



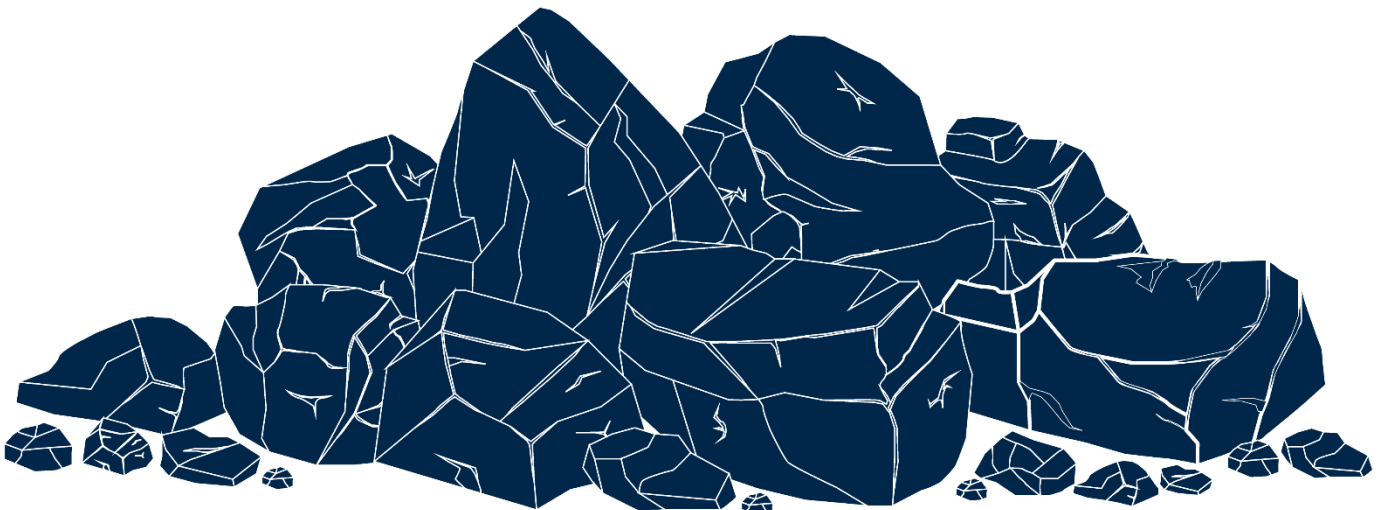
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Karuah East Quarry

Annual Review

01 January to 31 December 2025



Annual Review Title Block

Table 1 Karuah East Quarry Annual Review 2025 Title Block.


Name of Operation:	Karuah East Quarry
Name of Operator:	Karuah East Quarry Pty Limited
Project Approval:	MP09_0175
Name of holder of Project Approval:	Karuah East Quarry Pty Limited
Mining Lease:	N/A
Water Licences:	None
MOP / RMP:	N/A
Annual Review Start Date:	01 January 2025
Annual Review End Date:	31 December 2025

I, **Scott Ellerton**, certify that this audit report is a true and accurate record of the compliance status of **Karuah East Quarry** for the period **01 January 2025** to **31 December 2025** and that I am authorised to make this statement on behalf of **Karuah East Quarry Pty Limited**.

Note.

- A. *The Annual Review is an ‘environmental audit’ for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, \$1 million and for an individual, \$250,000.*

- B. *The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement—maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications / information / documents — maximum penalty 2 years imprisonment or \$22,000, or both).*

Name of Authorised Reporting Officer:	Scott Ellerton
Title of Authorised Reporting Officer:	Environment & Development Manager
Signature of Authorised Reporting Officer:	
Date:	31 March 2026 (original) 29 June 2026 (revision)

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Glossary

Abbreviation / Term	Meaning
AEMR	Annual Environmental Management Report
AHIMS	Aboriginal Heritage Information Management System
AQIA	Air Quality Impact Assessment
BAM	NSW Biodiversity Assessment Methodology
BOA	Biodiversity Offset Area
BOAMP	Biodiversity Offset Area Management Plan
BOS	NSW Biodiversity Offsets Scheme
CCC	Community Consultative Committee
DDG	Dust Deposition Gauge
DCCEEW	Department of Climate Change, Energy, the Environment & Water
EIS	Environmental Impact Statement (or Environmental Assessment Report)
EPBC Act	Commonwealth <i>Environment Protection & Biodiversity Conservation Act 1999</i>
EP&A Act	NSW <i>Environmental Planning & Assessment Act 1979</i>
EPL	NSW Environment Protection Licence
Ha	Hectare
HVAS	High Volume Air Sampler
HQPL	Hunter Quarries Pty Ltd
IEA	Independent Environmental Audit
KEQ	Karuah East Quarry
KEQPL	Karuah East Quarry Pty Limited
km	Kilometre
L	Litre
LALC	Local Aboriginal Land Council
L&RMP	Landscape & Rehabilitation Management Plan
LDP	Licensed Discharge Point
MNES	Commonwealth Matters of National Environmental Significance
MCC	MidCoast Council
MOD	Modification to the NSW Project Approval
NIA	Noise Impact Assessment
NSW Planning	NSW Department of Planning, Housing & Infrastructure
PM10	Particulates less than 10 µm in diameter
POEO Act	NSW <i>Protection of the Environment Operations Act 1997</i>
RAR	Response to Audit Recommendations
Tpa	tonnes per annum
TSP	Total Suspended Particulates
TSS	Total Suspended Solids
WPC	Wedgetail Project Consulting

1.0 Statement of Compliance

The compliance status of the Karuah East Quarry (KEQ) site at the end of the 2025 Annual Review reporting period is summarised by **Table 2**, **Table 3**, and **Table 4** below, in reference to the site’s Project Approval and Environment Protection Licence (EPL).

Table 2 *Statement of Compliance.*

Were all conditions of the relevant approval(s) complied with?	
Project Approval (MP09_0175)	No
Environment Protection Licence (EPL 20611)	No

Table 3 *Compliance Status Key (NSW Planning Annual Review Guideline, October 2015).*

Risk Level	Colour Code	Description
High	Non-compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence.
Medium	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> potential for serious environmental consequences, but is unlikely to occur; or potential for moderate environmental consequences, but is likely to occur.
Low	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> potential for moderate environmental consequences, but is unlikely to occur; or potential for low environmental consequences, but is likely to occur.
Administrative	Non-compliant	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions).

Table 4 *Summary of Non-Compliances.*

Relevant Approval	Condition	Condition Aspect	Compliance Status	Description	Section
Project Approval	Schedule 3, Condition 13	Air Quality	Non-compliant	Algal bloom exceedance of one DDG in the March 2025 Monitoring Period.	Section 6.2 and Section 11.0
				Anomalous exceedance of one DDG in the July 2025 Monitoring Period.	
			Non-compliant	Exceedance of short-term PM10 criteria associated with various local bushfires at The Branch and North Arm Cove on 14 November 2025.	
				Exceedance of short-term PM10 criteria associated with the Pacific Highway, Bulahdelah bushfire on 08 December 2025.	

Relevant Approval	Condition	Condition Aspect	Compliance Status	Description	Section
Project Approval	Schedule 3, Condition 13	Air Quality	Non-compliant	Complete failure to monitor due to power outage on 18 January 2025 associated with an east-coast low weather event. A replacement run was completed on 21 January 2025.	Section 6.2 and Section 11.0
Environment Protection Licence	Condition M2.2			Partial failure to monitor due to power outage on 08 November 2025 associated with Essential Energy maintenance works. A replacement run was completed on 12 November 2025.	
Project Approval	Schedule 3, Condition 19	Water	Non-compliant	Major rainfall events resulting in discharges of sediment-laden water from:	Section 7.2 and Section 11.0
Environment Protection Licence	Condition L2.3			<ul style="list-style-type: none"> ■ 09 to 12 January 2025; ■ 17 to 20 January 2025; ■ 27 April to 04 May 2025; ■ 19 to 25 May 2025; ■ 01 to 03 July 2025; and ■ 02 to 05 August 2025. 	

2.0 Introduction

This Annual Review covers the reporting period from the **01 January 2025** to **31 December 2025** for the Karuah East Quarry site.

Karuah East Quarry is a hard rock andesite quarry which contributes materials to the construction, civil infrastructure and land development industries in the Greater Newcastle, Hunter Valley, and Mid-North Coast regions. The site is located approximately 5 km to the north-east of the village of Karuah within the MidCoast Council LGA and is accessed via Blue Rock Close and Andersite Road adjacent to the northern Tarean Road interchange with the A1 Pacific Highway. The site is approved to cover approximately 40 Ha of land within Lot 12 and 13 of DP1024564.

Figure 1 and **Figure 2** illustrate the site within its broader regional context and site layouts respectively.

The approved development includes the following key elements:

- Quarrying operation is permitted on the site until 31 December 2034;
- Establishment and use of quarry plant and associated infrastructure;
- The extraction, processing, stockpiling and transport of quarry products is limited to 1.5 million tonnes in any calendar year;
- Roadworks to secure access to the site including upgrade and extension of Blue Rock Close, realignment of the Andersite Road and Blue Rock Close intersection and adjust road markings at Branch Lane and Andersite Road intersection;
- Establishment of land-based Biodiversity Offset Areas (BOA) on Part Lot 13 DP 1024564, Lot 14 DP 1024564, Lot 5 DP 838128 (Eastern BOA) and part Lot 201 DP 1042537 (Western BOA);
- Conditions apply to manage / mitigate potential impacts associated with a range of environmental conditions including air quality, blasting, noise, soil and water, transport, biodiversity, heritage, and waste.

Existing and approved site improvements include:

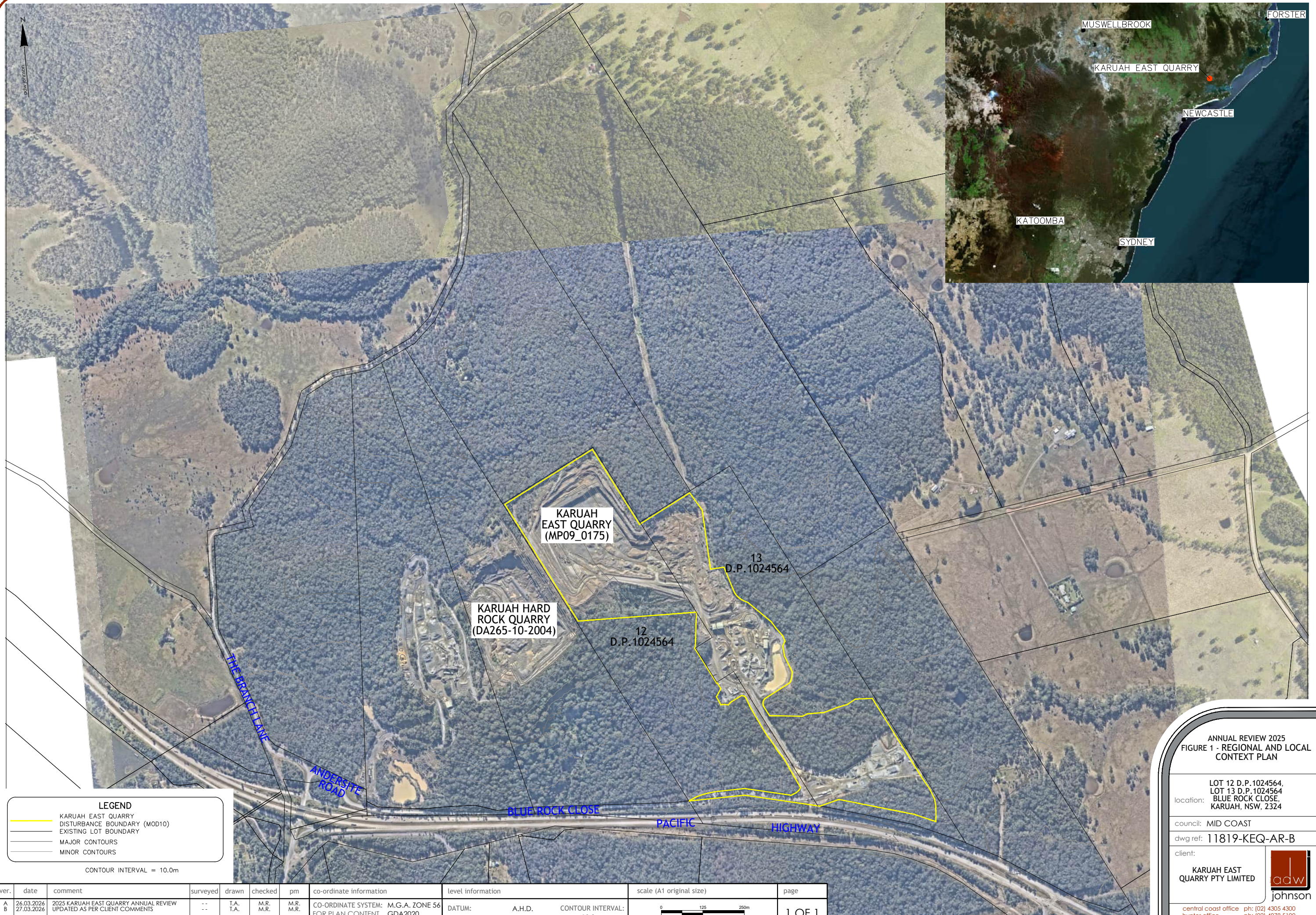
- quarry pit (extraction area);
- crushing plant and processing infrastructure;
- wash plant and workshops;
- stockpiling areas;
- internal haulage roads;
- weighbridge office;
- weighbridge (two weighbridges approved);
- stormwater management infrastructure including three (3) dams;
- parking areas for light and heavy vehicles;
- administration office;
- amenity facilities;
- other minor structures; and
- fencing and access gates.

2.1 Quarry Contacts

Key personnel who are responsible for environmental management of the operation are provided by **Table 5**.

Table 5 *Key Quarry Contacts.*

Position	Name	Contact	Contact Priority
Environment & Development Manager	Scott Ellerton	0447 044 646	Primary Contact
Quarry Manager	Darryn Bosch	0490 405 375	Secondary Contact
General Manager	Todd Kalajzich	02 4050 0304	–



LEGEND

- KARUAH EAST QUARRY
- DISTURBANCE BOUNDARY (MOD10)
- EXISTING LOT BOUNDARY
- MAJOR CONTOURS
- MINOR CONTOURS

CONTOUR INTERVAL = 10.0m

ver.	date	comment	surveyed	drawn	checked	pm	co-ordinate information	level information	scale (A1 original size)	page
A	26.03.2026	2025 KARUAH EAST QUARRY ANNUAL REVIEW	--	T.A.	M.R.	M.R.	CO-ORDINATE SYSTEM: M.G.A. ZONE 56	DATUM: A.H.D.	0 125 250m	1 OF 1
B	27.03.2026	UPDATED AS PER CLIENT COMMENTS	--	T.A.	M.R.	M.R.	FOR PLAN CONTENT GDA2020 ORIGIN OF CO-ORDINATES: P.M.	CONTOUR INTERVAL: 10.0 m ORIGIN OF LEVELS: LIDAR DATA	SCALE: 1:5000 (FULL)	

**ANNUAL REVIEW 2025
 FIGURE 1 - REGIONAL AND LOCAL
 CONTEXT PLAN**

location: LOT 12 D.P. 1024564,
 LOT 13 D.P. 1024564
 BLUE ROCK CLOSE,
 KARUAH, NSW, 2324

council: MID COAST
 dwg ref: 11819-KEQ-AR-B

client:
**KARUAH EAST
 QUARRY PTY LIMITED**

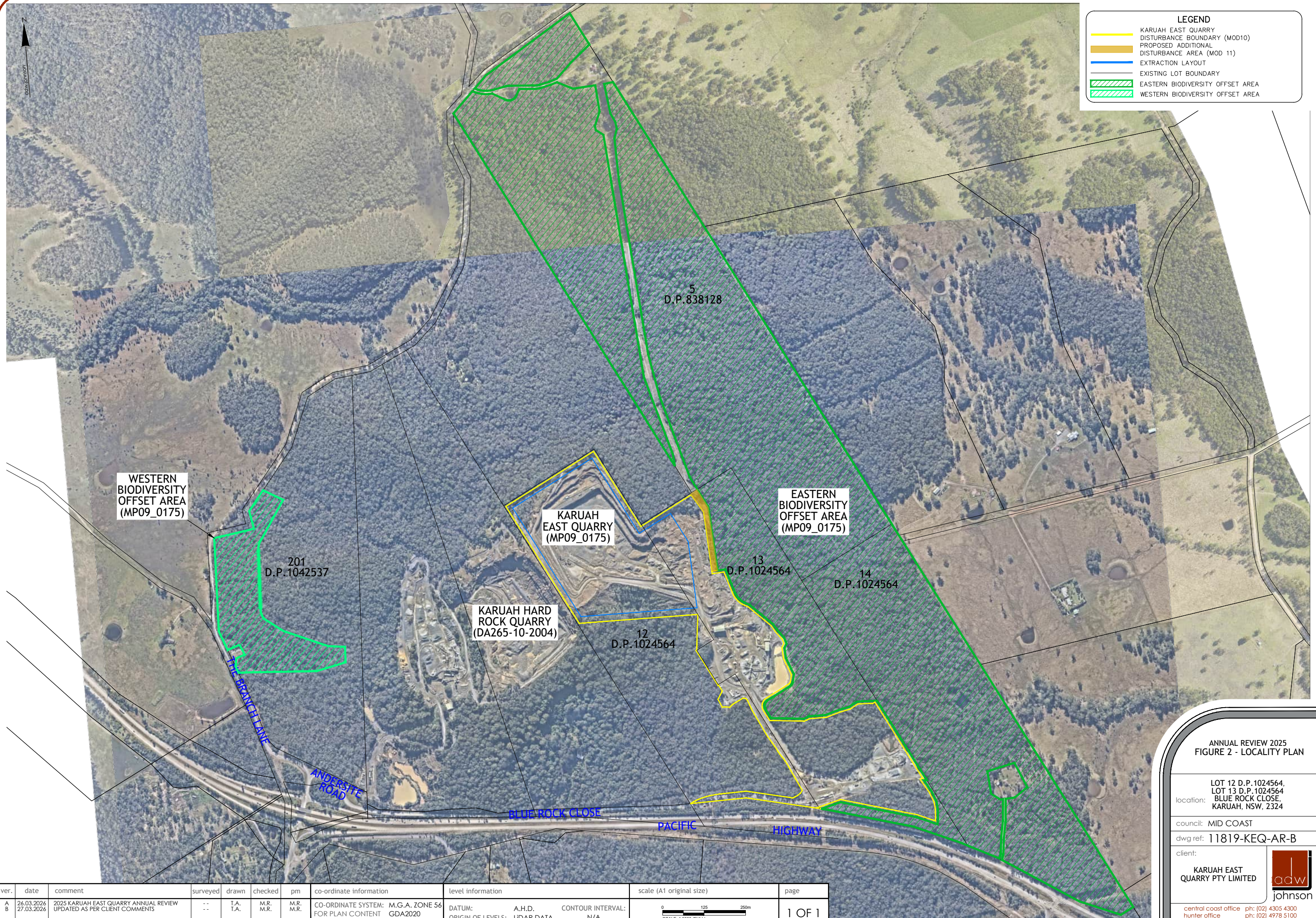


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LEGEND

- KARUAH EAST QUARRY
- DISTURBANCE BOUNDARY (MOD10)
- PROPOSED ADDITIONAL DISTURBANCE AREA (MOD 11)
- EXTRACTION LAYOUT
- EXISTING LOT BOUNDARY
- EASTERN BIODIVERSITY OFFSET AREA
- WESTERN BIODIVERSITY OFFSET AREA



Plotted By: Tim Alan; Plot Date: 27/03/26 12:38:52PM; Cod File: N:\11819\DWG\2025 ANNUAL REVIEW\11819-KEQ-AR-B.DWG
 This plan includes coloured information. If you have a black and white copy, you do not have all of the information. This note is coloured RED.

working beyond expectations

**ANNUAL REVIEW 2025
FIGURE 2 - LOCALITY PLAN**

location: LOT 12 D.P.1024564,
LOT 13 D.P.1024564
BLUE ROCK CLOSE,
KARUAH, NSW, 2324

council: MID COAST
dwg ref: 11819-KEQ-AR-B

client:
**KARUAH EAST
QUARRY PTY LIMITED**



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ver.	date	comment	surveyed	drawn	checked	pm	co-ordinate information	level information	scale (A1 original size)	page
A	26.03.2024	2025 KARUAH EAST QUARRY ANNUAL REVIEW	--	T.A.	M.R.	M.R.	CO-ORDINATE SYSTEM: M.G.A. ZONE 56	DATUM: A.H.D. CONTOUR INTERVAL: N/A	0 125 250m SCALE: 1:5000 (FULL)	1 OF 1
B	27.03.2024	UPDATED AS PER CLIENT COMMENTS	--	T.A.	M.R.	M.R.	FOR PLAN CONTENT GDA2020 ORIGIN OF CO-ORDINATES: P.M.	ORIGIN OF LEVELS: LIDAR DATA		

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3.0 Approvals

A summary of the approvals benefiting the Karuah East Quarry are provided in **Table 6** with further details of each NSW and Commonwealth approval provided in the subsequent sub-sections.

Table 6 *Project Approvals associated with the Karuah East Quarry.*

Instrument	Grant Date	Expiry Date	Comments
Project Approval (MP09_0175)	17/06/2014	31/12/2034	Primary statutory approval for the site under NSW <i>Environmental Planning and Assessment Act 1979</i> (EP&A Act).
Environment Protection Licence (EPL 20611)	26/08/2015	–	Primary statutory licence for the site under NSW <i>Protection of the Environment Operations Act 1997</i> (POEO Act).
Commonwealth Approval (EPBC 2014/7278)	20/03/2015	30/03/2045	Commonwealth statutory approval for the original project under Commonwealth <i>Environmental Protection and Biodiversity Conservation Act 1999</i> (EPBC Act).
Commonwealth Approval (EPBC 2022/9164)	02/07/2025	19/06/2125	Commonwealth statutory approval for the KEQ MOD10 Stockpile Extension Project under the EPBC Act.

3.1 NSW Project Approval (MP09_0175)

The Project Approval has been subject to five Modifications as summarised by **Table 7**.

Table 7 *Modifications to the Project Approval for the Karuah East Quarry.*

MOD	Approval Date	Description
MOD1	27/04/2018	Modification 1 (MOD1) was approved on 27 April 2018 under the provisions of section 75W of the EP&A Act. The modification approved a nominal expansion to the approved area of disturbance by 2,500 m ² to allow for improved vehicle manoeuvring in proximity of the crushing plant and processing area.
MOD2	19/12/2018	Modification 2 (MOD2) was approved on 19 December 2018 under the provisions of section 75W of the EP&A Act. The modification approved a 1.133 Ha increase to the site disturbance area to allow for improved environmental management and improved operational safety (for quarry vehicles).
MOD3 to MOD7		Withdrawn
MOD8	22/12/2020	Modification 8 (MOD8) was approved on 22 December 2020 under the provisions of section 4.55(1A) of the EP&A Act. The modification approved revised operational acoustic criteria in line with the NSW Noise Policy for Industry 2017; and formalised a number of industry best practice acoustic mitigation measures that have been installed at the quarry.
MOD9	02/12/2021	Modification 9 (MOD9) was approved 02 December 2021 under the provisions of section 4.55(1A) of the EP&A Act. The modification approved extended operating hours of the KEQ site.
MOD10	18/05/2023	Modification 10 (MOD10) was approved on 18 May 2023 under the provisions of section 4.55(2) of the EP&A Act. The modification approved a 7.17 Ha increase in the disturbance area to a total of 40.18 Ha to allow for additional product stockpiling areas, facilitate improved surface water management, construct a new administration building and expand vehicle manoeuvring and parking at site.
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Karuah Pit Consolidation Project (KEQ MOD11)

In early 2025, KEQPL acquired Lot 11 DP1024564 (Lot 11) finalising ownership of all landholdings within the Karuah Quarry Complex with the neighbouring Karuah Hard Rock Quarry (KHRQ) site (DA 265-10-2004), which facilitated a holistic review of quarry operations.

In August 2025, KEQPL submitted scoping letters to NSW Planning for the proposed Karuah Pit Consolidation Project, which seeks to extract the previously sterilised resource within areas of current disturbance, including the dividing highwall between the KEQ (Lot 12) and the KHRQ (Lot 11) and consolidate extraction operations between the two quarries via two concurrent s4.55(2) Modification Applications (MOD11 to the KEQ and MOD2 to the adjoining KHRQ).

In October 2025, NSW Planning issued Environmental Assessment Requirements to inform the concurrent s4.55(2) Modification Applications. At the time of writing this Annual Review, the Modification Applications were being prepared.

No change is proposed (or necessary) to the Project Approval as it relates to annual extraction, processing and transport rates (capped at 1.5 Mtpa) to facilitate the MOD11 development.

The KEQ MOD11 component of the project seeks to modify the following elements of the Project Approval:

- Concurrently modify both the KEQ and KHRQ consents to extract the known resource contained within already disturbed areas of Lot 12, Lot 13 and Lot 11 including the dividing highwall, within the currently approved excavation depths of RL45 at KEQ and RL65 at KHRQ.
- Formalise a total life of quarry extraction at KEQ of 28.33Mt (a nominal reduction from the 29 million tonnes anticipated in the original KEQ Project Approval documentation).
- Minor extension and overlap of extraction boundary of both KEQ (into Lot 11) and KHRQ (into Lot 12) extraction areas to holistically encompass the highwall structure, inclusive of appropriate safety offsets.
- Extension of the KEQ extraction area to the west (highwall removal) and to the east.
- Material sourced from the overlapping area of the CEA will be transported by internal haul road to either the KEQ or KHRQ for processing, stockpiling, sale and transport to market within currently approved throughput rates.
- A minor extension of 4,690 m² to the KEQ disturbance area. This area is located at the north-eastern boundary of the approved KEQ and is highly degraded and comprised entirely of exotic grasses and disturbed vegetation that has been historically cleared and managed to support a now redundant powerline corridor (infrastructure has been previously removed). This area is proposed to form a minor extension of the approved disturbance area and is incorporated into the consolidated extraction area. With the inclusion of this area, the total site disturbance area of KEQ will increase nominally from 40.18 to 40.65 Ha (an increase of 1.2%).
- Environmental safeguards incorporated into Management Plans that are in place for the KEQPL operation will be reviewed and updated to accommodate the proposal.

- Changes to approved blasting activity as follows:
 - Reduction in blasting frequency to limit the number of blasts to a maximum of two (2) blasts per week in total between KEQ and KHRQ (currently a cumulative total of three (3) blasts per week is approved (two at KEQ and one at KHRQ).
 - Approved blasting hours at KEQ are proposed to be extended by one (1) hour to occur between the hours of 9am and 5pm (Monday to Friday) to provide improved flexibility during blasting of the dividing highwall and align with proposed arrangements at KHRQ.
- Revised final landform resulting in a free-draining landscape of the current extraction area, reduced geotechnical risks over the long-term and a landform with greater consistency with the existing surrounding environment.

3.2 NSW Environment Protection Licence (EPL 20611)

The Environment Protection Licence (EPL) was originally granted on 26 August 2015 and has been subject to ten licence variations to-date as summarised by **Table 8**.

In 2025, three variation applications were finalised, including:

- 17 February 2025, to undertake minor adjustments to the locations of three (3x) of the site’s Depositional Dust Gauges (DDG).
- 24 July 2025, to remove DDG 5 (EPL Monitoring Point 16) from the licence following the acquisition of Lot 11.
- 04 September 2025, administrative updates following completion of the scheduled statutory licence review, including updating noise condition to reference the KEQ MOD10 Project and the removal of a completed Pollution Reduction Study.

On 01 December 2025, a further variation application was lodged to the EPA to include additional licence conditions to facilitate the use of on-site turbidity (NTU) measurements for compliance purposes when considering controlled discharges, rather than solely relying on laboratory testing for Total Suspended Solids (TSS).

Table 8 Variations to the Environment Protection Licence for the Karuah East Quarry.

No.	Variation Date	Description
–	26/08/2015	Original EPL granted for the site under NSW Protection of the Environment Operations Act 1997.
1	21/09/2015	Relocation of the blast monitoring location (EPL Monitoring Point 11).
2	06/12/2016	Relocation of Deposited Dust Gauge 5 (EPL Monitoring Point 8) and the High-Volume Air Sampler (EPL Monitoring Point 9).
3	16/01/2019	Inclusion of a Pollution Reduction Study following noise-related non-compliances.
4	25/06/2019	Amended noise monitoring frequency from annual to quarterly monitoring.
5	18/07/2019	Revised Scheduled Activity in accordance with the EPA’s updated definitions.
6	02/09/2022	Update for MOD9 extended operating hours and correction of administrative items.
7	07/11/2022	Removal of noise monitoring at Location I.
8	17/02/2025	Minor adjustment of DDG locations.

No.	Variation Date	Description
9	24/07/2025	Removal of Deposited Dust Gauge 5 (EPL Monitoring Point 16) following acquisition of Lot 11.
10	04/09/2025	Administrative updates following licence review, including updating noise condition reference to the KEQ MOD10 Project and the removal of a completed Pollution Reduction Study.
11	Currently under assessment	Lodged on 01 December 2025 to allow turbidity measurements to be used for discharge compliance purposes.

3.3 Commonwealth EPBC Approval (EPBC 2014/7282 & 2022/9164)

EPBC 2014/7282

KEQPL received EPBC approval (2014/7282) on 20 March 2015 for the original KEQ project.

EPBC 2014/7282 has been subject to two (2x) variations to date as summarised in by **Table 9** below.

A third variation application was submitted on 09 July 2025 following the receipt of EPBC Approval 2022/9164 to align the reporting periods of both Commonwealth EPBC approvals for Annual Compliance Reports and Independent Audits with the existing anniversary date of 27 April.

Table 9 Variations to the Commonwealth EPBC Approval for the Karuah East Quarry (2014/7282).

No.	Approval Date	Description
–	20/03/2015	Original approval granted for the site under Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> .
1	04/10/2018	Variation 1 was required as a result of MOD1 to the NSW Project Approval which impacted upon 0.25 Ha of native vegetation.
NOTE: MOD2, MOD8 and MOD9 to the NSW Project Approval did not necessitate a variation due to:		
<ul style="list-style-type: none"> ■ MOD2 did not disturb any Matters of National Environmental Significance (MNES); and ■ MOD8 and MOD9 did not change the KEQ disturbance footprint. 		
2	07/05/2025	Variation 2 was required as a result of MOD10 to the NSW Project Approval which impacted upon 7.17 Ha within the existing Biodiversity Offset Area (BOA). This variation approved changes to the BOA layout via the provision of a replacement BOA on part Lot 201 DP1042537 (Lot 201) that is known as the Western BOA.
3	Pending Approval	Lodged on 09 July 2025 to align reporting period dates for Annual Compliance Reports and Independent Audits with the existing 27 April anniversary date.

EPBC 2022/9164

KEQPL received EPBC approval (2022/9164) on 02 July 2025 for the additional ‘new’ land disturbance approved for the KEQ MOD10 Stockpile Extension Project.

In a similar fashion, a variation was submitted on 09 July 2025 following the receipt of EPBC Approval 2022/9164 to align the reporting periods of both Commonwealth EPBC approvals for Annual Compliance Reports and Independent Audits with the existing anniversary date of 27 April.

Table 10 Variations to the Commonwealth EPBC Approval for the KEQ MOD10 Project (2022/9164).

No.	Approval Date	Description
–	02/07/2025	Original approval granted for the KEQ MOD10 Stockpile Extension Project under Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> .
1	Pending Approval	Lodged on 09 July 2025 to align reporting period dates for Annual Compliance Reports and Independent Audits with the existing 27 April anniversary date.

3.4 Statutory Requirements of this Annual Review

Requirements of the Annual Review are summarised in **Table 11**.

Table 11 Summary of Statutory Requirements of the Annual Review.

No.	Requirement	Section
Schedule 2 – Administrative Conditions		
Condition 14	<u>Production Data</u> <i>The Applicant must:</i>	Section 4.1
	<ul style="list-style-type: none"> a) <i>provide annual quarry production data to MEG using the standard form for that purpose; and</i> b) <i>report this data in the Annual Review (see condition 4 of Schedule 5).</i> 	
Schedule 3 – Environmental Performance Conditions		
Condition 23	<u>Monitoring of Product Transport</u> <i>The Applicant must keep accurate records of all laden truck movements to and from the site (including arrival and dispatch) and publish a summary of records on its website every 6 months and in the Annual Review.</i>	Section 4.6 and Appendix 2
Schedule 5 – Environmental Management, Reporting and Auditing		
Condition 4	<u>Annual Review</u> <i>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:</i>	Section 4.0 and Section 8.0
	<ul style="list-style-type: none"> a) <i>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;</i> 	
	<ul style="list-style-type: none"> b) <i>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:</i> <ul style="list-style-type: none"> • <i>the relevant statutory requirements, limits or performance measures/criteria;</i> • <i>the monitoring results of previous years; and</i> • <i>the relevant predictions in the documents referred to in condition 2(d) of Schedule 2 of this consent;</i> 	Section 6.0 and Section 7.0
	<ul style="list-style-type: none"> c) <i>identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;</i> 	
<ul style="list-style-type: none"> d) <i>identify any trends in the monitoring data over the life of the development;</i> 	Section 6.0 and Section 7.0	

No.	Requirement	Section
	<i>e) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and</i>	Section 6.0 and Section 7.0
	<i>f) describe the measures that would be implemented over the current calendar year to improve the environmental performance of the development.</i>	Section 12.0

3.5 Summary of Environmental Management Plans

A summary of the site's Environmental Management Plans is provided in **Table 12**.

