Appendix 3 – Noise Monitoring Reports

Noise Monitoring Report – Q1 2023

Noise Monitoring Report – Q2 2023

Noise Monitoring Report – Q3 2023

Noise Monitoring Report – Q4 2023

Karuah East Quarry

Quarterly Attended Noise Monitoring - Q1 2023

Prepared for Karuah East Quarry Pty Limited

March 2023

Karuah East Quarry

Quarterly Attended Noise Monitoring - Q1 2023

Karuah East Quarry Pty Limited

E230083 RP1

March 2023

Version	Date	Prepared by	Reviewed by	Comments
1	17 February 2023	Lucas Adamson	Najah Ishac	Draft
2	3 March 2023	Lucas Adamson	Najah Ishac	Final

Approved by

Najah Ishac
Director
3 March 2023

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Appendices

Tables

Figures

1 Introduction

1.1 Background

EMM Consulting Pty Ltd (EMM) was engaged by Karuah East Quarry Pty Limited to conduct a quarterly noise survey of operations at Karuah East Quarry (KEQ, the site) located at Blue Rock Close, Karuah NSW. The survey is needed to quantify the acoustic environment and used to compare site noise levels against specified limits.

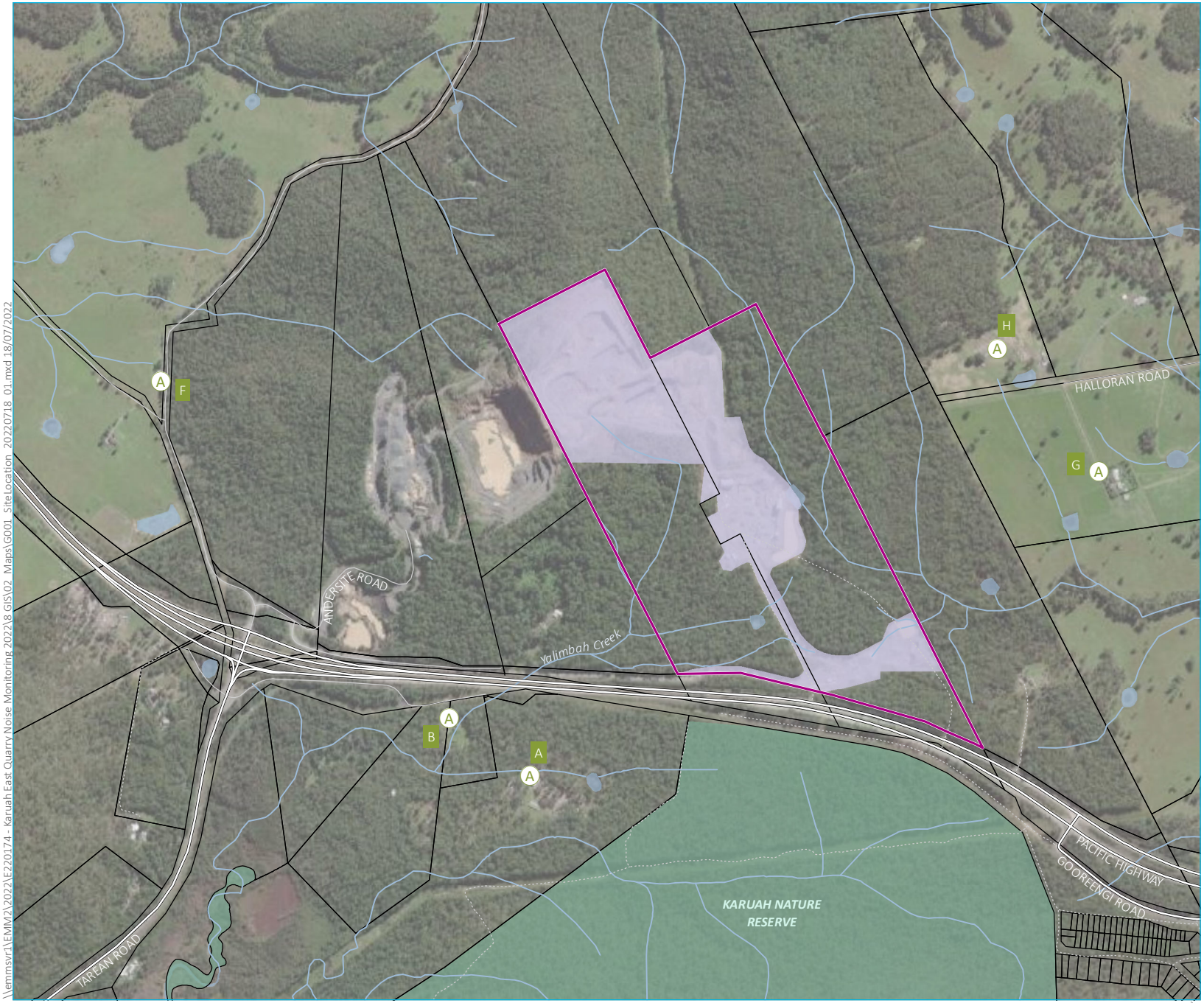
Attended environmental noise monitoring described in this report was done during morning shoulder, day and evening periods on Tuesday 7 and Wednesday 8 February 2023 at five monitoring locations.

1.2 Attended monitoring locations

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

Table 1.1 Attended noise monitoring locations

Location descriptor/ID	Description/address	Coordinates (MGA56)	
		Easting	Northing
A	Private Residence - 74 Mill Hill Close, Karuah	406623	6388704
B	Private Residence - 64 Mill Hill Close, Karuah	406405	6388859
F	Private Residence - 1714 The Branch Lane, Karuah	405639	6389782
G	Private Residence - 2 Halloran Road, North Arm Cove	405629	6389766
H	Private Residence - 21 Halloran Road, North Arm Cove	407795	6389868



KEY

- Site boundary
- Attended noise monitoring location
- Approved disturbance area
- Major road
- Minor road
- Vehicular track
- Watercourse/drainage line
- Cadastral boundary
- Waterbody
- NPWS reserve
- State forest

Attended noise monitoring locations

Source: EMM (2022); ADW Johnson (2020); DFSI (2017); ICSM (2012); GA (2011); ASGC (2006)

0 0.5 1 km

GDA 1994 MGA Zone 56

N

Karuah East Quarry
Quarterly attended noise monitoring
Figure 1.1

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1.3 Terminology and abbreviations

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

Table 1.2 Terminology and abbreviations

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

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

2 Noise limits

2.1 Project approval

Karuah East Quarry noise limits are detailed in Condition 3 of Project Approval (PA) 09_0175. Relevant sections of PA 09_0175 are reproduced in Appendix B.1.

2.2 Environment protection licence

Karuah East Quarry noise limits are detailed in Condition L4.1 of Environment Protection Licence (EPL) 20611. Relevant sections of EPL 20611 are reproduced in Appendix B.2.

2.3 Noise management plan

The approved Noise Management Plan (NMP) adopts five attended noise monitoring locations that are representative of residences outlined in PA 09_0175 and EPL 20611. Relevant sections of the NMP are reproduced in Appendix B.3.

2.4 Noise limits

Noise impact limits based on PA 09_0175 and EPL 20611 are as shown in Table 2.1.

Table 2.1 Noise impact limits, dB

Location	Day $L_{Aeq,15minute}$	Evening $L_{Aeq,15minute}$	Morning Shoulder $L_{Aeq,15minute}$	Morning Shoulder $L_{A1,1minute}$
A	42	40	35	52
B	40	40	35	52
F	40	35	35	52
G	43	39	35	52
H	44	46	35	52

Notes: 1. Morning shoulder period is from 5:00 am to 7:00 am.

2.5 Meteorological conditions

PA 09_0175 specifies that noise generated by the project is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Noise Policy for Industry. Similarly, the requirements of Condition L4.3 of EPL 20611 state that noise limits do not apply under the following meteorological conditions:

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

2.6 Additional requirements

Monitoring and reporting have been done in accordance with the NSW EPA 'Noise Policy for Industry' (NPfI) issued in October 2017 and the 'Approved methods for the measurement and analysis of environmental noise in NSW' (Approved Methods) issued in January 2022.

3 Methodology

3.1 Overview

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

3.2 Attended noise monitoring

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

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

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

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

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

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

3.3 Meteorological data

Meteorological data for the monitoring period was sourced from the Karuah East Quarry on-site meteorological station to determine applicability of criteria in accordance with the EPL and PA.

3.4 Modifying factors

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

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

3.5 Instrumentation

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

Table 3.1 Attended noise monitoring equipment

Item	Serial number	Calibration due date	Relevant standard
Brüel & Kjær 2250 sound level meter	2759405	2/2/2024	IEC 61672-1:2002
Svantek SV-36 calibrator	79952	26/9/2023	IEC 60942

4 Results

4.1 Total measured noise levels and atmospheric conditions

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

Table 4.1 Total measured noise levels – Q1 2023[1]

Location	Start date and time	L_{Amax} dB	L_{A1} dB	L_{A10} dB	L_{Aeq} dB	L_{A50} dB	L_{A90} dB	L_{Amin} dB
A	7/02/2023 5:00	80	76	69	65	58	50	44
B	7/02/2023 5:16	73	70	65	61	59	50	44
F	7/02/2023 5:34	81	61	46	54	43	41	38
G	7/02/2023 5:58	77	60	48	52	46	44	42
H	7/02/2023 6:15	67	52	46	45	43	42	39
A	7/02/2023 7:00	77	75	70	66	63	54	47
B	7/02/2023 7:16	73	71	66	63	62	58	49
F	7/02/2023 7:34	80	61	51	54	47	44	40
G	7/02/2023 8:18	64	48	40	40	36	34	32
H	7/02/2023 8:35	66	48	40	39	34	33	31
A	8/02/2023 18:01	78	74	69	66	63	56	47
B	8/02/2023 18:17	77	71	67	63	61	55	49
F	8/02/2023 18:35	69	56	47	47	44	41	38
G	8/02/2023 18:59	63	50	45	43	42	41	38
H	8/02/2023 19:16	63	48	44	42	42	40	38

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

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

Table 4.2 Measured atmospheric conditions – Q1 2023

Location	Start date and time	Temperature °C	Wind speed m/s	Wind direction ° Magnetic north[1]	Cloud cover 1/8s
A	7/02/2023 5:00	19.7	0.3	85	0
B	7/02/2023 5:16	20.1	0.6	85	0
F	7/02/2023 5:34	20.6	0.4	90	0
G	7/02/2023 5:58	20.5	0.3	85	1
H	7/02/2023 6:15	20.6	0.3	85	1
A	7/02/2023 7:00	22.0	0.6	90	1
B	7/02/2023 7:16	22.2	0.5	85	1
F	7/02/2023 7:34	22.9	0.7	90	0
G	7/02/2023 8:18	23.5	0.7	85	0
H	7/02/2023 8:35	23.8	0.8	90	0
A	8/02/2023 18:01	26.5	1.9	90	0
B	8/02/2023 18:17	25.9	1.5	85	0
F	8/02/2023 18:35	25.3	1.7	90	0
G	8/02/2023 18:59	24.9	1.6	90	0
H	8/02/2023 19:16	23.9	1.5	85	0

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

4.2 Site only noise levels

4.2.1 Modifying factors

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

4.2.2 Monitoring results

Table 4.3 provides site noise levels in the absence of other sources, where possible, and includes weather data obtained from the site's AWS. Limits are applicable if weather conditions were within specified parameters during each measurement.

Table 4.3 Site noise levels and limits – Q1 2023

Location	Start Date and Time (Period)	Wind		Stability Class	Limits apply? [1]	Limit, dB		Site level, dB [2]		Exceedance, dB	
		Speed m/s	Direction [4]			$L_{Aeq,15minute}$	L_{Amax}	$L_{Aeq,15minute}$	L_{Amax}	$L_{Aeq,15minute}$	L_{Amax}
A	7/02/2023 5:00 (MS)	1.1	101	F	Y	35	52	IA	IA	No	No
B	7/02/2023 5:16 (MS)	1.0	127	F	Y	35	52	IA	IA	No	No
F	7/02/2023 5:34 (MS)	1.2	97	F	Y	35	52	IA	IA	No	No
G	7/02/2023 5:58 (MS)	0.9	123	F	Y	35	52	IA	IA	No	No
H	7/02/2023 6:15 (MS)	0.8	111	F	Y	35	52	IA	IA	No	No
A	7/02/2023 7:00 (D)	0.7	145	A	Y	42	N/A	IA	N/A	No	N/A
B	7/02/2023 7:16 (D)	0.6	133	A	Y	40	N/A	IA	N/A	No	N/A
F	7/02/2023 7:34 (D)	0.4	101	A	Y	40	N/A	IA	N/A	No	N/A
G	7/02/2023 8:18 (D)	1.1	118	A	Y	43	N/A	<30	N/A	No	N/A
H	7/02/2023 8:35 (D)	1.3	114	A	Y	44	N/A	<30	N/A	No	N/A

Table 4.3 Site noise levels and limits – Q1 2023

Location	Start Date and Time (Period)	Wind		Stability Class	Limits apply? [1]	Limit, dB		Site level, dB [2]		Exceedance, dB	
		Speed m/s	Direction [4]			$L_{Aeq,15minute}$	L_{Amax}	$L_{Aeq,15minute}$	L_{Amax}	$L_{Aeq,15minute}$	L_{Amax}
A	8/02/2023 18:01 (E)	3.6	144	D	N	40	N/A	IA	N/A	No	N/A
B	8/02/2023 18:17 (E)	2.9	141	E	Y	40	N/A	IA	N/A	No	N/A
F	8/02/2023 18:35 (E)	2.9	135	E	Y	35	N/A	IA	N/A	No	N/A
G	8/02/2023 18:59 (E)	1.8	135	F	Y	39	N/A	IA	N/A	No	N/A
H	8/02/2023 19:16 (E)	1.8	154	F	Y	46	N/A	IA	N/A	No	N/A

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

5 Summary

EMM Consulting Pty Ltd (EMM) was engaged by Karuah East Quarry Pty Limited to conduct a quarterly noise survey of operations at the site. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified PA and EPL noise limits.

Attended environmental noise monitoring described in this report was done during the morning shoulder, day and evening periods on Tuesday 7 and Wednesday 8 February 2023 at five monitoring locations.

Noise levels from site complied with relevant limits at all monitoring locations during the Q1 2023 survey.

Appendix A
Noise perception and examples

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A.1 Noise levels

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

Table A.1 Perceived change in noise

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

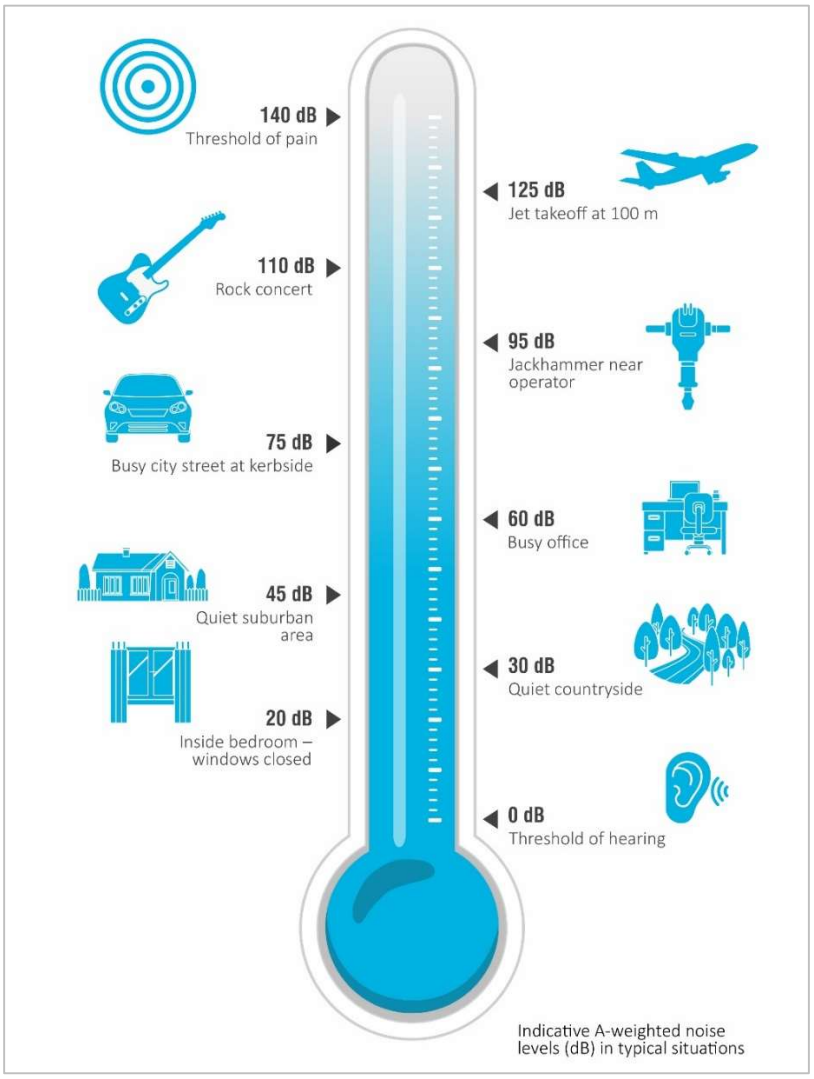

Figure A.1 Common noise levels

Appendix B
Regulator documents

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B.1 Project approval

SCHEDULE 3
ENVIRONMENTAL PERFORMANCE CONDITIONS

IDENTIFICATION OF APPROVED LIMITS OF EXTRACTION

1. The Applicant shall, prior to carrying out quarrying operations on the site:
   (a) engage a registered surveyor to mark out the boundaries of the approved limits of extraction within the Extraction Area; and
   (b) submit a survey plan of the extraction boundaries,
   to the satisfaction of the Planning Secretary.

2. The Applicant must ensure that the extraction boundaries are clearly marked at all times while quarrying operations are being carried out, in a manner that allows the limits of extraction to be clearly identified.

NOISE

Operational Noise Criteria

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

Table 2: Operational noise criteria dB

Noise Assessment Location[a]	Morning Shoulder $L_{Aeq\ (15\ min)}$	Morning Shoulder L_{Amax}	Day $L_{Aeq\ (15\ min)}$	Evening $L_{Aeq\ (15\ min)}$
A	35	52	42	40
B	35	52	40	40
G	35	52	43	39
H	35	52	44	46
I	35	52	40	37
All other residences	35	52	40	35

[a] *Noise Assessment Locations referred to in Table 2 are shown in Appendix 2.*

Noise generated by the development must be monitored and measured in accordance with the relevant procedures and modifications (including certain meteorological conditions) of the NPfI.

3A. The noise criteria in Table 2 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.

Road Traffic Noise Criteria

4. The Applicant must take all reasonable and feasible measures to ensure that the traffic noise generated by the development does not cause additional exceedances of the criteria in Table 3 at any residence on privately-owned land.

Table 3: Road traffic noise criteria

Road	***Criteria (Day[a])***
Pacific Highway	60 dB(A) $L_{Aeq\ (15\ hour)}$
Local roads	55 dB(A) $L_{Aeq\ (1\ hour)}$

[a] *Day is the period from 7 am to 10 pm every day in accordance with the EPA's NSW Road Noise Policy (2011).*

5. Deleted

Noise Operating Conditions

6. 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 quarterly attended noise monitoring (unless otherwise agreed by the Planning Secretary) to determine whether the development is complying with the relevant conditions of this consent; and
   (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.

Noise Management Plan

7. 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) be prepared in consultation with the EPA;
   (c) 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;
      (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);
   (d) describe the noise management system in detail; and
   (e) include a monitoring program that:
      (i) is capable of evaluating the performance of the development;
      (ii) monitors noise at the nearest and/or most affected residences;
      (iii) adequately supports the noise management system;
      (iv) includes a protocol for distinguishing noise emissions of the development from any neighbouring developments; and
      (v) 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.

7A. The Applicant must implement the plan as approved by the Planning Secretary.

BLASTING

Blasting Criteria

8. The Applicant must ensure that blasting on the site does not cause exceedances of the criteria in Table 5.

B.2 Environmental protection licence

Environment Protection Licence

L3 Waste

L3.1 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 Noise limits

L4.1 Noise generated at the premises must not exceed the noise limits in the table below. The locations referred to in the table below are indicated in Table 2: Operational Noise Criteria, and Figure 1 of the document titled Project Approval 09_0175 Modification 9 (MOD 9) Department of Planning, Industry& Environment - which has been filed on EPA file Doc22/715570-1.

Noise Assesment Location	Morning Shoulder LAeq(15 min)	Morning shoulder LAmax	Day LAeq (15 min)	Evening LAeq (15 min)
A (74 Mill Hill Close, Karuah, Lot 100 DP 1028885)	35	52	42	40
B (64 Mill Hill Close, Karuah, Lot 3 DP785172)	35	52	40	40
G (2 Halloran Road, North Arm Cove Lot 1 DP1032636)	35	52	43	39
H (21 Halloran Road, North Arm Cove Lot 10 DP1032636)	35	52	44	46
I (83 Halloran Road, North Arm Cove Lot 12 DP1032636)	35	52	40	37
All other residences	35	52	40	35

L4.2 Noise limit definitions - For the purpose of the table at L4.1, the following definitions apply:
Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays;
Morning Shoulder is defined as the period from 5:00am to 7:00am Monday to Saturday;
Evening is defined as the period from 6:00pm to 10:00pm Monday to Saturday.

L4.3 The noise limits set out in this licence apply under all meteorological conditions except for the following:
a) Wind speed greater than 3 metres/second at 10 metres above ground level; or
b) Stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or

c) Stability category G temperature inversion conditions.

L4.4 **Determining Compliance**

To determine compliance with the noise limits set out in the table above, the licensee must locate monitoring equipment:
a) 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 that is closest to the premises;
b) approximately on the boundary where any dwelling is situated 30 metres or less from the property boundary that is closest to the premises;
c) at the most affected point at a location where there is no dwelling at the location; and
d) within approximately 50 metres of the boundary of a national park or nature reserve.

Note: A non-compliance of the Noise Limits table will still occur where noise generated from the premises in excess of the appropriate limit is measured:
i) at a location other than an area prescribed in part (a) and part (b); and/or
ii) at a point other than the most affected point at a location.

L4.5 For the purposes of determining the noise generated at the premises the modification factors in Fact Sheet C of the EPA's "Noise Policy for Industry" must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

L5 Blasting

L5.1 Blasting in or on the premises must only be carried out between the hours of 9:00 am and 4:00 pm Monday to Friday. No blasting is permitted on Saturdays, Sundays or public holidays. Blasting outside of the hours specified in this condition can only take place with the written approval of the EPA.

L5.2 Blasting is not permitted simultaneously with adjacent quarry(s).

L5.3 The airblast overpressure level from blasting operations in or on the premises must not exceed:
a) 115 dB (Lin Peak) for more than 5% of the total number of blasts during each reporting period; and
b) 120 dB (Lin Peak) at any time,
at monitoring point 11 detailed in Condition P1.4.

L5.4 The ground vibration peak particle velocity from blasting operations carried out in or on the premises must not exceed:
a) 5 mm/second for more than 5% of the total number of blasts during each reporting period; and
b) 10 mm/second at any time,
at monitoring point 11 detailed in Condition P1.4.

L5.5 Error margins associated with any monitoring equipment used to measure airblast overpressure or peak particle velocity are not to be taken into account in determing whether or not the limit has been exceeded.

L5.6 The airblast overpressure and ground vibration levels in the conditions above do not apply at noise sensitive locations that are owned by the licensee or subject to a private agreement, relating to airblast overpressure and ground vibration levels, between the licensee and land owner.

a) the date and time of the complaint;
b) the method by which the complaint was made;
c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
d) the nature of the complaint;
e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and
f) if no action was taken by the licensee, the reasons why no action was taken.

M5.3 The record of a complaint must be kept for at least 4 years after the complaint was made.

M5.4 The record must be produced to any authorised officer of the EPA who asks to see them.

M6 Telephone complaints line

M6.1 The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.

M6.2 The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.

M6.3 The preceding two conditions do not apply until 1 month after the date of the issue of this licence.

M7 Blasting

M7.1 To determine complaince with Blast Limit conditions of this licence:
a) Airblast overpressure and ground vibration levels must be measured and electronically recorded for monitoring point 11 for the parameters specified in Column 1 of the table below; and
b) The licensee must use the units of measure, sampling method, and sample at the frequency specified opposite in the other columns.

Parameter	Units of Measure	Frequency	Sampling Method
Airblast Overpressure	Decibels (Linear Peak	All blasts	Australian Standard AS 2187.2-2006
Ground Vibration Peak Particle Velocity	millimetres/second	All blasts	Australian Standard AS 2187.2-2006

M8 Noise monitoring

M8.1 To assess compliance with the noise limits for this premises attended noise monitoring must be undertaken in accordance with all noise conditions and:
a) during a period of normal quarry operations;
b) at each one of the locations listed in the noise limits table of this licence;

c) occur quarterly in the reporting period;
d) occur during each day period as defined in the NSW Noise Policy for Industry.

