

Balranald Mineral Sands Project

Environmental noise monitoring

Prepared for Iluka Resources Limited

January 2024

Balranald Mineral Sands Project

Environmental noise monitoring

Iluka Resources Limited

E231081 RP1

January 2024

Version	Date	Prepared by	Reviewed by	Comments
V1	23/01/2024	Will Moore	Tony Welbourne	Draft
V2	30/01/2024	Will Moore	Robert Kirwan	Final

Approved by



Robert Kirwan

Associate Acoustic Consultant

30 January 2024

Level 3 175 Scott Street

Newcastle NSW 2300

This report has been prepared in accordance with the brief provided by Iluka Resources Limited and, in its preparation, EMM has relied upon the information collected at the times and under the conditions specified in this report. All findings, conclusions or recommendations contained in this report are based on those aforementioned circumstances. The contents of this report are private and confidential. This report is only for Iluka Resources Limited's use in accordance with its agreement with EMM and is not to be relied on by or made available to any other party without EMM's prior written consent. Except as permitted by the *Copyright Act 1968* (Cth) and only to the extent incapable of exclusion, any other use (including use or reproduction of this report for resale or other commercial purposes) is prohibited without EMM's prior written consent. Except where expressly agreed to by EMM in writing, and to the extent permitted by law, EMM will have no liability (and assumes no duty of care) to any person in relation to this document, other than to Iluka Resources Limited (and subject to the terms of EMM's agreement with Iluka Resources Limited).

© EMM Consulting Pty Ltd, Ground Floor Suite 01, 20 Chandos Street, St Leonards NSW 2065, [2024].

TABLE OF CONTENTS

1	Introduction	1
1.1	Background	1
1.2	Attended monitoring locations	1
1.3	Terminology and abbreviations	3
2	Noise limits	4
2.1	Development consent	4
2.2	Environment protection licence	4
2.3	Noise management plan	4
2.4	Noise limits	4
2.5	Meteorological conditions	4
2.6	Additional requirements	4
3	Methodology	6
3.1	Overview	6
3.2	Attended noise monitoring	6
3.3	Modifying factors	6
3.4	Instrumentation and personnel	7
4	Results	8
4.1	Total measured noise levels and atmospheric conditions	8
4.2	Construction activities	9
4.3	Site only noise levels	9
5	Summary	11

Appendices

Appendix A	Noise perception and examples	A.1
Appendix B	Regulator documents	B.1
Appendix C	Calibration certificates	C.1

Tables

Table 1.1	Attended noise monitoring locations	1
Table 1.2	Terminology and abbreviations	3
Table 2.1	Noise impact limits, dB	4
Table 3.1	Measurement equipment	7

Table 4.1	Total measured noise levels, dB – Quarter 4 2023 ¹	8
Table 4.2	Measured atmospheric conditions – Quarter 4 2023	8
Table 4.3	Site noise levels and limits – Quarter 4 2023	10
Table A.1	Perceived change in noise	A.2

Figures

Figure 1.1	Attended noise monitoring locations	2
Figure A.1	Common noise levels	A.2

1 Introduction

1.1 Background

EMM Consulting Pty Ltd (EMM) was engaged by Iluka Resources Limited to conduct a quarterly noise survey of construction at Balranald Mineral Sands Project (BMS, the site) located near Balranald, NSW. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits.

Attended environmental noise monitoring described in this report was done during the day, evening and night periods of 6 December 2023 at three monitoring locations.

1.2 Attended monitoring locations

Site monitoring locations are detailed in Table 1.1 and shown on Figure 1.1. It should be noted that Figure 1.1 shows actual monitoring positions, not necessarily the location of residences.

Table 1.1 Attended noise monitoring locations

Location descriptor	Description	Coordinates (MGA 54)	
		Easting	Northing
BN1	Adjacent Balranald-Ivanhoe road	737482	6172117
BN2	Burke and Wills road	726679	6196614
BN3	Cringadale/Karra boundary	716208	6187677

