HERRING STORER ACOUSTICS

BENNETT RESOURCES PTY LTD

VALHALLA GAS EXPLORATION AND APPRAISAL PROGRAM

ENVIRONMENTAL ACOUSTIC IMPACT ASSESSMENT

NOVEMBER 2021

OUR REFERENCE: 28634-2-21370

Rochdale Holdings Pty Ltd A.B.N. 85 009 049 067 trading as:
HERRING STORER ACOUSTICS
P.O. Box 219, Como, W.A. 6952
(08) 9367 6200
hsa@hsacoustics.com.au

DOCUMENT CONTROL PAGE

ACOUSTIC ASSESSMENT

VALHALLA GAS EXPLORATION AND APPRAISAL PROGRAM

Job No: 21370

Document Reference: 28634-2-21370

FOR

BENNETT RESOURCES PTY LTD

DOCUMENT INFORMATION			
Author:	Paul Daly	**Checked By:**	Tim Reynolds
Date of Issue:	9 November 2021		

REVISION HISTORY

Revision	Description	Date	Author	Checked
1	Client Comments	8/12/2021	PLD	

DOCUMENT DISTRIBUTION

Copy No.	Version No.	Destination	Hard Copy	Electronic Copy
1	1	Bennett Resources Att: Chief Operating Officer		✓
1	2	Bennett Resources Att: Chief Operating Officer		✓

CONTENTS

APPENDICIES

1. INTRODUCTION

Herring Storer Acoustics was commissioned by Bennett Resources Pty Ltd to undertake an acoustic assessment of noise emissions from the Valhalla Gas Exploration and Appraisal Program.

The Valhalla Gas Exploration and Appraisal Program is located approximately 51 km North West of the townsite of Fitzroy Crossing (Shire of Derby-West Kimberley) in the Canning Basin Region in the State of Western Australia. It is located within the Petroleum Lease EP 371.

Access to the Proposal area is via the Great Northern Highway and Calwynyardah-Noonkanbah Road from the township of Fitzroy Crossing.

The nearest noise sensitive premises are to the north and south of the Development Envelope of the Proposal, being the Jimbalakudunj and Yungnora Communities. Ten proposed well sites form part of the Proposal, with the closest wells being between 20 and 28km from the Communities.

The operations at each well site include the following activities:

Site preparation operations
- Civil activities including vegetation clearing and well site construction
- Construction of well site ponds, pits, sumps and well cellars

Drilling operations
- Mobilisation of drilling packaged, ancillary services, rig camp, personnel, and supplies
- Conducting drilling activities
- Wireline logging activities
- Well suspension

HFS operations
- Mobilisation of HFS spread personnel and supplies
- Well perforation and clean-up
- HFS treatment
- Well testing operations – use of flare pit
- Well suspension

This assessment takes into account the cumulative noise level of all activities at each of the proposed well sites. For information, Figure 1.1 shows the locations and overall map for the lease.

Operational hours for the site are proposed to be:

- Drilling operations will be 24 hours per day.
- HFS operations (including well testing) with pumps, blender and generators are the highest noise sources and will be running almost 24 hours per day.
- Site preparation operations will be conducted during daylight.

The estimated duration of HFS operations per well is about 10 days. Wells will be drilled and fracked one at a time.

As part of the study, the following was carried out:

- Identification of individual operations and the associated noise levels.
- Measure the ambient noise levels for the area prior to the commencement of works.
- Assess the predicted noise levels at the nearest surrounding noise sensitive premises for compliance with the appropriate criteria.
- If exceedances are predicted, comment on possible noise amelioration options for compliance with the appropriate criteria.

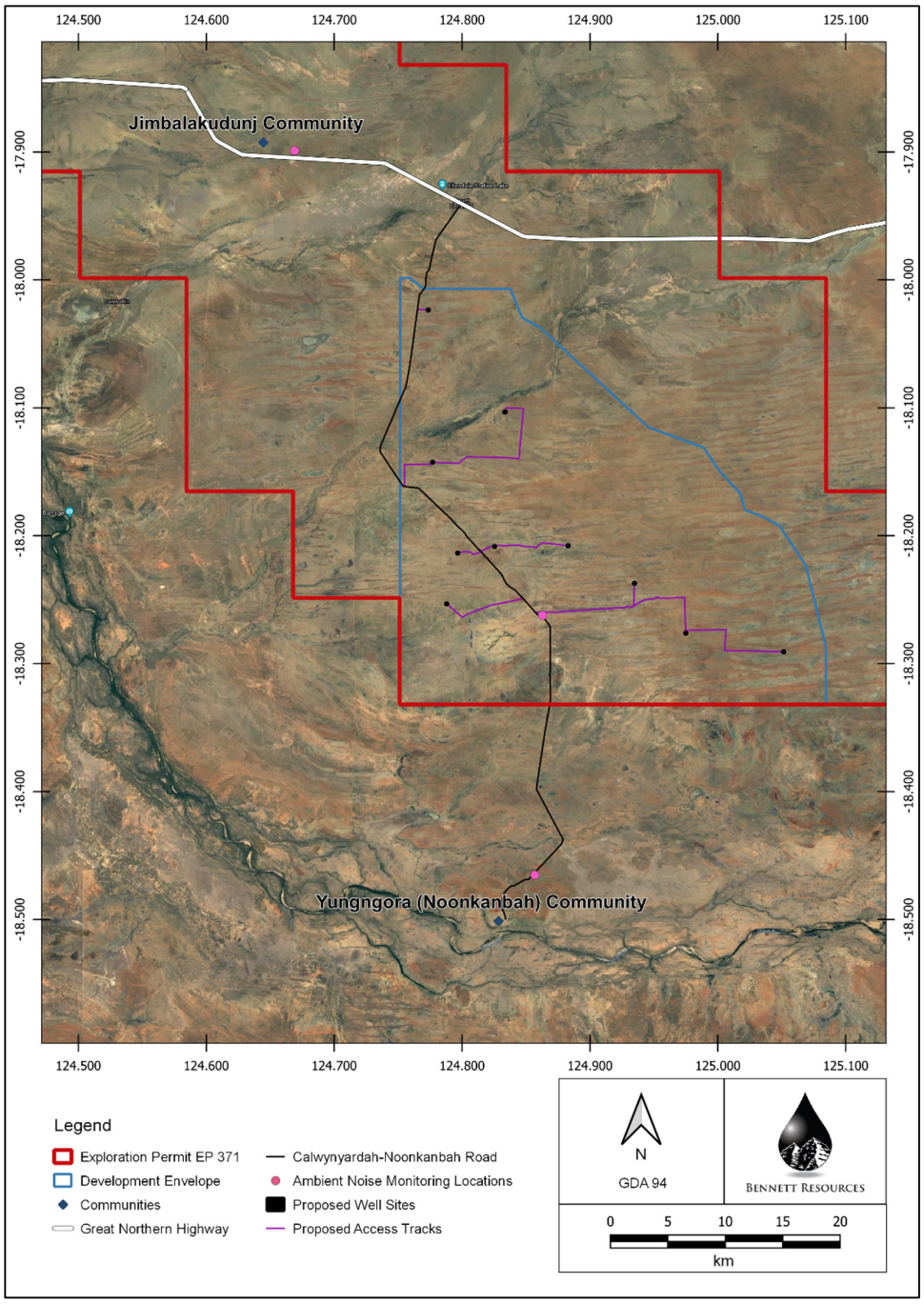


FIGURE 1.1 – SITE AND SURROUNDS

The assessment is provided to support the Environmental Review Document for the referral of the Proposal under Section 38 of the Environment Protection Act 1986.

