



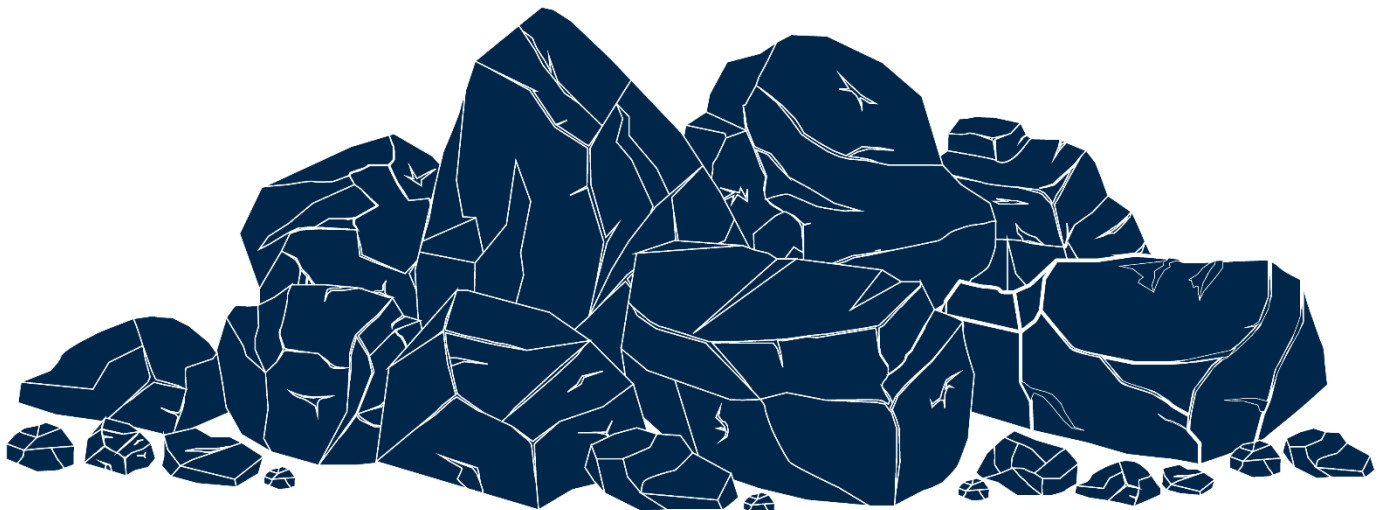
Karuah Hard Rock Quarry
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Karuah Hard Rock Quarry

Annual Review 2025

16 January 2025 to 15 January 2026



Annual Review Title Block


Table 1 Karuah Hard Rock Quarry Annual Review 2025 Title Block.

Name of Operation:	Karuah Hard Rock Quarry
Name of Operator:	Hunter Quarries Pty Ltd
Development Consent:	DA 265-10-2004
Name of holder of Development Consent:	Hunter Quarries Pty Ltd
Mining Lease:	N/A
Water Licences:	None
MOP / RMP:	N/A
Annual Review Start Date:	16 January 2025
Annual Review End Date:	15 January 2026

I, **Scott Ellerton**, certify that this audit report is a true and accurate record of the compliance status of **Karuah Hard Rock Quarry** for the period **16 January 2025 to 15 January 2026** and that I am authorised to make this statement on behalf of **Hunter Quarries Pty Ltd**.

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:	15 March 2026

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Glossary

Abbreviation / Term	Meaning
ACH	Aboriginal Cultural Heritage
AR / AEMR	Annual Review / Annual Environmental Management Report
AQMP	Air Quality Monitoring Program
CCC	Community Consultative Committee
CCR	Community Consultation Report
CEA	Proposed Consolidated Extraction Area
COA	Conservation Offset Area
CPHR	Conservation Programs and Heritage Regulation Group within the NSW DCCEEW
DA	Development Application
DDG	Dust Deposition Gauge
EA	Environmental Assessment
EC	Electrical Conductivity measured in $\mu\text{S}/\text{cm}$
EIS	Environmental Impact Statement
EMP	Environmental Monitoring Program
EMS	Environmental Management Strategy
EMS&MP	Environmental Management Strategy & Monitoring Program
EPA	NSW Environment Protection Authority
EPL	NSW Environment Protection Licence
F&FMP	Flora & Fauna Management Plan
HVAS	High Volume Air Sampler
HQPL	Hunter Quarries Pty Ltd
IEA	Independent Environmental Audit
KHRQ	Karuah Hard Rock Quarry
KEQ	Karuah East Quarry
ML	Megalitre
LEC	NSW Land and Environment Court
LDP	Licensed Discharge Point
LGA	Local Government Area
MCC	MidCoast Council
NSW DCCEEW	NSW Department of Climate Change, Energy, the Environment and Water
NSW Planning	NSW Department of Planning, Housing and Infrastructure
NMP	Noise Monitoring Program
NTU	Nephelometric Turbidity Unit
PM10	Particulate Matter below 10 μm in diameter
RAR	Response to Audit Recommendations
RAPs	Registered Aboriginal Parties
RCP	Rehabilitation and Closure Plan
SWMP	Site Water Management Plan
TSP	Total Suspended Particulates
TSS	Total Suspended Solids measured in mg/L
WPC	Wedgetail Project Consulting

1.0 Statement of Compliance

The compliance status of the Karuah Hard Rock Quarry (KHRQ) 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 Development Consent and Environment Protection Licence (EPL).

Table 2 Statement of Compliance.

Were all conditions of the relevant approval(s) complied with?	
Development Consent (DA 265-10-2004)	No
Environment Protection Licence (EPL 11569)	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
Development Consent	Schedule 3, Condition 13	Air Quality	Non-compliant	Anomalous exceedance of one Depositional Dust Gauge in the July 2025 Monitoring Period.	Section 6.2 and Section 11.0
			Non-compliant	Exceedance of short-term PM10 criteria associated with various local bushfires at The Branch and North Arm Cove on 14 November 2025.	
			Non-compliant	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
Development Consent	Schedule 3, Condition 24 and 25.	Water	Non-compliant	Major rainfall events resulting in discharges of sediment-laden water from: <ul style="list-style-type: none"> ■ 19 and 20 January 2025, ■ 01 to 03 May 2025, ■ 19 to 25 May 2025, and ■ 03 and 04 August 2025. 	Section 7.0 and Section 11.0
Environment Protection Licence	Condition L2.4		Non-compliant	Minor exceedances of TSS criteria associated with controlled discharges over a weekend period from 08 to 11 August 2025.	

2.0 Introduction

This Annual Review covers the reporting period from the **16 January 2025** to **15 January 2026** for the KHRQ.

Mountain Industries obtained approval to operate the KHRQ in 1997, with the site subsequently purchased by Hunter Quarries Pty Ltd (HQPL) in 2002. In October 2004, HQPL applied to the then Department of Infrastructure, Planning and Natural Resources (now known as the Department of Planning, Housing and Infrastructure – NSW Planning) for approval to expand the quarry into adjoining lands (the Stage 2 Extraction Area) to allow the extraction of further andesite reserves.

Development Consent was granted by the Minister for Infrastructure, Planning and Natural Resources on 03 June 2005 (DA 265-10-2004), with the approved development including:

- Implementing the remainder of the approved Stage 1 Extraction Area;
- Extending the quarry operations into the Stage 2 Extraction Area;
- Upgrading and using existing infrastructure on site;
- Rehabilitating the site by re-contouring and revegetating exposed surfaces; and
- Producing up to 500,000 tonnes per annum of andesite product over the next 22 years.

The KHRQ 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 five kilometres north-east of the village of Karuah in the MidCoast LGA. The overall site covers an area of approximately 78.5 Ha across the following properties as outlined by **Figure 1**:

- Lot 21 DP 1024564 consisting of material processing and product stockpiling;
- Lot 11 DP 1024564 consisting of the Stage 2 Extraction Area; and
- Part Lot 12 DP 1024564 consisting of the Conservation Offset Area (COA).

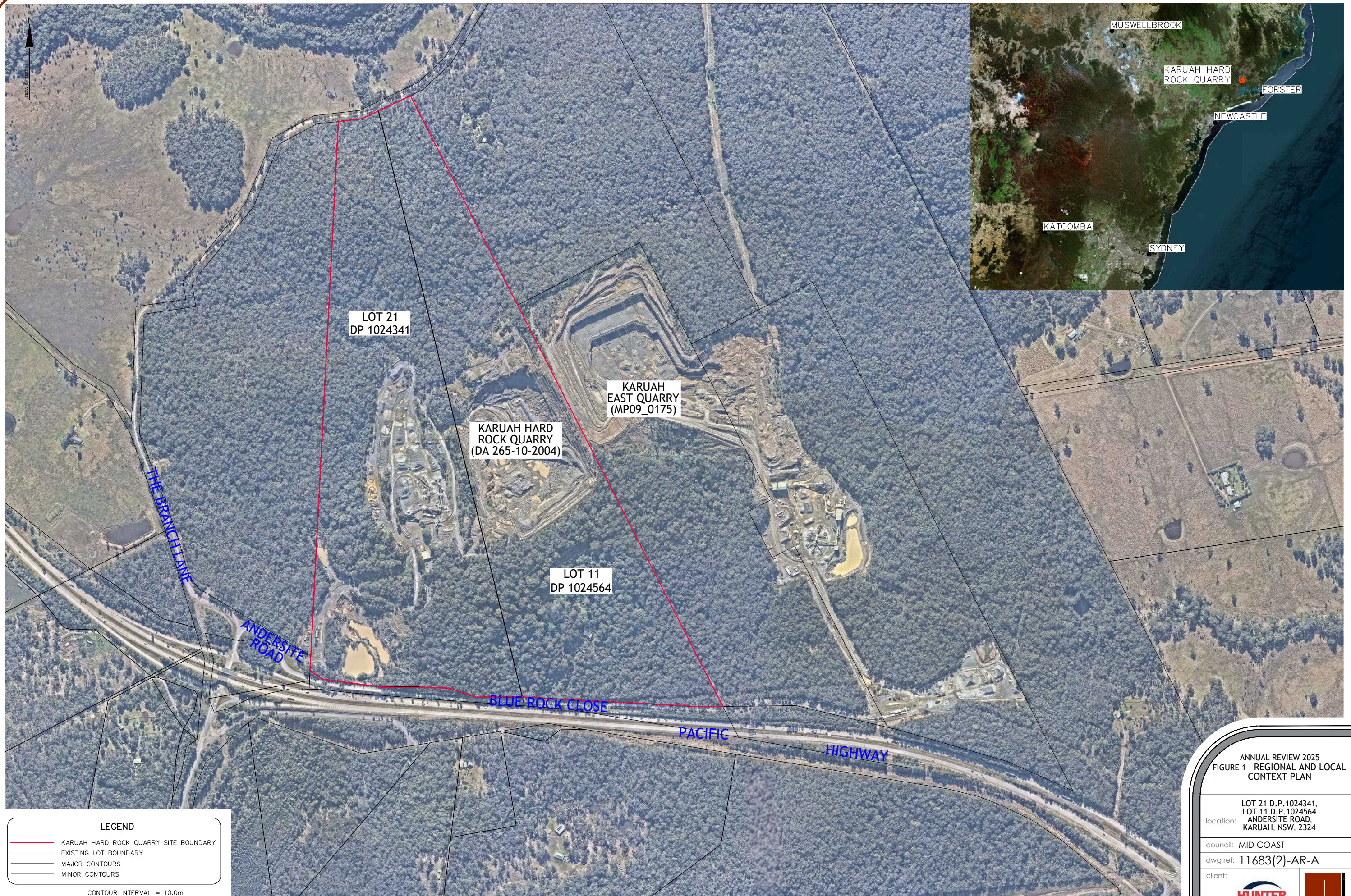
Figure 1 and **Figure 2** illustrate the site within its broader regional context and site layouts respectively.

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 HARD ROCK QUARRY SITE BOUNDARY
- 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	12.03.2026	2025 KARUAH HARD ROCK QUARRY 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: 2.0 m ORIGIN OF LEVELS: LIDAR DATA	0 100 200m SCALE: 1:4000 (FULL)	1 OF 1

^ MONITORING POINTS HAVE BEEN PROVIDED BY HUNTER QUARRIES PTY LTD. REFER TO PLAN 'KARUAH HARD ROCK QUARRY ENVIRONMENTAL MONITORING LOCATIONS - FIGURE 1' BY SLR CONSULTING AUSTRALIA - REFERENCE: 633.HQP00.0030 DATED 23/06/2014.

ANNUAL REVIEW 2025
FIGURE 1 - REGIONAL AND LOCAL
CONTEXT PLAN

location: LOT 21 D.P.1024341,
LOT 11 D.P.1024564
ANDERSITE ROAD,
KARUAH, NSW, 2324

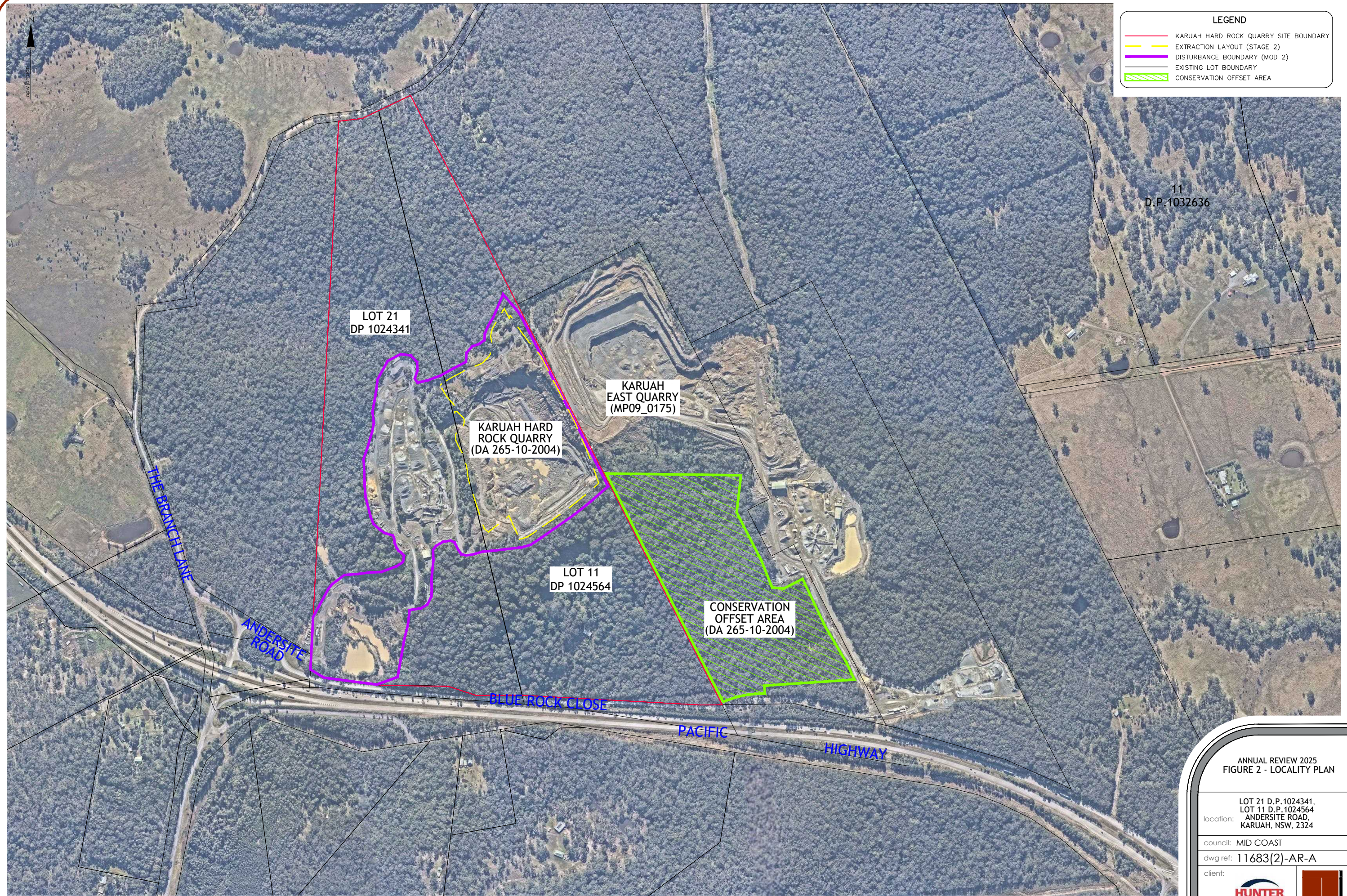
council: MID COAST
dwg ref: 11683(2)-AR-A

client:




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

www.adwjohanson.com.au



LEGEND

- KARUAH HARD ROCK QUARRY SITE BOUNDARY
- EXTRACTION LAYOUT (STAGE 2)
- DISTURBANCE BOUNDARY (MOD 2)
- EXISTING LOT BOUNDARY
- ▨ CONSERVATION OFFSET AREA

11
D.P. 1032636

LOT 21
DP 1024341

KARUAH
EAST QUARRY
(MP09_0175)

KARUAH HARD
ROCK QUARRY
(DA 265-10-2004)

LOT 11
DP 1024564

CONSERVATION
OFFSET AREA
(DA 265-10-2004)

THE BRANCH LANE

ANDERSITE ROAD

BLUE ROCK CLOSE

PACIFIC

HIGHWAY

ANNUAL REVIEW 2025
FIGURE 2 - LOCALITY PLAN

location: LOT 21 D.P. 1024341,
LOT 11 D.P. 1024564
ANDERSITE ROAD,
KARUAH, NSW, 2324

council: MID COAST

dwg ref: 11683(2)-AR-A

client:



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

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ver.	date	comment	surveyed	drawn	checked	pm	co-ordinate information	level information	scale (A1 original size)	page
A	12.03.2026	2025 KARUAH HARD ROCK QUARRY 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: 2.0 m ORIGIN OF LEVELS: LIDAR DATA	0 100 200m SCALE: 1:4000 (FULL)	1 OF 1

^ MONITORING POINTS HAVE BEEN PROVIDED BY HUNTER QUARRIES PTY LTD. REFER TO PLAN 'KARUAH HARD ROCK QUARRY ENVIRONMENTAL MONITORING LOCATIONS - FIGURE 1' BY SLR CONSULTING AUSTRALIA - REFERENCE: 633.HQP00.0030 DATED 23/06/2014.

Plotted By: Tim Alton Plot Date: 12/03/26 3:07:56PM Cad File: N:\11683\11683(2)-AR-A\DWG\ENGINEERING\ESK\2025 ANNUAL REVIEW\11683(2)-AR-A.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.

3.0 Approvals

A summary of the approvals benefiting the KHRQ are provided in **Table 6** with further details of each approval provided in the subsequent sub-sections.

