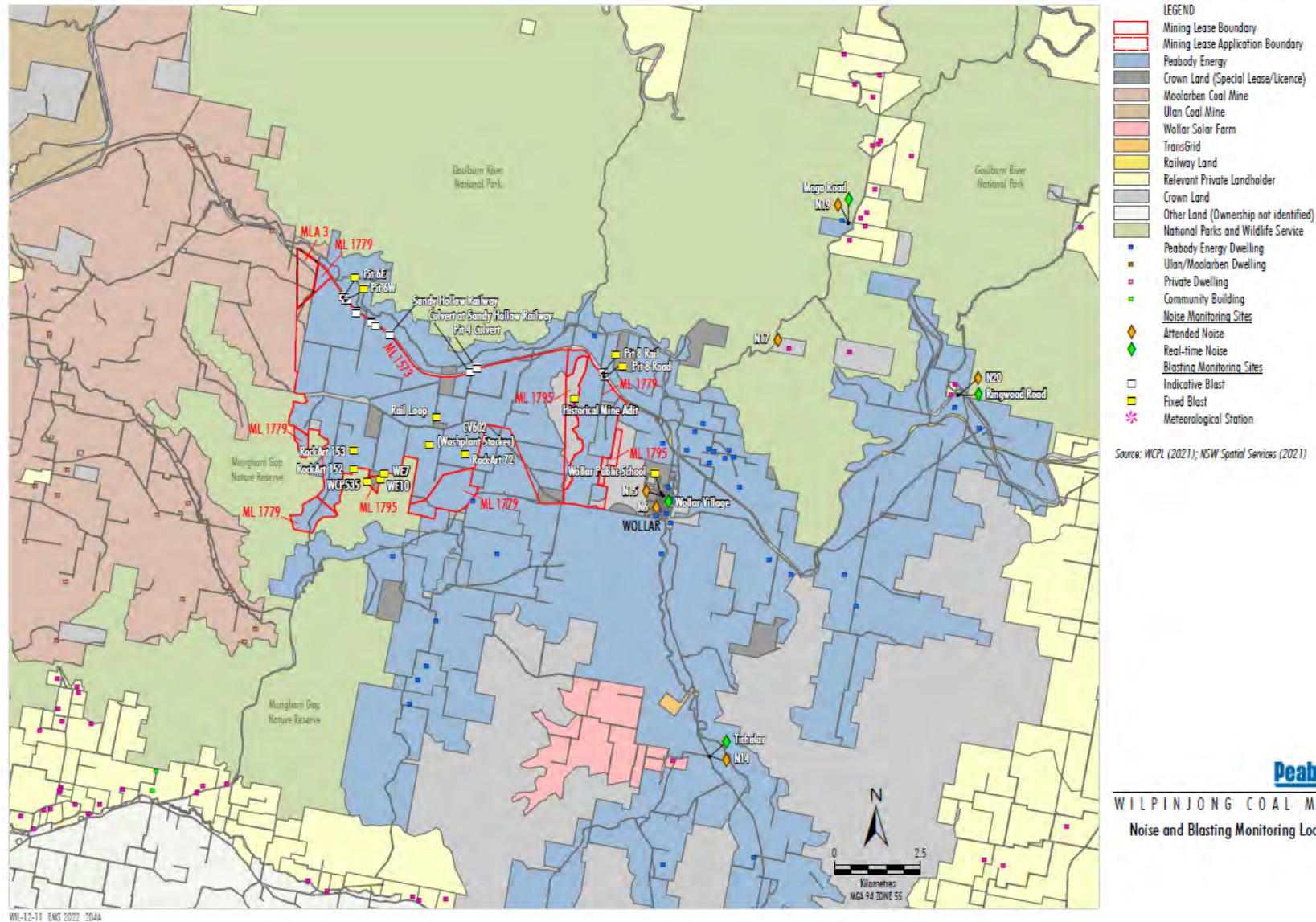


**APPENDIX 3F**  
**NOISE MONITORING DATA**

Noise Monitoring Locations



Noise Monitoring Locations (Wollar)



Source: WCPL (2022), NSW Spatial Services (2022)

- |                                    |                              |
|------------------------------------|------------------------------|
| <b>LEGEND</b>                      |                              |
| Peabody Energy                     | Noise Monitoring Sites       |
| Crown Land (Special Lease/Licence) | Attended Noise               |
| Crown Land                         | Real-time Noise              |
| Railway Land                       | Fixed Blast                  |
| Pending Exchange of Contract       | Air Quality Monitoring Sites |
| Landholder Reference Number        | Static Dust Gauge            |
| Peabody Energy Dwelling            | High Volume Air Sampler      |
| Community Building                 | Real-time PM <sub>2.5</sub>  |
| Private Dwelling                   | Real-time PM <sub>10</sub>   |
| Special Lease/Licence Holder       |                              |

**Peabody**  
 WILPINJONG COAL MINE  
 Wollar Environmental Monitoring Sites

## Noise Monitoring Reports



# *Wilpinjong Coal*

---

*Environmental Noise Monitoring  
January 2022*

*Prepared for  
Wilpinjong Coal Pty Ltd*

---



Noise and Vibration Analysis and Solutions

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## Wilpinjong Coal

### Environmental Noise Monitoring January 2022

Reference: 22019\_R01

Report date: 24 February 2022

#### Prepared for

Wilpinjong Coal Pty Ltd

Locked Bag 2005

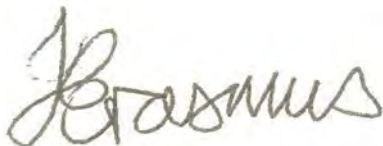
Mudgee NSW 2850

#### Prepared by

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Prepared: Jonathan Erasmus  
Consultant



QA Review: Robert Kirwan  
Consultant

*Global Acoustics Pty Ltd ~ Environmental noise modelling and impact assessment ~ Sound power testing ~ Noise control advice ~ Noise and vibration monitoring ~ OHS noise monitoring and advice ~ Expert evidence in Land and Environment and Compensation Courts ~ Architectural acoustics ~ Blasting assessments and monitoring ~ Noise management plans (NMP) ~ Sound level meter and noise logger sales and hire*

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# 1 INTRODUCTION

## 1.1 Background

Global Acoustics was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP), an open cut coal mine located approximately 40 kilometres north east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 27/28 January 2022 at six locations.

## 1.2 Monitoring Locations

Monitoring locations are detailed in Table 1.1 and shown on Figure 1. It should be noted that Figure 1 shows the actual monitoring position, not the location of residences.

Table 1.1: WCP ATTENDED NOISE MONITORING LOCATIONS

NMP Descriptor	Monitoring Location
N6	St Laurence O'Toole Catholic Church, representative of Wollar Village south
N14	'Tichular', intersection of Tichular and Barigan Roads, Tichular
N15	Track off Barigan Street near Wollar Public School, Wollar Village
N17	Mogo Road, off Araluen Road, Wollar
N19	North Mogo Road, Mogo
N20	Ringwood Road, off Wollar Road, Wollar

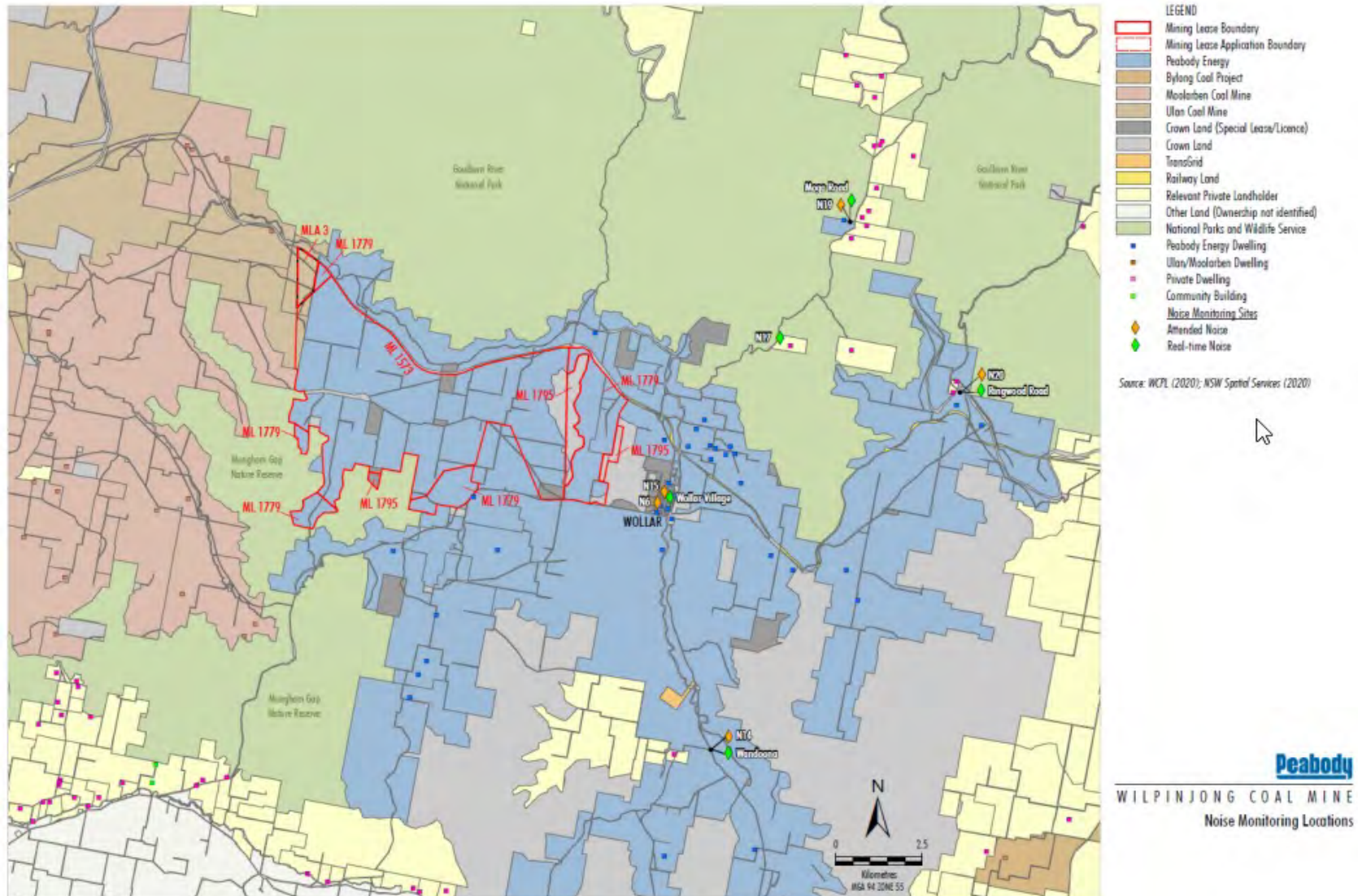


Figure 1: WCP Attended Noise Monitoring Locations (Source: WCP NMP, 2020)

### 1.3 Terminology & Abbreviations

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

Table 1.2: TERMINOLOGY & ABBREVIATIONS

Descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The "A" weighting scale is used to describe human response to noise.
L <sub>Amax</sub>	The maximum A-weighted noise level over a time period.
L <sub>A1</sub>	The noise level which is exceeded for 1 per cent of the time.
L <sub>A1,1minute</sub>	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L <sub>A10</sub>	The noise level which is exceeded for 10 percent of the time.
L <sub>Aeq</sub>	The average noise A-weighted energy during a measurement period.
L <sub>A50</sub>	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L <sub>A90</sub>	The level exceeded for 90 percent of the time. The L <sub>A90</sub> level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes.
L <sub>Amin</sub>	The minimum A-weighted noise level over a time period.
L <sub>Ceq</sub>	The 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.
SC	Stability class (or category) is determined from measured wind speed and either sigma-theta or VTG.
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	This is the period 7:00am to 6:00pm.
Evening	This is the period 6:00pm to 10:00pm.
Night	This is the period 10:00pm to 7:00am.

## 2 REGULATOR REQUIREMENTS AND NOISE CRITERIA

### 2.1 Development Consent

The most current development consent associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017), which covers all current operations and has replaced the previous consent (05-0021). The relevant noise conditions from the current consent are reproduced in Appendix A.

### 2.2 Environment Protection Licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently issued in March 2021. Relevant noise sections of the EPL are reproduced in Appendix A.

### 2.3 Noise Monitoring Program

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in August 2020. The relevant sections are reproduced in Appendix A.

### 2.4 Project Specific Criteria

Noise criteria and meteorological conditions required for noise criteria to apply are consistent in the project approval and EPL. The applicable noise criteria for each monitoring location are shown in Table 2.1.

Table 2.1: WCP PROJECT SPECIFIC CRITERIA, dB

NMP Descriptor / Resident Number	Monitoring Location	Day L <sub>Aeq,15minute</sub>	Evening L <sub>Aeq,15minute</sub>	Night L <sub>Aeq,15minute</sub> / L <sub>A1,1minute</sub>
N6 <sup>1</sup>	St Laurence O'Toole Catholic Church	36	37	37/45
N14	'Tichular'	35	35	35/45
N15	Wollar Village	36	37	37/45
N17 <sup>2</sup>	Mogo Road, off Araluen Road	36	36	38/45
N19	North Mogo Road	35	35	35/45
N20	Ringwood Road, off Wollar Road	35	35	35/45

Notes:

1. N6 noise limits have been assumed to be as detailed for 'Wollar Village – Residential' in the PA, as the church is no longer a place of worship; and
2. N17 noise limits have been determined based on the assumption that N17 is property 102 in accordance with Appendix 5 Figure 1 of Development Consent SSD-6764.



## 2.5 Modifying Factors

The EPA 'Noise Policy for Industry' (NPfI, 2017) was approved for use in NSW in October 2017. 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 has 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 NPfI. Low-frequency modifying factors have been assessed in accordance with both the development consent and NPfI.

## 3 METHODOLOGY

### 3.1 Overview

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

### 3.2 Attended Noise Monitoring

During this survey, monthly attended monitoring was undertaken during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric condition measurement was also undertaken at each monitoring location. Attended monitoring during this reporting period was undertaken by Jonathan Erasmus.

This survey presents noise levels gathered during attended monitoring that are the result of many sounds reaching the sound level meter microphone during monitoring. Received levels from various noise sources were noted during attended monitoring and particular attention was paid to the extent of WCP's contribution, if any, to measured levels. At each receptor location, WCP's  $L_{Aeq,15\text{minute}}$  and  $L_{A1,1\text{minute}}$  (in the absence of any other noise) was measured directly, where possible, or, determined by frequency analysis.

If the exact contribution of the source of interest (in this case WCP) cannot be established, due to masking by other noise sources in a similar frequency range, but site noise levels are observed to be well below (more than 5 dB lower than) any relevant criterion, a maximum estimate of the potential contribution of the site might be made based on other measured site-only noise descriptors in accordance with Section 7.1 of the NPfI. This is generally expressed as a 'less than' quantity, such as <20 dB or <30 dB.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may also 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 some noise was audible but could not be quantified. If site noise was NM due to masking but estimated to be significant in relation to a relevant criterion, we would employ methods (e.g. measure closer and back calculate) to determine a value for reporting.

All sites noted as NM in this report are due to one or more of the following reasons:

- Site noise levels were extremely low and unlikely, in many cases, to be even noticed;
- Site noise levels were masked by another relatively loud noise source that is characteristic of the environment (e.g. breeze in foliage or continuous road traffic noise) that cannot be eliminated by moving closer; and/or

- It was not feasible, nor reasonable to employ methods such as move closer and back calculate. Cases may include, but are not limited to, 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.

A measurement of  $L_{A1,1\text{minute}}$  corresponds to the highest noise level generated for 0.6 second during one minute. In practical terms this is the highest noise level, or  $L_{A\text{max}}$ , received from the site during the entire measurement period (i.e. the highest level of the worst minute during the 15 minute measurement).

Often extraneous noise events (for example, road traffic pass-bys and dogs) interfere with the measurement of site noise levels in the frequency range of interest. Where required, the sound level meter is paused during these occurrences to aid in quantification of the site only noise.

### 3.3 Modifying Factors

All measurements were evaluated for potential modifying factors in accordance with the NPfI. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfI.

Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable, such that the site-only  $L_{A\text{eq}}$  was not "NM" or less than a maximum cut off value (e.g. "<20 dB" or "<30dB").

If applicable, modifying factors have been reported and added to measured site-only  $L_{A\text{eq}}$  noise levels when meteorological conditions satisfied requirements for site noise criteria to be applicable. Low-frequency modifying factors have only been applied to site-only  $L_{A\text{eq}}$  levels if WCP was the only contributing low-frequency noise source.

### 3.4 Noise Monitoring Equipment

The equipment used to measure environmental noise levels are listed in Table 3.1. Calibration certificates are included as Appendix B.

Table 3.1: ATTENDED NOISE MONITORING EQUIPMENT

Model	Serial Number	Calibration Due Date
Rion NA-28 sound level meter	30131882	08/02/2023
Pulsar 105 acoustic calibrator	78226	08/02/2023

## 4 RESULTS

### 4.1 Total Measured Noise Levels

Overall noise levels measured at each location during attended measurement are provided in Table 4.1. Discussion as to the noise sources responsible for these measured levels is provided in Chapter 5 of this report.

Table 4.1: MEASURED NOISE LEVELS – JANUARY 2022<sup>1</sup>

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	27/01/2022 22:48	45	40	37	36	36	35	31
N14	27/01/2022 23:15	56	54	52	49	48	42	33
N15	27/01/2022 22:30	47	39	38	37	37	35	33
N17	28/01/2022 01:12	53	36	35	34	34	33	31
N19	28/01/2022 00:47	51	47	42	40	40	37	34
N20	28/01/2022 00:00	52	49	43	41	39	36	33

Note:

- Noise levels in this table are not necessarily the result of activities at WCP.

### 4.2 Modifying Factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfI and methodology described in Section 3.3.

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



### 4.3 Attended Noise Monitoring

Table 4.2 to Table 4.3 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement.

**Table 4.2:  $L_{Aeq,15minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – JANUARY 2022**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq,15min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	27/01/2022 22:48	1.1	E	37	Yes	IA	Nil
N14	27/01/2022 23:15	1.6	E	35	Yes	IA	Nil
N15	27/01/2022 22:30	1.2	E	37	Yes	IA	Nil
N17	28/01/2022 01:12	1.2	E	38	Yes	IA	Nil
N19	28/01/2022 00:47	1.5	E	35	Yes	IA	Nil
N20	28/01/2022 00:00	1.8	E	35	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.3:  $L_{A1,1minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – JANUARY 2022**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	27/01/2022 22:48	1.1	E	45	Yes	IA	Nil
N14	27/01/2022 23:15	1.6	E	45	Yes	IA	Nil
N15	27/01/2022 22:30	1.2	E	45	Yes	IA	Nil
N17	28/01/2022 01:12	1.2	E	45	Yes	IA	Nil
N19	28/01/2022 00:47	1.5	E	45	Yes	IA	Nil
N20	28/01/2022 00:00	1.8	E	45	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{A1,1minute}$  attributed to WCP; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

## 4.4 Atmospheric Conditions

Atmospheric condition data measured by the operator during each measurement using a Kestrel hand-held weather meter is shown in Table 4.4. The wind speed, direction and temperature were measured at approximately 1.8 metres. Attended noise monitoring is not undertaken during rain, hail, or wind speeds above 5 m/s at microphone height.

*Table 4.4: MEASURED ATMOSPHERIC CONDITIONS – JANUARY 2022*

Location	Start Date And Time	Temperature °C	Wind Speed m/s	Wind Direction °MN	Cloud Cover eighths
N6	27/01/2022 22:48	22	0.0	-	0
N14	27/01/2022 23:15	19	1.0	120	0
N15	27/01/2022 22:30	22	0.0	-	0
N17	28/01/2022 01:12	21	0.0	-	0
N19	28/01/2022 00:47	22	0.0	-	0
N20	28/01/2022 00:00	21	0.7	260	0

Notes:

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

Meteorological data used for compliance assessment is sourced from the WCP AWS and inversion tower.

## 5 DISCUSSION

### 5.1 Noted Noise Sources

During attended monitoring, the time variations (temporal characteristics) of noise sources are taken into account in each measurement via statistical descriptors. From these observations, summaries have been derived for each location and provided in this chapter. Statistical 1/3 octave-band analysis of environmental noise was undertaken and the following figures display frequency ranges of various noise sources at each location for LA1, LA10, LAeq, LA50 and LA90 descriptors. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 2 where it can be seen that frogs and insects are generating noise at frequencies above 1000 Hz while mining noise is at frequencies less than 1000 Hz, which is typical. Adding levels at frequencies that relate to mining only allows separate statistical results to be calculated. This analysis cannot always be performed if there are significant levels of other noise at the same frequencies as mining, such as dogs, cows, or (most commonly) road traffic.

It should be noted that the method of summing statistical values up to a cut-off frequency can overstate the LA1 result by a small margin but is entirely accurate for LAeq.

Historical site only noise levels from attended monitoring over the previous 12 month period have been provided as additional information in Table 5.1 to Table 5.6.

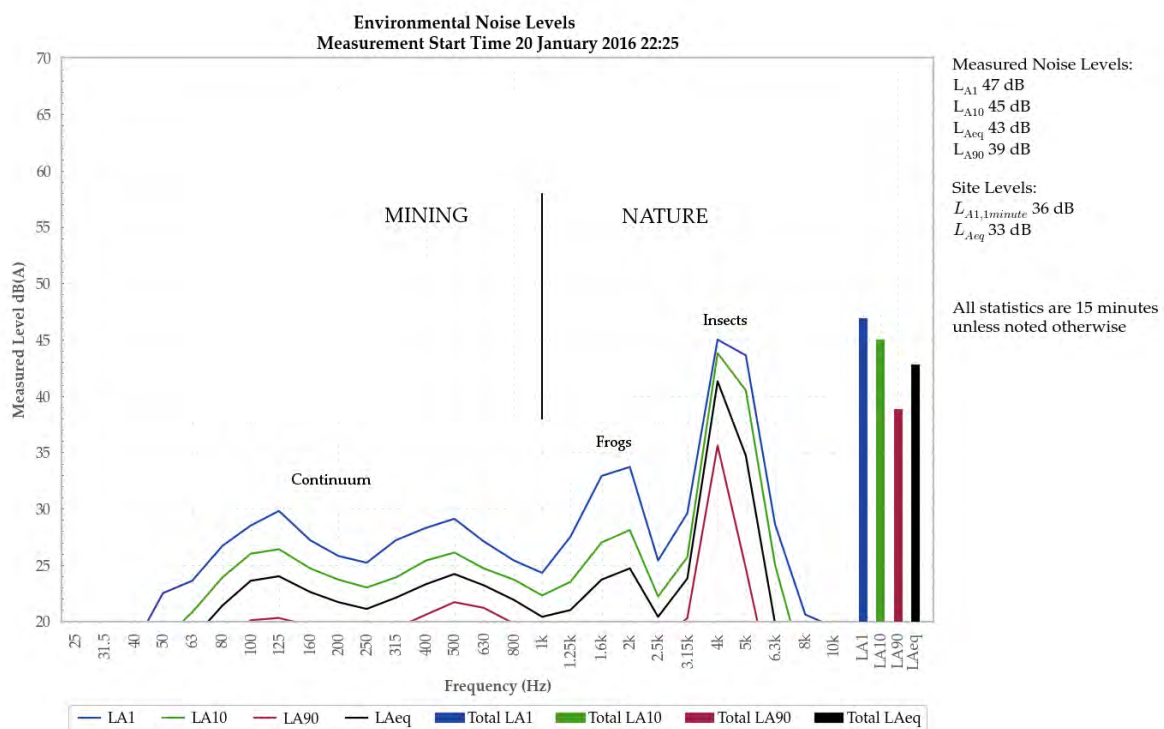


Figure 2: Example graph (refer to Section 5.1 for explanatory note)

### 5.1.1 N6

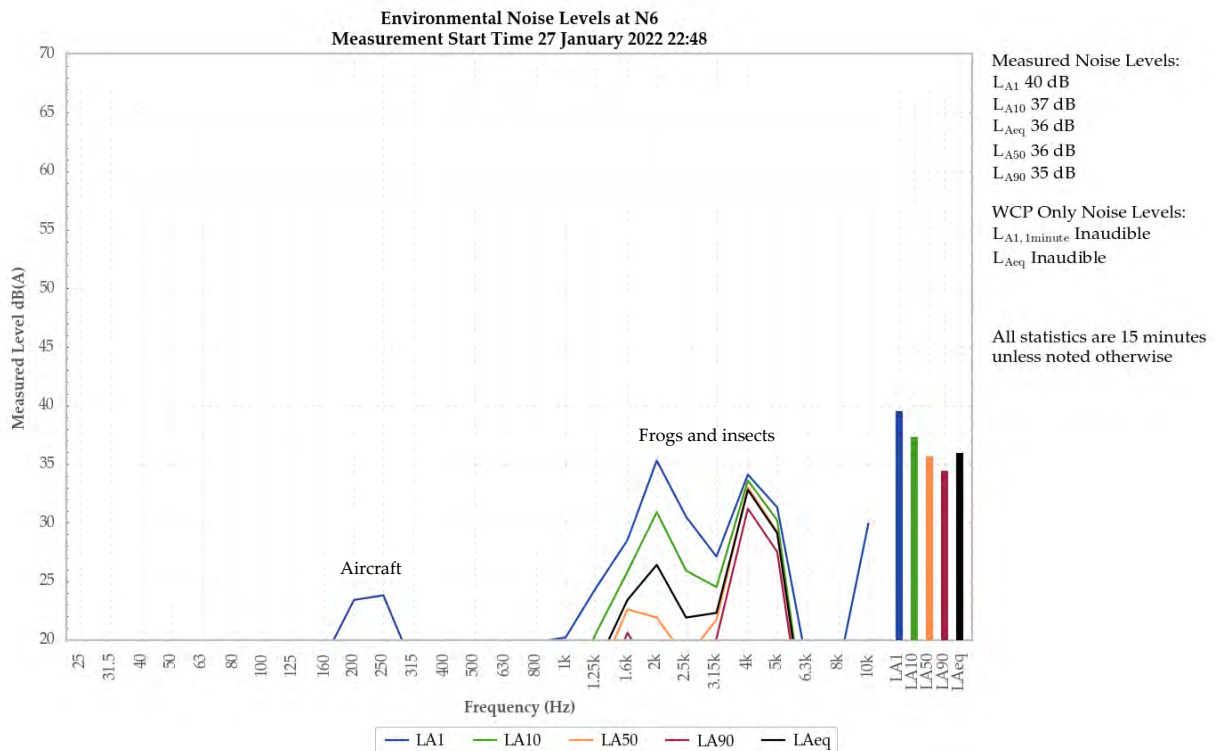


Figure 3: Environmental Noise Levels - N6, St Laurence O’Toole Catholic Church, Wollar Village

WCP was inaudible.

Frogs and insects generated the measured LA1, LA10, LAeq, LA50, and LA90.

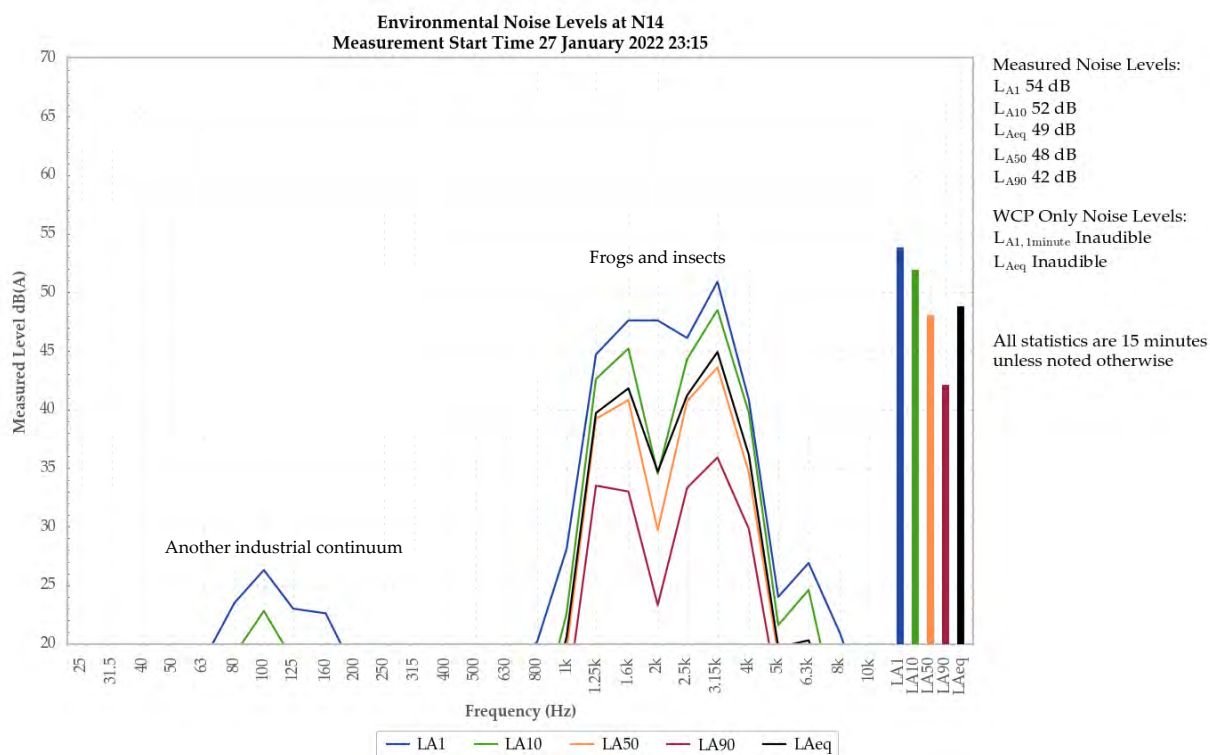
An aircraft was also noted.

Table 5.1: HISTORICAL WCP ONLY NOISE LEVELS AT N6

Month	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021
<b>LAeq</b>	IA	IA	<20	IA	30	30	IA	<25	IA	IA	31	IA	IA
<b>LA1,1min</b>	IA	IA	<20	IA	31	35	IA	<25	IA	IA	33	IA	IA



### 5.1.2 N14



**Figure 4: Environmental Noise Levels - N14, 'Tichular', intersection of Tichular and Barigan Roads**

WCP was inaudible.

Frogs and insects generated the measured LA1, LA10, LAeq, LA50, and LA90.

Another industrial continuum and birds were also noted.

*Table 5.2: HISTORICAL WCP ONLY NOISE LEVELS AT N14*

Month	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021
LAeq	IA	<25	<25	IA	<25	<20	<25	IA	IA	IA	<25	IA	IA
LA1,1min	IA	28	<25	IA	27	<20	26	IA	IA	IA	25	IA	IA

### 5.1.3 N15

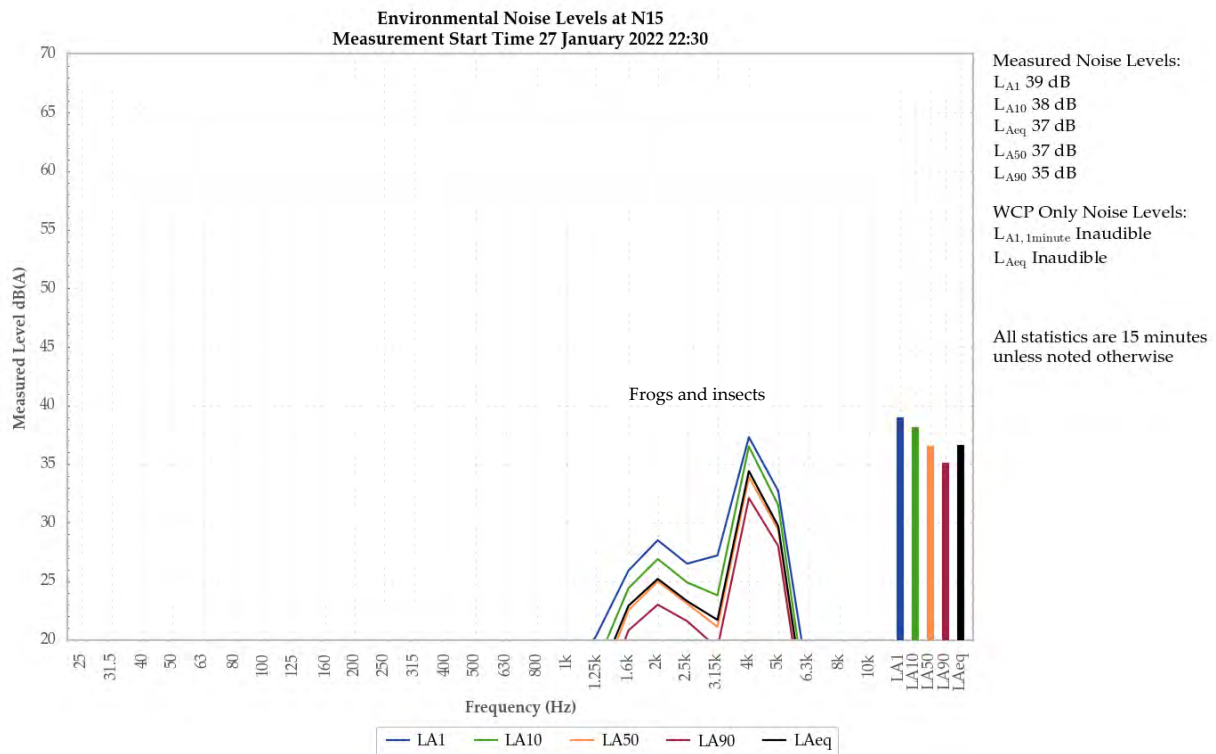


Figure 5: Environmental Noise Levels - N15, Track off Barigan Street near Wollar School, Wollar Village

WCP was inaudible.

Frogs and insects generated the measured LA1, LA10, LAeq, LA50, and LA90.

Livestock were also noted.

Table 5.3: HISTORICAL WCP ONLY NOISE LEVELS AT N15

Month	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021
LAeq	IA	IA	IA	IA	34	30	IA	<25	IA	NM	33	IA	IA
LA1,1min	IA	IA	IA	IA	44	40	IA	<30	IA	NM	41	IA	IA

### 5.1.4 N17

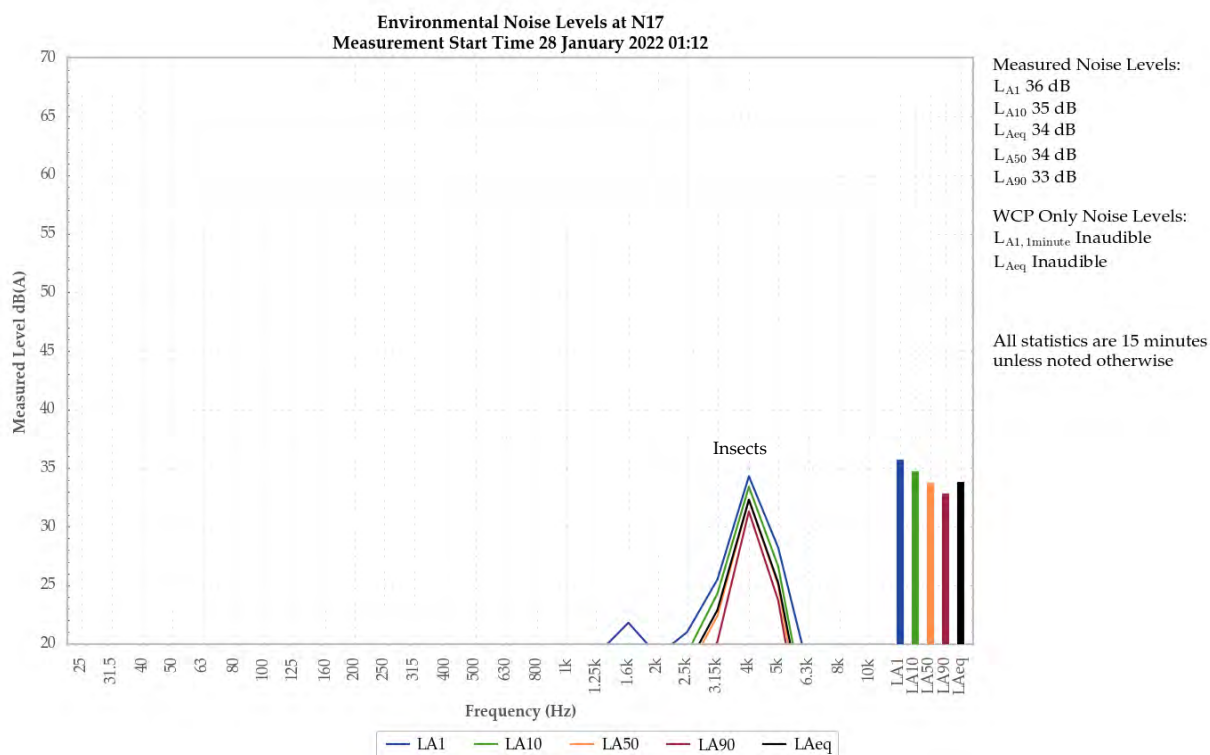


Figure 6: Environmental Noise Levels – N17 Mogo Road, off Araluen Road

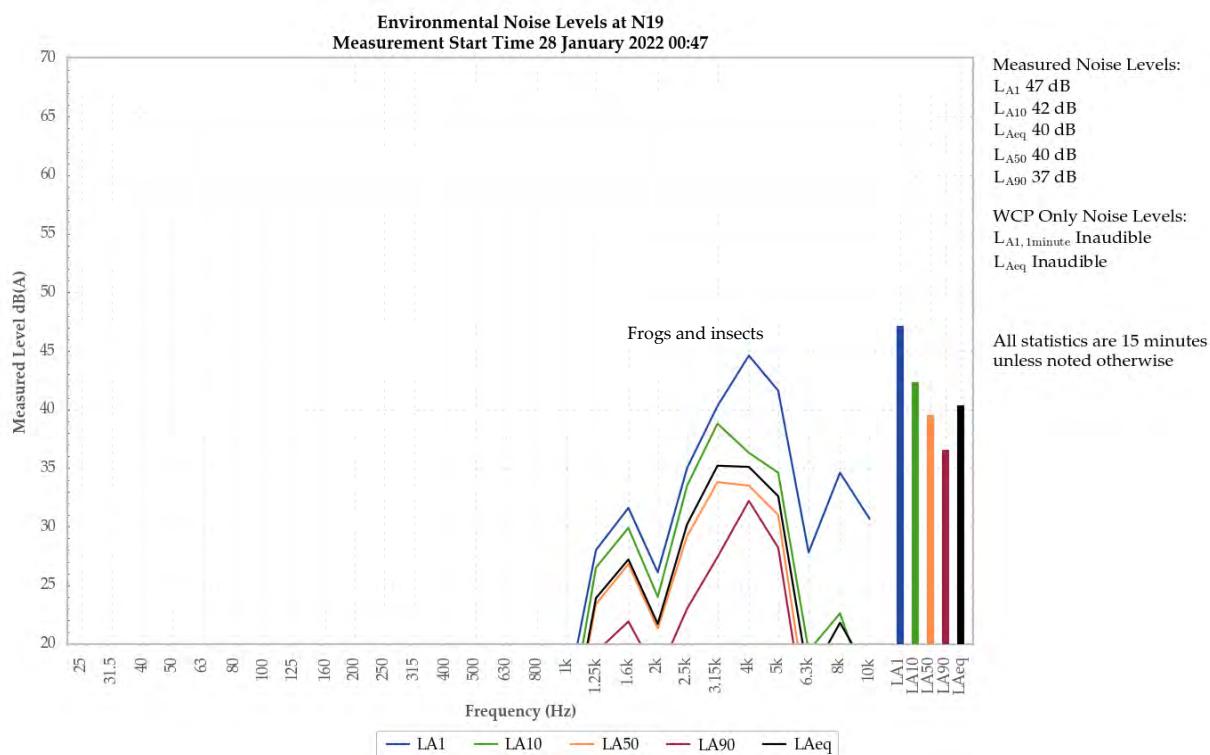
WCP was inaudible.

Insects generated the measured LA1, LA10, LAeq, LA50, and LA90.

Table 5.4: HISTORICAL WCP ONLY NOISE LEVELS AT N17

Month	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021
LAeq	<25	26	IA	IA	33	25	IA	IA	<20	IA	<20	IA	IA
LA1,1min	28	35	IA	IA	42	31	IA	IA	<20	IA	<25	IA	IA

### 5.1.5 N19



**Figure 7: Environmental Noise Levels – N19, Upper Mogo Road**

WCP was inaudible.

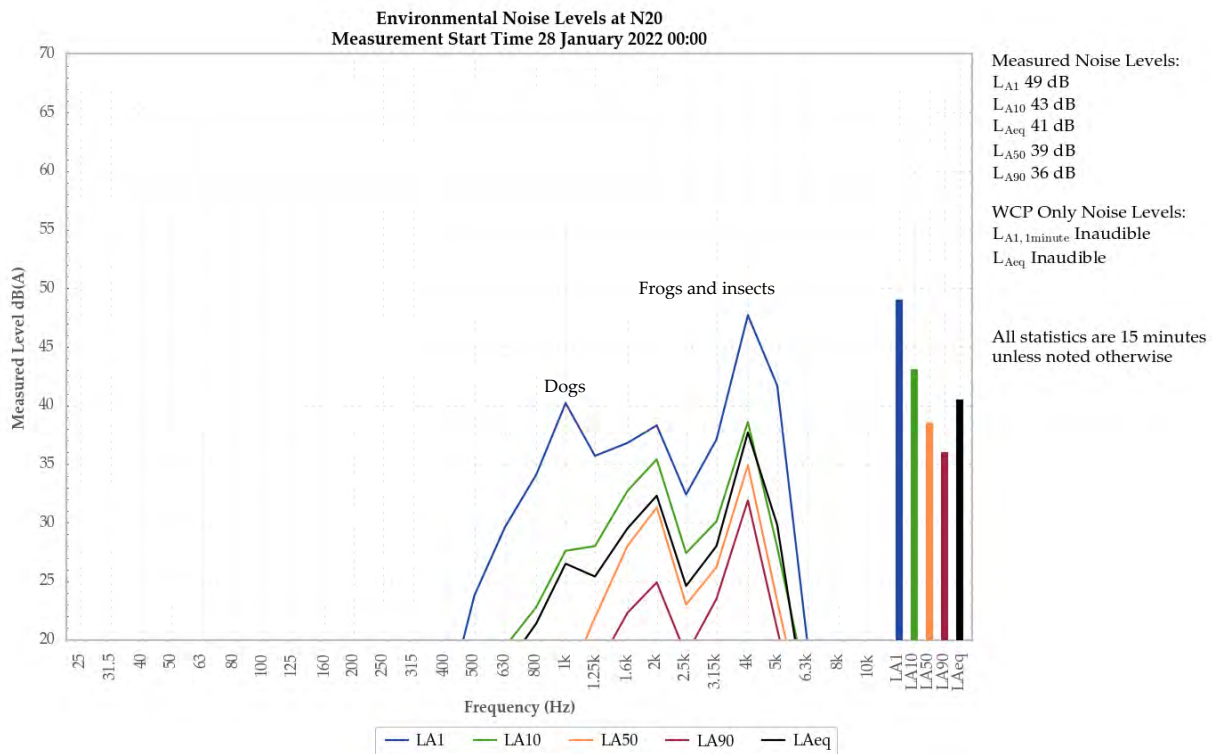
Frogs and insects generated the measured LA1, LA10, LAeq, LA50, and LA90.

A local low-frequency continuum was also noted.

*Table 5.5: HISTORICAL WCP ONLY NOISE LEVELS AT N19*

Month	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021
LAeq	IA	<20	IA	IA	<25	<20	IA	IA	<20	IA	IA	IA	IA
LA1,1min	IA	<20	IA	IA	<30	<20	IA	IA	<20	IA	IA	IA	IA

### 5.1.6 N20



**Figure 8: Environmental Noise Levels, N20 – Ringwood Road**

WCP was inaudible.

Frogs and insects generated the measured LA1, LA10, LAeq, LA50, and LA90.

Dogs and an aircraft were also noted.

*Table 5.6: HISTORICAL WCP ONLY NOISE LEVELS AT N20*

Month	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021
LAeq	IA	IA	IA	IA	<25	IA	IA	IA	IA	IA	IA	IA	IA
LA1,1min	IA	IA	IA	IA	31	IA	IA	IA	IA	IA	IA	IA	IA

## 6 SUMMARY

Global Acoustics was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP, an open cut coal mine located approximately 40 kilometres north east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 27/28 January 2022 at eight monitoring locations.

Noise levels from WCP complied with relevant noise limits at all monitoring locations during the January 2022 monitoring. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

**Global Acoustics Pty Ltd**

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## APPENDIX

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### A REGULATOR DOCUMENTS



## A.1 Wilpinjong Coal Extension Project Approval (SSD-6764)

### SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

#### ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from the owner of the land listed in Table 1, the Applicant must acquire the land in accordance with the procedures in conditions 5 and 6 of schedule 4.

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

Note: To interpret the land referred to in Table 1, see the applicable figures in Appendix 5.

#### MITIGATION UPON REQUEST

2. Upon receiving a written request from the owner of any residence on the land listed in Table 2, the Applicant must implement additional noise mitigation measures at or in the immediate vicinity of the residence in consultation with the landowner. These measures must be consistent with the measures outlined in the *Voluntary Land Acquisition and Mitigation Policy*. They must also be reasonable and feasible and proportionate with the level of predicted impact.

If within 3 months of receiving this request from the owner, the Applicant and the owner 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.

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

Note: To interpret the land referred to in Table 2, see the applicable figures in Appendix 5.

#### NOISE

##### Noise Criteria

3. The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 3 at any residence on privately-owned land or at the other specified locations.

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>A1</sub> (1 minute)
102	36	36	38	45
Wollar Village – Residential	36	37	37	45
All other privately owned land	35	35	35	45
901 – Wollar School		35 (internal) 45 (external) When in use		-
150A – St Luke’s Anglican Church 900 – St Laurence O’Toole Catholic Church		40 (internal) When in use		-

Note: To interpret the locations referred to in Table 3, see the applicable figures in Appendix 5.

Noise generated by the development is to be measured in accordance with the relevant requirements of the *NSW Industrial Noise Policy* (as may be updated from time to time). Appendix 6 sets out the meteorological conditions under which these criteria apply along with any modifications to the *NSW Industrial Noise Policy* and the requirements for evaluating compliance with these criteria.

However, these criteria do not apply if the Applicant has an agreement with the owner/s of the relevant residence of land 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, low frequency, road and rail noise of the development;
  - (b) operate a comprehensive noise management system 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 consent;
  - (c) minimise the noise impacts of the development during meteorological conditions when the noise limits in this consent do not apply (see Appendix 6);
  - (d) only use locomotives and rolling stock that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL;
  - (e) co-ordinate noise management at the site with the noise management at Moolarben and Ulan mines to minimise cumulative noise impacts; and
  - (f) carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent.

### Noise Management Plan

5. Prior to carrying out any development under this consent, unless the Secretary agrees otherwise, 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 in this consent;
  - (c) describe the proposed noise management system in detail; and
  - (d) include a monitoring program that:
    - evaluates and reports on:
      - the effectiveness of the noise management system;
      - compliance against the noise criteria in this consent; and
      - compliance against the noise operating conditions;
    - includes a program to calibrate and validate the real-time noise monitoring results with the attended monitoring results over time (so the real-time noise monitoring program can be used as a better indicator of compliance with the noise criteria in this consent and trigger for further attended monitoring); and
    - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.
6. The Applicant must implement the approved Noise Management Plan for the development.

## APPENDIX 6 NOISE COMPLIANCE ASSESSMENT

### Applicable Meteorological Conditions

1. The noise criteria in Table 3 of schedule 3 are to apply under all meteorological conditions except the following:
  - (a) wind speeds greater than 3 m/s at 10 m above ground level; or
  - (b) stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
  - (c) stability category G temperature inversion conditions.

### Determination of Meteorological Conditions

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions must be that recorded by the meteorological station located on the site.

### Compliance Monitoring

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
4. This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
5. Unless otherwise agreed with the Secretary, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
  - (a) monitoring locations for the collection of representative noise data;
  - (b) meteorological conditions during which collection of noise data is not appropriate;
  - (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
  - (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

Table 6-1: One-third octave low frequency noise thresholds

Hz/dB(Z)	One-third octave $L_{Zeq,15minute}$ threshold level												
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB(Z)	92	89	86	77	69	61	54	50	50	48	48	46	44

## A.2 Environmental Protection Licence

### L5 Noise limits

L5.1 Noise generated at the premises must not exceed the noise limits presented in the table below. The

locations referred to in the table below are indicated in Appendix 5 - Figures 1 and 2 of Development Consent number SSD-6764 dated 24 April 2017.

Location	Day	Evening	Night	Night
	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LA1(1 minute)
Wollar village - residential	36	37	37	45
All other privately owned land	35	35	35	45
102	36	36	38	45
Wollar school	35 (internal), 45 (external) when in use			
St Luke's Anglican Church & St Laurence O'Toole Catholic Church	40 (internal) when in use			

Note: The above noise limits do not apply at properties where the licensee has a written agreement with the landowner to exceed the noise limits.

L5.2 For the purpose of condition L5.1;

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.
- Evening is defined as the period 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.

L5.3 The noise limits set out in condition L5.1 apply under all meteorological conditions except for the following:

- a) Wind speeds greater than 3 metres/second at 10 metres above ground level; or
- b) Stability category F temperature inversions and wind speeds greater than 2m/s at 10m above ground level; or
- c) Stability category G temperature inversion conditions.

L5.4 For the purpose of condition L5.3:

- a) The meteorological data to be used for determining meteorological conditions is the data recorded by the meteorological weather station identified as EPA identification Point 21 in condition P1.1; 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.

- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, 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 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
    - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
  - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
  - c) With the noise limits in condition L5.1, 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 conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
  - b) at a point other than the most affected point at a location.
- L5.7 For the purpose 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.



## A.3 Noise Management Plan

### 6 Noise Monitoring Program

WCPL utilise a combination of operator-attended and unattended noise monitoring to assess the performance of the Mine against the Noise Criteria from Development Consent (SSD-6467). Operator-attended noise monitoring will be used for determining compliance against the Noise Criteria in **Table 6**. Unattended real-time noise monitoring is primarily utilised as a proactive noise control system; providing noise alerts when predetermined noise levels are triggered so mining operations can be modified where noise levels are influenced by noise from the Project.

#### 6.1 Monitoring Locations

Operator-attended noise monitoring locations have been chosen considering the following criteria:

- In any given direction, the site is as close as reasonably practical to the nearest Private Receiver;
- There is no closer Private Receiver that is not monitored;
- The site is unlikely to cause concern to any person residing on nearby private property; and
- The site can be safely accessed by the persons carrying out the noise monitoring.

WCPL will undertake operator-attended noise monitoring as identified in **Table 7 (Figure 3 and Figure 4)**. Real-time noise monitoring units are relocated from time to time, to assist with additional targeted noise monitoring and in response to community complaints. Real-time noise monitoring locations will be reviewed and modified as necessary in response to monitoring results, changes to the operation, or as a result of community consultation.

Should circumstances change, WCPL may amend the noise monitoring locations shown in **Table 7** with consideration to the above criteria. WCPL will update this NMP, in consultation with DPIE and the EPA.

**Table 7 Noise Monitoring Locations**

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
St Laurence O'Toole Church	N6	Operator-attended Noise	777299.9	6415716.9	Location based on the nearest community structure to the East of the Mine
Tichular	N14	Operator-attended Noise	778791.9	6408624.7	Location based on the nearest community structure to the South of the Mine
Wollar Village	N15	Operator-attended Noise	777452.0	6416158.9	Location based on the nearest community structure to the South-East of the Mine
Mogo Rd	N17	Operator-attended Noise	780771.0	6420641.0	Location based on the nearest community structure to the North-East of the Mine
Mogo Rd	N19	Operator-attended Noise	782644.5	6424151.1	Location based on the nearest and residential community structure to the North-East of the Mine
Ringwood Road	N20	Operator-attended Noise	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine.
WCPL Rail Loop	-	Meteorology & Inversion	770630.9	6418085.1	Location based on consideration of prevailing meteorological conditions

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
Wollar Village <sup>4</sup>	-	Real-Time Noise - Fixed	777608.9	6415996.8	Location based on the nearest non-mine owned residence to the South-East of the Mine N15 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Mogo Rd <sup>4</sup>	-	Real-Time Noise - Fixed	782644.5	6424151.1	Location based on the nearest non-mine owned residence to the East of the Mine N19 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Ringwood Road	-	Real-Time Noise - Fixed	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine. N20 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Tichular <sup>3</sup>	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

**Notes:**

1. MGA94, Zone 55
2. Monitoring will be undertaken at this location until it can be demonstrated that the noise contribution from the Mine is negligible. At this point, WCPL will notify DPIE and EPA of the results of this monitoring and advise if and when the monitoring at this location will be scaled back or discontinued. The real-time noise monitor at Wandooona may be relocated in response to a complaint or identified noise issue at another location.
3. Where continuous monitors are located at compliance locations (e.g. privately-owned receivers), WCPL will conduct a review of the identification/characterisation of mine-related noise by the real-time monitoring system at that location by comparing against observed mine-related noise identified during operator-attended monitoring (i.e. validate the identification of mine related noise and filtering of extraneous noise sources by the real-time system). Refer to **Section 6.5**.

## 6.2 Meteorological Monitoring

WCPL maintains a continuous on-site meteorological monitoring station that complies with the requirements of the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (DEC, 2007). The location of this meteorological monitoring station is shown on **Figure 3**.

WCPL's meteorological monitoring station is capable of continuous real-time measurement of temperature lapse rate in accordance with the INP (EPA, 2000).

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

- a) Rainfall;
- b) Relative humidity;
- c) Temperature – measured at 2, 10 and 60 m above ground level;
- d) Wind speed – horizontal and vertical;
- e) Wind direction – measured at 10 m above ground level;
- f) Sigma theta;
- g) Pasquill stability classification;
- h) Solar radiation; and
- i) Temperature lapse rate.

Meteorological forecasting will be undertaken as specified in **Section 5.4**.

### 6.3 Operator-attended Noise Monitoring

#### 6.3.1 Purpose

Operator-attended noise monitoring will be used to evaluate compliance against the Noise Criteria detailed in **Table 6**.

#### 6.3.2 Summary

Operator-attended noise will be undertaken in accordance with **Table 8**.

**Table 8 Operator-attended Noise Monitoring Summary**

Element	Description
Locations	<ul style="list-style-type: none"> <li>As per <b>Table 7</b>,</li> <li><b>Figure 3</b> and <b>Figure 4</b></li> </ul>
Period	<ul style="list-style-type: none"> <li>Night-time period (10 pm to 7 am) being the most sensitive time period for noise.</li> </ul>
Frequency	<ul style="list-style-type: none"> <li>12 times per year<sup>1</sup> (i.e. one night per month); plus</li> <li>12 times per year<sup>1</sup> (i.e. one night per month) at locations as identified in <b>Table 7</b> to validate real-time noise monitoring data (<b>Section 6.5</b>).</li> </ul>

Notes: <sup>1</sup> Monitoring frequency at Mogo Road (N19) and Ringwood Road (N20) will remain at the frequency identified in **Table 8** during the commencement of operations in Pit 8. A review of the monitoring frequency at N19 and N20 will be undertaken during subsequent reviews of this NMP in consultation with WCPL's noise specialist and relevant government agencies.

#### 6.3.3 Methodology

Operator-attended noise monitoring will be undertaken as outlined in **Table 8** by an independent acoustic consultant and guided by the requirements of the INP (EPA, 2000) and *AS 1055.1-1997 'Acoustics – Description and measurement of environmental noise – General procedures'*. Routine operator-attended noise monitoring will be undertaken during night-time periods (10 pm - 7 am).

If any of the Noise Criteria are exceeded, a second measurement will be taken at the same location within 75 minutes of the first measurement. If the second measurement does not exceed the Noise Criteria, as defined in **Table 6**, then the result will be recorded and the regular monitoring program resumed.

If the second measurement does exceed the applicable Noise Criteria, then:

- The noise consultant will immediately report both results to the WCPL Environment and Community Manager or delegate immediately;
- Upon confirming the exceedances are deemed a non-compliance in accordance with the **Figure 5**, WCPL will report both results to DPIE and EPA immediately, upon confirming the exceedance (**Section 9.0**).

WCPL will:

- Take immediate action in accordance with the NMS;
- Arrange for additional operator-attended noise monitoring to occur at that site within 1 week; and
- Deploy the mobile real-time noise monitor to measure and record the noise at that site for at least a 1 week period.

WCPL will also investigate any changes to the mine operations, and may revisit the noise model on the basis of the noise measurements recorded at the site.

The acoustic noise consultant will consider the modification factors in Section 4 of the INP (EPA, 2000) during the evaluation of attending monitoring results.

### 6.3.6 Applicable Meteorological Conditions

The Noise Criteria in **Table 6** are to be applied under all meteorological conditions except for the following:

- Wind speeds greater than 3 m/s at 10 m above ground level; or
- Stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
- Stability category G temperature inversion conditions.

Except for wind speed at microphone height, the data used for determining meteorological conditions will be that recorded by the meteorological station located on the Mine site.

It should be noted that when assessing wind conditions to determine the potential for noise level alteration by the refraction of sound-waves through the atmosphere, meteorological measurements should be undertaken at a height of 10 m above the ground level, in accordance with Section 5 of the INP (EPA, 2000). Local meteorological conditions, including near-surface winds are measured at the inbuilt meteorological station (2 m); however, in accordance with the INP (EPA, 2000), the 2 m data cannot be used to determine impacts from sound-wave refraction. The 2 m meteorological data is used to assess local meteorological conditions that may increase ambient noise levels including surface winds and rainfall.



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## APPENDIX

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### *B CALIBRATION CERTIFICATES*



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 Level Meter**  
IEC 61672-3:2013  
**Calibration Certificate**  
Calibration Number C21058

<b>Client Details</b>	Global Acoustics Pty Ltd 12/16 Huntingdale Drive Thornton NSW 2322
<b>Equipment Tested/ Model Number :</b>	Rion NA-28
<b>Instrument Serial Number :</b>	30131882
<b>Microphone Serial Number :</b>	04739
<b>Pre-amplifier Serial Number :</b>	11942
<b>Pre-Test Atmospheric Conditions</b>	<b>Post-Test Atmospheric Conditions</b>
<b>Ambient Temperature :</b> 23.5°C	<b>Ambient Temperature :</b> 23.3°C
<b>Relative Humidity :</b> 46.7%	<b>Relative Humidity :</b> 47.7%
<b>Barometric Pressure :</b> 100.28kPa	<b>Barometric Pressure :</b> 100.25kPa
<b>Calibration Technician :</b> Jeff Yu	<b>Secondary Check:</b> Max Moore
<b>Calibration Date :</b> 8 Feb 2021	<b>Report Issue Date :</b> 9 Feb 2021
<b>Approved Signatory :</b>	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.



**Sound Calibrator**  
IEC 60942-2017  
**Calibration Certificate**

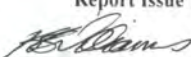
Calibration Number C21059

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

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

**Atmospheric Conditions**  
**Ambient Temperature :** 23.3°C  
**Relative Humidity :** 47.7%  
**Barometric Pressure :** 100.27kPa

**Calibration Technician :** Jeff Yu  
**Calibration Date :** 08 Feb 2021  
**Secondary Check:** Max Moore  
**Report Issue Date :** 9 Feb 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 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	Least Uncertainties of Measurement - Environmental Conditions	
	Generated SPL	±0.14dB
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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PAGE 1 OF 1

# *Wilpinjong Coal*

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*Environmental Noise Monitoring  
February 2022*

*Prepared for  
Wilpinjong Coal Pty Ltd*

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Noise and Vibration Analysis and Solutions

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## Wilpinjong Coal

### Environmental Noise Monitoring February 2022

Reference: 22032\_R01

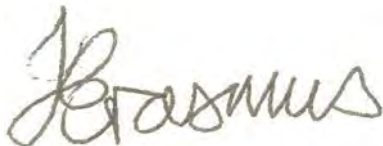
Report date: 15 March 2022

#### Prepared for

Wilpinjong Coal Pty Ltd  
Locked Bag 2005  
Mudgee NSW 2850

#### Prepared by

Global Acoustics Pty Ltd  
PO Box 3115  
Thornton NSW 2322



Prepared: Jonathan Erasmus  
Consultant



QA Review: Jesse Tribby  
Consultant

*Global Acoustics Pty Ltd ~ Environmental noise modelling and impact assessment ~ Sound power testing ~ Noise control advice ~ Noise and vibration monitoring ~ OHS noise monitoring and advice ~ Expert evidence in Land and Environment and Compensation Courts ~ Architectural acoustics ~ Blasting assessments and monitoring ~ Noise management plans (NMP) ~ Sound level meter and noise logger sales and hire*

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# 1 INTRODUCTION

## 1.1 Background

Global Acoustics was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP), an open cut coal mine located approximately 40 kilometres north east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 10/11 February 2022 at six locations.

## 1.2 Monitoring Locations

Monitoring locations are detailed in Table 1.1 and shown on Figure 1. It should be noted that Figure 1 shows the actual monitoring position, not the location of residences.

*Table 1.1: WCP ATTENDED NOISE MONITORING LOCATIONS*

<b>NMP Descriptor</b>	<b>Monitoring Location</b>
N6	St Laurence O'Toole Catholic Church, representative of Wollar Village south
N14	'Tichular', intersection of Tichular and Barigan Roads, Tichular
N15	Track off Barigan Street near Wollar Public School, Wollar Village
N17	Mogo Road, off Araluen Road, Wollar
N19	North Mogo Road, Mogo
N20	Ringwood Road, off Wollar Road, Wollar

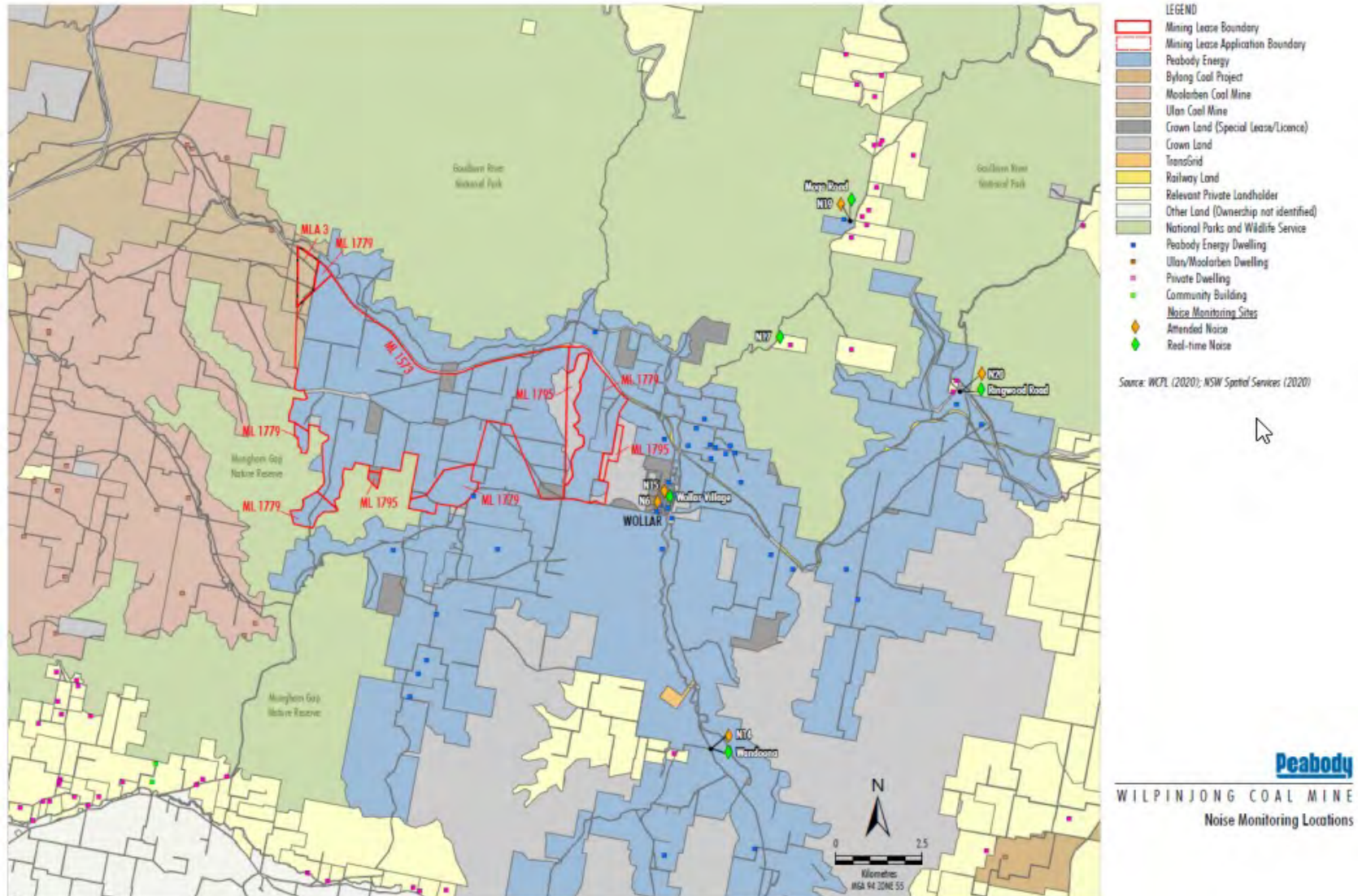


Figure 1: WCP Attended Noise Monitoring Locations (Source: WCP NMP, 2020)

### 1.3 Terminology & Abbreviations

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

Table 1.2: TERMINOLOGY & ABBREVIATIONS

Descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The "A" weighting scale is used to describe human response to noise.
L <sub>Amax</sub>	The maximum A-weighted noise level over a time period.
L <sub>A1</sub>	The noise level which is exceeded for 1 per cent of the time.
L <sub>A1,1minute</sub>	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L <sub>A10</sub>	The noise level which is exceeded for 10 percent of the time.
L <sub>Aeq</sub>	The average noise A-weighted energy during a measurement period.
L <sub>A50</sub>	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L <sub>A90</sub>	The level exceeded for 90 percent of the time. The L <sub>A90</sub> level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes.
L <sub>Amin</sub>	The minimum A-weighted noise level over a time period.
L <sub>Ceq</sub>	The 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.
SC	Stability class (or category) is determined from measured wind speed and either sigma-theta or VTG.
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	This is the period 7:00am to 6:00pm.
Evening	This is the period 6:00pm to 10:00pm.
Night	This is the period 10:00pm to 7:00am.

## 2 REGULATOR REQUIREMENTS AND NOISE CRITERIA

### 2.1 Development Consent

The most current development consent associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017), which covers all current operations and has replaced the previous consent (05-0021). The relevant noise conditions from the current consent are reproduced in Appendix A.

### 2.2 Environment Protection Licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently issued in March 2021. Relevant noise sections of the EPL are reproduced in Appendix A.

### 2.3 Noise Monitoring Program

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in August 2020. The relevant sections are reproduced in Appendix A.

### 2.4 Project Specific Criteria

Noise criteria and meteorological conditions required for noise criteria to apply are consistent in the project approval and EPL. The applicable noise criteria for each monitoring location are shown in Table 2.1.

Table 2.1: WCP PROJECT SPECIFIC CRITERIA, dB

NMP Descriptor/ Resident Number	Monitoring Location	Day L <sub>Aeq,15minute</sub>	Evening L <sub>Aeq,15minute</sub>	Night L <sub>Aeq,15minute</sub> / L <sub>A1,1minute</sub>
N6 <sup>1</sup>	St Laurence O'Toole Catholic Church	36	37	37/45
N14	'Tichular'	35	35	35/45
N15	Wollar Village	36	37	37/45
N17 <sup>2</sup>	Mogo Road, off Araluen Road	36	36	38/45
N19	North Mogo Road	35	35	35/45
N20	Ringwood Road, off Wollar Road	35	35	35/45

Notes:

1. N6 noise limits have been assumed to be as detailed for 'Wollar Village – Residential' in the PA, as the church is no longer a place of worship; and
2. N17 noise limits have been determined based on the assumption that N17 is property 102 in accordance with Appendix 5 Figure 1 of Development Consent SSD-6764.

## 2.5 Modifying Factors

The EPA 'Noise Policy for Industry' (NPfI, 2017) was approved for use in NSW in October 2017. 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 has 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 NPfI. Low-frequency modifying factors have been assessed in accordance with both the development consent and NPfI.

## 3 METHODOLOGY

### 3.1 Overview

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

### 3.2 Attended Noise Monitoring

During this survey, monthly attended monitoring was undertaken during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric condition measurement was also undertaken at each monitoring location. Attended monitoring during this reporting period was undertaken by Jonathan Erasmus.

This survey presents noise levels gathered during attended monitoring that are the result of many sounds reaching the sound level meter microphone during monitoring. Received levels from various noise sources were noted during attended monitoring and particular attention was paid to the extent of WCP's contribution, if any, to measured levels. At each receptor location, WCP's  $L_{Aeq,15\text{minute}}$  and  $L_{A1,1\text{minute}}$  (in the absence of any other noise) was measured directly, where possible, or, determined by frequency analysis.

If the exact contribution of the source of interest (in this case WCP) cannot be established, due to masking by other noise sources in a similar frequency range, but site noise levels are observed to be well below (more than 5 dB lower than) any relevant criterion, a maximum estimate of the potential contribution of the site might be made based on other measured site-only noise descriptors in accordance with Section 7.1 of the NPfI. This is generally expressed as a 'less than' quantity, such as <20 dB or <30 dB.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may also 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 some noise was audible but could not be quantified. If site noise was NM due to masking but estimated to be significant in relation to a relevant criterion, we would employ methods (e.g. measure closer and back calculate) to determine a value for reporting.

All sites noted as NM in this report are due to one or more of the following reasons:

- Site noise levels were extremely low and unlikely, in many cases, to be even noticed;
- Site noise levels were masked by another relatively loud noise source that is characteristic of the environment (e.g. breeze in foliage or continuous road traffic noise) that cannot be eliminated by moving closer; and/or



- It was not feasible, nor reasonable to employ methods such as move closer and back calculate. Cases may include, but are not limited to, 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.

A measurement of  $L_{A1,1\text{minute}}$  corresponds to the highest noise level generated for 0.6 second during one minute. In practical terms this is the highest noise level, or  $L_{A\text{max}}$ , received from the site during the entire measurement period (i.e. the highest level of the worst minute during the 15 minute measurement).

Often extraneous noise events (for example, road traffic pass-bys and dogs) interfere with the measurement of site noise levels in the frequency range of interest. Where required, the sound level meter is paused during these occurrences to aid in quantification of the site only noise.

### 3.3 Modifying Factors

All measurements were evaluated for potential modifying factors in accordance with the NPfI. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfI.

Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable, such that the site-only  $L_{A\text{eq}}$  was not "NM" or less than a maximum cut off value (e.g. "<20 dB" or "<30dB").

If applicable, modifying factors have been reported and added to measured site-only  $L_{A\text{eq}}$  noise levels when meteorological conditions satisfied requirements for site noise criteria to be applicable. Low-frequency modifying factors have only been applied to site-only  $L_{A\text{eq}}$  levels if WCP was the only contributing low-frequency noise source.

### 3.4 Noise Monitoring Equipment

The equipment used to measure environmental noise levels are listed in Table 3.1. Calibration certificates are included as Appendix B.

Table 3.1: ATTENDED NOISE MONITORING EQUIPMENT

Model	Serial Number	Calibration Due Date
Rion NA-28 sound level meter	00370304	24/11/2022
Pulsar 106 acoustic calibrator	81334	24/11/2022



## 4 RESULTS

### 4.1 Total Measured Noise Levels

Overall noise levels measured at each location during attended measurement are provided in Table 4.1. Discussion as to the noise sources responsible for these measured levels is provided in Chapter 5 of this report.

Table 4.1: MEASURED NOISE LEVELS – FEBRUARY 2022<sup>1</sup>

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	10/02/2022 23:19	49	44	42	41	41	38	35
N14	11/02/2022 00:30	52	50	48	45	45	39	32
N15	10/02/2022 23:00	48	43	37	36	36	35	33
N17	10/02/2022 22:26	49	36	34	32	32	30	27
N19	10/02/2022 22:00	52	41	38	36	35	34	31
N20	10/02/2022 23:45	52	51	50	47	47	42	36

Note:

- Noise levels in this table are not necessarily the result of activities at WCP.

### 4.2 Modifying Factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfI and methodology described in Section 3.3.

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

### 4.3 Attended Noise Monitoring

Table 4.2 to Table 4.3 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement.

**Table 4.2:  $L_{Aeq,15minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – FEBRUARY 2022**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq,15min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	10/02/2022 23:19	2.1	E	37	Yes	IA	Nil
N14	11/02/2022 00:30	1.7	D	35	Yes	IA	Nil
N15	10/02/2022 23:00	2.3	E	37	Yes	IA	Nil
N17	10/02/2022 22:26	2.3	E	38	Yes	IA	Nil
N19	10/02/2022 22:00	3.9	E	35	No	IA	NA
N20	10/02/2022 23:45	2.2	E	35	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.3:  $L_{A1,1minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – FEBRUARY 2022**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	10/02/2022 23:19	2.1	E	45	Yes	IA	Nil
N14	11/02/2022 00:30	1.7	D	45	Yes	IA	Nil
N15	10/02/2022 23:00	2.3	E	45	Yes	IA	Nil
N17	10/02/2022 22:26	2.3	E	45	Yes	IA	Nil
N19	10/02/2022 22:00	3.9	E	45	No	IA	NA
N20	10/02/2022 23:45	2.2	E	45	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{A1,1minute}$  attributed to WCP; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

#### 4.4 Atmospheric Conditions

Atmospheric condition data measured by the operator during each measurement using a Kestrel hand-held weather meter is shown in Table 4.4. The wind speed, direction and temperature were measured at approximately 1.8 metres. Attended noise monitoring is not undertaken during rain, hail, or wind speeds above 5 m/s at microphone height.

Table 4.4: MEASURED ATMOSPHERIC CONDITIONS – FEBRUARY 2022

Location	Start Date And Time	Temperature °C	Wind Speed m/s	Wind Direction °MN	Cloud Cover eighths
N6	10/02/2022 23:19	21	0.7	140	4
N14	11/02/2022 00:30	21	0.0	-	3
N15	10/02/2022 23:00	21	0.8	140	7
N17	10/02/2022 22:26	21	0.0	-	4
N19	10/02/2022 22:00	25	0.0	-	6
N20	10/02/2022 23:45	20	0.0	-	4

Notes:

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

Meteorological data used for compliance assessment is sourced from the WCP AWS and inversion tower.

## 5 DISCUSSION

### 5.1 Noted Noise Sources

During attended monitoring, the time variations (temporal characteristics) of noise sources are taken into account in each measurement via statistical descriptors. From these observations, summaries have been derived for each location and provided in this chapter. Statistical 1/3 octave-band analysis of environmental noise was undertaken and the following figures display frequency ranges of various noise sources at each location for LA1, LA10, LAeq, LA50 and LA90 descriptors. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 2 where it can be seen that frogs and insects are generating noise at frequencies above 1000 Hz while mining noise is at frequencies less than 1000 Hz, which is typical. Adding levels at frequencies that relate to mining only allows separate statistical results to be calculated. This analysis cannot always be performed if there are significant levels of other noise at the same frequencies as mining, such as dogs, cows, or (most commonly) road traffic.

It should be noted that the method of summing statistical values up to a cut-off frequency can overstate the LA1 result by a small margin but is entirely accurate for LAeq.

Historical site only noise levels from attended monitoring over the previous 12 month period have been provided as additional information in Table 5.1 to Table 5.6.

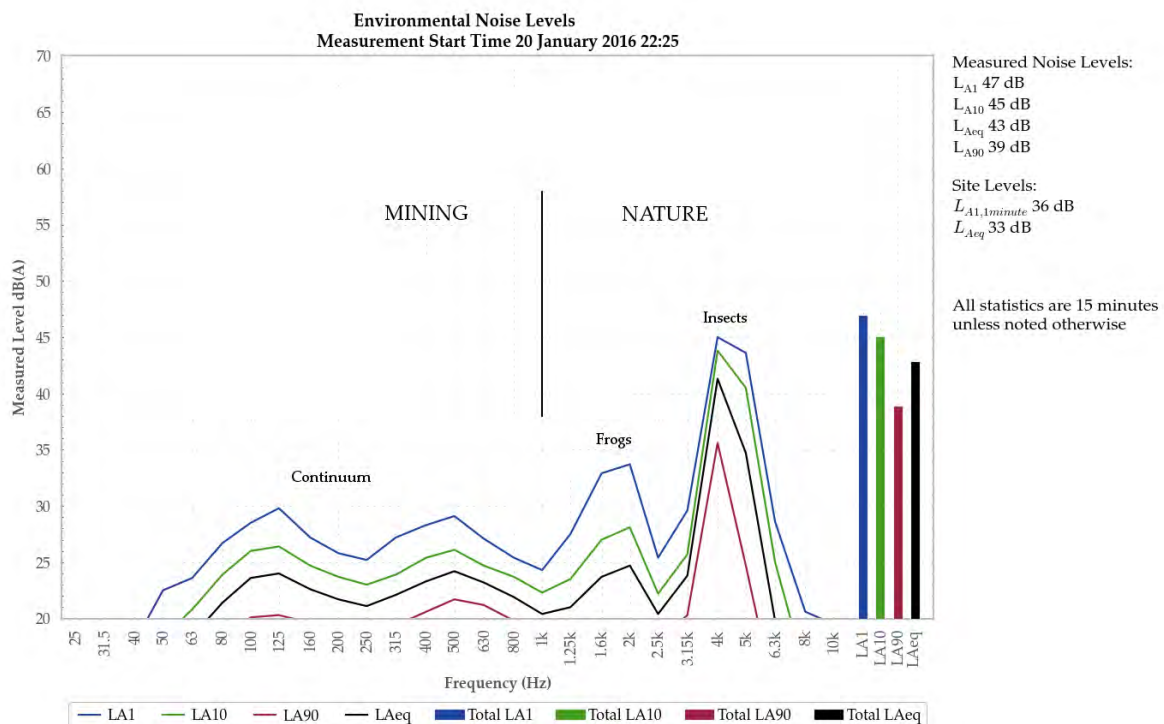
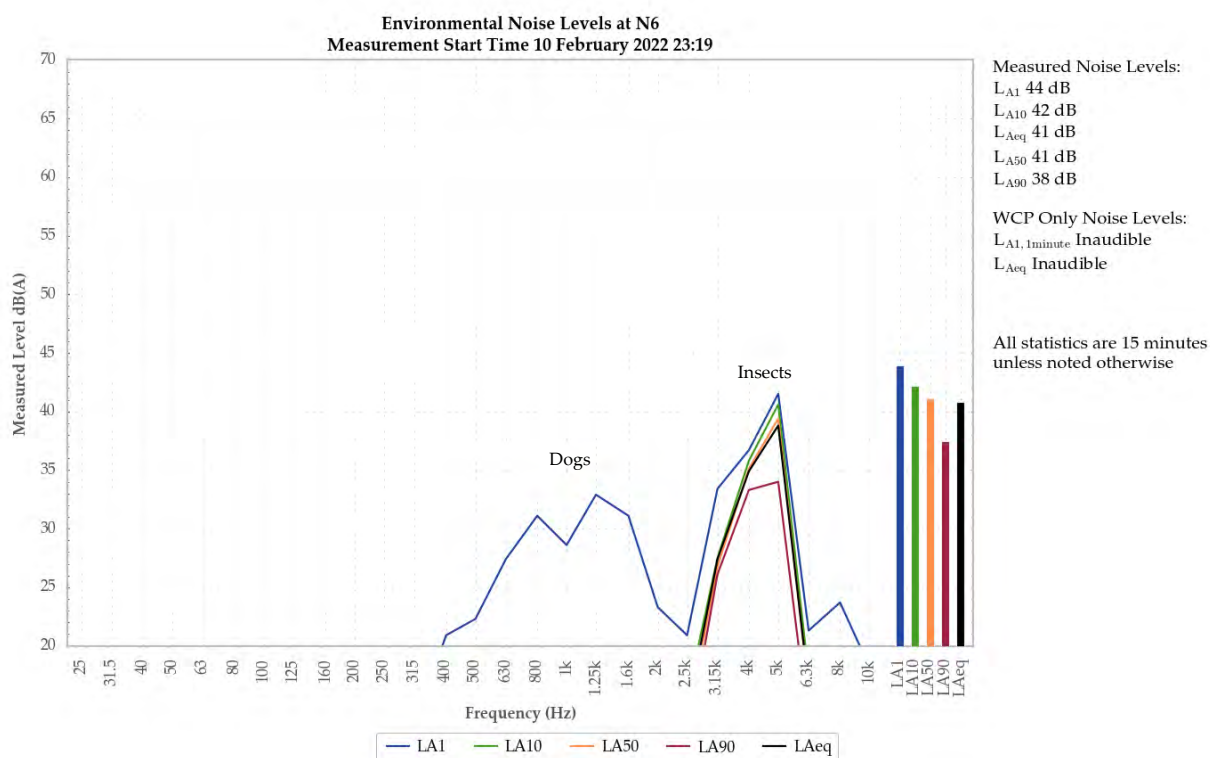


Figure 2: Example graph (refer to Section 5.1 for explanatory note)

### 5.1.1 N6



**Figure 3: Environmental Noise Levels - N6, St Laurence O’Toole Catholic Church, Wollar Village**

WCP was inaudible during the measurement.

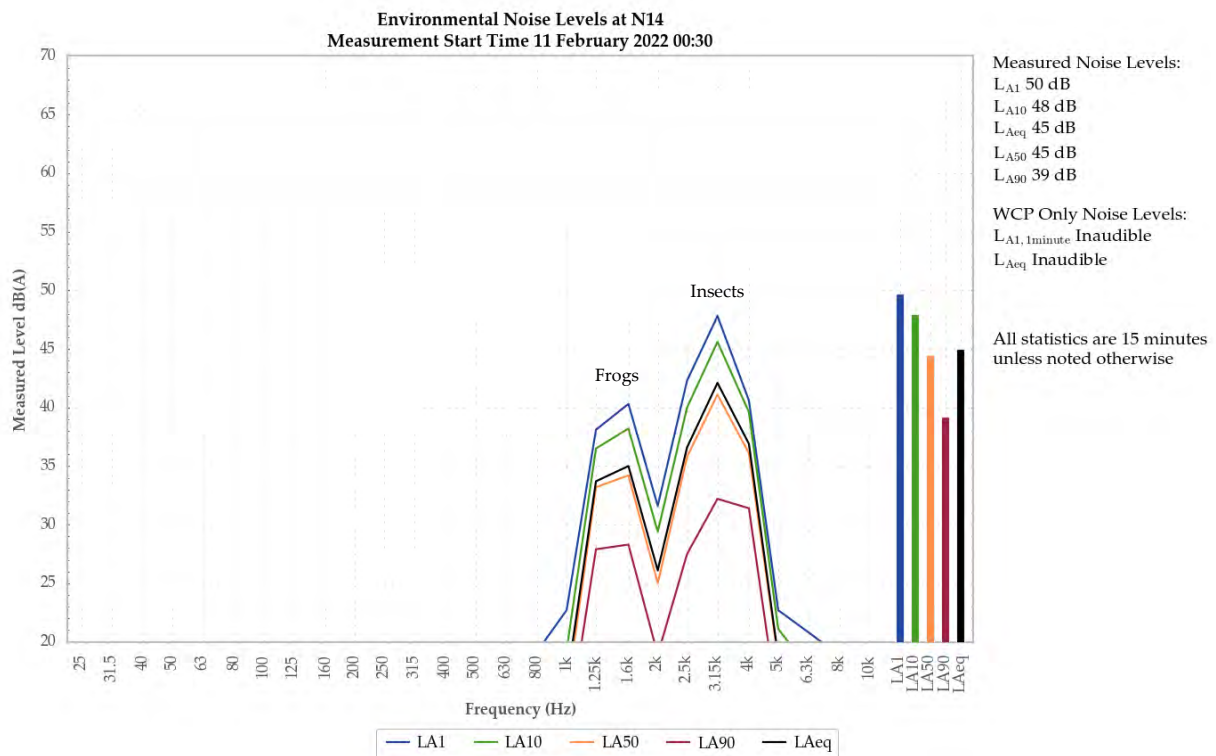
Insects generated the measured noise levels.

Dogs, breeze in foliage, and residential noise were also noted.

*Table 5.1: HISTORICAL WCP ONLY NOISE LEVELS AT N6*

Month	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Jan 2022
<b>LAeq</b>	IA	IA	<20	IA	30	30	IA	<25	IA	IA	31	IA	IA
<b>LA1,1min</b>	IA	IA	<20	IA	31	35	IA	<25	IA	IA	33	IA	IA

### 5.1.2 N14



**Figure 4: Environmental Noise Levels - N14, 'Tichular', intersection of Tichular and Barigan Roads**

WCP was inaudible during the measurement.

Frogs and insects generated the measured noise levels.

Birds were also noted.

*Table 5.2: HISTORICAL WCP ONLY NOISE LEVELS AT N14*

Month	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022
<b>L<sub>Aeq</sub></b>	IA	<25	<25	IA	<25	<20	<25	IA	IA	IA	<25	IA	IA	IA
<b>L<sub>A1,1min</sub></b>	IA	28	<25	IA	27	<20	26	IA	IA	IA	25	IA	IA	IA



### 5.1.3 N15

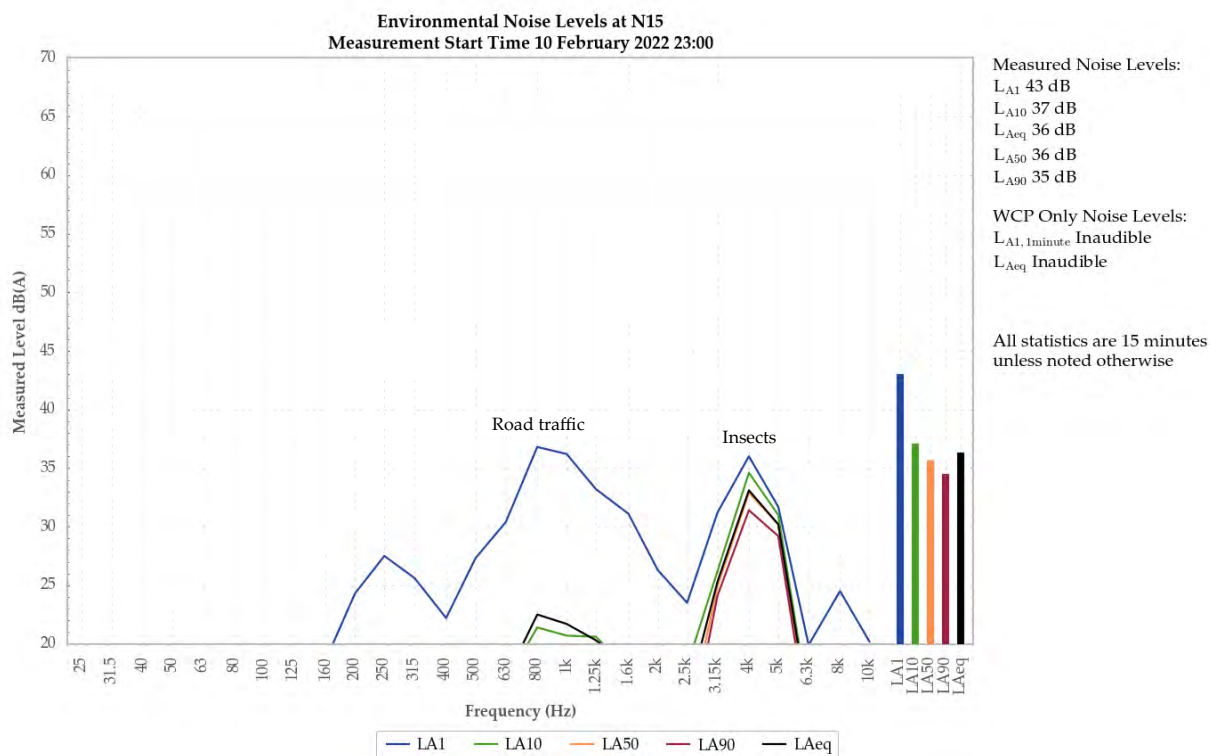


Figure 5: Environmental Noise Levels - N15, Track off Barigan Street near Wollar School, Wollar Village

WCP was inaudible during the measurement.

Road traffic and insects generated the measured LA1. Insects generated the measured LA10, LAeq, LA50, and LA90.

Dogs were also noted.

Table 5.3: HISTORICAL WCP ONLY NOISE LEVELS AT N15

Month	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022
LAeq	IA	IA	IA	IA	34	30	IA	<25	IA	NM	33	IA	IA	IA
LA1,1min	IA	IA	IA	IA	44	40	IA	<30	IA	NM	41	IA	IA	IA

5.14 N17

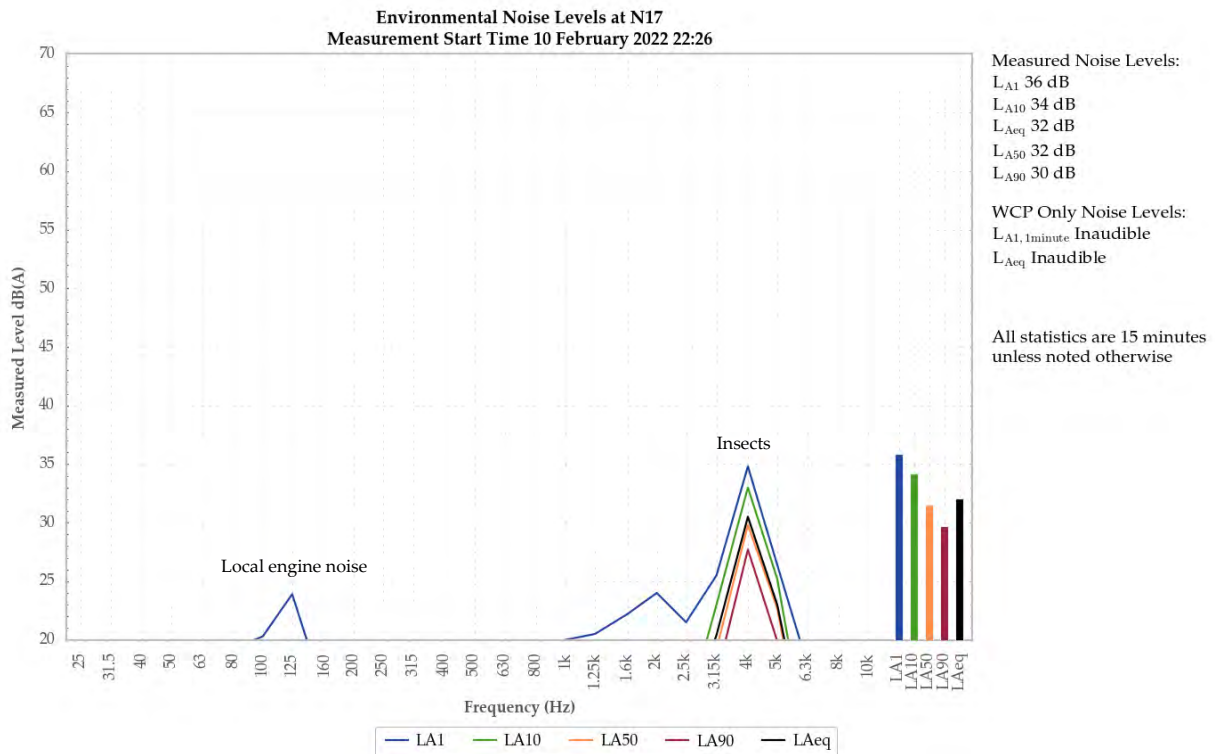


Figure 6: Environmental Noise Levels - N17 Mogo Road, off Araluen Road

WCP was inaudible during the measurement.