2. SUMMARY

The assessment has been conducted on the proposed operation at the Valhalla Gas Exploration and Appraisal Program.

The nearest noise sensitive premises are to the north and south of the Development Envelope of the Proposal, being the Jimbalakudunj and Yungnora Communities. Ten proposed well sites form part of the Proposal, with the closest wells being between 20 and 28km from the Communities.

The applicable criterion for this assessment is an L_{A10} of 35 dB(A) at the nearest residential locations, (ie operations during night period).

Noise received at the existing residential premises has been determined, to be less than 10 dB(A) for the operations, for the worst-case operating scenario (i.e. operations at the nearest well to each receiver).

The above noise levels have been considered not to contain tonal characteristics, due to the low level of the noise emissions, (i.e. below background).

Given these operating parameters, noise levels received at the nearest premises has been calculated to comply with the *Environmental Protection (Noise) Regulations 1997* for the operating times as outlined in this assessment.

3. CRITERIA

The allowable noise level for noise sensitive premises in the vicinity of the proposed site is prescribed by the *Environmental Protection (Noise) Regulations 1997*. Regulations 7 and 8 stipulate maximum allowable external noise levels or assigned noise levels that can be received at a premise from another premises. For residential premises, this noise level is determined by the calculation of an influencing factor, which is then added to the base levels shown below. The influencing factor is calculated for the usage of land within two circles, having radii of 100m and 450m from the premises of concern. The base noise levels for residential premises are listed in Table 3.1.

TABLE 3.1 - BASELINE ASSIGNED OUTDOOR NOISE LEVEL

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		$L_{A\ 10}$	$L_{A\ 1}$	$L_{A\ max}$
Noise sensitive premises	0700 - 1900 hours Monday to Saturday (Day)	45 + IF	55 + IF	65 + IF
	0900 - 1900 hours Sunday and Public Holidays (Sunday / Public Holiday Day Period)	40 + IF	50 + IF	65 + IF
	1900 - 2200 hours all days (Evening)	40 + IF	50 + IF	55 + IF
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays (Night)	35 + IF	45 + IF	55 + IF

Note: L_{A10} is the noise level exceeded for 10% of the time.
L_{A1} is the noise level exceeded for 1% of the time.
L_{Amax} is the maximum noise level.
IF is the influencing factor.

It is a requirement that received noise be free of annoying characteristics (tonality, modulation and impulsiveness), defined below as per Regulation 9.

"impulsiveness" means a variation in the emission of a noise where the difference between L_{Apeak} and $L_{Amax\ Slow}$ is more than 15 dB when determined for a single representative event.

"modulation" means a variation in the emission of noise that –

(a) is more than 3dB $L_{A\ Fast}$ or is more than 3 dB $L_{A\ Fast}$ in any one-third octave band;
(b) is present for more at least 10% of the representative assessment period; and
(c) is regular, cyclic and audible;

"tonality" means the presence in the noise emission of tonal characteristics where the difference between –

(a) the A-weighted sound pressure level in any one-third octave band; and
(b) the arithmetic average of the A-weighted sound pressure levels in the 2 adjacent one-third octave bands,

is greater than 3 dB when the sound pressure levels are determined as $L_{Aeq,T}$ levels where the time period T is greater than 10% of the representative assessment period, or greater than 8 dB at any time when the sound pressure levels are determined as $L_{A\ Slow}$ levels.

The nearest potential noise sensitive premises to the proposed development have been identified using the area map in Figure 1.1. As there are no major roads or other areas of noise influence, the influencing factor is 0 with the assigned noise levels for operational times are as noted in Table 3.1.

4. MONITORED AMBIENT NOISE

As per the "Draft Guidelines on Environmental Noise for Prescribed Premises" (released in May 2016), continuous noise monitoring has been conducted to establish the ambient noise levels.

Continual ambient noise monitoring was conducted at three locations between the 16th and 23rd August 2021. Figure 4.1 contains a map of the monitoring location.

Appendix 2 contains the ambient noise monitoring data and report.

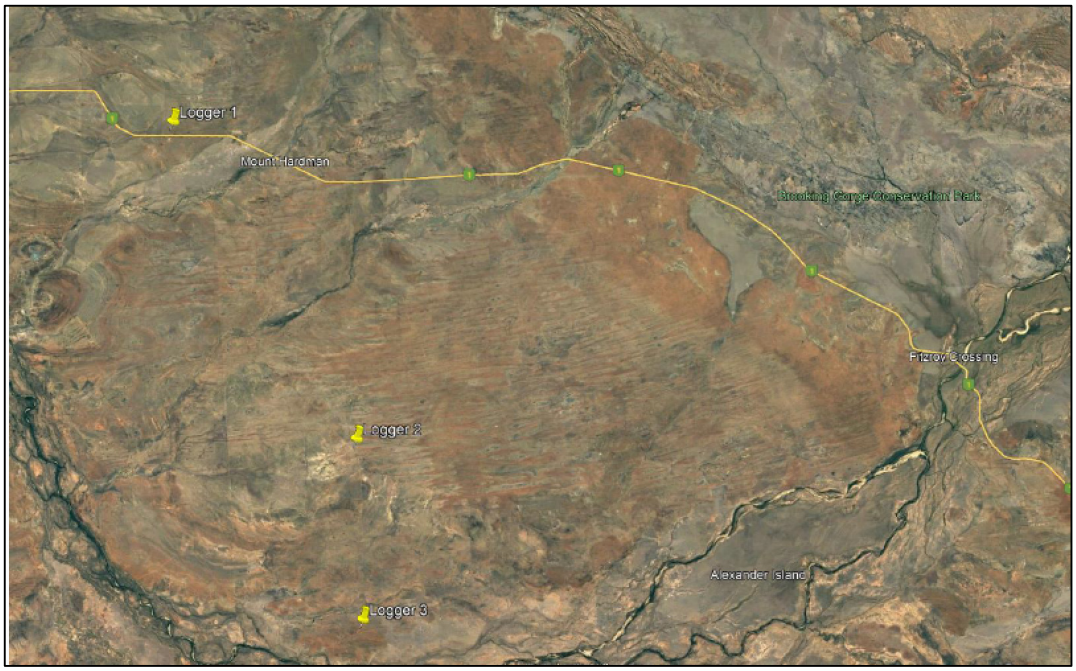


FIGURE 4.1 – NOISE MONITORING LOCATION MAP

5. CALCULATED NOISE LEVELS

Noise received at the nearest neighbouring residential premises, due to noise associated with the proposed operations, was modelled with the computer programme SoundPlan. Sound power levels used for the calculations are based on measured sound pressure levels of similar equipment proposed for use on site.