Table 12 Summary of Statutory Environmental Management Plans.

Environmental Management Plan	Status	2026 Action
Environmental Management Strategy	Comprehensive review completed in March 2025 by KEQPL accounting for the acquisition of Lot 11; and approved by NSW Planning on 05 May 2025.	Continue to review and update as required.
Air Quality Management Plan	Comprehensive review completed in March 2025 by IEMA accounting for the acquisition of Lot 11 and deletion of DDG5; and approved by NSW Planning on 30 April 2025.	Continue to review and update as required.
Biodiversity Offset Area Management Plan	Comprehensive review completed by Wedgetail Project Consulting (WPC) in May 2024. Development of the final revised document is subject to Commonwealth Approval for the configuration of the Western BOA in accordance with Condition 9A of EPBC 2024/7282.	Final update pending Commonwealth endorsement for the configuration of the Western BOA.
Biodiversity Offset Strategy	Comprehensive review completed by KEQPL & WPC in September 2025; and approved by NSW Planning on 12 February 2026.	Continue to review and update as required.
Blast Management Plan	Comprehensive review completed by IEMA in March 2025 accounting for the acquisition of Lot 11 and cessation of the Cooperative Blasting Agreement between KEQPL and Wedgerock Pty Ltd. The revised plan was approved by NSW Planning on 23 April 2025.	Continue to review and update as required.
Heritage Management Plan	Comprehensive review completed by Heritage Now in August 2023 accounting for the KEQ MOD10 Stockpile Extension Project; and approved by NSW Planning on 12 January 2024.	Continue to review and update as required.
Landscape and Rehabilitation Management Plan	Comprehensive review completed by IEMA and WPC in October 2024 accounting for the KEQ MOD10 Stockpile Extension Project; and approved by NSW Planning on 10 March 2025.	Continue to review and update as required.
Noise Management Plan	Comprehensive review completed by EMM in February 2024 accounting for the KEQ MOD10 Stockpile Extension Project; and approved by NSW Planning on 11 July 2024.	Continue to review and update as required.
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		19 of 434

Environmental Management Plan	Status	2026 Action
Transport Management Plan	Comprehensive review completed in May 2024 by ADW Johnson; and approved by NSW Planning on 26 November 2024.	Continue to review and update as required.
Tetratheca juncea Translocation Plan	Program completed in 2020.	–
Water Management Plan	Comprehensive review completed by ADW Johnson in May 2024 with EMM being engaged in 2025 to produce groundwater impact triggers following consultation with the Water Group within the NSW Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW).	Finalise the revisions for groundwater management aspects and resubmit to NSW Planning for approval.

4.0 Operations Summary

The KEQ site operated during the 2025 reporting period as outlined below.

4.1 Quarry Production Summary

The monthly production summary during the reporting period is included in **Table 13**.

Table 13 *Monthly Quarry Production Data.*

Month	Production (t)	Truck Loads (#)
Jan-25	54,080	1,822
Feb-25	95,968	3,048
Mar-25	95,438	3,001
Apr-25	63,662	2,044
May-25	65,786	2,174
Jun-25	93,552	3,087
Jul-25	88,839	2,964
Aug-25	53,267	1,773
Sep-25	89,707	3,045
Oct-25	107,258	3,419
Nov-25	81,136	2,759
Dec-25	59,505	2,015
2025 TOTAL:	948,198	31,151
2026 FORECAST:	1,200,000	40,000

4.2 Land Preparation

No land clearing was completed during the 2025 reporting period.

4.3 Construction & Demolition Activities

No construction or demolition activities were completed during the 2025 reporting period.

4.4 Operating Hours

During the 2025 reporting period the KEQ site generally operated within the operating hours provided by Schedule 2, Condition 7 of the Project Approval as outlined by **Figure 3**. No temporary extensions to operating hours were sought from the Planning Secretary and no directions from statutory authorities were received during 2025.

In April 2025, a complaint was received regarding audible noise being generated from the quarry at a nearby residence on Halloran Road, North Arm Cove between 10.00 and 10.30 pm as outlined by **Section 9.3**. A letter box drop was subsequently issued confirming quarry operating hours to 10.00 pm on Mondays and 9.00 pm from Tuesday to Friday; whilst operations staff and contractors were subject to toolbox talks of these hours and associated allowable activities.

In October 2025, extended operating hours consisting of sales loading from 05.30 am was enacted to support Acciona in the delivery of the Singleton Bypass. In a similar fashion, a letter box drop was issued to surrounding landholders to advise of the temporary change in operating hours.

Hours of Operation

7. The Applicant must comply with the operating hours in Table 1.

Table 1: Operating hours

Activity	Operating Hours
Quarrying Operations	7:00 am to 9:00 pm, Monday to Friday 7:00 am to 10:00 pm Monday to Friday on 50 calendar days per year; and 7:00 am to 6:00 pm, Saturday. No drilling 6:00 pm to 10:00 pm Monday to Friday or 1:00 pm to 6:00 pm Saturday No quarrying operations on Sundays or Public Holidays.
Product loading and dispatch	5:00 am to 9:00 pm Monday to Friday 5:00 am to 10:00 pm Monday to Friday on 50 calendar days per year 6:00 am to 6:00 pm Saturday No product loading and dispatch on Sundays or Public Holidays
Construction activities	7.00 am to 6.00 pm, Monday to Friday; and 8.00 am to 1.00 pm, Saturdays, unless noise from these activities does not exceed 40 dB(A) $L_{Aeq}(15 \text{ min})$ at any privately-owned residence.
Maintenance activities	24 hours a day, 7 days per week, providing maintenance activities are inaudible at any privately-owned residence

Note: This condition does not apply in the event of a direction from police or other relevant authority for safety or emergency reasons regarding works which may need to be undertaken to avoid loss of life, property loss and/or to prevent environmental harm.

Figure 3 Operating Hours as specified in the Project Approval.

4.5 Operating Equipment

During the 2025 reporting period the following equipment was available for use during operational periods:

- 3x Excavators,
- 5x Front End Loaders,
- 2x Rigid Haul Trucks,
- 4x Articulated Haul Trucks,
- 1x Mini Digger,
- 1x Posi-track,
- 1 x Mobile Screen,
- 1 x Mobile Jaw,
- 1 x Mobile Grizzly,
- 1 x 30,000 litre Water Cart,
- 1 x Trommel,
- 1 x Pugmill, and
- 1 x Elevated Work Platform.

4.6 Transport Rates

Transport rate monitoring is conducted in accordance with Schedule 3, Condition 23 of the Project Approval, outlined by **Figure 4**. Monthly truck movements are summarised by **Table 13** with detailed reports provided by **Appendix 2** and published on the Hunter Quarries website.

Monitoring of Product Transport

23. 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.

Figure 4 Product Transport Monitoring Requirements from the Project Approval.

4.7 Next Reporting Period

Forecast operations for the next 2026 reporting period are summarised by **Table 14**.

Table 14 Forecast Operations for the Next 2026 Reporting Period.

Aspect	Forecast Operations for the Next 2026 Reporting Period
Quarrying Operations	Continuation of quarrying activities within the approved extraction pit. It is expected that the Karuah Pit Consolidation Project (KEQ MOD11) will be determined in 2026 and if approved, extraction operations will commence within the proposed CEA.
Infrastructure Upgrades	Expanded operational and ancillary infrastructure in accordance with the KEQ MOD10 Project, including increased stockpile areas, additional administration buildings and upgraded sedimentation dams. Routine maintenance to structural assets will continue to be completed subject to economic business cases and in accordance with operational requirements and the expected life of fixed plant.
Equipment Upgrades	No major equipment upgrades are planned; however, routine replacement of equipment will continue to be completed subject to economic business cases and in accordance with operational requirements and the expected life of plant and equipment.

5.0 Actions Required from Previous Annual Reviews

KEQPL received correspondence from NSW Planning on 07 July 2025 regarding the 2024 Annual Review and found it to generally satisfy the reporting requirements of the Project Approval and the NSW Planning Annual Review Guideline (October, 2015).

The actions required as an outcome of the previous Annual Reviews are summarised in **Table 15**.

Table 15 Summary of Previous Actions.

Action ID	Action Required	Status	Section
KEQ Findings – 2023 Annual Review			
2023-1	<u>KEQ MOD10 Project:</u> Submit EPL Variation for updated activities for the KEQ MOD10 Project.	Completed Variation 10 to the site’s EPL was approved by the EPA on 04 September 2025 consisting of administrative updates for noise components. NOTE – a further variation will be required once the revision of the Water Management Plan is approved by NSW Planning as outlined by Action 2025-1 .	Section 3.5 and Section 7.0
2023-2	Undertake comprehensive review and update of the following Management Plans for the KEQ MOD10 Project and 2023 KEQ IEA.	Management Plan approvals required prior to the commencement of construction for the KEQ MOD10 Project.	
	C. Biodiversity Offset Area Management Plan.	Continuing Pending Commonwealth endorsement for the configuration of the Western BOA.	Section 3.5
	D. Biodiversity Offset Strategy.	Completed Approved by NSW Planning on 12 February 2026.	Section 3.5
	I. Water Management Plan (including effectiveness of WMP and TARP for surface water management to minimise exceedances of discharge limits).	Continuing Consultation with the Water Group within the NSW DCCEEW was completed; with EMM being engaged to develop groundwater management triggers.	Section 3.5

Action ID	Action Required	Status	Section
2023-3	<u>Air Quality:</u> Submit EPL Variation (in conjunction with HQPL) to undertake minor relocation of three depositional dust gauges to minimise risk of contamination with organic as far as reasonably practicable.	<u>Completed</u> The EPL Variation was approved on 17 February 2025. DDG2 and DDG5 were relocated on 19 March 2025 and DDG4 on 04 June 2025, becoming operational from the April 2025 and June 2025 monitoring periods, respectively.	Section 6.2
2023-4	<u>Surface Water Management:</u> Progress with detailed design of surface water improvement opportunities identified by VGT (2023); and review appropriate approval pathways.	<u>Closed</u> Improvement opportunities will be included in civil works for the Karuah Pit Consolidation Project (KEQ MOD11).	Section 7.2
2023-6	<u>Fencing:</u> C. Install fauna fencing along the western boundary of Lot 13 adjoining the KEQ site.	<u>C. Completed</u> Fencing installation completed on 18 and 19 February 2026.	Section 6.6
2023-7	<u>Erosion and Sediment Control:</u> Repair sites of surface erosion along the eastern interface of the approved KEQ disturbance boundary and Lot 13.	<u>Closed</u> Improvement opportunities will be included in civil works for the Karuah Pit Consolidation Project (KEQ MOD11).	Section 6.6
2023-8	<u>Weed Control:</u> Determine appropriate lantana control programme.	<u>Completed</u> In 2025, KEQPL on-boarded a new position dedicated to on-going vegetation management.	Section 6.6
2023-9	<u>Pest Control:</u> Undertake 2-yearly vertebrate pest monitoring.	<u>Completed</u> WPC completed vertebrate pest monitoring in the 2025 Ecology Monitoring Report.	Section 6.6
KEQ Findings – 2024 Annual Review			
2024-1	KEQPL will complete a comprehensive review of the status of all fencing across the Biodiversity Offset Area.	<u>Completed</u> Status review completed.	Section 6.6
2024-2	<i>Duplicate action of Action 2024-1.</i>		
2024-3	KEQPL to complete the 5-yearly statutory review of the site's EPL and include updating the administrative references to the KEQ MOD10 Project.	<u>Completed</u> The statutory review was completed in July 2025 with Variation 10 to the site's EPL being issued on 04 September 2025.	Section 6.4

6.0 Environmental Performance

KEQPL undertakes environmental monitoring in accordance with the Project Approval and EPL. Key monitoring locations are illustrated by **Figure 5**.

Table 16 provides a summary of the environmental performance at the site for the 2025 reporting period.

Table 16 Summary of Environmental Performance During the 2025 Reporting Period.

Aspect	Approval Criteria OR EIS Prediction	Performance During the Operating Period	Trend OR Key Management Implications	Implemented OR Proposed Management Actions
Air Quality	Project Approval – Schedule 3, Condition 13	2x Depositional Dust exceedances	Algal growth exceedance (March 2025).	Application of tinted bottles to reduce the potential for algal growth.
			Anomalous dust exceedance (July 2025).	Continued monitoring and management of DDG sites.
		2x HVAS power outages.	Outages from the Essential Energy network associated with storm events and/or maintenance works.	Continued monitoring and completion of replacement manual runs.
		2x PM10 exceedances.	Attributable to bushfire smoke rather than quarry operations.	Continued monitoring.
Blasting	Project Approval – Schedule 3, Condition 8	Compliant	Within criteria.	Continued monitoring.
Noise	Project Approval – Schedule 3, Condition 3	Compliant	Within criteria.	Continued monitoring.
Heritage	Project Approval – Schedule 3, Condition 36	Not triggered	No specific criteria.	No additional management proposed.
Biodiversity	Project Approval – Schedule 3, Condition 33	Compliant	Within criteria for BOAMP	Implement actions from Biodiversity Offset Area Monitoring Report.
Waste	Project Approval – Schedule 3, Condition 42	Compliant	Stabilised waste associated within improved housekeeping processes.	Continued monitoring.
Water	Project Approval – Schedule 3, Condition 19	Non-Compliant	Discharges of sediment-laden water following major rainfall events.	Continued monitoring.



LEGEND

- KARUAH EAST QUARRY DISTURBANCE BOUNDARY (MOD 10)
- PROPOSED ADDITIONAL DISTURBANCE AREA (MOD 11)
- EXTRACTION LAYOUT
- EXISTING LOT BOUNDARY
- ▲ DEPOSITIONAL DUST GAUGE
- AIR BLAST MONITOR
- NOISE MONITOR
- METEOROLOGICAL STATION

^ MONITORING POINTS HAVE BEEN PROVIDED BY KARUAH EAST QUARRY PTY LTD.

ver.	date	comment	surveyed	drawn	checked	pm	co-ordinate information	level information	scale (A1 original size)	page
A	26.03.2024	2025 KARUAH EAST QUARRY ANNUAL REVIEW	--	T.A.	M.R.	M.R.	CO-ORDINATE SYSTEM: M.G.A. ZONE 56	DATUM: A.H.D.	0 125 250m	1 OF 1
B	27.03.2024	UPDATED AS PER CLIENT COMMENTS	--	T.A.	M.R.	M.R.	FOR PLAN CONTENT GDA2020	ORIGIN OF LEVELS: LIDAR DATA	SCALE: 1:5000 (FULL)	

**ANNUAL REVIEW 2025
 FIGURE 5 - ENVIRONMENTAL
 MONITORING LOCATIONS**

location: LOT 12 D.P. 1024564,
 LOT 13 D.P. 1024564
 BLUE ROCK CLOSE,
 KARUAH, NSW, 2324

council: MID COAST

dwg ref: 11819-KEQ-AR-B

client:
**KARUAH EAST
 QUARRY PTY LIMITED**



central coast office ph: (02) 4305 4300
 hunter office ph: (02) 4978 5100
 sydney office ph: (02) 8046 7411

www.adwjohanson.com.au

6.1 Meteorological Monitoring

For the 2025 reporting period the KEQ site operated a meteorological monitoring station in accordance with Schedule 3, Condition 17 of the Project Approval as illustrated by **Figure 6**.

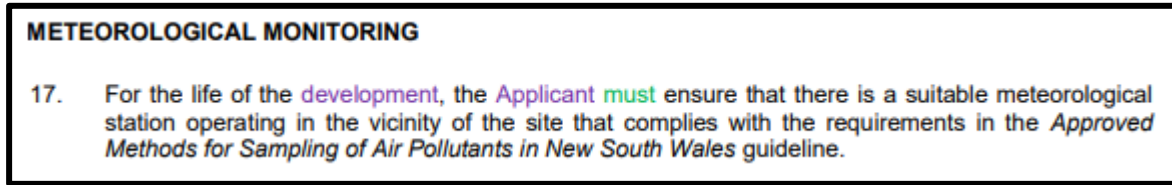


Figure 6 Meteorological Monitoring Requirements from the Project Approval.

The meteorological monitoring station was installed in August 2016 adjacent to the weighbridge of the Karuah Hard Rock Quarry (DA 265-10-2004) as illustrated by **Figure 5** and currently services both quarries at the Karuah Quarry Complex. On 03 April 2025 the station was serviced and subject to the required annual field calibration.

Table 17 presents a summary of the meteorological data collected by the meteorological station during the Reporting Period.

Table 17 Recorded 2025 Meteorological Data.

Month	Temperature (°C)				Rainfall (mm)		Wet Days (No. >1 mm)	Wind [Max Gust] (km/h)
	Low (min)	Low (ave)	High (ave)	High (max)	Total	Max Daily		
Jan-25	12.7	17.9	29.4	40.4	410.8	103.8	14	58.0
Feb-25	10.8	18.0	29.7	35.8	46.6	27.6	4	47.3
Mar-25	14.2	18.4	27.7	37.1	205.4	42.8	15	47.3
Apr-25	9.3	13.8	25.1	29.7	369.0	142.2	17	54.4
May-25	7.4	12.0	20.6	26.4	654.2	175.8	18	49.7
Jun-25	2.9	6.9	17.6	21.7	83.6	42.6	9	62.7
Jul-25	1.5	6.4	17.4	22.4	204.6	71.6	10	61.5
Aug-25	2.5	8.0	18.6	26.3	295.8	114.2	16	68.6
Sep-25	5.1	9.2	24.1	30.2	70.4	28.4	6	52.1
Oct-25	7.5	13.0	28.6	40.1	44.2	27.8	3	56.8
Nov-25	7.2	15.1	29.9	38.5	15.6	5.4	3	50.9
Dec-25	9.2	16.6	30.5	43.4	40.2	14.0	6	47.3

The total rainfall for 2025 was 2,440.4 mm compared to 1,504.0 mm in 2024 and 931.2 mm in 2023. The increased rainfall throughout 2025 is associated with a significant number of east coast low weather events from January to August, which is contrasted lower than average rainfall from September to December.

6.2 Air Quality

EIS Predictions

The revised Air Quality Impact Assessment (AQIA) (updated for the Preferred Project Report) indicates that Karuah East Quarry may operate without significant impact on the surrounding environment. In particular, the updated AQIA has confirmed that potential cumulative impacts of Karuah East Quarry and existing Karuah Hard Rock Quarry are well below acceptable criteria levels and will not impose adverse impacts. Overall, it has been demonstrated that the AQIA for Karuah East Quarry is acceptable in terms of air quality considerations for both the construction and operational phases.

Approval Criteria

Air quality criteria is provided in Schedule 3, Condition 13 of the Project Approval as outlined by **Figure 7**. All reasonable and feasible avoidance and mitigation measures are to be employed so that particulate matter emissions generated do not exceed the criteria at any residence on privately owned land.

No specific limits are specified for air quality emissions by the EPL; however, the EPA does mandate the use of Approved Methods as outlined by their guidance document – *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (EPA, 2022).

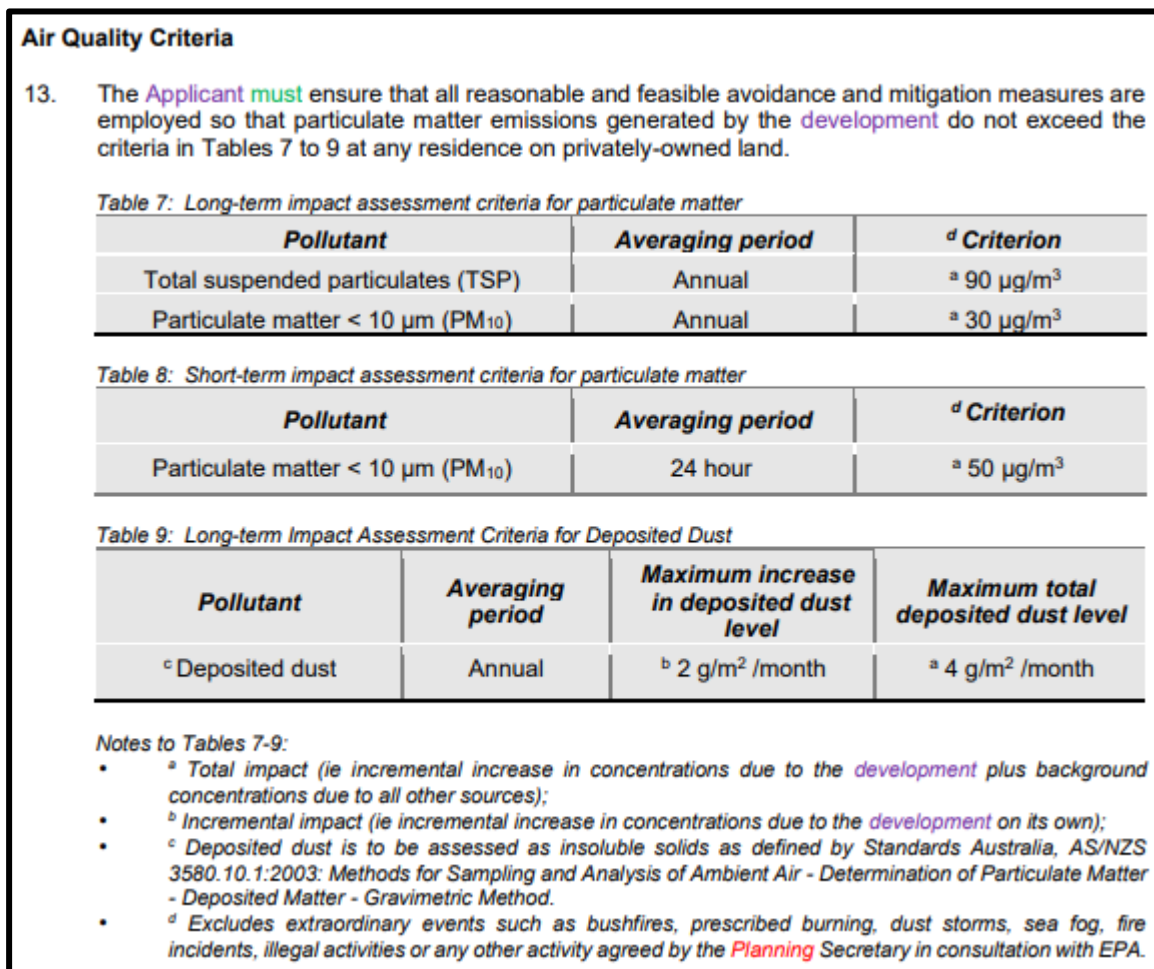


Figure 7 Air Quality Criteria Provided by the Project Approval.

The main source of air pollution at the quarry is in the form of airborne dust, which arises from activities such as quarry operations, product processing and vehicle movements. Air quality monitoring has been performed to meet the EPA’s Approved Methods (EPA, 2022) using four (4x) Depositional Dust Gauges and one (1x) High-Volume Air Sampler. The location of these monitoring locations is illustrated by **Figure 5**.

Environmental Performance Results (Deposited Dust)

Depositional dust results are outlined within **Table 18**. The monitoring results indicated that the maximum deposited dust levels measured at DDG 1 to DDG 4 were generally all less than the long-term impact assessment criteria for depositional dust (maximum deposited dust level of 4 g/m²/month) over the 2024 reporting period.

It should be noted in response previous contamination events, DDG2, DDG4 and DDG5 were subject to minor relocation within the vicinity of the respective residential receivers to minimise risk of contamination events. These relocation works correspond to revised EPL Identification Point Numbers in **Table 18**.

Additional changes to the network were made from August 2025 with the discontinuation of DDG5 following the acquisition of Lot 11.

Table 18 Summary of Depositional Dust Gauge Results During 2025.

Monitoring Details				Deposited Dust (g/m ² /month)				
Reporting Period	Start Date	End Date	Days	DDG 1 (EPL ID 2) EPL ID 6	DDG 2 (EPL ID 3) EPL ID 7	DDG 3 (EPL ID 4) EPL ID 8	DDG 4 (EPL ID 5) EPL ID 9	DDG 5 (EPL ID 8) EPL ID 10
Jan-25	30/12/2024	31/01/2025	32	(3.8)	(1.7)	(1.9)	(1.3)	(1.3)
Feb-25	31/01/2025	03/03/2025	31	(1.2)	(0.9)	(1.1)	(1.2)	(2.1)
Mar-25	03/03/2025	03/04/2025	31	(0.7)	(1.0)	(1.4)		(28.2) [1]
	04/03/2025	03/04/2025	30				(1.1)	
Apr-25	03/04/2025	05/05/2025	32	1.2	3.2	0.4	(1.0)	1.1
May-25	05/05/2025	03/06/2025	29	2.0	3.9	0.2	(0.3)	0.6
Jun-25	03/06/2025	01/07/2025	28	2.9	1.0	0.6	0.4	2.1
Jul-25	01/07/2025	01/08/2025	31	10.1 [2]	0.5	0.4	0.2	0.9
Aug-25	01/08/2025	01/09/2025	31	0.9	2.3	0.5	0.8	
Sep-25	01/09/2025	01/10/2025	30	1.7	1.3	1.0	0.7	
Oct-25	01/10/2025	31/10/2025	30	1.1	1.7	1.7	1.2	
Nov-25	31/10/2025	02/12/2025	32	1.0	2.5	2.1	1.1	
Dec-25	02/12/2025	02/01/2026	31	1.8	1.6	1.3	1.5	
2025 Annual Average:				2.4	1.8	1.1	0.9	1.4
2025 Minimum:				0.7	0.5	0.2	0.2	0.6
2025 Maximum:				10.1	3.9	2.1	1.5	28.2

Notes:

1. An exceedance was recorded at DDG5 during the March 2025 Monitoring Period, due to an elevated quantity of combustible matter being recorded (27.5 g). This is attributed to the development of a significant algal bloom on the collected rainwater surface within the dust gauge glassware. This event was reported to the NSW Planning, the EPA and surrounding landholders in accordance with the relevant conditions of the Project Approval and EPL.

2. An anomalous exceedance was recorded at DDG1 during the July 2025 monitoring period which was subsequently reported to NSW Planning, the EPA and surrounding landholders in accordance with the relevant conditions of the Project Approval and EPL. NSW Planning subsequently acknowledged the notification and determined to provide no commentary on the matter on 29 August 2025.

Environmental Performance Results (Particulate Matter)

Total Suspended Particulates (TSP) and Particulate Matter < 10 µm in diameter (PM10) results for the 2025 reporting period are summarised by **Table 19** and illustrated by **Figure 8** and **Figure 9** respectively. The results were compliant with the long-term criteria (TSP and PM10) and generally compliant with the short-term criteria (PM10 only), as outlined below:

- The annual average TSP was 22.3 µg/m³, which is below the long-term criteria of 90 µg/m³;
- The annual average PM10 was 12.5 µg/m³, which is below the long-term criteria of 30 µg/m³; and
- The maximum PM10 (non-bushfire impacted) result was 35 µg/m³, which is below the short-term criteria of 50 µg/m³.

Table 19 TSP & PM10 High-Volume Air Sampler Results During 2025.

HVAS Run Date	TSP (µg/m ³)	PM10 (µg/m ³)	Status	HVAS Run Date	TSP (µg/m ³)	PM10 (µg/m ³)	Status
06/01/2025	28	13	Compliant	05/07/2025	5	4	Compliant
12/01/2025	12	4	Compliant	11/07/2025	10	3	Compliant
21/01/2025	32	17	Compliant [1]	17/07/2025	9	5	Compliant
24/01/2025	35	14	Compliant	23/07/2025	5	4	Compliant
30/01/2025	25	12	Compliant	29/07/2025	15	7	Compliant
05/02/2025	50	27	Compliant	04/08/2025	9	6	Compliant
11/02/2025	17	9	Compliant	10/08/2025	3	2	Compliant
17/02/2025	30	11	Compliant	16/08/2025	4	3	Compliant
23/02/2025	16	9	Compliant	22/08/2025	4	2	Compliant
01/03/2025	32	18	Compliant	28/08/2025	16	7	Compliant
07/03/2025	20	10	Compliant	03/09/2025	22	10	Compliant
13/03/2025	20	10	Compliant	09/09/2025	31	15	Compliant
19/03/2025	43	15	Compliant	15/09/2025	27	12	Compliant
25/03/2025	19	8	Compliant	21/09/2025	16	6	Compliant
31/03/2025	13	4	Compliant	27/09/2025	28	22	Compliant
06/04/2025	17	9	Compliant	03/10/2025	23	10	Compliant
12/04/2025	12	4	Compliant	09/10/2025	25	14	Compliant
18/04/2025	19	10	Compliant	15/10/2025	30	15	Compliant
24/04/2025	13	2	Compliant	21/10/2025	29	19	Compliant
30/04/2025	8	4	Compliant	27/10/2025	27	13	Compliant
06/05/2025	10	6	Compliant	02/11/2025	14	10	Compliant
12/05/2025	5	3	Compliant	08/11/2025	34	15	Compliant [3]
18/05/2025	7	6	Compliant	12/11/2025	47	34	Compliant [3]
24/05/2025	7	4	Compliant	14/11/2025	117	106	Exceedance [4]
30/05/2025	12	7	Compliant	20/11/2025	48	35	Compliant
05/06/2025	16	10	Compliant	26/11/2025	24	11	Compliant

HVAS Run Date	TSP (µg/m ³)	PM10 (µg/m ³)	Status	HVAS Run Date	TSP (µg/m ³)	PM10 (µg/m ³)	Status
11/06/2025	12	4	Compliant	02/12/2025	20	10	Compliant
17/06/2025	8	5	Compliant	08/12/2025	83	64	Exceedance [5]
24/06/2025	16	6	Compliant [2]	14/12/2025	21	12	Compliant
29/06/2025	3	2	Compliant	20/12/2025	22	13	Compliant
				26/12/2025	35	9	Compliant
2025 Annual Average:					22.3	12.5	Compliant
2025 Minimum:					3	2	
2025 Maximum:					117	106	

Notes:

1. From 16 to 19 January intermittent power outages with the Essential Energy network were experienced associated with a major east-coast low weather event preventing normal operation of the HVAS unit during the scheduled run day on 18 January 2025. As such, a replacement run was completed upon return of mains power on 21 January 2025 with notifications issued to NSW Planning, the EPA and surrounding landholders in accordance with the relevant conditions of the Project Approval and EPL.
2. A planned maintenance outage was planned by Essential Energy for a scheduled run day on 23 June 2025. Accordingly, consultation was undertaken with NSW Planning and the EPA on 13 June 2025 to confirm that the application of a replacement run on 24 June 2025 would be satisfactory; with both agencies confirming acceptance of the approach on 13 June 2025 and 26 June 2025, respectively.
3. On 08 November 2025 a maintenance outage was performed by Essential Energy for urgent work resulting in a partial HVAS run. A replacement run was then completed on 12 November 2025 with all data reported to NSW Planning, the EPA and surrounding landholders in accordance with the relevant conditions of the Project Approval and EPL.
4. An exceedance of short-term (daily) particulate monitoring criteria occurred on 14 November 2025 as a result of three bushfires in the vicinity of the Karuah Quarry Complex, including the Tenterfield Road, North Arm Cove; the Pacific Highway, Karuah; and the Warraba Road, The Branch bushfires.
5. An exceedance of short-term (daily) particulate monitoring criteria occurred on 08 December 2025 as a result of northerly winds pushing bushfire smoke across the Lower Hunter Region from the Pacific Highway, Bulahdelah bushfire that continued burning between Crawford River and Nerong.

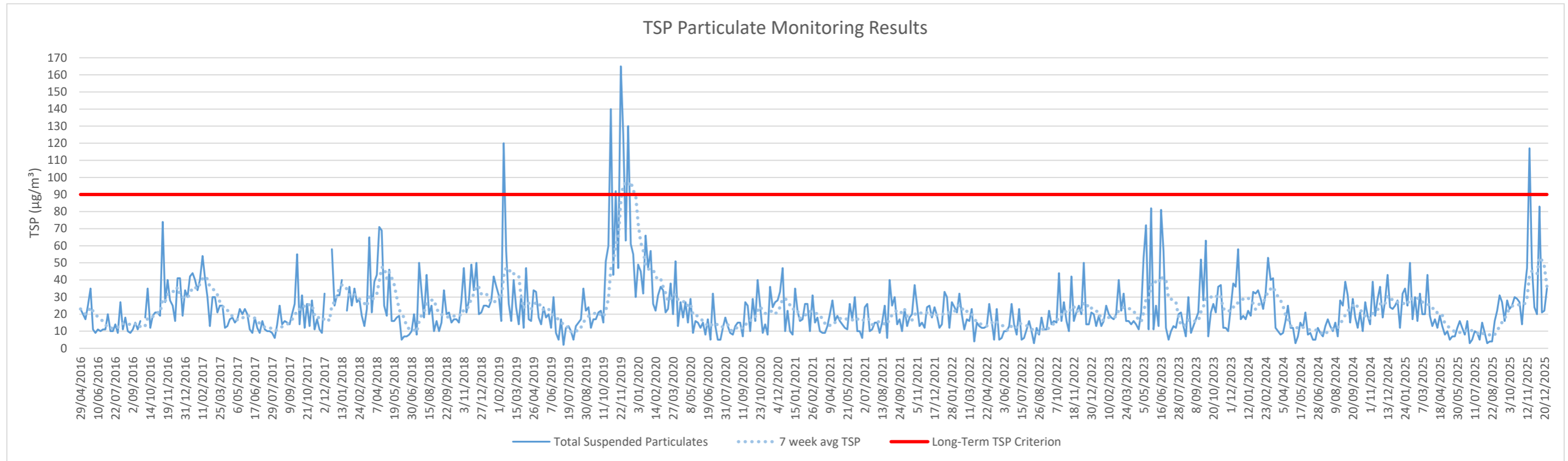


Figure 8 Long-term TSP monitoring trends.

