	65	45	51	47	107	40
GEN_SD2	Outdoor Emergency Generator - Side	67	45	53	44	108	41

Notes:

[1] Wherever possible, the Source ID is identical with that used in the ESDM report.

[2] Point of Reception (POR) height is 4.5 m unless otherwise stated.

[3] Sound Level Unit
A-Weighted 1-hour equivalent sound level (L_{eq} (1-hr) in dBA for continuous sources.

Table 3: Noise Impact Study Summary Table

Point of Reception ID	Point of Reception Description	Time Period [1]	Total Level at POR (L_{eq}, 1-hr) [2]	Verified by Acoustic Audit (Yes/No)	Performance Limit (L_{eq} 1-hr) [3]	Compliance with Performance Limit (Yes/No)
R1	Two-Storey House	Daytime	52	No	55	Yes
R2	Two-Storey House	Daytime	52	No	55	Yes
R3	Two-Storey Townhouse	Daytime	51	No	55	Yes

Notes:

[1] The predictable worst-case one (1) hour period was considered in the study.

[2] Worst-case one hour equivalent sound level from all applicable sources operating in dBA.

[3] NPC-300 default minimum values of one hour L_{eq} for Class 1 Areas plus additional five (5) decibels.

Table 4: Sound Level Measurement Details

Source ID [1]	Source Description	1/1 Octave Band Sound Pressure Level (dBA, Ref. 2×10^{-5} Pa) [2]										Source Directivity [3]	Measurement Distance, m [4]	Measurement Area, m^2 [5]
		31.5	63	125	250	500	1000	2000	4000	8000	L_p(A)			
GEN_RAD	Outdoor Emergency Generator - Radiator Louvre	44	62	72	72	66	66	63	63	53	**77**	2	7.0	-
GEN_IN	Outdoor Emergency Generator - Air Intake Louvre	39	53	67	62	60	62	57	54	46	**70**	2	7.0	-
GEN_SD1	Outdoor Emergency Generator - Side	40	60	64	59	58	54	51	47	39	**68**	2	7.0	-
GEN_SD2	Outdoor Emergency Generator - Side	42	61	66	60	58	55	51	47	40	**69**	2	7.0	-

Notes:

[1] Wherever possible, the Source ID is identical with that used in the ESDM report.

[2] Measured A-weighted sound pressure level, Reference 2×10^{-5} Pa
If a single value is listed under 500 Hz it refers to the overall A-weighted sound power level.
The attenuation terms for 500 Hz were used in the calculations as per ISO 9613-2: 1996.

[3] Source Directivity, Q
Q = 1, 2, 4, etc.

[4] Measurement Distance, r (m)
The distance is measured from the microphone to the acoustical centre of the source, m

[5] Measurement Area, A (m^2)
An area is used in calculations if the source is scanned.

APPENDIX B

Figures & Drawings

(3 Pages)