Table 6 Approvals associated with the Karuah Hard Rock Quarry.

Instrument	Grant Date	Expiry Date	Comments
Development Consent (DA 265-10-2004)	03/06/2005	03/06/2027	Primary statutory approval for the site under NSW <i>Environmental Planning and Assessment Act 1979</i> .
Environment Protection Licence (EPL 11569)	16/01/2015	-	Primary statutory licence for the site under NSW <i>Protection of the Environment Operations Act 1997</i> .

3.1 Development Consent (DA 265-10-2004)

The Development Consent was granted in 2005 for 22-years allowing the extraction of a total of 11.2 Mt of andesite until 03 June 2027.

The Development Consent has been the subject of one previous modification application (MOD1), with the intent of addressing various administrative arrangements. NSW Planning produced draft conditions of consent for MOD1, however it was withdrawn by HQPL prior to determination due to the inability to obtain landowners consent from the former owner of Lot 11 DP1024564 (Lot 11).

Subsequent to MOD1, on 29 September 2006, the NSW Land and Environment Court (LEC) amended Schedule 2, Condition 13 of the Development Consent, as it relates to Section 94 contributions for road haulage on local roads managed by MidCoast Council.

Karuah Pit Consolidation Project (KHRQ MOD2)

In early 2025, HQPL acquired Lot 11 finalising all landholdings within the Karuah Quarry Complex with the neighbouring Karuah East Quarry (KEQ) site, which facilitated a holistic review of quarry operations. In August 2025, HQPL submitted scoping letters to NSW Planning for the proposed Karuah Pit Consolidation Project, which seeks to extract the previously sterilised resource within the remnant dividing highwall and consolidate extraction operations between the two quarries via two concurrent s4.55(2) Modification Applications (MOD2 to the KHRQ and MOD11 to the adjoining KEQ).

No change is proposed (or necessary) to the Development Consent as it relates to annual extraction, processing and transport rates (capped at 500,000 tpa) to facilitate the MOD2 development.

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.

The KHRQ MOD2 component of the project seeks to modify the following elements of the Development Consent:

- Concurrently modify both the KHRQ Development Consent and KEQ Project Approval 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 RL65 at KHRQ and RL45 at KEQ.

- Minor extension and overlap of extraction boundary of both KHRQ (into Lot 12) and KEQ (into Lot 11) extraction areas to holistically encompass the highwall structure, inclusive of appropriate operating safety offsets.
- Material sourced from the overlapping area of the combined extraction area (CEA) will be transported by internal haul road to either the KHRQ or KEQ for processing, stockpiling, sale and transport to market within currently approved throughput rates.
- An extension of the life of quarrying operations from 3 June 2027 to 31 December 2034 to align with the approved operational timeframe of the KEQ.
- Increase in approved total resource volume from 11.20 Mt to 13.20 Mt (18% increase).
- Extended operating hours to match the approved hours of operation of the KEQ as follows:
 - 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.
 - 7.00 am to 6.00pm 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 6.00pm Saturday.
 - No quarrying operations 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 construction activities does not exceed 40 dB(A) _{LAeq(15 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.
- Changes to approved blasting activities as follows:
 - Change in blasting frequency from one (1) blast per week at KHRQ to a combined two (2) blasts per week in total between KHRQ and KEQ. This will result in a cumulative reduction of blasting activities between KHRQ (one blast per week currently approved) and KEQ (2 blasts per week currently approved) from a total of three (3) blasts per week to two (2) blasts per week.
 - Approved blasting hours are proposed to be extended by 2 hours to occur between 9am and 5pm (Monday to Friday) to provide improved flexibility during blasting of the dividing highwall and align with proposed arrangements at KEQ.
- Revised final landform resulting in a free-draining landscape of the current extraction area, resulting in reduced geotechnical risks over the long-term and a landform with greater consistency with the existing surrounding environment.
- Environmental safeguards incorporated into Management Plans that are in place for the KHRQ operation will be reviewed and updated (where required) to accommodate the proposal.

3.2 Environment Protection Licence (EPL 11569)

Since the granting of the Development Consent on 03 June 2005, the site’s EPL has been subject to eight variations as summarised by **Table 7**.

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).

This application will minimise the risk of minor parameter exceedances associated with weekend discharges where laboratory results may be delayed, such as those outlined by **Section 7.0**.

Table 7 Variations to the Environment Protection Licence for the Karuah Hard Rock Quarry.

No.	Variation Date	Description
1	30/06/2005	Increase in fee-based activity classifications.
2	14/09/2006	Licence review to remove completed Pollution Reduction Programs.
3	16/04/2007	Variation of Condition L6.3 to be consistent with the KHRQ Development Consent.
4	04/05/2010	Licence review and subsequent administrative changes.
5	29/12/2011	EPA software upgrade.
6	26/08/2016	Licence review and subsequent modernisation of licence conditions.
7	20/07/2020	Licence review and subsequent administrative changes.
8	06/12/2024	Minor adjustment of DDG locations.
9	Currently under assessment	Lodged on 01 December 2025 to allow turbidity measurements to be used for discharge compliance purposes.

3.3 Statutory Requirements of this Annual Review

Requirements of the Annual Review are summarised in **Table 8**.

Table 8 Summary of Statutory Requirements of the Annual Review.

No.	Aspect	Requirement	Section
Schedule 3 – Specific Environmental Conditions			
Condition 23	FLORA AND FAUNA	<p>Reporting <i>The Applicant shall include a progress report on the implementation and performance of the Flora and Fauna Management Plan and the Conservation Offset Strategy in the AEMR.</i></p>	Section 6.6

No.	Aspect	Requirement	Section
Condition 29	VISUAL IMPACT	<p>The Applicant shall:</p> <ul style="list-style-type: none"> a) implement all practicable measures to minimise the visual impacts of the development; b) retain, re-vegetate and subsequently maintain a visual bund within the Stage 1 works area (in accordance with Figures 13 and 14 of the EIS) to minimise the visual impacts of development; c) include a progress report on the re-vegetation and maintenance of the visual bund in the AEMR, to the satisfaction of the Director General. 	Section 8.2
Condition 34	WASTE MANAGEMENT	<p>The Applicant shall:</p> <ul style="list-style-type: none"> a) monitor the amount of waste generated by the development; b) investigate ways to minimise waste generated by the development; c) implement reasonable and feasible measures to minimise waste generated by the development; and d) report on waste management and minimisation in the AEMR. to the satisfaction of the Director-General. 	Section 6.7
Condition 37	PRODUCTION DATA	<p>The Applicant shall:</p> <ul style="list-style-type: none"> a) provide annual production data to the DPI (Minerals) using the standard form for that purpose; and b) include a copy of this data in the AEMR. 	Section 4.1
Condition 39	REHABILITATION	<p>Reporting The Applicant shall include a progress report on the Rehabilitation Management Plan in the AEMR.</p>	Section 8.1
Schedule 4 – Environmental Management, Monitoring, Auditing and Reporting			
Condition 5	ANNUAL REPORTING	<p>The Applicant shall prepare and submit an AEMR to the Director-General and the relevant agencies. This report must address:</p> <ul style="list-style-type: none"> a) identify the standards and performance measures that apply to the development; 	Section 6.0, Section 7.0 and Section 8.0
		<ul style="list-style-type: none"> b) describe the works carried out in the last 12 months; 	Section 4.0 and Section 5.0
		<ul style="list-style-type: none"> c) describe the works that will be carried out in the next 12 months; 	Section 4.6 and Section 12.0
		<ul style="list-style-type: none"> d) include a summary of the complaints received during the past year, and compare this to the complaints received in previous years; 	Section 9.3
		<ul style="list-style-type: none"> e) include a summary of the monitoring results for the development during the past year; 	Section 6.0 and Section 7.0

No.	Aspect	Requirement	Section
Condition 5 cont.	ANNUAL REPORTING	f) include an analysis of these monitoring results against the relevant: <ul style="list-style-type: none"> • impact assessment criteria; • monitoring results from previous years; and • predictions in the EIS; 	Section 6.0 and Section 7.0
		g) identify any trends in the monitoring results over the life of the development;	Section 6.0 and Section 7.0
		h) identify any non-compliance during the previous year; and	Section 11.0
		i) describe what actions were, or are being taken to ensure compliance.	Section 11.0 and Section 12.0

3.4 Summary of Environmental Management Plans

A summary of the site’s Environmental Management Plans is provided in **Table 9**.

In 2026, further comprehensive reviews of each Management Plan will be undertaken following receipt of approval of the Karuah Pit Consolidation Project (KHRQ MOD2).

Table 9 Summary of Statutory Environmental Management Plans.

Environmental Management Plan	Status	2026 Action
Environmental Management Strategy & Monitoring Program	Comprehensive review incorporating the findings of the 2024 IEA completed in April 2025 and approved by NSW Planning on 29 May 2025. A further revision facilitating the proposed Joint Karuah Quarry Complex Community Consultative Committee (CCC) was approved by NSW Planning on 03 October 2025.	–
Bushfire Management Plan	Comprehensive review accounting for property acquisitions of Lot 4 DP838128 and Lot 11 DP1024564 was completed in September 2025.	–
Flora and Fauna Management Plan	Comprehensive review completed by Wedgetail Project Consulting (WPC) and submitted to NSW Planning on 31 July 2025. Extensive commentary regarding the draft F&FMP was received from NSW Conservation Programs, Heritage and Regulation Group (CPHR) within the NSW Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW) on 29 September 2025.	Finalise the review, response and revision of the F&FMP incorporating CPHR’s commentary for approval by NSW Planning.

Environmental Management Plan	Status	2026 Action
Rehabilitation and Closure Plan	Comprehensive review accounting for the acquisition of 11 DP1024564 and associated revised operating life was completed in March 2025 and approved by NSW Planning on 19 May 2025.	-
Site Water Management Plan	Comprehensive review last completed in September 2023 by IEMA. An administrative update was completed in December 2024 by HQPL.	-

4.0 Operations Summary

The KHRQ site operated during the 2025 Annual Review reporting period as outlined below.

4.1 Quarry Production Summary

The monthly production summary during the reporting period is included in **Table 10**; and a long-term production summary is provided in **Table 11** since 2005.

In 2025, strong production demand from the site (compared to 2021 and 2022) continued associated with on-going major supply contracts for state significant infrastructure projects including the Newcastle Inner City Bypass (SSI-6888), the M1 Pacific Motorway Extension to Raymond Terrace (SSI-7319), Hexham Straight widening of the Pacific Highway and the Singleton Bypass.

However, reduced demand was observed January, April, May and August due to major rainfall events, reducing total production volumes in total compared to 2023.

Schedule 2, Condition 7 outlines a life of quarry production limit of 11.2 Mt of andesite and forecast production for 2026 will remain within this limit.

Table 10 *Monthly Quarry Production Data.*

Month	Production (t)	Truck Loads (#)
16-Jan-25 to 31-Jan-25	8,958	263
Feb-25	26,011	794
Mar-25	23,981	745
Apr-25	10,524	329
May-25	20,295	576
Jun-25	39,666	1,126
Jul-25	19,637	569
Aug-25	11,005	316
Sep-25	27,642	843
Oct-25	26,552	808
Nov-25	24,824	774
Dec-25	18,940	570
01-Jan-26 to 15-Jan-26	5,908	168
2025 TOTAL:	263,943	7,881
2026 FORECAST:	240,000	12,000

Table 11 Production Data Summary since 2005.

Annual Review Reporting Period	Production (t)	Notes
01/01/2005 – 31/07/2006	595,898	19-month period
01/08/2006 – 31/07/2007	338,528	
01/08/2007 – 31/07/2008	494,117	
01/08/2008 – 31/07/2009	779,006	
01/08/2008 – 31/07/2009	460,294	
01/08/2010 – 15/01/2012	637,234	16-month period
16/01/2012 – 15/01/2013	460,148	
16/01/2013 – 15/01/2014	458,040	
16/01/2014 – 15/01/2015	442,831	
16/01/2015 – 15/01/2016	412,779	
16/01/2016 – 15/01/2017	497,077	
16/01/2017 – 15/01/2018	498,752	
16/01/2018 – 15/01/2019	459,059	
16/01/2019 – 15/01/2020	456,990	
16/01/2020 – 15/01/2021	95,648	
16/01/2021 – 15/01/2022	119,833	
16/01/2022 – 15/01/2023	148,515	
16/01/2023 – 15/01/2024	276,605	
16/01/2024 – 15/01/2025	310,676	
16/01/2025 – 15/01/2026	263,943	
TOTAL:	8,205,973	

4.2 Land Preparation

Extraction Boundary Audit

In November 2024, minor land clearing was conducted within the approved Stage 2 Extraction Area following the outcomes of a survey audit of the approved extraction boundary of the Stage 2 Extraction Area.

In October 2024, ADW Johnson Pty Ltd prepared a survey audit of the previously approved survey plan (Asquith de Witt, 2006) and associated physical survey marks installed to delineate within the approved Stage 2 Extraction Area, as required by Schedule 2, Condition 12(c) of the Development Consent. The audit resulted in nominal adjustments to the approved extraction boundary, informed by the following process:

- Digitisation of the approved pit shell to accurately identify the approved extraction limits as provided within Appendix 1 of the Development Consent (DA 265-10-2004);
- Previously identified coordinates and survey marks were located and replaced where appropriate (and able to be safely accessed); and
- New survey marks were installed as required and delineated in continuous yellow flagging tape.

A new survey plan of extraction boundary (inclusive of coordinates) was produced and submitted to NSW Planning on 03 October 2024, in accordance with Schedule 2, Condition 12(b) of the Development Consent, which was formally acknowledged on 14 October 2024 via the NSW Major Projects Portal.

Minor Land Clearing

Following confirmation from NSW Planning and completion of survey marking of the approved extraction boundary, the need for minor clearing was identified, with the final segment of clearing being completed during April 2025. In accordance with the Vegetation Clearing Protocol in the approved Flora and Fauna Management Plan (dated September 2020), the following occurred prior to and during clearing:

- A pre-clearance survey was undertaken by a suitably qualified ecologist from WPC on 23 January 2025. Refer to the Pre-Clearing Survey Report dated 18 February 2025, provided in **Appendix 2**.
- Felling supervision for habitat trees was undertaken by a suitably qualified ecologist from WPC on 16 April 2025 addressing the soft felling of one (1) Hollow Bearing Tree. Refer to the Habitat Tree Felling Supervision Report dated 23 May 2025 provided in **Appendix 2**.

4.3 Construction Activities

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

4.4 Operating Hours

For the 2025 reporting period the KHRQ was operated within the approved operating hours provided by Schedule 3, Condition 2 of the Development Consent 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 the 2025 reporting period.

Operating Hours		
2. The Applicant shall comply with the operating hours in Table 1:		
Activity	Days of the Week	Time
<ul style="list-style-type: none"> • Construction • Extraction and processing • Internal and off-site transportation of product 	Monday – Friday	7am to 6pm
	Saturday	7am to 1pm
	Sunday and public holidays	No work at any time
Minor maintenance works on plant and machinery	7 days a week and public holidays	7am to 6pm

Table 1: Operating Hours for the Development

Note: Delivery of material outside of the hours of operation permitted by condition 2 is only allowed, where that delivery is required by the police or other authorities for safety reasons; and/or where the operation or personnel or equipment are endangered. In such circumstances, prior notification should be provided to the DEC and affected residents as soon as possible, or within a reasonable period in the case of emergency.

Figure 3 Operating Hours as specified in the Development Consent.

4.5 Operating Equipment

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

- 2x Excavators,
- 2x Front End Loaders,
- 2x Articulated Haul Trucks,
- 1x Mini Digger,
- 1x Posi-track,
- 1x Mobile Screen,
- 1x Mobile Stacker,
- 1x 15,000 litre Water Cart,
- 1x Elevated Work Platform, and
- 1x Telehandler.

4.6 Next Reporting Period

Forecast operations for the next 2026 reporting period are summarised by **Table 12**.

Table 12 *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 (KHRQ MOD2) will be determined in 2026 and if approved, extraction operations will commence within the proposed CEA.
Infrastructure Upgrades	No major infrastructure upgrades are planned; however, 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 mobile plant and equipment.

5.0 Actions Required from Previous Annual Reviews

HQPL received correspondence from NSW Planning on 13 May 2025 regarding the 2024 Annual Review, which confirmed that NSW Planning considered the document to generally satisfy the reporting requirements of the Development Consent and the Annual Review Guideline (October, 2015).

A summary of the actions required as an outcome of the previous 2024 Annual Review are summarised in **Table 13**.

Table 13 Summary of Previous Actions.