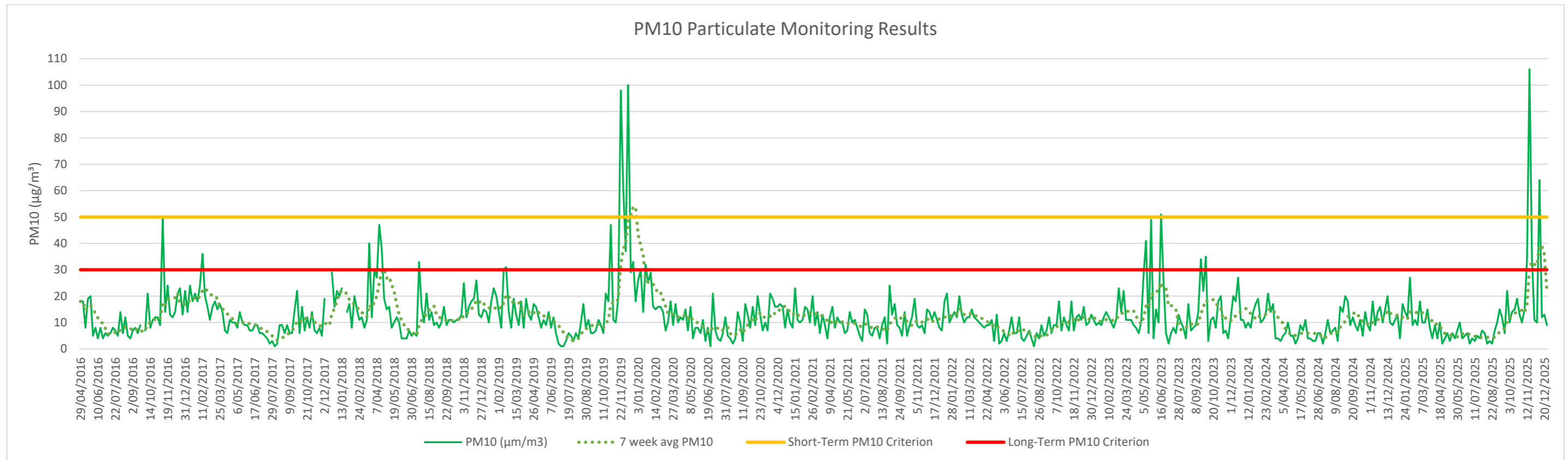


Figure 9 Long-term PM10 monitoring trends.

Management Measures

The following best practice air quality control measures continued to be implemented in 2025 including:

- Disturb only the minimum area necessary for onsite activities.
- Perform regular inspections of weather conditions to identify conditions which would be unfavourable in terms of dust levels at nearest sensitive locations blowing in the direction of sensitive receptors and implement remedial measures where required.
- All trafficable areas and vehicle manoeuvring areas in or on the premises will be maintained in a condition that will minimise the emission of dust to the air, or emission from the premises of wind-blown or traffic generated dust.
- Trucks entering and leaving the premises that are carrying loads of dust generating materials will have their loads covered at all times, except during loading and unloading.
- All plant and equipment to be installed at the site to be maintained and operated in a proper and efficient condition, in accordance with manufacturer’s instructions and the POEO Act.

Improvements

KEQPL will continue to monitor air quality in accordance with the conditions of the Project Approval and EPL. It is expected that the air quality monitoring program will be contemporised following determination of the Karuah Pit Consolidation Project (KEQ MOD11).

6.3 Blasting

EIS Predictions

The Noise Impact Assessment (NIA) (SLR, 2012) prepared as part of the EIS, developed blasting site laws for Karuah East Quarry based on blast monitoring results from the existing Karuah Quarry. The site laws were utilised to determine limiting factors to blast design for the site in order to achieve the criteria described in **Section 6.3.2**. Based on the predicted blast results the blast emission criteria are predicted to be met without imposing any significant constraints on blast design throughout the life of the quarry. Subsequent modifications have not resulted to changes in blasting practices.

Approval Criteria

Blasting criteria for the site are provided in Schedule 3, Condition 8 of the Project Approval as outlined by **Figure 10**. Additionally, Conditions L5.1 to 5.7 of the EPL 20611 detail consistent blast limits for the project.

Blasting Criteria

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

Table 4: Blasting criteria

Location	Airblast overpressure (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedance
Residence on privately-owned land	120	10	0%
	115	5	5% of the total number of blasts over a period of 12 months

However, the blasting criteria in Table 5 do not apply if the Applicant has a written agreement with the relevant landowner or infrastructure provider/owner, and the Applicant has advised the Department in writing of the terms of this agreement.

Figure 10 Blasting Criteria provided by the Project Approval.

Environmental Performance Results

In 2025, seventeen (17x) blast events were completed at the site as summarised by **Table 20**. All blast output results were within the limits provided by the Project Approval and EPL.

Table 20 Blast Monitoring Results for the 2025 Reporting Period.

Date	Time	Location	Airblast Overpressure* (dB [Lin Peak])	Ground Vibration* PPV (mm/s)
16/01/2025	15:22	RL 128	n/t	n/t
03/02/2025	11:04	RL 105	108.7	0.61
17/02/2025	13:41	RL 105	112.9	0.71
03/03/2025	13:36	RL 120	n/t	n/t
28/03/2025	12:33	RL 120	111.0	0.84
11/04/2025	14:40	RL 120 + 90	113.4	0.62
05/05/2025	13:39	RL 120 + 90	n/t	n/t
06/06/2025	11:31	RL 120	106.1	1.33
30/06/2025	13:36	RL120 + 128	n/t	n/t
15/07/2025	12:32	RL120	114.1	0.96
30/07/2025	13:15	RL120	110.7	0.56
15/08/2025	13:15	RL105	109.1	0.90
12/09/2025	14:12	RL105 + 120	105	1.03
03/10/2025	12:32	RL105	n/t	n/t
21/10/2025	12:33	RL105	n/t	n/t
12/11/2025	11:34	RL105	105	0.43
28/11/2025	13:59	RL105 + 128	107.9	0.44

*n/t = Not triggered:

Ground Vibration < 0.5 mm/s

Overpressure < 108 dB(L)

Management Measures

Section 3 of the approved *Blast Management Plan* outlines the blasting controls that are implemented at the site. No exceedances were identified and therefore no further controls are considered necessary.

During the 2025 reporting period, the site's Blast Notification Register was subject to minor revisions associated with property transactions and addition of CCC members, where requested.

Improvements

KEQPL will continue to monitor blasting activities in accordance with the conditions of the Project Approval and EPL and will review operational practices if any exceedances or incidents occur, or community complaints are received.

6.4 Noise

EIS Predictions

For the KEQ MOD10 Project, a Noise Impact Assessment was conducted by EMM (EMM, 2022) in accordance with the methodology outlined in the NPfl for existing sites and the NSW Noise Policy for industry (2017). Quarry noise emissions are predicted to be below (i.e. comply with) the relevant PNTL during all periods of operations at most assessment locations. The one exception is Location H during the day and evening period, although it is noted however that operational noise emissions are predicted to be below the current consented daytime and evening noise limits at this location (44 dB and 46 dB respectively) and MOD10 did not propose to change these limits. These predicted noise levels are summarised by **Table 21**.

Table 21 MOD10 EIS Predicted Noise Levels.

Location	Period	Predicted Noise Level MOD 10 operations (LAeq,15min) (dB)	PNTL (LAeq,15min) (dB)	Existing Noise Limit (LAeq,15min) (dB)
A	Morning shoulder	<35	38	35
	Day	40	51	42
	Evening	40	43	40
B	Morning shoulder	<35	38	35
	Day	40	51	40
	Evening	40	43	40
C	Morning shoulder	<35	38	35
	Day	35	51	40
	Evening	35	43	35
D	Morning shoulder	<35	38	35
	Day	<35	51	40
	Evening	<35	43	35
E	Morning shoulder	<35	38	35
	Day	<35	51	40
	Evening	<35	43	35
F	Morning shoulder	<35	38	35
	Day	<35	48	40
	Evening	<35	43	35

Location	Period	Predicted Noise Level MOD 10 operations (LAeq,15min) (dB)	PNTL (LAeq,15min) (dB)	Existing Noise Limit (LAeq,15min) (dB)
G	Morning shoulder	<35	38	35
	Day	39	46	43
	Evening	39	43	39
H	Morning shoulder	<35	38	35
	Day	44	40	44
	Evening	46	43	46
I	Morning shoulder	<35	38	35
	Day	37	40	40
	Evening	37	40	37
J	Morning shoulder	<35	35	35
	Day	<35	40	40
	Evening	<35	35	35

Note: This predicted noise level included a moderation factor of +2 dB to account for the low frequency noise from the processing plant

Approval Criteria

Noise criteria for the site are provided in Schedule 3, Condition 3 of the Project Approval as outlined by Figure 11. Additionally, Conditions L4.1 to 4.5 of the EPL 20611 detail similar noise criteria.

NOTE – a minor administrative variation to the EPL was issued on 04 September 2025 to reflect the KEQ MOD10 Project, however, this did not result in a change to the quantitative criteria.

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 LAeq (15 min)	Morning Shoulder LAmax	Day LAeq (15 min)	Evening LAeq (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 NPfl.

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.

Figure 11 Noise Criteria provided by the Project Approval.

Environmental Performance Results

Attended noise monitoring was conducted at the nearest residential receivers surrounding the site on a quarterly basis by EMM Consulting in accordance with the Project Approval and EPL. The four monitoring reports for the 2025 reporting period are provided by **Appendix 3**.

Noise results for all residential receptors were generally within compliance limits for all morning shoulder, day and evening monitoring time periods across all four quarterly monitoring rounds.

Management Measures and Improvements

Section 3.0 of the approved *Noise Management Plan* outlines the noise mitigation and management controls that are implemented at the site.

6.5 Heritage (Aboriginal Cultural Heritage & Historic Heritage)

EIS Predictions

An Aboriginal Heritage Impact Assessment was completed as part of the EIS specialist report prepared by RPS (2012). A search of the Aboriginal Heritage Information Management System (AHIMS) database revealed no listed sites inside the project area and the pedestrian survey revealed no Aboriginal cultural heritage items. No evidence of Aboriginal cultural heritage was found during the survey and no impacts were predicted.

A Due Diligence Report was completed by RPS on 17 August 2018 as part of the KEQ MOD2 Project; and by Heritage Now on 18 October 2021 as part of the KEQ MOD10 Project. These assessments confirmed that the site contains low archaeological sensitivity; with the subsequent management recommendations being outlined in Heritage Management Plan.

Approval Criteria

There are no specific performance criteria provided by the Project Approval associated with Aboriginal Cultural Heritage or Historic Heritage.

Environmental Performance Results

No additional disturbance was undertaken within the Reporting Period and therefore no heritage impacts occurred, or management issues were identified.

Management Measures and Improvements

A comprehensive review of the *Heritage Management Plan* for the MOD10 project was undertaken during the 2023 reporting period, which included consultation with Registered Aboriginal Parties, the Karuah LALC and Heritage NSW (Aboriginal Cultural Heritage and Historical Archaeology divisions) to ensure management measures are consistent with contemporary legislation and industry best practices. This revised Heritage Management Plan was approved by NSW Planning on 12 January 2024.

At the time of writing a further Due Diligence Report has been completed to support the proposed Karuah Pit Consolidation Project (KEQ MOD11) and if approved, the KEQ Heritage Management Plan will be subject to a further comprehensive review.

6.6 Biodiversity

EIS Predictions

The Preferred Project Report (RPS, 2013) ecology assessment for the NSW Project Approval identified impacts to the following non-threatened vegetation communities:

- 20.38 Ha of *Spotted Gum-Grey Gum-Grey Ironbark White Mahogany Moist Sclerophyll Forest*;
- 7.31 Ha of *Smooth barked Apple-Red Bloodwood-Stringybark Dry Sclerophyll Forest*; and
- 0.4 Ha of *Grey Myrtle Dry Rainforest*.

RPS concluded that no fauna species would be materially impacted; however, one threatened flora species would be directly impacted by the removal of 243 individual clumps of *Tetratheca juncea* (Black-eyed Susan). Based on this impact (and possible indirect impacts to *Grevillea parviflora ssp. parviflora* [Small-flower Grevillea]), an EPBC Referral was conducted to the Commonwealth DCCEEW (formerly Department of Sustainability, Environment, Water, Population and Communities – SEWPAC).

The EPBC Assessment Report (ELA, 2014) considered the impact of the Preferred Project to the Matters of National Environmental Significance (MNES) and identified additional direct impacts to Commonwealth Listed threatened species, including:

- 60 individuals of *Asperula asthenes* (Trailing Woodruff); and
- 24.04 Ha of *Phascolarctos cinereus* (Koala) habitat.

The KEQ MOD2 Project impacted a further 0.25 Ha of the smooth-barked apple vegetation community and 13 individual clumps of *Tetratheca juncea*. The minor nature of this footprint extension was managed by altering existing offset arrangements as outlined in **Section 3.1** and **Section 3.3**.

The KEQ MOD10 Project impacted a further 7.17 Ha of native vegetation as assessed under the Bilateral Assessment process between the NSW Planning and the Commonwealth DCCEEW and utilised the NSW Biodiversity Assessment Methodology (BAM) 2020.

The assessment concluded additional impacts to the following biodiversity values which will be offset under the NSW Biodiversity Offsets Scheme (BOS):

- 6.68 Ha of *PCT 1619 - Smooth-barked Apple - Red Bloodwood - Brown Stringybark - Hairpin Banksia heathy open forest of coastal lowlands*;
- 0.30 Ha of *PCT 695 - Blackbutt - Turpentine - Tallowwood shrubby open forest of the coastal foothills of the central NSW North Coast Bioregion*;
- 6.98 Ha of *Tetratheca juncea* habitat;
- 6.68 Ha of *Grevillea parviflora ssp. parviflora* habitat;
- 6.98 Ha of Squirrel Glider habitat; and
- 2.90 Ha of Southern Myotis habitat.

Approved Criteria

There are no specific criteria associated with biodiversity management for the site; however, quarry activities are completed in accordance with the NSW Project Approval, Commonwealth EPBC Approval, and the site's Environment Management Plans, including the Biodiversity Offset Area Management Plan (BOAMP) and Landscape and Rehabilitation Management Plan (L&RMP).

Environmental Performance Results

The Biodiversity Offset Area (BOA) for the site is a 138.22 Ha parcel of land parcel comprised of three lots:

- Lot 13 DP 1024564 (part);
- Lot 14 DP 1024564; and
- Lot 5 DP 838128.

Ecological monitoring was completed by Wedgetail Project Consulting (WPC) in September 2025, with the Biodiversity Offset Area Monitoring Report attached in **Appendix 5**. Key findings from the 2025 monitoring programme include:

- *Asperula asthenes*, *Tetratheca juncea* and *Grevillea parviflora* subsp. *parviflora* populations are in good condition, though several populations have seen decreases in size since the previous monitoring event. This is possibly due to many factors including natural environmental variation, edge effect from quarry operations (MP 15, MP6) or *Lantana camara* infestations (MP3). Others have experienced a small increase but have overall remained relatively stable since the previous monitoring event.
- Key disturbances recorded within the KEQ BOA and Lot 12 include minor sedimentation due to overtopping of a small number of sediment fences, the occurrence of dust on foliage within close proximity to quarry operations, and the runoff of excavated rock into the BOA from the eastern boundary and western boundary along the haul road of the quarry operations.
- Weed coverage across the KEQ BOA and Lot 12 is largely unchanged since the previous monitoring event with the majority of the site remaining moderately infested – management is required to reduce *Lantana* cover, especially within the northern portion of the site (Lot 5 and spreading down into Lot 13), adjacent to the powerline easement (particularly MP 2, MP3 and MP 4). *Lantana* infestations were also seen in the northern section of Lot 12.
- Maintenance required to repair and install fencing and sediment fencing.
- Minor erosion and sedimentation of a dam in Lot 12 due to runoff from the eastern boundary of the quarry.
- Evidence of feral cats, wild dogs, rabbits and foxes were observed during the 2025 monitoring event. Further trapping is recommended on a scheduled basis to manage the population within the BOA. Future monitoring will determine if control efforts are successful.
- A female Koala and a juvenile were opportunistically captured at two locations on the pest monitoring cameras (RC 218 and RC 221).
- A total of 375 nest boxes have been installed to date across the KEQ BOA. Monitoring of nest boxes have been carried out in 2018, 2020 2022 and 2024. No further nest boxes need to be installed until further clearing of hollow bearing trees occurs. Monitoring will be required in 2026.
- Aerial fauna crossings installed at Karuah Hardrock Quarry in 2019, and KEQ in 2020. Remote Camera monitoring programmes for both crossings are presumed completed though analysis of cameras are recommended to ascertain accurate trends in usage.

Management Measures

The 2025 Biodiversity Offset Area Monitoring Report (**Appendix 5**) provides an update on the completion of various performance criteria and management measures.

In 2026, the 10-year anniversary of the BOA will be reached and accordingly it is proposed to complete an implementation review of these measures.

The outcome of this review will then be incorporated into the development of the revised Eastern BOAMP for the Eastern BOA and the new Western BOAMP for the Western BOA.

Improvements

The revised Landscape & Rehabilitation Management Plan (L&RMP) was approved on 11 February 2025; and the Biodiversity Offset Area Management Plan (BOAMP) will be finalised following receipt of Commonwealth endorsement for the Western BOA following the receipt EPBC Approval for the KEQ MOD10 Project consisting of Variation 2 to EPBC 2014/7282 and EPBC 2022/9164.

Throughout 2025, KEQPL commenced the installation of permanent survey marks delineated with continuous flagging rope to mark-out internal boundaries of the Eastern BOA.

6.7 Waste Management

Approval Criteria

Waste management requirements for the site are provided in Schedule 3, Condition 42 of the Project Approval as outlined by **Figure 12**.

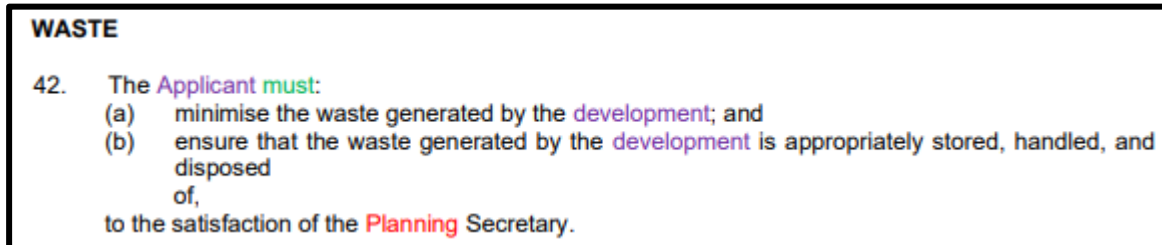


Figure 12 Waste Management Requirements provided by the Project Approval.

Environmental Performance Results

A licenced waste contractor removes waste from a 3 m³ waste bin at the site. There were 46 collections during the reporting period, with capacity of the bin ranging from 10% to 100%, or a total of approximately 101 m³ of waste being removed from site. This represents a stabilisation in the increase in waste generation compared to 93 m³ in 2024, 106 m³ in 2023 and 57 m³ in 2022 which was attributed to greater housekeeping processes being implemented in the previous reporting period.

Improvements

KEQPL will continue to monitor and review waste management processes as required.

7.0 Water Management

7.1 Water Management Overview

Surface water at Karuah East Quarry is managed in accordance with the Water Management Plan (WMP). The primary objective of water management is to remain compliant with the Project Approval and EPL; and ensure any discharges of water from the site is of a suitable quality, as far as reasonably practicable. This objective is intrinsic to erosion and sedimentation designs and controls for the quarry.

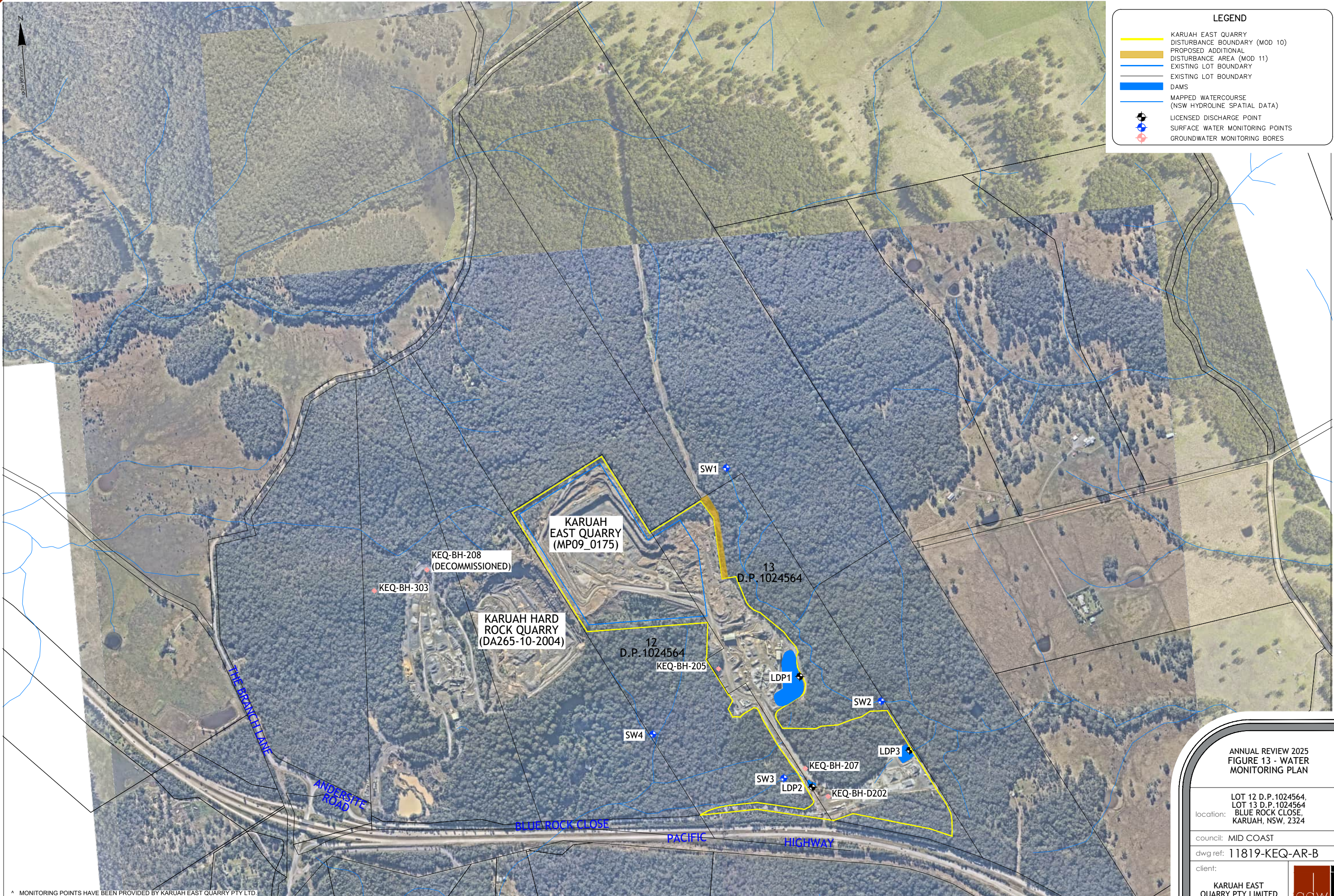
As such, the following specific objectives of this WMP have been established as part of the construction and operational phases:

- Conducting best practice land clearing procedures for all proposed disturbance areas;
- Implementation of erosion and sediment controls during construction and operation as per the Blue Book and WMP;
- Separating undisturbed runoff from disturbed runoff where possible to minimise and isolate the amount of disturbed or dirty water runoff;
- Directing sediment-laden runoff into designated sediment control dams;
- Diverting clean runoff from areas upstream of the operation into natural depressions and creeks;
- Allowing sediments to settle in sediment control dams so that the water can be re-used for onsite dust suppression, thereby maintaining dam capacities for subsequent rainfall events;
- Maintaining sediment control structures to ensure that the designed capacities are maintained for optimum settling of sediments; and
- Implementing an effective revegetation and maintenance program for the site.

The Karuah East Quarry has three sediment dams, including:

- Dam 1 - Catchment (crushing plant and product stockpiles);
- Dam 2 - Catchment (product stockpiles and office infrastructure area); and
- Dam 3 - Catchment (product stockpiles area).

The current water management system and location of dams are shown in **Figure 13**.



LEGEND

- KARUAH EAST QUARRY DISTURBANCE BOUNDARY (MOD 10)
- PROPOSED ADDITIONAL DISTURBANCE AREA (MOD 11)
- EXISTING LOT BOUNDARY
- EXISTING LOT BOUNDARY
- DAMS
- MAPPED WATERCOURSE (NSW HYDROLINE SPATIAL DATA)
- + LICENSED DISCHARGE POINT
- + SURFACE WATER MONITORING POINTS
- + GROUNDWATER MONITORING BORES

^ MONITORING POINTS HAVE BEEN PROVIDED BY KARUAH EAST QUARRY PTY LTD.

ver.	date	comment	surveyed	drawn	checked	pm	co-ordinate information	level information	scale (A1 original size)	page
A	26.03.2024	2025 KARUAH EAST QUARRY ANNUAL REVIEW	--	T.A.	M.R.	M.R.	CO-ORDINATE SYSTEM: M.G.A. ZONE 56 FOR PLAN CONTENT GDA2020 ORIGIN OF CO-ORDINATES: P.M.	DATUM: A.H.D. CONTOUR INTERVAL: N/A ORIGIN OF LEVELS: LIDAR DATA		1 OF 1
B	27.03.2024	UPDATED AS PER CLIENT COMMENTS	--	T.A.	M.R.	M.R.				

**ANNUAL REVIEW 2025
FIGURE 13 - WATER
MONITORING PLAN**

location: LOT 12 D.P. 1024564,
LOT 13 D.P. 1024564
BLUE ROCK CLOSE,
KARUAH, NSW, 2324

council: MID COAST

dwg ref: 11819-KEQ-AR-B

client:
**KARUAH EAST
QUARRY PTY LIMITED**

central coast office ph: (02) 4305 4300
hunter office ph: (02) 4978 5100
sydney office ph: (02) 8046 7411

www.adwjohanson.com.au

Plotted By: Tim Alan; Plot Date: 27/03/24 12:39:09PM; Cod File: N:\11819\DWG\2025 ANNUAL REVIEW\11819-KEQ-AR-B.DWG
 This plan includes coloured information. If you have a black and white copy you do not have all of the information. This note is coloured red.

7.2 Surface Water

EIS Predictions

Surface water was assessed EIS and then updated for the Preferred Project Report (2013).

The only direct disturbance to occur to the local drainage system will be in the upper reaches of the northern most drainage line in Lot 12. The length of the channel which will be disturbed as a result of excavation in the upper reaches of the catchment with no clearly defined bed or banks. Therefore, the impact on the wider catchment as a result of disturbance to the upper reaches of this drainage line is not anticipated to be significant.

With regards to offsite discharges, a water balance model has been developed to predict the frequency and volume of discharges from the project. The water balance predicts that uncontrolled discharges will be minimal, averaging only one discharge day per year in Stage 2 (which represents approximately half of the total disturbance area) and two days in Stage 5 (at full disturbance).

Approval Criteria

Discharge criteria is provided in Condition L2.4 of the EPL and summarised in **Table 22**. These pollutants will be tested during discharge events from LDP 1, LDP 2 and LDP 3.

Table 22 EPL Discharge Monitoring Criteria for LDP 1, LDP 2, and LDP 3.

Parameter	Units of Measure	EPL Discharge Limits (100 Percentile Concentration Limit)
Oil and Grease	mg/L	5 and/or non-visible
pH	pH	6.5 – 8.5
Total Suspended Solids	mg/L	40
Turbidity	NTU	–

As detailed in Section 8.1.3 of the WMP, surface water monitoring is undertaken at the following locations:

- Dam 1 (LDP 1), Dam 2 (LDP 2), and Dam 3 (LDP 3);
- SW 1 – Existing first order drainage line upstream of the site;
- SW 2 – Existing second order drainage line downstream of the site;
- SW 3 – Existing first order drainage line downstream of Dam 2; and
- SW 4 – Existing first drainage line downstream of the quarry extraction area.

As per Section 8.1.3 of the WMP, SW 1 to 4 will be tested on a six-monthly basis (when flowing) during operations to determine ongoing compliance with the water quality performance criteria. SW2 and SW3 will be tested within 24 hours any discharge.

Environmental Performance Results (Discharge)

Discharge monitoring results for offsite water releases through the sites licenced discharge points are summarised by **Table 23**. In summary:

- 30x days of offsite discharges from Dam 1 (all of which were non-compliant);
- 54x days of offsite discharges from Dam 2 (19x of which were non-compliant); and
- 84x days of offsite discharges from Dam 3 (22x of which were non-compliant).

Table 23 Discharge Monitoring Results for LDP 1, LDP 2, and LDP 3.