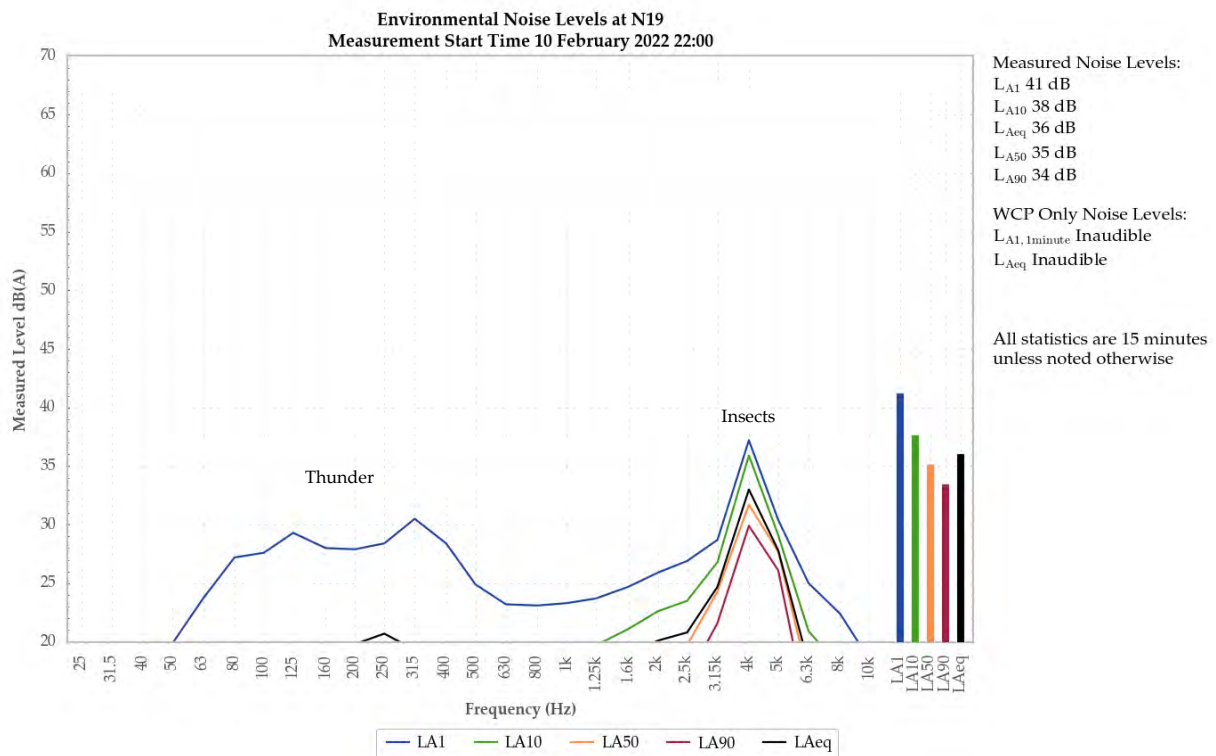
Insects generated the measured noise levels.

Local engine noise, thunder, and birds were also noted.

Table 5.4: HISTORICAL WCP ONLY NOISE LEVELS AT N17

Month	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022
LAeq	<25	26	IA	IA	33	25	IA	IA	<20	IA	<20	IA	IA	IA
LA1,1min	28	35	IA	IA	42	31	IA	IA	<20	IA	<25	IA	IA	IA

### 5.1.5 N19



**Figure 7: Environmental Noise Levels - N19, Upper Mogo Road**

WCP was inaudible during the measurement.

Insects and thunder generated the measured  $L_{A1}$ . Insects generated the measured  $L_{A10}$ ,  $L_{Aeq}$ ,  $L_{A50}$ , and  $L_{A90}$ .

Breeze in foliage and an aircraft were also noted.

*Table 5.5: HISTORICAL WCP ONLY NOISE LEVELS AT N19*

Month	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022
$L_{Aeq}$	IA	<20	IA	IA	<25	<20	IA	IA	<20	IA	IA	IA	IA	IA
$L_{A1,1min}$	IA	<20	IA	IA	<30	<20	IA	IA	<20	IA	IA	IA	IA	IA

5.1.6 N20

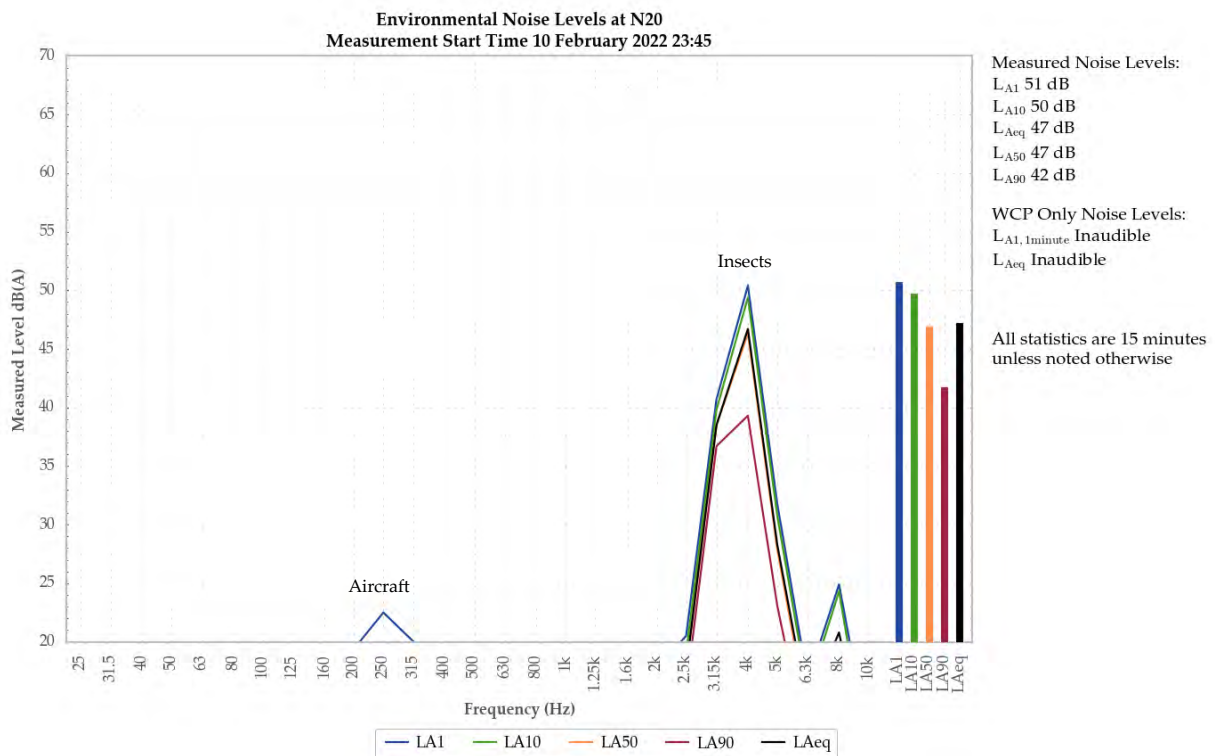


Figure 8: Environmental Noise Levels, N20 - Ringwood Road

WCP was inaudible during the measurement.

Insects generated the measured noise levels.

An aircraft was also noted.

Table 5.6: HISTORICAL WCP ONLY NOISE LEVELS AT N20

Month	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022
L <sub>Aeq</sub>	IA	IA	IA	IA	<25	IA	IA	IA	IA	IA	IA	IA	IA	IA
L <sub>A1,1min</sub>	IA	IA	IA	IA	31	IA	IA	IA	IA	IA	IA	IA	IA	IA

## 6 SUMMARY

Global Acoustics was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP, an open cut coal mine located approximately 40 kilometres north east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 10/11 February 2022 at eight monitoring locations.

Noise levels from WCP complied with relevant noise limits at all monitoring locations during the February 2022 monitoring. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

**Global Acoustics Pty Ltd**

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## APPENDIX

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### A *REGULATOR DOCUMENTS*



## A.1 Wilpinjong Coal Extension Project Approval (SSD-6764)

### SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

#### ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from the owner of the land listed in Table 1, the Applicant must acquire the land in accordance with the procedures in conditions 5 and 6 of schedule 4.

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

Note: To interpret the land referred to in Table 1, see the applicable figures in Appendix 5.

#### MITIGATION UPON REQUEST

2. Upon receiving a written request from the owner of any residence on the land listed in Table 2, the Applicant must implement additional noise mitigation measures at or in the immediate vicinity of the residence in consultation with the landowner. These measures must be consistent with the measures outlined in the *Voluntary Land Acquisition and Mitigation Policy*. They must also be reasonable and feasible and proportionate with the level of predicted impact.

If within 3 months of receiving this request from the owner, the Applicant and the owner 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.

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

Note: To interpret the land referred to in Table 2, see the applicable figures in Appendix 5.

#### NOISE

##### Noise Criteria

3. The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 3 at any residence on privately-owned land or at the other specified locations.

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>A1</sub> (1 minute)
102	36	36	38	45
Wollar Village – Residential	36	37	37	45
All other privately owned land	35	35	35	45
901 – Wollar School		35 (internal) 45 (external) When in use		-
150A – St Luke’s Anglican Church 900 – St Laurence O’Toole Catholic Church		40 (internal) When in use		-

Note: To interpret the locations referred to in Table 3, see the applicable figures in Appendix 5.

Noise generated by the development is to be measured in accordance with the relevant requirements of the *NSW Industrial Noise Policy* (as may be updated from time to time). Appendix 6 sets out the meteorological conditions under which these criteria apply along with any modifications to the *NSW Industrial Noise Policy* and the requirements for evaluating compliance with these criteria.

However, these criteria do not apply if the Applicant has an agreement with the owner/s of the relevant residence of land 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, low frequency, road and rail noise of the development;
  - (b) operate a comprehensive noise management system 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 consent;
  - (c) minimise the noise impacts of the development during meteorological conditions when the noise limits in this consent do not apply (see Appendix 6);
  - (d) only use locomotives and rolling stock that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL;
  - (e) co-ordinate noise management at the site with the noise management at Moolarben and Ulan mines to minimise cumulative noise impacts; and
  - (f) carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent.

### Noise Management Plan

5. Prior to carrying out any development under this consent, unless the Secretary agrees otherwise, 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 in this consent;
  - (c) describe the proposed noise management system in detail; and
  - (d) include a monitoring program that:
    - evaluates and reports on:
      - the effectiveness of the noise management system;
      - compliance against the noise criteria in this consent; and
      - compliance against the noise operating conditions;
    - includes a program to calibrate and validate the real-time noise monitoring results with the attended monitoring results over time (so the real-time noise monitoring program can be used as a better indicator of compliance with the noise criteria in this consent and trigger for further attended monitoring); and
    - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.
6. The Applicant must implement the approved Noise Management Plan for the development.



## APPENDIX 6 NOISE COMPLIANCE ASSESSMENT

### Applicable Meteorological Conditions

1. The noise criteria in Table 3 of schedule 3 are to apply under all meteorological conditions except the following:
  - (a) wind speeds greater than 3 m/s at 10 m above ground level; or
  - (b) stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
  - (c) stability category G temperature inversion conditions.

### Determination of Meteorological Conditions

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions must be that recorded by the meteorological station located on the site.

### Compliance Monitoring

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
4. This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
5. Unless otherwise agreed with the Secretary, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
  - (a) monitoring locations for the collection of representative noise data;
  - (b) meteorological conditions during which collection of noise data is not appropriate;
  - (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
  - (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

Table 6-1: One-third octave low frequency noise thresholds

Hz/dB(Z)	One-third octave $L_{Zeq,15minute}$ threshold level												
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB(Z)	92	89	86	77	69	61	54	50	50	48	48	46	44

## A.2 Environmental Protection Licence

### L5 Noise limits

L5.1 Noise generated at the premises must not exceed the noise limits presented in the table below. The

locations referred to in the table below are indicated in Appendix 5 - Figures 1 and 2 of Development Consent number SSD-6764 dated 24 April 2017.

Location	Day	Evening	Night	Night
	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LA1(1 minute)
Wollar village - residential	36	37	37	45
All other privately owned land	35	35	35	45
102	36	36	38	45
Wollar school	35 (internal), 45 (external) when in use			
St Luke's Anglican Church & St Laurence O'Toole Catholic Church	40 (internal) when in use			

Note: The above noise limits do not apply at properties where the licensee has a written agreement with the landowner to exceed the noise limits.

L5.2 For the purpose of condition L5.1;

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.
- Evening is defined as the period 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.

L5.3 The noise limits set out in condition L5.1 apply under all meteorological conditions except for the following:

- a) Wind speeds greater than 3 metres/second at 10 metres above ground level; or
- b) Stability category F temperature inversions and wind speeds greater than 2m/s at 10m above ground level; or
- c) Stability category G temperature inversion conditions.

L5.4 For the purpose of condition L5.3:

- a) The meteorological data to be used for determining meteorological conditions is the data recorded by the meteorological weather station identified as EPA identification Point 21 in condition P1.1; 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.

- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, 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 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
    - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
  - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
  - c) With the noise limits in condition L5.1, 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 conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
  - b) at a point other than the most affected point at a location.
- L5.7 For the purpose 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.

## A.3 Noise Management Plan

### 6 Noise Monitoring Program

WCPL utilise a combination of operator-attended and unattended noise monitoring to assess the performance of the Mine against the Noise Criteria from Development Consent (SSD-6467). Operator-attended noise monitoring will be used for determining compliance against the Noise Criteria in **Table 6**. Unattended real-time noise monitoring is primarily utilised as a proactive noise control system; providing noise alerts when predetermined noise levels are triggered so mining operations can be modified where noise levels are influenced by noise from the Project.

#### 6.1 Monitoring Locations

Operator-attended noise monitoring locations have been chosen considering the following criteria:

- In any given direction, the site is as close as reasonably practical to the nearest Private Receiver;
- There is no closer Private Receiver that is not monitored;
- The site is unlikely to cause concern to any person residing on nearby private property; and
- The site can be safely accessed by the persons carrying out the noise monitoring.

WCPL will undertake operator-attended noise monitoring as identified in **Table 7 (Figure 3 and Figure 4)**. Real-time noise monitoring units are relocated from time to time, to assist with additional targeted noise monitoring and in response to community complaints. Real-time noise monitoring locations will be reviewed and modified as necessary in response to monitoring results, changes to the operation, or as a result of community consultation.

Should circumstances change, WCPL may amend the noise monitoring locations shown in **Table 7** with consideration to the above criteria. WCPL will update this NMP, in consultation with DPIE and the EPA.

**Table 7 Noise Monitoring Locations**

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
St Laurence O'Toole Church	N6	Operator-attended Noise	777299.9	6415716.9	Location based on the nearest community structure to the East of the Mine
Tichular	N14	Operator-attended Noise	778791.9	6408624.7	Location based on the nearest community structure to the South of the Mine
Wollar Village	N15	Operator-attended Noise	777452.0	6416158.9	Location based on the nearest community structure to the South-East of the Mine
Mogo Rd	N17	Operator-attended Noise	780771.0	6420641.0	Location based on the nearest community structure to the North-East of the Mine
Mogo Rd	N19	Operator-attended Noise	782644.5	6424151.1	Location based on the nearest and residential community structure to the North-East of the Mine
Ringwood Road	N20	Operator-attended Noise	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine.
WCPL Rail Loop	-	Meteorology & Inversion	770630.9	6418085.1	Location based on consideration of prevailing meteorological conditions



Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
Wollar Village <sup>4</sup>	-	Real-Time Noise - Fixed	777608.9	6415996.8	Location based on the nearest non-mine owned residence to the South-East of the Mine N15 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Mogo Rd <sup>4</sup>	-	Real-Time Noise - Fixed	782644.5	6424151.1	Location based on the nearest non-mine owned residence to the East of the Mine N19 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Ringwood Road	-	Real-Time Noise - Fixed	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine. N20 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Tichular <sup>3</sup>	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

**Notes:**

1. MGA94, Zone 55
2. Monitoring will be undertaken at this location until it can be demonstrated that the noise contribution from the Mine is negligible. At this point, WCPL will notify DPIE and EPA of the results of this monitoring and advise if and when the monitoring at this location will be scaled back or discontinued. The real-time noise monitor at Wandooona may be relocated in response to a complaint or identified noise issue at another location.
3. Where continuous monitors are located at compliance locations (e.g. privately-owned receivers), WCPL will conduct a review of the identification/characterisation of mine-related noise by the real-time monitoring system at that location by comparing against observed mine-related noise identified during operator-attended monitoring (i.e. validate the identification of mine related noise and filtering of extraneous noise sources by the real-time system). Refer to Section 6.5.

## 6.2 Meteorological Monitoring

WCPL maintains a continuous on-site meteorological monitoring station that complies with the requirements of the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (DEC, 2007). The location of this meteorological monitoring station is shown on **Figure 3**.

WCPL's meteorological monitoring station is capable of continuous real-time measurement of temperature lapse rate in accordance with the INP (EPA, 2000).

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

- a) Rainfall;
- b) Relative humidity;
- c) Temperature – measured at 2, 10 and 60 m above ground level;
- d) Wind speed – horizontal and vertical;
- e) Wind direction – measured at 10 m above ground level;
- f) Sigma theta;
- g) Pasquill stability classification;
- h) Solar radiation; and
- i) Temperature lapse rate.

Meteorological forecasting will be undertaken as specified in **Section 5.4**.

## 6.3 Operator-attended Noise Monitoring

### 6.3.1 Purpose

Operator-attended noise monitoring will be used to evaluate compliance against the Noise Criteria detailed in **Table 6**.

### 6.3.2 Summary

Operator-attended noise will be undertaken in accordance with **Table 8**.

**Table 8 Operator-attended Noise Monitoring Summary**

Element	Description
Locations	<ul style="list-style-type: none"> <li>As per <b>Table 7</b>,</li> <li><b>Figure 3</b> and <b>Figure 4</b></li> </ul>
Period	<ul style="list-style-type: none"> <li>Night-time period (10 pm to 7 am) being the most sensitive time period for noise.</li> </ul>
Frequency	<ul style="list-style-type: none"> <li>12 times per year<sup>1</sup> (i.e. one night per month); plus</li> <li>12 times per year<sup>1</sup> (i.e. one night per month) at locations as identified in <b>Table 7</b> to validate real-time noise monitoring data (<b>Section 6.5</b>).</li> </ul>

Notes: <sup>1</sup> Monitoring frequency at Mogo Road (N19) and Ringwood Road (N20) will remain at the frequency identified in **Table 8** during the commencement of operations in Pit 8. A review of the monitoring frequency at N19 and N20 will be undertaken during subsequent reviews of this NMP in consultation with WCPL's noise specialist and relevant government agencies.

### 6.3.3 Methodology

Operator-attended noise monitoring will be undertaken as outlined in **Table 8** by an independent acoustic consultant and guided by the requirements of the INP (EPA, 2000) and AS 1055.1-1997 'Acoustics – Description and measurement of environmental noise – General procedures'. Routine operator-attended noise monitoring will be undertaken during night-time periods (10 pm - 7 am).

If any of the Noise Criteria are exceeded, a second measurement will be taken at the same location within 75 minutes of the first measurement. If the second measurement does not exceed the Noise Criteria, as defined in **Table 6**, then the result will be recorded and the regular monitoring program resumed.

If the second measurement does exceed the applicable Noise Criteria, then:

- The noise consultant will immediately report both results to the WCPL Environment and Community Manager or delegate immediately;
- Upon confirming the exceedances are deemed a non-compliance in accordance with the **Figure 5**, WCPL will report both results to DPIE and EPA immediately, upon confirming the exceedance (**Section 9.0**).

WCPL will:

- Take immediate action in accordance with the NMS;
- Arrange for additional operator-attended noise monitoring to occur at that site within 1 week; and
- Deploy the mobile real-time noise monitor to measure and record the noise at that site for at least a 1 week period.

WCPL will also investigate any changes to the mine operations, and may revisit the noise model on the basis of the noise measurements recorded at the site.

The acoustic noise consultant will consider the modification factors in **Section 4** of the INP (EPA, 2000) during the evaluation of attending monitoring results.

### 6.3.6 Applicable Meteorological Conditions

The Noise Criteria in **Table 6** are to be applied under all meteorological conditions except for the following:

- Wind speeds greater than 3 m/s at 10 m above ground level; or
- Stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
- Stability category G temperature inversion conditions.

Except for wind speed at microphone height, the data used for determining meteorological conditions will be that recorded by the meteorological station located on the Mine site.

It should be noted that when assessing wind conditions to determine the potential for noise level alteration by the refraction of sound-waves through the atmosphere, meteorological measurements should be undertaken at a height of 10 m above the ground level, in accordance with Section 5 of the INP (EPA, 2000). Local meteorological conditions, including near-surface winds are measured at the inbuilt meteorological station (2 m); however, in accordance with the INP (EPA, 2000), the 2 m data cannot be used to determine impacts from sound-wave refraction. The 2 m meteorological data is used to assess local meteorological conditions that may increase ambient noise levels including surface winds and rainfall.

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## APPENDIX

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### ***B CALIBRATION CERTIFICATES***



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 Level Meter IEC 61672-3.2013 Calibration Certificate

Calibration Number C20674

<b>Client Details</b>	Global Acoustics Pty Ltd 12/16 Huntingdale Drive Thornton NSW 2322
<b>Equipment Tested/ Model Number :</b>	Rion NA-28
<b>Instrument Serial Number :</b>	00370304
<b>Microphone Serial Number :</b>	10421
<b>Pre-amplifier Serial Number :</b>	60313
<b>Pre-Test Atmospheric Conditions</b>	<b>Post-Test Atmospheric Conditions</b>
Ambient Temperature : 22°C	Ambient Temperature : 21.9°C
Relative Humidity : 50.6%	Relative Humidity : 50.1%
Barometric Pressure : 100.08kPa	Barometric Pressure : 100.09kPa
<b>Calibration Technician :</b> Lucky Jaiswal	<b>Secondary Check:</b> Max Moore
<b>Calibration Date :</b> 24 Nov 2020	<b>Report Issue Date :</b> 25 Nov 2020
<b>Approved Signatory :</b>	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.





**Sound Calibrator**  
IEC 60942-2017  
**Calibration Certificate**

Calibration Number C20676

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

**Equipment Tested/ Model Number :** Pulsar Model 106  
**Instrument Serial Number :** 81334

**Atmospheric Conditions**  
**Ambient Temperature :** 22.1°C  
**Relative Humidity :** 50.6%  
**Barometric Pressure :** 100.09kPa

**Calibration Technician :** Lucky Jaiswal  
**Calibration Date :** 24 Nov 2020  
**Secondary Check:** Max Moore  
**Report Issue Date :** 25 Nov 2020

**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	94.13	1000.30

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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PAGE 1 OF 1



# *Wilpinjong Coal*

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*Environmental Noise Monitoring  
March 2022*

*Prepared for  
Wilpinjong Coal Pty Ltd*

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Noise and Vibration Analysis and Solutions

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## Wilpinjong Coal

### Environmental Noise Monitoring March 2022

Reference: 22043\_R01

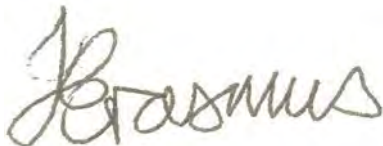
Report date: 18 April 2022

#### Prepared for

Wilpinjong Coal Pty Ltd  
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#### Prepared by

Global Acoustics Pty Ltd  
PO Box 3115  
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Prepared: Jonathan Erasmus  
Consultant



QA Review: Jesse Tribby  
Consultant

*Global Acoustics Pty Ltd ~ Environmental noise modelling and impact assessment ~ Sound power testing ~ Noise control advice ~ Noise and vibration monitoring ~ OHS noise monitoring and advice ~ Expert evidence in Land and Environment and Compensation Courts ~ Architectural acoustics ~ Blasting assessments and monitoring ~ Noise management plans (NMP) ~ Sound level meter and noise logger sales and hire*

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# 1 INTRODUCTION

## 1.1 Background

Global Acoustics was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP), an open cut coal mine located approximately 40 kilometres north east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 2/3 March 2022 at eight locations.

## 1.2 Monitoring Locations

Monitoring locations are detailed in Table 1.1 and shown on Figure 1. It should be noted that Figure 1 shows the actual monitoring position, not the location of residences.

*Table 1.1: WCP ATTENDED NOISE MONITORING LOCATIONS*

<b>NMP Descriptor</b>	<b>Monitoring Location</b>
N6	St Laurence O'Toole Catholic Church, representative of Wollar Village south
N14	'Tichular', intersection of Tichular and Barigan Roads, Tichular
N15	Track off Barigan Street near Wollar Public School, Wollar Village
N17	Mogo Road, off Araluen Road, Wollar
N19	North Mogo Road, Mogo
N20	Ringwood Road, off Wollar Road, Wollar





### 1.3 Terminology & Abbreviations

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

Table 1.2: TERMINOLOGY & ABBREVIATIONS

Descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The "A" weighting scale is used to describe human response to noise.
L <sub>Amax</sub>	The maximum A-weighted noise level over a time period.
L <sub>A1</sub>	The noise level which is exceeded for 1 per cent of the time.
L <sub>A1,1minute</sub>	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L <sub>A10</sub>	The noise level which is exceeded for 10 percent of the time.
L <sub>Aeq</sub>	The average noise A-weighted energy during a measurement period.
L <sub>A50</sub>	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L <sub>A90</sub>	The level exceeded for 90 percent of the time. The L <sub>A90</sub> level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes.
L <sub>Amin</sub>	The minimum A-weighted noise level over a time period.
L <sub>Ceq</sub>	The 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.
SC	Stability class (or category) is determined from measured wind speed and either sigma-theta or VTG.
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	This is the period 7:00am to 6:00pm.
Evening	This is the period 6:00pm to 10:00pm.
Night	This is the period 10:00pm to 7:00am.

## 2 REGULATOR REQUIREMENTS AND NOISE CRITERIA

### 2.1 Development Consent

The most current development consent associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017), which covers all current operations and has replaced the previous consent (05-0021). The relevant noise conditions from the current consent are reproduced in Appendix A.

### 2.2 Environment Protection Licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently issued in March 2021. Relevant noise sections of the EPL are reproduced in Appendix A.

### 2.3 Noise Monitoring Program

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in August 2020. The relevant sections are reproduced in Appendix A.

### 2.4 Project Specific Criteria

Noise criteria and meteorological conditions required for noise criteria to apply are consistent in the project approval and EPL. The applicable noise criteria for each monitoring location are shown in Table 2.1.

Table 2.1: WCP PROJECT SPECIFIC CRITERIA, dB

NMP Descriptor/ Resident Number	Monitoring Location	Day L <sub>Aeq,15minute</sub>	Evening L <sub>Aeq,15minute</sub>	Night L <sub>Aeq,15minute</sub> / L <sub>A1,1minute</sub>
N6 <sup>1</sup>	St Laurence O'Toole Catholic Church	36	37	37/45
N14	'Tichular'	35	35	35/45
N15	Wollar Village	36	37	37/45
N17 <sup>2</sup>	Mogo Road, off Araluen Road	36	36	38/45
N19	North Mogo Road	35	35	35/45
N20	Ringwood Road, off Wollar Road	35	35	35/45

Notes:

1. N6 noise limits have been assumed to be as detailed for 'Wollar Village – Residential' in the PA, as the church is no longer a place of worship; and
2. N17 noise limits have been determined based on the assumption that N17 is property 102 in accordance with Appendix 5 Figure 1 of Development Consent SSD-6764.

## 2.5 Modifying Factors

The EPA 'Noise Policy for Industry' (NPfI, 2017) was approved for use in NSW in October 2017. 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 has 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 NPfI. Low-frequency modifying factors have been assessed in accordance with both the development consent and NPfI.

## 3 METHODOLOGY

### 3.1 Overview

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

### 3.2 Attended Noise Monitoring

During this survey, monthly attended monitoring was undertaken during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric condition measurement was also undertaken at each monitoring location. Attended monitoring during this reporting period was undertaken by Jonathan Erasmus.

This survey presents noise levels gathered during attended monitoring that are the result of many sounds reaching the sound level meter microphone during monitoring. Received levels from various noise sources were noted during attended monitoring and particular attention was paid to the extent of WCP's contribution, if any, to measured levels. At each receptor location, WCP's  $L_{Aeq,15\text{minute}}$  and  $L_{A1,1\text{minute}}$  (in the absence of any other noise) was measured directly, where possible, or, determined by frequency analysis.

If the exact contribution of the source of interest (in this case WCP) cannot be established, due to masking by other noise sources in a similar frequency range, but site noise levels are observed to be well below (more than 5 dB lower than) any relevant criterion, a maximum estimate of the potential contribution of the site might be made based on other measured site-only noise descriptors in accordance with Section 7.1 of the NPfI. This is generally expressed as a 'less than' quantity, such as <20 dB or <30 dB.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may also 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 some noise was audible but could not be quantified. If site noise was NM due to masking but estimated to be significant in relation to a relevant criterion, we would employ methods (e.g. measure closer and back calculate) to determine a value for reporting.

All sites noted as NM in this report are due to one or more of the following reasons:

- Site noise levels were extremely low and unlikely, in many cases, to be even noticed;
- Site noise levels were masked by another relatively loud noise source that is characteristic of the environment (e.g. breeze in foliage or continuous road traffic noise) that cannot be eliminated by moving closer; and/or

- It was not feasible, nor reasonable to employ methods such as move closer and back calculate. Cases may include, but are not limited to, 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.

A measurement of  $L_{A1,1\text{minute}}$  corresponds to the highest noise level generated for 0.6 second during one minute. In practical terms this is the highest noise level, or  $L_{A\text{max}}$ , received from the site during the entire measurement period (i.e. the highest level of the worst minute during the 15 minute measurement).

Often extraneous noise events (for example, road traffic pass-bys and dogs) interfere with the measurement of site noise levels in the frequency range of interest. Where required, the sound level meter is paused during these occurrences to aid in quantification of the site only noise.

### 3.3 Modifying Factors

All measurements were evaluated for potential modifying factors in accordance with the NPfI. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfI.

Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable, such that the site-only  $L_{A\text{eq}}$  was not "NM" or less than a maximum cut off value (e.g. "<20 dB" or "<30dB").

If applicable, modifying factors have been reported and added to measured site-only  $L_{A\text{eq}}$  noise levels when meteorological conditions satisfied requirements for site noise criteria to be applicable. Low-frequency modifying factors have only been applied to site-only  $L_{A\text{eq}}$  levels if WCP was the only contributing low-frequency noise source.

### 3.4 Noise Monitoring Equipment

The equipment used to measure environmental noise levels are listed in Table 3.1. Calibration certificates are included as Appendix B.

Table 3.1: ATTENDED NOISE MONITORING EQUIPMENT

Model	Serial Number	Calibration Due Date
Rion NA-28 sound level meter	00370304	24/11/2022
Pulsar 105 acoustic calibrator	81334	29/11/2023

## 4 RESULTS

### 4.1 Total Measured Noise Levels

Overall noise levels measured at each location during attended measurement are provided in Table 4.1. Discussion as to the noise sources responsible for these measured levels is provided in Chapter 5 of this report.

Table 4.1: MEASURED NOISE LEVELS – MARCH 2022<sup>1</sup>

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	02/03/2022 23:19	45	42	42	41	41	40	38
N14	03/03/2022 00:30	45	37	37	36	36	35	33
N15	02/03/2022 23:00	45	38	36	35	34	33	31
N17	02/03/2022 22:30	46	41	31	30	28	26	23
N19	02/03/2022 22:06	52	36	35	34	34	33	31
N20	02/03/2022 23:46	41	35	33	32	32	31	30

Note:

- Noise levels in this table are not necessarily the result of activities at WCP.

### 4.2 Modifying Factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfI and methodology described in Section 3.3.

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



### 4.3 Attended Noise Monitoring

Table 4.2 to Table 4.3 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement.

**Table 4.2:  $L_{Aeq,15minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – MARCH 2022**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq,15min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	02/03/2022 23:19	2.4	D	37	Yes	IA	Nil
N14	03/03/2022 00:30	1.3	D	35	Yes	IA	Nil
N15	02/03/2022 23:00	1.0	D	37	Yes	IA	Nil
N17	02/03/2022 22:30	1.7	E	38	Yes	IA	Nil
N19	02/03/2022 22:06	1.7	D	35	Yes	IA	Nil
N20	02/03/2022 23:46	1.8	D	35	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.3:  $L_{A1,1minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – MARCH 2022**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	02/03/2022 23:19	2.4	D	45	Yes	IA	Nil
N14	03/03/2022 00:30	1.3	D	45	Yes	IA	Nil
N15	02/03/2022 23:00	1.0	D	45	Yes	IA	Nil
N17	02/03/2022 22:30	1.7	E	45	Yes	IA	Nil
N19	02/03/2022 22:06	1.7	D	45	Yes	IA	Nil
N20	02/03/2022 23:46	1.8	D	45	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{A1,1minute}$  attributed to WCP; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

## 4.4 Atmospheric Conditions

Atmospheric condition data measured by the operator during each measurement using a Kestrel hand-held weather meter is shown in Table 4.4. The wind speed, direction and temperature were measured at approximately 1.8 metres. Attended noise monitoring is not undertaken during rain, hail, or wind speeds above 5 m/s at microphone height.

Table 4.4: MEASURED ATMOSPHERIC CONDITIONS – MARCH 2022

Location	Start Date And Time	Temperature °C	Wind Speed m/s	Wind Direction °MN	Cloud Cover eighths
N6	02/03/2022 23:19	22	0.0	-	8
N14	03/03/2022 00:30	22	0.0	-	8
N15	02/03/2022 23:00	22	0.5	120	8
N17	02/03/2022 22:30	23	0.0	-	8
N19	02/03/2022 22:06	20	0.7	220	8
N20	02/03/2022 23:46	21	0.0	-	8

Notes:

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

Meteorological data used for compliance assessment is sourced from the WCP AWS and inversion tower.

## 5 DISCUSSION

### 5.1 Noted Noise Sources

During attended monitoring, the time variations (temporal characteristics) of noise sources are taken into account in each measurement via statistical descriptors. From these observations, summaries have been derived for each location and provided in this chapter. Statistical 1/3 octave-band analysis of environmental noise was undertaken and the following figures display frequency ranges of various noise sources at each location for LA1, LA10, LAeq, LA50 and LA90 descriptors. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 2 where it can be seen that frogs and insects are generating noise at frequencies above 1000 Hz while mining noise is at frequencies less than 1000 Hz, which is typical. Adding levels at frequencies that relate to mining only allows separate statistical results to be calculated. This analysis cannot always be performed if there are significant levels of other noise at the same frequencies as mining, such as dogs, cows, or (most commonly) road traffic.

It should be noted that the method of summing statistical values up to a cut-off frequency can overstate the LA1 result by a small margin but is entirely accurate for LAeq.

Historical site only noise levels from attended monitoring over the previous 12 month period have been provided as additional information in Table 5.1 to Table 5.6.

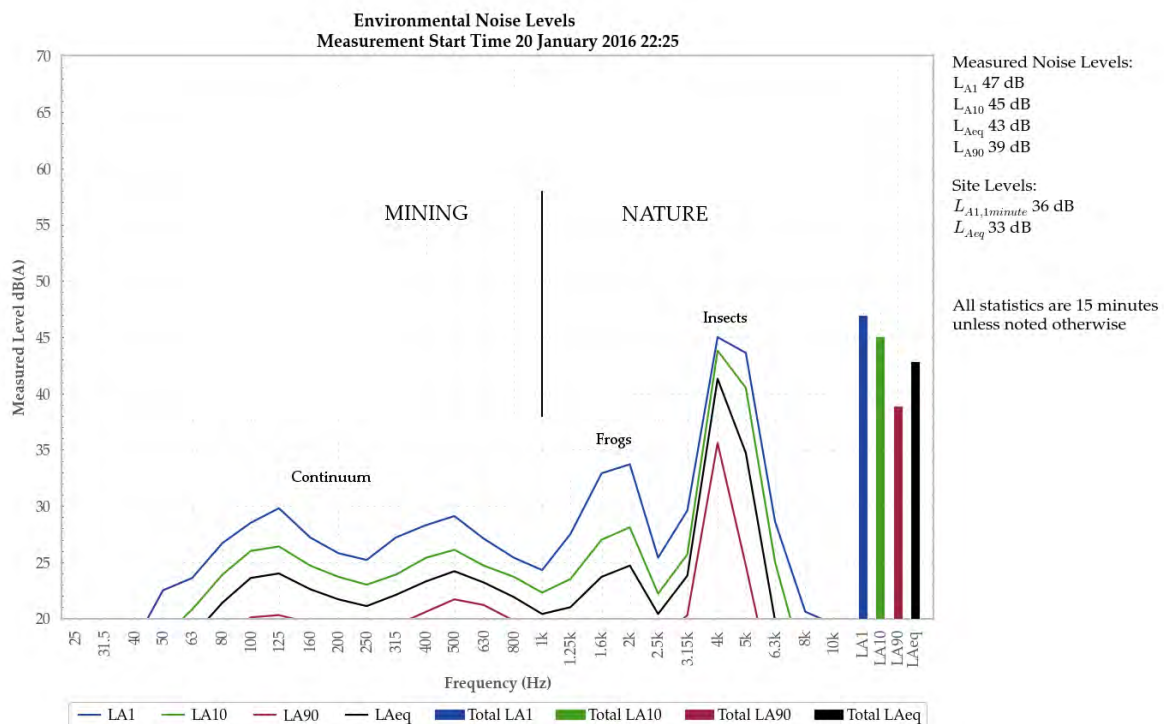
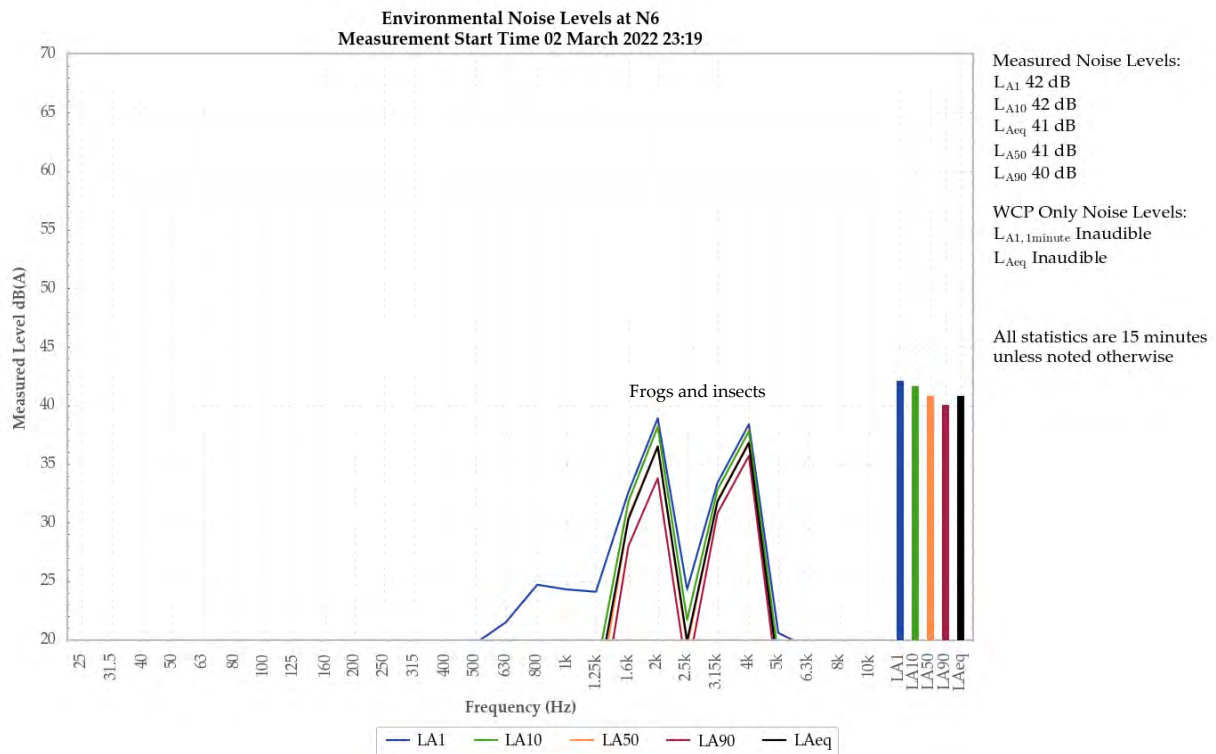


Figure 2: Example graph (refer to Section 5.1 for explanatory note)

### 5.1.1 N6



**Figure 3: Environmental Noise Levels - N6, St Laurence O’Toole Catholic Church, Wollar Village**

WCP was inaudible during the measurement.

Frogs and insects generated the measured noise levels.

Livestock and road traffic were also noted.

*Table 5.1: HISTORICAL WCP ONLY NOISE LEVELS AT N6*

Month	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Jan 2022	Feb 2022
<b>LAeq</b>	IA	IA	<20	IA	30	30	IA	<25	IA	IA	31	IA	IA	IA
<b>LA1,1min</b>	IA	IA	<20	IA	31	35	IA	<25	IA	IA	33	IA	IA	IA

### 5.1.2 N14

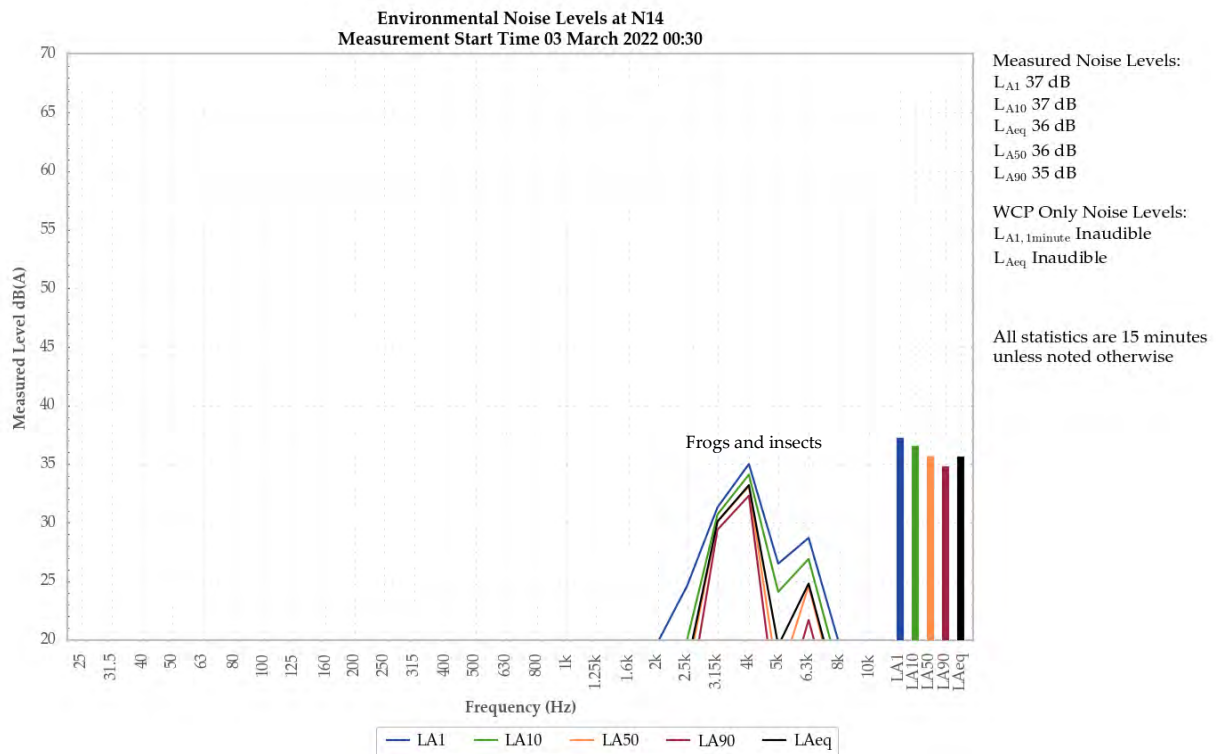


Figure 4: Environmental Noise Levels - N14, 'Tichular', intersection of Tichular and Barigan Roads

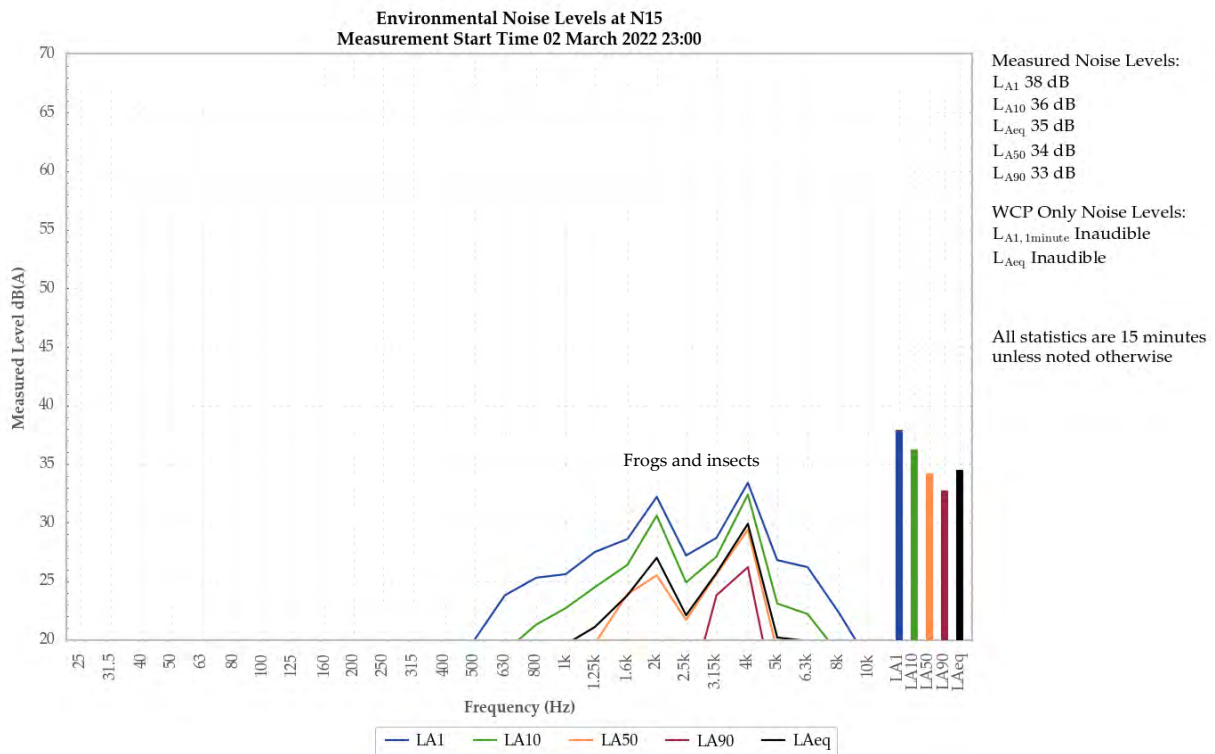
WCP was inaudible during the measurement.

Frogs and insects generated the measured noise levels.

Table 5.2: HISTORICAL WCP ONLY NOISE LEVELS AT N14

Month	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022
<b>L<sub>Aeq</sub></b>	IA	<25	<25	IA	<25	<20	<25	IA	IA	IA	<25	IA	IA	IA	IA
<b>L<sub>A1,1min</sub></b>	IA	28	<25	IA	27	<20	26	IA	IA	IA	25	IA	IA	IA	IA

### 5.1.3 N15



**Figure 5: Environmental Noise Levels - N15, Track off Barigan Street near Wollar School, Wollar Village**

WCP was inaudible during the measurement.

Frogs and insects generated the measured noise levels.

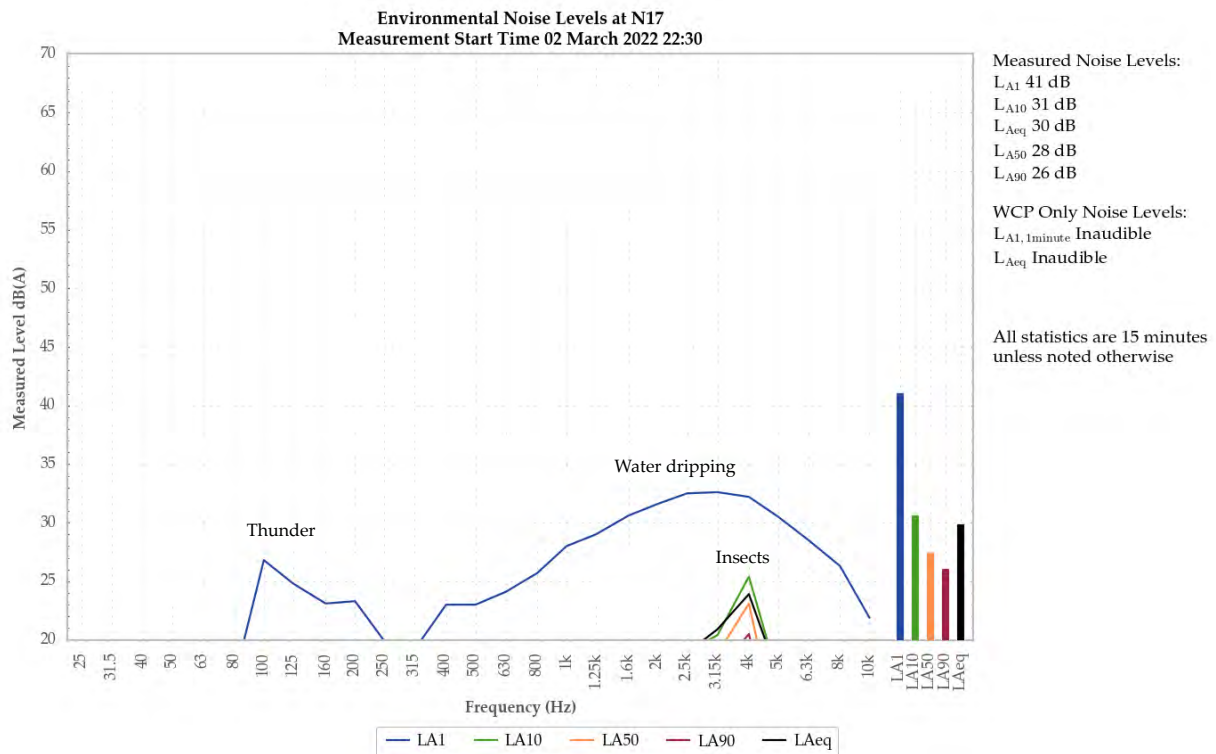
Road traffic and livestock were also noted.

*Table 5.3: HISTORICAL WCP ONLY NOISE LEVELS AT N15*

Month	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022
LAeq	IA	IA	IA	IA	34	30	IA	<25	IA	NM	33	IA	IA	IA	IA
LA1,1min	IA	IA	IA	IA	44	40	IA	<30	IA	NM	41	IA	IA	IA	IA



### 5.14 N17



**Figure 6: Environmental Noise Levels - N17 Mogo Road, off Araluen Road**

WCP was inaudible during the measurement.

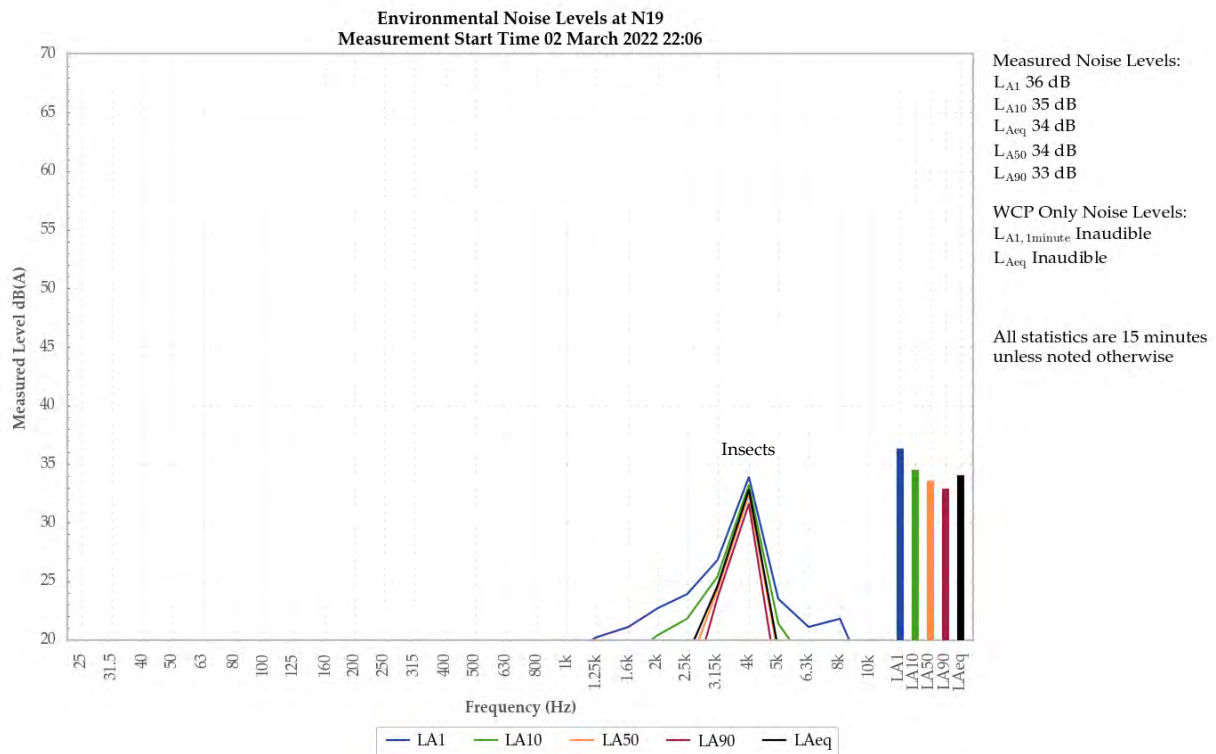
Water dripping generated the measured LA1. Insects generated the measured LA10, LAeq, LA50, and LA90.

Thunder and local engine noise were also noted.

*Table 5.4: HISTORICAL WCP ONLY NOISE LEVELS AT N17*

Month	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022
LAeq	<25	26	IA	IA	33	25	IA	IA	<20	IA	<20	IA	IA	IA	IA
LA1,1min	28	35	IA	IA	42	31	IA	IA	<20	IA	<25	IA	IA	IA	IA

### 5.1.5 N19



**Figure 7: Environmental Noise Levels - N19, Upper Mogo Road**

WCP was inaudible during the measurement.

Insects generated the measured noise levels.

Breeze in the foliage was also noted.

*Table 5.5: HISTORICAL WCP ONLY NOISE LEVELS AT N19*

Month	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022
LAeq	IA	<20	IA	IA	<25	<20	IA	IA	<20	IA	IA	IA	IA	IA	IA
LA1,1min	IA	<20	IA	IA	<30	<20	IA	IA	<20	IA	IA	IA	IA	IA	IA

5.1.6 N20

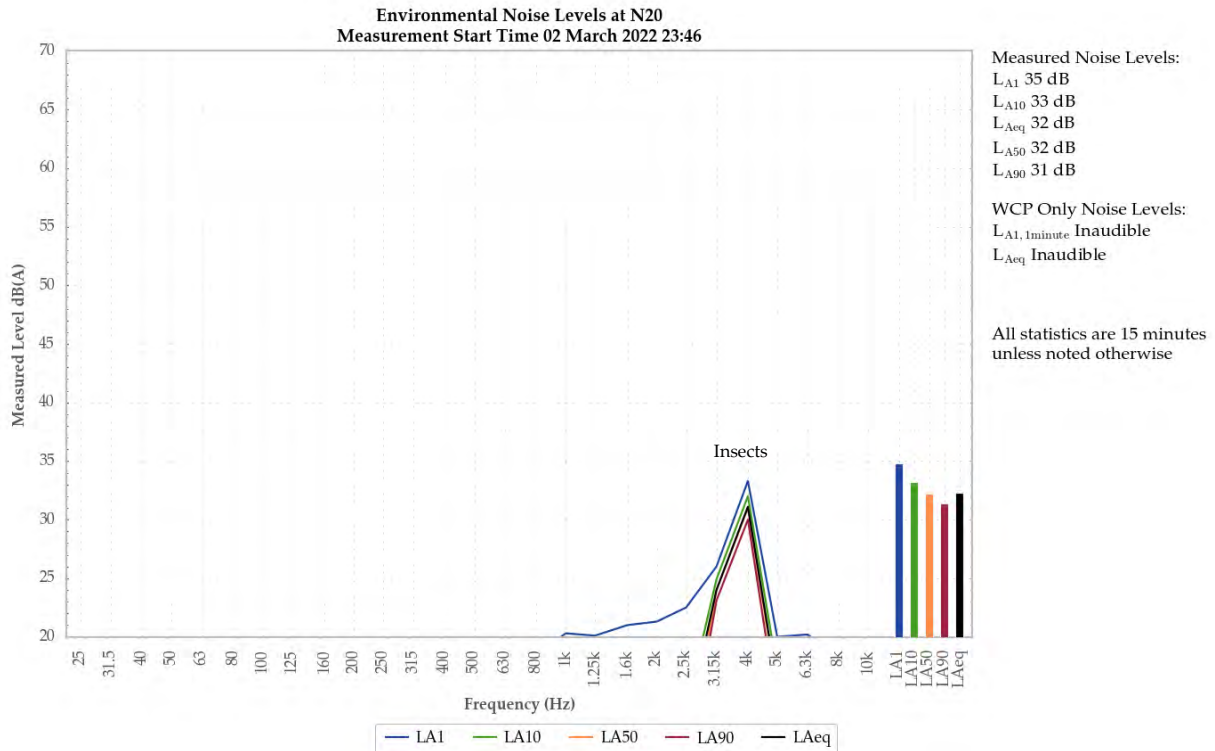


Figure 8: Environmental Noise Levels, N20 - Ringwood Road

WCP was inaudible during the measurement.

Insects generated the measured noise levels.

Table 5.6: HISTORICAL WCP ONLY NOISE LEVELS AT N20

Month	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022
LAeq	IA	IA	IA	IA	<25	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA
LA1,1min	IA	IA	IA	IA	31	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA

## 6 SUMMARY

Global Acoustics was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP, an open cut coal mine located approximately 40 kilometres north east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 2/3 March 2022 at eight monitoring locations.

Noise levels from WCP complied with relevant noise limits at all monitoring locations during the March 2022 monitoring. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

**Global Acoustics Pty Ltd**

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## APPENDIX

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### A *REGULATOR DOCUMENTS*

## A.1 Wilpinjong Coal Extension Project Approval (SSD-6764)

### SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

#### ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from the owner of the land listed in Table 1, the Applicant must acquire the land in accordance with the procedures in conditions 5 and 6 of schedule 4.

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

Note: To interpret the land referred to in Table 1, see the applicable figures in Appendix 5.

#### MITIGATION UPON REQUEST

2. Upon receiving a written request from the owner of any residence on the land listed in Table 2, the Applicant must implement additional noise mitigation measures at or in the immediate vicinity of the residence in consultation with the landowner. These measures must be consistent with the measures outlined in the *Voluntary Land Acquisition and Mitigation Policy*. They must also be reasonable and feasible and proportionate with the level of predicted impact.

If within 3 months of receiving this request from the owner, the Applicant and the owner 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.

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

Note: To interpret the land referred to in Table 2, see the applicable figures in Appendix 5.

#### NOISE

##### Noise Criteria

3. The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 3 at any residence on privately-owned land or at the other specified locations.

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>A1</sub> (1 minute)
102	36	36	38	45
Wollar Village – Residential	36	37	37	45
All other privately owned land	35	35	35	45
901 – Wollar School		35 (internal) 45 (external) When in use		-
150A – St Luke’s Anglican Church 900 – St Laurence O’Toole Catholic Church		40 (internal) When in use		-

Note: To interpret the locations referred to in Table 3, see the applicable figures in Appendix 5.

Noise generated by the development is to be measured in accordance with the relevant requirements of the *NSW Industrial Noise Policy* (as may be updated from time to time). Appendix 6 sets out the meteorological conditions under which these criteria apply along with any modifications to the *NSW Industrial Noise Policy* and the requirements for evaluating compliance with these criteria.

However, these criteria do not apply if the Applicant has an agreement with the owner/s of the relevant residence of land 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, low frequency, road and rail noise of the development;
  - (b) operate a comprehensive noise management system 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 consent;
  - (c) minimise the noise impacts of the development during meteorological conditions when the noise limits in this consent do not apply (see Appendix 6);
  - (d) only use locomotives and rolling stock that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL;
  - (e) co-ordinate noise management at the site with the noise management at Moolarben and Ulan mines to minimise cumulative noise impacts; and
  - (f) carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent.

### Noise Management Plan

5. Prior to carrying out any development under this consent, unless the Secretary agrees otherwise, 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 in this consent;
  - (c) describe the proposed noise management system in detail; and
  - (d) include a monitoring program that:
    - evaluates and reports on:
      - the effectiveness of the noise management system;
      - compliance against the noise criteria in this consent; and
      - compliance against the noise operating conditions;
    - includes a program to calibrate and validate the real-time noise monitoring results with the attended monitoring results over time (so the real-time noise monitoring program can be used as a better indicator of compliance with the noise criteria in this consent and trigger for further attended monitoring); and
    - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.
6. The Applicant must implement the approved Noise Management Plan for the development.

## APPENDIX 6 NOISE COMPLIANCE ASSESSMENT

### Applicable Meteorological Conditions

1. The noise criteria in Table 3 of schedule 3 are to apply under all meteorological conditions except the following:
  - (a) wind speeds greater than 3 m/s at 10 m above ground level; or
  - (b) stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
  - (c) stability category G temperature inversion conditions.

### Determination of Meteorological Conditions

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions must be that recorded by the meteorological station located on the site.

### Compliance Monitoring

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
4. This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
5. Unless otherwise agreed with the Secretary, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
  - (a) monitoring locations for the collection of representative noise data;
  - (b) meteorological conditions during which collection of noise data is not appropriate;
  - (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
  - (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

Table 6-1: One-third octave low frequency noise thresholds

Hz/dB(Z)	One-third octave $L_{Zeq,15minute}$ threshold level												
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB(Z)	92	89	86	77	69	61	54	50	50	48	48	46	44

## A.2 Environmental Protection Licence

### L5 Noise limits

L5.1 Noise generated at the premises must not exceed the noise limits presented in the table below. The

locations referred to in the table below are indicated in Appendix 5 - Figures 1 and 2 of Development Consent number SSD-6764 dated 24 April 2017.

Location	Day	Evening	Night	Night
	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LA1(1 minute)
Wollar village - residential	36	37	37	45
All other privately owned land	35	35	35	45
102	36	36	38	45
Wollar school	35 (internal), 45 (external) when in use			
St Luke's Anglican Church & St Laurence O'Toole Catholic Church	40 (internal) when in use			

Note: The above noise limits do not apply at properties where the licensee has a written agreement with the landowner to exceed the noise limits.

L5.2 For the purpose of condition L5.1;

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.
- Evening is defined as the period 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.

L5.3 The noise limits set out in condition L5.1 apply under all meteorological conditions except for the following:

- Wind speeds greater than 3 metres/second at 10 metres above ground level; or
- Stability category F temperature inversions and wind speeds greater than 2m/s at 10m above ground level; or
- Stability category G temperature inversion conditions.

L5.4 For the purpose of condition L5.3:

- The meteorological data to be used for determining meteorological conditions is the data recorded by the meteorological weather station identified as EPA identification Point 21 in condition P1.1; and
- 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.

- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, 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 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
    - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
  - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
  - c) With the noise limits in condition L5.1, 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 conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
  - b) at a point other than the most affected point at a location.
- L5.7 For the purpose 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.



## A.3 Noise Management Plan

### 6 Noise Monitoring Program

WCPL utilise a combination of operator-attended and unattended noise monitoring to assess the performance of the Mine against the Noise Criteria from Development Consent (SSD-6467). Operator-attended noise monitoring will be used for determining compliance against the Noise Criteria in **Table 6**. Unattended real-time noise monitoring is primarily utilised as a proactive noise control system; providing noise alerts when predetermined noise levels are triggered so mining operations can be modified where noise levels are influenced by noise from the Project.

#### 6.1 Monitoring Locations

Operator-attended noise monitoring locations have been chosen considering the following criteria:

- In any given direction, the site is as close as reasonably practical to the nearest Private Receiver;
- There is no closer Private Receiver that is not monitored;
- The site is unlikely to cause concern to any person residing on nearby private property; and
- The site can be safely accessed by the persons carrying out the noise monitoring.

WCPL will undertake operator-attended noise monitoring as identified in **Table 7 (Figure 3 and Figure 4)**. Real-time noise monitoring units are relocated from time to time, to assist with additional targeted noise monitoring and in response to community complaints. Real-time noise monitoring locations will be reviewed and modified as necessary in response to monitoring results, changes to the operation, or as a result of community consultation.

Should circumstances change, WCPL may amend the noise monitoring locations shown in **Table 7** with consideration to the above criteria. WCPL will update this NMP, in consultation with DPIE and the EPA.

**Table 7 Noise Monitoring Locations**

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
St Laurence O'Toole Church	N6	Operator-attended Noise	777299.9	6415716.9	Location based on the nearest community structure to the East of the Mine
Tichular	N14	Operator-attended Noise	778791.9	6408624.7	Location based on the nearest community structure to the South of the Mine
Wollar Village	N15	Operator-attended Noise	777452.0	6416158.9	Location based on the nearest community structure to the South-East of the Mine
Mogo Rd	N17	Operator-attended Noise	780771.0	6420641.0	Location based on the nearest community structure to the North-East of the Mine
Mogo Rd	N19	Operator-attended Noise	782644.5	6424151.1	Location based on the nearest and residential community structure to the North-East of the Mine
Ringwood Road	N20	Operator-attended Noise	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine.
WCPL Rail Loop	-	Meteorology & Inversion	770630.9	6418085.1	Location based on consideration of prevailing meteorological conditions

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
Wollar Village <sup>4</sup>	-	Real-Time Noise - Fixed	777608.9	6415996.8	Location based on the nearest non-mine owned residence to the South-East of the Mine N15 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Mogo Rd <sup>4</sup>	-	Real-Time Noise - Fixed	782644.5	6424151.1	Location based on the nearest non-mine owned residence to the East of the Mine N19 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Ringwood Road	-	Real-Time Noise - Fixed	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine. N20 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Tichular <sup>3</sup>	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

**Notes:**

1. MGA94, Zone 55
2. Monitoring will be undertaken at this location until it can be demonstrated that the noise contribution from the Mine is negligible. At this point, WCPL will notify DPIE and EPA of the results of this monitoring and advise if and when the monitoring at this location will be scaled back or discontinued. The real-time noise monitor at Wandooma may be relocated in response to a complaint or identified noise issue at another location.
3. Where continuous monitors are located at compliance locations (e.g. privately-owned receivers), WCPL will conduct a review of the identification/characterisation of mine-related noise by the real-time monitoring system at that location by comparing against observed mine-related noise identified during operator-attended monitoring (i.e. validate the identification of mine related noise and filtering of extraneous noise sources by the real-time system). Refer to Section 6.5.

## 6.2 Meteorological Monitoring

WCPL maintains a continuous on-site meteorological monitoring station that complies with the requirements of the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (DEC, 2007). The location of this meteorological monitoring station is shown on **Figure 3**.

WCPL's meteorological monitoring station is capable of continuous real-time measurement of temperature lapse rate in accordance with the INP (EPA, 2000).

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

- a) Rainfall;
- b) Relative humidity;
- c) Temperature – measured at 2, 10 and 60 m above ground level;
- d) Wind speed – horizontal and vertical;
- e) Wind direction – measured at 10 m above ground level;
- f) Sigma theta;
- g) Pasquil stability classification;
- h) Solar radiation; and
- i) Temperature lapse rate.

Meteorological forecasting will be undertaken as specified in **Section 5.4**.



## 6.3 Operator-attended Noise Monitoring

### 6.3.1 Purpose

Operator-attended noise monitoring will be used to evaluate compliance against the Noise Criteria detailed in **Table 6**.

### 6.3.2 Summary

Operator-attended noise will be undertaken in accordance with **Table 8**.

**Table 8 Operator-attended Noise Monitoring Summary**

Element	Description
Locations	<ul style="list-style-type: none"> <li>As per <b>Table 7</b>,</li> <li><b>Figure 3</b> and <b>Figure 4</b></li> </ul>
Period	<ul style="list-style-type: none"> <li>Night-time period (10 pm to 7 am) being the most sensitive time period for noise.</li> </ul>
Frequency	<ul style="list-style-type: none"> <li>12 times per year<sup>1</sup> (i.e. one night per month); plus</li> <li>12 times per year<sup>1</sup> (i.e. one night per month) at locations as identified in <b>Table 7</b> to validate real-time noise monitoring data (<b>Section 6.5</b>).</li> </ul>

Notes: <sup>1</sup> Monitoring frequency at Mogo Road (N19) and Ringwood Road (N20) will remain at the frequency identified in **Table 8** during the commencement of operations in Pit 8. A review of the monitoring frequency at N19 and N20 will be undertaken during subsequent reviews of this NMP in consultation with WCPL's noise specialist and relevant government agencies.

### 6.3.3 Methodology

Operator-attended noise monitoring will be undertaken as outlined in **Table 8** by an independent acoustic consultant and guided by the requirements of the INP (EPA, 2000) and AS 1055.1-1997 'Acoustics – Description and measurement of environmental noise – General procedures'. Routine operator-attended noise monitoring will be undertaken during night-time periods (10 pm - 7 am).

If any of the Noise Criteria are exceeded, a second measurement will be taken at the same location within 75 minutes of the first measurement. If the second measurement does not exceed the Noise Criteria, as defined in **Table 6**, then the result will be recorded and the regular monitoring program resumed.

If the second measurement does exceed the applicable Noise Criteria, then:

- The noise consultant will immediately report both results to the WCPL Environment and Community Manager or delegate immediately;
- Upon confirming the exceedances are deemed a non-compliance in accordance with the **Figure 5**, WCPL will report both results to DPIE and EPA immediately, upon confirming the exceedance (**Section 9.0**).

WCPL will:

- Take immediate action in accordance with the NMS;
- Arrange for additional operator-attended noise monitoring to occur at that site within 1 week; and
- Deploy the mobile real-time noise monitor to measure and record the noise at that site for at least a 1 week period.

WCPL will also investigate any changes to the mine operations, and may revisit the noise model on the basis of the noise measurements recorded at the site.

The acoustic noise consultant will consider the modification factors in **Section 4** of the INP (EPA, 2000) during the evaluation of attending monitoring results.

### 6.3.6 Applicable Meteorological Conditions

The Noise Criteria in **Table 6** are to be applied under all meteorological conditions except for the following:

- Wind speeds greater than 3 m/s at 10 m above ground level; or
- Stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
- Stability category G temperature inversion conditions.

Except for wind speed at microphone height, the data used for determining meteorological conditions will be that recorded by the meteorological station located on the Mine site.

It should be noted that when assessing wind conditions to determine the potential for noise level alteration by the refraction of sound-waves through the atmosphere, meteorological measurements should be undertaken at a height of 10 m above the ground level, in accordance with Section 5 of the INP (EPA, 2000). Local meteorological conditions, including near-surface winds are measured at the inbuilt meteorological station (2 m); however, in accordance with the INP (EPA, 2000), the 2 m data cannot be used to determine impacts from sound-wave refraction. The 2 m meteorological data is used to assess local meteorological conditions that may increase ambient noise levels including surface winds and rainfall.

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## APPENDIX

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### ***B CALIBRATION CERTIFICATES***



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 Level Meter IEC 61672-3.2013 Calibration Certificate

Calibration Number C20674

<b>Client Details</b>	Global Acoustics Pty Ltd 12/16 Huntingdale Drive Thornton NSW 2322
<b>Equipment Tested/ Model Number :</b>	Rion NA-28
<b>Instrument Serial Number :</b>	00370304
<b>Microphone Serial Number :</b>	10421
<b>Pre-amplifier Serial Number :</b>	60313
<b>Pre-Test Atmospheric Conditions</b>	<b>Post-Test Atmospheric Conditions</b>
Ambient Temperature : 22°C	Ambient Temperature : 21.9°C
Relative Humidity : 50.6%	Relative Humidity : 50.1%
Barometric Pressure : 100.08kPa	Barometric Pressure : 100.09kPa
<b>Calibration Technician :</b> Lucky Jaiswal	<b>Secondary Check:</b> Max Moore
<b>Calibration Date :</b> 24 Nov 2020	<b>Report Issue Date :</b> 25 Nov 2020
<b>Approved Signatory :</b>	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 C21832

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

**Equipment Tested/ Model Number :** Pulsar Model 105  
**Instrument Serial Number :** 81334

**Atmospheric Conditions**

**Ambient Temperature :** 25°C  
**Relative Humidity :** 49.6%  
**Barometric Pressure :** 100.8kPa

**Calibration Technician :** Lucky Jaiswal  
**Calibration Date :** 29 Nov 2021  
**Secondary Check:** Harrison Kim  
**Report Issue Date :** 2 Dec 2021

**Approved Signatory :** *Ken Williams*

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	94.19	1000.30

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.

Uncertainties of Measurement -			
Specific Tests	Environmental Conditions		
Generated SPL	±0.11dB	Temperature	±0.1°C
Frequency	±0.07%	Relative Humidity	±1.9%
Distortion	±0.50%	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.

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PAGE 1 OF 1

# *Wilpinjong Coal*

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*Environmental Noise Monitoring  
April 2022*

*Prepared for  
Wilpinjong Coal Pty Ltd*

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Noise and Vibration Analysis and Solutions

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## Wilpinjong Coal

### Environmental Noise Monitoring April 2022

Reference: 22055\_R01

Report date: 18 May 2022

#### Prepared for

Wilpinjong Coal Pty Ltd  
Locked Bag 2005  
Mudgee NSW 2850

#### Prepared by

Global Acoustics Pty Ltd  
PO Box 3115  
Thornton NSW 2322



Prepared: Will Moore  
Consultant



QA Review: Jesse Tribby  
Consultant

*Global Acoustics Pty Ltd ~ Environmental noise modelling and impact assessment ~ Sound power testing ~ Noise control advice ~ Noise and vibration monitoring ~ OHS noise monitoring and advice ~ Expert evidence in Land and Environment and Compensation Courts ~ Architectural acoustics ~ Blasting assessments and monitoring ~ Noise management plans (NMP) ~ Sound level meter and noise logger sales and hire*

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# 1 INTRODUCTION

## 1.1 Background

Global Acoustics was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP), an open cut coal mine located approximately 40 kilometres north east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 28/29 April 2022 at eight locations.

## 1.2 Monitoring Locations

Monitoring locations are detailed in Table 1.1 and shown on Figure 1. It should be noted that Figure 1 shows the actual monitoring position, not the location of residences.

Table 1.1: WCP ATTENDED NOISE MONITORING LOCATIONS

NMP Descriptor	Monitoring Location
N6	St Laurence O'Toole Catholic Church, representative of Wollar Village south
N14	'Tichular', intersection of Tichular and Barigan Roads, Tichular
N15	Track off Barigan Street near Wollar Public School, Wollar Village
N17	Mogo Road, off Araluen Road, Wollar
N19	North Mogo Road, Mogo
N20	Ringwood Road, off Wollar Road, Wollar

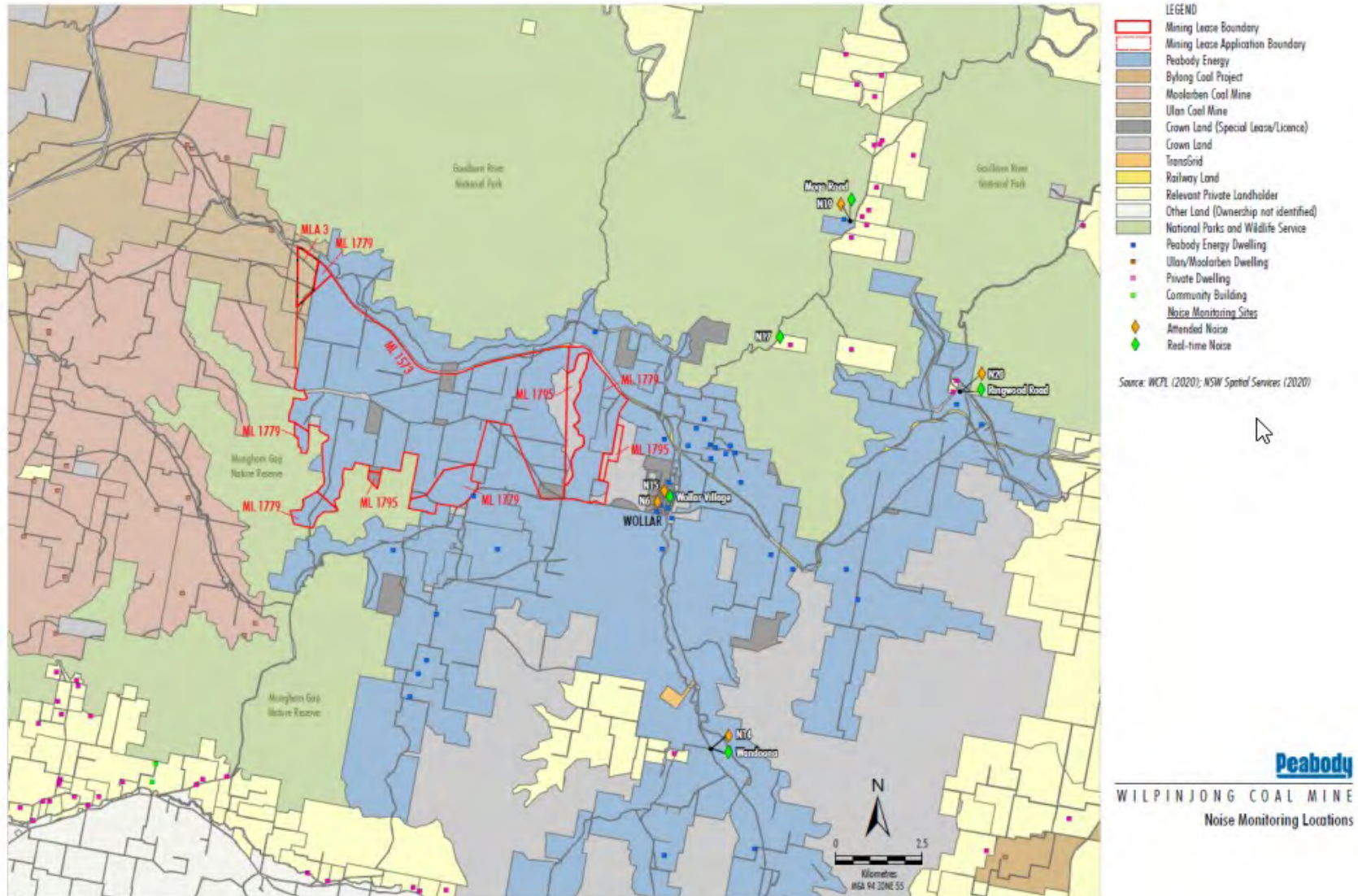


Figure 1: WCP Attended Noise Monitoring Locations (Source: WCP NMP, 2020)

### 1.3 Terminology & Abbreviations

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

Table 1.2: TERMINOLOGY & ABBREVIATIONS

Descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The "A" weighting scale is used to describe human response to noise.
L <sub>Amax</sub>	The maximum A-weighted noise level over a time period.
L <sub>A1</sub>	The noise level which is exceeded for 1 per cent of the time.
L <sub>A1,1minute</sub>	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L <sub>A10</sub>	The noise level which is exceeded for 10 percent of the time.
L <sub>Aeq</sub>	The average noise A-weighted energy during a measurement period.
L <sub>A50</sub>	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L <sub>A90</sub>	The level exceeded for 90 percent of the time. The L <sub>A90</sub> level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes.
L <sub>Amin</sub>	The minimum A-weighted noise level over a time period.
L <sub>Ceq</sub>	The 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.
SC	Stability class (or category) is determined from measured wind speed and either sigma-theta or VTG.
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	This is the period 7:00am to 6:00pm.
Evening	This is the period 6:00pm to 10:00pm.
Night	This is the period 10:00pm to 7:00am.



## 2 REGULATOR REQUIREMENTS AND NOISE CRITERIA

### 2.1 Development Consent

The most current development consent associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017), which covers all current operations and has replaced the previous consent (05-0021). The relevant noise conditions from the current consent are reproduced in Appendix A.

### 2.2 Environment Protection Licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently issued in March 2021. Relevant noise sections of the EPL are reproduced in Appendix A.

### 2.3 Noise Monitoring Program

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in August 2020. The relevant sections are reproduced in Appendix A.

### 2.4 Project Specific Criteria

Noise criteria and meteorological conditions required for noise criteria to apply are consistent in the project approval and EPL. The applicable noise criteria for each monitoring location are shown in Table 2.1.

Table 2.1: WCP PROJECT SPECIFIC CRITERIA, dB

NMP Descriptor / Resident Number	Monitoring Location	Day L <sub>Aeq,15minute</sub>	Evening L <sub>Aeq,15minute</sub>	Night L <sub>Aeq,15minute</sub> / L <sub>A1,1minute</sub>
N6 <sup>1</sup>	St Laurence O'Toole Catholic Church	36	37	37/45
N14	'Tichular'	35	35	35/45
N15	Wollar Village	36	37	37/45
N17 <sup>2</sup>	Mogo Road, off Araluen Road	36	36	38/45
N19	North Mogo Road	35	35	35/45
N20	Ringwood Road, off Wollar Road	35	35	35/45

Notes:

1. N6 noise limits have been assumed to be as detailed for 'Wollar Village – Residential' in the PA, as the church is no longer a place of worship; and
2. N17 noise limits have been determined based on the assumption that N17 is property 102 in accordance with Appendix 5 Figure 1 of Development Consent SSD-6764.

## 2.5 *Modifying Factors*

The EPA 'Noise Policy for Industry' (NPfI, 2017) was approved for use in NSW in October 2017. 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 has 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 NPfI. Low-frequency modifying factors have been assessed in accordance with both the development consent and NPfI.

## 3 METHODOLOGY

### 3.1 Overview

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

### 3.2 Attended Noise Monitoring

During this survey, monthly attended monitoring was undertaken during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric condition measurement was also undertaken at each monitoring location. Attended monitoring during this reporting period was undertaken by Will Moore.

This survey presents noise levels gathered during attended monitoring that are the result of many sounds reaching the sound level meter microphone during monitoring. Received levels from various noise sources were noted during attended monitoring and particular attention was paid to the extent of WCP's contribution, if any, to measured levels. At each receptor location, WCP's  $L_{Aeq,15\text{minute}}$  and  $L_{A1,1\text{minute}}$  (in the absence of any other noise) was measured directly, where possible, or, determined by frequency analysis.

If the exact contribution of the source of interest (in this case WCP) cannot be established, due to masking by other noise sources in a similar frequency range, but site noise levels are observed to be well below (more than 5 dB lower than) any relevant criterion, a maximum estimate of the potential contribution of the site might be made based on other measured site-only noise descriptors in accordance with Section 7.1 of the NPfI. This is generally expressed as a 'less than' quantity, such as <20 dB or <30 dB.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may also 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 some noise was audible but could not be quantified. If site noise was NM due to masking but estimated to be significant in relation to a relevant criterion, we would employ methods (e.g. measure closer and back calculate) to determine a value for reporting.

All sites noted as NM in this report are due to one or more of the following reasons:

- Site noise levels were extremely low and unlikely, in many cases, to be even noticed;
- Site noise levels were masked by another relatively loud noise source that is characteristic of the environment (e.g. breeze in foliage or continuous road traffic noise) that cannot be eliminated by moving closer; and/or

- It was not feasible, nor reasonable to employ methods such as move closer and back calculate. Cases may include, but are not limited to, 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.

A measurement of  $L_{A1,1\text{minute}}$  corresponds to the highest noise level generated for 0.6 second during one minute. In practical terms this is the highest noise level, or  $L_{A\text{max}}$ , received from the site during the entire measurement period (i.e. the highest level of the worst minute during the 15 minute measurement).

Often extraneous noise events (for example, road traffic pass-bys and dogs) interfere with the measurement of site noise levels in the frequency range of interest. Where required, the sound level meter is paused during these occurrences to aid in quantification of the site only noise.

### 3.3 Modifying Factors

All measurements were evaluated for potential modifying factors in accordance with the NPfI. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfI.

Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable, such that the site-only  $L_{A\text{eq}}$  was not "NM" or less than a maximum cut off value (e.g. "<20 dB" or "<30dB").

If applicable, modifying factors have been reported and added to measured site-only  $L_{A\text{eq}}$  noise levels when meteorological conditions satisfied requirements for site noise criteria to be applicable. Low-frequency modifying factors have only been applied to site-only  $L_{A\text{eq}}$  levels if WCP was the only contributing low-frequency noise source.

### 3.4 Noise Monitoring Equipment

The equipment used to measure environmental noise levels are listed in Table 3.1. Calibration certificates are included as Appendix B.

Table 3.1: ATTENDED NOISE MONITORING EQUIPMENT

Model	Serial Number	Calibration Due Date
Rion NA-28 sound level meter	30131882	08/02/2023
Pulsar 105 acoustic calibrator	78226	08/02/2023

## 4 RESULTS

### 4.1 Total Measured Noise Levels

Overall noise levels measured at each location during attended measurement are provided in Table 4.1. Discussion as to the noise sources responsible for these measured levels is provided in Chapter 5 of this report.

Table 4.1: MEASURED NOISE LEVELS – APRIL 2022<sup>1</sup>

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	29/04/2022 01:15	46	42	35	34	33	32	30
N14	28/04/2022 23:46	53	46	42	41	41	40	39
N15	28/04/2022 23:00	56	51	43	41	36	34	31
N17	28/04/2022 22:25	52	36	32	30	29	28	27
N19	28/04/2022 22:00	44	41	38	34	31	28	27
N20	29/04/2022 00:30	49	43	35	33	30	28	26

Note:

- Noise levels in this table are not necessarily the result of activities at WCP.

### 4.2 Modifying Factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfI and methodology described in Section 3.3.

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

### 4.3 Attended Noise Monitoring

Table 4.2 to Table 4.3 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement.

**Table 4.2:  $L_{Aeq,15minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – APRIL 2022**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq,15min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	29/04/2022 01:15	0.8	E	37	Yes	<20	Nil
N14	28/04/2022 23:46	0.0	D	35	Yes	<25	Nil
N15	28/04/2022 23:00	0.0	E	37	Yes	23	Nil
N17	28/04/2022 22:25	0.0	E	38	Yes	<20	Nil
N19	28/04/2022 22:00	0.0	E	35	Yes	IA	Nil
N20	29/04/2022 00:30	1.2	E	35	Yes	<25	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.3:  $L_{A1,1minute}$  GENERATED BY WCP AGAINST PROJECT SPECIFIC CRITERIA – APRIL 2022**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3</sup>	Exceedance <sup>4</sup>
N6	29/04/2022 01:15	0.8	E	45	Yes	23	Nil
N14	28/04/2022 23:46	0.0	D	45	Yes	<25	Nil
N15	28/04/2022 23:00	0.0	E	45	Yes	32	Nil
N17	28/04/2022 22:25	0.0	E	45	Yes	23	Nil
N19	28/04/2022 22:00	0.0	E	45	Yes	IA	Nil
N20	29/04/2022 00:30	1.2	E	45	Yes	<25	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data;
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions;
3. Site-only  $L_{A1,1minute}$  attributed to WCP; and
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.



## 4.4 Atmospheric Conditions

Atmospheric condition data measured by the operator during each measurement using a Kestrel hand-held weather meter is shown in Table 4.4. The wind speed, direction and temperature were measured at approximately 1.8 metres. Attended noise monitoring is not undertaken during rain, hail, or wind speeds above 5 m/s at microphone height.

Table 4.4: MEASURED ATMOSPHERIC CONDITIONS – APRIL 2022

Location	Start Date And Time	Temperature °C	Wind Speed m/s	Wind Direction °MN	Cloud Cover eighths
N6	29/04/2022 01:15	19	0.0	-	4
N14	28/04/2022 23:46	18	0.0	-	7
N15	28/04/2022 23:00	20	0.0	-	6
N17	28/04/2022 22:25	19	0.0	-	6
N19	28/04/2022 22:00	19	0.5	85	6
N20	29/04/2022 00:30	19	0.0	-	7

Notes:

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

Meteorological data used for compliance assessment is sourced from the WCP AWS and inversion tower.

## 5 DISCUSSION

### 5.1 Noted Noise Sources

During attended monitoring, the time variations (temporal characteristics) of noise sources are taken into account in each measurement via statistical descriptors. From these observations, summaries have been derived for each location and provided in this chapter. Statistical 1/3 octave-band analysis of environmental noise was undertaken and the following figures display frequency ranges of various noise sources at each location for LA1, LA10, LAeq, LA50 and LA90 descriptors. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 2 where it can be seen that frogs and insects are generating noise at frequencies above 1000 Hz while mining noise is at frequencies less than 1000 Hz, which is typical. Adding levels at frequencies that relate to mining only allows separate statistical results to be calculated. This analysis cannot always be performed if there are significant levels of other noise at the same frequencies as mining, such as dogs, cows, or (most commonly) road traffic.

It should be noted that the method of summing statistical values up to a cut-off frequency can overstate the LA1 result by a small margin but is entirely accurate for LAeq.

Historical site only noise levels from attended monitoring over the previous 12 month period have been provided as additional information in Table 5.1 to Table 5.6.