Figure 1 - Scaled Area Plan, Showing the Facility and Receptors

N

Drawn by: ARM	
Scale: 1:3000	
Date: October 16, 2018	

CCR Canada c/o Farmhouse Investments Inc., 20 Cope Drive, Ottawa, Ontario

Pinchin Project: 230393

PINCHIN

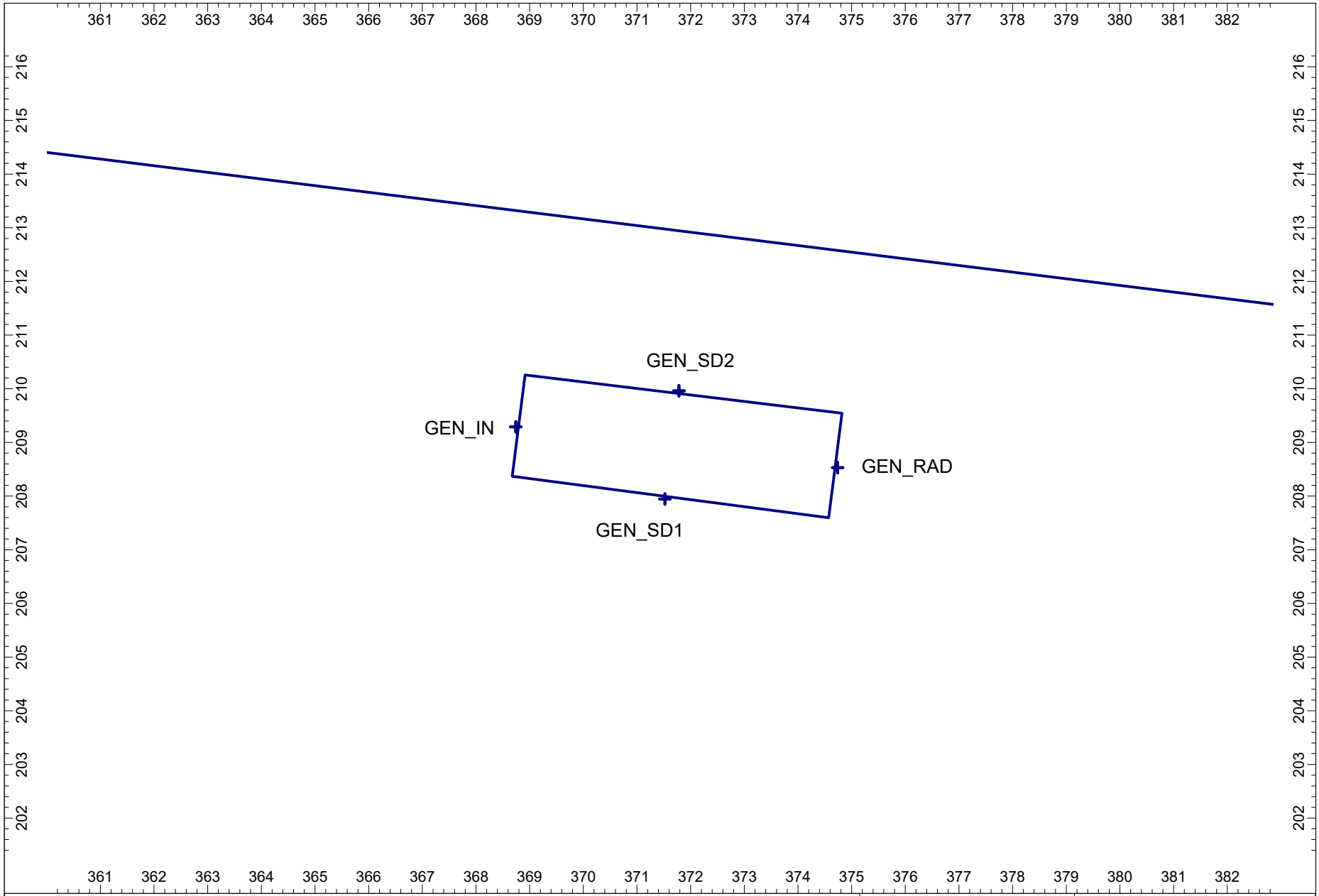

Figure 2 - Site Plan, Showing Outdoor Emergency Generator Noise Sources

N

Drawn by: ARM	
Scale: 1:100	
Date: October 16, 2018	

CCR Canada c/o Farmhouse Investments Inc., 20 Cope Drive, Ottawa, Ontario

Pinchin Project: 230393

PINCHIN

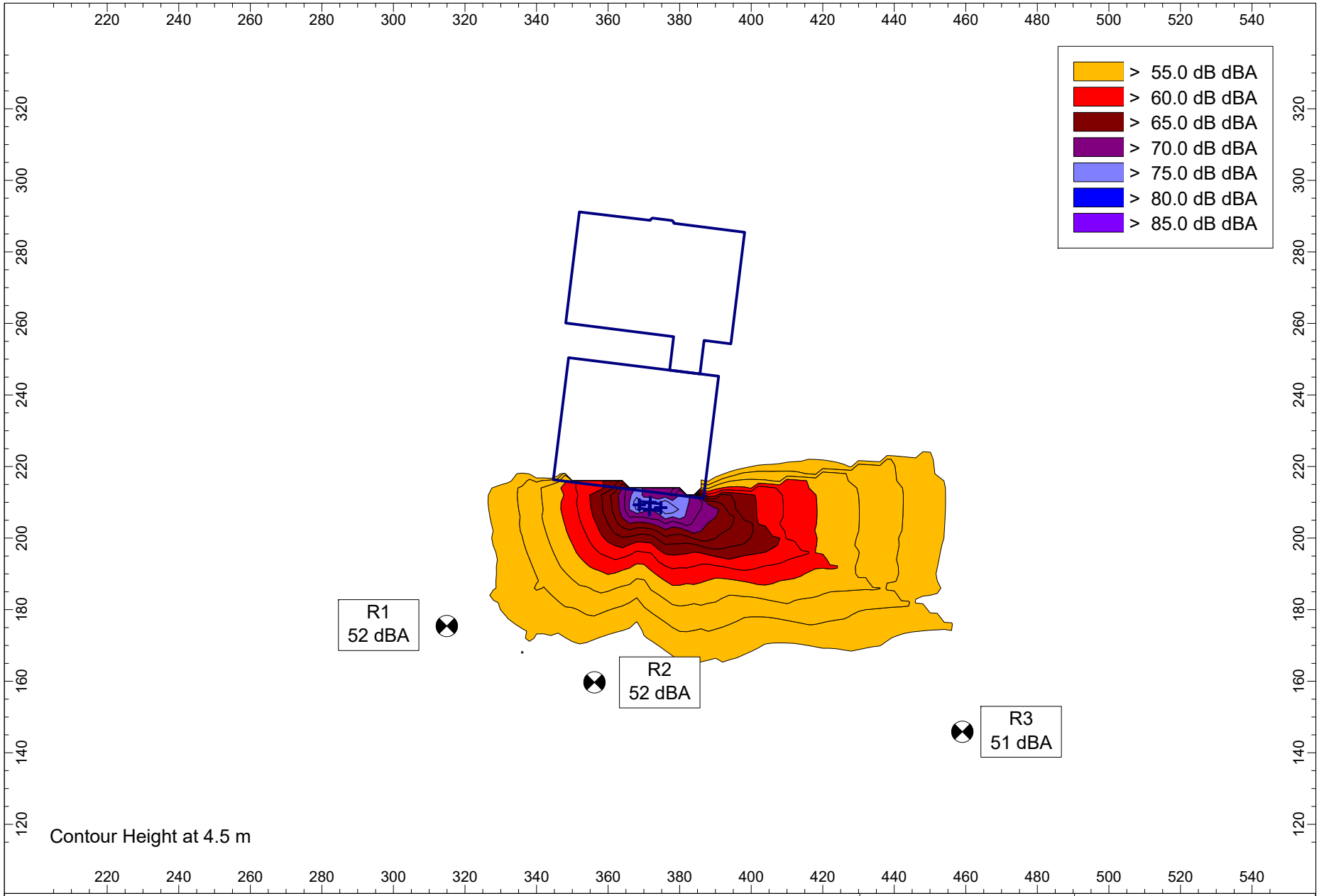

Figure 3 - Noise Impact Contour Map

N

Drawn by: ARM

Scale: 1:1500

Date: October 16, 2018

CCR Canada c/o Farmhouse Investments Inc., 20 Cope Drive, Ottawa, Ontario

Pinchin Project: 230393

PINCHIN

APPENDIX C

Zoning Information

(3 Pages)

Ottawa Zoning Map

October 16, 2018

1:4,079

Flood Plain Overlay (Section 58) / Zone sous-jacente de plaine inondable (article 58)

- Flood Plain (Section 58) / Plaine inondable (Article 58)
- Flood Plain - Area-Specific Provisions (Section 58(4)) / Plaine inondable - Dispositions propres à des emplacements (art. 58 (4))
- Heritage (Section 60) / Patrimone (Article 60)
- Village Residental Enterprise (Section 128A) / Zone sous-jacente résidentielle de village - Entreprise (article 128A)