Note: Quarterly attended noise monitoring must be completed (unless otherwise agreed by the Planning Secretary) to determine whether the development is complying with the relevant conditions of this consent. The frequency of noise monitoring will be reviewed, upon request.

6 Reporting Conditions

R1 Annual return documents

R1.1 The licensee must complete and supply to the EPA an Annual Return in the approved form comprising:

1. a Statement of Compliance,
2. a Monitoring and Complaints Summary,
3. a Statement of Compliance - Licence Conditions,
4. a Statement of Compliance - Load based Fee,
5. a Statement of Compliance - Requirement to Prepare Pollution Incident Response Management Plan,
6. a Statement of Compliance - Requirement to Publish Pollution Monitoring Data; and
7. a Statement of Compliance - Environmental Management Systems and Practices.

At the end of each reporting period, the EPA will provide to the licensee notification that the Annual Return is due.

R1.2 An Annual Return must be prepared in respect of each reporting period, except as provided below.

Note: The term "reporting period" is defined in the dictionary at the end of this licence. Do not complete the Annual Return until after the end of the reporting period.

R1.3 Where this licence is transferred from the licensee to a new licensee:
a) the transferring licensee must prepare an Annual Return for the period commencing on the first day of the reporting period and ending on the date the application for the transfer of the licence to the new licensee is granted; and
b) the new licensee must prepare an Annual Return for the period commencing on the date the application for the transfer of the licence is granted and ending on the last day of the reporting period.

Note: An application to transfer a licence must be made in the approved form for this purpose.

R1.4 Where this licence is surrendered by the licensee or revoked by the EPA or Minister, the licensee must prepare an Annual Return in respect of the period commencing on the first day of the reporting period and ending on:
a) in relation to the surrender of a licence - the date when notice in writing of approval of the surrender is given; or
b) in relation to the revocation of the licence - the date from which notice revoking the licence operates.

R1.5 The Annual Return for the reporting period must be supplied to the EPA via eConnect *EPA* or by registered

B.3 Noise management plan

5 Noise limits

5.1 Operational noise

Condition 3 of Schedule 3 of PA 09_0175 provides the operational noise limits for KEQ. These are reproduced in Table 5.1.

Table 5.1 Operational noise criteria (dB) from Table 2 of PA 09_0175

Noise Assessment Location[1]	Morning Shoulder $L_{Aeq(15\ minute)}$	Morning Shoulder L_{Amax}	Day $L_{Aeq(15\ minute)}$	Evening $L_{Aeq(15\ minute)}$
A	35	52	42	40
B	35	52	40	40
G	35	52	43	39
H	35	52	44	46
I	35	52	40	37
All other residences	35	52	40	35

Noise assessment locations are shown in Figure 3.1.

Noise generated by the development must be monitored and measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NPfI (EPA 2017).

The noise limits provided in Table 5.1 apply under standard and noise-enhancing meteorological conditions (as defined in the NPfI) determined by monitoring at the relevant weather station. In accordance with Condition L4.3 of EPL 20611 and consistent with Condition 3 of Schedule 3 of PA 09_0175 the noise limits provided in Table 5.1 apply under all meteorological conditions except for the following:

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

In accordance with Fact Sheet D of the NPfI, for 'very noise enhancing meteorological conditions' the applicable noise limit is set at 5dB above those provided in Table 5.1.

Noise limits do not apply if Karuah East has an agreement with the owner/s of the relevant residence or land to exceed the noise criteria, and Karuah East has advised the Department in writing of the terms of this agreement.

5.2 Road traffic noise

Condition 4 of Schedule 3 of PA 09_0175 states that all reasonable and feasible measures must be taken to ensure that the traffic generated by KEQ does not cause additional exceedances of the criteria provided in Table 5.2 at any residence on privately-owned land.

Appendix C
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%.

NATA
WORLD RECOGNISED ACCREDITATION
Accredited Lab No. 9262
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

Certificate Of Calibration

Certificate No: SLM31670

Equipment Tested: Sound Level Meter

Manufacturer:	B & K		
Type No:	2250	**Serial No:**	2759405
Mic. Type:	4189	**Serial No:**	2983733
Pre-Amp. Type:	ZC0032	**Serial No:**	22666
Filter Type:	1/3 Octave	**Test No:**	F031671

Owner: EMM Consulting
Level 3, 175 Scott Street
Newcastle, NSW 2300

Tests Performed: IEC 61672-3:2013 & IEC 61260-3:2016

Comments: All Test passed for Class 1. (See overleaf for details)

Conditions Of Test:

Ambient Pressure	992	hPa ±1 hPa	**Date of Receipt :**	02/02/2022
Temperature	26	°C ±1° C	**Date of Calibration :**	02/02/2022
Relative Humidity	48	% ±5%	**Date of Issue :**	03/02/2022

Acu-Vib Test Procedure: AVP10 (SLM) & AVP06 (Filters)

Checked By: ..... **Authorised Signature:** .....

Jack Kielt

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.

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Karuah East Quarry

Quarterly Attended Noise Monitoring - Q2 2023

Prepared for Karuah East Quarry Pty Limited

May 2023

Karuah East Quarry

Quarterly Attended Noise Monitoring - Q2 2023

Karuah East Quarry Pty Limited

E230083 RP2

May 2023

Version	Date	Prepared by	Reviewed by	Comments
1	2 May 2023	Lucas Adamson	Najah Ishac	Draft
2	3 May 2023	Lucas Adamson	Najah Ishac	Final

Approved by

Najah Ishac
Director
3 May 2023

Level 3 175 Scott Street
Newcastle NSW 2300

TABLE OF CONTENTS

Appendices

Tables

Figures

1 Introduction

1.1 Background

EMM Consulting Pty Ltd (EMM) was engaged by Karuah East Quarry Pty Limited to conduct a quarterly noise survey of operations at Karuah East Quarry (KEQ, the site) located at Blue Rock Close, Karuah NSW. The survey is needed to quantify the acoustic environment and used to compare site noise levels against specified limits.

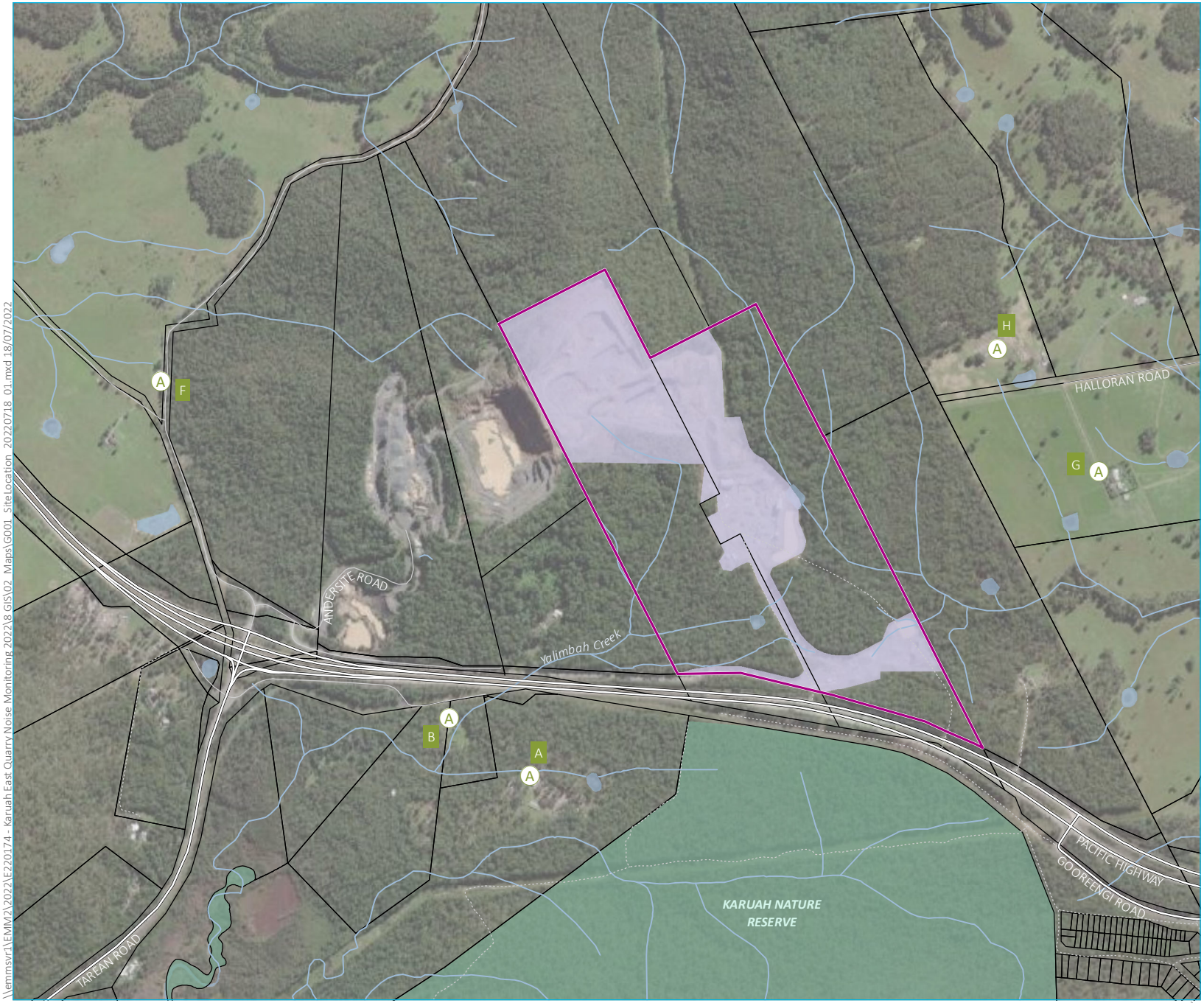
Attended environmental noise monitoring described in this report was done during morning shoulder, day and evening periods on Wednesday 19 and Monday 24 April 2023 at five monitoring locations.

1.2 Attended monitoring locations

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

Table 1.1 Attended noise monitoring locations

Location descriptor/ID	Description/address	Coordinates (MGA56)	
		Easting	Northing
A	Private Residence - 74 Mill Hill Close, Karuah	406623	6388704
B	Private Residence - 64 Mill Hill Close, Karuah	406405	6388859
F	Private Residence - 1714 The Branch Lane, Karuah	405639	6389782
G	Private Residence - 2 Halloran Road, North Arm Cove	405629	6389766
H	Private Residence - 21 Halloran Road, North Arm Cove	407795	6389868



KEY

- Site boundary
- Attended noise monitoring location
- Approved disturbance area
- Major road
- Minor road
- Vehicular track
- Watercourse/drainage line
- Cadastral boundary
- Waterbody
- NPWS reserve
- State forest

Attended noise monitoring locations

Source: EMM (2022); ADW Johnson (2020); DFSI (2017); ICSM (2012); GA (2011); ASGC (2006)

0 0.5 1 km

GDA 1994 MGA Zone 56

N

Karuah East Quarry
Quarterly attended noise monitoring
Figure 1.1

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\\emmsvr1\EMM2\2022\E220174 - Karuah East Quarry Noise Monitoring 2022\8 GIS\02_Maps\G001_Site Location_20220718_01.mxd 18/07/2022

1.3 Terminology and abbreviations

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

Table 1.2 Terminology and abbreviations

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

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

2 Noise limits

2.1 Project approval

Karuah East Quarry noise limits are detailed in Condition 3 of Project Approval (PA) 09_0175. Relevant sections of PA 09_0175 are reproduced in Appendix B.1.

2.2 Environment protection licence

Karuah East Quarry noise limits are detailed in Condition L4.1 of Environment Protection Licence (EPL) 20611. Relevant sections of EPL 20611 are reproduced in Appendix B.2.

2.3 Noise management plan

The approved Noise Management Plan (NMP) adopts five attended noise monitoring locations that are representative of residences outlined in PA 09_0175 and EPL 20611. Relevant sections of the NMP are reproduced in Appendix B.3.

2.4 Noise limits

Noise impact limits based on PA 09_0175 and EPL 20611 are as shown in Table 2.1.

Table 2.1 Noise impact limits, dB

Location	Day $L_{Aeq,15minute}$	Evening $L_{Aeq,15minute}$	Morning Shoulder $L_{Aeq,15minute}$	Morning Shoulder $L_{A1,1minute}$
A	42	40	35	52
B	40	40	35	52
F	40	35	35	52
G	43	39	35	52
H	44	46	35	52

Notes: 1. Morning shoulder period is from 5:00 am to 7:00 am Monday to Saturday as defined in Condition L4.2 of EPL 20611.

2.5 Meteorological conditions

PA 09_0175 specifies that noise generated by the project is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Noise Policy for Industry. Similarly, the requirements of Condition L4.3 of EPL 20611 state that noise limits do not apply under the following meteorological conditions:

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

2.6 Additional requirements

Monitoring and reporting have been done in accordance with the NSW EPA 'Noise Policy for Industry' (NPfI) issued in October 2017 and the 'Approved methods for the measurement and analysis of environmental noise in NSW' (Approved Methods) issued in January 2022.

3 Methodology

3.1 Overview

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

3.2 Attended noise monitoring

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

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

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

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

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

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

3.3 Meteorological data

Meteorological data for the monitoring period was sourced from the Karuah East Quarry on-site meteorological station to determine applicability of criteria in accordance with the EPL and PA.

3.4 Modifying factors

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

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

3.5 Instrumentation

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

Table 3.1 Attended noise monitoring equipment

Item	Serial number	Calibration due date	Relevant standard
Brüel & Kjær 2250 sound level meter	3029363	3/11/2024	IEC 61672-1:2002
Svantek SV-36 calibrator	86311	17/10/2024	IEC 60942

4 Results

4.1 Total measured noise levels and atmospheric conditions

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

Table 4.1 Total measured noise levels – Q2 2023[1]

Location	Start date and time	L_{Amax} dB	L_{A1} dB	L_{A10} dB	L_{Aeq} dB	L_{A50} dB	L_{A90} dB	L_{Amin} dB
H	19/04/2023 15:35	65	49	45	43	42	40	38
G	19/04/2023 15:54	73	56	45	48	42	40	38
F	19/04/2023 16:20	83	69	48	57	45	43	40
B	19/04/2023 16:54	79	74	69	66	64	59	53
A	19/04/2023 17:15	67	61	57	54	53	50	47
H	19/04/2023 18:00	51	45	42	41	40	39	36
G	19/04/2023 18:17	59	46	42	40	39	38	36
F	19/04/2023 18:42	77	53	48	50	45	42	38
B	19/04/2023 19:02	83	75	70	66	62	54	46
A	19/04/2023 19:19	78	75	70	66	61	54	48
H	24/04/2023 5:06	51	48	45	42	40	36	30
G	24/04/2023 5:24	54	50	46	43	42	38	34
F	24/04/2023 6:06	77	61	54	54	49	45	41
B	24/04/2023 6:25	80	74	68	65	61	56	50
A	24/04/2023 6:43	65	54	52	50	50	47	44

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

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

Table 4.2 Measured atmospheric conditions – Q2 2023

Location	Start date and time	Temperature °C	Wind speed m/s	Wind direction °Magnetic north[1]	Cloud cover 1/8s
H	19/04/2023 15:35	22.7	1.9	60	1
G	19/04/2023 15:54	22.5	1.8	60	1
F	19/04/2023 16:20	22.1	<0.5	-	0
B	19/04/2023 16:54	21.4	0.7	70	0
A	19/04/2023 17:15	20.1	<0.5	-	0
H	19/04/2023 18:00	18.2	<0.5	-	0
G	19/04/2023 18:17	17.8	<0.5	-	0
F	19/04/2023 18:42	17.1	<0.5	-	0
B	19/04/2023 19:02	16.3	<0.5	-	0
A	19/04/2023 19:19	16.0	<0.5	-	0
H	24/04/2023 5:06	15.9	<0.5	-	1
G	24/04/2023 5:24	16.2	<0.5	-	1
F	24/04/2023 6:06	17.6	<0.5	-	1
B	24/04/2023 6:25	17.3	<0.5	-	1
A	24/04/2023 6:43	17.8	<0.5	-	1

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

4.2 Site only noise levels

4.2.1 Modifying factors

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

4.2.2 Monitoring results

Table 4.3 provides site noise levels in the absence of other sources, where possible, and includes weather data obtained from the site's AWS. Limits are applicable if weather conditions were within specified parameters during each measurement.

Table 4.3 Site noise levels and limits – Q2 2023

Location	Start Date and Time (Period)	Wind		Stability Class	Limits apply? [1]	Limit, dB		Site level, dB [2]		Exceedance, dB	
		Speed m/s	Direction [4]			$L_{Aeq,15minute}$	L_{Amax}	$L_{Aeq,15minute}$	L_{Amax}	$L_{Aeq,15minute}$	L_{Amax}
H	19/04/2023 15:35 (D)	2.4	136	A	Y	44	N/A	IA	N/A	No	N/A
G	19/04/2023 15:54 (D)	2.0	128	A	Y	43	N/A	IA	N/A	No	N/A
F	19/04/2023 16:20 (D)	1.7	131	A	Y	40	N/A	IA	N/A	No	N/A
B	19/04/2023 16:54 (D)	0.9	137	A	Y	40	N/A	IA	N/A	No	N/A
A	19/04/2023 17:15 (D)	1.2	128	A	Y	42	N/A	IA	N/A	No	N/A
H	19/04/2023 18:00 (E)	0.7	130	F	Y	46	N/A	IA	N/A	No	N/A
G	19/04/2023 18:17 (E)	0.8	136	F	Y	39	N/A	IA	N/A	No	N/A
F	19/04/2023 18:42 (E)	0.9	135	F	Y	35	N/A	IA	N/A	No	N/A
B	19/04/2023 19:02 (E)	0.9	141	F	Y	40	N/A	IA	N/A	No	N/A
A	19/04/2023 19:19 (E)	1.0	141	E	Y	40	N/A	IA	N/A	No	N/A

Table 4.3 Site noise levels and limits – Q2 2023

Location	Start Date and Time (Period)	Wind		Stability Class	Limits apply? [1]	Limit, dB		Site level, dB [2]		Exceedance, dB	
		Speed m/s	Direction [4]			$L_{Aeq,15minute}$	L_{Amax}	$L_{Aeq,15minute}$	L_{Amax}	$L_{Aeq,15minute}$	L_{Amax}
H	24/04/2023 5:06 (MS)	0.4	333	F	Y	35	52	IA	IA	No	No
G	24/04/2023 5:24 (MS)	0.4	322	F	Y	35	52	IA	IA	No	No
F	24/04/2023 6:06 (MS)	0.1	336	F	Y	35	52	IA	IA	No	No
B	24/04/2023 6:25 (MS)	0.3	321	F	Y	35	52	IA	IA	No	No
A	24/04/2023 6:43 (MS)	0.1	331	F	Y	35	52	IA	IA	No	No

Notes: 1. Noise emission limits do not apply during periods of rainfall or winds greater than 3 metres per second (at a height of 10 metres).

2. Site-only $L_{Aeq,15minute}$, includes modifying factor penalties if applicable.

3. NA in exceedance column means criterion was not applicable due to atmospheric conditions outside those specified in project approval.

4. Degrees magnetic north, "-" indicates calm conditions.

5. MS = Morning Shoulder period; D = Day period; E = Evening period.

5 Summary

EMM Consulting Pty Ltd (EMM) was engaged by Karuah East Quarry Pty Limited to conduct a quarterly noise survey of operations at the site. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified PA and EPL noise limits.

Attended environmental noise monitoring described in this report was done during the morning shoulder, day and evening periods on Wednesday 19 and Monday 24 April 2023 at five monitoring locations.

Karuah East Quarry was confirmed inaudible at all locations during the day, evening and morning shoulder periods. Typically, when this type of noise source is not audible above ambient (not withstanding insect noise and other sources of varied character), the likely level of that source is at least 10 dB below the measured background (L_{A90}) level. However, given the locality of locations A and B (directly adjacent to the Pacific Highway), the L_{A90} is controlled by road traffic noise. Karuah East Quarry was also confirmed to be inaudible during lulls in road traffic noise which, for the measurements at A and B, would correlate with the L_{Amin} measured during the surveys. Given this, the measured background noise levels and measured L_{Amin} (for locations A and B), Karuah East Quarry was estimated to be below the relevant noise limits. The Karuah East Quarry L_{Amax} was also deemed to satisfy the relevant limits given site was inaudible at all locations during the morning shoulder period.

Noise levels from site complied with relevant limits at all monitoring locations during the Q2 2023 survey.

Appendix A
Noise perception and examples

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A.1 Noise levels

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

Table A.1 Perceived change in noise

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

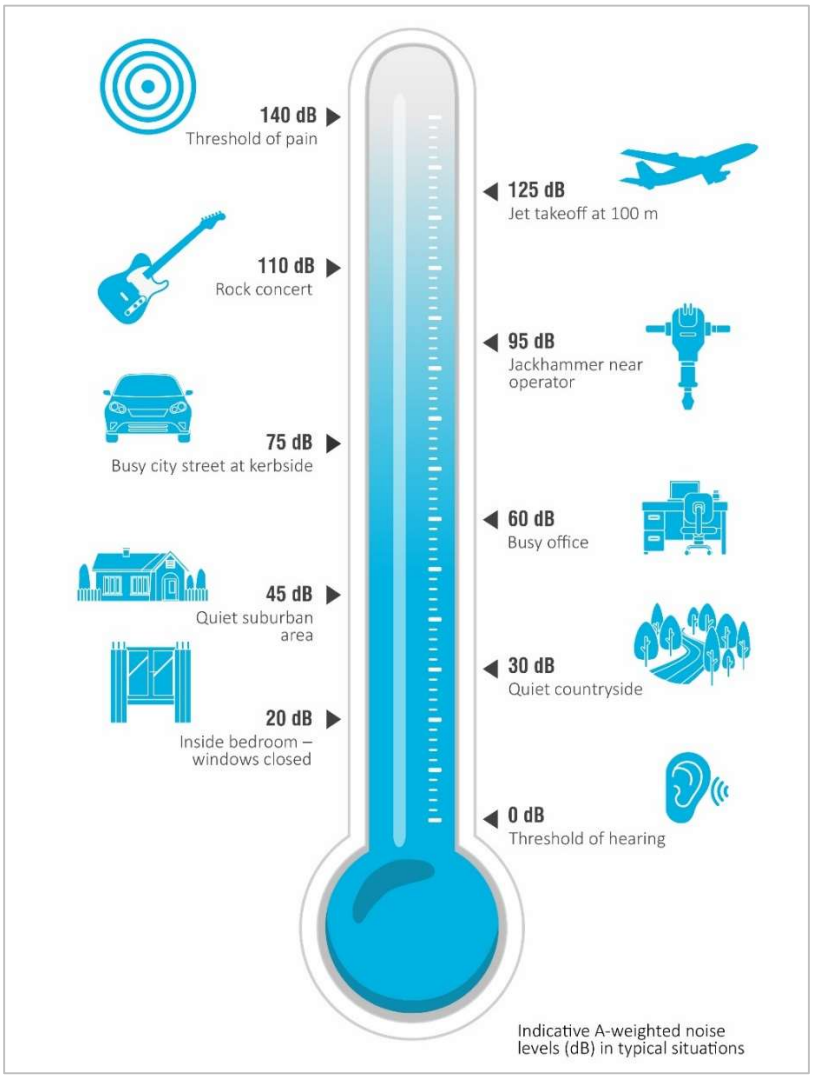

Figure A.1 Common noise levels

Appendix B
Regulator documents

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B.1 Project approval

SCHEDULE 3
ENVIRONMENTAL PERFORMANCE CONDITIONS

IDENTIFICATION OF APPROVED LIMITS OF EXTRACTION

1. The Applicant shall, prior to carrying out quarrying operations on the site:
   (a) engage a registered surveyor to mark out the boundaries of the approved limits of extraction within the Extraction Area; and
   (b) submit a survey plan of the extraction boundaries,
   to the satisfaction of the Planning Secretary.

2. The Applicant must ensure that the extraction boundaries are clearly marked at all times while quarrying operations are being carried out, in a manner that allows the limits of extraction to be clearly identified.

NOISE

Operational Noise Criteria

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

Table 2: Operational noise criteria dB

Noise Assessment Location[a]	Morning Shoulder $L_{Aeq\ (15\ min)}$	Morning Shoulder L_{Amax}	Day $L_{Aeq\ (15\ min)}$	Evening $L_{Aeq\ (15\ min)}$
A	35	52	42	40
B	35	52	40	40
G	35	52	43	39
H	35	52	44	46
I	35	52	40	37
All other residences	35	52	40	35

[a] *Noise Assessment Locations referred to in Table 2 are shown in Appendix 2.*

Noise generated by the development must be monitored and measured in accordance with the relevant procedures and modifications (including certain meteorological conditions) of the NPfI.

3A. The noise criteria in Table 2 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.