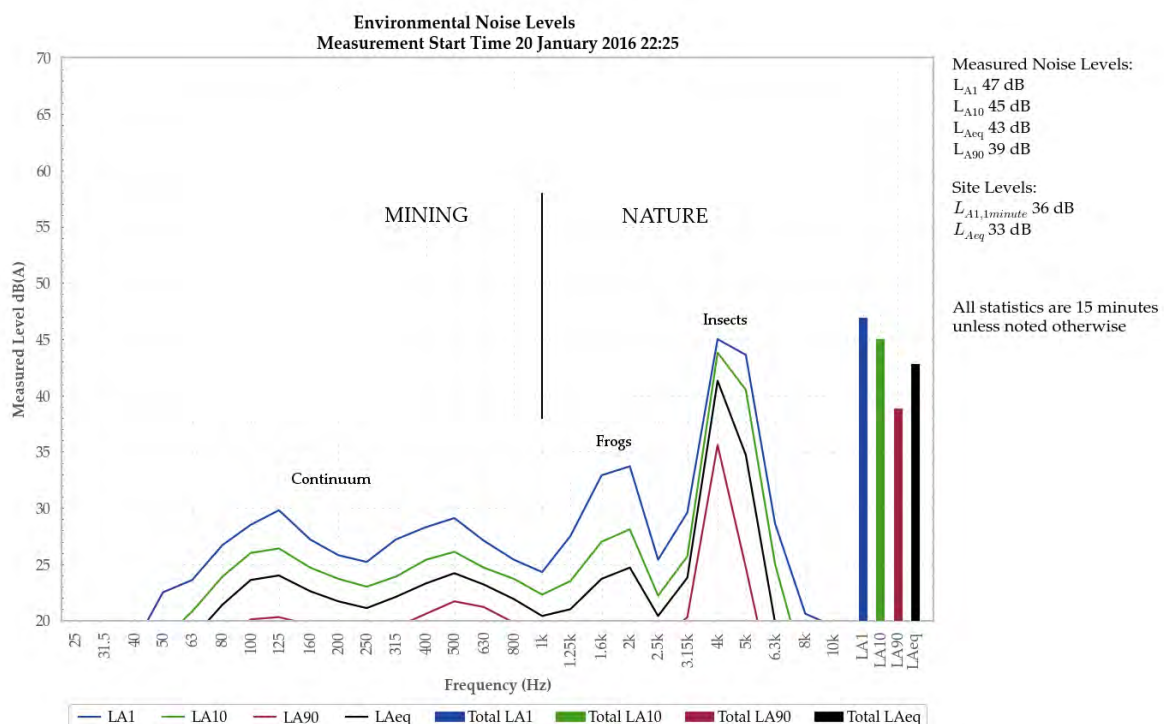


Figure 2: Example graph (refer to Section 5.1 for explanatory note)

5.1.1 N6

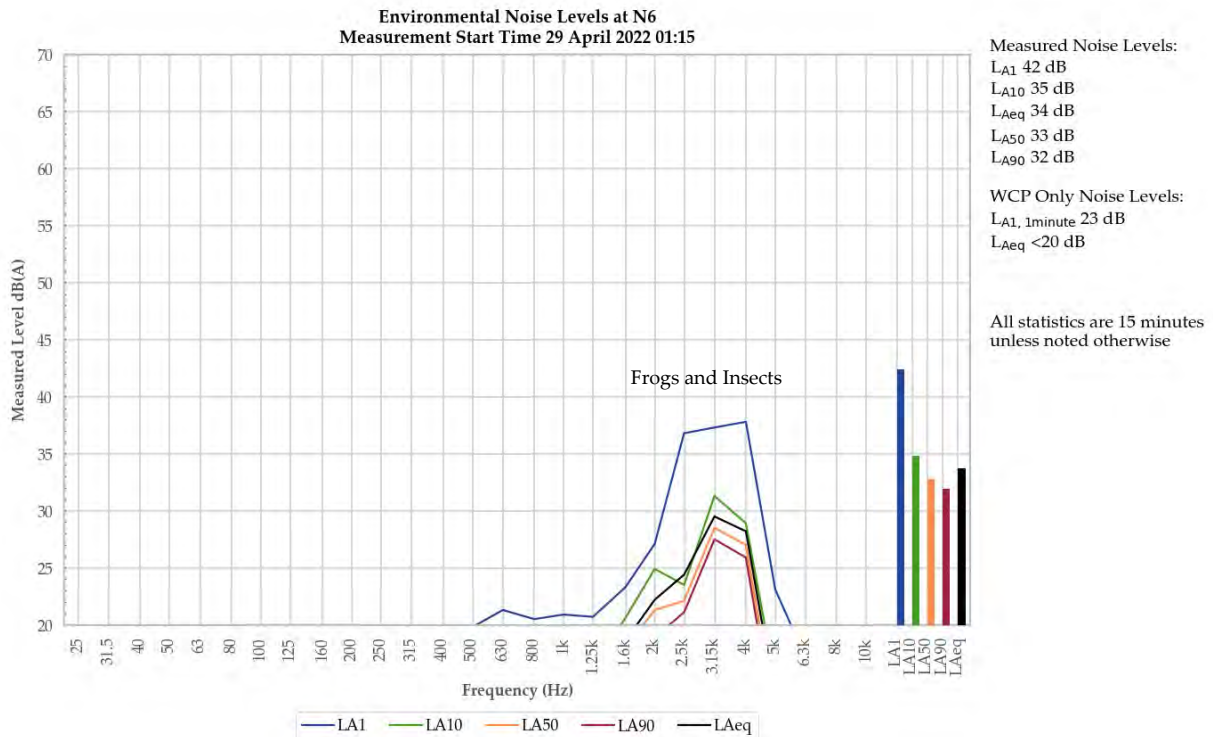


Figure 3: Environmental Noise Levels - N6, St Laurence O’Toole Catholic Church, Wollar Village

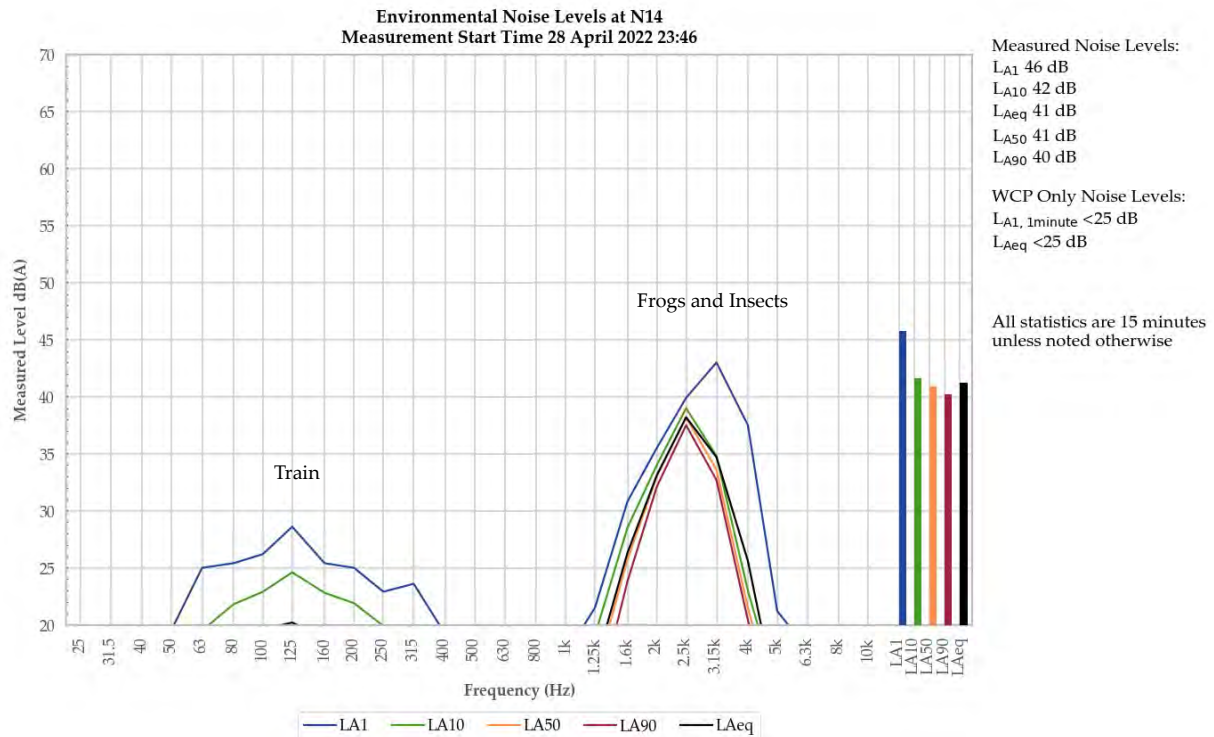
A mining continuum from WCP was audible at very low levels during the measurement, generating a site-only LAeq of less than 20 dB. Engine surges were responsible for generating the LA1,1minute of 23 dB.

Frogs and insects were responsible for the measured noise levels.

Table 5.1: HISTORICAL WCP ONLY NOISE LEVELS AT N6

Month	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	Mar 2022
LAeq	30	30	IA	<25	IA	IA	31	IA	IA	IA	IA	IA
LA1,1min	31	35	IA	<25	IA	IA	33	IA	IA	IA	IA	IA

### 5.1.2 N14



**Figure 4: Environmental Noise Levels - N14, 'Tichular', intersection of Tichular and Barigan Roads**

A mining continuum from WCP was audible at low levels throughout the measurement, generating a site-only LAeq and LA1,1minute of less than 25 dB. Track noise was also noted.

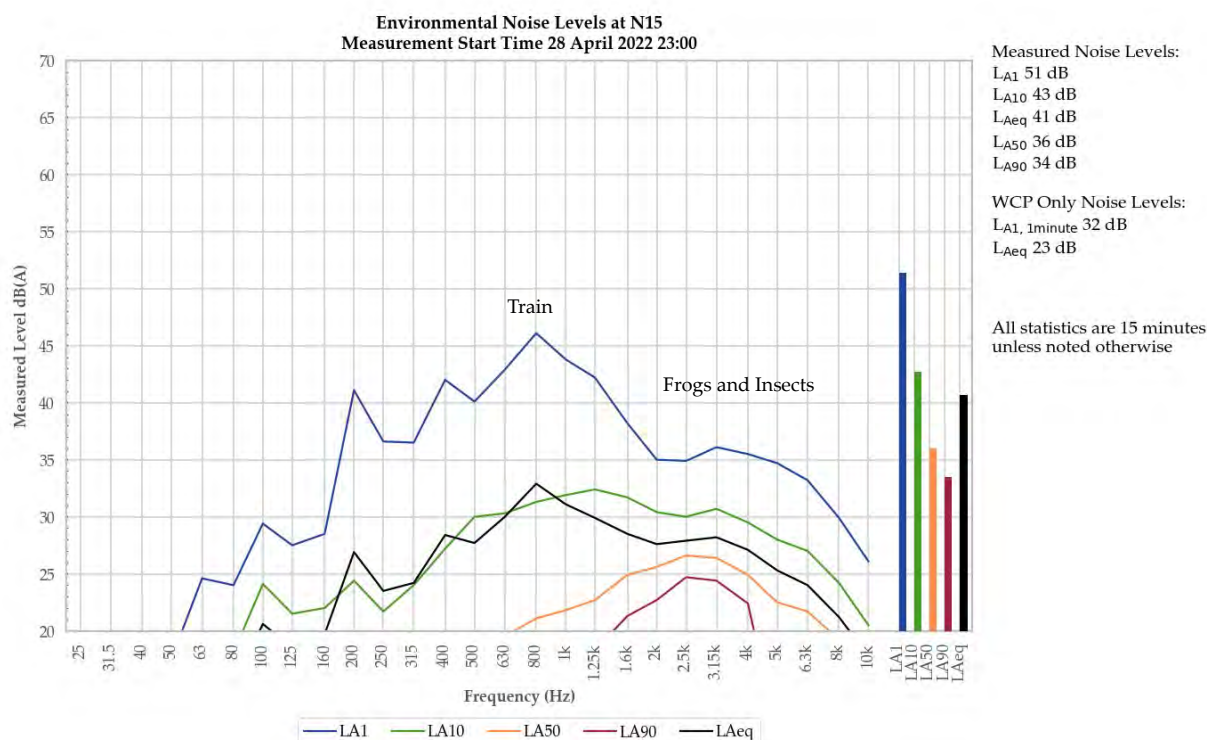
Frogs and insects were responsible for the measured noise levels.

A train and birds were also noted.

*Table 5.2: HISTORICAL WCP ONLY NOISE LEVELS AT N14*

Month	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	Mar 2022
<b>LAeq</b>	<25	<20	<25	IA	IA	IA	<25	IA	IA	IA	IA	IA
<b>LA1,1min</b>	27	<20	26	IA	IA	IA	25	IA	IA	IA	IA	IA

### 5.1.3 N15



**Figure 5: Environmental Noise Levels - N15, Track off Barigan Street near Wollar School, Wollar Village**

A mining continuum from WCP was audible at low levels throughout the measurement, generating a site-only LAeq of 23 dB. Engine surges were responsible for generating the LA1,1minute of 32dB.

A train was primarily responsible for the measured LA1, LA10, and LAeq. Frogs and insects contributed to the measured LAeq and were responsible for the LA50 and LA90

Raindrops from recent rainfall were also noted.

**Table 5.3: HISTORICAL WCP ONLY NOISE LEVELS AT N15**

Month	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	Mar 2022
LAeq	34	30	IA	<25	IA	NM	33	IA	IA	IA	IA	IA
LA1,1min	44	40	IA	<30	IA	NM	41	IA	IA	IA	IA	IA

5.1.4 N17

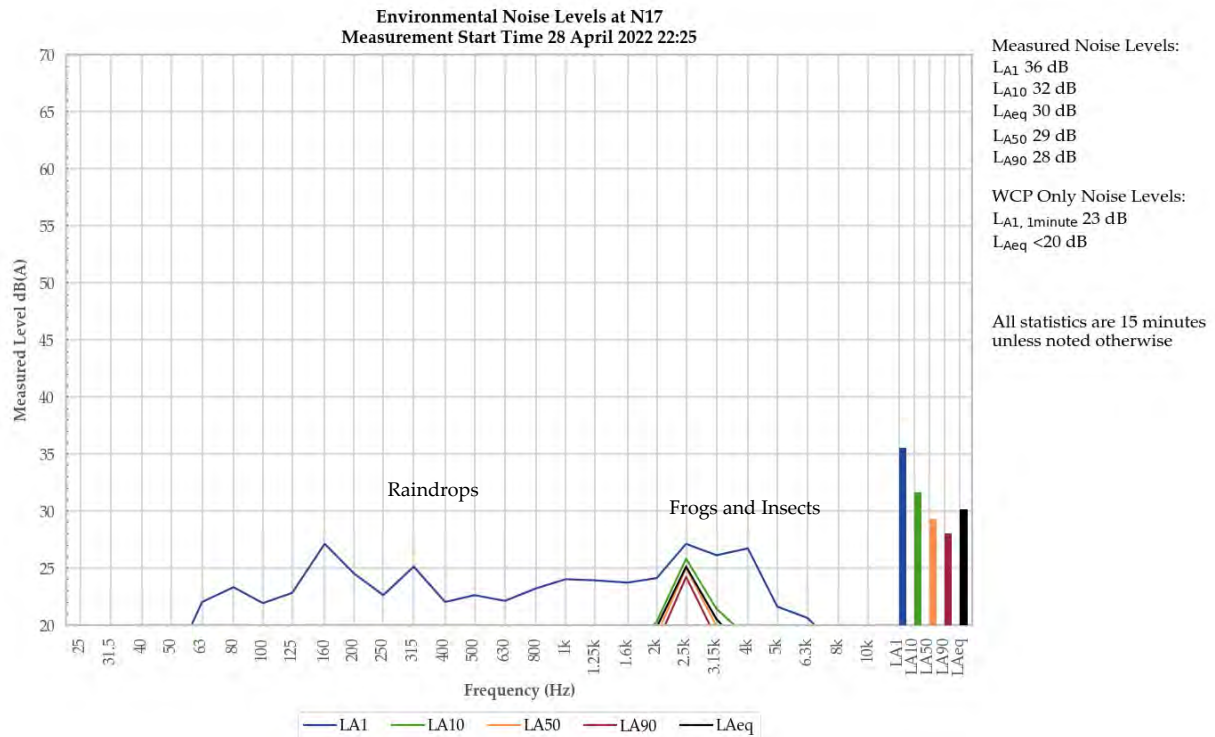


Figure 6: Environmental Noise Levels - N17 Mogo Road, off Araluen Road

A mining continuum from WCP was audible at very low levels during the measurement, generating a LAeq of less than 20 dB. Engine surges were responsible for generating the LA1,1minute of 23dB.

Frogs and insects were primarily responsible for the measured noise levels, with drops on the ground from recent rainfall contributing to the LA1.

Nearby animals and a plane were also noted

Table 5.4: HISTORICAL WCP ONLY NOISE LEVELS AT N17

Month	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	Mar 2022
LAeq	33	25	IA	IA	<20	IA	<20	IA	IA	IA	IA	IA
LA1,1min	42	31	IA	IA	<20	IA	<25	IA	IA	IA	IA	IA



5.1.5 N19

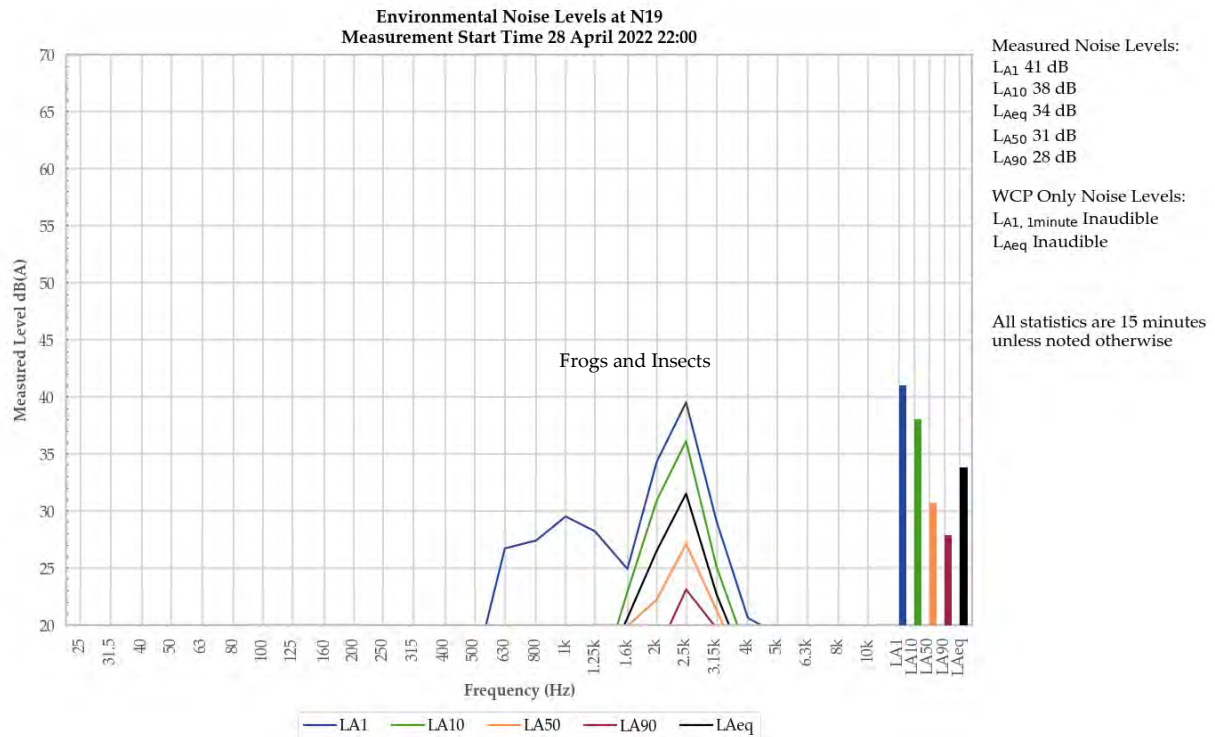


Figure 7: Environmental Noise Levels - N19, Upper Mogo Road

WCP was inaudible during this measurement.

Frogs and insects were responsible for measured noise levels.

Bats and a plane were also noted.

Table 5.5: HISTORICAL WCP ONLY NOISE LEVELS AT N19

Month	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	Mar 2022
LAeq	<25	<20	IA	IA	<20	IA	IA	IA	IA	IA	IA	IA
LA1,1min	<30	<20	IA	IA	<20	IA	IA	IA	IA	IA	IA	IA

5.1.6 N20

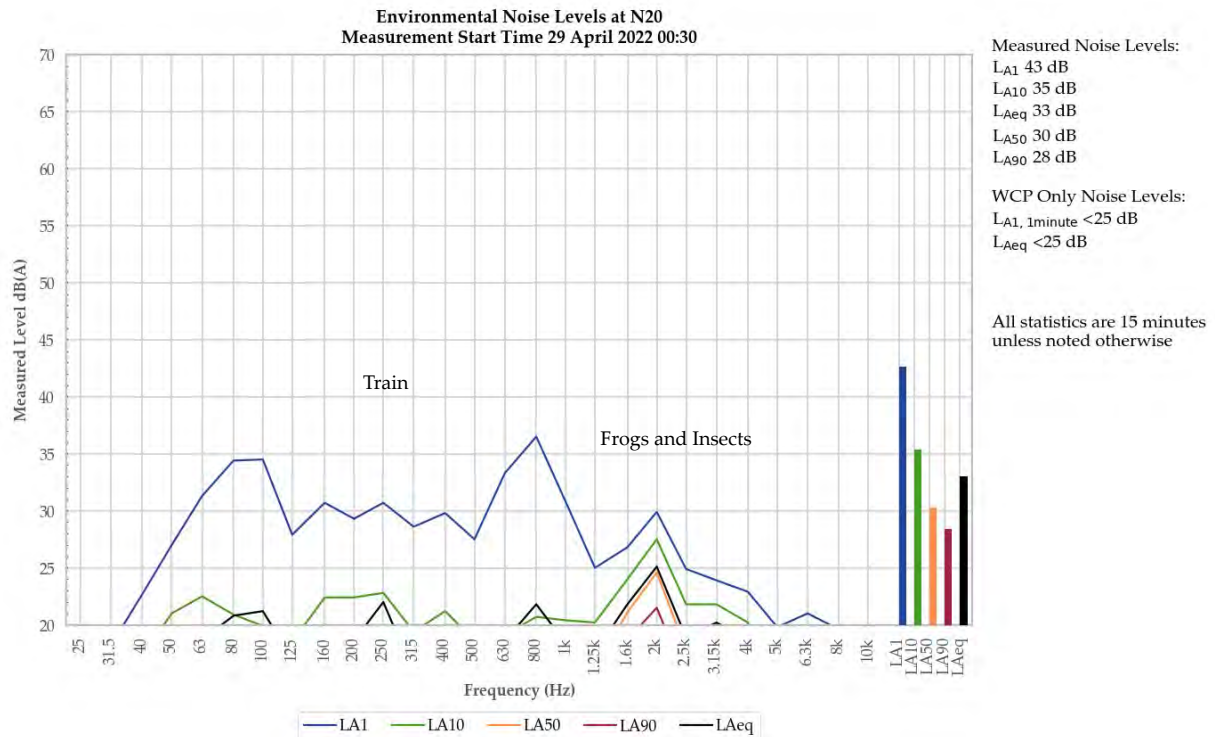


Figure 8: Environmental Noise Levels, N20 - Ringwood Road

A mining continuum from WCP was audible at low levels throughout the measurement, generating a site-only LAeq and LA1,1minute of less than 25 dB.

A train was responsible for the measured LA1 and contributed to the measured LA10 and LAeq. Frogs and insects also contributed to the measured LA10 and LAeq and were responsible for the measured LA50 and LA90.

Table 5.6: HISTORICAL WCP ONLY NOISE LEVELS AT N20

Month	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	Mar 2022
LAeq	<25	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA
LA1,1min	31	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA

## 6 SUMMARY

Global Acoustics was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP, an open cut coal mine located approximately 40 kilometres north east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 28/29 April 2022 at eight monitoring locations.

Noise levels from WCP complied with relevant noise limits at all monitoring locations during the April 2022 monitoring. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

**Global Acoustics Pty Ltd**

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## APPENDIX

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### A *REGULATOR DOCUMENTS*

## A.1 Wilpinjong Coal Extension Project Approval (SSD-6764)

### SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

#### ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from the owner of the land listed in Table 1, the Applicant must acquire the land in accordance with the procedures in conditions 5 and 6 of schedule 4.

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

Note: To interpret the land referred to in Table 1, see the applicable figures in Appendix 5.

#### MITIGATION UPON REQUEST

2. Upon receiving a written request from the owner of any residence on the land listed in Table 2, the Applicant must implement additional noise mitigation measures at or in the immediate vicinity of the residence in consultation with the landowner. These measures must be consistent with the measures outlined in the *Voluntary Land Acquisition and Mitigation Policy*. They must also be reasonable and feasible and proportionate with the level of predicted impact.

If within 3 months of receiving this request from the owner, the Applicant and the owner 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.

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

Note: To interpret the land referred to in Table 2, see the applicable figures in Appendix 5.

#### NOISE

##### Noise Criteria

3. The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 3 at any residence on privately-owned land or at the other specified locations.

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>A1</sub> (1 minute)
102	36	36	38	45
Wollar Village – Residential	36	37	37	45
All other privately owned land	35	35	35	45
901 – Wollar School		35 (internal) 45 (external) When in use		-
150A – St Luke’s Anglican Church 900 – St Laurence O’Toole Catholic Church		40 (internal) When in use		-

Note: To interpret the locations referred to in Table 3, see the applicable figures in Appendix 5.

Noise generated by the development is to be measured in accordance with the relevant requirements of the *NSW Industrial Noise Policy* (as may be updated from time to time). Appendix 6 sets out the meteorological conditions under which these criteria apply along with any modifications to the *NSW Industrial Noise Policy* and the requirements for evaluating compliance with these criteria.

However, these criteria do not apply if the Applicant has an agreement with the owner/s of the relevant residence of land 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, low frequency, road and rail noise of the development;
  - (b) operate a comprehensive noise management system 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 consent;
  - (c) minimise the noise impacts of the development during meteorological conditions when the noise limits in this consent do not apply (see Appendix 6);
  - (d) only use locomotives and rolling stock that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL;
  - (e) co-ordinate noise management at the site with the noise management at Moolarben and Ulan mines to minimise cumulative noise impacts; and
  - (f) carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent.

### Noise Management Plan

5. Prior to carrying out any development under this consent, unless the Secretary agrees otherwise, 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 in this consent;
  - (c) describe the proposed noise management system in detail; and
  - (d) include a monitoring program that:
    - evaluates and reports on:
      - the effectiveness of the noise management system;
      - compliance against the noise criteria in this consent; and
      - compliance against the noise operating conditions;
    - includes a program to calibrate and validate the real-time noise monitoring results with the attended monitoring results over time (so the real-time noise monitoring program can be used as a better indicator of compliance with the noise criteria in this consent and trigger for further attended monitoring); and
    - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.
6. The Applicant must implement the approved Noise Management Plan for the development.



## APPENDIX 6 NOISE COMPLIANCE ASSESSMENT

### Applicable Meteorological Conditions

1. The noise criteria in Table 3 of schedule 3 are to apply under all meteorological conditions except the following:
  - (a) wind speeds greater than 3 m/s at 10 m above ground level; or
  - (b) stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
  - (c) stability category G temperature inversion conditions.

### Determination of Meteorological Conditions

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions must be that recorded by the meteorological station located on the site.

### Compliance Monitoring

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
4. This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
5. Unless otherwise agreed with the Secretary, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
  - (a) monitoring locations for the collection of representative noise data;
  - (b) meteorological conditions during which collection of noise data is not appropriate;
  - (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
  - (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

Table 6-1: One-third octave low frequency noise thresholds

Hz/dB(Z)	One-third octave $L_{Zeq,15minute}$ threshold level												
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB(Z)	92	89	86	77	69	61	54	50	50	48	48	46	44

## A.2 Environmental Protection Licence

### L5 Noise limits

L5.1 Noise generated at the premises must not exceed the noise limits presented in the table below. The

locations referred to in the table below are indicated in Appendix 5 - Figures 1 and 2 of Development Consent number SSD-6764 dated 24 April 2017.

Location	Day	Evening	Night	Night
	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LA1(1 minute)
Wollar village - residential	36	37	37	45
All other privately owned land	35	35	35	45
102	36	36	38	45
Wollar school	35 (internal), 45 (external) when in use			
St Luke's Anglican Church & St Laurence O'Toole Catholic Church	40 (internal) when in use			

Note: The above noise limits do not apply at properties where the licensee has a written agreement with the landowner to exceed the noise limits.

L5.2 For the purpose of condition L5.1;

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.
- Evening is defined as the period 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.

L5.3 The noise limits set out in condition L5.1 apply under all meteorological conditions except for the following:

- a) Wind speeds greater than 3 metres/second at 10 metres above ground level; or
- b) Stability category F temperature inversions and wind speeds greater than 2m/s at 10m above ground level; or
- c) Stability category G temperature inversion conditions.

L5.4 For the purpose of condition L5.3:

- a) The meteorological data to be used for determining meteorological conditions is the data recorded by the meteorological weather station identified as EPA identification Point 21 in condition P1.1; 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.

- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, 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 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
    - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
  - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
  - c) With the noise limits in condition L5.1, 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 conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
  - b) at a point other than the most affected point at a location.
- L5.7 For the purpose 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.

## A.3 Noise Management Plan

### 6 Noise Monitoring Program

WCPL utilise a combination of operator-attended and unattended noise monitoring to assess the performance of the Mine against the Noise Criteria from Development Consent (SSD-6467). Operator-attended noise monitoring will be used for determining compliance against the Noise Criteria in **Table 6**. Unattended real-time noise monitoring is primarily utilised as a proactive noise control system; providing noise alerts when predetermined noise levels are triggered so mining operations can be modified where noise levels are influenced by noise from the Project.

#### 6.1 Monitoring Locations

Operator-attended noise monitoring locations have been chosen considering the following criteria:

- In any given direction, the site is as close as reasonably practical to the nearest Private Receiver;
- There is no closer Private Receiver that is not monitored;
- The site is unlikely to cause concern to any person residing on nearby private property; and
- The site can be safely accessed by the persons carrying out the noise monitoring.

WCPL will undertake operator-attended noise monitoring as identified in **Table 7 (Figure 3 and Figure 4)**. Real-time noise monitoring units are relocated from time to time, to assist with additional targeted noise monitoring and in response to community complaints. Real-time noise monitoring locations will be reviewed and modified as necessary in response to monitoring results, changes to the operation, or as a result of community consultation.

Should circumstances change, WCPL may amend the noise monitoring locations shown in **Table 7** with consideration to the above criteria. WCPL will update this NMP, in consultation with DPIE and the EPA.

**Table 7 Noise Monitoring Locations**

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
St Laurence O'Toole Church	N6	Operator-attended Noise	777299.9	6415716.9	Location based on the nearest community structure to the East of the Mine
Tichular	N14	Operator-attended Noise	778791.9	6408624.7	Location based on the nearest community structure to the South of the Mine
Wollar Village	N15	Operator-attended Noise	777452.0	6416158.9	Location based on the nearest community structure to the South-East of the Mine
Mogo Rd	N17	Operator-attended Noise	780771.0	6420641.0	Location based on the nearest community structure to the North-East of the Mine
Mogo Rd	N19	Operator-attended Noise	782644.5	6424151.1	Location based on the nearest and residential community structure to the North-East of the Mine
Ringwood Road	N20	Operator-attended Noise	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine.
WCPL Rail Loop	-	Meteorology & Inversion	770630.9	6418085.1	Location based on consideration of prevailing meteorological conditions



Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
Wollar Village <sup>4</sup>	-	Real-Time Noise - Fixed	777608.9	6415996.8	Location based on the nearest non-mine owned residence to the South-East of the Mine N15 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Mogo Rd <sup>4</sup>	-	Real-Time Noise - Fixed	782644.5	6424151.1	Location based on the nearest non-mine owned residence to the East of the Mine N19 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Ringwood Road	-	Real-Time Noise - Fixed	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine. N20 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Tichular <sup>3</sup>	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

**Notes:**

1. MGA94, Zone 55
2. Monitoring will be undertaken at this location until it can be demonstrated that the noise contribution from the Mine is negligible. At this point, WCPL will notify DPIE and EPA of the results of this monitoring and advise if and when the monitoring at this location will be scaled back or discontinued. The real-time noise monitor at Wandooma may be relocated in response to a complaint or identified noise issue at another location.
3. Where continuous monitors are located at compliance locations (e.g. privately-owned receivers), WCPL will conduct a review of the identification/characterisation of mine-related noise by the real-time monitoring system at that location by comparing against observed mine-related noise identified during operator-attended monitoring (i.e. validate the identification of mine related noise and filtering of extraneous noise sources by the real-time system). Refer to Section 6.5.

## 6.2 Meteorological Monitoring

WCPL maintains a continuous on-site meteorological monitoring station that complies with the requirements of the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (DEC, 2007). The location of this meteorological monitoring station is shown on **Figure 3**.

WCPL's meteorological monitoring station is capable of continuous real-time measurement of temperature lapse rate in accordance with the INP (EPA, 2000).

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

- a) Rainfall;
- b) Relative humidity;
- c) Temperature – measured at 2, 10 and 60 m above ground level;
- d) Wind speed – horizontal and vertical;
- e) Wind direction – measured at 10 m above ground level;
- f) Sigma theta;
- g) Pasquil stability classification;
- h) Solar radiation; and
- i) Temperature lapse rate.

Meteorological forecasting will be undertaken as specified in **Section 5.4**.

### 6.3 Operator-attended Noise Monitoring

#### 6.3.1 Purpose

Operator-attended noise monitoring will be used to evaluate compliance against the Noise Criteria detailed in **Table 6**.

#### 6.3.2 Summary

Operator-attended noise will be undertaken in accordance with **Table 8**.

**Table 8 Operator-attended Noise Monitoring Summary**

Element	Description
Locations	<ul style="list-style-type: none"> <li>As per <b>Table 7</b>,</li> <li><b>Figure 3</b> and <b>Figure 4</b></li> </ul>
Period	<ul style="list-style-type: none"> <li>Night-time period (10 pm to 7 am) being the most sensitive time period for noise.</li> </ul>
Frequency	<ul style="list-style-type: none"> <li>12 times per year<sup>1</sup> (i.e. one night per month); plus</li> <li>12 times per year<sup>1</sup> (i.e. one night per month) at locations as identified in <b>Table 7</b> to validate real-time noise monitoring data (<b>Section 6.5</b>).</li> </ul>

Notes: <sup>1</sup> Monitoring frequency at Mogo Road (N19) and Ringwood Road (N20) will remain at the frequency identified in **Table 8** during the commencement of operations in Pit 8. A review of the monitoring frequency at N19 and N20 will be undertaken during subsequent reviews of this NMP in consultation with WCPL's noise specialist and relevant government agencies.

#### 6.3.3 Methodology

Operator-attended noise monitoring will be undertaken as outlined in **Table 8** by an independent acoustic consultant and guided by the requirements of the INP (EPA, 2000) and AS 1055.1-1997 'Acoustics – Description and measurement of environmental noise – General procedures'. Routine operator-attended noise monitoring will be undertaken during night-time periods (10 pm - 7 am).

If any of the Noise Criteria are exceeded, a second measurement will be taken at the same location within 75 minutes of the first measurement. If the second measurement does not exceed the Noise Criteria, as defined in **Table 6**, then the result will be recorded and the regular monitoring program resumed.

If the second measurement does exceed the applicable Noise Criteria, then:

- The noise consultant will immediately report both results to the WCPL Environment and Community Manager or delegate immediately;
- Upon confirming the exceedances are deemed a non-compliance in accordance with the **Figure 5**, WCPL will report both results to DPIE and EPA immediately, upon confirming the exceedance (**Section 9.0**).

WCPL will:

- Take immediate action in accordance with the NMS;
- Arrange for additional operator-attended noise monitoring to occur at that site within 1 week; and
- Deploy the mobile real-time noise monitor to measure and record the noise at that site for at least a 1 week period.

WCPL will also investigate any changes to the mine operations, and may revisit the noise model on the basis of the noise measurements recorded at the site.

The acoustic noise consultant will consider the modification factors in **Section 4** of the INP (EPA, 2000) during the evaluation of attending monitoring results.



### 6.3.6 Applicable Meteorological Conditions

The Noise Criteria in **Table 6** are to be applied under all meteorological conditions except for the following:

- Wind speeds greater than 3 m/s at 10 m above ground level; or
- Stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
- Stability category G temperature inversion conditions.

Except for wind speed at microphone height, the data used for determining meteorological conditions will be that recorded by the meteorological station located on the Mine site.

It should be noted that when assessing wind conditions to determine the potential for noise level alteration by the refraction of sound-waves through the atmosphere, meteorological measurements should be undertaken at a height of 10 m above the ground level, in accordance with Section 5 of the INP (EPA, 2000). Local meteorological conditions, including near-surface winds are measured at the inbuilt meteorological station (2 m); however, in accordance with the INP (EPA, 2000), the 2 m data cannot be used to determine impacts from sound-wave refraction. The 2 m meteorological data is used to assess local meteorological conditions that may increase ambient noise levels including surface winds and rainfall.

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## APPENDIX

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### ***B CALIBRATION CERTIFICATES***



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 Level Meter**  
IEC 61672-3:2013  
**Calibration Certificate**  
Calibration Number C21058

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

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

**Pre-Test Atmospheric Conditions**  
**Ambient Temperature :** 23.5°C  
**Relative Humidity :** 46.7%  
**Barometric Pressure :** 100.28kPa

**Post-Test Atmospheric Conditions**  
**Ambient Temperature :** 23.3°C  
**Relative Humidity :** 47.7%  
**Barometric Pressure :** 100.25kPa

**Calibration Technician :** Jeff Yu  
**Calibration Date :** 8 Feb 2021

**Secondary Check:** Max Moore  
**Report Issue Date :** 9 Feb 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 - Environmental Conditions			
Acoustic Tests		Temperature	±0.2°C
125Hz	±0.12dB	Relative Humidity	±2.4%
1kHz	±0.11dB	Barometric Pressure	±0.015kPa
8kHz	±0.13dB		
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.

PAGE 1 OF 1



**Sound Calibrator**  
IEC 60942-2017  
**Calibration Certificate**

Calibration Number C21059

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

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

**Atmospheric Conditions**  
**Ambient Temperature :** 23.3°C  
**Relative Humidity :** 47.7%  
**Barometric Pressure :** 100.27kPa

**Calibration Technician :** Jeff Yu  
**Calibration Date :** 08 Feb 2021  
**Secondary Check:** Max Moore  
**Report Issue Date :** 9 Feb 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 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.

Least Uncertainties of Measurement - Environmental Conditions			
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.

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.



# **Wilpinjong Coal**

## **Environmental Noise Monitoring**

May 2022

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Prepared for Wilpinjong Coal Pty Ltd

# Wilpinjong Coal

## Environmental Noise Monitoring

May 2022

Wilpinjong Coal Pty Ltd

E220456 RP1

Version	Date	Prepared by	Approved by	Comments
1.0	18/06/2022	Will Moore	Tony Welbourne	Final

Approved by



**Tony Welbourne**

Associate Director

18 June 2022

Level 3 175 Scott Street

Newcastle NSW 2300

---

This report has been prepared in accordance with the brief provided by Wilpinjong Coal Pty Ltd and has relied upon the information collected at the time and under the conditions specified in the report. All findings, conclusions or recommendations contained in the report are based on the aforementioned circumstances. The report is for the use of Wilpinjong Coal Pty Ltd and no responsibility will be taken for its use by other parties. Wilpinjong Coal Pty Ltd may, at its discretion, use the report to inform regulators and the public.

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# 1 Introduction

## 1.1 Background

Global Acoustics (now part of EMM) was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP), an open cut coal mine located approximately 40 kilometres north-east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 16/17 May 2022 at eight locations.

## 1.2 Monitoring locations

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

**Table 1.1** Attended monitoring locations

NMP Descriptor	Monitoring Location
N6	St Laurence O’Toole Catholic Church representative of Wollar Village south
N14	‘Tichular’ intersection of Tichular and Barigan Roads, Tichular
N15	Track off Barigan Street near Wollar Public School, Wollar Village
N17	Mogo Road, off Araluen Road, Wollar
N19	North Mogo Road, Mogo
N20	Ringwood Road, off Wollar Road, Wollar

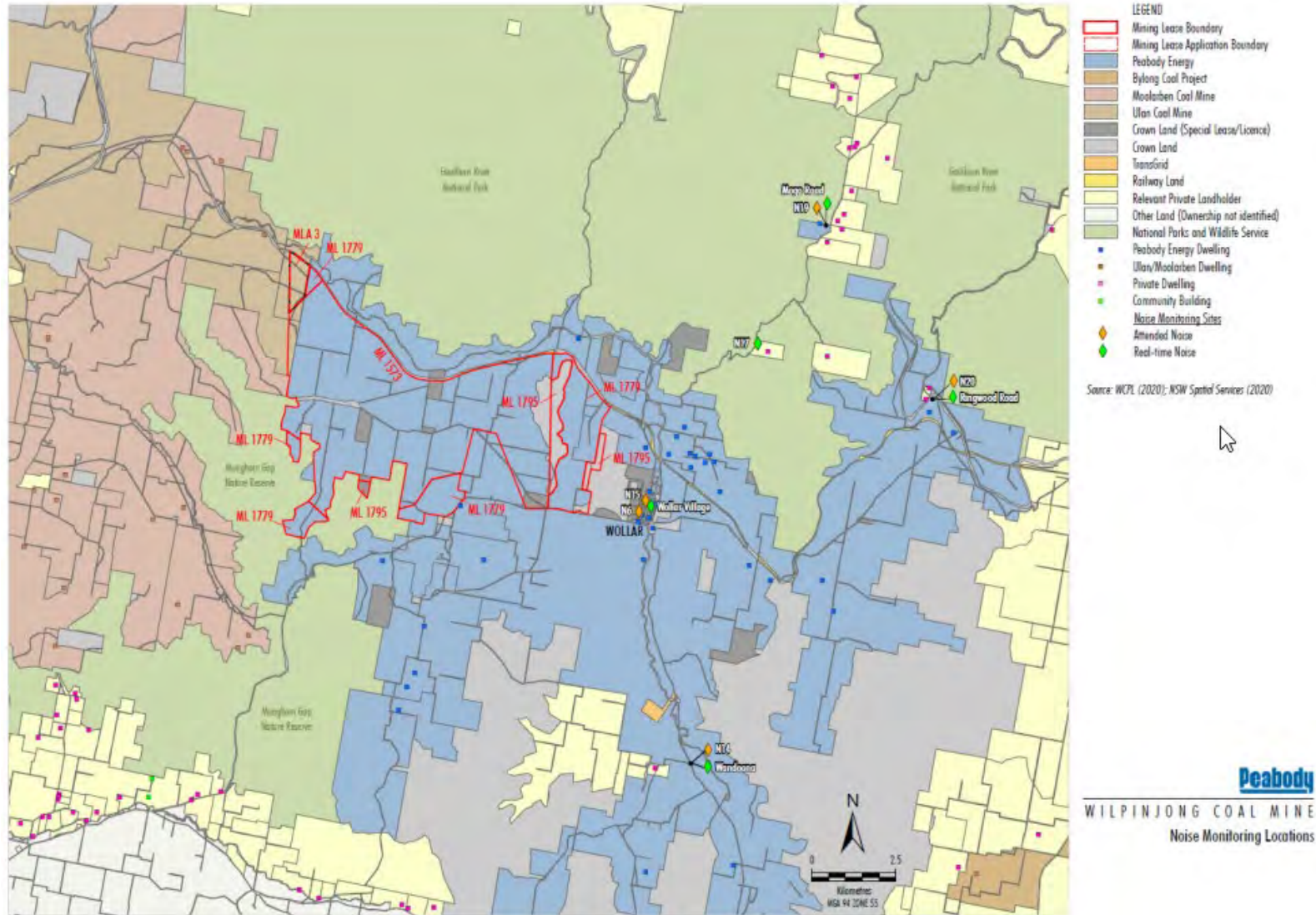


Figure 1.1 Wilpinjong noise monitoring locations

### 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**

Descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to describe human response to noise.
L <sub>Amax</sub>	The maximum A-weighted noise level over a time period.
L <sub>A1</sub>	The noise level which is exceeded for 1 per cent of the time.
L <sub>A1,1minute</sub>	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L <sub>A10</sub>	The noise level which is exceeded for 10 percent of the time.
L <sub>Aeq</sub>	The average noise A-weighted energy during a measurement period.
L <sub>A50</sub>	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L <sub>A90</sub>	The level exceeded for 90 percent of the time. The L <sub>A90</sub> level is often referred to as the “background” noise level and is commonly used to determine noise criteria for assessment purposes.
L <sub>Amin</sub>	The minimum A-weighted noise level over a time period.
L <sub>Ceq</sub>	The 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.
SC	Stability class (or category) is determined from measured wind speed and either sigma-theta or VTG.
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	This is the period 7:00am to 6:00pm.
Evening	This is the period 6:00pm to 10:00pm.
Night	This is the period 10:00pm to 7:00am.

## 2 Regulator requirements and noise criteria

### 2.1 Development consents

The most current development consent associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017), which covers all current operations and has replaced the previous consent (05-0021). The relevant noise conditions from the current consent are reproduced in Appendix A.

### 2.2 Environment protection licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently issued in March 2021. Relevant noise sections of the EPL are reproduced in Appendix A.

### 2.3 Noise Monitoring Program

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in August 2020. The relevant sections are reproduced in Appendix A.

### 2.4 Project Specific Criteria

Noise criteria and meteorological conditions required for noise criteria to apply are consistent in the project approval and EPL. The applicable noise criteria for each monitoring location are shown in Table 2.1.

**Table 2.1** WCP project specific criteria, dB

NMP Descriptor	Day LAeq,15minute	Evening LAeq,15minute	Night LAeq,15minute	Night LA1,1minute
N6	36	37	37	45
N14	35	35	35	45
N15	36	37	37	45
N17	36	36	38	45
N19	35	35	35	45
N20	35	35	35	45

Notes: 1. N6 noise limits have been assumed to be as detailed for 'Wollar Village – Residential' in the PA, as the church is no longer a place of worship.  
2. N17 noise limits have been determined based on the assumption that N17 is property 102 in accordance with Appendix 5 Figure 1 of Development Consent SSD-6764.



## 2.5 Modifying Factors

The EPA 'Noise Policy for Industry' (NPfI, 2017) was approved for use in NSW in October 2017. 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 has 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 NPfI. Low-frequency modifying factors have been assessed in accordance with both the development consent and NPfI.

## 3 Methodology

### 3.1 Overview

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

### 3.2 Attended noise monitoring

During this survey, monthly attended monitoring was undertaken during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric condition measurement was also undertaken at each monitoring location. Attended monitoring during this reporting period was undertaken by Will Moore.

This survey presents noise levels gathered during attended monitoring that are the result of many sounds reaching the sound level meter microphone during monitoring. Received levels from various noise sources were noted during attended monitoring and particular attention was paid to the extent of WCP's contribution, if any, to measured levels. At each receptor location, WCP's  $L_{Aeq,15\text{minute}}$  and  $L_{A1,1\text{minute}}$  (in the absence of any other noise) was measured directly, where possible, or, determined by frequency analysis.

If the exact contribution of the source of interest (in this case WCP) cannot be established, due to masking by other noise sources in a similar frequency range, but site noise levels are observed to be well below (more than 5 dB lower than) any relevant criterion, a maximum estimate of the potential contribution of the site might be made based on other measured site-only noise descriptors in accordance with Section 7.1 of the NPfl. This is generally expressed as a 'less than' quantity, such as <20 dB or <30 dB.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may also 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 some noise was audible but could not be quantified. If site noise was NM due to masking but estimated to be significant in relation to a relevant criterion, we would employ methods (eg measure closer and back calculate) to determine a value for reporting.

All sites noted as NM in this report are due to one or more of the following reasons:

- Site noise levels were extremely low and unlikely, in many cases, to be even noticed;
- Site noise levels were masked by another relatively loud noise source that is characteristic of the environment (eg breeze in foliage or continuous road traffic noise) that cannot be eliminated by moving closer; and/or
- It was not feasible, nor reasonable to employ methods such as move closer and back calculate. Cases may include, but are not limited to, 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.

A measurement of  $L_{A1,1\text{minute}}$  corresponds to the highest noise level generated for 0.6 second during one minute. In practical terms this is the highest noise level, or  $L_{A\text{max}}$ , received from the site during the entire measurement period (ie the highest level of the worst minute during the 15 minute measurement).

Often extraneous noise events (for example, road traffic pass-bys and dogs) interfere with the measurement of site noise levels in the frequency range of interest. Where required, the sound level meter is paused during these occurrences to aid in quantification of the site only noise.

### 3.3 Modifying factors

All measurements were evaluated for potential modifying factors in accordance with the NPfl. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfl.

Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable, such that the site only  $L_{Aeq}$  was not “NM” or less than a maximum cut off value (eg “<20 dB” or “<30dB”).

If applicable, modifying factors have been reported and added to measured site only  $L_{Aeq}$  noise levels when meteorological conditions satisfied requirements for site noise criteria to be applicable. Low-frequency modifying factors have only been applied to site-only  $L_{Aeq}$  levels if WCP was the only contributing low-frequency noise source.

### 3.4 Attended noise monitoring equipment

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

**Table 3.1** Attended noise monitoring equipment

Model	Serial number	Calibration due date
Rion NA-28 sound level meter	1070590	11/06/2022
Pulsar 106 acoustic calibrator	74813	10/06/2022

## 4 Results

### 4.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.1. Discussion as to the noise sources responsible for these measured levels is provided in Chapter 5 of this report.

**Table 4.1** Measured noise levels - May 2022

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	17/05/2022 00:30	48	47	45	39	29	27	25
N14	16/05/2022 23:30	52	34	32	30	28	26	23
N15	16/05/2022 23:00	44	40	37	34	33	30	26
N17	16/05/2022 22:25	45	37	34	33	32	30	28
N19	16/05/2022 22:00	47	42	32	30	25	22	20
N20	17/05/2022 00:00	38	31	29	27	27	25	23

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

### 4.2 Modifying factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfI and methodology described in Section 3.3.

There were no modifying factors applicable to site during the survey. Mining noise was analysed and did not satisfy requirements for tonal, intermittent, or low-frequency modifying factors, as defined in the NPfI.

### 4.3 Attended noise monitoring results

Table 4.2 to Table 4.3 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement

**Table 4.2** LAeq,15minute generated by WCP against project specific criteria - May 2022

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB <sup>5</sup>	Criterion Applies? <sup>2</sup>	WCP LAeq dB <sup>3,4</sup>	Exceedance dB <sup>4,5</sup>
N6	17/05/2022 00:30	0.0	F	37	Yes	<25	Nil
N14	16/05/2022 23:30	0.0	F	35	Yes	IA	Nil
N15	16/05/2022 23:00	0.0	F	37	Yes	34	Nil
N17	16/05/2022 22:25	0.0	F	38	Yes	32	Nil
N19	16/05/2022 22:00	1.1	F	35	Yes	<20	Nil
N20	17/05/2022 00:00	0.0	D	35	Yes	22	Nil

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site-only LAeq,15minute attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.3** LA1,1minute generated by WCP against project specific criteria - May 2022

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB <sup>5</sup>	Criterion Applies? <sup>2</sup>	WCP LA1,1min dB <sup>3,4</sup>	Exceedance dB <sup>4,5</sup>
N6	17/05/2022 00:30	0.0	F	45	Yes	<25	Nil
N14	16/05/2022 23:30	0.0	F	45	Yes	IA	Nil
N15	16/05/2022 23:00	0.0	F	45	Yes	38	Nil
N17	16/05/2022 22:25	0.0	F	45	Yes	37	Nil
N19	16/05/2022 22:00	1.1	F	45	Yes	<20	Nil
N20	17/05/2022 00:00	0.0	D	45	Yes	28	Nil

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site-only LA1,1minute attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

## 4.4 Atmospheric conditions

Atmospheric condition data measured by the operator during each measurement using a Kestrel hand-held weather meter is shown in Table 4.4. The wind speed, direction and temperature were measured at approximately 1.8 metres. Attended noise monitoring is not undertaken during rain, hail, or wind speeds above 5 m/s at microphone height.

**Table 4.4 Measured atmospheric conditions – May 2022**

Location	Start Date and Time	Temperature °C	Wind Speed m/s	Wind Direction °Magnetic North <sup>1</sup>	Cloud Cover 1/8s
N6	17/05/2022 00:30	7	0.4	50	0
N14	16/05/2022 23:30	9	0.0	-	0
N15	16/05/2022 23:00	11	0.0	-	0
N17	16/05/2022 22:25	11	0.0	-	0
N19	16/05/2022 22:00	11	0.6	80	0
N20	17/05/2022 00:00	9	0.4	120	0

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

Meteorological data used for compliance assessment is sourced from the WCP AWS and inversion tower.



# 5 Discussion

## 5.1 Noted noise sources

During attended monitoring, the time variations (temporal characteristics) of noise sources are considered in each measurement via statistical descriptors. From these observations summaries have been derived for the location where an exceedance was measured and are provided in this chapter. Statistical 1/3 octave-band analysis of environmental noise was undertaken and the following figures display frequency ranges of various noise sources at each location for LA1, LA10, LAeq, LA50 and LA90 descriptors. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 5.1 where it can be seen that frogs and insects are generating noise at frequencies above 1000 Hz while mining noise is at frequencies less than 1000 Hz, which is typical. Adding levels at frequencies that relate to mining only allows separate statistical results to be calculated. This analysis cannot always be performed if there are significant levels of other noise at the same frequencies as mining, such as dogs, cows, or (most commonly) road traffic.

It should be noted that the method of summing statistical values up to a cut-off frequency can overstate the LA1 result by a small margin but is entirely accurate for LAeq.

Historical site only noise levels from attended monitoring over the previous 12-month period has been provided as additional information in Table 5.1 to Table 5.6.

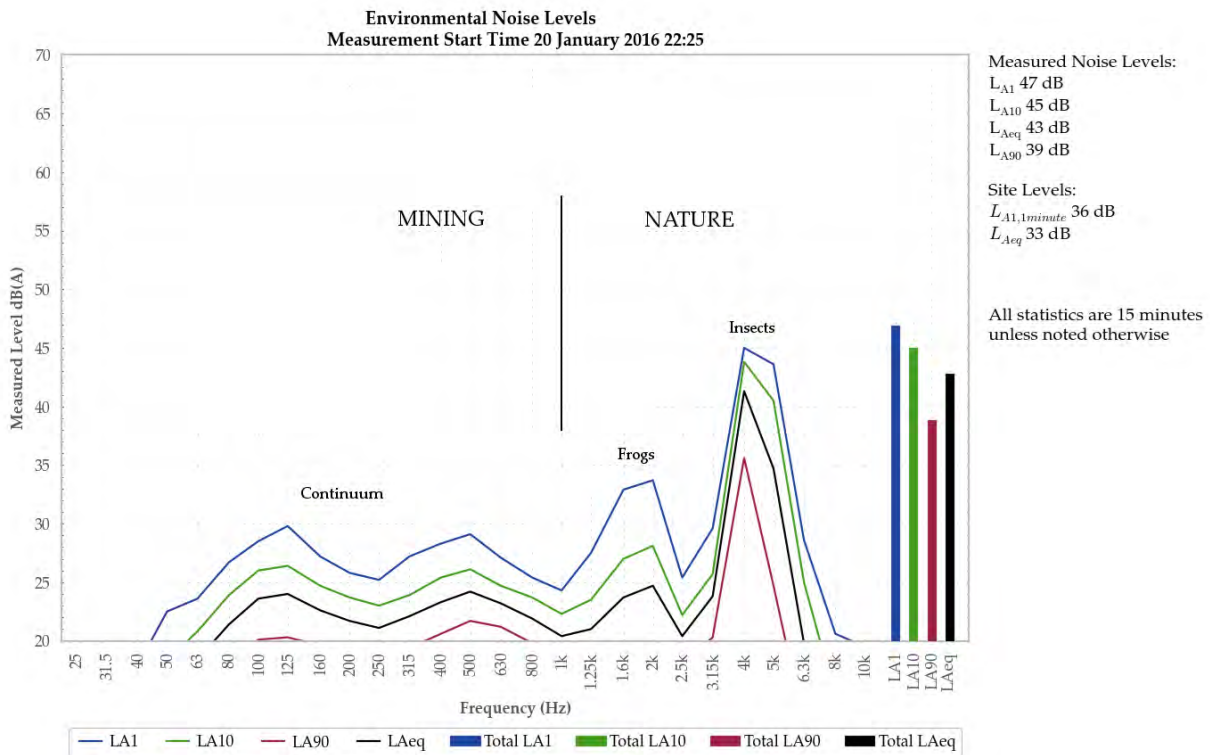


Figure 5.1 Example graph (refer to Section 5.1 for explanatory note)

5.1.1 N6

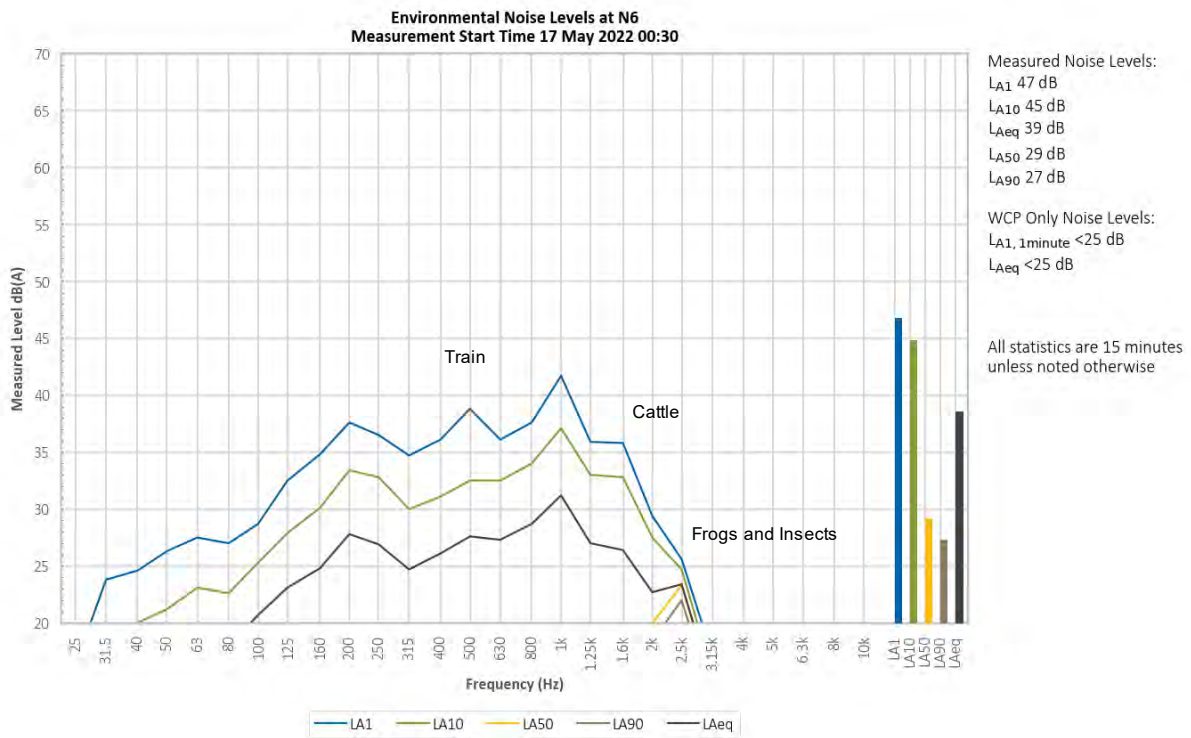


Figure 5.2 Environmental noise levels N6, St Laurence O’Toole Catholic Church, Wollar Village

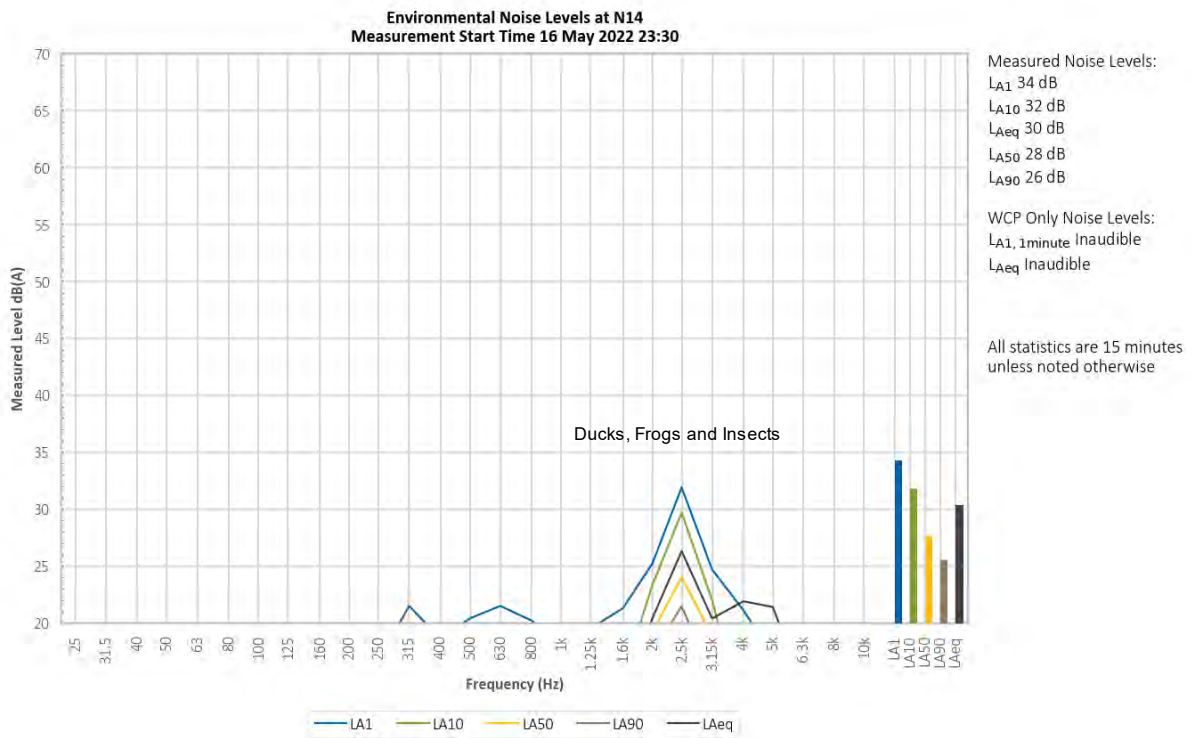
A low mining continuum from WCP was audible throughout the measurement, generating a site only LAeq and LA1,1minute of less than 25 dB.

A train was responsible for the measured LA1, LA10 and LAeq. Cattle generated the measured LA50. Frogs, insects, and cattle all contributed to the measured LA90.

Table 5.1 Historical WCP only Levels at N6

Month	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022
LAeq	30	IA	<25	IA	IA	31	IA	IA	IA	IA	IA	<20
LA1,1min	35	IA	<25	IA	IA	33	IA	IA	IA	IA	IA	23

## 5.1.2 N14



**Figure 5.2 Environmental noise levels N14, 'Tichular', intersection of Tichular and Barigan Roads**

WCP was inaudible during the measurement.

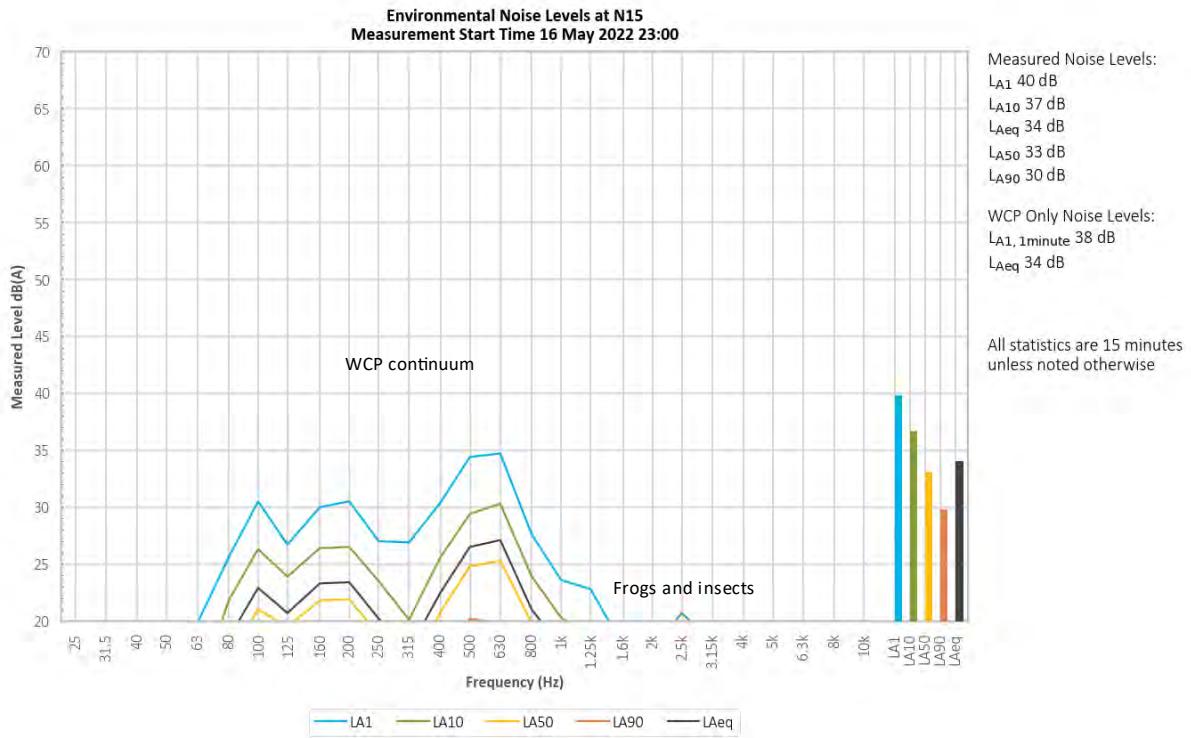
Ducks were responsible for the measured LA1 and LA10. Frogs and insects generated the measured LAeq, LA50, and LA90.

Noise from a plane and a low continuum from a substation was also noted.

**Table 5.2 Historical WCP only noise levels at N14**

Month	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022
LAeq	<20	<25	IA	IA	IA	<25	IA	IA	IA	IA	IA	<25
LA1,1min	<20	26	IA	IA	IA	25	IA	IA	IA	IA	IA	<25

5.1.3 N15



**Figure 5.3 Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village**

A mining continuum from WCP was audible throughout the measurement, generating a site only LAeq of 34 dB. Engine surges were responsible for generating the site only LA1,1minute of 38 dB. Horns and track noise were also noted.

Continuum from WCP was responsible for measured noise levels.

Noise from cattle, frogs, and insects was also noted.

**Table 5.3 Historical WCP only noise levels at N15**

Month	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022
LAeq	30	IA	<25	IA	NM	33	IA	IA	IA	IA	IA	23
LA1,1min	40	IA	<30	IA	NM	41	IA	IA	IA	IA	IA	32

5.1.4 N17

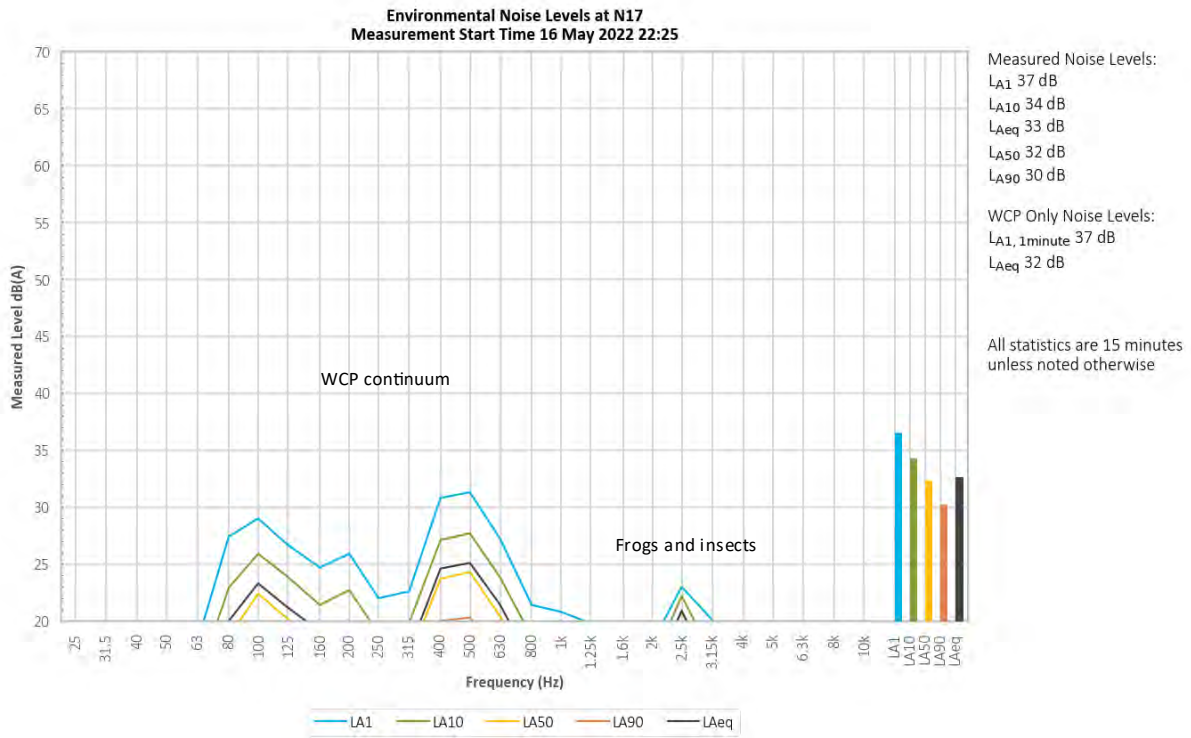


Figure 5.4 Environmental noise levels N17, Mogo Road, off Araluen Road

A mining continuum from WCP was audible throughout the measurement, generating a site only LAeq of 32. Dumping noise generated the site only LA1,1minute of 37 dB. Track noise, horns and a reverse quacker were also noted

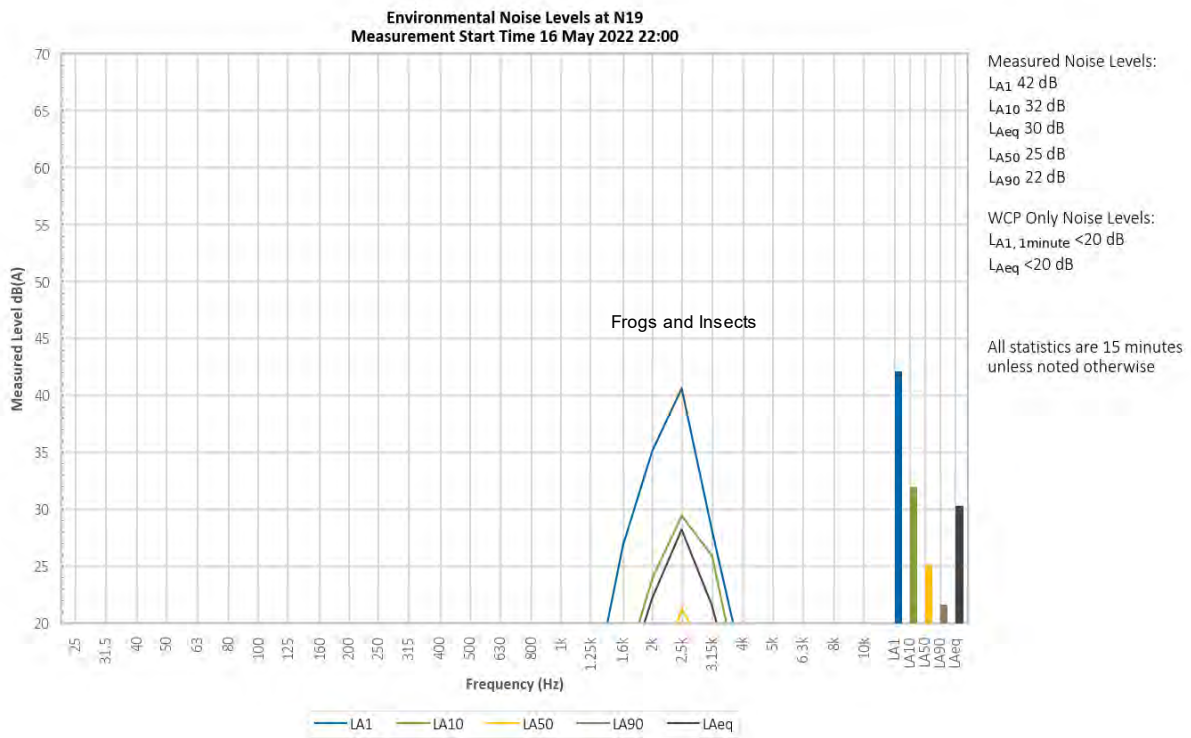
Continuum from WCP was responsible for measured noise levels.

Noise from frogs, insects, and a bird was also noted.

Table 5.4 Historical WCP only noise levels at N17

Month	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022
LAeq	25	IA	IA	<20	IA	<20	IA	IA	IA	IA	IA	<20
LA1,1min	31	IA	IA	<20	IA	<20	IA	IA	IA	IA	IA	23

### 5.1.5 N19



**Figure 5.5 Environmental noise levels N19, Upper Mogo Road**

A low mining continuum from WCP was audible throughout the measurement, generating a site only LAeq and LA1,1minute of less than 20 dB.

Frogs and insects generated measured noise levels.

Noise from a plane and dog was also noted.

**Table 5.5 Historical WCP only noise levels at N19**

Month	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022
LAeq	<20	IA	IA	<20	IA	IA	IA	IA	IA	IA	IA	IA
LA1,1min	<20	IA	IA	<20	IA	IA	IA	IA	IA	IA	IA	IA



5.1.6 N20

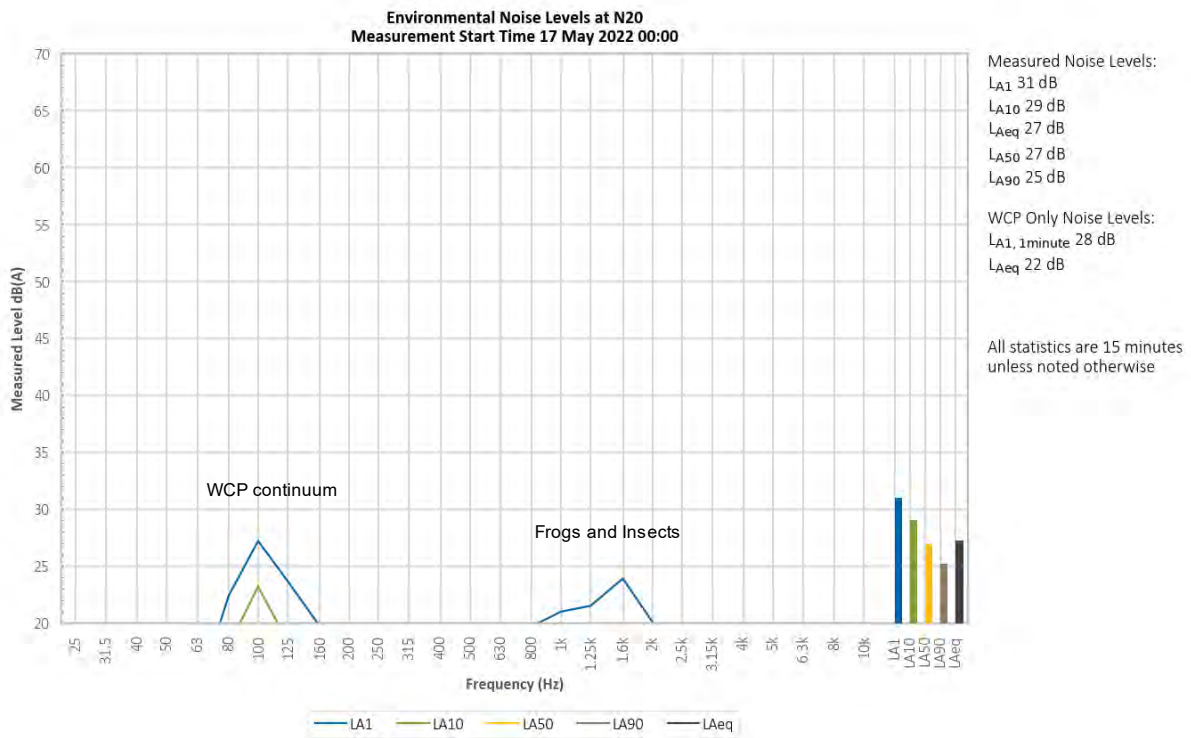


Figure 5.6 Environmental noise levels N20, Ringwood Road

A mining continuum from WCP was audible throughout the measurement, generating the site only LAeq of 22 dB. Engine surges and track noise generated the site only LA1,1minute of 28dB.

A continuum from WCP was responsible for the measured LA1, LA10 and LAeq. The WCP continuum, and noise from frogs, insects, and running water all contributed to the measured LA50 and LA90.

Table 5.6 Historical WCP only noise levels at N20

Month	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022
LAeq	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	<25
LA1,1min	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	<25

## 6 Summary

Global Acoustics (now part of EMM) was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP, an open cut coal mine located approximately 40 kilometres north-east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was done around WCP during the night period of 16/17 May 2022.

Noise levels from WCP complied with relevant noise limits at all monitoring locations during May 2022 monitoring. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

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# Appendix A

## Regulator documents

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## A.1 Wilpinjong Coal Extension Project Approval (SSD-6764)

### SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

#### ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from the owner of the land listed in Table 1, the Applicant must acquire the land in accordance with the procedures in conditions 5 and 6 of schedule 4.

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

Note: To interpret the land referred to in Table 1, see the applicable figures in Appendix 5.

#### MITIGATION UPON REQUEST

2. Upon receiving a written request from the owner of any residence on the land listed in Table 2, the Applicant must implement additional noise mitigation measures at or in the immediate vicinity of the residence in consultation with the landowner. These measures must be consistent with the measures outlined in the *Voluntary Land Acquisition and Mitigation Policy*. They must also be reasonable and feasible and proportionate with the level of predicted impact.

If within 3 months of receiving this request from the owner, the Applicant and the owner 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.

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

Note: To interpret the land referred to in Table 2, see the applicable figures in Appendix 5.

#### NOISE

##### Noise Criteria

3. The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 3 at any residence on privately-owned land or at the other specified locations.

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	$L_{Aeq}(15 \text{ minute})$	$L_{Aeq}(15 \text{ minute})$	$L_{Aeq}(15 \text{ minute})$	$L_{A1}(1 \text{ minute})$
102	36	36	38	45
Wollar Village – Residential	36	37	37	45
All other privately owned land	35	35	35	45
901 – Wollar School		35 (internal) 45 (external) When in use		
150A – St Luke’s Anglican Church 900 – St Laurence O’Toole Catholic Church		40 (internal) When in use		

Note: To interpret the locations referred to in Table 3, see the applicable figures in Appendix 5.

Noise generated by the development is to be measured in accordance with the relevant requirements of the *NSW Industrial Noise Policy* (as may be updated from time to time). Appendix 6 sets out the meteorological conditions under which these criteria apply along with any modifications to the *NSW Industrial Noise Policy* and the requirements for evaluating compliance with these criteria.

However, these criteria do not apply if the Applicant has an agreement with the owner/s of the relevant residence of land 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, low frequency, road and rail noise of the development;
  - (b) operate a comprehensive noise management system 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 consent;
  - (c) minimise the noise impacts of the development during meteorological conditions when the noise limits in this consent do not apply (see Appendix 6);
  - (d) only use locomotives and rolling stock that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL;
  - (e) co-ordinate noise management at the site with the noise management at Moolarben and Ulan mines to minimise cumulative noise impacts; and
  - (f) carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent.

### Noise Management Plan

5. Prior to carrying out any development under this consent, unless the Secretary agrees otherwise, 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 in this consent;
  - (c) describe the proposed noise management system in detail; and
  - (d) include a monitoring program that:
    - evaluates and reports on:
      - the effectiveness of the noise management system;
      - compliance against the noise criteria in this consent; and
      - compliance against the noise operating conditions;
    - includes a program to calibrate and validate the real-time noise monitoring results with the attended monitoring results over time (so the real-time noise monitoring program can be used as a better indicator of compliance with the noise criteria in this consent and trigger for further attended monitoring); and
    - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.
6. The Applicant must implement the approved Noise Management Plan for the development.



**APPENDIX 6  
NOISE COMPLIANCE ASSESSMENT**

**Applicable Meteorological Conditions**

1. The noise criteria in Table 3 of schedule 3 are to apply under all meteorological conditions except the following:
  - (a) wind speeds greater than 3 m/s at 10 m above ground level; or
  - (b) stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
  - (c) stability category G temperature inversion conditions.

**Determination of Meteorological Conditions**

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions must be that recorded by the meteorological station located on the site.

**Compliance Monitoring**

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
4. This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
5. Unless otherwise agreed with the Secretary, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
  - (a) monitoring locations for the collection of representative noise data;
  - (b) meteorological conditions during which collection of noise data is not appropriate;
  - (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
  - (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

Table 6-1: One-third octave low frequency noise thresholds

Hz/dB(Z)	One-third octave $L_{Zeq,15minute}$ threshold level												
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB(Z)	92	89	86	77	69	61	54	50	50	48	48	46	44



## A.2 Environment Protection Licence

### L5 Noise limits

L5.1 Noise generated at the premises must not exceed the noise limits presented in the table below. The

locations referred to in the table below are indicated in Appendix 5 - Figures 1 and 2 of Development Consent number SSD-6764 dated 24 April 2017.

Location	Day	Evening	Night	Night
	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LA1(1 minute)
Wollar village - residential	36	37	37	45
All other privately owned land	35	35	35	45
102	36	36	38	45
Wollar school	35 (internal), 45 (external) when in use			
St Luke's Anglican Church & St Laurence O'Toole Catholic Church	40 (internal) when in use			

Note: The above noise limits do not apply at properties where the licensee has a written agreement with the landowner to exceed the noise limits.

L5.2 For the purpose of condition L5.1;

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.
- Evening is defined as the period 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.

L5.3 The noise limits set out in condition L5.1 apply under all meteorological conditions except for the following:

- Wind speeds greater than 3 metres/second at 10 metres above ground level; or
- Stability category F temperature inversions and wind speeds greater than 2m/s at 10m above ground level; or
- Stability category G temperature inversion conditions.

L5.4 For the purpose of condition L5.3:

- The meteorological data to be used for determining meteorological conditions is the data recorded by the meteorological weather station identified as EPA identification Point 21 in condition P1.1; and
- 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.

- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, 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 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
    - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
  - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
  - c) With the noise limits in condition L5.1, 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 conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
  - b) at a point other than the most affected point at a location.
- L5.7 For the purpose 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.

## 6 Noise Monitoring Program

WCPL utilise a combination of operator-attended and unattended noise monitoring to assess the performance of the Mine against the Noise Criteria from Development Consent (SSD-6467). Operator-attended noise monitoring will be used for determining compliance against the Noise Criteria in **Table 6**. Unattended real-time noise monitoring is primarily utilised as a proactive noise control system; providing noise alerts when predetermined noise levels are triggered so mining operations can be modified where noise levels are influenced by noise from the Project.

### 6.1 Monitoring Locations

Operator-attended noise monitoring locations have been chosen considering the following criteria:

- In any given direction, the site is as close as reasonably practical to the nearest Private Receiver;
- There is no closer Private Receiver that is not monitored;
- The site is unlikely to cause concern to any person residing on nearby private property; and
- The site can be safely accessed by the persons carrying out the noise monitoring.

WCPL will undertake operator-attended noise monitoring as identified in **Table 7 (Figure 3 and Figure 4)**. Real-time noise monitoring units are relocated from time to time, to assist with additional targeted noise monitoring and in response to community complaints. Real-time noise monitoring locations will be reviewed and modified as necessary in response to monitoring results, changes to the operation, or as a result of community consultation.

Should circumstances change, WCPL may amend the noise monitoring locations shown in **Table 7** with consideration to the above criteria. WCPL will update this NMP, in consultation with DPIE and the EPA.

**Table 7 Noise Monitoring Locations**

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
St Laurence O'Toole Church	N6	Operator-attended Noise	777299.9	6415716.9	Location based on the nearest community structure to the East of the Mine
Tichular	N14	Operator-attended Noise	778791.9	6408624.7	Location based on the nearest community structure to the South of the Mine
Wollar Village	N15	Operator-attended Noise	777452.0	6416158.9	Location based on the nearest community structure to the South-East of the Mine
Mogo Rd	N17	Operator-attended Noise	780771.0	6420641.0	Location based on the nearest community structure to the North-East of the Mine
Mogo Rd	N19	Operator-attended Noise	782644.5	6424151.1	Location based on the nearest and residential community structure to the North-East of the Mine
Ringwood Road	N20	Operator-attended Noise	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine.
WCPL Rail Loop	-	Meteorology & Inversion	770630.9	6418085.1	Location based on consideration of prevailing meteorological conditions



Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
Wollar Village <sup>4</sup>	-	Real-Time Noise - Fixed	777608.9	6415996.8	Location based on the nearest non-mine owned residence to the South-East of the Mine N15 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Mogo Rd <sup>4</sup>	-	Real-Time Noise - Fixed	782644.5	6424151.1	Location based on the nearest non-mine owned residence to the East of the Mine N19 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Ringwood Road	-	Real-Time Noise - Fixed	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine. N20 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Tichular <sup>3</sup>	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

**Notes:**

1. MGA94, Zone 55
2. Monitoring will be undertaken at this location until it can be demonstrated that the noise contribution from the Mine is negligible. At this point, WCPL will notify DPIE and EPA of the results of this monitoring and advise if and when the monitoring at this location will be scaled back or discontinued. The real-time noise monitor at Wandooma may be relocated in response to a complaint or identified noise issue at another location.
3. Where continuous monitors are located at compliance locations (e.g. privately-owned receivers), WCPL will conduct a review of the identification/characterisation of mine-related noise by the real-time monitoring system at that location by comparing against observed mine-related noise identified during operator-attended monitoring (i.e. validate the identification of mine related noise and filtering of extraneous noise sources by the real-time system). Refer to Section 6.5.

## 6.2 Meteorological Monitoring

WCPL maintains a continuous on-site meteorological monitoring station that complies with the requirements of the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (DEC, 2007). The location of this meteorological monitoring station is shown on **Figure 3**.

WCPL's meteorological monitoring station is capable of continuous real-time measurement of temperature lapse rate in accordance with the INP (EPA, 2000).

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

- a) Rainfall;
- b) Relative humidity;
- c) Temperature – measured at 2, 10 and 60 m above ground level;
- d) Wind speed – horizontal and vertical;
- e) Wind direction – measured at 10 m above ground level;
- f) Sigma theta;
- g) Pasquil stability classification;
- h) Solar radiation; and
- i) Temperature lapse rate.

Meteorological forecasting will be undertaken as specified in **Section 5.4**.

### 6.3 Operator-attended Noise Monitoring

#### 6.3.1 Purpose

Operator-attended noise monitoring will be used to evaluate compliance against the Noise Criteria detailed in **Table 6**.

#### 6.3.2 Summary

Operator-attended noise will be undertaken in accordance with **Table 8**.

**Table 8 Operator-attended Noise Monitoring Summary**

Element	Description
Locations	<ul style="list-style-type: none"><li>As per Table 7,</li><li>Figure 3 and Figure 4</li></ul>
Period	<ul style="list-style-type: none"><li>Night-time period (10 pm to 7 am) being the most sensitive time period for noise.</li></ul>
Frequency	<ul style="list-style-type: none"><li>12 times per year<sup>1</sup> (i.e. one night per month); plus</li><li>12 times per year<sup>1</sup> (i.e. one night per month) at locations as identified in Table 7 to validate real-time noise monitoring data (Section 6.5).</li></ul>

Notes: <sup>1</sup> Monitoring frequency at Mogo Road (N19) and Ringwood Road (N20) will remain at the frequency identified in Table 8 during the commencement of operations in Pit 8. A review of the monitoring frequency at N19 and N20 will be undertaken during subsequent reviews of this NMP in consultation with WCPL's noise specialist and relevant government agencies.

#### 6.3.3 Methodology

Operator-attended noise monitoring will be undertaken as outlined in **Table 8** by an independent acoustic consultant and guided by the requirements of the INP (EPA, 2000) and AS 1055.1-1997 'Acoustics – Description and measurement of environmental noise – General procedures'. Routine operator-attended noise monitoring will be undertaken during night-time periods (10 pm - 7 am).

If any of the Noise Criteria are exceeded, a second measurement will be taken at the same location within 75 minutes of the first measurement. If the second measurement does not exceed the Noise Criteria, as defined in **Table 6**, then the result will be recorded and the regular monitoring program resumed.

If the second measurement does exceed the applicable Noise Criteria, then:

- The noise consultant will immediately report both results to the WCPL Environment and Community Manager or delegate immediately;
- Upon confirming the exceedances are deemed a non-compliance in accordance with the **Figure 5**, WCPL will report both results to DPIE and EPA immediately, upon confirming the exceedance (**Section 9.0**).

WCPL will:

- Take immediate action in accordance with the NMS;
- Arrange for additional operator-attended noise monitoring to occur at that site within 1 week; and
- Deploy the mobile real-time noise monitor to measure and record the noise at that site for at least a 1 week period.

WCPL will also investigate any changes to the mine operations, and may revisit the noise model on the basis of the noise measurements recorded at the site.

The acoustic noise consultant will consider the modification factors in Section 4 of the INP (EPA, 2000) during the evaluation of attending monitoring results.

### 6.3.6 Applicable Meteorological Conditions

The Noise Criteria in **Table 6** are to be applied under all meteorological conditions except for the following:

- Wind speeds greater than 3 m/s at 10 m above ground level; or
- Stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
- Stability category G temperature inversion conditions.

Except for wind speed at microphone height, the data used for determining meteorological conditions will be that recorded by the meteorological station located on the Mine site.

It should be noted that when assessing wind conditions to determine the potential for noise level alteration by the refraction of sound-waves through the atmosphere, meteorological measurements should be undertaken at a height of 10 m above the ground level, in accordance with Section 5 of the INP (EPA, 2000). Local meteorological conditions, including near-surface winds are measured at the inbuilt meteorological station (2 m); however, in accordance with the INP (EPA, 2000), the 2 m data cannot be used to determine impacts from sound-wave refraction. The 2 m meteorological data is used to assess local meteorological conditions that may increase ambient noise levels including surface winds and rainfall.



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# Appendix B

## Calibration certificates

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B.1 Calibration Certificates



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 Level Meter**  
 IEC 61672-3:2013  
**Calibration Certificate**  
 Calibration Number C20331

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

**Equipment Tested/ Model Number :** Rion NA-28  
**Instrument Serial Number :** 01070590  
**Microphone Serial Number :** 08184  
**Pre-amplifier Serial Number :** 52329

**Pre-Test Atmospheric Conditions**  
**Ambient Temperature :** 21.1°C  
**Relative Humidity :** 57.8%  
**Barometric Pressure :** 101.27kPa

**Post-Test Atmospheric Conditions**  
**Ambient Temperature :** 21.8°C  
**Relative Humidity :** 56.5%  
**Barometric Pressure :** 101.17kPa

**Calibration Technician :** Jeff Yu  
**Calibration Date :** 11 Jun 2020  
**Secondary Check:** Max Moore  
**Report Issue Date :** 15 Jun 2020

**Approved Signatory :** *Ken Williams* Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of frequency weightings	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 Measurements - Environmental Conditions			
Acoustic Tests		Temperature	+0.2%
1231e	+0.15dB	Relative Humidity	+2.4%
181e	+0.13dB	Barometric Pressure	+0.01MPa
141e	+0.14dB		
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 re-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.



**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: C20332

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

**Equipment Tested/ Model Number :** Pulsar Model 106  
**Instrument Serial Number :** 74813

**Atmospheric Conditions**

**Ambient Temperature :** 21.5°C  
**Relative Humidity :** 56.9%  
**Barometric Pressure :** 101.46kPa

**Calibration Technician :** Jeff Yu  
**Calibration Date :** 10 Jun 2020  
**Secondary Check:** Max Moore  
**Report Issue Date :** 15 Jun 2020

**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	93.96	1000.30

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 Test	Environmental Conditions
Generated SPL	Temperature
Frequency	Relative Humidity
Distortion	Barometric Pressure

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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# Wilpinjong Coal

## Environmental Noise Monitoring

June 2022

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Prepared for Wilpinjong Coal Pty Ltd

# Wilpinjong Coal

## Environmental Noise Monitoring

June 2022

Wilpinjong Coal Pty Ltd

E220456 RP1

Version	Date	Prepared by	Approved by	Comments
1.0	27/06/2022	Will Moore	Tony Welbourne	Final

Approved by



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Associate Director

27 June 2022

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# 1 Introduction

## 1.1 Background

Global Acoustics (now part of EMM) was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP), an open cut coal mine located approximately 40 kilometres north-east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 15/16 June 2022 at eight locations.