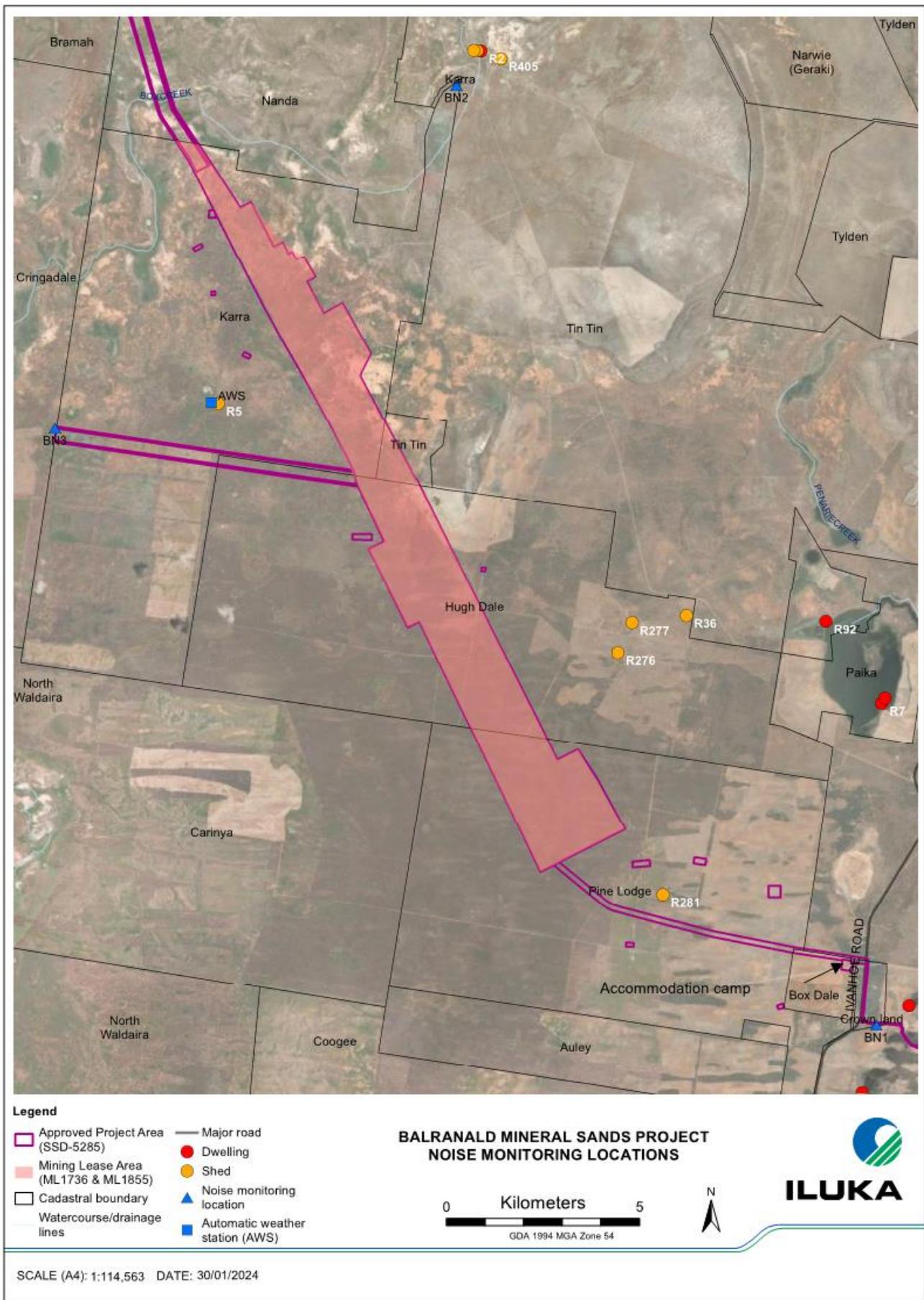


Figure 1.1 Attended noise monitoring locations

1.3 Terminology and abbreviations

Some definitions of terms and abbreviations which may be used in this report are provided in Table 1.2.

