Mannering Colliery

Monthly attended noise monitoring - October 2022

Prepared for Great Southern Energy Pty Ltd (trading as Delta Coal)

November 2022

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E220750 RP10

November 2022

Version	Date	Prepared by	Approved by	Comments
1	1 November 2022	Lucas Adamson	Tony Welbourne	

Approved by

Tony Welbourne
Associate Director
1 November 2022
Level 3 175 Scott Street
Newcastle NSW 2300

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Appendices

Tables

Figures

1 Introduction

EMM Consulting Pty Limited (EMM) was engaged to complete operator-attended noise surveys on behalf of Great Southern Energy Pty Ltd (Delta Coal).

The purpose of the monitoring was to address requirements of the approved Mannering Colliery Noise Management Plan (NMP), prepared to satisfy the requirements of the project approval MP06_0311 (PA) and Environment Protection License (EPL) 191. The NMP incorporates noise management for both Delta Coal's Chain Valley Colliery (CVC) and Mannering Colliery (MC).

Noise monitoring is required to occur monthly for MC. This report presents the results and findings of attended noise monitoring conducted on 18 October 2022.

The following material was referenced as part of this assessment:

- Department of Planning, Industry and Environment (DPIE), PA MP06_0311, as modified on 5 June 2020 (current as of the monitoring date 18 October 2022);
- Environment Protection Authority (EPA), EPL 191, as varied on 14 April 2021 (current as of the monitoring date 18 October 2022);
- NSW EPA, Noise Policy for Industry (NPfI), 2017; and
- Chain Valley Colliery and Mannering Colliery Noise Management Plan (approved 19 April 2022) updated following MC Mod 5 approval (Mod 5 approval).

A glossary of acoustic terms relevant to this report is provided in Appendix A.

2 Noise limits

2.1 Overview

Noise limits for MC are provided in Table 1, Condition 2 of Schedule 3 of the PA. The EPL references the PA with respect to noise limits. Extracts of the relevant sections of the PA and EPL pertaining to noise are provided in Appendix B and Appendix C, respectively.

The NMP was prepared in line with the Mod 5 approval and in accordance with the NPfI. Three attended noise monitoring locations representative of the noise assessment locations outlined in the PA have been adopted in the NMP for the purpose of determining compliance with relevant noise limits.

2.2 Noise limits

The MC attended noise monitoring program is undertaken monthly during the evening and night periods. The attended noise monitoring locations and relevant limits per the NMP are summarised in Table 2.1.

Table 2.1 Attended noise monitoring locations and noise limits

Attended noise monitoring location	Assessment locations	Day $L_{Aeq,15\ minute}$, dB	Evening $L_{Aeq,15\ minute}$, dB	Night $L_{Aeq,15\ minute}$, dB	Night $L_{A1,1\ minute}$, dB
RA1	4, 5, 6	40	36	36	46
RA2	7, 8	40	40	40	45
RA3	9, 11, 18, 20	40	39	39	49

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

2.3 Adjustment to noise limits under certain meteorological conditions

The PA (Mod 5) states the following:

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

Section 5.2 of the NPfI states that noise limits applicable under 'very noise-enhancing' conditions should be the limits that apply under 'standard' or 'noise-enhancing' conditions plus 5 dB. This implies that there will be no periods when noise limits do not apply due to meteorological conditions. Refer the glossary of acoustic terms in Appendix A for the definition of 'standard', 'noise-enhancing' and 'very noise -enhancing' meteorological conditions.

As per the PA (Mod 5) and NMP, and in accordance with the NPfI, this assessment has adopted a +5 dB adjustment to the limits shown in Table 2.1 when monitoring is undertaken during the following 'very noise-enhancing' conditions:

- wind speeds greater than 3 m/s at 10 m above ground level;

- stability category F temperature inversion conditions with wind speeds greater than 2 m/s at 10 m above ground level; or
- stability category G temperature inversion conditions.

When monitoring has been undertaken during 'very noise-enhancing' conditions and a +5 dB adjustment to the limits has been adopted, this is indicated in Table 4.1.

2.4 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.

3 Assessment methodology

3.1 Attended noise monitoring

To quantify noise emissions from MC, 15-minute operator-attended noise monitoring surveys were completed at three representative locations as per the NMP.