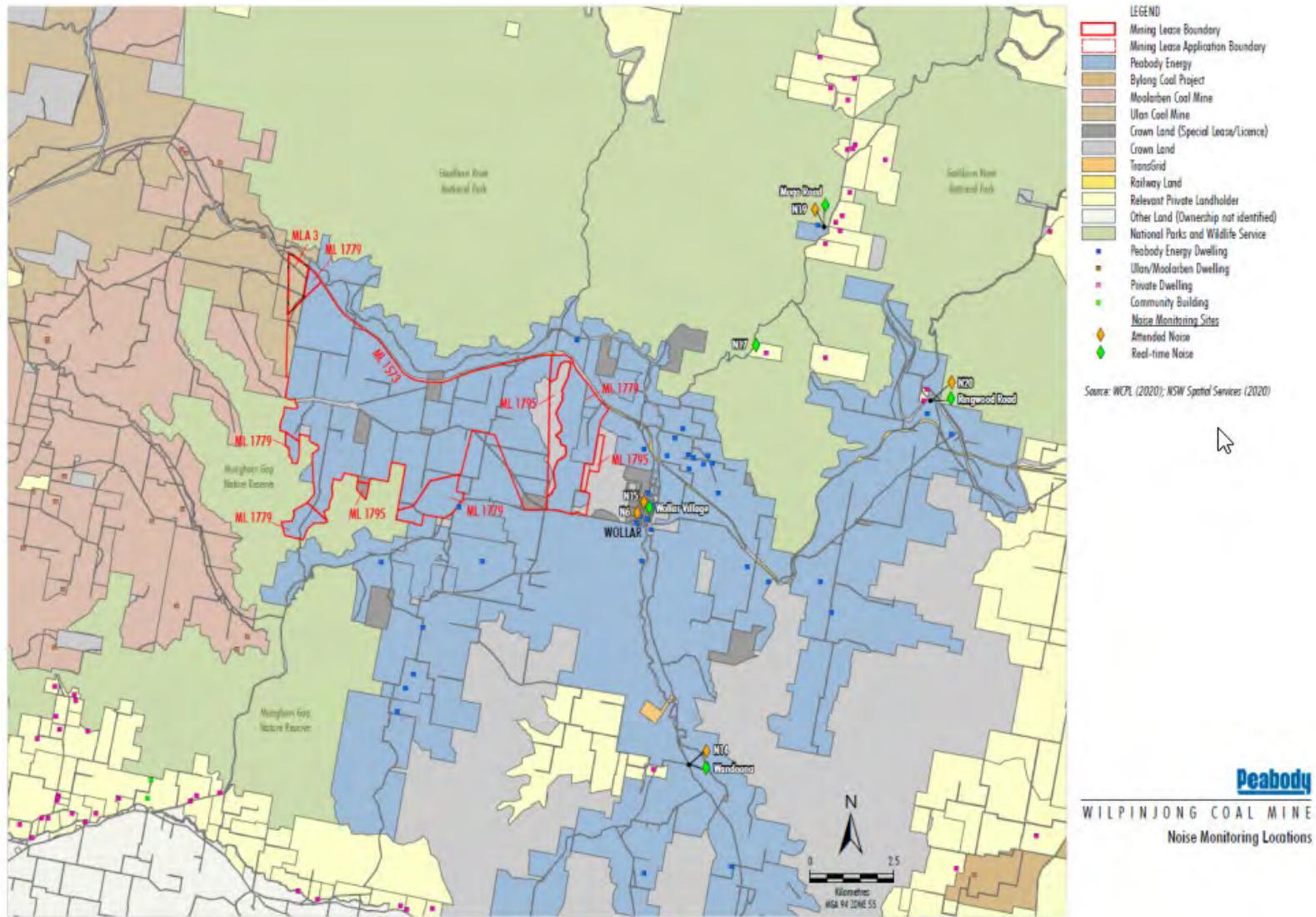
## 1.2 Monitoring locations

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

**Table 1.1** Attended monitoring locations

NMP Descriptor	Monitoring Location
N6	St Laurence O’Toole Catholic Church representative of Wollar Village south
N14	‘Tichular’ intersection of Tichular and Barigan Roads, Tichular
N15	Track off Barigan Street near Wollar Public School, Wollar Village
N17	Mogo Road, off Araluen Road, Wollar
N19	North Mogo Road, Mogo
N20	Ringwood Road, off Wollar Road, Wollar

Figure 1.1 Wilpinjong 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

Descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to describe human response to noise.
L <sub>Amax</sub>	The maximum A-weighted noise level over a time period.
L <sub>A1</sub>	The noise level which is exceeded for 1 per cent of the time.
L <sub>A1,1minute</sub>	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L <sub>A10</sub>	The noise level which is exceeded for 10 percent of the time.
L <sub>Aeq</sub>	The average noise A-weighted energy during a measurement period.
L <sub>A50</sub>	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L <sub>A90</sub>	The level exceeded for 90 percent of the time. The L <sub>A90</sub> level is often referred to as the “background” noise level and is commonly used to determine noise criteria for assessment purposes.
L <sub>Amin</sub>	The minimum A-weighted noise level over a time period.
L <sub>Ceq</sub>	The 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.
SC	Stability class (or category) is determined from measured wind speed and either sigma-theta or VTG.
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	This is the period 7:00am to 6:00pm.
Evening	This is the period 6:00pm to 10:00pm.
Night	This is the period 10:00pm to 7:00am.

## 2 Regulator requirements and noise criteria

### 2.1 Development consents

The most current development consent associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017), which covers all current operations and has replaced the previous consent (05-0021). The relevant noise conditions from the current consent are reproduced in Appendix A.

### 2.2 Environment protection licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently issued in March 2021. Relevant noise sections of the EPL are reproduced in Appendix A.

### 2.3 Noise Monitoring Program

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in August 2020. The relevant sections are reproduced in Appendix A.

### 2.4 Project Specific Criteria

Noise criteria and meteorological conditions required for noise criteria to apply are consistent in the project approval and EPL. The applicable noise criteria for each monitoring location are shown in Table 2.1.

**Table 2.1** WCP project specific criteria, dB

NMP Descriptor	Day L <sub>Aeq,15minute</sub>	Evening L <sub>Aeq,15minute</sub>	Night L <sub>Aeq,15minute</sub>	Night L <sub>A1,1minute</sub>
N6	36	37	37	45
N14	35	35	35	45
N15	36	37	37	45
N17	36	36	38	45
N19	35	35	35	45
N20	35	35	35	45

Notes: 1. N6 noise limits have been assumed to be as detailed for 'Wollar Village – Residential' in the PA, as the church is no longer a place of worship.  
2. N17 noise limits have been determined based on the assumption that N17 is property 102 in accordance with Appendix 5 Figure 1 of Development Consent SSD-6764.

## 2.5 Modifying Factors

The EPA 'Noise Policy for Industry' (NPfI, 2017) was approved for use in NSW in October 2017. 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 has 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 NPfI. Low-frequency modifying factors have been assessed in accordance with both the development consent and NPfI.



## 3 Methodology

### 3.1 Overview

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

### 3.2 Attended noise monitoring

During this survey, monthly attended monitoring was undertaken during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric condition measurement was also undertaken at each monitoring location. Attended monitoring during this reporting period was undertaken by Will Moore.

This survey presents noise levels gathered during attended monitoring that are the result of many sounds reaching the sound level meter microphone during monitoring. Received levels from various noise sources were noted during attended monitoring and particular attention was paid to the extent of WCP's contribution, if any, to measured levels. At each receptor location, WCP's  $L_{Aeq,15\text{minute}}$  and  $L_{A1,1\text{minute}}$  (in the absence of any other noise) was measured directly, where possible, or, determined by frequency analysis.

If the exact contribution of the source of interest (in this case WCP) cannot be established, due to masking by other noise sources in a similar frequency range, but site noise levels are observed to be well below (more than 5 dB lower than) any relevant criterion, a maximum estimate of the potential contribution of the site might be made based on other measured site-only noise descriptors in accordance with Section 7.1 of the NPfl. This is generally expressed as a 'less than' quantity, such as <20 dB or <30 dB.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may also 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 some noise was audible but could not be quantified. If site noise was NM due to masking but estimated to be significant in relation to a relevant criterion, we would employ methods (eg measure closer and back calculate) to determine a value for reporting.

All sites noted as NM in this report are due to one or more of the following reasons:

- Site noise levels were extremely low and unlikely, in many cases, to be even noticed;
- Site noise levels were masked by another relatively loud noise source that is characteristic of the environment (eg breeze in foliage or continuous road traffic noise) that cannot be eliminated by moving closer; and/or
- It was not feasible, nor reasonable to employ methods such as move closer and back calculate. Cases may include, but are not limited to, 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.

A measurement of  $L_{A1,1\text{minute}}$  corresponds to the highest noise level generated for 0.6 second during one minute. In practical terms this is the highest noise level, or  $L_{Amax}$ , received from the site during the entire measurement period (ie the highest level of the worst minute during the 15 minute measurement).

Often extraneous noise events (for example, road traffic pass-bys and dogs) interfere with the measurement of site noise levels in the frequency range of interest. Where required, the sound level meter is paused during these occurrences to aid in quantification of the site only noise.

### 3.3 Modifying factors

All measurements were evaluated for potential modifying factors in accordance with the NPfl. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfl.

Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable, such that the site only  $L_{Aeq}$  was not “NM” or less than a maximum cut off value (eg “<20 dB” or “<30dB”).

If applicable, modifying factors have been reported and added to measured site only  $L_{Aeq}$  noise levels when meteorological conditions satisfied requirements for site noise criteria to be applicable. Low-frequency modifying factors have only been applied to site-only  $L_{Aeq}$  levels if WCP was the only contributing low-frequency noise source.

### 3.4 Attended noise monitoring equipment

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

**Table 3.1** Attended noise monitoring equipment

Model	Serial number	Calibration due date
Rion NA-28 sound level meter	00370304	24/11/2022
Pulsar 105 acoustic calibrator	81334	29/11/2023

## 4 Results

### 4.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.1. Discussion as to the noise sources responsible for these measured levels is provided in Chapter 5 of this report.

**Table 4.1** Measured noise levels - June 2022

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	16/06/2022 1:15	41	37	32	30	29	27	24
N14	16/06/2022 0:00	40	32	29	27	26	24	21
N15	15/06/2022 23:00	59	55	43	43	37	34	29
N15 remeasure	15/06/2022 23:30	45	39	36	35	34	32	30
N17	15/06/2022 22:25	45	35	32	28	26	23	20
N19	15/06/2022 22:00	39	23	22	21	21	20	18
N20	16/06/2022 0:45	40	27	24	23	23	21	20

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

### 4.2 Modifying factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfI and methodology described in Section 3.3.

There were no modifying factors applicable to site during the survey. Mining noise was analysed and did not satisfy requirements for tonal, intermittent, or low-frequency modifying factors, as defined in the NPfI.

### 4.3 Attended noise monitoring results

Table 4.2 to Table 4.3 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement

**Table 4.2** LAeq,15minute generated by WCP against project specific criteria - June 2022

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB <sup>5</sup>	Criterion Applies? <sup>2</sup>	WCP LAeq dB <sup>3,4</sup>	Exceedance dB <sup>4,5</sup>
N6	16/06/2022 1:15	0.0	G	37	No	30	Nil
N14	16/06/2022 0:00	0.0	F	35	Yes	IA	Nil
N15	15/06/2022 23:00	0.0	F	37	Yes	38	1
N15 remeasure	15/06/2022 23:30	0.0	F	37	Yes	34	Nil
N17	15/06/2022 22:25	0.0	F	38	Yes	23	Nil
N19	15/06/2022 22:00	0.0	F	35	Yes	IA	Nil
N20	16/06/2022 0:45	0.0	F	35	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
3. Site-only LAeq,15minute attributed to WCP, including modifying factors if applicable.
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.3** LA1,1minute generated by WCP against project specific criteria - June 2022

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB <sup>5</sup>	Criterion Applies? <sup>2</sup>	WCP LA1,1min dB <sup>3,4</sup>	Exceedance dB <sup>4,5</sup>
N6	16/06/2022 1:15	0.0	G	45	No	37	Nil
N14	16/06/2022 0:00	0.0	F	45	Yes	IA	Nil
N15	15/06/2022 23:00	0.0	F	45	Yes	42	Nil
N15 remeasure	15/06/2022 23:30	0.0	F	45	Yes	35	Nil
N17	15/06/2022 22:25	0.0	F	45	Yes	28	Nil
N19	15/06/2022 22:00	0.0	F	45	Yes	IA	Nil
N20	16/06/2022 0:45	0.0	F	45	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
3. Site-only LA1,1minute attributed to WCP, including modifying factors if applicable.

4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

## 4.4 Atmospheric conditions

Atmospheric condition data measured by the operator during each measurement using a Kestrel hand-held weather meter is shown in Table 4.4. The wind speed, direction and temperature were measured at approximately 1.8 metres. Attended noise monitoring is not undertaken during rain, hail, or wind speeds above 5 m/s at microphone height.

**Table 4.4 Measured atmospheric conditions – June 2022**

Location	Start Date and Time	Temperature °C	Wind Speed m/s	Wind Direction °Magnetic North <sup>1</sup>	Cloud Cover 1/8s
N6	16/06/2022 1:15	2	0.0	-	2
N14	16/06/2022 0:00	4	0.4	320	0
N15	15/06/2022 23:00	3	0.0	-	2
N15 remeasure	15/06/2022 23:30	2	0.0	-	0
N17	15/06/2022 22:25	6	0.0	-	7
N19	15/06/2022 22:00	5	0.7	40	0
N20	16/06/2022 0:45	0	0.0	-	2

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

Meteorological data used for compliance assessment is sourced from the WCP AWS and inversion tower.

# 5 Discussion

## 5.1 Noted noise sources

During attended monitoring, the time variations (temporal characteristics) of noise sources are considered in each measurement via statistical descriptors. From these observations summaries have been derived for the location where an exceedance was measured and are provided in this chapter. Statistical 1/3 octave-band analysis of environmental noise was undertaken and the following figures display frequency ranges of various noise sources at each location for LA1, LA10, LAeq, LA50 and LA90 descriptors. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 5.1 where it can be seen that frogs and insects are generating noise at frequencies above 1000 Hz while mining noise is at frequencies less than 1000 Hz, which is typical. Adding levels at frequencies that relate to mining only allows separate statistical results to be calculated. This analysis cannot always be performed if there are significant levels of other noise at the same frequencies as mining, such as dogs, cows, or (most commonly) road traffic.

It should be noted that the method of summing statistical values up to a cut-off frequency can overstate the LA1 result by a small margin but is entirely accurate for LAeq.

Historical site only noise levels from attended monitoring over the previous 12-month period has been provided as additional information in Table 5.1 to Table 5.6.

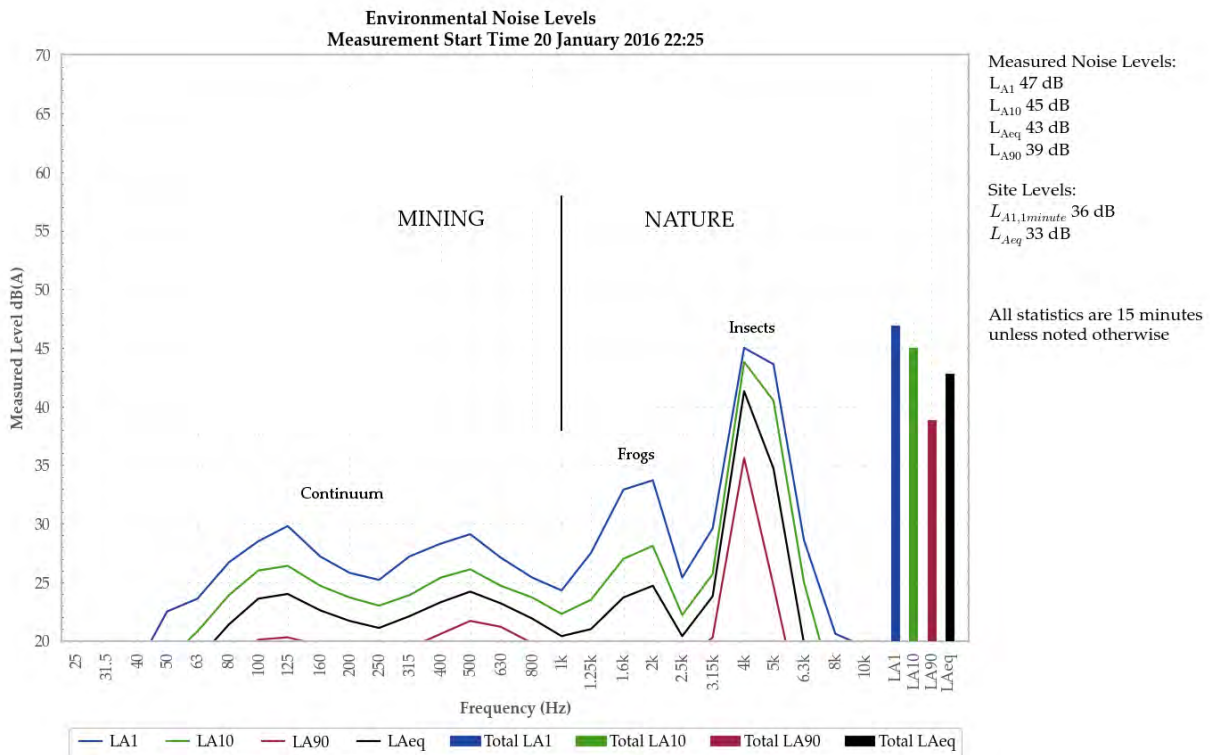
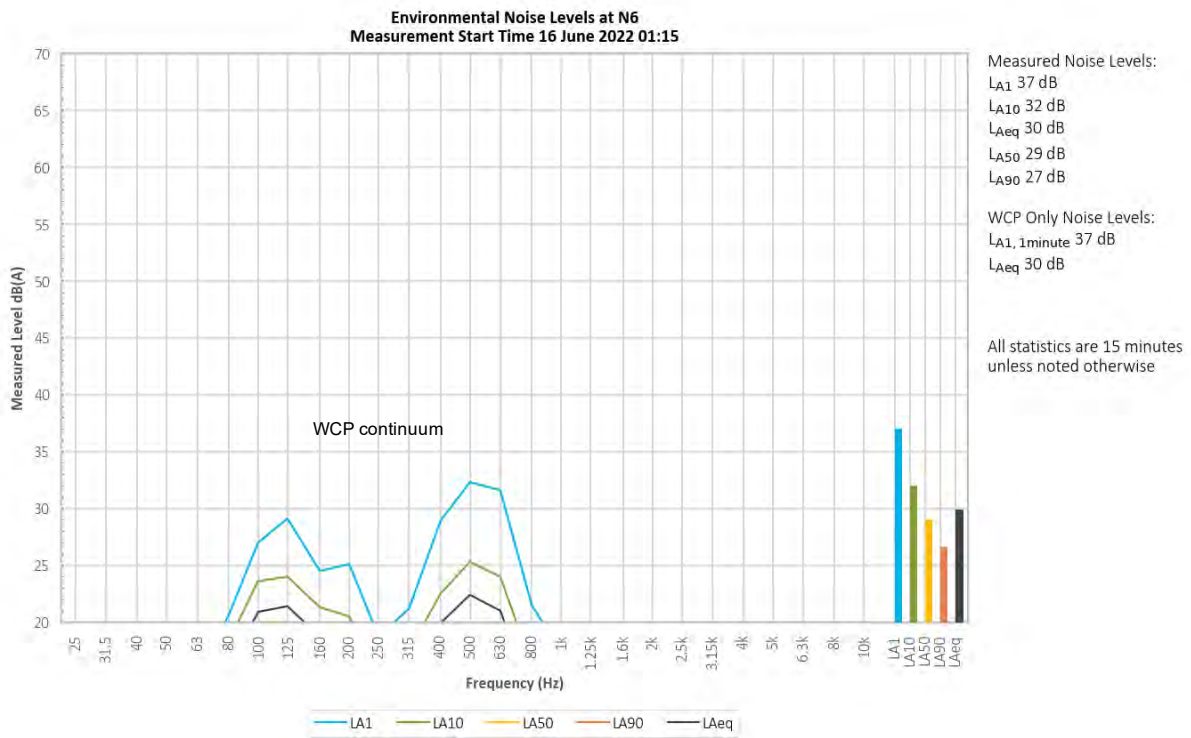


Figure 5.1 Example graph (refer to Section 5.1 for explanatory note)



5.1.1 N6



**Figure 5.2 Environmental noise levels N6, St Laurence O’Toole Catholic Church, Wollar Village**

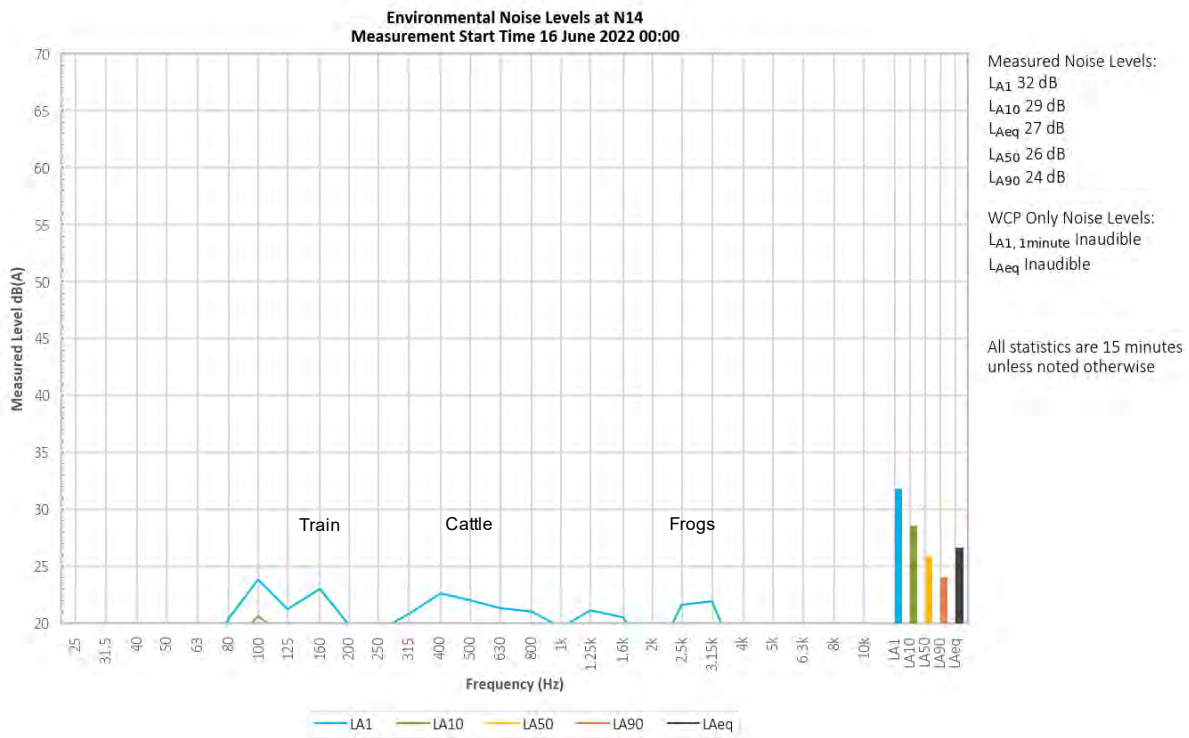
A mining continuum from WCP was audible throughout the measurement, generating a site only LAeq of 30 dB. Engine surges were responsible for the site only LA1,1minute of 37 dB. Track noise was also noted.

WCP continuum was responsible for all measured noise levels.

**Table 5.1 Historical WCP only noise levels at N6**

Month	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022
LAeq	IA	<25	IA	IA	31	IA	IA	IA	IA	IA	<20	<25
LA1,1min	IA	<25	IA	IA	33	IA	IA	IA	IA	IA	23	<25

### 5.1.2 N14



**Figure 5.3 Environmental noise levels N14, ‘Tichular’, intersection of Tichular and Barigan Roads**

WCP was inaudible during the measurement.

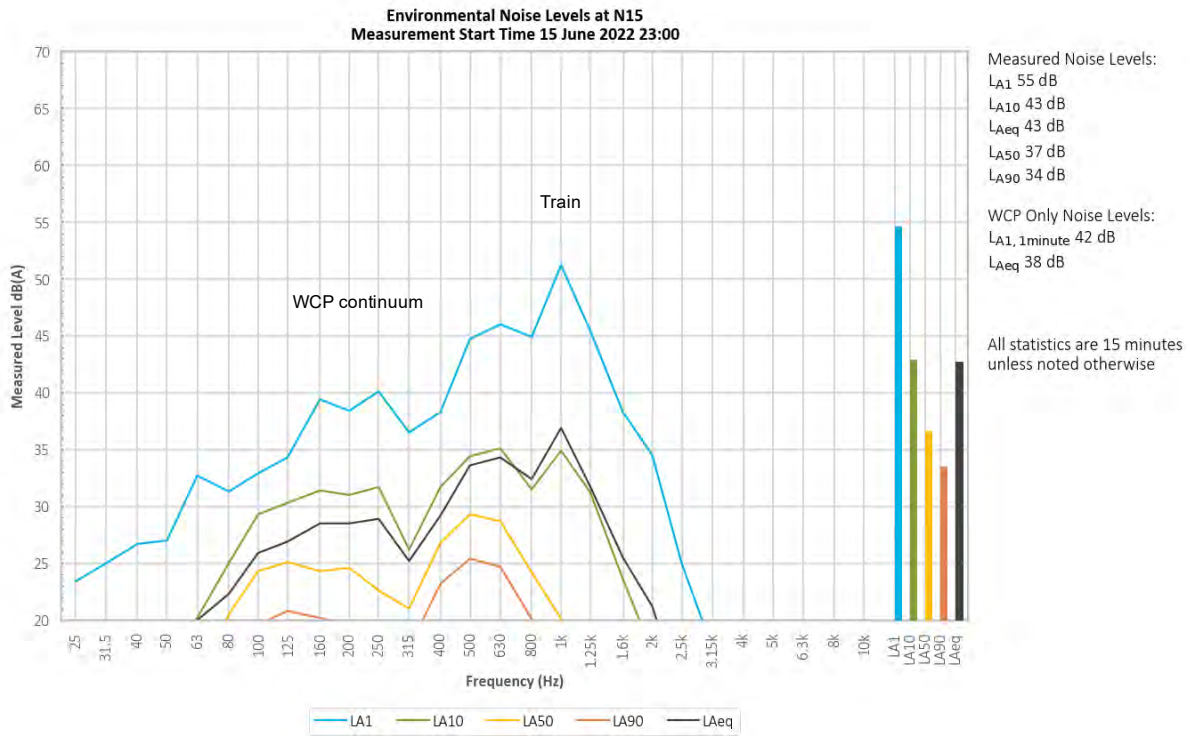
Cattle were responsible for the measured LA1 and contributed to the LA10. Frogs and a train generated the measured LA10 and LAeq. Frogs generated the measured LA50, and LA90.

A low continuum from a substation was also noted.

**Table 5.2 Historical WCP only noise levels at N14**

Month	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022
LAeq	<25	IA	IA	IA	<25	IA	IA	IA	IA	IA	<25	IA
LA1,1min	26	IA	IA	IA	25	IA	IA	IA	IA	IA	<25	IA

5.1.3 N15



**Figure 5.4 Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village**

A mining continuum from WCP was audible throughout the measurement, generating a site only LAeq of 38 dB. Engine surges were responsible for generating the site only LA1,1minute of 42 dB. Horns and track noise were also noted

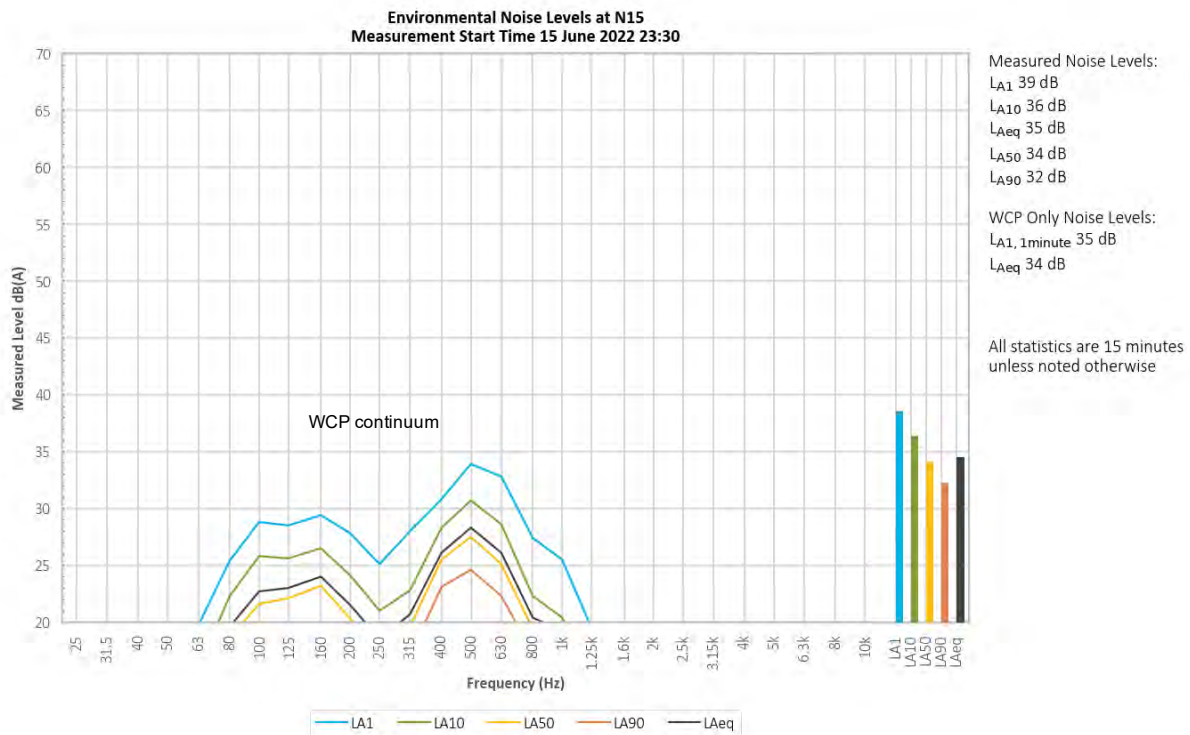
A train was responsible for the measured LA1 and contributed to the LA10 and LAeq. Continuum from WCP contributed to the measured LA10 and LAeq. WCP continuum was responsible for the LA50 and LA90.

Noise from cattle, and birds was also noted.

**Table 5.3 Historical WCP only noise levels at N15**

Month	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022
LAeq	IA	<25	IA	NM	33	IA	IA	IA	IA	IA	23
LA1,1min	IA	<30	IA	NM	41	IA	IA	IA	IA	IA	32

### 5.1.4 N15 remeasure



**Figure 5.5 Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village**

A mining continuum from WCP was audible throughout the second measurement, generating a site only LAeq of 34 dB. Engine surges were responsible for generating the site only LA1,1minute of 35 dB. Track noise was also noted.

Continuum from WCP was responsible for measured noise levels.

Noise from cattle, and birds was also noted.

**Table 5.4 Historical WCP only noise levels at N15**

Month	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022
LAeq	IA	<25	IA	NM	33	IA	IA	IA	IA	IA	23	34
LA1,1min	IA	<30	IA	NM	41	IA	IA	IA	IA	IA	32	38

5.1.5 N17

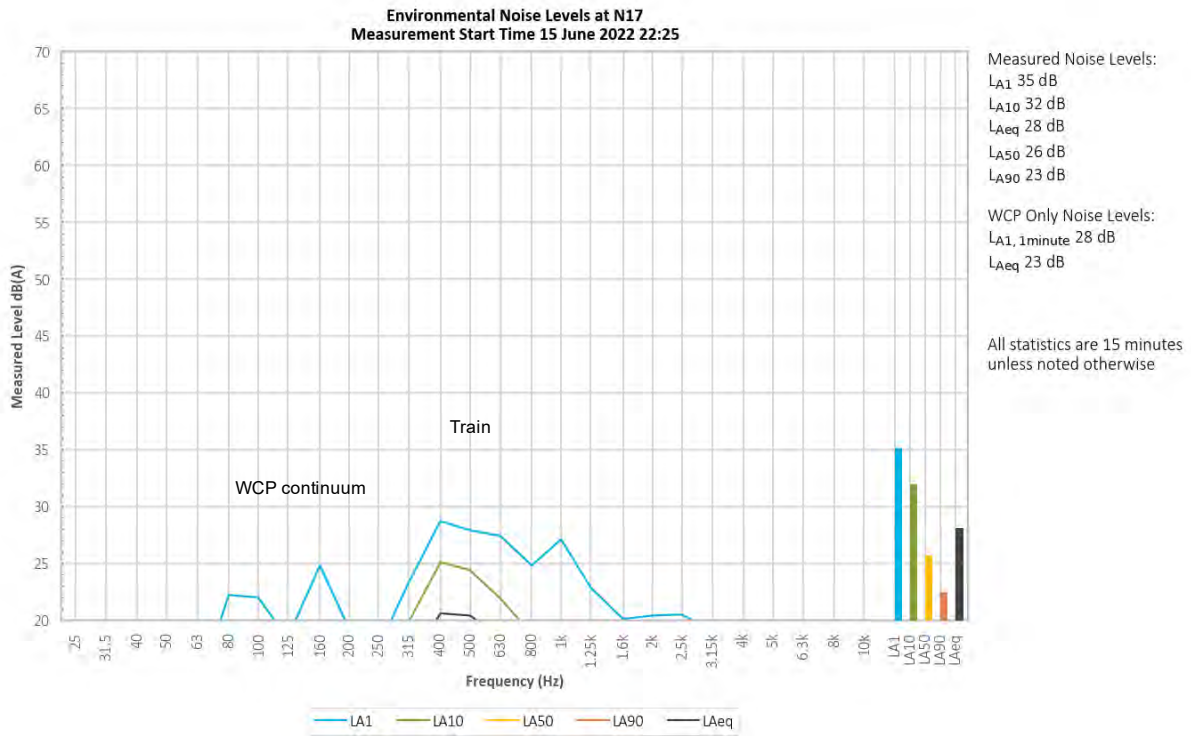


Figure 5.6 Environmental noise levels N17, Mogo Road, off Araluen Road

A mining continuum from WCP was audible throughout the measurement, generating a site only LAeq of 23 dB. Engine surges were responsible for generated the site only LA1,1minute of 28 dB.

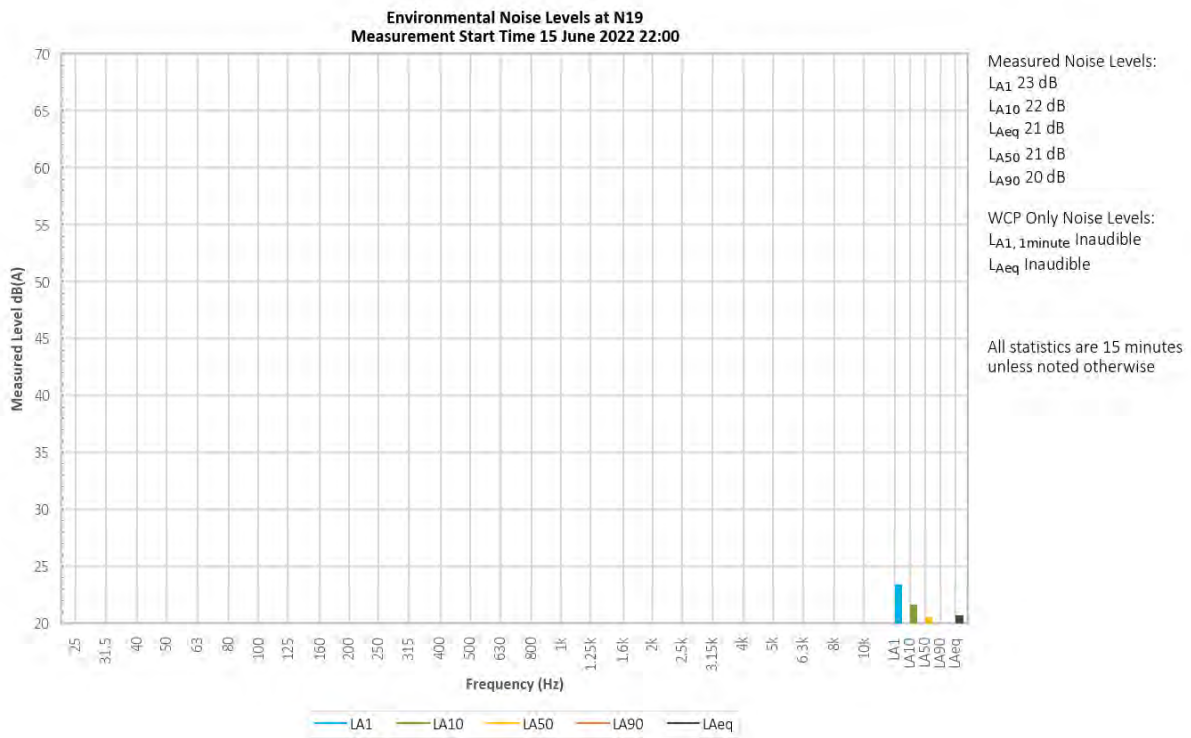
A train was responsible for the measured LA1, LA10, LA50 and LAeq.

Low-level noise from a plane was also noted

Table 5.5 Historical WCP only noise levels at N17

Month	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022
LAeq	IA	IA	<20	IA	<20	IA	IA	IA	IA	IA	<20	32
LA1,1min	IA	IA	<20	IA	<20	IA	IA	IA	IA	IA	23	37

## 5.1.6 N19



**Figure 5.7 Environmental noise levels N19, Upper Mogo Road**

WCP was inaudible during the measurement.

A continuum from a generator in a nearby paddock and the noise floor of the instrument were responsible for the measured noise levels.

**Table 5.6 Historical WCP only noise levels at N19**

Month	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022
L <sub>Aeq</sub>	IA	IA	<20	IA	IA	IA	IA	IA	IA	IA	IA	<20
L <sub>A1,1min</sub>	IA	IA	<20	IA	IA	IA	IA	IA	IA	IA	IA	<20



5.1.7 N20

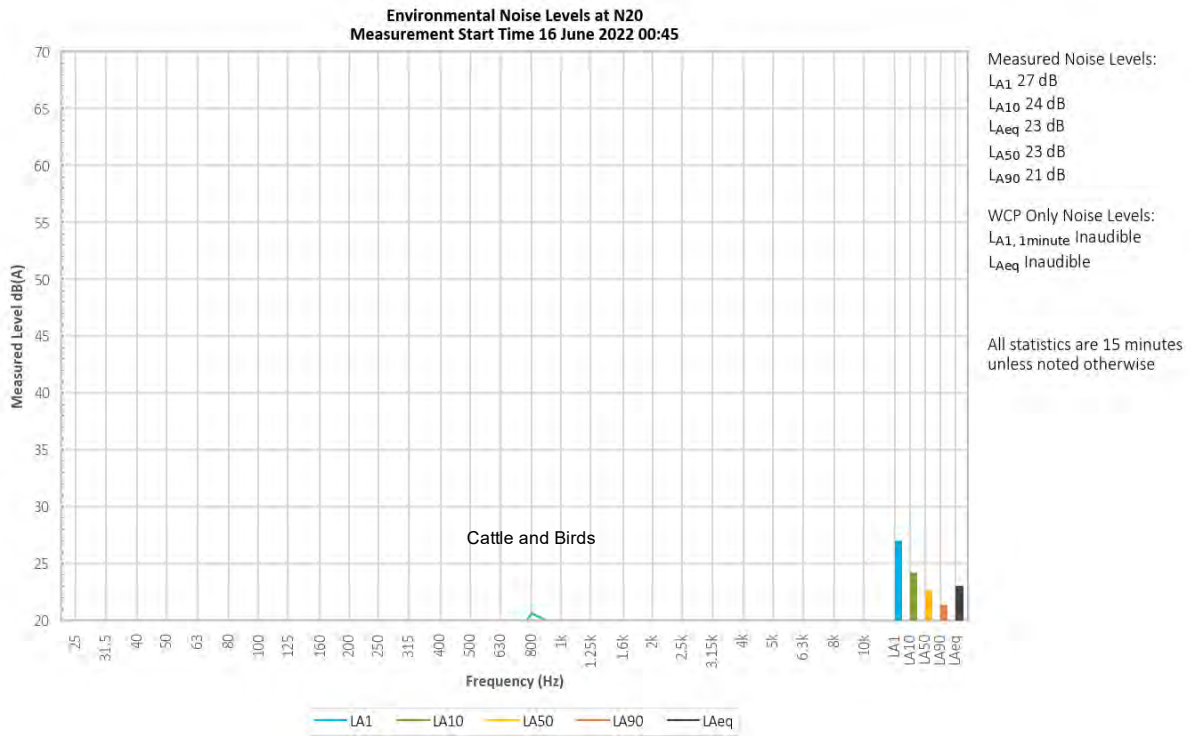


Figure 5.8 Environmental noise levels N20, Ringwood Road

WCP was inaudible during the measurement.

A bird was responsible for the measured LA1. Cattle were responsible for the measured LA10. Running water and the noise floor of the instrument generated the measured LAeq, LA50 and LA90.

Table 5.7 Historical WCP only noise levels at N20

Month	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022
LAeq	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	<25	22
LA1,1min	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	<25	28

## 6 Summary

Global Acoustics (now part of EMM) was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP, an open cut coal mine located approximately 40 kilometres north-east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was done around WCP during the night period of 15/16 June 2022.

Noise levels from WCP complied with relevant noise limits at all monitoring locations excluding the first measurement at N15. A remeasurement was taken 15 minutes after and noise levels were compliant.

Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

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# Appendix A

## Regulator documents

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## A.1 Wilpinjong Coal Extension Project Approval (SSD-6764)

### SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

#### ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from the owner of the land listed in Table 1, the Applicant must acquire the land in accordance with the procedures in conditions 5 and 6 of schedule 4.

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

Note: To interpret the land referred to in Table 1, see the applicable figures in Appendix 5.

#### MITIGATION UPON REQUEST

2. Upon receiving a written request from the owner of any residence on the land listed in Table 2, the Applicant must implement additional noise mitigation measures at or in the immediate vicinity of the residence in consultation with the landowner. These measures must be consistent with the measures outlined in the *Voluntary Land Acquisition and Mitigation Policy*. They must also be reasonable and feasible and proportionate with the level of predicted impact.

If within 3 months of receiving this request from the owner, the Applicant and the owner 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.

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

Note: To interpret the land referred to in Table 2, see the applicable figures in Appendix 5.

#### NOISE

##### Noise Criteria

3. The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 3 at any residence on privately-owned land or at the other specified locations.

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>A1</sub> (1 minute)
102	36	36	38	45
Wollar Village – Residential	36	37	37	45
All other privately owned land	35	35	35	45
901 – Wollar School		35 (internal) 45 (external) When in use		
150A – St Luke’s Anglican Church 900 – St Laurence O’Toole Catholic Church		40 (internal) When in use		

Note: To interpret the locations referred to in Table 3, see the applicable figures in Appendix 5.

Noise generated by the development is to be measured in accordance with the relevant requirements of the *NSW Industrial Noise Policy* (as may be updated from time to time). Appendix 6 sets out the meteorological conditions under which these criteria apply along with any modifications to the *NSW Industrial Noise Policy* and the requirements for evaluating compliance with these criteria.

However, these criteria do not apply if the Applicant has an agreement with the owner/s of the relevant residence of land 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, low frequency, road and rail noise of the development;
  - (b) operate a comprehensive noise management system 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 consent;
  - (c) minimise the noise impacts of the development during meteorological conditions when the noise limits in this consent do not apply (see Appendix 6);
  - (d) only use locomotives and rolling stock that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL;
  - (e) co-ordinate noise management at the site with the noise management at Moolarben and Ulan mines to minimise cumulative noise impacts; and
  - (f) carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent.

### Noise Management Plan

5. Prior to carrying out any development under this consent, unless the Secretary agrees otherwise, 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 in this consent;
  - (c) describe the proposed noise management system in detail; and
  - (d) include a monitoring program that:
    - evaluates and reports on:
      - the effectiveness of the noise management system;
      - compliance against the noise criteria in this consent; and
      - compliance against the noise operating conditions;
    - includes a program to calibrate and validate the real-time noise monitoring results with the attended monitoring results over time (so the real-time noise monitoring program can be used as a better indicator of compliance with the noise criteria in this consent and trigger for further attended monitoring); and
    - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.
6. The Applicant must implement the approved Noise Management Plan for the development.



**APPENDIX 6  
NOISE COMPLIANCE ASSESSMENT**

**Applicable Meteorological Conditions**

1. The noise criteria in Table 3 of schedule 3 are to apply under all meteorological conditions except the following:
  - (a) wind speeds greater than 3 m/s at 10 m above ground level; or
  - (b) stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
  - (c) stability category G temperature inversion conditions.

**Determination of Meteorological Conditions**

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions must be that recorded by the meteorological station located on the site.

**Compliance Monitoring**

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
4. This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
5. Unless otherwise agreed with the Secretary, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
  - (a) monitoring locations for the collection of representative noise data;
  - (b) meteorological conditions during which collection of noise data is not appropriate;
  - (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
  - (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

Table 6-1: One-third octave low frequency noise thresholds

Hz/dB(Z)	One-third octave $L_{Zeq,15minute}$ threshold level												
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB(Z)	92	89	86	77	69	61	54	50	50	48	48	46	44



## A.2 Environment Protection Licence

### L5 Noise limits

L5.1 Noise generated at the premises must not exceed the noise limits presented in the table below. The

locations referred to in the table below are indicated in Appendix 5 - Figures 1 and 2 of Development Consent number SSD-6764 dated 24 April 2017.

Location	Day	Evening	Night	Night
	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LA1(1 minute)
Wollar village - residential	36	37	37	45
All other privately owned land	35	35	35	45
102	36	36	38	45
Wollar school	35 (internal), 45 (external) when in use			
St Luke's Anglican Church & St Laurence O'Toole Catholic Church	40 (internal) when in use			

Note: The above noise limits do not apply at properties where the licensee has a written agreement with the landowner to exceed the noise limits.

L5.2 For the purpose of condition L5.1;

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.
- Evening is defined as the period 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.

L5.3 The noise limits set out in condition L5.1 apply under all meteorological conditions except for the following:

- a) Wind speeds greater than 3 metres/second at 10 metres above ground level; or
- b) Stability category F temperature inversions and wind speeds greater than 2m/s at 10m above ground level; or
- c) Stability category G temperature inversion conditions.

L5.4 For the purpose of condition L5.3:

- a) The meteorological data to be used for determining meteorological conditions is the data recorded by the meteorological weather station identified as EPA identification Point 21 in condition P1.1; 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.

- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, 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 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
    - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
  - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
  - c) With the noise limits in condition L5.1, 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 conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
  - b) at a point other than the most affected point at a location.
- L5.7 For the purpose 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.

## 6 Noise Monitoring Program

WCPL utilise a combination of operator-attended and unattended noise monitoring to assess the performance of the Mine against the Noise Criteria from Development Consent (SSD-6467). Operator-attended noise monitoring will be used for determining compliance against the Noise Criteria in **Table 6**. Unattended real-time noise monitoring is primarily utilised as a proactive noise control system; providing noise alerts when predetermined noise levels are triggered so mining operations can be modified where noise levels are influenced by noise from the Project.

### 6.1 Monitoring Locations

Operator-attended noise monitoring locations have been chosen considering the following criteria:

- In any given direction, the site is as close as reasonably practical to the nearest Private Receiver;
- There is no closer Private Receiver that is not monitored;
- The site is unlikely to cause concern to any person residing on nearby private property; and
- The site can be safely accessed by the persons carrying out the noise monitoring.

WCPL will undertake operator-attended noise monitoring as identified in **Table 7 (Figure 3 and Figure 4)**. Real-time noise monitoring units are relocated from time to time, to assist with additional targeted noise monitoring and in response to community complaints. Real-time noise monitoring locations will be reviewed and modified as necessary in response to monitoring results, changes to the operation, or as a result of community consultation.

Should circumstances change, WCPL may amend the noise monitoring locations shown in **Table 7** with consideration to the above criteria. WCPL will update this NMP, in consultation with DPIE and the EPA.

**Table 7 Noise Monitoring Locations**

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
St Laurence O'Toole Church	N6	Operator-attended Noise	777299.9	6415716.9	Location based on the nearest community structure to the East of the Mine
Tichular	N14	Operator-attended Noise	778791.9	6408624.7	Location based on the nearest community structure to the South of the Mine
Wollar Village	N15	Operator-attended Noise	777452.0	6416158.9	Location based on the nearest community structure to the South-East of the Mine
Mogo Rd	N17	Operator-attended Noise	780771.0	6420641.0	Location based on the nearest community structure to the North-East of the Mine
Mogo Rd	N19	Operator-attended Noise	782644.5	6424151.1	Location based on the nearest and residential community structure to the North-East of the Mine
Ringwood Road	N20	Operator-attended Noise	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine.
WCPL Rail Loop	-	Meteorology & Inversion	770630.9	6418085.1	Location based on consideration of prevailing meteorological conditions

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
Wollar Village <sup>4</sup>	-	Real-Time Noise - Fixed	777608.9	6415996.8	Location based on the nearest non-mine owned residence to the South-East of the Mine N15 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Mogo Rd <sup>4</sup>	-	Real-Time Noise - Fixed	782644.5	6424151.1	Location based on the nearest non-mine owned residence to the East of the Mine N19 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Ringwood Road	-	Real-Time Noise - Fixed	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine. N20 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Tichular <sup>3</sup>	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

**Notes:**

1. MGA94, Zone 55
2. Monitoring will be undertaken at this location until it can be demonstrated that the noise contribution from the Mine is negligible. At this point, WCPL will notify DPIE and EPA of the results of this monitoring and advise if and when the monitoring at this location will be scaled back or discontinued. The real-time noise monitor at Wandooona may be relocated in response to a complaint or identified noise issue at another location.
3. Where continuous monitors are located at compliance locations (e.g. privately-owned receivers), WCPL will conduct a review of the identification/characterisation of mine-related noise by the real-time monitoring system at that location by comparing against observed mine-related noise identified during operator-attended monitoring (i.e. validate the identification of mine related noise and filtering of extraneous noise sources by the real-time system). Refer to Section 6.5.

## 6.2 Meteorological Monitoring

WCPL maintains a continuous on-site meteorological monitoring station that complies with the requirements of the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (DEC, 2007). The location of this meteorological monitoring station is shown on **Figure 3**.

WCPL's meteorological monitoring station is capable of continuous real-time measurement of temperature lapse rate in accordance with the INP (EPA, 2000).

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

- a) Rainfall;
- b) Relative humidity;
- c) Temperature – measured at 2, 10 and 60 m above ground level;
- d) Wind speed – horizontal and vertical;
- e) Wind direction – measured at 10 m above ground level;
- f) Sigma theta;
- g) Pasquil stability classification;
- h) Solar radiation; and
- i) Temperature lapse rate.

Meteorological forecasting will be undertaken as specified in **Section 5.4**.



## 6.3 Operator-attended Noise Monitoring

### 6.3.1 Purpose

Operator-attended noise monitoring will be used to evaluate compliance against the Noise Criteria detailed in **Table 6**.

### 6.3.2 Summary

Operator-attended noise will be undertaken in accordance with **Table 8**.

**Table 8 Operator-attended Noise Monitoring Summary**

Element	Description
Locations	<ul style="list-style-type: none"><li>As per Table 7,</li><li>Figure 3 and Figure 4</li></ul>
Period	<ul style="list-style-type: none"><li>Night-time period (10 pm to 7 am) being the most sensitive time period for noise.</li></ul>
Frequency	<ul style="list-style-type: none"><li>12 times per year<sup>1</sup> (i.e. one night per month); plus</li><li>12 times per year<sup>1</sup> (i.e. one night per month) at locations as identified in Table 7 to validate real-time noise monitoring data (Section 6.5).</li></ul>

Notes: <sup>1</sup> Monitoring frequency at Mogo Road (N19) and Ringwood Road (N20) will remain at the frequency identified in Table 8 during the commencement of operations in Pit 8. A review of the monitoring frequency at N19 and N20 will be undertaken during subsequent reviews of this NMP in consultation with WCPL's noise specialist and relevant government agencies.

### 6.3.3 Methodology

Operator-attended noise monitoring will be undertaken as outlined in **Table 8** by an independent acoustic consultant and guided by the requirements of the INP (EPA, 2000) and AS 1055.1-1997 'Acoustics – Description and measurement of environmental noise – General procedures'. Routine operator-attended noise monitoring will be undertaken during night-time periods (10 pm - 7 am).

If any of the Noise Criteria are exceeded, a second measurement will be taken at the same location within 75 minutes of the first measurement. If the second measurement does not exceed the Noise Criteria, as defined in **Table 6**, then the result will be recorded and the regular monitoring program resumed.

If the second measurement does exceed the applicable Noise Criteria, then:

- The noise consultant will immediately report both results to the WCPL Environment and Community Manager or delegate immediately;
- Upon confirming the exceedances are deemed a non-compliance in accordance with the **Figure 5**, WCPL will report both results to DPIE and EPA immediately, upon confirming the exceedance (**Section 9.0**).

WCPL will:

- Take immediate action in accordance with the NMS;
- Arrange for additional operator-attended noise monitoring to occur at that site within 1 week; and
- Deploy the mobile real-time noise monitor to measure and record the noise at that site for at least a 1 week period.

WCPL will also investigate any changes to the mine operations, and may revisit the noise model on the basis of the noise measurements recorded at the site.

The acoustic noise consultant will consider the modification factors in Section 4 of the INP (EPA, 2000) during the evaluation of attending monitoring results.

### 6.3.6 Applicable Meteorological Conditions

The Noise Criteria in **Table 6** are to be applied under all meteorological conditions except for the following:

- Wind speeds greater than 3 m/s at 10 m above ground level; or
- Stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
- Stability category G temperature inversion conditions.

Except for wind speed at microphone height, the data used for determining meteorological conditions will be that recorded by the meteorological station located on the Mine site.

It should be noted that when assessing wind conditions to determine the potential for noise level alteration by the refraction of sound-waves through the atmosphere, meteorological measurements should be undertaken at a height of 10 m above the ground level, in accordance with Section 5 of the INP (EPA, 2000). Local meteorological conditions, including near-surface winds are measured at the inbuilt meteorological station (2 m); however, in accordance with the INP (EPA, 2000), the 2 m data cannot be used to determine impacts from sound-wave refraction. The 2 m meteorological data is used to assess local meteorological conditions that may increase ambient noise levels including surface winds and rainfall.



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# Appendix B

## Calibration certificates

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## B.1 Calibration Certificates



### Sound Level Meter IEC 61672-3:2013 Calibration Certificate Calibration Number C20674

<b>Client Details</b>	Global Acoustics Pty Ltd 12/16 Huntingdale Drive Thornton NSW 2322
<b>Equipment Tested/ Model Number :</b>	Rion NA-28
<b>Instrument Serial Number :</b>	00370304
<b>Microphone Serial Number :</b>	10421
<b>Pre-amplifier Serial Number :</b>	60313
<b>Pre-Test Atmospheric Conditions</b>	<b>Post-Test Atmospheric Conditions</b>
Ambient Temperature : 22°C	Ambient Temperature : 21.9°C
Relative Humidity : 50.6%	Relative Humidity : 50.1%
Barometric Pressure : 100.08kPa	Barometric Pressure : 100.09kPa
<b>Calibration Technician :</b> Lucky Jaiswal	<b>Secondary Check:</b> Max Moore
<b>Calibration Date :</b> 24 Nov 2020	<b>Report Issue Date :</b> 25 Nov 2020
<b>Approved Signatory :</b>	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 - Environmental Conditions			
Acoustic Tests		Temperature	±0.2°C
125Hz	±0.12dB	Relative Humidity	±2.4%
180Hz	±0.11dB	Barometric Pressure	±0.015kPa
500Hz	±0.13dB		
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 C21832

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

**Equipment Tested/ Model Number :** Pulsar Model 105  
**Instrument Serial Number :** 81334

**Atmospheric Conditions**

**Ambient Temperature :** 25°C  
**Relative Humidity :** 49.6%  
**Barometric Pressure :** 100.8kPa

**Calibration Technician :** Lucky Jaiswal  
**Calibration Date :** 29 Nov 2021  
**Secondary Check:** Harrison Kim  
**Report Issue Date :** 2 Dec 2021

**Approved Signatory :** *Lucky Jaiswal*

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	94.19	1000.30

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.

**Uncertainties of Measurement -**

Specific Tests		Environmental Conditions	
Generated SPL	±0.1 dB	Temperature	±0.1°C
Frequency	±0.07%	Relative Humidity	±1.9%
Distortion	±0.50%	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.



# **Wilpinjong Coal**

## **Environmental Noise Monitoring**

July 2022

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Prepared for Wilpinjong Coal Pty Ltd

# Wilpinjong Coal

## Environmental Noise Monitoring

July 2022

Wilpinjong Coal Pty Ltd

E220456 RP1

Version	Date	Prepared by	Approved by	Comments
1.0	14/08/2022	Will Moore	Jesse Tribby	

Approved by



**Jesse Tribby**

Senior Acoustic Consultant

14 August 2022

Level 3 175 Scott Street

Newcastle NSW 2300

---

This report has been prepared in accordance with the brief provided by Wilpinjong Coal Pty Ltd and has relied upon the information collected at the time and under the conditions specified in the report. All findings, conclusions or recommendations contained in the report are based on the aforementioned circumstances. The report is for the use of Wilpinjong Coal Pty Ltd and no responsibility will be taken for its use by other parties. Wilpinjong Coal Pty Ltd may, at its discretion, use the report to inform regulators and the public.

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# 1 Introduction

## 1.1 Background

Global Acoustics (now part of EMM) was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP), an open cut coal mine located approximately 40 kilometres north-east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 28/29 July 2022 at eight locations.

## 1.2 Monitoring locations

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

**Table 1.1** Attended monitoring locations

NMP Descriptor	Monitoring Location
N6	St Laurence O’Toole Catholic Church representative of Wollar Village south
N14	‘Tichular’ intersection of Tichular and Barigan Roads, Tichular
N15	Track off Barigan Street near Wollar Public School, Wollar Village
N17	Mogo Road, off Araluen Road, Wollar
N19	North Mogo Road, Mogo
N20	Ringwood Road, off Wollar Road, Wollar

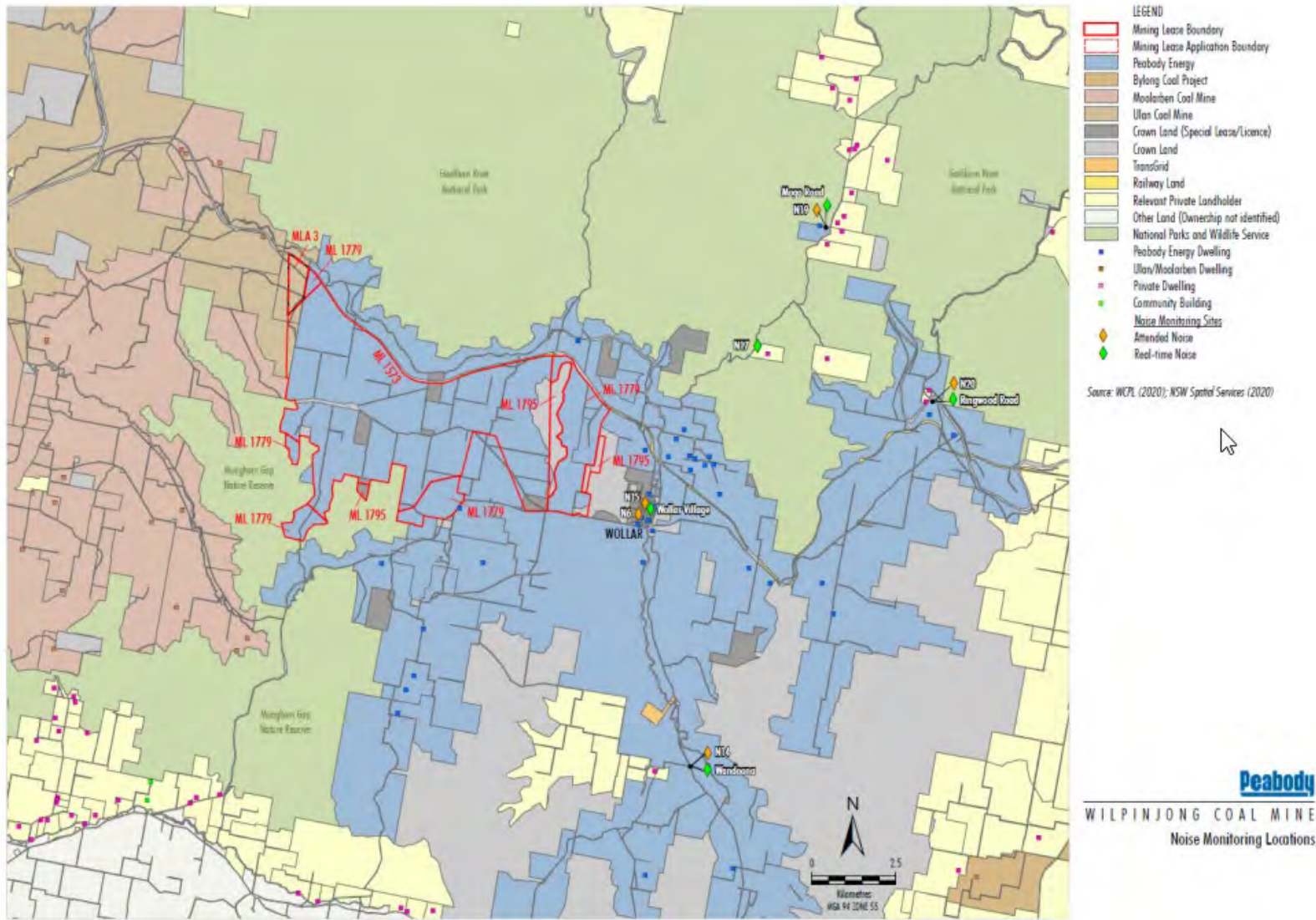


Figure 1.1 Wilpinjong noise monitoring locations

## 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**

Descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to describe human response to noise.
L <sub>Amax</sub>	The maximum A-weighted noise level over a time period.
L <sub>A1</sub>	The noise level which is exceeded for 1 per cent of the time.
L <sub>A1,1minute</sub>	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L <sub>A10</sub>	The noise level which is exceeded for 10 percent of the time.
L <sub>Aeq</sub>	The average noise A-weighted energy during a measurement period.
L <sub>A50</sub>	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L <sub>A90</sub>	The level exceeded for 90 percent of the time. The L <sub>A90</sub> level is often referred to as the “background” noise level and is commonly used to determine noise criteria for assessment purposes.
L <sub>Amin</sub>	The minimum A-weighted noise level over a time period.
L <sub>Ceq</sub>	The 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.
SC	Stability class (or category) is determined from measured wind speed and either sigma-theta or VTG.
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	This is the period 7:00am to 6:00pm.
Evening	This is the period 6:00pm to 10:00pm.
Night	This is the period 10:00pm to 7:00am.

## 2 Regulator requirements and noise criteria

### 2.1 Development consents

The most current development consent associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017), which covers all current operations and has replaced the previous consent (05-0021). The relevant noise conditions from the current consent are reproduced in Appendix A.

### 2.2 Environment protection licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently issued in March 2021. Relevant noise sections of the EPL are reproduced in Appendix A.

### 2.3 Noise Monitoring Program

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in August 2020. The relevant sections are reproduced in Appendix A.

### 2.4 Project Specific Criteria

Noise criteria and meteorological conditions required for noise criteria to apply are consistent in the project approval and EPL. The applicable noise criteria for each monitoring location are shown in Table 2.1.

**Table 2.1** WCP project specific criteria, dB

NMP Descriptor	Day L <sub>Aeq,15minute</sub>	Evening L <sub>Aeq,15minute</sub>	Night L <sub>Aeq,15minute</sub>	Night L <sub>A1,1minute</sub>
N6	36	37	37	45
N14	35	35	35	45
N15	36	37	37	45
N17	36	36	38	45
N19	35	35	35	45
N20	35	35	35	45

Notes: 1. N6 noise limits have been assumed to be as detailed for 'Wollar Village – Residential' in the PA, as the church is no longer a place of worship.  
2. N17 noise limits have been determined based on the assumption that N17 is property 102 in accordance with Appendix 5 Figure 1 of Development Consent SSD-6764.

## 2.5 Modifying Factors

The EPA 'Noise Policy for Industry' (NPfI, 2017) was approved for use in NSW in October 2017. 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 has 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 NPfI. Low-frequency modifying factors have been assessed in accordance with both the development consent and NPfI.



## 3 Methodology

### 3.1 Overview

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

### 3.2 Attended noise monitoring

During this survey, monthly attended monitoring was undertaken during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric condition measurement was also undertaken at each monitoring location. Attended monitoring during this reporting period was undertaken by Will Moore.

This survey presents noise levels gathered during attended monitoring that are the result of many sounds reaching the sound level meter microphone during monitoring. Received levels from various noise sources were noted during attended monitoring and particular attention was paid to the extent of WCP's contribution, if any, to measured levels. At each receptor location, WCP's  $L_{Aeq,15\text{minute}}$  and  $L_{A1,1\text{minute}}$  (in the absence of any other noise) was measured directly, where possible, or, determined by frequency analysis.

If the exact contribution of the source of interest (in this case WCP) cannot be established, due to masking by other noise sources in a similar frequency range, but site noise levels are observed to be well below (more than 5 dB lower than) any relevant criterion, a maximum estimate of the potential contribution of the site might be made based on other measured site-only noise descriptors in accordance with Section 7.1 of the NPfl. This is generally expressed as a 'less than' quantity, such as <20 dB or <30 dB.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may also 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 some noise was audible but could not be quantified. If site noise was NM due to masking but estimated to be significant in relation to a relevant criterion, we would employ methods (eg measure closer and back calculate) to determine a value for reporting.

All sites noted as NM in this report are due to one or more of the following reasons:

- Site noise levels were extremely low and unlikely, in many cases, to be even noticed;
- Site noise levels were masked by another relatively loud noise source that is characteristic of the environment (eg breeze in foliage or continuous road traffic noise) that cannot be eliminated by moving closer; and/or
- It was not feasible, nor reasonable to employ methods such as move closer and back calculate. Cases may include, but are not limited to, 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.

A measurement of  $L_{A1,1\text{minute}}$  corresponds to the highest noise level generated for 0.6 second during one minute. In practical terms this is the highest noise level, or  $L_{Amax}$ , received from the site during the entire measurement period (ie the highest level of the worst minute during the 15 minute measurement).

Often extraneous noise events (for example, road traffic pass-bys and dogs) interfere with the measurement of site noise levels in the frequency range of interest. Where required, the sound level meter is paused during these occurrences to aid in quantification of the site only noise.

### 3.3 Modifying factors

All measurements were evaluated for potential modifying factors in accordance with the NPfI. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfI.

Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable, such that the site only  $L_{Aeq}$  was not “NM” or less than a maximum cut off value (eg “<20 dB” or “<30dB”).

If applicable, modifying factors have been reported and added to measured site only  $L_{Aeq}$  noise levels when meteorological conditions satisfied requirements for site noise criteria to be applicable. Low-frequency modifying factors have only been applied to site-only  $L_{Aeq}$  levels if WCP was the only contributing low-frequency noise source.

### 3.4 Attended noise monitoring equipment

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

**Table 3.1** Attended noise monitoring equipment

Model	Serial number	Calibration due date
Rion NA-28 sound level meter	01070590	09/06/2024
Pulsar 106 acoustic calibrator	74813	09/06/2024

## 4 Results

### 4.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.1. Discussion as to the noise sources responsible for these measured levels is provided in Section 5 of this report.

**Table 4.1** Measured noise levels <sup>1</sup> - July 2022

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	28/07/2022 23:19	58	44	37	35	32	28	27
N14	29/07/2022 00:34	61	54	36	40	29	26	24
N15	28/07/2022 23:00	42	36	33	30	30	28	26
N17	28/07/2022 22:25	42	34	31	29	29	27	25
N19	28/07/2022 22:00	59	45	38	35	31	27	25
N20	29/07/2022 00:00	45	35	32	29	29	27	25

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

### 4.2 Modifying factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfl and methodology described in Section 3.3.

There were no modifying factors applicable to site during the survey. Mining noise was analysed and did not satisfy requirements for tonal, intermittent, or low-frequency modifying factors, as defined in the NPfl.

### 4.3 Attended noise monitoring results

Table 4.2 to Table 4.3 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement

**Table 4.2**  $L_{Aeq,15minute}$  generated by WCP against project specific criteria – July 2022

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB <sup>5</sup>	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq}$ dB <sup>3,4</sup>	Exceedance dB <sup>4,5</sup>
N6	28/07/2022 23:19	0.0	G	37	No	IA	NA
N14	29/07/2022 00:34	0.0	G	35	No	IA	NA
N15	28/07/2022 23:00	0.0	G	37	No	29	NA
N17	28/07/2022 22:25	0.2	G	38	No	27	NA
N19	28/07/2022 22:00	1.2	G	35	No	IA	NA
N20	29/07/2022 00:00	0.0	G	35	No	IA	NA

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.3**  $L_{A1,1minute}$  generated by WCP against project specific criteria - July 2022

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB <sup>5</sup>	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3,4</sup>	Exceedance dB <sup>4,5</sup>
N6	28/07/2022 23:19	0.0	G	45	No	IA	NA
N14	29/07/2022 00:34	0.0	G	45	No	IA	NA
N15	28/07/2022 23:00	0.0	G	45	No	40	NA
N17	28/07/2022 22:25	0.2	G	45	No	30	NA
N19	28/07/2022 22:00	1.2	G	45	No	IA	NA
N20	29/07/2022 00:00	0.0	G	45	No	IA	NA

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site-only  $L_{A1,1minute}$  attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

## 4.4 Atmospheric conditions

Atmospheric condition data measured by the operator during each measurement using a Kestrel hand-held weather meter is shown in Table 4.4. The wind speed, direction and temperature were measured at approximately 1.8 metres. Attended noise monitoring is not undertaken during rain, hail, or wind speeds above 5 m/s at microphone height.

**Table 4.4 Measured atmospheric conditions – July 2022**

Location	Start Date and Time	Temperature °C	Wind Speed m/s	Wind Direction ° Magnetic North <sup>1</sup>	Cloud Cover 1/8s
N6	28/07/2022 23:19	4	0.0	-	0
N14	29/07/2022 00:34	3	1.0	340	0
N15	28/07/2022 23:00	10	0.0	-	0
N17	28/07/2022 22:25	8	0.0	-	0
N19	28/07/2022 22:00	10	0.0	-	0
N20	29/07/2022 00:00	4	0.9	290	0

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

Meteorological data used for compliance assessment is sourced from the WCP AWS and inversion tower.

# 5 Discussion

## 5.1 Noted noise sources

During attended monitoring, the time variations (temporal characteristics) of noise sources are considered in each measurement via statistical descriptors. From these observations summaries have been derived for the location where an exceedance was measured and are provided in this chapter. Statistical 1/3 octave-band analysis of environmental noise was undertaken and the following figures display frequency ranges of various noise sources at each location for  $L_{A1}$ ,  $L_{A10}$ ,  $L_{Aeq}$ ,  $L_{A50}$  and  $L_{A90}$  descriptors. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 5.1 where it can be seen that frogs and insects are generating noise at frequencies above 1000 Hz while mining noise is at frequencies less than 1000 Hz, which is typical. Adding levels at frequencies that relate to mining only allows separate statistical results to be calculated. This analysis cannot always be performed if there are significant levels of other noise at the same frequencies as mining, such as dogs, cows, or (most commonly) road traffic.

It should be noted that the method of summing statistical values up to a cut-off frequency can overstate the  $L_{A1}$  result by a small margin but is entirely accurate for  $L_{Aeq}$ .

Historical site only noise levels from attended monitoring over the previous 12-month period has been provided as additional information in Table 5.1 to Table 5.6.

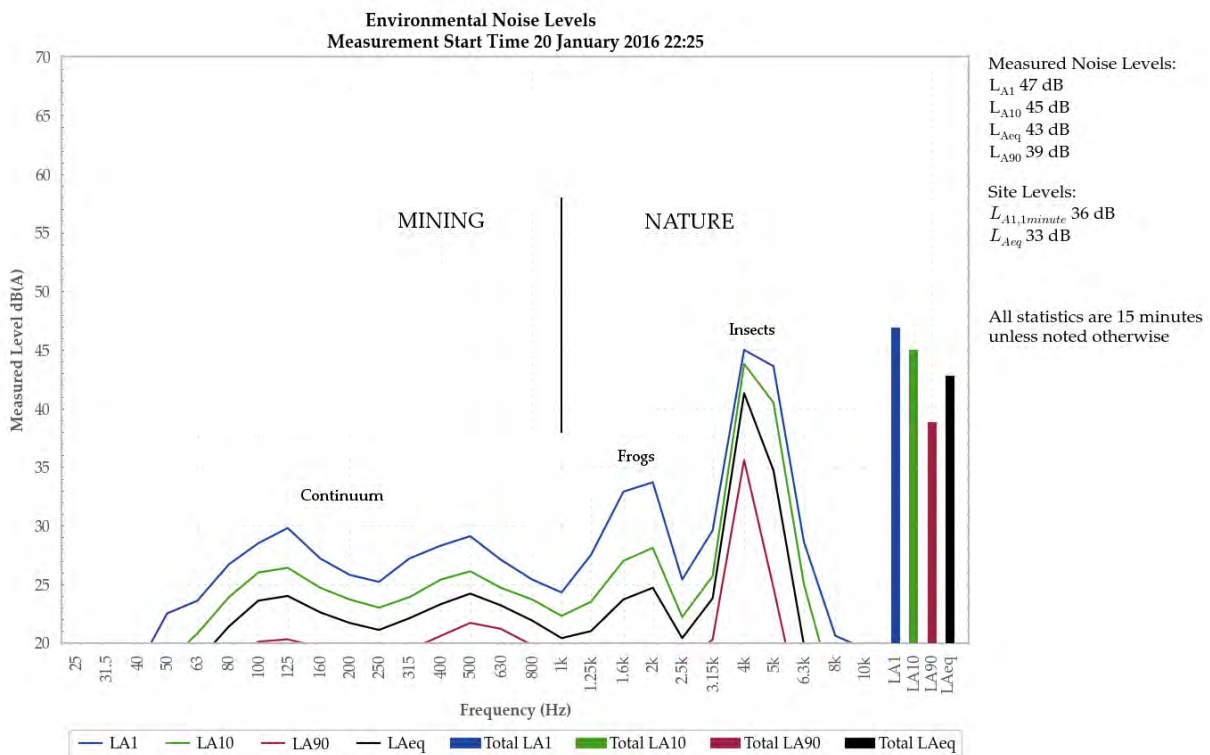


Figure 5.1 Example graph (refer to Section 5.1 for explanatory note)



5.1.1 N6

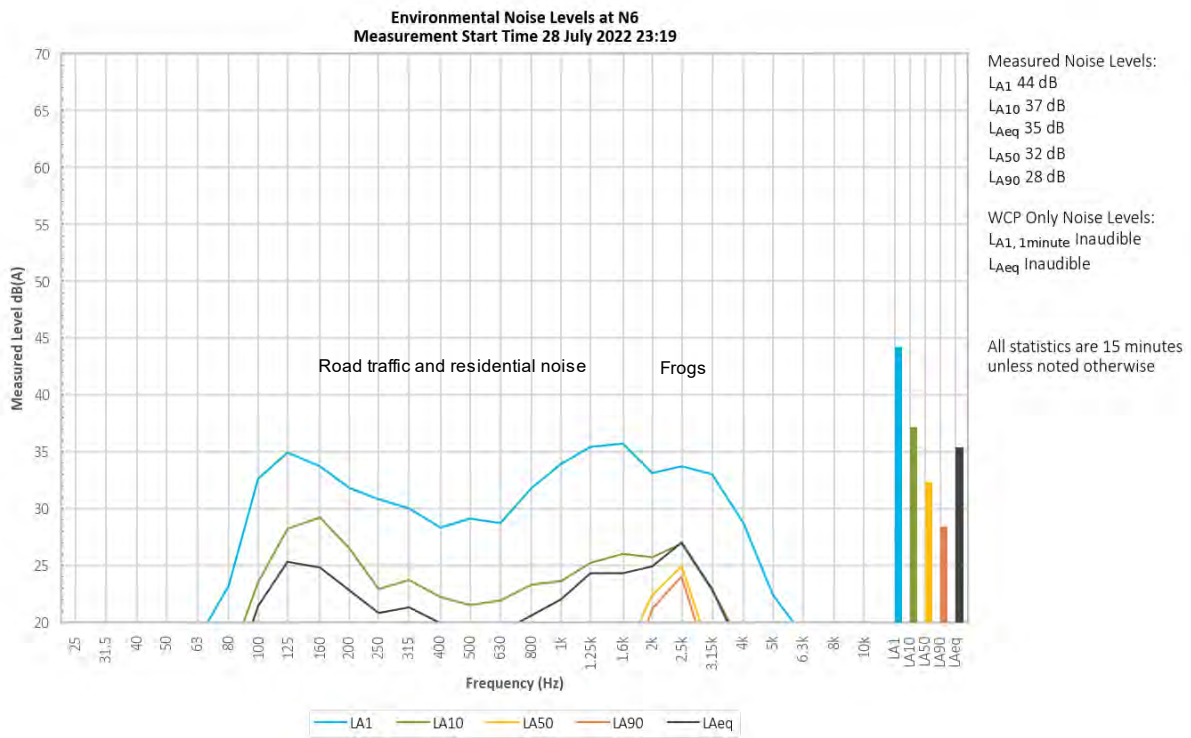


Figure 5.2 Environmental noise levels N6, St Laurence O’Toole Catholic Church, Wollar Village

WCP was inaudible throughout the measurement.

Road traffic and residential activity was primarily responsible for the measured LA1, LA10, LAeq, and LA50. Frogs contributed to the measured LA10, LAeq, and LA50, and were responsible for the measured LA90.

Table 5.1 Historical WCP only noise levels at N6

Month	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022
LAeq	<25	IA	IA	31	IA	IA	IA	IA	IA	<20	<25	30
LA1,1min	<25	IA	IA	33	IA	IA	IA	IA	IA	23	<25	37

5.1.2 N14

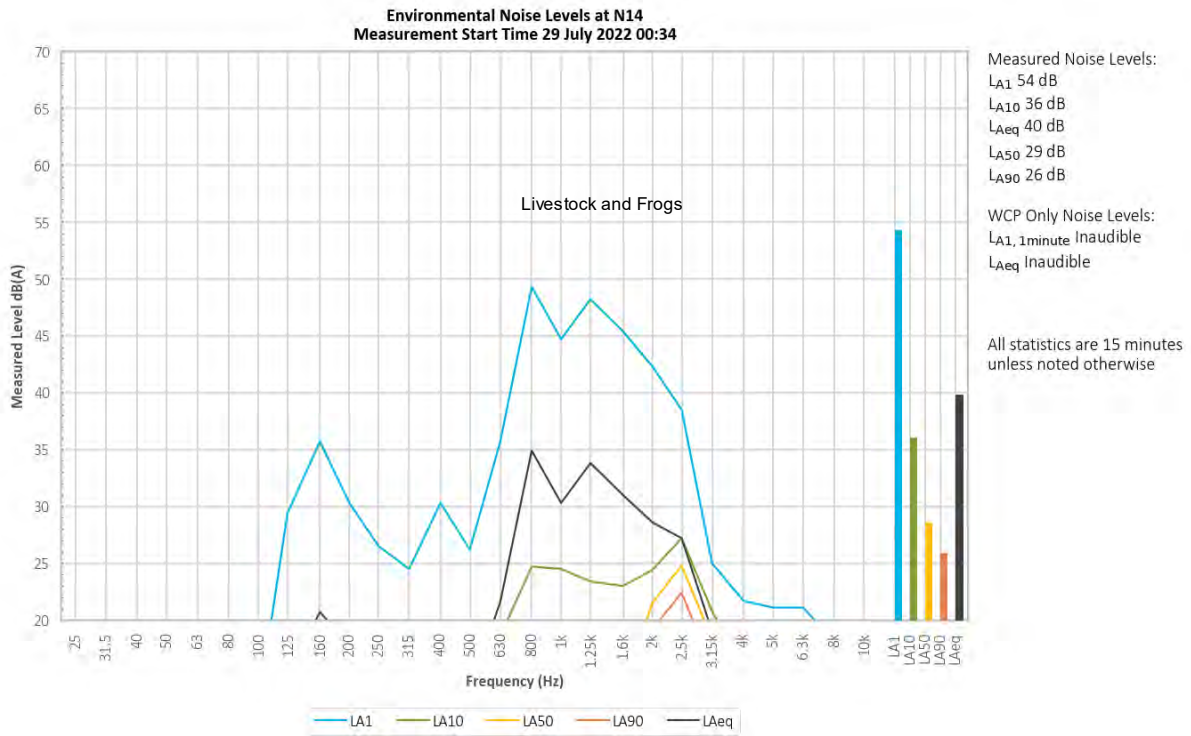


Figure 5.3 Environmental noise levels N14, 'Tichular', intersection of Tichular and Barigan Roads

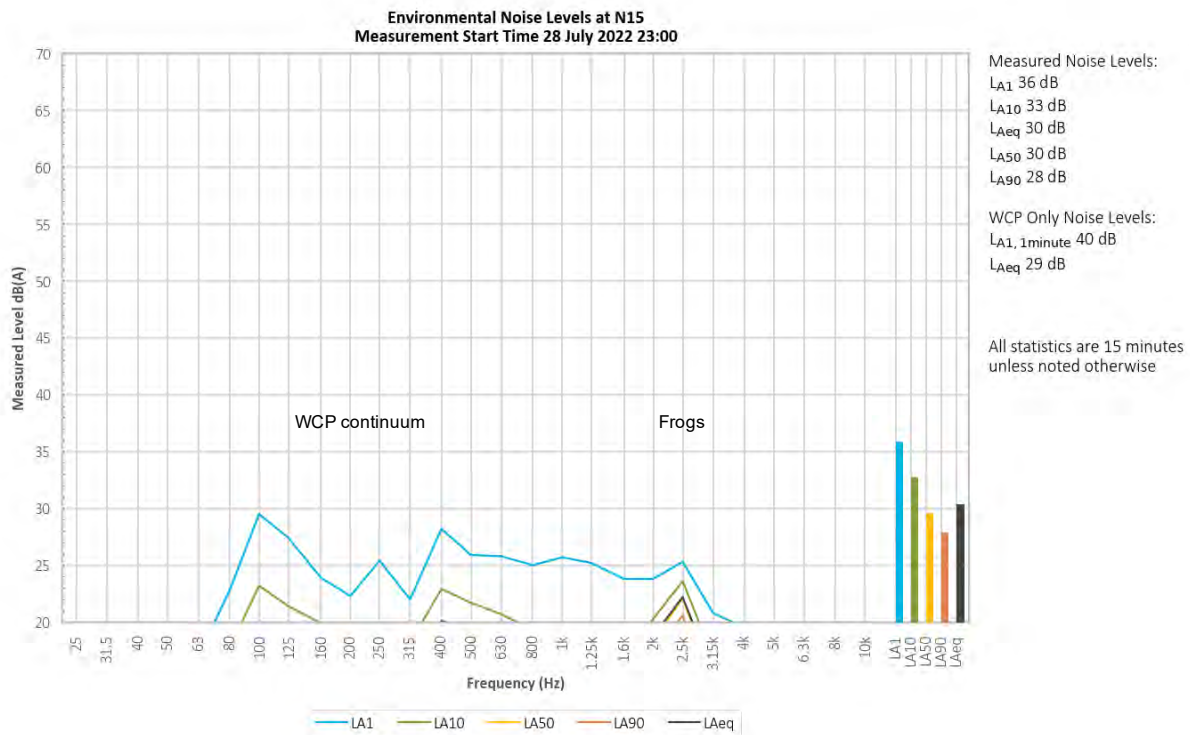
WCP was inaudible during the measurement.

Livestock was responsible for the measured LA1 and LAeq and contributed to the measured LA10. Frogs were responsible for the LA50 and LA90, and also contributed to the measured LA10.

Table 5.2 Historical WCP only noise levels at N14

Month	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022
LAeq	IA	IA	IA	<25	IA	IA	IA	IA	IA	<25	IA	IA
LA1,1min	IA	IA	IA	25	IA	IA	IA	IA	IA	<25	IA	IA

5.1.3 N15



**Figure 5.4 Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village**

A mining continuum from WCP was audible throughout the measurement, generating a site only LAeq of 29 dB. Track noise was responsible for generating the site only LA1,1minute of 40 dB. Engine surges were also noted.

WCP continuum was primarily responsible for the measured LA1, LA10, LAeq and LA50 and contributed to the LA90. Frogs contributed to the measured LA10, LAeq, LA50, and LA90.

Noise from nearby residents was also noted.

**Table 5.3 Historical WCP only noise levels at N15**

Month	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022 <sup>1</sup>
LAeq	<25	IA	NM	33	IA	IA	IA	IA	IA	23	34	38/34
LA1,1min	<30	IA	NM	41	IA	IA	IA	IA	IA	32	38	42/35

Notes: 1. Second result is remeasure following measured exceedance, in accordance with the NMP.

5.1.4 N17

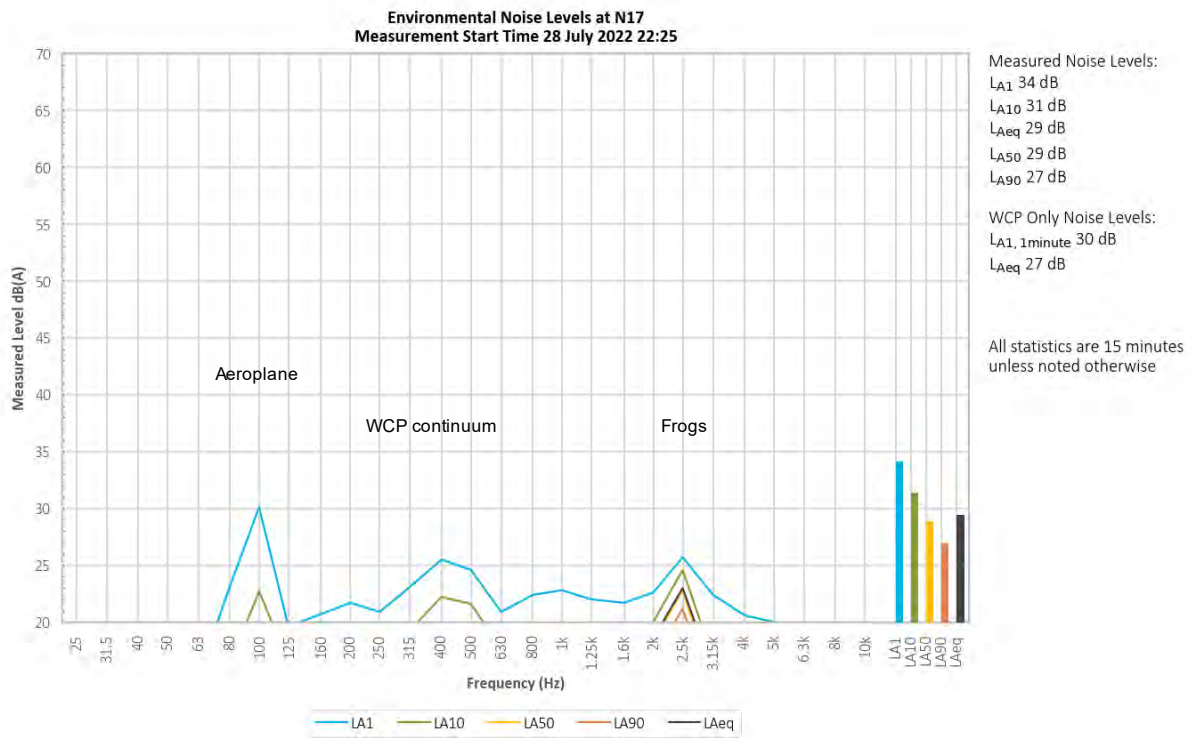


Figure 5.5 Environmental noise levels N17, Mogo Road, off Araluen Road

A mining continuum from WCP was audible throughout the measurement, generating a site only LAeq of 27 dB. Engine surges were responsible for generated the site only LA1,1minute of 30 dB.

An aeroplane was primarily responsible for the measured LA1 and contributed to the measured LA10. WCP continuum contributed to measured noise levels. Frogs contributed to the measured LA10 and was primarily responsible for the measured LAeq, LA50 and LA90.

Table 5.4 Historical WCP only noise levels at N17

Month	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022
LAeq	IA	<20	IA	<20	IA	IA	IA	IA	IA	<20	32	23
LA1,1min	IA	<20	IA	<20	IA	IA	IA	IA	IA	23	37	28

5.1.5 N19

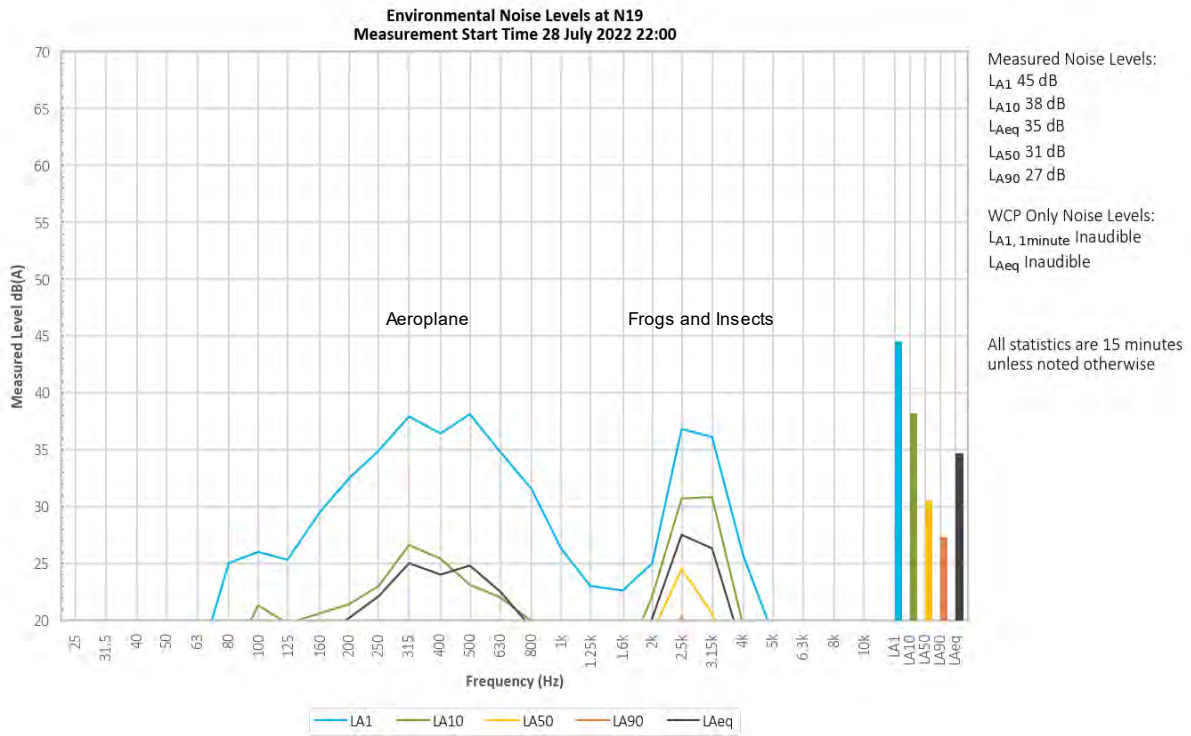


Figure 5.6 Environmental noise levels N19, Upper Mogo Road

WCP was inaudible during the measurement.

An aeroplane was responsible for the measured LA1 and LA10. Frogs and insects were responsible for the measured LAeq, LA50 and LA90.

Noise from a train was also noted.