Date	pH	Total Suspended Solids, TSS (mg/L)	Turbidity (NTU)	Oil and Grease	Discharge Type	Status
KEQ Dam 1 – LDP 1						
09/01/2025	7.4	810	>1,000	NV	Uncontrolled	Non-Compliant
10/01/2025	7.3	300	>1,000	NV	Uncontrolled	Non-Compliant
11/01/2025	7.3	580	>1,000	NV	Uncontrolled	Non-Compliant
12/01/2025	7.4	280	>1,000	NV	Uncontrolled	Non-Compliant
17/01/2025	7.5	1,200	>1,000	NV	Uncontrolled	Non-Compliant
18/01/2025	7.2	450	>1,000	NV	Uncontrolled	Non-Compliant
19/01/2025	7.3	560	>1,000	NV	Uncontrolled	Non-Compliant
20/01/2025	7.6	540	>1,000	NV	Uncontrolled	Non-Compliant
27/04/2025	7.3	2400	>1,000	NV	Uncontrolled	Non-Compliant
28/04/2025	7.6	1000	>1,000	NV	Uncontrolled	Non-Compliant
29/04/2025	7.4	640	>1,000	NV	Uncontrolled	Non-Compliant
30/04/2025	7.3	1,300	>1,000	NV	Uncontrolled	Non-Compliant
01/05/2025	7.4	1,300	>1,000	NV	Uncontrolled	Non-Compliant
02/05/2025	7.3	290	>1,000	NV	Uncontrolled	Non-Compliant
03/05/2025	7.4	520	>1,000	NV	Uncontrolled	Non-Compliant
04/05/2025	7.4	690	>1,000	NV	Uncontrolled	Non-Compliant
19/05/2025	7.4	700	>1,000	NV	Uncontrolled	Non-Compliant
20/05/2025	7.3	890	>1000	NV	Uncontrolled	Non-Compliant
21/05/2025	7.2	450	>1,000	NV	Uncontrolled	Non-Compliant
22/05/2025	7.3	510	940	NV	Uncontrolled	Non-Compliant
23/05/2025	7.3	600	>1,000	NV	Uncontrolled	Non-Compliant
24/05/2025	7.3	920	>1,000	NV	Uncontrolled	Non-Compliant
25/05/2025	7.3	820	>1,000	NV	Uncontrolled	Non-Compliant
01/07/2025	7.2	1,200	>1,000	NV	Uncontrolled	Non-Compliant
02/07/2025	7.5	1,200	>1,000	NV	Uncontrolled	Non-Compliant
03/07/2025	7.5	1,300	>1,000	NV	Uncontrolled	Non-Compliant
03/08/2025	7.4	1,100	>1,000	NV	Uncontrolled	Non-Compliant
04/08/2025	7.3	290	820	NV	Uncontrolled	Non-Compliant
05/08/2025	7.6	440	>1,000	NV	Uncontrolled	Non-Compliant
KEQ Dam 2 – LDP 2						
09/01/2025	6.9	140	240	NV	Uncontrolled	Non-Compliant
10/01/2025	6.9	54	190	NV	Uncontrolled	Non-Compliant
11/01/2025	6.8	21	45	NV	Controlled	Compliant
17/01/2025	6.9	20	40	NV	Uncontrolled	Compliant
18/01/2025	6.7	26	70	NV	Uncontrolled	Compliant
19/01/2025	6.7	66	200	NV	Uncontrolled	Non-Compliant
10/02/2025	7.1	<5	3	NV	Controlled	Compliant
24/02/2025	7.1	<5	2	NV	Controlled	Compliant
06/03/2025	7.2	12	19	NV	Controlled	Compliant
10/03/2025	7.4	24	45	NV	Controlled	Compliant
14/03/2025	7.6	19	27	NV	Controlled	Compliant
24/03/2025	7.7	6	11	NV	Controlled	Compliant
29/03/2025	7.1	35	45	NV	Controlled	Compliant
01/04/2025	6.9	29	45	NV	Controlled	Compliant
15/04/2025	7.5	8	11	NV	Controlled	Compliant
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Date	pH	Total Suspended Solids, TSS (mg/L)	Turbidity (NTU)	Oil and Grease	Discharge Type	Status
17/04/2025	7.0	29	55	NV	Controlled	Compliant
22/04/2025	7.1	31	45	NV	Controlled	Compliant
24/04/2025	7.0	34	60	NV	Controlled	Compliant
27/04/2025	6.8	380	840	NV	Uncontrolled	Non-Compliant
28/04/2025	7.1	160	380	NV	Uncontrolled	Non-Compliant
29/04/2025	7.1	74	250	NV	Uncontrolled	Non-Compliant
01/05/2025	6.8	130	330	NV	Uncontrolled	Non-Compliant
02/05/2025	6.7	380	530	NV	Uncontrolled	Non-Compliant
04/05/2025	6.7	46	70	NV	Controlled	Non-Compliant
05/05/2025	7.1	28	60	NV	Controlled	Compliant
13/05/2025	7.1	34	65	NV	Controlled	Compliant
16/05/2025	7.0	37	70	NV	Controlled	Compliant
19/05/2025	6.7	730	>1,000	NV	Uncontrolled	Non-Compliant
20/05/2025	7.0	110	210	NV	Uncontrolled	Non-Compliant
21/05/2025	6.9	99	190	NV	Uncontrolled	Non-Compliant
22/05/2025	7.0	160	300	NV	Uncontrolled	Non-Compliant
23/05/2025	6.9	140	280	NV	Uncontrolled	Non-Compliant
24/05/2025	6.8	160	280	NV	Uncontrolled	Non-Compliant
30/05/2025	6.8	27	60	NV	Controlled	Compliant
13/06/2025	6.6	39	60	NV	Controlled	Compliant
01/07/2025	6.8	86	290	NV	Uncontrolled	Non-Compliant
02/07/2025	7.0	150	370	NV	Uncontrolled	Non-Compliant
03/07/2025	7.0	180	290	NV	Uncontrolled	Non-Compliant
05/07/2025	7.1	27	50	NV	Controlled	Compliant
19/07/2025	7.5	5	13	NV	Controlled	Compliant
29/07/2025	7.8	<5	3	NV	Controlled	Compliant
03/08/2025	7.0	140	290	NV	Uncontrolled	Non-Compliant
07/08/2025	7.0	24	45	NV	Controlled	Compliant
14/08/2025	7.0	26	50	NV	Controlled	Compliant
15/08/2025	6.8	32	50	NV	Controlled	Compliant
20/08/2025	6.9	15	25	NV	Controlled	Compliant
21/08/2025	6.6	20	39	NV	Controlled	Compliant
22/08/2025	6.8	14	30	NV	Controlled	Compliant
23/08/2025	7.5	32	45	NV	Controlled	Compliant
11/09/2025	7.0	31	27	NV	Controlled	Compliant
12/09/2025	7.5	12	15	NV	Controlled	Compliant
24/09/2025	7.3	25	25	NV	Controlled	Compliant
25/09/2025	7.2	<5	8	NV	Controlled	Compliant
29/10/2025	7.0	10	19	NV	Controlled	Compliant
KEQ Dam 3 – LDP 3						
08/01/2025	7.3	28	35	NV	Controlled	Compliant
09/01/2025	7.3	60	90	NV	Uncontrolled	Non-Compliant
10/01/2025	7.2	18	50	NV	Controlled	Compliant
11/01/2025	7.3	28	40	NV	Controlled	Compliant
12/01/2025	7.6	19	32	NV	Controlled	Compliant
14/01/2025	7.4	28	37	NV	Controlled	Compliant
15/01/2025	7.2	34	65	NV	Controlled	Compliant

Date	pH	Total Suspended Solids, TSS (mg/L)	Turbidity (NTU)	Oil and Grease	Discharge Type	Status
17/01/2025	7.4	66	100	NV	Uncontrolled	Non-Compliant
18/01/2025	7.1	100	230	NV	Uncontrolled	Non-Compliant
19/01/2025	7.0	100	220	NV	Uncontrolled	Non-Compliant
10/02/2025	7.2	9	16	NV	Controlled	Compliant
11/02/2025	7.1	15	24	NV	Controlled	Compliant
12/02/2025	7.1	12	18	NV	Controlled	Compliant
24/02/2025	7.3	7	12	NV	Controlled	Compliant
25/02/2025	7.2	6	10	NV	Controlled	Compliant
05/03/2025	7.3	14	20	NV	Controlled	Compliant
10/03/2025	7.3	14	24	NV	Controlled	Compliant
11/03/2025	7.3	20	28	NV	Controlled	Compliant
24/03/2025	7.4	10	20	NV	Controlled	Compliant
25/03/2025	7.2	11	18	NV	Controlled	Compliant
29/03/2025	7.8	17	31	NV	Controlled	Compliant
01/04/2025	7.1	30	50	NV	Controlled	Compliant
02/04/2025	6.7	38	55	NV	Controlled	Compliant
03/04/2025	7.1	24	39	NV	Controlled	Compliant
17/04/2025	7.2	26	65	NV	Controlled	Compliant
18/04/2025	7.1	18	33	NV	Controlled	Compliant
19/04/2025	7.1	22	45	NV	Controlled	Compliant
22/04/2025	7.2	32	50	NV	Controlled	Compliant
23/04/2025	7.1	33	50	NV	Controlled	Compliant
24/04/2025	7.1	27	50	NV	Controlled	Compliant
27/04/2025	7.0	43	95	NV	Uncontrolled	Non-Compliant
28/04/2025	7.0	140	240	NV	Uncontrolled	Non-Compliant
29/04/2025	6.9	160	290	NV	Uncontrolled	Non-Compliant
01/05/2025	6.9	190	340	NV	Uncontrolled	Non-Compliant
02/05/2025	6.8	200	330	NV	Uncontrolled	Non-Compliant
04/05/2025	6.6	48	70	NV	Controlled	Non-Compliant
05/05/2025	7.2	28	50	NV	Controlled	Compliant
06/05/2025	7.4	24	60	NV	Controlled	Compliant
15/05/2025	6.8	27	60	NV	Controlled	Compliant
16/05/2025	6.8	33	60	NV	Controlled	Compliant
17/05/2025	7.0	29	55	NV	Controlled	Compliant
19/05/2025	6.9	96	110	NV	Uncontrolled	Non-Compliant
20/05/2025	7.0	120	260	NV	Uncontrolled	Non-Compliant
21/05/2025	6.9	100	180	NV	Uncontrolled	Non-Compliant
22/05/2025	7.0	64	150	NV	Uncontrolled	Non-Compliant
23/05/2025	6.9	100	170	NV	Uncontrolled	Non-Compliant
24/05/2025	6.7	150	260	NV	Uncontrolled	Non-Compliant
30/05/2025	6.8	24	60	NV	Controlled	Compliant
31/05/2025	6.8	29	50	NV	Controlled	Compliant
01/06/2025	6.8	37	65	NV	Controlled	Compliant
12/06/2025	6.9	33	65	NV	Controlled	Compliant
13/06/2025	6.8	29	40	NV	Controlled	Compliant
01/07/2025	7.0	120	200	NV	Uncontrolled	Non-Compliant
02/07/2025	6.9	47	120	NV	Uncontrolled	Non-Compliant

Date	pH	Total Suspended Solids, TSS (mg/L)	Turbidity (NTU)	Oil and Grease	Discharge Type	Status
03/07/2025	6.9	76	120	NV	Uncontrolled	Non-Compliant
05/07/2025	6.9	35	60	NV	Controlled	Compliant
06/07/2025	6.7	30	60	NV	Controlled	Compliant
07/07/2025	6.8	34	60	NV	Controlled	Compliant
18/07/2025	7.0	15	26	NV	Controlled	Compliant
19/07/2025	7.1	14	29	NV	Controlled	Compliant
20/07/2025	7.0	6	18	NV	Controlled	Compliant
29/07/2025	7.1	6	8	NV	Controlled	Compliant
30/07/2025	7.0	7	9	NV	Controlled	Compliant
31/07/2025	7.1	12	15	NV	Controlled	Compliant
01/08/2025	7.0	30	50	NV	Controlled	Compliant
02/08/2025	6.9	43	85	NV	Controlled	Non-Compliant
03/08/2025	7.1	90	160	NV	Uncontrolled	Non-Compliant
04/08/2025	7.1	91	170	NV	Uncontrolled	Non-Compliant
07/08/2025	6.9	37	55	NV	Controlled	Compliant
08/08/2025	7.0	31	50	NV	Controlled	Compliant
12/08/2025	6.7	36	50	NV	Controlled	Compliant
15/08/2025	6.8	24	33	NV	Controlled	Compliant
16/08/2025	6.8	15	25	NV	Controlled	Compliant
17/08/2025	6.9	14	25	NV	Controlled	Compliant
19/08/2025	6.7	24	31	NV	Controlled	Compliant
20/08/2025	6.9	14	20	NV	Controlled	Compliant
21/08/2025	6.5	27	39	NV	Controlled	Compliant
22/08/2025	6.7	32	38	NV	Controlled	Compliant
23/08/2025	7.4	33	45	NV	Controlled	Compliant
24/08/2025	7.2	33	45	NV	Controlled	Compliant
10/09/2025	7.5	6	9	NV	Controlled	Compliant
11/09/2025	7.1	8	9	NV	Controlled	Compliant
23/09/2025	7.2	32	45	NV	Controlled	Compliant
24/09/2025	7.1	7	9	NV	Controlled	Compliant

Environmental Performance Results (Monitoring)

Surface water monitoring results for the site are provided by **Table 24** for the first half of 2025 and **Table 25** for the second half of 2025. The results the downstream monitoring sites are generally compliant with the ANZECC Guidelines.

Table 24 Six-Monthly Surface Water Monitoring Results for H1 2025 (28 March 2025).

Parameter	Units	EPL Discharge Limits	LDP1	LDP2	LDP3	SW1	SW2	SW3	SW4
Oil and Grease	mg/L	5 and/or non-visible	<5	<5	<5	Not flowing – unable to obtain sample.	<5	<5	Not flowing – unable to obtain sample.
pH	pH	6.5 – 8.5	7.7	8.3	7.5		6.9	6.7	
Total Suspended Solids	mg/L	40	1,200	16	8		100	290	
Parameter	Units	ANZECC Guidelines*	LDP1	LDP2	LDP3		SW2	SW3	
Conductivity	µS/cm	125 – 2200	393	1,110	618		514	397	
Total Dissolved Solids	mg/L	--	1,560	930	370		410	500	
Total Phosphorus	mg/L	0.025	0.5	<0.05	<0.05		<0.05	0.2	
Ammonia	mg/L	0.2	0.02	0.02	<0.02		0.03	<0.02	
Nitrogen (Nitrate)	mg/L	0.350	1.6	<0.005	<0.005		0.009	<0.005	
Total Hardness (as CaCO ₃)	mg/L	--	14	370	98		58	57	
Arsenic	mg/L	0.024	0.005	<0.001	<0.001		<0.001	0.002	
Cadmium	mg/L	0.0002	0.0002	<0.0001	<0.0001		<0.0001	<0.0001	
Calcium	mg/L	--	2	130	28		14	13	
Chromium	mg/L	0.001	0.04	<0.001	<0.001		0.003	0.016	
Copper	mg/L	0.0014	0.05	0.002	<0.001		0.003	0.017	
Lead	mg/L	0.0034	0.027	<0.001	<0.001		0.002	0.009	
Magnesium	mg/L	--	2.0	9.1	6.6		5.8	5.9	
Manganese	mg/L	1.9	1.4	0.032	0.03		0.14	0.54	
Nickel	mg/L	0.011	0.031	<0.001	<0.001		0.002	0.012	
Potassium	mg/L	--	1	3	1		2	2	
Sodium	mg/L	--	60	53	65	61	43		
Vanadium	mg/L	--	0.12	0.003	0.001	0.01	0.046		
Zinc	mg/L	0.0312	0.25	0.003	0.002	0.016	0.1		

*Key default trigger values presented in ANZECC 2000 for slightly disturbed upland rivers in NSW. Heavy metals based on hard water (120-179 mg CaCO₃/L).

Table 25 Six-Monthly Surface Water Monitoring Results for H2 2025 (18 August 2025).

Parameter	Units	EPL Discharge Limits	LDP1	LDP2	LDP3	SW1	SW2	SW3	SW4
Oil and Grease	mg/L	5 and/or non-visible	< 5	< 5	< 5	< 5	< 5	< 5	< 5
pH	pH	6.5 – 8.5	7.7	7.7	7.0	6.1	7.0	6.6	6.4
Total Suspended Solids	mg/L	40	580	120	13	8	180	40	64
Parameter	Units	ANZECC Guidelines*	LDP1	LDP2	LDP3	SW1	SW2	SW3	SW4
Conductivity	µS/cm	125 – 2200	7.7	7.7	7.0	6.1	7.0	6.6	6.4
Total Dissolved Solids	mg/L	--	580	120	13	8	180	40	64
Total Phosphorus	mg/L	0.025	266	249	608	184	289	236	396
Ammonia	mg/L	0.2	1,100	240	390	270	370	250	430
Nitrogen (Nitrate)	mg/L	0.350	0.5	0.1	<0.05	<0.05	0.2	0.05	0.09
Total Hardness (as CaCO ₃)	mg/L	--	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	0.02
Arsenic	mg/L	0.024	6.2	0.058	0.064	0.02	2.5	0.02	0.59
Cadmium	mg/L	0.0002	5	34	190	18	34	65	37
Calcium	mg/L	--	0.006	0.001	<0.001	<0.001	0.003	0.001	0.002
Chromium	mg/L	0.001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Copper	mg/L	0.0014	0.6	6.5	70	2	6.4	18	4
Lead	mg/L	0.0034	0.038	0.005	<0.001	0.001	0.018	0.004	0.006
Magnesium	mg/L	--	0.1	0.008	0.002	0.002	0.025	0.015	0.008
Manganese	mg/L	1.9	0.034	0.004	<0.001	0.001	0.015	0.004	0.006
Nickel	mg/L	0.011	0.9	4.0	5.0	3.0	4.0	5.0	6.7
Potassium	mg/L	--	1.70	0.13	0.05	0.05	0.64	0.11	0.17
Sodium	mg/L	--	0.038	0.004	<0.001	<0.001	0.017	0.004	0.005
Vanadium	mg/L	--	0.8	1.0	1.0	1.0	1.0	1.0	2.0
Zinc	mg/L	0.0312	45	36	30	24	36	18	51

*Key default trigger values presented in ANZECC 2000 for slightly disturbed upland rivers in NSW. Heavy metals based on hard water (120-179 mg CaCO₃/L).

Management Measures and Improvements

KEQPL implements management measures as outlined by the approved WMP; and aims to implement continual improvement processes.

The Karuah Pit Consolidation Project (KEQ MOD11) proposes to extend the approved extraction area to the east and south within current disturbed land and once extraction has developed sufficiently, it is expected additional air space within the remaining void will be created to assist with the retention of wet weather flows above the minimum requirements provided by the Blue Book (*Managing Urban Stormwater: soils and construction. Volume 2E - mines and quarries*).

7.3 Groundwater

EIS Predictions and Approval Criteria

The EIS assessment indicated that the extraction area did not intercept any groundwater aquifers and therefore any impacts to groundwater were considered unlikely. As such, there are not approval criteria provided by the Project Approval or EPL.

However, to confirm this and identify any long-term groundwater level and quality trends, the WMP provides quarterly groundwater level and 6-monthly quality monitoring.

Groundwater is monitored at the existing groundwater monitoring bores at BH205, BH207, BH208, and BH303, as locationally illustrated in **Figure 13**. BH207 was relocated in September 2016 and BH205 was relocated on 11 March 2017. Both of these piezometers were relocated within 30 m to their original locations to allow construction to progress.

Environmental Performance Results

Table 26 shows a comparison of groundwater levels since 2016. All groundwater locations were monitored on a quarterly basis during 2025 in accordance with the prescribed frequency provided by the approved WMP.

As evident, water levels have remained relatively consistent at BH208 and BH303 since monitoring commenced; however, BH205 and BH207 show a consistent increase followed by a stabilisation in water level in recent years.

During major rainfall events during April and May 2025, BH208 was impacted by minor ground movements rendering the well unrecoverable. It is proposed to replace this monitoring bore with the existing bores located on Lot 11 for the proposed Karuah South Quarry. An update to the WMP will be progressed during 2026 to formalise this change in the monitoring network.

Table 27 shows a comparison of groundwater quality since 2016. Sampling of groundwater monitoring locations occurred on 18 March, 04 June, 24 September and 12 December 2025.

2025 results are comparable to results from previous years. TDS levels continued to be highly variable across the years. Average Electrical Conductivity (EC) at each monitoring locations was generally comparable to the 2024 average EC levels.

Management Measures and Improvements

Groundwater monitoring results are generally consistent with previous years and therefore no management measures are considered to be necessary. In 2025, KEQPL engaged EMM to review the incorporation of additionally monitoring bores on Lot 11 and to develop groundwater trigger values for the Karuah Quarry Complex. This work will continue in 2026 and culminate in the finalising the draft revision to the WMP.

Table 26 Groundwater Level since 2016.

Year	Period	Date	Groundwater level (metres below ground level)				
			KEQ-BH-205	KEQ-BH-207	KEQ-BH-208	KEQ-BH-303	KEQ-BH-D202
2016	H1	30/03/2016	22.83	12.38	19.54	29.89	-
	H2	04/10/2016	23.56	8.95	19.80	29.98	-
2017	H1	04/04/2017	24.53	8.73	19.99	30.19	-
	H2	05/10/2017	22.10	8.22	19.90	30.13	-
2018	Q1	17/01/2018	21.21	8.46	20.27	30.20	-
	Q2	18/04/2018	20.92	8.54	20.47	30.33	-
		06/06/2018	20.30	8.39	20.48	30.39	-
	Q3	26/07/2018	19.69	8.23	20.49	30.39	-
2019	Q4	31/10/2018	19.63	8.64	19.98	30.33	-
	Q1	18/01/2019	19.34	8.55	20.44	30.49	-
	Q2	30/04/2019	19.53	8.54	20.45	30.14	-
	Q3	23/07/2019	18.91	8.42	20.57	30.62	-
2020	Q4	30/10/2019	17.83	7.57	20.55	30.23	-
	Q1	14/01/2020	19.18	8.59	20.71	30.73	-
	Q2	14/04/2020	17.60	7.64	20.59	29.93	-
	Q3	27/07/2020	17.42	7.68	20.75	30.75	-
2021	Q4	01/10/2020	15.89	7.04	20.70	30.40	-
	Q1	01/01/2021	17.33	7.85	20.75	30.91	-
	Q2	01/04/2021	16.77	6.74	20.72	30.46	-
	Q3	27/07/2021	17.42	7.68	20.75	30.75	-
2022	Q4	06/10/2021	15.96	6.74	20.54	30.25	-
	Q1	24/01/2022	16.67	7.20	20.71	30.60	-
	Q2	28/04/2022	16.43	6.99	*	30.53	-
	Q3	18/07/2022	15.98	6.72	*	30.20	-
2023	Q4	20/10/2022	15.03	6.23	*	29.73	-
	Q1	19/01/2023	15.83	6.72	*	29.57	-
	Q2	19/04/2023	14.91	6.46	19.32	29.67	-
	Q3	18/07/2023	16.16	6.42	19.34	29.74	-
		13/10/2023	16.52	6.81	19.52	29.88	-
2024	Q4	08/12/2023	15.61	6.93	19.62	30.06	-
	Q1	08/03/2024	15.81	7.25	19.80	30.39	-
	Q2	28/06/2024	15.58	6.40	19.80	30.50	-
	Q3	12/09/2024	15.80	6.63	19.49	30.35	-
2025	Q4	19/12/2024	16.76	7.01	19.23	30.33	23.30
	Q1	18/03/2025	16.90	7.27	19.10	30.32	23.30
	Q2	04/06/2025	16.20	6.78	-	30.16	23.02
	Q3	24/09/2025	15.81	6.75	-	29.45	23.12
	Q4	12/12/2025	16.52	6.94	-	29.31	23.08

*No data recorded due to insufficient water levels.

Table 27 Average Groundwater Quality Results for Key Parameters.

Year	Monitoring Location	pH	EC (µS/cm)	TDS (mg/L)	Number of Samples
2016	KEQ-BH-205	7.3	2015	1182	2
	KEQ-BH-207	6.9	2780	1578	2
	KEQ-BH-208	6.4	3010	2000	2
	KEQ-BH-303	6.4	1556	890	2
2017	KEQ-BH-205	8.7	2400	1200	2
	KEQ-BH-207	7.2	3600	1800	2
	KEQ-BH-208	6.6	3500	1900	2
	KEQ-BH-303	6.9	2350	1175	2
2018	KEQ-BH-205	8.8	2500	1150	2
	KEQ-BH-207	7.2	1940	1020	2
	KEQ-BH-208	7.1	3000	3000	1
	KEQ-BH-303	7.5	2550	1250	2
2019	KEQ-BH-205	7.6	2545	1617	2
	KEQ-BH-207	6.9	2945	1740	2
	KEQ-BH-208	-	-	-	0
	KEQ-BH-303	6.3	2740	1629	2
2020	KEQ-BH-205	7.1	2735	1460	2
	KEQ-BH-207	7.0	2865	1548	2
	KEQ-BH-208	-	-	-	0
	KEQ-BH-303	5.9	2985	1625	2
2021	KEQ-BH-205	6.7	1889	1869	2
	KEQ-BH-207	6.5	3220	1663	2
	KEQ-BH-208	-	-	-	0
	KEQ-BH-303	5.8	2810	1674	2
2022	KEQ-BH-205	6.3	5020	2740	2
	KEQ-BH-207	6.6	3465	1889	2
	KEQ-BH-208	-	-	-	0
	KEQ-BH-303	6.0	2745	1518	2
2023	KEQ-BH-205	6.1	4820	2827	3
	KEQ-BH-207	6.3	3433	2106	3
	KEQ-BH-208	6.5	3867	2321	3
	KEQ-BH-303	5.8	2990	1879	3
2024	KEQ-BH-205	6.0	4560	2833	4
	KEQ-BH-207	6.3	3415	2065	4
	KEQ-BH-208	6.4	3963	2515	4
	KEQ-BH-303	5.9	2810	1840	4
2025	KEQ-BH-205	6.0	5038	2980	4
	KEQ-BH-207	6.3	3533	2018	4
	KEQ-BH-208	6.3	3690	2190	1
	KEQ-BH-303	6.0	3108	1923	4
	KEQ-BH-D202	5.8	2533	1457	3

*No data recorded due to insufficient water levels.

7.4 Other Water Management Matters

Water Licencing

KEQPL's surface water system has been designed to remain within Harvestable Rights provisions and therefore no surface water licences are required. Similarly, KEQPL holds no groundwater extraction licences.

Salinity Trading

KEQPL does not participate in any salinity trading schemes.

Compensatory Water Supply

KEQPL has not impacted any neighbouring landholders' water supply schemes requiring the provision of compensatory water supply.

8.0 Rehabilitation

In 2025, there have been no opportunities to establish rehabilitation at the quarry site in its current form as main extraction area is yet to reach terminal bench widths along the rear northern face and extraction depth is yet to sufficiently progress to enable additional access roadways to become redundant. A summary of rehabilitation details is provided by **Table 28** and **Table 29** below.

Future rehabilitation activities will be undertaken in due course once available, as outlined by the approved Landscape and Rehabilitation Management Plan (L&RMP), with planned activities for the 2025 reporting period summarised by **Table 30**.

Relevant to rehabilitation, the Karuah Pit Consolidation Project (KEQ MOD11) proposes to remove the western quarry face (i.e. the remnant dividing highwall between the KEQ and the adjoining KHRQ extraction pits) resulting in changes to the site’s rehabilitation objectives through the provision of a free-draining landscape. The L&RMP will be further revised (subject to approval) following determination of the MOD11 project accounting for these changes to the modified operation.

Table 28 Summary of Rehabilitation Performance During the 2025 Reporting Period.

Rehabilitation Performance Details	KEQ Site Comments
Extent of the operations and rehabilitation at completion of the reporting period.	No rehabilitation completed.
Agreed post-rehabilitation land-use.	Final land-use is outlined within the L&RMP. The vegetation at closure will be native woodland consistent with the surrounding bushland.
Key rehabilitation performance indicators.	No rehabilitation completed.
Renovation or removal of buildings.	No rehabilitation completed.
Any other Rehabilitation undertaken including: <ul style="list-style-type: none"> ■ Exploration activities; ■ Infrastructure; ■ Dams; and ■ The installation or maintenance of fences, bunds and any other works. 	No rehabilitation completed.
Rehabilitation sign-off status of completed areas against the land-use objectives and completion criteria.	No rehabilitation completed.
Variations to activities undertaken to those proposed (including why there were variations and whether the Resources Regulator was notified)	No rehabilitation completed.
Outcomes of trials, research projects and other initiatives.	No rehabilitation completed.
Key issues that may affect successful rehabilitation.	No rehabilitation completed.

Table 29 Disturbance and Rehabilitation Status.

Item	Quarry Area Type	Previous 2024 Reporting Period [actual] (Ha)	Current 2025 Reporting Period [actual] (Ha)	Next 2026 Reporting Period [forecast] (Ha)
A	Total Quarry Footprint	29.35	29.35	40.65*
B	Total Active Disturbance	29.35	29.35	40.65*
C	Land Being Prepared for Rehabilitation	0	0	0
D	Land Under Active Rehabilitation	0	0	0
E	Completed Rehabilitation	0	0	0

* Increased disturbance area associated with the expected commencement of the KEQ MOD10 Stockpile Extension Project and the KEQ MOD11 Karuah Pit Consolidation Project.

Table 30 Actions for the Next 2026 Reporting Period.

Action	KEQ Site Comment
Describe the steps to be undertaken to progress agreement during next reporting period, where final rehabilitation outcomes have not yet been agreed between stakeholders.	<ul style="list-style-type: none"> Subject to approval of KEQ MOD11, revised rehabilitation objectives will be determined. A comprehensive review of the RCP will be completed to align closure planning to the newly proposed final landform.
Outline proposed rehabilitation trials, research projects and other initiatives to be undertaken during next reporting period.	<ul style="list-style-type: none"> There are no additional rehabilitation trials during the next Annual Review period.
Summary of rehabilitation activities proposed for next report period.	<ul style="list-style-type: none"> Subject to approval of KEQ MOD11, complete comprehensive review of the RCP and seek approval from NSW Planning.

9.0 Community

9.1 Community Engagement

A Community Consultative Committee (CCC) was formed for the Karuah East Quarry to undertake community engagement activities in accordance with Schedule 5, Condition 6 of the Project Approval as summarised by **Figure 14**.

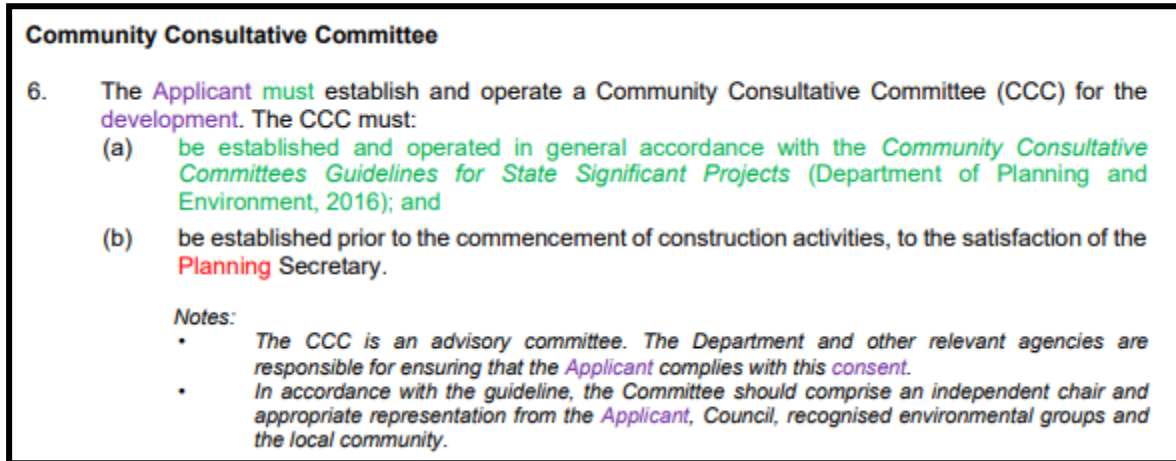


Figure 14 Community Consultative Committee requirements from the Project Approval.

In 2025, the CCC was ordinarily called to meet twice on **17 March 2025** and **09 September 2025**; and consisted of the following members:

- 1x independent chair (Michael Ulph, GHD Technical Director – Communications and Stakeholder Engagement)
- 4x local community members (2x from North Karuah and 2x from North Arm Cove);
- 3x stakeholder group representatives from the North Arm Cove Residents Association, Port Stephens Shellfish Program and the Karuah LALC;
- 1x council representative from MidCoast Council; and
- 3x company representatives from KEQPL.

Key items discussed during the CCC meetings include project approvals and current operations, environmental management performance, upcoming projects, community sponsorships and other support, community complaints and associated responses.

During 2025, as a result of HQPL’s acquisition of Lot 11 and the early planning of the proposed Karuah Pit Consolidation Project (as detailed within **Section 3.1**), it was proposed to NSW Planning, MidCoast Council (MCC) and the existing KEQ CCC to form a joint CCC for the Karuah Quarry Complex for both KHRQ and KEQ sites.

The implementation of the Joint Karuah Quarry Complex CCC is expected to enable improved and wholistic community consultation by providing a central forum for community members, local stakeholder groups and MCC to consider and discuss all relevant quarry operations within the Karuah Quarry Complex, including any potential for cumulative impacts.

This proposal was unanimously supported by all stakeholders with an additional round of expression of interests being issued to residents within the North Karuah area being released in October 2025; however, no responses were received. The proposed Joint Karuah Quarry Complex CCC was subsequently progressed and formally expanded at the 17 March 2026 meeting to include both quarry operations.

In addition to the two ordinary CCC meetings noted above, a third extraordinary meeting was called for 03 November 2025 to provide committee members with a briefing on the proposed Karuah Pit Consolidation Project (KEQ MOD11 and KHRQ MOD2). Immediately prior to the meeting a project-specific site inspection was also undertaken.

9.2 Community Contributions

The Karuah East Quarry contributes to supporting the local economy through parent company, Hunter Quarries Pty Ltd (HQPL).

In 2025, HQPL supported the following organisations:

- The Backpack Venture, Raymond Terrace – Donation
- Clarence Town Cobras – Sponsorship Package
- Destiny Haven, Brookfield – Women’s Centre
- Fourie Family, Gresford – Material Donation
- Hunter Region Botanic Gardens – Donation
- Maitland Junior Rugby Club – Sponsorship Package
- Movember – Mo Miles for Movember Campaign
- Karuah Golf Club – Material Donation
- Karuah Men’s Shed – Appliances (Refrigerator)
- Karuah Pearls Netball Club – Sponsorship Package
- Karuah RSL Bowling Club – Sponsorship Package
- NSW SES Volunteers Association – The Volunteer Magazine
- Stroud Show – Chainsaw Championships
- Tarro Cricket Club – Sponsorship Package
- Tomaree Breast Cancer Support Group – Donation
- Victoria Hotel – Bullarama
- Westpac Rescue Helicopter Service’s Port Stephens Support Group – Donation

9.3 Community Complaints

Members of the community are encouraged to report any issues that are identified associated with our operations via the dedicated **Community Call Line** on **1800 329 161**. The Environment & Development Manager (or delegate) reviews, investigates, and reports all complaints received in accordance with the Project Approval, EPL, and the site’s Environmental Management Strategy.

The Community Call Line was advertised by:

- Signage at the entrance to the quarry premises;
- Inclusion of the Community Call Line in prominent locations on the Hunter Quarries’ website; and
- Inclusion of the Community Call Line in communications with the CCC.

In 2025, two community complaints were reported to KEQPL, which is consistent with the typical results of one to two complaints per year as summarised by the complaints history provided in **Table 31**.

On 03 April 2025, a SMS text message was received from a nearby resident on Halloran Road, North Arm Cove to advise audible noise from quarry operations were experienced between 10.00 and 10.30 pm. An investigation of the complaint confirmed that noise generating activities were conducted beyond approved hours of operation provided by the Project Approval and EPL.