ID	Action Required	Status	Section
KHRQ Findings – 2023 Annual Review			
2023-3	Complete the statutory 5-year comprehensive review of the Flora & Fauna Management Plan.	Complete The Flora & Fauna Management Plan was subject to comprehensive review completed by WPC which was submitted to NSW Planning on 31 July 2025.	Section 3.3
2023-5	Submit EPL Variation (in conjunction with KEQPL) to undertake minor relocation of two depositional dust gauges.	Complete Variation 8 to the EPL was approved by the EPA on 06 December 2024 and the corresponding variation application to EPL 20611 for the adjacent Karuah East Quarry was approved on 17 February 2025. DDG2 was relocated on 19 March 2025 and DDG4 on 04 June 2025, becoming operational from the April 2025 and June 2025 monitoring periods, respectively.	Section 3.2 and Section 6.2
KHRQ Findings – 2024 Annual Review			
2024-1	Continue detailed rehabilitation planning for Lot 11 (Stage 2 Extraction Area) ahead of commencement of site works.	Closed Action has been superseded by the development of a new Rehabilitation & Closure Plan for the proposed Karuah Pit Consolidation Project (KHRQ MOD2), subject to approval by NSW Planning as outlined by Action 2025-2 .	Section 3.3
2024-2	Complete a comprehensive review of the site's Environmental Management Strategy & Monitoring Program (EMS&MP).	Completed Comprehensive review incorporating the findings of the 2024 IEA completed in April 2025 and approved by NSW Planning on 29 May 2025.	Section 3.3

ID	Action Required	Status	Section
KHRQ Findings – 2024 Independent Environmental Audit			
2024-3	Review the calculation methodology used to determine s94 Contributions to MidCoast Council made between 2019 and 2024 to confirm compliance with amended condition.	<u>On-going</u> HQPL has completed a review of the contributions paid between 2019 and 2024. The next step will be to engage with MidCoast Council regarding the outcome of the review within the context of the roll-out of HQPL's new financial management system.	Section 10.0, Section 12.0 and Appendix 4
2024-4	Consult with NSW Planning regarding HQPL's management plan structure to consolidate the site's Environmental Management Strategy, Environmental Monitoring Program, Community Consultation Strategy, Air Quality Monitoring Program and Noise Monitoring Program into a single document.	<u>Complete</u> Consultation was conducted with NSW Planning via the NSW Major Projects Portal on 05 March 2025, with consolidation of the constituent management plan elements into the single EMS&MP document was approved by NSW Planning on 02 April 2025.	Section 3.3, Section 10.0 and Appendix 4
2024-5	Finalise installation of surface water monitoring hardware and implement an appropriate record keeping system.	<u>Complete</u> In 2024, HQPL installed flowmeters on internal fixed water pipelines and VGT installed alarmed water level hardware. In 2025, Nutrien Irrigation completed replacement of the flowmeter for the Sediment Dam 2 discharge outlet. This completed site metering of Sediment Dam 2 allowing HQPL to finalise water balance record keeping.	Section 7.0, Section 10.0 and Appendix 4
2024-6	Complete a comprehensive review of the site's waste management processes.	<u>On-going</u> HQPL has developed a framework for waste management at the site. Next steps will be to process map waste management dataflows within the context of the roll-out of HQPL's new financial management system.	Section 6.7, Section 10.0, Section 12.0 and Appendix 4

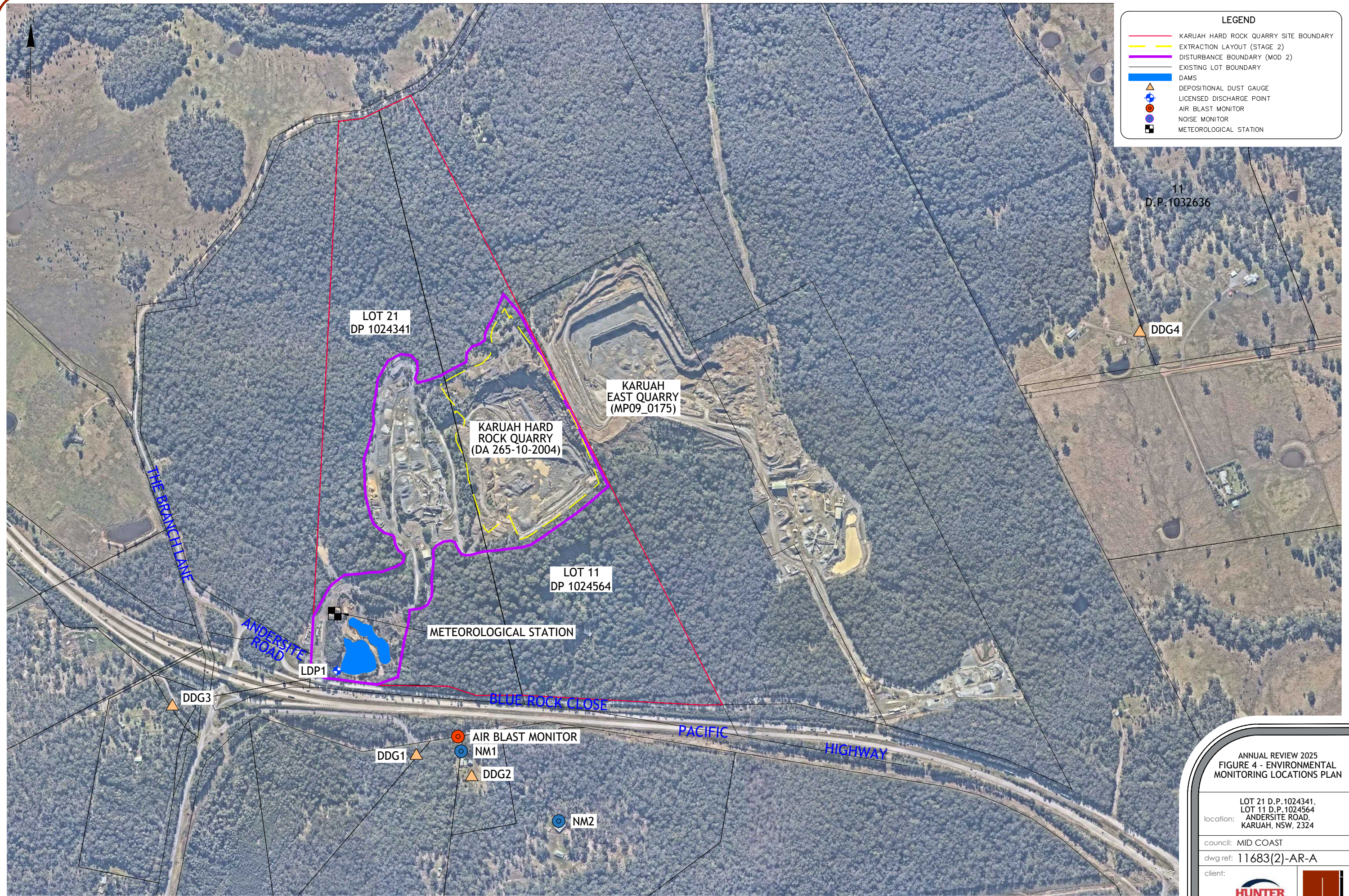
6.0 Environmental Performance

HQPL undertakes environmental monitoring in accordance with the Development Consent and EPL. Key monitoring locations are illustrated by **Figure 4**.

Table 14 provides a summary of the environmental performance at the site for the 2025 reporting period.

Table 14 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	Development Consent – Schedule 3, Condition 13	1x Depositional Dust Exceedance	Anomalous dust exceedance.	Continued monitoring and management of DDG sites.
		2x PM10 Exceedances	Attributable to bushfire smoke rather than quarry operations.	Continued monitoring.
Blasting	Development Consent – Schedule 3, Conditions 4 & 5	Compliant	Within criteria.	Continued monitoring.
Noise	Development Consent – Schedule 3, Condition 1	Compliant	Within criteria.	Continued monitoring.
Heritage	–	Not triggered	No specific criteria.	No additional management proposed.
Biodiversity	Development Consent – Schedule 3, Condition 17 to 23	Compliant	Within criteria for F&FMP.	Continued management.
Waste	Development Consent – Schedule 3, Conditions 34 & 35	Compliant	<ul style="list-style-type: none"> Stabilised waste generation volumes associated with improved housekeeping processes. 	Continued implementation of the reviewed of waste management processes.
Water	Development Consent – Schedule 3, Condition 19	5x Non-Compliant Discharge Events	<ul style="list-style-type: none"> Controlled discharges generally within discharge criteria. Non-compliant discharges generally associated with major rainfall events. 	Continued monitoring.



LEGEND

- KARUAH HARD ROCK QUARRY SITE BOUNDARY
- EXTRACTION LAYOUT (STAGE 2)
- DISTURBANCE BOUNDARY (MOD 2)
- EXISTING LOT BOUNDARY
- DAMS
- ▲ DEPOSITIONAL DUST GAUGE
- LICENSED DISCHARGE POINT
- AIR BLAST MONITOR
- NOISE MONITOR
- METEOROLOGICAL STATION

ANNUAL REVIEW 2025
FIGURE 4 - ENVIRONMENTAL MONITORING LOCATIONS PLAN

location: LOT 21 D.P.1024341,
 LOT 11 D.P.1024564
 ANDERSITE ROAD,
 KARUAH, NSW, 2324

council: MID COAST
 dwg ref: 11683(2)-AR-A

client:

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

www.adwjohanson.com.au

ver.	date	comment	surveyed	drawn	checked	pm	co-ordinate information	level information	scale (A1 original size)	page
A	12.03.2026	2025 KARUAH HARD ROCK QUARRY 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: 2.0 m ORIGIN OF LEVELS: LIDAR DATA	0 100 200m SCALE: 1:4000 (FULL)	1 OF 1

^ MONITORING POINTS HAVE BEEN PROVIDED BY HUNTER QUARRIES PTY LTD.
 REFER TO PLAN 'KARUAH HARD ROCK QUARRY ENVIRONMENTAL MONITORING LOCATIONS - FIGURE 1'
 BY SLR CONSULTING AUSTRALIA - REFERENCE: 633.HQP00.0030 DATED 23/06/2014.

Plotted By: Tim Allan Plot Date: 12/03/26 3:07:57PM Cad File: N:\11683\11683(2)\DWG\ENGINEERING\ESK\2025 ANNUAL REVIEW\11683(2)-AR-A.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.

6.1 Meteorological Monitoring

For the 2025 reporting period the KHRQ operated a meteorological monitoring station in accordance with Schedule 3, Condition 16 of the Development Consent as illustrated by **Figure 5**.

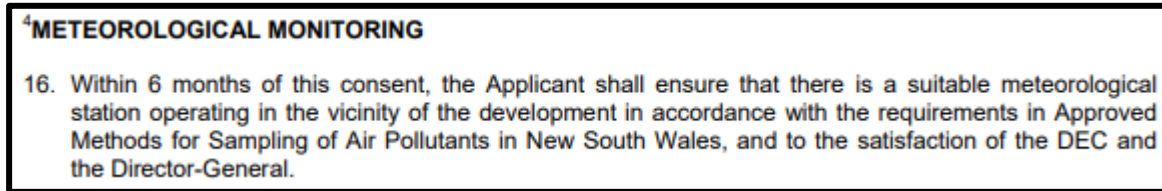


Figure 5 Meteorological Monitoring Requirements from the Development Consent.

The meteorological monitoring station was installed in August 2016 adjacent to the site’s weighbridge as illustrated by **Figure 4** 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 15 summarises the meteorological data collected by the meteorological station during 2025.

Table 15 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 2004 EIS for the then ‘Proposed Hard Rock Quarry Extension’ predicted that dust levels from the operation would be within the criteria of 4 g/m²/month. The obtained depositional dust monitoring data since this time demonstrates that the operation is meeting these predicted dust levels.

Approval Criteria

Air quality criteria is provided in Schedule 3, Condition 13 of the Development Consent as outlined by **Figure 6**. However, 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).

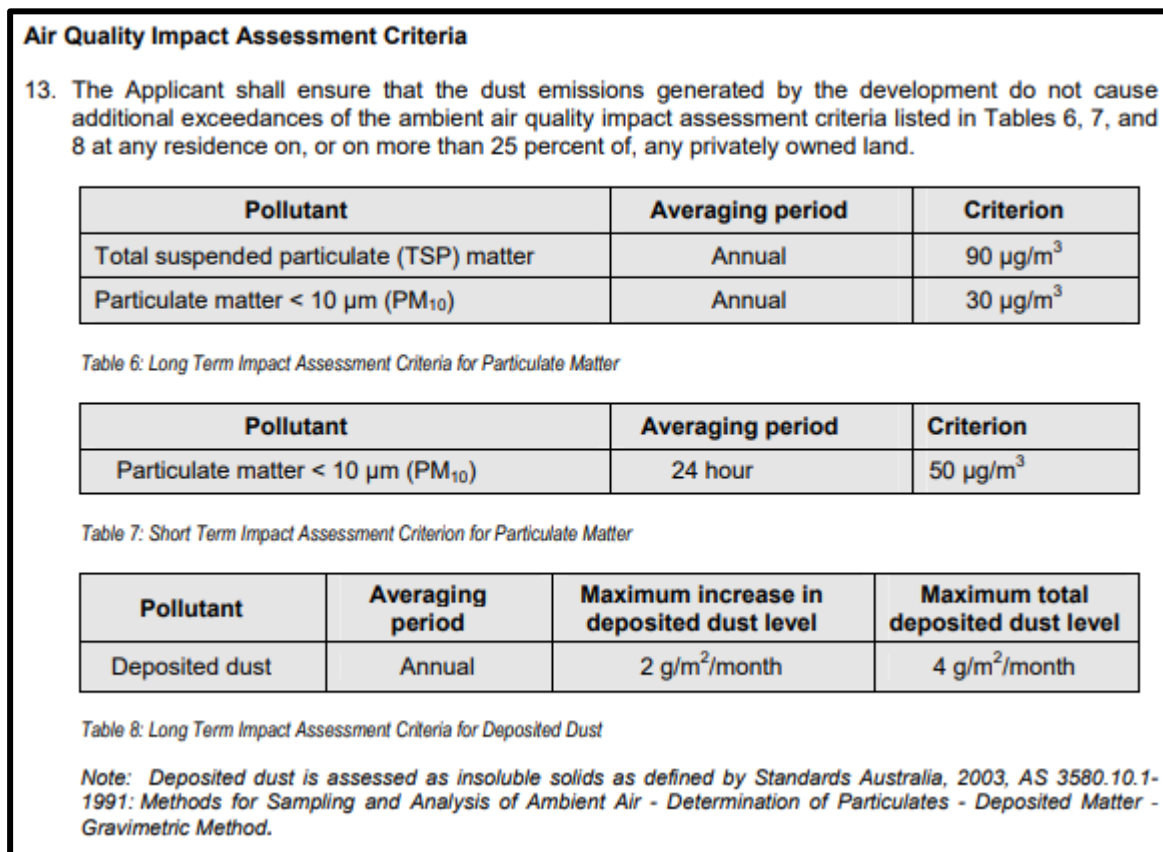


Figure 6 Air Quality Criteria provided by the Development Consent.

The main source of air pollution at the quarry is in the form of airborne dust, which arises from activities such as quarry operations, material 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 (DDG). The location of these monitoring locations are illustrated by **Figure 4**.

Environmental Performance Results (Depositional Dust)

Depositional dust results are outlined within **Table 16**. The 2025 monitoring results indicated that the maximum deposited dust levels measured at DDG 1 to DDG 4 were generally less than the long-term impact assessment criteria for depositional dust (maximum deposited dust level of 4 g/m²/month) over the reporting period.

It should be noted in response previous contamination events, DDG2 and DDG4 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 16**.

Table 16 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
Jan-25	30/12/2024	31/01/2025	32	(3.8)	(1.7)	(1.9)	(1.3)
Feb-25	31/01/2025	03/03/2025	31	(1.2)	(0.9)	(1.1)	(1.2)
Mar-25	03/03/2025	03/04/2025	31	(0.7)	(1.0)	(1.4)	
	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)
May-25	05/05/2025	03/06/2025	29	2.0	3.9	0.2	(0.3)
Jun-25	03/06/2025	01/07/2025	28	2.9	1.0	0.6	0.4
Jul-25	01/07/2025	01/08/2025	31	10.1*	0.5	0.4	0.2
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 Average:				2.4	1.8	1.1	0.9
2025 Minimum:				0.7	0.5	0.2	0.2
2025 Maximum:				10.1	3.9	2.1	1.5

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

Long-term dust results are summarised by **Table 17**, with consistent results from 2014 to 2025.

Table 17 Long-term summary of Depositional Dust Gauge Results.

Reporting Period	Recorded Deposited Dust											
	DDG 1			DDG 2			DDG 3			DDG 4		
	min	ave	max	min	ave	max	min	ave	max	min	ave	max
2014	0.5	1.2	2.2	0.4	0.9	2.2	0.3	0.8	1.4	0.3	1.6	7.1
2015	0.3	1.5	6.4	0.3	0.9	3.7	0.1	0.6	2.8	0.3	1.2	4.1
2016	0.4	1.9	4.0	0.3	1.0	3.0	0.1	0.7	1.3	0.3	1.3	3.2
2017	0.4	0.9	1.7	0.1	0.7	1.8	0.5	0.9	1.4	0.5	1.5	3.8
2018	0.6	1.1	1.6	0.4	0.9	3.4	0.4	0.9	3.4	0.2	1.3	3.0
2019	0.3	1.5	3.8	0.5	1.8	4.0	0.2	1.3	3.5	0.1	1.6	4.8

Reporting Period	Recorded Deposited Dust											
	DDG 1			DDG 2			DDG 3			DDG 4		
	min	ave	max	min	ave	max	min	ave	max	min	ave	max
2020	0.1	1.5	3.4	0.1	0.8	2.3	0.1	0.7	2.3	0.1	0.9	3.5
2021	0.2	1.5	3.6	0.1	0.6	1.4	0.2	0.7	2.2	0.1	0.8	3.7
2022	0.1	0.6	1.4	0.2	0.8	3.6	0.1	0.5	1.2	0.1	0.5	1.2
2023	0.2	0.8	1.6	0.3	1.2	2.5	0.2	1.0	2.2	0.1	0.8	1.6
2024	0.5	1.0	2.2	0.3	0.8	1.4	0.2	0.9	1.8	0.4	1.5	5.1
2025	0.7	2.4	10.1	0.5	1.8	3.9	0.2	1.1	2.1	0.2	0.9	1.5

Environmental Performance Results (Particulate Monitoring)

A High-Volume Air Sampler (HVAS) operated at the site from October 2006 until December 2008. It was demonstrated that measured particulate matter was at a sufficiently low level to not require on-going monitoring and its removal was approved by NSW Planning and the EPA.

However, a HVAS was re-established for the KEQ at Receiver B located on Mill Hill Close in 2016; and in accordance with the approved KHRQ Environmental Management Strategy & Monitoring Program (EMS&MP) any exceedances of performance criteria provided by Schedule 3, Condition 13 of the Development Consent are reported to NSW Planning and the EPA.

In 2025, two short-term exceedances of Particulate Matter below 10 µm in diameter (PM10) were observed, which were directly attributable to bushfire smoke; however, no air quality complaints or directions from NSW Planning were received requiring a review of the KEQ’s particulate matter results.

The two exceedance events are summarised below, with further information being provided in the 2025 KEQ Annual Review.

- 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.

This event was reported to NSW Planning and the EPA on 11 December 2025 and acknowledged by both agencies on 12 December 2025 and 17 December 2025 respectively, with no further compliance action to be undertaken.

- 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.

This event was reported to NSW Planning and the EPA on 08 January 2026, with NSW Planning determining to record a breach with no further enforcement action on 29 January 2026. It was noted by NSW Planning that a breach is the only possible outcome as Schedule 3, Condition 13 of the Development Consent does not allow for consideration of extraordinary events such as bushfires.

At the time of writing, no response has been received from the EPA to-date.

Management Measures

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

- Air quality monitoring;
- Minimising disturbance of land to only what is required by quarry activities;
- Minimising distance travelled by hauling rock the shortest distance possible;
- Utilising quarry runoff water for dust suppression on roads, stockpiles, production plant and work areas. A 25,000 L water cart is used at the site to assist with firefighting capabilities and dust management. Water is regularly collected from Sediment Dam 2 and sprayed on roads throughout the quarry to minimise dust generated from vehicle movements;
- Engaging the services of a contract road sweeper to regularly clean roadways around the entrance to the quarry; and
- Ensuring loads are covered when leaving the site.

Improvements

HQPL will continue to monitor air quality in accordance with the conditions of the Development Consent and EPL. It is expected that the air quality monitoring program will be contemporised following determination of the Karuah Pit Consolidation Project (KHRQ MOD2).

6.3 Blasting

EIS Predictions

The 2004 EIS predicted that air blast and ground vibration levels will meet the EPA Guidelines at all residential locations surrounding the development with appropriate maximum instantaneous charge (MIC) limits in place.