Table 1.2 Terminology and abbreviations

Term/descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to approximate how humans hear noise.
L_{Amax}	The maximum root mean squared A-weighted noise level over a time period.
L_{A1}	The A-weighted noise level which is exceeded for 1% of the time.
$L_{A1,1minute}$	The A-weighted noise level which is exceeded for 1% of the specified time period of 1 minute.
L_{A10}	The A-weighted noise level which is exceeded for 10% of the time.
L_{Aeq}	The energy average A-weighted noise level.
L_{A50}	The A-weighted noise level which is exceeded for 50% of the time, also the median noise level during a measurement period.
L_{A90}	The A-weighted noise level exceeded for 90% of the time, also referred to as the “background” noise level and commonly used to derive noise limits.
L_{Amin}	The minimum A-weighted noise level over a time period.
L_{Ceq}	The energy average C-weighted noise energy during a measurement period. The “C” weighting scale is used to take into account low-frequency components of noise within the audibility range of humans.
SPL	Sound pressure level. Fluctuations in pressure measured as 10 times a logarithmic scale, with the reference pressure being 20 micropascals.
Hertz (Hz)	The frequency of fluctuations in pressure, measured in cycles per second. Most sounds are a combination of many frequencies together.
AWS	Automatic weather station used to collect meteorological data, typically at an altitude of 10 metres
VTG	Vertical temperature gradient in degrees Celsius per 100 metres altitude.
Sigma-theta	The standard deviation of the horizontal wind direction over a period of time.
IA	Inaudible. When site noise is noted as IA then there was no site noise at the monitoring location.
NM	Not Measurable. If site noise is noted as NM, this means some noise was audible but could not be quantified.
Day	Monday – Saturday: 7 am to 6 pm, on Sundays and Public Holidays: 8 am to 6 pm.
Evening	Monday – Saturday: 6 pm to 10 pm, on Sundays and Public Holidays: 6 pm to 10 pm.
Night	Monday – Saturday: 10 pm to 7 am, on Sundays and Public Holidays: 10 pm to 8 am.

Appendix A provides further information that gives an indication as to how an average person perceives changes in noise level, and examples of common noise levels.

2 Noise limits

2.1 Development consent

The current development consent for BMS is SSD-5285 (MOD 2, August 2023). Relevant sections of the development consent are reproduced in Appendix B.1.

2.2 Environment protection licence

BMS holds Environmental Protection License (EPL) No.20795 issued by the Environmental Protection Authority (EPA) on 5 June 2023. Relevant sections of the EPL are reproduced in Appendix B.2.

2.3 Noise management plan

Noise monitoring requirements are detailed in BMS Noise Management Plan (NMP). The most recent version of the NMP was approved in February 2023. Relevant sections of the NMP are reproduced in Appendix B.3.

2.4 Noise limits

Noise impact limits based on both the development consent and EPL are provided in Table 2.1.

Table 2.1 Noise impact limits, dB

Location	Day $L_{Aeq,15minute}$	Evening $L_{Aeq,15minute}$	Night $L_{Aeq,15minute}$	Night $L_{A1,1minute}$
BN1	35	35	35	45
BN2	35	35	35	45
BN3	35	35	35	45

2.5 Meteorological conditions

As detailed in the NMP, noise limits apply under all meteorological conditions except the following:

- wind speeds greater than 3 m/s at 10 m above ground level, or
- stability category F temperature inversion conditions and wind speeds greater than 2 m/s at 10 m above ground level, or
- temperature inversion conditions greater than 8 °C/100 m.

2.6 Additional requirements

Monitoring and reporting have been done in accordance with the NSW EPA 'Noise Policy for Industry' (NPfI) issued in October 2017 and the 'Approved methods for the measurement and analysis of environmental noise in NSW' (Approved Methods) issued in January 2022. For assessment of modifying factors, the NPfI immediately superseded the 'Industrial Noise Policy' (INP 2000), as outlined in the EPA document 'Implementation and transitional arrangements for the Noise Policy for Industry' (2017). Assessment and reporting of modifying factors have been undertaken in accordance with Fact Sheet C of the NPfI.

Condition 6 in Appendix 6 of the development consent details specific methodology for assessment of low-frequency noise, which is consistent with methodology in Fact Sheet C of the NPfl. Low frequency modifying factors have been assessed in accordance with both the development consent and NPfl.

3 Methodology

3.1 Overview

Attended environmental noise monitoring was done in general accordance with Australian Standard AS1055 'Acoustics, Description and Measurement of Environmental Noise' and relevant NSW EPA requirements. Meteorological data was obtained from the site automatic weather station (AWS) which allowed correlation of atmospheric parameters with measured site noise levels.

3.2 Attended noise monitoring

During this survey, attended noise monitoring was conducted during the day/evening/night periods at each location. The duration of each measurement was 15 minutes. Atmospheric conditions were measured at each monitoring location.

