# Boggabri Coal Mine

## Environmental Noise Monitoring

Prepared for Boggabri Coal Operations Pty Ltd

February 2023

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Boggabri Coal Operations Pty Ltd

E221234 RP2

February 2023

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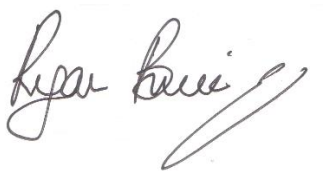

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16 February 2023

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# 1 Introduction

## 1.1 Background

EMM Consulting Pty Ltd (EMM) was engaged by Boggabri Coal Operations Pty Ltd to conduct a monthly noise survey of operations at Boggabri Coal Mine (BCM, the site) located near Boggabri, 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 night period of 1 February 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 (MGA56) | |
|---|---|---|---|
| | | Easting | Northing |
| N2 | 'Sylvania', Dripping Rock Road[1] | 235699 | 6608098 |
| N3 | 'Picton', Dripping Rock Road | 233272 | 6606096 |
| N4 [1] | 'Barbers Lagoon', Boggabri-Manilla Road | 222819 | 6602895 |

Notes: 1. Monitoring location moved approximately 300m south from May 2018 to avoid disturbing dogs (as requested by the resident).

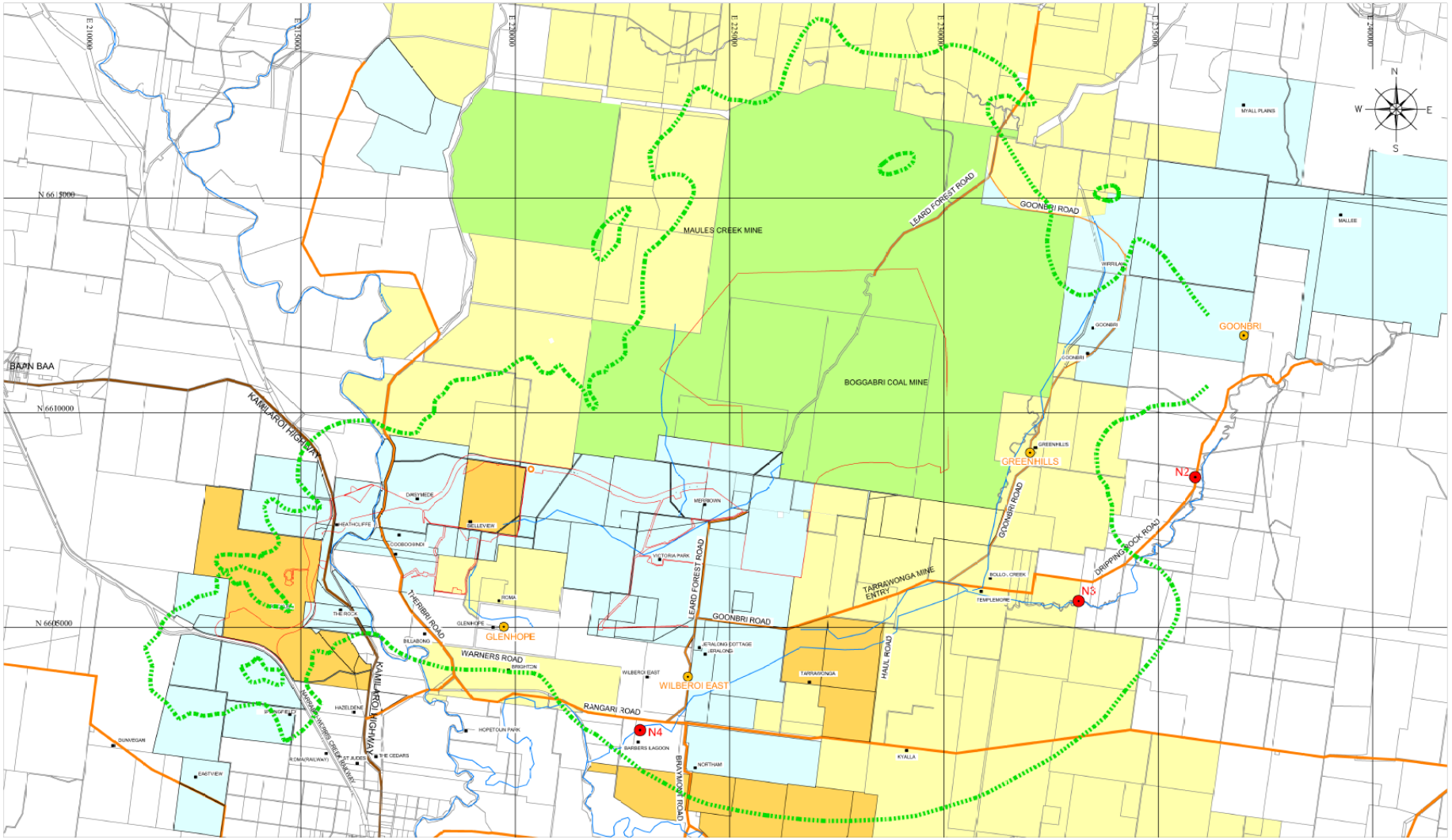


**Figure 1.1 Attended noise monitoring locations**

## 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 per cent of the time. |
| $L_{A1,1minute}$ | The A-weighted noise level which is exceeded for 1 per cent of the specified time period of 1 minute. |
| $L_{A10}$ | The A-weighted noise level which is exceeded for 10 percent of the time. |
| $L_{Aeq}$ | The energy average A-weighted noise level. |
| $L_{A50}$ | The A-weighted noise level which is exceeded for 50 per cent of the time, also the median noise level during a measurement period. |
| $L_{A90}$ | The A-weighted noise level exceeded for 90 percent 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 Project approval

The most current approval associated with activities at BCM is the 'Boggabri Coal Project, Project Approval 09_0182 (MOD 7, May 2019). Schedule 3 of the project approval details specific conditions related to noise generated by BCM. Relevant sections of the project approval are reproduced in Appendix B.1.