Road Traffic Noise Criteria

4. The Applicant must take all reasonable and feasible measures to ensure that the traffic noise generated by the development does not cause additional exceedances of the criteria in Table 3 at any residence on privately-owned land.

Table 3: Road traffic noise criteria

Road	***Criteria (Day[a])***
Pacific Highway	60 dB(A) $L_{Aeq\ (15\ hour)}$
Local roads	55 dB(A) $L_{Aeq\ (1\ hour)}$

[a] *Day is the period from 7 am to 10 pm every day in accordance with the EPA's NSW Road Noise Policy (2011).*

5. Deleted

Noise Operating Conditions

6. 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 quarterly attended noise monitoring (unless otherwise agreed by the Planning Secretary) to determine whether the development is complying with the relevant conditions of this consent; and
   (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.

Noise Management Plan

7. 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) be prepared in consultation with the EPA;
   (c) 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;
      (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);
   (d) describe the noise management system in detail; and
   (e) include a monitoring program that:
      (i) is capable of evaluating the performance of the development;
      (ii) monitors noise at the nearest and/or most affected residences;
      (iii) adequately supports the noise management system;
      (iv) includes a protocol for distinguishing noise emissions of the development from any neighbouring developments; and
      (v) 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.

7A. The Applicant must implement the plan as approved by the Planning Secretary.

BLASTING

Blasting Criteria

8. The Applicant must ensure that blasting on the site does not cause exceedances of the criteria in Table 5.

B.2 Environmental protection licence

Environment Protection Licence

L3 Waste

L3.1 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 Noise limits

L4.1 Noise generated at the premises must not exceed the noise limits in the table below. The locations referred to in the table below are indicated in Table 2: Operational Noise Criteria, and Figure 1 of the document titled Project Approval 09_0175 Modification 9 (MOD 9) Department of Planning, Industry& Environment - which has been filed on EPA file Doc22/715570-1.

Noise Assesment Location	Morning Shoulder LAeq(15 min)	Morning shoulder LAmax	Day LAeq (15 min)	Evening LAeq (15 min)
A (74 Mill Hill Close, Karuah, Lot 100 DP 1028885)	35	52	42	40
B (64 Mill Hill Close, Karuah, Lot 3 DP785172)	35	52	40	40
G (2 Halloran Road, North Arm Cove Lot 1 DP1032636)	35	52	43	39
H (21 Halloran Road, North Arm Cove Lot 10 DP1032636)	35	52	44	46
I (83 Halloran Road, North Arm Cove Lot 12 DP1032636)	35	52	40	37
All other residences	35	52	40	35

L4.2 Noise limit definitions - For the purpose of the table at L4.1, the following definitions apply:
Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays;
Morning Shoulder is defined as the period from 5:00am to 7:00am Monday to Saturday;
Evening is defined as the period from 6:00pm to 10:00pm Monday to Saturday.

L4.3 The noise limits set out in this licence apply under all meteorological conditions except for the following:
a) Wind speed greater than 3 metres/second at 10 metres above ground level; or
b) Stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or

c) Stability category G temperature inversion conditions.

L4.4 **Determining Compliance**

To determine compliance with the noise limits set out in the table above, the licensee must locate monitoring equipment:
a) 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 that is closest to the premises;
b) approximately on the boundary where any dwelling is situated 30 metres or less from the property boundary that is closest to the premises;
c) at the most affected point at a location where there is no dwelling at the location; and
d) within approximately 50 metres of the boundary of a national park or nature reserve.

Note: A non-compliance of the Noise Limits table will still occur where noise generated from the premises in excess of the appropriate limit is measured:
i) at a location other than an area prescribed in part (a) and part (b); and/or
ii) at a point other than the most affected point at a location.

L4.5 For the purposes of determining the noise generated at the premises the modification factors in Fact Sheet C of the EPA's "Noise Policy for Industry" must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

L5 Blasting

L5.1 Blasting in or on the premises must only be carried out between the hours of 9:00 am and 4:00 pm Monday to Friday. No blasting is permitted on Saturdays, Sundays or public holidays. Blasting outside of the hours specified in this condition can only take place with the written approval of the EPA.

L5.2 Blasting is not permitted simultaneously with adjacent quarry(s).

L5.3 The airblast overpressure level from blasting operations in or on the premises must not exceed:
a) 115 dB (Lin Peak) for more than 5% of the total number of blasts during each reporting period; and
b) 120 dB (Lin Peak) at any time,
at monitoring point 11 detailed in Condition P1.4.

L5.4 The ground vibration peak particle velocity from blasting operations carried out in or on the premises must not exceed:
a) 5 mm/second for more than 5% of the total number of blasts during each reporting period; and
b) 10 mm/second at any time,
at monitoring point 11 detailed in Condition P1.4.

L5.5 Error margins associated with any monitoring equipment used to measure airblast overpressure or peak particle velocity are not to be taken into account in determing whether or not the limit has been exceeded.

L5.6 The airblast overpressure and ground vibration levels in the conditions above do not apply at noise sensitive locations that are owned by the licensee or subject to a private agreement, relating to airblast overpressure and ground vibration levels, between the licensee and land owner.

a) the date and time of the complaint;
b) the method by which the complaint was made;
c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
d) the nature of the complaint;
e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and
f) if no action was taken by the licensee, the reasons why no action was taken.

M5.3 The record of a complaint must be kept for at least 4 years after the complaint was made.

M5.4 The record must be produced to any authorised officer of the EPA who asks to see them.

M6 Telephone complaints line

M6.1 The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.

M6.2 The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.

M6.3 The preceding two conditions do not apply until 1 month after the date of the issue of this licence.

M7 Blasting

M7.1 To determine complaince with Blast Limit conditions of this licence:
a) Airblast overpressure and ground vibration levels must be measured and electronically recorded for monitoring point 11 for the parameters specified in Column 1 of the table below; and
b) The licensee must use the units of measure, sampling method, and sample at the frequency specified opposite in the other columns.

Parameter	Units of Measure	Frequency	Sampling Method
Airblast Overpressure	Decibels (Linear Peak	All blasts	Australian Standard AS 2187.2-2006
Ground Vibration Peak Particle Velocity	millimetres/second	All blasts	Australian Standard AS 2187.2-2006

M8 Noise monitoring

M8.1 To assess compliance with the noise limits for this premises attended noise monitoring must be undertaken in accordance with all noise conditions and:
a) during a period of normal quarry operations;
b) at each one of the locations listed in the noise limits table of this licence;

c) occur quarterly in the reporting period;
d) occur during each day period as defined in the NSW Noise Policy for Industry.

Note: Quarterly attended noise monitoring must be completed (unless otherwise agreed by the Planning Secretary) to determine whether the development is complying with the relevant conditions of this consent. The frequency of noise monitoring will be reviewed, upon request.

6 Reporting Conditions

R1 Annual return documents

R1.1 The licensee must complete and supply to the EPA an Annual Return in the approved form comprising:

1. a Statement of Compliance,
2. a Monitoring and Complaints Summary,
3. a Statement of Compliance - Licence Conditions,
4. a Statement of Compliance - Load based Fee,
5. a Statement of Compliance - Requirement to Prepare Pollution Incident Response Management Plan,
6. a Statement of Compliance - Requirement to Publish Pollution Monitoring Data; and
7. a Statement of Compliance - Environmental Management Systems and Practices.

At the end of each reporting period, the EPA will provide to the licensee notification that the Annual Return is due.

R1.2 An Annual Return must be prepared in respect of each reporting period, except as provided below.

Note: The term "reporting period" is defined in the dictionary at the end of this licence. Do not complete the Annual Return until after the end of the reporting period.

R1.3 Where this licence is transferred from the licensee to a new licensee:
a) the transferring licensee must prepare an Annual Return for the period commencing on the first day of the reporting period and ending on the date the application for the transfer of the licence to the new licensee is granted; and
b) the new licensee must prepare an Annual Return for the period commencing on the date the application for the transfer of the licence is granted and ending on the last day of the reporting period.

Note: An application to transfer a licence must be made in the approved form for this purpose.

R1.4 Where this licence is surrendered by the licensee or revoked by the EPA or Minister, the licensee must prepare an Annual Return in respect of the period commencing on the first day of the reporting period and ending on:
a) in relation to the surrender of a licence - the date when notice in writing of approval of the surrender is given; or
b) in relation to the revocation of the licence - the date from which notice revoking the licence operates.

R1.5 The Annual Return for the reporting period must be supplied to the EPA via eConnect *EPA* or by registered

B.3 Noise management plan

5 Noise limits

5.1 Operational noise

Condition 3 of Schedule 3 of PA 09_0175 provides the operational noise limits for KEQ. These are reproduced in Table 5.1.

Table 5.1 Operational noise criteria (dB) from Table 2 of PA 09_0175

Noise Assessment Location[1]	Morning Shoulder $L_{Aeq(15\ minute)}$	Morning Shoulder L_{Amax}	Day $L_{Aeq(15\ minute)}$	Evening $L_{Aeq(15\ minute)}$
A	35	52	42	40
B	35	52	40	40
G	35	52	43	39
H	35	52	44	46
I	35	52	40	37
All other residences	35	52	40	35

Noise assessment locations are shown in Figure 3.1.

Noise generated by the development must be monitored and measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NPfI (EPA 2017).

The noise limits provided in Table 5.1 apply under standard and noise-enhancing meteorological conditions (as defined in the NPfI) determined by monitoring at the relevant weather station. In accordance with Condition L4.3 of EPL 20611 and consistent with Condition 3 of Schedule 3 of PA 09_0175 the noise limits provided in Table 5.1 apply under all meteorological conditions except for the following:

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

In accordance with Fact Sheet D of the NPfI, for 'very noise enhancing meteorological conditions' the applicable noise limit is set at 5dB above those provided in Table 5.1.

Noise limits do not apply if Karuah East has an agreement with the owner/s of the relevant residence or land to exceed the noise criteria, and Karuah East has advised the Department in writing of the terms of this agreement.

5.2 Road traffic noise

Condition 4 of Schedule 3 of PA 09_0175 states that all reasonable and feasible measures must be taken to ensure that the traffic generated by KEQ does not cause additional exceedances of the criteria provided in Table 5.2 at any residence on privately-owned land.

Appendix C
Calibration certificates

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CERTIFICATE OF CALIBRATION

CERTIFICATE NO: C34022

EQUIPMENT TESTED : Sound Level Calibrator

Manufacturer: Svantek
Type No: SV-36 **Serial No:** 86311
Owner: EMM Consulting
Suite 01, 20 Chandos St
St Leonards NSW 2065
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	94.01 dB	1000.00 Hz	2.00 %
Level2:	NA	N	113.92 dB	1000.00 Hz	0.35 %
Uncertainty			±0.11 dB	±0.05%	±0.20 %
Uncertainty (at 95% c.l.) k=2					

CONDITION OF TEST:

Ambient Pressure 1013 hPa ±1 hPa
Temperature 22 °C ±1° C
Relative Humidity 56 % ±5%

Date of Receipt : 17/10/2022
Date of Calibration : 17/10/2022
Date of Issue : 17/10/2022

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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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

CERTIFICATE OF CALIBRATION

CERTIFICATE NO: SLM34169

EQUIPMENT TESTED: Sound Level Meter

Manufacturer:	B & K		
Type No:	2250	**Serial No:**	3029363
Mic. Type:	4189	**Serial No:**	3260501
Pre-Amp. Type:	ZC0032	**Serial No:**	30109
Filter Type:	1/3 Octave	**Test No:**	F034175

Owner: EMM Consulting
Suite 01, 20 Chandos St
St Leonards NSW 2065

Tests Performed: IEC 61672-3:2013 & IEC 61260-3:2016

Comments: All Test passed for Class 1. (See overleaf for details)

CONDITIONS OF TEST:

Ambient Pressure	1002	hPa ±1 hPa	**Date of Receipt :**	02/11/2022
Temperature	24	°C ±1° C	**Date of Calibration :**	03/11/2022
Relative Humidity	35	% ±5%	**Date of Issue :**	04/11/2022

Acu-Vib Test Procedure: AVP10 (SLM) & AVP06 (Filters)

CHECKED BY: ..... **AUTHORISED SIGNATURE:** .....

Jack Kielt

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Karuah East Quarry

Quarterly Attended Noise Monitoring - Q3 2023

Prepared for Karuah East Quarry Pty Limited

October 2023

Karuah East Quarry

Quarterly Attended Noise Monitoring - Q3 2023

Karuah East Quarry Pty Limited

E230083 RP4

October 2023

Version	Date	Prepared by	Reviewed by	Comments
1	23 August 2023	Lucas Adamson	Tony Welbourne	Draft
2	25 August 2023	Lucas Adamson	Tony Welbourne	Final
3	18 October 2023	Rick Scully	Robert Kirwan	Updated to include reference to EPL Conditions R3(a) and (c)

Approved by

Robert Kirwan
Associate Consultant
18 October 2023

Level 3 175 Scott Street
Newcastle NSW 2300

TABLE OF CONTENTS

Tables

Figures

1 Introduction

1.1 Background

EMM Consulting Pty Ltd (EMM) was engaged by Karuah East Quarry Pty Limited to conduct a quarterly noise survey of operations at Karuah East Quarry (KEQ, the site) located at Blue Rock Close, Karuah NSW. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits.

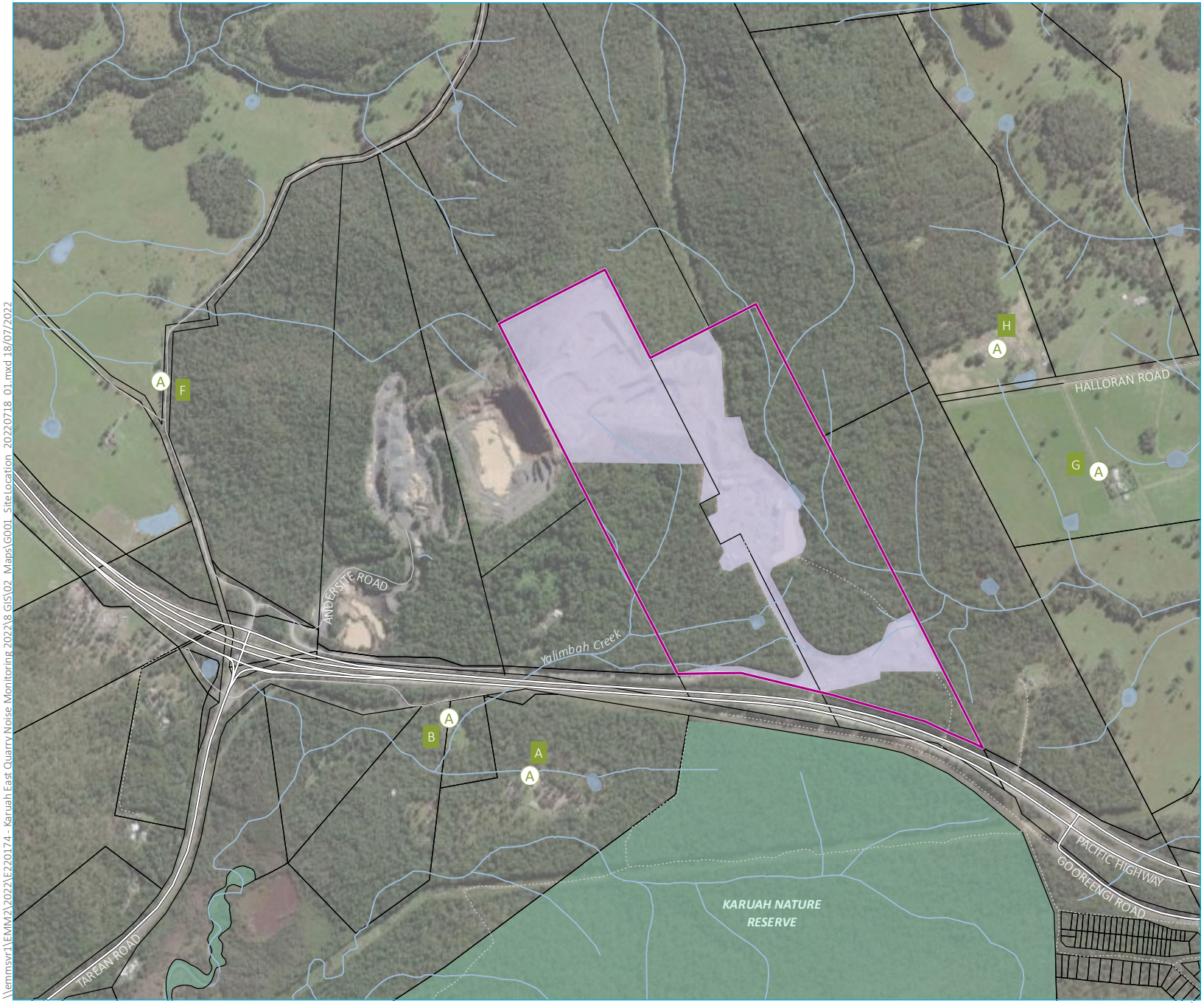
Attended environmental noise monitoring described in this report was done during morning shoulder, day and evening periods on Thursday 10 and Friday 11 August 2023 at five monitoring locations.

1.2 Attended monitoring locations

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

Table 1.1 Attended noise monitoring locations

Location descriptor/ID	Description/address	Coordinates (MGA56)	
		Easting	Northing
A	Private residence - 74 Mill Hill Close, Karuah	406623	6388704
B	Private residence - 64 Mill Hill Close, Karuah	406405	6388859
F	Private residence - 1714 The Branch Lane, Karuah	405639	6389782
G	Private residence - 2 Halloran Road, North Arm Cove	405629	6389766
H	Private residence - 21 Halloran Road, North Arm Cove	407795	6389868



KEY

- Site boundary
- Attended noise monitoring location
- Approved disturbance area
- Major road
- Minor road
- Vehicular track
- Watercourse/drainage line
- Cadastral boundary
- Waterbody
- NPWS reserve
- State forest

Attended noise monitoring locations

Source: EMM (2022); ADW Johnson (2020); DFSI (2017); ICSM (2012); GA (2011); ASGC (2006)

0 0.5 1 km

GDA 1994 MGA Zone 56

N

Karuah East Quarry
Quarterly attended noise monitoring
Figure 1.1

EMM creating opportunities

\\emmsvr1\EMM2\2022\E220174 - Karuah East Quarry Noise Monitoring 2022\8 GIS\02_Maps\G001_Site Location_20220718_01.mxd 18/07/2022

1.3 Terminology and abbreviations

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

Table 1.2 Terminology and abbreviations

Term/descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The "A" weighting scale is used to approximate how humans hear noise.
L_{Amax}	The maximum root mean squared A-weighted noise level over a time period.
L_{A1}	The A-weighted noise level which is exceeded for 1 per cent of the time.
$L_{A1,1minute}$	The A-weighted noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L_{A10}	The A-weighted noise level which is exceeded for 10 per cent of the time.
L_{Aeq}	The energy average A-weighted noise level.
L_{A50}	The A-weighted noise level which is exceeded for 50 per cent of the time, also the median noise level during a measurement period.
L_{A90}	The A-weighted noise level exceeded for 90 per cent of the time, also referred to as the "background" noise level and commonly used to derive noise limits.
L_{Amin}	The minimum A-weighted noise level over a time period.
L_{Ceq}	The energy average C-weighted noise energy during a measurement period. The "C" weighting scale is used to take into account low-frequency components of noise within the audibility range of humans.
SPL	Sound pressure level. Fluctuations in pressure measured as 10 times a logarithmic scale, with the reference pressure being 20 micropascals.
Hertz (Hz)	The frequency of fluctuations in pressure, measured in cycles per second. Most sounds are a combination of many frequencies together.
AWS	Automatic weather station used to collect meteorological data, typically at an altitude of 10 metres
VTG	The vertical temperature gradient in degrees Celsius per 100 metres altitude.
Sigma-theta	The standard deviation of the horizontal wind direction over a period of time.
IA	Inaudible. When site noise is noted as IA then there was no site noise at the monitoring location.
NM	Not Measurable. If site noise is noted as NM, this means some noise was audible but could not be quantified.
Day	Monday – Saturday: 7 am to 6 pm, on Sundays and Public Holidays: 8 am to 6 pm.
Evening	Monday – Saturday: 6 pm to 10 pm, on Sundays and Public Holidays: 6 pm to 10 pm.
Morning Shoulder	Monday – Saturday: 5 am to 7 am.

Appendix A provides further information that indicates how an average person perceives changes in noise levels and examples of common noise levels.

2 Noise limits

2.1 Project approval

Karuah East Quarry noise limits are detailed in Condition 3 of Project Approval (PA) 09_0175. Relevant sections of PA 09_0175 are reproduced in Appendix B.1.

2.2 Environment protection licence

Karuah East Quarry noise limits are detailed in Condition L4.1 of Environment Protection Licence (EPL) 20611. Relevant sections of EPL 20611 are reproduced in Appendix B.2.

2.3 Noise management plan

The approved Noise Management Plan (NMP) adopts five attended noise monitoring locations that are representative of residences outlined in PA 09_0175 and EPL 20611. Relevant sections of the NMP are reproduced in Appendix B.3.

2.4 Noise limits

Noise impact limits based on PA 09_0175 and EPL 20611 are as shown in Table 2.1.

Table 2.1 Noise impact limits, dB

Location	Day $L_{Aeq,15minute}$	Evening $L_{Aeq,15minute}$	Morning Shoulder $L_{Aeq,15minute}$	Morning Shoulder $L_{A1,1minute}$
A	42	40	35	52
B	40	40	35	52
F	40	35	35	52
G	43	39	35	52
H	44	46	35	52

Notes: 1. Morning shoulder period is from 5:00 am to 7:00 am Monday to Saturday as defined in Condition L4.2 of EPL 20611.

2.5 Meteorological conditions

PA 09_0175 specifies that noise generated by the project is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW EPA 'Noise Policy for Industry' (NPfI) issued in October 2017. Similarly, the requirements of Condition L4.3 of EPL 20611 state that noise limits do not apply under the following meteorological conditions:

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

2.6 Additional requirements

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

2.7 Very noise-enhancing meteorological conditions

In accordance with the approved methods, noise monitoring for the site is scheduled to occur during forecasted meteorological conditions where noise limits in Table 2.1 will be applicable. However, in cases where actual meteorological conditions do not align with forecasts and noise limits are subsequently not directly applicable, it is the expectation of regulators that noise impact still be managed.

The NPfI states that:

> Noise limits derived for consents and licences will apply under the meteorological conditions used in the environmental assessment process, that is, standard or noise-enhancing meteorological conditions. For 'very noise-enhancing meteorological conditions' … a limit is set based on the limit derived under standard or noise-enhancing conditions (whichever is adopted in the assessment) plus 5 dB. In this way a development is subject to noise limits under all meteorological conditions.

Therefore, if monthly noise monitoring occurs during meteorological conditions outside of those specified in Section 2.5, site limits will be adjusted based on Table 2.1 plus 5 dB.

3 Methodology

3.1 Overview

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

3.2 Attended noise monitoring

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

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

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

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

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

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

3.3 Meteorological data

Meteorological data for the monitoring period was sourced from the Karuah East Quarry on-site meteorological station (the site AWS) to determine the applicability of criteria in accordance with the EPL and PA.