Given that the project is likely to commence in 4 years, the exact makes/models of equipment is unknown, as the project will be taking bids from multiple vendors.

The HFS spread will be comprised of high-pressure pumps, a blender (mixing unit to blend water, proppant, and chemicals), crane, generators, command centre and coil tubing unit (to clean out well post HFS and prior to well testing).

The modelling of noise levels has been based on noise sources and sound power levels shown in Table 5.1.

TABLE 5.1 – EQUIPMENT SOUND POWER LEVELS DB(A)

Equipment	Quantity	Typical make / model	Example engine type	SWL dB(A)
Frac pump	16	Halliburton Q10	Cat 3512E Tier IV Final 2500 BHP diesel	103
Blender	1	Halliburton FB4K	Cat C32 ACERT Tier IV Final 1225 BHP diesel	107
Wireline truck	1	Synergy 270	Detroit Diesel DD15 Tier IV Final 500 BHP diesel	110
Crane	1	Grove GMK5150	Mercedes OM471LA Tier IV Final 522 BHP diesel	110
Genset	1	Multiquip DCA-300SSCU	Cummins QSL9-G3 350 BHP diesel	108

Based on noise emissions[1] from the above equipment, an overall, worst case operating scenario has been developed. This scenario allows for all equipment to be operating at the same time, at each of the proposed well sites. It is noted that the operations will only be conducted at one well site at a time.

The design layout and site configuration, including source location is shown in Figure 5.1 and 5.2.

FIGURE 5.1 - Above photo is an actual layout from one of the wells completed by the previous operator of the permit within the same project area.

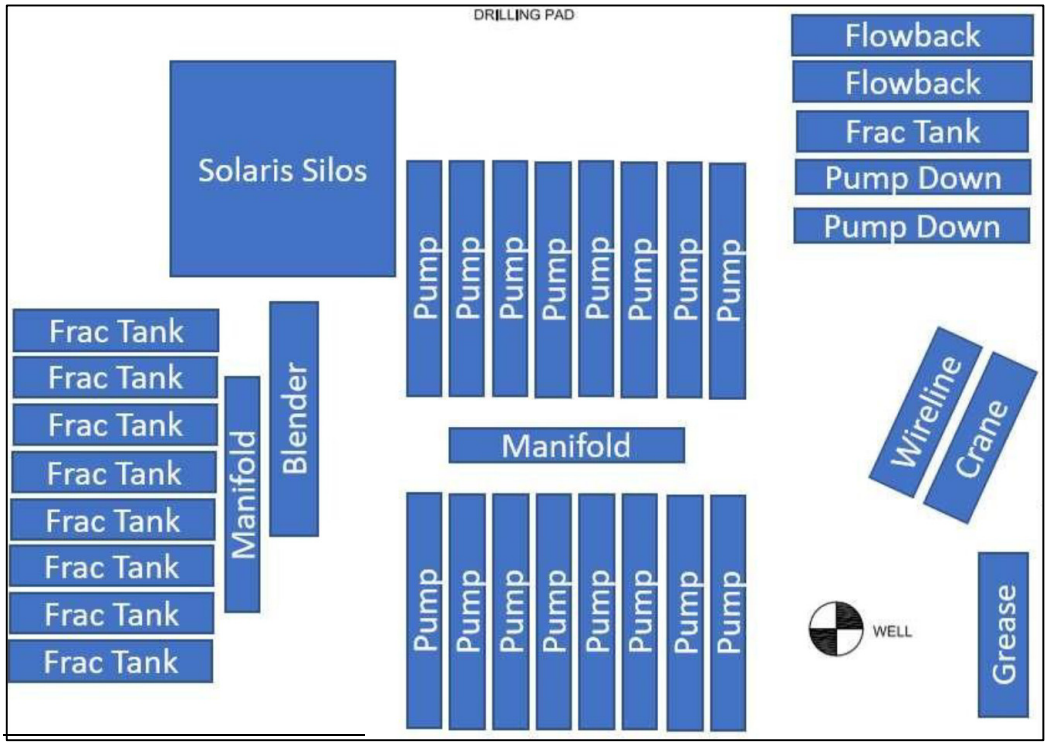


FIGURE 5.2- EXAMPLE OF SITE EQUIPMENT LAYOUT (NOISE SOURCE LOCATION)

The following input data was used in the calculations:

a) Provided plans.

b) Sound Power Levels listed in Table 5.1.

c) Ground contours and receiver point provided by client.

Weather conditions for modelling were as stipulated in the Environmental Protection Authority's "*Draft Guidance for Assessment of Environmental Factors No. 8 - Environmental Noise"* and for the day period are as listed in Table 4.

TABLE 4 – WEATHER CONDITIONS

Condition	Day	Night
Temperature	20°C	15°C
Relative humidity	50%	50%
Pasquill Stability Class	E	F
Wind speed	4 m/s*	3 m/s*

* From sources, towards receivers.

6. RESULTS

Calculated noise levels associated with the noise emissions from the proposed activities for the assumed scenario is summarised below in Table 6.1. Appendix B contains the noise contour plot with an example shown in Figure 6.1 below.

TABLE 6.1 – CALCULATED NOISE LEVEL

Receiver	All Equipment Operating dB(A)
Jimbalakudunj Community	< 10
Yungnora Community	< 10