## 2.2 Environment protection licence

BCM holds Environment Protection Licence (EPL) No. 12407 issued by the Environment Protection Authority (EPA) most recently on 5 October 2021. Noise limits and meteorological exclusions are consistent between the EPL and project approval. However, the EPL does not specify cumulative noise limits. Relevant sections of the EPL are reproduced in Appendix B.2.

## 2.3 Noise management plan

Noise monitoring requirements, including monitoring locations, are detailed in the BCM Noise Monitoring Plan (NMP). The most recent version of the NMP is Revision No. 13 approved in June 2019. Relevant sections of the NMP are reproduced in Appendix B.3.

## 2.4 Noise limits

### 2.4.1 Operational noise limits

Operational noise impact limits based on approval are as shown in Table 2.1.

**Table 2.1 Operational noise impact limits, dB**

| Location | Day $L_{Aeq,15minute}$ | Evening $L_{Aeq,15minute}$ | Night $L_{Aeq,15minute}$ | Night $L_{A1,1minute}$ |
|---|---|---|---|---|
| N2 | 35 | 35 | 35 | 45 |
| N3 | 35 | 35 | 35 | 45 |
| N4 | 35 | 35 | 35 | 45 |

### 2.4.2 Cumulative noise limits

Cumulative noise limits detailed in the project approval are reproduced below.

*Table 4: Cumulative noise criteria dB(A) $L_{Aeq\ (period)}$*

| Location | Day ($L_{Aeq\ (period)}$) | Evening ($L_{Aeq\ (period)}$) | Night ($L_{Aeq\ (period)}$) |
|---|---|---|---|
| All privately-owned land | 40 | 40 | 40 |

*Notes:*

- *Cumulative noise is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy.*
- *Operational noise includes noise from the mining operations and use of private haul roads and rail spurs*

## 2.5 Meteorological conditions

Meteorological conditions required for noise limits to be applicable are consistent between the project approval and EPL.

Condition L4.5 of the EPL outlines meteorological conditions required for limits to be applicable. Noise limits detailed in the EPL apply under all meteorological conditions except for the following:

a) *Wind speeds greater than 3 m/s at 10 metres above ground level.*

Condition 14 of Schedule 3 of the Project Approval provides more detail regarding meteorological exclusions:

> *"Where conditions in this approval refer to measurement of noise within the context of the NSW Industrial Noise Policy the inversion class to be applied to the project is Class G."*

As noise limits apply under the strongest inversion conditions (Stability Class G), no exemptions for inversion conditions are applicable for BCM. Based on the information above, noise limits have been assumed to apply under all meteorological conditions except during periods of rainfall or wind speeds greater than 3 m/s at 10 metres above ground level.

## 2.6 Additional EPA requirements

The NSW EPA 'Industrial Noise Policy' (INP, 2000) was replaced by the 'Noise Policy for Industry' (NPfI) in October 2017. Noise conditions in the EPL and project approval still reference the INP exclusively, so monitoring has been conducted in accordance with the INP.

For assessment of modifying factors, the NPfI immediately superseded the INP, as outlined in the EPA document 'Implementation and transitional arrangements for the Noise Policy for Industry' (2017). Therefore, assessment and reporting of modifying factors have been done in accordance with Fact Sheet C of the NPfI.

Monitoring and reporting have been done in accordance with the EPA 'Approved methods for the measurement and analysis of environmental noise in NSW' issued in January 2022.

# 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, and the BCM NMP. Meteorological data was obtained from the BCM automatic weather station (AWS) which allowed correlation of atmospheric parameters with measured noise levels.

## 3.2 Attended noise monitoring

During this survey, attended noise monitoring was conducted during the night period 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 $L_{Aeq,15minute}$ and $L_{Amax}$ were measured directly or determined by other methods detailed in Section 7.1 of the NPfI.

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

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may be used in this report. When site noise is noted as IA, no site noise was audible at the monitoring location. When site noise is noted as NM, this means site noise was audible but could not be quantified. All results noted as NM in this report were due to one or more of the following:

- Site noise levels were extremely low and unlikely, in many cases, to be noticed.
- Site noise levels were masked by other more dominant noise 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 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.

For this assessment, the measured $L_{Amax}$ has been used as a conservative estimate of $L_{A1,1minute}$. The EPA accepts sleep disturbance analysis based on either the $L_{A1,1minute}$ 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 NPfI. 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 $L_{Aeq}$ noise levels.

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 NPfI.

## 3.4 Instrumentation

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

**Table 3.1 Attended noise monitoring equipment**

| Item | Serial number | Calibration due date | Relevant standard |
|---|---|---|---|
| Rion NA-28 sound level meter | 00701424 | 01/06/2023 | IEC 61672-1:2002 |
| Pulsar 106 acoustic calibrator | 79631 | 26/05/2023 | IEC 60942 |

# 4 Results

## 4.1 Total measured noise levels and atmospheric conditions

Overall noise levels measured at each location during attended measurements are provided in Table 4.1.

**Table 4.1 Measured noise levels – February 2023 [1]**

| Location | Start Date and Time | $L_{Amax}$ dB | $L_{A1}$ dB | $L_{A10}$ dB | $L_{Aeq}$ dB | $L_{A50}$ dB | $L_{A90}$ dB | $L_{Amin}$ dB |
|---|---|---|---|---|---|---|---|---|
| N2 | 01/02/2023 22:01 | 65 | 59 | 58 | 57 | 57 | 56 | 53 |
| N3 | 01/02/2023 22:26 | 52 | 51 | 50 | 50 | 50 | 49 | 48 |
| N4 | 01/02/2023 22:58 | 50 | 47 | 45 | 44 | 43 | 42 | 41 |

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. 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 – February 2023**

| Location | Start Date and Time | Temperature °C | Wind Speed m/s | Wind Direction °Magnetic North[1] | Cloud Cover 1/8s |
|---|---|---|---|---|---|
| N2 | 01/02/2023 22:01 | 26 | 0.0 | - | 3 |
| N3 | 01/02/2023 22:26 | 25 | 0.0 | - | 3 |
| N4 | 01/02/2023 22:58 | 24 | 0.0 | - | 3 |

Notes: 1. "-" indicates calm conditions at monitoring location.