3.4 Modifying factors

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

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

3.5 Site operations

As required by Condition R4.3(a) of the EPL, the operations occurring at the time of monitoring are summarised per period below:

- Day
  - Routine quarry operations in the quarry pit
  - Routine plant processing operations
  - Routine material transport from the quarry pit to the processing plant and product stockpile areas
  - Routine product loading and dispatch to road trucks
- Evening
  - Routine material transport from the processing plant to product stockpile areas
  - Routine maintenance activities of plant and equipment
- Morning shoulder
  - Routine maintenance activities of plant and equipment
  - Routine product loading and dispatch to road trucks

3.6 Instrumentation

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

Table 3.1 Attended noise monitoring equipment

Item	Serial number	Calibration due date	Relevant standard
Brüel & Kjær 2250 sound level meter	2759405	2/2/2024	IEC 61672-1:2002
Svantek SV-36 calibrator	79952	29/9/2024	IEC 60942

4 Results

4.1 Total measured noise levels and atmospheric conditions

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

Table 4.1 Total measured noise levels – Q3 2023[1]

Location	Start date and time	L_{Amax} dB	L_{A1} dB	L_{A10} dB	L_{Aeq} dB	L_{A50} dB	L_{A90} dB	L_{Amin} dB
A	10/08/2023 16:11	108	85	57	77	54	51	46
B	10/08/2023 16:28	76	74	69	66	65	60	54
F	10/08/2023 16:46	93	65	51	60	48	46	42
G	10/08/2023 17:09	63	50	38	41	35	33	31
H	10/08/2023 17:28	64	47	40	38	33	31	28
H	10/08/2023 18:00	78	49	37	46	34	33	31
G	10/08/2023 18:17	53	47	40	39	37	36	32
F	10/08/2023 18:40	83	59	55	55	52	49	44
B	10/08/2023 18:59	76	74	68	65	63	57	51
A	10/08/2023 19:16	68	61	57	55	53	50	46
A	11/08/2023 5:00	77	75	69	65	59	54	48
B	11/08/2023 5:17	79	75	68	65	60	55	48
F	11/08/2023 5:35	81	64	58	57	54	51	45
G	11/08/2023 5:59	68	58	46	46	43	40	37
H	11/08/2023 6:16	65	60	47	47	43	41	38

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

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

Table 4.2 Measured atmospheric conditions – Q3 2023

Location	Start date and time	Temperature °C	Wind speed m/s	Wind direction °Magnetic north[1]	Cloud cover 1/8s
A	10/08/2023 16:11	22.5	<0.5	-	1
B	10/08/2023 16:28	22.8	<0.5	-	1
F	10/08/2023 16:46	21.6	0.9	0	1
G	10/08/2023 17:09	20.1	<0.5	-	2
H	10/08/2023 17:28	19.5	<0.5	-	2
H	10/08/2023 18:00	18.6	<0.5	-	2
G	10/08/2023 18:17	18.1	<0.5	-	2
F	10/08/2023 18:40	17.7	<0.5	-	2
B	10/08/2023 18:59	17.5	<0.5	-	2
A	10/08/2023 19:16	17.1	<0.5	-	2
A	11/08/2023 5:00	12.5	<0.5	-	0
B	11/08/2023 5:17	12.8	<0.5	-	0
F	11/08/2023 5:35	13.2	<0.5	-	0
G	11/08/2023 5:59	13.3	<0.5	-	0
H	11/08/2023 6:16	13.4	<0.5	-	0

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

4.2 Site only noise levels

4.2.1 Modifying factors

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

4.2.2 Monitoring results

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

Table 4.3 Site noise levels and limits – Q3 2023

Location	Start Date and Time (Period)	Wind		Stability Class	Very enhancing? [1]	Limit, dB		Site level, dB [2]		Exceedance, dB	
		Speed m/s	Direction [4]			$L_{Aeq,15minute}$	L_{Amax}	$L_{Aeq,15minute}$	L_{Amax}	$L_{Aeq,15minute}$	L_{Amax}
A	10/08/2023 16:11 (D)	1.4	313	A	N	42	N/A	NM	N/A	No	N/A
B	10/08/2023 16:28 (D)	1.2	273	A	N	40	N/A	IA	N/A	No	N/A
F	10/08/2023 16:46 (D)	1.0	223	A	N	40	N/A	IA	N/A	No	N/A
G	10/08/2023 17:09 (D)	0.3	189	A	N	43	N/A	<35	N/A	No	N/A
H	10/08/2023 17:28 (D)	0.4	163	A	N	44	N/A	26	N/A	No	N/A
H	10/08/2023 18:00 (E)	0.5	96	F	N	46	N/A	IA	N/A	No	N/A
G	10/08/2023 18:17 (E)	0.4	124	F	N	39	N/A	IA	N/A	No	N/A
F	10/08/2023 18:40 (E)	0.4	89	F	N	35	N/A	IA	N/A	No	N/A
B	10/08/2023 18:59 (E)	0.3	145	F	N	40	N/A	IA	N/A	No	N/A
A	10/08/2023 19:16 (E)	0.3	111	F	N	40	N/A	IA	N/A	No	N/A

Table 4.3 Site noise levels and limits – Q3 2023

Location	Start Date and Time (Period)	Wind		Stability Class	Very enhancing? [1]	Limit, dB		Site level, dB [2]		Exceedance, dB	
		Speed m/s	Direction [4]			$L_{Aeq,15minute}$	L_{Amax}	$L_{Aeq,15minute}$	L_{Amax}	$L_{Aeq,15minute}$	L_{Amax}
A	11/08/2023 5:00 (MS)	0.3	189	F	N	35	52	IA	IA	No	No
B	11/08/2023 5:17 (MS)	0.2	89	F	N	35	52	IA	IA	No	No
F	11/08/2023 5:35 (MS)	0.1	84	F	N	35	52	IA	IA	No	No
G	11/08/2023 5:59 (MS)	0.1	152	F	N	35	52	IA	IA	No	No
H	11/08/2023 6:16 (MS)	0.2	150	F	N	35	52	IA	IA	No	No

Notes: 1. Noise limits are adjusted by +5 dB during 'very noise-enhancing meteorological conditions' in accordance with the NPfI.

2. Site-only $L_{Aeq,15minute}$, includes modifying factor penalties if applicable.

3. Degrees magnetic north, "-" indicates calm conditions.

4. MS = Morning Shoulder period; D = Day period; E = Evening period.

5 Mitigation and management

5.1 Proposed management actions

EPL Condition R4.3(c) requires details of any management actions taken within the monitoring period to address any exceedances of the limits. As there were no exceedances, no management actions were required.

6 Summary

EMM Consulting Pty Ltd (EMM) was engaged by Karuah East Quarry Pty Limited to conduct a quarterly noise survey of operations at the site. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified PA and EPL noise limits.

Attended environmental noise monitoring described in this report was done during the morning shoulder, day and evening periods on Thursday 10 and Friday 11 August 2023 at five monitoring locations.

Noise levels from the site complied with relevant limits at all monitoring locations during the Q3 2023 survey.

Appendix A
Noise perception and examples

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A.1 Noise levels

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

Table A.1 Perceived change in noise

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

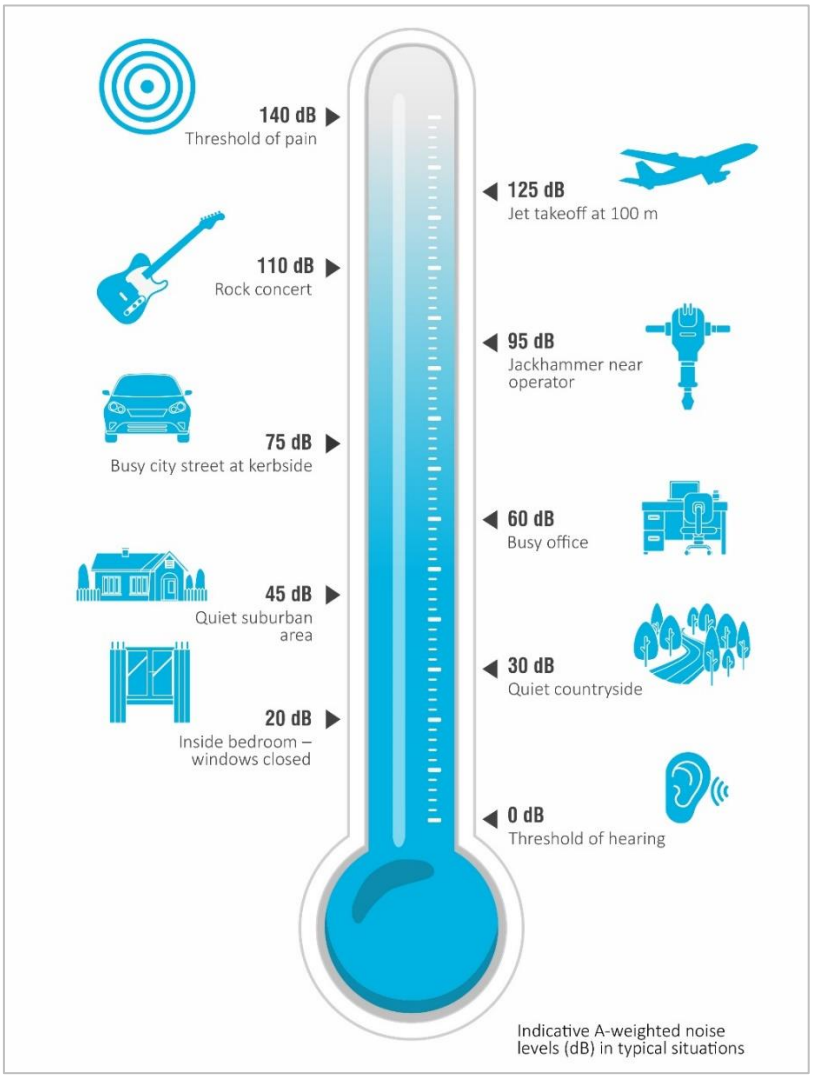

Figure A.1 Common noise levels

Appendix B
Regulator documents

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B.1 Project approval

SCHEDULE 3
ENVIRONMENTAL PERFORMANCE CONDITIONS

IDENTIFICATION OF APPROVED LIMITS OF EXTRACTION

1. The Applicant shall, prior to carrying out quarrying operations on the site:
   (a) engage a registered surveyor to mark out the boundaries of the approved limits of extraction within the Extraction Area; and
   (b) submit a survey plan of the extraction boundaries,
   to the satisfaction of the Planning Secretary.

2. The Applicant must ensure that the extraction boundaries are clearly marked at all times while quarrying operations are being carried out, in a manner that allows the limits of extraction to be clearly identified.

NOISE

Operational Noise Criteria

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

Table 2: Operational noise criteria dB

Noise Assessment Location[a]	Morning Shoulder $L_{Aeq\ (15\ min)}$	Morning Shoulder L_{Amax}	Day $L_{Aeq\ (15\ min)}$	Evening $L_{Aeq\ (15\ min)}$
A	35	52	42	40
B	35	52	40	40
G	35	52	43	39
H	35	52	44	46
I	35	52	40	37
All other residences	35	52	40	35

[a] *Noise Assessment Locations referred to in Table 2 are shown in Appendix 2.*

Noise generated by the development must be monitored and measured in accordance with the relevant procedures and modifications (including certain meteorological conditions) of the NPfI.

3A. The noise criteria in Table 2 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.

Road Traffic Noise Criteria

4. The Applicant must take all reasonable and feasible measures to ensure that the traffic noise generated by the development does not cause additional exceedances of the criteria in Table 3 at any residence on privately-owned land.

Table 3: Road traffic noise criteria

Road	***Criteria (Day[a])***
Pacific Highway	60 dB(A) $L_{Aeq\ (15\ hour)}$
Local roads	55 dB(A) $L_{Aeq\ (1\ hour)}$

[a] *Day is the period from 7 am to 10 pm every day in accordance with the EPA's NSW Road Noise Policy (2011).*

5. Deleted

Noise Operating Conditions

6. 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 quarterly attended noise monitoring (unless otherwise agreed by the Planning Secretary) to determine whether the development is complying with the relevant conditions of this consent; and
   (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.

Noise Management Plan

7. 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) be prepared in consultation with the EPA;
   (c) 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;
      (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);
   (d) describe the noise management system in detail; and
   (e) include a monitoring program that:
      (i) is capable of evaluating the performance of the development;
      (ii) monitors noise at the nearest and/or most affected residences;
      (iii) adequately supports the noise management system;
      (iv) includes a protocol for distinguishing noise emissions of the development from any neighbouring developments; and
      (v) 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.

7A. The Applicant must implement the plan as approved by the Planning Secretary.

BLASTING

Blasting Criteria

8. The Applicant must ensure that blasting on the site does not cause exceedances of the criteria in Table 5.

B.2 Environmental protection licence

Environment Protection Licence

L3 Waste

L3.1 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 Noise limits

L4.1 Noise generated at the premises must not exceed the noise limits in the table below. The locations referred to in the table below are indicated in Table 2: Operational Noise Criteria, and Figure 1 of the document titled Project Approval 09_0175 Modification 9 (MOD 9) Department of Planning, Industry& Environment - which has been filed on EPA file Doc22/715570-1.

Noise Assesment Location	Morning Shoulder LAeq(15 min)	Morning shoulder LAmax	Day LAeq (15 min)	Evening LAeq (15 min)
A (74 Mill Hill Close, Karuah, Lot 100 DP 1028885)	35	52	42	40
B (64 Mill Hill Close, Karuah, Lot 3 DP785172)	35	52	40	40
G (2 Halloran Road, North Arm Cove Lot 1 DP1032636)	35	52	43	39
H (21 Halloran Road, North Arm Cove Lot 10 DP1032636)	35	52	44	46
I (83 Halloran Road, North Arm Cove Lot 12 DP1032636)	35	52	40	37
All other residences	35	52	40	35

L4.2 Noise limit definitions - For the purpose of the table at L4.1, the following definitions apply:
Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays;
Morning Shoulder is defined as the period from 5:00am to 7:00am Monday to Saturday;
Evening is defined as the period from 6:00pm to 10:00pm Monday to Saturday.

L4.3 The noise limits set out in this licence apply under all meteorological conditions except for the following:
a) Wind speed greater than 3 metres/second at 10 metres above ground level; or
b) Stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or

c) Stability category G temperature inversion conditions.

L4.4 **Determining Compliance**

To determine compliance with the noise limits set out in the table above, the licensee must locate monitoring equipment:
a) 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 that is closest to the premises;
b) approximately on the boundary where any dwelling is situated 30 metres or less from the property boundary that is closest to the premises;
c) at the most affected point at a location where there is no dwelling at the location; and
d) within approximately 50 metres of the boundary of a national park or nature reserve.

Note: A non-compliance of the Noise Limits table will still occur where noise generated from the premises in excess of the appropriate limit is measured:
i) at a location other than an area prescribed in part (a) and part (b); and/or
ii) at a point other than the most affected point at a location.

L4.5 For the purposes of determining the noise generated at the premises the modification factors in Fact Sheet C of the EPA's "Noise Policy for Industry" must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

L5 Blasting

L5.1 Blasting in or on the premises must only be carried out between the hours of 9:00 am and 4:00 pm Monday to Friday. No blasting is permitted on Saturdays, Sundays or public holidays. Blasting outside of the hours specified in this condition can only take place with the written approval of the EPA.

L5.2 Blasting is not permitted simultaneously with adjacent quarry(s).

L5.3 The airblast overpressure level from blasting operations in or on the premises must not exceed:
a) 115 dB (Lin Peak) for more than 5% of the total number of blasts during each reporting period; and
b) 120 dB (Lin Peak) at any time,
at monitoring point 11 detailed in Condition P1.4.

L5.4 The ground vibration peak particle velocity from blasting operations carried out in or on the premises must not exceed:
a) 5 mm/second for more than 5% of the total number of blasts during each reporting period; and
b) 10 mm/second at any time,
at monitoring point 11 detailed in Condition P1.4.

L5.5 Error margins associated with any monitoring equipment used to measure airblast overpressure or peak particle velocity are not to be taken into account in determing whether or not the limit has been exceeded.

L5.6 The airblast overpressure and ground vibration levels in the conditions above do not apply at noise sensitive locations that are owned by the licensee or subject to a private agreement, relating to airblast overpressure and ground vibration levels, between the licensee and land owner.

a) the date and time of the complaint;
b) the method by which the complaint was made;
c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
d) the nature of the complaint;
e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and
f) if no action was taken by the licensee, the reasons why no action was taken.

M5.3 The record of a complaint must be kept for at least 4 years after the complaint was made.

M5.4 The record must be produced to any authorised officer of the EPA who asks to see them.

M6 Telephone complaints line

M6.1 The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.

M6.2 The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.

M6.3 The preceding two conditions do not apply until 1 month after the date of the issue of this licence.

M7 Blasting

M7.1 To determine complaince with Blast Limit conditions of this licence:
a) Airblast overpressure and ground vibration levels must be measured and electronically recorded for monitoring point 11 for the parameters specified in Column 1 of the table below; and
b) The licensee must use the units of measure, sampling method, and sample at the frequency specified opposite in the other columns.

Parameter	Units of Measure	Frequency	Sampling Method
Airblast Overpressure	Decibels (Linear Peak	All blasts	Australian Standard AS 2187.2-2006
Ground Vibration Peak Particle Velocity	millimetres/second	All blasts	Australian Standard AS 2187.2-2006

M8 Noise monitoring

M8.1 To assess compliance with the noise limits for this premises attended noise monitoring must be undertaken in accordance with all noise conditions and:
a) during a period of normal quarry operations;
b) at each one of the locations listed in the noise limits table of this licence;

c) occur quarterly in the reporting period;
d) occur during each day period as defined in the NSW Noise Policy for Industry.

Note: Quarterly attended noise monitoring must be completed (unless otherwise agreed by the Planning Secretary) to determine whether the development is complying with the relevant conditions of this consent. The frequency of noise monitoring will be reviewed, upon request.

6 Reporting Conditions

R1 Annual return documents

R1.1 The licensee must complete and supply to the EPA an Annual Return in the approved form comprising:

1. a Statement of Compliance,
2. a Monitoring and Complaints Summary,
3. a Statement of Compliance - Licence Conditions,
4. a Statement of Compliance - Load based Fee,
5. a Statement of Compliance - Requirement to Prepare Pollution Incident Response Management Plan,
6. a Statement of Compliance - Requirement to Publish Pollution Monitoring Data; and
7. a Statement of Compliance - Environmental Management Systems and Practices.

At the end of each reporting period, the EPA will provide to the licensee notification that the Annual Return is due.

R1.2 An Annual Return must be prepared in respect of each reporting period, except as provided below.

Note: The term "reporting period" is defined in the dictionary at the end of this licence. Do not complete the Annual Return until after the end of the reporting period.

R1.3 Where this licence is transferred from the licensee to a new licensee:
a) the transferring licensee must prepare an Annual Return for the period commencing on the first day of the reporting period and ending on the date the application for the transfer of the licence to the new licensee is granted; and
b) the new licensee must prepare an Annual Return for the period commencing on the date the application for the transfer of the licence is granted and ending on the last day of the reporting period.

Note: An application to transfer a licence must be made in the approved form for this purpose.

R1.4 Where this licence is surrendered by the licensee or revoked by the EPA or Minister, the licensee must prepare an Annual Return in respect of the period commencing on the first day of the reporting period and ending on:
a) in relation to the surrender of a licence - the date when notice in writing of approval of the surrender is given; or
b) in relation to the revocation of the licence - the date from which notice revoking the licence operates.

R1.5 The Annual Return for the reporting period must be supplied to the EPA via eConnect *EPA* or by registered

B.3 Noise management plan

5 Noise limits

5.1 Operational noise

Condition 3 of Schedule 3 of PA 09_0175 provides the operational noise limits for KEQ. These are reproduced in Table 5.1.

Table 5.1 Operational noise criteria (dB) from Table 2 of PA 09_0175

Noise Assessment Location[1]	Morning Shoulder $L_{Aeq(15\ minute)}$	Morning Shoulder L_{Amax}	Day $L_{Aeq(15\ minute)}$	Evening $L_{Aeq(15\ minute)}$
A	35	52	42	40
B	35	52	40	40
G	35	52	43	39
H	35	52	44	46
I	35	52	40	37
All other residences	35	52	40	35

Noise assessment locations are shown in Figure 3.1.

Noise generated by the development must be monitored and measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NPfI (EPA 2017).

The noise limits provided in Table 5.1 apply under standard and noise-enhancing meteorological conditions (as defined in the NPfI) determined by monitoring at the relevant weather station. In accordance with Condition L4.3 of EPL 20611 and consistent with Condition 3 of Schedule 3 of PA 09_0175 the noise limits provided in Table 5.1 apply under all meteorological conditions except for the following:

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

In accordance with Fact Sheet D of the NPfI, for 'very noise enhancing meteorological conditions' the applicable noise limit is set at 5dB above those provided in Table 5.1.

Noise limits do not apply if Karuah East has an agreement with the owner/s of the relevant residence or land to exceed the noise criteria, and Karuah East has advised the Department in writing of the terms of this agreement.

5.2 Road traffic noise

Condition 4 of Schedule 3 of PA 09_0175 states that all reasonable and feasible measures must be taken to ensure that the traffic generated by KEQ does not cause additional exceedances of the criteria provided in Table 5.2 at any residence on privately-owned land.

Appendix C
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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Accredited Lab No. 9262
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

Certificate Of Calibration

Certificate No: SLM31670

Equipment Tested: Sound Level Meter

Manufacturer:	B & K		
Type No:	2250	**Serial No:**	2759405
Mic. Type:	4189	**Serial No:**	2983733
Pre-Amp. Type:	ZC0032	**Serial No:**	22666
Filter Type:	1/3 Octave	**Test No:**	F031671

Owner: EMM Consulting
Level 3, 175 Scott Street
Newcastle, NSW 2300

Tests Performed: IEC 61672-3:2013 & IEC 61260-3:2016

Comments: All Test passed for Class 1. (See overleaf for details)

Conditions Of Test:

Ambient Pressure	992	hPa ±1 hPa	**Date of Receipt :**	02/02/2022
Temperature	26	°C ±1° C	**Date of Calibration :**	02/02/2022
Relative Humidity	48	% ±5%	**Date of Issue :**	03/02/2022

Acu-Vib Test Procedure: AVP10 (SLM) & AVP06 (Filters)

Checked By: ..... **Authorised Signature:** .....

Jack Kielt

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Karuah East Quarry

Quarterly Attended Noise Monitoring - Q4 2023

Prepared for Karuah East Quarry Pty Limited

December 2023

Karuah East Quarry

Quarterly Attended Noise Monitoring - Q4 2023

Karuah East Quarry Pty Limited

E230083 RP5

December 2023

Version	Date	Prepared by	Reviewed by	Comments
1	6 December 2023	Lucas Adamson	Najah Ishac	Draft
2	7 December 2023	Lucas Adamson	Najah Ishac	Final

Approved by

Najah Ishac
Director
7 December 2023

Level 3 175 Scott Street
Newcastle NSW 2300

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Appendices

Tables

Figures

1 Introduction

1.1 Background

EMM Consulting Pty Ltd (EMM) was engaged by Karuah East Quarry Pty Limited to conduct a quarterly noise survey of operations at Karuah East Quarry (KEQ, the site) located at Blue Rock Close, Karuah NSW. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits.

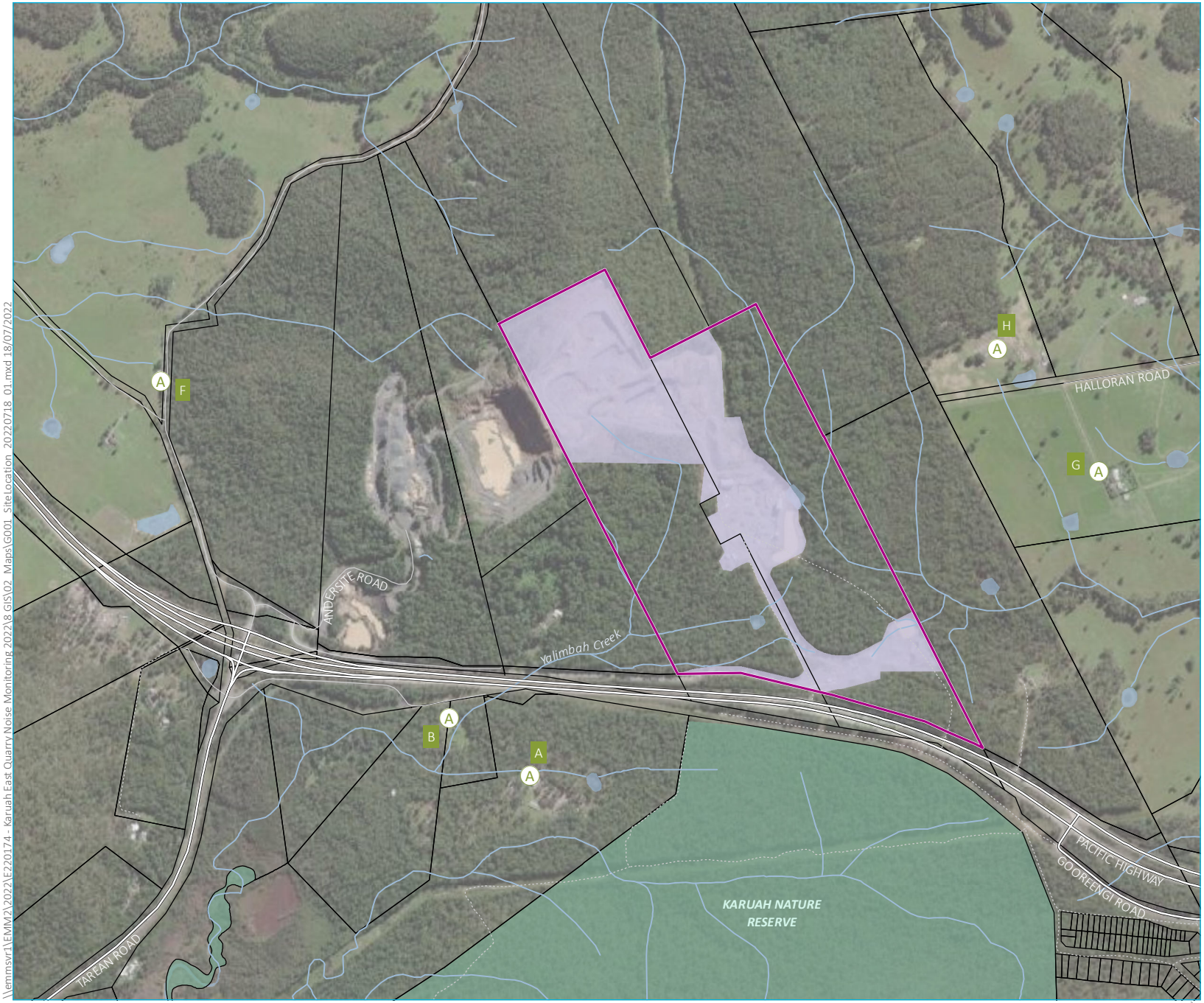
Attended environmental noise monitoring described in this report was done during morning shoulder, day and evening periods on Friday 24 and Thursday 30 November 2023 at five monitoring locations.