Measured sound levels from various sources were noted during each measurement and particular attention was paid to the extent of site's contribution (if any) to measured levels. At each monitoring location, the site-only $L_{Aeq,15\text{minute}}$ and L_{Amax} were measured directly or determined by other methods detailed in Section 7.1 of the Npfl.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may be used in this report. When site noise is noted as IA, it was inaudible at the monitoring location. When site noise is noted as NM, this means it was audible but could not be quantified. All results noted as IA or NM in this report were due to one or more of the following:

- Site noise levels were very low, typically more than 10 dB below the measured background (L_{A90}), and unlikely to be noticed.
- Site noise levels were masked by more dominant sources that are characteristic of the environment (such as breeze in foliage or continuous road traffic noise) that cannot be eliminated by monitoring at an alternate or intermediate location.
- It was not feasible or reasonable to employ methods such as to move closer and back calculate. Cases may include rough terrain preventing closer measurement, addition/removal of significant source to receiver shielding caused by moving closer, and meteorological conditions where back calculation may not be accurate.

If exact noise levels from site could not be established due to masking by other noise sources in a similar frequency range but were determined to be at least 5 dB lower than relevant limits, then a maximum estimate of may be provided. This is expressed as a 'less than' quantity, such as <20 dB or <30 dB.

For this assessment, the measured L_{Amax} has been used as a conservative estimate of $L_{A1,1\text{minute}}$. The EPA accepts sleep disturbance analysis based on either the $L_{A1,1\text{minute}}$ or L_{Amax} metrics, with the L_{Amax} representing a more conservative assessment of site noise emissions.

3.3 Modifying factors

All measurements were evaluated for potential modifying factors in accordance with the NPfl. Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable. If applicable, modifying factor penalties have been reported and added to measured site-only L_{Aeq} .

Low-frequency modifying factor penalties have only been applied to site-only L_{Aeq} levels if the site was the only contributing low-frequency noise source. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfl.

3.4 Instrumentation and personnel

Attended noise monitoring was conducted by Will Moore. Qualifications, experience, and/or demonstration of competence in accordance with the Approved methods is available upon request.

Equipment used to measure environmental noise levels is detailed in Table 3.1. Calibration certificates are provided in Appendix C.

Table 3.1 Measurement equipment

Item	Serial number	Calibration due date	Relevant standard
Rion NA-28 sound level meter	30131882	23/01/2025	IEC 61672-1:2002
Pulsar 105 acoustic calibrator	78226	24/01/2025	IEC 60942:2003

4 Results

4.1 Total measured noise levels and atmospheric conditions

Total noise levels measured during each 15-minute attended measurement are provided in Table 4.1.

Table 4.1 Total measured noise levels, dB – Quarter 4 2023 ¹

Location	Start date and time	L _{Amax}	L _{A1}	L _{A10}	L _{Aeq}	L _{A50}	L _{A90}	L _{Amin}
BN1	6/12/2023 16:57	55	43	35	33	30	28	26
BN1	6/12/2023 19:09	60	43	33	34	29	27	25
BN1	6/12/2023 23:24	52	44	43	41	41	40	37
BN2	6/12/2023 16:10	53	42	35	32	26	19	16
BN2	6/12/2023 19:50	45	34	25	24	18	16	15
BN2	6/12/2023 22:42	39	32	26	23	20	18	16
BN3	6/12/2023 15:22	50	44	38	35	32	26	22
BN3	6/12/2023 20:35	50	43	41	40	40	34	26
BN3	6/12/2023 22:00	45	44	43	39	38	37	33

Notes: 1. Levels in this table are not necessarily the result of activity at site.

Atmospheric condition data measured by the operator during each measurement using a hand-held weather meter is shown in Table 4.2. The wind speed, direction and temperature were measured at approximately 1.5 metres above ground. Attended noise monitoring is not done during rain, hail, or wind speeds above 5 m/s at microphone height.

Table 4.2 Measured atmospheric conditions – Quarter 4 2023

Location	Start date and time	Temperature °C	Wind speed m/s	Wind direction ° magnetic north ¹	Cloud cover 1/8s
BN1	6/12/2023 16:57	36	1.7	190	2
BN1	6/12/2023 19:09	36	1.8	160	2
BN1	6/12/2023 23:24	28	3.1	160	0
BN2	6/12/2023 16:10	38	3.0	200	2
BN2	6/12/2023 19:50	33	1.3	130	4
BN2	6/12/2023 22:42	29	2.3	170	1
BN3	6/12/2023 15:22	38	1.2	160	1
BN3	6/12/2023 20:35	31	0.9	170	4
BN3	6/12/2023 22:00	31	1.6	170	4

Notes: 1. “-” indicates calm conditions at monitoring location.

4.2 Construction activities

BMS has advised the following construction activities were occurring during the day period of the Quarter 4 2023 noise monitoring survey:

- grader working on fence lines
- drill constructing a groundwater well
- excavator clearing vegetation
- water trucks for dust suppression.