## 4.2 Site only noise levels

### 4.2.1 Modifying factors

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

### 4.2.2 Site noise levels

Table 4.3 provides site noise levels in the absence of other sources, where possible. Limits are applicable if weather conditions were within specified parameters during each measurement.

**Table 4.3 Site noise levels and limits – February 2023**

| Location | Start Date and Time | Wind | | Stability Class | Limits apply? [1] | Limit, dB | | Site level, dB [2] | | Exceedance, dB [3] | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Speed m/s | Direction [4] | | | $L_{Aeq,15minute}$ | $L_{Amax}$ | $L_{Aeq,15minute}$ | $L_{Amax}$ | $L_{Aeq,15minute}$ | $L_{Amax}$ |
| N2 | 01/02/2023 22:01 | 1.6 | 278 | D | Yes | 35 | 45 | <25 | <25 | Nil | Nil |
| N3 | 01/02/2023 22:26 | 1.4 | 254 | D | Yes | 35 | 45 | IA | IA | Nil | Nil |
| N4 | 01/02/2023 22:58 | 1.2 | 254 | E | Yes | 35 | 45 | IA | IA | Nil | Nil |

Notes:
1. Noise emission limits do not apply during periods of rainfall or winds greater than 3 metres per second (at a height of 10 metres).
2. Site-only $L_{Aeq,15minute}$, includes modifying factor penalties if applicable.
3. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in project approval.
4. Degrees magnetic north, "-" indicates calm conditions.

### 4.2.3 Cumulative noise level

Table 4.4 compares measured $L_{Aeq}$ levels for BCM combined with noise generated by other mines in the area against cumulative noise limits, as detailed in the project approval.

**Table 4.4 Mining $L_{Aeq,period}$ noise levels against BCM cumulative noise limits - February 2023**

| Location | Start Date and Time | Cumulative noise limits $L_{Aeq,period}$ dB | Cumulative mining noise $L_{Aeq,period}$ dB [1,2] | Exceedance dB |
|---|---|---|---|---|
| N2 | 01/02/2023 22:01 | 40 | Nil | Nil |
| N3 | 01/02/2023 22:26 | 40 | Nil | Nil |
| N4 | 01/02/2023 22:58 | 40 | Nil | Nil |

Notes: 1. Cumulative result for BCM combined with noise from other mines in the area. If only one source of mining noise is present or if BCM did not contribute to total mining noise levels, then the measured cumulative noise is defined here as 'Nil'.

2. 15-minute measurements have been assumed to apply across the entire night period as worst-case results.

# 5 Summary

EMM was engaged by Boggabri Coal Operations Pty Ltd to conduct a monthly noise survey of operations at BCM located near Boggabri, NSWThe 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 night period of 1 February 2023 at three monitoring locations.

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

# Appendix A
## Noise perception and examples

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## 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 |