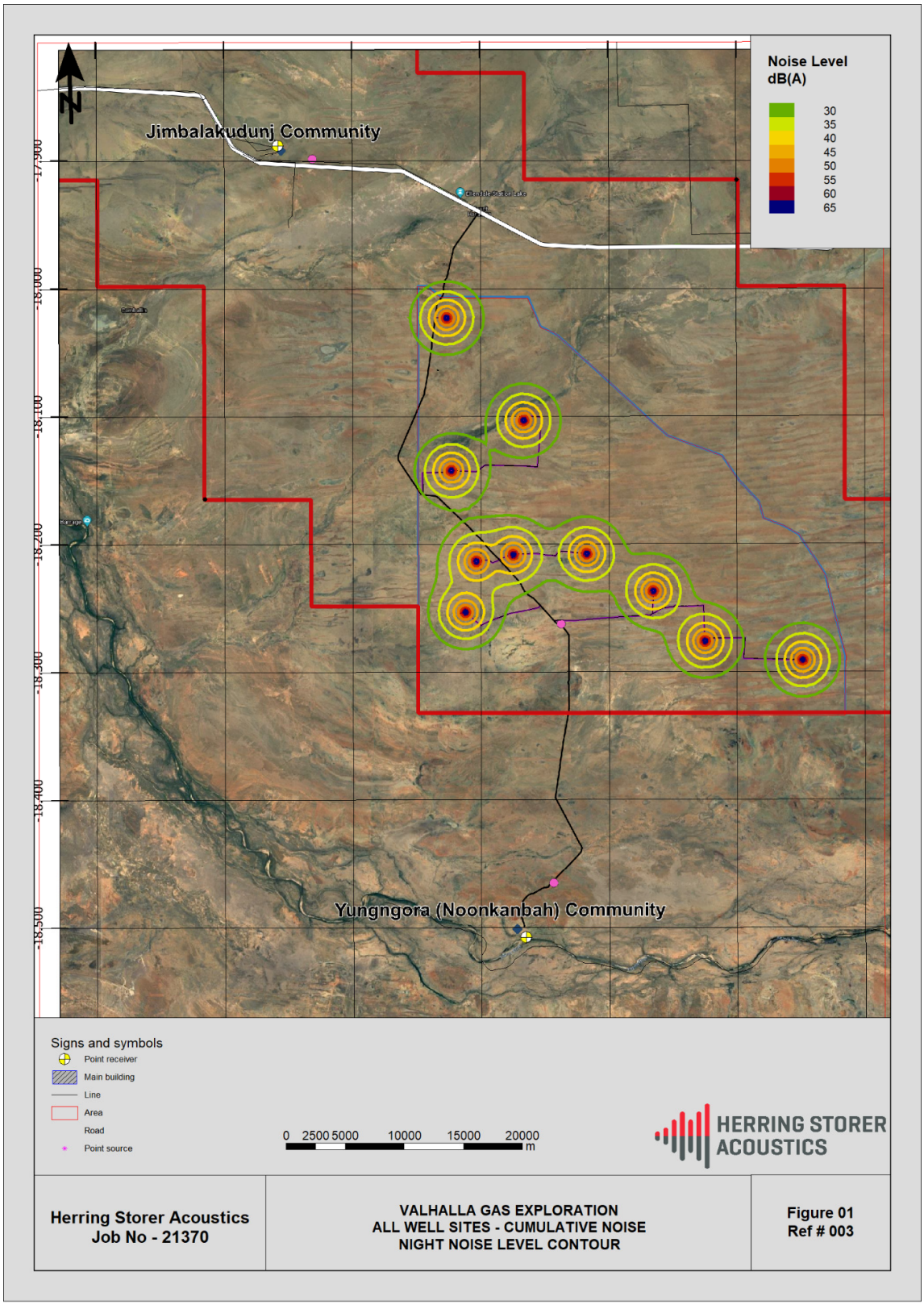


FIGURE 6.1- WORST CASE NOISE LEVEL CONTOUR PLT – ALL WELL SITES

7. ASSESSMENT

Based on calculated noise levels at the nearest premises, noise levels could be considered as not being tonal in characteristics. This is based on the calculated noise levels likely being less than the ambient noise levels.

Hence, Table 7.1 summarises the applicable Assigned Noise Levels, and assessable noise level emissions, for the scenario considered.

TABLE 7.1 – ASSESSMENT OF NOISE LEVELS

Receiver	All Equipment Operating	Time of Day	Assigned Level (dB)
Jimbalakudunj Community	< 10	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays (Night)	35
Yungnora Community	< 10		

The above noise levels all comply with the applicable L_{A10} assigned noise level of 35 dB(A) at the nearest residential locations.

8. CONCLUSION

Assessment has been conducted on the proposed operation at the Valhalla Gas Exploration and Appraisal Program.

The nearest noise sensitive premises are to the north and south of the Development Envelope of the Proposal, being the Jimbalakudunj and Yungnora Communities. Ten proposed well sites form part of the Proposal, with the closest wells being between 20 and 28km from the Communities.

The applicable criterion for this assessment is an L_{A10} of 35 dB(A) at the nearest residential locations, (ie operations during night period).

Noise received at the existing residential premises has been determined, to be less than 10 dB(A) for the operations, for the worst-case operating scenario (i.e. operations at the nearest well to each receiver).

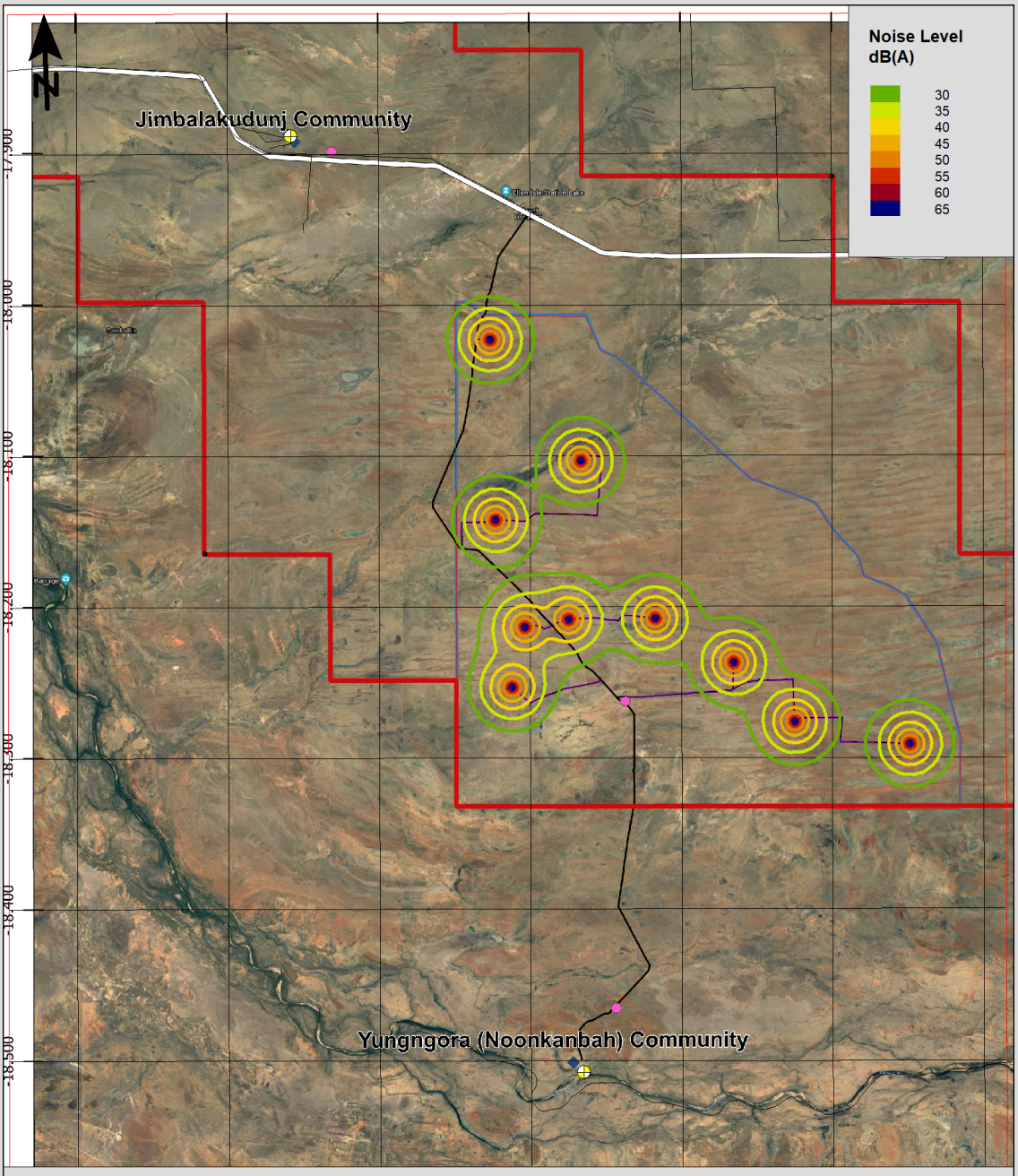
The above noise levels have been considered not to contain tonal characteristics, due to the low level of the noise emissions, (i.e. below background).