Approval Criteria

Blasting criteria for the site are provided in Schedule 3, Condition 4 (airblast overpressure) and Schedule 3, Condition 5 (ground vibration) of the Development Consent as outlined by **Figure 7**. Additionally, Conditions L4.1 to 4.7 of the EPL detail consistent blast limits for the project.

Environmental Performance Results

In the 2025 reporting period, seven (7x) blast events were completed at the site as summarised by **Table 18**. All blasts were within the limits provided by the Development Consent and EPL.

Management Measures and Improvements

No exceedances were identified and therefore no further controls are considered necessary.

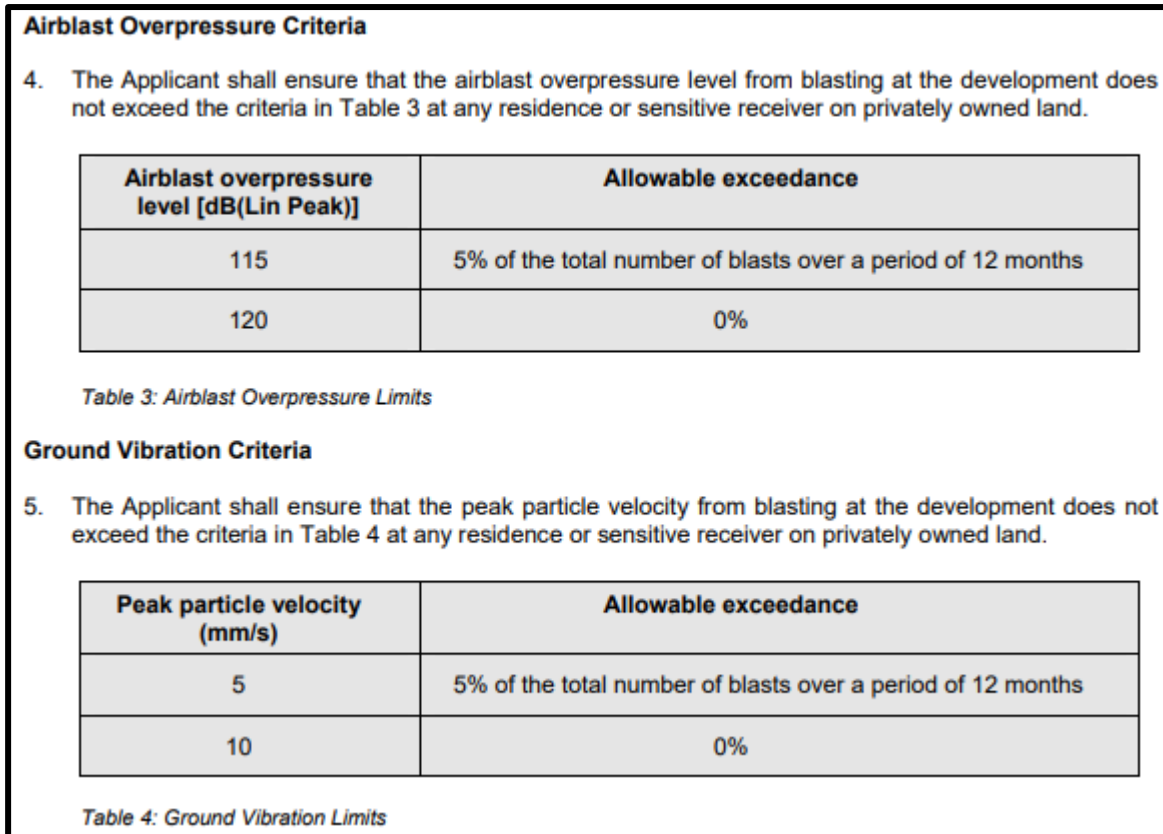


Figure 7 *Blasting Criteria provided by the Development Consent.*

Table 18 *Blast Monitoring Results for the 2025 Reporting Period.*

Date	Time	Location	Airblast Overpressure* (dB [Lin Peak])	Ground Vibration* PPV (mm/s)
07/02/2025	11:34	RL 105	111.4	1.10
21/03/2025	13:06	RL 95	113.8	1.46
16/06/2025	11:02	RL 105	106.7	1.32
17/07/2025	13:30	South Highwall & Pit Sump	114.1	2.18
02/09/2025	12:54	South Highwall	106.5	2.57
29/09/2025	12:30	South Highwall	109.4	1.45
04/12/2025	12:00	Pit Sump	105.0	0.55
2025 Average:			109.6 dBL	1.52 mm/s
2025 Minimum:			105.0 dBL	0.55 mm/s
2025 Maximum:			114.1 dBL	2.57 mm/s

6.4 Noise

EIS Predictions

The 2004 EIS noted that operational noise levels are predicted to meet project specific noise goals at all nearest, potentially affected privately-owned residential locations surrounding the site. The 2004 EIS predicted that there would be no increase in road traffic noise levels due to quarry-related traffic discernible at any residential location adjacent to the Pacific Highway.

Approval Criteria

Noise criteria for the site are provided in Schedule 3, Condition 1 of the Development Consent as outlined by **Figure 8**.

Environmental Performance Results

Attended and unattended noise monitoring was conducted at the two nearest residential receivers (NM1 and NM2) on a six-monthly basis by EMM Consulting in accordance with the Development Consent and EPL. The two monitoring reports for the 2025 reporting period are provided by **Appendix 3**.

Noise results, attributable to quarry-operations, for both residential receptors were assessed as being within compliance limits for both monitoring rounds.

Management Measures and Improvements

No exceedances were identified and therefore no further controls are considered necessary.

Noise Impact Assessment Criteria

1. The Applicant shall ensure that the noise generated by the development does not exceed the criteria specified in Table 2 at any residence or noise sensitive receptor on privately owned land.

Time Period	Noise Limits dB(A)
	$L_{Aeq}(15\text{minute})$
Day (7am to 6pm) Monday to Friday and 7am to 1pm Saturday	48
Evening (6pm to 10pm) Monday to Friday	47
At all other times	46

Table 2: Noise Impact Assessment Criteria for the Development

Notes:

- Noise from the site is to be measured within thirty meters of any residence or other noise sensitive areas to determine compliance with the noise criteria set out in Table 2.
- $L_{Aeq}(15\text{ minute})$ is the equivalent continuous noise level - the level of noise equivalent to the energy average of noise levels occurring over a measurement period.
- For the purpose of noise measures required for this condition, the L_{Aeq} noise level must be measured or computed at the point defined in this condition over a period of 15 minutes using "FAST" response on the sound level meter.
- For the purpose of the noise criteria for this condition, 5dBA must be added to the measured level if the noise is substantially tonal or impulsive in character. The location or point of impact can be different for each development, for example, at the closest residential receiver or at the closest boundary of the development. Measurement locations can be:
 - 1 meter from the facade of the residence for night time assessment;
 - at the residential boundary;
 - 30 meters from the residence (rural situations) where boundary is more than 30 meters from residence.
- The noise emission limits identified in this condition apply for prevailing meteorological conditions (winds up to 3m/s), except under conditions of temperature inversions. Noise impacts that may be enhanced by temperature inversions must be addressed by:
 - documenting noise complaints received to identify any higher level of impacts or patterns of temperature inversions;
 - where levels of noise complaints indicate a higher level of impact then actions to quantify and ameliorate any enhanced impacts under temperature inversions conditions should be developed and implemented.

Figure 8 Noise Criteria provided by the Development Consent.

6.5 Heritage (Aboriginal Cultural Heritage & Historic Heritage)

EIS Predictions

The archaeological survey conducted for the EIS (ADW, 2004) process did not find any heritage items onsite and there were no predicted impacts to heritage from the KHRQ.

Approval Criteria

There are no specific criteria associated with heritage relating to the project. The process for managing any unexpected heritage items is outlined below under *Management Measures and Improvements*.

Environmental Performance Results

There were no issues or unexpected finds relating to Aboriginal cultural heritage during the reporting period.

Management Measures and Improvements

Should unexpected Aboriginal objects/features be encountered, work must stop immediately, and the area cordoned off with a high visibility barrier. The Environment & Development Manager is to then contact a heritage consultant and Registered Aboriginal Parties (RAPs). The heritage consultant, in consultation with the RAPs, is to conduct a field survey to assess the Aboriginal objects/features identified. The heritage consultant, in consultation with the RAPs, will then recommend appropriate mitigation measures.

The Environment & Development Manager is to implement the mitigation measures that are recommended by the heritage consultant and agreed to by the RAPs and in accordance with Heritage NSW regulations. If additional visual inspection and salvage is recommended, the Environment & Development Manager is to arrange for the heritage consultant and RAPs to undertake those works.

Provided that these heritage contingency protocols have been followed, works within the project area may proceed. As there have been no heritage items located to date, no improvements to management measures are proposed.

6.6 Biodiversity

EIS Predictions

The 2004 Stage 2 EIS stated:

“The proposed extension will impact on four endangered species, one directly and the others indirectly. The impacts can be adequately mitigated to allow these species to continue to function unimpeded by the proposed extension. A conservation off-set of 16 hectares will be provided on adjacent land. The off-set will comprise similar habitat to that which will be disturbed by quarrying. The off-set will ensure an appropriate level of formal protection for threatened flora and fauna species in the long-term.”

Approval Criteria

There are no specific criteria associated with biodiversity management for the site. Activities need to be completed in accordance with the EIS.

Environmental Performance Results

HQPL implement a Flora and Fauna Management Plan. The key components and management measures of the Flora and Fauna Management Plan include a Vegetation Clearing Protocol, a Remnant Vegetation Conservation Plan, and a Conservation Offset Management Plan.

Ecological monitoring is undertaken on a two-yearly basis with the latest monitoring round being undertaken during the 2024-25 spring and summer periods, with the Ecological Monitoring Report for the reporting period provided in the 2024 Annual Review. The next monitoring round will be reported in the 2026 Annual Review.

Management Measures and Improvements

HQPL will continue to undertake weed control measures particularly around haul roads and within rehabilitation areas in 2026. Site inspections for the identification of noxious weeds will continue to be undertaken.

6.7 Waste Management

Approval Criteria

Waste management requirements for the site are provided in Schedule 3, Condition 34 and 35 of the Development Consent as outlined by **Figure 9**.

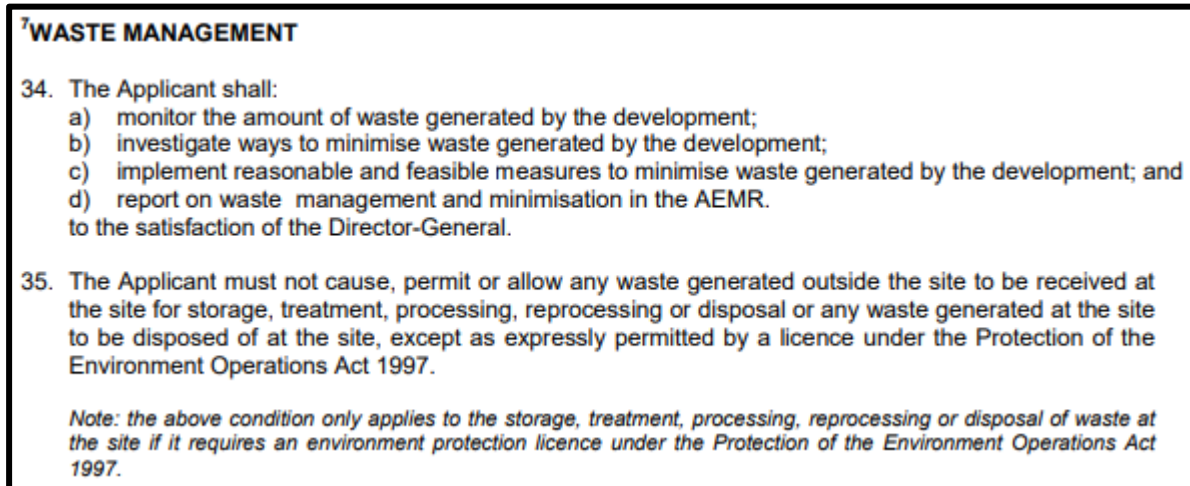


Figure 9 Waste Management Requirements provided by the Development Consent.

Environmental Performance Results

A licenced waste contractor removes waste from a 3 m³ waste bin at the site. There were 44 collections during the reporting period, with capacity of the bin ranging from 15% to 85%, or a total of approximately 75 m³ of waste being removed from site. This represents a stabilisation in the increase in waste generation compared to 93 m³ in 2024, 87 m³ in 2023 and 68 m³ in 2022 which was attributed to greater housekeeping processes being implemented in the previous reporting period.

No waste material was imported onto the site during the reporting period as per Schedule 3, Condition 35.

Management Measures and Improvement

HQPL use a licensed contractor for waste removal at the site. Typical waste at the quarry generally consists of non-hazardous and general wastes, as well as oily wastes. The general and non-hazardous wastes are placed in a skip bin and removed from site.

Oily water accumulates in the workshop sump within a bunded area and is removed by a licenced contractor when the sump is full. Additionally, scrap steel and tyres are separated and stockpiled until there is enough quantity for removal by a licensed contractor for recycling.

HQPL completed a review of the site's waste management processes in 2025, with the findings of the review to be implemented throughout 2026 within the context of the roll-out of HQPL's new financial management system.

7.0 Water Management

Overview

Surface water at the KHRQ is managed in accordance with the Site Water Management Plan (SWMP). The primary objective of water management at the site is to remain compliant with the Development Consent and EPL. As such, water contained within the footprint of the development is directed to Sediment Dam 2; or where this is not possible, water is directed through sediment control structures such as silt fences and retention sumps in accordance with the provisions of the Blue Book.

The capacity of Sediment Dam 2 is approximately 18 ML and primarily used for dirty water management, including the storage and re-use for:

- Dust suppression on internal access and haul roads; and
- Process water/dust suppression for the crusher, conveyors and stockpiles.

EIS Predictions

The 2004 EIS noted:

“No groundwater or creeks will be affected by the proposed quarry extension. Water will be retained on site for reuse on site for quarry operations and for environmental mitigation. No run-off is expected from the site. Water quality management facilities are already in place as part of the existing quarry to ensure the quality of the water should any run-off occur. These existing measures will be upgraded.”

Approval Criteria

Discharge criteria is provided in Condition L2.4 of the EPL and summarised in **Table 19**. These pollutants will be tested during discharge events from LDP 1 (Sediment Dam 2).

Table 19 EPL Discharge Monitoring Criteria for LDP 1 (Sediment Dam 2).

Parameter	Units of Measure	EPL Discharge Limits (100 Percentile Concentration Limit)
Oil and Grease	mg/L and/or Visibility	5 and/or non-visible
pH	pH	6.5 – 8.5
Total Suspended Solids	mg/L	50
Total Nitrogen	mg/L	–
Total Phosphorus	mg/L	–

Environmental Performance Results (Discharge)

Water quality monitoring is undertaken daily during discharge to demonstrate compliance with parameters specified in the EPL. During 2025, there were 48 days of discharges from the LDP located at Sediment Dam 2, as summarised in **Table 20**.

Throughout 2025, a number of major rainfall events impacted the site resulting in various non-compliant wet-weather discharges. These exceedances are outlined in **Section 11.0** as listed below:

- 19 & 20 January 2025;
- 01 to 03 and 19 to 25 May 2025; and,
- 03 & 04 and 08 to 11 August 2025.

Table 20 Discharge Monitoring Results for Sediment Dam 2 and Sediment Basin 4.

Date	pH	EC (µS/cm)	Turbidity (NTU)	TSS (mg/L)	Oil & Grease (mg/L)	Total N (mg/L)	Total P (mg/L)	Notes
Sediment Dam 2								
19/01/2025	7.1	352	350	140	NV	0.6	0.10	3
20/01/2025	7.3	354	370	170	NV	0.5	0.10	3
26/01/2025	7.2	358	85	27	NV	0.8	<0.05	1
27/01/2025	7.3	369	70	36	NV	0.8	<0.05	1
28/01/2025	7.4	369	75	44	NV	0.8	<0.05	1
29/01/2025	7.4	366	65	33	NV	0.8	<0.05	1
10/03/2025	7.4	880	50	38	NV	1.0	<0.05	1
11/03/2025	7.3	818	39	28	NV	1.1	<0.05	1
12/03/2025	7.4	897	34	24	NV	1.1	<0.05	1
13/03/2025	7.2	756	65	35	NV	1.3	<0.05	1
29/03/2025	7.4	483	200	50	NV	1.4	0.08	1
09/04/2025	7.2	611	40	16	NV	1.8	<0.05	1
10/04/2025	7.2	596	50	22	NV	2.1	<0.05	1
11/04/2025	7.4	597	55	24	NV	1.6	<0.05	1
12/04/2025	7.6	595	55	36	NV	1.4	<0.05	1
13/04/2025	7.7	584	45	18	NV	1.3	<0.05	1
17/04/2025	7.5	566	65	38	NV	2.2	<0.05	1
27/04/2025	7.2	566	60	30	NV	1.8	<0.05	1
28/04/2025	7.2	563	65	26	NV	1.7	<0.05	2
29/04/2025	7.3	468	65	36	NV	1.5	<0.05	2
30/04/2025	7.4	423	60	36	NV	1.1	<0.05	2
01/05/2025	7.2	402	340	160	NV	0.9	0.09	3
02/05/2025	7.1	377	470	250	NV	1.0	0.10	3
03/05/2025	7.1	346	390	170	NV	3.0	0.10	3
19/05/2025	7.1	311	330	160	NV	0.7	0.10	3
20/05/2025	7.1	253	960	480	NV	0.7	0.20	3
21/05/2025	7.0	229	630	350	NV	0.4	0.10	3
22/05/2025	7.0	206	440	200	NV	0.3	0.10	3
23/05/2025	6.8	79.4	170	63	NV	0.4	0.06	3
24/05/2025	6.8	143	260	88	NV	0.7	0.10	3
02/07/2025	7.9	5,350	100	40	NV	0.4	<0.05	1
03/07/2025	7.5	420	75	32	NV	0.3	<0.05	1
04/07/2025	7.4	421	75	24	NV	0.4	<0.05	1
05/07/2025	7.4	421	75	28	NV	0.3	<0.05	1
06/07/2025	7.5	428	70	26	NV	0.4	<0.05	1
07/07/2025	7.1	421	65	30	NV	0.4	<0.05	1
08/07/2025	7.2	410	70	29	NV	0.3	<0.05	1
09/07/2025	7.2	407	95	49	NV	0.3	<0.05	1
01/08/2025	7.1	243	100	28	NV	0.3	0.10	1
02/08/2025	7.1	1,090	70	48	NV	0.6	<0.05	1
03/08/2025	7.2	1,650	80	65	NV	0.6	<0.05	3 & 4
04/08/2025	7.2	2,000	90	77	NV	0.4	<0.05	3 & 4
08/08/2025	7	2,460	65	52	NV	0.4	<0.05	4
09/08/2025	7.3	6,210	50	52	NV	0.7	<0.05	4
10/08/2025	7.3	5,060	70	52	NV	0.6	<0.05	4

Date	pH	EC (µS/cm)	Turbidity (NTU)	TSS (mg/L)	Oil & Grease (mg/L)	Total N (mg/L)	Total P (mg/L)	Notes	
11/08/2025	7.4	4,770	60	52	NV	0.5	<0.05	4	
12/08/2025	7.5	4,480	45	42	NV	0.5	<0.05	1	
21/08/2025	6.8	1,120	55	29	NV	0.3	<0.05	1	
22/08/2025	6.5	1,300	45	15	NV	0.3	<0.05	1	
Sediment Basin 4									
19/01/2025	7.2	252	>1,000	550	NV	1.2	0.2	3	
01/05/2025	7.4	157	930	600	NV	0.7	0.3	3	
02/05/2025	7.2	216	780	450	NV	1.5	0.3	3	
03/05/2025	7.3	281	740	450	NV	4.1	0.2	3	
19/05/2025	<i>Unable to safely access.</i>								3
20/05/2025	7.4	163	>1,000	1300	NV	0.2	0.4	3	
21/05/2025	7.2	160	750	490	NV	1.2	0.2	3	
22/05/2025	7.2	213	>1,000	1200	NV	1.2	0.4	3	
23/05/2025	7.2	118	>1,000	780	NV	1.1	0.2	3	
24/05/2025	7.2	188	>1,000	790	NV	0.3	0.2	3	
25/05/2025	7.4	250	>1,000	470	NV	0.6	0.2	3	

- Notes:
- 1 – Controlled and compliant discharge
 - 2 – Uncontrolled but compliant discharge
 - 3 – Non-compliant discharge associated with major rainfall event
 - 4 – Minor TSS exceedance.