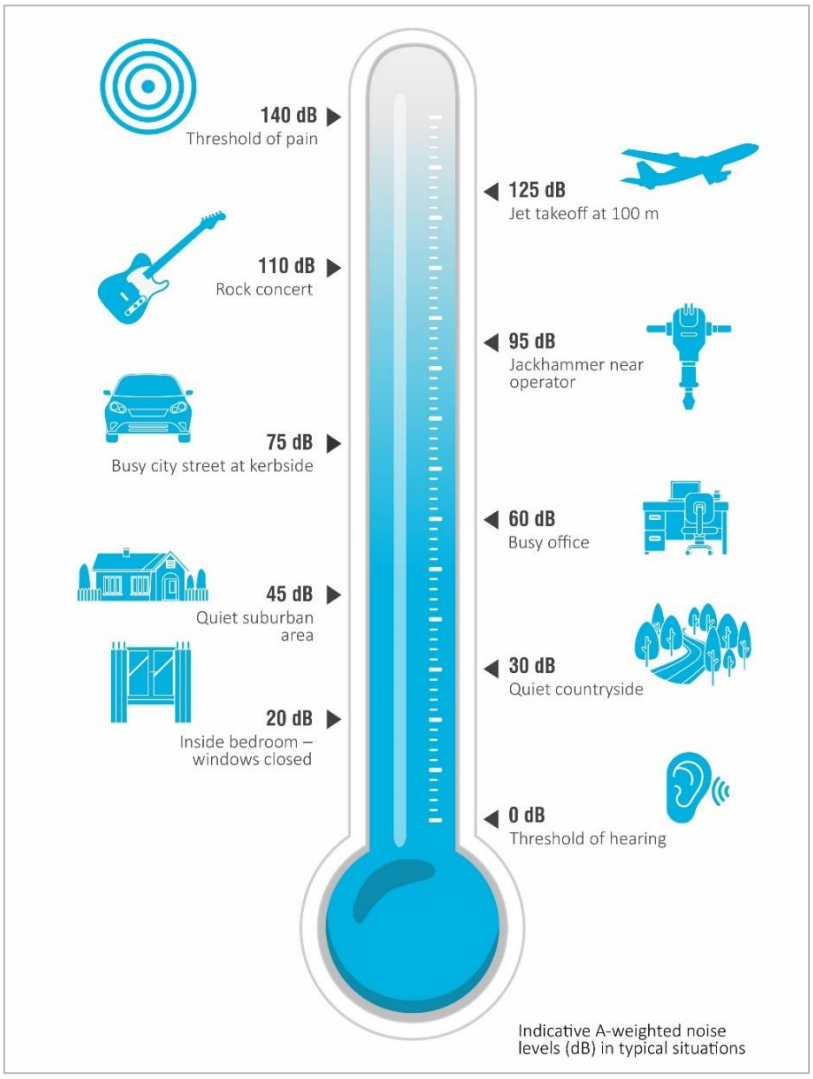


**Figure A.1 Common noise levels**

# Appendix B
## Regulator documents

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## B.1 Project approval

**NOISE AND VIBRATION**

**Construction Noise and Vibration Criteria**

2. During the hours of:
   (a) 7:00 am to 6:00 pm Monday to Fridays, inclusive;
   (b) 8:00 am to 1:00 pm on Saturdays; and
   (c) at no time on Sundays or public holidays.

noise from activities associated with the construction and/or upgrade of the Boggabri Rail Spur Line, Kamilaroi Highway Access Roads, and Daisymede Laydown Compound shall meet the criteria in Table 1.

*Table 1: Construction Noise impact assessment criteria – maximum any stage of project life*

| ***Location*** ***Property/ID*** | ***Construction Noise Impact Assessment Criteria*** ***Day*** ***dB(A) $L_{Aeq(15\ min)}$*** |
|---|---|
| 27 | 50 |
| 23 | 45 |
| All other privately-owned residences | 40 |

*Note: To interpret the locations referred to in Table 1, see the applicable figure in Appendix 4.*

Vibration from activities associated with the construction and/or upgrade of Boggabri Rail Spur Line, Kamilaroi Highway Access Roads, and Daisymede Laydown Compound shall meet the limits set by:
(a) for structural damage, the vibration limits set out in the German Standard *DIN 4150-3: Structural Vibration - effects of vibration on structures*; and
(b) for human exposure, the acceptable vibration values set out in the *Environmental Noise Management Assessing Vibration: A Technical Guideline* (Department of Environment and Conservation, 2006).

Should the Proponent propose to undertake any construction works associated with the Boggabri Rail Spur Line, Kamilaroi Highway Access Roads, and Daisymede Laydown Compound outside of hours specified above then the Proponent must develop an Out of Hours Work (OOHW) protocol consistent with the requirements of the *Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009). The OOHW protocol must be developed to the satisfaction of the Secretary in consultation with the EPA and residents likely to be affected and demonstrate how the proposed scheduling would minimise impacts and how local residents' preferences would be accommodated.

*Note: For areas where construction noise from the Boggabri Rail Spur Line, Kamilaroi Highway Access Roads, and Daisymede Laydown Compound is predicted to be at or below 35dB(A) and/ or below operational noise criteria at sensitive receptors, this is likely to provide sufficient justification for the need to operate outside of recommended standard hours as specified in the ICNG.*

**Operational Noise – Noise Affected Land**

3. For privately-owned residences identified within the project's 35dB(A) noise impact contour (see Appendix 4A) the owner(s) can make a written request to the Proponent for one of the following:
   (a) mitigation (such as double glazing, insulation and air conditioning) at the residence in consultation with the owner(s). These measures must be reasonable and feasible and directed towards reducing the noise impacts of the project on the residence. If within 3 months of receiving this request from the owner(s), the Proponent and owner(s) cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution; or
   (b) acquisition of the residence and land in accordance with the procedures in conditions 8-9 of Schedule 4.

   Upon receiving a written request from the owner(s), the Proponent must undertake whichever option has been requested by the owner(s).

   However, this condition does not apply if the Proponent has an agreement with the owner(s) of the relevant residence to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.

   *Notes:*
   1. *For the purposes of this condition a privately-owned residence is defined as a residence not owned by a mining company that: is regularly occupied; or is an existing residence that is not regularly occupied but for which a valid development consent exists; or is a proposed residence for which a development application has been lodged with the relevant authority prior to the date of this approval.*
   2. *For the purposes of acquisition under this condition, parcels of land that are in close proximity and operated as a single agricultural enterprise should be considered as part of the land to be acquired. Where the Proponent and the owner(s) cannot agree on whether non-contiguous parcels of land should be included, either party may refer the matter to the Secretary for resolution. The Secretary's decision as to the lands to be included for acquisition under the procedures in conditions 8 and 9 of Schedule 4 shall be final.*

4. Where the owner(s) of a residence included in condition 3 of this schedule have opted for either an agreement to generate higher noise levels or mitigation under condition 3(a), and the owner(s) have reason to believe that the noise impacts at the residence are more than 3 dB(A) above the predicted noise levels for that residence (see Table 2), the owner(s) can request an independent noise impact assessment for the residence. The request shall be made in writing to the Secretary. If the Secretary considers that a noise impact assessment is warranted, then the Proponent shall commission the assessment.

   If the noise impact assessment determines that the noise generated by the project causes sustained exceedances, or is likely to cause sustained exceedances, of the predicted noise levels by more than 3 dB(A) the owner(s) may require the Proponent to acquire the residence and land in accordance with the procedures in conditions 8-9 of Schedule 4.