Attended noise monitoring locations and their coordinates are listed in Table 3.1 and are shown in Figure 3.1.

Table 3.1 Attended noise monitoring locations

Attended noise monitoring location	Description	Coordinates (MGA56)	
		Easting	Northing
RA1	Pacific Highway, Doyalson	364646	6327221
RA2	Macquarie Shores Home Village, Doyalson North	365164	6328332
RA3	Tall Timbers Road (northern end), Kingfisher Shores	365069	6328953

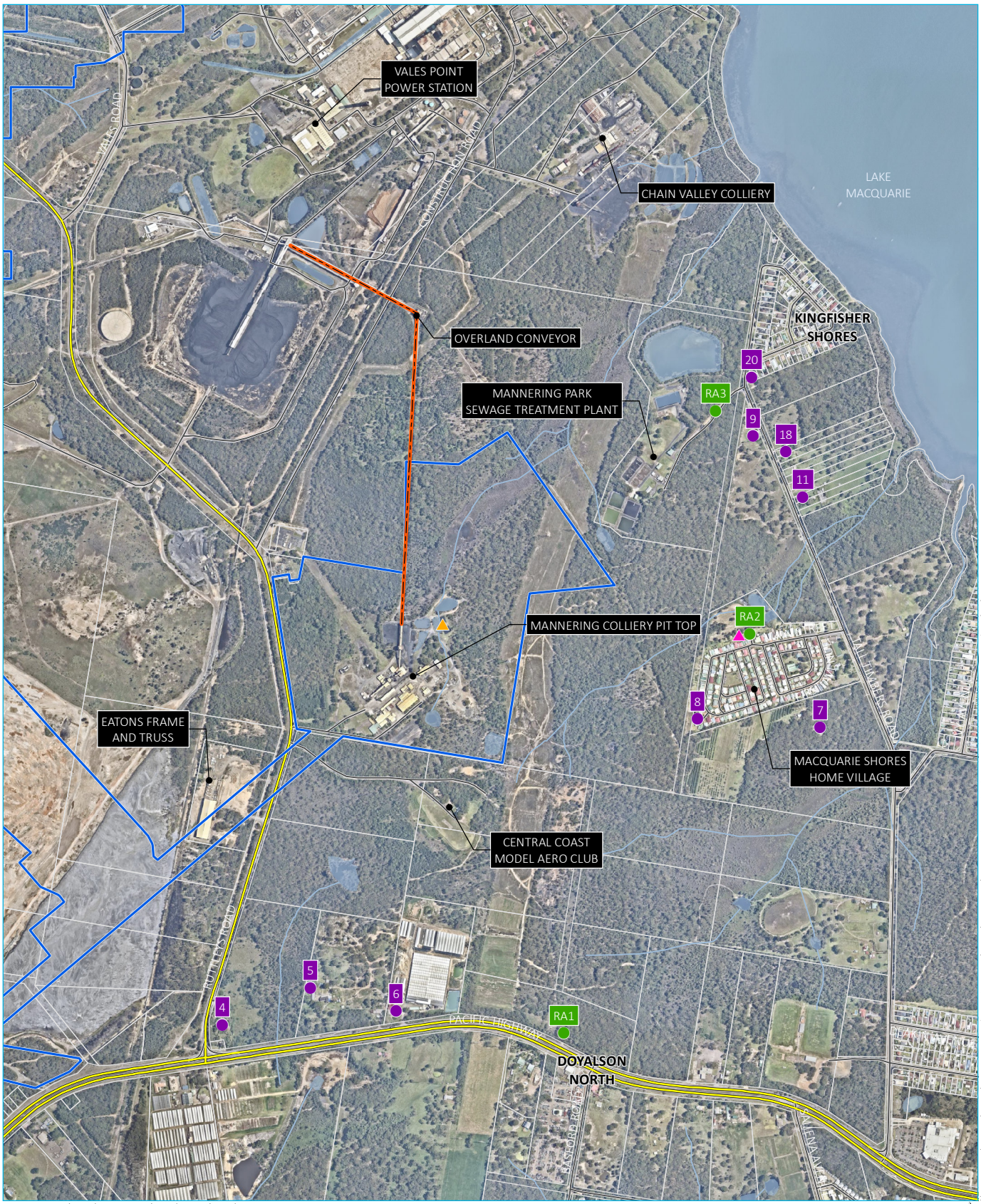
The attended noise monitoring consisted of two 15-minute operator-attended noise monitoring measurements at each of the monitoring locations (ie RA1, RA2 and RA3); one during the evening and one during the night period in accordance with methodology outlined in the NMP.