Environmental Performance Results (Monitoring)

Six-monthly surface water monitoring results for Sediment Dam 2 site are provided by **Table 21**. The monitoring results indicate the dam was compliant for pH and oil & grease; however, TSS was above the discharge limits in February and September 2025. Prior to any potential discharges the dams are treated (dosed) with Calcium Chloride flocculant to reduce the TSS to below 50 mg/L to comply with the Development Consent and EPL.

Table 21 Six-Monthly Surface Water Monitoring Results for Sediment Dam 2.

Parameter	Units	EPL Discharge Limits	H1 2024 (14/02/2024)	H2 2025 (04/09/2025)
Oil and Grease	mg/L	5 and/or non-visible	Non-visible	Non-visible
pH	pH	6.5 – 8.5	7.4	7.4
Total Suspended Solids, TSS	mg/L	50	110	180
Turbidity	NTU	–	190	270
Electrical Conductivity, EC	µS/cm	–	453	303
Total Nitrogen	mg/L	–	2.1	0.30
Total Phosphorus	mg/L	–	0.09	0.08

Management Measures and Improvements

Non-compliant discharges were generally associated with major rainfall events which are beyond the 95th percentile rainfall event of 90.6 mm which the site is required to adequately manage, and therefore no material improvements are considered necessary.

However, in response to minor TSS exceedances associated with controlled discharges during weekend periods, an EPL Variation was lodged on 01 December 2025 to enable field-based turbidity measurements to be used to govern discharge compliance rather than relying on laboratory results that may be delayed in certain circumstances.

Other Water Management Matters

- Water Licencing: HQPL holds no surface water or groundwater extraction licences.
- Salinity Trading: HQPL does not participate in any salinity trading schemes.
- Compensatory Water Supply: HQPL has not impacted any neighbouring landholders' water supply schemes requiring the provision of compensatory water supply.

8.0 Rehabilitation

8.1 Site Rehabilitation

The KHRQ Rehabilitation and Closure Plan (RCP) has been prepared to meet the requirements of Schedule 3, Condition 39 (Rehabilitation Management Plan) and Schedule 3, Condition 44 (Quarry Closure Plan) of the Development Consent. The current RCP (IEMA, March 2025) was approved by NSW Planning on 14 May 2025 following the acquisition of Lot 11 to facilitate revised rehabilitation timeframes aligning with the currently approved quarry life to 03 June 2027 provided by the Development Consent rather than the terms of the Licence Agreement with the former owner of Lot 11.

Side-casting of the eastern quarry face was undertaken in 2020 and 2021; and in 2023 side-casting commenced along the northern quarry face. There have been limited further opportunities to establish rehabilitation at the quarry site to-date, due to the configuration of the quarry and the progressive nature of the working operational areas, particularly in light of increased production associated with various state significant infrastructure projects in the Greater Newcastle region.

Relevant to rehabilitation, the Karuah Pit Consolidation Project (KHRQ MOD2) proposes to remove the eastern quarry face (i.e. the remnant dividing highwall between the KHRQ and the adjoining KEQ extraction pits) resulting in changes to the site’s rehabilitation objectives through the provision of a free-draining landscape. The RCP will be further revised (subject to approval) following determination of the MOD2 project accounting for these changes to the modified operation as well as revised rehabilitation schedule aligning with the proposed extended quarry operating life until 31 December 2034.

A summary of rehabilitation works completed in 2025 is provided by **Table 22**; and a status update of total rehabilitation is provided by **Table 23**. Planned rehabilitation actions for 2026 are summarised by **Table 24**.

Table 22 Summary of Rehabilitation Performance During the 2025 Reporting Period.

Rehabilitation Performance Details	KHRQ Site Comments
Extent of the operations and rehabilitation at completion of the reporting period.	–
Agreed post-rehabilitation land-use.	Revision to the RCP following the acquisition of Lot 11 to facilitate revised rehabilitation timeframes aligning with the approved quarry life to 03 June 2027 provided by the Development Consent rather than the terms of the Licence Agreement with the former owner of Lot 11.
Key rehabilitation performance indicators.	–
Renovation or removal of buildings.	–
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. 	–
Rehabilitation sign-off status of completed areas against the land-use objectives and completion criteria.	–
Variations to activities undertaken to those proposed (including why there were variations and whether the Resources Regulator was notified)	–

Rehabilitation Performance Details	KHRQ Site Comments
Outcomes of trials, research projects and other initiatives.	–
Key issues that may affect successful rehabilitation.	–

Table 23 Disturbance and Rehabilitation Status.

ID	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	28.8	28.8	28.8
B	Total Active Disturbance	28.8	28.8	28.8
C	Land Being Prepared for Rehabilitation	0	0	0
D	Land Under Active Rehabilitation	0	0	0
E	Completed Rehabilitation	11.2	11.2	11.2

Table 24 Actions for the Next 2026 Reporting Period.

Action	KHRQ Site Comments
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 KHRQ MOD2, 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 KHRQ MOD2, complete comprehensive review of the RCP and seek approval from NSW Planning.

8.2 Visual Bund

During the 2025 reporting period, no material maintenance activities were required to the site’s visual bund.

9.0 Community

9.1 Community Engagement

In both 2007 and 2011, HQPL distributed flyers to nearby neighbours and advertised for expressions of interest for a Community Consultative Committee (CCC). There was no interest received and therefore a CCC was not formed. The neighbouring Karuah East Quarry, which has an established CCC that meets six-monthly, provides community members with the opportunity to discuss KHRQ if required.

HQPL have committed to distributing a six-monthly report to nearby residents and MidCoast Council updating these stakeholders on the environmental performance of the quarry from January to June and July to December of each year. Information can be accessed by the community twice a year through this report, as well as this Annual Review. The Community Consultation Reports (CCR's) can be found published on the HQPL website at <https://hunterquarries.com.au/reporting/>.

More detail on this Community Communication Strategy is available in **Section 5.1** of the EMS&MP.

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 will be progressed and formally established early 2026, and once operational it is anticipated that the joint CCC will replace the CCR as the primary method of community consultation for the KHRQ.

9.2 Community Contributions

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 reviews, investigates, and reports all complaints received in accordance with the Development Consent, EPL, and the site’s EMS&MP.

The Community Call Line is 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 KEQ CCC.

In 2025, one community complaint was reported to HQPL, which is consistent with the typical results of one to two complaints per year as summarised by the complaints history provided in **Table 25**.

The complaint was received on 18 November 2025, by a resident at 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 25 **Community Complaints 2012-2025.**

Year	Number of Complaints Received
2012	0
2013	0
2014	0
2015	0
2016	0
2017	1
2018	1
2019	1
2020	2
2021	2
2022	1
2023	0
2024	1
2025	1

10.0 Independent Environment Audit

In accordance with Schedule 4, Condition 6 of the Development Consent, HQPL has commissioned an Independent Environment Audit (IEA) every five years as summarised by **Figure 10**.

INDEPENDENT ENVIRONMENTAL AUDIT	
6.	<p>Within 2 years of the date of this consent, and every 5 years thereafter, unless the Director-General directs otherwise, the Applicant shall commission and pay the full cost of an Independent Environmental Audit of the development. This audit must:</p> <ol style="list-style-type: none"> be conducted by a suitably qualified, experienced, and independent person whose appointment has been endorsed by the Director-General; be consistent with <i>ISO 19011:2002 - Guidelines for Quality and/ or Environmental Systems Auditing</i>, or updated versions of this guideline; assess the environmental performance of the development, and its effects on the surrounding environment; assess whether the development is complying with the relevant standards, performance measures, and statutory requirements; review the adequacy of the Applicant's Environmental Management Strategy and Environmental Monitoring Program; and if necessary, recommend measures or actions to improve the environmental performance of the development, and/or the environmental management and monitoring systems.
7.	<p>Within 3 months of commissioning this audit, or as otherwise agreed by the Director-General, the Applicant shall submit a copy of the audit report to the Director-General, with a response to the recommendations contained in the audit report.</p>

Figure 10 Independent Environmental Audit (IEA) requirements from the Development Consent.

In 2024, HQPL engaged Talis Consultants to complete the 2024 IEA of the site. Lead Auditor, Leanne Cross, and Auditor, Alfred Davis, were subsequently approved by NSW Planning as suitably qualified, experienced and independent persons in accordance with the Development Consent and Independent Audit Guideline (May, 2020) on 04 November 2024.

A site inspection was conducted on 10 December 2024, with the submission of the final Audit Report and HQPL's Response to Audit Recommendations (RAR) to NSW Planning on 04 March 2025 (within 3 months of commencement). A copy of these audit reports have been published on the Hunter Quarries' website at <https://hunterquarries.com.au/reporting/>.

The audit assessed a total of 15 conditions as non-compliant out of a total of 64 conditions, representing a non-compliance rate of approximately 23%. The key audit findings include:

- Various administrative non-compliances associated with the submission of documents within statutory timeframes;
- Uncertainty regarding the methodology used to determine s94 Council Contributions;
- Uncertainty regarding the approval status of consolidated sub-plans into the approved EMS&MP;
- On-going implementation status of surface water monitoring infrastructure; and
- Uncertainty regarding the implementation of waste minimisation measures.

A summary of all assessed non-compliances and recommendations for improvement opportunities is provided by HQPL's RAR in **Appendix 4**; whilst a summary of on-going corrective actions are provided in **Section 12.0** to be finalised in 2026.

11.0 Incidents & Non-Compliances During the Reporting Period

In 2025, eight exceedances of performance criteria occurred, all related to either air quality or water discharges during major rainfall events.

■ 19 & 20 January 2025 – Discharges of sediment-laden water following major rainfall event

Uncontrolled discharges of sediment-laden water to Yalimbah Creek on Sunday 19 January and Monday 20 January 2025 following the receipt of 91.8 mm of rainfall over approximately 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 HQPL executive and the local community. Formal incident reports were subsequently submitted to NSW Planning and the EPA.

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

Uncontrolled discharges of sediment-laden water to Yalimbah Creek from Thursday 01 May to Saturday 03 May 2025 following the receipt of 142.2 mm of rainfall over approximately 24 hours with a total of 318.6 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 HQPL executive and the local community. Formal incident reports were subsequently submitted to NSW Planning and the EPA.

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

Uncontrolled discharges of sediment-laden water to Yalimbah Creek from Monday 19 May to Sunday 25 May 2025 following the receipt of 175.8 mm of rainfall over approximately 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 HQPL executive and the local community. Formal incident reports were subsequently submitted to NSW Planning and the 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 and the EPA in accordance with the relevant conditions of the Development Consent and EPL. NSW Planning subsequently acknowledged the notification and determined to provide no commentary on the matter on 29 October 2025.

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

■ **03 & 04 August 2025 – Discharges of sediment-laden water following major rainfall event**

Uncontrolled discharges of sediment-laden water to Yalimbah Creek on Sunday 03 August and Monday 04 January 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 HQPL executive and the local community. Formal incident reports were subsequently submitted to NSW Planning and the EPA.

■ **08 to 11 August 2025 – Minor exceedances of TSS during controlled discharge event**

Minor exceedances of the TSS limit associated with controlled weekend discharges occurred from 08 August to 11 August 2025 without the receipt of daily laboratory results.

These exceedances are not considered to have caused material environmental harm and therefore the site’s PIRMP was not enacted; however, the results were published in the monthly Environmental Monitoring Report for August 2025, reported within the 2025-26 Annual Return to the EPA and have been included in this Annual Review to NSW Planning.

HQPL has since lodged an variation to the site’s EPL to facilitate the use of field turbidity measurements to minimise the risk of recurrence.

■ **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 µg/m³ against a short-term criterion of 50 µg/m³; 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 and the EPA in accordance with the relevant conditions of the Development Consent 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 and the EPA in accordance with the relevant conditions of the Development Consent and EPL. NSW Planning determined to record a breach with no further enforcement action on 29 January 2026, whilst at the time of writing no response has been received from the EPA.

It was noted by NSW Planning that a breach is the only possible outcome as Schedule 3, Condition 13 of the Development Consent does not allow for consideration of extraordinary events such as bushfires.

12.0 Activities to be Completed in the Next Reporting Period

Table 26 outlines the actions to be completed within the 2026 reporting period.

Table 26 Proposed Actions for the Next 2026 Reporting Period.

ID	Action	Timeline
KHRQ Findings – 2024 Independent Environmental Audit		
2024-3	Review the calculation methodology used to determine s94 Contributions to MidCoast Council made between 2019 and 2024 to confirm compliance with amended condition.	<u>On-going – DUE 30/06/2026</u> HQPL has completed a review of the contributions paid between 2019 and 2024. The next step will be to engage with MidCoast Council regarding the outcome of the review within the context of the roll-out of HQPL’s new financial management system.
2024-6	Complete a comprehensive review of the site’s waste management processes.	<u>On-going – DUE 31/12/2026</u> HQPL has developed a framework for waste management at the site. Next steps will be to process map waste management dataflows within the context of the roll-out of HQPL’s new financial management system.
KHRQ Findings – 2025 Annual Review		
2025-1	Finalise the review, response and revision of the F&FMP incorporating CPHR’s commentary for approval by NSW Planning.	Submit response by 31 December 2026.
2025-2	Review site’s environmental management plans for the proposed KHRQ MOD2 Karuah Pit Consolidation Project.	Complete review by 31 December 2026.
2025-3	Finalise the EPL Variation and implement revised processes for turbidity field measurements during controlled discharge events.	Complete works by 31 December 2026.

Appendix 1 – NSW Planning Correspondence

NSW Planning Response to KHRQ Annual Review 2024

NSW Planning ref: DA265-10-2004-PA-37

Scott Ellerton
Environment and Development Manager
Hunter Quarries Pty Ltd
Worimi Country
PO Box 23
KARUAH NSW 2324

13/05/2025

Sent via the Major Projects Portal only

Subject: Karuah Quarry - 2024 Annual Review

Dear Mr Ellerton

I refer to the Annual Environmental Management Report (AEMR) for the period 16 January 2024 to 15 January 2025, submitted as required by Schedule 5, Condition 5 of DA265-10-2004 as modified (the consent) to the NSW Department of Planning, Housing and Infrastructure on 14 March 2025.

The Department has reviewed the 2024 AEMR and considers it to satisfy the reporting requirements of the consent and the Annual Review Guideline (October 2015).

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

Non-compliances identified in the Annual Review will be assessed in accordance with the NSW Planning Compliance Policy. Further correspondence may be sent in relation to these non-compliances.

Should you wish to discuss this matter, please contact Jennifer Sage, Senior Compliance Officer on 02 6575 3420 or email compliance@planning.nsw.gov.au

Yours sincerely



Heidi Watters
Team Leader
Compliance

As nominee of the Planning Secretary

Appendix 2 – Land Clearing Reports

Pre-Clearing Survey Report – 18 February 2025

Habitat Tree Felling Supervision Report – 23 May 2025

Tuesday, 18 February 2025

Hunter Quarries
Andersite Road
Karuah NSW 2324

Attention: Scott Ellerton

Sent by email to: se@hunterquarries.com.au

SUBJECT: Karuah Hard Rock Quarry Pre-Clearing Survey, January 2025.

Dear Scott,

This letter provides a summary of work undertaken on January 23, 2025. Wedgetail Project Consulting Ecologist Olivia Szekelyhidy was present to undertake a pre-clearing survey for fauna habitat within the Karuah hard Rock Quarry (KHRQ).

PRE-CLEARING SURVEY JANUARY 2025

On the 23rd January 2025 WPC ecologist, inspected an area of vegetation that has been approved for vegetation clearing within Karuah Hard Rock Quarry (KHRQ). The pre-clearance survey involved marking all habitat trees with spray paint and/or flagging tape and the searches of rocky areas within native vegetation to the south of the existing hard rock quarry. The location of the habitat trees was mapped accordingly (**Figure 1**).

No evidence of fauna habitation was detected during the pre-clearance surveys. Clearing of all vegetation (excluding habitat trees) can now commence without the supervision of an ecologist.

In accordance with the Vegetation Clearing Protocol in Hunter Quarries, Karuah Hard Rock Quarry Flora and Fauna Management Plan 2020, all habitat trees identified during pre-clearance surveys are required to be left standing for two days after the surrounding vegetation has been cleared. An ecologist will be required to supervise the felling of all habitat trees.

Table 1 Hollow bearing trees

Habitat Tree	Number and Size of Recorded Hollows			Notes
	Small (<5 cm)	Medium (5 cm – <20 cm)	Large (>20 cm)	
1 – Ironbark	1	1	-	Fissure in tree. Maximum hollow height 4m
Totals	1	1	-	Total: 2 hollow

For any further questions, please do not hesitate to call me.