Table 5.5 Historical WCP only noise levels at N19

Month	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022
LAeq	IA	<20	IA	IA	IA	IA	IA	IA	IA	IA	<20	IA
LA1,1min	IA	<20	IA	IA	IA	IA	IA	IA	IA	IA	<20	IA

5.1.6 N20

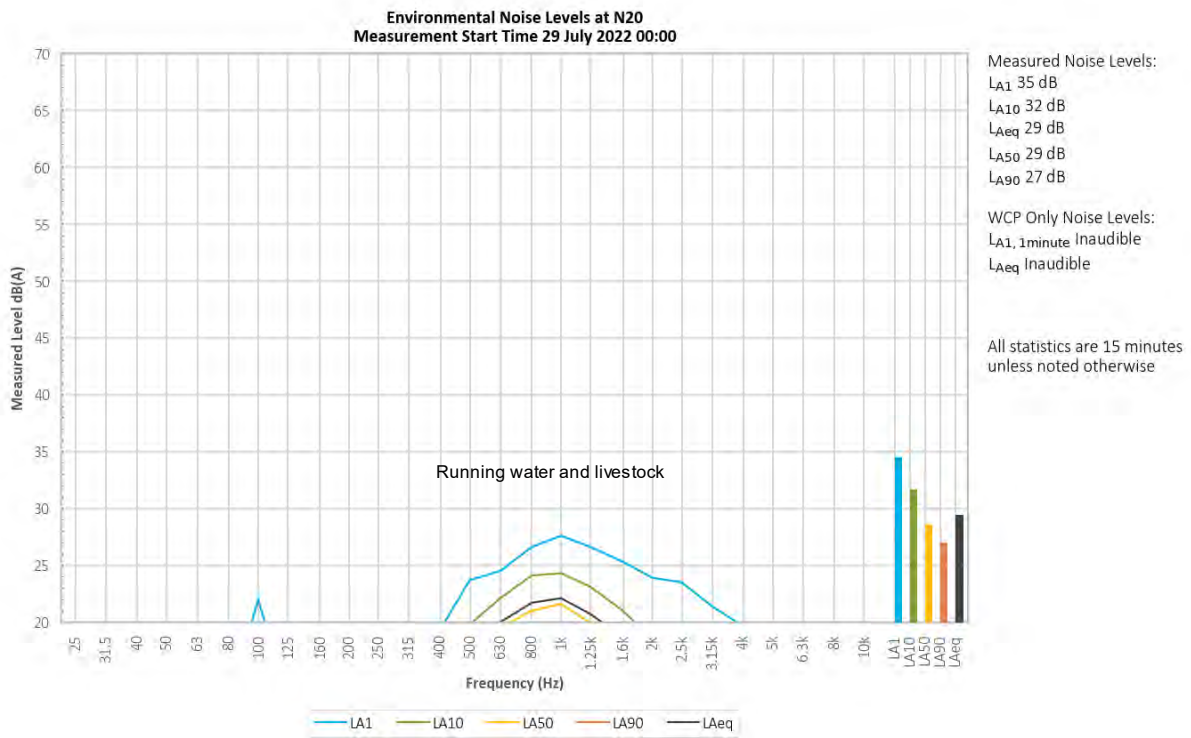


Figure 5.7 Environmental noise levels N20, Ringwood Road

WCP was inaudible during the measurement.

Running water was responsible for measured noise levels.

Noise from livestock was also noted.

Table 5.6 Historical WCP only noise levels at N20

Month	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022
LAeq	IA	IA	IA	IA	IA	IA	IA	IA	IA	<25	22	IA
LA1,1min	IA	IA	IA	IA	IA	IA	IA	IA	IA	<25	28	IA



## 6 Summary

Global Acoustics (now part of EMM) was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP, an open cut coal mine located approximately 40 kilometres north-east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was done around WCP during the night period of 28/29 July 2022.

Noise levels from WCP complied with relevant noise limits at all monitoring locations during the July 2022 survey. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

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# Appendix A

## Regulator documents

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## A.1 Wilpinjong Coal Extension Project Approval (SSD-6764)

### SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

#### ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from the owner of the land listed in Table 1, the Applicant must acquire the land in accordance with the procedures in conditions 5 and 6 of schedule 4.

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

Note: To interpret the land referred to in Table 1, see the applicable figures in Appendix 5.

#### MITIGATION UPON REQUEST

2. Upon receiving a written request from the owner of any residence on the land listed in Table 2, the Applicant must implement additional noise mitigation measures at or in the immediate vicinity of the residence in consultation with the landowner. These measures must be consistent with the measures outlined in the *Voluntary Land Acquisition and Mitigation Policy*. They must also be reasonable and feasible and proportionate with the level of predicted impact.

If within 3 months of receiving this request from the owner, the Applicant and the owner 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.

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

Note: To interpret the land referred to in Table 2, see the applicable figures in Appendix 5.

#### NOISE

##### Noise Criteria

3. The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 3 at any residence on privately-owned land or at the other specified locations.

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>A1</sub> (1 minute)
102	36	36	38	45
Wollar Village – Residential	36	37	37	45
All other privately owned land	35	35	35	45
901 – Wollar School		35 (internal) 45 (external) When in use		
150A – St Luke’s Anglican Church 900 – St Laurence O’Toole Catholic Church		40 (internal) When in use		

Note: To interpret the locations referred to in Table 3, see the applicable figures in Appendix 5.

Noise generated by the development is to be measured in accordance with the relevant requirements of the *NSW Industrial Noise Policy* (as may be updated from time to time). Appendix 6 sets out the meteorological conditions under which these criteria apply along with any modifications to the *NSW Industrial Noise Policy* and the requirements for evaluating compliance with these criteria.

However, these criteria do not apply if the Applicant has an agreement with the owner/s of the relevant residence of land 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, low frequency, road and rail noise of the development;
  - (b) operate a comprehensive noise management system 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 consent;
  - (c) minimise the noise impacts of the development during meteorological conditions when the noise limits in this consent do not apply (see Appendix 6);
  - (d) only use locomotives and rolling stock that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL;
  - (e) co-ordinate noise management at the site with the noise management at Moolarben and Ulan mines to minimise cumulative noise impacts; and
  - (f) carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent.

### Noise Management Plan

5. Prior to carrying out any development under this consent, unless the Secretary agrees otherwise, 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 in this consent;
  - (c) describe the proposed noise management system in detail; and
  - (d) include a monitoring program that:
    - evaluates and reports on:
      - the effectiveness of the noise management system;
      - compliance against the noise criteria in this consent; and
      - compliance against the noise operating conditions;
    - includes a program to calibrate and validate the real-time noise monitoring results with the attended monitoring results over time (so the real-time noise monitoring program can be used as a better indicator of compliance with the noise criteria in this consent and trigger for further attended monitoring); and
    - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.
6. The Applicant must implement the approved Noise Management Plan for the development.



**APPENDIX 6  
NOISE COMPLIANCE ASSESSMENT**

**Applicable Meteorological Conditions**

1. The noise criteria in Table 3 of schedule 3 are to apply under all meteorological conditions except the following:
  - (a) wind speeds greater than 3 m/s at 10 m above ground level; or
  - (b) stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
  - (c) stability category G temperature inversion conditions.

**Determination of Meteorological Conditions**

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions must be that recorded by the meteorological station located on the site.

**Compliance Monitoring**

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
4. This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
5. Unless otherwise agreed with the Secretary, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
  - (a) monitoring locations for the collection of representative noise data;
  - (b) meteorological conditions during which collection of noise data is not appropriate;
  - (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
  - (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

Table 6-1: One-third octave low frequency noise thresholds

Hz/dB(Z)	One-third octave $L_{Zeq,15minute}$ threshold level												
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB(Z)	92	89	86	77	69	61	54	50	50	48	48	46	44

## A.2 Environment Protection Licence

### L5 Noise limits

L5.1 Noise generated at the premises must not exceed the noise limits presented in the table below. The

locations referred to in the table below are indicated in Appendix 5 - Figures 1 and 2 of Development Consent number SSD-6764 dated 24 April 2017.

Location	Day	Evening	Night	Night
	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LA1(1 minute)
Wollar village - residential	36	37	37	45
All other privately owned land	35	35	35	45
102	36	36	38	45
Wollar school	35 (internal), 45 (external) when in use			
St Luke's Anglican Church & St Laurence O'Toole Catholic Church	40 (internal) when in use			

Note: The above noise limits do not apply at properties where the licensee has a written agreement with the landowner to exceed the noise limits.

L5.2 For the purpose of condition L5.1;

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.
- Evening is defined as the period 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.

L5.3 The noise limits set out in condition L5.1 apply under all meteorological conditions except for the following:

- Wind speeds greater than 3 metres/second at 10 metres above ground level; or
- Stability category F temperature inversions and wind speeds greater than 2m/s at 10m above ground level; or
- Stability category G temperature inversion conditions.

L5.4 For the purpose of condition L5.3:

- The meteorological data to be used for determining meteorological conditions is the data recorded by the meteorological weather station identified as EPA identification Point 21 in condition P1.1; and
- 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.



- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, 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 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
    - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
  - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
  - c) With the noise limits in condition L5.1, 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 conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
  - b) at a point other than the most affected point at a location.
- L5.7 For the purpose 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.

## 6 Noise Monitoring Program

WCPL utilise a combination of operator-attended and unattended noise monitoring to assess the performance of the Mine against the Noise Criteria from Development Consent (SSD-6467). Operator-attended noise monitoring will be used for determining compliance against the Noise Criteria in **Table 6**. Unattended real-time noise monitoring is primarily utilised as a proactive noise control system; providing noise alerts when predetermined noise levels are triggered so mining operations can be modified where noise levels are influenced by noise from the Project.

### 6.1 Monitoring Locations

Operator-attended noise monitoring locations have been chosen considering the following criteria:

- In any given direction, the site is as close as reasonably practical to the nearest Private Receiver;
- There is no closer Private Receiver that is not monitored;
- The site is unlikely to cause concern to any person residing on nearby private property; and
- The site can be safely accessed by the persons carrying out the noise monitoring.

WCPL will undertake operator-attended noise monitoring as identified in **Table 7 (Figure 3 and Figure 4)**. Real-time noise monitoring units are relocated from time to time, to assist with additional targeted noise monitoring and in response to community complaints. Real-time noise monitoring locations will be reviewed and modified as necessary in response to monitoring results, changes to the operation, or as a result of community consultation.

Should circumstances change, WCPL may amend the noise monitoring locations shown in **Table 7** with consideration to the above criteria. WCPL will update this NMP, in consultation with DPIE and the EPA.

**Table 7 Noise Monitoring Locations**

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
St Laurence O'Toole Church	N6	Operator-attended Noise	777299.9	6415716.9	Location based on the nearest community structure to the East of the Mine
Tichular	N14	Operator-attended Noise	778791.9	6408624.7	Location based on the nearest community structure to the South of the Mine
Wollar Village	N15	Operator-attended Noise	777452.0	6416158.9	Location based on the nearest community structure to the South-East of the Mine
Mogo Rd	N17	Operator-attended Noise	780771.0	6420641.0	Location based on the nearest community structure to the North-East of the Mine
Mogo Rd	N19	Operator-attended Noise	782644.5	6424151.1	Location based on the nearest and residential community structure to the North-East of the Mine
Ringwood Road	N20	Operator-attended Noise	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine.
WCPL Rail Loop	-	Meteorology & Inversion	770630.9	6418085.1	Location based on consideration of prevailing meteorological conditions

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
Wollar Village <sup>4</sup>	-	Real-Time Noise - Fixed	777608.9	6415996.8	Location based on the nearest non-mine owned residence to the South-East of the Mine N15 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Mogo Rd <sup>4</sup>	-	Real-Time Noise - Fixed	782644.5	6424151.1	Location based on the nearest non-mine owned residence to the East of the Mine N19 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Ringwood Road	-	Real-Time Noise - Fixed	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine. N20 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Tichular <sup>3</sup>	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

**Notes:**

1. MGA94, Zone 55
2. Monitoring will be undertaken at this location until it can be demonstrated that the noise contribution from the Mine is negligible. At this point, WCPL will notify DPIE and EPA of the results of this monitoring and advise if and when the monitoring at this location will be scaled back or discontinued. The real-time noise monitor at Wandooma may be relocated in response to a complaint or identified noise issue at another location.
3. Where continuous monitors are located at compliance locations (e.g. privately-owned receivers), WCPL will conduct a review of the identification/characterisation of mine-related noise by the real-time monitoring system at that location by comparing against observed mine-related noise identified during operator-attended monitoring (i.e. validate the identification of mine related noise and filtering of extraneous noise sources by the real-time system). Refer to Section 6.5.

## 6.2 Meteorological Monitoring

WCPL maintains a continuous on-site meteorological monitoring station that complies with the requirements of the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (DEC, 2007). The location of this meteorological monitoring station is shown on **Figure 3**.

WCPL's meteorological monitoring station is capable of continuous real-time measurement of temperature lapse rate in accordance with the INP (EPA, 2000).

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

- a) Rainfall;
- b) Relative humidity;
- c) Temperature – measured at 2, 10 and 60 m above ground level;
- d) Wind speed – horizontal and vertical;
- e) Wind direction – measured at 10 m above ground level;
- f) Sigma theta;
- g) Pasquil stability classification;
- h) Solar radiation; and
- i) Temperature lapse rate.

Meteorological forecasting will be undertaken as specified in **Section 5.4**.

## 6.3 Operator-attended Noise Monitoring

### 6.3.1 Purpose

Operator-attended noise monitoring will be used to evaluate compliance against the Noise Criteria detailed in **Table 6**.

### 6.3.2 Summary

Operator-attended noise will be undertaken in accordance with **Table 8**.

**Table 8 Operator-attended Noise Monitoring Summary**

Element	Description
Locations	<ul style="list-style-type: none"><li>As per Table 7,</li><li>Figure 3 and Figure 4</li></ul>
Period	<ul style="list-style-type: none"><li>Night-time period (10 pm to 7 am) being the most sensitive time period for noise.</li></ul>
Frequency	<ul style="list-style-type: none"><li>12 times per year<sup>1</sup> (i.e. one night per month); plus</li><li>12 times per year<sup>1</sup> (i.e. one night per month) at locations as identified in Table 7 to validate real-time noise monitoring data (Section 6.5).</li></ul>

Notes: <sup>1</sup> Monitoring frequency at Mogo Road (N19) and Ringwood Road (N20) will remain at the frequency identified in Table 8 during the commencement of operations in Pit 8. A review of the monitoring frequency at N19 and N20 will be undertaken during subsequent reviews of this NMP in consultation with WCPL's noise specialist and relevant government agencies.

### 6.3.3 Methodology

Operator-attended noise monitoring will be undertaken as outlined in **Table 8** by an independent acoustic consultant and guided by the requirements of the INP (EPA, 2000) and AS 1055.1-1997 'Acoustics – Description and measurement of environmental noise – General procedures'. Routine operator-attended noise monitoring will be undertaken during night-time periods (10 pm - 7 am).

If any of the Noise Criteria are exceeded, a second measurement will be taken at the same location within 75 minutes of the first measurement. If the second measurement does not exceed the Noise Criteria, as defined in **Table 6**, then the result will be recorded and the regular monitoring program resumed.

If the second measurement does exceed the applicable Noise Criteria, then:

- The noise consultant will immediately report both results to the WCPL Environment and Community Manager or delegate immediately;
- Upon confirming the exceedances are deemed a non-compliance in accordance with the **Figure 5**, WCPL will report both results to DPIE and EPA immediately, upon confirming the exceedance (**Section 9.0**).

WCPL will:

- Take immediate action in accordance with the NMS;
- Arrange for additional operator-attended noise monitoring to occur at that site within 1 week; and
- Deploy the mobile real-time noise monitor to measure and record the noise at that site for at least a 1 week period.

WCPL will also investigate any changes to the mine operations, and may revisit the noise model on the basis of the noise measurements recorded at the site.

The acoustic noise consultant will consider the modification factors in Section 4 of the INP (EPA, 2000) during the evaluation of attending monitoring results.



### 6.3.6 Applicable Meteorological Conditions

The Noise Criteria in **Table 6** are to be applied under all meteorological conditions except for the following:

- Wind speeds greater than 3 m/s at 10 m above ground level; or
- Stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
- Stability category G temperature inversion conditions.

Except for wind speed at microphone height, the data used for determining meteorological conditions will be that recorded by the meteorological station located on the Mine site.

It should be noted that when assessing wind conditions to determine the potential for noise level alteration by the refraction of sound-waves through the atmosphere, meteorological measurements should be undertaken at a height of 10 m above the ground level, in accordance with Section 5 of the INP (EPA, 2000). Local meteorological conditions, including near-surface winds are measured at the inbuilt meteorological station (2 m); however, in accordance with the INP (EPA, 2000), the 2 m data cannot be used to determine impacts from sound-wave refraction. The 2 m meteorological data is used to assess local meteorological conditions that may increase ambient noise levels including surface winds and rainfall.

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# Appendix B

## Calibration certificates

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## B.1 Calibration Certificates



**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 Level Meter**  
**IEC 61672-3:2013**  
**Calibration Certificate**  
Calibration Number **C22373**

<b>Client Details:</b>	EMM Consulting Suite 6, Level 1, 146 Hunter Street Newcastle NSW 2300
------------------------	---

<b>Equipment Tested/ Model Number :</b>	Rion NA-28
<b>Instrument Serial Number :</b>	01070590
<b>Microphone Serial Number :</b>	08184
<b>Pre-amplifier Serial Number :</b>	52329

<b>Pre-Test Atmospheric Conditions</b>	<b>Post-Test Atmospheric Conditions</b>
Ambient Temperature : 25.7°C	Ambient Temperature : 25.4°C
Relative Humidity : 31.9%	Relative Humidity : 32.4%
Barometric Pressure : 100.18kPa	Barometric Pressure : 100.11kPa

<b>Calibration Technician :</b> Lucky Jaiswal	<b>Secondary Check:</b> Max Moore
<b>Calibration Date :</b> 9 Jun 2022	<b>Report Issue Date :</b> 20 Jun 2022

**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.



**Acoustic  
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www.acousticresearch.com.au

**Sound Calibrator**  
IEC 60942:2017

## Calibration Certificate

Calibration Number C22374

**Client Details** EMM Consulting  
Suite 6, Level 1, 146 Hunter Street  
Newcastle NSW 2300

**Equipment Tested/ Model Number :** Pulsar Model 106  
**Instrument Serial Number :** 74813

**Atmospheric Conditions**

**Ambient Temperature :** 25.8°C  
**Relative Humidity :** 33.6%  
**Barometric Pressure :** 100.19kPa

**Calibration Technician :** Lucky Jaiswal  
**Calibration Date :** 09 Jun 2022  
**Secondary Check:** Max Moore  
**Report Issue Date :** 20 Jun 2022

**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	94.09	1000.30

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.

Uncertainties of Measurement -			
Specific Tests		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.

PAGE 1 OF 1



# **Wilpinjong Coal**

## **Environmental Noise Monitoring**

August 2022

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Prepared for Wilpinjong Coal Pty Ltd

# Wilpinjong Coal

## Environmental Noise Monitoring

August 2022

Wilpinjong Coal Pty Ltd

E220456 RP1

Version	Date	Prepared by	Approved by	Comments
1.0	14/09/2022	Will Moore	Jesse Tribby	

Approved by



**Jesse Tribby**

Senior Acoustic Consultant

14 September 2022

Level 3 175 Scott Street

Newcastle NSW 2300

---

This report has been prepared in accordance with the brief provided by Wilpinjong Coal Pty Ltd and has relied upon the information collected at the time and under the conditions specified in the report. All findings, conclusions or recommendations contained in the report are based on the aforementioned circumstances. The report is for the use of Wilpinjong Coal Pty Ltd and no responsibility will be taken for its use by other parties. Wilpinjong Coal Pty Ltd may, at its discretion, use the report to inform regulators and the public.

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# 1 Introduction

## 1.1 Background

Global Acoustics (now part of EMM) was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP), an open cut coal mine located approximately 40 kilometres north-east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 25/26 August 2022 at eight locations.

## 1.2 Monitoring locations

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

**Table 1.1** Attended monitoring locations

NMP Descriptor	Monitoring Location
N6	St Laurence O’Toole Catholic Church representative of Wollar Village south
N14	‘Tichular’ intersection of Tichular and Barigan Roads, Tichular
N15	Track off Barigan Street near Wollar Public School, Wollar Village
N17	Mogo Road, off Araluen Road, Wollar
N19	North Mogo Road, Mogo
N20	Ringwood Road, off Wollar Road, Wollar



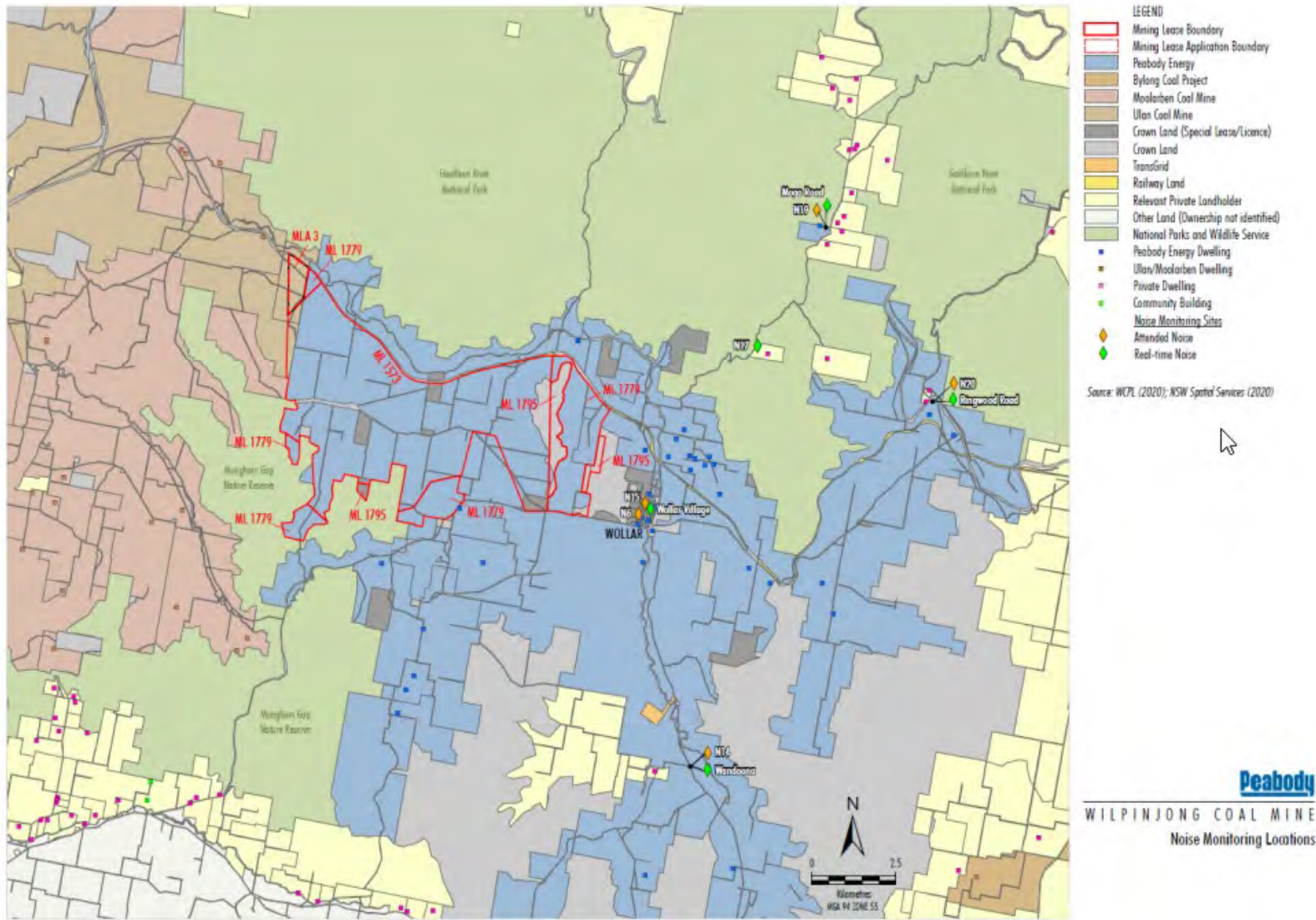


Figure 1.1 Wilpinjong noise monitoring locations

## 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**

Descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to describe human response to noise.
L <sub>Amax</sub>	The maximum A-weighted noise level over a time period.
L <sub>A1</sub>	The noise level which is exceeded for 1 per cent of the time.
L <sub>A1,1minute</sub>	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L <sub>A10</sub>	The noise level which is exceeded for 10 percent of the time.
L <sub>Aeq</sub>	The average noise A-weighted energy during a measurement period.
L <sub>A50</sub>	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L <sub>A90</sub>	The level exceeded for 90 percent of the time. The L <sub>A90</sub> level is often referred to as the “background” noise level and is commonly used to determine noise criteria for assessment purposes.
L <sub>Amin</sub>	The minimum A-weighted noise level over a time period.
L <sub>Ceq</sub>	The 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 micro pascals.
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.
SC	Stability class (or category) is determined from measured wind speed and either sigma-theta or VTG.
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	This is the period 7:00am to 6:00pm.
Evening	This is the period 6:00pm to 10:00pm.
Night	This is the period 10:00pm to 7:00am.

## 2 Regulatory requirements and noise criteria

### 2.1 Development consents

The most current development consent associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017), which covers all current operations and has replaced the previous consent (05-0021). The relevant noise conditions from the current consent are reproduced in Appendix A.

### 2.2 Environment protection licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently issued in March 2021. Relevant noise sections of the EPL are reproduced in Appendix A.

### 2.3 Noise Monitoring Program

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in August 2020. The relevant sections are reproduced in Appendix A.

### 2.4 Project Specific Criteria

Noise criteria and meteorological conditions required for noise criteria to apply are consistent in the project approval and EPL. The applicable noise criteria for each monitoring location are shown in Table 2.1.

**Table 2.1 WCP project specific criteria, dB**

NMP Descriptor	Day L <sub>Aeq,15minute</sub>	Evening L <sub>Aeq,15minute</sub>	Night L <sub>Aeq,15minute</sub>	Night L <sub>A1,1minute</sub>
N6	36	37	37	45
N14	35	35	35	45
N15	36	37	37	45
N17	36	36	38	45
N19	35	35	35	45
N20	35	35	35	45

Notes: 1. N6 noise limits have been assumed to be as detailed for 'Wollar Village – Residential' in the PA, as the church is no longer a place of worship.  
2. N17 noise limits have been determined based on the assumption that N17 is property 102 in accordance with Appendix 5 Figure 1 of Development Consent SSD-6764.

## 2.5 Modifying Factors

The EPA 'Noise Policy for Industry' (NPfI, 2017) was approved for use in NSW in October 2017. 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 has 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 NPfI. Low frequency modifying factors have been assessed in accordance with both the development consent and NPfI.

## 3 Methodology

### 3.1 Overview

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

### 3.2 Attended noise monitoring

During this survey, monthly attended monitoring was undertaken during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric condition measurement was also undertaken at each monitoring location. Attended monitoring during this reporting period was undertaken by Will Moore.

This survey presents noise levels gathered during attended monitoring that are the result of many sounds reaching the sound level meter microphone during monitoring. Received levels from various noise sources were noted during attended monitoring and particular attention was paid to the extent of WCP's contribution, if any, to measured levels. At each receptor location, WCP's  $L_{Aeq,15\text{minute}}$  and  $L_{A1,1\text{minute}}$  (in the absence of any other noise) was measured directly, where possible, or, determined by frequency analysis.

If the exact contribution of the source of interest (in this case WCP) cannot be established, due to masking by other noise sources in a similar frequency range, but site noise levels are observed to be well below (more than 5 dB lower than) any relevant criterion, a maximum estimate of the potential contribution of the site might be made based on other measured site-only noise descriptors in accordance with Section 7.1 of the NPfl. This is generally expressed as a 'less than' quantity, such as <20 dB or <30 dB.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may also 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 some noise was audible but could not be quantified. If site noise was NM due to masking but estimated to be significant in relation to a relevant criterion, we would employ methods (e.g., measure closer and back calculate) to determine a value for reporting.

All sites noted as NM in this report are due to one or more of the following reasons:

- Site noise levels were extremely low and unlikely, in many cases, to be even noticed;
- Site noise levels were masked by another relatively loud noise source that is characteristic of the environment (e.g., breeze in foliage or continuous road traffic noise) that cannot be eliminated by moving closer; and/or
- It was not feasible, nor reasonable to employ methods such as move closer and back calculate. Cases may include, but are not limited to, 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.

A measurement of  $L_{A1,1\text{minute}}$  corresponds to the highest noise level generated for 0.6 second during one minute. In practical terms this is the highest noise level, or  $L_{Amax}$ , received from the site during the entire measurement period (i.e., the highest level of the worst minute during the 15 minute measurement).

Often extraneous noise events (for example, road traffic pass-bys and dogs) interfere with the measurement of site noise levels in the frequency range of interest. Where required, the sound level meter is paused during these occurrences to aid in quantification of the site only noise.

### 3.3 Modifying factors

All measurements were evaluated for potential modifying factors in accordance with the NPfl. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfl.

Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable, such that the site only  $L_{Aeq}$  was not “NM” or less than a maximum cut off value (e.g., “<20 dB” or “<30dB”).

Assessment of low frequency modifying factors is a two-step process as follows:

1. Comparison of C-weighted and A-weighted source contribution (in this case WCP). If the difference between these values is 15 dB(A) or more, then proceed to step 2.
2. Comparison of Z-weighted source noise levels in the range of 10-160 Hz against the third-octave reference threshold reproduced from NPfl Fact Sheet C. Where any third-octave noise level from the source exceeds the reference threshold below, a 2 dB or 5 dB positive adjustment is applied to the source  $L_{Aeq}$ , depending on the extent of the exceedance above the reference threshold.

**Table C2: One-third octave low-frequency noise thresholds.**

Hz/dB(Z)	One-third octave $L_{Zeq,15min}$ threshold level												
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB(Z)	92	89	86	77	69	61	54	50	50	48	48	46	44

**Notes:**

- dB(Z) = decibel (Z frequency weighted).

If applicable, modifying factors have been reported and added to measured site only  $L_{Aeq}$  noise levels when meteorological conditions satisfied requirements for site noise criteria to be applicable. Low-frequency modifying factors have only been applied to site-only  $L_{Aeq}$  levels if WCP was the only contributing low-frequency noise source.

### 3.4 Attended noise monitoring equipment

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

**Table 3.1 Attended noise monitoring equipment**

Model	Serial number	Calibration due date
Rion NA-28 sound level meter	01070590	09/06/2024
Pulsar 106 acoustic calibrator	74813	09/06/2024



## 4 Results

### 4.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.1. Discussion as to the noise sources responsible for these measured levels is provided in Section 5 of this report.

**Table 4.1** Measured noise levels <sup>1</sup> - August 2022

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	26/08/2022 00:45	44	35	30	27	25	24	23
N14	25/08/2022 23:30	56	49	44	39	27	24	23
N15	25/08/2022 23:00	53	47	41	37	29	24	22
N17	25/08/2022 22:23	40	38	35	31	28	25	23
N19	25/08/2022 22:00	55	49	37	37	31	27	22
N20	26/08/2022 00:15	42	37	32	29	27	24	22

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

### 4.2 Modifying factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfI and methodology described in Section 3.3.

There were no modifying factors, as defined in the NPfI, applicable during the survey. Mining noise was analysed and did not satisfy requirements for tonal, intermittent, or low frequency modifying factors, as defined in the NPfI. This means that no modifying factor penalties were applied to any measured result during this survey.

### 4.3 Attended noise monitoring results

Table 4.2 to Table 4.3 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement

**Table 4.2**  $L_{Aeq,15minute}$  generated by WCP against project specific criteria – August 2022

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB <sup>5</sup>	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq}$ dB <sup>3,4</sup>	Exceedance dB <sup>4,5</sup>
N6	26/08/2022 00:45	0.0	F	37	Yes	IA	Nil
N14	25/08/2022 23:30	0.0	G	35	No	IA	NA
N15	25/08/2022 23:00	0.8	F	37	Yes	IA	Nil
N17	25/08/2022 22:23	1.0	F	38	Yes	IA	Nil
N19	25/08/2022 22:00	0.0	F	35	Yes	IA	Nil
N20	26/08/2022 00:15	0.0	F	35	Yes	IA	Nil

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.3**  $L_{A1,1minute}$  generated by WCP against project specific criteria - August 2022

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB <sup>5</sup>	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3,4</sup>	Exceedance dB <sup>4,5</sup>
N6	26/08/2022 00:45	0.0	F	45	Yes	IA	Nil
N14	25/08/2022 23:30	0.0	G	45	No	IA	NA
N15	25/08/2022 23:00	0.8	F	45	Yes	IA	Nil
N17	25/08/2022 22:23	1.0	F	45	Yes	IA	Nil
N19	25/08/2022 22:00	0.0	F	45	Yes	IA	Nil
N20	26/08/2022 00:15	0.0	F	45	Yes	IA	Nil

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site-only  $L_{A1,1minute}$  attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

## 4.4 Atmospheric conditions

Atmospheric condition data measured by the operator during each measurement using a Kestrel hand-held weather meter is shown in Table 4.4. The wind speed, direction and temperature were measured at approximately 1.8 metres. Attended noise monitoring is not undertaken during rain, hail, or wind speeds above 5 m/s at microphone height.

**Table 4.4 Measured atmospheric conditions – August 2022**

Location	Start Date and Time	Temperature °C	Wind Speed m/s	Wind Direction ° Magnetic North <sup>1</sup>	Cloud Cover 1/8s
N6	26/08/2022 00:45	0.0	-	5	0.0
N14	25/08/2022 23:30	0.0	-	0	0.0
N15	25/08/2022 23:00	0.0	-	0	0.0
N17	25/08/2022 22:23	0.0	-	0	0.0
N19	25/08/2022 22:00	0.8	25	0	0.8
N20	26/08/2022 00:15	0.0	-	4	0.0

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

Meteorological data used for compliance assessment is sourced from the WCP AWS and inversion tower.

# 5 Discussion

## 5.1 Noted noise sources

During attended monitoring, the time variations (temporal characteristics) of noise sources are considered in each measurement via statistical descriptors. From these observations summaries have been derived for the location where an exceedance was measured and are provided in this chapter. Statistical 1/3 octave-band analysis of environmental noise was undertaken and the following figures display frequency ranges of various noise sources at each location for  $L_{A1}$ ,  $L_{A10}$ ,  $L_{Aeq}$ ,  $L_{A50}$  and  $L_{A90}$  descriptors. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 5.1 where it can be seen that frogs and insects are generating noise at frequencies above 1000 Hz while mining noise is at frequencies less than 1000 Hz, which is typical. Adding levels at frequencies that relate to mining only allows separate statistical results to be calculated. This analysis cannot always be performed if there are significant levels of other noise at the same frequencies as mining, such as dogs, cows, or (most commonly) road traffic.

It should be noted that the method of summing statistical values up to a cut-off frequency can overstate the  $L_{A1}$  result by a small margin but is entirely accurate for  $L_{Aeq}$ .

Historical site only noise levels from attended monitoring over the previous 12-month period has been provided as additional information in Table 5.1 to Table 5.6.

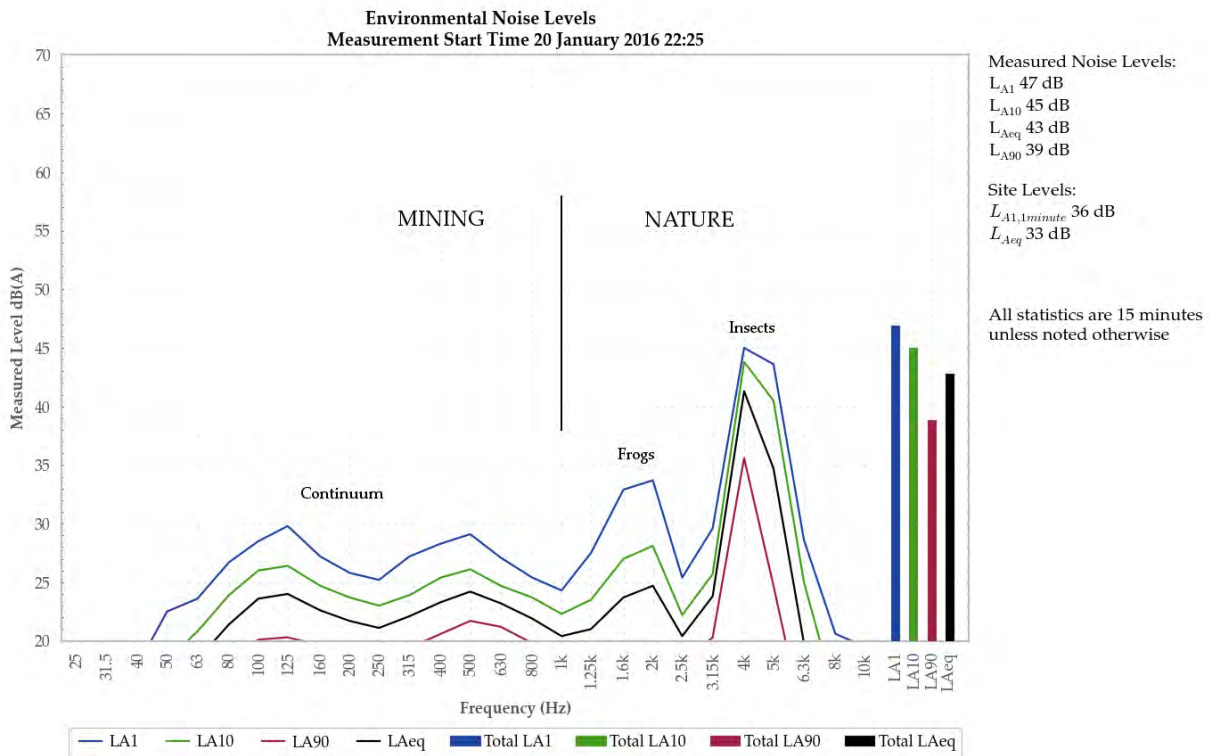


Figure 5.1 Example graph (refer to Section 5.1 for explanatory note)

5.1.1 N6

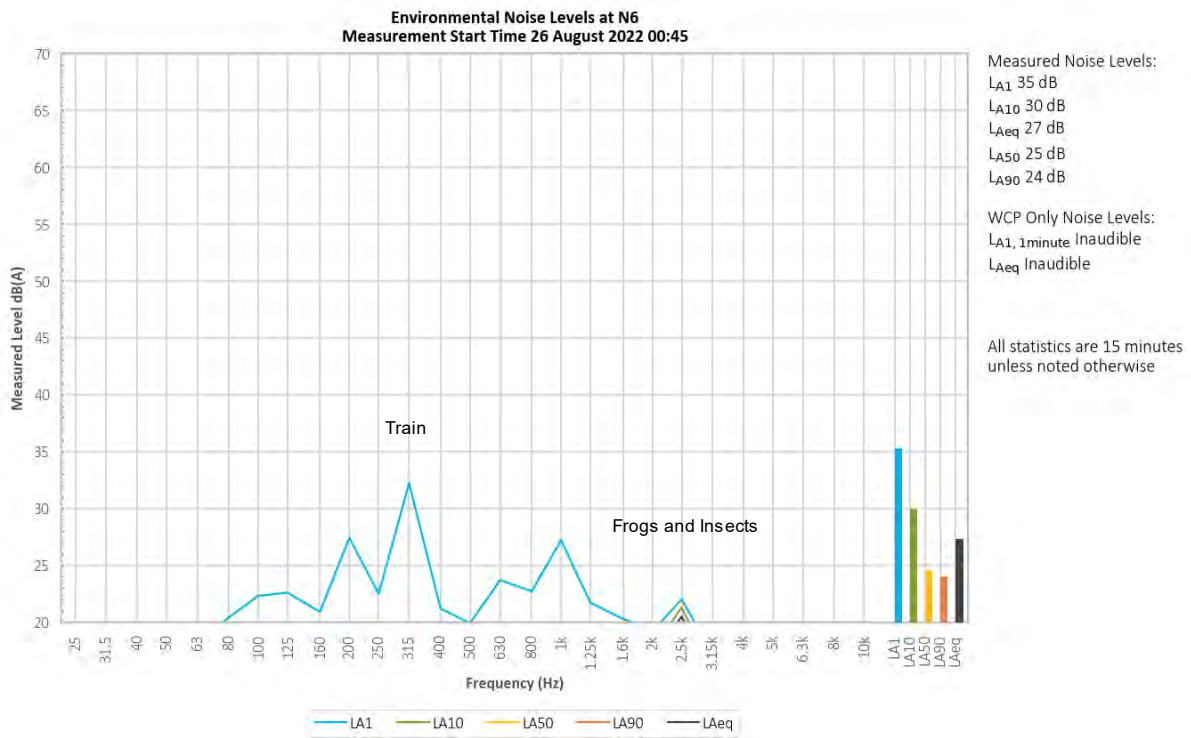


Figure 5.2 Environmental noise levels N6, St Laurence O’Toole Catholic Church, Wollar Village

WCP was inaudible throughout the measurement.

A train contributed to the LAeq and was responsible for the measured LA1 and LA10. Frogs and insects were responsible for the measured LA50 and LA90, and also contributed to the LAeq.

Noise from road traffic was also noted.

Table 5.1 Historical WCP only noise levels at N6

Month	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022
LAeq	IA	IA	31	IA	IA	IA	IA	IA	<20	<25	30	IA
LA1,1min	IA	IA	33	IA	IA	IA	IA	IA	23	<25	37	IA

5.1.2 N14

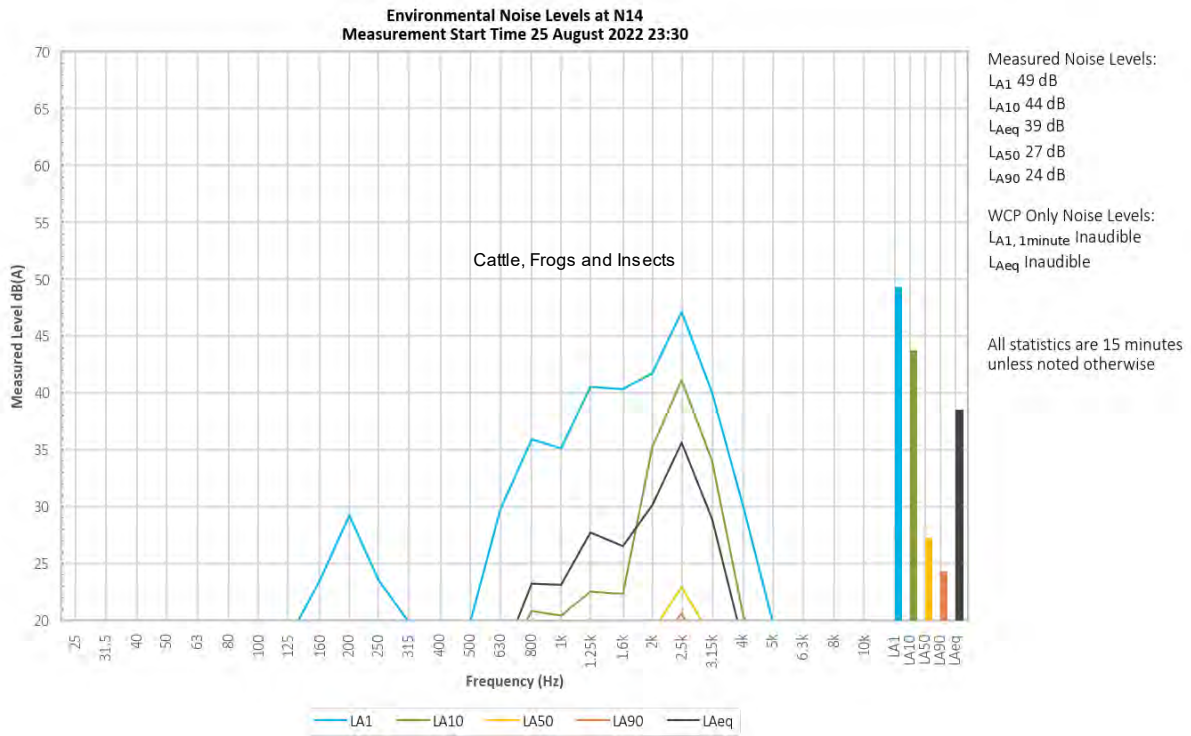


Figure 5.3 Environmental noise levels N14, 'Tichular', intersection of Tichular and Barigan Roads

WCP was inaudible during the measurement.

Frogs and insects were primarily responsible for measured noise levels. Livestock contributed to the measured LA1, L10, and LAeq.

Noise from road traffic was also noted

Table 5.2 Historical WCP only noise levels at N14

Month	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022
LAeq	IA	IA	<25	IA	IA	IA	IA	IA	<25	IA	IA	IA
LA1,1min	IA	IA	25	IA	IA	IA	IA	IA	<25	IA	IA	IA



5.1.3 N15

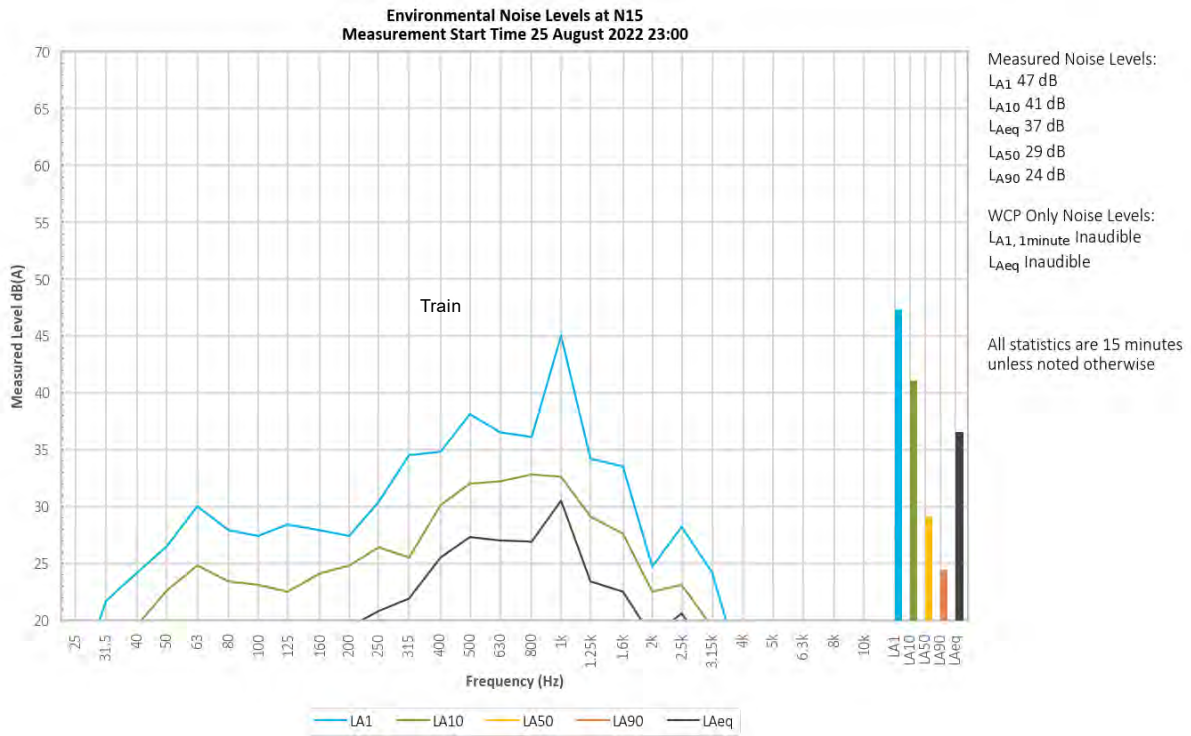


Figure 5.4 Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village

WCP was inaudible during the measurement.

A train was responsible for measured LA1, L10, and LAeq. Frogs and insects generated the measured LA50 and LA90. Noise from dogs and an owl was also noted.

Table 5.3 Historical WCP only noise levels at N15

Month	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022 <sup>1</sup>	July 2022
LAeq	IA	NM	33	IA	IA	IA	IA	IA	23	34	38/34	29
LA1,1min	IA	NM	41	IA	IA	IA	IA	IA	32	38	42/35	40

Notes: 1. Second result is remeasure following measured exceedance, in accordance with the NMP.

5.1.4 N17

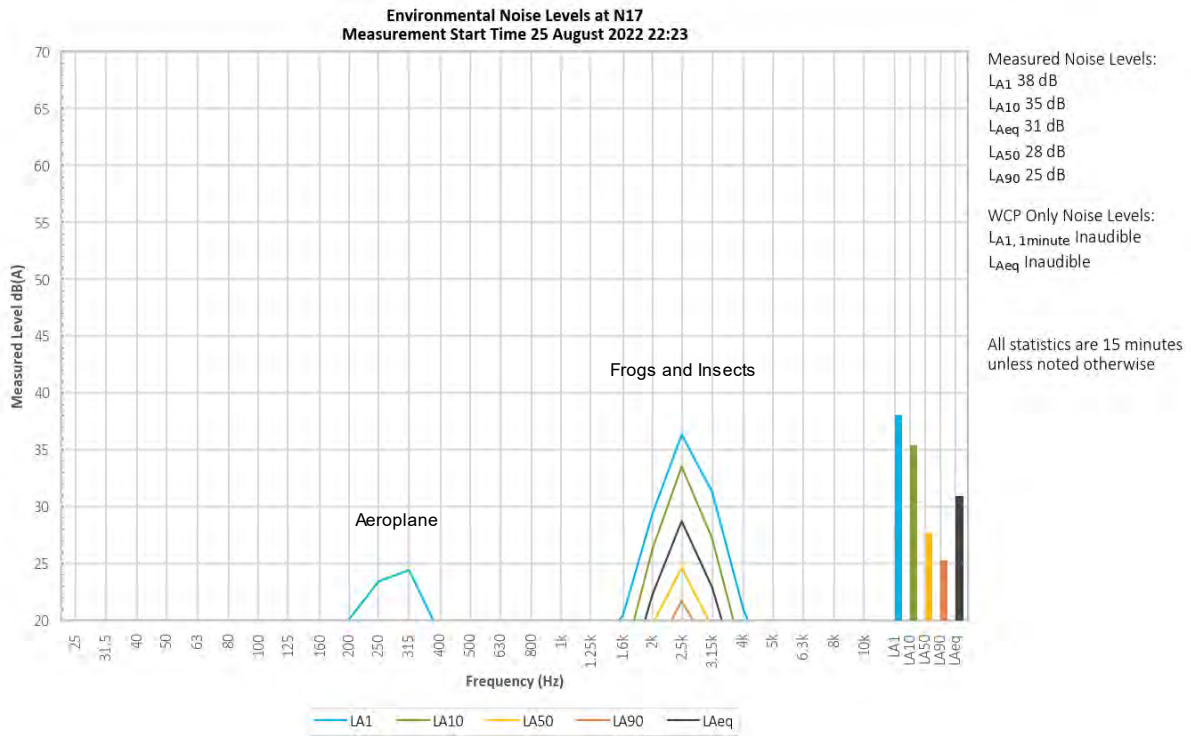


Figure 5.5 Environmental noise levels N17, Mogo Road, off Araluen Road

WCP was inaudible during the measurement.

Frogs and insects were responsible for measured noise levels.

Noise from an aeroplane was also noted.

Table 5.4 Historical WCP only noise levels at N17

Month	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022
LAeq	<20	IA	<20	IA	IA	IA	IA	IA	<20	32	23	27
LA1,1min	<20	IA	<20	IA	IA	IA	IA	IA	23	37	28	30

5.1.5 N19

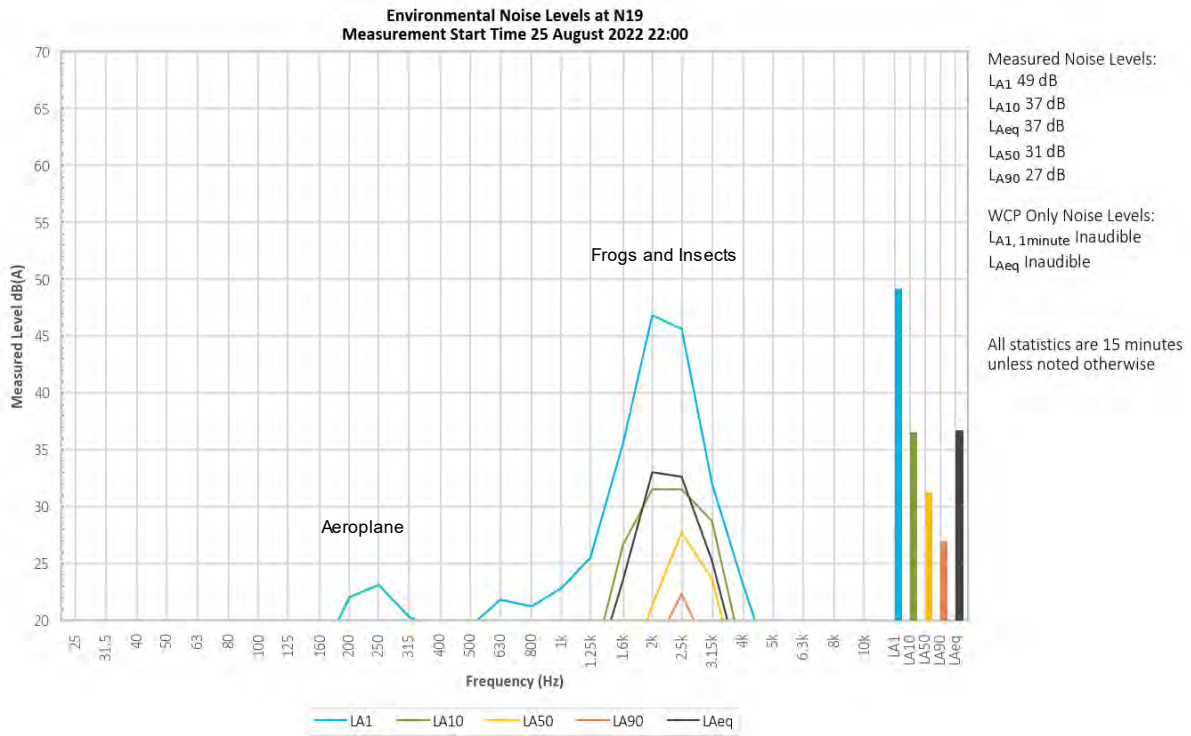


Figure 5.6 Environmental noise levels N19, Upper Mogo Road

WCP was inaudible during the measurement.

Frogs and insects were responsible for measured noise levels.

Noise from an aeroplane was also noted.

Table 5.5 Historical WCP only noise levels at N19

Month	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022
L <sub>Aeq</sub>	<20	IA	IA	IA	IA	IA	IA	IA	IA	<20	IA	IA
L <sub>A1,1min</sub>	<20	IA	IA	IA	IA	IA	IA	IA	IA	<20	IA	IA

5.1.6 N20

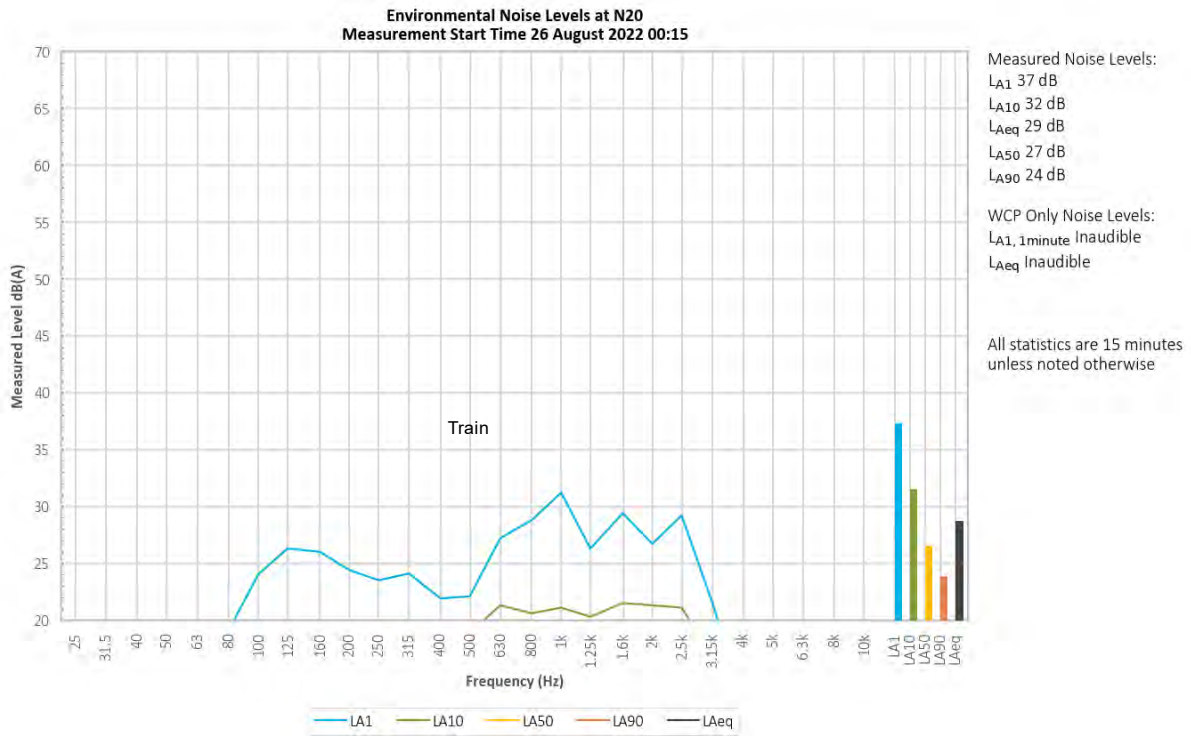


Figure 5.7 Environmental noise levels N20, Ringwood Road

WCP was inaudible during the measurement.

A train was responsible for the measured LA1 and LA10. Frogs and insects were responsible for the measured LAeq, LA50 and LA90.

Noise from road traffic was also noted.

Table 5.6 Historical WCP only noise levels at N20

Month	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022
LAeq	IA	IA	IA	IA	IA	IA	IA	IA	<25	22	IA	IA
LA1,1min	IA	IA	IA	IA	IA	IA	IA	IA	<25	28	IA	IA

## 6 Summary

Global Acoustics (now part of EMM) was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP, an open cut coal mine located approximately 40 kilometres north-east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was done around WCP during the night period of 25/26 August 2022.

Noise levels from WCP complied with relevant noise limits at all monitoring locations during the August 2022 survey.

Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

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# Appendix A

## Regulator documents

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## A.1 Wilpinjong Coal Extension Project Approval (SSD-6764)

### SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

#### ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from the owner of the land listed in Table 1, the Applicant must acquire the land in accordance with the procedures in conditions 5 and 6 of schedule 4.

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

Note: To interpret the land referred to in Table 1, see the applicable figures in Appendix 5.

#### MITIGATION UPON REQUEST

2. Upon receiving a written request from the owner of any residence on the land listed in Table 2, the Applicant must implement additional noise mitigation measures at or in the immediate vicinity of the residence in consultation with the landowner. These measures must be consistent with the measures outlined in the *Voluntary Land Acquisition and Mitigation Policy*. They must also be reasonable and feasible and proportionate with the level of predicted impact.

If within 3 months of receiving this request from the owner, the Applicant and the owner 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.

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

Note: To interpret the land referred to in Table 2, see the applicable figures in Appendix 5.

#### NOISE

##### Noise Criteria

3. The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 3 at any residence on privately-owned land or at the other specified locations.

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>A1</sub> (1 minute)
102	36	36	38	45
Wollar Village – Residential	36	37	37	45
All other privately owned land	35	35	35	45
901 – Wollar School		35 (internal) 45 (external) When in use		
150A – St Luke’s Anglican Church 900 – St Laurence O’Toole Catholic Church		40 (internal) When in use		

Note: To interpret the locations referred to in Table 3, see the applicable figures in Appendix 5.

Noise generated by the development is to be measured in accordance with the relevant requirements of the *NSW Industrial Noise Policy* (as may be updated from time to time). Appendix 6 sets out the meteorological conditions under which these criteria apply along with any modifications to the *NSW Industrial Noise Policy* and the requirements for evaluating compliance with these criteria.

However, these criteria do not apply if the Applicant has an agreement with the owner/s of the relevant residence of land 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, low frequency, road and rail noise of the development;
  - (b) operate a comprehensive noise management system 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 consent;
  - (c) minimise the noise impacts of the development during meteorological conditions when the noise limits in this consent do not apply (see Appendix 6);
  - (d) only use locomotives and rolling stock that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL;
  - (e) co-ordinate noise management at the site with the noise management at Moolarben and Ulan mines to minimise cumulative noise impacts; and
  - (f) carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent.

### Noise Management Plan

5. Prior to carrying out any development under this consent, unless the Secretary agrees otherwise, 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 in this consent;
  - (c) describe the proposed noise management system in detail; and
  - (d) include a monitoring program that:
    - evaluates and reports on:
      - the effectiveness of the noise management system;
      - compliance against the noise criteria in this consent; and
      - compliance against the noise operating conditions;
    - includes a program to calibrate and validate the real-time noise monitoring results with the attended monitoring results over time (so the real-time noise monitoring program can be used as a better indicator of compliance with the noise criteria in this consent and trigger for further attended monitoring); and
    - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.
6. The Applicant must implement the approved Noise Management Plan for the development.



**APPENDIX 6  
NOISE COMPLIANCE ASSESSMENT**

**Applicable Meteorological Conditions**

1. The noise criteria in Table 3 of schedule 3 are to apply under all meteorological conditions except the following:
  - (a) wind speeds greater than 3 m/s at 10 m above ground level; or
  - (b) stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
  - (c) stability category G temperature inversion conditions.

**Determination of Meteorological Conditions**

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions must be that recorded by the meteorological station located on the site.

**Compliance Monitoring**

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
4. This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
5. Unless otherwise agreed with the Secretary, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
  - (a) monitoring locations for the collection of representative noise data;
  - (b) meteorological conditions during which collection of noise data is not appropriate;
  - (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
  - (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

Table 6-1: One-third octave low frequency noise thresholds

Hz/dB(Z)	One-third octave $L_{Zeq,15minute}$ threshold level												
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB(Z)	92	89	86	77	69	61	54	50	50	48	48	46	44

## A.2 Environment Protection Licence

### L5 Noise limits

L5.1 Noise generated at the premises must not exceed the noise limits presented in the table below. The

locations referred to in the table below are indicated in Appendix 5 - Figures 1 and 2 of Development Consent number SSD-6764 dated 24 April 2017.

Location	Day	Evening	Night	Night
	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LA1(1 minute)
Wollar village - residential	36	37	37	45
All other privately owned land	35	35	35	45
102	36	36	38	45
Wollar school	35 (internal), 45 (external) when in use			
St Luke's Anglican Church & St Laurence O'Toole Catholic Church	40 (internal) when in use			

Note: The above noise limits do not apply at properties where the licensee has a written agreement with the landowner to exceed the noise limits.

L5.2 For the purpose of condition L5.1;

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.
- Evening is defined as the period 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.

L5.3 The noise limits set out in condition L5.1 apply under all meteorological conditions except for the following:

- a) Wind speeds greater than 3 metres/second at 10 metres above ground level; or
- b) Stability category F temperature inversions and wind speeds greater than 2m/s at 10m above ground level; or
- c) Stability category G temperature inversion conditions.

L5.4 For the purpose of condition L5.3:

- a) The meteorological data to be used for determining meteorological conditions is the data recorded by the meteorological weather station identified as EPA identification Point 21 in condition P1.1; 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.

- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, 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 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
    - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
  - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
  - c) With the noise limits in condition L5.1, 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 conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
  - b) at a point other than the most affected point at a location.
- L5.7 For the purpose 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.

## 6 Noise Monitoring Program

WCPL utilise a combination of operator-attended and unattended noise monitoring to assess the performance of the Mine against the Noise Criteria from Development Consent (SSD-6467). Operator-attended noise monitoring will be used for determining compliance against the Noise Criteria in **Table 6**. Unattended real-time noise monitoring is primarily utilised as a proactive noise control system; providing noise alerts when predetermined noise levels are triggered so mining operations can be modified where noise levels are influenced by noise from the Project.

### 6.1 Monitoring Locations

Operator-attended noise monitoring locations have been chosen considering the following criteria:

- In any given direction, the site is as close as reasonably practical to the nearest Private Receiver;
- There is no closer Private Receiver that is not monitored;
- The site is unlikely to cause concern to any person residing on nearby private property; and
- The site can be safely accessed by the persons carrying out the noise monitoring.

WCPL will undertake operator-attended noise monitoring as identified in **Table 7 (Figure 3 and Figure 4)**. Real-time noise monitoring units are relocated from time to time, to assist with additional targeted noise monitoring and in response to community complaints. Real-time noise monitoring locations will be reviewed and modified as necessary in response to monitoring results, changes to the operation, or as a result of community consultation.

Should circumstances change, WCPL may amend the noise monitoring locations shown in **Table 7** with consideration to the above criteria. WCPL will update this NMP, in consultation with DPIE and the EPA.

**Table 7 Noise Monitoring Locations**

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
St Laurence O'Toole Church	N6	Operator-attended Noise	777299.9	6415716.9	Location based on the nearest community structure to the East of the Mine
Tichular	N14	Operator-attended Noise	778791.9	6408624.7	Location based on the nearest community structure to the South of the Mine
Wollar Village	N15	Operator-attended Noise	777452.0	6416158.9	Location based on the nearest community structure to the South-East of the Mine
Mogo Rd	N17	Operator-attended Noise	780771.0	6420641.0	Location based on the nearest community structure to the North-East of the Mine
Mogo Rd	N19	Operator-attended Noise	782644.5	6424151.1	Location based on the nearest and residential community structure to the North-East of the Mine
Ringwood Road	N20	Operator-attended Noise	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine.
WCPL Rail Loop	-	Meteorology & Inversion	770630.9	6418085.1	Location based on consideration of prevailing meteorological conditions



Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
Wollar Village <sup>4</sup>	-	Real-Time Noise - Fixed	777608.9	6415996.8	Location based on the nearest non-mine owned residence to the South-East of the Mine N15 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Mogo Rd <sup>4</sup>	-	Real-Time Noise - Fixed	782644.5	6424151.1	Location based on the nearest non-mine owned residence to the East of the Mine N19 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Ringwood Road	-	Real-Time Noise - Fixed	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine. N20 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Tichular <sup>3</sup>	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

**Notes:**

1. MGA94, Zone 55
2. Monitoring will be undertaken at this location until it can be demonstrated that the noise contribution from the Mine is negligible. At this point, WCPL will notify DPIE and EPA of the results of this monitoring and advise if and when the monitoring at this location will be scaled back or discontinued. The real-time noise monitor at Wandooma may be relocated in response to a complaint or identified noise issue at another location.
3. Where continuous monitors are located at compliance locations (e.g. privately-owned receivers), WCPL will conduct a review of the identification/characterisation of mine-related noise by the real-time monitoring system at that location by comparing against observed mine-related noise identified during operator-attended monitoring (i.e. validate the identification of mine related noise and filtering of extraneous noise sources by the real-time system). Refer to Section 6.5.

## 6.2 Meteorological Monitoring

WCPL maintains a continuous on-site meteorological monitoring station that complies with the requirements of the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (DEC, 2007). The location of this meteorological monitoring station is shown on **Figure 3**.

WCPL's meteorological monitoring station is capable of continuous real-time measurement of temperature lapse rate in accordance with the INP (EPA, 2000).

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

- a) Rainfall;
- b) Relative humidity;
- c) Temperature – measured at 2, 10 and 60 m above ground level;
- d) Wind speed – horizontal and vertical;
- e) Wind direction – measured at 10 m above ground level;
- f) Sigma theta;
- g) Pasquil stability classification;
- h) Solar radiation; and
- i) Temperature lapse rate.

Meteorological forecasting will be undertaken as specified in **Section 5.4**.

## 6.3 Operator-attended Noise Monitoring

### 6.3.1 Purpose

Operator-attended noise monitoring will be used to evaluate compliance against the Noise Criteria detailed in **Table 6**.

### 6.3.2 Summary

Operator-attended noise will be undertaken in accordance with **Table 8**.

**Table 8 Operator-attended Noise Monitoring Summary**

Element	Description
Locations	<ul style="list-style-type: none"><li>As per Table 7,</li><li>Figure 3 and Figure 4</li></ul>
Period	<ul style="list-style-type: none"><li>Night-time period (10 pm to 7 am) being the most sensitive time period for noise.</li></ul>
Frequency	<ul style="list-style-type: none"><li>12 times per year<sup>1</sup> (i.e. one night per month); plus</li><li>12 times per year<sup>1</sup> (i.e. one night per month) at locations as identified in Table 7 to validate real-time noise monitoring data (Section 6.5).</li></ul>

Notes: <sup>1</sup> Monitoring frequency at Mogo Road (N19) and Ringwood Road (N20) will remain at the frequency identified in Table 8 during the commencement of operations in Pit 8. A review of the monitoring frequency at N19 and N20 will be undertaken during subsequent reviews of this NMP in consultation with WCPL's noise specialist and relevant government agencies.

### 6.3.3 Methodology

Operator-attended noise monitoring will be undertaken as outlined in **Table 8** by an independent acoustic consultant and guided by the requirements of the INP (EPA, 2000) and AS 1055.1-1997 'Acoustics – Description and measurement of environmental noise – General procedures'. Routine operator-attended noise monitoring will be undertaken during night-time periods (10 pm - 7 am).

If any of the Noise Criteria are exceeded, a second measurement will be taken at the same location within 75 minutes of the first measurement. If the second measurement does not exceed the Noise Criteria, as defined in **Table 6**, then the result will be recorded and the regular monitoring program resumed.

If the second measurement does exceed the applicable Noise Criteria, then:

- The noise consultant will immediately report both results to the WCPL Environment and Community Manager or delegate immediately;
- Upon confirming the exceedances are deemed a non-compliance in accordance with the **Figure 5**, WCPL will report both results to DPIE and EPA immediately, upon confirming the exceedance (**Section 9.0**).

WCPL will:

- Take immediate action in accordance with the NMS;
- Arrange for additional operator-attended noise monitoring to occur at that site within 1 week; and
- Deploy the mobile real-time noise monitor to measure and record the noise at that site for at least a 1 week period.

WCPL will also investigate any changes to the mine operations, and may revisit the noise model on the basis of the noise measurements recorded at the site.

The acoustic noise consultant will consider the modification factors in Section 4 of the INP (EPA, 2000) during the evaluation of attending monitoring results.

### 6.3.6 Applicable Meteorological Conditions

The Noise Criteria in **Table 6** are to be applied under all meteorological conditions except for the following:

- Wind speeds greater than 3 m/s at 10 m above ground level; or
- Stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
- Stability category G temperature inversion conditions.

Except for wind speed at microphone height, the data used for determining meteorological conditions will be that recorded by the meteorological station located on the Mine site.

It should be noted that when assessing wind conditions to determine the potential for noise level alteration by the refraction of sound-waves through the atmosphere, meteorological measurements should be undertaken at a height of 10 m above the ground level, in accordance with Section 5 of the INP (EPA, 2000). Local meteorological conditions, including near-surface winds are measured at the inbuilt meteorological station (2 m); however, in accordance with the INP (EPA, 2000), the 2 m data cannot be used to determine impacts from sound-wave refraction. The 2 m meteorological data is used to assess local meteorological conditions that may increase ambient noise levels including surface winds and rainfall.

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# Appendix B

## Calibration certificates

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B.1 Calibration Certificates



**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 Level Meter  
IEC 61672-3:2013  
Calibration Certificate**

Calibration Number **C22373**

<b>Client Details</b>	EMM Consulting Suite 6, Level 1, 146 Hunter Street Newcastle NSW 2300
<b>Equipment Tested/ Model Number :</b>	Rion NA-28
<b>Instrument Serial Number :</b>	01070590
<b>Microphone Serial Number :</b>	08184
<b>Pre-amplifier Serial Number :</b>	52329
<b>Pre-Test Atmospheric Conditions</b>	<b>Post-Test Atmospheric Conditions</b>
Ambient Temperature : 25.7°C	Ambient Temperature : 25.4°C
Relative Humidity : 31.9%	Relative Humidity : 32.4%
Barometric Pressure : 100.18kPa	Barometric Pressure : 100.11kPa
<b>Calibration Technician :</b> Lucky Jaiswal	<b>Secondary Check:</b> Max Moore
<b>Calibration Date :</b> 9 Jun 2022	<b>Report Issue Date :</b> 20 Jun 2022
<b>Approved Signatory :</b>	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.





**Acoustic  
Research  
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**Sound Calibrator**  
IEC 60942:2017

## Calibration Certificate

Calibration Number C22374

**Client Details** EMM Consulting  
Suite 6, Level 1, 146 Hunter Street  
Newcastle NSW 2300

**Equipment Tested/ Model Number :** Pulsar Model 106  
**Instrument Serial Number :** 74813

**Atmospheric Conditions**

**Ambient Temperature :** 25.8°C  
**Relative Humidity :** 33.6%  
**Barometric Pressure :** 100.19kPa

**Calibration Technician :** Lucky Jaiswal  
**Calibration Date :** 09 Jun 2022  
**Secondary Check:** Max Moore  
**Report Issue Date :** 20 Jun 2022

**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	94.09	1000.30

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.

Uncertainties of Measurement -			
Specific Tests		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.

PAGE 1 OF 1



# **Wilpinjong Coal**

## **Environmental Noise Monitoring**

September 2022

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Prepared for Wilpinjong Coal Pty Ltd

# Wilpinjong Coal

## Environmental Noise Monitoring

September 2022

Wilpinjong Coal Pty Ltd

E220456 RP1

Version	Date	Prepared by	Approved by	Comments
1.0	06/10/2022	Will Moore	Ryan Bruniges	Final

Approved by



**Ryan Bruniges**

Senior Acoustic Consultant

6 October 2022

Level 3 175 Scott Street

Newcastle NSW 2300

---

This report has been prepared in accordance with the brief provided by Wilpinjong Coal Pty Ltd and has relied upon the information collected at the time and under the conditions specified in the report. All findings, conclusions or recommendations contained in the report are based on the aforementioned circumstances. The report is for the use of Wilpinjong Coal Pty Ltd and no responsibility will be taken for its use by other parties. Wilpinjong Coal Pty Ltd may, at its discretion, use the report to inform regulators and the public.

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# 1 Introduction

## 1.1 Background

Global Acoustics (now part of EMM) was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP), an open cut coal mine located approximately 40 kilometres north-east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 19/20 September 2022 at eight locations.

## 1.2 Monitoring locations

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

**Table 1.1** Attended monitoring locations

NMP Descriptor	Monitoring Location
N6	St Laurence O’Toole Catholic Church representative of Wollar Village south
N14	‘Tichular’ intersection of Tichular and Barigan Roads, Tichular
N15	Track off Barigan Street near Wollar Public School, Wollar Village
N17	Mogo Road, off Araluen Road, Wollar
N19	North Mogo Road, Mogo
N20	Ringwood Road, off Wollar Road, Wollar



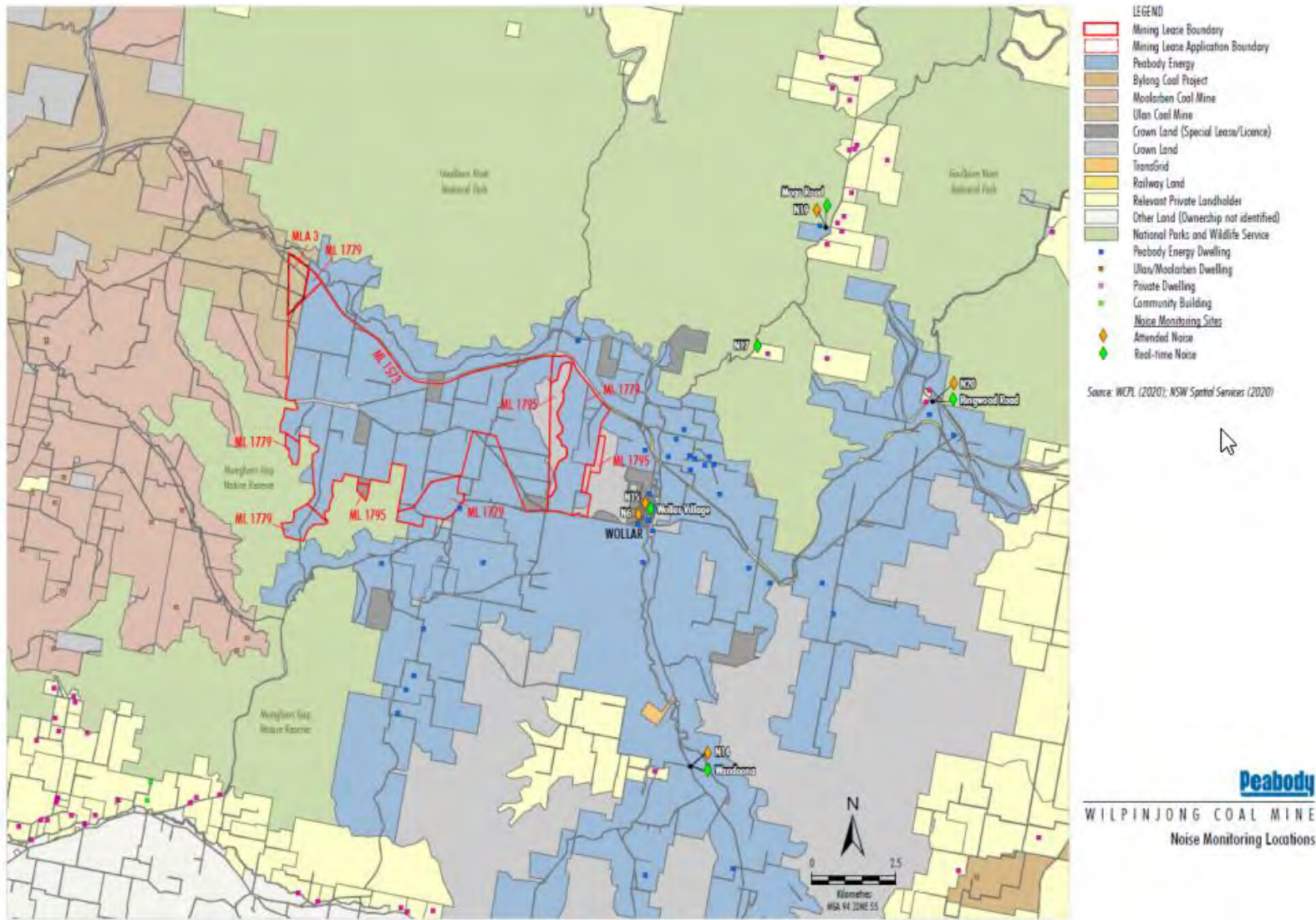


Figure 1.1 Wilpinjong noise monitoring locations



## 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**

Descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to describe human response to noise.
L <sub>Amax</sub>	The maximum A-weighted noise level over a time period.
L <sub>A1</sub>	The noise level which is exceeded for 1 per cent of the time.
L <sub>A1,1minute</sub>	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L <sub>A10</sub>	The noise level which is exceeded for 10 percent of the time.
L <sub>Aeq</sub>	The average noise A-weighted energy during a measurement period.
L <sub>A50</sub>	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L <sub>A90</sub>	The level exceeded for 90 percent of the time. The L <sub>A90</sub> level is often referred to as the “background” noise level and is commonly used to determine noise criteria for assessment purposes.
L <sub>Amin</sub>	The minimum A-weighted noise level over a time period.
L <sub>Ceq</sub>	The 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 micro pascals.
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.
SC	Stability class (or category) is determined from measured wind speed and either sigma-theta or VTG.
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	This is the period 7:00am to 6:00pm.
Evening	This is the period 6:00pm to 10:00pm.
Night	This is the period 10:00pm to 7:00am.

## 2 Regulatory requirements and noise criteria

### 2.1 Development consents

The most current development consent associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017), which covers all current operations and has replaced the previous consent (05-0021). The relevant noise conditions from the current consent are reproduced in Appendix A.

### 2.2 Environment protection licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently issued in March 2021. Relevant noise sections of the EPL are reproduced in Appendix A.

### 2.3 Noise Monitoring Program

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in August 2020. The relevant sections are reproduced in Appendix A.

### 2.4 Project Specific Criteria

Noise criteria and meteorological conditions required for noise criteria to apply are consistent in the project approval and EPL. The applicable noise criteria for each monitoring location are shown in Table 2.1.

**Table 2.1** WCP project specific criteria, dB

NMP Descriptor	Day L <sub>Aeq,15minute</sub>	Evening L <sub>Aeq,15minute</sub>	Night L <sub>Aeq,15minute</sub>	Night L <sub>A1,1minute</sub>
N6	36	37	37	45
N14	35	35	35	45
N15	36	37	37	45
N17	36	36	38	45
N19	35	35	35	45
N20	35	35	35	45

Notes:

1. N6 noise limits have been assumed to be as detailed for 'Wollar Village – Residential' in the PA, as the church is no longer a place of worship.
2. N17 noise limits have been determined based on the assumption that N17 is property 102 in accordance with Appendix 5 Figure 1 of Development Consent SSD-6764.

## 2.5 Modifying Factors

The EPA 'Noise Policy for Industry' (NPfI, 2017) was approved for use in NSW in October 2017. 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 has 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 NPfI. Low frequency modifying factors have been assessed in accordance with both the development consent and NPfI.

## 3 Methodology

### 3.1 Overview

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

### 3.2 Attended noise monitoring

During this survey, monthly attended monitoring was undertaken during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric condition measurement was also undertaken at each monitoring location. Attended monitoring during this reporting period was undertaken by Will Moore.

This survey presents noise levels gathered during attended monitoring that are the result of many sounds reaching the sound level meter microphone during monitoring. Received levels from various noise sources were noted during attended monitoring and particular attention was paid to the extent of WCP's contribution, if any, to measured levels. At each receptor location, WCP's  $L_{Aeq,15\text{minute}}$  and  $L_{A1,1\text{minute}}$  (in the absence of any other noise) was measured directly, where possible, or, determined by frequency analysis.

If the exact contribution of the source of interest (in this case WCP) cannot be established, due to masking by other noise sources in a similar frequency range, but site noise levels are observed to be well below (more than 5 dB lower than) any relevant criterion, a maximum estimate of the potential contribution of the site might be made based on other measured site-only noise descriptors in accordance with Section 7.1 of the NPfl. This is generally expressed as a 'less than' quantity, such as <20 dB or <30 dB.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may also 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 some noise was audible but could not be quantified. If site noise was NM due to masking but estimated to be significant in relation to a relevant criterion, we would employ methods (e.g., measure closer and back calculate) to determine a value for reporting.

All sites noted as NM in this report are due to one or more of the following reasons:

- Site noise levels were extremely low and unlikely, in many cases, to be even noticed;
- Site noise levels were masked by another relatively loud noise source that is characteristic of the environment (e.g., breeze in foliage or continuous road traffic noise) that cannot be eliminated by moving closer; and/or
- It was not feasible, nor reasonable to employ methods such as move closer and back calculate. Cases may include, but are not limited to, 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.

A measurement of  $L_{A1,1\text{minute}}$  corresponds to the highest noise level generated for 0.6 second during one minute. In practical terms this is the highest noise level, or  $L_{Amax}$ , received from the site during the entire measurement period (i.e., the highest level of the worst minute during the 15 minute measurement).

Often extraneous noise events (for example, road traffic pass-bys and dogs) interfere with the measurement of site noise levels in the frequency range of interest. Where required, the sound level meter is paused during these occurrences to aid in quantification of the site only noise.

### 3.3 Modifying factors

All measurements were evaluated for potential modifying factors in accordance with the NPfl. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfl.

Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable, such that the site only  $L_{Aeq}$  was not “NM” or less than a maximum cut off value (e.g., “<20 dB” or “<30dB”).

Assessment of low frequency modifying factors is a two-step process as follows:

1. Comparison of C-weighted and A-weighted source contribution (in this case WCP). If the difference between these values is 15 dB(A) or more, then proceed to step 2.
2. Comparison of Z-weighted source noise levels in the range of 10-160 Hz against the third-octave reference threshold reproduced from NPfl Fact Sheet C. Where any third-octave noise level from the source exceeds the reference threshold below, a 2 dB or 5 dB positive adjustment is applied to the source  $L_{Aeq}$ , depending on the extent of the exceedance above the reference threshold.

**Table C2: One-third octave low-frequency noise thresholds.**

Hz/dB(Z)	One-third octave $L_{Zeq,15min}$ threshold level												
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB(Z)	92	89	86	77	69	61	54	50	50	48	48	46	44

**Notes:**

- dB(Z) = decibel (Z frequency weighted).

If applicable, modifying factors have been reported and added to measured site only  $L_{Aeq}$  noise levels when meteorological conditions satisfied requirements for site noise criteria to be applicable. Low-frequency modifying factors have only been applied to site-only  $L_{Aeq}$  levels if WCP was the only contributing low-frequency noise source.

### 3.4 Attended noise monitoring equipment

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

**Table 3.1 Attended noise monitoring equipment**

Model	Serial number	Calibration due date
Rion NA-28 sound level meter	00701424	02/06/2023
Pulsar 106 acoustic calibrator	79631	26/05/2023

## 4 Results

### 4.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.1. Discussion as to the noise sources responsible for these measured levels is provided in Section 5 of this report.

**Table 4.1** Measured noise levels <sup>1</sup> - September 2022

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	20/09/2022 00:42	50	48	43	37	28	27	26
N14	20/09/2022 00:15	59	53	43	41	30	28	25
N15	19/09/2022 23:00	47	34	30	29	28	26	25
N17	19/09/2022 22:28	52	44	42	41	41	40	38
N19	19/09/2022 22:00	51	36	34	33	33	31	29
N20	19/09/2022 23:31	50	48	44	41	39	36	32

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

### 4.2 Modifying factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfI and methodology described in Section 3.3.

There were no modifying factors, as defined in the NPfI, applicable during the survey. Mining noise was analysed and did not satisfy requirements for tonal, intermittent, or low frequency modifying factors, as defined in the NPfI. This means that no modifying factor penalties were applied to any measured result during this survey.



### 4.3 Attended noise monitoring results

Table 4.2 to Table 4.3 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement

**Table 4.2**  $L_{Aeq,15minute}$  generated by WCP against project specific criteria – September 2022

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB <sup>5</sup>	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq}$ dB <sup>3,4</sup>	Exceedance dB <sup>4,5</sup>
N6	20/09/2022 00:42	0.8	G	37	No	IA	NA
N14	20/09/2022 00:15	0.0	G	35	No	<25	NA
N15	19/09/2022 23:00	0.0	G	37	No	<25	NA
N17	19/09/2022 22:28	1.3	F	38	Yes	27	Nil
N19	19/09/2022 22:00	0.0	F	35	Yes	<25	Nil
N20	19/09/2022 23:31	0.0	G	35	No	IA	NA

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.3**  $L_{A1,1minute}$  generated by WCP against project specific criteria - September 2022

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB <sup>5</sup>	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3,4</sup>	Exceedance dB <sup>4,5</sup>
N6	20/09/2022 00:42	0.8	G	45	No	IA	NA
N14	20/09/2022 00:15	0.0	G	45	No	<25	NA
N15	19/09/2022 23:00	0.0	G	45	No	<25	NA
N17	19/09/2022 22:28	1.3	F	45	Yes	34	Nil
N19	19/09/2022 22:00	0.0	F	45	Yes	26	Nil
N20	19/09/2022 23:31	0.0	G	45	No	IA	NA

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site-only  $L_{A1,1minute}$  attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

## 4.4 Atmospheric conditions

Atmospheric condition data measured by the operator during each measurement using a Kestrel hand-held weather meter is shown in Table 4.4. The wind speed, direction and temperature were measured at approximately 1.8 metres. Attended noise monitoring is not undertaken during rain, hail, or wind speeds above 5 m/s at microphone height.

**Table 4.4 Measured atmospheric conditions – September 2022**

Location	Start Date and Time	Temperature °C	Wind Speed m/s	Wind Direction °Magnetic North <sup>1</sup>	Cloud Cover 1/8s
N6	20/09/2022 00:42	4	0.0	-	0
N14	20/09/2022 00:15	4	0.0	-	0
N15	19/09/2022 23:00	6	0.0	-	0
N17	19/09/2022 22:28	12	0.0	-	0
N19	19/09/2022 22:00	12	0.0	-	0
N20	19/09/2022 23:31	7	0.0	-	0

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

Meteorological data used for compliance assessment is sourced from the WCP AWS and inversion tower.

# 5 Discussion

## 5.1 Noted noise sources

During attended monitoring, the time variations (temporal characteristics) of noise sources are considered in each measurement via statistical descriptors. From these observations summaries have been derived for the location where an exceedance was measured and are provided in this chapter. Statistical 1/3 octave-band analysis of environmental noise was undertaken and the following figures display frequency ranges of various noise sources at each location for  $L_{A1}$ ,  $L_{A10}$ ,  $L_{Aeq}$ ,  $L_{A50}$  and  $L_{A90}$  descriptors. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 5.1 where it can be seen that frogs and insects are generating noise at frequencies above 1000 Hz while mining noise is at frequencies less than 1000 Hz, which is typical. Adding levels at frequencies that relate to mining only allows separate statistical results to be calculated. This analysis cannot always be performed if there are significant levels of other noise at the same frequencies as mining, such as dogs, cows, or (most commonly) road traffic.

It should be noted that the method of summing statistical values up to a cut-off frequency can overstate the  $L_{A1}$  result by a small margin but is entirely accurate for  $L_{Aeq}$ .

Historical site only noise levels from attended monitoring over the previous 12-month period has been provided as additional information in Table 5.1 to Table 5.6.

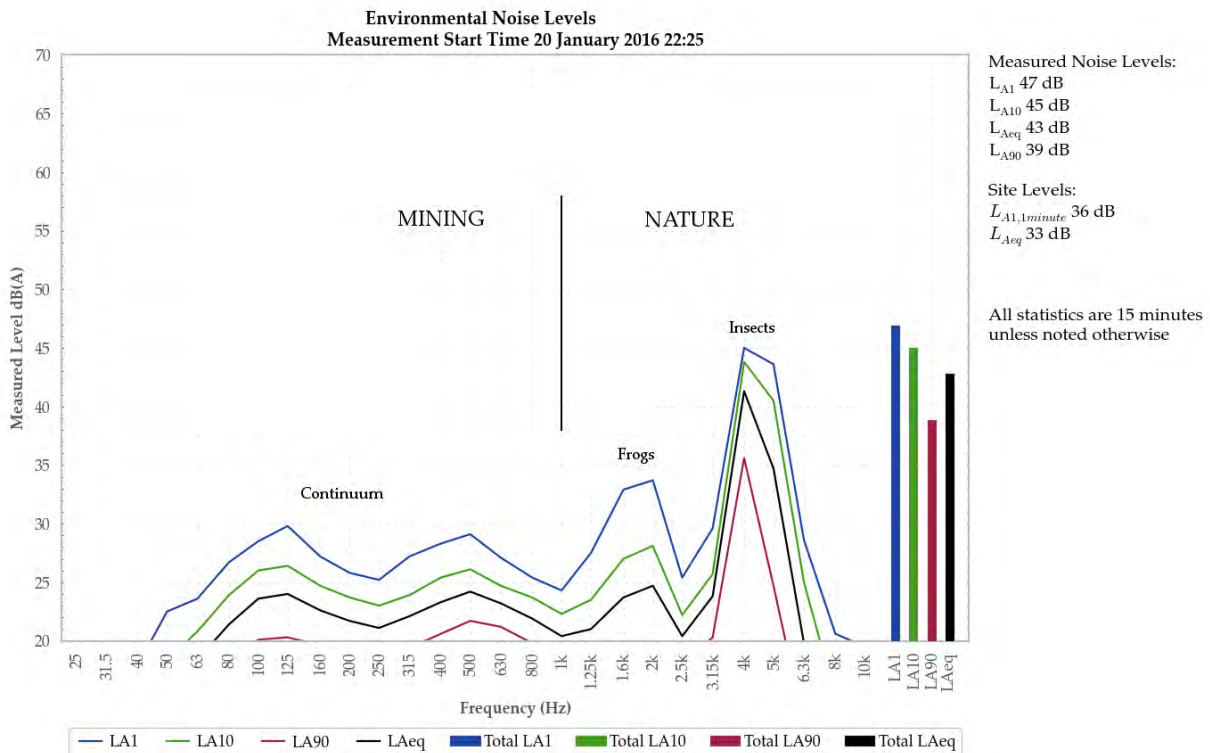


Figure 5.1 Example graph (refer to Section 5.1 for explanatory note)

5.1.1 N6

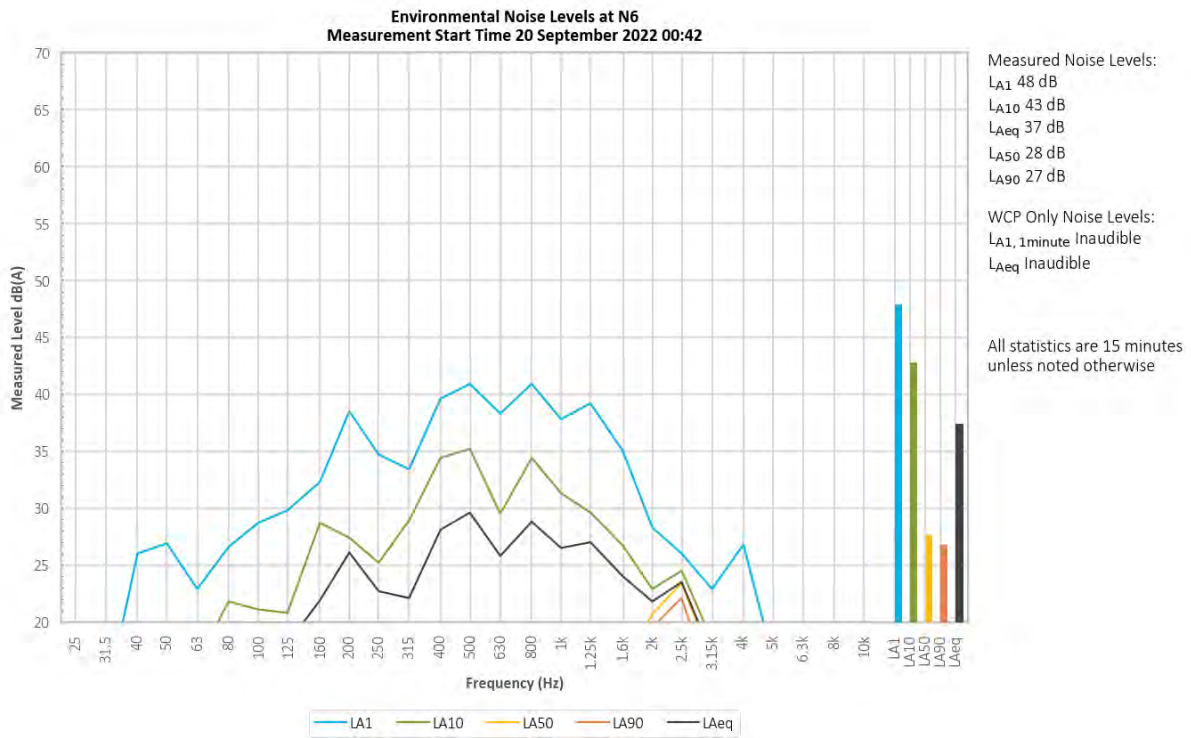


Figure 5.2 Environmental noise levels N6, St Laurence O’Toole Catholic Church, Wollar Village

WCP was inaudible throughout the measurement.