- Zoning Boundary / Limite de la zone
- Mature Neighbourhoods Overlay / Zone sous-jacente du caractère des anciens quartiers
- Relief Overlay / Terrains assujettis aux dispositions
- Water / Eau
- Mature Neighbourhoods Overlay / Zone sous-jacente du caractère des anciens quartiers

0 0.05 0.1 0.2 mi

0 0.075 0.15 0.3 km

City of Ottawa

TABLE 35(B)- LIST OF PRIMARY ZONES AND CODES

(I) Zone Name	(II) Zone Code
RESIDENTIAL ZONES	
(1) Residential First Density Zone	R1
(2) Residential Second Density Zone	R2
(3) Residential Third Density Zone	R3
(4) Residential Fourth Density Zone	R4
(5) Residential Fifth Density Zone	R5
(6) Mobile Home Park Zone	RM
INSTITUTIONAL ZONES	
(7) Minor Institutional Zone	I1
(8) Major Institutional Zone	I2
OPEN SPACE AND LEISURE ZONES	
(9) Parks and Open Space Zone	O1
(10) Community Leisure Facility Zone	L1
(11) Major Leisure Facility Zone	L2
(12) Central Experimental Farm Zone	L3
ENVIRONMENTAL ZONE	
(13) Environmental Protection Zone	EP
COMMERCIAL/MIXED USE ZONES	
(14) Local Commercial Zone	LC
(15) General Mixed Use Zone	GM
(16) Traditional Mainstreet Zone	TM
(17) Arterial Mainstreet Zone	AM
(18) Mixed Use Centre Zone	MC
(19) Mixed Use Downtown Zone	MD