1.2 Attended monitoring locations

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

Table 1.1 Attended noise monitoring locations

Location descriptor/ID	Description/address	Coordinates (MGA56)	
		Easting	Northing
A	Private residence - 74 Mill Hill Close, Karuah	406623	6388704
B	Private residence - 64 Mill Hill Close, Karuah	406405	6388859
F	Private residence - 1714 The Branch Lane, Karuah	405639	6389782
G	Private residence - 2 Halloran Road, North Arm Cove	405629	6389766
H	Private residence - 21 Halloran Road, North Arm Cove	407795	6389868



KEY

- Site boundary
- Attended noise monitoring location
- Approved disturbance area
- Major road
- Minor road
- Vehicular track
- Watercourse/drainage line
- Cadastral boundary
- Waterbody
- NPWS reserve
- State forest

Attended noise monitoring locations

Source: EMM (2022); ADW Johnson (2020); DFSI (2017); ICSM (2012); GA (2011); ASGC (2006)

0 0.5 1 km

GDA 1994 MGA Zone 56

N

Karuah East Quarry
Quarterly attended noise monitoring
Figure 1.1

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\\emmsvr1\EMM2\2022\E220174 - Karuah East Quarry Noise Monitoring 2022\8 GIS\02_Maps\G001_Site Location_20220718_01.mxd 18/07/2022

1.3 Terminology and abbreviations

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

Table 1.2 Terminology and abbreviations

Term/descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The "A" weighting scale is used to approximate how humans hear noise.
L_{Amax}	The maximum root mean squared A-weighted noise level over a time period.
L_{A1}	The A-weighted noise level which is exceeded for 1 per cent of the time.
$L_{A1,1minute}$	The A-weighted noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L_{A10}	The A-weighted noise level which is exceeded for 10 per cent of the time.
L_{Aeq}	The energy average A-weighted noise level.
L_{A50}	The A-weighted noise level which is exceeded for 50 per cent of the time, also the median noise level during a measurement period.
L_{A90}	The A-weighted noise level exceeded for 90 per cent of the time, also referred to as the "background" noise level and commonly used to derive noise limits.
L_{Amin}	The minimum A-weighted noise level over a time period.
L_{Ceq}	The energy average C-weighted noise energy during a measurement period. The "C" weighting scale is used to take into account low-frequency components of noise within the audibility range of humans.
SPL	Sound pressure level. Fluctuations in pressure measured as 10 times a logarithmic scale, with the reference pressure being 20 micropascals.
Hertz (Hz)	The frequency of fluctuations in pressure, measured in cycles per second. Most sounds are a combination of many frequencies together.
AWS	Automatic weather station used to collect meteorological data, typically at an altitude of 10 metres
VTG	The vertical temperature gradient in degrees Celsius per 100 metres altitude.
Sigma-theta	The standard deviation of the horizontal wind direction over a period of time.
IA	Inaudible. When site noise is noted as IA then there was no site noise at the monitoring location.
NM	Not Measurable. If site noise is noted as NM, this means some noise was audible but could not be quantified.
Day	Monday – Saturday: 7 am to 6 pm, on Sundays and Public Holidays: 8 am to 6 pm.
Evening	Monday – Saturday: 6 pm to 10 pm, on Sundays and Public Holidays: 6 pm to 10 pm.
Morning Shoulder	Monday – Saturday: 5 am to 7 am.

Appendix A provides further information that indicates how an average person perceives changes in noise levels and examples of common noise levels.

2 Noise limits

2.1 Project approval

Karuah East Quarry noise limits are detailed in Condition 3 of Project Approval (PA) 09_0175. Relevant sections of PA 09_0175 are reproduced in Appendix B.1.

2.2 Environment protection licence

Karuah East Quarry noise limits are detailed in Condition L4.1 of Environment Protection Licence (EPL) 20611. Relevant sections of EPL 20611 are reproduced in Appendix B.2.

2.3 Noise management plan

The approved Noise Management Plan (NMP) adopts five attended noise monitoring locations that are representative of residences outlined in PA 09_0175 and EPL 20611. Relevant sections of the NMP are reproduced in Appendix B.3.

2.4 Noise limits

Noise limits based on PA 09_0175 and EPL 20611 are as shown in Table 2.1.

Table 2.1 Noise impact limits, dB

Location	Day $L_{Aeq,15minute}$	Evening $L_{Aeq,15minute}$	Morning Shoulder $L_{Aeq,15minute}$	Morning Shoulder $L_{A1,1minute}$
A	42	40	35	52
B	40	40	35	52
F	40	35	35	52
G	43	39	35	52
H	44	46	35	52

Notes: 1. Morning shoulder period is from 5:00 am to 7:00 am Monday to Saturday as defined in Condition L4.2 of EPL 20611.

2.5 Meteorological conditions

PA 09_0175 specifies that noise generated by the project is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW EPA 'Noise Policy for Industry' (NPfI) issued in October 2017.

The EPA requirements in Condition L4.3 of EPL 20611 state that noise limits do not apply under the following meteorological conditions:

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

2.6 Additional requirements

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

2.7 Very noise-enhancing meteorological conditions

In accordance with the approved methods, noise monitoring for the site is scheduled to occur during forecasted meteorological conditions where noise limits in Table 2.1 will be applicable. However, in cases where actual meteorological conditions do not align with forecasts and noise limits are subsequently not directly applicable, it is the expectation of regulators that noise impact still be managed.

The NPfI states that:

> Noise limits derived for consents and licences will apply under the meteorological conditions used in the environmental assessment process, that is, standard or noise-enhancing meteorological conditions. For 'very noise-enhancing meteorological conditions' … a limit is set based on the limit derived under standard or noise-enhancing conditions (whichever is adopted in the assessment) plus 5 dB. In this way a development is subject to noise limits under all meteorological conditions.

Therefore, if monthly noise monitoring occurs during meteorological conditions outside of those specified in Section 2.5, site limits will be adjusted based on Table 2.1 plus 5 dB.

3 Methodology

3.1 Overview

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

3.2 Attended noise monitoring

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

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

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

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

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

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

3.3 Meteorological data

Meteorological data for the monitoring period was sourced from the Karuah East Quarry on-site meteorological station (the site AWS) to determine the applicability of criteria in accordance with the EPL and PA.

3.4 Modifying factors

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

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

3.5 Site operations

As required by Condition R4.3(a) of the EPL, the operations occurring at the time of monitoring are summarised per period below:

- Day
  - Routine quarry operations in the quarry pit
  - Routine plant processing operations
  - Routine material transport from the quarry pit to the processing plant and product stockpile areas
  - Routine product loading and dispatch to road trucks
- Evening
  - Routine material transport from the processing plant to product stockpile areas
  - Routine maintenance activities of plant and equipment
- Morning shoulder
  - Routine maintenance activities of plant and equipment
  - Routine product loading and dispatch to road trucks

3.6 Instrumentation

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

Table 3.1 Attended noise monitoring equipment

Item	Serial number	Calibration due date	Relevant standard
Brüel & Kjær 2250 sound level meter	3029363	3/11/2024	IEC 61672-1:2002
Svantek SV-36 calibrator	79952	27/9/2025	IEC 60942

4 Results

4.1 Total measured noise levels and atmospheric conditions

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

Table 4.1 Total measured noise levels – Q4 2023[1]

Location	Start date and time	L_{Amax} dB	L_{A1} dB	L_{A10} dB	L_{Aeq} dB	L_{A50} dB	L_{A90} dB	L_{Amin} dB
A	24/11/2023 5:02	56	55	53	49	49	42	37
B	24/11/2023 5:20	74	70	65	61	57	49	42
F	24/11/2023 5:40	96	74	53	70	48	43	39
G	24/11/2023 6:08	59	48	40	39	37	33	30
H	24/11/2023 6:27	57	48	43	39	35	32	29
H	24/11/2023 7:00	64	59	52	48	38	31	28
G	24/11/2023 7:19	66	42	37	36	34	31	28
F	24/11/2023 7:45	96	73	51	65	47	44	40
B	24/11/2023 8:14	74	69	65	62	61	57	50
A	24/11/2023 8:33	60	55	53	51	51	48	44
A	30/11/2023 18:07	61	58	55	52	52	48	43
B	30/11/2023 18:25	78	74	68	65	63	58	51
F	30/11/2023 18:45	89	60	51	57	47	44	41
G	30/11/2023 19:11	59	47	43	41	40	37	33
H	30/11/2023 19:33	66	43	41	39	39	37	34

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

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

Table 4.2 Measured atmospheric conditions – Q4 2023

Location	Start date and time	Temperature °C	Wind speed m/s	Wind direction °Magnetic north[1]	Cloud cover 1/8s
A	24/11/2023 5:02	19.2	<0.5	-	8
B	24/11/2023 5:20	19.3	<0.5	-	8
F	24/11/2023 5:40	19.5	<0.5	-	8
G	24/11/2023 6:08	19.5	<0.5	-	7
H	24/11/2023 6:27	19.6	<0.5	-	7
H	24/11/2023 7:00	20.4	<0.5	-	7
G	24/11/2023 7:19	20.8	<0.5	-	7
F	24/11/2023 7:45	21.4	<0.5	-	7
B	24/11/2023 8:14	22.1	<0.5	-	7
A	24/11/2023 8:33	22.2	<0.5	-	7
A	30/11/2023 18:07	27.9	<0.5	-	7
B	30/11/2023 18:25	27.5	<0.5	-	7
F	30/11/2023 18:45	27.3	<0.5	-	7
G	30/11/2023 19:11	27.1	<0.5	-	6
H	30/11/2023 19:33	26.7	<0.5	-	6

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

4.2 Site only noise levels

4.2.1 Modifying factors

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

4.2.2 Monitoring results

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

Table 4.3 Site noise levels and limits – Q4 2023

Location	Start Date and Time (Period)	Wind		Stability Class	Very enhancing? [1]	Limit, dB		Site level, dB [2]		Exceedance, dB	
		Speed m/s	Direction [4]			$L_{Aeq,15minute}$	L_{Amax}	$L_{Aeq,15minute}$	L_{Amax}	$L_{Aeq,15minute}$	L_{Amax}
A	24/11/2023 5:02 (MS)	0.1	254	F	N	35	52	IA	IA	No	No
B	24/11/2023 5:20 (MS)	0.1	22	F	N	35	52	IA	IA	No	No
F	24/11/2023 5:40 (MS)	0.3	339	F	N	35	52	IA	IA	No	No
G	24/11/2023 6:08 (MS)	0.2	310	F	N	35	52	IA	IA	No	No
H	24/11/2023 6:27 (MS)	0.1	307	F	N	35	52	IA	IA	No	No
H	24/11/2023 7:00 (D)	0.1	275	A	N	44	N/A	<27	N/A	No	N/A
G	24/11/2023 7:19 (D)	0.3	132	A	N	43	N/A	<26	N/A	No	N/A
F	24/11/2023 7:45 (D)	0.7	140	A	N	40	N/A	IA	N/A	No	N/A
B	24/11/2023 8:14 (D)	0.5	283	A	N	40	N/A	IA	N/A	No	N/A
A	24/11/2023 8:33 (D)	0.9	208	A	N	42	N/A	IA	N/A	No	N/A

Table 4.3 Site noise levels and limits – Q4 2023

Location	Start Date and Time (Period)	Wind		Stability Class	Very enhancing? [1]	Limit, dB		Site level, dB [2]		Exceedance, dB	
		Speed m/s	Direction [4]			$L_{Aeq,15minute}$	L_{Amax}	$L_{Aeq,15minute}$	L_{Amax}	$L_{Aeq,15minute}$	L_{Amax}
A	30/11/2023 18:07 (E)	2.1	287	F	N	40	N/A	IA	N/A	No	N/A
B	30/11/2023 18:25 (E)	0.8	312	F	N	40	N/A	IA	N/A	No	N/A
F	30/11/2023 18:45 (E)	1.0	312	F	N	35	N/A	IA	N/A	No	N/A
G	30/11/2023 19:11 (E)	0.8	312	F	N	39	N/A	IA	N/A	No	N/A
H	30/11/2023 19:33 (E)	1.0	298	F	N	46	N/A	IA	N/A	No	N/A

Notes: 1. Noise limits are adjusted by +5 dB during 'very noise-enhancing meteorological conditions' in accordance with the NPfI.

2. Site-only $L_{Aeq,15minute}$, includes modifying factor penalties if applicable.

3. Degrees magnetic north, "-" indicates calm conditions.

4. MS = Morning Shoulder period; D = Day period; E = Evening period.

5 Mitigation and management

5.1 Proposed management actions

EPL Condition 4.3(c) requires details of any management actions taken within the monitoring period to address any exceedances of the limits. As there were no exceedances, no management actions were required.

6 Summary

EMM Consulting Pty Ltd (EMM) was engaged by Karuah East Quarry Pty Limited to conduct a quarterly noise survey of operations at the site. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified PA and EPL noise limits.

Attended environmental noise monitoring described in this report was done during the morning shoulder, day and evening periods on Friday 24 and Thursday 30 November 2023 at five monitoring locations.

Noise levels from the site complied with relevant limits at all monitoring locations during the Q4 2023 survey.

Appendix A
Noise perception and examples

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A.1 Noise levels

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

Table A.1 Perceived change in noise

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

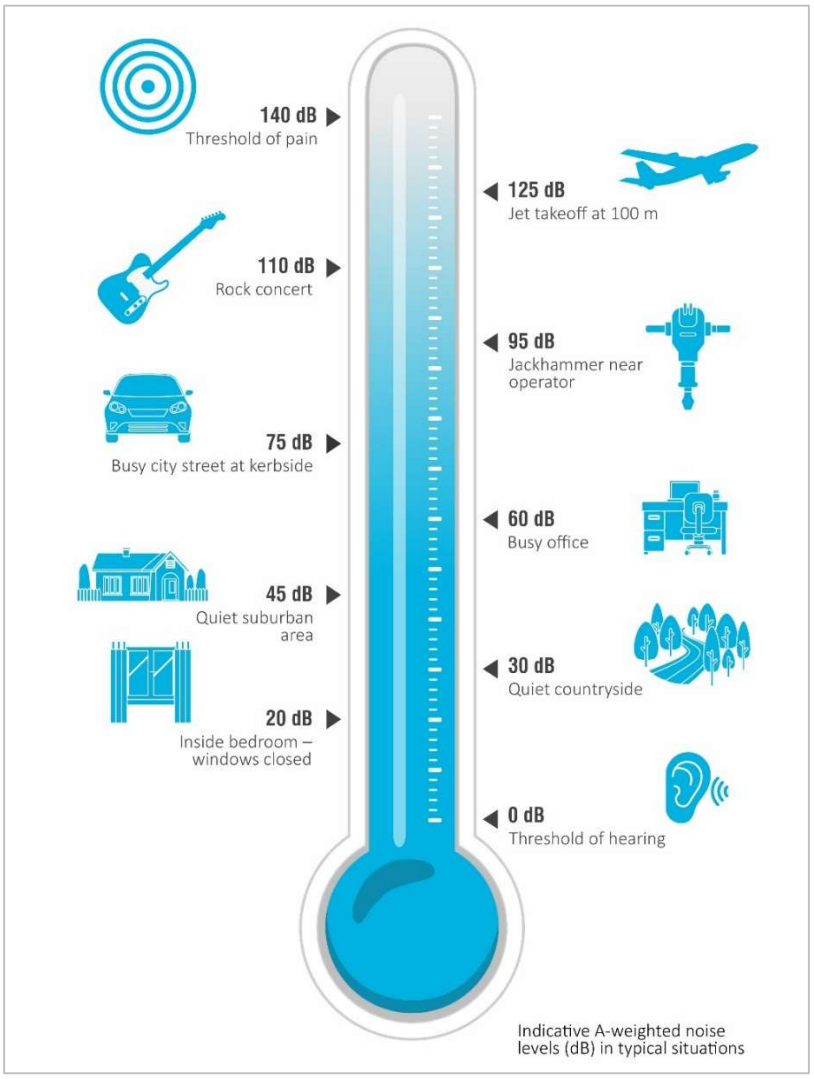

Figure A.1 Common noise levels

Appendix B
Regulator documents

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B.1 Project approval

SCHEDULE 3
ENVIRONMENTAL PERFORMANCE CONDITIONS

IDENTIFICATION OF APPROVED LIMITS OF EXTRACTION

1. The Applicant shall, prior to carrying out quarrying operations on the site:
   (a) engage a registered surveyor to mark out the boundaries of the approved limits of extraction within the Extraction Area; and
   (b) submit a survey plan of the extraction boundaries,
   to the satisfaction of the Planning Secretary.

2. The Applicant must ensure that the extraction boundaries are clearly marked at all times while quarrying operations are being carried out, in a manner that allows the limits of extraction to be clearly identified.

NOISE

Operational Noise Criteria

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

Table 2: Operational noise criteria dB

Noise Assessment Location[a]	Morning Shoulder $L_{Aeq\ (15\ min)}$	Morning Shoulder L_{Amax}	Day $L_{Aeq\ (15\ min)}$	Evening $L_{Aeq\ (15\ min)}$
A	35	52	42	40
B	35	52	40	40
G	35	52	43	39
H	35	52	44	46
I	35	52	40	37
All other residences	35	52	40	35

[a] *Noise Assessment Locations referred to in Table 2 are shown in Appendix 2.*

Noise generated by the development must be monitored and measured in accordance with the relevant procedures and modifications (including certain meteorological conditions) of the NPfI.

3A. The noise criteria in Table 2 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.

Road Traffic Noise Criteria

4. The Applicant must take all reasonable and feasible measures to ensure that the traffic noise generated by the development does not cause additional exceedances of the criteria in Table 3 at any residence on privately-owned land.

Table 3: Road traffic noise criteria

Road	***Criteria (Day[a])***
Pacific Highway	60 dB(A) $L_{Aeq\ (15\ hour)}$
Local roads	55 dB(A) $L_{Aeq\ (1\ hour)}$

[a] *Day is the period from 7 am to 10 pm every day in accordance with the EPA's NSW Road Noise Policy (2011).*

5. Deleted

Noise Operating Conditions

6. 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 quarterly attended noise monitoring (unless otherwise agreed by the Planning Secretary) to determine whether the development is complying with the relevant conditions of this consent; and
   (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.

Noise Management Plan

7. 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) be prepared in consultation with the EPA;
   (c) 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;
      (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);
   (d) describe the noise management system in detail; and
   (e) include a monitoring program that:
      (i) is capable of evaluating the performance of the development;
      (ii) monitors noise at the nearest and/or most affected residences;
      (iii) adequately supports the noise management system;
      (iv) includes a protocol for distinguishing noise emissions of the development from any neighbouring developments; and
      (v) 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.

7A. The Applicant must implement the plan as approved by the Planning Secretary.

BLASTING

Blasting Criteria

8. The Applicant must ensure that blasting on the site does not cause exceedances of the criteria in Table 5.

B.2 Environmental protection licence

L3 Waste

L3.1 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 Noise limits

L4.1 Noise generated at the premises must not exceed the noise limits in the table below. The locations referred to in the table below are indicated in Table 2: Operational Noise Criteria, and Figure 1 of the document titled Project Approval 09_0175 Modification 9 (MOD 9) Department of Planning, Industry& Environment - which has been filed on EPA file Doc22/715570-1.

Noise Assesment Location	Morning Shoulder LAeq(15 min)	Morning shoulder LAmax	Day LAeq (15 min)	Evening LAeq (15 min)
A (74 Mill Hill Close, Karuah, Lot 100 DP 1028885)	35	52	42	40
B (64 Mill Hill Close, Karuah, Lot 3 DP785172)	35	52	40	40
G (2 Halloran Road, North Arm Cove Lot 1 DP1032636)	35	52	43	39
H (21 Halloran Road, North Arm Cove Lot 10 DP1032636)	35	52	44	46
All other residences	35	52	40	35

L4.2 Noise limit definitions - For the purpose of the table at L4.1, the following definitions apply:
Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays;
Morning Shoulder is defined as the period from 5:00am to 7:00am Monday to Saturday;
Evening is defined as the period from 6:00pm to 10:00pm Monday to Saturday.

L4.3 The noise limits set out in this licence apply under all meteorological conditions except for the following:
a) Wind speed greater than 3 metres/second at 10 metres above ground level; or
b) Stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or
c) Stability category G temperature inversion conditions.

L4.4 **Determining Compliance**

To determine compliance with the noise limits set out in the table above, the licensee must locate monitoring equipment:
a) 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 that is closest to the premises;
b) approximately on the boundary where any dwelling is situated 30 metres or less from the property boundary that is closest to the premises;
c) at the most affected point at a location where there is no dwelling at the location; and
d) within approximately 50 metres of the boundary of a national park or nature reserve.

Note: A non-compliance of the Noise Limits table will still occur where noise generated from the premises in excess of the appropriate limit is measured:
i) at a location other than an area prescribed in part (a) and part (b); and/or
ii) at a point other than the most affected point at a location.

L4.5 For the purposes of determining the noise generated at the premises the modification factors in Fact Sheet C of the EPA's "Noise Policy for Industry" must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

L5 Blasting

L5.1 Blasting in or on the premises must only be carried out between the hours of 9:00 am and 4:00 pm Monday to Friday. No blasting is permitted on Saturdays, Sundays or public holidays. Blasting outside of the hours specified in this condition can only take place with the written approval of the EPA.

L5.2 Blasting is not permitted simultaneously with adjacent quarry(s).

L5.3 The airblast overpressure level from blasting operations in or on the premises must not exceed:
a) 115 dB (Lin Peak) for more than 5% of the total number of blasts during each reporting period; and
b) 120 dB (Lin Peak) at any time,
at monitoring point 11 detailed in Condition P1.4.

L5.4 The ground vibration peak particle velocity from blasting operations carried out in or on the premises must not exceed:
a) 5 mm/second for more than 5% of the total number of blasts during each reporting period; and
b) 10 mm/second at any time,
at monitoring point 11 detailed in Condition P1.4.

L5.5 Error margins associated with any monitoring equipment used to measure airblast overpressure or peak particle velocity are not to be taken into account in determing whether or not the limit has been exceeded.

L5.6 The airblast overpressure and ground vibration levels in the conditions above do not apply at noise sensitive locations that are owned by the licensee or subject to a private agreement, relating to airblast overpressure and ground vibration levels, between the licensee and land owner.

L5.7 Offensive blast fume must not be emitted from the premises.

Definition:

d) the nature of the complaint;
e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and
f) if no action was taken by the licensee, the reasons why no action was taken.

M5.3 The record of a complaint must be kept for at least 4 years after the complaint was made.

M5.4 The record must be produced to any authorised officer of the EPA who asks to see them.

M6 Telephone complaints line

M6.1 The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.

M6.2 The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.

M6.3 The preceding two conditions do not apply until 1 month after the date of the issue of this licence.

M7 Blasting

M7.1 To determine complaince with Blast Limit conditions of this licence:
a) Airblast overpressure and ground vibration levels must be measured and electronically recorded for monitoring point 11 for the parameters specified in Column 1 of the table below; and
b) The licensee must use the units of measure, sampling method, and sample at the frequency specified opposite in the other columns.

Parameter	Units of Measure	Frequency	Sampling Method
Airblast Overpressure	Decibels (Linear Peak	All blasts	Australian Standard AS 2187.2-2006
Ground Vibration Peak Particle Velocity	millimetres/second	All blasts	Australian Standard AS 2187.2-2006

M8 Noise monitoring

M8.1 To assess compliance with the noise limits for this premises attended noise monitoring must be undertaken in accordance with all noise conditions and:
a) during a period of normal quarry operations;
b) at each one of the locations listed in the noise limits table of this licence;
c) occur quarterly in the reporting period;
d) occur during each day period as defined in the NSW Noise Policy for Industry.

Note: Quarterly attended noise monitoring must be completed (unless otherwise agreed by the Planning

Secretary) to determine whether the development is complying with the relevant conditions of this consent. The frequency of noise monitoring will be reviewed, upon request.

6 Reporting Conditions

R1 Annual return documents

R1.1 The licensee must complete and supply to the EPA an Annual Return in the approved form comprising:

1. a Statement of Compliance,
2. a Monitoring and Complaints Summary,
3. a Statement of Compliance - Licence Conditions,
4. a Statement of Compliance - Load based Fee,
5. a Statement of Compliance - Requirement to Prepare Pollution Incident Response Management Plan,
6. a Statement of Compliance - Requirement to Publish Pollution Monitoring Data; and
7. a Statement of Compliance - Environmental Management Systems and Practices.