A train was responsible for the measured LA1, LA10 and LAeq. Insects were responsible for the measured LA50 and LA90.

Noise from dogs and local continuum was also noted.

Table 5.1 Historical WCP only noise levels at N6

Month	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022
LAeq	IA	31	IA	IA	IA	IA	IA	<20	<25	30	IA	IA
LA1,1min	IA	33	IA	IA	IA	IA	IA	23	<25	37	IA	IA

5.1.2 N14

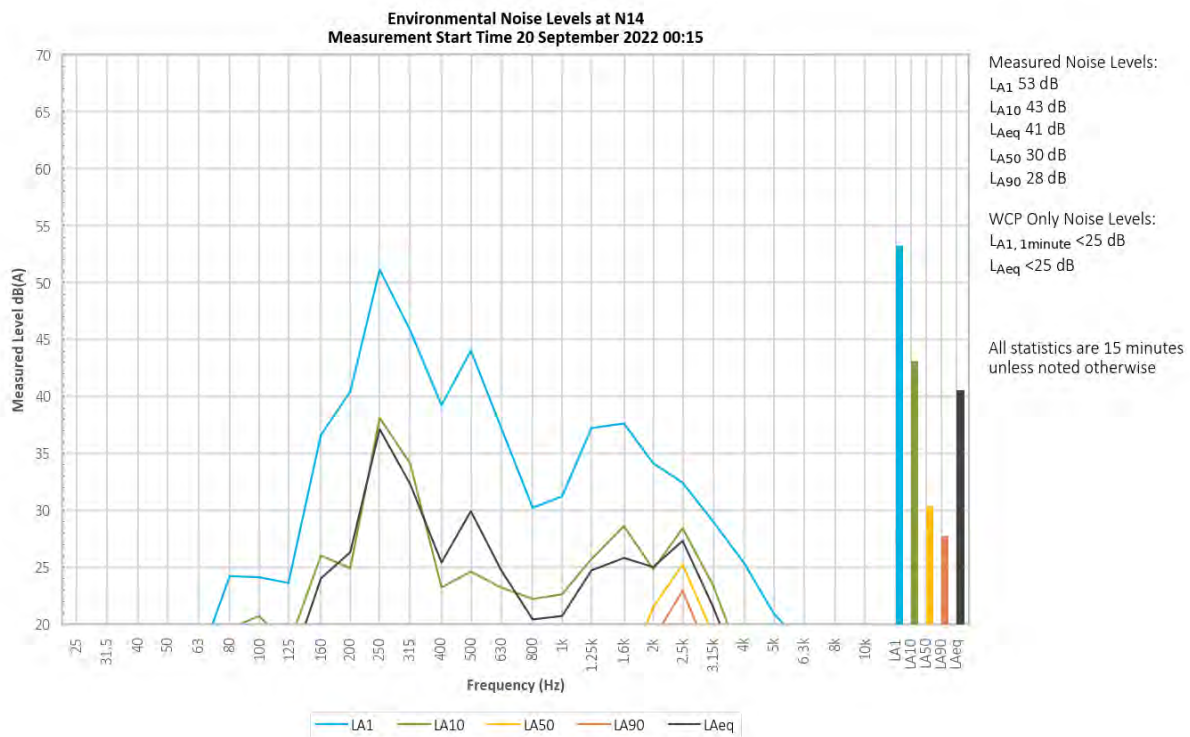


Figure 5.3 Environmental noise levels N14, ‘Tichular’, intersection of Tichular and Barigan Roads

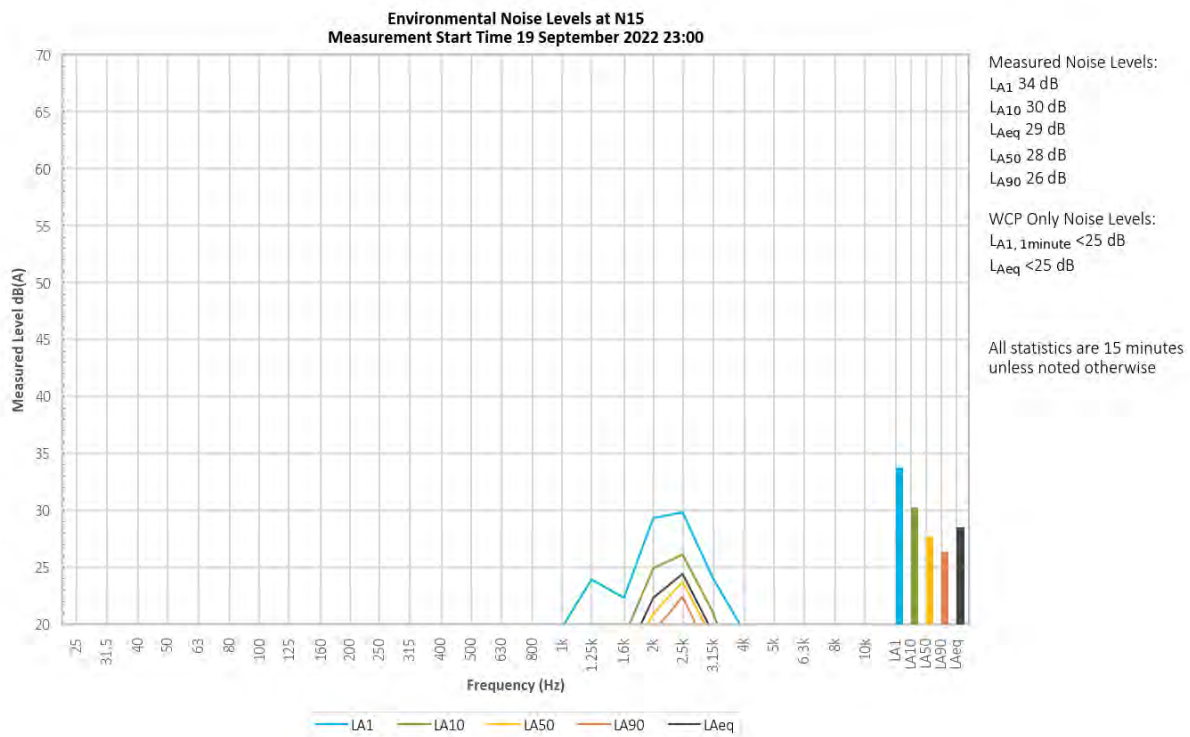
A mining continuum from WCP was audible during the measurement, generating a site only LAeq and LA1,1minute of less than 25 dB.

Cattle were responsible for the measured LA1, LA10 and LAeq. Frogs and insects were responsible for measured LA90 and LA50.

Table 5.2 Historical WCP only noise levels at N14

Month	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022
LAeq	IA	<25	IA	IA	IA	IA	IA	<25	IA	IA	IA	IA
LA1,1min	IA	25	IA	IA	IA	IA	IA	<25	IA	IA	IA	IA

### 5.1.3 N15



**Figure 5.4 Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village**

A mining continuum from WCP was audible during the measurement, generating a site only LAeq and LA1,1minute of less than 25 dB. Track noise was also noted.

Frogs and insects were responsible for the measured noise levels.

Noise from birds was also noted.

**Table 5.3 Historical WCP only noise levels at N15**

Month	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022 <sup>1</sup>	July 2022	Aug 2022
LAeq	NM	33	IA	IA	IA	IA	IA	23	34	38/34	29	IA
LA1,1min	NM	41	IA	IA	IA	IA	IA	32	38	42/35	40	IA

Notes: 1. Second result is remeasure following measured exceedance, in accordance with the NMP.



5.1.4 N17

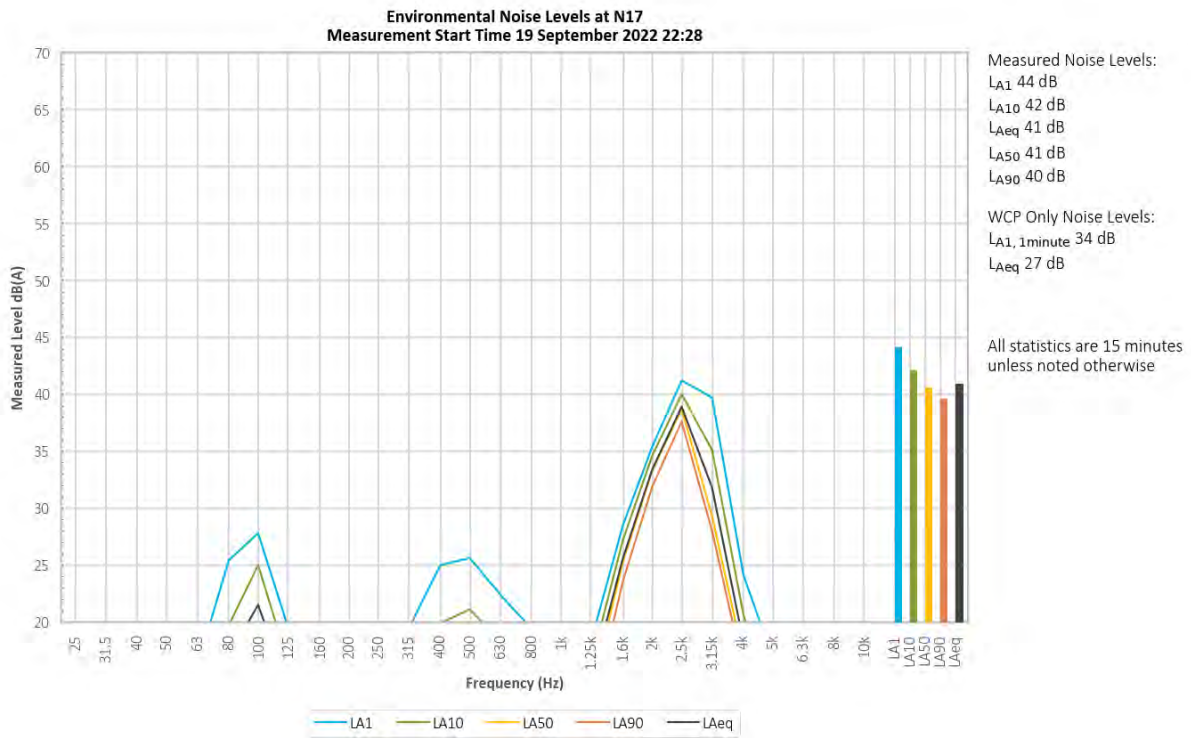


Figure 5.5 Environmental noise levels N17, Mogo Road, off Araluen Road

A mining continuum from WCP was audible during the measurement, generating a site only LAeq of 27 dB. Engine surges generated a site only LA1,1minute of 34 dB.

Frogs and insects were responsible for measured noise levels.

Noise from birds was also noted.

Table 5.4 Historical WCP only noise levels at N17

Month	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022
LAeq	IA	<20	IA	IA	IA	IA	IA	<20	32	23	27	IA
LA1,1min	IA	<20	IA	IA	IA	IA	IA	23	37	28	30	IA

5.1.5 N19

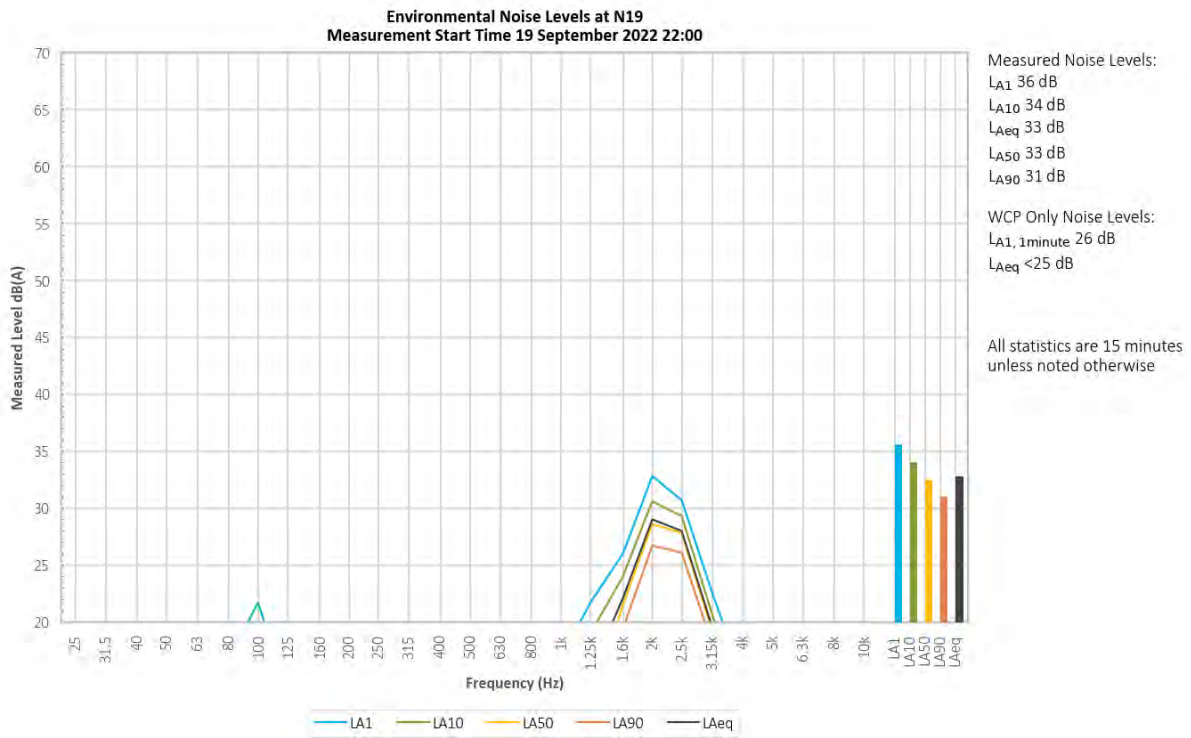


Figure 5.6 Environmental noise levels N19, Upper Mogo Road

A mining continuum from WCP was audible during the measurement, generating a site only LAeq of less than 25 dB. Engine surges generated a site only LA1,1minute of 26 dB.

Frogs and insects were responsible for measured noise levels.

Noise from an aeroplane and wildlife was also noted.

Table 5.5 Historical WCP only noise levels at N19

Month	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022
LAeq	IA	IA	IA	IA	IA	IA	IA	IA	<20	IA	IA	IA
LA1,1min	IA	IA	IA	IA	IA	IA	IA	IA	<20	IA	IA	IA

5.1.6 N20

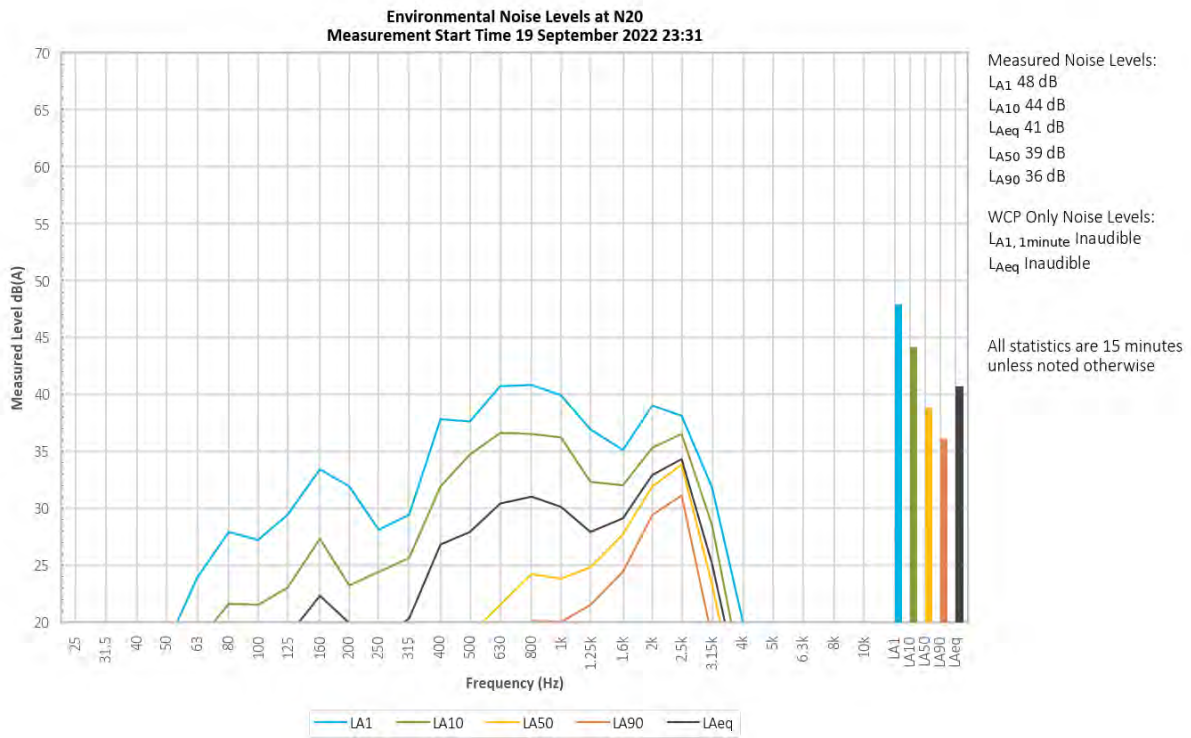


Figure 5.7 Environmental noise levels N20, Ringwood Road

WCP was inaudible during the measurement.

A train was responsible for the measured LA1, primarily responsible for the LA10 and contributed to the LAeq. Frogs and insects contributed to the LA10 and LAeq and were responsible for the measured LA50 and LA90.

Noise from road traffic and running water was also noted.

Table 5.6 Historical WCP only noise levels at N20

Month	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022
LAeq	IA	IA	IA	IA	IA	IA	IA	<25	22	IA	IA	IA
LA1,1min	IA	IA	IA	IA	IA	IA	IA	<25	28	IA	IA	IA

## 6 Summary

Global Acoustics (now part of EMM) was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP, an open cut coal mine located approximately 40 kilometres north-east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was done around WCP during the night period of 19/20 September 2022.

Noise levels from WCP complied with relevant noise limits at all monitoring locations during the September 2022 survey.

Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

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# Appendix A

## Regulator documents

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## A.1 Wilpinjong Coal Extension Project Approval (SSD-6764)

### SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

#### ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from the owner of the land listed in Table 1, the Applicant must acquire the land in accordance with the procedures in conditions 5 and 6 of schedule 4.

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

Note: To interpret the land referred to in Table 1, see the applicable figures in Appendix 5.

#### MITIGATION UPON REQUEST

2. Upon receiving a written request from the owner of any residence on the land listed in Table 2, the Applicant must implement additional noise mitigation measures at or in the immediate vicinity of the residence in consultation with the landowner. These measures must be consistent with the measures outlined in the *Voluntary Land Acquisition and Mitigation Policy*. They must also be reasonable and feasible and proportionate with the level of predicted impact.

If within 3 months of receiving this request from the owner, the Applicant and the owner 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.

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

Note: To interpret the land referred to in Table 2, see the applicable figures in Appendix 5.

#### NOISE

##### Noise Criteria

3. The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 3 at any residence on privately-owned land or at the other specified locations.

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>A1</sub> (1 minute)
102	36	36	38	45
Wollar Village – Residential	36	37	37	45
All other privately owned land	35	35	35	45
901 – Wollar School		35 (internal) 45 (external) When in use		
150A – St Luke’s Anglican Church 900 – St Laurence O’Toole Catholic Church		40 (internal) When in use		

Note: To interpret the locations referred to in Table 3, see the applicable figures in Appendix 5.

Noise generated by the development is to be measured in accordance with the relevant requirements of the *NSW Industrial Noise Policy* (as may be updated from time to time). Appendix 6 sets out the meteorological conditions under which these criteria apply along with any modifications to the *NSW Industrial Noise Policy* and the requirements for evaluating compliance with these criteria.

However, these criteria do not apply if the Applicant has an agreement with the owner/s of the relevant residence of land 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, low frequency, road and rail noise of the development;
  - (b) operate a comprehensive noise management system 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 consent;
  - (c) minimise the noise impacts of the development during meteorological conditions when the noise limits in this consent do not apply (see Appendix 6);
  - (d) only use locomotives and rolling stock that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL;
  - (e) co-ordinate noise management at the site with the noise management at Moolarben and Ulan mines to minimise cumulative noise impacts; and
  - (f) carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent.

## Noise Management Plan

5. Prior to carrying out any development under this consent, unless the Secretary agrees otherwise, 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 in this consent;
  - (c) describe the proposed noise management system in detail; and
  - (d) include a monitoring program that:
    - evaluates and reports on:
      - the effectiveness of the noise management system;
      - compliance against the noise criteria in this consent; and
      - compliance against the noise operating conditions;
    - includes a program to calibrate and validate the real-time noise monitoring results with the attended monitoring results over time (so the real-time noise monitoring program can be used as a better indicator of compliance with the noise criteria in this consent and trigger for further attended monitoring); and
    - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.
6. The Applicant must implement the approved Noise Management Plan for the development.

**APPENDIX 6  
NOISE COMPLIANCE ASSESSMENT**

**Applicable Meteorological Conditions**

1. The noise criteria in Table 3 of schedule 3 are to apply under all meteorological conditions except the following:
  - (a) wind speeds greater than 3 m/s at 10 m above ground level; or
  - (b) stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
  - (c) stability category G temperature inversion conditions.

**Determination of Meteorological Conditions**

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions must be that recorded by the meteorological station located on the site.

**Compliance Monitoring**

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
4. This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
5. Unless otherwise agreed with the Secretary, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
  - (a) monitoring locations for the collection of representative noise data;
  - (b) meteorological conditions during which collection of noise data is not appropriate;
  - (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
  - (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

Table 6-1: One-third octave low frequency noise thresholds

Hz/dB(Z)	One-third octave $L_{Zeq,15minute}$ threshold level												
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB(Z)	92	89	86	77	69	61	54	50	50	48	48	46	44

## A.2 Environment Protection Licence

### L5 Noise limits

L5.1 Noise generated at the premises must not exceed the noise limits presented in the table below. The

locations referred to in the table below are indicated in Appendix 5 - Figures 1 and 2 of Development Consent number SSD-6764 dated 24 April 2017.

Location	Day	Evening	Night	Night
	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LA1(1 minute)
Wollar village - residential	36	37	37	45
All other privately owned land	35	35	35	45
102	36	36	38	45
Wollar school	35 (internal), 45 (external) when in use			
St Luke's Anglican Church & St Laurence O'Toole Catholic Church	40 (internal) when in use			

Note: The above noise limits do not apply at properties where the licensee has a written agreement with the landowner to exceed the noise limits.

L5.2 For the purpose of condition L5.1;

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.
- Evening is defined as the period 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.

L5.3 The noise limits set out in condition L5.1 apply under all meteorological conditions except for the following:

- Wind speeds greater than 3 metres/second at 10 metres above ground level; or
- Stability category F temperature inversions and wind speeds greater than 2m/s at 10m above ground level; or
- Stability category G temperature inversion conditions.

L5.4 For the purpose of condition L5.3:

- The meteorological data to be used for determining meteorological conditions is the data recorded by the meteorological weather station identified as EPA identification Point 21 in condition P1.1; and
- 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.

- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, 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 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
    - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
  - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
  - c) With the noise limits in condition L5.1, 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 conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
  - b) at a point other than the most affected point at a location.
- L5.7 For the purpose 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.



## 6 Noise Monitoring Program

WCPL utilise a combination of operator-attended and unattended noise monitoring to assess the performance of the Mine against the Noise Criteria from Development Consent (SSD-6467). Operator-attended noise monitoring will be used for determining compliance against the Noise Criteria in **Table 6**. Unattended real-time noise monitoring is primarily utilised as a proactive noise control system; providing noise alerts when predetermined noise levels are triggered so mining operations can be modified where noise levels are influenced by noise from the Project.

### 6.1 Monitoring Locations

Operator-attended noise monitoring locations have been chosen considering the following criteria:

- In any given direction, the site is as close as reasonably practical to the nearest Private Receiver;
- There is no closer Private Receiver that is not monitored;
- The site is unlikely to cause concern to any person residing on nearby private property; and
- The site can be safely accessed by the persons carrying out the noise monitoring.

WCPL will undertake operator-attended noise monitoring as identified in **Table 7 (Figure 3 and Figure 4)**. Real-time noise monitoring units are relocated from time to time, to assist with additional targeted noise monitoring and in response to community complaints. Real-time noise monitoring locations will be reviewed and modified as necessary in response to monitoring results, changes to the operation, or as a result of community consultation.

Should circumstances change, WCPL may amend the noise monitoring locations shown in **Table 7** with consideration to the above criteria. WCPL will update this NMP, in consultation with DPIE and the EPA.

**Table 7 Noise Monitoring Locations**

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
St Laurence O'Toole Church	N6	Operator-attended Noise	777299.9	6415716.9	Location based on the nearest community structure to the East of the Mine
Tichular	N14	Operator-attended Noise	778791.9	6408624.7	Location based on the nearest community structure to the South of the Mine
Wollar Village	N15	Operator-attended Noise	777452.0	6416158.9	Location based on the nearest community structure to the South-East of the Mine
Mogo Rd	N17	Operator-attended Noise	780771.0	6420641.0	Location based on the nearest community structure to the North-East of the Mine
Mogo Rd	N19	Operator-attended Noise	782644.5	6424151.1	Location based on the nearest and residential community structure to the North-East of the Mine
Ringwood Road	N20	Operator-attended Noise	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine.
WCPL Rail Loop	-	Meteorology & Inversion	770630.9	6418085.1	Location based on consideration of prevailing meteorological conditions

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
Wollar Village <sup>4</sup>	-	Real-Time Noise - Fixed	777608.9	6415996.8	Location based on the nearest non-mine owned residence to the South-East of the Mine N15 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Mogo Rd <sup>4</sup>	-	Real-Time Noise - Fixed	782644.5	6424151.1	Location based on the nearest non-mine owned residence to the East of the Mine N19 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Ringwood Road	-	Real-Time Noise - Fixed	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine. N20 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Tichular <sup>3</sup>	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

**Notes:**

1. MGA94, Zone 55
2. Monitoring will be undertaken at this location until it can be demonstrated that the noise contribution from the Mine is negligible. At this point, WCPL will notify DPIE and EPA of the results of this monitoring and advise if and when the monitoring at this location will be scaled back or discontinued. The real-time noise monitor at Wandooona may be relocated in response to a complaint or identified noise issue at another location.
3. Where continuous monitors are located at compliance locations (e.g. privately-owned receivers), WCPL will conduct a review of the identification/characterisation of mine-related noise by the real-time monitoring system at that location by comparing against observed mine-related noise identified during operator-attended monitoring (i.e. validate the identification of mine related noise and filtering of extraneous noise sources by the real-time system). Refer to Section 6.5.

## 6.2 Meteorological Monitoring

WCPL maintains a continuous on-site meteorological monitoring station that complies with the requirements of the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (DEC, 2007). The location of this meteorological monitoring station is shown on **Figure 3**.

WCPL's meteorological monitoring station is capable of continuous real-time measurement of temperature lapse rate in accordance with the INP (EPA, 2000).

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

- a) Rainfall;
- b) Relative humidity;
- c) Temperature – measured at 2, 10 and 60 m above ground level;
- d) Wind speed – horizontal and vertical;
- e) Wind direction – measured at 10 m above ground level;
- f) Sigma theta;
- g) Pasquil stability classification;
- h) Solar radiation; and
- i) Temperature lapse rate.

Meteorological forecasting will be undertaken as specified in **Section 5.4**.



## 6.3 Operator-attended Noise Monitoring

### 6.3.1 Purpose

Operator-attended noise monitoring will be used to evaluate compliance against the Noise Criteria detailed in **Table 6**.

### 6.3.2 Summary

Operator-attended noise will be undertaken in accordance with **Table 8**.

**Table 8 Operator-attended Noise Monitoring Summary**

Element	Description
Locations	<ul style="list-style-type: none"><li>As per Table 7,</li><li>Figure 3 and Figure 4</li></ul>
Period	<ul style="list-style-type: none"><li>Night-time period (10 pm to 7 am) being the most sensitive time period for noise.</li></ul>
Frequency	<ul style="list-style-type: none"><li>12 times per year<sup>1</sup> (i.e. one night per month); plus</li><li>12 times per year<sup>1</sup> (i.e. one night per month) at locations as identified in Table 7 to validate real-time noise monitoring data (Section 6.5).</li></ul>

Notes: <sup>1</sup> Monitoring frequency at Mogo Road (N19) and Ringwood Road (N20) will remain at the frequency identified in Table 8 during the commencement of operations in Pit 8. A review of the monitoring frequency at N19 and N20 will be undertaken during subsequent reviews of this NMP in consultation with WCPL's noise specialist and relevant government agencies.

### 6.3.3 Methodology

Operator-attended noise monitoring will be undertaken as outlined in **Table 8** by an independent acoustic consultant and guided by the requirements of the INP (EPA, 2000) and AS 1055.1-1997 'Acoustics – Description and measurement of environmental noise – General procedures'. Routine operator-attended noise monitoring will be undertaken during night-time periods (10 pm - 7 am).

If any of the Noise Criteria are exceeded, a second measurement will be taken at the same location within 75 minutes of the first measurement. If the second measurement does not exceed the Noise Criteria, as defined in **Table 6**, then the result will be recorded and the regular monitoring program resumed.

If the second measurement does exceed the applicable Noise Criteria, then:

- The noise consultant will immediately report both results to the WCPL Environment and Community Manager or delegate immediately;
- Upon confirming the exceedances are deemed a non-compliance in accordance with the **Figure 5**, WCPL will report both results to DPIE and EPA immediately, upon confirming the exceedance (**Section 9.0**).

WCPL will:

- Take immediate action in accordance with the NMS;
- Arrange for additional operator-attended noise monitoring to occur at that site within 1 week; and
- Deploy the mobile real-time noise monitor to measure and record the noise at that site for at least a 1 week period.

WCPL will also investigate any changes to the mine operations, and may revisit the noise model on the basis of the noise measurements recorded at the site.

The acoustic noise consultant will consider the modification factors in Section 4 of the INP (EPA, 2000) during the evaluation of attending monitoring results.

### 6.3.6 Applicable Meteorological Conditions

The Noise Criteria in **Table 6** are to be applied under all meteorological conditions except for the following:

- Wind speeds greater than 3 m/s at 10 m above ground level; or
- Stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
- Stability category G temperature inversion conditions.

Except for wind speed at microphone height, the data used for determining meteorological conditions will be that recorded by the meteorological station located on the Mine site.

It should be noted that when assessing wind conditions to determine the potential for noise level alteration by the refraction of sound-waves through the atmosphere, meteorological measurements should be undertaken at a height of 10 m above the ground level, in accordance with Section 5 of the INP (EPA, 2000). Local meteorological conditions, including near-surface winds are measured at the inbuilt meteorological station (2 m); however, in accordance with the INP (EPA, 2000), the 2 m data cannot be used to determine impacts from sound-wave refraction. The 2 m meteorological data is used to assess local meteorological conditions that may increase ambient noise levels including surface winds and rainfall.

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# Appendix B

## Calibration certificates

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## B.1 Calibration Certificates



### Sound Level Meter IEC 61672-3:2013 Calibration Certificate Calibration Number C21344

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

**Equipment Tested/ Model Number :** Rion NA-28  
**Instrument Serial Number :** 00701424  
**Microphone Serial Number :** 01916  
**Pre-amplifier Serial Number :** 01463

<b>Pre-Test Atmospheric Conditions</b>	<b>Post-Test Atmospheric Conditions</b>
<b>Ambient Temperature :</b> 20.6°C	<b>Ambient Temperature :</b> 22.4°C
<b>Relative Humidity :</b> 47%	<b>Relative Humidity :</b> 44%
<b>Barometric Pressure :</b> 101.05kPa	<b>Barometric Pressure :</b> 100.91kPa

**Calibration Technician :** Jeff Yu      **Secondary Check:** Harrison Kim  
**Calibration Date :** 2 Jun 2021      **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 confirms to the class 1 requirements of IEC 61672-1:2013.

<b>Acoustic Tests</b>		<b>Least Uncertainties of Measurement - Environmental Conditions</b>	
125Hz	±0.12dB	Temperature	±0.2°C
1kHz	±0.11dB	Relative Humidity	±2.4%
8kHz	±0.13dB	Barometric Pressure	±0.01kPa
<b>Electrical Tests</b>	<b>±0.10dB</b>		

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.

Specific Tests	Least Uncertainties of Measurement -	
	Environmental Conditions	
Generated SPL	±0.14dB	Temperature ±0.2°C
Frequency	±0.09%	Relative Humidity ±2.4%
Distortion	±0.09%	Barometric Pressure ±0.01kPa

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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Page 1 of 1



# **Wilpinjong Coal**

## **Environmental Noise Monitoring**

October 2022

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Prepared for Wilpinjong Coal Pty Ltd



# Wilpinjong Coal

## Environmental Noise Monitoring

October 2022

Wilpinjong Coal Pty Ltd

E220456 RP1

Version	Date	Prepared by	Approved by	Comments
1.0	20/10/2022	Will Moore	Ryan Bruniges	Final

Approved by



**Ryan Bruniges**

Senior Acoustic Consultant

20 October 2022

Level 3 175 Scott Street

Newcastle NSW 2300

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This report has been prepared in accordance with the brief provided by Wilpinjong Coal Pty Ltd and has relied upon the information collected at the time and under the conditions specified in the report. All findings, conclusions or recommendations contained in the report are based on the aforementioned circumstances. The report is for the use of Wilpinjong Coal Pty Ltd and no responsibility will be taken for its use by other parties. Wilpinjong Coal Pty Ltd may, at its discretion, use the report to inform regulators and the public.

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# 1 Introduction

## 1.1 Background

Global Acoustics (now part of EMM) was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP), an open cut coal mine located approximately 40 kilometres north-east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 11/12 October 2022 at four locations. Due to flood waters locations N14, N17 and N19 were not accessible. There was no suitable location to represent N17 and N19, so no measurements were undertaken for these locations. The measurement at N14 was done north of Wollar Creek, approximately 1km closer to WCP than the regular location for N14.

## 1.2 Monitoring locations

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

**Table 1.1** Attended monitoring locations

NMP Descriptor	Monitoring Location
N6	St Laurence O’Toole Catholic Church representative of Wollar Village south
N14	‘Tichular’ intersection of Tichular and Barigan Roads, Tichular
N15	Track off Barigan Street near Wollar Public School, Wollar Village
N17	Mogo Road, off Araluen Road, Wollar
N19	North Mogo Road, Mogo
N20	Ringwood Road, off Wollar Road, Wollar

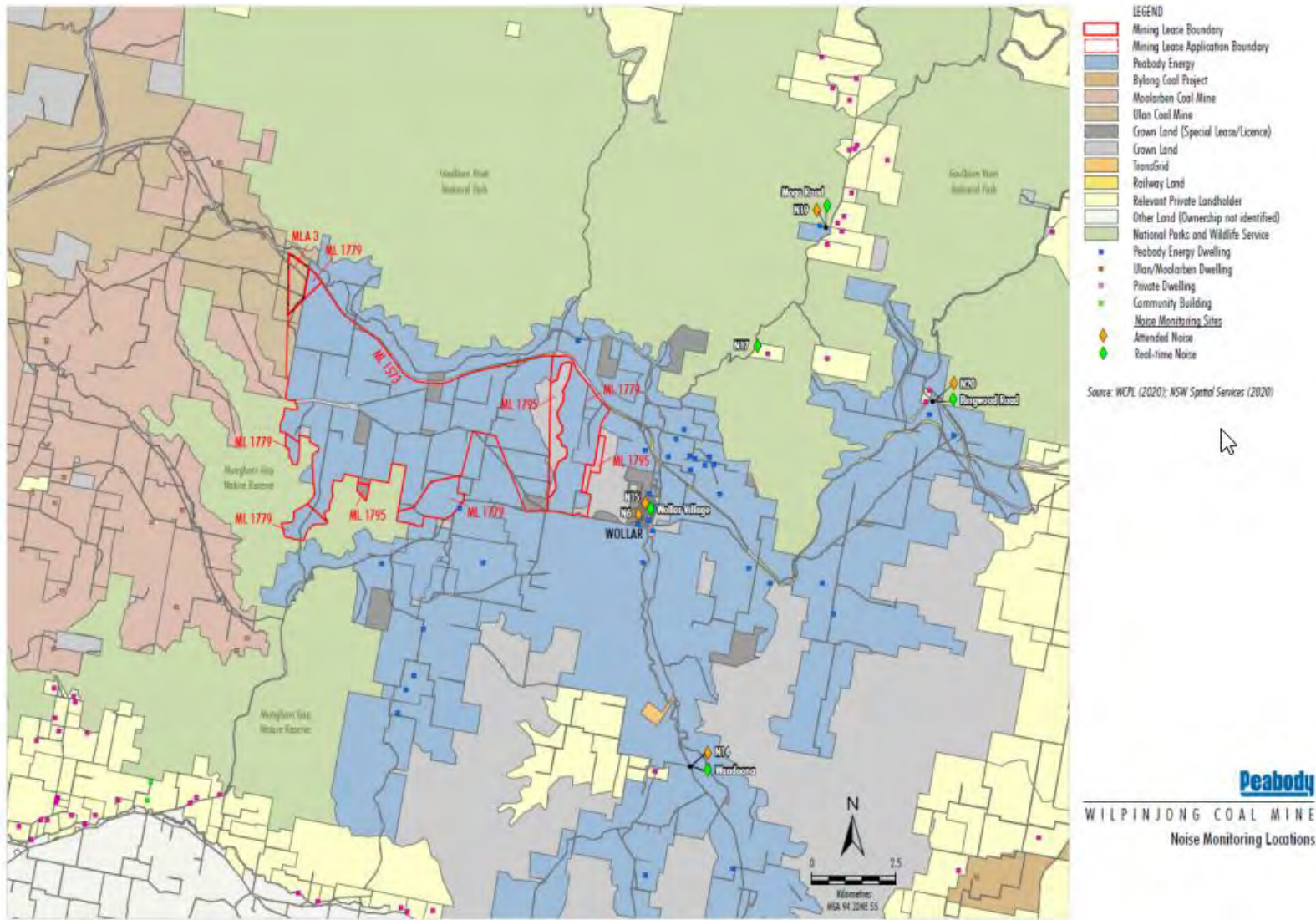


Figure 1.1 Wilpinjong noise monitoring locations

## 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**

Descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to describe human response to noise.
L <sub>Amax</sub>	The maximum A-weighted noise level over a time period.
L <sub>A1</sub>	The noise level which is exceeded for 1 per cent of the time.
L <sub>A1,1minute</sub>	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L <sub>A10</sub>	The noise level which is exceeded for 10 percent of the time.
L <sub>Aeq</sub>	The average noise A-weighted energy during a measurement period.
L <sub>A50</sub>	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L <sub>A90</sub>	The level exceeded for 90 percent of the time. The L <sub>A90</sub> level is often referred to as the “background” noise level and is commonly used to determine noise criteria for assessment purposes.
L <sub>Amin</sub>	The minimum A-weighted noise level over a time period.
L <sub>Ceq</sub>	The 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 micro pascals.
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.
SC	Stability class (or category) is determined from measured wind speed and either sigma-theta or VTG.
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	This is the period 7:00am to 6:00pm.
Evening	This is the period 6:00pm to 10:00pm.
Night	This is the period 10:00pm to 7:00am.



## 2 Regulatory requirements and noise criteria

### 2.1 Development consents

The most current development consent associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017), which covers all current operations and has replaced the previous consent (05-0021). The relevant noise conditions from the current consent are reproduced in Appendix A.

### 2.2 Environment protection licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently issued in March 2021. Relevant noise sections of the EPL are reproduced in Appendix A.

### 2.3 Noise Monitoring Program

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in August 2020. The relevant sections are reproduced in Appendix A.

### 2.4 Project Specific Criteria

Noise criteria and meteorological conditions required for noise criteria to apply are consistent in the project approval and EPL. The applicable noise criteria for each monitoring location are shown in Table 2.1.

**Table 2.1** WCP project specific criteria, dB

NMP Descriptor	Day L <sub>Aeq,15minute</sub>	Evening L <sub>Aeq,15minute</sub>	Night L <sub>Aeq,15minute</sub>	Night L <sub>A1,1minute</sub>
N6	36	37	37	45
N14	35	35	35	45
N15	36	37	37	45
N17	36	36	38	45
N19	35	35	35	45
N20	35	35	35	45

Notes:

1. N6 noise limits have been assumed to be as detailed for 'Wollar Village – Residential' in the PA, as the church is no longer a place of worship.
2. N17 noise limits have been determined based on the assumption that N17 is property 102 in accordance with Appendix 5 Figure 1 of Development Consent SSD-6764.

## 2.5 Modifying Factors

The EPA 'Noise Policy for Industry' (NPfI, 2017) was approved for use in NSW in October 2017. 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 has 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 NPfI. Low frequency modifying factors have been assessed in accordance with both the development consent and NPfI.

## 3 Methodology

### 3.1 Overview

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

### 3.2 Attended noise monitoring

During this survey, monthly attended monitoring was undertaken during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric condition measurement was also undertaken at each monitoring location. Attended monitoring during this reporting period was undertaken by Tom Maddock.

This survey presents noise levels gathered during attended monitoring that are the result of many sounds reaching the sound level meter microphone during monitoring. Received levels from various noise sources were noted during attended monitoring and particular attention was paid to the extent of WCP's contribution, if any, to measured levels. At each receptor location, WCP's  $L_{Aeq,15\text{minute}}$  and  $L_{A1,1\text{minute}}$  (in the absence of any other noise) was measured directly, where possible, or, determined by frequency analysis.

If the exact contribution of the source of interest (in this case WCP) cannot be established, due to masking by other noise sources in a similar frequency range, but site noise levels are observed to be well below (more than 5 dB lower than) any relevant criterion, a maximum estimate of the potential contribution of the site might be made based on other measured site-only noise descriptors in accordance with Section 7.1 of the NPfl. This is generally expressed as a 'less than' quantity, such as <20 dB or <30 dB.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may also 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 some noise was audible but could not be quantified. If site noise was NM due to masking but estimated to be significant in relation to a relevant criterion, we would employ methods (e.g., measure closer and back calculate) to determine a value for reporting.

All sites noted as NM in this report are due to one or more of the following reasons:

- Site noise levels were extremely low and unlikely, in many cases, to be even noticed;
- Site noise levels were masked by another relatively loud noise source that is characteristic of the environment (e.g., breeze in foliage or continuous road traffic noise) that cannot be eliminated by moving closer; and/or
- It was not feasible, nor reasonable to employ methods such as move closer and back calculate. Cases may include, but are not limited to, 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.

A measurement of  $L_{A1,1\text{minute}}$  corresponds to the highest noise level generated for 0.6 second during one minute. In practical terms this is the highest noise level, or  $L_{Amax}$ , received from the site during the entire measurement period (i.e., the highest level of the worst minute during the 15 minute measurement).

Often extraneous noise events (for example, road traffic pass-bys and dogs) interfere with the measurement of site noise levels in the frequency range of interest. Where required, the sound level meter is paused during these occurrences to aid in quantification of the site only noise.

### 3.3 Modifying factors

All measurements were evaluated for potential modifying factors in accordance with the NPfl. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfl.

Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable, such that the site only  $L_{Aeq}$  was not “NM” or less than a maximum cut off value (e.g., “<20 dB” or “<30dB”).

Assessment of low frequency modifying factors is a two-step process as follows:

1. Comparison of C-weighted and A-weighted source contribution (in this case WCP). If the difference between these values is 15 dB(A) or more, then proceed to step 2.
2. Comparison of Z-weighted source noise levels in the range of 10-160 Hz against the third-octave reference threshold reproduced from NPfl Fact Sheet C. Where any third-octave noise level from the source exceeds the reference threshold below, a 2 dB or 5 dB positive adjustment is applied to the source  $L_{Aeq}$ , depending on the extent of the exceedance above the reference threshold.

**Table C2: One-third octave low-frequency noise thresholds.**

Hz/dB(Z)	One-third octave $L_{Zeq,15min}$ threshold level												
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB(Z)	92	89	86	77	69	61	54	50	50	48	48	46	44

**Notes:**

- dB(Z) = decibel (Z frequency weighted).

If applicable, modifying factors have been reported and added to measured site only  $L_{Aeq}$  noise levels when meteorological conditions satisfied requirements for site noise criteria to be applicable. Low-frequency modifying factors have only been applied to site-only  $L_{Aeq}$  levels if WCP was the only contributing low-frequency noise source.

### 3.4 Attended noise monitoring equipment

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

**Table 3.1 Attended noise monitoring equipment**

Model	Serial number	Calibration due date
Rion NA-28 sound level meter	01070590	09/06/2024
Pulsar 106 acoustic calibrator	74813	09/06/2024

## 4 Results

### 4.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.1. Discussion as to the noise sources responsible for these measured levels is provided in Section 5 of this report.

**Table 4.1** Measured noise levels <sup>1</sup> - October 2022

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	11/10/2022 22:21	62	44	41	39	37	35	33
N14	11/10/2022 23:00	51	47	46	45	45	45	44
N15	11/10/2022 22:00	81	53	46	47	42	39	35
N20	11/10/2022 23:45	46	40	39	37	37	35	33

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

### 4.2 Modifying factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfI and methodology described in Section 3.3.

There were no modifying factors, as defined in the NPfI, applicable during the survey. Mining noise was analysed and did not satisfy requirements for tonal, intermittent, or low frequency modifying factors, as defined in the NPfI. This means that no modifying factor penalties were applied to any measured result during this survey.

### 4.3 Attended noise monitoring results

Table 4.2 to Table 4.3 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement

**Table 4.2**  $L_{Aeq,15minute}$  generated by WCP against project specific criteria – October 2022

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB <sup>5</sup>	Criterion Applies? <sup>2</sup>	WCP $L_{Aeq}$ dB <sup>3,4</sup>	Exceedance dB <sup>4,5</sup>
N6	11/10/2022 22:21	2.1	E	37	Yes	IA	Nil
N14	11/10/2022 23:00	2.7	E	35	Yes	<25	Nil
N15	11/10/2022 22:00	2.0	E	37	Yes	IA	Nil
N20	11/10/2022 23:45	2.4	E	35	Yes	IA	Nil

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site-only  $L_{Aeq,15minute}$  attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.3**  $L_{A1,1minute}$  generated by WCP against project specific criteria - October 2022

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB <sup>5</sup>	Criterion Applies? <sup>2</sup>	WCP $L_{A1,1min}$ dB <sup>3,4</sup>	Exceedance dB <sup>4,5</sup>
N6	11/10/2022 22:21	2.1	E	45	Yes	IA	Nil
N14	11/10/2022 23:00	2.7	E	45	Yes	<25	Nil
N15	11/10/2022 22:00	2.0	E	45	Yes	IA	Nil
N20	11/10/2022 23:45	2.4	E	45	Yes	IA	Nil

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site-only  $L_{A1,1minute}$  attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.



## 4.4 Atmospheric conditions

Atmospheric condition data measured by the operator during each measurement using a Kestrel hand-held weather meter is shown in Table 4.4. The wind speed, direction and temperature were measured at approximately 1.8 metres. Attended noise monitoring is not undertaken during rain, hail, or wind speeds above 5 m/s at microphone height.

**Table 4.4 Measured atmospheric conditions – October 2022**

Location	Start Date and Time	Temperature °C	Wind Speed m/s	Wind Direction °Magnetic North <sup>1</sup>	Cloud Cover 1/8s
N6	11/10/2022 22:21	15	0.1	10	0
N14	11/10/2022 23:00	12	0.6	10	0
N15	11/10/2022 22:00	14	0.0	-	0
N20	11/10/2022 23:45	15	0.0	-	0

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

Meteorological data used for compliance assessment is sourced from the WCP AWS and inversion tower.

# 5 Discussion

## 5.1 Noted noise sources

During attended monitoring, the time variations (temporal characteristics) of noise sources are considered in each measurement via statistical descriptors. From these observations summaries have been derived for the location where an exceedance was measured and are provided in this chapter. Statistical 1/3 octave-band analysis of environmental noise was undertaken and the following figures display frequency ranges of various noise sources at each location for  $L_{A1}$ ,  $L_{A10}$ ,  $L_{Aeq}$ ,  $L_{A50}$  and  $L_{A90}$  descriptors. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 5.1 where it can be seen that frogs and insects are generating noise at frequencies above 1000 Hz while mining noise is at frequencies less than 1000 Hz, which is typical. Adding levels at frequencies that relate to mining only allows separate statistical results to be calculated. This analysis cannot always be performed if there are significant levels of other noise at the same frequencies as mining, such as dogs, cows, or (most commonly) road traffic.

It should be noted that the method of summing statistical values up to a cut-off frequency can overstate the  $L_{A1}$  result by a small margin but is entirely accurate for  $L_{Aeq}$ .

Historical site only noise levels from attended monitoring over the previous 12-month period has been provided as additional information in Table 5.1 to Table 5.6.

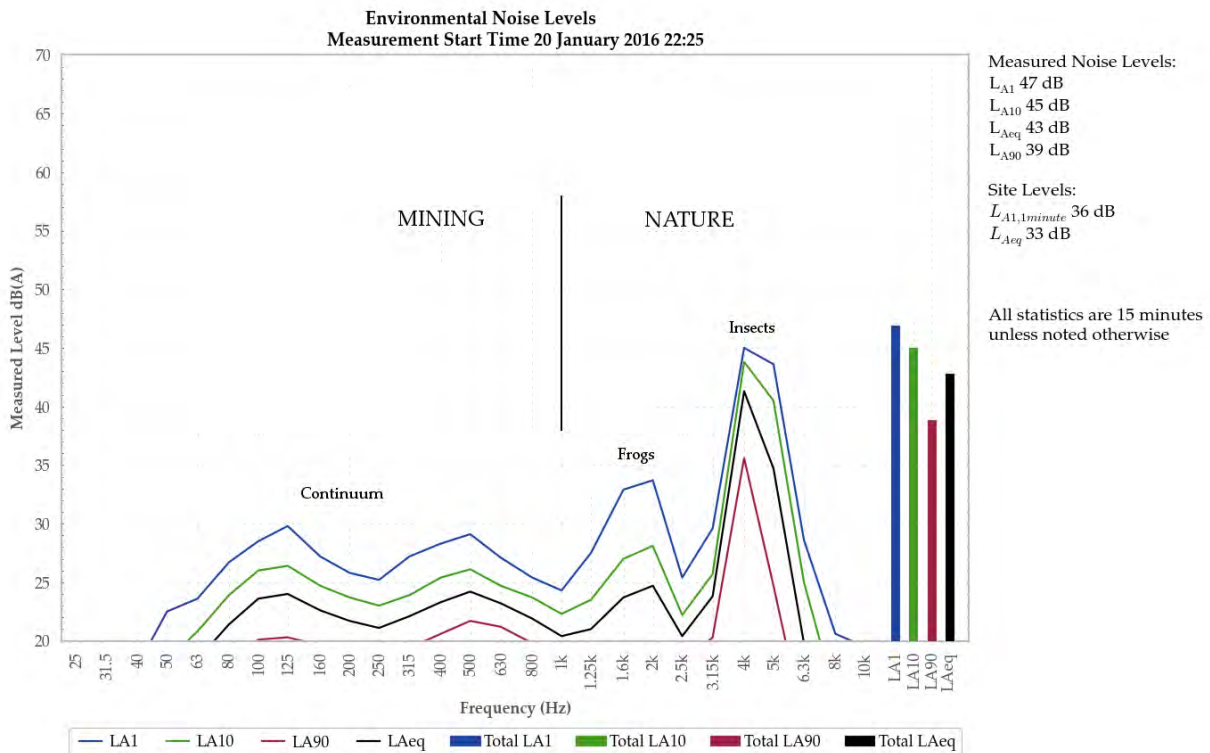


Figure 5.1 Example graph (refer to Section 5.1 for explanatory note)

5.1.1 N6

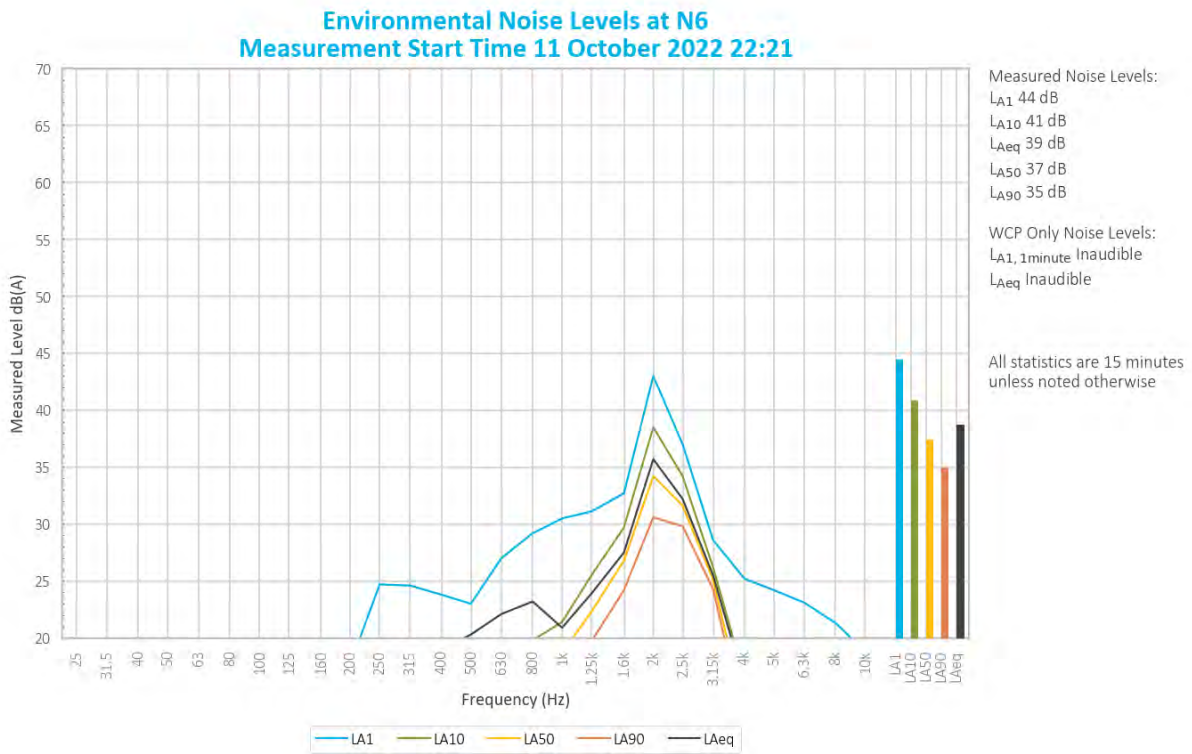


Figure 5.2 Environmental noise levels N6, St Laurence O’Toole Catholic Church, Wollar Village

WCP was inaudible throughout the measurement.

Frogs and insects generated measured noise levels. Animals in nearby bushland contributed to the measured LA1.

Noise from a car was also noted.

Table 5.1 Historical WCP only noise levels at N6

Month	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022
LAeq	31	IA	IA	IA	IA	IA	<20	<25	30	IA	IA	IA
LA1,1min	33	IA	IA	IA	IA	IA	23	<25	37	IA	IA	IA

5.1.2 N14

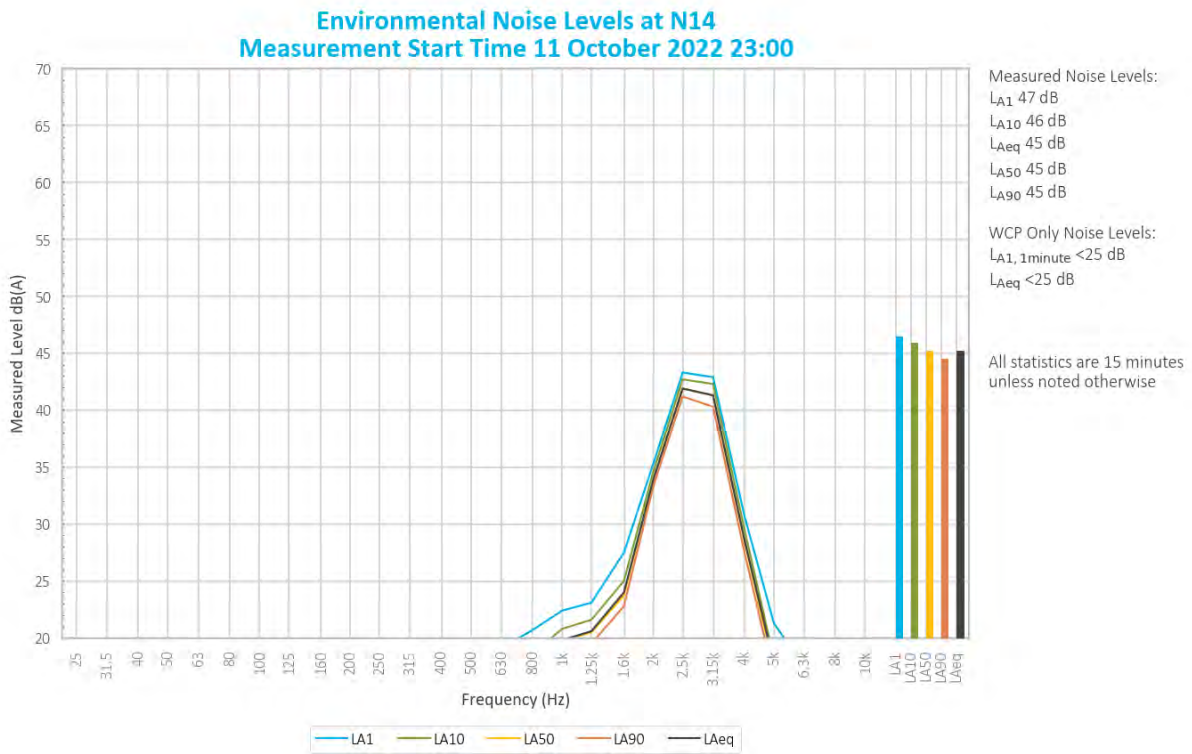


Figure 5.3 Environmental noise levels N14, ‘Tichular’, intersection of Tichular and Barigan Roads

A mining continuum from WCP was audible during the measurement, generating a site only LAeq and LA1,1minute of less than 25 dB.

Frogs and insects generated measured noise levels.

Noise from birds and running water was also noted.

Table 5.2 Historical WCP only noise levels at N14

Month	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022
LAeq	<25	IA	IA	IA	IA	IA	<25	IA	IA	IA	IA	<25
LA1,1min	25	IA	IA	IA	IA	IA	<25	IA	IA	IA	IA	<25

5.1.3 N15

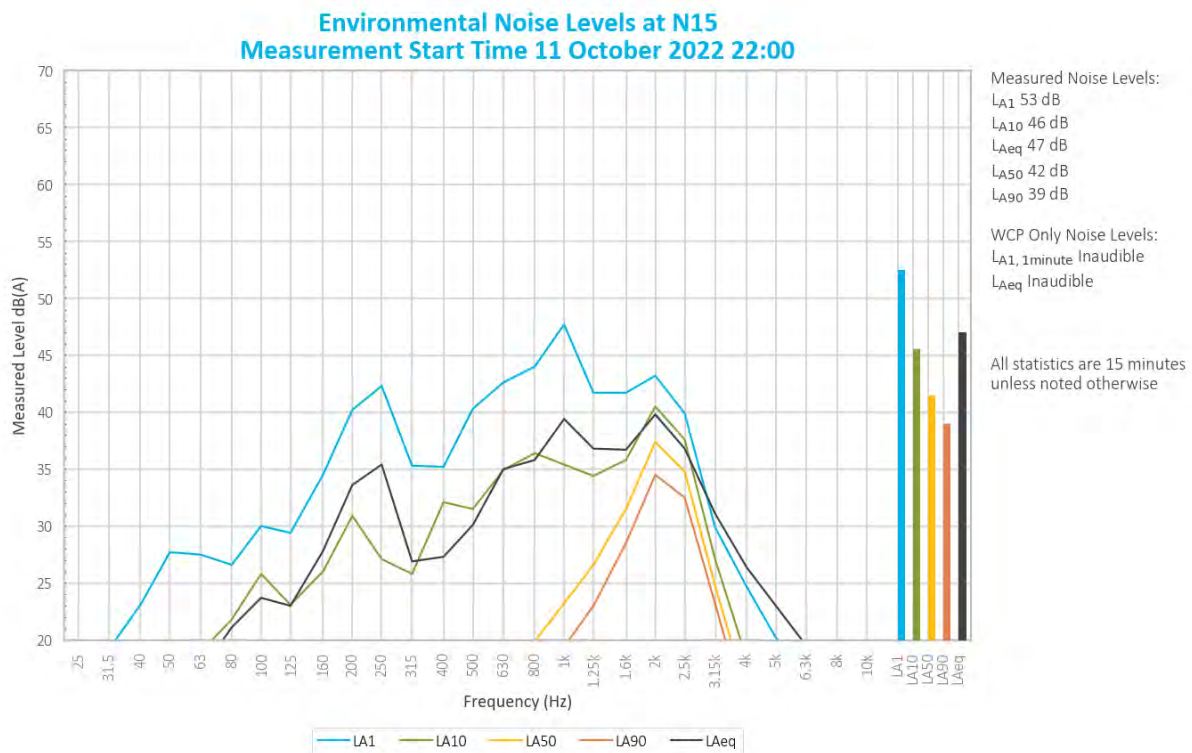


Figure 5.4 Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village

WCP was inaudible throughout the measurement.

A train was responsible for the LA1 and contributed to the LA10 and LAeq. Local continuum contributed to the LA10 and LAeq. Frogs and insects generated the LA50 and LA90 and contributed to the LAeq and LA10.

Table 5.3 Historical WCP only noise levels at N15

Month	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022 <sup>1</sup>	July 2022	Aug 2022	Sept 2022
LAeq	33	IA	IA	IA	IA	IA	23	34	38/34	29	IA	<25
LA1,1min	41	IA	IA	IA	IA	IA	32	38	42/35	40	IA	<25

Notes: 1. Second result is remeasure following measured exceedance, in accordance with the NMP.

#### 5.1.4 N17

Measurements could not be taken for N17 as access was flooded.

**Table 5.4** Historical WCP only noise levels at N17

Month	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022
L <sub>Aeq</sub>	<20	IA	IA	IA	IA	IA	<20	32	23	27	IA	27
L <sub>A1,1min</sub>	<20	IA	IA	IA	IA	IA	23	37	28	30	IA	34



### 5.1.5 N19

Measurements could not be taken for N19 as access was flooded.

**Table 5.5** Historical WCP only noise levels at N19

Month	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022
L <sub>Aeq</sub>	IA	IA	IA	IA	IA	IA	IA	<20	IA	IA	IA	<25
L <sub>A1,1min</sub>	IA	IA	IA	IA	IA	IA	IA	<20	IA	IA	IA	26

5.1.6 N20

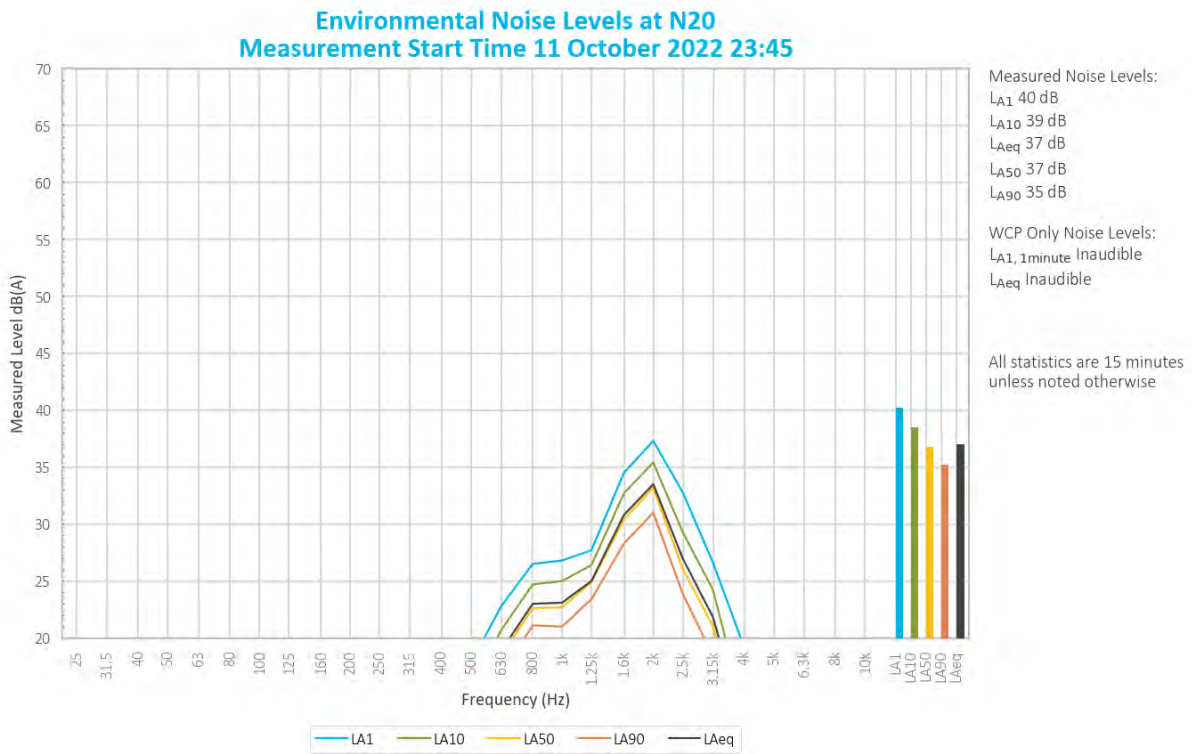


Figure 5.5 Environmental noise levels N20, Ringwood Road

WCP was inaudible throughout the measurement.  
 Frogs and insects generated measured noise levels.  
 Noise from traffic was also noted.

Table 5.6 Historical WCP only noise levels at N20

Month	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022
LAeq	IA	IA	IA	IA	IA	IA	<25	22	IA	IA	IA	IA
LA1,1min	IA	IA	IA	IA	IA	IA	<25	28	IA	IA	IA	IA

## 6 Summary

Global Acoustics (now part of EMM) was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP, an open cut coal mine located approximately 40 kilometres north-east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was done around WCP during the night period of 11/12 October 2022. Due to flood waters locations N14, N17 and N19 were not accessible. There was no suitable location to represent N17 and N19, so no measurements were undertaken for these locations. The measurement at N14 was done north of Wollar Creek, approximately 1km closer to WCP than the regular location for N14.

Noise levels from WCP complied with relevant noise limits at all monitoring locations during the October 2022 survey.

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# Appendix A

## Regulator documents

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## A.1 Wilpinjong Coal Extension Project Approval (SSD-6764)

### SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

#### ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from the owner of the land listed in Table 1, the Applicant must acquire the land in accordance with the procedures in conditions 5 and 6 of schedule 4.

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

Note: To interpret the land referred to in Table 1, see the applicable figures in Appendix 5.

#### MITIGATION UPON REQUEST

2. Upon receiving a written request from the owner of any residence on the land listed in Table 2, the Applicant must implement additional noise mitigation measures at or in the immediate vicinity of the residence in consultation with the landowner. These measures must be consistent with the measures outlined in the *Voluntary Land Acquisition and Mitigation Policy*. They must also be reasonable and feasible and proportionate with the level of predicted impact.

If within 3 months of receiving this request from the owner, the Applicant and the owner 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.

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

Note: To interpret the land referred to in Table 2, see the applicable figures in Appendix 5.

#### NOISE

##### Noise Criteria

3. The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 3 at any residence on privately-owned land or at the other specified locations.

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>A1</sub> (1 minute)
102	36	36	38	45
Wollar Village – Residential	36	37	37	45
All other privately owned land	35	35	35	45
901 – Wollar School		35 (internal) 45 (external) When in use		
150A – St Luke’s Anglican Church 900 – St Laurence O’Toole Catholic Church		40 (internal) When in use		

Note: To interpret the locations referred to in Table 3, see the applicable figures in Appendix 5.

Noise generated by the development is to be measured in accordance with the relevant requirements of the *NSW Industrial Noise Policy* (as may be updated from time to time). Appendix 6 sets out the meteorological conditions under which these criteria apply along with any modifications to the *NSW Industrial Noise Policy* and the requirements for evaluating compliance with these criteria.

However, these criteria do not apply if the Applicant has an agreement with the owner/s of the relevant residence of land 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, low frequency, road and rail noise of the development;
  - (b) operate a comprehensive noise management system 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 consent;
  - (c) minimise the noise impacts of the development during meteorological conditions when the noise limits in this consent do not apply (see Appendix 6);
  - (d) only use locomotives and rolling stock that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL;
  - (e) co-ordinate noise management at the site with the noise management at Moolarben and Ulan mines to minimise cumulative noise impacts; and
  - (f) carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent.

## Noise Management Plan

5. Prior to carrying out any development under this consent, unless the Secretary agrees otherwise, 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 in this consent;
  - (c) describe the proposed noise management system in detail; and
  - (d) include a monitoring program that:
    - evaluates and reports on:
      - the effectiveness of the noise management system;
      - compliance against the noise criteria in this consent; and
      - compliance against the noise operating conditions;
    - includes a program to calibrate and validate the real-time noise monitoring results with the attended monitoring results over time (so the real-time noise monitoring program can be used as a better indicator of compliance with the noise criteria in this consent and trigger for further attended monitoring); and
    - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.
6. The Applicant must implement the approved Noise Management Plan for the development.



**APPENDIX 6  
NOISE COMPLIANCE ASSESSMENT**

**Applicable Meteorological Conditions**

1. The noise criteria in Table 3 of schedule 3 are to apply under all meteorological conditions except the following:
  - (a) wind speeds greater than 3 m/s at 10 m above ground level; or
  - (b) stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
  - (c) stability category G temperature inversion conditions.

**Determination of Meteorological Conditions**

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions must be that recorded by the meteorological station located on the site.

**Compliance Monitoring**

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
4. This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
5. Unless otherwise agreed with the Secretary, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
  - (a) monitoring locations for the collection of representative noise data;
  - (b) meteorological conditions during which collection of noise data is not appropriate;
  - (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
  - (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

Table 6-1: One-third octave low frequency noise thresholds

Hz/dB(Z)	One-third octave $L_{Zeq,15minute}$ threshold level												
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB(Z)	92	89	86	77	69	61	54	50	50	48	48	46	44

## A.2 Environment Protection Licence

### L5 Noise limits

L5.1 Noise generated at the premises must not exceed the noise limits presented in the table below. The

locations referred to in the table below are indicated in Appendix 5 - Figures 1 and 2 of Development Consent number SSD-6764 dated 24 April 2017.

Location	Day	Evening	Night	Night
	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)	LA1(1 minute)
Wollar village - residential	36	37	37	45
All other privately owned land	35	35	35	45
102	36	36	38	45
Wollar school	35 (internal), 45 (external) when in use			
St Luke's Anglican Church & St Laurence O'Toole Catholic Church	40 (internal) when in use			

Note: The above noise limits do not apply at properties where the licensee has a written agreement with the landowner to exceed the noise limits.

L5.2 For the purpose of condition L5.1;

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.
- Evening is defined as the period 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.

L5.3 The noise limits set out in condition L5.1 apply under all meteorological conditions except for the following:

- Wind speeds greater than 3 metres/second at 10 metres above ground level; or
- Stability category F temperature inversions and wind speeds greater than 2m/s at 10m above ground level; or
- Stability category G temperature inversion conditions.

L5.4 For the purpose of condition L5.3:

- The meteorological data to be used for determining meteorological conditions is the data recorded by the meteorological weather station identified as EPA identification Point 21 in condition P1.1; and
- 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.

- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, 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 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
    - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
  - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
  - c) With the noise limits in condition L5.1, 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 conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
  - b) at a point other than the most affected point at a location.
- L5.7 For the purpose 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.

## 6 Noise Monitoring Program

WCPL utilise a combination of operator-attended and unattended noise monitoring to assess the performance of the Mine against the Noise Criteria from Development Consent (SSD-6467). Operator-attended noise monitoring will be used for determining compliance against the Noise Criteria in **Table 6**. Unattended real-time noise monitoring is primarily utilised as a proactive noise control system; providing noise alerts when predetermined noise levels are triggered so mining operations can be modified where noise levels are influenced by noise from the Project.

### 6.1 Monitoring Locations

Operator-attended noise monitoring locations have been chosen considering the following criteria:

- In any given direction, the site is as close as reasonably practical to the nearest Private Receiver;
- There is no closer Private Receiver that is not monitored;
- The site is unlikely to cause concern to any person residing on nearby private property; and
- The site can be safely accessed by the persons carrying out the noise monitoring.

WCPL will undertake operator-attended noise monitoring as identified in **Table 7 (Figure 3 and Figure 4)**. Real-time noise monitoring units are relocated from time to time, to assist with additional targeted noise monitoring and in response to community complaints. Real-time noise monitoring locations will be reviewed and modified as necessary in response to monitoring results, changes to the operation, or as a result of community consultation.

Should circumstances change, WCPL may amend the noise monitoring locations shown in **Table 7** with consideration to the above criteria. WCPL will update this NMP, in consultation with DPIE and the EPA.

**Table 7 Noise Monitoring Locations**

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
St Laurence O'Toole Church	N6	Operator-attended Noise	777299.9	6415716.9	Location based on the nearest community structure to the East of the Mine
Tichular	N14	Operator-attended Noise	778791.9	6408624.7	Location based on the nearest community structure to the South of the Mine
Wollar Village	N15	Operator-attended Noise	777452.0	6416158.9	Location based on the nearest community structure to the South-East of the Mine
Mogo Rd	N17	Operator-attended Noise	780771.0	6420641.0	Location based on the nearest community structure to the North-East of the Mine
Mogo Rd	N19	Operator-attended Noise	782644.5	6424151.1	Location based on the nearest and residential community structure to the North-East of the Mine
Ringwood Road	N20	Operator-attended Noise	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine.
WCPL Rail Loop	-	Meteorology & Inversion	770630.9	6418085.1	Location based on consideration of prevailing meteorological conditions



Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
Wollar Village <sup>4</sup>	-	Real-Time Noise - Fixed	777608.9	6415996.8	Location based on the nearest non-mine owned residence to the South-East of the Mine N15 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Mogo Rd <sup>4</sup>	-	Real-Time Noise - Fixed	782644.5	6424151.1	Location based on the nearest non-mine owned residence to the East of the Mine N19 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Ringwood Road	-	Real-Time Noise - Fixed	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine. N20 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Tichular <sup>3</sup>	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

**Notes:**

1. MGA94, Zone 55
2. Monitoring will be undertaken at this location until it can be demonstrated that the noise contribution from the Mine is negligible. At this point, WCPL will notify DPIE and EPA of the results of this monitoring and advise if and when the monitoring at this location will be scaled back or discontinued. The real-time noise monitor at Wandooona may be relocated in response to a complaint or identified noise issue at another location.
3. Where continuous monitors are located at compliance locations (e.g. privately-owned receivers), WCPL will conduct a review of the identification/characterisation of mine-related noise by the real-time monitoring system at that location by comparing against observed mine-related noise identified during operator-attended monitoring (i.e. validate the identification of mine related noise and filtering of extraneous noise sources by the real-time system). Refer to Section 6.5.

## 6.2 Meteorological Monitoring

WCPL maintains a continuous on-site meteorological monitoring station that complies with the requirements of the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (DEC, 2007). The location of this meteorological monitoring station is shown on **Figure 3**.

WCPL's meteorological monitoring station is capable of continuous real-time measurement of temperature lapse rate in accordance with the INP (EPA, 2000).

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

- a) Rainfall;
- b) Relative humidity;
- c) Temperature – measured at 2, 10 and 60 m above ground level;
- d) Wind speed – horizontal and vertical;
- e) Wind direction – measured at 10 m above ground level;
- f) Sigma theta;
- g) Pasquil stability classification;
- h) Solar radiation; and
- i) Temperature lapse rate.

Meteorological forecasting will be undertaken as specified in **Section 5.4**.

## 6.3 Operator-attended Noise Monitoring

### 6.3.1 Purpose

Operator-attended noise monitoring will be used to evaluate compliance against the Noise Criteria detailed in **Table 6**.

### 6.3.2 Summary

Operator-attended noise will be undertaken in accordance with **Table 8**.

**Table 8 Operator-attended Noise Monitoring Summary**

Element	Description
Locations	<ul style="list-style-type: none"><li>As per Table 7,</li><li>Figure 3 and Figure 4</li></ul>
Period	<ul style="list-style-type: none"><li>Night-time period (10 pm to 7 am) being the most sensitive time period for noise.</li></ul>
Frequency	<ul style="list-style-type: none"><li>12 times per year<sup>1</sup> (i.e. one night per month); plus</li><li>12 times per year<sup>1</sup> (i.e. one night per month) at locations as identified in Table 7 to validate real-time noise monitoring data (Section 6.5).</li></ul>

Notes: <sup>1</sup> Monitoring frequency at Mogo Road (N19) and Ringwood Road (N20) will remain at the frequency identified in Table 8 during the commencement of operations in Pit 8. A review of the monitoring frequency at N19 and N20 will be undertaken during subsequent reviews of this NMP in consultation with WCPL's noise specialist and relevant government agencies.

### 6.3.3 Methodology

Operator-attended noise monitoring will be undertaken as outlined in **Table 8** by an independent acoustic consultant and guided by the requirements of the INP (EPA, 2000) and AS 1055.1-1997 'Acoustics – Description and measurement of environmental noise – General procedures'. Routine operator-attended noise monitoring will be undertaken during night-time periods (10 pm - 7 am).

If any of the Noise Criteria are exceeded, a second measurement will be taken at the same location within 75 minutes of the first measurement. If the second measurement does not exceed the Noise Criteria, as defined in **Table 6**, then the result will be recorded and the regular monitoring program resumed.

If the second measurement does exceed the applicable Noise Criteria, then:

- The noise consultant will immediately report both results to the WCPL Environment and Community Manager or delegate immediately;
- Upon confirming the exceedances are deemed a non-compliance in accordance with the **Figure 5**, WCPL will report both results to DPIE and EPA immediately, upon confirming the exceedance (**Section 9.0**).

WCPL will:

- Take immediate action in accordance with the NMS;
- Arrange for additional operator-attended noise monitoring to occur at that site within 1 week; and
- Deploy the mobile real-time noise monitor to measure and record the noise at that site for at least a 1 week period.

WCPL will also investigate any changes to the mine operations, and may revisit the noise model on the basis of the noise measurements recorded at the site.

The acoustic noise consultant will consider the modification factors in Section 4 of the INP (EPA, 2000) during the evaluation of attending monitoring results.



### 6.3.6 Applicable Meteorological Conditions

The Noise Criteria in **Table 6** are to be applied under all meteorological conditions except for the following:

- Wind speeds greater than 3 m/s at 10 m above ground level; or
- Stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
- Stability category G temperature inversion conditions.

Except for wind speed at microphone height, the data used for determining meteorological conditions will be that recorded by the meteorological station located on the Mine site.

It should be noted that when assessing wind conditions to determine the potential for noise level alteration by the refraction of sound-waves through the atmosphere, meteorological measurements should be undertaken at a height of 10 m above the ground level, in accordance with Section 5 of the INP (EPA, 2000). Local meteorological conditions, including near-surface winds are measured at the inbuilt meteorological station (2 m); however, in accordance with the INP (EPA, 2000), the 2 m data cannot be used to determine impacts from sound-wave refraction. The 2 m meteorological data is used to assess local meteorological conditions that may increase ambient noise levels including surface winds and rainfall.

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# Appendix B

## Calibration certificates

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B.1 Calibration Certificates



**Sound Level Meter**  
IEC 61672-3:2013  
**Calibration Certificate**

Calibration Number C22373

<b>Client Details</b>	EMM Consulting Suite 6, Level 1, 146 Hunter Street Newcastle NSW 2300		
<b>Equipment Tested/ Model Number :</b>	Rion NA-28		
<b>Instrument Serial Number :</b>	01070590		
<b>Microphone Serial Number :</b>	08184		
<b>Pre-amplifier Serial Number :</b>	52329		
<b>Pre-Test Atmospheric Conditions</b>	<b>Post-Test Atmospheric Conditions</b>		
<b>Ambient Temperature :</b>	25.7°C	<b>Ambient Temperature :</b>	25.4°C
<b>Relative Humidity :</b>	31.9%	<b>Relative Humidity :</b>	32.4%
<b>Barometric Pressure :</b>	100.18kPa	<b>Barometric Pressure :</b>	100.11kPa
<b>Calibration Technician :</b>	Lucky Jaiswal	<b>Secondary Check:</b>	Max Moore
<b>Calibration Date :</b>	9 Jun 2022	<b>Report Issue Date :</b>	20 Jun 2022
<b>Approved Signatory :</b>			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%
5kHz	±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.



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**Sound Calibrator**

IEC 60942:2017

**Calibration Certificate**

Calibration Number C22374


**Client Details** EMM Consulting  
Suite 6, Level 1, 146 Hunter Street  
Newcastle NSW 2300

**Equipment Tested/ Model Number :** Pulsar Model 106  
**Instrument Serial Number :** 74813

**Atmospheric Conditions**

**Ambient Temperature :** 25.8°C  
**Relative Humidity :** 33.6%  
**Barometric Pressure :** 100.19kPa

**Calibration Technician :** Lucky Jaiswal  
**Calibration Date :** 09 Jun 2022  
**Secondary Check:** Max Moore  
**Report Issue Date :** 20 Jun 2022

**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	94.09	1000.30

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.

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.



# **Wilpinjong Coal**

## **Environmental Noise Monitoring**

November 2022

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Prepared for Wilpinjong Coal Pty Ltd

# Wilpinjong Coal

## Environmental Noise Monitoring

November 2022

Wilpinjong Coal Pty Ltd

E220456 RP11

Version	Date	Prepared by	Approved by	Comments
1.0	23/11/2022	Will Moore	Tony Welbourne	Final

Approved by



**Tony Welbourne**

Associate Director

12 December 2022

Level 3 175 Scott Street

Newcastle NSW 2300

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This report has been prepared in accordance with the brief provided by Wilpinjong Coal Pty Ltd 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 Wilpinjong Coal Pty Ltd'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 Wilpinjong Coal Pty Ltd (and subject to the terms of EMM's agreement with Wilpinjong Coal Pty Ltd).

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# 1 Introduction

## 1.1 Background

Global Acoustics (now part of EMM) was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP), an open cut coal mine located approximately 40 kilometres north-east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 15/16 November 2022 at four locations. Locations N17 and N19 were not accessible due to a road closure related to flooding. There were no suitable alternate locations to represent N17 and N19 that were accessible, so no monitoring occurred for these locations.

## 1.2 Monitoring locations

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

**Table 1.1** Attended monitoring locations

NMP Descriptor	Monitoring Location
N6	St Laurence O’Toole Catholic Church representative of Wollar Village south
N14	‘Tichular’ intersection of Tichular and Barigan Roads, Tichular
N15	Track off Barigan Street near Wollar Public School, Wollar Village
N17	Mogo Road, off Araluen Road, Wollar
N19	North Mogo Road, Mogo
N20	Ringwood Road, off Wollar Road, Wollar

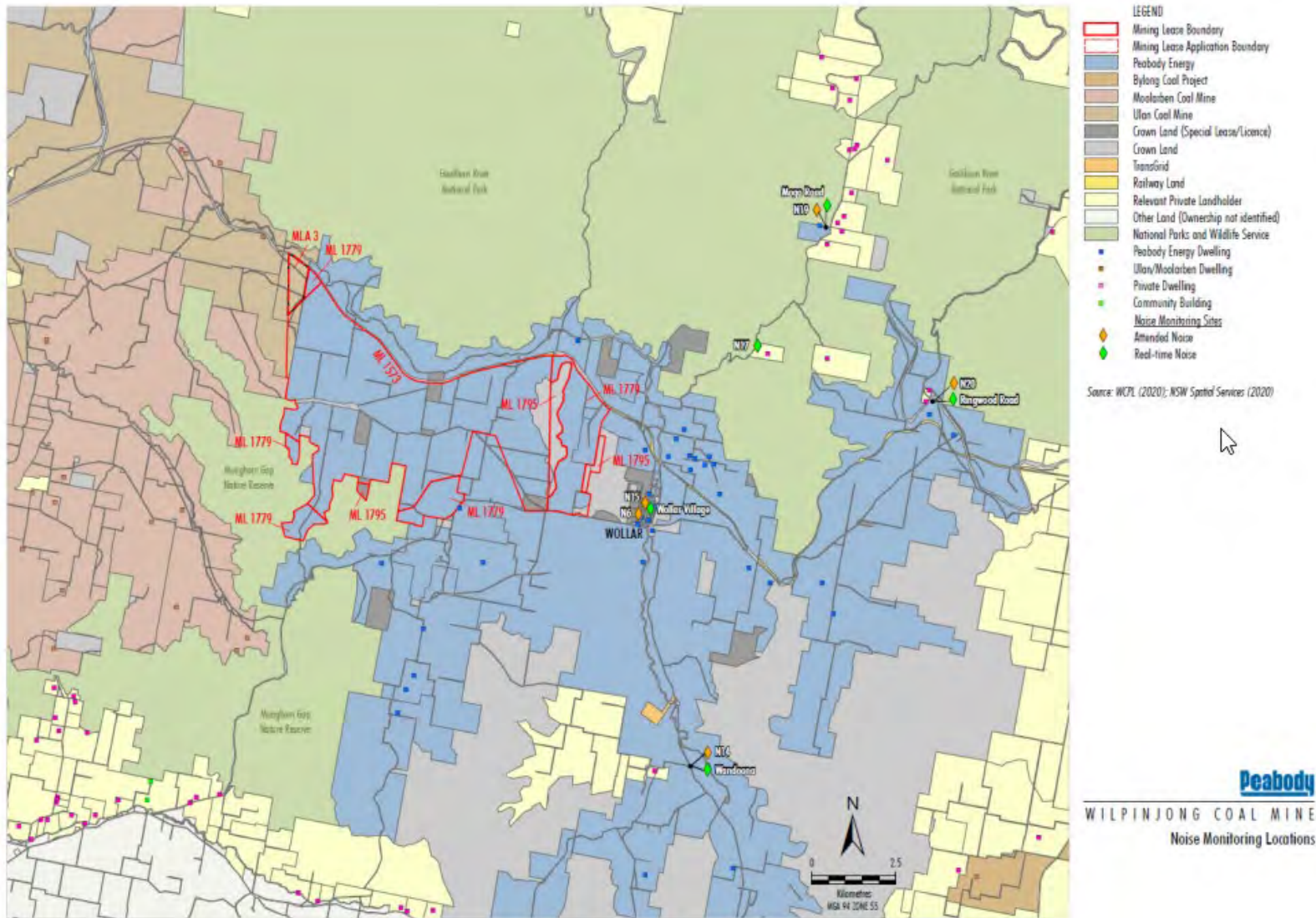


Figure 1.1 Wilpinjong noise monitoring locations

## 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

Descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to describe human response to noise.
L <sub>Amax</sub>	The maximum A-weighted noise level over a time period.
L <sub>A1</sub>	The noise level which is exceeded for 1 per cent of the time.
L <sub>A1,1minute</sub>	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L <sub>A10</sub>	The noise level which is exceeded for 10 percent of the time.
L <sub>Aeq</sub>	The average noise A-weighted energy during a measurement period.
L <sub>A50</sub>	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L <sub>A90</sub>	The level exceeded for 90 percent of the time. The L <sub>A90</sub> level is often referred to as the “background” noise level and is commonly used to determine noise criteria for assessment purposes.
L <sub>Amin</sub>	The minimum A-weighted noise level over a time period.
L <sub>Ceq</sub>	The 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 micro pascals.
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.
SC	Stability class (or category) is determined from measured wind speed and either sigma-theta or VTG.
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	This is the period 7:00am to 6:00pm.
Evening	This is the period 6:00pm to 10:00pm.
Night	This is the period 10:00pm to 7:00am.

## 2 Regulatory requirements and noise criteria

### 2.1 Development consents

The most current development consent associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017), which covers all current operations and has replaced the previous consent (05-0021). The relevant noise conditions from the current consent are reproduced in Appendix A.

### 2.2 Environment protection licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently issued in March 2021. Relevant noise sections of the EPL are reproduced in Appendix A.

### 2.3 Noise Monitoring Program

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in August 2020. The relevant sections are reproduced in Appendix A.

### 2.4 Project Specific Criteria

Noise criteria and meteorological conditions required for noise criteria to apply are consistent in the project approval and EPL. The applicable noise criteria for each monitoring location are shown in Table 2.1.

**Table 2.1** WCP project specific criteria, dB

NMP Descriptor	Day L <sub>Aeq,15minute</sub>	Evening L <sub>Aeq,15minute</sub>	Night L <sub>Aeq,15minute</sub>	Night L <sub>A1,1minute</sub>
N6 <sup>1</sup>	36	37	37	45
N14	35	35	35	45
N15	36	37	37	45
N17 <sup>2</sup>	36	36	38	45
N19	35	35	35	45
N20	35	35	35	45

Notes: 1. N6 noise limits have been assumed to be as detailed for 'Wollar Village – Residential' in the PA, as the church is no longer a place of worship.  
2. N17 noise limits have been determined based on the assumption that N17 is property 102 in accordance with Appendix 5 Figure 1 of Development Consent SSD-6764.



## 2.5 Modifying Factors

The EPA 'Noise Policy for Industry' (NPfI, 2017) was approved for use in NSW in October 2017. 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 has 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 NPfI. Low frequency modifying factors have been assessed in accordance with both the development consent and NPfI.

## 3 Methodology

### 3.1 Overview

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

### 3.2 Attended noise monitoring

During this survey, monthly attended monitoring was done during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric condition measurement was also undertaken at each monitoring location. Attended monitoring during this reporting period was undertaken by Will Moore.