A letterbox drop to neighbouring landholders was subsequently completed confirming operating hours until 10:00 pm Mondays and until 9:00 pm from Tuesday to Friday. Operations staff and contractors were then subject to toolbox talks of these hours and the associated allowable activities.

On 18 November 2025, a complaint was received by a resident of The Branch who raised concerns regarding heavy vehicle movements through the intersection of The Branch Lane and Andersite Road. In response, drivers and employees were subject to toolbox talks regarding safe driving practices.

The complainant requested to remain anonymous and to not be contacted any further.

Table 31 Community Complaints 2016-2025.

Year	Total Received	Complaint Category						Comments
		Air Quality	Blasting	Noise	Transport	Water	Other	
2016	1	–	–	–	1	–	–	–
2017	3	1*	–	2*	–	1	–	*Combined noise and air quality (dust) complaint.
2018	2	–	1	1	–	–	–	–
2019	2	–	1	–	–	–	1^	^property access
2020	1	–	1	–	–	–	–	–
2021	1	–	–	1	–	–	–	–
2022	2	1	–	–	–	1	–	–
2023	5	–	3	–	2	–	–	–
2024	0	–	–	–	–	–	–	–
2025	1 2	–	–	1°	1	–	–	°Combined noise and operating hours complaint.

10.0 Independent Environment Audit

In accordance with Schedule 5, Condition 9 of the Project Approval, KEQPL has commissioned an Independent Environment Audit (IEA) every three years as summarised by **Figure 15**.

INDEPENDENT ENVIRONMENTAL AUDIT

9. Within 12 months of the commencement of development on the site, and every 3 years thereafter, unless the **Planning** Secretary directs otherwise, the **Applicant** must commission and pay the full cost of an Independent Environmental Audit of the **development**. This audit must:

- (a) be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the **Planning** Secretary;
- (b) include consultation with the relevant agencies;
- (c) assess the environmental performance of the **development** and whether it is complying with the relevant requirements in this **consent** and any relevant EPL and/or Water Licence (including any assessment, plan or program required under these approvals);
- (d) review the adequacy of any approved strategy, plan or program required under these approvals; and
- (e) recommend measures or actions to improve the environmental performance of the **development**, and/or any assessment, plan or program required under these approvals.

*Note: This audit team must be led by a suitably qualified auditor and include experts in any fields specified by the **Planning** Secretary.*

10. Within three months of commencing an Independent Environmental Audit, or within another timeframe agreed by the **Planning** Secretary, the **Applicant** must submit a copy of the audit report to the **Planning** Secretary, and any other NSW agency that requests it, together with its response to any recommendations contained in the audit report, and a timetable for the implementation of the recommendations. The recommendations must be implemented to the satisfaction of the **Planning** Secretary.

Figure 15 Independent Environmental Audit requirements from the Project Approval.

The first IEA was completed in July 2017 by EMM Consulting and in October 2020, Hansen Bailey completed the second IEA.

In October 2023, ERM conducted the third IEA of the Karuah East Quarry; which included the following key documents:

- Project Approval, MP09_0175 (as modified);
- Environment Protection Licence, EPL 20611; and
- Karuah East Quarry’s Environmental Management Plans.

The non-compliances identified in the 2023 IEA were generally minor in nature and focused on the regular revision of Environmental Management Plans, non-compliant water discharges and various other administrative matters. All actions were resolved throughout 2024.

In 2026, KEQPL will commission the fourth IEA for the KEQ site.

11.0 Incidents & Non-Compliances During the Reporting Period

During the 2025 reporting period, a number of non-compliances with performance criteria occurred, relating to surface water discharges and air quality as summarised below.

- **09 to 12 January 2025 – Discharges of sediment-laden water following major rainfall event.**

Uncontrolled discharges of sediment-laden water to Yalimbah and Bulga Creeks from Thursday 09 to Sunday 12 January 2025 following the receipt of 164.2 mm of rainfall over 48 hours with a total of 185.8 mm over the cumulative five-day rainfall event.

This rainfall event exceeded the 95th percentile 5x day rainfall depth of 90.6 mm; which the site's sediment dams are designed to withstand in accordance with Landcom's Blue Book.

During the event the PIRMP was enacted through reporting to regulatory authorities, the KEQPL executive and the local community. Formal incident reports were subsequently submitted to NSW Planning and the NSW EPA.

- **17 to 20 January 2025 – Discharges of sediment-laden water following major rainfall event.**

Uncontrolled discharges of sediment-laden water to Yalimbah and Bulga Creeks from Friday 17 to Monday 20 January 2025 following the receipt of 91.8 mm of rainfall over 24 hours with a total of 174.6 mm over the cumulative four-day rainfall event.

This rainfall event exceeded the 95th percentile 5x day rainfall depth of 90.6 mm; which the site's sediment dams are designed to withstand in accordance with Landcom's Blue Book.

During the event the PIRMP was enacted through reporting to regulatory authorities, the KEQPL executive and the local community. Formal incident reports were subsequently submitted to NSW Planning and the NSW EPA.

- **18 January 2025 – Failure to Monitor Particulate Matter due to intermittent power outages.**

From 16 to 19 January intermittent power outages with the Essential Energy network were experienced associated with a major east-coast low weather event preventing normal operation of the HVAS unit during the scheduled run day on 18 January 2025. As such, a replacement run was completed upon return of mains power on 21 January 2025 with notifications issued to NSW Planning, the EPA and surrounding landholders in accordance with the relevant conditions of the Project Approval and EPL.

On 30 May 2025, NSW Planning confirmed acceptance of the notification and that KEQPL complied with the relevant conditions of the Project Approval and KEQ Air Quality Management Plan. No response was received from the EPA.

■ **March 2025 – Exceedance of Depositional Dust Criteria due to Algal Growth**

An exceedance was recorded at DDG5 during the March 2025 Monitoring Period, due to an elevated quantity of combustible matter being recorded (27.5 g). This is attributed to the development of a significant algal bloom on the collected rainwater surface within the dust gauge glassware. This event was reported to the NSW Planning, the EPA and surrounding landholders in accordance with the relevant conditions of the Project Approval and EPL.

NSW Planning subsequently determined to not take any enforcement action on 15 May 2025; whilst no response was received from the EPA.

■ **27 April to 04 May 2025 – Discharges of sediment-laden water following major rainfall event.**

Uncontrolled discharges of sediment-laden water to Yalimbah and Bulga Creeks from Sunday 17 April to Sunday 04 May 2025 following the receipt of 142.2 mm of rainfall over 24 hours with a total of 318.4 mm over the cumulative six-day rainfall event.

This rainfall event exceeded the 95th percentile 5x day rainfall depth of 90.6 mm; which the site's sediment dams are designed to withstand in accordance with Landcom's Blue Book.

During the event the PIRMP was enacted through reporting to regulatory authorities, the KEQPL executive and the local community. Formal incident reports were subsequently submitted to NSW Planning and the NSW EPA.

■ **23 June 2025 – Failure to Monitor Particulate Matter due to scheduled power outage.**

A planned maintenance outage was planned by Essential Energy for a scheduled run day on 23 June 2025. Accordingly, consultation was undertaken with NSW Planning and the EPA on 13 June 2025 to confirm that the application of a replacement run on 24 June 2025 would be satisfactory; with both agencies confirming acceptance of the approach on 13 June 2025 and 26 June 2025, respectively.

■ **19 to 25 May 2025 – Discharges of sediment-laden water following major rainfall event.**

Uncontrolled discharges of sediment-laden water to Yalimbah and Bulga Creeks from Monday 19 to Sunday 25 May 2025 following the receipt of 175.8 mm of rainfall over 48 hours with a total of 457.4 mm over the cumulative six-day rainfall event.

This rainfall event exceeded the 95th percentile 5x day rainfall depth of 90.6 mm; which the site's sediment dams are designed to withstand in accordance with Landcom's Blue Book.

During the event the PIRMP was enacted through reporting to regulatory authorities, the KEQPL executive and the local community. Formal incident reports were subsequently submitted to NSW Planning and the NSW EPA.

■ **01 to 03 July 2025 – Discharges of sediment-laden water following major rainfall event**

Uncontrolled discharges of sediment-laden water to Yalimbah and Bulga Creeks from Tuesday 01 to Thursday 03 July 2025 following the receipt of approximately 95 mm of rainfall over 24 hours with a total of 120.4 mm over the cumulative three-day rainfall event.

This rainfall event exceeded the 95th percentile 5x day rainfall depth of 90.6 mm; which the site's sediment dams are designed to withstand in accordance with Landcom's Blue Book.

During the event the PIRMP was enacted through reporting to regulatory authorities, the KEQPL executive and the local community. Formal incident reports were subsequently submitted to NSW Planning and the NSW EPA.

■ **July 2025 – Exceedance of Depositional Dust Criteria**

An anomalous exceedance was recorded at DDG1 during the July 2025 monitoring period which was subsequently reported to NSW Planning, the EPA and surrounding landholders in accordance with the relevant conditions of the Project Approval and EPL. NSW Planning subsequently acknowledged the notification and determined to provide no commentary on the matter on 29 August 2025.

However, it should be noted that the results remain well within long-term criteria compliance limits.

■ **03 to 05 August 2025 – Discharges of sediment-laden water following major rainfall event**

Uncontrolled discharges of sediment-laden water to Yalimbah and Bulga Creeks from Sunday 03 to Tuesday 05 August 2025 following the receipt of a total of 211.8 mm of rainfall over a cumulative five-day rainfall event.

This rainfall event exceeded the 95th percentile 5x day rainfall depth of 90.6 mm; which the site's sediment dams are designed to withstand in accordance with Landcom's Blue Book.

During the event the PIRMP was enacted through reporting to regulatory authorities, the KEQPL executive and the local community. Formal incident reports were subsequently submitted to NSW Planning and the NSW EPA.

■ **08 November 2025 – Failure to Monitor Particulate Matter due to maintenance outage.**

On 08 November 2025 a maintenance outage was performed by Essential Energy for urgent work was undertaken resulting in a partial HVAAS run. A replacement run was then completed on 12 November 2025 with all data reported to NSW Planning, the EPA and surrounding landholders in accordance with the relevant conditions of the Project Approval and EPL.

NSW Planning subsequently acknowledged and confirmed no further comment on the matter on 12 December 2025, whilst the EPA considered that rectification action to be appropriate on 17 December 2025.

■ **14 November 2025 – Exceedance of Short-Term PM10 Criteria**

An exceedance of short-term (daily) particulate matter monitoring criteria occurred on 14 November 2025 as a result of three bushfires in the vicinity of the Karuah Quarry Complex, including the Tenterfield Road, North Arm Cove; the Pacific Highway, Karuah; and the Warraba Road, The Branch bushfires. The PM10 result was recorded at 106 $\mu\text{g}/\text{m}^3$ against a short-term criterion of 50 $\mu\text{g}/\text{m}^3$; whilst long-term averages for both TSP and PM10 remained within the long-term criteria over the previous 12-months.

This exceedance event was reported to the NSW Planning, the EPA and surrounding landholders in accordance with the relevant conditions of the Project Approval and EPL.

NSW Planning subsequently acknowledged the notification and determined to provide no commentary on 12 December 2025. On 17 December 2025, the EPA acknowledged the exceedance was associated with local bushfire activity and provided feedback regarding the incident report which has been implemented for future events of this nature.

■ **08 December 2025 – Exceedance of Short-Term PM10 Criteria**

An exceedance of short-term (daily) particulate matter monitoring criteria occurred on 08 December 2025 as a result of the Pacific Highway, Bulahdelah bushfire burning in a southerly direction between Crawford River and Nerong. The PM10 result was recorded at 64 $\mu\text{g}/\text{m}^3$ against a short-term criterion of 50 $\mu\text{g}/\text{m}^3$; whilst long-term averages for both TSP and PM10 remained within the long-term criteria over the previous 12-months.

This exceedance event was reported to the NSW Planning, the EPA and surrounding landholders in accordance with the relevant conditions of the Project Approval and EPL. NSW Planning determined that the bushfire event triggered the extraordinary event provisions allowing the event to be discounted as a non-compliance with the approval on 29 January 2026.

12.0 Activities to be Completed in the Next Reporting Period

A consolidated summary of proposed actions to be completed during the 2026 reporting period is provided by **Table 32**.

Table 32 Summary of Proposed Actions in the Next 2026 Reporting Period.

Action ID	Action	Timeline
2023 Annual Review		
2023-2	Undertake comprehensive review and update of the following Management Plans for the KEQ MOD10 Project and 2023 KEQ IEA.	Management Plan approvals required prior to the commencement of construction for the KEQ MOD10 Project.
	C. Biodiversity Offset Area Management Plan.	Pending Commonwealth endorsement for the configuration of the Western BOA.
	I. Water Management Plan (including effectiveness of WMP and TARP for surface water management to minimise exceedances of discharge limits).	KEQPL will finalise required groundwater management updates and submit to NSW Planning by 31 December 2026.
2025 Annual Review		
2025-1	KEQPL will finalise the EPL variation associated with water management infrastructure for the KEQ MOD10 Stockpile Extension Project.	Pending approval of the revised Water Management Plan by NSW Planning.
2025-2	KEQPL will be complete a 10-year implementation review of all performance criteria and management measures outlined by the BOAMP.	KEQPL will complete the review by 31 December 2026.
2025-3	KEQPL will coordinate the completion of the site's fourth Independent Environmental Audit.	KEQPL will submit the Response to Audit Recommendations for the 2026 IEA by 31 December 2026.

Appendix 1 – NSW Planning Correspondence

NSW Planning Response to KEQ Annual Review 2024

NSW Planning ref: MP09_0175-PA-54

Scott Ellerton
Environment and Development Manager
Karuah East Quarry Pty Ltd
Worimi Country
PO Box 23
KARUAH NSW 2324
07/07/2025

Sent via the Major Projects Portal only

Subject: Karuah East Quarry Project - 2024 Annual Review

Dear Mr Ellerton

I refer to the Annual Review for the period 1 January 2024 to 31 December 2024 (2024 Annual Review) submitted as required by Schedule 5, Condition 4 of project approval MP09_0175 as modified (the approval) to the NSW Department of Planning, Housing and Infrastructure (NSW Planning) on 23 March 2025.

NSW Planning has reviewed the Annual Review and considers it to generally satisfy the reporting requirements of the approval and the NSW Planning Annual Review Guideline (October 2015). Please make publicly available a copy of the 2024 Annual Review on the company's website within 30 days.

Please note that the NSW Planning's acceptance of this Annual Review is not an endorsement of the compliance status of the project.

Should you wish to discuss the matter further, please contact me on 02 65753401 or email compliance@planning.nsw.gov.au

Yours sincerely



Heidi Watters
Team Leader
Compliance

As nominee of the Planning Secretary

Appendix 2 – Transport Monitoring Reports

KEQ Transport Monitoring Report – H1 2025

KEQ Transport Monitoring Report – H2 2025

Appendix 3 – Noise Monitoring Reports

Noise Monitoring Report – Q1 2025

Noise Monitoring Report – Q2 2025

Noise Monitoring Report – Q3 2025

Noise Monitoring Report – Q4 2025

Karuah East Quarry

Quarterly attended noise monitoring - Q1 2025

Prepared for Karuah East Quarry Pty Limited

February 2025

Karuah East Quarry

Quarterly attended noise monitoring - Q1 2025

Karuah East Quarry Pty Limited

E250042 RP#1

February 2025

Version	Date	Prepared by	Reviewed by	Comments
1	11 February 2025	Kirsten Garlick	Robert Kirwan	Final

Approved by



Robert Kirwan

Associate Acoustics Consultant

11 February 2025

Level 3 175 Scott Street

Newcastle NSW 2300

ABN: 28 141 736 558

This report has been prepared in accordance with the brief provided by Karuah East Quarry and, in its preparation, EMM has relied upon the information collected at the times and under the conditions specified in this report. All findings, conclusions or recommendations contained in this report are based on those aforementioned circumstances. This report is to only be used for the purpose for which it has been provided. Except as permitted by the Copyright Act 1968 (Cth) and only to the extent incapable of exclusion, any other use (including use or reproduction of this report for resale or other commercial purposes) is prohibited without EMM's prior written consent. Except where expressly agreed to by EMM in writing, and to the extent permitted by law, EMM will have no liability (and assumes no duty of care) to any person in relation to this document, other than to Karuah East Quarry (and subject to the terms of EMM's agreement with Karuah East Quarry).

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ABN: 28 141 736 558

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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 period on Wednesday 5 February 2025 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

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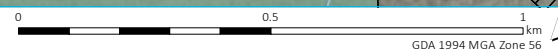


- KEY**
- Site boundary
 - A Attended noise monitoring location
 - Approved disturbance area
 - Major road
 - Minor road
 - Vehicular track
 - Watercourse/drainage line
 - Cadastral boundary
 - Waterbody
 - NPWS reserve
 - State forest

Attended noise monitoring locations

Karuah East Quarry
Quarterly attended noise monitoring
Figure 1.1

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



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.
$LA_{1,1minute}$	The A-weighted noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
LA_{10}	The A-weighted noise level which is exceeded for 10 per cent of the time.
LA_{eq}	The energy average A-weighted noise level.
LA_{50}	The A-weighted noise level which is exceeded for 50 per cent of the time, also the median noise level during a measurement period.
LA_{90}	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.
LA_{min}	The minimum A-weighted noise level over a time period.
LC_{eq}	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 limit summary

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

Table 2.1 Noise 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 considerations

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 using a handheld device.

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

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

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
Rion NA-28 sound level meter	01070590	27/5/2026	IEC 61672-1:2002
Pulsar Model 105 calibrator	96080	26/2/2025	IEC 60942:2003

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 2025¹

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	05/02/2025 05:00	61	56	54	52	52	49	46
A	05/02/2025 08:31	74	71	66	63	61	57	53
A	05/02/2025 18:00	69	55	51	50	49	46	42
B	05/02/2025 05:21	74	71	67	62	59	51	45
B	05/02/2025 08:11	63	62	61	60	60	51	46
B	05/02/2025 18:19	74	71	65	62	59	54	47
F	05/02/2025 05:43	78	60	52	53	48	46	43
F	05/02/2025 07:47	81	70	49	56	46	43	38
F	05/02/2025 18:41	80	63	51	54	48	44	40
G	05/02/2025 06:09	62	53	46	45	43	42	39
G	05/02/2025 07:20	56	49	45	42	41	39	36
G	05/02/2025 19:07	53	47	44	42	41	39	36
H	05/02/2025 06:30	66	54	52	48	44	41	38
H	05/02/2025 07:00	58	52	51	47	46	40	37
H	05/02/2025 19:26	56	50	48	45	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 – Q1 2025

Location	Start date and time	Temperature °C	Wind speed m/s	Wind direction ° Magnetic north ¹	Cloud cover 1/8s
A	05/02/2025 05:00	23.1	-	-	1
A	05/02/2025 08:31	27.5	-	-	2
A	05/02/2025 18:00	27.0	-	-	8
B	05/02/2025 05:21	22.3	-	-	2
B	05/02/2025 08:11	26.0	-	-	1
B	05/02/2025 18:19	28.0	-	-	8
F	05/02/2025 05:43	22.6	-	-	2
F	05/02/2025 07:47	24.9	-	-	1
F	05/02/2025 18:41	26.0	0.8	180	8
G	05/02/2025 06:09	21.6	-	-	3
G	05/02/2025 07:20	31.4	-	-	1
G	05/02/2025 19:07	25.7	1.0	200	7
H	05/02/2025 06:30	21.8	-	-	3
H	05/02/2025 07:00	26.6	-	-	2
H	05/02/2025 19:26	24.8	0.7	200	7

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 NPfl.

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 – Q1 2025

Location	Start Date and Time (Period)	Wind		Stability Class	Very enhancing? ¹	Limit, dB		Site level, dB ²		Exceedance	
		Speed m/s	Direction ⁴			L _{Aeq,15minute}	L _{Amax}	L _{Aeq,15minute}	L _{Amax}	L _{Aeq,15minute}	L _{Amax}
A	05/02/2025 05:00 (MS)	0.2	192	F	No	35	52	IA	IA	Nil	Nil
A	05/02/2025 08:31 (D)	0.9	268	A	No	42	N/A	IA	N/A	Nil	N/A
A	05/02/2025 18:00 (E)	1.2	151	F	No	40	N/A	IA	N/A	Nil	N/A
B	05/02/2025 05:21 (MS)	0.4	206	F	No	35	52	IA	IA	Nil	Nil
B	05/02/2025 08:11 (D)	0.5	165	A	No	40	N/A	IA	N/A	Nil	N/A
B	05/02/2025 18:19 (E)	0.9	200	F	No	40	N/A	IA	N/A	Nil	N/A
F	05/02/2025 05:43 (MS)	0.2	177	F	No	35	52	IA	IA	Nil	Nil
F	05/02/2025 07:47 (D)	0.3	62	A	No	40	N/A	IA	N/A	Nil	N/A
F	05/02/2025 18:41 (E)	1.1	183	F	No	35	N/A	IA	N/A	Nil	N/A
G	05/02/2025 06:09 (MS)	0.2	193	F	No	35	52	<30	42	Nil	Nil
G	05/02/2025 07:20 (D)	0.3	259	A	No	43	N/A	<35	N/A	Nil	N/A
G	05/02/2025 19:07 (E)	0.8	164	F	No	39	N/A	IA	N/A	Nil	N/A
H	05/02/2025 06:30 (MS)	0.4	248	B	No	35	52	<20	30	Nil	Nil
H	05/02/2025 07:00 (D)	0.3	298	F	No	44	N/A	<25	N/A	Nil	N/A

Table 4.3 Site noise levels and limits – Q1 2025

Location	Start Date and Time (Period)	Wind		Stability Class	Very enhancing? ¹	Limit, dB		Site level, dB ²		Exceedance	
		Speed m/s	Direction ⁴			L _{Aeq,15minute}	L _{Amax}	L _{Aeq,15minute}	L _{Amax}	L _{Aeq,15minute}	L _{Amax}
H	05/02/2025 19:26 (E)	0.8	163	F	No	46	N/A	IA	N/A	Nil	N/A

- Notes:
1. Noise limits are adjusted by +5 dB during 'very noise-enhancing meteorological conditions' in accordance with the NPfl.
 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 period on Wednesday 5 February 2025 at five monitoring locations.

Noise levels from the site complied with relevant limits at all monitoring locations during the Q1 2025 survey.

Appendix A

Noise perception and examples

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

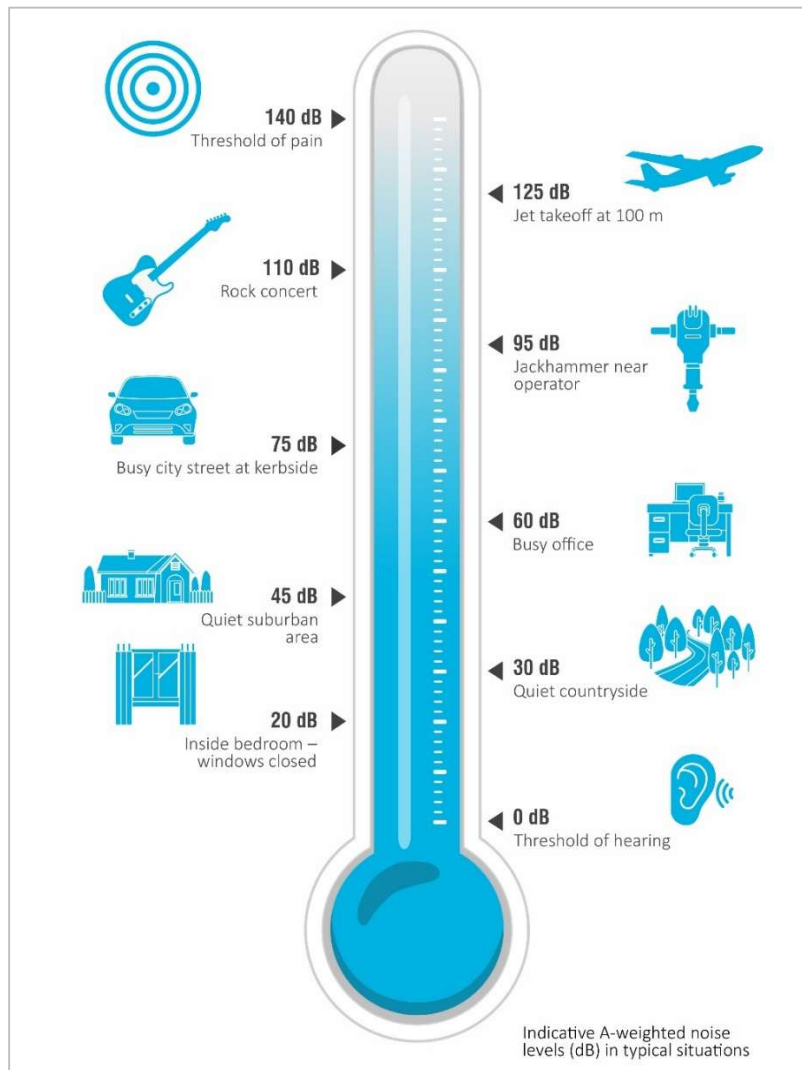


Figure A.1 Common noise levels

Appendix B

Regulator documents

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 <i>L_{Aeq} (15 min)</i>	Morning Shoulder <i>L_{Amax}</i>	Day <i>L_{Aeq} (15 min)</i>	Evening <i>L_{Aeq} (15 min)</i>
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:
- take all reasonable steps to minimise noise from construction and operational activities, including low frequency noise and other audible characteristics, associated with the development;
 - implement reasonable and feasible noise attenuation measures on all plant and equipment that will operate in noise sensitive areas;
 - operate a comprehensive noise management system commensurate with the risk of impact;
 - 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 NPfl);
 - 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
 - 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:
- be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary;
 - be prepared in consultation with the EPA;
 - describe the measures to be implemented to ensure:
 - compliance with the noise criteria and operating conditions in this consent;
 - best practice management is being employed;
 - noise impacts of the development are minimised during noise-enhancing meteorological conditions when the noise criteria in this consent do not apply (see NPfl);
 - describe the noise management system in detail; and
 - include a monitoring program that:
 - is capable of evaluating the performance of the development;
 - monitors noise at the nearest and/or most affected residences;
 - adequately supports the noise management system;
 - includes a protocol for distinguishing noise emissions of the development from any neighbouring developments; and
 - 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

Licence - 20611

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

L4.4 Determining Compliance

Environment Protection Licence

Licence - 20611

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 determining 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:

Environment Protection Licence

Licence - 20611

- 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 compliance 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

Environment Protection Licence

Licence - 20611

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	Morning Shoulder	Day	Evening
	L _{Aeq} (15 minute)	L _{Amax}	L _{Aeq} (15 minute)	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 NPfl (EPA 2017).

The noise limits provided in Table 5.1 apply under standard and noise-enhancing meteorological conditions (as defined in the NPfl) 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 than 2m/s at 10m above ground level; or
- stability category G temperature inversion conditions.

In accordance with Fact Sheet D of the NPfl, 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



**Sound Level Meter
IEC 61672-3:2013**

Calibration Certificate

Calibration Number C24405

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

Equipment Tested/ Model Number :	NA-28
Instrument Serial Number :	01070590
Microphone Serial Number :	08184
Pre-amplifier Serial Number :	52329
Firmware Version :	v2.0

Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditions
Ambient Temperature : 24.4 °C	Ambient Temperature : 23.8 °C
Relative Humidity : 45.2 %	Relative Humidity : 46.7 %
Barometric Pressure : 101.3 kPa	Barometric Pressure : 101.26 kPa

Calibration Technician : Peter Elters	Secondary Check: Rhys Gravelle
Calibration Date : 27 May 2024	Report Issue Date : 3 Jun 2024

Approved Signatory :  Ken Williams

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

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

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

Acoustic Tests		Uncertainties of Measurement - Environmental Conditions	
125Hz	±0.13 dB	Temperature	±0.1 °C
1kHz	±0.13 dB	Relative Humidity	±1.9 %
8kHz	±0.14 dB	Barometric Pressure	±0.11 kPa
Electrical Tests	±0.13 dB		

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



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

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

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

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



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

Calibration Number C24154

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

Equipment Tested/ Model Number : Model 105
Instrument Serial Number : 96080

Atmospheric Conditions

Ambient Temperature : 25.5 °C
Relative Humidity : 52.1 %
Barometric Pressure : 100.4 kPa

Calibration Technician : Peter Elters **Secondary Check:** Rhys Gravelle
Calibration Date : 26 Feb 2024 **Report Issue Date :** 26 Feb 2024

Approved Signatory :  Ken Williams

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

Nominal Level	Nominal Frequency	Measured Level	Measured Frequency
94	1000	93.80	1000.30

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

Specific Tests		Uncertainties of Measurement - Environmental Conditions	
Generated SPL	±0.10 dB	Temperature	±0.1 °C
Frequency	±0.07 %	Relative Humidity	±1.9 %
Distortion	±0.20 %	Barometric Pressure	±0.11 kPa

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



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

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

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

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Karuah East Quarry

Quarterly attended noise monitoring - Q2 2025

Prepared for Karuah East Quarry Pty Limited

May 2025

Karuah East Quarry

Quarterly attended noise monitoring - Q2 2025

Karuah East Quarry Pty Limited

E250042 RP#2

May 2025

Version	Date	Prepared by	Reviewed by	Comments
1	30 May 2025	Lucas Adamson	Robert Kirwan	Final

Approved by



Robert Kirwan

Associate Acoustics Consultant – Team Leader

30 May 2025

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This report has been prepared in accordance with the brief provided by Hunter Quarries Pty Limited and, in its preparation, EMM has relied upon the information collected at the times and under the conditions specified in this report. All findings, conclusions or recommendations contained in this report are based on those aforementioned circumstances. This report is to only be used for the purpose for which it has been provided. Except as permitted by the Copyright Act 1968 (Cth) and only to the extent incapable of exclusion, any other use (including use or reproduction of this report for resale or other commercial purposes) is prohibited without EMM's prior written consent. Except where expressly agreed to by EMM in writing, and to the extent permitted by law, EMM will have no liability (and assumes no duty of care) to any person in relation to this document, other than to Hunter Quarries Pty Limited (and subject to the terms of EMM's agreement with Hunter Quarries Pty Limited).

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ABN: 28 141 736 558

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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 day and evening periods on Wednesday 14 May 2025 and during the morning shoulder period on Wednesday 28 May 2025 at five monitoring locations

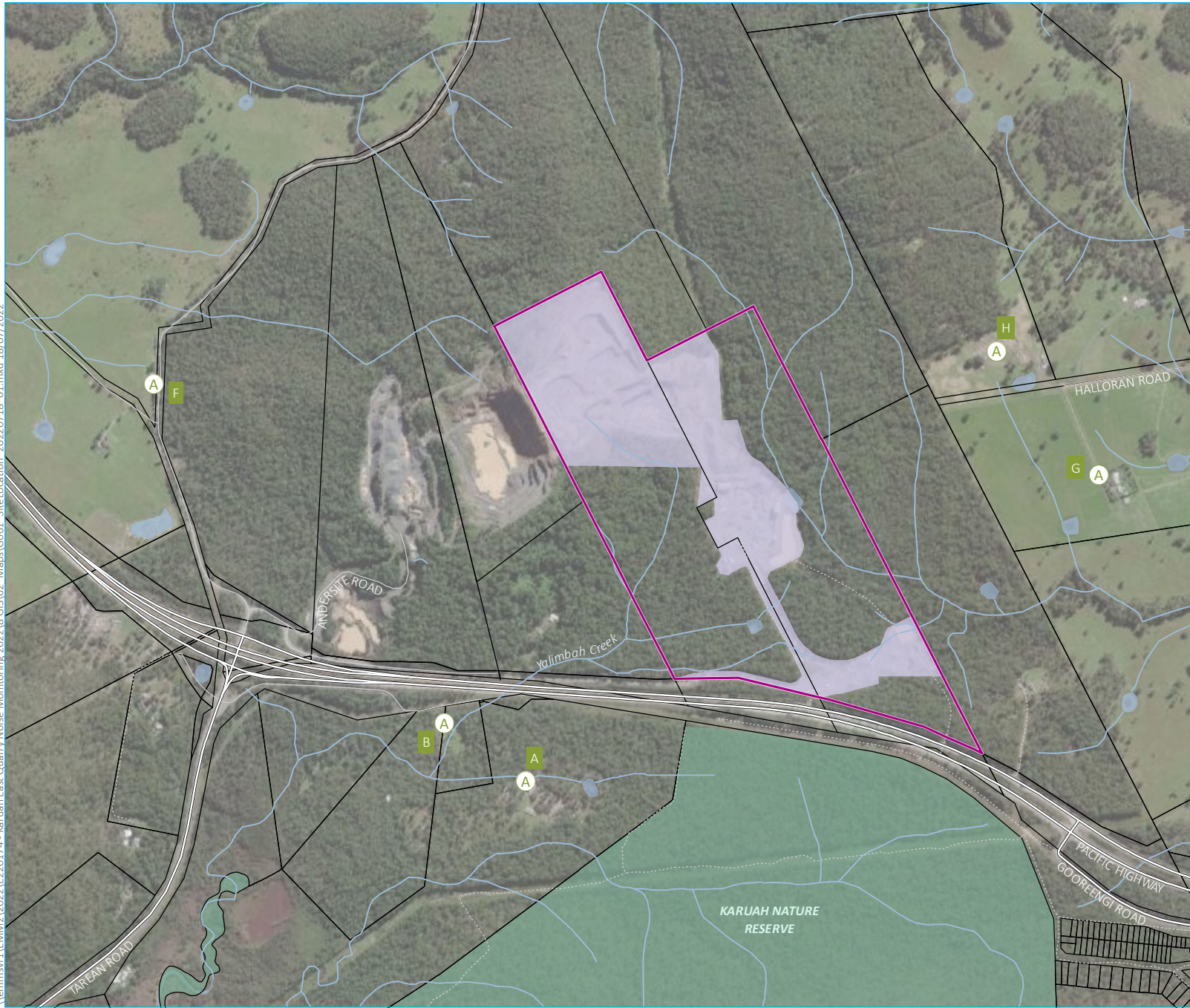
1.2 Attended monitoring locations

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

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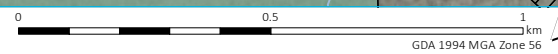


- KEY**
- Site boundary
 - A Attended noise monitoring location
 - Approved disturbance area
 - Major road
 - Minor road
 - Vehicular track
 - Watercourse/drainage line
 - Cadastral boundary
 - Waterbody
 - NPWS reserve
 - State forest

Attended noise monitoring locations

Karuah East Quarry
Quarterly attended noise monitoring
Figure 1.1

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



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 limit summary

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

Table 2.1 Noise 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 considerations

Monitoring and reporting have been done in accordance with the NPfl 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 NPfl 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 using a handheld device.