As per the NMP, attended noise monitoring is scheduled considering the occurrence of regular operations at MC. Noise monitoring is generally planned to avoid scheduled down-time or maintenance. Regular operations (ie coal production) were occurring during the monitoring period.

3.2 Instrumentation

One Brüel & Kjær 2250 Type 1 sound analyser (s/n 3029363) was used to conduct 15-minute attended measurements and record one-third octave frequency and statistical noise indices. The sound analyser was calibrated before and on completion of the measurements using a Svantek SV-36 sound level calibrator (s/n 79952). Instrumentation calibration certificates are provided in Appendix D.

Where possible throughout each measurement the operator has quantified the contribution of site noise and other significant noise sources. This was done by matching audible sounds with the response of the sound analyser (where applicable) and/or via post-analysis of data (eg low-pass filtering). No post-analysis of data was completed for this round of noise monitoring, given site was inaudible at all monitoring locations.



\\Emmsvr1\emm3\2021\P210018 - Delta Noise 2021\8 GIS\02_Maps\N001_NoiseMonitoringLocations_20210225_01.mxd 26/02/2021

Source: EMM (2021); NearMap (2019); DFSI (2017)

0 250 500 m

GDA 1994 MGA Zone 56

N

KEY

- Mannering Colliery project approval boundary
- Alignment of overland conveyor to VPPS
- Main road
- Local road
- Watercourse/drainage line
- Waterbody
- Cadastral boundary
- Assessment location
- Attended monitoring location
- Continuous monitoring location
- Meteorological station

Attended noise monitoring and assessment locations

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Figure 3.1

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3.3 Determination of stability categories

For this assessment and as required by the NMP, atmospheric stability categories were determined for each 15-minute attended monitoring period. The stability category data as well as the average wind data (speed and direction) for the monitoring period were obtained from MC's meteorological station located to the north of the site (refer to Figure 3.1).

The stability categories and associated ranges in temperature lapse rates are presented in Table 3.2.

Table 3.2 Stability categories and temperature lapse rates

Stability category	Temperature lapse rate (ΔT) (°C/100 m)
A	$\Delta T < -1.9$
B	$-1.9 \leq \Delta T < -1.7$
C	$-1.7 \leq \Delta T < -1.5$
D	$-1.5 \leq \Delta T < -0.5$
E	$-0.5 \leq \Delta T < 1.5$
F	$1.5 \leq \Delta T < 4.0$
G	$\Delta T \geq 4.0$

Source: NPfI (EPA 2017).

4 Review of data and discussion

Results of attended noise measurements are summarised in Table 4.1. Noise from MC was quantified for each survey using in-field observations and post-analysis of data as required (eg removing higher frequencies that are not mine related where applicable). Attended noise monitoring was completed during the evening and night periods on 18 October 2022.

The meteorological data for the monitoring period was sourced from MC's meteorological station to determine relevant noise limits in accordance with the NMP. In accordance with the NMP, the standard noise limits applied for five of the six 15-minute attended noise measurements. The very noise enhancing noise limits applied for one measurement, at RA2 during the evening period, due to the presence of wind speeds greater than 2 m/s in combination with an F atmospheric stability category.

Site noise was inaudible during all six measurements. Typically, when a particular source is not audible above local ambient noise levels, the likely contribution of that source is at least 10 dB below the measured background (L_{A90}) level. For five of the six measurements, the measured $L_{A90,15\ minute}$ noise level was no greater than 10 dB above the applicable $L_{Aeq,15\ minute}$ limit. The exception to this was the evening measurement at RA1, where the measured L_{A90} was 11 dB above the applicable $L_{Aeq,15\ minute}$ noise limit. The background noise level during this measurement was noted to be heavily influenced by road traffic on the Pacific Highway. Given this, it is expected that the relevant site noise contribution would have been at or below the relevant noise limit for this location. Therefore, all site $L_{Aeq,15\ minute}$ noise contributions are considered to have been less than relevant noise limits.

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfI and methodology described in Section 2.4. There were no modifying factors, as defined in the NPfI, applicable during the survey.