This survey presents noise levels gathered during attended monitoring that are the result of many sounds reaching the sound level meter microphone during monitoring. Received levels from various noise sources were noted during attended monitoring and particular attention was paid to the extent of WCP's contribution, if any, to measured levels. At each receptor location, WCP's  $L_{Aeq,15\text{minute}}$  and  $L_{A1,1\text{minute}}$  (in the absence of any other noise) was measured directly, where possible, or, determined by frequency analysis.

If the exact contribution of the source of interest (in this case WCP) cannot be established, due to masking by other noise sources in a similar frequency range, but site noise levels are observed to be well below (more than 5 dB lower than) any relevant criterion, a maximum estimate of the potential contribution of the site might be made based on other measured site-only noise descriptors in accordance with Section 7.1 of the NPfl. This is generally expressed as a 'less than' quantity, such as <20 dB or <30 dB.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may also 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 some noise was audible but could not be quantified. If site noise was NM due to masking but estimated to be significant in relation to a relevant criterion, we would employ methods (eg, measure closer and back calculate) to determine a value for reporting.

All sites noted as NM in this report are due to one or more of the following reasons:

- Site noise levels were extremely low and unlikely, in many cases, to be even noticed;
- Site noise levels were masked by another relatively loud noise source that is characteristic of the environment (eg, breeze in foliage or continuous road traffic noise) that cannot be eliminated by moving closer; and/or
- It was not feasible, nor reasonable to employ methods such as move closer and back calculate. Cases may include, but are not limited to, 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  $L_{A1,1\text{minute}}$ . The EPA accepts sleep disturbance analysis based on either the  $L_{A1,1\text{minute}}$  or  $L_{Amax}$  metrics, with the  $L_{Amax}$  resulting in a more conservative assessment of site noise emissions.

Often extraneous noise events (for example, road traffic pass-bys and dogs) interfere with the measurement of site noise levels in the frequency range of interest. Where required, the sound level meter is paused during these occurrences to aid in quantification of the site only noise.

### 3.3 Modifying factors

All measurements were evaluated for potential modifying factors in accordance with the NPfI. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfI.

Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable, such that the site only  $L_{Aeq}$  was not “NM” or less than a maximum cut off value (eg “<20 dB” or “<30dB”).

If applicable, modifying factors have been reported and added to measured site only  $L_{Aeq}$  noise levels when meteorological conditions satisfied requirements for site noise criteria to be applicable. Low-frequency modifying factors have only been applied to site-only  $L_{Aeq}$  levels if WCP was the only contributing low-frequency noise source.

### 3.4 Attended noise monitoring equipment

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

**Table 3.1** Attended noise monitoring equipment

Model	Serial number	Calibration due date
Rion NA-28 sound level meter	01070590	09/06/2024
Pulsar 106 acoustic calibrator	74813	09/06/2024

## 4 Results

### 4.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.1. Discussion as to the noise sources responsible for these measured levels is provided in Section 5 of this report.

**Table 4.1** Measured noise levels <sup>1</sup> - November 2022

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	15/11/2022 23:37	43	36	33	32	31	30	28
N14	15/11/2022 22:45	50	40	37	35	35	33	30
N15	15/11/2022 23:15	44	40	37	35	34	31	28
N20	15/11/2022 22:00	46	43	42	41	40	39	36

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

### 4.2 Modifying factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfI and methodology described in Section 3.3.

There were no modifying factors, as defined in the NPfI, applicable during the survey. Mining noise was analysed and did not satisfy requirements for tonal, intermittent, or low frequency modifying factors, as defined in the NPfI. This means that no modifying factor penalties were applied to any measured result during this survey.

### 4.3 Attended noise monitoring results

Table 4.2 to Table 4.3 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement.

**Table 4.2** **L<sub>Aeq,15minute</sub> generated by WCP against project specific criteria – November 2022**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB <sup>5</sup>	Criterion Applies? <sup>2</sup>	WCP L <sub>Aeq</sub> dB <sup>3,4</sup>	Exceedance dB <sup>4</sup>
N6	15/11/2022 23:37	2.4	C	37	Yes	<25	Nil
N14	15/11/2022 22:45	3.0	D	35	Yes	<25	Nil
N15	15/11/2022 23:15	3.3	E	37	No	<25	NA
N20	15/11/2022 22:00	2.6	D	35	Yes	IA	Nil

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site-only L<sub>Aeq,15minute</sub> attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.3** **L<sub>A1,1minute</sub> generated by WCP against project specific criteria - November 2022**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB <sup>5</sup>	Criterion Applies? <sup>2</sup>	WCP L <sub>A1,1min</sub> dB <sup>3,4</sup>	Exceedance dB <sup>4</sup>
N6	15/11/2022 23:37	2.4	C	45	Yes	27	Nil
N14	15/11/2022 22:45	3.0	D	45	Yes	30	Nil
N15	15/11/2022 23:15	3.3	E	45	No	<25	NA
N20	15/11/2022 22:00	2.6	D	45	Yes	IA	Nil

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site-only L<sub>A1,1minute</sub> attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

## 4.4 Atmospheric conditions

Atmospheric condition data measured by the operator during each measurement using a hand-held weather meter is shown in Table 4.4. The wind speed, direction and temperature were measured at approximately 1.8 metres. Attended noise monitoring is not undertaken during rain, hail, or wind speeds above 5 m/s at microphone height.

**Table 4.4 Measured atmospheric conditions – November 2022**

Location	Start Date and Time	Temperature °C	Wind Speed m/s	Wind Direction °Magnetic North <sup>1</sup>	Cloud Cover 1/8s
N6	15/11/2022 23:37	13	0.0	-	2
N14	15/11/2022 22:45	13	0.5	50	0
N15	15/11/2022 23:15	14	0.5	10	2
N20	15/11/2022 22:00	14	0.4	240	0

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

Meteorological data used for compliance assessment is sourced from the WCP AWS and inversion tower.



# 5 Discussion

## 5.1 Noted noise sources

During attended monitoring, the time variations (temporal characteristics) of noise sources are considered in each measurement via statistical descriptors. From these observations summaries have been derived for the location where an exceedance was measured and are provided in this chapter. Statistical 1/3 octave-band analysis of environmental noise was undertaken and the following figures display frequency ranges of various noise sources at each location for LA1, LA10, LAeq, LA50 and LA90 descriptors. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 5.1 where it can be seen that frogs and insects are generating noise at frequencies above 1000 Hz while mining noise is at frequencies less than 1000 Hz, which is typical. Adding levels at frequencies that relate to mining only allows separate statistical results to be calculated. This analysis cannot always be performed if there are significant levels of other noise at the same frequencies as mining, such as dogs, cows, or (most commonly) road traffic.

It should be noted that the method of summing statistical values up to a cut-off frequency can overstate the LA1 result by a small margin but is entirely accurate for LAeq.

Historical site only noise levels from attended monitoring over the previous 12-month period has been provided as additional information in Table 5.1 to Table 5.6.

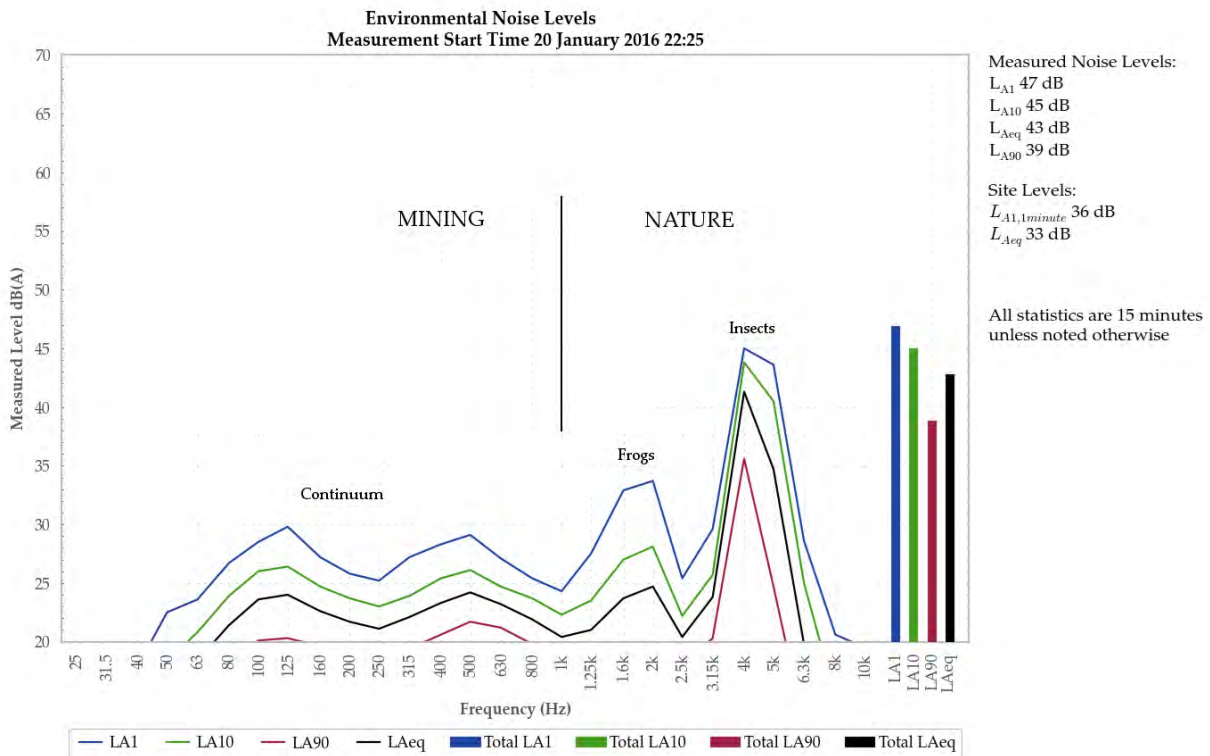


Figure 5.1 Example graph (refer to Section 5.1 for explanatory note)

5.1.1 N6

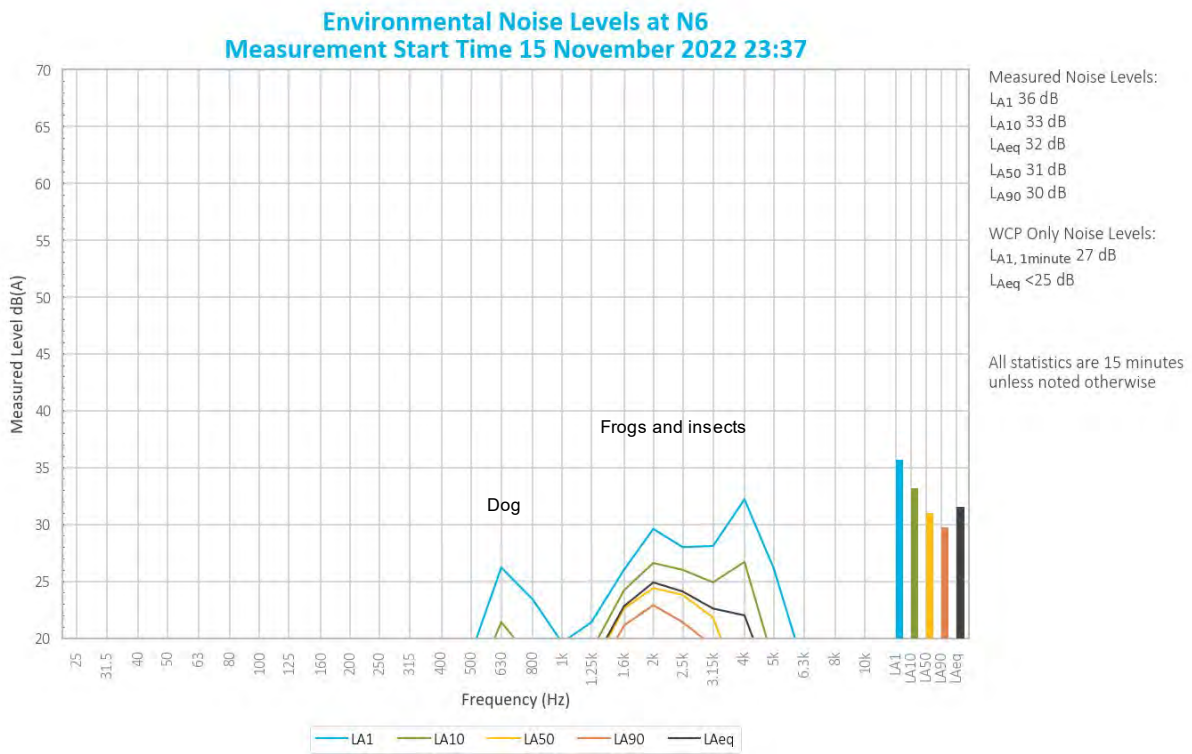


Figure 5.2 Environmental noise levels N6, St Laurence O’Toole Catholic Church, Wollar Village

A mining continuum from WCP was audible during the measurement, generating a site only LAeq of less than 25 dB. Engine surges generated the site only LA1,1minute of 27 dB.

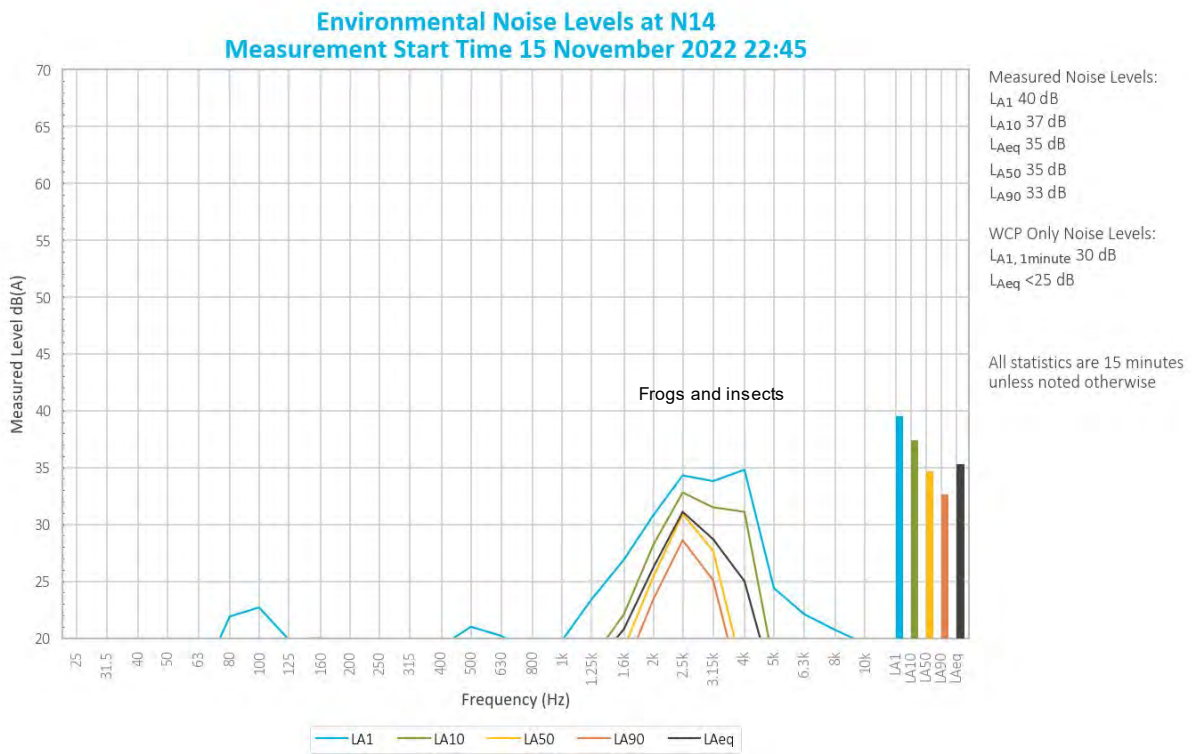
Frogs and insects generated measured noise levels.

Noise from bats, a dog, and an owl was also noted.

Table 5.1 Historical WCP only noise levels at N6

Month	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022
LAeq	IA	IA	IA	IA	IA	<20	<25	30	IA	IA	IA	IA
LA1,1min	IA	IA	IA	IA	IA	23	<25	37	IA	IA	IA	IA

5.1.2 N14



**Figure 5.3 Environmental noise levels N14, ‘Tichular’, intersection of Tichular and Barigan Roads**

A mining continuum from WCP was audible during the measurement, generating a site only LAeq of less than 25 dB. Engine surges generated the site only LA1,1minute of 30 dB. Impact noise was also noted.

Frogs and insects generated measured noise levels.

Noise from cattle was also noted.

**Table 5.2 Historical WCP only noise levels at N14**

Month	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022
LAeq	IA	IA	IA	IA	IA	<25	IA	IA	IA	IA	<25	<25
LA1,1min	IA	IA	IA	IA	IA	<25	IA	IA	IA	IA	<25	<25

5.1.3 N15

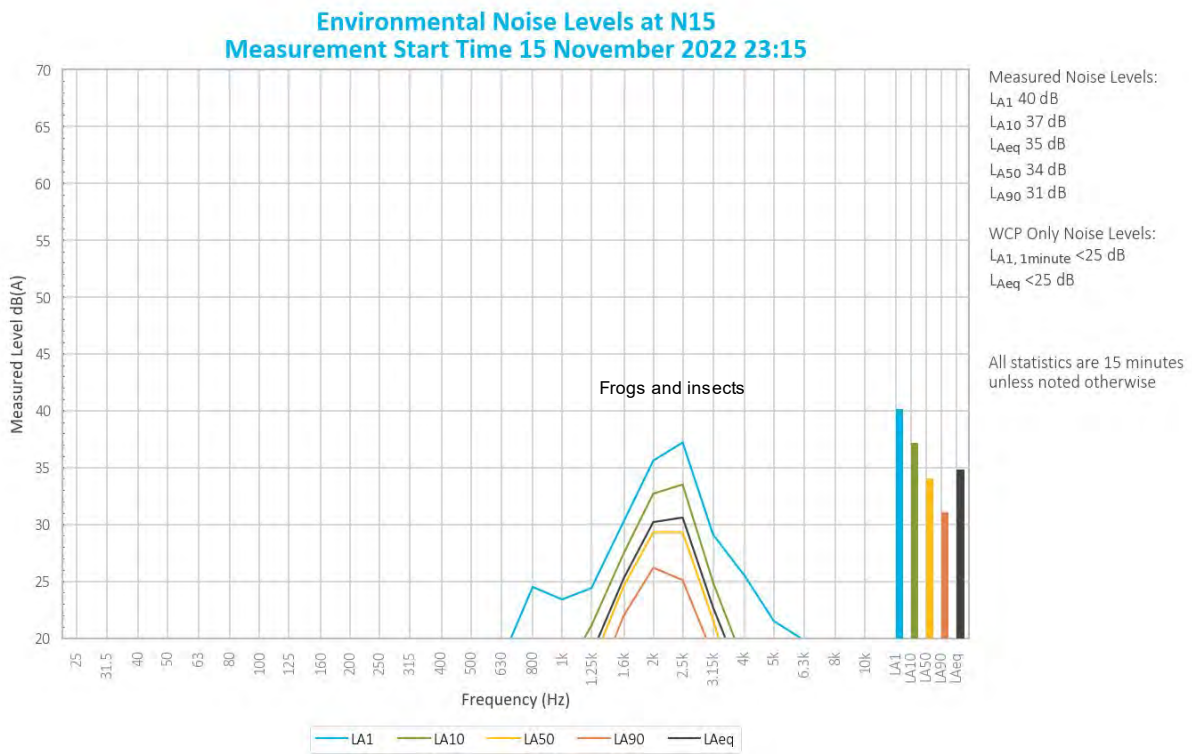


Figure 5.4 Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village

A mining continuum from WCP was audible during the measurement, generating a site only LAeq and LA1,1minute of less than 25 dB.

Frogs and insects generated measured noise levels.

Noise from sheep and breeze in nearby foliage was also noted.

Table 5.3 Historical WCP only noise levels at N15

Month	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022 <sup>1</sup>	July 2022	Aug 2022	Sept 2022	Oct 2022
LAeq	IA	IA	IA	IA	IA	23	34	38/34	29	IA	<25	IA
LA1,1min	IA	IA	IA	IA	IA	32	38	42/35	40	IA	<25	IA

Notes: 1. Second result is remeasure following measured exceedance, in accordance with the NMP.

#### 5.1.4 N17

Measurement could not be taken for N17 as access was closed due to flooding.

**Table 5.4** Historical WCP only noise levels at N17

Month	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022 <sup>1</sup>
L <sub>Aeq</sub>	IA	IA	IA	IA	IA	<20	32	23	27	IA	27	-
L <sub>A1,1min</sub>	IA	IA	IA	IA	IA	23	37	28	30	IA	34	-

Notes: 1. Measurement could not be taken as access to N17 was closed due to flooding.

#### 5.1.5 N19

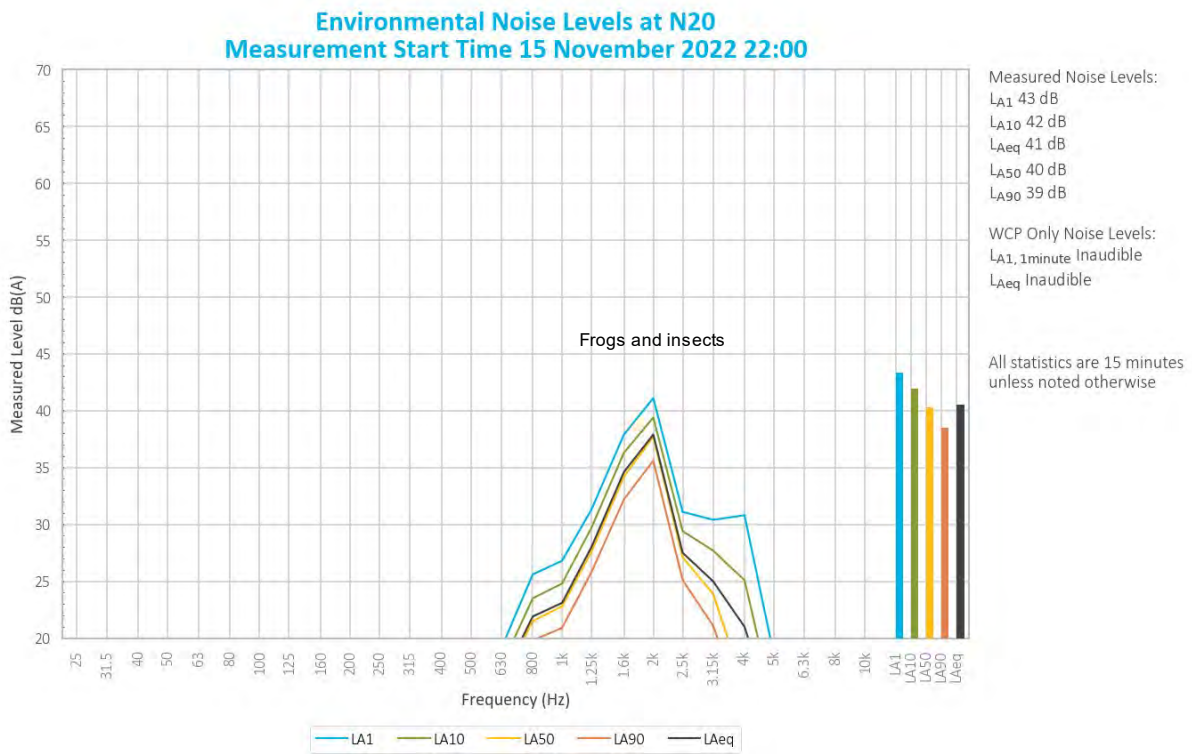
Measurement could not be taken for N19 as access was closed due to flooding.

**Table 5.5** Historical WCP only noise levels at N19

Month	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022 <sup>1</sup>
L <sub>Aeq</sub>	IA	IA	IA	IA	IA	IA	<20	IA	IA	IA	<25	-
L <sub>A1,1min</sub>	IA	IA	IA	IA	IA	IA	<20	IA	IA	IA	26	-

Notes: 1. Measurement could not be taken as access to N19 was closed due to flooding.

5.1.6 N20



**Figure 5.5 Environmental noise levels N20, Ringwood Road**

WCP was inaudible during the measurement.

Frogs and insects generated measured noise levels.

Noise from traffic and a plane were also noted.

**Table 5.6 Historical WCP only noise levels at N20**

Month	Nov 2021	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022
LAeq	IA	IA	IA	IA	IA	<25	22	IA	IA	IA	IA	IA
LA1,1min	IA	IA	IA	IA	IA	<25	28	IA	IA	IA	IA	IA



## 6 Summary

Global Acoustics (now part of EMM) was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP, an open cut coal mine located approximately 40 kilometres north-east of Mudgee. The attended noise monitoring survey purpose is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was done around WCP during the night period of 15/16 November 2022. Locations N17 and N19 were not accessible due to a road closure related to flooding. There were no suitable alternate locations to represent N17 and N19 that were accessible, so no monitoring occurred for these locations.

Noise levels from WCP complied with relevant noise limits at all accessible monitoring locations during the November 2022 survey.

Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

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# Appendix A

## Regulator documents

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## A.1 Wilpinjong Coal Extension Project Approval (SSD-6764)

### SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

#### ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from the owner of the land listed in Table 1, the Applicant must acquire the land in accordance with the procedures in conditions 5 and 6 of schedule 4.

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

Note: To interpret the land referred to in Table 1, see the applicable figures in Appendix 5.

#### MITIGATION UPON REQUEST

2. Upon receiving a written request from the owner of any residence on the land listed in Table 2, the Applicant must implement additional noise mitigation measures at or in the immediate vicinity of the residence in consultation with the landowner. These measures must be consistent with the measures outlined in the *Voluntary Land Acquisition and Mitigation Policy*. They must also be reasonable and feasible and proportionate with the level of predicted impact.

If within 3 months of receiving this request from the owner, the Applicant and the owner 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.

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

Note: To interpret the land referred to in Table 2, see the applicable figures in Appendix 5.

#### NOISE

##### Noise Criteria

3. The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 3 at any residence on privately-owned land or at the other specified locations.

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	$L_{Aeq}(15 \text{ minute})$	$L_{Aeq}(15 \text{ minute})$	$L_{Aeq}(15 \text{ minute})$	$L_{A1}(1 \text{ minute})$
102	36	36	38	45
Wollar Village – Residential	36	37	37	45
All other privately owned land	35	35	35	45
901 – Wollar School		35 (internal) 45 (external) When in use		
150A – St Luke’s Anglican Church 900 – St Laurence O’Toole Catholic Church		40 (internal) When in use		

Note: To interpret the locations referred to in Table 3, see the applicable figures in Appendix 5.

Noise generated by the development is to be measured in accordance with the relevant requirements of the *NSW Industrial Noise Policy* (as may be updated from time to time). Appendix 6 sets out the meteorological conditions under which these criteria apply along with any modifications to the *NSW Industrial Noise Policy* and the requirements for evaluating compliance with these criteria.

However, these criteria do not apply if the Applicant has an agreement with the owner/s of the relevant residence of land 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, low frequency, road and rail noise of the development;
  - (b) operate a comprehensive noise management system 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 consent;
  - (c) minimise the noise impacts of the development during meteorological conditions when the noise limits in this consent do not apply (see Appendix 6);
  - (d) only use locomotives and rolling stock that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL;
  - (e) co-ordinate noise management at the site with the noise management at Moolarben and Ulan mines to minimise cumulative noise impacts; and
  - (f) carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent.

### Noise Management Plan

5. Prior to carrying out any development under this consent, unless the Secretary agrees otherwise, 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 in this consent;
  - (c) describe the proposed noise management system in detail; and
  - (d) include a monitoring program that:
    - evaluates and reports on:
      - the effectiveness of the noise management system;
      - compliance against the noise criteria in this consent; and
      - compliance against the noise operating conditions;
    - includes a program to calibrate and validate the real-time noise monitoring results with the attended monitoring results over time (so the real-time noise monitoring program can be used as a better indicator of compliance with the noise criteria in this consent and trigger for further attended monitoring); and
    - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.
6. The Applicant must implement the approved Noise Management Plan for the development.



**APPENDIX 6  
NOISE COMPLIANCE ASSESSMENT**

**Applicable Meteorological Conditions**

1. The noise criteria in Table 3 of schedule 3 are to apply under all meteorological conditions except the following:
  - (a) wind speeds greater than 3 m/s at 10 m above ground level; or
  - (b) stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
  - (c) stability category G temperature inversion conditions.

**Determination of Meteorological Conditions**

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions must be that recorded by the meteorological station located on the site.

**Compliance Monitoring**

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
4. This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
5. Unless otherwise agreed with the Secretary, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
  - (a) monitoring locations for the collection of representative noise data;
  - (b) meteorological conditions during which collection of noise data is not appropriate;
  - (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
  - (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

Table 6-1: One-third octave low frequency noise thresholds

Hz/dB(Z)	One-third octave $L_{Zeq,15minute}$ threshold level												
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB(Z)	92	89	86	77	69	61	54	50	50	48	48	46	44

## A.2 Environment Protection Licence

### L5 Noise limits

L5.1 Noise generated at the premises must not exceed the noise limits presented in the table below. The

locations referred to in the table below are indicated in Appendix 5 - Figures 1 and 2 of Development Consent number SSD-6764 dated 24 April 2017.

Location	Day LAeq(15 minute)	Evening LAeq(15 minute)	Night LAeq(15 minute)	Night LA1(1 minute)
Wollar village - residential	36	37	37	45
All other privately owned land	35	35	35	45
102	36	36	38	45
Wollar school	35 (internal), 45 (external) when in use			
St Luke's Anglican Church & St Laurence O'Toole Catholic Church	40 (internal) when in use			

Note: The above noise limits do not apply at properties where the licensee has a written agreement with the landowner to exceed the noise limits.

L5.2 For the purpose of condition L5.1;

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.
- Evening is defined as the period 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.

L5.3 The noise limits set out in condition L5.1 apply under all meteorological conditions except for the following:

- a) Wind speeds greater than 3 metres/second at 10 metres above ground level; or
- b) Stability category F temperature inversions and wind speeds greater than 2m/s at 10m above ground level; or
- c) Stability category G temperature inversion conditions.

L5.4 For the purpose of condition L5.3:

- a) The meteorological data to be used for determining meteorological conditions is the data recorded by the meteorological weather station identified as EPA identification Point 21 in condition P1.1; 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.



- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, 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 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
    - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
  - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
  - c) With the noise limits in condition L5.1, 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 conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
  - b) at a point other than the most affected point at a location.
- L5.7 For the purpose 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.

## 6 Noise Monitoring Program

WCPL utilise a combination of operator-attended and unattended noise monitoring to assess the performance of the Mine against the Noise Criteria from Development Consent (SSD-6467). Operator-attended noise monitoring will be used for determining compliance against the Noise Criteria in **Table 6**. Unattended real-time noise monitoring is primarily utilised as a proactive noise control system; providing noise alerts when predetermined noise levels are triggered so mining operations can be modified where noise levels are influenced by noise from the Project.

### 6.1 Monitoring Locations

Operator-attended noise monitoring locations have been chosen considering the following criteria:

- In any given direction, the site is as close as reasonably practical to the nearest Private Receiver;
- There is no closer Private Receiver that is not monitored;
- The site is unlikely to cause concern to any person residing on nearby private property; and
- The site can be safely accessed by the persons carrying out the noise monitoring.

WCPL will undertake operator-attended noise monitoring as identified in **Table 7 (Figure 3 and Figure 4)**. Real-time noise monitoring units are relocated from time to time, to assist with additional targeted noise monitoring and in response to community complaints. Real-time noise monitoring locations will be reviewed and modified as necessary in response to monitoring results, changes to the operation, or as a result of community consultation.

Should circumstances change, WCPL may amend the noise monitoring locations shown in **Table 7** with consideration to the above criteria. WCPL will update this NMP, in consultation with DPIE and the EPA.

**Table 7 Noise Monitoring Locations**

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
St Laurence O'Toole Church	N6	Operator-attended Noise	777299.9	6415716.9	Location based on the nearest community structure to the East of the Mine
Tichular	N14	Operator-attended Noise	778791.9	6408624.7	Location based on the nearest community structure to the South of the Mine
Wollar Village	N15	Operator-attended Noise	777452.0	6416158.9	Location based on the nearest community structure to the South-East of the Mine
Mogo Rd	N17	Operator-attended Noise	780771.0	6420641.0	Location based on the nearest community structure to the North-East of the Mine
Mogo Rd	N19	Operator-attended Noise	782644.5	6424151.1	Location based on the nearest and residential community structure to the North-East of the Mine
Ringwood Road	N20	Operator-attended Noise	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine.
WCPL Rail Loop	-	Meteorology & Inversion	770630.9	6418085.1	Location based on consideration of prevailing meteorological conditions



Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
Wollar Village <sup>4</sup>	-	Real-Time Noise - Fixed	777608.9	6415996.8	Location based on the nearest non-mine owned residence to the South-East of the Mine N15 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Mogo Rd <sup>4</sup>	-	Real-Time Noise - Fixed	782644.5	6424151.1	Location based on the nearest non-mine owned residence to the East of the Mine N19 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Ringwood Road	-	Real-Time Noise - Fixed	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine. N20 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Tichular <sup>3</sup>	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

**Notes:**

1. MGA94, Zone 55
2. Monitoring will be undertaken at this location until it can be demonstrated that the noise contribution from the Mine is negligible. At this point, WCPL will notify DPIE and EPA of the results of this monitoring and advise if and when the monitoring at this location will be scaled back or discontinued. The real-time noise monitor at Wandooona may be relocated in response to a complaint or identified noise issue at another location.
3. Where continuous monitors are located at compliance locations (e.g. privately-owned receivers), WCPL will conduct a review of the identification/characterisation of mine-related noise by the real-time monitoring system at that location by comparing against observed mine-related noise identified during operator-attended monitoring (i.e. validate the identification of mine related noise and filtering of extraneous noise sources by the real-time system). Refer to Section 6.5.

## 6.2 Meteorological Monitoring

WCPL maintains a continuous on-site meteorological monitoring station that complies with the requirements of the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (DEC, 2007). The location of this meteorological monitoring station is shown on **Figure 3**.

WCPL's meteorological monitoring station is capable of continuous real-time measurement of temperature lapse rate in accordance with the INP (EPA, 2000).

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

- a) Rainfall;
- b) Relative humidity;
- c) Temperature – measured at 2, 10 and 60 m above ground level;
- d) Wind speed – horizontal and vertical;
- e) Wind direction – measured at 10 m above ground level;
- f) Sigma theta;
- g) Pasquil stability classification;
- h) Solar radiation; and
- i) Temperature lapse rate.

Meteorological forecasting will be undertaken as specified in **Section 5.4**.

### 6.3 Operator-attended Noise Monitoring

#### 6.3.1 Purpose

Operator-attended noise monitoring will be used to evaluate compliance against the Noise Criteria detailed in **Table 6**.

#### 6.3.2 Summary

Operator-attended noise will be undertaken in accordance with **Table 8**.

**Table 8 Operator-attended Noise Monitoring Summary**

Element	Description
Locations	<ul style="list-style-type: none"><li>As per Table 7,</li><li>Figure 3 and Figure 4</li></ul>
Period	<ul style="list-style-type: none"><li>Night-time period (10 pm to 7 am) being the most sensitive time period for noise.</li></ul>
Frequency	<ul style="list-style-type: none"><li>12 times per year<sup>1</sup> (i.e. one night per month); plus</li><li>12 times per year<sup>1</sup> (i.e. one night per month) at locations as identified in Table 7 to validate real-time noise monitoring data (Section 6.5).</li></ul>

Notes: <sup>1</sup> Monitoring frequency at Mogo Road (N19) and Ringwood Road (N20) will remain at the frequency identified in Table 8 during the commencement of operations in Pit 8. A review of the monitoring frequency at N19 and N20 will be undertaken during subsequent reviews of this NMP in consultation with WCPL's noise specialist and relevant government agencies.

#### 6.3.3 Methodology

Operator-attended noise monitoring will be undertaken as outlined in **Table 8** by an independent acoustic consultant and guided by the requirements of the INP (EPA, 2000) and AS 1055.1-1997 'Acoustics – Description and measurement of environmental noise – General procedures'. Routine operator-attended noise monitoring will be undertaken during night-time periods (10 pm - 7 am).

If any of the Noise Criteria are exceeded, a second measurement will be taken at the same location within 75 minutes of the first measurement. If the second measurement does not exceed the Noise Criteria, as defined in **Table 6**, then the result will be recorded and the regular monitoring program resumed.

If the second measurement does exceed the applicable Noise Criteria, then:

- The noise consultant will immediately report both results to the WCPL Environment and Community Manager or delegate immediately;
- Upon confirming the exceedances are deemed a non-compliance in accordance with the **Figure 5**, WCPL will report both results to DPIE and EPA immediately, upon confirming the exceedance (**Section 9.0**).

WCPL will:

- Take immediate action in accordance with the NMS;
- Arrange for additional operator-attended noise monitoring to occur at that site within 1 week; and
- Deploy the mobile real-time noise monitor to measure and record the noise at that site for at least a 1 week period.

WCPL will also investigate any changes to the mine operations, and may revisit the noise model on the basis of the noise measurements recorded at the site.

The acoustic noise consultant will consider the modification factors in Section 4 of the INP (EPA, 2000) during the evaluation of attending monitoring results.

### 6.3.6 Applicable Meteorological Conditions

The Noise Criteria in **Table 6** are to be applied under all meteorological conditions except for the following:

- Wind speeds greater than 3 m/s at 10 m above ground level; or
- Stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
- Stability category G temperature inversion conditions.

Except for wind speed at microphone height, the data used for determining meteorological conditions will be that recorded by the meteorological station located on the Mine site.

It should be noted that when assessing wind conditions to determine the potential for noise level alteration by the refraction of sound-waves through the atmosphere, meteorological measurements should be undertaken at a height of 10 m above the ground level, in accordance with Section 5 of the INP (EPA, 2000). Local meteorological conditions, including near-surface winds are measured at the inbuilt meteorological station (2 m); however, in accordance with the INP (EPA, 2000), the 2 m data cannot be used to determine impacts from sound-wave refraction. The 2 m meteorological data is used to assess local meteorological conditions that may increase ambient noise levels including surface winds and rainfall.

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# Appendix B

## Calibration certificates

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## B.1 Calibration Certificates



### Sound Level Meter IEC 61672-3:2013 Calibration Certificate Calibration Number C22373

<b>Client Details</b>	EMM Consulting Suite 6, Level 1, 146 Hunter Street Newcastle NSW 2300
<b>Equipment Tested/ Model Number :</b>	Rion NA-28
<b>Instrument Serial Number :</b>	01070590
<b>Microphone Serial Number :</b>	08184
<b>Pre-amplifier Serial Number :</b>	52329
<b>Pre-Test Atmospheric Conditions</b>	<b>Post-Test Atmospheric Conditions</b>
Ambient Temperature : 25.7°C	Ambient Temperature : 25.4°C
Relative Humidity : 31.9%	Relative Humidity : 32.4%
Barometric Pressure : 100.18kPa	Barometric Pressure : 100.11kPa
<b>Calibration Technician :</b> Lucky Jaiswal	<b>Secondary Check:</b> Max Moore
<b>Calibration Date :</b> 9 Jun 2022	<b>Report Issue Date :</b> 20 Jun 2022
<b>Approved Signatory :</b>	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 - Environmental Conditions			
Acoustic Tests		Temperature	±0.1°C
125Hz	±0.13dB	Relative Humidity	±1.9%
1kHz	±0.13dB	Barometric Pressure	±0.014kPa
5kHz	±0.14dB		
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.

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**Sound Calibrator**

IEC 60942:2017

**Calibration Certificate**

Calibration Number C22374


**Client Details** EMM Consulting  
Suite 6, Level 1, 146 Hunter Street  
Newcastle NSW 2300

**Equipment Tested/ Model Number :** Pulsar Model 106  
**Instrument Serial Number :** 74813

**Atmospheric Conditions**

**Ambient Temperature :** 25.8°C  
**Relative Humidity :** 33.6%  
**Barometric Pressure :** 100.19kPa

**Calibration Technician :** Lucky Jaiswal  
**Calibration Date :** 09 Jun 2022  
**Secondary Check:** Max Moore  
**Report Issue Date :** 20 Jun 2022

**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	94.09	1000.30

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.

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.



# **Wilpinjong Coal**

## **Environmental Noise Monitoring**

December 2022

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Prepared for Wilpinjong Coal Pty Ltd

# Wilpinjong Coal

## Environmental Noise Monitoring

December 2022

Wilpinjong Coal Pty Ltd

E220456 RP12

Version	Date	Prepared by	Approved by	Comments
1.0	06/01/2023	Will Moore	Jesse Tribby	Final

Approved by



**Jesse Tribby**

Senior Acoustic Consultant

6 January 2023

Level 3 175 Scott Street

Newcastle NSW 2300

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# 1 Introduction

## 1.1 Background

Global Acoustics (now part of EMM) was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at Wilpinjong Coal Project (WCP), an open cut coal mine located approximately 40 kilometres north-east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the night period of 6/7 December 2022 at four locations. Locations N17 and N19 were not accessible due to a road closure related to flooding. There were no suitable alternate locations to represent N17 and N19 that were accessible, so no monitoring occurred for these locations.

## 1.2 Monitoring locations

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

**Table 1.1** Attended monitoring locations

NMP Descriptor	Monitoring Location
N6	St Laurence O’Toole Catholic Church representative of Wollar Village south
N14	‘Tichular’ intersection of Tichular and Barigan Roads, Tichular
N15	Track off Barigan Street near Wollar Public School, Wollar Village
N17	Mogo Road, off Araluen Road, Wollar
N19	North Mogo Road, Mogo
N20	Ringwood Road, off Wollar Road, Wollar

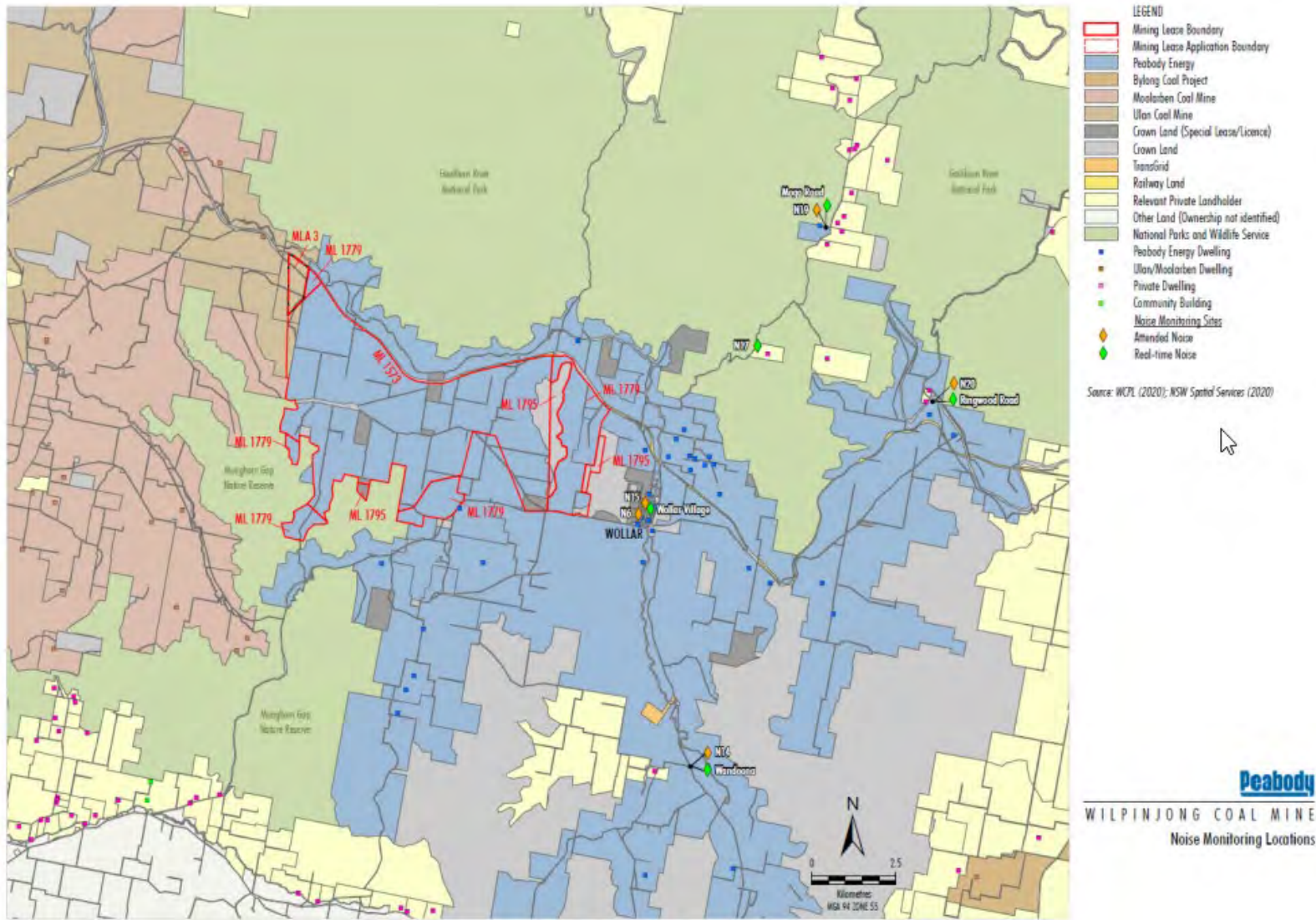


Figure 1.1 Wilpinjong noise monitoring locations

## 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**

Descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to describe human response to noise.
L <sub>Amax</sub>	The maximum A-weighted noise level over a time period.
L <sub>A1</sub>	The noise level which is exceeded for 1 per cent of the time.
L <sub>A1,1minute</sub>	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L <sub>A10</sub>	The noise level which is exceeded for 10 percent of the time.
L <sub>Aeq</sub>	The average noise A-weighted energy during a measurement period.
L <sub>A50</sub>	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L <sub>A90</sub>	The level exceeded for 90 percent of the time. The L <sub>A90</sub> level is often referred to as the “background” noise level and is commonly used to determine noise criteria for assessment purposes.
L <sub>Amin</sub>	The minimum A-weighted noise level over a time period.
L <sub>Ceq</sub>	The 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 micro pascals.
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.
SC	Stability class (or category) is determined from measured wind speed and either sigma-theta or VTG.
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	This is the period 7:00am to 6:00pm.
Evening	This is the period 6:00pm to 10:00pm.
Night	This is the period 10:00pm to 7:00am.

## 2 Regulatory requirements and noise criteria

### 2.1 Development consents

The most current development consent associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017), which covers all current operations and has replaced the previous consent (05-0021). The relevant noise conditions from the current consent are reproduced in Appendix A.

### 2.2 Environment protection licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently issued in March 2021. Relevant noise sections of the EPL are reproduced in Appendix A.

### 2.3 Noise Monitoring Program

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in August 2020. The relevant sections are reproduced in Appendix A.

### 2.4 Project Specific Criteria

Noise criteria and meteorological conditions required for noise criteria to apply are consistent in the project approval and EPL. The applicable noise criteria for each monitoring location are shown in Table 2.1.

**Table 2.1** WCP project specific criteria, dB

NMP Descriptor	Day L <sub>Aeq,15minute</sub>	Evening L <sub>Aeq,15minute</sub>	Night L <sub>Aeq,15minute</sub>	Night L <sub>A1,1minute</sub>
N6 <sup>1</sup>	36	37	37	45
N14	35	35	35	45
N15	36	37	37	45
N17 <sup>2</sup>	36	36	38	45
N19	35	35	35	45
N20	35	35	35	45

Notes: 1. N6 noise limits have been assumed to be as detailed for 'Wollar Village – Residential' in the PA, as the church is no longer a place of worship.  
2. N17 noise limits have been determined based on the assumption that N17 is property 102 in accordance with Appendix 5 Figure 1 of Development Consent SSD-6764.

## 2.5 Modifying Factors

The EPA 'Noise Policy for Industry' (NPfI, 2017) was approved for use in NSW in October 2017. 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 has 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 NPfI. Low frequency modifying factors have been assessed in accordance with both the development consent and NPfI.

## 3 Methodology

### 3.1 Overview

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

### 3.2 Attended noise monitoring

During this survey, monthly attended monitoring was done during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric condition measurement was also undertaken at each monitoring location. Attended monitoring during this reporting period was undertaken by Will Moore.

This survey presents noise levels gathered during attended monitoring that are the result of many sounds reaching the sound level meter microphone during monitoring. Received levels from various noise sources were noted during attended monitoring and particular attention was paid to the extent of WCP's contribution, if any, to measured levels. At each receptor location, WCP's  $L_{Aeq,15\text{minute}}$  and  $L_{A1,1\text{minute}}$  (in the absence of any other noise) was measured directly, where possible, or, determined by frequency analysis.

If the exact contribution of the source of interest (in this case WCP) cannot be established, due to masking by other noise sources in a similar frequency range, but site noise levels are observed to be well below (more than 5 dB lower than) any relevant criterion, a maximum estimate of the potential contribution of the site might be made based on other measured site-only noise descriptors in accordance with Section 7.1 of the NPfl. This is generally expressed as a 'less than' quantity, such as <20 dB or <30 dB.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may also 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 some noise was audible but could not be quantified. If site noise was NM due to masking but estimated to be significant in relation to a relevant criterion, we would employ methods (eg, measure closer and back calculate) to determine a value for reporting.

All sites noted as NM in this report are due to one or more of the following reasons:

- Site noise levels were extremely low and unlikely, in many cases, to be even noticed;
- Site noise levels were masked by another relatively loud noise source that is characteristic of the environment (eg, breeze in foliage or continuous road traffic noise) that cannot be eliminated by moving closer; and/or
- It was not feasible, nor reasonable to employ methods such as move closer and back calculate. Cases may include, but are not limited to, 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  $L_{A1,1\text{minute}}$ . The EPA accepts sleep disturbance analysis based on either the  $L_{A1,1\text{minute}}$  or  $L_{Amax}$  metrics, with the  $L_{Amax}$  resulting in a more conservative assessment of site noise emissions.

Often extraneous noise events (for example, road traffic pass-bys and dogs) interfere with the measurement of site noise levels in the frequency range of interest. Where required, the sound level meter is paused during these occurrences to aid in quantification of the site only noise.



### 3.3 Modifying factors

All measurements were evaluated for potential modifying factors in accordance with the NPfI. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfI.

Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable, such that the site only  $L_{Aeq}$  was not “NM” or less than a maximum cut off value (e.g., “<20 dB” or “<30dB”).

If applicable, modifying factors have been reported and added to measured site only  $L_{Aeq}$  noise levels when meteorological conditions satisfied requirements for site noise criteria to be applicable. Low-frequency modifying factors have only been applied to site-only  $L_{Aeq}$  levels if WCP was the only contributing low-frequency noise source.

### 3.4 Attended noise monitoring equipment

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

**Table 3.1** Attended noise monitoring equipment

Model	Serial number	Calibration due date
Rion NA-28 sound level meter	00701424	02/06/2023
Pulsar 106 acoustic calibrator	79631	26/05/2023

## 4 Results

### 4.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.1. Discussion as to the noise sources responsible for these measured levels is provided in Section 5 of this report.

**Table 4.1** Measured noise levels <sup>1</sup> - December 2022

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	6/12/2022 23:35	56	50	44	39	28	24	22
N14	6/12/2022 22:45	48	46	42	37	33	29	25
N15	6/12/2022 23:15	50	43	38	34	31	27	24
N20	6/12/2022 22:00	46	43	37	35	33	31	27

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

### 4.2 Modifying factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfI and methodology described in Section 3.3.

There were no modifying factors, as defined in the NPfI, applicable during the survey. Mining noise was analysed and did not satisfy requirements for tonal, intermittent, or low frequency modifying factors, as defined in the NPfI. This means that no modifying factor penalties were applied to any measured result during this survey.

### 4.3 Attended noise monitoring results

Table 4.2 to Table 4.3 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement

**Table 4.2 LAeq,15minute generated by WCP against project specific criteria – December 2022**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB <sup>5</sup>	Criterion Applies? <sup>2</sup>	WCP LAeq dB <sup>3,4</sup>	Exceedance dB <sup>4,5</sup>
N6	6/12/2022 23:35	0.4	F	37	Yes	<20	Nil
N14	6/12/2022 22:45	1.1	F	35	Yes	IA	Nil
N15	6/12/2022 23:15	0.0	G	37	No	<20	NA
N20	6/12/2022 22:00	0.7	F	35	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
3. Site- only LAeq,15minute attributed to WCP, including modifying factors if applicable.
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.3 LA1,1minute generated by WCP against project specific criteria - December 2022**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB <sup>5</sup>	Criterion Applies? <sup>2</sup>	WCP LA1,1min dB <sup>3,4</sup>	Exceedance dB <sup>4,5</sup>
N6	6/12/2022 23:35	0.4	F	45	Yes	<20	Nil
N14	6/12/2022 22:45	1.1	F	45	Yes	IA	Nil
N15	6/12/2022 23:15	0.0	G	45	No	<20	NA
N20	6/12/2022 22:00	0.7	F	45	Yes	IA	Nil

Notes:

1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
3. Site- only LA1,1minute attributed to WCP, including modifying factors if applicable.
4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

## 4.4 Atmospheric conditions

Atmospheric condition data measured by the operator during each measurement using a hand-held weather meter is shown in Table 4.4. The wind speed, direction and temperature were measured at approximately 1.8 metres. Attended noise monitoring is not undertaken during rain, hail, or wind speeds above 5 m/s at microphone height.

**Table 4.4 Measured atmospheric conditions – December 2022**

Location	Start Date and Time	Temperature °C	Wind Speed m/s	Wind Direction °Magnetic North <sup>1</sup>	Cloud Cover 1/8s
N6	6/12/2022 23:35	12	0.0	-	1
N14	6/12/2022 22:45	14	0.0	-	0
N15	6/12/2022 23:15	14	0.6	170	1
N20	6/12/2022 22:00	16	0.0	-	0

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

Meteorological data used for compliance assessment is sourced from the WCP AWS and inversion tower.

# 5 Discussion

## 5.1 Noted noise sources

During attended monitoring, the time variations (temporal characteristics) of noise sources are considered in each measurement via statistical descriptors. From these observations summaries have been derived for the location where an exceedance was measured and are provided in this chapter. Statistical 1/3 octave-band analysis of environmental noise was undertaken and the following figures display frequency ranges of various noise sources at each location for LA1, LA10, LAeq, LA50 and LA90 descriptors. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 5.1 where it can be seen that frogs and insects are generating noise at frequencies above 1000 Hz while mining noise is at frequencies less than 1000 Hz, which is typical. Adding levels at frequencies that relate to mining only allows separate statistical results to be calculated. This analysis cannot always be performed if there are significant levels of other noise at the same frequencies as mining, such as dogs, cows, or (most commonly) road traffic.

It should be noted that the method of summing statistical values up to a cut-off frequency can overstate the LA1 result by a small margin but is entirely accurate for LAeq.

Historical site only noise levels from attended monitoring over the previous 12-month period has been provided as additional information in Table 5.1 to Table 5.6.

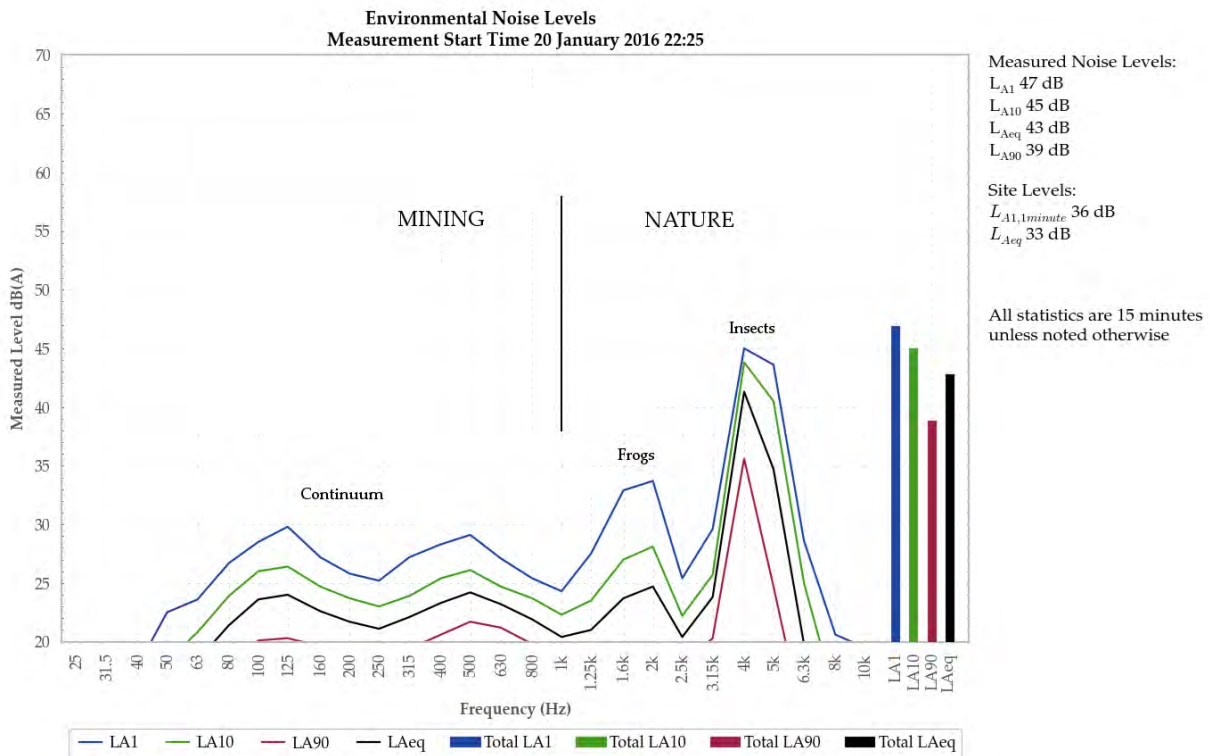


Figure 5.1 Example graph (refer to Section 5.1 for explanatory note)

5.1.1 N6

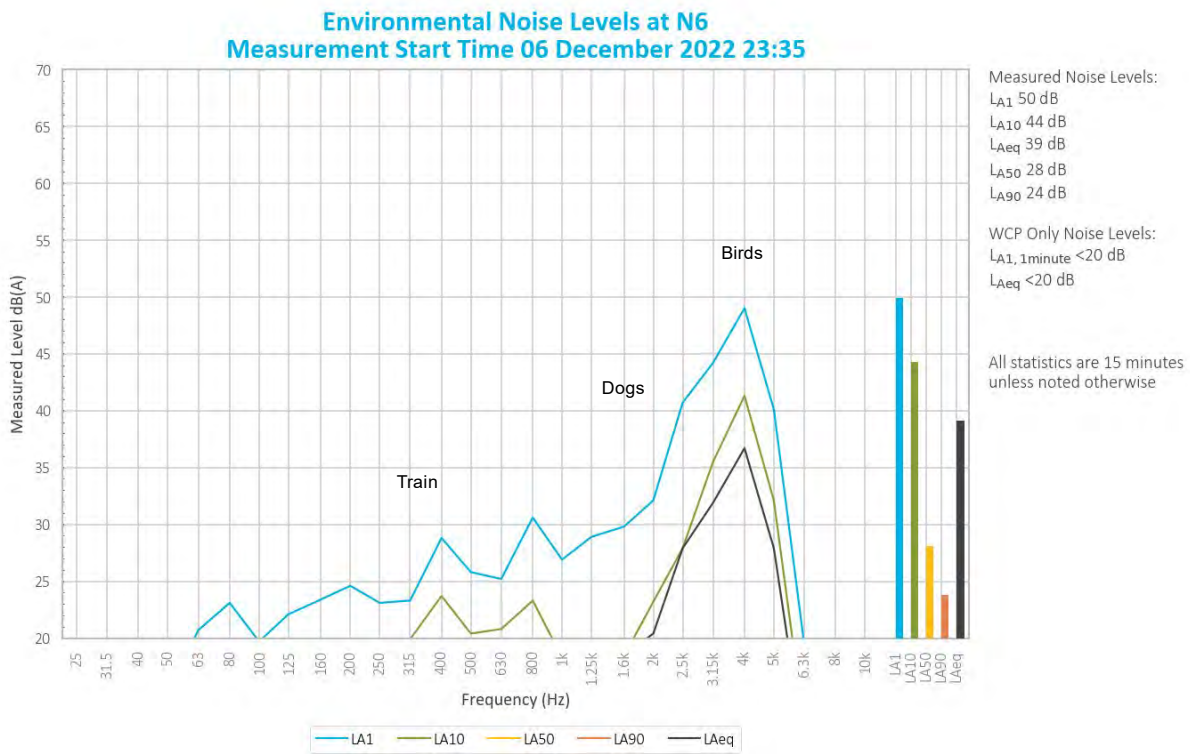


Figure 5.2 Environmental noise levels N6, St Laurence O’Toole Catholic Church, Wollar Village

A mining continuum from WCP was audible during the measurement, generating a site only LAeq and LA1,1minute of less than 25 dB.

Birds were responsible for generating the measured LA1, LA10 and LAeq. Frogs and insects generated measured LA50 and LA90.

Noise from cattle, dogs, and a train was also noted.

Table 5.1 Historical WCP only noise levels at N6

Month	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022
LAeq	IA	IA	IA	IA	<20	<25	30	IA	IA	IA	IA	<25
LA1,1min	IA	IA	IA	IA	23	<25	37	IA	IA	IA	IA	27



5.1.2 N14

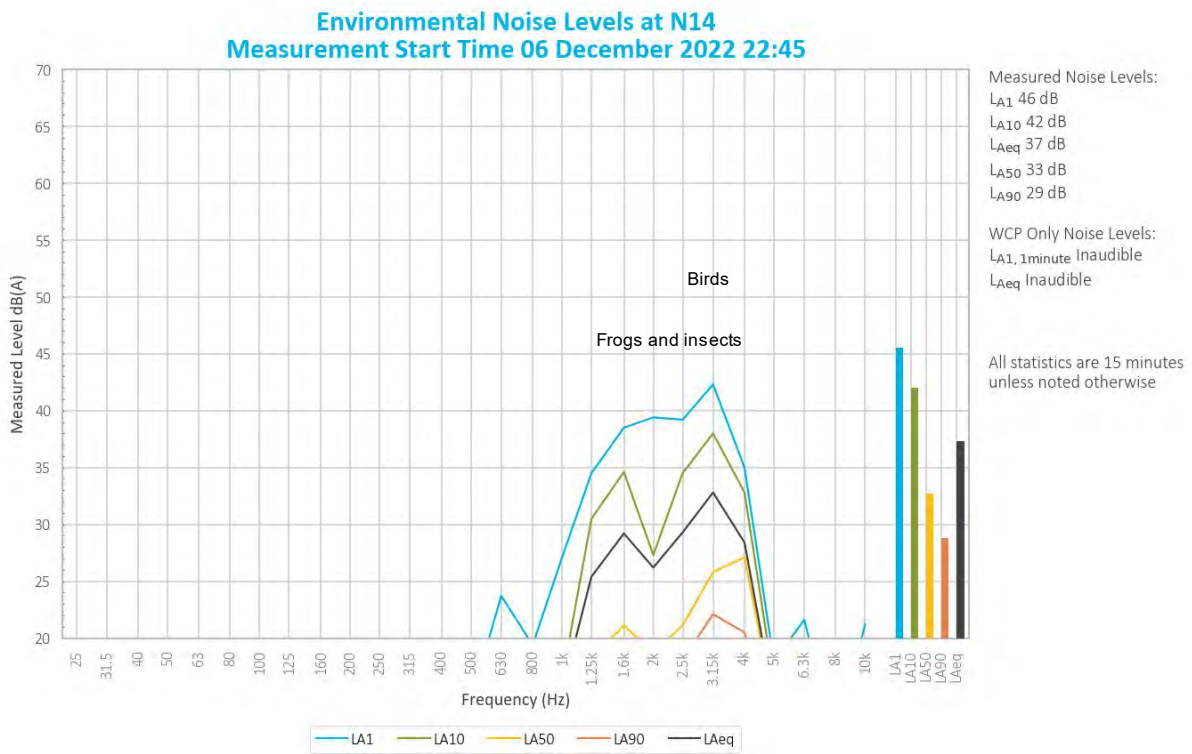


Figure 5.3 Environmental noise levels N14, ‘Tichular’, intersection of Tichular and Barigan Roads

WCP was inaudible during the measurement.

Birds were responsible for generating the measured LA1, LA10 and LAeq. Frogs and insects were responsible for generating the measured LA50 and LA90.

Continuum from an electric substation and noise from cattle and bats was also noted.

Table 5.2 Historical WCP only noise levels at N14

Month	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022
LAeq	IA	IA	IA	IA	<25	IA	IA	IA	IA	<25	<25	<25
LA1,1min	IA	IA	IA	IA	<25	IA	IA	IA	IA	<25	<25	30

5.1.3 N15

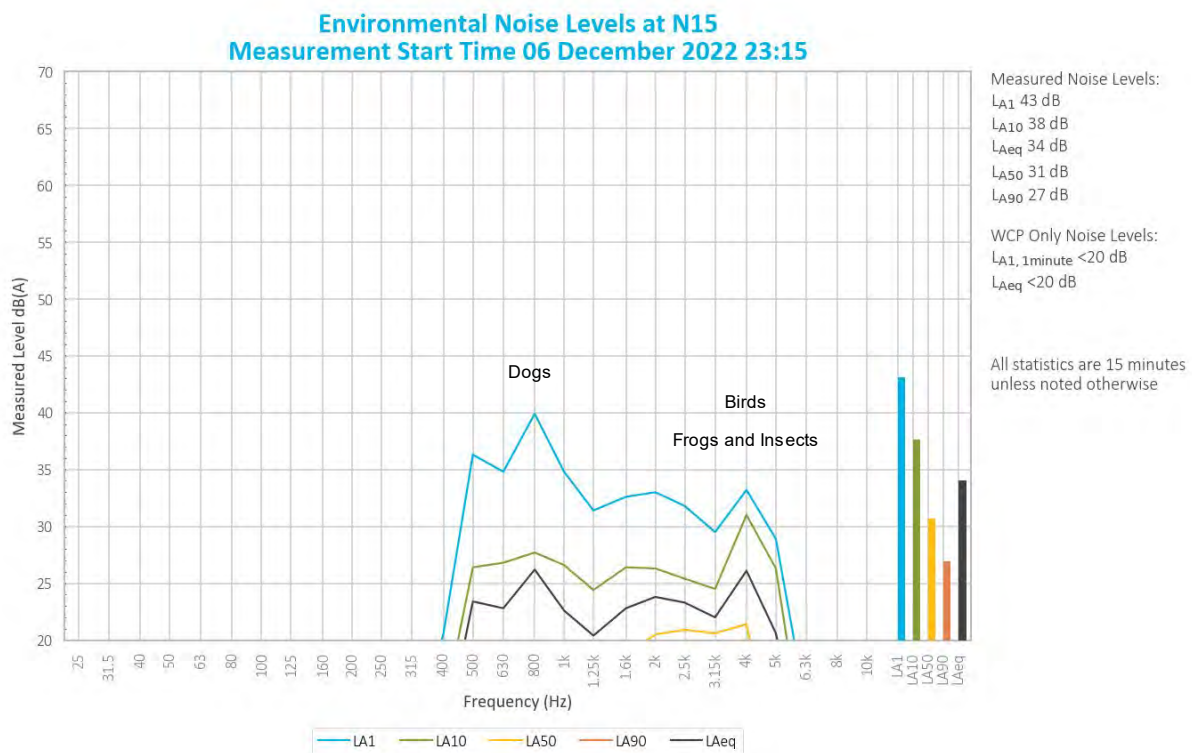


Figure 5.4 Environmental noise levels N15, Track off Barigan Street near Wollar School, Wollar Village

A mining continuum from WCP was audible during the measurement, generating a site only LAeq and LA1,1minute of less than 20 dB. Track noise was also noted.

Dogs were primarily responsible for generating the measured LA1 and contributed to the LA10 and LAeq. Birds contributed to the LA1 and LA10. Frogs and insects were primarily responsible for generating the measured LAeq and generated the LA50 and LA90.

Noise from aeroplane and cattle was also noted.

Table 5.3 Historical WCP only noise levels at N15

Month	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022 <sup>1</sup>	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022
LAeq	IA	IA	IA	IA	23	34	38/34	29	IA	<25	IA	<25
LA1,1min	IA	IA	IA	IA	32	38	42/35	40	IA	<25	IA	<25

Notes: 1. Second result is remeasure following measured exceedance, in accordance with the NMP.

#### 5.1.4 N17

Measurement could not be taken for N17 as access was closed due to flooding.

**Table 5.4** Historical WCP only noise levels at N17

Month	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022 <sup>1</sup>	Nov 2022 <sup>1</sup>
LAeq	IA	IA	IA	IA	<20	32	23	27	IA	27	-	-
LA1,1min	IA	IA	IA	IA	23	37	28	30	IA	34	-	-

Notes: 1. Measurement could not be taken as access to N17 was closed due to flooding.

#### 5.1.5 N19

Measurement could not be taken for N19 as access was closed due to flooding.

**Table 5.5** Historical WCP only noise levels at N19

Month	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022 <sup>1</sup>	Nov 2022 <sup>1</sup>
LAeq	IA	IA	IA	IA	IA	<20	IA	IA	IA	<25	-	-
LA1,1min	IA	IA	IA	IA	IA	<20	IA	IA	IA	26	-	-

Notes: 1. Measurement could not be taken as access to N19 was closed due to flooding.

5.1.6 N20

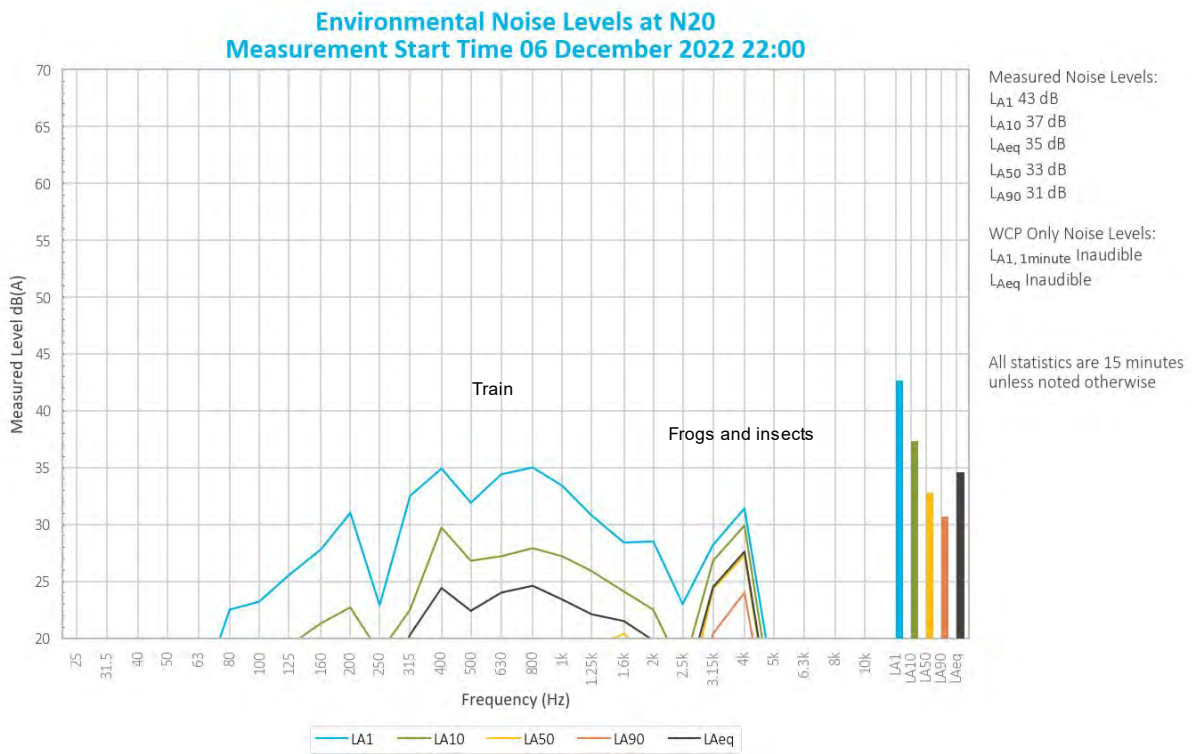


Figure 5.5 Environmental noise levels N20, Ringwood Road

WCP was inaudible throughout the measurement.

A train generated the measured LA1 and contributed to the measured LA10 and LAeq. Frogs and insects contributed to the measured LA10 and LAeq, and generated the measured LA50 and LA90.

Noise from flowing water was also noted.

Table 5.6 Historical WCP only noise levels at N20

Month	Dec 2021	Jan 2022	Feb 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Aug 2022	Sept 2022	Oct 2022	Nov 2022
LAeq	IA	IA	IA	IA	<25	22	IA	IA	IA	IA	IA	IA
LA1,1min	IA	IA	IA	IA	<25	28	IA	IA	IA	IA	IA	IA

## 6 Summary

Global Acoustics (now part of EMM) was engaged by Wilpinjong Coal Pty Ltd to conduct a monthly noise survey of operations at WCP, an open cut coal mine located approximately 40 kilometres north-east of Mudgee. The purpose of the attended noise monitoring survey is to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was done around WCP during the night period of 6/7 December 2022. Locations N17 and N19 were not accessible due to a road closure related to flooding. There were no suitable alternate locations to represent N17 and N19 that were accessible, so no monitoring occurred for these locations.

Noise levels from WCP complied with relevant noise limits at all monitoring locations during the December 2022 survey.

Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

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# Appendix A

## Regulator documents

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## A.1 Wilpinjong Coal Extension Project Approval (SSD-6764)

### SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

#### ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from the owner of the land listed in Table 1, the Applicant must acquire the land in accordance with the procedures in conditions 5 and 6 of schedule 4.

Table 1: Land subject to acquisition upon request

Residence
102, 903, 908, 933, and 959

Note: To interpret the land referred to in Table 1, see the applicable figures in Appendix 5.

#### MITIGATION UPON REQUEST

2. Upon receiving a written request from the owner of any residence on the land listed in Table 2, the Applicant must implement additional noise mitigation measures at or in the immediate vicinity of the residence in consultation with the landowner. These measures must be consistent with the measures outlined in the *Voluntary Land Acquisition and Mitigation Policy*. They must also be reasonable and feasible and proportionate with the level of predicted impact.

If within 3 months of receiving this request from the owner, the Applicant and the owner 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.

Table 2: Land subject to additional mitigation upon request

Mitigation Basis	Residence
Noise	102, 903, 908 and 933

Note: To interpret the land referred to in Table 2, see the applicable figures in Appendix 5.

#### NOISE

##### Noise Criteria

3. The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 3 at any residence on privately-owned land or at the other specified locations.

Table 3: Noise criteria dB(A)

Location	Day	Evening	Night	
	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>A1</sub> (1 minute)
102	36	36	38	45
Wollar Village – Residential	36	37	37	45
All other privately owned land	35	35	35	45
901 – Wollar School		35 (internal) 45 (external) When in use		
150A – St Luke’s Anglican Church 900 – St Laurence O’Toole Catholic Church		40 (internal) When in use		

Note: To interpret the locations referred to in Table 3, see the applicable figures in Appendix 5.

Noise generated by the development is to be measured in accordance with the relevant requirements of the *NSW Industrial Noise Policy* (as may be updated from time to time). Appendix 6 sets out the meteorological conditions under which these criteria apply along with any modifications to the *NSW Industrial Noise Policy* and the requirements for evaluating compliance with these criteria.

However, these criteria do not apply if the Applicant has an agreement with the owner/s of the relevant residence of land 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, low frequency, road and rail noise of the development;
  - (b) operate a comprehensive noise management system 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 consent;
  - (c) minimise the noise impacts of the development during meteorological conditions when the noise limits in this consent do not apply (see Appendix 6);
  - (d) only use locomotives and rolling stock that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL;
  - (e) co-ordinate noise management at the site with the noise management at Moolarben and Ulan mines to minimise cumulative noise impacts; and
  - (f) carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent.

### Noise Management Plan

5. Prior to carrying out any development under this consent, unless the Secretary agrees otherwise, 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 in this consent;
  - (c) describe the proposed noise management system in detail; and
  - (d) include a monitoring program that:
    - evaluates and reports on:
      - the effectiveness of the noise management system;
      - compliance against the noise criteria in this consent; and
      - compliance against the noise operating conditions;
    - includes a program to calibrate and validate the real-time noise monitoring results with the attended monitoring results over time (so the real-time noise monitoring program can be used as a better indicator of compliance with the noise criteria in this consent and trigger for further attended monitoring); and
    - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.
6. The Applicant must implement the approved Noise Management Plan for the development.



**APPENDIX 6  
NOISE COMPLIANCE ASSESSMENT**

**Applicable Meteorological Conditions**

1. The noise criteria in Table 3 of schedule 3 are to apply under all meteorological conditions except the following:
  - (a) wind speeds greater than 3 m/s at 10 m above ground level; or
  - (b) stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
  - (c) stability category G temperature inversion conditions.

**Determination of Meteorological Conditions**

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions must be that recorded by the meteorological station located on the site.

**Compliance Monitoring**

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
4. This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
5. Unless otherwise agreed with the Secretary, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
  - (a) monitoring locations for the collection of representative noise data;
  - (b) meteorological conditions during which collection of noise data is not appropriate;
  - (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
  - (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.
6. The assessment of excessive levels of low frequency noise generated by the mine shall be as follows: Measure/assess C- and A-weighted Leq,T levels over same time period. Where the C minus A level is 15dB or more and:
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by up to 5dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period.
  - where any of the 1/3 octave noise levels in Table 6-1 are exceeded by more than 5dB and cannot be mitigated, a 5 dB(A) positive adjustment to measured/predicted A weighted levels applies for the evening/night period and a 2dB positive adjustment applies for the daytime period.

Table 6-1: One-third octave low frequency noise thresholds

Hz/dB(Z)	One-third octave $L_{Zeq,15minute}$ threshold level												
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB(Z)	92	89	86	77	69	61	54	50	50	48	48	46	44

## A.2 Environment Protection Licence

### L5 Noise limits

L5.1 Noise generated at the premises must not exceed the noise limits presented in the table below. The

locations referred to in the table below are indicated in Appendix 5 - Figures 1 and 2 of Development Consent number SSD-6764 dated 24 April 2017.

Location	Day LAeq(15 minute)	Evening LAeq(15 minute)	Night LAeq(15 minute)	Night LA1(1 minute)
Wollar village - residential	36	37	37	45
All other privately owned land	35	35	35	45
102	36	36	38	45
Wollar school	35 (internal), 45 (external) when in use			
St Luke's Anglican Church & St Laurence O'Toole Catholic Church	40 (internal) when in use			

Note: The above noise limits do not apply at properties where the licensee has a written agreement with the landowner to exceed the noise limits.

L5.2 For the purpose of condition L5.1;

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.
- Evening is defined as the period 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.

L5.3 The noise limits set out in condition L5.1 apply under all meteorological conditions except for the following:

- a) Wind speeds greater than 3 metres/second at 10 metres above ground level; or
- b) Stability category F temperature inversions and wind speeds greater than 2m/s at 10m above ground level; or
- c) Stability category G temperature inversion conditions.

L5.4 For the purpose of condition L5.3:

- a) The meteorological data to be used for determining meteorological conditions is the data recorded by the meteorological weather station identified as EPA identification Point 21 in condition P1.1; 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.

- L5.5 To determine compliance:
- a) With the Leq(15 minute) noise limits in condition L5.1, 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 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
    - iii) within approximately 50 metres of the boundary of a National Park or Nature Reserve
  - b) With the LA1(1 minute) noise limits in condition L5.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
  - c) With the noise limits in condition L5.1, 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 conditions L5.5(a) or L5.5(b).
- L5.6 A non-compliance of condition L5.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:
- a) at a location other than an area prescribed by conditions L5.5(a) and L5.5(b); and/or
  - b) at a point other than the most affected point at a location.
- L5.7 For the purpose 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.



## 6 Noise Monitoring Program

WCPL utilise a combination of operator-attended and unattended noise monitoring to assess the performance of the Mine against the Noise Criteria from Development Consent (SSD-6467). Operator-attended noise monitoring will be used for determining compliance against the Noise Criteria in **Table 6**. Unattended real-time noise monitoring is primarily utilised as a proactive noise control system; providing noise alerts when predetermined noise levels are triggered so mining operations can be modified where noise levels are influenced by noise from the Project.

### 6.1 Monitoring Locations

Operator-attended noise monitoring locations have been chosen considering the following criteria:

- In any given direction, the site is as close as reasonably practical to the nearest Private Receiver;
- There is no closer Private Receiver that is not monitored;
- The site is unlikely to cause concern to any person residing on nearby private property; and
- The site can be safely accessed by the persons carrying out the noise monitoring.

WCPL will undertake operator-attended noise monitoring as identified in **Table 7 (Figure 3 and Figure 4)**. Real-time noise monitoring units are relocated from time to time, to assist with additional targeted noise monitoring and in response to community complaints. Real-time noise monitoring locations will be reviewed and modified as necessary in response to monitoring results, changes to the operation, or as a result of community consultation.

Should circumstances change, WCPL may amend the noise monitoring locations shown in **Table 7** with consideration to the above criteria. WCPL will update this NMP, in consultation with DPIE and the EPA.

**Table 7 Noise Monitoring Locations**

Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
St Laurence O'Toole Church	N6	Operator-attended Noise	777299.9	6415716.9	Location based on the nearest community structure to the East of the Mine
Tichular	N14	Operator-attended Noise	778791.9	6408624.7	Location based on the nearest community structure to the South of the Mine
Wollar Village	N15	Operator-attended Noise	777452.0	6416158.9	Location based on the nearest community structure to the South-East of the Mine
Mogo Rd	N17	Operator-attended Noise	780771.0	6420641.0	Location based on the nearest community structure to the North-East of the Mine
Mogo Rd	N19	Operator-attended Noise	782644.5	6424151.1	Location based on the nearest and residential community structure to the North-East of the Mine
Ringwood Road	N20	Operator-attended Noise	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine.
WCPL Rail Loop	-	Meteorology & Inversion	770630.9	6418085.1	Location based on consideration of prevailing meteorological conditions



Location	Site	Type	Easting <sup>1</sup>	Northing <sup>1</sup>	Justification
Wollar Village <sup>4</sup>	-	Real-Time Noise - Fixed	777608.9	6415996.8	Location based on the nearest non-mine owned residence to the South-East of the Mine N15 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Mogo Rd <sup>4</sup>	-	Real-Time Noise - Fixed	782644.5	6424151.1	Location based on the nearest non-mine owned residence to the East of the Mine N19 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Ringwood Road	-	Real-Time Noise - Fixed	785964.2	6419050.6	Location based near to community residence in discussions with DPIE and EPA on the 23 May 2017 to the East of the Mine. N20 operator-attended Noise Monitoring (validation of real-time noise monitoring)
Tichular <sup>3</sup>	-	Real-Time Noise - Mobile	778791.9	6408624.7	Location based on recommendations from noise specialist (Global Acoustics) review of this NMP (Version 4). N14 operator-attended Noise Monitoring (validation of real-time noise monitoring)

**Notes:**

1. MGA94, Zone 55
2. Monitoring will be undertaken at this location until it can be demonstrated that the noise contribution from the Mine is negligible. At this point, WCPL will notify DPIE and EPA of the results of this monitoring and advise if and when the monitoring at this location will be scaled back or discontinued. The real-time noise monitor at Wandooona may be relocated in response to a complaint or identified noise issue at another location.
3. Where continuous monitors are located at compliance locations (e.g. privately-owned receivers), WCPL will conduct a review of the identification/characterisation of mine-related noise by the real-time monitoring system at that location by comparing against observed mine-related noise identified during operator-attended monitoring (i.e. validate the identification of mine related noise and filtering of extraneous noise sources by the real-time system). Refer to Section 6.5.

## 6.2 Meteorological Monitoring

WCPL maintains a continuous on-site meteorological monitoring station that complies with the requirements of the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (DEC, 2007). The location of this meteorological monitoring station is shown on **Figure 3**.

WCPL's meteorological monitoring station is capable of continuous real-time measurement of temperature lapse rate in accordance with the INP (EPA, 2000).

The meteorological station is routinely calibrated by appropriately accredited technicians.

The following parameters are monitored:

- a) Rainfall;
- b) Relative humidity;
- c) Temperature – measured at 2, 10 and 60 m above ground level;
- d) Wind speed – horizontal and vertical;
- e) Wind direction – measured at 10 m above ground level;
- f) Sigma theta;
- g) Pasquil stability classification;
- h) Solar radiation; and
- i) Temperature lapse rate.

Meteorological forecasting will be undertaken as specified in **Section 5.4**.

### 6.3 Operator-attended Noise Monitoring

#### 6.3.1 Purpose

Operator-attended noise monitoring will be used to evaluate compliance against the Noise Criteria detailed in **Table 6**.

#### 6.3.2 Summary

Operator-attended noise will be undertaken in accordance with **Table 8**.

**Table 8 Operator-attended Noise Monitoring Summary**

Element	Description
Locations	<ul style="list-style-type: none"><li>As per Table 7,</li><li>Figure 3 and Figure 4</li></ul>
Period	<ul style="list-style-type: none"><li>Night-time period (10 pm to 7 am) being the most sensitive time period for noise.</li></ul>
Frequency	<ul style="list-style-type: none"><li>12 times per year<sup>1</sup> (i.e. one night per month); plus</li><li>12 times per year<sup>1</sup> (i.e. one night per month) at locations as identified in Table 7 to validate real-time noise monitoring data (Section 6.5).</li></ul>

Notes: <sup>1</sup> Monitoring frequency at Mogo Road (N19) and Ringwood Road (N20) will remain at the frequency identified in Table 8 during the commencement of operations in Pit 8. A review of the monitoring frequency at N19 and N20 will be undertaken during subsequent reviews of this NMP in consultation with WCPL's noise specialist and relevant government agencies.

#### 6.3.3 Methodology

Operator-attended noise monitoring will be undertaken as outlined in **Table 8** by an independent acoustic consultant and guided by the requirements of the INP (EPA, 2000) and AS 1055.1-1997 'Acoustics – Description and measurement of environmental noise – General procedures'. Routine operator-attended noise monitoring will be undertaken during night-time periods (10 pm - 7 am).

If any of the Noise Criteria are exceeded, a second measurement will be taken at the same location within 75 minutes of the first measurement. If the second measurement does not exceed the Noise Criteria, as defined in **Table 6**, then the result will be recorded and the regular monitoring program resumed.

If the second measurement does exceed the applicable Noise Criteria, then:

- The noise consultant will immediately report both results to the WCPL Environment and Community Manager or delegate immediately;
- Upon confirming the exceedances are deemed a non-compliance in accordance with the **Figure 5**, WCPL will report both results to DPIE and EPA immediately, upon confirming the exceedance (**Section 9.0**).

WCPL will:

- Take immediate action in accordance with the NMS;
- Arrange for additional operator-attended noise monitoring to occur at that site within 1 week; and
- Deploy the mobile real-time noise monitor to measure and record the noise at that site for at least a 1 week period.

WCPL will also investigate any changes to the mine operations, and may revisit the noise model on the basis of the noise measurements recorded at the site.

The acoustic noise consultant will consider the modification factors in Section 4 of the INP (EPA, 2000) during the evaluation of attending monitoring results.

### 6.3.6 Applicable Meteorological Conditions

The Noise Criteria in **Table 6** are to be applied under all meteorological conditions except for the following:

- Wind speeds greater than 3 m/s at 10 m above ground level; or
- Stability category F temperature inversions and wind speeds greater than 2 m/s at 10 m above ground level; or
- Stability category G temperature inversion conditions.

Except for wind speed at microphone height, the data used for determining meteorological conditions will be that recorded by the meteorological station located on the Mine site.

It should be noted that when assessing wind conditions to determine the potential for noise level alteration by the refraction of sound-waves through the atmosphere, meteorological measurements should be undertaken at a height of 10 m above the ground level, in accordance with Section 5 of the INP (EPA, 2000). Local meteorological conditions, including near-surface winds are measured at the inbuilt meteorological station (2 m); however, in accordance with the INP (EPA, 2000), the 2 m data cannot be used to determine impacts from sound-wave refraction. The 2 m meteorological data is used to assess local meteorological conditions that may increase ambient noise levels including surface winds and rainfall.

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# Appendix B

## Calibration certificates

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## B.1 Calibration Certificates



### Sound Level Meter IEC 61672-3:2013 Calibration Certificate Calibration Number C21344

<b>Client Details</b>	Global Acoustics Pty Ltd 12/16 Huntingdale Drive Thornton NSW 2323
<b>Equipment Tested/ Model Number :</b>	Rion NA-28
<b>Instrument Serial Number :</b>	00701424
<b>Microphone Serial Number :</b>	01916
<b>Pre-amplifier Serial Number :</b>	01463
<b>Pre-Test Atmospheric Conditions</b>	<b>Post-Test Atmospheric Conditions</b>
Ambient Temperature : 20.6°C	Ambient Temperature : 22.4°C
Relative Humidity : 47%	Relative Humidity : 44%
Barometric Pressure : 101.05kPa	Barometric Pressure : 100.91kPa
<b>Calibration Technician :</b> Jeff Yu	<b>Secondary Check:</b> Harrison Kim
<b>Calibration Date :</b> 2 Jun 2021	<b>Report Issue Date :</b> 2 Jun 2021
<b>Approved Signatory :</b> 	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 61672-3:2013, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-3:2013, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-3:2013.

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

**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	Least Uncertainties of Measurement	Environmental Conditions	Least Uncertainties of Measurement
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.

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.



# **Wilpinjong Coal**

## **Annual Environmental Monitoring Report 2022**

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Prepared for Wilpinjong Coal Pty Ltd

March 2023

# Wilpinjong Coal

## Annual Environmental Monitoring Report 2022

Wilpinjong Coal Pty Ltd

E220456 RP#01

March 2023

Version	Date	Prepared by	Reviewed by	Comments
0-1	09/01/2023	Will Moore	Robert Kirwan	Draft
1	14/03/2023	Will Moore	Robert Kirwan	Final

Approved by



**Robert Kirwan**

Associate Acoustic Consultant

14 March 2023

Level 3 175 Scott Street

Newcastle NSW 2300

This report has been prepared in accordance with the brief provided by Wilpinjong Coal Pty Ltd and has relied upon the information collected at the time and under the conditions specified in the report. All findings, conclusions or recommendations contained in the report are based on the aforementioned circumstances. The report is for the use of Wilpinjong Coal Pty Ltd and no responsibility will be taken for its use by other parties. Wilpinjong Coal Pty Ltd may, at its discretion, use the report to inform regulators and the public.

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# Executive Summary

EMM Consulting Pty Ltd (EMM) was engaged by Wilpinjong Coal (WCP) Pty Ltd to provide an Annual Environmental Monitoring Report for 2022, in order to compare noise monitoring results against both relevant criteria and predictions in the most recently approved Environmental Impact Statement (EIS) for the Wilpinjong Extension Project.

This report summarises monthly attended noise monitoring surveys conducted around WCP during the reporting period 1 January to 31 December 2022. The purpose of the surveys was to quantify and describe the acoustic environment around the site and compare results with specified limits. The duration of each measurement was 15 minutes.

Attended noise monitoring described in this report was conducted on a monthly basis in accordance with Project Approval SSD-6764, the WCP Noise Management Plan, and Environment Protection Licence No. 12425.

## January to December 2022 Compliance

During 2022 attended noise monitoring, noise levels from WCP complied with relevant noise limits at all monitoring locations, with a single exception. There was one exceedance of WCP impact assessment  $L_{Aeq}$  noise criteria at N15 in June 2022. A follow up measurement was conducted directly afterwards and WCP levels were compliant with relevant criteria.

## Long-Term Noise Trends

Site only  $L_{Aeq}$  noise levels were low (either IA, NM, or less than 30 dB) for a large majority of measurements at all monitoring locations. At N14, N19, and N20, site only  $L_{Aeq}$  noise levels were inaudible or less than 30 dB during all attended noise monitoring measurements. At N6, N15, and N17, site only  $L_{Aeq}$  noise levels were occasionally above 30 dB and long-term noise trend lines indicate site only  $L_{Aeq}$  noise levels have increased slightly during attended noise monitoring.