Given these operating parameters, noise levels received at the nearest premises has been calculated to comply with the *Environmental Protection (Noise) Regulations 1997* for the operating times as outlined in this assessment.

APPENDIX 1

Noise Contours

Rochdale Holdings Pty Ltd A.B.N. 85 009 049 067 trading as:
HERRING STORER ACOUSTICS
P.O. Box 219, Como, W.A. 6952
(08) 9367 6200
hsa@hsacoustics.com.au



Herring Storer Acoustics **Job No - 21370**	**VALHALLA GAS EXPLORATION** **ALL WELL SITES - CUMULATIVE NOISE** **NIGHT NOISE LEVEL CONTOUR**	**Figure 01** **Ref # 003**

APPENDIX 2

Ambient Noise Monitoring Data and Report

Rochdale Holdings Pty Ltd A.B.N. 85 009 049 067 trading as:
HERRING STORER ACOUSTICS
P.O. Box 219, Como, W.A. 6952
(08) 9367 6200
hsa@hsacoustics.com.au

MEMO

MARSHALL DAY Acoustics

Project:	Valhalla Gas Exploration and Appraisal Program – Baseline Noise Monitoring Survey	**Document No.:**	Mm 001 r01		
To:	Bennett Resources Pty Ltd	**Date:**	29 September 2021		
Attention:	Bennett Resources representatives	**Cross Reference:**	-		
Delivery:	Email	**Project No.:**	20210638		
From:	Ben Wilson	**No. Pages:**	17	**Attachments:**	Yes
Subject:	Baseline noise monitoring data				

The memo outlines the results of a baseline noise monitoring survey carried out for the proposed Valhalla Gas Exploration and Appraisal Program in the Kimberley region of Western Australia.

SURVEY DETAILS

Three noise loggers were deployed by Bennett Resources representatives from 16 – 23 August 2021. The loggers were deployed at sites being used concurrently for air quality monitoring.

The purpose of the survey was to establish existing background noise levels at representative locations around the project site.

Noise environment

Each logger was deployed at a remote rural/outback location. The noise environment was typically characterised by sounds from natural sources (bird song, insects, wind generated noise). It is understood vehicle use on nearby access roads is infrequent and not a dominant contributor to average noise levels.

A constant low-level noise was generated by the co-located air quality monitoring equipment which was only apparent at the quietest periods. The noise monitors were relocated midway through the survey to eliminate any influence of this noise (typically within 20-30 m of the original location).

Equipment details

Table 1 presents the detail of the noise logging equipment used for the survey. The location of each noise logger is also provided. Photos showing the loggers are presented in Appendix D. A map showing the location is provided in Appendix E.

A field calibration check was carried out. No significant change in level was noted for the survey period.

The loggers were configured to continuously measure noise levels at 125 ms intervals (post processed to generate 15-minute logging periods). Measurements were obtained using the slow ('S') response time and A-weighting frequency network for consistency with the *Western Australia Environmental Protection (Noise) Regulations 1997 (the Noise Regulations)* .

The logger microphones were mounted on tripods at a height of approximately 1.2m above ground level in free field conditions.

Weather conditions during the survey period were fine (no rain) and typical for the northern dry season, based on review of the BoM data from the Fitzroy Crossing weather station. Wind speeds during the survey were typically lowest during night-time periods with higher wind speeds during the middle of the day. Site specific conditions can be confirmed by AES.

Certified System ISO 9001

Table 1: Noise monitoring equipment details

Logger/equipment	Device Type	Serial Number	Coordinates
Logger 1	01dB Cube (FW 2.50)	10423	17° 53' 55.05 S 124° 40' 08.52 E
Logger 2	01dB Cube (FW 2.50)	10418	18° 15' 44.57 S 124° 51' 46.22 E
Logger 3	01dB DUO (FW 2.50)	10447	18° 27' 48.49 S 124° 51' 27.67 E
Calibrator	Cal 21	34134143	n/a

RESULTS

Table 2 - Table 4 present the average levels for the day, evening and night periods for each logger. A range of typical measurement parameters have been presented.

A daily breakdown of the results is presented in Appendix B. Time history plots are provided in Appendix C

Table 2: Average noise level – Day time period (Day 0700-1900)

Logger	L_{Aeq}	L_{AS10}	L_{A90}	L_{ASmax}	L_{AS1}
Logger 1	44	42	34	56	48
Logger 2	46	52	43	44	42
Logger 3	46	44	32	55	51

Table 3: Average noise level – Evening period (1900-2200)

Logger	L_{Aeq}	L_{AS10}	L_{A90}	L_{ASmax}	L_{AS1}
Logger 1	40	42	31	50	45
Logger 2	52	51	46	57	53
Logger 3	48	48	43	52	50

Table 4: Average noise level – Night period (2200-0700)

Logger	L_{Aeq}	L_{AS10}	L_{A90}	L_{ASmax}	L_{AS1}
Logger 1	57	36	25	63	45
Logger 2	46	39	34	51	42
Logger 3	36	28	26	43	34

DISCUSSION

The results show levels that are consistent with remote locations not heavily influenced by human activity. Diurnal patterns typical of urban areas (higher average levels during the day and quieter at night) were not observed. Instead, noise levels were influenced by bird song and insects which are active during the early morning (dawn) and evening/early night periods. Detailed review of the L_{eq} levels for Logger 1 shows that they were likely to be heavily influenced by early morning bird song between 4-6am which may explain why the average night L_{eq} level is higher than the day and evening periods.

Brief periods of elevated levels (spikes in L_{Amax} levels) are likely due to vehicles passing or when birds and insects were located near the microphone (this was confirmed through sampling of audio from logger 3).