Sincerely,

Mark Dean

Ecologist

M: 0455 381 346

mdean@wedgetail.com.au



- ▭ HQ Pit Shell Boundary
- ▬ Survey Track
- Hollow-bearing Tree
- ◆ Rocky Habitat

Figure 1
Pre-clear Survey





Friday, 23 May 2025

Hunter Quarries
Andersite Road
Karuah NSW 2324

Attention: Scott Ellerton

Sent by email to: se@hunterquarries.com.au

SUBJECT: Karuah Hard Rock Quarry Habitat Tree Removal Supervision April 2025.

Dear Scott,

This letter provides a summary of work undertaken on 16 April 2025. Wedgetail Project Consulting Ecologist Jake Mauger was present to undertake a clearing supervision for habitat trees within the Karuah Hard Rock Quarry (KHRQ).

HABITAT CLEARING SUPERVISION FEBRUARY/APRIL 2025.

On the 16 April 2025 WPC ecologists, inspected an area of vegetation that has been approved for vegetation clearing within Karuah Hard Rock Quarry (KHRQ). The pre-clearance survey involved marking all habitat trees with spray paint and/or flagging tape within native vegetation to the south of the existing hard rock quarry. The location of the habitat trees was mapped accordingly (**Figure 1**).

Pre-clearing surveys were conducted by Olivia Szekelyhidy on 18 February 2025 where no evidence of fauna habitation was detected.

In accordance with the Vegetation Clearing Protocol in the KHRQ site's Flora and Fauna Management Plan (SLR, 2020), all habitat trees identified during pre-clearance surveys were required to be left standing for a minimum of two days after the surrounding vegetation was cleared.

On the 16 April 2025, a total of one (1) hollow-bearing habitat trees were soft-felled within the clearing area (**Figure 1**). A total of two (2) small hollows were identified within the habitat trees which were inspected for fauna after felling (**Table 1**). No fauna species were found during the clearing supervision.

Table 1: Habitat Trees removed during clearing.

Habitat Tree	Number and Size of Recorded Hollows			Notes
	Small (<5 cm)	Medium (5 cm – <20 cm)	Large (>20 cm)	
1 – Ironbark	1	1	-	Fissure in tree. Maximum hollow height 4m
Totals	1	1	-	Total: 2 hollows

For any further questions, please do not hesitate to call me.

Sincerely,

Olivia Szekelyhidly
Ecologist

M: 0466 615 588

oszekelyhidly@wedgetail.com.au



- HQ Pit Shell Boundary
- Cleared in April 2025
- Previously Cleared
- Rocky Habitat
- ◉ Hollow-bearing tree

Figure 1: Karuah Quarry Clearing Supervision

GDA94 / MGA zone 56
EPSG:28356



Map Produced: 30/05/2025
Produced By: Keryn Dowling

Appendix 3 – Noise Monitoring Reports

Noise Monitoring Report – H1 2025

Noise Monitoring Report – H2 2025

Karuah Quarry

Biannual Attended Noise Monitoring - Semester 1 2025

Prepared for Hunter Quarries Pty Limited

May 2025

Karuah Quarry

Biannual Attended Noise Monitoring - Semester 1 2025

Hunter Quarries Pty Limited

E250042 RP3

May 2025

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

Approved by



Robert Kirwan

Associate Acoustics Consultant – Team Leader

30 May 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 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 Hunter Quarries Pty Limited to conduct a bi-annual noise survey of operations at Karuah Quarry (KQ, 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 the day period on Wednesday 14 May 2025 at two monitoring locations, required by the environmental monitoring program (EMP). It is of note that the site currently operates during the day period only and as such, noise monitoring during the evening and high-time periods is not required.

1.2 Attended monitoring locations

The 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 near-by	Coordinates (MGA56)	
		Easting	Northing
NM1	Private Residence - 74 Mill Hill Close, Karuah	406623	6388704
NM2	Private Residence - 64 Mill Hill Close, Karuah	406405	6388859

\\lemmsvr1\EMM3\2021\E2\10782 - KEO Noise monitoring\8 GIS\02 Maps\N001 NoiseMonitoringLocations_20211206_01.mxd 6/12/2021



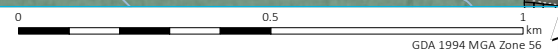
KEY

- Site boundary
- Noise monitoring location
- Major road
- Minor road
- Vehicular track
- Watercourse/drainage line
- Cadastral boundary
- Waterbody
- NPWS reserve
- State forest

Noise monitoring locations

Karuah Quarry
Bi-annual noise monitoring
Figure 3.1

Source: EMM (2021); 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 percent 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 percent 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	Vertical temperature gradient in degrees Celsius per 100 metres altitude.
Sigma-theta	The standard deviation of the horizontal wind direction over a period of time.
IA	Inaudible. When site noise is noted as IA then there was no site noise at the monitoring location.
NM	Not Measurable. If site noise is noted as NM, this means some noise was audible but could not be quantified.
Day	Monday – Saturday: 7 am to 6 pm, on Sundays and Public Holidays: 8 am to 6 pm.
Evening	Monday – Saturday: 6 pm to 10 pm, on Sundays and Public Holidays: 6 pm to 10 pm.
Night	Monday – Saturday: 10 pm to 7 am, on Sundays and Public Holidays: 10 pm to 8 am.

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

2 Noise limits

2.1 Development consent

Karuah Quarry noise limits are detailed in Condition 1 of Schedule 3 of Development Consent (DC) DA 265-10-2004. Relevant sections of DA 265-10-2004 are reproduced in Appendix B.

2.2 Environment protection licence

There are no noise limits detailed in the site's Environment Protection Licence (EPL) 11569.

2.3 Environmental monitoring program

The approved EMP adopts two attended noise monitoring locations that are representative of residences outlined in DA 265-10-2004. Relevant sections of the EMP are reproduced in Appendix B.2.

2.4 Noise limits

Noise impact limits based on the development consent are provided in Table 2.1.

Table 2.1 Noise impact limits, dB

Location	Day $L_{Aeq,15minute}$	Evening $L_{Aeq,15minute}$	All other times $L_{Aeq,15minute}$
NM1	48	47	46
NM2	48	47	46

Notes: 1. Day: 7:00 am–6:00 pm Monday to Saturday; 8:00 am–6:00 pm Sundays and public holidays; Evening: 6:00 pm–10:00 pm; Night: All other times: 10:00 pm–7:00 am Monday to Saturday; 10:00 pm–8:00 am Sundays and public holidays.

2.5 Meteorological conditions

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

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

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

2.6 Additional requirements

Monitoring and reporting have been done in accordance with the 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 as guided by Australian Standard AS1055 'Acoustics, Description and Measurement of Environmental Noise' and relevant EPA requirements. Meteorological data was obtained from the site automatic weather station (AWS) which allowed correlation of atmospheric parameters with measured site noise levels.

3.2 Attended noise monitoring

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

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

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

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may be used in this report. When site noise is noted as IA, 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 NM in this report were due to one or more of the following:

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

3.3 Unattended noise monitoring

The unattended noise monitoring was carried out using two Acoustic Research Labs (ARL) Ngara unattended noise loggers. These environmental noise loggers were in place from Wednesday 14 to Wednesday 28 May 2025.

Calibration of instrumentation was checked prior to and following measurements. All equipment carried appropriate and current NATA (or manufacturer) calibration certificates (refer Appendix C).

Data affected by adverse meteorological conditions and by spurious or uncharacteristic events has been excluded from the results in accordance with methodologies provided in the NPfl.

3.4 Meteorological data

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

3.5 Modifying factors

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

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

3.6 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 Noise monitoring equipment

Item	Serial number	Calibration due date	Relevant standard
Rion NA-28 sound level meter	30131882	06/02/2027	IEC 61672-1:2002
SVAN SV-36 acoustic calibrator	138014	07/08/2025	IEC 60942:2003
ARL Ngara unattended noise logger	878124	28/02/2026	IEC 61672-3:2013
ARL Ngara unattended noise logger	878125	3/11/2025	IEC 61672-3:2013

4 Results

4.1 Attended noise monitoring

4.1.1 Total measured noise levels and atmospheric conditions

Overall noise levels measured at each location during attended measurements are provided in Table 4.1. Discussion as to the noise sources responsible for these measured levels is provided in Section 5.1 of this report.

Table 4.1 Total measured 15-minute noise levels (attended) – Semester 1 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
NM1	14/05/2025 16:58	60	58	55	53	52	48	43
NM2	14/05/2025 17:35	73	70	67	63	61	55	47

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

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

Table 4.2 Measured atmospheric conditions – Semester 1 2025

Location	Start date and time	Temperature °C	Wind speed m/s	Wind direction °Magnetic north ¹	Cloud cover 1/8s
NM1	14/05/2025 16:58	23.7	<0.5	-	6
NM2	14/05/2025 17:35	23.9	<0.5	-	6

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

4.1.2 Site only noise levels

i Modifying factors

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

ii Monitoring results

Table 4.3 provides site noise levels in the absence of other sources, where possible, and includes weather data 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 – Semester 1 2025

Location	Start Date and Time	Wind		Stability Class	Standard limits apply? ¹	Limits, dB	Site levels, dB	Exceedances, dB ¹
		Speed m/s	Direction ³			L _{Aeq,15minute}	L _{Aeq,15minute} ²	L _{Aeq,15minute}
NM1	14/05/2025 16:58	1.0	338	A	Yes	48	IA	Nil
NM2	14/05/2025 17:35	0.7	79	A	Yes	48	IA	Nil

- Notes:
1. Noise emission limits are applicable if weather conditions were within parameters specified in Section 2.5. NA in exceedance column indicates that limits were not applicable due to weather conditions.
 2. Site-only L_{Aeq,15minute} includes modifying factor penalties if applicable.
 3. Degrees magnetic north, “-” indicates calm conditions.

4.2 Unattended noise monitoring

Overall noise levels measured at each location during unattended measurements are provided in Table 4.4. Discussion as to the noise sources responsible for these measured levels is provided in Section 5.2 of this report.

Table 4.4 Total measured noise levels (unattended) – Semester 1 2025¹

Location	Period	Measured noise levels, dB	
		RBL	L _{Aeq,period}
NM1 14-28 May 2025	Day	47	54
	Evening	46	54
	Night	37	51
NM2 ² 14-28 May 2025	Day	57	65
	Evening	51	64
	Night	38	62

Notes: 1. Levels in this table are not necessarily the result of activity at site.
2. Due to equipment failure (attributed to heavy rain/flooding during the monitoring), the data captured by the unattended noise monitor at location NM2 did not meet the minimum requirements of at least four full days of monitoring data, as per the Karuah Quarry EMP.

5 Discussion

5.1 Attended noise monitoring

5.1.1 Noted noise sources

During attended monitoring, the time variations (temporal characteristics) of noise sources are considered in each measurement via statistical descriptors. From these observations, summaries have been derived for each location and provided in this section. Statistical 1/3 octave-band analysis of environmental noise was undertaken and the following figures display frequency ranges of various noise sources at each location for L_{A1} , L_{A10} , L_{Aeq} , L_{A50} , and L_{A90} descriptors. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 5.1, where frogs, insects and birds are seen to be generating noise at frequencies above 1000 Hz, while industrial noise is observed at frequencies less than 1000 Hz.

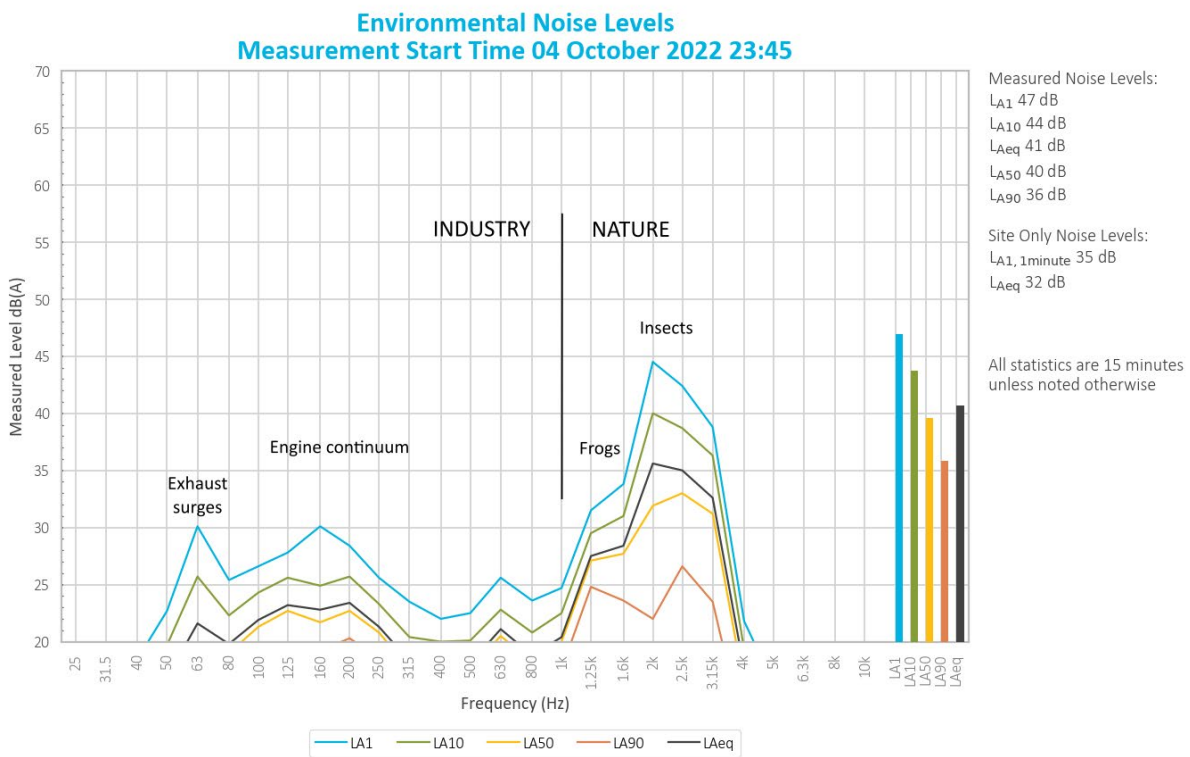


Figure 5.1 Example graph

5.1.2 NM1

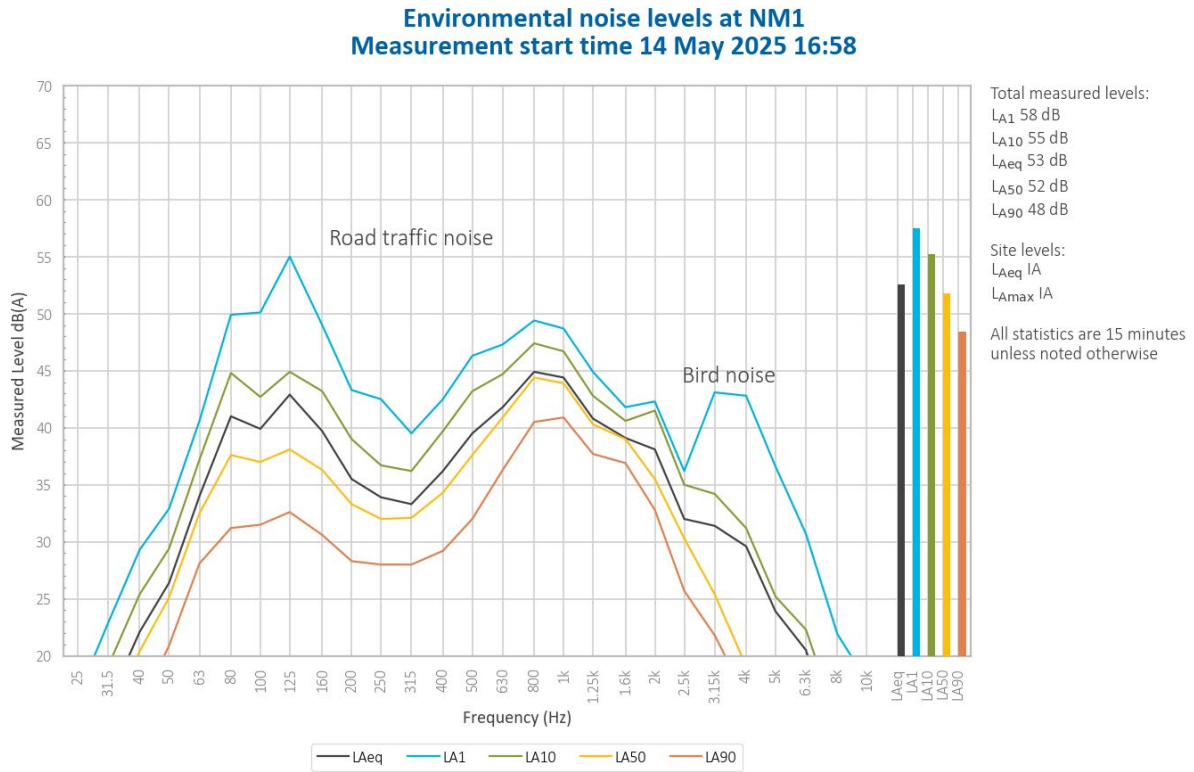


Figure 5.2 Environmental Noise Levels – NM1

Karuah Quarry operations were inaudible during the entire measurement.

Road traffic noise dominated total measured noise levels.

Noise from birds, insects and frogs was also noted.