## EIS Comparison

When comparable, measured noise levels were lower than predicted noise levels under corresponding meteorological conditions at all locations during all measurements, with three exceptions.

During the April 2022 measurement at N15, the measured site only  $L_{Aeq}$  was 5 dB higher than predicted under calm conditions. The measured site only  $L_{Aeq}$  was 12 dB lower than the relevant criterion during this measurement.

During the May 2022 measurement at N20, the measured site only  $L_{Aeq}$  was 13 dB higher than predicted under calm conditions. The measured site only  $L_{Aeq}$  was 13 dB lower than the relevant criterion during this measurement.

During the June 2022 measurement at N15, the measured site only  $L_{Aeq}$  was 3 dB higher than predicted under strong inversion conditions. The measured site only  $L_{Aeq}$  was 1 dB higher than the relevant criterion during this measurement.

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# 1 Introduction

## 1.1 Background

EMM was engaged by WCP to provide an Annual Environmental Monitoring Report (AEMR) for 2022, in order to compare noise monitoring results against both relevant criteria and predictions in the most recently approved EIS for the Wilpinjong Extension Project (WEP).

This report summarises monthly attended noise monitoring surveys conducted around WCP during the reporting period 1 January to 31 December 2022. The purpose of the surveys was to quantify and describe the acoustic environment around the site and compare results with specified limits

## 1.2 Monitoring locations

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

**Table 1.1** Attended monitoring locations

NMP Descriptor	Monitoring Location
N6	St Laurence O’Toole Catholic Church representative of Wollar Village south
N14	‘Tichular’ intersection of Tichular and Barigan Roads, Tichular
N15	Track off Barigan Street near Wollar Public School, Wollar Village
N17	Mogo Road, off Araluen Road, Wollar
N19	North Mogo Road, Mogo
N20	Ringwood Road, off Wollar Road, Wollar

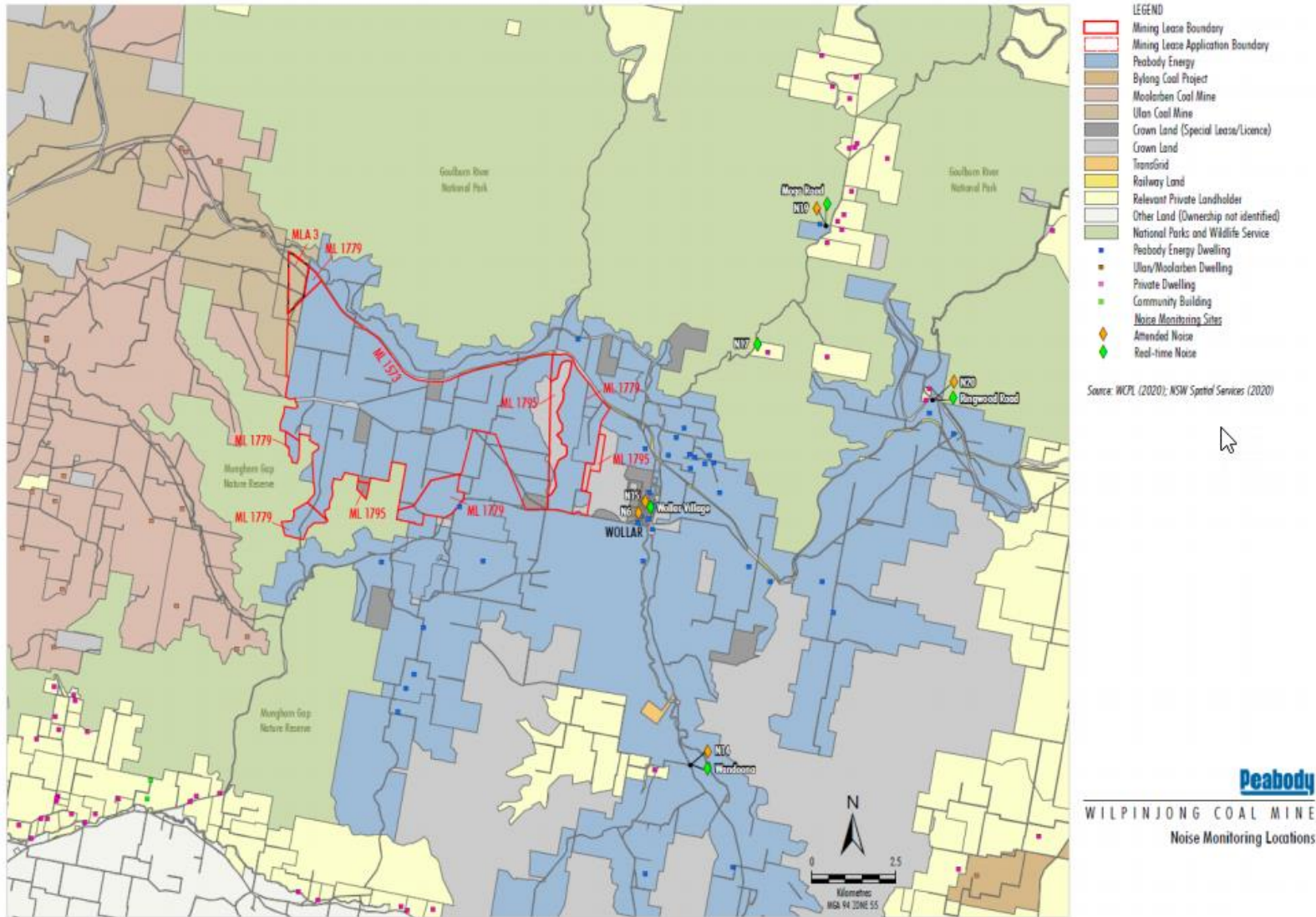


Figure 1.1 Wilpinjong noise monitoring locations

### 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**

Descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to describe human response to noise.
L <sub>Amax</sub>	The maximum A-weighted noise level over a time period.
L <sub>A1</sub>	The noise level which is exceeded for 1 per cent of the time.
L <sub>A1,1minute</sub>	The noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L <sub>A10</sub>	The noise level which is exceeded for 10 percent of the time.
L <sub>Aeq</sub>	The average noise A-weighted energy during a measurement period.
L <sub>A50</sub>	The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period.
L <sub>A90</sub>	The level exceeded for 90 percent of the time. The L <sub>A90</sub> level is often referred to as the “background” noise level and is commonly used to determine noise criteria for assessment purposes.
L <sub>Amin</sub>	The minimum A-weighted noise level over a time period.
L <sub>Ceq</sub>	The 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 micro pascals.
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.
SC	Stability class (or category) is determined from measured wind speed and either sigma-theta or VTG.
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	This is the period 7:00am to 6:00pm.
Evening	This is the period 6:00pm to 10:00pm.
Night	This is the period 10:00pm to 7:00am.

## 2 Statutory requirements and criteria

### 2.1 Project approval

### 2.2 Development consents

The most current development consent associated with activities at WCP is the 'Wilpinjong Extension Project (SSD-6764, April 2017). A noise and blasting assessment was prepared in November 2015 as part of an EIS to support project approval of the WEP.

### 2.3 Environment protection licence

WCP currently holds Environment Protection Licence (EPL) No. 12425 issued by the Environment Protection Authority (EPA), most recently issued in March 2021.

### 2.4 Noise Monitoring Program

Noise monitoring requirements are detailed in the WCP Noise Management Plan (NMP). The most recent version of the NMP was approved in August 2020.

### 2.5 Project Specific Criteria

Noise criteria and meteorological conditions required for noise criteria to apply are consistent in the project approval and EPL. The applicable noise criteria for each monitoring location are shown in Table 2.1.

**Table 2.1 WCP project specific criteria, dB**

NMP Descriptor	Monitoring Locations	Day L <sub>Aeq,15minute</sub>	Evening L <sub>Aeq,15minute</sub>	Night L <sub>Aeq,15minute</sub>	Night L <sub>A1,1minute</sub>
N6 <sup>1</sup>	St Laurence O'Toole Catholic Church	36	37	37	45
N14	'Tichular'	35	35	35	45
N15	Wollar Village	36	37	37	45
N17 <sup>2</sup>	Mogo Road, off Araluen Road	36	36	38	45
N19	North Mogo Road	35	35	35	45
N20	Ringwood Road, off Wollar Road	35	35	35	45

Notes: 1. N6 noise limits have been assumed to be as detailed for 'Wollar Village – Residential' in the PA, as the church is no longer a place of worship.

2. N17 noise limits have been determined based on the assumption that N17 is property 102 in accordance with Appendix 5 Figure 1 of Development Consent SSD-6764.

## 2.6 Modifying Factors

The EPA 'Noise Policy for Industry' (NPfi, 2017) was approved for use in NSW in October 2017. 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 has 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 NPfi. Low frequency modifying factors have been assessed in accordance with both the development consent and NPfi.



## 3 Methodology

### 3.1 Overview

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

### 3.2 Attended noise monitoring

During this survey, monthly attended monitoring was done during the night period at each location. The duration of each measurement was 15 minutes. Atmospheric condition measurement was also undertaken at each monitoring location. Attended monitoring during this reporting period was undertaken by Will Moore.

This survey presents noise levels gathered during attended monitoring that are the result of many sounds reaching the sound level meter microphone during monitoring. Received levels from various noise sources were noted during attended monitoring and particular attention was paid to the extent of WCP's contribution, if any, to measured levels. At each receptor location, WCP's  $L_{Aeq,15\text{minute}}$  and  $L_{A1,1\text{minute}}$  (in the absence of any other noise) was measured directly, where possible, or, determined by frequency analysis.

If the exact contribution of the source of interest (in this case WCP) cannot be established, due to masking by other noise sources in a similar frequency range, but site noise levels are observed to be well below (more than 5 dB lower than) any relevant criterion, a maximum estimate of the potential contribution of the site might be made based on other measured site-only noise descriptors in accordance with Section 7.1 of the NPfl. This is generally expressed as a 'less than' quantity, such as <20 dB or <30 dB.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may also 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 some noise was audible but could not be quantified. If site noise was NM due to masking but estimated to be significant in relation to a relevant criterion, we would employ methods (eg, measure closer and back calculate) to determine a value for reporting.

All sites noted as NM in this report are due to one or more of the following reasons:

- Site noise levels were extremely low and unlikely, in many cases, to be even noticed;
- Site noise levels were masked by another relatively loud noise source that is characteristic of the environment (eg, breeze in foliage or continuous road traffic noise) that cannot be eliminated by moving closer; and/or
- It was not feasible, nor reasonable to employ methods such as move closer and back calculate. Cases may include, but are not limited to, 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  $L_{A1,1\text{minute}}$ . The EPA accepts sleep disturbance analysis based on either the  $L_{A1,1\text{minute}}$  or  $L_{Amax}$  metrics, with the  $L_{Amax}$  resulting in a more conservative assessment of site noise emissions.

Often extraneous noise events (for example, road traffic pass-bys and dogs) interfere with the measurement of site noise levels in the frequency range of interest. Where required, the sound level meter is paused during these occurrences to aid in quantification of the site only noise.

### 3.3 Modifying factors

All measurements were evaluated for potential modifying factors in accordance with the NPfI. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfI.

Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable, such that the site only  $L_{Aeq}$  was not “NM” or less than a maximum cut off value (e.g., “<20 dB” or “<30dB”).

If applicable, modifying factors have been reported and added to measured site only  $L_{Aeq}$  noise levels when meteorological conditions satisfied requirements for site noise criteria to be applicable. Low-frequency modifying factors have only been applied to site-only  $L_{Aeq}$  levels if WCP was the only contributing low-frequency noise source.

### 3.4 Attended real time noise monitoring comparison

WCP-only noise levels from four attended monitoring locations are compared to results from nearby Sentinex units. Start times of attended and real-time measurements do not directly overlap. Real-time measurement with the most overlap with attended monitoring times are selected for comparison.

Attended monitoring locations and the real-time monitoring locations they represent are listed in Table 3.1.

**Table 3.1** attended and real time monitoring locations for comparison

NMP Descriptor	Real time monitor ID	Monitoring location
N15	SX33-N1	Wollar Village
N19	SX32-N1	North Mogo Road
N20	SX30-N1	Ringwood Road, off Wollar Road
N14	SX31-N1	'Tichular', intersection of Tichular and Barigan Roads, Tichular

### 3.5 Comparison with WEP EIS model predictions

A noise and blasting assessment was prepared in November 2015 as part of the EIS to support project approval for the WEP. The report assessed noise and blasting impacts associated with ongoing operations. As part of the modelling assessment, noise levels from WCP were predicted for representative operating scenarios, time periods and weather conditions. Predicted noise levels for “Year 2020” most closely aligned with the 2022 reporting year and have been compared with measured levels from attended compliance monitoring under corresponding meteorological conditions.

Table 11 of the noise and blasting assessment lists modelled meteorological conditions and is reproduced below.

**Table 11 INP Assessable Meteorological Noise Modelling Parameters**

Period	Meteorological Parameter	Air Temperature	Relative Humidity	Wind Speed and Direction	Temperature Gradient
Daytime	Calm	20°C	50%	0 m/s	0°C/100 m
	Autumn Wind 30% (occurrence)	19°C	55%	E 3 m/s	0°C/100 m
Evening	Calm	19°C	56%	0 m/s	0°C/100 m
	Autumn Wind 30% (occurrence)	18°C	63%	ESE 3 m/s	0°C/100 m
	Winter Wind 30% (occurrence)	10°C	71%	WNW, NW 3 m/s	0°C/100 m
Night-time	Calm	14°C	76%	0 m/s	0°C/100 m
	Summer Wind > 30% (occurrence)	19°C	68%	ESE, SE, E 3 m/s	0°C/100 m
	Strong Inversion (10% exceedance) <sup>1</sup>	6°C	86%	0 m/s	5.2°C/100 m

Note 1: Winter evening/night-time 10% exceedance temperature gradient in accordance with INP Appendix E Table 4.

Note 2: m/s = metres per second.

The following rules were used to allocate meteorological parameter bounds for each condition:

- For night-time “calm” atmospheric conditions, wind speeds less than 0.5 metres per second (m/s), all wind directions, and temperature gradients in the range -1.5° and 1.5° C/100m were included. This vertical temperature gradient range corresponds with Stability Categories D and E according to Table D2 of the NPfI;
- For night “summer wind” atmospheric conditions, wind speeds in the range 0.5 to 3.0 m/s and vertical temperature gradients in the range -1.5° and 1.5° C/100m were included. This vertical temperature gradient range corresponds with Stability Categories D and E according to Table D2 of the NPfI. The modelled wind directions were E (90 degrees), ESE (112.5 degrees), and SE (135 degrees). Wind directions 22.5 degrees either side of the modelled directions were included; and
- For “strong inversion” atmospheric conditions with no wind, wind speeds up to 0.5 m/s and vertical temperature gradients in the range 3.0° to 5.2° C/100m were included. This vertical temperature gradient range corresponds with Stability Category F according to Table D2 of the NPfI.

Meteorological parameter bounds used to identify corresponding meteorological conditions during attended monitoring are outlined in Table 3.2.

**Table 3.2 Meteorological condition definitions**

Parameter	Night		
	Clam	Summer wind	Strong inversion
Wind speed (m/s)	0.0 – 0.5	0.5 – 3.0	0.0 – 0.5
Wind direction (°)	all	67.5° – 157.5°	all
Stability category	D and E	D and E	F and G

## 4 Results

### 4.1 January 2022

#### 4.1.1 Total measured noise levels

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

**Table 4.1** Measured noise levels <sup>1</sup> – January 2022

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	27/01/2022 22:48	45	40	37	36	36	35	31
N14	27/01/2022 23:15	56	54	52	49	48	42	33
N15	27/01/2022 22:30	47	39	38	37	37	35	33
N17	28/01/2022 01:12	53	36	35	34	34	33	31
N19	28/01/2022 00:47	51	47	42	40	40	37	34
N20	28/01/2022 00:00	52	49	43	41	39	36	33

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

#### 4.1.2 Modifying factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfI and methodology described in Section 3.3.

There were no modifying factors, as defined in the NPfI, applicable during the survey. Mining noise was analysed and did not satisfy requirements for tonal, intermittent, or low frequency modifying factors, as defined in the NPfI. This means that no modifying factor penalties were applied to any measured result during this survey.

### 4.1.3 Attended noise monitoring results

Table 4.2 to Table 4.3 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement

**Table 4.2 LAeq,15minute generated by WCP against project specific criteria – January 2022**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP LAeq dB <sup>3,4</sup>	Exceedance dB <sup>4</sup>
N6	27/01/2022 22:48	1.1	E	37	Yes	IA	Nil
N14	27/01/2022 23:15	1.6	E	35	Yes	IA	Nil
N15	27/01/2022 22:30	1.2	E	37	Yes	IA	Nil
N17	28/01/2022 01:12	1.2	E	38	Yes	IA	Nil
N19	28/01/2022 00:47	1.5	E	35	Yes	IA	Nil
N20	28/01/2022 00:00	1.8	E	35	Yes	IA	Nil

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site- only LAeq,15minute attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.3 LA1,1minute generated by WCP against project specific criteria – January 2022**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP LA1,1min dB <sup>3,4</sup>	Exceedance dB <sup>4</sup>
N6	27/01/2022 22:48	1.1	E	45	Yes	IA	Nil
N14	27/01/2022 23:15	1.6	E	45	Yes	IA	Nil
N15	27/01/2022 22:30	1.2	E	45	Yes	IA	Nil
N17	28/01/2022 01:12	1.2	E	45	Yes	IA	Nil
N19	28/01/2022 00:47	1.5	E	45	Yes	IA	Nil
N20	28/01/2022 00:00	1.8	E	45	Yes	IA	Nil

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site- only LA1,1minute attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

#### 4.1.4 Comparison of Real time and attended noise results

A summary of attended monitoring data and that measured by the four real time Sentinex units (omni-directional) is shown in Table 4.4 Low pass (<630 Hz)  $L_{Aeq}$  and  $L_{A90}$  are typically good indicators of mining noise levels.

**Table 4.4 Real time and attended noise levels<sup>1</sup> – January 2022**

Location/Sentinex	Attended Start Date and Time	Sentinex Start Date and Time	Sentinex Data <sup>2</sup>				Attended Measurement	
			Total $L_{Aeq}$ dB	Total $L_{A90}$ dB	Low pass (<630Hz) $L_{Aeq}$ dB	Low pass (<630Hz) $L_{A90}$ dB	Total $L_{A90}$ dB	WCP $L_{Aeq}$ dB
N14/SX31	27/01/2022 23:15	27/01/2022 23:15	49	47	26	24	42	IA
N15/SX33	27/01/2022 22:30	27/01/2022 22:30	42	38	21	18	35	IA
N19/SX32	28/01/2022 00:47	28/01/2022 00:45	40	37	20	17	37	IA
N20/SX30	28/01/2022 00:00	28/01/2022 00:00	47	45	34	21	36	IA

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

2. NR – no Sentinex data recorded for this period.



## 4.2 February 2022

### 4.2.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.5.

**Table 4.5 Measured noise levels<sup>1</sup> – February 2022**

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	10/02/2022 23:19	49	44	42	41	41	38	35
N14	11/02/2022 00:30	52	50	48	45	45	39	32
N15	10/02/2022 23:00	48	43	37	36	36	35	33
N17	10/02/2022 22:26	49	36	34	32	32	30	27
N19	10/02/2022 22:00	52	41	38	36	35	34	31
N20	10/02/2022 23:45	52	51	50	47	47	42	36

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

### 4.2.2 Modifying factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfI and methodology described in Section 3.3.

There were no modifying factors, as defined in the NPfI, applicable during the survey. Mining noise was analysed and did not satisfy requirements for tonal, intermittent, or low frequency modifying factors, as defined in the NPfI. This means that no modifying factor penalties were applied to any measured result during this survey.

### 4.2.3 Attended noise monitoring results

Table 4.6 to Table 4.7 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement

**Table 4.6** LAeq,15minute generated by WCP against project specific criteria – February 2022

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP LAeq dB <sup>3,4</sup>	Exceedance dB <sup>4</sup>
N6	10/02/2022 23:19	2.1	E	37	Yes	IA	Nil
N14	11/02/2022 00:30	1.7	D	35	Yes	IA	Nil
N15	10/02/2022 23:00	2.3	E	37	Yes	IA	Nil
N17	10/02/2022 22:26	2.3	E	38	Yes	IA	Nil
N19	10/02/2022 22:00	3.9	E	35	No	IA	NA
N20	10/02/2022 23:45	2.2	E	35	Yes	IA	Nil

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site- only LAeq,15minute attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.7** LA1,1minute generated by WCP against project specific criteria – February 2022

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP LA1,1min dB <sup>3,4</sup>	Exceedance dB <sup>4</sup>
N6	10/02/2022 23:19	2.1	E	45	Yes	IA	Nil
N14	11/02/2022 00:30	1.7	D	45	Yes	IA	Nil
N15	10/02/2022 23:00	2.3	E	45	Yes	IA	Nil
N17	10/02/2022 22:26	2.3	E	45	Yes	IA	Nil
N19	10/02/2022 22:00	3.9	E	45	No	IA	NA
N20	10/02/2022 23:45	2.2	E	45	Yes	IA	Nil

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site- only LA1,1minute attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

#### 4.2.4 Comparison of Real time and attended noise results

A summary of attended monitoring data and that measured by the four real time Sentinex units (omni-directional) is shown in Table 4.8 Low pass (<630 Hz)  $L_{Aeq}$  and  $L_{A90}$  are typically good indicators of mining noise levels.

**Table 4.8 Real time and attended noise levels<sup>1</sup> – February 2022**

Location/Sentinex	Attended Start Date and Time	Sentinex Start Date and Time	Sentinex Data <sup>2</sup>				Attended Measurement	
			Total $L_{Aeq}$ dB	Total $L_{A90}$ dB	Low pass (<630Hz) $L_{Aeq}$ dB	Low pass (<630Hz) $L_{A90}$ dB	Total $L_{A90}$ dB	WCP $L_{Aeq}$ dB
N14/SX31	11/02/2022 00:30	11/02/2022 00:30	50	46	25	21	39	IA
N15/SX33	10/02/2022 23:00	10/02/2022 23:00	53	52	29	17	35	IA
N19/SX32	10/02/2022 22:00	10/02/2022 22:00	40	37	14	12	34	IA
N20/SX30	10/02/2022 23:45	10/02/2022 23:45	53	47	22	20	42	IA

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

2. NR – no Sentinex data recorded for this period.

## 4.3 March 2022

### 4.3.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.9.

**Table 4.9 Measured noise levels<sup>1</sup> – March 2022**

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	02/03/2022 23:19	45	42	42	41	41	31	38
N14	03/03/2022 00:30	45	37	37	36	36	33	33
N15	02/03/2022 23:00	45	38	36	35	34	26	31
N17	02/03/2022 22:30	46	41	31	30	28	33	23
N19	02/03/2022 22:06	52	36	35	34	34	35	31
N20	02/03/2022 23:46	41	35	33	32	32	40	30

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

### 4.3.2 Modifying factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfI and methodology described in Section 3.3.

There were no modifying factors, as defined in the NPfI, applicable during the survey. Mining noise was analysed and did not satisfy requirements for tonal, intermittent, or low frequency modifying factors, as defined in the NPfI. This means that no modifying factor penalties were applied to any measured result during this survey.

### 4.3.3 Attended noise monitoring results

Table 4.10 to Table 4.11 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement

**Table 4.10 LAeq,15minute generated by WCP against project specific criteria – March 2022**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP LAeq dB <sup>3,4</sup>	Exceedance dB <sup>4</sup>
N6	02/03/2022 23:19	2.4	D	37	Yes	IA	Nil
N14	03/03/2022 00:30	1.3	D	35	Yes	IA	Nil
N15	02/03/2022 23:00	1.0	D	37	Yes	IA	Nil
N17	02/03/2022 22:30	1.7	E	38	Yes	IA	Nil
N19	02/03/2022 22:06	1.7	D	35	Yes	IA	Nil
N20	02/03/2022 23:46	1.8	D	35	Yes	IA	Nil

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site- only LAeq,15minute attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.11 LA1,1minute generated by WCP against project specific criteria – March 2022**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP LA1,1min dB <sup>3,4</sup>	Exceedance dB <sup>4</sup>
N6	02/03/2022 23:19	2.4	D	45	Yes	IA	Nil
N14	03/03/2022 00:30	1.3	D	45	Yes	IA	Nil
N15	02/03/2022 23:00	1.0	D	45	Yes	IA	Nil
N17	02/03/2022 22:30	1.7	E	45	Yes	IA	Nil
N19	02/03/2022 22:06	1.7	D	45	Yes	IA	Nil
N20	02/03/2022 23:46	1.8	D	45	Yes	IA	Nil

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site- only LA1,1minute attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

#### 4.3.4 Comparison of Real time and attended noise results

A summary of attended monitoring data and that measured by the four real time Sentinex units (omni-directional) is shown in Table 4.12 Low pass (<630 Hz) L<sub>Aeq</sub> and L<sub>A90</sub> are typically good indicators of mining noise levels.

**Table 4.12 Real time and attended noise levels <sup>1</sup> – March 2022**

Location/Sentinex	Attended Start Date and Time	Sentinex Start Date and Time	Sentinex Data <sup>2</sup>				Attended Measurement	
			Total L <sub>Aeq</sub> dB	Total L <sub>A90</sub> dB	Low pass (<630Hz) L <sub>Aeq</sub> dB	Low pass (<630Hz) L <sub>A90</sub> dB	Total L <sub>A90</sub> dB	WCP L <sub>Aeq</sub> dB
N14/SX31	03/03/2022 00:30	03/03/2022 00:30	53	51	20	18	33	IA
N15/SX33	02/03/2022 23:00	02/03/2022 23:00	50	41	26	18	26	IA
N19/SX32	02/03/2022 22:06	02/03/2022 22:00	36	34	23	14	35	IA
N20/SX30	02/03/2022 23:46	02/03/2022 23:45	53	51	17	16	40	IA

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

2. NR – no Sentinex data recorded for this period.



## 4.4 April 2022

### 4.4.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.13.

**Table 4.13 Measured noise levels<sup>1</sup> – April 2022**

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	29/04/2022 01:15	45	42	35	34	33	32	30
N14	28/04/2022 23:46	53	45	42	41	41	40	39
N15	28/04/2022 23:00	56	51	43	41	36	34	31
N17	28/04/2022 22:25	52	36	32	30	29	28	27
N19	28/04/2022 22:00	44	41	38	34	31	28	27
N20	29/04/2022 00:30	49	43	35	33	30	28	26

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

### 4.4.2 Modifying factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfl and methodology described in Section 3.3.

There were no modifying factors, as defined in the NPfl, applicable during the survey. Mining noise was analysed and did not satisfy requirements for tonal, intermittent, or low frequency modifying factors, as defined in the NPfl. This means that no modifying factor penalties were applied to any measured result during this survey.

### 4.4.3 Attended noise monitoring results

Table 4.14 to Table 4.15 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement

**Table 4.14** LAeq,15minute generated by WCP against project specific criteria – April 2022

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP LAeq dB <sup>3,4</sup>	Exceedance dB <sup>4</sup>
N6	29/04/2022 01:15	0.8	E	37	Yes	<20	Nil
N14	28/04/2022 23:46	0.0	D	35	Yes	<25	Nil
N15	28/04/2022 23:00	0.0	E	37	Yes	23	Nil
N17	28/04/2022 22:25	0.0	E	38	Yes	<20	Nil
N19	28/04/2022 22:00	0.0	E	35	Yes	IA	Nil
N20	29/04/2022 00:30	1.2	E	35	Yes	<25	Nil

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site- only LAeq,15minute attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.15** LA1,1minute generated by WCP against project specific criteria – April 2022

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP LA1,1min dB <sup>3,4</sup>	Exceedance dB <sup>4</sup>
N6	29/04/2022 01:15	0.8	E	45	Yes	23	Nil
N14	28/04/2022 23:46	0.0	D	45	Yes	<25	Nil
N15	28/04/2022 23:00	0.0	E	45	Yes	32	Nil
N17	28/04/2022 22:25	0.0	E	45	Yes	23	Nil
N19	28/04/2022 22:00	0.0	E	45	Yes	IA	Nil
N20	29/04/2022 00:30	1.2	E	45	Yes	<25	Nil

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site- only LA1,1minute attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

#### 4.4.4 Comparison of Real time and attended noise results

A summary of attended monitoring data and that measured by the four real time Sentinex units (omni-directional) is shown in Table 4.16 Low pass (<630 Hz) L<sub>Aeq</sub> and L<sub>A90</sub> are typically good indicators of mining noise levels.

**Table 4.16 Real time and attended noise levels <sup>1</sup> – April 2022**

Location/Sentinex	Attended Start Date and Time	Sentinex Start Date and Time	Sentinex Data <sup>2</sup>				Attended Measurement	
			Total L <sub>Aeq</sub> dB	Total L <sub>A90</sub> dB	Low pass (<630Hz) L <sub>Aeq</sub> dB	Low pass (<630Hz) L <sub>A90</sub> dB	Total L <sub>A90</sub> dB	WCP L <sub>Aeq</sub> dB
N14/SX31	28/04/2022 23:46	28/04/2022 23:45	49	47	31	28	40	<25
N15/SX33	28/04/2022 23:00	28/04/2022 23:00	49	38	43	27	34	23
N19/SX32	28/04/2022 22:00	28/04/2022 22:00	26	23	18	NR	28	IA
N20/SX30	29/04/2022 00:30	29/04/2022 00:30	45	31	33	23	28	<25

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

2. NR – no Sentinex data recorded for this period.

## 4.5 May 2022

### 4.5.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.17.

**Table 4.17 Measured noise levels<sup>1</sup> – May 2022**

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	17/05/2022 00:30	48	47	45	39	29	27	25
N14	16/05/2022 23:30	52	34	32	30	28	26	23
N15	16/05/2022 23:00	44	40	37	34	33	30	26
N17	16/05/2022 22:25	45	37	34	33	32	30	28
N19	16/05/2022 22:00	47	42	32	30	25	22	20
N20	17/05/2022 00:00	38	31	29	27	27	25	23

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

### 4.5.2 Modifying factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfl and methodology described in Section 3.3.

There were no modifying factors, as defined in the NPfl, applicable during the survey. Mining noise was analysed and did not satisfy requirements for tonal, intermittent, or low frequency modifying factors, as defined in the NPfl. This means that no modifying factor penalties were applied to any measured result during this survey.

### 4.5.3 Attended noise monitoring results

Table 4.18 to Table 4.19 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement

**Table 4.18** LAeq,15minute generated by WCP against project specific criteria – May 2022

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP LAeq dB <sup>3,4</sup>	Exceedance dB <sup>4</sup>
N6	17/05/2022 00:30	0.0	F	37	Yes	<25	Nil
N14	16/05/2022 23:30	0.0	F	35	Yes	IA	Nil
N15	16/05/2022 23:00	0.0	F	37	Yes	34	Nil
N17	16/05/2022 22:25	0.0	F	38	Yes	32	Nil
N19	16/05/2022 22:00	1.1	F	35	Yes	<20	Nil
N20	17/05/2022 00:00	0.0	D	35	Yes	22	Nil

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site- only LAeq,15minute attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.19** LA1,1minute generated by WCP against project specific criteria – May 2022

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP LA1,1min dB <sup>3,4</sup>	Exceedance dB <sup>4</sup>
N6	17/05/2022 00:30	0.0	F	45	Yes	<25	Nil
N14	16/05/2022 23:30	0.0	F	45	Yes	IA	Nil
N15	16/05/2022 23:00	0.0	F	45	Yes	38	Nil
N17	16/05/2022 22:25	0.0	F	45	Yes	37	Nil
N19	16/05/2022 22:00	1.1	F	45	Yes	<20	Nil
N20	17/05/2022 00:00	0.0	D	45	Yes	28	Nil

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site- only LA1,1minute attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

#### 4.5.4 Comparison of Real time and attended noise results

A summary of attended monitoring data and that measured by the four real time Sentinex units (omni-directional) is shown in Table 4.20 Low pass (<630 Hz)  $L_{Aeq}$  and  $L_{A90}$  are typically good indicators of mining noise levels.

**Table 4.20 Real time and attended noise levels<sup>1</sup> – May 2022**

Location/Sentinex	Attended Start Date and Time	Sentinex Start Date and Time	Sentinex Data <sup>2</sup>				Attended Measurement	
			Total $L_{Aeq}$ dB	Total $L_{A90}$ dB	Low pass (<630Hz) $L_{Aeq}$ dB	Low pass (<630Hz) $L_{A90}$ dB	Total $L_{A90}$ dB	WCP $L_{Aeq}$ dB
N14/SX31	16/05/2022 23:30	16/05/2022 23:30	31	29	23	22	26	IA
N15/SX33	16/05/2022 23:00	16/05/2022 23:00	NR	NR	NR	NR	30	34
N19/SX32	16/05/2022 22:00	16/05/2022 22:00	26	24	18	16	22	<20
N20/SX30	17/05/2022 00:00	17/05/2022 00:00	31	30	26	24	25	22

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

2. NR – no Sentinex data recorded for this period.



## 4.6 June 2022

### 4.6.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.21.

**Table 4.21 Measured noise levels<sup>1</sup> – June 2022**

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	16/06/2022 1:15	41	37	32	30	29	27	24
N14	16/06/2022 00:00	40	32	29	27	26	24	21
N15	15/06/2022 23:00	59	55	43	43	37	34	29
N15 remeasure	15/06/2022 23:30	45	39	36	35	34	32	30
N17	15/06/2022 22:25	45	35	32	28	26	23	20
N19	15/06/2022 22:00	39	23	22	21	21	20	18
N20	16/06/2022 0:45	40	27	24	23	23	21	20

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

### 4.6.2 Modifying factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfI and methodology described in Section 3.3.

There were no modifying factors, as defined in the NPfI, applicable during the survey. Mining noise was analysed and did not satisfy requirements for tonal, intermittent, or low frequency modifying factors, as defined in the NPfI. This means that no modifying factor penalties were applied to any measured result during this survey.

### 4.6.3 Attended noise monitoring results

Table 4.22 to Table 4.23 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement

**Table 4.22** LAeq,15minute generated by WCP against project specific criteria – June 2022

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP LAeq dB <sup>3,4</sup>	Exceedance dB <sup>4</sup>
N6	16/06/2022 1:15	0.0	G	37	No	30	Nil
N14	16/06/2022 00:00	0.0	F	35	Yes	IA	Nil
N15	15/06/2022 23:00	0.0	F	37	Yes	38	1
N15 remeasure	15/06/2022 23:30	0.0	F	37	Yes	34	Nil
N17	15/06/2022 22:25	0.0	F	38	Yes	23	Nil
N19	15/06/2022 22:00	0.0	F	35	Yes	IA	Nil
N20	16/06/2022 00:45	0.0	F	35	Yes	IA	Nil

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site- only LAeq,15minute attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.23** LA1,1minute generated by WCP against project specific criteria – June 2022

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP LA1,1min dB <sup>3,4</sup>	Exceedance dB <sup>4</sup>
N6	16/06/2022 1:15	0.0	G	45	No	37	Nil
N14	16/06/2022 00:00	0.0	F	45	Yes	IA	Nil
N15	15/06/2022 23:00	0.0	F	45	Yes	42	Nil
N15 remeasure	15/06/2022 23:30	0.0	F	45	Yes	35	Nil
N17	15/06/2022 22:25	0.0	F	45	Yes	28	Nil
N19	15/06/2022 22:00	0.0	F	45	Yes	IA	Nil
N20	16/06/2022 00:45	0.0	F	45	Yes	IA	Nil

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site- only LA1,1minute attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

#### 4.6.4 Comparison of Real time and attended noise results

A summary of attended monitoring data and that measured by the four real time Sentinex units (omni-directional) is shown in Table 4.24 Low pass (<630 Hz) L<sub>Aeq</sub> and L<sub>A90</sub> are typically good indicators of mining noise levels.

**Table 4.24 Real time and attended noise levels<sup>1</sup> – June 2022**

Location/Sentinex	Attended Start Date and Time	Sentinex Start Date and Time	Sentinex Data <sup>2</sup>				Attended Measurement	
			Total L <sub>Aeq</sub> dB	Total L <sub>A90</sub> dB	Low pass (<630Hz) L <sub>Aeq</sub> dB	Low pass (<630Hz) L <sub>A90</sub> dB	Total L <sub>A90</sub> dB	WCP L <sub>Aeq</sub> dB
N14/SX31	16/06/2022 00:00	16/06/2022 00:00	25	23	25	23	24	IA
N15/SX33	15/06/2022 23:00	15/06/2022 23:00	49	35	47	34	34	38
N15 <sup>3</sup> /SX33	15/06/2022 23:30	15/06/2022 23:30	38	34	36	33	32	34
N19/SX32	15/06/2022 22:00	15/06/2022 22:00	24	23	20	19	20	IA
N20/SX30	16/06/2022 00:45	16/06/2022 00:45	27	26	22	21	21	IA

- Notes:
1. Levels in this table are not necessarily the result of activity at WCP.
  2. NR – no Sentinex data recorded for this period.
  3. Remeasure.

## 4.7 July 2022

### 4.7.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.25.

**Table 4.25 Measured noise levels<sup>1</sup> – July 2022**

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	28/07/2022 23:19	58	44	37	35	32	28	27
N14	29/07/2022 00:34	61	54	36	40	29	26	24
N15	28/07/2022 23:00	42	36	33	30	30	28	26
N17	28/07/2022 22:25	42	34	31	29	29	27	25
N19	28/07/2022 22:00	59	45	38	35	31	27	25
N20	29/07/2022 00:00	45	35	32	29	29	27	25

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

### 4.7.2 Modifying factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfl and methodology described in Section 3.3.

There were no modifying factors, as defined in the NPfl, applicable during the survey. Mining noise was analysed and did not satisfy requirements for tonal, intermittent, or low frequency modifying factors, as defined in the NPfl. This means that no modifying factor penalties were applied to any measured result during this survey.

### 4.7.3 Attended noise monitoring results

Table 4.26 to Table 4.27 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement

**Table 4.26 LAeq,15minute generated by WCP against project specific criteria – July 2022**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP LAeq dB <sup>3,4</sup>	Exceedance dB <sup>4</sup>
N6	28/07/2022 23:19	0.0	G	37	No	IA	NA
N14	29/07/2022 00:34	0.0	G	35	No	IA	NA
N15	28/07/2022 23:00	0.0	G	37	No	29	NA
N17	28/07/2022 22:25	0.2	G	38	No	27	NA
N19	28/07/2022 22:00	1.2	G	35	No	IA	NA
N20	29/07/2022 00:00	0.0	G	35	No	IA	NA

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site- only LAeq,15minute attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.27 LA1,1minute generated by WCP against project specific criteria – July 2022**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP LA1,1min dB <sup>3,4</sup>	Exceedance dB <sup>4</sup>
N6	28/07/2022 23:19	0.0	G	45	No	IA	NA
N14	29/07/2022 00:34	0.0	G	45	No	IA	NA
N15	28/07/2022 23:00	0.0	G	45	No	40	NA
N17	28/07/2022 22:25	0.2	G	45	No	30	NA
N19	28/07/2022 22:00	1.2	G	45	No	IA	NA
N20	29/07/2022 00:00	0.0	G	45	No	IA	NA

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site- only LA1,1minute attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

#### 4.7.4 Comparison of Real time and attended noise results

A summary of attended monitoring data and that measured by the four real time Sentinex units (omni-directional) is shown in Table 4.28 Low pass (<630 Hz)  $L_{Aeq}$  and  $L_{A90}$  are typically good indicators of mining noise levels.

**Table 4.28 Real time and attended noise levels<sup>1</sup> – July 2022**

Location/Sentinex	Attended Start Date and Time	Sentinex Start Date and Time	Sentinex Data <sup>2</sup>				Attended Measurement	
			Total $L_{Aeq}$ dB	Total $L_{A90}$ dB	Low pass (<630Hz) $L_{Aeq}$ dB	Low pass (<630Hz) $L_{A90}$ dB	Total $L_{A90}$ dB	WCP $L_{Aeq}$ dB
N14/SX31	29/07/2022 00:34	29/07/2022 00:30	46	23	30	18	26	IA
N15/SX34	28/07/2022 23:00	28/07/2022 23:00	NR	NR	NR	NR	28	29
N19/SX32	28/07/2022 22:00	28/07/2022 22:00	34	27	33	24	27	IA
N20/SX30	29/07/2022 00:00	29/07/2022 00:00	30	29	24	24	27	IA

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

2. NR – no Sentinex data recorded for this period.



## 4.8 August 2022

### 4.8.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.29.

**Table 4.29 Measured noise levels<sup>1</sup> – August 2022**

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	26/08/2022 00:45	44	35	30	27	25	24	23
N14	25/08/2022 23:30	56	49	44	39	27	24	23
N15	25/08/2022 23:00	53	47	41	37	29	24	22
N17	25/08/2022 22:23	40	38	35	31	28	25	23
N19	25/08/2022 22:00	55	49	37	37	31	27	22
N20	26/08/2022 00:15	42	37	32	29	27	24	22

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

### 4.8.2 Modifying factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfl and methodology described in Section 3.3.

There were no modifying factors, as defined in the NPfl, applicable during the survey. Mining noise was analysed and did not satisfy requirements for tonal, intermittent, or low frequency modifying factors, as defined in the NPfl. This means that no modifying factor penalties were applied to any measured result during this survey.

### 4.8.3 Attended noise monitoring results

Table 4.30 to Table 4.31 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement

**Table 4.30 LAeq,15minute generated by WCP against project specific criteria – August 2022**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP LAeq dB <sup>3,4</sup>	Exceedance dB <sup>4</sup>
N6	26/08/2022 00:45	0.0	F	37	Yes	IA	Nil
N14	25/08/2022 23:30	0.0	G	35	No	IA	NA
N15	25/08/2022 23:00	0.8	F	37	Yes	IA	Nil
N17	25/08/2022 22:23	1.0	F	38	Yes	IA	Nil
N19	25/08/2022 22:00	0.0	F	35	Yes	IA	Nil
N20	26/08/2022 00:15	0.0	F	35	Yes	IA	Nil

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site- only LAeq,15minute attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.31 LA1,1minute generated by WCP against project specific criteria – August 2022**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP LA1,1min dB <sup>3,4</sup>	Exceedance dB <sup>4</sup>
N6	26/08/2022 00:45	0.0	F	45	Yes	IA	Nil
N14	25/08/2022 23:30	0.0	G	45	No	IA	NA
N15	25/08/2022 23:00	0.8	F	45	Yes	IA	Nil
N17	25/08/2022 22:23	1.0	F	45	Yes	IA	Nil
N19	25/08/2022 22:00	0.0	F	45	Yes	IA	Nil
N20	26/08/2022 00:15	0.0	F	45	Yes	IA	Nil

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site- only LA1,1minute attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

#### 4.8.4 Comparison of Real time and attended noise results

A summary of attended monitoring data and that measured by the four real time Sentinex units (omni-directional) is shown in Table 4.32 Low pass (<630 Hz) L<sub>Aeq</sub> and L<sub>A90</sub> are typically good indicators of mining noise levels.

**Table 4.32 Real time and attended noise levels<sup>1</sup> – August 2022**

Location/Sentinex	Attended Start Date and Time	Sentinex Start Date and Time	Sentinex Data <sup>2</sup>				Attended Measurement	
			Total L <sub>Aeq</sub> dB	Total L <sub>A90</sub> dB	Low pass (<630Hz) L <sub>Aeq</sub> dB	Low pass (<630Hz) L <sub>A90</sub> dB	Total L <sub>A90</sub> dB	WCP L <sub>Aeq</sub> dB
N14/SX31	25/08/2022 23:30	25/08/2022 23:30	39	25	33	21	24	IA
N15/SX33	25/08/2022 23:00	25/08/2022 23:00	41	29	39	23	24	IA
N19/SX32	25/08/2022 22:00	25/08/2022 22:00	27	24	23	18	27	IA
N20/SX30	26/08/2022 00:15	26/08/2022 00:15	31	30	26	23	24	IA

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

2. NR – no Sentinex data recorded for this period.

## 4.9 September 2022

### 4.9.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.33.

**Table 4.33 Measured noise levels<sup>1</sup> – September 2022**

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	20/09/2022 00:42	50	48	43	37	28	27	26
N14	20/09/2022 00:15	59	53	43	41	30	28	25
N15	19/09/2022 23:00	47	34	30	29	28	26	25
N17	19/09/2022 22:28	52	44	42	41	41	40	38
N19	19/09/2022 22:00	51	36	34	33	33	31	29
N20	19/09/2022 23:31	50	48	44	41	39	36	32

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

### 4.9.2 Modifying factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfl and methodology described in Section 3.3.

There were no modifying factors, as defined in the NPfl, applicable during the survey. Mining noise was analysed and did not satisfy requirements for tonal, intermittent, or low frequency modifying factors, as defined in the NPfl. This means that no modifying factor penalties were applied to any measured result during this survey.

### 4.9.3 Attended noise monitoring results

Table 4.34 to Table 4.35 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement

**Table 4.34 LAeq,15minute generated by WCP against project specific criteria – September 2022**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP LAeq dB <sup>3,4</sup>	Exceedance dB <sup>4</sup>
N6	20/09/2022 00:42	0.8	G	37	No	IA	NA
N14	20/09/2022 00:15	0.0	G	35	No	<25	NA
N15	19/09/2022 23:00	0.0	G	37	No	<25	NA
N17	19/09/2022 22:28	1.3	F	38	Yes	27	Nil
N19	19/09/2022 22:00	0.0	F	35	Yes	<25	Nil
N20	19/09/2022 23:31	0.0	G	35	No	IA	NA

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site- only LAeq,15minute attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

**Table 4.35 LA1,1minute generated by WCP against project specific criteria – September 2022**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP LA1,1min dB <sup>3,4</sup>	Exceedance dB <sup>4</sup>
N6	20/09/2022 00:42	0.8	G	45	No	IA	NA
N14	20/09/2022 00:15	0.0	G	45	No	<25	NA
N15	19/09/2022 23:00	0.0	G	45	No	<25	NA
N17	19/09/2022 22:28	1.3	F	45	Yes	34	Nil
N19	19/09/2022 22:00	0.0	F	45	Yes	26	Nil
N20	19/09/2022 23:31	0.0	G	45	No	IA	NA

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site- only LA1,1minute attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.

#### 4.9.4 Comparison of Real time and attended noise results

A summary of attended monitoring data and that measured by the four real time Sentinex units (omni-directional) is shown in Table 4.36 Low pass (<630 Hz) L<sub>Aeq</sub> and L<sub>A90</sub> are typically good indicators of mining noise levels.

**Table 4.36 Real time and attended noise levels <sup>1</sup> – September 2022**

Location/Sentinex	Attended Start Date and Time	Sentinex Start Date and Time	Sentinex Data <sup>2</sup>				Attended Measurement	
			Total L <sub>Aeq</sub> dB	Total L <sub>A90</sub> dB	Low pass (<630Hz) L <sub>Aeq</sub> dB	Low pass (<630Hz) L <sub>A90</sub> dB	Total L <sub>A90</sub> dB	WCP L <sub>Aeq</sub> dB
N14/SX31	20/09/2022 00:15	20/09/2022 00:15	36	32	26	22	28	<25
N15/SX33	19/09/2022 23:00	19/09/2022 23:00	37	31	31	19	26	<25
N19/SX32	19/09/2022 22:00	19/09/2022 22:00	35	31	23	21	31	<25
N20/SX30	19/09/2022 23:31	19/09/2022 23:30	47	36	44	30	36	IA

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

2. NR – no Sentinex data recorded for this period.



## 4.10 October 2022

### 4.10.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.37.

**Table 4.37 Measured noise levels<sup>1</sup> – October 2022**

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	11/10/2022 22:21	62	44	41	39	37	35	33
N14	11/10/2022 23:00	51	47	46	45	45	45	44
N15	11/10/2022 22:00	81	53	46	47	42	39	35
N17 <sup>2</sup>	-	-	-	-	-	-	-	-
N19 <sup>2</sup>	-	-	-	-	-	-	-	-
N20	11/10/2022 23:45	46	40	39	37	37	35	33

Notes: 1. Levels in this table are not necessarily the result of activity at WCP.  
2. Access to Mogo Road closed, measurements could not be taken.

### 4.10.2 Modifying factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfI and methodology described in Section 3.3.

There were no modifying factors, as defined in the NPfI, applicable during the survey. Mining noise was analysed and did not satisfy requirements for tonal, intermittent, or low frequency modifying factors, as defined in the NPfI. This means that no modifying factor penalties were applied to any measured result during this survey.

### 4.10.3 Attended noise monitoring results

Table 4.38 to Table 4.39 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement

**Table 4.38 LAeq,15minute generated by WCP against project specific criteria – October 2022**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP LAeq dB <sup>3,4</sup>	Exceedance dB <sup>4</sup>
N6	11/10/2022 22:21	2.1	E	37	Yes	IA	Nil
N14	11/10/2022 23:00	2.7	E	35	Yes	<25	Nil
N15	11/10/2022 22:00	2.0	E	37	Yes	IA	Nil
N17 <sup>5</sup>	-	-	-	38	-	-	-
N19 <sup>5</sup>	-	-	-	35	-	-	-
N20	11/10/2022 23:45	2.4	E	35	Yes	IA	Nil

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site- only LAeq,15minute attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.
  5. Access to Mogo Road closed, measurements could not be taken.

**Table 4.39 LA1,1minute generated by WCP against project specific criteria – October 2022**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP LA1,1min dB <sup>3,4</sup>	Exceedance dB <sup>4</sup>
N6	11/10/2022 22:21	2.1	E	45	Yes	IA	Nil
N14	11/10/2022 23:00	2.7	E	45	Yes	<25	Nil
N15	11/10/2022 22:00	2.0	E	45	Yes	IA	Nil
N17 <sup>5</sup>	-	-	-	45	-	-	-
N19 <sup>5</sup>	-	-	-	45	-	-	-
N20	11/10/2022 23:45	2.4	E	45	Yes	IA	Nil

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site- only LA1,1minute attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.
  5. Access to Mogo Road closed, measurements could not be taken.

#### 4.10.4 Comparison of Real time and attended noise results

A summary of attended monitoring data and that measured by the four real time Sentinex units (omni-directional) is shown in Table 4.40 Low pass (<630 Hz) LAeq and LA90 are typically good indicators of mining noise levels.

**Table 4.40 Real time and attended noise levels <sup>1</sup> – October 2022**

Location/Sentinex	Attended Start Date and Time	Sentinex Start Date and Time	Sentinex Data <sup>2</sup>				Attended Measurement	
			Total LAeq dB	Total LA90 dB	Low pass (<630Hz) LAeq dB	Low pass (<630Hz) LA90 dB	Total LA90 dB	WCP LAeq dB
N14/SX31	11/10/2022 23:00	11/10/2022 23:00	44	42	22	22	45	<25
N15/SX34	11/10/2022 22:00	11/10/2022 22:00	55	45	46	28	39	IA
N19 <sup>3</sup> /SX32	-	-	-	-	-	-	-	-
N20/SX30	11/10/2022 23:45	11/10/2022 23:45	37	36	30	29	35	IA

- Notes:
1. Levels in this table are not necessarily the result of activity at WCP.
  2. NR – no Sentinex data recorded for this period.
  3. Access to Mogo Road closed, measurements could not be taken.

## 4.11 November 2022

### 4.11.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.41.

**Table 4.41 Measured noise levels<sup>1</sup> – November 2022**

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	15/11/2022 23:37	43	36	33	32	31	30	28
N14	15/11/2022 22:45	50	40	37	35	35	33	30
N15	15/11/2022 23:15	44	40	37	35	34	31	28
N17 <sup>2</sup>	-	-	-	-	-	-	-	-
N19 <sup>2</sup>	-	-	-	-	-	-	-	-
N20	15/11/2022 22:00	46	43	42	41	40	39	36

Notes: 1. Levels in this table are not necessarily the result of activity at WCP.  
2. Access to Mogo Road closed, measurements could not be taken.

### 4.11.2 Modifying factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfI and methodology described in Section 3.3.

There were no modifying factors, as defined in the NPfI, applicable during the survey. Mining noise was analysed and did not satisfy requirements for tonal, intermittent, or low frequency modifying factors, as defined in the NPfI. This means that no modifying factor penalties were applied to any measured result during this survey.

### 4.11.3 Attended noise monitoring results

Table 4.42 to Table 4.43 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement

**Table 4.42 LAeq,15minute generated by WCP against project specific criteria – November 2022**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP LAeq dB <sup>3,4</sup>	Exceedance dB <sup>4</sup>
N6	15/11/2022 23:37	2.4	C	37	Yes	<25	Nil
N14	15/11/2022 22:45	3.0	D	35	Yes	<25	Nil
N15	15/11/2022 23:15	3.3	E	37	No	<25	NA
N17 <sup>5</sup>	-	-	-	38	-	-	-
N19 <sup>5</sup>	-	-	-	35	-	-	-
N20	15/11/2022 22:00	2.6	D	35	Yes	IA	Nil

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site- only LAeq,15minute attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.
  5. Access to Mogo Road closed, measurements could not be taken.

**Table 4.43 LA1,1minute generated by WCP against project specific criteria – November 2022**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP LA1,1min dB <sup>3,4</sup>	Exceedance dB <sup>4</sup>
N6	15/11/2022 23:37	2.4	C	45	Yes	27	Nil
N14	15/11/2022 22:45	3.0	D	45	Yes	30	Nil
N15	15/11/2022 23:15	3.3	E	45	No	<25	NA
N17 <sup>5</sup>	-	-	-	45	-	-	-
N19 <sup>5</sup>	-	-	-	45	-	-	-
N20	15/11/2022 22:00	2.6	D	45	Yes	IA	Nil

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site- only LA1,1minute attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.
  5. Access to Mogo Road closed, measurements could not be taken.

#### 4.11.4 Comparison of Real time and attended noise results

A summary of attended monitoring data and that measured by the four real time Sentinex units (omni-directional) is shown in Table 4.44 Low pass (<630 Hz) LAeq and LA90 are typically good indicators of mining noise levels.

**Table 4.44 Real time and attended noise levels <sup>1</sup> – November 2022**

Location/Sentinex	Attended Start Date and Time	Sentinex Start Date and Time	Sentinex Data <sup>2</sup>				Attended Measurement	
			Total LAeq dB	Total LA90 dB	Low pass (<630Hz) LAeq dB	Low pass (<630Hz) LA90 dB	Total LA90 dB	WCP LAeq dB
N14/SX31	15/11/2022 22:45	15/11/2022 22:45	40	37	24	24	33	<25
N15/SX33	15/11/2022 23:15	15/11/2022 23:15	52	37	23	22	31	<25
N19 <sup>3</sup> /SX32	-	-	-	-	-	-	-	-
N20/SX30	15/11/2022 22:00	15/11/2022 22:00	39	36	35	29	39	IA

- Notes:
1. Levels in this table are not necessarily the result of activity at WCP.
  2. NR – no Sentinex data recorded for this period.
  3. Access to Mogo Road closed, measurements could not be taken.



## 4.12 December 2022

### 4.12.1 Total measured noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.45.

**Table 4.45 Measured noise levels<sup>1</sup> – December 2022**

Location	Start Date and Time	L <sub>Amax</sub> dB	L <sub>A1</sub> dB	L <sub>A10</sub> dB	L <sub>Aeq</sub> dB	L <sub>A50</sub> dB	L <sub>A90</sub> dB	L <sub>Amin</sub> dB
N6	06/12/2022 23:35	56	50	44	39	28	24	22
N14	06/12/2022 22:45	48	46	42	37	33	29	25
N15	06/12/2022 23:15	50	43	38	34	31	27	24
N17 <sup>2</sup>	-	-	-	-	-	-	-	-
N19 <sup>2</sup>	-	-	-	-	-	-	-	-
N20	06/12/2022 22:00	46	43	37	35	33	31	27

Notes: 1. Levels in this table are not necessarily the result of activity at WCP.  
2. Access to Mogo Road closed, measurements could not be taken.

### 4.12.2 Modifying factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfI and methodology described in Section 3.3.

There were no modifying factors, as defined in the NPfI, applicable during the survey. Mining noise was analysed and did not satisfy requirements for tonal, intermittent, or low frequency modifying factors, as defined in the NPfI. This means that no modifying factor penalties were applied to any measured result during this survey.

### 4.12.3 Attended noise monitoring results

Table 4.46 to Table 4.47 detail noise levels from WCP in the absence of other noise sources. Noise criteria are applicable if weather conditions were within specified parameters during the measurement

**Table 4.46 LAeq,15minute generated by WCP against project specific criteria – December 2022**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP LAeq dB <sup>3,4</sup>	Exceedance dB <sup>4</sup>
N6	06/12/2022 23:35	0.4	F	37	Yes	<20	Nil
N14	06/12/2022 22:45	1.1	F	35	Yes	IA	Nil
N15	06/12/2022 23:15	0.0	G	37	No	<20	NA
N17 <sup>5</sup>	-	-	-	38	-	-	-
N19 <sup>5</sup>	-	-	-	35	-	-	-
N20	06/12/2022 22:00	0.7	F	35	Yes	IA	Nil

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site- only LAeq,15minute attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.
  5. Access to Mogo Road closed, measurements could not be taken.

**Table 4.47 LA1,1minute generated by WCP against project specific criteria – December 2022**

Location	Start Date and Time	Wind Speed m/s <sup>1</sup>	Stability Class <sup>1</sup>	Criterion dB	Criterion Applies? <sup>2</sup>	WCP LA1,1min dB <sup>3,4</sup>	Exceedance dB <sup>4</sup>
N6	06/12/2022 23:35	0.4	F	45	Yes	<20	Nil
N14	06/12/2022 22:45	1.1	F	45	Yes	IA	Nil
N15	06/12/2022 23:15	0.0	G	45	No	<20	NA
N17 <sup>5</sup>	-	-	-	45	-	-	-
N19 <sup>5</sup>	-	-	-	45	-	-	-
N20	06/12/2022 22:00	0.7	F	45	Yes	IA	Nil

- Notes:
1. Wind speed is sourced from the WCP weather station, stability class is determined based on WCP inversion tower data.
  2. Noise emission limits apply for all meteorological conditions, except for the following: wind speeds greater than 3 m/s above ground level; or stability category F temperature inversions and wind speeds greater than 2 m/s at 10m above ground level; or stability category G temperature inversion conditions.
  3. Site- only LA1,1minute attributed to WCP, including modifying factors if applicable.
  4. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in EPL.
  5. Access to Mogo Road closed, measurements could not be taken.

#### 4.12.4 Comparison of Real time and attended noise results

A summary of attended monitoring data and that measured by the four real time Sentinex units (omni-directional) is shown in Table 4.48 Low pass (<630 Hz) LAeq and LA90 are typically good indicators of mining noise levels.

**Table 4.48 Real time and attended noise levels <sup>1</sup> – December 2022**

Location/Sentinex	Attended Start Date and Time	Sentinex Start Date and Time	Sentinex Data <sup>2</sup>				Attended Measurement	
			Total LAeq dB	Total LA90 dB	Low pass (<630Hz) LAeq dB	Low pass (<630Hz) LA90 dB	Total LA90 dB	WCP LAeq dB
N14/SX31	06/12/2022 22:45	06/12/2022 22:45	30	24	19	18	29	IA
N15/SX33	06/12/2022 23:15	06/12/2022 23:15	53	43	27	23	27	<20
N19 <sup>3</sup> /SX32	-	-	-	-	-	-	-	-
N20/SX30	06/12/2022 22:00	06/12/2022 22:00	47	32	46	28	31	IA

- Notes:
1. Levels in this table are not necessarily the result of activity at WCP.
  2. NR – no Sentinex data recorded for this period.
  3. Access to Mogo Road closed, measurements could not be taken.

## 5 Long term trends

Site only  $L_{Aeq}$  noise levels measured during monthly attended environmental noise monitoring over a 5-year period from January 2018 to December 2022 have been collated and graphed to summarise WCP long-term noise performance. Less than five years of data was available at three locations due to monitoring commencing at those locations during the 5-year period.

Due to the qualitative nature of some attended noise monitoring descriptors, calculation of site noise statistics such as mean, median, and standard deviation is not always possible. Subsequently, site only  $L_{Aeq}$  noise levels for each monitoring event have been grouped into one of three categories:

WCP only  $L_{Aeq}$  was either inaudible (IA), not measurable (NM), or less than 30 dB, which together are represented by green bars;

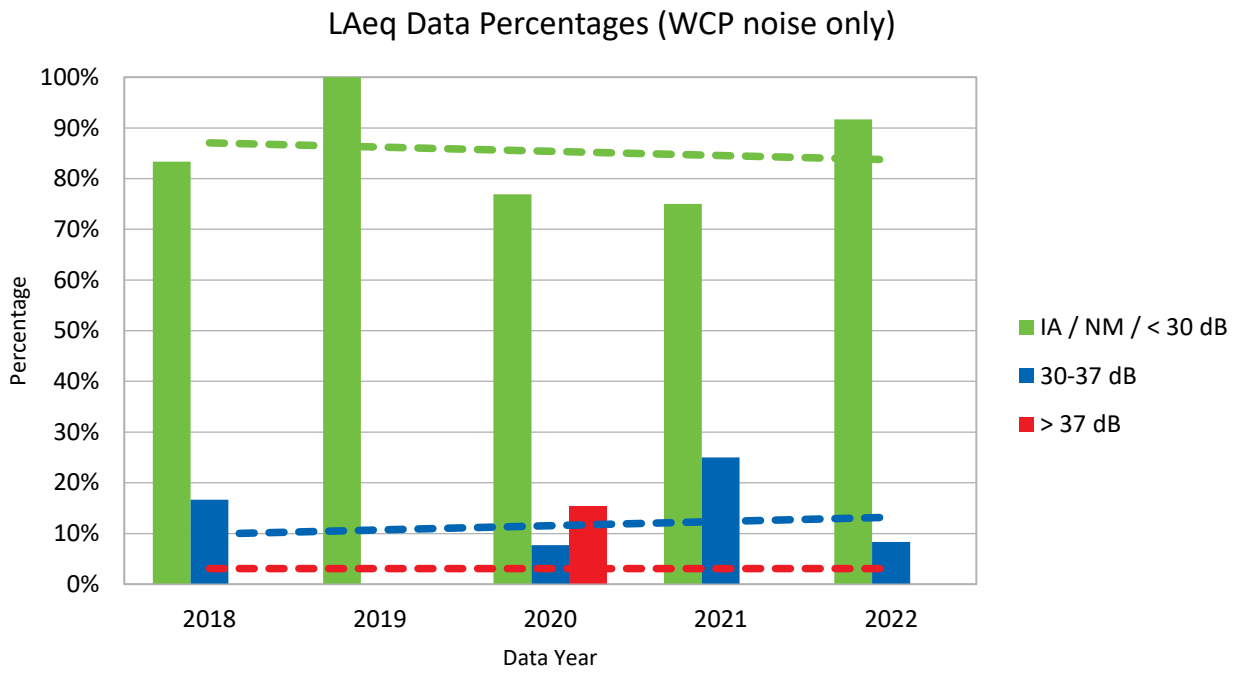
WCP only  $L_{Aeq}$  was between 30 dB and the relevant impact assessment criterion (inclusive), represented by blue bars; or

WCP only  $L_{Aeq}$  was greater than the impact assessment criterion for that location, represented by red bars.

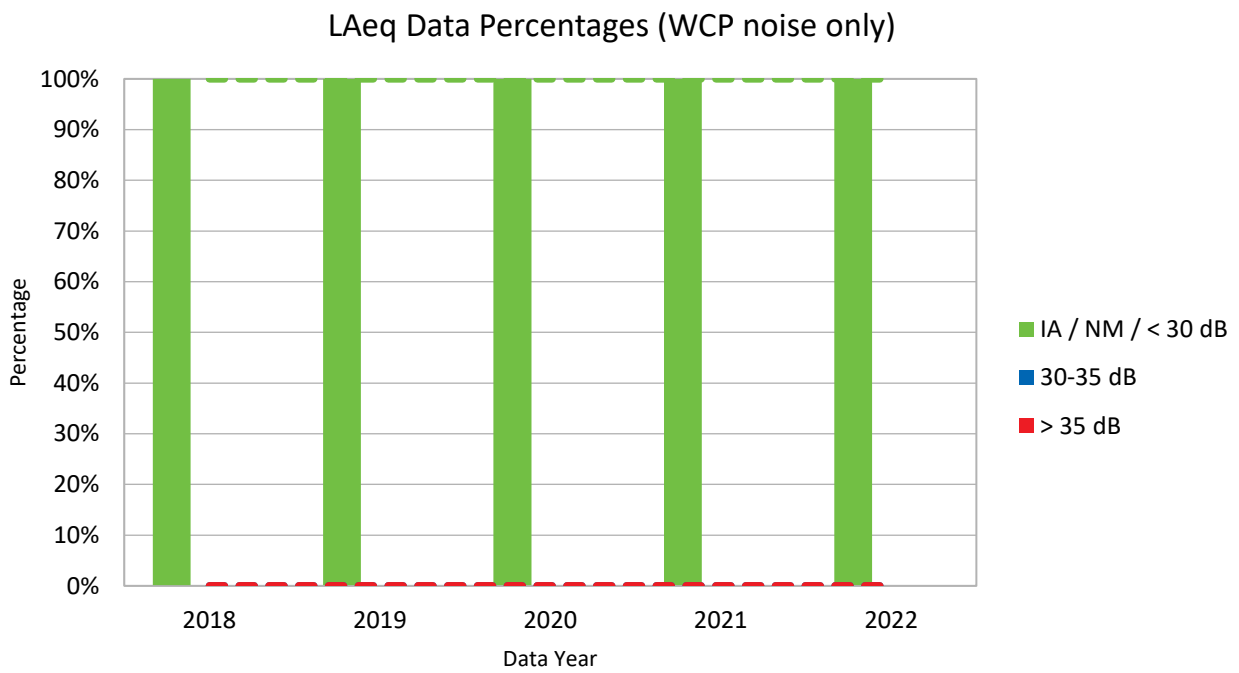
For each calendar year, the percentage of occurrence for each of these categories is shown, as well as annual trend lines over the entire five-year period. Figures show site only  $L_{Aeq}$  noise levels, including adjustments due to modifying factors, as defined by the Environment Protection Authority (EPA) 'Noise Policy for Industry' (NPfI, current as of October 2017). Meteorological conditions and applicability of noise criteria have not been considered.

### 5.1 Noise trend graphs

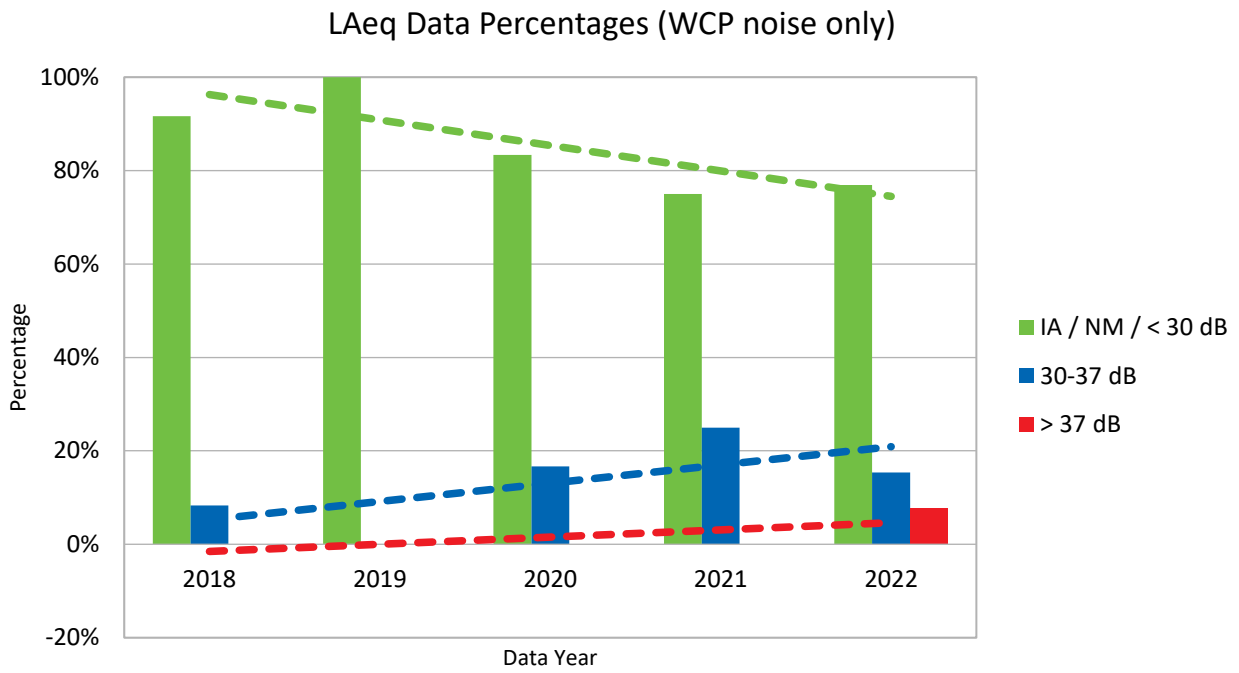
Site only  $L_{Aeq}$  noise levels measured during attended environmental noise monitoring over a 5-year period have been collated and graphed to summarise long-term noise trends. Figure 5.1 to Figure 5.6 provide percentage occurrence information for WCP noise levels at six monitoring locations.



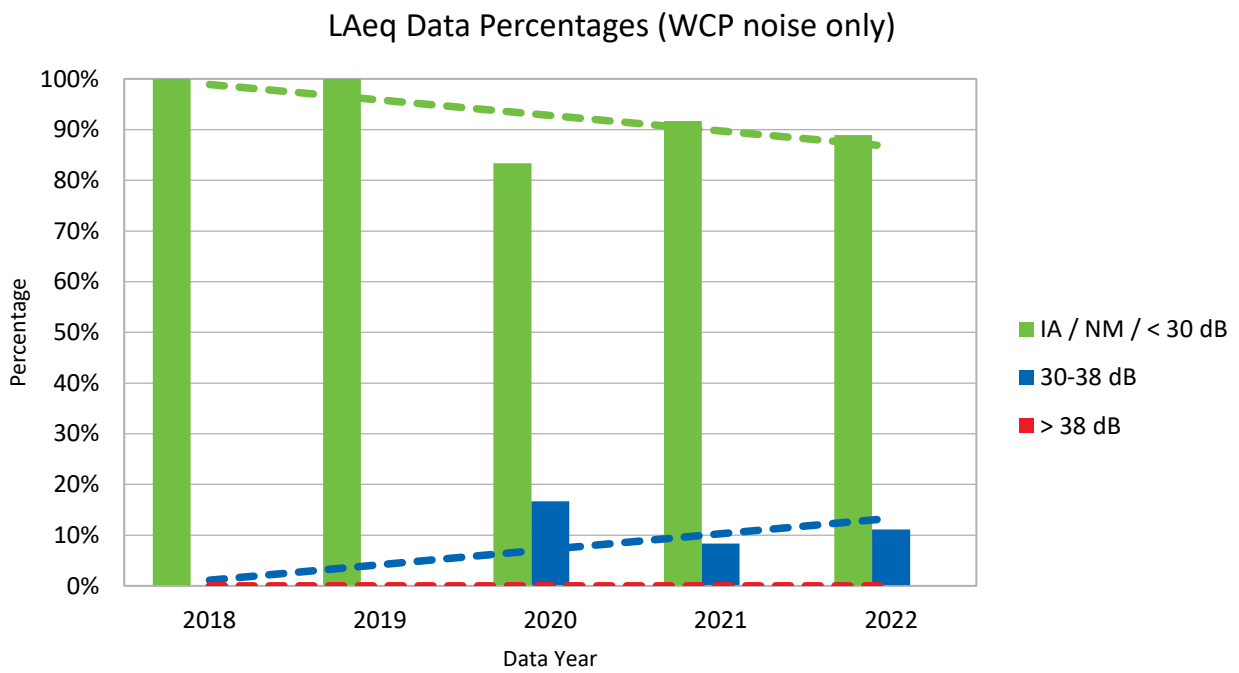
**Figure 5.1** Attended noise monitoring data, N6



**Figure 5.2** Attended noise monitoring data, N14



**Figure 5.3** Attended noise monitoring data, N15



**Figure 5.4** Attended noise monitoring data, N17



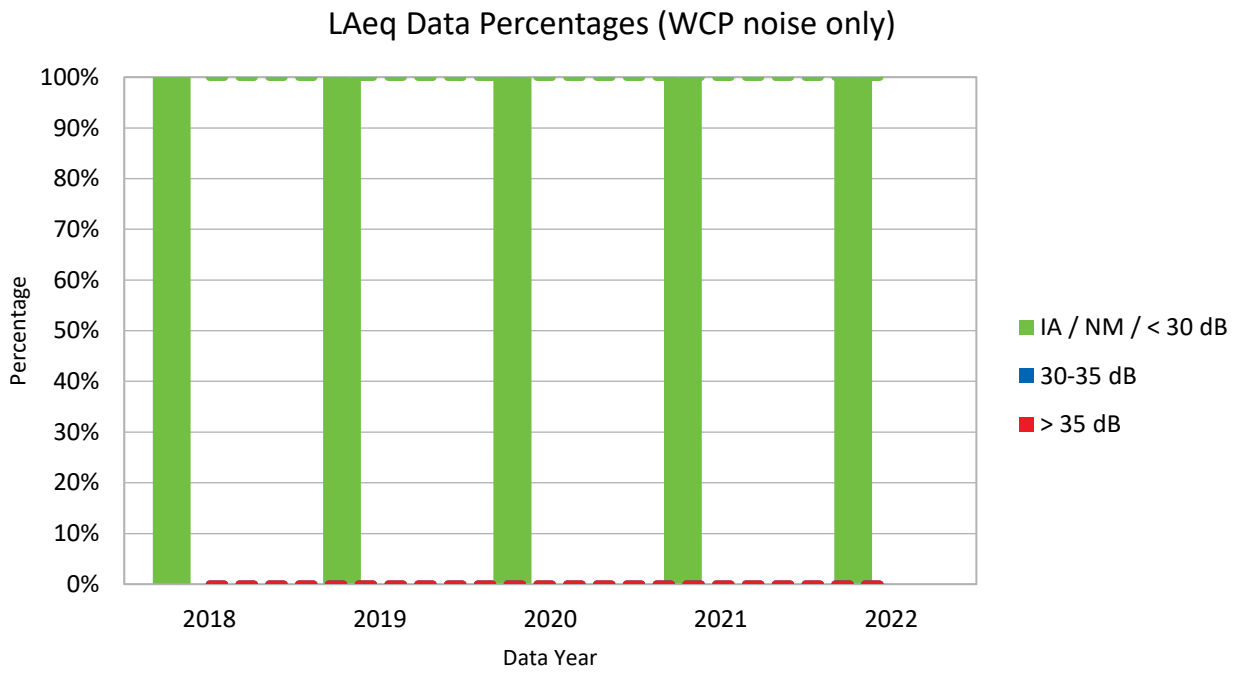


Figure 5.5 Attended noise monitoring data, N19

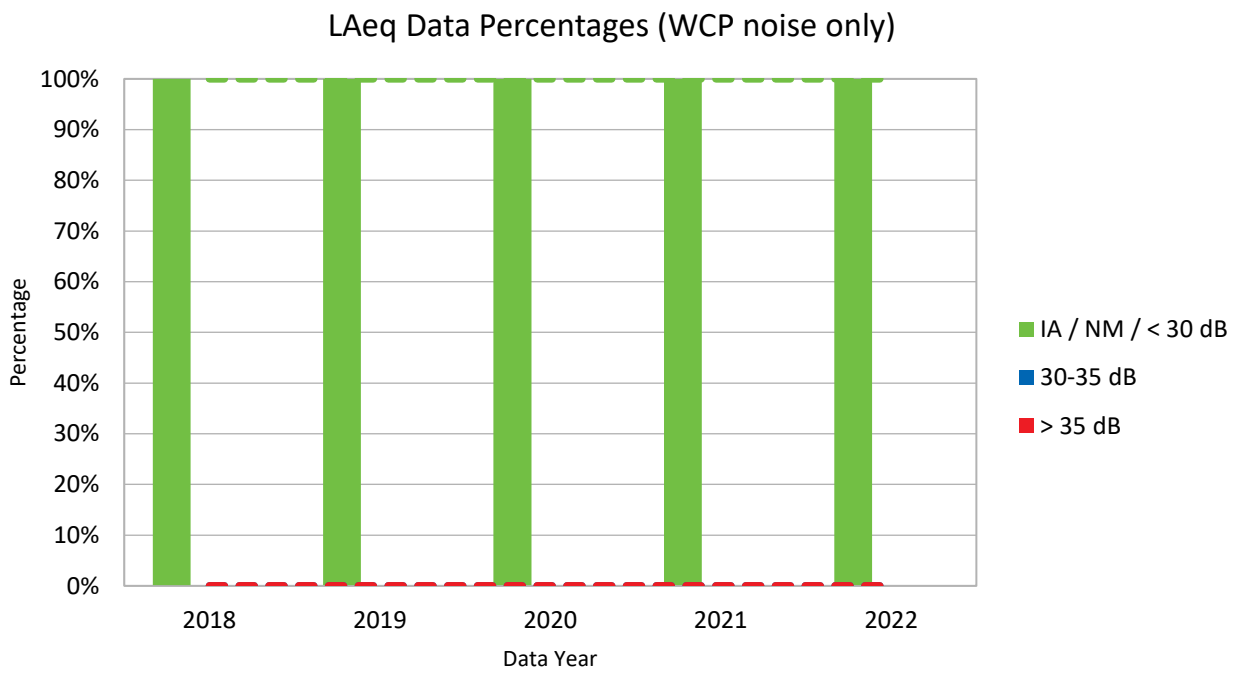


Figure 5.6 Attended noise monitoring data, N20

## 5.2 Discussion

Site only  $L_{Aeq}$  noise levels were low (either IA, NM, or less than 30 dB) for a large majority of measurements at all monitoring locations. At N14, N19, and N20, site only  $L_{Aeq}$  noise levels were inaudible or less than 30 dB during all attended noise monitoring measurements. At N6, N15, and N17, site only  $L_{Aeq}$  noise levels were occasionally above 30 dB and long-term noise trend lines indicate site only  $L_{Aeq}$  noise levels have increased slightly during attended noise monitoring.

## 6 Comparison with EIS modelled predictions

A noise and blasting assessment was prepared in November 2015 as part of an EIS to support application of the WEP. As part of the modelling assessment, noise levels from WCP were predicted for representative operating scenarios, time periods and weather conditions.

Predicted noise levels for “Year 2020” most closely aligned with the 2022 reporting year and have been compared with measured levels from attended compliance monitoring under corresponding meteorological conditions. Table 6.1 summarises predicted noise levels for specific monitoring locations detailed in Table 26 and 27 of the noise and blasting assessment, under certain meteorological condition defined in Section 3.5 of this report.

**Table 6.1 WCP operational predictions, Year 2020 - dB**

NMP Descriptor	Monitoring Locations	Nearest property ID	Night LAeq,15minute Calm	Night LAeq,15minute Wind or Inversion	Night LA1,1minute Wind or Inversion
N6	St Laurence O’Toole Catholic Church	(903) <sup>1</sup>	19	33	40
N14	Tichular	(153) <sup>1</sup>	13	31	38
N15	Wollar Village	(933) <sup>1</sup>	18	35	42
N17	Mogo Road	102	21	35	42
N19	North Mogo Road	104	19	31	37
N20	Ringwood Road	160	9	27	34

Notes: 1. Monitoring location is not at residence in brackets. Noise predictions for the nearest residence have been used for comparison.

Table 6.2 to Table 6.7 of this report compare the measured operational levels to predicted noise levels in the EIS for Year 2022. A positive difference indicates the measured level is greater than the predicted level and a negative difference indicates the measured levels are less than predicted in the EIS.

When meteorological conditions during the attended monitoring measurement do not correspond with those that are modelled, the meteorological conditions are considered “not applicable” (NA) and no further analysis is undertaken. When meteorological conditions during the measurement correspond with modelled conditions, but measured WCP noise levels were not directly quantifiable, measured and modelled noise levels are “not comparable” (NC) and no further analysis is required

## 6.1 Results

### 6.1.1 N6, St Laurance O’Toole Catholic Church

**Table 6.2 Measured WCP LAeq,15minute compared to year 2022 predicted LAeq,15minute at N6, dB(A)**

Month	Applicable Meteorological Condition <sup>1,2</sup>	Measured WCP LAeq,15minute	Predicted WCP LAeq,15minute	Difference <sup>2,3</sup>	Measured WCP LA1,1minute	Predicted WCP LA1,1minute	Difference <sup>2,3</sup>
January	Summer Wind	IA	33	NC	IA	40	NC
February	Summer Wind	IA	33	NC	IA	40	NC
March	NA	IA	-	NA	IA	-	NA
April	NA	<20	-	NA	23	-	NA
May	Strong Inversion	<25	33	NC	<25	40	NC
June	Strong Inversion	30	33	-3	37	40	-3
July	Strong Inversion	IA	33	NC	IA	40	NC
August	Strong Inversion	IA	33	NC	IA	40	NC
September	NA	IA	-	NA	IA	-	NA
October	Summer Wind	IA	33	NC	IA	40	NC
November	NA	<25	-	NA	27	-	NA
December	Strong Inversion	<20	33	NC	<20	40	NC

- Notes:
1. Refer to Table 3.2 for applicable meteorological conditions;
  2. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison; and
  3. NC indicated measured WCP noise levels were inaudible (IA), not measurable (NM), or expressed as a “less than” (eg. Less than 30 dB), therefore measured and predicted noise levels were not comparable.

## 6.1.2 N14, Tichular

**Table 6.3 Measured WCP LAeq,15minute compared to year 2022 predicted LAeq,15minute at N14, dB(A)**

Month	Applicable Meteorological Condition <sup>1,2</sup>	Measured WCP LAeq,15minute	Predicted WCP LAeq,15minute	Difference <sup>2,3</sup>	Measured WCP LA1,1minute	Predicted WCP LA1,1minute	Difference <sup>2,3</sup>
January	Summer Wind	IA	31	NC	IA	38	NC
February	Summer Wind	IA	31	NC	IA	38	NC
March	NA	IA	-	NA	IA	-	NA
April	Calm	<25	13	NC	<25	-	NC
May	Strong Inversion	IA	31	NC	IA	38	NC
June	Strong Inversion	IA	31	NC	IA	38	NC
July	Strong Inversion	IA	31	NC	IA	38	NC
August	Strong Inversion	IA	31	NC	IA	38	NC
September	Strong Inversion	<25	31	NC	<25	38	NC
October	Summer Wind	<25	31	NC	<25	38	NC
November	NA	<25	-	NC	30	-	NA
December	NA	IA	-	NA	IA	-	NA

- Notes:
1. Refer to Table 3.2 for applicable meteorological conditions;
  2. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison; and
  3. NC indicated measured WCP noise levels were inaudible (IA), not measurable (NM), or expressed as a "less than" (eg. Less than 30 dB), therefore measured and predicted noise levels were not comparable.

### 6.1.3 N15, Wollar Village

**Table 6.4 Measured WCP LAeq,15minute compared to year 2022 predicted LAeq,15minute at N15, dB(A)**

Month	Applicable Meteorological Condition <sup>1,2</sup>	Measured WCP LAeq,15minute	Predicted WCP LAeq,15minute	Difference <sup>2,3</sup>	Measured WCP LA1,1minute	Predicted WCP LA1,1minute	Difference <sup>2,3</sup>
January	Summer Wind	IA	35	NC	IA	42	NC
February	Summer Wind	IA	35	NC	IA	42	NC
March	NA	IA	-	NA	IA	-	NA
April	Calm	23	18	+5	32	-	NA
May	Strong Inversion	34	35	-1	38	42	-4
June	Strong Inversion	38	35	+3	42	42	0
June remeasure	Strong Inversion	34	35	-1	35	42	-7
July	Strong Inversion	29	35	-6	40	42	-2
August	NA	IA	-	NC	IA	-	NA
September	Strong Inversion	<25	35	NC	<25	42	NC
October	Summer Wind	IA	35	NC	IA	42	NC
November	NA	<25	-	NC	<25	-	NC
December	Strong Inversion	<20	35	NC	<20	42	NC

- Notes:
1. Refer to Table 3.2 for applicable meteorological conditions;
  2. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison; and
  3. NC indicated measured WCP noise levels were inaudible (IA), not measurable (NM), or expressed as a "less than" (eg. Less than 30 dB), therefore measured and predicted noise levels were not comparable.



## 6.1.4 N17, Mogo Road

**Table 6.5 Measured WCP LAeq,15minute compared to year 2022 predicted LAeq,15minute at N17, dB(A)**

Month	Applicable Meteorological Condition <sup>1,2</sup>	Measured WCP LAeq,15minute	Predicted WCP LAeq,15minute	Difference <sup>2,3</sup>	Measured WCP LA1,1minute	Predicted WCP LA1,1minute	Difference <sup>2,3</sup>
January	Summer Wind	IA	35	NC	IA	42	NC
February	Summer Wind	IA	35	NC	IA	42	NC
March	NA	IA	-	NA	IA	-	NA
April	Calm	<20	21	NC	23	-	NA
May	Strong Inversion	32	35	-3	37	42	-5
June	Strong Inversion	23	35	-12	28	42	-14
July	Strong Inversion	27	35	-8	30	42	-12
August	NA	IA	-	NA	IA	-	NA
September	NA	27	-	NA	34	-	NA
October <sup>4</sup>	-	-	-	-	-	-	-
November <sup>4</sup>	-	-	-	-	-	-	-
December <sup>4</sup>	-	-	-	-	-	-	-

- Notes:
1. Refer to Table 3.2 for applicable meteorological conditions;
  2. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison; and
  3. NC indicated measured WCP noise levels were inaudible (IA), not measurable (NM), or expressed as a "less than" (eg. Less than 30 dB), therefore measured and predicted noise levels were not comparable.
  4. Access to Mogo Road closed, measurements could not be taken.

## 6.1.5 N19, North Mogo Road

**Table 6.6 Measured WCP LAeq,15minute compared to year 2022 predicted LAeq,15minute at N19, dB(A)**

Month	Applicable Meteorological Condition <sup>1,2</sup>	Measured WCP LAeq,15minute	Predicted WCP LAeq,15minute	Difference <sup>2,3</sup>	Measured WCP LA1,1minute	Predicted WCP LA1,1minute	Difference <sup>2,3</sup>
January	Summer Wind	IA	31	NC	IA	37	NC
February	NA	IA	-	NA	IA	-	NA
March	NA	IA	-	NA	IA	-	NA
April	Calm	IA	19	NC	IA	-	NA
May	Strong Inversion	<20	31	NC	<20	37	NC
June	Strong Inversion	IA	31	NC	IA	37	NC
July	NA	IA	-	NA	IA	-	NA
August	Strong Inversion	IA	31	NC	IA	37	NC
September	Strong Inversion	<25	31	NC	26	37	-11
October <sup>4</sup>	-	-	-	-	-	-	-
November <sup>4</sup>	-	-	-	-	-	-	-
December <sup>4</sup>	-	-	-	-	-	-	-

- Notes:
1. Refer to Table 3.2 for applicable meteorological conditions;
  2. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison; and
  3. NC indicated measured WCP noise levels were inaudible (IA), not measurable (NM), or expressed as a "less than" (eg. Less than 30 dB), therefore measured and predicted noise levels were not comparable.
  4. Access to Mogo Road closed, measurements could not be taken.

## 6.1.6 N20, Ringwood Road

**Table 6.7 Measured WCP LAeq,15minute compared to year 2022 predicted LAeq,15minute at N20, dB(A)**

Month	Applicable Meteorological Condition <sup>1,2</sup>	Measured WCP LAeq,15minute	Predicted WCP LAeq,15minute	Difference <sup>2,3</sup>	Measured WCP LA1,1minute	Predicted WCP LA1,1minute	Difference <sup>2,3</sup>
January	Summer Wind	IA	27	NC	IA	34	NC
February	Summer Wind	IA	27	NC	IA	34	NC
March	NA	IA	-	NA	IA	-	NA
April	Summer Wind	<25	27	NC	<25	34	NC
May	Calm	22	9	+13	28	-	NA
June	NA	IA	-	NA	IA	-	NA
July	Strong Inversion	IA	27	NC	IA	34	NC
August	Strong Inversion	IA	27	NC	IA	34	NC
September	Strong Inversion	IA	27	NC	IA	34	NC
October	Summer Wind	IA	27	NC	IA	34	NC
November	NA	IA	-	NA	IA	-	NA
December	NA	IA	-	NA	IA	-	NA

- Notes:
1. Refer to Table 3.2 for applicable meteorological conditions;
  2. NA indicates meteorological conditions during the measurement did not correspond with any modelled meteorological conditions, and were not applicable for comparison; and
  3. NC indicated measured WCP noise levels were inaudible (IA), not measurable (NM), or expressed as a "less than" (eg. Less than 30 dB), therefore measured and predicted noise levels were not comparable.

## 6.2 Discussion

When comparable, measured noise levels were lower than predicted noise levels under corresponding meteorological conditions at all locations during all measurements, with three exceptions.

During the April 2022 measurement at N15, the measured site only  $L_{Aeq}$  was 5 dB higher than predicted under calm conditions. The measured site only  $L_{Aeq}$  was 12 dB lower than the relevant criterion during this measurement.

During the May 2022 measurement at N20, the measured site only  $L_{Aeq}$  was 13 dB higher than predicted under calm conditions. The measured site only  $L_{Aeq}$  was 13 dB lower than the relevant criterion during this measurement.

During the June 2022 measurement at N15, the measured site only  $L_{Aeq}$  was 3 dB higher than predicted under strong inversion conditions. The measured site only  $L_{Aeq}$  was 1 dB higher than the relevant criterion during this measurement.

## 7 Summary

EMM was engaged by WCP to provide an Annual Environmental Monitoring Report for 2022, in order to compare noise monitoring results against both relevant criteria and predictions in the most recently approved EIS for the WEP.

This report summarises monthly attended noise monitoring surveys conducted around WCP during the reporting period 1 January to 31 December 2022. The purpose of the surveys was to quantify and describe the acoustic environment around the site and compare results with specified limits. The duration of each measurement was 15 minutes.

Attended noise monitoring described in this report was conducted on a monthly basis in accordance with Project Approval SSD-6764, the WCP NMP, and EPL No. 12425

### 7.1 January to December 2022 compliance

During 2022 attended noise monitoring, noise levels from WCP complied with relevant noise limits at all monitoring locations, with a single exception. There was one exceedance of WCP impact assessment  $L_{Aeq}$  noise criteria at N15 in June 2022. A follow up measurement was conducted directly afterwards and WCP levels were compliant with relevant criteria.

### 7.2 Long term noise trends

Site only  $L_{Aeq}$  noise levels were low (either IA, NM, or less than 30 dB) for a large majority of measurements at all monitoring locations. At N14, N19, and N20, site only  $L_{Aeq}$  noise levels were inaudible or less than 30 dB during all attended noise monitoring measurements. At N6, N15, and N17, site only  $L_{Aeq}$  noise levels were occasionally above 30 dB and long-term noise trend lines indicate site only  $L_{Aeq}$  noise levels have increased slightly during attended noise monitoring.

### 7.3 EIS Comparison

When comparable, measured noise levels were lower than predicted noise levels under corresponding meteorological conditions at all locations during all measurements, with three exceptions.

During the April 2022 measurement at N15, the measured site only  $L_{Aeq}$  was 5 dB higher than predicted under calm conditions. The measured site only  $L_{Aeq}$  was 12 dB lower than the relevant criterion during this measurement.

During the May 2022 measurement at N20, the measured site only  $L_{Aeq}$  was 13 dB higher than predicted under calm conditions. The measured site only  $L_{Aeq}$  was 13 dB lower than the relevant criterion during this measurement.

During the June 2022 measurement at N15, the measured site only  $L_{Aeq}$  was 3 dB higher than predicted under strong inversion conditions. The measured site only  $L_{Aeq}$  was 1 dB higher than the relevant criterion during this measurement.

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