Noise contributions from MC ($L_{Aeq,15\ minute}$ and L_{Amax}) were determined to have satisfied the noise limits at all locations for this round of noise monitoring, as per the NMP.

Table 4.1 MC attended noise monitoring results – October 2022

Location	Date	Start time	Total 15-minute noise levels, dB								Site levels, dB			Met. conditions[4] Very noise-enhancing?	Applicable noise limits, dB		Exceedance, dB	Comments
			L_{Amin}	L_{A90}	L_{Aeq}	LP L_{Aeq}[1]	L_{A10}	L_{A1}	L_{Amax}	L_{Ceq}	Mod. factor[2]	L_{Aeq}	L_{Amax}[3]		L_{Aeq}	L_{Amax}[3]		
RA1	18/10	20:30 (Eve.)	43	47	59	54	62	68	73	67	N/A	IA	N/A	1.7 m/s @ 67° F class stability No	36	N/A	Nil	**MC inaudible.** Traffic on the Pacific Highway, Insects and frogs consistently audible. Aircraft noise occasionally audible.
RA2	18/10	20:51 (Eve.)	36	37	39	36	40	43	49	61	N/A	IA	N/A	2.1 m/s @ 52° F class stability Yes	45 (40+5)	N/A	Nil	**MC inaudible.** Vales Point Power Station (VPPS hum), insects and frogs consistently audible. Distant traffic, aircraft noise, wind in foliage and distant dogs barking occasionally audible.
RA3	18/10	21:10 (Eve.)	35	37	45	41	41	51	70	63	N/A	IA	N/A	1.4 m/s @ 52° F class stability No	39	N/A	Nil	**MC inaudible.** VPPS hum, insects and frogs consistently audible. Distant traffic and wind in foliage occasionally audible.
RA3	18/10	22:00 (Night)	34	36	37	36	39	41	54	62	N/A	IA	IA	1.2 m/s @ 73° F class stability No	39	49	Nil	**MC inaudible.** VPPS hum, insects and frogs consistently audible. Distant traffic occasionally audible.
RA2	18/10	22:19 (Night)	34	35	37	34	38	40	61	60	N/A	IA	IA	0.9 m/s @ 70° F class stability No	40	45	Nil	**MC inaudible.** VPPS hum, insects and frogs consistently audible. Distant traffic, bird noise and wind in foliage occasionally audible.
RA1	18/10	22:42 (Night)	37	40	54	48	59	64	67	62	N/A	IA	IA	0.7m/s @ 77° F class stability No	36	46	Nil	**MC inaudible.** Traffic on the Pacific Highway, Insects and frogs consistently audible. Wind in foliage occasionally audible.

Notes:
1. Low-pass $L_{Aeq,15\ minute}$ noise level which excludes higher frequencies above the 800 Hz one-third octave band centre frequency.
2. Modifying factor in accordance with Fact sheet C of the NPfI (refer to Section 2.4).
3. For assessment purposes the recorded L_{Amax} has been used as a conservative estimate of the $L_{A1,1min}$.
4. Meteorological data including wind speed, wind direction and stability category (SC) were taken as an average over 15 minutes from MC weather station (refer to Section 3.3).
5. IA = inaudible.
6. N/A = not applicable.

5 Conclusion

EMM has completed a review of mine noise from MC within the surrounding community based on attended measurements conducted on 18 October 2022.

Meteorological data for the monitoring period was sourced from MC's meteorological station to determine relevant noise limits in accordance with the NMP. In accordance with the NMP, the standard noise limits applied for five of the six 15-minute attended noise measurements. The very noise enhancing noise limits applied for one measurement, at RA2 during the evening period, due to the presence of wind speeds greater than 2 m/s in combination with an F atmospheric stability category.

The assessment of noise from site included consideration of modifying factors for certain noise characteristics, such as low frequency noise, in accordance with the NPfI. Modifying factors were found to be not relevant at all monitoring locations.

Noise levels from MC were below relevant noise limits at all monitoring locations as per the NMP.

References

Chain Valley Colliery and Mannering Colliery Noise Management Plan, 2022.

NSW Department of Planning and Environment, Project Approval MP 06_0311, 2020.

NSW Environment Protection Authority, Environment Protection License 191, 2021.

NSW Environment Protection Authority, Noise Policy for Industry, 2017.