At the end of each reporting period, the EPA will provide to the licensee notification that the Annual Return is due.

R1.2 An Annual Return must be prepared in respect of each reporting period, except as provided below.

Note: The term "reporting period" is defined in the dictionary at the end of this licence. Do not complete the Annual Return until after the end of the reporting period.

R1.3 Where this licence is transferred from the licensee to a new licensee:
a) the transferring licensee must prepare an Annual Return for the period commencing on the first day of the reporting period and ending on the date the application for the transfer of the licence to the new licensee is granted; and
b) the new licensee must prepare an Annual Return for the period commencing on the date the application for the transfer of the licence is granted and ending on the last day of the reporting period.

Note: An application to transfer a licence must be made in the approved form for this purpose.

R1.4 Where this licence is surrendered by the licensee or revoked by the EPA or Minister, the licensee must prepare an Annual Return in respect of the period commencing on the first day of the reporting period and ending on:
a) in relation to the surrender of a licence - the date when notice in writing of approval of the surrender is given; or
b) in relation to the revocation of the licence - the date from which notice revoking the licence operates.

R1.5 The Annual Return for the reporting period must be supplied to the EPA via eConnect *EPA* or by registered post not later than 60 days after the end of each reporting period or in the case of a transferring licence not later than 60 days after the date the transfer was granted (the 'due date').

R1.6 The licensee must retain a copy of the Annual Return supplied to the EPA for a period of at least 4 years after

B.3 Noise management plan

5 Noise limits

5.1 Operational noise

Condition 3 of Schedule 3 of PA 09_0175 provides the operational noise limits for KEQ. These are reproduced in Table 5.1.

Table 5.1 Operational noise criteria (dB) from Table 2 of PA 09_0175

Noise Assessment Location[1]	Morning Shoulder $L_{Aeq(15\ minute)}$	Morning Shoulder L_{Amax}	Day $L_{Aeq(15\ minute)}$	Evening $L_{Aeq(15\ minute)}$
A	35	52	42	40
B	35	52	40	40
G	35	52	43	39
H	35	52	44	46
I	35	52	40	37
All other residences	35	52	40	35

Noise assessment locations are shown in Figure 3.1.

Noise generated by the development must be monitored and measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NPfI (EPA 2017).

The noise limits provided in Table 5.1 apply under standard and noise-enhancing meteorological conditions (as defined in the NPfI) determined by monitoring at the relevant weather station. In accordance with Condition L4.3 of EPL 20611 and consistent with Condition 3 of Schedule 3 of PA 09_0175 the noise limits provided in Table 5.1 apply under all meteorological conditions except for the following:

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

In accordance with Fact Sheet D of the NPfI, for 'very noise enhancing meteorological conditions' the applicable noise limit is set at 5dB above those provided in Table 5.1.

Noise limits do not apply if Karuah East has an agreement with the owner/s of the relevant residence or land to exceed the noise criteria, and Karuah East has advised the Department in writing of the terms of this agreement.

5.2 Road traffic noise

Condition 4 of Schedule 3 of PA 09_0175 states that all reasonable and feasible measures must be taken to ensure that the traffic generated by KEQ does not cause additional exceedances of the criteria provided in Table 5.2 at any residence on privately-owned land.

Appendix C
Calibration certificates

EMM
creating opportunities

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

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CALIBRATIONS SALES RENTALS REPAIRS

Head Office & Calibration Laboratory
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CERTIFICATE OF CALIBRATION

CERTIFICATE NO: SLM34169

EQUIPMENT TESTED: Sound Level Meter

Manufacturer:	B & K		
Type No:	2250	**Serial No:**	3029363
Mic. Type:	4189	**Serial No:**	3260501
Pre-Amp. Type:	ZC0032	**Serial No:**	30109
Filter Type:	1/3 Octave	**Test No:**	F034175

Owner: EMM Consulting
Suite 01, 20 Chandos St
St Leonards NSW 2065

Tests Performed: IEC 61672-3:2013 & IEC 61260-3:2016

Comments: All Test passed for Class 1. (See overleaf for details)

CONDITIONS OF TEST:

Ambient Pressure	1002	hPa ±1 hPa	**Date of Receipt :**	02/11/2022
Temperature	24	°C ±1° C	**Date of Calibration :**	03/11/2022
Relative Humidity	35	% ±5%	**Date of Issue :**	04/11/2022

Acu-Vib Test Procedure: AVP10 (SLM) & AVP06 (Filters)

CHECKED BY: ..... **AUTHORISED SIGNATURE:** .....

Jack Kielt

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.

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Appendix 4 – KEQ IEA 2023: Response to Audit Recommendations

KEQ IEA 2023 – Response to Audit Recommendations

KEQ 2020 IEA Action Review – Project Approval (MP09_0175)					
No	*Requirement*	*Details of Non-Compliance*	*2020 KEQ Response / Action*	*2023 IEA Finding*	*2023 KEQ Response / Action*
S2, C11	The Applicant must pay Council, in accordance with Council's Great Lakes Wide Development Contributions Plan (November 2007) – Amended: (a) a one-off Headquarters Building contribution of $1.00 per $1,000.00 of capital value of the development; and (b) Annual road maintenance contributions of $.037 per tonne per km, for every tonne of quarry products transported from the site on local roads in accordance with Council's Great Lakes Wide Development Contributions Plan (November 2007) – Amended. Each payment must be: i. paid to Council at the end of each calendar year. ii. Based on weighbridge records of the quantity of quarry products transported from the site; and iii. Increased annually over the life of the development in accordance with the CPI. *Note: If the parties are not able to agree on any aspect of the road maintenance contributions, either party may refer the matter to the Planning Secretary for resolution.*	(a) Records of one-off contribution to Council for Headquarters Building were not available at the time of audit. (b) Records of annual contributions to Council for road maintenance in the 2019/20 Financial Year were not available at the time of audit.	KEQ are investigating payments made to MidCoast Council to ensure that all required developer contribution payments have been made. If payments have not been made, KEQ will consult with Council to establish a payment plan.	Deemed as **Non-Compliant** during the audit.	**RESPONSE:** KEQ can confirm: (a) Headquarters building contribution was provided to Council on 11 April 2022. (b) Road maintenance contributions for FY18 to FY22 was provided to Council on 30 June 2023. This was subject to compensatory cost escalation in accordance with CPI. FY23 was provided to Council on 03 August 2023 (remittance advice date). **STATUS:** KEQ considers this 2020 finding to be resolved.
S3, C11 (d) (ii)	The Applicant must: (d) Not undertake blasting within 500 metres of: ii. Any land outside the site not owned by the Applicant, unless: • The Applicant has a written agreement with the relevant landowner to allow blasting to be carried out closer to the land, and the Applicant has advised the Department in writing of the terms of this agreement, or • the Applicant has: ○ Demonstrated to the satisfaction of the Planning Secretary that the blasting can be carried out closer to the land without compromising the safety of the people or livestock on the land, or damaging the buildings and/or structures on the land; and ○ Updated the Blast Management Plan to include the specific measures that would be implemented while blasting is being carried out within 500 metres of the land, to the satisfaction of the Planning Secretary.	Evidence that written agreements with landholders within 500 m of project blasting was not available at the time of audit.	KEQ have operated in accordance with the approved Blast Management Plan (2015) which identifies that there are no residents/receivers within 500 metres from the potentially nearest blasting areas. Refer to Section 3.4 – Sensitive Receivers of the Karuah East Quarry Blast Management Plan for further details. KEQ have never received a community complaint regarding blasting undertaken at the Quarry. KEQ will consult with the Department to determine if any action is required.	Deemed as **Non-Compliant** during the audit. It is considered that blasting activities during the audit period would have occurred within 500 m of privately owned land without a written agreement. Sale of the subject property has since taken place and thus there are no further actions required in relation to this. Further detail is available in Appendix A1.	**RESPONSE:** KEQ can confirm the property (Lot 4, DP838128) has been acquired. **STATUS:** KEQ considers this 2020 finding to be resolved.
S3, C16	The Applicant must prepare an Air Quality Management Plan for the development to the satisfaction of the Planning Secretary. This plan must: (a) Be prepared by a suitably qualified expert whose appointment has been approved by the Planning Secretary. (b) Be prepared in consultation with Council and EPA and submitted for approval to the Planning Secretary prior to the commencement of construction activities. (c) Describe the measures that would be implemented to ensure: • Compliance with the relevant air quality conditions of this consent;	In June and December of 2017, HVAS monitor filters were not changed at the correct time leading to an overrun of the sample. Filters were changed as soon as errors were identified.	No recommendation made.	Deemed as **Non-Compliant** during the audit. Whilst ERM consider KEQ are generally compliant with	**RESPONSE:** KEQ have since updated our processes to ensure HVAS monitoring is completed. This failure to monitor has not since been repeated. **STATUS:** KEQ considers this 2020 finding to be resolved.

KEQ IEA 2023 – Response to Audit Recommendations

KEQ 2020 IEA Action Review – Project Approval (MP09_0175)					
No	*Requirement*	*Details of Non-Compliance*	*2020 KEQ Response / Action*	*2023 IEA Finding*	*2023 KEQ Response / Action*
	• best management practice is employed; and • The air quality impacts of the development are minimised during adverse meteorological conditions and extraordinary events. (d) Describe the proposed air quality management system; and (e) Include a monitoring program that: • Can evaluate the performance of the development. • Includes a protocol for determining any exceedances of the relevant conditions of consent. • Effectively supports the air quality management system; and • Evaluates and reports on the adequacy of the air quality management system. The applicant must implement the plan as approved by the Planning Secretary			conditions (a) to (e), implementation of the plan requires a period review in accordance with Schedule 5, Condition 5 meaning that the 2019 version of the AQMP is now outdated.	Refer to the 2023 audit response for details regarding the 2023 findings.
S3, C19	The Applicant must comply with the discharge limits in any EPL, or with Section 120 of the POEO Act.	Uncontrolled and controlled discharges from sediment dams in exceedance of discharge limits occurred during the audit period in 2017, 2018 and 2019.	Responses outlined in S3, C21 below.	Deemed as **Non-Compliant** during the audit. Non-compliant discharges were recorded within the audit period. This is discussed in further detail in Condition 19, Schedule 3 of Appendix A1.	**RESPONSE:** Discharge events were associated with rainfall events greater than the designated design-storm events outlined by the Blue Book (Managing Urban Stormwater: Soils and Construction – Volume 2E, Mines and quarries). **STATUS:** KEQ considers this 2020 finding to be resolved. Refer to the 2023 audit response for details regarding the 2023 findings.
S3, C21	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 the EPA and DPE Water by suitably qualified and experienced person/s whose appointment has been approved by the Planning Secretary. (b) Be submitted to the Planning Secretary for approval prior to the commencement of construction activities. (c) Include: i. A Site Water Balance that includes details of: • Sources and security of water supply, including contingencyplanning; • Water use on site; and • Measures that would be implemented to minimise use of clean water and maximise recycling of dirty water on the site. ii. A Surface Water Management Plan, that includes: • Baseline data on surface water flows and quality in the watercourses that could be affected by the development. • A detailed description of the surface water management system on the site, including the design objectives and performance criteria for the: ○ clean water diversions; ○ erosion and sediment controls; ○ water storages (including Maximum Harvestable Rights requirements); and ○ control of water pollution from areas of the site that have been rehabilitated.	The surface water monitoring does not include a program for the monitoring of stream ecosystem health. A noncompliance with the WMP was recorded in 2017 due to frequency of Groundwater level monitoring (as reported in Section 7.4.2 of the 2017 Annual Review). Quarterly monitoring commenced in accordance with the required frequency in October 2017; prior to this date monitoring had been undertaken on a six-monthly basis.	KEQ agree with this recommendation and will consult with the Department during the next review of the WMP. KEQ will consult with the Department during the next review of the WMP and BOAMP to determine whether additional monitoring is required to monitor the health of local watercourses. However, let it be noted that local watercourses are monitored and reported on in the annual Biodiversity Offset Area Monitoring Report; this is in line with the approved BOAMP.	Deemed as **Non-Compliant** during the audit. There was no evidence to confirm a review has taken place due to exceedances in surface water discharge limits (refer Section 3 Condition 19).	KEQ considers the 2020 findings to be superseded. Refer to the 2023 audit response for details regarding the 2023 findings.

KEQ IEA 2023 – Response to Audit Recommendations

KEQ 2020 IEA Action Review – Project Approval (MP09_0175)					
No	*Requirement*	*Details of Non-Compliance*	*2020 KEQ Response / Action*	*2023 IEA Finding*	*2023 KEQ Response / Action*
	• Surface water impact assessment criteria, to be developed following analysis of baseline data, including trigger levels for investigating any potentially adverse surface water quality impacts. • A program to monitor: o any surface water discharges; o the effectiveness of the water management system; o surface water flows and quality in local watercourses; and o ecosystem health of local watercourses; and • An assessment of appropriate options to improve storage and retention times in accordance with Managing Urban Stormwater: Soils and Construction (Landcom); iii. A Groundwater Monitoring Program that includes: • Baseline data of groundwater levels surrounding the site. • Groundwater impact assessment criteria, to be developed following analysis of baseline data, including trigger levels for investigating any potentially adverse groundwater impacts; and • A program to monitor and/or validate the impacts of the development on groundwater resources; and iv. A Surface and Ground Water Response Plan that describes the measures and/or procedures that would be implemented to: • Respond to any exceedances of the surface water impact assessment criteria and groundwater impact assessment criteria; and • Mitigate and/or offset any adverse impacts on surface water and groundwater resources located within and adjacent to the site. The Applicant must implement the plan as approved by the Planning Secretary				
S3, C23	The Applicant must keep accurate records of all laden truck movements to and from the site (including time of arrival and dispatch) and publish a summary of records on its website every 6 months and in the Annual Review.	(a) Production records are reported in the audit period Annual Reviews, however the transportation of product from site per calendar month and the number of laden truck movements is not reported. (b) Viewed KEQ website on 17/8/20 and quarterly truck movement records were not available.	KEQ agree with this recommendation. Future environmental monitoring reports will include information on the factors identified in mentioned conditions.	Deemed as **Non-Compliant** during the audit. Laden truck movements are not recorded within the KEQ Annual Reviews.	KEQ considers the 2020 findings to be superseded. Refer to the 2023 audit response for details regarding the 2023 findings.
S3, C28	The Applicant must, prior to the commencement of vegetation clearing activities for Modification 10, finalise the Biodiversity Offset Strategy, as described in documents listed in condition 2 of Schedule 2, summarised in Table 10 and Table 11 and shown conceptually in Figure 1 of Appendix 4, in consultation with BCD and Council, and to the satisfaction of the Planning Secretary.	The Biodiversity Offset Strategy Finalisation letter (as referenced in Section 2.2 and Appendix 2 in the BOAMP) and evidence of consultation with OEH (now BCD) and Council was not available for review at the time of audit.	Officers of the Biodiversity Conservation Trust are attending site in November to assess the Biodiversity Area and consult on the progress of the Biodiversity Offset Strategy. KEQ will consult with the Department and seek	Deemed as **Non-Compliant** during the audit. The Biodiversity Offset Strategy should have been updated within 3 months of any	The 2020 audit finding was prior to MOD10 being assessed and approved. Therefore, the resulting actions are no-longer current due to the revised condition. KEQ considers the 2020 findings to be superseded. Refer to the 2023 audit response for details regarding the 2023 findings.

KEQ 2020 IEA Action Review – Project Approval (MP09_0175)					
No	*Requirement*	*Details of Non-Compliance*	*2020 KEQ Response / Action*	*2023 IEA Finding*	*2023 KEQ Response / Action*
			extension to the timeframe required if required.	modification to the conditions of this consent. It is noted that latest version of the BOS is dated July 2013.	
S3, C32	Within 6 months of the date of approval of Modification 1, the Applicant must prepare a Landscape and Rehabilitation Management Plan for the development to the satisfaction of the Planning Secretary. This Plan would relate to the area of the quarry and all perimeter lands. This plan must: (a) Be prepared by a suitably qualified expert whose appointment has been approved by the Planning Secretary. (b) Be prepared in consultation with BCD and Council, and submitted to the Planning Secretary for approval prior to the commencement of construction activities; (c) Describe how the implementation of the Tetratheca juncea Translocation Program would be integrated with the overall rehabilitation of the site; (d) Describe the short, medium and long-term measures that would be implemented to: • Manage remnant vegetation and habitat on the site; and • Ensure compliance with the rehabilitation objectives and progressive rehabilitation obligations of this consent. (e) include detailed performance and completion criteria for evaluating the performance of the rehabilitation of the site, including triggers for any remedial action; (f) Include a detailed description of the measures that would be implemented over the next 3 years (to be updated for each 3 year period following initial preparation of the plan), including the procedures to be implemented for: • Ensuring compliance with the rehabilitation objectives and progressive rehabilitation obligations of this consent; • Enhancing the quality of remnant vegetation and fauna habitat; • Restoring native endemic vegetation and fauna habitat within the rehabilitation area, including details of the target revegetation communities of the rehabilitated landform; • Coordinating the relocation of native fauna to protected habitats associated with preclearing fauna surveys; • Maximising the salvage of environmental resources within the approved disturbance area - including tree hollows, vegetative and soil resources - for beneficial reuse in the enhancement of the rehabilitation area; • Collecting and propagating seed; • Ensuring minimal environmental consequences for threatened species, populations and habitats; • Minimising the impacts on native fauna on site, including the details and implementation of appropriate pre-clearance surveys; • Minimising the impacts on fauna movement between undisturbed areas of the site and nearby vegetation (including potential fauna crossings); • Controlling weeds and feral pests; • Controlling erosion; • Controlling access and providing for management trails; and • Bushfire management and implementation of ecologically appropriate bushfire intervals. (i) Include a program to monitor the effectiveness of these measures, and progress against the performance and completion criteria.	The revisions detailed in Table 2 of the Landscape and Rehabilitation Management Plan (LRMP) do not describe updating the measures to implemented over the three-year period. The condition requires update every three years following initial preparation of the plan, in this case being November 2018. Chapters 6-9 of the LRMP detail management measures, however the plan does not specify which activities will occur over the next three years of the plan.	KEQ agree with the recommendation made by the auditor and will conduct a revision of the LRMP in the near future. The revisions describe here will be made. During the revision of the LRMP, KEQ will ensure all procedures to record, and report are examined and responsible employees are made aware of their obligations.	Deemed as **Non-Compliant** during the audit. The LRMP has not been updated within a 3 year period as required by clause (f) of this condition. Further details are discussed in Appendix A1.	KEQ considers the 2020 findings to be superseded. Refer to the 2023 audit response for details regarding the 2023 findings.

KEQ IEA 2023 – Response to Audit Recommendations

KEQ 2020 IEA Action Review – Project Approval (MP09_0175)					
No	*Requirement*	*Details of Non-Compliance*	*2020 KEQ Response / Action*	*2023 IEA Finding*	*2023 KEQ Response / Action*
	(j) Identify the potential risks to successful implementation of the Tetratheca juncea translocation Program and rehabilitation of the site, and include a description of the contingency measures that would be implemented to mitigate these risks. (k) Include details as to how the rehabilitated land would be permanently conserved and managed as part of the broader Biodiversity Offset Area approved in these conditions. (l) Include details of who would be responsible for monitoring, reviewing, and implementing the plan; and (m) Include details as to the timing of actions set out in the plan The Applicant must implement the plan as approved by the Planning Secretary.				
S3, C33	The Applicant must prepare a Biodiversity Offset Area Management Plan for the development to the satisfaction of the Planning Secretary. This Plan would relate to the area of the Biodiversity Offset Area required in these conditions. This plan must: (a) Be prepared by a suitably qualified expert whose appointment has been approved by the Planning Secretary (b) Be prepared in consultation with BCD and Council (c) Describe how the implementation of the Tetratheca juncea Translocation Program would be integrated with the Biodiversity Offset Area management. (d) Describe the short, medium and long-term measures that would be implemented to manage remnant vegetation and habitat on the Biodiversity Offset Area (e) Include detailed performance and completion criteria for evaluating the performance of the conservation, restoration and management of the Biodiversity Offset Area, including triggers for any remedial action. (f) Providing for the transfer of environmental resources from the approved disturbance area - including tree hollows, vegetative and soil resources - for beneficial reuse in the enhancement of the Biodiversity Offset Area. (g) Providing for the incorporation of the final rehabilitated landform into the Biodiversity Offset Area and its management. (h) Include a detailed description of the measures that would be implemented over the next 3 years (to be updated for each 3-year period following initial preparation of the plan), including the procedures to be implemented for: • Enhancing the quality of remnant vegetation and fauna habitat • Restoring native endemic vegetation and fauna habitat within the parts of the Biodiversity Offset Area that are cleared or modified, including details of the target revegetation communities of the restored landform. • Coordinating the relocation of native fauna to protected habitats associated with preclearing fauna surveys. • Collecting and propagating seed • Maximising the protection and restoration of threatened species, populations and habitats in the Biodiversity Offset Area • Maximising fauna movement between the Biodiversity Offset Area and adjacent habitats. • Controlling weeds and feral pests • Controlling erosion • Controlling access and providing for management trails; and • Bushfire management and implementation of ecologically appropriate bushfire intervals. (i) Include a program to monitor the effectiveness of these measures, and progress against the performance and completion criteria. (j) Identify the potential risks to successful implementation of the Biodiversity Offset program and include a description of the contingency measures that would be implemented to mitigate these risks.	Chapter 3 of the BOAMP details management measures, and some timing details are provided in Chapter 4; however, the plan does not specify which activities will occur over the next three years of the plan. Cumberland Ecology recommends that the BOAMP be updated to include a three year management schedule for the period November 2018 – November 2021.	KEQ agree with this recommendation by the auditor. KEQ have already engaged Kleinfelder to revise the BOAMP to reflect changes to the Project Approval. While this revision is taking place, KEQPL will request Kleinfelder to make these recommended changes.	Deemed as **Non-Compliant** during the audit. A number of outstanding actions recommended within the latest Ecological Monitoring Report (included within the 2022 Annual Review) have not been closed out and constitutes a non-compliance against clause (h) of this condition. Further details are discussed in Appendix A1.	**RESPONSE:** The BOAMP was updated in May 2021. **STATUS:** KEQ considers the 2020 findings to be resolved. Refer to the 2023 audit response for details regarding the 2023 findings.

KEQ IEA 2023 – Response to Audit Recommendations

KEQ 2020 IEA Action Review – Project Approval (MP09_0175)					
No	*Requirement*	*Details of Non-Compliance*	*2020 KEQ Response / Action*	*2023 IEA Finding*	*2023 KEQ Response / Action*
	(k) Include details of who would be responsible for monitoring, reviewing, and implementing the plan. (l) Include details of the indicative costs of management actions; and Include details as to the timing of actions set out in the plan.				
S5, C2	The Applicant must assess and manage development-related risks to ensure that there are no exceedances of the criteria and/or performance measures in this consent. Any exceedance of these criteria and/or performance measures constitutes a breach of this consent and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation. Where any exceedance of these criteria and/or performance measures has occurred, the Applicant must, at the earliest opportunity: (a) Take all reasonable and feasible measures to ensure that the exceedance ceases and does not recur. (b) Consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other course of action; and (c) Implement remediation measures as directed by the Planning Secretary.	Evidence was not available at the time of audit to confirm that reports were provided to DPIE which reviewed control measures and remedial actions required following identified exceedances.	KEQ are in the process of reviewing and where necessary revising the PIRMP. During this process KEQ will review all communication and notification procedures for reporting of pollution exceedances to ARAs.	Deemed as **Non-Compliant** during the audit. During the audit period, there have been multiple exceedances of the surface water discharge limits, however it is not clear to the auditors whether feasible measures (including a review of appropriate Management Plans) have been taken to ensure the exceedance ceases.	**RESPONSE:** All exceedances of criteria are now reported to the Department and NSW EPA as required. **STATUS:** KEQ considers the 2020 findings to be resolved. Refer to the 2023 audit response for details regarding the 2023 findings.
S5, C5	Within 3 months of: (a) The submission of an annual review under Condition 4 above. (b) The submission of an incident report under Condition 7 below. (c) The submission of an audit report under Condition 9 below; or (d) Any modification to the conditions of this consent, (unless the conditions require otherwise), the Applicant must review the strategies, plans, and programs required under this consent, to the satisfaction of the Planning Secretary. Where this review leads to revisions in any such document, then within 4 weeks of the review the revised document must be submitted for the approval of the Planning Secretary. *Note: The purpose of this condition is to ensure that strategies, plans and programs are regularly updated to incorporate any measures recommended to improve environmental performance of the development.*	(a – d) No evidence was available at the time of audit to confirm that KEQ had reviewed strategies, plans and programs required under the approval following audit period Annual Reviews, incidents, audit reports and modifications.	KEQ agree with this recommendation. A controlled templates will be prepared for use when reviewing documents (such as procedures or management plans).	Deemed as **Non-Compliant** during the audit. Multiple plans and programs required under this consent have not been reviewed within the requirements of this condition. This is discussed in further detail in Appendix A1.	KEQ considers the 2020 findings to be superseded. Refer to the 2023 audit response for details regarding the 2023 findings.
KEQ 2020 IEA Action Review – Project Approval Statement of Commitments					
The Statement of Commitments have been removed from the Project Approval following MOD10. Therefore, no further response or action from KEQ is required.					