4.3 Site only noise levels

4.3.1 Modifying factors

There were no modifying factors, as defined in the NPfl, applicable during the survey.

4.3.2 Monitoring results

Table 4.3 provides site noise levels in the absence of other sources, where possible, and includes weather data from the site AWS. Noise limits are applicable under all weather conditions but are adjusted during very noise-enhancing weather conditions as defined by the NPfl.

Table 4.3 Site noise levels and limits – Quarter 4 2023

Location	Start date and time	Wind		Stability class	Limits apply? ¹	Limits, dB ¹		Site levels, dB		Exceedances, dB ¹	
		Speed m/s	Direction ³			L _{Aeq,15minute}	L _{Amax}	L _{Aeq,15minute} ²	L _{Amax}	L _{Aeq,15minute}	L _{Amax}
BN1	6/12/2023 16:57	3.0	219	B	Yes	35	-	IA	-	Nil	-
BN1	6/12/2023 19:09	2.7	194	D	Yes	35	-	IA	-	Nil	-
BN1	6/12/2023 23:24	4.3	179	D	No	35	45	IA	IA	N/A	N/A
BN2	6/12/2023 16:10	4.4	213	D	No	35	-	IA	-	N/A	-
BN2	6/12/2023 19:50	1.6	171	D	Yes	35	-	IA	-	Nil	-
BN2	6/12/2023 22:42	4.2	186	D	No	35	45	IA	IA	N/A	N/A
BN3	6/12/2023 15:22	4.6	190	C	No	35	-	IA	-	N/A	-
BN3	6/12/2023 20:35	1.9	160	D	Yes	35	-	IA	-	Nil	-
BN3	6/12/2023 22:00	3.4	187	D	Yes	35	45	IA	IA	Nil	Nil

- Notes:
1. Noise emission limits are applicable if weather conditions were within parameters specified in Section 2.5. N/A in exceedance column indicates that limits were not applicable due to weather conditions.
 2. Site-only L_{Aeq,15minute} includes modifying factor penalties, if applicable.
 3. Degrees magnetic north, “-” indicates calm conditions.

5 Summary

EMM was engaged by Iluka Resources Limited to conduct a quarterly noise survey of construction at the site. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits.

Attended environmental noise monitoring described in this report was done during the day, evening and night periods of 6 December 2023 at three monitoring locations.

Noise levels from site complied with relevant limits at all monitoring locations during the Quarter 4 2023 survey.

Appendix A

Noise perception and examples

A.1 Noise levels

Table A.1 gives an indication as to how an average person perceives changes in noise level. Examples of common noise levels are provided in Figure A.1.

Table A.1 Perceived change in noise

Change in sound pressure level (dB)	Perceived change in noise
Up to 2	Not perceptible
3	Just perceptible
5	Noticeable difference
10	Twice (or half) as loud
15	Large change
20	Four times (or quarter) as loud