5.1.3 NM2

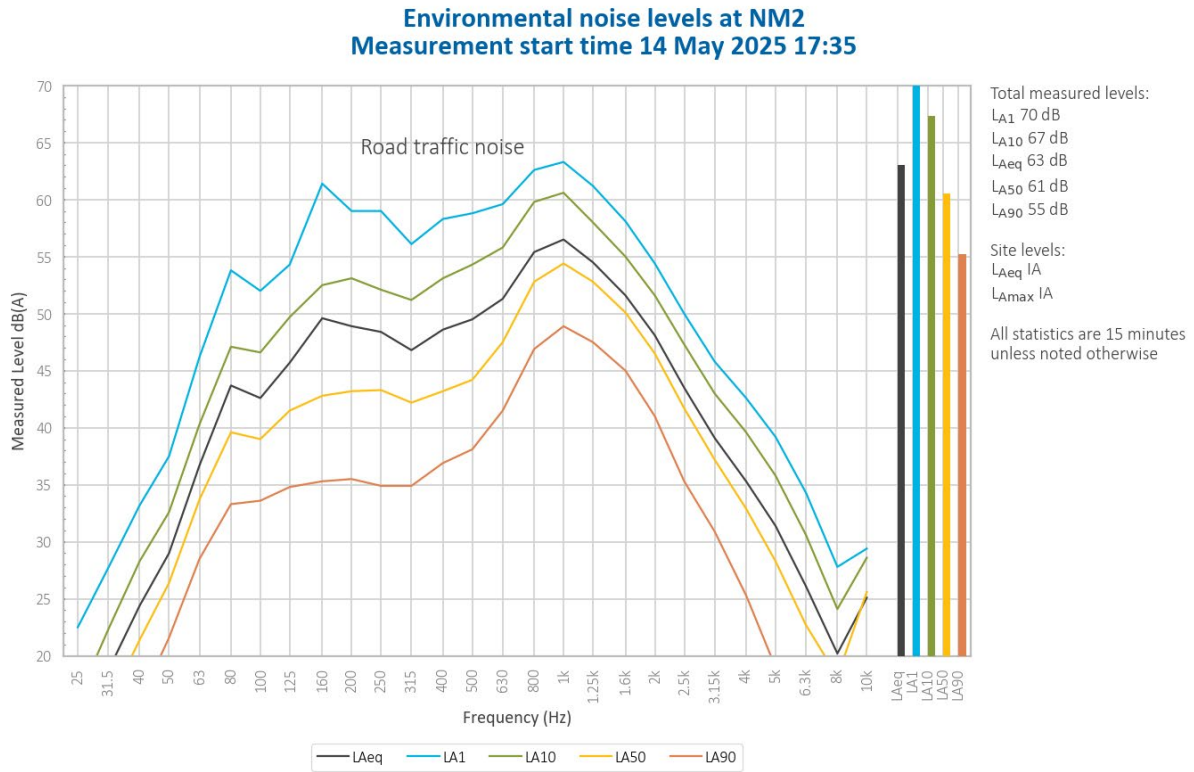


Figure 5.3 Environmental Noise Levels – NM2

Karuah Quarry operations were inaudible during the entire measurement.

Road traffic noise dominated total measured noise levels.

Noise from insects and frogs was also noted.

5.2 Unattended noise monitoring

Observations during the operator attended measurements indicate that the dominant source of noise at both unattended noise monitoring locations is road traffic noise from the Pacific Highway (particularly during peak traffic periods), with insects, birds and dogs barking also noted to be audible.

Notwithstanding, a review of the unattended noise monitoring data has found no correlation between recorded noise levels and events associated with Karuah Quarry operations. Without an operator present to discern the noise sources contributing to the measured noise levels, it is difficult to establish any meaningful conclusions or trends from the unattended noise monitoring data.

6 Summary

EMM was engaged by Hunter Quarries Pty Limited to conduct a bi-annual noise survey of operations at the site surrounds. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits.

Attended environmental noise monitoring described in this report was done during the day period on Wednesday 14 May 2025 at two monitoring locations, as required by the EMP.

Noise levels from site complied with relevant limits at all monitoring locations during the Semester 1 2025 survey.

A review of the unattended noise monitoring data found that no meaningful conclusions, events or trends could be associated with Karuah Quarry operations.

Appendix A

Noise perception and examples

A.1 Noise levels

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

Table A.1 Perceived change in noise

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

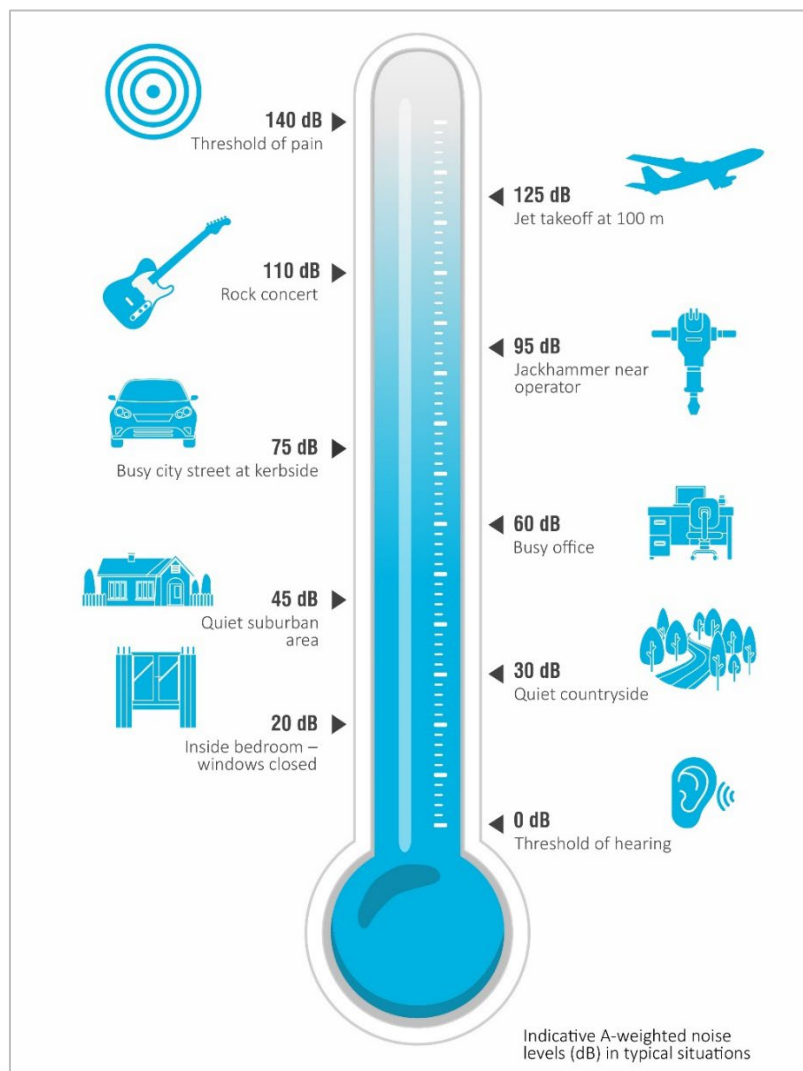


Figure A.1 Common noise levels

Appendix B

Regulator documents

**SCHEDULE 3
SPECIFIC ENVIRONMENTAL CONDITIONS**

¹NOISE

Noise Impact Assessment Criteria

1. The Applicant shall ensure that the noise generated by the development does not exceed the criteria specified in Table 2 at any residence or noise sensitive receptor on privately owned land.

Time Period	Noise Limits dB(A)
	L _{Aeq} (15minute)
Day (7am to 6pm) Monday to Friday and 7am to 1pm Saturday	48
Evening (6pm to 10pm) Monday to Friday	47
At all other times	46

Table 2: Noise Impact Assessment Criteria for the Development

Notes:

- Noise from the site is to be measured within thirty meters of any residence or other noise sensitive areas to determine compliance with the noise criteria set out in Table 2.
- L_{Aeq}(15 minute) is the equivalent continuous noise level - the level of noise equivalent to the energy average of noise levels occurring over a measurement period.
- For the purpose of noise measures required for this condition, the L_{Aeq} noise level must be measured or computed at the point defined in this condition over a period of 15 minutes using "FAST" response on the sound level meter.
- For the purpose of the noise criteria for this condition, 5dBA must be added to the measured level if the noise is substantially tonal or impulsive in character. The location or point of impact can be different for each development, for example, at the closest residential receiver or at the closest boundary of the development. Measurement locations can be:
 - a) 1 meter from the facade of the residence for night time assessment;
 - b) at the residential boundary;
 - c) 30 meters from the residence (rural situations) where boundary is more than 30 meters from residence.
- The noise emission limits identified in this condition apply for prevailing meteorological conditions (winds up to 3m/s), except under conditions of temperature inversions. Noise impacts that may be enhanced by temperature inversions must be addressed by:
 - a) documenting noise complaints received to identify any higher level of impacts or patterns of temperature inversions;
 - b) where levels of noise complaints indicate a higher level of impact then actions to quantify and ameliorate any enhanced impacts under temperature inversions conditions should be developed and implemented.

Operating Hours

2. The Applicant shall comply with the operating hours in Table 1:

Activity	Days of the Week	Time
<ul style="list-style-type: none"> • Construction • Extraction and processing 	Monday – Friday	7am to 6pm
	Saturday	7am to 1pm
<ul style="list-style-type: none"> • Internal and off-site transportation of product 	Sunday and public holidays	No work at any time
Minor maintenance works on plant and machinery	7 days a week and public holidays	7am to 6pm

Table 1: Operating Hours for the Development

Note: Delivery of material outside of the hours of operation permitted by condition 2 is only allowed, where that delivery is required by the police or other authorities for safety reasons; and/or where the operation or personnel or equipment are endangered. In such circumstances, prior notification should be provided to the DEC and affected residents as soon as possible, or within a reasonable period in the case of emergency.

Noise Monitoring

3. Within 6 months of the date of this consent, the Applicant shall prepare and implement a Noise Monitoring Program for the development to evaluate compliance with the noise impact assessment criteria in this consent, in consultation with the DEC, and to the satisfaction of the Director-General.

¹ Incorporates DEC GTAs

4.3 Blast Monitoring

In accordance with Schedule 3, Condition 6 of the Development Consent, blasting will only be conducted between 9.00 am and 3.00 pm Monday to Friday, and within a maximum of one blast per week. No blasting will occur on weekends or public holidays. Any blasting outside of these hours will be conducted with prior approval of NSW Planning.

It should be noted that the blast event, may consist of a number of blasts in the same vicinity, within a short period of time, typically less than two minutes.

In accordance with Schedule 4, Condition 4 and Condition 5 of the Development Consent, all blasts will be monitored for overpressure and ground vibration at the nearest residential receptor, currently located on Mill Hill Close, as illustrated in **Figure 4**, to ensure blasting remains within compliance criteria summarised by **Table 8**.

Table 8 Summary of Blasting Compliance Criteria.

Location	Airblast Overpressure [dBL (Lin Peak)]	Ground Vibration, PPV (mm/s)	Allowable Exceedance
Any residence on privately-owned land	120	10	0%
	115	5	5% of the total number of blasts over a period of 12-months

4.4 Noise Monitoring

Schedule 3, Condition 11 of the Development Consent provides noise impact assessment criteria for the site as summarised by **Table 9**. The noise monitoring regime is outlined below.

Table 9 Summary of Noise Compliance Criteria.

Assessment Period	Time Period	Noise Limits [dB(A) LA _{eq(15min)}]
Day	7am to 6pm Monday to Friday; and 7am to 1pm Saturday	48
Evening	6 pm to 10pm Monday to Friday	47
	At all other times	46

Noise monitoring rounds occur on a six-monthly basis consisting of both attended and unattended noise monitoring at the two nearest residential receivers (NM1 and NM2) located on Mill Hill Close, as illustrated by **Figure 4**.

The continuous unattended monitoring will occur over a period of at least four full days; and the attended monitoring will be undertaken for 15-minute intervals during both day and evening assessment periods by a suitably qualified noise consultant.

During the attended monitoring surveys, on-site climatic data will be logged to ensure that the noise assessment periods will be completed during favourable weather conditions as defined by the EPA's *Approved methods for the measurement and analysis of environmental noise in NSW*.

Document Number	Version Number	Version Date	Revision Date	Document Owner	Page
ENV-MP-KHRQ001	Version 7A	16/04/2025	16/04/2030	E&D Manager	19 of 33

Appendix C

Calibration certificates



Sound Level Meter

IEC 61672-3:2013

Calibration Certificate

Calibration Number C24148

Client Details	EMM Consulting Ground Floor, Suite 01, 20 Chandos Street, PO St Leonards NSW 2065
-----------------------	---

Equipment Tested/ Model Number :	NGARA GRY
Instrument Serial Number :	878124
Microphone Serial Number :	322004
Pre-amplifier Serial Number :	28248
Firmware Version :	v12.6

Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditions
Ambient Temperature : 23.7 °C	Ambient Temperature : 24 °C
Relative Humidity : 52.6 %	Relative Humidity : 51.9 %
Barometric Pressure : 100.87 kPa	Barometric Pressure : 100.82 kPa

Calibration Technician : Peter Elters	Secondary Check: Shaheen Boaz
Calibration Date : 28 Feb 2024	Report Issue Date : 29 Feb 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	N/A
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	N/A
15: Long Term Stability	Pass	20: Overload Indication	Pass
16: Level linearity on the reference level range	Pass	21: High Level Stability	Pass

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

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

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



Sound Level Meter

IEC 61672-3:2013

Calibration Certificate

Calibration Number C23804

Client Details	EMM Consulting Ground Floor, Suite 01, 20 Chandos Street St Leonards NSW 2065
-----------------------	---

Equipment Tested/ Model Number :	ARL Ngara
Instrument Serial Number :	878125
Microphone Serial Number :	320652
Pre-amplifier Serial Number :	28213
Firmware Version :	12.6

Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditions
Ambient Temperature : 25 °C	Ambient Temperature : 25.1 °C
Relative Humidity : 42.1 %	Relative Humidity : 42.1 %
Barometric Pressure : 100.56 kPa	Barometric Pressure : 100.53 kPa

Calibration Technician : Shaheen Boaz	Secondary Check: Dhanush Bonu
Calibration Date : 3 Nov 2023	Report Issue Date : 6 Nov 2023

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	N/A
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	N/A
15: Long Term Stability	Pass	20: Overload Indication	Pass
16: Level linearity on the reference level range	Pass	21: High Level Stability	Pass

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

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

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

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*

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SIGNATURE:

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emmconsulting.com.au





E250042_KQ_S1_V1

Final Audit Report

2025-05-30

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Karuah Quarry

Biannual Attended Noise Monitoring - Semester 2 2025

Prepared for Hunter Quarries Pty Limited

December 2025

Karuah Quarry

Biannual Attended Noise Monitoring - Semester 2 2025

Hunter Quarries Pty Limited

E250042 RP#6

December 2025

Version	Date	Prepared by	Reviewed by	Comments
1	12 December 2025	Lucas Adamson	Robert Kirwan	Final

Approved by



Robert Kirwan

Senior Associate – Team Leader

12 December 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 Hunter Quarries Pty Limited to conduct a bi-annual noise survey of operations at Karuah Quarry (KQ, 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 the day period on Thursday 4 December 2025 at two monitoring locations, required by the environmental monitoring program (EMP). It is of note that the site currently operates during the day period only and as such, noise monitoring during the evening and night-time periods is not required.

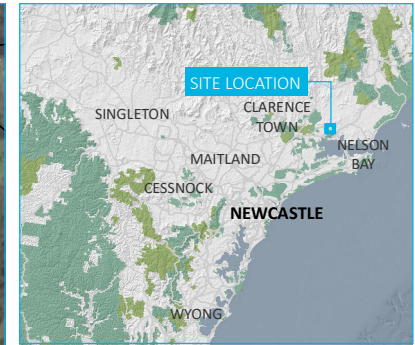
1.2 Attended monitoring locations

The 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 near-by	Coordinates (MGA56)	
		Easting	Northing
NM1	Private Residence - 74 Mill Hill Close, Karuah	406623	6388704
NM2	Private Residence - 64 Mill Hill Close, Karuah	406405	6388859

\\lemmsvr1\EMM3\2021\E2\10782 - KEO Noise monitoring\8 GIS\02 Maps\N001 NoiseMonitoringLocations_20211206_01.mxd 6/12/2021



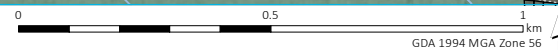
KEY

- Site boundary
- A Noise monitoring location
- Major road
- Minor road
- Vehicular track
- Watercourse/drainage line
- Cadastral boundary
- Waterbody
- NPWS reserve
- State forest

Noise monitoring locations

Karuah Quarry
Bi-annual noise monitoring
Figure 3.1

Source: EMM (2021); 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 percent 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 percent of the time, also referred to as the “background” noise level and commonly used to derive noise limits.
L_{Amin}	The minimum A-weighted noise level over a time period.
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	Vertical temperature gradient in degrees Celsius per 100 metres altitude.
Sigma-theta	The standard deviation of the horizontal wind direction over a period of time.
IA	Inaudible. When site noise is noted as IA then there was no site noise at the monitoring location.
NM	Not Measurable. If site noise is noted as NM, this means some noise was audible but could not be quantified.
Day	Monday – Saturday: 7 am to 6 pm, on Sundays and Public Holidays: 8 am to 6 pm.
Evening	Monday – Saturday: 6 pm to 10 pm, on Sundays and Public Holidays: 6 pm to 10 pm.
Night	Monday – Saturday: 10 pm to 7 am, on Sundays and Public Holidays: 10 pm to 8 am.

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

2 Noise limits

2.1 Development consent

Karuah Quarry noise limits are detailed in Condition 1 of Schedule 3 of Development Consent (DC) DA 265-10-2004. Relevant sections of DA 265-10-2004 are reproduced in Appendix B.

2.2 Environment protection licence

There are no noise limits detailed in the site's Environment Protection Licence (EPL) 11569.

2.3 Environmental monitoring program

The approved EMP adopts two attended noise monitoring locations that are representative of residences outlined in DA 265-10-2004. Relevant sections of the EMP are reproduced in Appendix B.2.

2.4 Noise limits

Noise impact limits based on the development consent are provided in Table 2.1.

Table 2.1 Noise impact limits, dB

Location	Day $L_{Aeq,15minute}$	Evening $L_{Aeq,15minute}$	All other times $L_{Aeq,15minute}$
NM1	48	47	46
NM2	48	47	46

Notes: 1. Day: 7:00 am–6:00 pm Monday to Saturday; 8:00 am–6:00 pm Sundays and public holidays; Evening: 6:00 pm–10:00 pm; Night: All other times: 10:00 pm–7:00 am Monday to Saturday; 10:00 pm–8:00 am Sundays and public holidays.

2.5 Meteorological conditions

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

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

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

2.6 Additional requirements

Monitoring and reporting have been done in accordance with the 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 as guided by Australian Standard AS1055 'Acoustics, Description and Measurement of Environmental Noise' and relevant EPA requirements. Meteorological data was obtained from the site automatic weather station (AWS) which allowed correlation of atmospheric parameters with measured site noise levels.

3.2 Attended noise monitoring

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

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

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

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may be used in this report. When site noise is noted as IA, 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 NM in this report were due to one or more of the following:

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

3.3 Unattended noise monitoring

The unattended noise monitoring was carried out using two Acoustic Research Labs (ARL) Ngara unattended noise loggers. These environmental noise loggers were in place from Thursday 4 to Wednesday 10 December 2025.

Calibration of instrumentation was checked prior to and following measurements. All equipment carried appropriate and current NATA (or manufacturer) calibration certificates (refer Appendix C).

Data affected by adverse meteorological conditions and by spurious or uncharacteristic events has been excluded from the results in accordance with methodologies provided in the NPfl.

3.4 Meteorological data

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

3.5 Modifying factors

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

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

3.6 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 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
ARL Ngara unattended noise logger	87801F	20/06/2026	IEC 61672-3:2013
ARL Ngara unattended noise logger	878017	20/11/2026	IEC 61672-3:2013

4 Results

4.1 Attended noise monitoring

4.1.1 Total measured noise levels and atmospheric conditions

Overall noise levels measured at each location during attended measurements are provided in Table 4.1. Discussion as to the noise sources responsible for these measured levels is provided in Section 5.1 of this report.