Of particular note is the very low levels of background noise at some periods during the night-time, particularly at logger location 3. Background levels (typically quantified using the L_{A90} parameter) fall below 20 dB for some periods at each location (see plots in Appendix C). This is at the quieter end of the range that might typically be expected in a remote location. Background noise at this level will not provide any masking so noise from any industrial or commercial sources could be more noticeable than might be the case in less remote areas with high background noise environments. This may be a relevant consideration during the assessment phase of the project, noting that the lower night-time assigned noise level is L_{A10} 35 dB.

APPENDIX A GLOSSARY OF TERMINOLOGY

Ambient	The ambient noise level is the noise level measured in the absence of the intrusive noise or the noise requiring control. Ambient noise levels are frequently measured to determine the situation prior to the addition of a new noise source.
A-weighting	The process by which noise levels are corrected to account for the non-linear frequency response of the human ear.
dB	Decibel The unit of sound level. Expressed as a logarithmic ratio of sound pressure P relative to a reference pressure of Pr=20 μPa i.e. dB = 20 x log(P/Pr)
dBA	The unit of sound level which has its frequency characteristics modified by a filter (A-weighted) so as to more closely approximate the frequency bias of the human ear.
Frequency	The number of pressure fluctuation cycles per second of a sound wave. Measured in units of Hertz (Hz).
L_{A01}	The noise level exceeded for only 1% of the measurement period, measured in dBA. This is sometimes referred to as the typical maximum noise level.
L_{A10}	The noise level exceeded for 10% of the measurement period, measured in dBA. This is commonly referred to as the average maximum noise level.
$L_{A90\,(t)}$	The A-weighted noise level equalled or exceeded for 90% of the measurement period. This is commonly referred to as the background noise level. The suffix "t" represents the time period to which the noise level relates, e.g. (8 h) would represent a period of 8 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10 pm and 7 am.
$L_{Aeq\,(t)}$	The equivalent continuous (time-averaged) A-weighted sound level. This is commonly referred to as the average noise level. The suffix "t" represents the time period to which the noise level relates, e.g. (8 h) would represent a period of 8 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10 pm and 7 am.
L_{Amax}	The A-weighted maximum noise level. The highest noise level which occurs during the measurement period.
Masking Noise	Background noise that is not disturbing, but due to its presence causes other unwanted noises to be less intelligible, noticeable and distracting.
Octave Band	A range of frequencies where the highest frequency included is twice the lowest frequency. Octave bands are referred to by their logarithmic centre frequencies, these being 31.5 Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, 8 kHz, and 16 kHz for the audible range of sound.
SPL or L_P	Sound Pressure Level A logarithmic ratio of a sound pressure measured at distance, relative to the threshold of hearing (20 μPa RMS) and expressed in decibels.

APPENDIX B DETAILED RESULTS

Table 5 to Table 13 present the breakdown of average levels for each day. It should be noted that the results for the first day period (Monday 16 August) and last night period (Sunday 22 August) are based on partial periods since data was not collected for the entire period due to deployment and retrieval times.

Logger 1 results

Table 5: Logger 1 – Day time period (Day 0700-1900)

Day of week	Noise level (dB)				
160821-220821	**L_{Aeq}**	**L_{AS10}**	**L_{A90}**	**L_{ASmax}**	**L_{AS1}**
Monday	44	46	40	61	50
Tuesday	47	45	36	59	52
Wednesday	46	42	29	55	49
Thursday	41	37	25	51	45
Friday	41	34	23	52	44
Saturday	39	35	24	50	44
Sunday	40	37	24	51	44
Average	**44**	**42**	**34**	**56**	**48**

Table 6: Logger 1 – Evening period (1900-2200)

Day of week	Noise level (dB)				
160821-220821	**L_{Aeq}**	**L_{AS10}**	**L_{A90}**	**L_{ASmax}**	**L_{AS1}**
Monday	46	49	29	58	51
Tuesday	39	34	29	44	41
Wednesday	31	29	21	41	38
Thursday	35	36	30	45	42
Friday	34	35	29	41	39
Saturday	42	41	37	45	44
Sunday	39	35	31	39	37
Average	**40**	**42**	**31**	**50**	**45**

Table 7: Logger 1 – Night period (2200-0700)

Day of week	Noise level (dB)				
160821-220821	**L_{Aeq}**	**L_{AS10}**	**L_{A90}**	**L_{ASmax}**	**L_{AS1}**
Monday	39	36	25	71	50
Tuesday	38	28	25	37	32
Wednesday	55	33	24	44	40
Thursday	58	39	23	53	48

Day of week	Noise level (dB)				
160821-220821	**L_{Aeq}**	**L_{AS10}**	**L_{A90}**	**L_{ASmax}**	**L_{AS1}**
Friday	62	39	27	48	45
Saturday	54	32	23	42	38
Sunday	58	36	26	45	41
Average	57	36	25	63	45

Logger 2 results

Table 8: Logger 2 – Day time period (Day 0700-1900)

Day of week	Noise level (dB)				
160821-220821	**L_{Aeq}**	**L_{AS10}**	**L_{A90}**	**L_{ASmax}**	**L_{AS1}**
Monday	44	61	50	46	40
Tuesday	29	28	28	35	30
Wednesday	44	36	29	43	40
Thursday	45	35	30	40	38
Friday	49	43	36	48	46
Saturday	47	42	38	44	43
Sunday	48	41	36	45	43
Average	**46**	**52**	**43**	**44**	**42**

Table 9: Logger 2 – Evening period (1900-2200)

Day of week	Noise level (dB)				
160821-220821	**L_{Aeq}**	**L_{AS10}**	**L_{A90}**	**L_{ASmax}**	**L_{AS1}**
Monday	40	44	28	59	46
Tuesday	42	38	32	49	44
Wednesday	51	49	44	57	52
Thursday	54	52	48	57	54
Friday	55	53	49	58	55
Saturday	54	53	48	57	55
Sunday	54	52	48	56	54
Average	**52**	**51**	**46**	**57**	**53**

Table 10: Logger 2 – Night period (2200-0700)

Day of week	Noise level (dB)				
160821-220821	**L_{Aeq}**	**L_{AS10}**	**L_{A90}**	**L_{ASmax}**	**L_{AS1}**
Monday	35	37	30	59	43
Tuesday	29	28	28	35	30
Wednesday	44	36	29	43	40
Thursday	45	35	30	40	38

Day of week	Noise level (dB)				
160821-220821	**L_{Aeq}**	**L_{AS10}**	**L_{A90}**	**L_{ASmax}**	**L_{AS1}**
Friday	49	43	36	48	46
Saturday	47	42	38	44	43
Sunday	48	41	36	45	43
Average	**46**	**39**	**34**	**51**	**42**

Logger 3 results

Table 11: Logger 3 – Day time period (Day 0700-1900)

Day of week	Noise level (dB)				
160821-220821	**L_{Aeq}**	**L_{AS10}**	**L_{A90}**	**L_{ASmax}**	**L_{AS1}**
Monday *	-	-	-	-	-
Tuesday	52	51	38	61	57
Wednesday	49	45	33	56	51
Thursday	38	37	24	49	44
Friday	33	33	21	48	42
Saturday	30	30	20	44	38
Sunday	29	28	20	45	38
Average	**46**	**44**	**32**	**55**	**51**

* Insufficient data collected for analysis purposes as logger deployed late in day period.