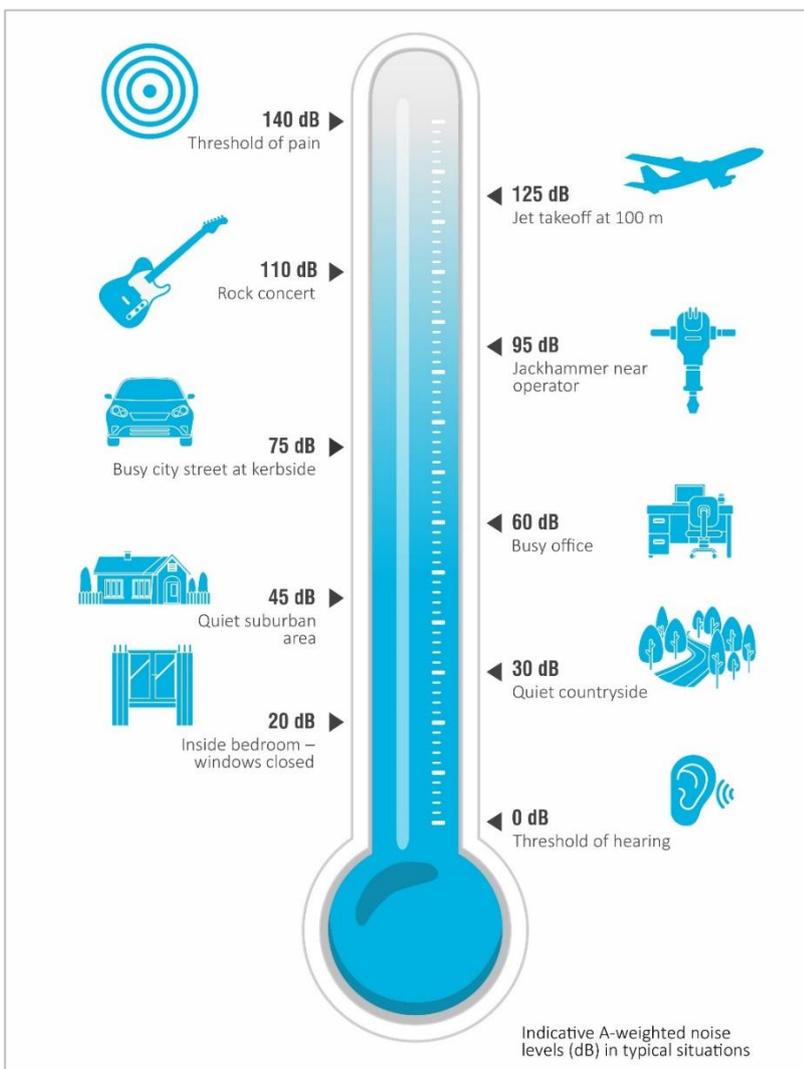


Figure A.1 Common noise levels

Appendix B

Regulator documents

B.1 Development Consent SSD-5285 (MOD 2, August 2023)

NOISE

Operational Noise Criteria

3. Except for the noise-affected land in Table 1, the Applicant **must** ensure that the noise generated by the development does not exceed the noise criteria in Table 2.

Table 2: Noise criteria dB(A)

Location	Day	Evening	Night	
	$L_{Aeq(15min)}$	$L_{Aeq(15min)}$	$L_{Aeq(15min)}$	$L_{A1(1min)}$
Any residence on privately-owned land	35	35	35	45
Mungo National Park and Mungo State Conservation Area (when in use)	50	50	50	-

Noise generated by the development must be monitored and measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the *NSW Noise Policy for Industry* (EPA, 2017).

However, these noise criteria do not apply if the Applicant has an agreement with the owner/s or leaseholders of the residence to generate higher noise levels, and the Applicant has advised the Department in writing of the terms of this agreement.

Operating Conditions

4. The Applicant must:
 - (a) implement all reasonable and feasible measures to minimise the construction, operational and road noise of the development;
 - (b) **minimise the noise impacts of the development during adverse meteorological conditions; and**
 - (c) undertake regular attended monitoring of the noise of the development, to ensure compliance with the relevant conditions of this consent.

Noise Management Plan

5. The Applicant **must** prepare a Noise Management Plan for the development to the satisfaction of the Secretary. This plan must:
 - (a) be prepared in consultation with the EPA;
 - (b) describe the measures that would be implemented to ensure compliance with the noise criteria and operating conditions of this consent;
 - (c) include a noise monitoring program for evaluating and reporting on:
 - compliance against the noise criteria in this consent; and
 - compliance against the noise operating conditions; and
 - (d) defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.

5A. The Applicant **must not** commence construction until the Noise Management Plan is approved by the Secretary.

5B. The Applicant **must** implement the Noise Management Plan as approved by the Secretary.

B.2 Environmental protection licence No.20795

L3 Noise limits

L3.1 Noise from the premises must not exceed the limits specified in the following table:

Location	Day [dB(A) LAeq 15 minute]	Evening [dB(A) LAeq 15 minute]	Night [dB(A) LAeq 15 minute]	Night [dB(A) LA1 1 minute]
All dwellings on privately-owned land not assigned acquisition or mitigation rights	35	35	35	45
Any National Park or Conservation Area	50	50	50	

L3.2 The noise emission limits identified in this licence apply under all meteorological conditions except:
a) during rain and wind speeds (at 10m height) greater than 3m/s; and
b) under "non-significant weather conditions".

M6 Noise monitoring

M6.1 To assess compliance with the noise limits specified within this licence, the licensee must undertake operator attended noise monitoring at each specified noise monitoring point in accordance with the table below.