Appendix A
Glossary of acoustic terms

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Several technical terms are discussed in this report. These are explained in Table A.1.

Table A.1 Glossary of acoustic terms

Term	Description
dB	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
L_{A1}	The 'A-weighted' noise level which is exceeded 1% of the time.
$L_{A1,1min}$	The 'A-weighted' noise level exceeded for 1% of the specified time period of 1 minute.
L_{A10}	The 'A-weighted' noise level which is exceeded 10% of the time. It is approximately equivalent to the average of maximum noise level.
L_{A90}	Commonly referred to as the background noise level. The 'A-weighted' noise level exceeded 90% of the time.
L_{Aeq}	The energy average noise from a source. This is the equivalent continuous 'A-weighted' sound pressure level over a given period. The $L_{Aeq,15\ minute}$ descriptor refers to an L_{Aeq} noise level measured over a 15-minute period.
L_{Amin}	The minimum 'A-weighted' noise level received during a measuring interval.
L_{Amax}	The maximum root mean squared 'A-weighted' sound pressure level (or maximum noise level) received during a measuring interval.
L_{Ceq}	The equivalent continuous 'C-weighted' sound pressure level over a given period. The $L_{Ceq,15\ minute}$ descriptor refers to an L_{Ceq} noise level measured over a 15-minute period. C-weighting can be used to measure low frequency noise.
Day period	Monday – Saturday: 7 am to 6 pm, on Sundays and Public Holidays: 8 am to 6 pm.
Evening period	Monday – Saturday: 6 pm to 10 pm, on Sundays and Public Holidays: 6 pm to 10 pm.
NPfI	Noise Policy for Industry (EPA 2017).
Standard meteorological conditions	Stability categories A-D with wind speed up to 0.5 m/s at 10 m above ground level during the day, evening, or night period, as defined in Table D1 of the NPfI.
Noise-enhancing meteorological conditions	Stability categories A-D with wind speed up to 3 m/s at 10 m above ground level during the day, evening, or night period, or stability category F with wind speed up to 2 m/s at 10 m above ground level during the night period, as defined in Table D1 of the NPfI. This does not necessarily imply that meteorological conditions were enhancing site noise at the monitoring location.
Very noise-enhancing meteorological conditions	Meteorological conditions outside of the range of either standard or noise-enhancing meteorological conditions, as defined in the NPfI. This does not necessarily imply that meteorological conditions were enhancing site noise at the monitoring location.
Night period	Monday – Saturday: 10 pm to 7 am, on Sundays and Public Holidays: 10 pm to 8 am.
Temperature inversion	A meteorological condition where the atmospheric temperature increases with altitude.

It is useful to have an appreciation of the decibel (dB), the unit of noise measurement. Table A.2 gives an indication as to how an average person perceives changes in noise level in the environment. Examples of common noise levels are provided in Figure A.1.

Table A.2 Perceived change in noise

Change in sound pressure level (dB)	Perceived change in noise in surrounding environment
up to 2	not perceptible
3	just perceptible
5	noticeable difference
10	twice (or half) as loud
15	large change
20	four times (or quarter) as loud