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

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

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
Rion NA28 sound level meter	30131882	06/02/2027	IEC 61672-1:2002
SVAN SV-36 acoustic calibrator	138014	07/08/2025	IEC 60942:2003

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 2025¹

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	14/05/2025 15:42	48	42	37	35	34	32	29
G	14/05/2025 16:05	52	47	42	39	37	36	31
F	14/05/2025 16:35	58	56	53	51	50	47	45
A	14/05/2025 16:58	60	58	55	53	52	48	43
B	14/05/2025 17:35	73	70	67	63	61	55	47
B	14/05/2025 18:01	72	70	66	62	60	54	47
A	14/05/2025 18:23	58	56	54	51	49	44	39
F	14/05/2025 18:47	60	57	54	51	49	45	43
G	14/05/2025 19:14	61	57	51	49	48	45	42
H	14/05/2025 19:42	52	49	47	45	44	42	36
H	28/05/2025 5:00	52	46	43	42	41	39	36
G	28/05/2025 5:22	49	44	42	40	39	37	35
F	28/05/2025 5:50	58	57	54	51	50	46	42
B	28/05/2025 6:13	72	71	67	63	61	54	48
A	28/05/2025 6:35	64	61	57	55	55	51	46

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 – Q2 2025

Location	Start date and time	Temperature °C	Wind speed m/s	Wind direction ° Magnetic north ¹	Cloud cover 1/8s
H	14/05/2025 15:42	23.2	<0.5	-	6
G	14/05/2025 16:05	25.9	<0.5	-	6
F	14/05/2025 16:35	23.5	<0.5	-	5
A	14/05/2025 16:58	23.7	<0.5	-	6
B	14/05/2025 17:35	23.9	<0.5	-	6

Location	Start date and time	Temperature °C	Wind speed m/s	Wind direction ° Magnetic north ¹	Cloud cover 1/8s
B	14/05/2025 18:01	23.9	<0.5	-	6
A	14/05/2025 18:23	22.8	<0.5	-	6
F	14/05/2025 18:47	19.9	<0.5	-	6
G	14/05/2025 19:14	19.5	<0.5	-	6
H	14/05/2025 19:42	23.4	<0.5	-	6
H	28/05/2025 5:00	13.1	0.9	310	0
G	28/05/2025 5:22	12.5	2.3	310	0
F	28/05/2025 5:50	13.3	0.9	0	0
B	28/05/2025 6:13	14.2	0.8	220	0
A	28/05/2025 6:35	13.7	0.5	320	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 NPfl.

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 – Q2 2025

Location	Start Date and Time (Period)	Wind		Stability Class	Very enhancing? ¹	Limit, dB		Site level, dB ²		Exceedance	
		Speed m/s	Direction ⁴			L _{Aeq,15minute}	L _{Amax}	L _{Aeq,15minute}	L _{Amax}	L _{Aeq,15minute}	L _{Amax}
H	14/05/2025 15:42 (D)	1.4	324	A	No	44	N/A	IA	IA	No	N/A
G	14/05/2025 16:05 (D)	0.5	48	A	No	43	N/A	IA	IA	No	N/A
F	14/05/2025 16:35 (D)	0.7	3	A	No	40	N/A	IA	IA	No	N/A
A	14/05/2025 16:58 (D)	1.0	338	A	No	42	N/A	IA	IA	No	N/A
B	14/05/2025 17:35 (D)	0.7	79	A	No	40	N/A	IA	IA	No	N/A
B	14/05/2025 18:01 (E)	1.8	92	F	No	40	N/A	IA	N/A	No	N/A
A	14/05/2025 18:23 (E)	1.1	58	F	No	40	N/A	IA	N/A	No	N/A
F	14/05/2025 18:47 (E)	0.3	302	F	No	35	N/A	IA	N/A	No	N/A
G	14/05/2025 19:14 (E)	0.6	132	F	No	39	N/A	IA	N/A	No	N/A
H	14/05/2025 19:42 (E)	1.2	249	F	No	46	N/A	IA	N/A	No	N/A
H	28/05/2025 5:00	1.7	236	F	No	35	52	IA	IA	No	No
G	28/05/2025 5:22	1.4	247	F	No	35	52	IA	IA	No	No
F	28/05/2025 5:50	1.9	237	F	No	35	52	IA	IA	No	No
B	28/05/2025 6:13	1.8	240	F	No	35	52	IA	IA	No	No
A	28/05/2025 6:35	1.6	239	F	No	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 NPfl.
 2. Site-only $L_{Aeq,15\text{minute}}$ 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 day and evening periods on Wednesday 14 May 2025 and during the morning shoulder period on Wednesday 28 May 2025 at five monitoring locations.

Noise levels from the site complied with relevant limits at all monitoring locations during the Q2 2025 survey.

Appendix A

Noise perception and examples

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

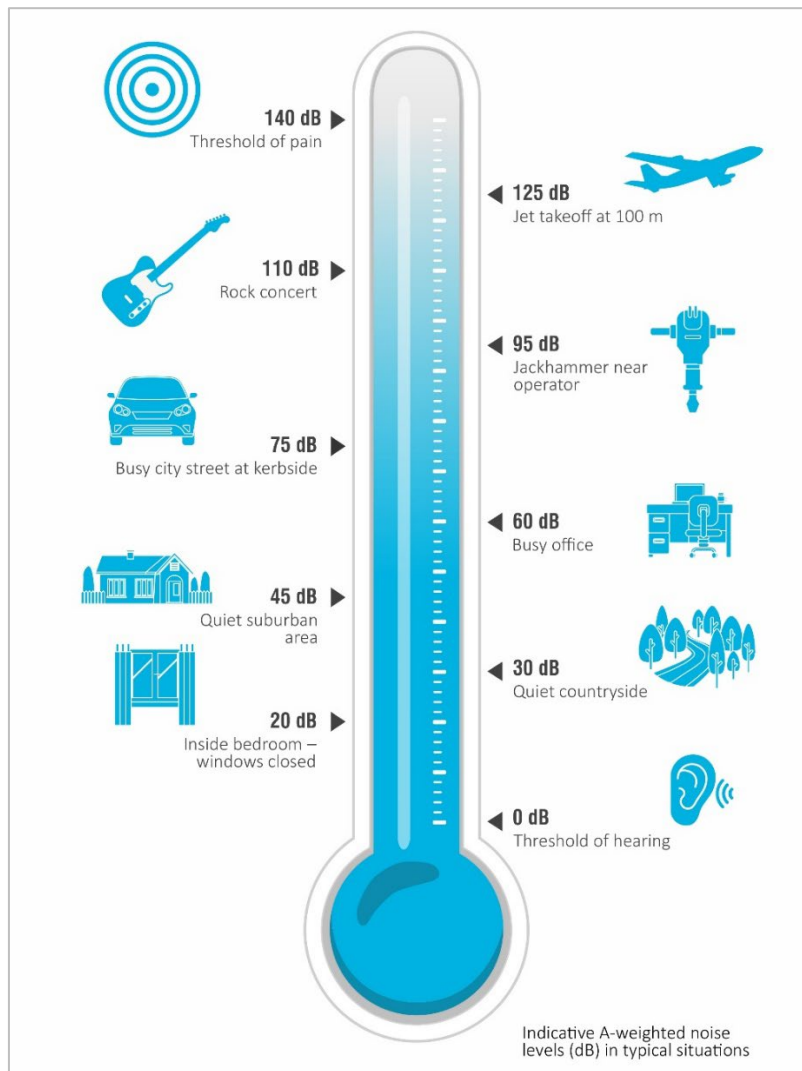


Figure A.1 Common noise levels

Appendix B

Regulator documents

**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 <i>L</i>_{Aeq (15 min)}	Morning Shoulder <i>L</i>_{Amax}	Day <i>L</i>_{Aeq (15 min)}	Evening <i>L</i>_{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:
- take all reasonable steps to minimise noise from construction and operational activities, including low frequency noise and other audible characteristics, associated with the development;
 - implement reasonable and feasible noise attenuation measures on all plant and equipment that will operate in noise sensitive areas;
 - operate a comprehensive noise management system commensurate with the risk of impact;
 - 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);
 - 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
 - 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:
- be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary;
 - be prepared in consultation with the EPA;
 - describe the measures to be implemented to ensure:
 - compliance with the noise criteria and operating conditions in this consent;
 - best practice management is being employed;
 - noise impacts of the development are minimised during noise-enhancing meteorological conditions when the noise criteria in this consent do not apply (see NPfI);
 - describe the noise management system in detail; and
 - include a monitoring program that:
 - is capable of evaluating the performance of the development;
 - monitors noise at the nearest and/or most affected residences;
 - adequately supports the noise management system;
 - includes a protocol for distinguishing noise emissions of the development from any neighbouring developments; and
 - 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.

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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.
- L2.3 To avoid any doubt, this condition does not authorise the pollution of waters by any pollutant other than those specified in the table/s.
- L2.4 Water and/or Land Concentration Limits

POINT 1,2,3

Pollutant	Units of Measure	50 Percentile concentration limit	90 Percentile concentration limit	3DGM concentration limit	100 percentile concentration limit
Oil and Grease	milligrams per litre				5 &/or none visible
pH	pH				6.5 - 8.5
Total suspended solids	milligrams per litre				40

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 Assessment 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

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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:
- Wind speed greater than 3 metres/second at 10 metres above ground level; or
 - Stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or
 - 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:
- 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;
 - approximately on the boundary where any dwelling is situated 30 metres or less from the property boundary that is closest to the premises;
 - at the most affected point at a location where there is no dwelling at the location; and
 - 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:
- at a location other than an area prescribed in part (a) and part (b); and/or
 - 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.

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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 compliance 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

4.3 Operational Noise Criteria

Schedule 3, Condition 3 of the Project Approval provides operational noise limits for all noise-sensitive receivers surrounding the site, as summarised by **Table 5**.

Table 5 *Noise Impact Criteria.*

Noise Assessment Location	Morning Shoulder	Morning Shoulder	Day	Evening
	L _{Aeq} (15 min)	L _{Amax}	L _{Aeq} (15 min)	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

Noise generated by the development must be monitored and measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions as well as corrections to account for characteristics of a noise source) of the NPfl (EPA 2017).

The noise limits provided in **Table 5** apply under standard and noise-enhancing meteorological conditions (as defined in the NPfl) determined by monitoring at the relevant weather station. In accordance with Condition L4.3 of the EPL and the Project Approval, the noise limits provided in **Table 5** apply under all meteorological conditions except for the following:

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

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

Noise limits do not apply if KEQ has an agreement with the owner/s of the relevant residence or land to exceed the noise criteria, and KEQ has advised the Department in writing of the terms of this agreement. No agreements have been required or implemented to-date.

4.4 Road Traffic Noise

Schedule 3, Condition 4 of the Project Approval 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 6** at any residence on privately-owned land.

Table 6 *Road traffic noise criteria.*

Road	Criteria (Day)
Pacific Highway	60 dB L _{Aeq} (15 hour)
Local Roads	55 dB L _{Aeq} (1 hour)

Based on the annual production limit, the following summarises the average daily traffic generation:

- a total of 432 vehicle movements per day (216 despatched loads per day); and
- a maximum hourly traffic flow of 44 vehicle movements (22 despatched loads during that hour).

Document Number	Version Number	Version Date	Revision Date	Document Owner	Page
ENV-MP-KEQ008	Version 4C	17/06/2024	17/06/2027	E&D Manager	21 of 37

Appendix C

Calibration certificates

CERTIFICATE OF CALIBRATION

CERTIFICATE No: **SLM52717**

EQUIPMENT TESTED: Sound Level Meter

Manufacturer: Rion
Type No: NA-28 **Serial No:** 30131882
Mic. Type: Rion UC-59 **Serial No:** 04739
Pre-Amp. Type: Rion NH-23 **Serial No:** 11942
Filter Type: 1/3 Octave **Test No:** FILT9709
Owner: EMM Consulting
Level 1, 175 Scott Street
Newcastle, NSW 2300

Tests Performed: IEC 61672-3:2013,
IEC 1260:1995, & AS/NZS 4476:1997

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

CONDITIONS OF TEST:

Ambient Pressure	1000 hPa ± 1 hPa	Date of Receipt :	31/01/2025
Temperature	24 $^{\circ}\text{C} \pm 1^{\circ}\text{C}$	Date of Calibration :	06/02/2025
Relative Humidity	46 % $\pm 5\%$	Date of Issue :	06/02/2025

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

CHECKED BY:

AUTHORISED

SIGNATURE:


Hein Sae
Hein Sae

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%.


Acu-Vib Electronics
ACOUSTICS AND VIBRATIONS

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



WORLD RECOGNISED
ACCREDITATION
Accredited Laboratory
No. 9262
Acoustic and Vibration
Measurements

CERTIFICATE NO: SLM52717

The performance characteristics listed below were tested. The tests are based on the relevant clauses of IEC 61672-3:2013

Tests Performed:	<i>Clause</i>	<i>Result</i>
<i>Absolute Calibration</i>	10	Pass
<i>Acoustical Frequency Weighting</i>	12	Pass
<i>Self-Generated Noise</i>	11.1	Observed
<i>Electrical Noise</i>	11.2	Observed
<i>Long Term Stability</i>	15	Pass
<i>Electrical Frequency Weightings</i>	13	Pass
<i>Frequency and Time Weightings</i>	14	Pass
<i>Reference Level Linearity</i>	16	Pass
<i>Range Level Linearity</i>	17	Pass
<i>Toneburst</i>	18	Pass
<i>Peak C Sound Level</i>	19	Pass
<i>Overload Indicator</i>	20	Pass
<i>High Level Stability</i>	21	Pass

Statement of Compliance: The sound level meter submitted for testing successfully completed the periodic tests of IEC 61672-3:-2013, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:-2013 because evidence was not publically available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:-2013 and because the periodic tests of IEC 61672-3:-2013 cover only a limited subset of the specifications in IEC 61672-1:-2013.

This Sound Level Meter included an Octave Filter Set. Tests were based on IEC 1260: 1995 and AS/NZS 4476 - 1997 and were conducted to test the following performance characteristics:

1. Relative attenuation clause 5.3

A full technical report is available on request.

CERTIFICATE OF CALIBRATION

CERTIFICATE NO: **C50817**

EQUIPMENT TESTED : Acoustic Calibrator

Manufacturer: Svantek

Type No: SV 36

Serial No: 138014

Class: 1

Owner: EMM Consulting

Suite 01, 20 Chandos St

St Leonards NSW 2065

Tests Performed: Measured Output Pressure level, Frequency & Distortion

Comments: See Details and Class Tolerance overleaf.

CONDITION OF TEST:

Ambient Pressure 1013 hPa ± 1 hPa

Temperature 22 $^{\circ}\text{C} \pm 1^{\circ}\text{C}$

Relative Humidity 41 % $\pm 5\%$

Date of Receipt : 05/08/2024

Date of Calibration : 07/08/2024

Date of Issue : 07/08/2024

Acu-Vib Test AVP02 (Calibrators)

Procedure: Test Method: AS IEC 60942 - 2017

CHECKED BY: *RS*

AUTHORISED

SIGNATURE:

Hein See

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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E250042_KEQ_Q2_V1

Final Audit Report

2025-05-30

Created:	2025-05-30
By:	Samantha Ezzy (sezzy@emmconsulting.com.au)
Status:	Signed
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-  Document created by Samantha Ezzy (sezzy@emmconsulting.com.au)
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-  Document emailed to Robert Kirwan (rkirwan@emmconsulting.com.au) for signature
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Karuah East Quarry

Quarterly attended noise monitoring - Q3 2025

Prepared for Karuah East Quarry Pty Limited

September 2025

Karuah East Quarry

Quarterly attended noise monitoring - Q3 2025

Karuah East Quarry Pty Limited

E250042 RP#4

September 2025

Version	Date	Prepared by	Reviewed by	Comments
1	5 September 2025	Lucas Adamson	Robert Kirwan	Final

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5 September 2025

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This report has been prepared in accordance with the brief provided by Karuah East Quarry Pty Limited and, in its preparation, EMM has relied upon the information collected at the times and under the conditions specified in this report. All findings, conclusions or recommendations contained in this report are based on those aforementioned circumstances. This report is to only be used for the purpose for which it has been provided. Except as permitted by the *Copyright Act 1968* (Cth) and only to the extent incapable of exclusion, any other use (including use or reproduction of this report for resale or other commercial purposes) is prohibited without EMM's prior written consent. Except where expressly agreed to by EMM in writing, and to the extent permitted by law, EMM will have no liability (and assumes no duty of care) to any person in relation to this document, other than to Karuah East Quarry Pty Limited (and subject to the terms of EMM's agreement with Karuah East Quarry Pty Limited).

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ABN: 28 141 736 558

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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 Wednesday 27 August 2025 at five monitoring locations.

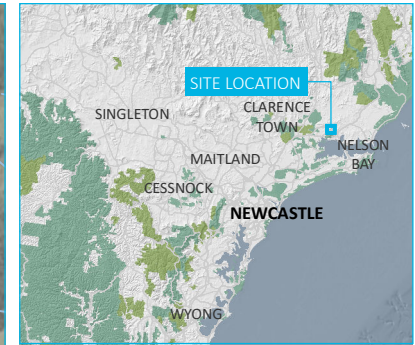
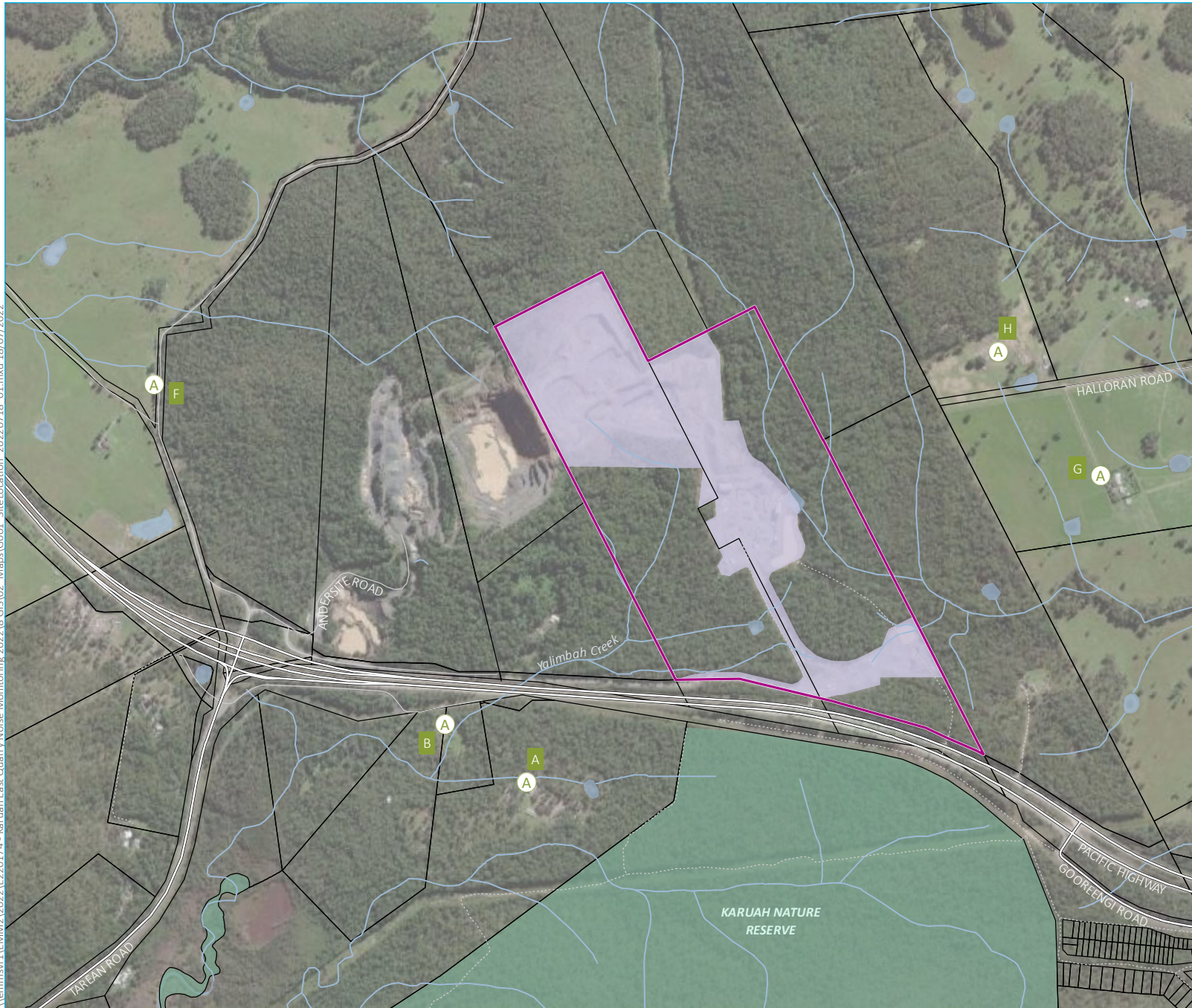
1.2 Attended monitoring locations

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

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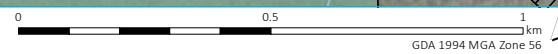


- KEY**
- Site boundary
 - A Attended noise monitoring location
 - Approved disturbance area
 - Major road
 - Minor road
 - Vehicular track
 - Watercourse/drainage line
 - Cadastral boundary
 - Waterbody
 - NPWS reserve
 - State forest

Attended noise monitoring locations

Karuah East Quarry
Quarterly attended noise monitoring
Figure 1.1

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



1.3 Terminology and abbreviations

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

Table 1.2 Terminology and abbreviations

Term/descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to approximate how humans hear noise.
L _{Amax}	The maximum root mean squared A-weighted noise level over a time period.
L _{A1}	The A-weighted noise level which is exceeded for 1% of the time.
LA1,1minute	The A-weighted noise level which is exceeded for 1% of the specified time period of 1 minute.
LA10	The A-weighted noise level which is exceeded for 10% of the time.
LAeq	The energy average A-weighted noise level.
LA50	The A-weighted noise level which is exceeded for 50% of the time, also the median noise level during a measurement period.
LA90	The A-weighted noise level exceeded for 90% of the time, also referred to as the “background” noise level and commonly used to derive noise limits.
L _{Amin}	The minimum A-weighted noise level over a time period.
LCeq	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 (m).
VTG	The vertical temperature gradient in degrees Celsius per 100 m 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: 7:00 am to 6:00 pm, on Sundays and public holidays: 8:00 am to 6:00 pm.
Evening	Monday – Saturday: 6:00 pm to 10:00 pm, on Sundays and public holidays: 6:00 pm to 10:00 pm.
Morning Shoulder	Monday – Saturday: 5:00 am to 7:00 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 limit summary

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

Table 2.1 Noise 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 considerations

Monitoring and reporting have been done in accordance with the NPfl 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 NPfl 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 using a handheld device.

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

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

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 and Kjær2250 sound level meter	2759405	20/12/2025	IEC 61672-1:2013
SVAN SV-36 acoustic calibrator	75592	09/10/2026	IEC 60942:2017

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 2025¹

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	27/08/2025 5:06	65	57	54	51	51	47	44
B	27/08/2025 5:24	77	74	68	64	59	51	45
F	27/08/2025 5:46	81	60	53	54	49	45	42
G	27/08/2025 6:12	66	47	41	42	39	38	36
H	27/08/2025 6:30	57	53	47	45	45	42	38
H	27/08/2025 7:00	57	52	48	46	46	44	41
G	27/08/2025 7:18	65	53	50	48	47	44	42
F	27/08/2025 7:43	81	67	55	56	51	48	45
B	27/08/2025 8:03	74	72	68	64	63	57	49
A	27/08/2025 8:21	65	58	53	50	49	47	41
A	27/08/2025 18:00	62	60	58	56	56	54	51
B	27/08/2025 18:17	77	76	72	68	66	59	51
F	27/08/2025 18:36	82	65	58	59	55	51	47
G	27/08/2025 19:01	60	48	46	44	44	42	39
H	27/08/2025 19:21	56	49	46	44	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 m 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 2025

Location	Start date and time	Temperature °C	Wind speed m/s	Wind direction ° Magnetic north ¹	Cloud cover 1/8s
A	27/08/2025 5:06	14.3	<0.5	-	0
B	27/08/2025 5:24	14.5	<0.5	-	0
F	27/08/2025 5:46	14.4	<0.5	-	0
G	27/08/2025 6:12	14.9	<0.5	-	0
H	27/08/2025 6:30	15.1	<0.5	-	0
H	27/08/2025 7:00	16.1	<0.5	-	1
G	27/08/2025 7:18	16.4	<0.5	-	1
F	27/08/2025 7:43	18.2	<0.5	-	2
B	27/08/2025 8:03	19.0	<0.5	-	2
A	27/08/2025 8:21	20.1	<0.5	-	2
A	27/08/2025 18:00	16.5	2.7	280	0
B	27/08/2025 18:17	16.2	2.4	270	0
F	27/08/2025 18:36	15.8	2.2	280	0
G	27/08/2025 19:01	15.2	1.7	285	0
H	27/08/2025 19:21	14.8	2.1	270	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 NPfl.

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 2025

Location	Start date and time (period)	Wind		Stability class	Very enhancing? ¹	Limit, dB		Site level, dB ²		Exceedance	
		Speed (m/s)	Direction ⁴			L _{Aeq,15minute}	L _{Amax}	L _{Aeq,15minute}	L _{Amax}	L _{Aeq,15minute}	L _{Amax}
A	27/08/2025 5:06	0.7	254	F	No	35	52	IA	IA	No	No
B	27/08/2025 5:24	0.7	294	F	No	35	52	IA	IA	No	No
F	27/08/2025 5:46	0.5	137	F	No	35	52	IA	IA	No	No
G	27/08/2025 6:12	0.3	57	F	No	35	52	IA	IA	No	No
H	27/08/2025 6:30	0.2	3	F	No	35	52	34	45	No	No
H	27/08/2025 7:00	0.4	248	A	No	44	N/A	42	N/A	No	N/A
G	27/08/2025 7:18	0.2	329	A	No	43	N/A	43	N/A	No	N/A
F	27/08/2025 7:43	0.4	60	A	No	40	N/A	IA	N/A	No	N/A
B	27/08/2025 8:03	0.5	1	A	No	40	N/A	IA	N/A	No	N/A
A	27/08/2025 8:21	0.9	61	A	No	42	N/A	IA	N/A	No	N/A
A	27/08/2025 18:00	3.6	223	D	Yes	40	N/A	IA	N/A	No	N/A
B	27/08/2025 18:17	3.4	224	E	Yes	40	N/A	IA	N/A	No	N/A
F	27/08/2025 18:36	3.6	226	D	Yes	35	N/A	IA	N/A	No	N/A
G	27/08/2025 19:01	1.9	230	F	No	39	N/A	IA	N/A	No	N/A

Location	Start date and time (period)	Wind		Stability class	Very enhancing? ¹	Limit, dB		Site level, dB ²		Exceedance	
		Speed (m/s)	Direction ⁴			L _{Aeq,15minute}	L _{Amax}	L _{Aeq,15minute}	L _{Amax}	L _{Aeq,15minute}	L _{Amax}
H	27/08/2025 19:21	2.1	221	F	Yes	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 NPfl.
 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 Wednesday 27 August 2025 at five monitoring locations.

Noise levels from the site complied with relevant limits at all monitoring locations during the Q3 2025 survey.

Appendix A

Noise perception and examples

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

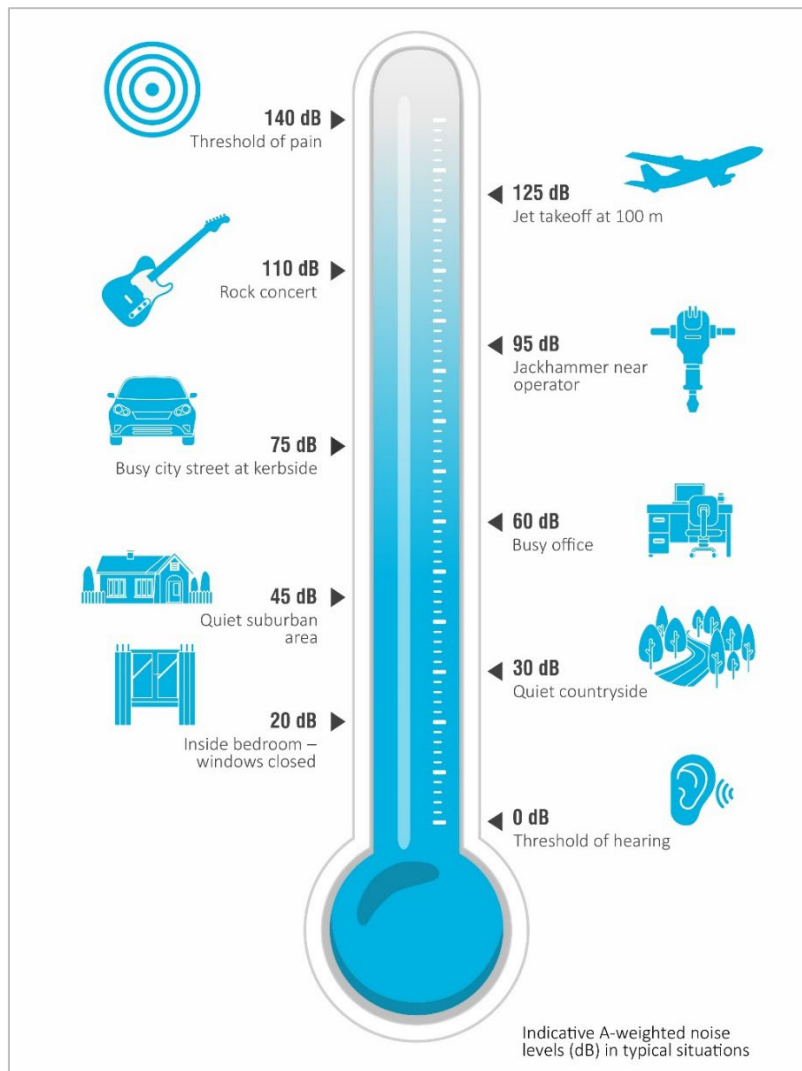


Figure A.1 Common noise levels

Appendix B

Regulator documents

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 <i>L_{Aeq} (15 min)</i>	Morning Shoulder <i>L_{Amax}</i>	Day <i>L_{Aeq} (15 min)</i>	Evening <i>L_{Aeq} (15 min)</i>
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:
- take all reasonable steps to minimise noise from construction and operational activities, including low frequency noise and other audible characteristics, associated with the development;
 - implement reasonable and feasible noise attenuation measures on all plant and equipment that will operate in noise sensitive areas;
 - operate a comprehensive noise management system commensurate with the risk of impact;
 - 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);
 - 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
 - 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:
- be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary;
 - be prepared in consultation with the EPA;
 - describe the measures to be implemented to ensure:
 - compliance with the noise criteria and operating conditions in this consent;
 - best practice management is being employed;
 - noise impacts of the development are minimised during noise-enhancing meteorological conditions when the noise criteria in this consent do not apply (see NPfI);
 - describe the noise management system in detail; and
 - include a monitoring program that:
 - is capable of evaluating the performance of the development;
 - monitors noise at the nearest and/or most affected residences;
 - adequately supports the noise management system;
 - includes a protocol for distinguishing noise emissions of the development from any neighbouring developments; and
 - 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

Licence - 20611

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.
- L2.3 To avoid any doubt, this condition does not authorise the pollution of waters by any pollutant other than those specified in the table/s.
- L2.4 Water and/or Land Concentration Limits

POINT 1,2,3

Pollutant	Units of Measure	50 Percentile concentration limit	90 Percentile concentration limit	3DGM concentration limit	100 percentile concentration limit
Oil and Grease	milligrams per litre				5 &/or none visible
pH	pH				6.5 - 8.5
Total suspended solids	milligrams per litre				40

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 Assessment 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

Environment Protection Licence

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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.