POINT 14,15,16

Assessment period	Minimum frequency in a reporting period	Minimum duration within assessment period	Minimum number of assessment period
Day, Evening, Night	Quarterly	15 minutes	1 operation day

B.3 Noise management plan

<p>Sc.3(C.3) Except for the noise-affected land in Table 1, the Applicant must ensure that the noise generated by the development does not exceed the noise criteria in Table 2.</p> <p>Table 2: Noise criteria dB(A)</p> <table border="1"> <thead> <tr> <th rowspan="2">Location</th> <th>Day</th> <th>Evening</th> <th colspan="2">Night</th> </tr> <tr> <th>$L_{Aeq}(15min)$</th> <th>$L_{Aeq}(15min)$</th> <th>$L_{Aeq}(15min)$</th> <th>$L_{A1}(1min)$</th> </tr> </thead> <tbody> <tr> <td>Any residence on privately-owned land</td> <td>35</td> <td>35</td> <td>35</td> <td>45</td> </tr> <tr> <td>Mungo National Park and Mungo State Conservation Area (when in use)</td> <td>50</td> <td>50</td> <td>50</td> <td>-</td> </tr> </tbody> </table> <p>Noise generated by the development must be monitored and measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Noise Policy for Industry (EPA, 2017). However, these noise criteria do not apply if the Applicant has an agreement with the owner/s or leaseholders of the residence to generate higher noise levels, and the Applicant has advised the Department in writing of the terms of this agreement.</p>					Location	Day	Evening	Night		$L_{Aeq}(15min)$	$L_{Aeq}(15min)$	$L_{Aeq}(15min)$	$L_{A1}(1min)$	Any residence on privately-owned land	35	35	35	45	Mungo National Park and Mungo State Conservation Area (when in use)	50	50	50	-	Section 4.7
Location	Day	Evening	Night																					
	$L_{Aeq}(15min)$	$L_{Aeq}(15min)$	$L_{Aeq}(15min)$	$L_{A1}(1min)$																				
Any residence on privately-owned land	35	35	35	45																				
Mungo National Park and Mungo State Conservation Area (when in use)	50	50	50	-																				

The noise criteria in Table 2 apply under all meteorological conditions except the following:

- wind speeds greater than 3 m/s at 10 metres above ground level; or
- stability category F temperature inversion conditions and wind speeds greater than 2 m/s at 10 m above ground level; or
- temperature inversion conditions greater than 8°C/100m.

Mungo National Park is located some 65km north of the west Balranald mine site and some 26km north of the Nepean deposit. The Balranald Mineral Sands Noise Assessment (EMM, 2015) did not identify any predicated noise impacts to Mungo National Park, therefore it is not proposed that any compliance monitoring will be undertaken to assess compliance with criteria for Mungo National Park as specified in Table 2.

4.7. Noise monitoring program

The noise monitoring program will comprise attended noise monitoring representative of the privately owned receivers most likely to be affected by noise generated by Project construction, mining operations and transport. Irrespective of land ownership these locations will be used to assess compliance with noise criteria specified in Table 2.

Noise monitoring will be undertaken in accordance with the relevant requirements for reviewing performance set out in the NSW Noise Policy for Industry (NPI) (EPA, 2017).

Meteorological monitoring will be conducted at Iluka’s Automatic Weather Station (AWS) which complies with the requirements in the *Approved Methods for Sampling of Air Pollutants in New South Wales* (NSW EPA, 2022) guideline.

4.7.2. Attended noise monitoring

An overview of the noise monitoring program is provided in Table 5. Figure 8 below shows the location of noise monitoring locations and sensitive receiver locations relevant to the Project area.

Table 5- Noise monitoring program

Site ID	Location	Frequency/Assessment period	Units of measure
BN1	Adjacent Balranald-Ivanhoe Rd (R54 & R57)	Quarterly during construction and quarterly during operations (first 12 months) *Day/Evening/Night	LAeq(15min)
BN2	Burke and Wills Rd (R2)		
BN3	Cringadale/Karra boundary (R362)		

* Assessment period is defined as: day (7am to 6pm); evening (6pm to 10pm); or night (10pm to 7am)

Attended noise monitoring at the sites will occur on a quarterly basis (i.e. at least 4 times in each calendar year) and in accordance with AS 1055:2018 *Acoustics- Description and Measurement of Environmental Noise* and the NPI (EPA, 2017).