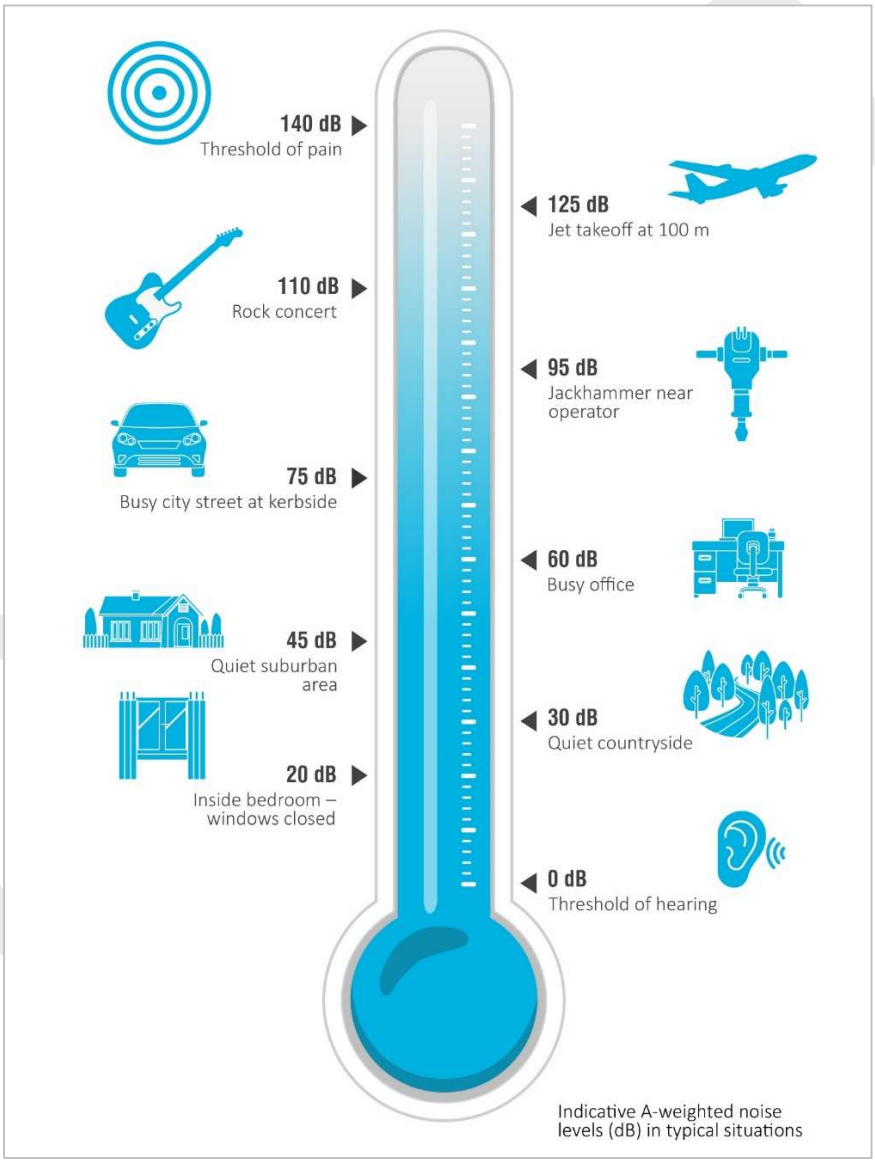

Figure A.1 Common noise levels

Appendix B
Project approval extract

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SCHEDULE 3
SPECIFIC ENVIRONMENTAL CONDITIONS

NOISE

Construction Noise

1. The Applicant must ensure that the noise generated by any construction work is managed in accordance with the requirements outlined in the *Interim Construction Noise Guideline* (DECC, 2009).

Operational Noise Criteria

2. Except for the carrying out of construction works, the Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 1 at any residence[a] on privately-owned land.

***Table 1**: Operational noise criteria dB(A)*

Noise Assessment Location	***Day*** $L_{Aeq\ (15\ min)}$	***Evening*** $L_{Aeq\ (15\ min)}$	***Night*** $L_{Aeq\ (15\ min)}$	***Night*** $L_{A1\ (1\ min)}$
4 – di Rocco	40	36	36	46
5 - Keighran	40	39	39	49
6 – Swan	40	37	37	47
7 – Druitt	40	35	35	45
8 – Macquarie Shores Home Village	42	42	42	47
9 - Jeans	40	37	37	47
11 - Jeans	40	36	36	46
18 - Jeans	40	36	36	46
20 – Knight and all other privately-owned residences	40	36	36	46

[a] *The Noise Assessment Locations referred to in Table 1 are shown in Appendix 4.*

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

3. The noise criteria in Table 1 do not apply if the Applicant has an agreement with the owner/s of the relevant residence or land to exceed the noise criteria, and the Applicant has advised the Department in writing of the terms of this agreement.

Noise Operating Conditions

3A. The Applicant must:

(a) take all reasonable steps to minimise noise from construction and operational activities, including low frequency noise and other audible characteristics, associated with the development;

(b) implement reasonable and feasible noise attenuation measures on all plant and equipment that will operate in noise sensitive areas;

(c) operate a comprehensive noise management system commensurate with the risk of impact;

(d) take all reasonable steps to minimise the noise impacts of the development during noise-enhancing meteorological conditions when the noise criteria in this consent do not apply (see NPfI);

(e) carry out regular attended noise monitoring (at least once a month, unless otherwise agreed by the Planning Secretary) to determine whether the development is complying with the relevant conditions of this consent;

(f) regularly assess the noise monitoring data and modify or stop operations on the site to ensure compliance with the relevant conditions of this consent; and
(g) implement reasonable and feasible measures to further enclose the structure housing the coal crusher in order to further mitigate noise from operational activites.