KEQ IEA 2023 – Response to Audit Recommendations

KEQ 2020 IEA Action Review – Environment Protection Licence (EPL 20611)					
No	*Requirement*	*Details of Non-Compliance*	*2020 KEQ Response / Action*	*2023 IEA Finding*	*2023 KEQ Response / Action*
L1.1, L2.1, L2.2	L1.1 – Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997. L2.1 – For each monitoring/discharge point or utilisation area specified in the table/s below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table. L2.2 – Where a pH quality limit is specified in the table, the specified percentage of samples must be within the specified ranges.	Some discharges during the audit period exceeded the concentration limits prescribed by Condition L2.4, thereby contravening Section 120 of the POEO Act (see Condition L2.1 below). Uncontrolled and controlled discharges from sediment dams in exceedance of EPL discharge limits occurred during the audit period in 2017, 2018 and 2019. KEQ self-reported the June 2019 discharge exceedances to EPA on 26/06/19 and EPA provided an associated 'Show Cause Notice' on 27/06/19. KEQ provided a response to the Show Cause/notice on 02/08/19. EPA issued a Penalty Infringement Notice for the 24 June 2019 discharge and Formal Warning regarding the other discharge events of 24 – 27 June 2019 via letter dated 15/08/19.	No recommendation made.	Deemed as **Non-Compliant** during the audit. There have been reoccurrences of exceedances of surface water discharge concentration limits within this audit period. Further details available in Appendix A2 –EPL Table.	No actions required.
O7.1	All acoustic bunds necessary to achieve compliance with the noise limits specified in this licence must be constructed prior to the commencement of quarrying activities and be maintained throughout the operational life of the premises to the height and location described in the Noise Management Plan.	Acoustic bunding for site infrastructure identified in the EA (ADW Johnson, 2013) was not constructed prior to the commencement of quarrying operations. See Schedule 3, Condition 7 of PA 09_0175.	No recommendation made.	Deemed as **Non-Compliant** during the audit. Acoustic bunding not installed during audit period. The condition though was varied during the audit period which removed the condition as another control was implement. Further detail is available in Appendix A2 – EPL Table.	No actions required.

KEQ IEA 2023 – Response to Audit Recommendations

KEQ 2023 IEA Findings and KEQ Response – Project Approval (MP09_0175)			
No	*Requirement*	*2023 IEA Assessment & Recommendation*	*2023 KEQ Response / Action*
S2, C11	The Applicant must pay Council, in accordance with Council's Great Lakes Wide Development Contributions Plan (November 2007) – Amended: (a) a one-off Headquarters Building contribution of $1.00 per $1,000.00 of capital value of the development; and (b) Annual road maintenance contributions of $.037 per tonne per km, for every tonne of quarry products transported from the site on local roads in accordance with Council's Great Lakes Wide Development Contributions Plan (November 2007) – Amended. Each payment must be: i. paid to Council at the end of each calendar year. ii. Based on weighbridge records of the quantity of quarry products transported from the site; and iii. Increased annually over the life of the development in accordance with the CPI. *Note: If the parties are not able to agree on any aspect of the road maintenance contributions, either party may refer the matter to the Planning Secretary for resolution.*	**Assessment:** (a) An invoice for payment was issued by MidCoast Council to "Branch Land Pty Ltd" in relation to Application No. DA-09-0175 on 11 April 2022 for a value of $5,000. Remittance Advice for the same amount with the matching supplier invoice reference number (20221212) was provided from MidCoast Council on 10 June 2022. ERM has not been provided with evidence to determine how this contribution amount was calculated and thus cannot verify that compliance with this condition has been met. (b) Road Maintenance Contributions were provided in one invoice to MidCoast Council, with remittance advice prepared on 30 June 2023 for the following amounts: ▪ FY2018: $3,438.77; ▪ FY2019: $14,876.66; ▪ FY2020: $112,797.25; ▪ FY2021: $65,794.58; and ▪ FY2022: $130,498.26. **Recommendation:** It is recommended that KEQ provide further evidence (e.g. a cost calculation and/or evidence of Council acceptance) that the payments made: ▪ Correctly represent the value of the Headquarters Building contribution; and ▪ Are based on weighbridge records and increased annually over the life of the development in accordance with the CPI. Should any contribution shortfalls be identified, it is recommended that KEQ make an additional payment to cover this amount as soon as practicable.	**RESPONSE:** KEQ can confirm: (a) Headquarters building contribution was provided to Council based on the capital investment value of the project. No concerns have been raised by Council. (b) Road maintenance contributions for FY18 to FY22 was provided to Council on 30 June 2023. This was subject to compensatory cost escalation in accordance with CPI as per the intent of the Condition. The CPI increases were completed in accordance with the methodology provided by the former Great Lakes Council on 13 April 2010 in relation to affiliated quarry, Karuah Hard Rock Quarry (DA 265-10-2004). Given the close relationship between the two quarry sites, KEQ considers it appropriate to apply the same methodology. On 30 June 2023, Council advised the matter had been provided to the Manager Finance for review. No further correspondence has been received from Council regarding this matter. FY23 was provided to Council on 03 August 2023 (remittance advice date). Council acknowledged receipt of the payment on 28 August 2023. No concerns have been raised by Council regarding the provision of Developer Contributions from the Karuah East Quarry. **STATUS:** KEQ considers this 2023 finding to be resolved.
S3, C11 (d) (ii)	The Applicant must: (d) Not undertake blasting within 500 metres of: ii. Any land outside the site not owned by the Applicant, unless: • The Applicant has a written agreement with the relevant landowner to allow blasting to be carried out closer to the land, and the Applicant has advised the Department in writing of the terms of this agreement, or • the Applicant has: ○ Demonstrated to the satisfaction of the Planning Secretary that the blasting can be carried out closer to the land without compromising the safety of the people or livestock on the land, or damaging the buildings and/or structures on the land; and ○ Updated the Blast Management Plan to include the specific measures that would be implemented while blasting is being carried out within 500 metres of the land, to the satisfaction of the Planning Secretary.	**Assessment:** ERM review the Blast Management Plan (BMP) prepared by SLR Consulting Ltd in May 2019. The following potential non-compliance in the BMP was observed: (d) (ii) A property is situated approximately 340 m north-north-west to the closest perimeter of the quarry. It is understood that the property is unoccupied, however the land is privately owned. As a result, it is considered that blasting activities during the audit period would have occurred within 500m of privately owned land without a written agreement or as to the satisfaction of the Planning Secretary. **Recommendation:** It was confirmed that the sale of the property within 500 m of the KEQ quarry pit took place. Therefore, no further actions are required in relation to this non-compliance.	**RESPONSE:** KEQ can confirm the property (Lot 4, DP838128) has been acquired. **STATUS:** KEQ considers this 2023 finding to be resolved.

KEQ IEA 2023 – Response to Audit Recommendations

<table>
<tr><th colspan="4">KEQ 2023 IEA Findings and KEQ Response – Project Approval (MP09_0175)</th></tr>
<tr><th>No</th><th>Requirement</th><th>2023 IEA Assessment & Recommendation</th><th>2023 KEQ Response / Action</th></tr>
<tr><td>S3, C12</td><td>The Applicant must prepare a Blast Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:
(a) Be prepared by a suitably qualified expert whose appointment has been approved by the Planning Secretary;
(b) Be prepared in consultation with Council and EPA, and submitted to the Planning Secretary for approval prior to the commencement of construction activities.
(c) Describe the measures that would be implemented to ensure:
• best management practice is being employed; and
• compliance with the relevant conditions of this consent;
(d) Include a road closure protocol if blasting occurs within 500 metres of a public road
(e) Include a specific blast fume management protocol, to demonstrate how emissions will be minimised including risk management strategies if blast fumes are generated; and
(f) Include a monitoring program for evaluating the performance of the development including:
• Compliance with the applicable criteria; and
• Minimising fume emissions from the site.
The Applicant must implement the plan as approved by the Planning Secretary.</td><td><u>Assessment:</u>
ERM reviewed the Blast Management Plan (BMP) prepared by SLR Consulting Ltd in May 2019. The following potential non-compliance in the BMP was observed:

(b) The BMP includes evidence of consultation with the EPA and Council and DPE approval occurring in 2015. There is no evidence of consultation provided for the May 2019 update.

(c) Best management and control measures are discussed in section 6 of the BMP including operating conditions, blast design, public safety, road closure management, monitoring of meteorological conditions, avoidance of concurrent blasts with nearby quarrying operations, and consultation with neighbouring residences.

For most conditions of this consent, the BMP describes measures to be implemented to ensure compliance is met, however in relation to condition 11 (d), the BMP does not describe the details of measures implemented to ensure a blast is not carried out within 500m of land outside the site not owned by the Applicant.

<u>Recommendation:</u>
The BMP is recommended to be updated to account for control measures carried out in order to meet compliance with Condition 11 d) ii and approved by the Planning Secretary. The BMP is recommended to be updated in consultation with the Council and EPA and be submitted to the Planning Secretary.</td><td><u>ACTION:</u>
KEQ to complete a comprehensive review of the Blast Management Plan and submit the revised document to the Planning Secretary for approval.

<u>DUE:</u>
28 May 2024 in accordance with Schedule 5, Condition 5(c).

<u>STATUS:</u>
Underway – draft revision of the management plan has been completed by IEMA. Further revisions are to be assessed in accordance with these recommendations.</td></tr>
<tr><td>S3, C13</td><td>The Applicant must ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do not exceed the criteria in Tables 7 to 9 at any residence on privately-owned land.
Table 7: Long-term impact assessment criteria for particulate matter
<table><tr><th>Pollutant</th><th>Averaging period</th><th>[d] Criterion</th></tr><tr><td>Total suspended particulates (TSP)</td><td>Annual</td><td>[a] 90 µg/m^3</td></tr><tr><td>Particulate matter < 10 µm (PM_{10})</td><td>Annual</td><td>[a] 30 µg/m^3</td></tr></table>Table 8: Short-term impact assessment criteria for particulate matter
<table><tr><th>Pollutant</th><th>Averaging period</th><th>[d] Criterion</th></tr><tr><td>Particulate matter < 10 µm (PM_{10})</td><td>24 hour</td><td>[a] 50 µg/m^3</td></tr></table>Table 9: Long-term Impact Assessment Criteria for Deposited Dust
<table><tr><th>Pollutant</th><th>Averaging period</th><th>Maximum increase in deposited dust level</th><th>Maximum total deposited dust level</th></tr><tr><td>[c] Deposited dust</td><td>Annual</td><td>[b] 2 g/m^2 /month</td><td>[a] 4 g/m^2 /month</td></tr></table></td><td><u>Assessment:</u>
Annual reviews report the measured particulate matter (PM) and depositional dust (DD) results against the approved criteria of this condition. The Short-term impact assessment criteria for particulate matter was exceeded on one occasion during the audit period and there were two “failure to monitor” events which ERM consider having been appropriately responded to. Additional detail relating to compliance with this CoC is provided in Appendix A1.

<u>Recommendation:</u>
It is recommended to continue the monitoring per the AQMP as only one low-range exceedance was recorded during the audit period. Should additional exceedances reoccur, examine additional mitigation measures in conjunction with a review of the AQMP.</td><td><u>ACTION:</u>
KEQ to include this recommendation into the comprehensive review of the Air Quality Management Plan.

Refer to the response under Schedule 3, Condition 16 for further details.</td></tr>
</table>

KEQ IEA 2023 – Response to Audit Recommendations

KEQ 2023 IEA Findings and KEQ Response – Project Approval (MP09_0175)			
No	*Requirement*	*2023 IEA Assessment & Recommendation*	*2023 KEQ Response / Action*
S3, C16	The Applicant must prepare an Air Quality Management Plan for the development to the satisfaction of the Planning Secretary. This plan must: (a) Be prepared by a suitably qualified expert whose appointment has been approved by the Planning Secretary. (b) Be prepared in consultation with Council and EPA and submitted for approval to the Planning Secretary prior to the commencement of construction activities. (c) Describe the measures that would be implemented to ensure: • Compliance with the relevant air quality conditions of this consent; • best management practice is employed; and • The air quality impacts of the development are minimised during adverse meteorological conditions and extraordinary events. (d) Describe the proposed air quality management system; and (e) Include a monitoring program that: • Can evaluate the performance of the development. • Includes a protocol for determining any exceedances of the relevant conditions of consent. • Effectively supports the air quality management system; and • Evaluates and reports on the adequacy of the air quality management system. The applicant must implement the plan as approved by the Planning Secretary	**Assessment:** The AQMP was most recently updated in May 2019 by SLR Consulting. Whilst ERM consider KEQ are generally compliant with conditions (a) to (e), implementation of the plan requires a period review in accordance with Schedule 5 Condition 5 meaning that the 2019 version of the AQMP is now outdated. Additional detail relating to compliance with this CoC is provided in Appendix A1. **Recommendation:** Refer to recommendation under Schedule 5 Condition 4 in relation to updates of strategies, plans and programs required under this consent.	**ACTION:** KEQ to complete a comprehensive review of the Air Quality Management Plan and submit the revised document to the Planning Secretary for approval. **DUE:** 28 May 2024 in accordance with Schedule 5, Condition 5(c). **STATUS:** Underway – draft revision of the management plan has been completed by IEMA. A further revision is to be assessed in accordance with these recommendations.
S3, C19	The Applicant must comply with the discharge limits in any EPL, or with Section 120 of the POEO Act.	**Assessment:** There are three Licenced Discharge Points (LDP) associated with the site. This includes LDP001 (Dam 1), LDP002 (Dam 2) and LDP003 (Dam 3). Discharge results are recorded within the KEQ Discharge Register. Heavy rainfall, particularly in 2021 and 2022 resulted in multiple uncontrolled and non-compliant discharges during the audit period. A review of the WMP has not been carried out as required following the multiple exceedances of the discharge limits. Additional detail relating to compliance with this CoC is provided in Appendix A1. **Recommendation:** Conduct a review the effectiveness of the WMP and TARP to ensure that the response plans can be effectively implemented to prevent exceedances of relevant water quality assessment criteria and ensure sufficient capacity is available in dams. The review should consider the multiple surface water discharge exceedances which took place in 2020, 2021 and 2022 and the effectiveness of associated response procedures. The review should be conducted by a suitable qualified specialist and recommendations should be reflected within an update to the WMP.	**ACTION:** KEQ to include these two recommendations into the comprehensive review of the Water Management Plan. Refer to the response under Schedule 3, Condition 21 for further details.
S3, C21	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 the EPA and DPE Water by suitably qualified and experienced person/s whose appointment has been approved by the Planning Secretary. (b) Be submitted to the Planning Secretary for approval prior to the commencement of construction activities. (c) Include: i. A Site Water Balance that includes details of: • Sources and security of water supply, including contingencyplanning;	**Assessment:** The KEQ Water Management Plan (WMP) was prepared by SLR Consulting Ltd and most recently updated in May 2019. There is no evidence to confirm a review has taken place due to exceedances in surface water discharge limits (refer Section 3 Condition 19). Additional detail relating to compliance with this CoC is provided in Appendix A1.	**ACTION:** KEQ to complete a comprehensive review of the Water Management Plan and submit the revised document to the Planning Secretary for approval. **DUE:** 28 May 2024 in accordance with Schedule 5, Condition 5(c).

KEQ IEA 2023 – Response to Audit Recommendations

KEQ 2023 IEA Findings and KEQ Response – Project Approval (MP09_0175)			
No	*Requirement*	*2023 IEA Assessment & Recommendation*	*2023 KEQ Response / Action*
	• Water use on site; and • Measures that would be implemented to minimise use of clean water and maximise recycling of dirty water on the site. ii. A Surface Water Management Plan, that includes: • Baseline data on surface water flows and quality in the watercourses that could be affected by the development. • A detailed description of the surface water management system on the site, including the design objectives and performance criteria for the: ○ clean water diversions; ○ erosion and sediment controls; ○ water storages (including Maximum Harvestable Rights requirements); and ○ control of water pollution from areas of the site that have been rehabilitated. • Surface water impact assessment criteria, to be developed following analysis of baseline data, including trigger levels for investigating any potentially adverse surface water quality impacts. • A program to monitor: ○ any surface water discharges; ○ the effectiveness of the water management system; ○ surface water flows and quality in local watercourses; and ○ ecosystem health of local watercourses; and • An assessment of appropriate options to improve storage and retention times in accordance with Managing Urban Stormwater: Soils and Construction (Landcom); iii. A Groundwater Monitoring Program that includes: • Baseline data of groundwater levels surrounding the site. • Groundwater impact assessment criteria, to be developed following analysis of baseline data, including trigger levels for investigating any potentially adverse groundwater impacts; and • A program to monitor and/or validate the impacts of the development on groundwater resources; and iv. A Surface and Ground Water Response Plan that describes the measures and/or procedures that would be implemented to: • Respond to any exceedances of the surface water impact assessment criteria and groundwater impact assessment criteria; and • Mitigate and/or offset any adverse impacts on surface water and groundwater resources located within and adjacent to the site. The Applicant must implement the plan as approved by the Planning Secretary	**Recommendation:** The following recommendations are made in relation the WMP: ▪ Updates to the WMP should include details of a contingency plan; ▪ It is recommended that KEQ implement a framework to log all steps and actions to be taken in accordance with the TARP, in particular when a 'Condition Amber' or 'Condition Red' Trigger Response is enacted. ▪ WMP updates are to be undertaken in consultation with the EPA and DPE Water and be submitted to the Planning Secretary. Additional recommendations which are applicable to this condition are made in relation to Adaptive Management (refer Schedule 5 Condition 2).	**STATUS:** Underway – IEMA has been engaged to draft a revision of the management plan. These water-themed recommendations will be incorporated.
S3, C23	The Applicant must keep accurate records of all laden truck movements to and from the site (including time of arrival and dispatch) and publish a summary of records on its website every 6 months and in the Annual Review.	**Assessment:** Monitoring of product transport is recorded and uploaded to Hunter Quarry's website under Karuah East Quarry. The monitoring data includes hourly truck movements for every day of each calendar year. Laden truck movements are not recorded within the KEQ Annual Reviews. **Recommendation:** It is recommended to publish a summary of laden truck movements to and from site in future Annual Reviews.	**ACTION:** KEQ to include laden truck movements in the Annual Reviews for all future submissions. **DUE:** 31 March 2024 in accordance with Schedule 5, Condition 4. **STATUS:** Completed – Product transport report has been included in the 2023 Annual Review document template.

KEQ IEA 2023 – Response to Audit Recommendations

<table>
<tr><th colspan="4">KEQ 2023 IEA Findings and KEQ Response – Project Approval (MP09_0175)</th></tr>
<tr><th>No</th><th>Requirement</th><th>2023 IEA Assessment & Recommendation</th><th>2023 KEQ Response / Action</th></tr>
<tr>
<td>S3, C28</td>
<td>The Applicant must, prior to the commencement of vegetation clearing activities for Modification 10, finalise the Biodiversity Offset Strategy, as described in documents listed in condition 2 of Schedule 2, summarised in Table 10 and Table 11 and shown conceptually in Figure 1 of Appendix 4, in consultation with BCD and Council, and to the satisfaction of the Planning Secretary.

Table 10: Biodiversity Offset Strategy – land-based offsets
<table>
<tr><th>Area</th><th>Offset Type</th><th>Minimum Size (ha)</th></tr>
<tr><td>Offset Area</td><td>Existing vegetation to be managed and enhanced</td><td>130.36 ha</td></tr>
</table>
Table 11: Biodiversity Offset Strategy – ecosystem and species credit requirements
<table>
<tr><th>Credit Type</th><th>Credits Required</th></tr>
<tr><td>Ecosystem Credits</td><td></td></tr>
<tr><td>PCT 1619: Smooth-barked Apple – Red Bloodwood – Brown Stringybark – Hairpin Banksia heathy open forest of coastal lowlands</td><td>188</td></tr>
<tr><td>PCT 695: Blackbutt – Turpentine – Tallowwood shrubby open forest of the coastal foothills of the central NSW North Coast Bioregion</td><td>7</td></tr>
<tr><td>Total</td><td>195</td></tr>
<tr><td>Species Credits</td><td></td></tr>
<tr><td>Tetratheca juncea (Black-eyed Susan)</td><td>260</td></tr>
<tr><td>Grevillea parviflora subsp. parviflora (Small-flower Grevillea)</td><td>250</td></tr>
<tr><td>Squirrel Glider (Petaurus norfolcensis)</td><td>260</td></tr>
<tr><td>Southern Myotis (Myotis macropus)</td><td>107</td></tr>
<tr><td>Total</td><td>877</td></tr>
</table>
Notes:
1. The Biodiversity Offset Strategy must direct that the land proposed as the Offset Area must be free of any dwelling-houses and associated sheds, bushfire asset protection zones and other related utilities or structures so as to preserve the integrity and function of that offset area. The Biodiversity Offset Strategy must also provide details of the revegetation of any parts of the offset area that are cleared of native vegetation or are in an otherwise substantially modified state, other than required management trails and boundary fencing buffer distances.
2. Credits required for impacts to EPBC Act listed species and associated habitats must be like-for-like.</td>
<td><u>Assessment:</u>
As Table 10 pre-existed Modification 10, in accordance with Condition 5 of Schedule 5, the Biodiversity Offset Strategy should have been updated within 3 months of any modification to the conditions of this consent. It is noted that latest version of the BOS is dated July 2013.

At the time of writing, as confirmed by Site Management, the updated Biodiversity Offset Strategy is pending Commonwealth EPBC Approval.

It was confirmed by Site Management and observed by the auditors during the site visit that no vegetation clearing activities have taken place for Modification 10 and thus an assessment of compliance against Table 11 of this condition is Not Triggered.

<u>Recommendation:</u>
Consultation with the BCD and Council in relation to this condition is recommended to be published in the latest Biodiversity Offset Strategy and uploaded to the Hunter Quarries website.

Review and update the BOS when the consent is modified.</td>
<td><u>ACTION:</u>
KEQ to complete a comprehensive review of the Biodiversity Offset Strategy and submit the revised document to the Planning Secretary for approval.

<u>DUE:</u>
TBD – pending the receipt of Commonwealth Approval for MOD10 (EPBC 2022 – 9164) under the Commonwealth EPBC Act 1999.

<u>STATUS:</u>
Table 10 – Underway:
▪ KEQ is continuing to engage with NSW Planning regarding the mechanism used for the land-based offset.

Table 11 (Ecosystem Credits) – Underway:
▪ PCT1619 have been secured.
▪ PCT695 have been secured.

Table 11 (Species Credits) – Underway:
▪ Black-eyed Susan – in-principle sale agreement for 25x credits has been reached. KEQ are continuing to review credit purchase options for the outstanding credits.
▪ Small-flower Grevillea – KEQ are continuing to review credit purchase options.
▪ Squirrel Glider – purchase agreement has been executed with the Credit Supply Taskforce.
▪ Southern Myotis – KEQ are continuing to review credit purchase options.</td>
</tr>
<tr>
<td>S3, C32</td>
<td>Within 6 months of the date of approval of Modification 1, the Applicant must prepare a Landscape and Rehabilitation Management Plan for the development to the satisfaction of the Planning Secretary. This Plan would relate to the area of the quarry and all perimeter lands. This plan must:
(a) Be prepared by a suitably qualified expert whose appointment has been approved by the Planning Secretary.
(b) Be prepared in consultation with BCD and Council, and submitted to the Planning Secretary for approval prior to the commencement of construction activities;
(c) Describe how the implementation of the Tetratheca juncea Translocation Program would be integrated with the overall rehabilitation of the site;
(d) Describe the short, medium and long-term measures that would be implemented to:
• Manage remnant vegetation and habitat on the site; and
• Ensure compliance with the rehabilitation objectives and progressive rehabilitation obligations of this consent.
(e) include detailed performance and completion criteria for evaluating the performance of the rehabilitation of the site, including triggers for any remedial action;
(f) Include a detailed description of the measures that would be implemented over the next 3 years (to be updated for each 3 year period following initial preparation of the plan), including the procedures to be implemented for:</td>
<td><u>Assessment:</u>
The Landscape and Rehabilitation Management Plan (LRMP) was most recently updated in March 2020. The LRMP has not been updated within a 3 year period as required by clause (f) of this condition. Additional detail relating to compliance with this CoC is provided in Appendix A1.

<u>Recommendation:</u>
Ensure the LRMP is updated every 3 years and that implementation of measures detailed in the plan have been reviewed and updated where required.