(I) Zone Name	(II) Zone Code
INDUSTRIAL ZONES	
(20) Business Park Industrial Zone	IP
(21) Light Industrial Zone	IL
(22) General Industrial Zone	IG
(23) Heavy Industrial Zone	IH
TRANSPORTATION ZONES	
(24) Air Transportation Facility Zone	T1
(25) Ground Transportation Facility Zone	T2
RURAL ZONES	
(26) Agricultural Zone	AG
(27) Mineral Extraction Zone	ME
(28) Mineral Aggregate Reserve Zone	MR
(29) Rural Commercial Zone	RC
(30) Rural General Industrial Zone	RG
(31) Rural Heavy Industrial Zone	RH
(32) Rural Institutional Zone	RI
(33) Rural Residential Zone	RR
(34) Rural Countryside Zone	RU
(35) Village Mixed Use Zone	VM
(36) Village Residential First Density Zone	V1
(37) Village Residential Second Density Zone	V2
(38) Village Residential Third Density Zone	V3
OTHER ZONES	
(39) Development Reserve Zone	DR

APPENDIX D

Measurement Weather Conditions

(3 Pages)

MEASUREMENT WEATHER CONDITIONS

Meteorological conditions during the noise measurements on October 11, 2018 were as follows. Daytime temperatures were between 9°C (lowest) and 12°C (highest). The sky was partially overcast and the average wind speed was approximately 13 km/hr.

Government of Canada / Gouvernement du Canada

Hourly Data Report for October 11, 2018

All times are specified in Local Standard Time (LST). Add 1 hour to adjust for Daylight Saving Time where and when it is observed.

OTTAWA INTL A
ONTARIO
Current Station Operator: NAVCAN

Latitude:	45°19'00.000" N
Longitude:	75°40'00.000" W
Elevation:	114.90 m
Climate ID:	6106001
WMO ID:	71628
TC ID:	YOW

	Temp °C	Dew Point Temp °C	Rel Hum %	Wind Dir 10's deg	Wind Spd km/h	Visibility km	Stn Press kPa	Hmdx	Wind Chill	Weather
TIME										
00:00	10.3	9.5	94	8	21	16.1	99.50			NA
01:00	9.8	9.3	97	8	22	12.9	99.41			Rain
02:00	9.2	8.7	96	8	19	12.9	99.28			Rain
03:00	8.9	8.4	97	8	20	4.8	99.20			Rain,Fog
04:00	8.7	8.3	97	8	21	4.8	99.10			Rain,Fog
05:00	8.6	8.1	97	8	23	9.7	99.02			Rain,Fog
06:00	8.5	8.1	97	8	17	9.7	98.99			Rain
07:00	8.6	8.3	97	8	14	6.4	98.95			Rain,Fog
08:00	8.8	8.4	97	7	14	6.4	98.94			Rain,Fog
09:00	9.0	8.6	98	8	12	8.1	98.88			Rain,Fog
10:00	9.3	9.0	98	8	12	0.6	98.83			Fog
11:00	9.9	9.6	98	6	13	0.6	98.79			Drizzle,Fog
12:00	10.8	10.6	98	9	9	0.6	98.73			Drizzle,Fog
13:00	11.4	11.2	99	8	12	0.6	98.60			Drizzle,Fog

	Temp °C	Dew Point Temp °C	Rel Hum %	Wind Dir 10's deg	Wind Spd km/h	Visibility km	Stn Press kPa	Hmdx	Wind Chill	Weather
14:00	11.7	11.4	98	7	13	0.6	98.57			Drizzle,Fog
15:00	11.2	10.9	98	2	12	0.8	98.56			Drizzle,Fog
16:00	10.7	10.4	98	7	14	0.6	98.52			Fog
17:00	10.5	10.3	99	4	11	0.6	98.60			Fog
18:00	10.3	10.1	99	36	1	0.6	98.70			Fog
19:00	10.7	10.4	99	30	7	0.6	98.76			Fog
20:00	10.4	10.1	99	22	5	0.4	98.81			Fog
21:00	10.1	9.9	99	27	15	16.1	98.89			NA
22:00	11.0	7.2	77	28	18	24.1	98.97			Mostly Cloudy
23:00	11.0	6.2	72	27	21	24.1	98.99			NA

Legend

- E = Estimated
- M = Missing
- NA = Not Available

Date modified:
2018-07-20

APPENDIX E

Measurement Equipment Information

(1 Page)

MEASUREMENT EQUIPMENT INFORMATION

The instrument used in this noise impact study included a B&K 2250 Sound Level Meter with the following specifications.

Sound Level Meter	Hand-held Analyzer Type: 2250 Serial No: 3004063
Pre-amplifier	Type: ZC0032 Serial No: 19692
Microphone	B&K Prepolarized Free-field 1/2” Microphone Type: 4189 Serial No: 2877092
Calibrator	B&K Sound Calibrator Type: 4231 Serial No: 3007944