3B. The Applicant must decommission the surface rotary breaker identified in the Statement of Commitments at Appendix 3, within 3 months of approval of Modification 5.

Noise Management Plan

3C. The Applicant must prepare a Noise Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:
(a) be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary;
(b) describe the measures to be implemented to ensure:
i. compliance with the noise criteria and operating conditions in this consent;
ii. best practice management is being employed; and
iii. noise impacts of the development are minimised during noise-enhancing meteorological conditions when the noise criteria in this consent do not apply (see NPfI);
(c) describe the noise management system in detail; and
(d) include a monitoring program that:
i. uses a combination of real-time and supplementary attended monitoring to evaluate the performance of the development;
ii. monitors noise at the nearest and/or most affected residences;
iii. includes a program to calibrate and validate the real-time noise monitoring results with the attended monitoring results over time;
iv. adequately supports the noise management system;
v. includes a protocol for distinguishing noise emissions of the development from any neighbouring developments; and
vi. includes a protocol for identifying any noise-related exceedance, incident or non-compliance and for notifying the Department and relevant stakeholders of any such event.

The Applicant must implement the Noise Management Plan as approved by the Planning Secretary.

SUBSIDENCE

4. The Applicant must limit its coal extraction methods on the site to first workings only, and must not undertake second workings.

5. Deleted.

SOIL AND WATER

Discharge

6. The Applicant must only discharge water from the site as expressly provided for by its EPL.

7. The Applicant must investigate, assess and report on the ecological interactions of minewater discharged from the site with the aquatic ecology of the unnamed creek and wetlands (and associated vegetation) between the minewater discharge point/s and Lake Macquarie. This report must:
(a) be prepared in consultation with EPA by suitably qualified expert/s whose appointment/s have been approved by the Planning Secretary;
(b) be submitted to the Planning Secretary by the end of March 2009; and
(c) assess the probable alterations in the local ecology attributable to previous and proposed minewater discharges and any future cessation of minewater discharge flows.

Water Management Plan

8. The Applicant must prepare a Water Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:
(a) be prepared in consultation with DPIE Water by suitably qualified expert/s whose appointment/s have been approved by the Planning Secretary;
(b) be submitted the Planning Secretary by the end of March 2009; and
(c) include a:
- Site Water Balance;

Appendix C
EPL extract

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Environment Protection Licence

L4.1 The licensee must not cause, permit or allow any waste to be received at the premises, except the wastes expressly referred to in the column titled “Waste” and meeting the definition, if any, in the column titled “Description” in the table below.
Any waste received at the premises must only be used for the activities referred to in relation to that waste in the column titled “Activity” in the table below.
Any waste received at the premises is subject to those limits or conditions, if any, referred to in relation to that waste contained in the column titled “Other Limits” in the table below.
This condition does not limit any other conditions in this licence.

Code	Waste	Description	Activity	Other Limits
NA	Waste	Any other waste received on the premises for storage, treatment, processing, sorting or disposal and which receipt is not a scheduled activity under Schedule 1 of the POEO Act, as in force from time to time.		
NA	General or Specific exempted waste	Waste that meets all the conditions of a resource recovery exemption under Clause 51A of the Protection of the Environment Operations (Waste) Regulation 2014	As specified in each particular resource recovery exemption	N/A

L4.2 The licensee must not cause, permit or allow any waste generated outside the premises to be received at the premises for storage, treatment, processing, reprocessing or disposal or any waste generated at the premises to be disposed of at the premises, except as expressly permitted by the licence.

L4.3 This condition only applies to the storage, treatment, processing, reprocessing or disposal of waste at the premises if it requires an environment protection licence.

L5 Noise limits

Note: Noise limits are not specified as a condition of this licence. Noise limits are prescribed with the conditions of Project Approval 06_0311 granted under the *Environmental Planning and Assessment Act 1979.* Under the *Environmental Planning and Assessment Act 1979* the Department of Planning is the appropriate authority in respect of the administration and regulation of the Project Approval.