*Table 2: Maximum Predicted Noise Levels*

| Location Property/ID | Day ($L_{Aeq\ (15\ min)}$) | Evening ($L_{Aeq\ (15\ min)}$) | Night ($L_{Aeq\ (15\ min)}$) | Night ($L_{A1\ (1\ min)}$) |
|---|---|---|---|---|
| 54 | 35 | 42 | 42 | 45 |
| 52 | 35 | 41 | 41 | 45 |
| 67, 68 | 35 | 40 | 40 | 45 |
| 23 | 35 | 38 | 38 | 51 |
| 27, 48 | 36 | 38 | 38 | 48 |
| 86 | 35 | 38 | 38 | 45 |
| 43, 44 | 35 | 37 | 37 | 45 |
| 32, 33, 79, 90 | 35 | 36 | 36 | 45 |

*Notes:*

1. *To interpret the locations referred to in Table 2, see the applicable figure in Appendix 4.*
2. *The noise assessment must be undertaken by a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary and include either:*
   - *sufficient monitoring at the affected residence to allow for assessment of the impacts under a range of meteorological conditions (including adverse conditions) likely to be experiences at the residence; or*
   - *Sufficient monitoring to allow reliable prediction of the likely impacts under the range of meteorological conditions (including adverse conditions) likely to be experienced at the residence.*
3. *Monitoring should be conducted in accordance with the requirements of the NSW Industrial Noise Policy.*
4. *Where predictions of likely impacts is to be used, either in substitution for, or in conjunction with, direct measurement of noise impacts at the residence, it must be based on sufficient monitoring data to provide a reliable estimate of the impacts (including under adverse meteorological conditions) and be derived using standard noise modeling techniques accepted by the EPA.*
5. *The Proponent shall ensure that the requested noise impact assessment is submitted to the Secretary within 3 months of the Secretary's decision that the assessment was warranted. The Proponent shall also provide a copy of the assessment to the owner(s) of the residence at the same time it is submitted to the Secretary.*
6. *Note 2 to condition 3 of this Schedule applies to acquisition under this condition.*

5. At any stage of the project, except for the noise-affected land identified in condition 3 as being within the project's 35 dB(A) contour, the Proponent shall ensure that operational noise generated by the project does not exceed the criteria in Table 3 at any residence on privately-owned land.

*Table 3: Noise impact assessment criteria dB(A) – maximum any stage of project life*

| Location Property/ID | Noise Impact Assessment Criteria | | | |
|---|---|---|---|---|
| | Day ($L_{Aeq\ (15\ min)}$) | Evening ($L_{Aeq\ (15\ min)}$) | Night ($L_{Aeq\ (15\ min)}$) | Night ($L_{A1\ (1\ min)}$) |
| All other privately-owned residences | 35 | 35 | 35 | 45 |

*Notes:*

1. *Noise generated by the project is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy*
2. *Operational noise generated by the project includes noise generated from use of the private haul road and proposed rail spur.*

However, these noise criteria do not apply if the Proponent has an agreement with the owner(s) of the relevant residence to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.

6. If the owner(s) of a privately-owned residence, which is not within the project's 35 dB(A) noise impact contour (see condition 3 and Appendix 4A), have reason to believe that operational noise from the project

is causing the criteria in Table 3 to be exceeded at the residence, the owner(s) can request an independent noise impact assessment for the residence. The request shall be made in writing to the Secretary. If the Secretary considers that a noise impact assessment is warranted, then the Proponent shall commission the assessment.

If the noise impact assessment determines that the noise generated by the project causes sustained exceedances, or is likely to cause sustained exceedances, of the criteria in Table 3, the owner(s) can make a written request to the Proponent for one of the following:

(a) mitigation (such as double glazing, insulation and air conditioning) at the residence in consultation with the owner(s). These measures must be reasonable and feasible and directed towards reducing the noise impacts of the project on the residence. If within 3 months of receiving this request from the owner(s), the Proponent and owner(s) cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution; or

(b) acquisition of the residence and land in accordance with the procedures in conditions 8-9 of Schedule 4.

Upon receiving a written request from the owner(s), the Proponent must undertake whichever option has been requested by the owner(s).

However, this condition does not apply if the Proponent has an agreement with the owner(s) of the relevant residence to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.

*Notes:*

1. *For the purposes of this condition a privately-owned residence is defined as a residence not owned by a mining company that: is regularly occupied; or is an existing residence that is not regularly occupied but for which a valid development consent exists; or is a proposed residence for which a development application has been lodged with the relevant authority prior to the date of this approval.*
2. *For the purposes of acquisition under this condition, parcels of land that are in close proximity and operated as a single agricultural enterprise should be considered as part of the land to be acquired. Where the Proponent and the owner(s) cannot agree on whether non-contiguous parcels of land should be included, either party may refer the matter to the Secretary for resolution. The Secretary's decision as to the lands to be included for acquisition under the procedures in conditions 8 and 9 of Schedule 4 shall be final.*
3. *Notes 2, 3, 4 and 5 of condition 4 apply to this condition.*

**Cumulative Noise Criteria**

7. Except for the noise affected land identified in condition 3 as being within the project's 35 dB(A) contour, the Proponent shall ensure that the operational noise generated by the project combined with the noise generated by other mines does not exceed the criteria in Table 4 at any residence on privately-owned land.

*Table 4: Cumulative noise criteria dB(A) $L_{Aeq\ (period)}$*

| Location | Day ($L_{Aeq\ (period)}$) | Evening ($L_{Aeq\ (period)}$) | Night ($L_{Aeq\ (period)}$) |
|---|---|---|---|
| All privately-owned land | 40 | 40 | 40 |

*Notes:*

- *Cumulative noise is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy.*
- *Operational noise includes noise from the mining operations and use of private haul roads and rail spurs*

**Cumulative Noise Acquisition Criteria**

8. If the owner(s) of a privately-owned residence, which is not within the project's 35 dB(A) noise impact contour (see condition 3 and Appendix 4A), reasonably believes that the noise limits in Table 4 are being exceeded at the residence and that the exceedance is caused by operational noise from the project and one or more other mines (including use of private haul roads or rail spurs), the owner(s) can request an independent noise impact assessment for the residence. The request shall be made in writing to the Secretary. If the Secretary considers that a noise impact assessment is warranted, then the Proponent shall commission the assessment.