Table 12: Logger 3 – Evening period (1900-2200)

Day of week	Noise level (dB)				
160821-220821	**L_{Aeq}**	**L_{AS10}**	**L_{A90}**	**L_{ASmax}**	**L_{AS1}**
Monday	37	40	30	55	44
Tuesday	40	38	32	48	44
Wednesday	42	39	30	45	43
Thursday	48	49	44	53	51
Friday	50	50	46	52	51
Saturday	52	51	46	54	53
Sunday	50	49	44	53	52
Average	**48**	**48**	**43**	**52**	**50**

Table 13: Logger 3 – Night period (2200-0700)

Day of week	Noise level (dB)				
160821-220821	**L_{Aeq}**	**L_{AS10}**	**L_{A90}**	**L_{ASmax}**	**L_{AS1}**
Monday	32	32	30	51	40
Tuesday	39	30	30	37	32
Wednesday	21	20	18	30	24

Day of week	Noise level (dB)				
160821-220821	**L_{Aeq}**	**L_{AS10}**	**L_{A90}**	**L_{ASmax}**	**L_{AS1}**
Thursday	36	26	22	35	30
Friday	35	27	22	35	31
Saturday	37	29	23	36	33
Sunday	35	27	23	34	30
Average	**36**	**28**	**26**	**43**	**34**