Scheduled reminders should be implemented to ensure that future updates of the LRMP are undertaken within the required 3 year period. Where required, update associated monitoring programs to ensure the effectiveness of the procedures can be effectively measured.</td>
<td><u>ACTION:</u>
KEQ to complete a comprehensive review of the Landscape and Rehabilitation Management Plan and submit the revised document to the Planning Secretary for approval.

<u>DUE:</u>
28 May 2024 in accordance with Schedule 5, Condition 5(c).
NOTE – this may be delayed, subject to the receipt of Commonwealth Approval for MOD10 (EPBC 2022 – 9164) under the Commonwealth EPBC Act 1999.

<u>STATUS:</u>
Underway – The rehabilitation component of the management plan is complete; and the landscape component is currently being reviewed by KEQ's ecologist. However, this may be delayed, subject to Commonwealth approval.</td>
</tr>
</table>

KEQ IEA 2023 – Response to Audit Recommendations

KEQ 2023 IEA Findings and KEQ Response – Project Approval (MP09_0175)			
No	*Requirement*	*2023 IEA Assessment & Recommendation*	*2023 KEQ Response / Action*
	• Ensuring compliance with the rehabilitation objectives and progressive rehabilitation obligations of this consent; • Enhancing the quality of remnant vegetation and fauna habitat; • Restoring native endemic vegetation and fauna habitat within the rehabilitation area, including details of the target revegetation communities of the rehabilitated landform; • Coordinating the relocation of native fauna to protected habitats associated with preclearing fauna surveys; • Maximising the salvage of environmental resources within the approved disturbance area - including tree hollows, vegetative and soil resources - for beneficial reuse in the enhancement of the rehabilitation area; • Collecting and propagating seed; • Ensuring minimal environmental consequences for threatened species, populations and habitats; • Minimising the impacts on native fauna on site, including the details and implementation of appropriate pre-clearance surveys; • Minimising the impacts on fauna movement between undisturbed areas of the site and nearby vegetation (including potential fauna crossings); • Controlling weeds and feral pests; • Controlling erosion; • Controlling access and providing for management trails; and • Bushfire management and implementation of ecologically appropriate bushfire intervals. (i) Include a program to monitor the effectiveness of these measures, and progress against the performance and completion criteria. (j) Identify the potential risks to successful implementation of the Tetratheca juncea translocation Program and rehabilitation of the site, and include a description of the contingency measures that would be implemented to mitigate these risks. (k) Include details as to how the rehabilitated land would be permanently conserved and managed as part of the broader Biodiversity Offset Area approved in these conditions. (l) Include details of who would be responsible for monitoring, reviewing, and implementing the plan; and (m) Include details as to the timing of actions set out in the plan The Applicant must implement the plan as approved by the Planning Secretary.		
S3, C33	The Applicant must prepare a Biodiversity Offset Area Management Plan for the development to the satisfaction of the Planning Secretary. This Plan would relate to the area of the Biodiversity Offset Area required in these conditions. This plan must: (a) Be prepared by a suitably qualified expert whose appointment has been approved by the Planning Secretary (b) Be prepared in consultation with BCD and Council (c) Describe how the implementation of the Tetratheca juncea Translocation Program would be integrated with the Biodiversity Offset Area management. (d) Describe the short, medium and long-term measures that would be implemented to manage remnant vegetation and habitat on the Biodiversity Offset Area (e) Include detailed performance and completion criteria for evaluating the performance of the conservation, restoration and management of the Biodiversity Offset Area, including triggers for any remedial action. (f) Providing for the transfer of environmental resources from the approved disturbance area - including tree hollows, vegetative and soil resources - for beneficial reuse in the enhancement of the Biodiversity Offset Area.	**Assessment:** The Biodiversity Offset Area Management Plan (BOAMP) was most recently updated in April 2021. A number of outstanding actions recommended within the latest Ecological Monitoring Report (included within the 2022 Annual Review) have not been closed out and constitutes a non-compliance against clause (h) of this condition. Additional detail relating to compliance with this CoC is provided in Appendix A1. **Recommendation:** ERM notes that KEQ have implemented a "BOA Completion Status and Action Plan" and recommends that the status of actions be reviewed and updated as soon as practicable.	**ACTION:** KEQ to continue implementing the 2022 BOA Monitoring Actions in accordance with the developed action plan. This action plan will need to be consolidated to include actions from the 2023 monitoring period. **DUE:** As soon as practicable. **STATUS:** Underway – The key action of repairs to fauna fencing surrounding Dam 1 commenced 30 January 2024.

KEQ IEA 2023 – Response to Audit Recommendations

KEQ 2023 IEA Findings and KEQ Response – Project Approval (MP09_0175)			
No	*Requirement*	*2023 IEA Assessment & Recommendation*	*2023 KEQ Response / Action*
	(g) Providing for the incorporation of the final rehabilitated landform into the Biodiversity Offset Area and its management. (h) Include a detailed description of the measures that would be implemented over the next 3 years (to be updated for each 3-year period following initial preparation of the plan), including the procedures to be implemented for: • Enhancing the quality of remnant vegetation and fauna habitat • Restoring native endemic vegetation and fauna habitat within the parts of the Biodiversity Offset Area that are cleared or modified, including details of the target revegetation communities of the restored landform. • Coordinating the relocation of native fauna to protected habitats associated with preclearing fauna surveys. • Collecting and propagating seed • Maximising the protection and restoration of threatened species, populations and habitats in the Biodiversity Offset Area • Maximising fauna movement between the Biodiversity Offset Area and adjacent habitats. • Controlling weeds and feral pests • Controlling erosion • Controlling access and providing for management trails; and • Bushfire management and implementation of ecologically appropriate bushfire intervals. (i) Include a program to monitor the effectiveness of these measures, and progress against the performance and completion criteria. (j) Identify the potential risks to successful implementation of the Biodiversity Offset program and include a description of the contingency measures that would be implemented to mitigate these risks. (k) Include details of who would be responsible for monitoring, reviewing, and implementing the plan. (l) Include details of the indicative costs of management actions; and (m) Include details as to the timing of actions set out in the plan.		
S3, C39	The Applicant must ensure that the storage, handling, and transport of dangerous goods and hazardous materials is conducted in accordance with the relevant Australian Standards, particularly AS1940 and AS1596, and the Dangerous Goods Code.	**Assessment:** KEQ have developed a Hazardous Substances (SDS) Register, most recently updated in December 2022, which describes the list of products, quantities, location on site, type of application, SDS issue and expiry dates, and "stability and reactivities" classification. Based on a review of tank compliance plates, tank brochures and site observations, the auditors are satisfied that dangerous good and hazardous materials are stored in accordance with AS1940, AS1596 ad the Dangerous Goods Code. However, it is noted that neither of the Diesel ASTs are included on the Hazardous Substances Register. **Recommendation:** The hazardous materials storage container should be repaired (to ensure it does not allow rainfall to fill the bund – making it inoperable) to ensure it complies with AS1940. It is recommended to update the Hazardous Subsidence Register to ensure it includes both diesel ASTs.	**ACTIONS:** 1. KEQ to review repair options to the storage container and implement as needed. 2. KEQ to review Hazardous Substances Register and include in KEQ reporting processes to ensure routine updates and revisions are carried out. **DUE:** As soon as practicable.

KEQ IEA 2023 – Response to Audit Recommendations

KEQ 2023 IEA Findings and KEQ Response – Project Approval (MP09_0175)			
No	*Requirement*	*2023 IEA Assessment & Recommendation*	*2023 KEQ Response / Action*
S5, C1	The Applicant must prepare an Environmental Management Strategy for the development to the satisfaction of the Planning Secretary. This strategy must: (a) Be submitted to the Planning Secretary for approval prior to the commencement of construction activities (b) Provide the strategic framework for environmental management of the development. (c) Identify the statutory approvals that apply to the development. (d) Describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the development. (e) Describe the procedures that would be implemented to: • Keep the local community and relevant agencies informed about the operation and environmental performance of the development. • Receive, handle, respond to, and record complaints; • resolve any disputes that may arise during the course of the development; • respond to any non-compliance; and • Respond to emergencies; and (f) Include: • Copies of any strategies, plans and programs approved under the conditions of this consent; and • Clear plan depicting all the monitoring required to be carried out under the conditions of this consent. The Applicant must implement the strategy as approved by the Planning Secretary.	**Assessment:** The latest version of the Environmental Management Strategy (EMS) was prepared in December 2015. It is noted that there are references to management plans within the EMS which are now superseded, therefore the version is not considered up to date as required by clause (f) of this condition. Additional detail relating to compliance with this CoC is provided in Appendix A1. **Recommendation:** It is recommended that a review of the EMS be undertaken and updated where required to ensure it is current. This includes but not limited to updates in statutory requirements and references to updated management plans and monitoring programs.	**ACTION:** KEQ to complete a comprehensive review of the Environmental Management Strategy and submit the revised document to the Planning Secretary for approval. **DUE:** 28 May 2024 in accordance with Schedule 5, Condition 5(c). **STATUS:** Underway – draft revision of the management plan has been completed by IEMA. A further revision is to be assessed in accordance with this recommendation.
S5, C2	The Applicant must assess and manage development-related risks to ensure that there are no exceedances of the criteria and/or performance measures in this consent. Any exceedance of these criteria and/or performance measures constitutes a breach of this consent and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation. Where any exceedance of these criteria and/or performance measures has occurred, the Applicant must, at the earliest opportunity: (a) Take all reasonable and feasible measures to ensure that the exceedance ceases and does not recur. (b) Consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other course of action; and (c) Implement remediation measures as directed by the Planning Secretary.	**Assessment:** (a) During the audit period, there have been multiple exceedances of the surface water discharge limits, however it is not clear to the auditors whether feasible measures (including a review of appropriate Management Plans) have been taken to ensure the exceedance ceases. (b) Example incident reports have been issued to the DPE and reviewed by ERM. Some incident reports have not been issued to the Department immediately after an incident occurred. (c) There have been no specific remediation measures directed by the Planning Secretary within this audit period. **Recommendation:** Conduct a review of short term adaptive management processes to consider whether temporary solutions such as pumping and storage of water to enable short term provisioning of additional capacity is recommended. The above recommendations should be incorporated within an update to the Water Management Plan.	**RESPONSE:** (a) VGT completed a water management review of the KEQ site on 14 September 2023, which concluded no reasonable short-term measures could be completed without securing further approvals. Therefore, KEQ disagrees with the non-compliance findings. **ACTION:** KEQ to include these two recommendations into the comprehensive review of the Water Management Plan. Refer to the response under Schedule 3, Condition 21 for further details.
S5, C4	By the end of March each year, the Applicant must review the environmental performance of the development to the satisfaction of the Planning Secretary. This review must: (a) describe the development (including rehabilitation) that was carried out in the previous calendar year, and the development that is proposed to be carried out over the current calendar year.	**Assessment:** The Annual Reviews which are applicable within this audit period are for the years 2020, 2021 and 2022. The auditors reviewed the Annual Reviews and confirm each contain the required details as listed within (a) to (f) of this condition.	**RESPONSE:** KEQ acknowledges the 2022 Annual Review was subject a late submission. KEQ has since implemented improved reporting processes to ensure submission of documents to external stakeholders is completed.

KEQ IEA 2023 – Response to Audit Recommendations

KEQ 2023 IEA Findings and KEQ Response – Project Approval (MP09_0175)			
No	*Requirement*	*2023 IEA Assessment & Recommendation*	*2023 KEQ Response / Action*
	(b) include a comprehensive review of the monitoring results and complaints records of the development over the previous calendar year, which includes a comparison of these results against: • The relevant statutory requirements, limits or performance measures/criteria; • The monitoring results of previous years; and • The relevant predictions in the documents referred to in condition 2(d) of Schedule 2 of this consent. (c) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance. (d) identify any trends in the monitoring data over the life of the development; (e) identify any discrepancies between the predicted and actual impacts of the development and analyse the potential cause of any significant discrepancies; and (f) describe the measures that would be implemented over the current calendar year to improve the environmental performance of the development.	Following consultation with the Planning Secretary and as captured within the 2022 Annual Review and "Post Approval Document Received" email notification, the 2021 Annual Review was identified to have been lodged in October 2022 therefore considered a late submission in accordance with this condition. **Recommendation:** It is recommended that all Annual Reviews are submitted to the Planning Secretary by the end of March each year.	**STATUS:** Completed – no further actions required.
S5, C5	Within 3 months of: (a) The submission of an annual review under Condition 4 above. (b) The submission of an incident report under Condition 7 below. (c) The submission of an audit report under Condition 9 below; or (d) Any modification to the conditions of this consent, (unless the conditions require otherwise), the Applicant must review the strategies, plans, and programs required under this consent, to the satisfaction of the Planning Secretary. Where this review leads to revisions in any such document, then within 4 weeks of the review the revised document must be submitted for the approval of the Planning Secretary. *Note: The purpose of this condition is to ensure that strategies, plans and programs are regularly updated to incorporate any measures recommended to improve environmental performance of the development.*	**Assessment:** The management plans and strategies which are applicable to this condition are as follows: ▪ Environmental Management Strategy – dated Dec 2015 ▪ Air Quality Management Plan –dated May 2019 ▪ Blast Management Plan – dated May 2019 ▪ Noise Management Plan – dated April 2022 ▪ Heritage Management Plan – dated December 2015 ▪ Water Management Plan – dated May 2019 ▪ Traffic Management Plan – dated December 2015 ▪ Tetratheca Juncea Translocation Plan – dated January 2019 ▪ Biodiversity Offset Strategy – dated July 2013 ▪ Landscape and Rehabilitation Management Plan – dated March 2020 ▪ Biodiversity Offset Area Management Plan – dated April 2021 There is no evidence within the respective strategies, plans and programs required under this consent to demonstrate that a review has taken place within the requirements of this condition. **Recommendation:** Ensure that all strategies, plans and programs required under this consent are updated to include a document control or similar so that revision dates are clear to the reader. Opportunities to improve notification systems are recommended to be reviewed to ensure programs are revised within the timeframes as required under this consent.	**RESPONSE:** KEQ acknowledges the review, revision, completion of agency consultation and re-submission of statutory management plans requires significant improvement. In 2023, KEQ has implemented a new document template, document control system (inclusive of Document ID and version numbers, and a consolidated document history table) as well as a new Management Plan register to enable improved timeliness of document updates when revision triggers are reached. **ACTIONS:** Refer to constituent management plan conditions for individual actions. **STATUS:** Completed – document management system.

KEQ IEA 2023 – Response to Audit Recommendations

KEQ 2023 IEA Findings and KEQ Response - Environment Protection Licence (EPL 20611)				
No	*Requirement*	*2023 IEA Assessment*	*2023 IEA Recommendation*	*2023 KEQ Response / Action*
L1.1, L2.1, L2.2	L1.1 – Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997. L2.1 – For each monitoring/discharge point or utilisation area specified in the table/s below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table. L2.2 – Where a pH quality limit is specified in the table, the specified percentage of samples must be within the specified ranges.	From the review of the Annual Returns and Surface Water Monitoring Discharge Register it is noted that numerous reoccurring uncontrolled discharges of surface waters that exceed the concentration limits have occurred during the audit period. According to the Discharge Register, the following discharges were recorded which exceeded the concentration limits defined in EPL 20611 [summary]: 2020 – a total of 11 discharges non-compliant with the EPL concentration limits. 2021 – a total of 18 discharges non-compliant with the EPL concentration limits. 2022 – a total of 29 discharges non-compliant with the EPL concentration limits. All discharges exceeding the concentration criteria have been reported within the Annual Returns. Heavy rainfall, particularly in 2021 and 2022 resulted in multiple uncontrolled and non-compliant discharges during the audit period. A review of the WMP has not been carried out as required following the multiple exceedances of the discharge limits. It is not clear whether the response procedures described in the WMP are effective in preventing non-compliant discharges during heavy rainfall.	Conduct a detailed review of the effectiveness of the WMP, inclusive of the TARP to ensure that management measure are appropriate to ensure sufficient storage capacity of the KEQ dams is effectively maintained, such that uncontrolled discharges do not occur. The review should consider the multiple surface water discharge exceedances which took place in 2020, 2021 and 2022 and the effectiveness of associated preventative measures and procedures, such as scheduling of dam desedimentation works prior to forecast rainfall events. The review should be conducted by a suitably qualified specialist and recommendations should be reflected within an update to the WMP. It is recommended that KEQimplement a framework to log all steps and actions to be taken in accordance with the TARP, in particular when a ‘Condition Amber’ or ‘Condition Red’ Trigger Response is enacted.	Duplicate recommendations. Refer to water-related conditions of the Project Approval for further details.
O1.1, O5.1, O5.2	O1.1 – Licensed activities must be carried out in a competent manner. This includes: (a) The processing, handling, movement and storage of materials and substances used to carry out the activity; and (b) The treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity. O5.1 – All tanks and storage areas for drums containing material that has potential to cause environmental harm must be bunded or have an alternative spill containment system in-place. The bunding and/or spill containment systems must be properly designed, engineered, and constructed to be suitable for the material types and quantities stored therein in accordance with all appropriate standards, including Australian Standards (AS)1940 and AS1596. O5.2 – Bunds must: (a) have walls and floors constructed of impervious materials; (b) Be of sufficient capacity to contain 110% of the volume of the tank (or 110% volume of the largest tank where a group of tanks are installed); (c) Have floors graded to a collection sump; (d) Not have a drain valve incorporated in the bund structure; or be constructed and operated in a manner that achieves the same environmental outcome.	Lubricants and associated materials were stored within a hazardous material storage container that was no longer structurally sound and open to the weather which results in the bund being filled with water, this considered non-compliant with this condition. There are two aboveground storage tanks (ASTs) containing diesel onsite, both of which comprise a double walled construction. The primary storage area has been constructed with a drainage system to sump, but the sump was noted to be under-sized and it would offer limited containment in the event of a spill.	The hazardous materials storage container should be repaired (to ensure it does not allow rainfall to fill the bund – making it inoperable) to ensure it complies with AS1940.	Duplicate recommendation. Refer to the Schedule 3, Condition 39 for further details.

KEQ IEA 2023 – Response to Audit Recommendations

KEQ 2023 IEA Findings and KEQ Response - Environment Protection Licence (EPL 20611)				
No	*Requirement*	*2023 IEA Assessment*	*2023 IEA Recommendation*	*2023 KEQ Response / Action*
O3.1, O3.2, O3.3	O3.1 – The premises must be maintained in a condition which minimises or prevents the emission of dust from the premises. O3.2 - Any activity carried out in or on the premises must be carried out by such practical means as to prevent dust or minimise the emission of dust to the air. O3.3 – Any plant operated in or on the premises must be operated by such practical means to prevent or minimise dust or other air pollutants.	Central control room to manage dust suppression sprays at each transfer point and stockpile within crushing and screening plant. Water spray truck actively wets internal roads and product stockpiles. Biggest observable issue during the site visit was noted to be from main drop point to boot – jaw crusher. Across the audit period it was noted that dust was generally managed in accordance with this condition, although an exceedance of the air quality limits stated in the Project Approval, as below: • Short term PM: One exceedance of the short-term criteria for PM10, occurring on 16 June 2023 with a PM10 monitoring value of 51 µg/m3. This result is considered a low-range exceedance with the PM10 limit of 50 µg/m3 and as this is the only exceedance recorded within this audit period, no further actions are recommended at this stage.	As only a single incident of a lowrange exceedance occurred during the audit period, no specific recommendations are made beyond continuing to monitor for exceedances as per the requirement of the EPL. If exceedances reoccur examine additional measure to manage.	Duplicate recommendations. Refer to air quality-related conditions of the Project Approval for further details.
O7.1	All acoustic bunds necessary to achieve compliance with the noise limits specified in this licence must be constructed prior to the commencement of quarrying activities and be maintained throughout the operational life of the premises to the height and location described in the Noise Management Plan.	It was noted in the Annual return for the reporting period 26-08-2020 to 25-08-2021 that acoustic bunding was not constructed as required by condition O7.1 as it was deemed to be ineffective. Enclosures were built around the crushers which meets noise limit protection requirements. The EPL was varied on 02/09/2022, removing the requirement for bunding and amending condition O7.1. The noncompliance noted for this condition was limited to the previous version of the EPL. The site is compliant as at the close of the audit period.	As the original requirement has been removed from the EPL condition, no further action is recommended.	**RESPONSE:** KEQ disagrees with this finding as the implementation of noise enclosures as part of MOD8 addressed the intent of this condition which was not removed at the time due to administrative oversight.
M2.1, M3.1	M2.1 – For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns. M3.1 – Monitoring for the concentration of a pollutant emitted to the air required to be conducted by this licence must be done in accordance with: (a) Any methodology which is required by or under the Act to be used for the testing of the concentration of the pollutant; or (b) If no such requirement is imposed by or under the Act, any methodology which a condition of this licence requires to be used for that testing; or (c) If no such requirement is imposed by or under the Act or by a condition of this licence, any methodology approved in writing by the EPA for the purposes of that testing prior to the testing taking place. *Note: The Protection of the Environment Operations (Clean Air) Regulation 2021 requires testing for certain purposes to be conducted in accordance with test methods contained in the publication "Approved Methods for the Sampling and Analysis of Air Pollutants in NSW".*	Monitoring of discharges is outlined in Section 8.1.3 of the WMP. The monitoring frequency is generally conducted in accordance with Condition M2.1. Examples of air quality monitoring for deposited dust, TSP and PM10 during the audit period were viewed. Sampling from reports reviewed is undertaken in accordance with the stated methods. A review of the Annual Returns noted 2 separate non-compliances against condition M2.1 & M3.1. The first was reported as being due to a HVAS sample jar being shattered twice (03/06/2021 and 05/07/2021) at the laboratory prior to analysis. KEQ stated the action taken was to instruct laboratory /field technicians to take greater care when handling sample jars. The second was reported as a failure of HVAS equipment failing during periods of extreme rainstorms	Ensure monitoring is undertaken in accordance with requirements of M2 conditions.	**RESPONSE:** KEQ acknowledges the finding, but considers no further actions are required.

KEQ IEA 2023 – Response to Audit Recommendations

KEQ 2023 IEA Findings and KEQ Response - Environment Protection Licence (EPL 20611)				
No	*Requirement*	*2023 IEA Assessment*	*2023 IEA Recommendation*	*2023 KEQ Response / Action*
		(22/03/2021, 28/03/2021 and 03/04/2021) resulting in scheduled runs not being able to be undertaken. Make up runs were subsequently undertaken to make up for the missed runs. Beyond the above noted issues, air quality monitoring is undertaken as per the methodology prescribed by the NSW Environment Protection Authority (EPA) in their document, Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (2022) (Approved Methods).		
M8.1	To assess compliance with the noise limits for this premises attended noise monitoring must be undertaken in accordance with all noise condition and: a) During a period of normal quarry operations. b) at each one of the locations listed in the noise limits table of this licence c) Occur quarterly in the reporting period. d) Occur during each day period as defined in the NSW Noise Policy for Industry. *Note: Quarterly attended noise monitoring must be completed (unless otherwise agreed by the Planning Secretary) to determine whether the development is complying with the relevant conditions of this consent. The frequency of noise monitoring will be reviewed, upon request.*	A review of the Quarterly Monitoring Reports, prepared by EMM Consulting, across the audit period identified the methodology includes the requirements of this condition. Recorded Weather and Operating Conditions as reported stated monitoring was conducted in accordance with the stated criteria a), b) and d). A review of the Annual Returns noted 1 noncompliance for c) Noise monitoring not undertaken during the 26-08-2020 to 25-08-2021 reporting period. KEQ stated due to statistically wet year, monitoring under the required meteorological conditions proved difficult and therefore the last quarter monitoring was not conducted in time. KEQ stated in response to the failure to monitor they were amending the process of planning for quarterly monitoring to account for weather impacts. It is noted that the incident has not reoccurred during the audit period.	Following the incident KEQ amended quarterly monitoring planning and the failure to conduct quarterly monitoring has not reoccurred. Therefore, no further action is recommended.	**RESPONSE:** KEQ acknowledges the finding, but considers no further actions are required.
R1.5	The Annual Return for the reporting period must be supplied to the EPA via eConnect EPA or by registered post not later than 60 days after the end of each reporting period or in the case of a transferring licence not later than 60 days after the date the transfer was granted (the 'due date').	A review of the submission dates of the Annual Returns noted that the Annual Return for the reporting period 26-08-21 to 25-08-2022 was submitted on 26-10-2022, 2 days after the due date of 24-10-2022. All other Annual returns for the audit period were noted to have been submitted within the required time period.	Ensure Annual Returns are submitted within the 60 days and the due date as notified by the EPA.	**RESPONSE:** KEQ acknowledges the 2021/22 Annual Return was subject a late submission. KEQ has since implemented improved reporting processes to ensure submission of documents to external stakeholders is completed. **STATUS:** Completed – no further actions required.