Where the noise impact assessment determines that the cumulative noise generated by the project combined with the noise from the other mine(s) causes, or is likely to cause, sustained exceedances of the criteria in Table 4, then the owner(s) can make a written request to the Proponent for one of the following:

(a) mitigation (such as double glazing, insulation and air conditioning) at the residence in consultation with the owner(s). These measures must be reasonable and feasible and directed towards reducing the noise impacts of the project on the residence. If within 3 months of receiving this request from the owner(s), the Proponent and owner(s) cannot agree on the measures to be implemented, or

there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution; or

(b) acquisition of the residence and land in accordance with the procedures in conditions 8-9 of Schedule 4.

Upon receiving a written request from the owner(s), the Proponent must undertake whichever option has been requested by the owner(s).

However, this condition does not apply if the Proponent has an agreement with the owner(s) of the relevant residence to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.

The Proponent may seek to recover an equitable share of the costs incurred from the other mines contributing to the cumulative impact. Unless otherwise agreed between the mines, the proportional contributions should be based on expert analysis of the monitoring results to assess relative contribution to the impact. In the event of a dispute between the mines the Proponent, or one of the contributing mines, may submit the matter to the Secretary for resolution. The Secretary's decision shall be final.

*Notes:*

1. *For the purposes of this condition a privately-owned residence is defined as a residence not owned by a mining company that: is regularly occupied; or is an existing residence that is not regularly occupied but for which a valid development consent exists; or is a proposed residence for which a development application has been lodged with the relevant authority prior to the date of this approval.*
2. *For the purposes of acquisition under this condition, parcels of land that are in close proximity and operated as a single agricultural enterprise should be considered as part of the land to be acquired. Where the Proponent and the owner(s) cannot agree on whether non-contiguous parcels of land should be included, either party may refer the matter to the Secretary for resolution. The Secretary's decision as to the lands to be included for acquisition under the procedures in conditions 8 and 9 of Schedule 4 shall be final.*
3. *Notes 2, 3, 4 and 5 of condition 4 apply to this condition.*
4. *The noise impact assessment shall include assessment of the relative contribution of the mines to the impact at the residence.*

**Attenuation of Plant**

9. The Proponent shall:
   (a) ensure that:
   - all new trucks, dozers, drills and excavators purchased for use on the site after the date of this approval are commissioned as noise suppressed (or attenuated) units;
   - ensure that all equipment and noise control measures deliver sound power levels that are equal to or better than the sound power levels identified in the EA and that correspond to best practice or the application of best available technology economically achievable;
   - where reasonable and feasible, improvements are made to existing noise suppression equipment as technologies become available; and

   (b) monitor and report on the implementation of these requirements annually on its website.

10. The Proponent shall:
   (a) conduct an annual testing program of the attenuated plant on site to ensure that the attenuation remains effective;
   (b) restore the effectiveness of any attenuation if it is found to be defective; and
   (c) report on the results of any testing and/or attenuation work within the Annual Review.

**Boggabri Rail Spur Line and Bridge Design – Noise impacts**

11. The Proponent shall:
   (a) ensure all relevant Boggabri Rail Spur Line and rail bridge designs are assessed by suitably qualified and experienced person/s in acoustic engineering for the purpose of providing reasonable and feasible recommendations to minimise noise, including low frequency noise. This acoustic review should consider the EA's relevant recommendations and additional noise attenuation such as acoustic barriers to minimise noise at sensitive receptors;
   (b) implement reasonable and feasible recommendations made in the acoustic review;
   (c) undertake commissioning trials of the operation of the Spur Line to optimise train speed to minimise noise impacts; and
   (d) following completion and commissioning of the Spur Line, undertake targeted noise monitoring to determine the accuracy of predicted acoustic impacts and effectiveness of any noise reduction measures, including monitoring during adverse inversion conditions,

   to the satisfaction of the Secretary.

**Operating Conditions**

12. The Proponent shall:
    (a) implement best management practice to minimise the operational, low frequency and road and rail traffic noise of the project;
    (b) operate a comprehensive noise management system on site that uses a combination of predictive meteorological forecasting and real-time noise monitoring data to guide the day to day planning of mining operations and the implementation of both proactive and reactive noise mitigation measures to ensure compliance with the relevant conditions of this approval;
    (c) maintain the effectiveness of noise suppression equipment on plant at all times and ensure defective plant is not used operationally until fully repaired;
    (d) ensure that noise attenuated plant is deployed preferentially in locations relevant to sensitive receivers;
    (e) minimise the noise impacts of the project during meteorological conditions when the noise limits in this approval do not apply;
    (f) ensure that the Boggabri Rail Spur Line is only accessed by locomotives that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL (No. 3142);
    (g) use its best endeavours to ensure that rolling stock supplied by service providers on the Boggabri Rail Spur Line is designed and constructed to minimise noise;
    (h) ensure any new rail rolling stock manufactured specifically for the project is designed and constructed to minimise noise;
    (i) use its best endeavours to achieve the long term intrusive noise goals for the project in Table 5, where this is reasonable and feasible, and report on the progress towards achieving these goals in the annual review; and
    (j) co-ordinate the noise management on site with the noise management at other mines within the Leard Forest Mining Precinct to minimise the cumulative noise impacts of these mines.

    to the satisfaction of the Secretary.