Appendix C

Calibration certificates

C.1 Calibration certificates



Sound Level Meter IEC 61672-3:2013 Calibration Certificate Calibration Number C23032

Client Details	EMM Consulting Level 3/175 Scott Street Newcastle NSW 2300
-----------------------	--

Equipment Tested/ Model Number :	Rion NA-28
Instrument Serial Number :	30131882
Microphone Serial Number :	04739
Pre-amplifier Serial Number :	11942
Firmware Version :	2.0

Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditions
Ambient Temperature : 24°C	Ambient Temperature : 23.5°C
Relative Humidity : 47.3%	Relative Humidity : 46.1%
Barometric Pressure : 100.14kPa	Barometric Pressure : 100.16kPa

Calibration Technician : Shaheen Boaz	Secondary Check: Dylan Selge
Calibration Date : 23 Jan 2023	Report Issue Date : 25 Jan 2023

Approved Signatory :  Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	Pass	17: Level linearity incl. the level range control	Pass
13: Electrical Sig. tests of frequency weightings	Pass	18: Toneburst response	Pass
14: Frequency and time weightings at 1 kHz	Pass	19: C Weighted Peak Sound Level	Pass
15: Long Term Stability	Pass	20: Overload Indication	Pass
16: Level linearity on the reference level range	Pass	21: High Level Stability	Pass

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Uncertainties of Measurement -			
Acoustic Tests		Environmental Conditions	
125Hz	±0.13dB	Temperature	±0.1°C
1kHz	±0.13dB	Relative Humidity	±1.9%
8kHz	±0.14dB	Barometric Pressure	±0.014kPa
Electrical Tests	±0.13dB		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.



This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.
Accredited for compliance with ISO/IEC 17025 - Calibration.

The results of the tests, calibrations and/or measurements included in this document are traceable to SI units.

NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

PAGE 1 OF 1



**Acoustic
Research
Labs Pty Ltd**

Unit 36/14 Loyalty Rd
North Rocks NSW AUSTRALIA 2151
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119
www.acousticresearch.com.au

Sound Calibrator

IEC 60942:2017

Calibration Certificate

Calibration Number C23033

Client Details EMM Consulting
Level 3/175 Scott Street
Newcastle NSW 2300

Equipment Tested/ Model Number : Pulsar Model 105
Instrument Serial Number : 78226

Atmospheric Conditions

Ambient Temperature : 24.4°C
Relative Humidity : 50.2%
Barometric Pressure : 100.2kPa

Calibration Technician : Shaheen Boaz
Calibration Date : 24 Jan 2023
Secondary Check: Dylan Selge
Report Issue Date : 25 Jan 2023

Approved Signatory :  Ken Williams

Characteristic Tested	Result
Generated Sound Pressure Level	Pass
Frequency Generated	Pass
Total Distortion	Pass

Nominal Level	Nominal Frequency	Measured Level	Measured Frequency
94	1000	94.17	1000.40

The sound calibrator has been shown to conform to the class 1 requirements for periodic testing, described in Annex B of IEC 60942:2017 for the sound pressure level(s) and frequency(ies) stated, for the environmental conditions under which the tests were performed.

Specific Tests	Uncertainties of Measurement -	
	Environmental Conditions	
Generated SPL	±0.10dB	Temperature ±0.1°C
Frequency	±0.13%	Relative Humidity ±1.9%
Distortion	±0.20%	Barometric Pressure ±0.014kPa

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.



This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.
Accredited for compliance with ISO/IEC 17025 - Calibration.

The results of the tests, calibrations and/or measurements included in this document are traceable to SI units.

NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

Australia

SYDNEY

Ground floor 20 Chandos Street
St Leonards NSW 2065
T 02 9493 9500

NEWCASTLE

Level 3 175 Scott Street
Newcastle NSW 2300
T 02 4907 4800

BRISBANE

Level 1 87 Wickham Terrace
Spring Hill QLD 4000
T 07 3648 1200

CANBERRA

Suite 2.04 Level 2
15 London Circuit
Canberra City ACT 2601

ADELAIDE

Level 4 74 Pirie Street
Adelaide SA 5000
T 08 8232 2253

MELBOURNE

Suite 8.03 Level 8
454 Collins Street
Melbourne VIC 3000
T 03 9993 1900

PERTH

Suite 9.02 Level 9
109 St Georges Terrace
Perth WA 6000
T 08 6430 4800

Canada

TORONTO

2345 Yonge Street Suite 300
Toronto ON M4P 2E5
T 647 467 1605

VANCOUVER

60 W 6th Ave
Vancouver BC V5Y 1K1
T 604 999 8297



[linkedin.com/company/emm-consulting-pty-limited](https://www.linkedin.com/company/emm-consulting-pty-limited)



emmconsulting.com.au