APPENDIX C TIME HISTORY PLOTS

Figure 1: Logger 1 time history plot

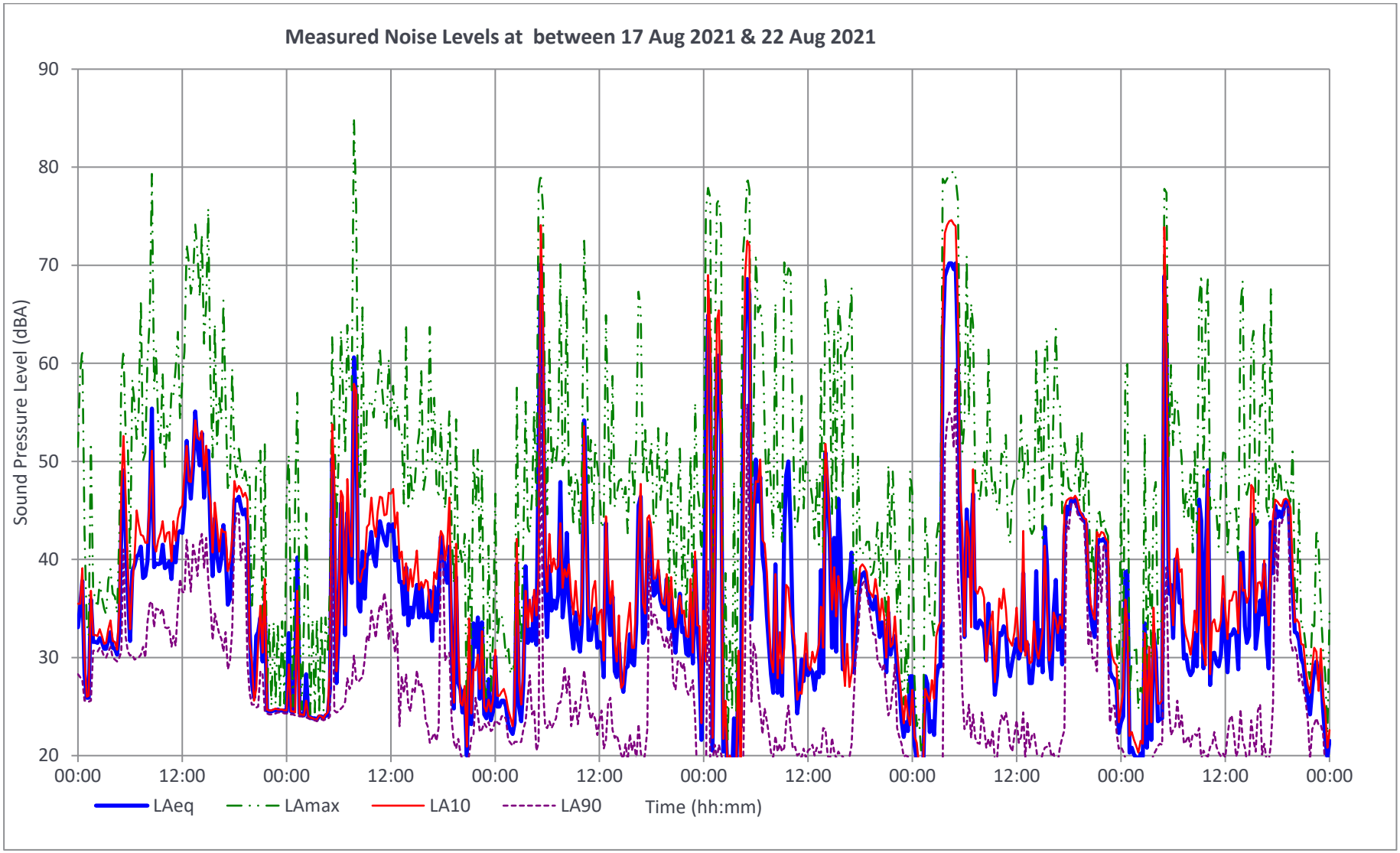


Figure 2: Logger 2 time history plot

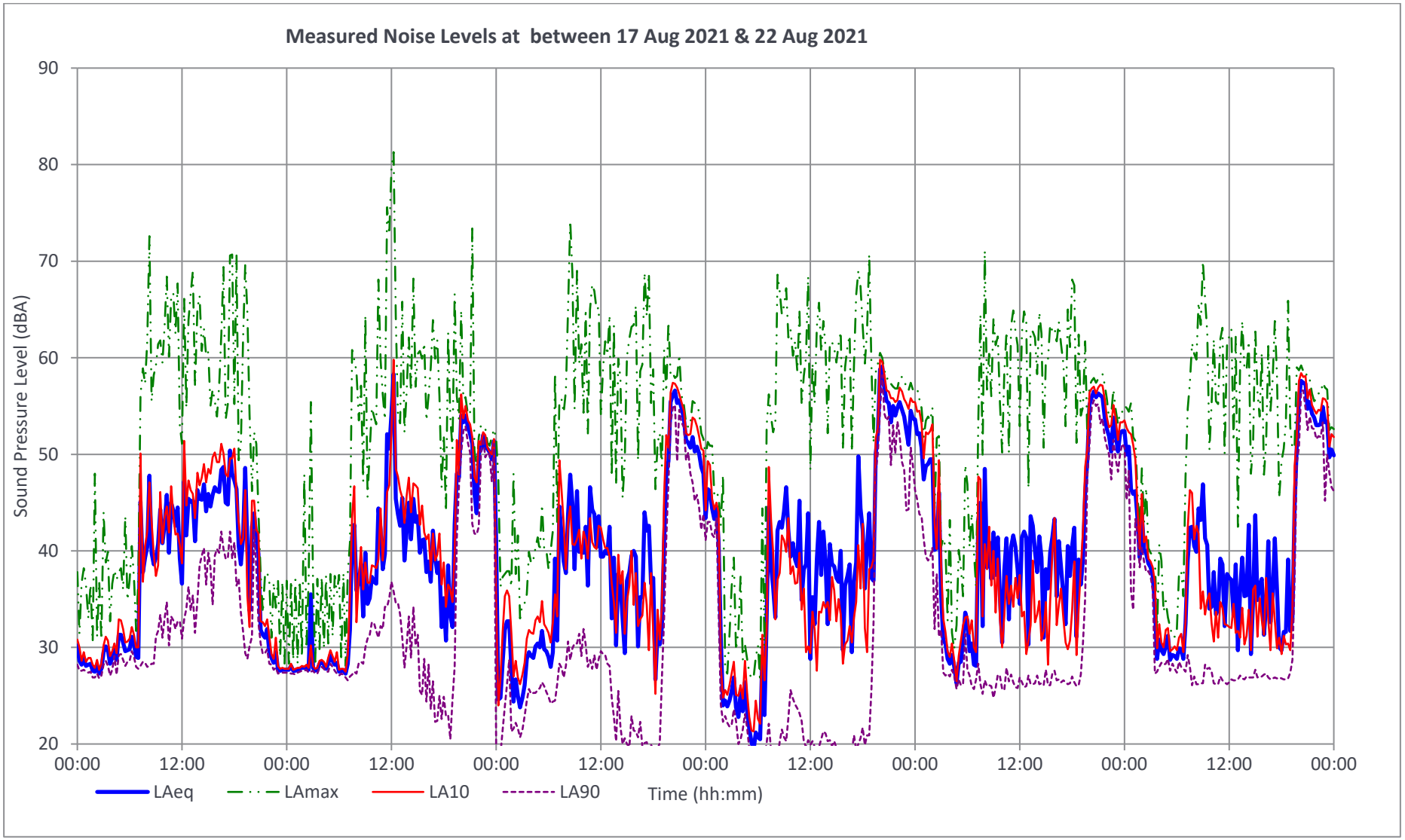
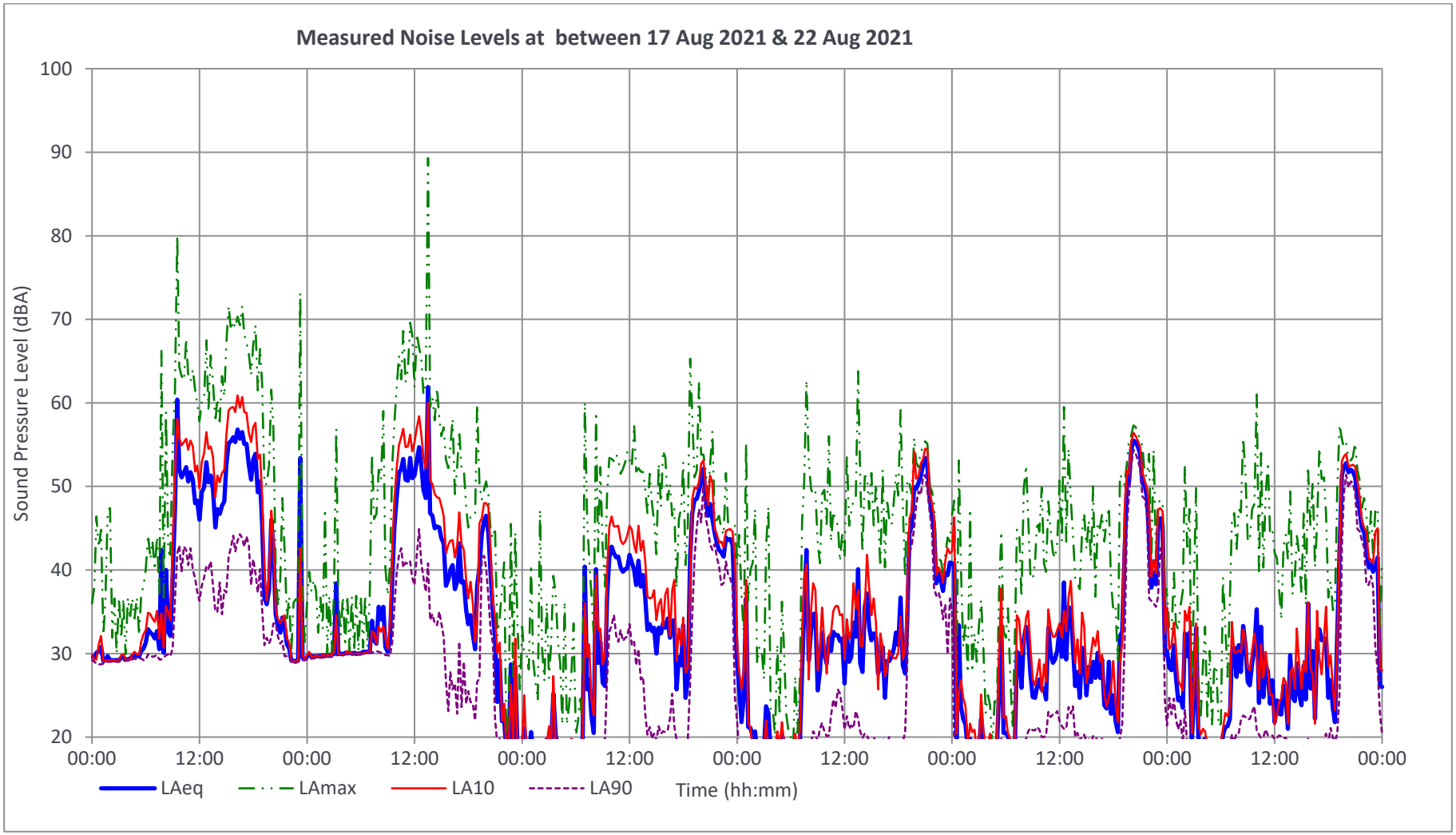


Figure 3: Logger 3 time history plot



APPENDIX D LOGGER PHOTOS

Figure 4: : Logger 1 - Cube 10423

Figure 5: : Logger 2 - Cube 10418

Figure 6: : Logger 3 - Duo 10447

APPENDIX E AERIAL MAP SHOWING LOGGER LOCATIONS