    *Notes:*

- *The comprehensive review can be undertaken as part of independent environmental audits required under condition 10 of Schedule 5.*

*Table 5: Long Term Intrusive Noise Goals – Existing Residences*

| Location | Day | Evening | Night | |
|---|---|---|---|---|
| | $L_{Aeq\ (15\ min)}$ | $L_{Aeq\ (15\ min)}$ | $L_{Aeq\ (15\ min)}$ | $L_{A1\ (1\ min)}$ |
| All residences on privately owned land | 35 | 35 | 35 | 45 |

*Notes:*

- *To interpret the locations referred to Table 5, see the applicable figures in Appendix 4; and*
- *Noise generated by the project is to be measured in accordance with condition 14 of this schedule.*

**Noise Management Plan**

13. The Proponent shall prepare and implement a Noise Management Plan for the project to the satisfaction of the Secretary. This plan must:
    (a) be prepared in consultation with the EPA and the CCC, and submitted to the Secretary for approval within 6 months of the date of this approval;
    (b) describe the measures that would be implemented to ensure:
        - best management practice is being employed;
        - the noise impacts of the project are minimised during meteorological conditions when the noise limits in this approval do not apply; and
        - compliance with the relevant conditions of this approval;
    (c) describe the proposed noise management system in detail;
    (d) include a risk/response matrix to codify mine operational responses to varying levels of risk resulting from weather conditions and specific mining activities;
    (e) include commitments to provide summary reports and specific briefings at CCC meetings on issues arising from noise monitoring;
    (f) include a monitoring program that:
        - uses a combination of real time and supplementary attended monitoring to evaluate the performance of the project;
        - adequately supports the proactive and reactive noise management system on site;
        - uses predictive meteorological forecasting to incorporate proactive mitigation measures to manage noise impacts;
        - includes monitoring of inversion strength at an appropriate sampling rate to determine compliance with noise limits;
        - evaluates and reports on the effectiveness of the noise management system on site;

- provides for the annual validation of the noise model for the project; and

(g) includes a Leard Forest Mining Precinct Noise Management Strategy that has been prepared in consultation with other coal mines in the Precinct to minimise the cumulative noise impacts of all mines within the Precinct, that includes:

- systems and processes to ensure that all mines are managed to achieve their noise criteria;
- a shared environmental monitoring network and data sharing protocol; and
- procedures for identifying and apportioning the source/s and contribution/s to cumulative noise impacts for operating mines and other sources, using the noise and meteorological monitoring network and appropriate investigative tools.

*Note: The Leard Forest Mining Precinct Noise Management Strategy can be developed in stages and will need to be subject to ongoing review dependent upon the determination and commencement of other mining projects in the area.*

**Noise Measurement**

14. Where conditions in this approval refer to measurement of noise within the context of the NSW Industrial Noise Policy the inversion class to be applied to the project is Class G.

However, the Proponent may undertake an investigation to determine whether a proposal for change in this classification could be considered for approval by the Secretary. Any such investigation must be conducted in consultation with the EPA and be conducted by a suitably qualified person whose appointment has been endorsed by the EPA and approved by the Secretary. The report and recommendation must be submitted to the EPA for endorsement prior to submission to the Secretary. If the Secretary is satisfied that the recommendation is reasonable, then the Secretary may amend the inversion class applying to the project under this approval.

## B.2 Environmental protection licence

### L4 Noise limits

L4.1 Noise generated at the premises must not exceed the noise limits in the table below.

| Locality and Location | Day- LAeq(15 minute) | Evening- LAeq(15 minute) | Night- LAeq(15 minute) | Night- LA1(1 minute) |
|---|---|---|---|---|
| All privately owned residences | 35 dB(A) | 35 dB(A) | 35 dB(A) | 45 dB(A) |

L4.2 The noise limits identified in the above table do not apply at privately owned residences that are:
a) identified as residences subject to acquisition or noise mitigation on request within the Project Approval Conditions (09_0182); or
b) subject to a private agreement, relating to the noise levels, between the licensee and the land owner.

L4.3 For the purpose of condition L4.2(a) above, those properties identified as residences subject to acquisition or noise mitigation on request within the Project Approval Conditions (PA 09_0182) are:

| Property No. | Lot/ DP |
|---|---|
| 54 | Lot 121/ DP 754926 |
| 52 | Lot 2/ DP 716002 |
| 67 | Lot 2/ DP 754927 |
| 68 | Lot 3/ DP 754927 |
| 23 | Lot 1/ DP 754926 |
| 27 | Lot 41/ DP 754926 |
| 48 | Lot 22/ DP 618032 |
| 86 | Lot 2/ DP 1131282 |
| 43 | Lot 1/ DP 509312 |
| 44 | Lot 11/ DP 775513 |
| 32 | Lot 1/ DP 1099042 |
| 33 | Lot 1/ DP 1092050 |
| 79 | Lot 132/ DP 754926 |
| 90 | Lot 143/ DP 754926 |

L4.4 For the purpose of the table above:

a) Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays;
b) Evening is defined as the period from 6pm to 10pm;
c) Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sundays and Public Holidays.

L4.5 The noise limits set out in the Noise Limits table apply under all meteorological conditions except for the following:
a) Wind speeds greater than 3 metres/second at 10 metres above ground level.

For the purposes of this condition:
a) Data recorded by the meteorological station identified as EPA Identification Point(s) W1 must be used to determine meteorological conditions; and
b) Temperature inversion conditions (stability category) are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW Industrial Noise Policy.

L4.6 For the purposes of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

L4.7 **Determining Compliance**

To determine compliance:
a) with the Leq(15 minute) noise limits in the Noise Limits table, the noise measurement equipment must be located:
i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
ii) within 30 metres of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or on any suitable alternate location.
iii) within approximately 50 metres of the boundary of a National Park or a Nature Reserve.

b) with the LA1(1 minute) noise limits in the Noise Limits table, the noise measurement equipment must be located at any suitable alternate location.
c) with the noise limits in the Noise Limits table, the noise measurement equipment must be located:
i) at the most affected point at a location where there is no dwelling at the location; or
ii) at the most affected point within an area at a location prescribed by part (a) or part (b) of this condition.