Environment Protection Licence

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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 compliance 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

B.3 Noise management plan

4.3 Operational Noise Criteria

Schedule 3, Condition 3 of the Project Approval provides operational noise limits for all noise-sensitive receivers surrounding the site, as summarised by **Table 5**.

Table 5 *Noise Impact Criteria.*

Noise Assessment Location	Morning Shoulder	Morning Shoulder	Day	Evening
	L _{Aeq} (15 min)	L _{Amax}	L _{Aeq} (15 min)	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

Noise generated by the development must be monitored and measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions as well as corrections to account for characteristics of a noise source) of the NPfl (EPA 2017).

The noise limits provided in **Table 5** apply under standard and noise-enhancing meteorological conditions (as defined in the NPfl) determined by monitoring at the relevant weather station. In accordance with Condition L4.3 of the EPL and the Project Approval, the noise limits provided in **Table 5** apply under all meteorological conditions except for the following:

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

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

Noise limits do not apply if KEQ has an agreement with the owner/s of the relevant residence or land to exceed the noise criteria, and KEQ has advised the Department in writing of the terms of this agreement. No agreements have been required or implemented to-date.

4.4 Road Traffic Noise

Schedule 3, Condition 4 of the Project Approval 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 6** at any residence on privately-owned land.

Table 6 *Road traffic noise criteria.*

Road	Criteria (Day)
Pacific Highway	60 dB L _{Aeq} (15 hour)
Local Roads	55 dB L _{Aeq} (1 hour)

Based on the annual production limit, the following summarises the average daily traffic generation:

- a total of 432 vehicle movements per day (216 despatched loads per day); and
- a maximum hourly traffic flow of 44 vehicle movements (22 despatched loads during that hour).

Document Number	Version Number	Version Date	Revision Date	Document Owner	Page
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Appendix C

Calibration certificates

CERTIFICATE OF CALIBRATION

Certificate No: CAU2300941

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CALIBRATION OF:

Sound Level Meter:	Brüel & Kjær	2250	No: 2759405
Microphone:	Brüel & Kjær	4189	No: 2983733
Preamplifier:	Brüel & Kjær	ZC-0032	No: 22666
Supplied Calibrator:	None		
Software version:	BZ7224 Version 4.7.4	Pattern Approval:	-
Instruction manual:	BE1712-22	Identification:	N/A

CUSTOMER:

EMM Consulting Pty Limited
 20 Chandos Street
 St Leonards NSW 2065

CALIBRATION CONDITIONS:

Preconditioning:	4 hours at 23 °C
Environment conditions:	<i>see actual values in Environmental conditions sections</i>

SPECIFICATIONS:

The Sound Level Meter has been calibrated in accordance with the requirements as specified in IEC61672-1:2013 class 1. Procedures from IEC 61672-3:2013 were used to perform the periodic tests. The measurements included in this document are traceable to Australian/National standards.

PROCEDURE:

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System B&K 3630 with application software type 7763 (version 8.6 - DB: 8.60) and test procedure 2250-4189.

RESULTS:

	Initial calibration		Calibration prior to repair/adjustment
X	Calibration without repair/adjustment		Calibration after repair/adjustment

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

Date of Calibration: 20/12/2023

Certificate issued: 21/12/2023

Calibration Technician: Sajeeb Tharayil

Approved signatory: Sajeeb Tharayil



Summary

Preliminary inspection	<u>Passed</u>
Environmental conditions, Prior to calibration	<u>Passed</u>
Reference information	<u>Passed</u>
Indication at the calibration check frequency	<u>Passed</u>
Acoustical signal tests of a frequency weighting, C weighting	<u>Passed</u>
Self-generated noise, Microphone installed	<u>Passed</u>
Self-generated noise, Electrical	<u>Passed</u>
Electrical signal tests of frequency weightings, A weighting	<u>Passed</u>
Electrical signal tests of frequency weightings, C weighting	<u>Passed</u>
Electrical signal tests of frequency weightings, Z weighting	<u>Passed</u>
Frequency and time weightings at 1 kHz	<u>Passed</u>
Long-term stability, Reference	<u>Passed</u>
Level linearity on the reference level range, Upper	<u>Passed</u>
Level linearity on the reference level range, Lower	<u>Passed</u>
Toneburst response, Time-weighting Fast	<u>Passed</u>
Toneburst response, Time-weighting Slow	<u>Passed</u>
Toneburst response, LAE	<u>Passed</u>
C-weighted peak sound level, 8 kHz	<u>Passed</u>
C-weighted peak sound level, 500 Hz	<u>Passed</u>
Overload indication	<u>Passed</u>
Long-term stability, 1. relative	<u>Passed</u>
High-level stability	<u>Passed</u>
Long-term stability, 2. relative	<u>Passed</u>
Environmental conditions, Following calibration	<u>Passed</u>

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

However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:2013 because (a) evidence was not publicly available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013 or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Conformance to a performance specification is demonstrated when the following criteria are both satisfied: (a) a measured deviation from a design goal does not exceed the applicable acceptance limit and (b) the corresponding uncertainty of measurement does not exceed the corresponding maximum-permitted uncertainty of measurement given in IEC 61672-1:2013 for the same coverage probability of 95 %.

Instruments

<u>Category:</u>	<u>Type:</u>	<u>Manufacturer:</u>	<u>Serial No.:</u>
Voltmeter	DMM34461A	Keysight / Agilent	MY60055667
Generator	Pulse Generator	Bruel & Kjaer	BK3161-105338
Calibrator	4226	Bruel & Kjaer	3222931
AmplifierDivider	WB-3630 Output Module	Bruel & Kjaer	3330940
Adaptor	WA0302B, 15 pF	Bruel & Kjaer	2747050

Preliminary inspection

Visually inspect instrument, and operate all relevant controls. (clause 5)

Result

Visual inspection	OK
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Environmental conditions, Prior to calibration

Actual environmental conditions prior to calibration. (clause 7)

	Expected	Accept - Limit	Accept + Limit	Measured
				[Deg / kPa / %RH]
Air temperature	23.00	-3.00	3.00	22.20
Air pressure	101.30	-21.30	3.70	100.40
Relative humidity	50.00	-25.00	20.00	51.20

Reference information

Information about reference range, level and channel. (clause 22.h + 22.m)

	Value
	[dB SPL]
Reference sound pressure level	94
Reference level range	140
Channel number	1

Indication at the calibration check frequency

Measure and adjust sound level meter using the supplied calibrator. (clause 10 + 22.m)

	Expected	Measured	Uncertainty
	[dB SPL / Hz]	[dB SPL / Hz]	[dB]
Calibration check frequency (in-house calibrator)	1000.00	1000.00	1.00
Initial indication (in-house calibrator)	93.93	93.83	0.20
Adjusted indication (in-house calibrator)	93.93	93.86	0.20

Acoustical signal tests of a frequency weighting, C weighting

Frequency weightings measured acoustically with a calibrated multi-frequency sound calibrator. Averaging time is 10 seconds, and the result is the average of 2 measurements. (clause 12)

	Coupler Pressure Lc [dB SPL]	Mic. Correction C4226 [dB]	Body Influence [dB]	Expected [dB SPL]	Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
1000Hz, Ref. (1st)	93.96	0.10	-0.07	93.93	93.86	-0.7	0.7	-0.07	0.25
1000Hz, Ref. (2nd)	93.96	0.10	-0.07	93.93	93.86	-0.7	0.7	-0.07	0.25
1000Hz, Ref. (Average)	93.96	0.10	-0.07	93.93	93.86	-0.7	0.7	-0.07	0.25
125.89Hz (1st)	94.04	0.00	0.00	93.84	93.92	-1.0	1.0	0.08	0.25
125.89Hz (2nd)	94.04	0.00	0.00	93.84	93.92	-1.0	1.0	0.08	0.25
125.89Hz (Average)	94.04	0.00	0.00	93.84	93.92	-1.0	1.0	0.08	0.25
7943.3Hz (1st)	93.69	2.80	-0.08	87.97	87.74	-2.5	1.5	-0.23	0.52
7943.3Hz (2nd)	93.69	2.80	-0.08	87.97	87.73	-2.5	1.5	-0.24	0.52
7943.3Hz (Average)	93.69	2.80	-0.08	87.97	87.73	-2.5	1.5	-0.24	0.52

Self-generated noise, Microphone installed

Self-generated noise measured with microphone submitted for periodic testing. Averaging time is 30 seconds. An anechoic chamber is used to isolate environmental noise. The level of self-generated noise is reported for information only and is not used to assess conformance to a requirement. (clause 11.1)

	Max [dB SPL]	Measured [dB SPL]	Uncertainty [dB]
A weighted	17.70	17.09	0.50

Self-generated noise, Electrical

Self-generated noise measured in most sensitive range, with electrical substitution for microphone, according to manufactures specifications. The level of self-generated noise is reported for information only and is not used to assess conformance to a requirement. (clause 11.2)

	Max [dB SPL]	Measured [dB SPL]	Uncertainty [dB]
A weighted	13.60	12.67	0.30
C weighted	14.30	12.97	0.30
Z weighted	19.40	18.08	0.30

Electrical signal tests of frequency weightings, A weighting

Frequency response measured with electrical signal relative to level at 1 kHz in reference range. (clause 13)

Electrical and acoustical response and body influence corrections are adjusted with the respective correction values at the reference frequency, in accordance with clause 13.6

	Input Level [dBV]	Expected [dB SPL]	Measured [dB SPL]	Response Corr. [dB]	Body Influence [dB]	Corr. Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
1000Hz, Ref.	-24.64	95.00	95.00	0.00	0.00	95.00	-0.5	0.5	0.00	0.12
63.096Hz	1.56	95.00	95.06	0.00	0.07	95.13	-1.0	1.0	0.13	0.12
125.89Hz	-8.54	95.00	95.02	0.00	0.07	95.09	-1.0	1.0	0.09	0.12
251.19Hz	-16.04	95.00	94.97	0.00	0.14	95.11	-1.0	1.0	0.11	0.12
501.19Hz	-21.44	95.00	94.97	0.00	0.29	95.26	-1.0	1.0	0.26	0.12
1995.3Hz	-25.84	95.00	95.01	-0.01	-0.02	94.98	-1.0	1.0	-0.02	0.12
3981.1Hz	-25.64	95.00	94.99	-0.02	-0.02	94.95	-1.0	1.0	-0.05	0.12
7943.3Hz	-23.54	95.00	95.00	0.00	-0.01	94.99	-2.5	1.5	-0.01	0.12
15849Hz	-18.04	95.00	94.11	0.87	0.18	95.16	-16.0	2.5	0.16	0.12

Electrical signal tests of frequency weightings, C weighting

Frequency response measured with electrical signal relative to level at 1 kHz in reference range. (clause 13)

Electrical and acoustical response and body influence corrections are adjusted with the respective correction values at the reference frequency, in accordance with clause 13.6

	Input Level [dBV]	Expected [dB SPL]	Measured [dB SPL]	Response Corr. [dB]	Body Influence [dB]	Corr. Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
1000Hz, Ref.	-24.64	95.00	95.00	0.00	0.00	95.00	-0.5	0.5	0.00	0.12
63.096Hz	-23.84	95.00	95.02	0.00	0.07	95.09	-1.0	1.0	0.09	0.12
125.89Hz	-24.44	95.00	95.04	0.00	0.07	95.11	-1.0	1.0	0.11	0.12
251.19Hz	-24.64	95.00	95.00	0.00	0.14	95.14	-1.0	1.0	0.14	0.12
501.19Hz	-24.64	95.00	95.03	0.00	0.29	95.32	-1.0	1.0	0.32	0.12
1995.3Hz	-24.44	95.00	95.04	-0.01	-0.02	95.01	-1.0	1.0	0.01	0.12
3981.1Hz	-23.84	95.00	95.00	-0.02	-0.02	94.96	-1.0	1.0	-0.04	0.12
7943.3Hz	-21.64	95.00	95.00	0.00	-0.01	94.99	-2.5	1.5	-0.01	0.12
15849Hz	-16.14	95.00	94.08	0.87	0.18	95.13	-16.0	2.5	0.13	0.12

Electrical signal tests of frequency weightings, Z weighting

Frequency response measured with electrical signal relative to level at 1 kHz in reference range. (clause 13)

Electrical and acoustical response and body influence corrections are adjusted with the respective correction values at the reference frequency, in accordance with clause 13.6

	Input Level [dBV]	Expected [dB SPL]	Measured [dB SPL]	Response Corr. [dB]	Body Influence [dB]	Corr. Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
1000Hz, Ref.	-24.64	95.00	95.00	0.00	0.00	95.00	-0.5	0.5	0.00	0.12
63.096Hz	-24.64	95.00	95.03	0.00	0.07	95.10	-1.0	1.0	0.10	0.12
125.89Hz	-24.64	95.00	95.01	0.00	0.07	95.08	-1.0	1.0	0.08	0.12
251.19Hz	-24.64	95.00	95.00	0.00	0.14	95.14	-1.0	1.0	0.14	0.12
501.19Hz	-24.64	95.00	95.00	0.00	0.29	95.29	-1.0	1.0	0.29	0.12
1995.3Hz	-24.64	95.00	95.01	-0.01	-0.02	94.98	-1.0	1.0	-0.02	0.12
3981.1Hz	-24.64	95.00	95.02	-0.02	-0.02	94.98	-1.0	1.0	-0.02	0.12
7943.3Hz	-24.64	95.00	95.00	0.00	-0.01	94.99	-2.5	1.5	-0.01	0.12
15849Hz	-24.64	95.00	94.14	0.87	0.18	95.19	-16.0	2.5	0.19	0.12

Frequency and time weightings at 1 kHz

Frequency and time weighting measured at 1 kHz with electrical signal in reference range. Measured relative to A-weighted and Fast response. (clause 14)

	Expected [dB SPL]	Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
LAF, Ref.	94.00	94.00	-0.5	0.5	0.00	0.12
LCF	94.00	94.00	-0.2	0.2	0.00	0.12
LZF	94.00	94.00	-0.2	0.2	0.00	0.12
LAS	94.00	93.96	-0.1	0.1	-0.04	0.12
LAeq	94.00	93.99	-0.1	0.1	-0.01	0.12

Long-term stability, Reference

Long-term stability over 25 to 35 minutes, with steady 1kHz signal at reference level. (clause 15)
Adjusting to reference level indication.

	Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Timestamp	Uncertainty [dB]
Reference	94.00	-0.5	0.5	0.00	2023-12-20 13:24:32	0.10

Level linearity on the reference level range, Upper

Level linearity in reference range, measured at 8 kHz until overload. (clause 16)

	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB]	[dB]
94 dB	94.00	94.00	-0.5	0.5	0.00	0.13
99 dB	99.00	99.00	-0.8	0.8	0.00	0.13
104 dB	104.00	104.00	-0.8	0.8	0.00	0.13
109 dB	109.00	109.00	-0.8	0.8	0.00	0.13
114 dB	114.00	114.02	-0.8	0.8	0.02	0.13
119 dB	119.00	119.02	-0.8	0.8	0.02	0.13
124 dB	124.00	124.02	-0.8	0.8	0.02	0.13
129 dB	129.00	129.02	-0.8	0.8	0.02	0.13
134 dB	134.00	134.02	-0.8	0.8	0.02	0.13
135 dB	135.00	135.02	-0.8	0.8	0.02	0.13
136 dB	136.00	136.02	-0.8	0.8	0.02	0.13
137 dB	137.00	137.02	-0.8	0.8	0.02	0.13
138 dB	138.00	138.02	-0.8	0.8	0.02	0.13
139 dB	139.00	139.02	-0.8	0.8	0.02	0.13
140 dB	140.00	140.01	-0.8	0.8	0.01	0.13

Level linearity on the reference level range, Lower

Level linearity in reference range, measured at 8 kHz down to lower limit, or until underrange. (clause 16)

	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB]	[dB]
94 dB	94.00	94.00	-0.5	0.5	0.00	0.13
89 dB	89.00	89.00	-0.8	0.8	0.00	0.13
84 dB	84.00	84.00	-0.8	0.8	0.00	0.13
79 dB	79.00	78.99	-0.8	0.8	-0.01	0.13
74 dB	74.00	73.99	-0.8	0.8	-0.01	0.13
69 dB	69.00	69.00	-0.8	0.8	0.00	0.13
64 dB	64.00	63.99	-0.8	0.8	-0.01	0.13
59 dB	59.00	58.99	-0.8	0.8	-0.01	0.13
54 dB	54.00	54.00	-0.8	0.8	0.00	0.13
49 dB	49.00	49.00	-0.8	0.8	0.00	0.13
44 dB	44.00	44.01	-0.8	0.8	0.01	0.13
39 dB	39.00	39.02	-0.8	0.8	0.02	0.24
34 dB	34.00	34.06	-0.8	0.8	0.06	0.24
30 dB	30.00	30.14	-0.8	0.8	0.14	0.24
29 dB	29.00	29.16	-0.8	0.8	0.16	0.24
28 dB	28.00	28.19	-0.8	0.8	0.19	0.24
27 dB	27.00	27.26	-0.8	0.8	0.26	0.24
26 dB	26.00	26.29	-0.8	0.8	0.29	0.24
25 dB	25.00	25.39	-0.8	0.8	0.39	0.24
24 dB	24.00	24.46	-0.8	0.8	0.46	0.24

Toneburst response, Time-weighting Fast

Response to 4 kHz toneburst measured in reference range, relative to continuous signal. (clause 18)

	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB]	[dB]
Continuous, Ref.	137.00	137.00	-0.5	0.5	0.00	0.12
200 ms Burst	136.00	135.99	-0.5	0.5	-0.01	0.12
2 ms Burst	119.00	118.93	-1.5	1.0	-0.07	0.12
0.25 ms Burst	110.00	109.82	-3.0	1.0	-0.18	0.12

Toneburst response, Time-weighting Slow

Response to 4 kHz toneburst measured in reference range, relative to continuous signal. (clause 18)

	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB]	[dB]
Continuous, Ref.	137.00	137.00	-0.5	0.5	0.00	0.12
200 ms Burst	129.60	129.63	-0.5	0.5	0.03	0.12
2 ms Burst	110.00	110.02	-3.0	1.0	0.02	0.12

Toneburst response, LAE

Response to 4 kHz toneburst measured in reference range, relative to continuous signal. (clause 18)

	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB]	[dB]
Continuous, Ref.	137.00	137.00	-0.5	0.5	0.00	0.12
200 ms Burst	130.00	129.99	-0.5	0.5	-0.01	0.12
2 ms Burst	110.00	109.96	-1.5	1.0	-0.04	0.12
0.25 ms Burst	101.00	100.85	-3.0	1.0	-0.15	0.12

C-weighted peak sound level, 8 kHz

Peak-response to a 8 kHz single-cycle sine measured in least-sensitive range, relative to continuous signal. (clause 19)

	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB]	[dB]
Continuous, Ref.	132.00	132.00	-0.5	0.5	0.00	0.09
Single Sine	135.40	135.30	-2.0	2.0	-0.10	0.20

C-weighted peak sound level, 500 Hz

Peak-response to a 500 Hz half-cycle sine measured in least-sensitive range, relative to continuous signal. (clause 19)

	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB]	[dB]
Continuous, Ref.	135.00	135.00	-0.5	0.5	0.00	0.09
Half-sine, Positive	137.40	137.12	-1.0	1.0	-0.28	0.12
Half-sine, Negative	137.40	137.12	-1.0	1.0	-0.28	0.12

Overload indication

Overload indication in the least sensitive range determined with a 4 kHz positive/negative half-cycle signal. (clause 20)

	Measured / Input Level	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB]	[dB]	[dB]	[dB]
Continuous	140.00	-0.5	0.5	0.00	0.20
Half-sine, Positive	141.30	-10.0	10.0	1.30	0.20
Half-sine, Negative	141.60	-10.0	10.0	1.60	0.20
Difference	141.60	-1.5	1.5	0.30	0.24

Long-term stability, 1. relative

Long-term stability over 25 to 35 minutes, with steady 1kHz signal at reference level. (clause 15)
Relative to prior adjustment to reference level indication.

	Measured	Accept - Limit	Accept + Limit	Deviation	Timestamp	Uncertainty
	[dB SPL / Min]	[dB / Min]	[dB / Min]	[dB / Min]		[dB]
Measurement	94.00	-0.1	0.1	0.00	2023-12-20 13:49:50	0.10
Time passed	25.18	0.0	35.0	25.18		0.00

High-level stability

High-level stability over 5 minutes, with steady 1kHz signal, 1dB below upper boundary. (clause 21)

	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB]	[dB]	[dB]	[dB]
High-level, Ref.	139.00	-0.5	0.5	0.00	0.10
High-level, after 5min	139.00	-0.1	0.1	0.00	0.10

Long-term stability, 2. relative

Long-term stability over 25 to 35 minutes, with steady 1kHz signal at reference level. (clause 15)
 Relative to prior adjustment to reference level indication.

	Measured [Min / dB SPL]	Accept - Limit [Min / dB]	Accept + Limit [Min / dB]	Deviation [Min / dB]	Timestamp	Uncertainty [dB]
Wait	31.31	25.0	120.0	31.31		0.00
Measurement	94.00	-0.1	0.1	0.00	2023-12-20 13:56:36	0.10

Environmental conditions, Following calibration

Actual environmental conditions following calibration. (clause 7)

	Expected	Accept - Limit	Accept + Limit	Measured [Deg / kPa / %RH]
Air temperature	23.00	-3.00	3.00	23.30
Air pressure	101.30	-21.30	3.70	100.50
Relative humidity	50.00	-25.00	20.00	59.40

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Karuah East Quarry

Quarterly attended noise monitoring - Q4 2025

Prepared for Karuah East Quarry Pty Limited

December 2025

Karuah East Quarry

Quarterly attended noise monitoring - Q4 2025

Karuah East Quarry Pty Limited

E250042 RP#5

December 2025

Version	Date	Prepared by	Reviewed by	Comments
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Approved by



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12 December 2025

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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 and day periods on Thursday 4 December 2025 and during the evening period on Wednesday 10 December 2025 at five monitoring locations.

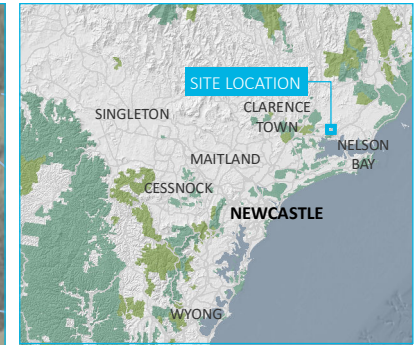
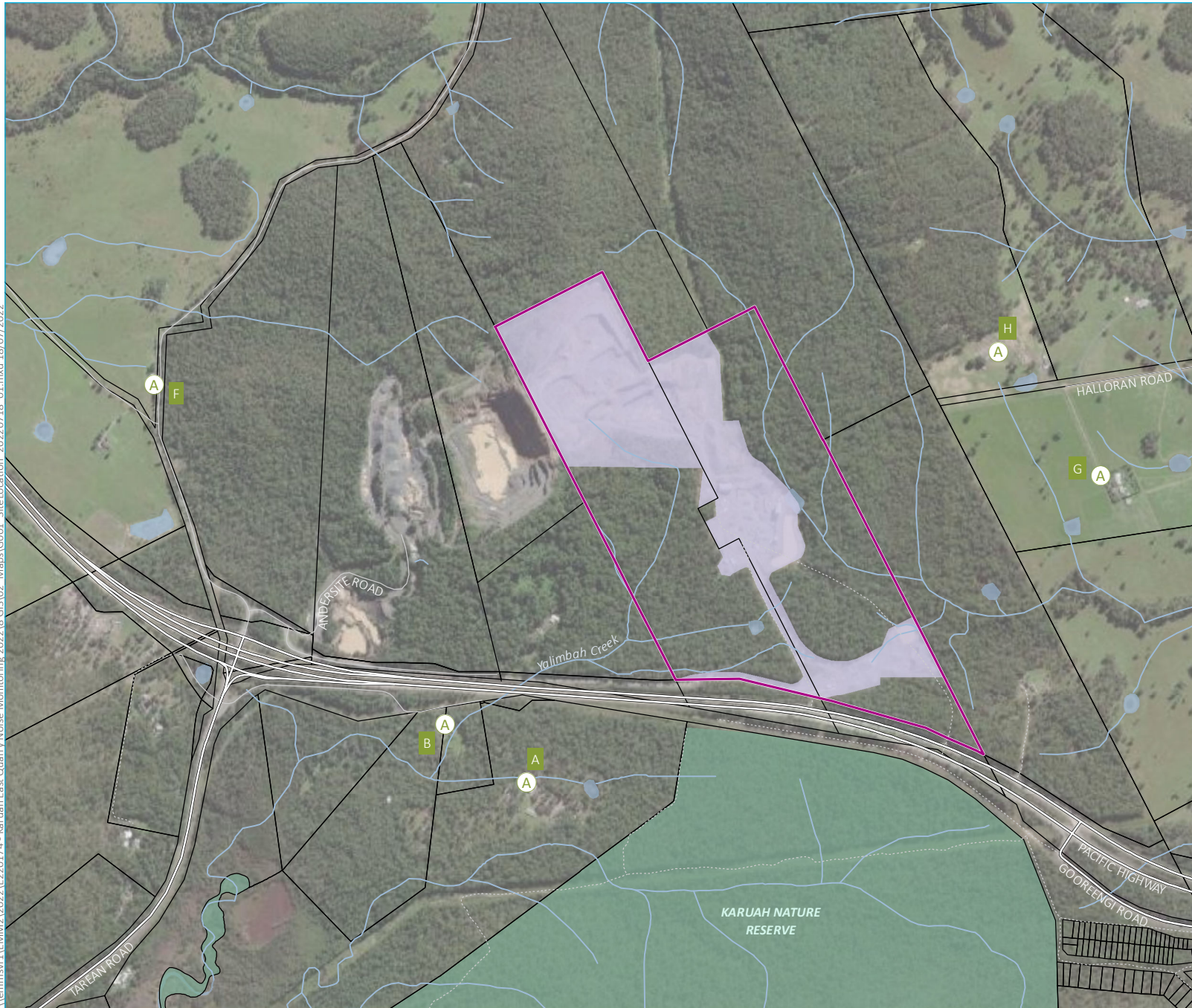
1.2 Attended monitoring locations

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

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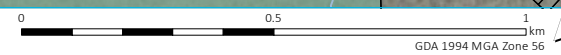


- KEY**
- Site boundary
 - A Attended noise monitoring location
 - Approved disturbance area
 - Major road
 - Minor road
 - Vehicular track
 - Watercourse/drainage line
 - Cadastral boundary
 - Waterbody
 - NPWS reserve
 - State forest

Attended noise monitoring locations

Karuah East Quarry
Quarterly attended noise monitoring
Figure 1.1

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



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 limit summary

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

Table 2.1 Noise 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 metres per second (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 considerations

Monitoring and reporting have been done in accordance with the NPfl 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 NPfl 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 using a handheld device.

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

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

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
Hottinger Brüel and Kjær 2255 sound level meter	100299	14/08/2026	IEC 61672-1:2013
SVAN SV-36 acoustic calibrator	140737	02/10/2027	IEC 60942:2017

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 2025¹

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	4/12/2025 5:01	70	63	58	56	55	52	46
B	4/12/2025 5:20	78	74	70	66	62	56	51
F	4/12/2025 5:42	71	62	59	56	54	50	45
G	4/12/2025 6:08	54	50	45	43	42	40	38
H	4/12/2025 6:27	59	52	45	43	40	38	36
H	4/12/2025 8:51	64	55	46	44	39	36	33
G	4/12/2025 9:09	64	48	41	39	36	34	32
F	4/12/2025 9:34	65	60	54	50	45	42	40
B	4/12/2025 9:57	77	73	69	67	66	63	57
A	4/12/2025 10:14	59	55	54	52	51	48	46
A	10/12/2025 18:02	99	66	51	68	47	42	35
B	10/12/2025 18:20	76	74	70	66	63	54	44
F	10/12/2025 18:40	61	55	52	49	48	45	41
G	10/12/2025 19:05	58	50	44	42	40	36	32
H	10/12/2025 19:24	55	48	45	43	42	38	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 m 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 2025

Location	Start date and time	Temperature °C	Wind speed m/s	Wind direction ° Magnetic north ¹	Cloud cover 1/8s
A	4/12/2025 5:01	16.8	<0.5	-	0
B	4/12/2025 5:20	17.1	<0.5	-	0
F	4/12/2025 5:42	17.5	<0.5	-	0
G	4/12/2025 6:08	18.0	<0.5	-	0
H	4/12/2025 6:27	17.8	<0.5	-	0
H	4/12/2025 8:51	21.3	1.0	35	0
G	4/12/2025 9:09	21.5	0.9	35	0
F	4/12/2025 9:34	22.5	<0.5	-	0
B	4/12/2025 9:57	24.1	<0.5	-	0
A	4/12/2025 10:14	24.0	<0.5	-	0
A	10/12/2025 18:02	23.2	<0.5	-	8
B	10/12/2025 18:20	23.0	<0.5	-	8
F	10/12/2025 18:40	22.4	1.1	135	8
G	10/12/2025 19:05	22.8	<0.5	-	8
H	10/12/2025 19:24	22.5	<0.5	-	8

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 NPfl.

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 2025

Location	Start Date and Time (Period)	Wind		Stability Class	Very enhancing? ¹	Limit, dB		Site level, dB ²		Exceedance	
		Speed (m/s)	Direction ⁴			L _{Aeq,15minute}	L _{Amax}	L _{Aeq,15minute}	L _{Amax}	L _{Aeq,15minute}	L _{Amax}
A	4/12/2025 5:01	0.0	74	F	No	35	52	IA	IA	No	No
B	4/12/2025 5:20	0.1	86	F	No	35	52	IA	IA	No	No
F	4/12/2025 5:42	0.1	329	F	No	35	52	IA	IA	No	No
G	4/12/2025 6:08	0.1	29	F	No	35	52	<30	47	No	No
H	4/12/2025 6:27	0.2	69	F	No	35	52	IA	IA	No	No
H	4/12/2025 8:51	1.3	222	A	No	44	N/A	IA	N/A	No	N/A
G	4/12/2025 9:09	1.3	233	A	No	43	N/A	<34	N/A	No	N/A
F	4/12/2025 9:34	1.6	209	A	No	40	N/A	IA	N/A	No	N/A
B	4/12/2025 9:57	1.9	211	A	No	40	N/A	IA	N/A	No	N/A
A	4/12/2025 10:14	1.4	229	A	No	42	N/A	IA	N/A	No	N/A
A	10/12/2025 18:02	0.6	138	F	No	40	N/A	IA	N/A	No	N/A
B	10/12/2025 18:20	0.6	118	F	No	40	N/A	IA	N/A	No	N/A
F	10/12/2025 18:40	1.8	71	F	No	35	N/A	IA	N/A	No	N/A
G	10/12/2025 19:05	1.6	81	F	No	39	N/A	IA	N/A	No	N/A
H	10/12/2025 19:24	1.0	94	F	No	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 NPfl.
 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 morning shoulder and day periods on Thursday 4 December 2025 and during the evening period on Wednesday 10 December 2025 at five monitoring locations.

Noise levels from the site complied with relevant limits at all monitoring locations during the Q4 2025 survey.