4 Operating Conditions

O1 Activities must be carried out in a competent manner

O1.1 Licensed activities must be carried out in a competent manner.

Appendix D
Calibration certificates

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CERTIFICATE OF CALIBRATION

CERTIFICATE NO: C33872

EQUIPMENT TESTED : Sound Level Calibrator

Manufacturer: Svantek
Type No: SV-36 **Serial No:** 79952
Owner: EMM Consulting Pty Ltd
L3, 175 Scott Street
Newcastle, NSW 2300
Tests Performed: Measured Output Pressure level, Frequency & Distortion
Comments: See Details overleaf. All Test Passed.

Parameter	Pre-Adj	Adj Y/N	Output: (dB re 20 µPa)	Frequency (Hz)	THD&N (%)
Level1:	NA	N	94.09 dB	1000.00 Hz	1.12 %
Level2:	NA	N	114.06 dB	1000.00 Hz	0.71 %
Uncertainty			±0.11 dB	±0.05%	±0.20 %
Uncertainty (at 95% c.l.) k=2					

CONDITION OF TEST:

Ambient Pressure 1004 hPa ±1 hPa
Temperature 23 °C ±1° C
Relative Humidity 55 % ±5%

Date of Receipt : 26/09/2022
Date of Calibration : 29/09/2022
Date of Issue : 29/09/2022

Acu-Vib Test Procedure: AVP02 (Calibrators)
Test Method: AS IEC 60942 - 2017

CHECKED BY: .....

AUTHORISED SIGNATURE: .....
Hein Soe

Accredited for compliance with ISO/IEC 17025 - Calibration
Results of the tests, calibration and/or measurements included in this document are traceable to SI units through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.

This report applies only to the item identified in the report and may not be reproduced in part.

The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.

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Acoustic and Vibration Measurements

Acu-Vib Electronics
CALIBRATIONS SALES RENTALS REPAIRS

Head Office & Calibration Laboratory
Unit 14, 22 Hudson Ave. Castle Hill NSW 2154
(02) 9680 8133
www.acu-vib.com.au

HBK HOTTINGER BRÜEL & KJÆR
The Calibration Laboratory
Skodsborgvej 307, DK-2850 Nærum, Denmark

ilac-MRA

DANAK
CAL Reg.No. 307
Member of EA MLA

CERTIFICATE OF CALIBRATION

No: CDK2007931

CALIBRATION OF

Sound Level Meter:	Brüel & Kjær Type 2250	No: 3029363	Id: -
Microphone:	Brüel & Kjær Type 4189	No: 3260501	
PreAmplifier:	Brüel & Kjær Type ZC-0032	No: 30109	
Supplied Calibrator:	None		
Software version:	BZ7222 Version 4.7.6	Pattern Approval:	-
Instruction manual:	BE1712-22		

CUSTOMER

EMM Consulting
Ground Floor, Suite 1
20 Chandos Street
2065 St Leonards
New South Wales, Australia

CALIBRATION CONDITIONS

Preconditioning: 4 hours at 23°C ± 3°C

Environment conditions: *See actual values in sections.*

SPECIFICATIONS

The Sound Level Meter Brüel & Kjær Type 2250 has been calibrated in accordance with the requirements as specified in IEC 61672-1:2013 class 1. Procedures from IEC 61672-3:2013 were used to perform the periodic tests. The accreditation assures the traceability to the international units system SI.

PROCEDURE

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System 3630 with application software type 7763 (version 8.2 - DB: 8.20) by using procedure B&K proc 2250, 4189 (IEC 61672:2013).

RESULTS

Calibration Mode: **Calibration as received.**

The reported expanded uncertainty is based on the standard uncertainty multiplied by a coverage factor $k = 2$ providing a level of confidence of approximately 95 %. The uncertainty evaluation has been carried out in accordance with EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device under calibration.

Date of calibration: 2020-11-26

Date of issue: 2020-11-26

Lene Petersen
Calibration Technician

Erik Bruus
Approved Signatory

Australia

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

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

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

CANBERRA
Suite 2.04 Level 2
15 London Circuit
Canberra City ACT 2601

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

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

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

Canada

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

VANCOUVER
60 W 6th Ave Suite 200
Vancouver BC V5Y 1K1
T 604 999 8297

linkedin.com/company/emm-consulting-pty-limited

emmconsulting.com.au