## M8 Noise monitoring

M8.1 To assess compliance with the noise limits presented in the Noise Limits table, attended noise monitoring must be undertaken in accordance with the condition titled Determining Compliance, outlined above, and:
a) at noise monitoring locations N2, N3 and N4 as shown on the map titled "Noise Management Strategy Boggabri Coal Pty Ltd, Appendix A" in the most recently approved Boggabri Coal Operations Pty Ltd Noise Management Plan as approved by the DPIE.
b) occur monthly in a reporting period; and
c) occur during each night period as defined in the NSW Industrial Noise Policy for a minimum of 15 minutes

## 6.1 Attended monitoring

Attended noise monitoring was conducted on a quarterly basis from inception of the BCM to the end of 2015. Continued attended monitoring to assess ongoing compliance with individual and cumulative noise criteria at privately owned properties is now conducted at monthly intervals during night periods.

The attended monitoring locations outside the 35 dB(A) contour are listed in Table 6.2 and illustrated in Appendix A. Additional one-off or occasional monitoring may also be undertaken at other surrounding locations as required utilising either a mobile real-time monitor or by commissioning an independent acoustic consultant to undertake attended monitoring.

**Table 6.2 BCM attended noise monitoring locations**

| Location No. | Landowner/Property name | Type |
|---|---|---|
| N2 | Sylvania | Attended |
| N3 | Picton | Attended |
| N4 | Barbers Lagoon | Attended |

Attended noise monitoring will be conducted as follows:

- All noise investigations will be carried out in accordance with NSW Industrial Noise Policy, 2000 (INP).
- Noise levels will be measured in one-third octave bands using an instrument with IEC Type 1 characteristics as defined in AS 1259-1990 “Sound Level Meters”. The instrument will have current calibration as per manufacturer’s instructions and field calibration will be confirmed before and after measurements with a sound level calibrator.

- The instrument will be set to A-weighting, "fast" response and measurements of $L_{Aeq(15\ minute)}$ will be taken at each location in Table 6.2.
- Attended surveys will occur at each location in Table 6.2 at a frequency specified in condition M8.1 of EPL 12407 as follows:
  - monthly,
  - During the night period as defined in the NSW Industrial Noise policy for a minimum of 15 minutes.
- Field notes will be taken during each measurement recording the time and duration of noise events, noise sources, instantaneous noise levels and frequency range of identified site noise sources.
- Extraneous noise sources will be filtered from the measured signal using appropriate methods such as, employing an appropriate low pass cut-off, pausing unwanted noise or similar methods and the $L_{Aeq(15\ minute)}$ and $L_{Amax}$ (as an estimate of the LA1(1-minute) sleep disturbance descriptor) levels attributable to BCM activities will be identified and compared with the relevant criterion.
- Details regarding plant configuration, survey interval, weather conditions, extraneous noise sources, monitoring locations and times of measurement will be recorded for inclusion in the noise monitoring report.

The selection of monitoring locations has been undertaken in consultation with relevant agencies. Compliance against the noise criteria within the Project Approval will be assessed using the monitoring locations identified in Table 6.2 irrespective of land ownership or distance from dwellings.

# Appendix C
## Calibration certificates

EMM
creating opportunities

## C.1 Calibration certificates

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# Sound Level Meter
IEC 61672-3.2013
# Calibration Certificate

**Calibration Number** C21344

| | |
|---|---|
| **Client Details** | Global Acoustics Pty Ltd<br>12/16 Huntingdale Drive<br>Thornton NSW 2322 |
| **Equipment Tested/ Model Number :** | Rion NA-28 |
| **Instrument Serial Number :** | 00701424 |
| **Microphone Serial Number :** | 01916 |
| **Pre-amplifier Serial Number :** | 01463 |

| Pre-Test Atmospheric Conditions | | Post-Test Atmospheric Conditions | |
|---|---|---|---|
| **Ambient Temperature :** | 20.6°C | **Ambient Temperature :** | 22.4°C |
| **Relative Humidity :** | 47% | **Relative Humidity :** | 44% |
| **Barometric Pressure :** | 101.05kPa | **Barometric Pressure :** | 100.91kPa |

**Calibration Technician :** Jeff Yu
**Calibration Date :** 2 Jun 2021
**Secondary Check:** Harrison Kim
**Report Issue Date :** 2 Jun 2021

**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.

As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation test performed in accordance with IEC 61672-2:2013, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2013.

Least Uncertainties of Measurement -

| Acoustic Tests | | Environmental Conditions | |
|---|---|---|---|
| *125Hz* | *±0.12dB* | *Temperature* | *±0.2°C* |
| *1kHz* | *±0.11dB* | *Relative Humidity* | *±2.4%* |
| *8kHz* | *±0.13dB* | *Barometric Pressure* | *±0.015kPa* |
| Electrical Tests | *±0.10dB* | | |

*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.

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# Sound Calibrator

IEC 60942-2017

# Calibration Certificate

**Calibration Number** C21341

**Client Details** Global Acoustics Pty Ltd
12/16 Huntingdale Drive
Thornton NSW 2322

**Equipment Tested/ Model Number :** Pulsar Model 106
**Instrument Serial Number :** 79631

**Atmospheric Conditions**
**Ambient Temperature :** 22.7°C
**Relative Humidity :** 47.5%
**Barometric Pressure :** 100.64kPa

**Calibration Technician :** Jeff Yu
**Calibration Date :** 26 May 2021
**Secondary Check:** Harrison Kim
**Report Issue Date :** 26 May 2021

**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 | 94.02 | 1000.40 |

The sound calibrator has been shown to conform to the class 2 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..

Least Uncertainties of Measurement -

| Specific Tests | | Environmental Conditions | |
|---|---|---|---|
| *Generated SPL* | *±0.14dB* | *Temperature* | *±0.2°C* |
| *Frequency* | *±0.09%* | *Relative Humidity* | *±2.4%* |
| *Distortion* | *±0.09%* | *Barometric Pressure* | *±0.015kPa* |

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

* The tests <1000 kHz are not covered by Acoustic Research Labs Pty Ltd NATA accreditation.

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.

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