Appendix A

Noise perception and examples

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

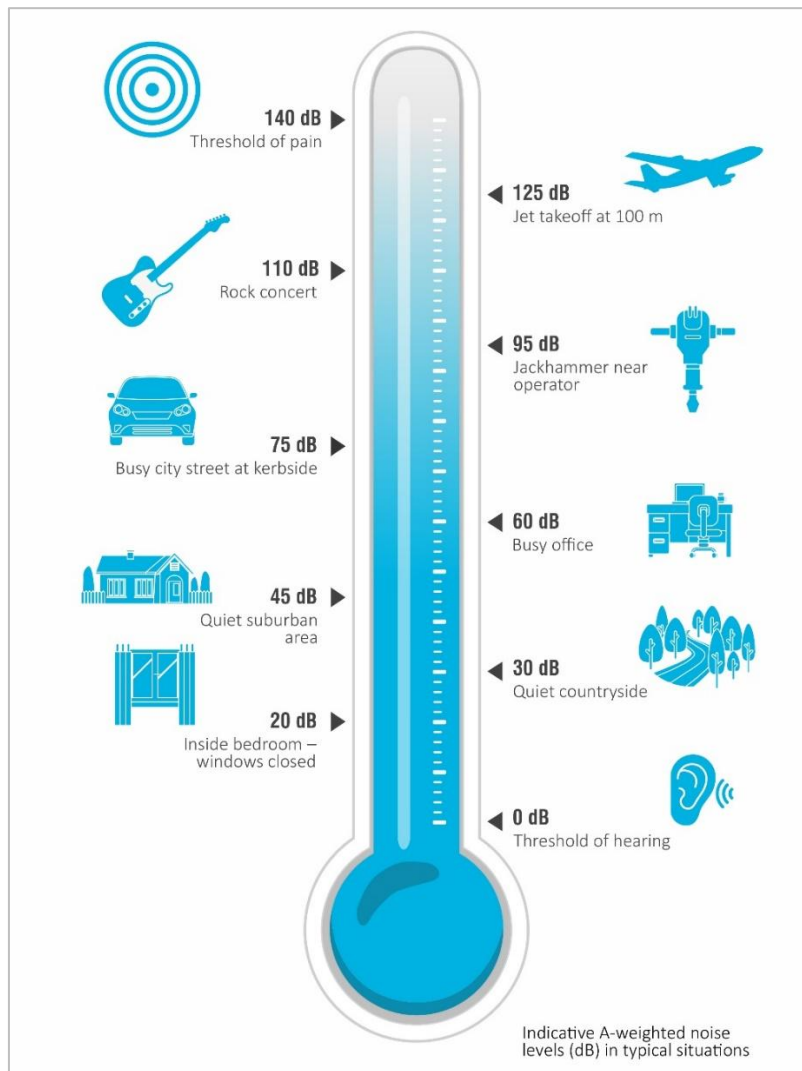


Figure A.1 Common noise levels

Appendix B

Regulator documents

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 <i>L_{Aeq} (15 min)</i>	Morning Shoulder <i>L_{Amax}</i>	Day <i>L_{Aeq} (15 min)</i>	Evening <i>L_{Aeq} (15 min)</i>
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:
- take all reasonable steps to minimise noise from construction and operational activities, including low frequency noise and other audible characteristics, associated with the development;
 - implement reasonable and feasible noise attenuation measures on all plant and equipment that will operate in noise sensitive areas;
 - operate a comprehensive noise management system commensurate with the risk of impact;
 - 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);
 - 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
 - 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:
- be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary;
 - be prepared in consultation with the EPA;
 - describe the measures to be implemented to ensure:
 - compliance with the noise criteria and operating conditions in this consent;
 - best practice management is being employed;
 - noise impacts of the development are minimised during noise-enhancing meteorological conditions when the noise criteria in this consent do not apply (see NPfI);
 - describe the noise management system in detail; and
 - include a monitoring program that:
 - is capable of evaluating the performance of the development;
 - monitors noise at the nearest and/or most affected residences;
 - adequately supports the noise management system;
 - includes a protocol for distinguishing noise emissions of the development from any neighbouring developments; and
 - 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

Licence - 20611

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.
- L2.3 To avoid any doubt, this condition does not authorise the pollution of waters by any pollutant other than those specified in the table/s.
- L2.4 Water and/or Land Concentration Limits

POINT 1,2,3

Pollutant	Units of Measure	50 Percentile concentration limit	90 Percentile concentration limit	3DGM concentration limit	100 percentile concentration limit
Oil and Grease	milligrams per litre				5 &/or none visible
pH	pH				6.5 - 8.5
Total suspended solids	milligrams per litre				40

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 Assessment 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

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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:
- Wind speed greater than 3 metres/second at 10 metres above ground level; or
 - Stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or
 - 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:
- 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;
 - approximately on the boundary where any dwelling is situated 30 metres or less from the property boundary that is closest to the premises;
 - at the most affected point at a location where there is no dwelling at the location; and
 - 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:
- at a location other than an area prescribed in part (a) and part (b); and/or
 - 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.

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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 compliance 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

B.3 Noise management plan

4.3 Operational Noise Criteria

Schedule 3, Condition 3 of the Project Approval provides operational noise limits for all noise-sensitive receivers surrounding the site, as summarised by **Table 5**.

Table 5 *Noise Impact Criteria.*

Noise Assessment Location	Morning Shoulder	Morning Shoulder	Day	Evening
	L _{Aeq} (15 min)	L _{Amax}	L _{Aeq} (15 min)	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

Noise generated by the development must be monitored and measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions as well as corrections to account for characteristics of a noise source) of the NPfl (EPA 2017).

The noise limits provided in **Table 5** apply under standard and noise-enhancing meteorological conditions (as defined in the NPfl) determined by monitoring at the relevant weather station. In accordance with Condition L4.3 of the EPL and the Project Approval, the noise limits provided in **Table 5** apply under all meteorological conditions except for the following:

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

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

Noise limits do not apply if KEQ has an agreement with the owner/s of the relevant residence or land to exceed the noise criteria, and KEQ has advised the Department in writing of the terms of this agreement. No agreements have been required or implemented to-date.

4.4 Road Traffic Noise

Schedule 3, Condition 4 of the Project Approval 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 6** at any residence on privately-owned land.

Table 6 *Road traffic noise criteria.*

Road	Criteria (Day)
Pacific Highway	60 dB L _{Aeq} (15 hour)
Local Roads	55 dB L _{Aeq} (1 hour)

Based on the annual production limit, the following summarises the average daily traffic generation:

- a total of 432 vehicle movements per day (216 despatched loads per day); and
- a maximum hourly traffic flow of 44 vehicle movements (22 despatched loads during that hour).

Document Number	Version Number	Version Date	Revision Date	Document Owner	Page
ENV-MP-KEQ008	Version 4C	17/06/2024	17/06/2027	E&D Manager	21 of 37

Appendix C

Calibration certificates

CERTIFICATE OF CALIBRATION

Certificate No: CAU2400803

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CALIBRATION OF:

Sound Level Meter:	Brüel & Kjær	2255	No: 2255-100299
Microphone:	Brüel & Kjær	4966	No: 3403563
Preamplifier:	Brüel & Kjær	ZC-0043	No: 3399249
Supplied Calibrator:	None		
Software version:	BZ7300 Version 1.2.0.1325	Pattern Approval:	-
Instruction manual:	BE1917-11	Identification:	N/A

CUSTOMER:

EMM Consulting Pty Limited
 20 Chandos Street
 St Leonards NSW 2065

CALIBRATION CONDITIONS:

Preconditioning: 4 hours at 23 °C
 Environment conditions: *see actual values in Environmental conditions sections*

SPECIFICATIONS:

The Sound Level Meter has been calibrated in accordance with the requirements as specified in IEC61672-3:2006 class 1. Procedures from IEC 61672-3:2006 were used to perform the periodic tests. The measurements included in this document are traceable to Australian / International standards through accredited calibration of all relevant reference equipment.

PROCEDURE:

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System B&K 3630 with application software type 7763 (version 8.6 - DB: 8.60) and test procedure 2255-N, 4966 (BZ-7300).

RESULTS:

X	Initial calibration		Calibration prior to repair/adjustment
	Calibration without repair/adjustment		Calibration after repair/adjustment

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

Date of Calibration: 14/08/2024

Certificate issued: 14/08/2024



Barath Chandar Rajendran
 Calibration Technician



Sajeeb Tharayil
 Approved signatory

Summary

Preliminary inspection	<u>Passed</u>
Environmental conditions, Prior to calibration	<u>Passed</u>
Reference information	<u>Passed</u>
Indication at the calibration check frequency	<u>Passed</u>
Acoustical signal tests of a frequency weighting, C weighting	<u>Passed</u>
Self-generated noise, Microphone installed	<u>Passed</u>
Self-generated noise, Electrical	<u>Passed</u>
Electrical signal tests of frequency weightings, A weighting	<u>Passed</u>
Electrical signal tests of frequency weightings, C weighting	<u>Passed</u>
Electrical signal tests of frequency weightings, Z weighting	<u>Passed</u>
Frequency and time weightings at 1 kHz	<u>Passed</u>
Long-term stability, Reference	<u>Passed</u>
Level linearity on the reference level range, Upper	<u>Passed</u>
Level linearity on the reference level range, Lower	<u>Passed</u>
Toneburst response, Time-weighting Fast	<u>Passed</u>
Toneburst response, Time-weighting Slow	<u>Passed</u>
Toneburst response, Leq	<u>Passed</u>
C-weighted peak sound level, 8 kHz	<u>Passed</u>
C-weighted peak sound level, 500 Hz	<u>Passed</u>
Overload indication	<u>Passed</u>
Long-term stability, 1. relative	<u>Passed</u>
High-level stability	<u>Passed</u>
Long-term stability, 2. relative	<u>Passed</u>
Environmental conditions, Following calibration	<u>Passed</u>

The sound level meter submitted for testing successfully completed the periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed. As evidence was publicly available, from an independent testing organization responsible for approving the results of pattern-evaluation tests performed in accordance with IEC 61672-2:2013, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013, the sound level meter submitted for testing conforms to the class 1 specifications of IEC 61672-1:2013.

Conformance to a performance specification is demonstrated when the following criteria are both satisfied: (a) a measured deviation from a design goal does not exceed the applicable acceptance limit and (b) the corresponding uncertainty of measurement does not exceed the corresponding maximum-permitted uncertainty of measurement given in IEC 61672-1:2013 for the same coverage probability of 95 %.

Instruments

<u>Category:</u>	<u>Type:</u>	<u>Manufacturer:</u>	<u>Serial No.:</u>
Voltmeter	DMM34461A	Keysight / Agilent	MY60055667
Generator	Pulse Generator	Bruel & Kjaer	BK3161-105338
Calibrator	4226	Bruel & Kjaer	3222931
AmplifierDivider	WB-3630 Output Module	Bruel & Kjaer	3330940
Adaptor	WA0302B, 15 pF	Bruel & Kjaer	2747050

Preliminary inspection

Visually inspect instrument, and operate all relevant controls. (clause 5)

	Result
Visual inspection	OK

Environmental conditions, Prior to calibration

Actual environmental conditions prior to calibration. (clause 7)

	Expected	Accept - Limit	Accept + Limit	Measured
				[Deg / kPa / %RH]
Air temperature	23.00	-3.00	3.00	24.10
Air pressure	101.30	-21.30	3.70	101.50
Relative humidity	50.00	-25.00	20.00	51.20

Reference information

Information about reference range, level and channel. (clause 22.h + 22.m)

	Value
	[dB SPL]
Reference sound pressure level	94
Reference level range	140
Channel number	1

Indication at the calibration check frequency

Measure and adjust sound level meter using the supplied calibrator. (clause 10 + 22.m)

	Expected	Measured	Uncertainty
	[dB SPL / Hz]	[dB SPL / Hz]	[dB]
Calibration check frequency (in-house calibrator)	1000.00	1000.00	1.00
Initial indication (in-house calibrator)	93.89	93.96	0.29
Adjusted indication (in-house calibrator)	93.89	93.93	0.29

Acoustical signal tests of a frequency weighting, C weighting

Frequency weightings measured acoustically with a calibrated multi-frequency sound calibrator. Averaging time is 10 seconds, and the result is the average of 2 measurements. (clause 12)

	Coupler Pressure Lc [dB SPL]	Mic. Correction C4226 [dB]	Body Influence [dB]	Expected [dB SPL]	Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
1000Hz, Ref. (1st)	93.96	0.06	0.01	93.89	93.91	-0.7	0.7	0.02	0.29
1000Hz, Ref. (2nd)	93.96	0.06	0.01	93.89	93.91	-0.7	0.7	0.02	0.29
1000Hz, Ref. (Average)	93.96	0.06	0.01	93.89	93.91	-0.7	0.7	0.02	0.29
125.89Hz (1st)	94.04	0.00	0.00	93.85	93.86	-1.0	1.0	0.01	0.26
125.89Hz (2nd)	94.04	0.00	0.00	93.85	93.83	-1.0	1.0	-0.02	0.26
125.89Hz (Average)	94.04	0.00	0.00	93.85	93.84	-1.0	1.0	-0.01	0.26
7943.3Hz (1st)	93.69	2.88	-0.03	87.85	87.58	-2.5	1.5	-0.27	0.47
7943.3Hz (2nd)	93.69	2.88	-0.03	87.85	87.58	-2.5	1.5	-0.27	0.47
7943.3Hz (Average)	93.69	2.88	-0.03	87.85	87.58	-2.5	1.5	-0.27	0.47

Self-generated noise, Microphone installed

Self-generated noise measured with microphone submitted for periodic testing. Averaging time is 30 seconds. An anechoic chamber is used to isolate environmental noise. The level of self-generated noise is reported for information only and is not used to assess conformance to a requirement. (clause 11.1)

	Max [dB SPL]	Measured [dB SPL]	Uncertainty [dB]
A weighted	17.30	16.81	0.50

Self-generated noise, Electrical

Self-generated noise measured in most sensitive range, with electrical substitution for microphone, according to manufactures specifications. The level of self-generated noise is reported for information only and is not used to assess conformance to a requirement. (clause 11.2)

	Max [dB SPL]	Measured [dB SPL]	Uncertainty [dB]
A weighted	12.00	7.05	0.30
C weighted	15.30	12.07	0.30
Z weighted	21.50	18.11	0.30

Electrical signal tests of frequency weightings, A weighting

Frequency response measured with electrical signal relative to level at 1 kHz in reference range. (clause 13)

Electrical and acoustical response and body influence corrections are adjusted with the respective correction values at the reference frequency, in accordance with clause 13.6

	Input Level	Expected	Measured	Response Corr.	Body Influence	Corr. Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dBV]	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB SPL]	[dB]	[dB]	[dB]	[dB]
1000Hz, Ref.	-25.00	95.00	95.00	0.00	0.00	95.00	-0.5	0.5	0.00	0.12
63.096Hz	1.20	95.00	94.95	0.02	-0.01	94.96	-1.0	1.0	-0.04	0.12
125.89Hz	-8.90	95.00	94.96	0.02	-0.01	94.97	-1.0	1.0	-0.03	0.12
251.19Hz	-16.40	95.00	94.96	0.01	0.02	94.99	-1.0	1.0	-0.01	0.12
501.19Hz	-21.80	95.00	94.96	0.01	0.07	95.04	-1.0	1.0	0.04	0.12
1995.3Hz	-26.20	95.00	95.04	-0.03	-0.11	94.90	-1.0	1.0	-0.10	0.12
3981.1Hz	-26.00	95.00	95.09	-0.11	0.12	95.10	-1.0	1.0	0.10	0.12
7943.3Hz	-23.90	95.00	94.90	0.09	-0.04	94.95	-2.5	1.5	-0.05	0.12
15849Hz	-18.40	95.00	94.43	0.57	0.14	95.14	-16.0	2.5	0.14	0.12

Electrical signal tests of frequency weightings, C weighting

Frequency response measured with electrical signal relative to level at 1 kHz in reference range. (clause 13)

Electrical and acoustical response and body influence corrections are adjusted with the respective correction values at the reference frequency, in accordance with clause 13.6

	Input Level	Expected	Measured	Response Corr.	Body Influence	Corr. Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dBV]	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB SPL]	[dB]	[dB]	[dB]	[dB]
1000Hz, Ref.	-25.00	95.00	95.00	0.00	0.00	95.00	-0.5	0.5	0.00	0.12
63.096Hz	-24.20	95.00	94.91	0.02	-0.01	94.92	-1.0	1.0	-0.08	0.12
125.89Hz	-24.80	95.00	95.03	0.02	-0.01	95.04	-1.0	1.0	0.04	0.12
251.19Hz	-25.00	95.00	94.99	0.01	0.02	95.02	-1.0	1.0	0.02	0.12
501.19Hz	-25.00	95.00	95.02	0.01	0.07	95.10	-1.0	1.0	0.10	0.12
1995.3Hz	-24.80	95.00	95.07	-0.03	-0.11	94.93	-1.0	1.0	-0.07	0.12
3981.1Hz	-24.20	95.00	95.10	-0.11	0.12	95.11	-1.0	1.0	0.11	0.12
7943.3Hz	-22.00	95.00	94.90	0.09	-0.04	94.95	-2.5	1.5	-0.05	0.12
15849Hz	-16.50	95.00	94.40	0.57	0.14	95.11	-16.0	2.5	0.11	0.12

Electrical signal tests of frequency weightings, Z weighting

Frequency response measured with electrical signal relative to level at 1 kHz in reference range. (clause 13)

Electrical and acoustical response and body influence corrections are adjusted with the respective correction values at the reference frequency, in accordance with clause 13.6

	Input Level	Expected	Measured	Response Corr.	Body Influence	Corr. Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dBV]	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB SPL]	[dB]	[dB]	[dB]	[dB]
1000Hz, Ref.	-25.04	95.00	95.00	0.00	0.00	95.00	-0.5	0.5	0.00	0.12
63.096Hz	-25.04	95.00	94.94	0.02	-0.01	94.95	-1.0	1.0	-0.05	0.12
125.89Hz	-25.04	95.00	94.97	0.02	-0.01	94.98	-1.0	1.0	-0.02	0.12
251.19Hz	-25.04	95.00	94.99	0.01	0.02	95.02	-1.0	1.0	0.02	0.12
501.19Hz	-25.04	95.00	95.00	0.01	0.07	95.08	-1.0	1.0	0.08	0.12
1995.3Hz	-25.04	95.00	95.04	-0.03	-0.11	94.90	-1.0	1.0	-0.10	0.12
3981.1Hz	-25.04	95.00	95.12	-0.11	0.12	95.13	-1.0	1.0	0.13	0.12
7943.3Hz	-25.04	95.00	94.92	0.09	-0.04	94.97	-2.5	1.5	-0.03	0.12
15849Hz	-25.04	95.00	94.44	0.57	0.14	95.15	-16.0	2.5	0.15	0.12

Frequency and time weightings at 1 kHz

Frequency and time weighting measured at 1 kHz with electrical signal in reference range. Measured relative to A-weighted and Fast response. (clause 14)

	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB]	[dB]
LAF, Ref.	94.00	94.00	-0.5	0.5	0.00	0.12
LCF	94.00	94.00	-0.2	0.2	0.00	0.12
LZF	94.00	94.04	-0.2	0.2	0.04	0.12
LAS	94.00	94.00	-0.1	0.1	0.00	0.12
LAeq	94.00	94.00	-0.1	0.1	0.00	0.12

Long-term stability, Reference

Long-term stability over 25 to 35 minutes, with steady 1kHz signal at reference level. (clause 15)
Adjusting to reference level indication.

	Measured	Accept - Limit	Accept + Limit	Deviation	Timestamp	Uncertainty
	[dB SPL]	[dB]	[dB]	[dB]		[dB]
Reference	94.00	-0.5	0.5	0.00	2024-08-14 12:06:21	0.10

Level linearity on the reference level range, Upper

Level linearity in reference range, measured at 8 kHz until overload. (clause 16)

	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB]	[dB]
94 dB	94.00	94.00	-0.5	0.5	0.00	0.13
99 dB	99.00	99.00	-0.8	0.8	0.00	0.13
104 dB	104.00	104.00	-0.8	0.8	0.00	0.13
109 dB	109.00	109.00	-0.8	0.8	0.00	0.13
114 dB	114.00	114.00	-0.8	0.8	0.00	0.13
119 dB	119.00	119.00	-0.8	0.8	0.00	0.13
124 dB	124.00	124.00	-0.8	0.8	0.00	0.13
129 dB	129.00	129.00	-0.8	0.8	0.00	0.13
134 dB	134.00	134.00	-0.8	0.8	0.00	0.13
135 dB	135.00	135.00	-0.8	0.8	0.00	0.13
136 dB	136.00	136.00	-0.8	0.8	0.00	0.13
137 dB	137.00	137.00	-0.8	0.8	0.00	0.13
138 dB	138.00	138.00	-0.8	0.8	0.00	0.13
139 dB	139.00	139.00	-0.8	0.8	0.00	0.13
140 dB	140.00	140.00	-0.8	0.8	0.00	0.13

Level linearity on the reference level range, Lower

Level linearity in reference range, measured at 8 kHz down to lower limit, or until underrange. (clause 16)

	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB]	[dB]
94 dB	94.00	94.00	-0.5	0.5	0.00	0.13
89 dB	89.00	89.00	-0.8	0.8	0.00	0.13
84 dB	84.00	84.00	-0.8	0.8	0.00	0.13
79 dB	79.00	79.00	-0.8	0.8	0.00	0.13
74 dB	74.00	74.00	-0.8	0.8	0.00	0.13
69 dB	69.00	69.00	-0.8	0.8	0.00	0.13
64 dB	64.00	64.00	-0.8	0.8	0.00	0.13
59 dB	59.00	59.00	-0.8	0.8	0.00	0.13
54 dB	54.00	54.00	-0.8	0.8	0.00	0.13
49 dB	49.00	49.00	-0.8	0.8	0.00	0.13
44 dB	44.00	44.00	-0.8	0.8	0.00	0.13
39 dB	39.00	39.00	-0.8	0.8	0.00	0.24
34 dB	34.00	34.01	-0.8	0.8	0.01	0.24
29 dB	29.00	29.03	-0.8	0.8	0.03	0.24
28 dB	28.00	28.04	-0.8	0.8	0.04	0.24
27 dB	27.00	27.05	-0.8	0.8	0.05	0.24
26 dB	26.00	26.04	-0.8	0.8	0.04	0.24
25 dB	25.00	25.09	-0.8	0.8	0.09	0.24
24 dB	24.00	24.08	-0.8	0.8	0.08	0.24
23 dB	23.00	23.11	-0.8	0.8	0.11	0.24

Toneburst response, Time-weighting Fast

Response to 4 kHz toneburst measured in reference range, relative to continuous signal. (clause 18)

	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB]	[dB]
Continuous, Ref.	137.00	137.00	-0.5	0.5	0.00	0.12
200 ms Burst	136.00	136.02	-0.5	0.5	0.02	0.12
2 ms Burst	119.00	118.95	-1.5	1.0	-0.05	0.12
0.25 ms Burst	110.00	109.83	-3.0	1.0	-0.17	0.12

Toneburst response, Time-weighting Slow

Response to 4 kHz toneburst measured in reference range, relative to continuous signal. (clause 18)

	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB]	[dB]
Continuous, Ref.	137.00	137.00	-0.5	0.5	0.00	0.12
200 ms Burst	129.60	129.58	-0.5	0.5	-0.02	0.12
2 ms Burst	110.00	109.97	-3.0	1.0	-0.03	0.12

Toneburst response, Leq

Response to 4 kHz toneburst measured in reference range, relative to continuous signal. (clause 18)

	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB]	[dB]
Continuous, Ref.	137.00	137.00	-0.5	0.5	0.00	0.12
200 ms Burst	120.00	120.01	-0.5	0.5	0.01	0.12
2 ms Burst	100.00	99.98	-1.5	1.0	-0.02	0.12
0.25 ms Burst	91.00	90.85	-3.0	1.0	-0.15	0.12

C-weighted peak sound level, 8 kHz

Peak-response to a 8 kHz single-cycle sine measured in least-sensitive range, relative to continuous signal. (clause 19)

	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB]	[dB]
Continuous, Ref.	132.00	132.00	-0.5	0.5	0.00	0.09
Single Sine	135.40	135.32	-2.0	2.0	-0.08	0.20

C-weighted peak sound level, 500 Hz

Peak-response to a 500 Hz half-cycle sine measured in least-sensitive range, relative to continuous signal. (clause 19)

	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB]	[dB]
Continuous, Ref.	135.00	135.00	-0.5	0.5	0.00	0.09
Half-sine, Positive	137.40	137.14	-1.0	1.0	-0.26	0.12
Half-sine, Negative	137.40	137.14	-1.0	1.0	-0.26	0.12

Overload indication

Overload indication in the least sensitive range determined with a 4 kHz positive/negative half-cycle signal. (clause 20)

	Measured / Input Level	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB]	[dB]	[dB]	[dB]
Continuous	140.00	-0.5	0.5	0.00	0.25
Half-sine, Positive	142.00	-10.0	10.0	2.00	0.25
Half-sine, Negative	142.00	-10.0	10.0	2.00	0.25
Difference	142.00	-1.5	1.5	0.00	0.25

Long-term stability, 1. relative

Long-term stability over 25 to 35 minutes, with steady 1kHz signal at reference level. (clause 15)
Relative to prior adjustment to reference level indication.

	Measured	Accept - Limit	Accept + Limit	Deviation	Timestamp	Uncertainty
	[dB SPL / Min]	[dB / Min]	[dB / Min]	[dB / Min]		[dB]
Measurement	94.00	-0.1	0.1	0.00	2024-08-14 12:38:01	0.10
Time passed	31.40	0.0	35.0	31.40		0.00

High-level stability

High-level stability over 5 minutes, with steady 1kHz signal, 1dB below upper boundary. (clause 21)

	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB]	[dB]	[dB]	[dB]
High-level, Ref.	139.00	-0.5	0.5	0.00	0.10
High-level, after 5min	139.00	-0.1	0.1	0.00	0.10

Long-term stability, 2. relative

Long-term stability over 25 to 35 minutes, with steady 1kHz signal at reference level. (clause 15)
 Relative to prior adjustment to reference level indication.

	Measured	Accept - Limit	Accept + Limit	Deviation	Timestamp	Uncertainty
	[Min / dB SPL]	[Min / dB]	[Min / dB]	[Min / dB]		[dB]
Wait	37.20	25.0	120.0	37.20		0.00
Measurement	94.00	-0.1	0.1	0.00	2024-08-14 12:44:02	0.10

Environmental conditions, Following calibration

Actual environmental conditions following calibration. (clause 7)

	Expected	Accept - Limit	Accept + Limit	Measured
				[Deg / kPa / %RH]
Air temperature	23.00	-3.00	3.00	24.07
Air pressure	101.30	-21.30	3.70	101.40
Relative humidity	50.00	-25.00	20.00	52.06



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Sound Calibrator

IEC 60942:2017

Calibration Certificate

Calibration Number C25652-V1


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

Equipment Tested :	Manufacturer	Model	Serial
Instrument :	Svantek	SV36	140737

Atmospheric Conditions

Ambient Temperature : 21.8 °C
Relative Humidity : 38 %
Barometric Pressure : 99.58 kPa

Calibration Technician : Peter Elters
Calibration Date : 02-Oct-2025
Secondary Check: Rhys Gravelle
Report Issue Date : 03-Oct-2025

Approved Signatory :  Ken Williams

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

Nominal Level	Nominal Frequency	Measured Level	Measured Frequency
94	1000	94.11	1000.00
114	1000	114.09	1000.00

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

Uncertainties of Measurement -

Specific Tests	Environmental Conditions
Generated SPL	Temperature
Frequency	Relative Humidity
Distortion	Barometric Pressure

±0.10 dB ±0.1 °C
±0.07 % ±1.9 %
±0.20 % ±0.019 kPa

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



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

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

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

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



Sound Calibrator IEC 60942:2017 Calibration Test Report

Calibration Number C25652-V1

Client Details	EMM Consulting Level 3, 175 Scott Street Newcastle, NSW, 2300
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Equipment Tested :	<i>Manufacturer</i>	<i>Model</i>	<i>Serial</i>
Instrument :	Svantek	SV36	140737

Atmospheric Conditions	
Ambient Temperature :	21.8 °C
Relative Humidity :	38 %
Barometric Pressure :	99.58 kPa

Calibration Technician :	Peter Elters	Secondary Check:	Rhys Gravelle
Calibration Date :	02-Oct-2025	Report Issue Date :	03-Oct-2025

Approved Signatory : Ken Williams

Characteristic Tested	Result
Generated Sound Pressure Level	<i>Pass</i>
Frequency Generated	<i>Pass</i>
Total Distortion	<i>Pass</i>

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

Uncertainties of Measurement -			
Specific Tests	Environmental Conditions		
<i>Generated SPL</i>	± 0.10 dB	<i>Temperature</i>	± 0.1 °C
<i>Frequency</i>	± 0.07 %	<i>Relative Humidity</i>	± 1.9 %
<i>Distortion</i>	± 0.20 %	<i>Barometric Pressure</i>	± 0.019 kPa

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

This report applies only to the item tested and shall only be reproduced in full, unless approved in writing by Acoustic Research Labs.



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1. REVISION HISTORY

Revision	Date	Description
1	03-Oct-2025	Original Issue

2. OVERVIEW

This report presents the calibration test results of a SV36 Acoustic Calibrator, and associated equipment. Calibration is carried out in accordance with *IEC 60942-2017, Electroacoustics - Sound Calibrators*.

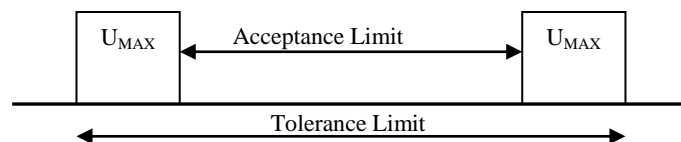
Relevant clauses from this standard have been used for periodic testing in conjunction with Acoustic Research Labs internal test methods described in Section 2 of the calibration work instruction manual.

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2.1 UNCERTAINTIES

For each test performed, the associated measurement uncertainties are derived at the 95% confidence level and are given with a coverage factor of 2.

The uncertainty applies at the time of measurement only, and takes no account of any drift or other effects that may apply afterwards. When estimating uncertainty at any later time, other relevant information should also be considered, including, where possible, the history of the performance of the instrument and the manufacturer's specifications.



Where deviations from the design goals are provided to determine conformance to performance specifications, each measurement is reported with:

- The measured deviation from the design goal
- Associated acceptance limits for the test
- Maximum allowable uncertainty of measurement for the test
- Actual expanded uncertainty for each measurement

2.2 DOCUMENT CONVENTIONS

Test results which highlight non-conformances relative to the standard, and the sound level meter type specified by the manufacturer have been marked with an **F** in the respective tests.

Any tests that are not required, due to sound level meter configuration, are marked N/A.

3. GENERAL

3.1 DEVICE UNDER TEST

Equipment Tested :	<i>Manufacturer</i>	<i>Model</i>	<i>Serial</i>
Instrument :	Svantek	SV36	140737

Instrument received in fair condition.

3.2 ENVIRONMENTAL CONDITIONS DURING TEST

No corrections have been applied to any results obtained to compensate for the environmental conditions.

All tolerance limits stated apply to measurements made at and around reference environmental conditions within the following ranges:

80 kPa to 105 kPa

20°C to 26°C

25% to 90% relative humidity

3.3 CALIBRATION TESTS

Where applicable the following tests were performed in accordance with the requirements of *IEC 60942-2017* Annex B.

3.4 TEST EQUIPMENT USED

All test equipment used during periodic testing are calibrated every 12months by an accredited laboratory, traceable to SI units.

The performance of all equipment during these calibrations and the effects of instrument stability are used to determine the measurement uncertainty of each reported result.

3.4.1 Multi-function Acoustic Calibrator

A Bruel & Kjaer 4226 Multi-function calibrator (S/N – 3215300) was used as the reference for the sound pressure level and the signal frequency.

3.4.2 Sound Level Meter

ARL Ngara Class 1 (S/N – 878035). This device was used for converting acoustic signals into voltages which may be measured by the multimeter.

3.4.3 Audio Analyser

Abonet Audio Analyzer AVR-3710 (S/N – V859B9018). This device was used for measuring the AC voltage output of the reference Ngara unit. The AC level is proportional to the sound pressure level and frequency applied to the reference microphone.

3.4.4 Environmental Monitoring

A MHB-382SD (S/N – AH88227) was used for measuring environmental conditions during device calibration. It is capable of providing temperature, relative humidity and pressure measurements.

4. CALIBRATION TEST RESULTS

4.1 SOUND PRESSURE LEVEL

4.1.1 Generated Sound Pressure Level

The sound pressure level generated by the sound calibrator was measured three times as an average over 20 s of operation. During each measurement the sound calibrator was decoupled and rotated from the microphone to ensure any variations in operation were captured.

Table 1 – Generated Sound Pressure Level Results

Nominal Level (dB)	Nominal Frequency (Hz)	Measured Level (dB)	Deviation (dB)	Acceptance Limit (dB)	P/F	Uncertainty (dB)	Maximum Permitted Uncertainty (dB)	
94	1000	94.11	0.11	±0.25	P	0.10	0.15	Measured Output
114	1000	114.09	0.09	±0.25	P	0.10	0.15	Measured Output

4.2 FREQUENCY OUTPUT

The frequency generated by the sound calibrator was measured as an average over 20s of operation. The deviation from expected values is calculated as the absolute value of the difference in per cent between the frequency of the sound generated by the sound calibrator and the corresponding specified frequency.

Table 2 – Frequency Output Results

Nominal Level (dB)	Nominal Frequency (Hz)	Measured Frequency (Hz)	Deviation (Hz)	Acceptance Limit (Hz)	P/F	Uncertainty (Hz)	Maximum Permitted Uncertainty (Hz)	
94	1000	1000.00	0.00	±7.00	P	0.70	2.00	Measured Output
114	1000	1000.00	0.00	±7.00	P	0.70	2.00	Measured Output

4.3 TOTAL HARMONIC DISTORTION AND NOISE

The total harmonic distortion and noise (THD+N), measured over the frequency range from 22,5 Hz to 20 kHz, was measured as an average over 20s of operation.

Table 3 – THD+N Results

Nominal Level (dB)	Nominal Frequency (Hz)	Distortion (%)	Acceptance Limit (%)	P/F	Uncertainty (%)	Maximum Permitted Uncertainty (%)	
94	1000	0.32	±2.50	P	0.20	0.50	Measured Output
114	1000	0.87	±2.50	P	0.20	0.50	Measured Output

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