Table 4.1 Total measured 15-minute noise levels (attended) – Semester 2 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
NM2	4/12/2025 9:57	77	73	69	67	66	63	57
NM1	4/12/2025 10:14	59	55	54	52	51	48	46

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

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

Table 4.2 Measured atmospheric conditions – Semester 2 2025

Location	Start date and time	Temperature °C	Wind speed m/s	Wind direction ° Magnetic north ¹	Cloud cover 1/8s
NM2	4/12/2025 9:57	24.1	<0.5	-	0
NM1	4/12/2025 10:14	24.0	<0.5	-	0

Notes: 1. “-” indicates calm conditions at monitoring location.

4.1.2 Site only noise levels

i Modifying factors

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

ii Monitoring results

Table 4.3 provides site noise levels in the absence of other sources, where possible, and includes weather data 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 – Semester 2 2025

Location	Start Date and Time	Wind		Stability Class	Standard limits apply? ¹	Limits, dB	Site levels, dB	Exceedances, dB ¹
		Speed m/s	Direction ³			L _{Aeq,15minute}	L _{Aeq,15minute} ²	L _{Aeq,15minute}
NM2	4/12/2025 9:57	1.9	211	A	Yes	48	IA	Nil
NM1	4/12/2025 10:14	1.4	229	A	Yes	48	IA	Nil

- Notes:
1. Noise emission limits are applicable if weather conditions were within parameters specified in Section 2.5. N/A in exceedance column indicates that limits were not applicable due to weather conditions.
 2. Site-only L_{Aeq,15minute}, includes modifying factor penalties if applicable.
 3. Degrees magnetic north, “-” indicates calm conditions.

4.2 Unattended noise monitoring

Overall noise levels measured at each location during unattended measurements are provided in Table 4.4. Discussion as to the noise sources responsible for these measured levels is provided in Section 5.2 of this report.

Table 4.4 Total measured noise levels (unattended) – Semester 2 2025¹

Location	Period	Measured noise levels, dB	
		RBL	L _{Aeq,period}
NM1 4-10 December 2025	Day	45	53
	Evening	44	54
	Night	38	52
NM2 ² 4-10 December 2025	Day	56	64
	Evening	47	64
	Night	41	62

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

5 Discussion

5.1 Attended noise monitoring

5.1.1 Noted noise sources

During attended monitoring, the time variations (temporal characteristics) of noise sources are considered in each measurement via statistical descriptors. From these observations, summaries have been derived for each location and provided in this section. Statistical 1/3 octave-band analysis of environmental noise was undertaken and the following figures display frequency ranges of various noise sources at each location for L_{A1} , L_{A10} , L_{Aeq} , L_{A50} , and L_{A90} descriptors. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 5.1, where frogs, insects and birds are seen to be generating noise at frequencies above 1000 Hz, while industrial noise is observed at frequencies less than 1000 Hz.

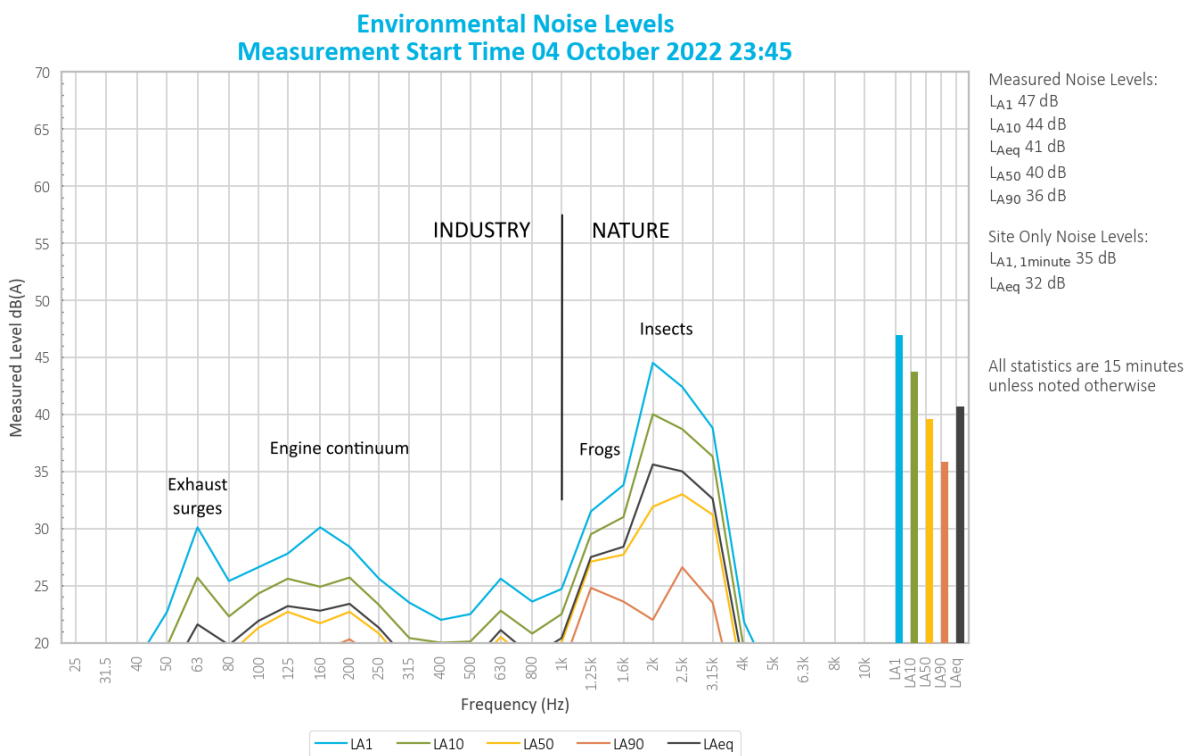


Figure 5.1 Example graph

5.1.2 NM1

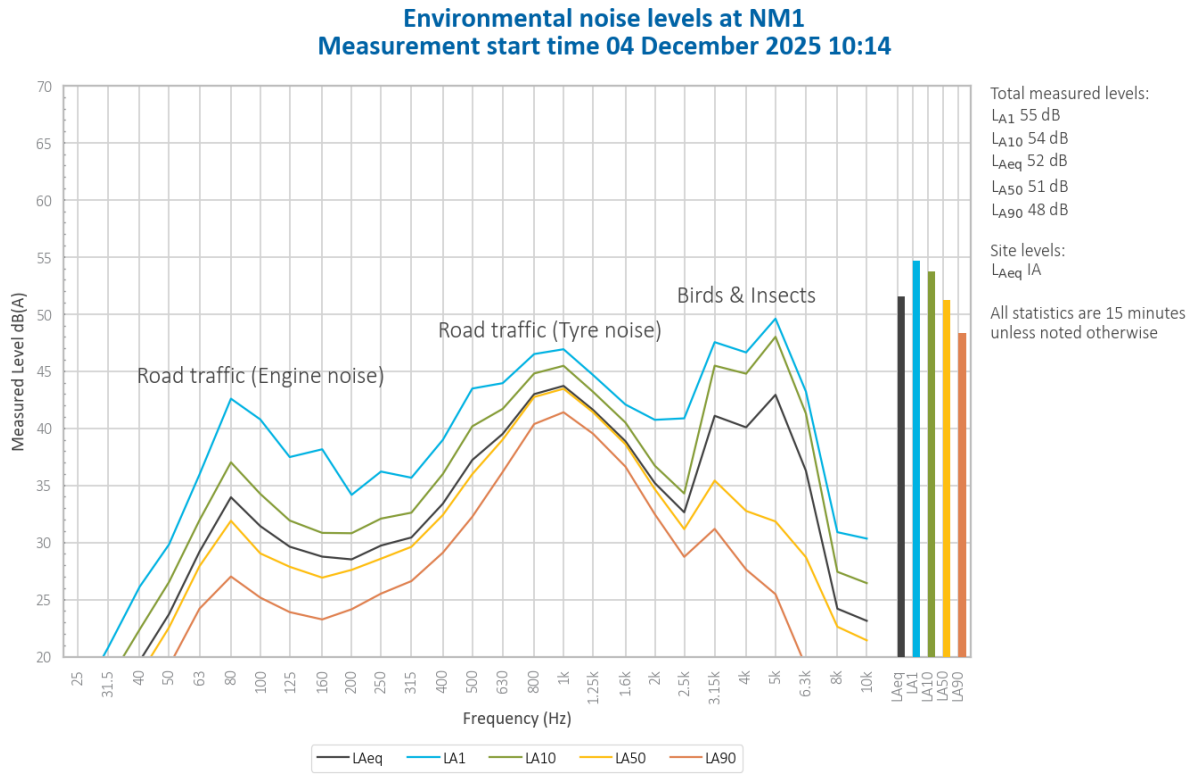


Figure 5.2 Environmental Noise Levels – NM1

Karuah Quarry operations were inaudible during the entire measurement.
 Road traffic noise dominated total measured noise levels.
 Noise from birds and insects was also noted.

5.1.3 NM2

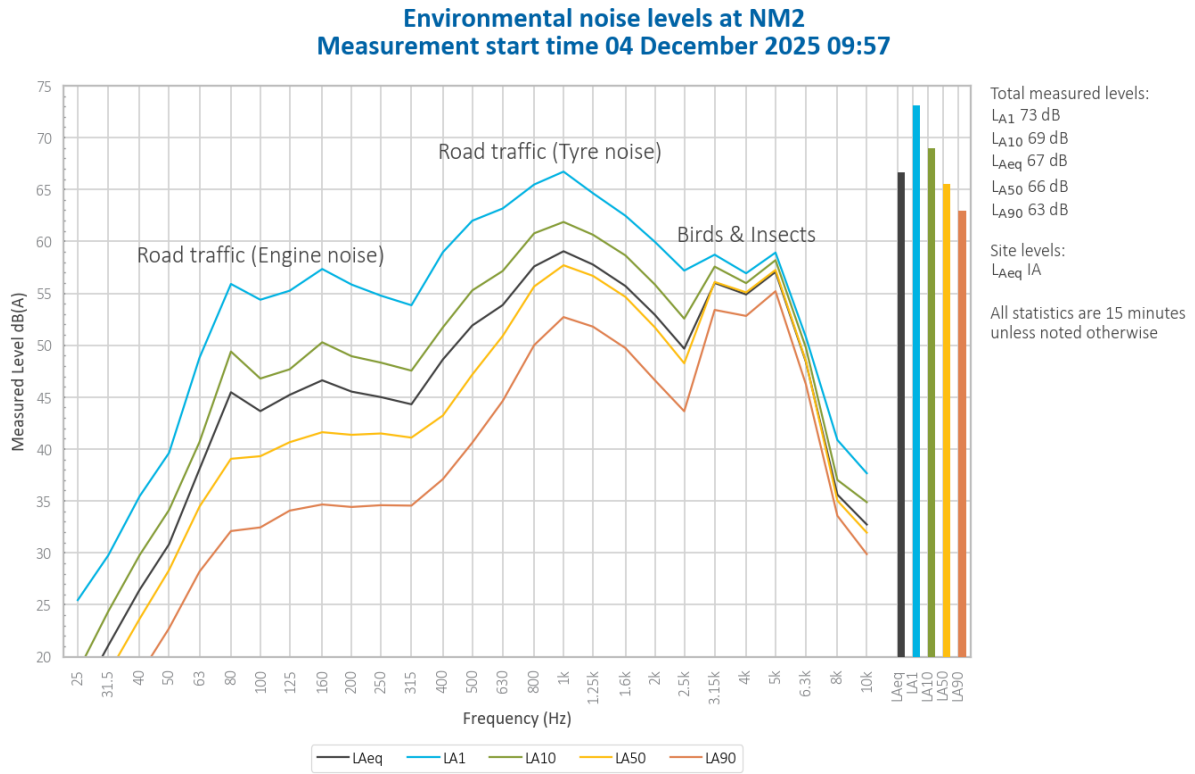


Figure 5.3 Environmental Noise Levels – NM2

Karuah Quarry operations were inaudible during the entire measurement.
 Road traffic noise dominated total measured noise levels.
 Noise from birds and insects was also noted.

5.2 Unattended noise monitoring

Observations during the operator attended measurements indicate that the dominant source of noise at both unattended noise monitoring locations is road traffic noise from the Pacific Highway (particularly during peak traffic periods), with insects, birds and dogs barking also noted to be audible.

Notwithstanding, a review of the unattended noise monitoring data has found no correlation between recorded noise levels and events associated with Karuah Quarry operations. Without an operator present to discern the noise sources contributing to the measured noise levels, it is difficult to establish any meaningful conclusions or trends from the unattended noise monitoring data.

6 Summary

EMM was engaged by Hunter Quarries Pty Limited to conduct a bi-annual noise survey of operations at the site surrounds. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits.

Attended environmental noise monitoring described in this report was done during the day period on Thursday 4 December 2025 at two monitoring locations, as required by the EMP.

Noise levels from site complied with relevant limits at all monitoring locations during the Semester 2 2025 survey.

A review of the unattended noise monitoring data found that no meaningful conclusions, events or trends could be associated with Karuah Quarry operations.

Appendix A

Noise perception and examples

A.1 Noise levels

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

Table A.1 Perceived change in noise

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

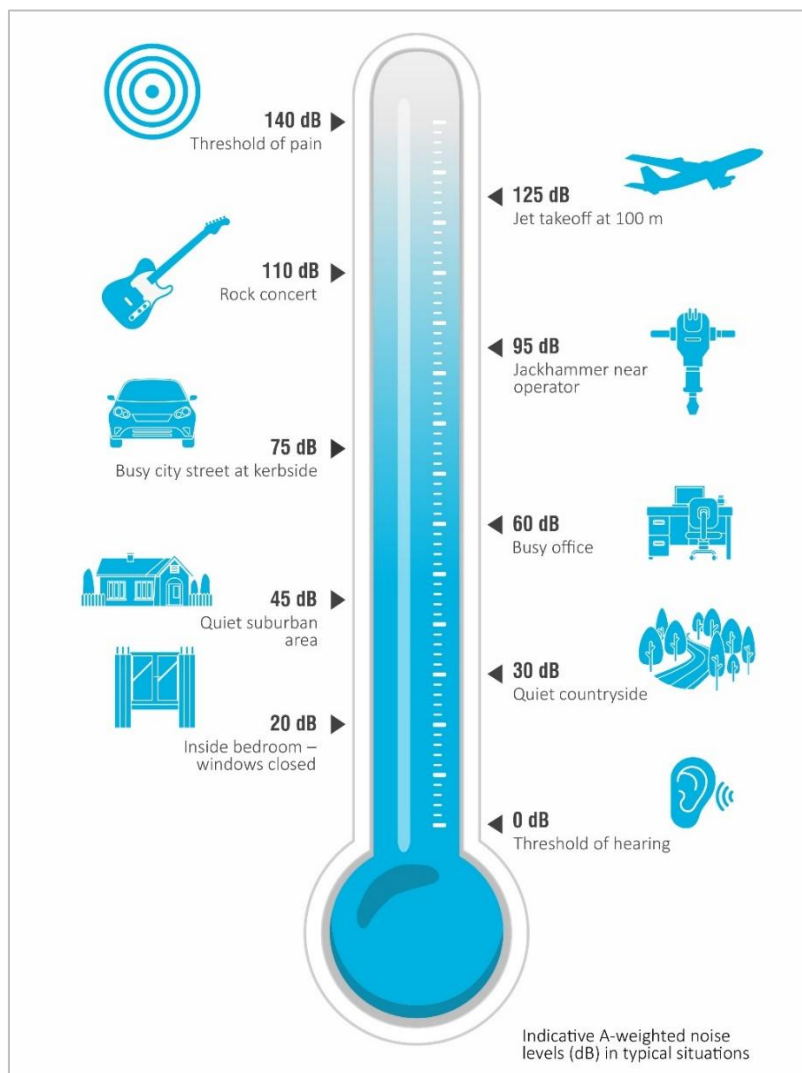


Figure A.1 Common noise levels

Appendix B

Regulator documents

B.1 Development Consent

**SCHEDULE 3
SPECIFIC ENVIRONMENTAL CONDITIONS**

¹NOISE

Noise Impact Assessment Criteria

1. The Applicant shall ensure that the noise generated by the development does not exceed the criteria specified in Table 2 at any residence or noise sensitive receptor on privately owned land.

Time Period	Noise Limits dB(A)
	L _{Aeq} (15minute)
Day (7am to 6pm) Monday to Friday and 7am to 1pm Saturday	48
Evening (6pm to 10pm) Monday to Friday	47
At all other times	46

Table 2: Noise Impact Assessment Criteria for the Development

Notes:

- Noise from the site is to be measured within thirty meters of any residence or other noise sensitive areas to determine compliance with the noise criteria set out in Table 2.
- L_{Aeq}(15 minute) is the equivalent continuous noise level - the level of noise equivalent to the energy average of noise levels occurring over a measurement period.
- For the purpose of noise measures required for this condition, the L_{Aeq} noise level must be measured or computed at the point defined in this condition over a period of 15 minutes using "FAST" response on the sound level meter.
- For the purpose of the noise criteria for this condition, 5dBA must be added to the measured level if the noise is substantially tonal or impulsive in character. The location or point of impact can be different for each development, for example, at the closest residential receiver or at the closest boundary of the development. Measurement locations can be:
 - a) 1 meter from the facade of the residence for night time assessment;
 - b) at the residential boundary;
 - c) 30 meters from the residence (rural situations) where boundary is more than 30 meters from residence.
- The noise emission limits identified in this condition apply for prevailing meteorological conditions (winds up to 3m/s), except under conditions of temperature inversions. Noise impacts that may be enhanced by temperature inversions must be addressed by:
 - a) documenting noise complaints received to identify any higher level of impacts or patterns of temperature inversions;
 - b) where levels of noise complaints indicate a higher level of impact then actions to quantify and ameliorate any enhanced impacts under temperature inversions conditions should be developed and implemented.

Operating Hours

2. The Applicant shall comply with the operating hours in Table 1:

Activity	Days of the Week	Time
<ul style="list-style-type: none"> • Construction • Extraction and processing 	Monday – Friday	7am to 6pm
	Saturday	7am to 1pm
<ul style="list-style-type: none"> • Internal and off-site transportation of product 	Sunday and public holidays	No work at any time
Minor maintenance works on plant and machinery	7 days a week and public holidays	7am to 6pm

Table 1: Operating Hours for the Development

Note: Delivery of material outside of the hours of operation permitted by condition 2 is only allowed, where that delivery is required by the police or other authorities for safety reasons; and/or where the operation or personnel or equipment are endangered. In such circumstances, prior notification should be provided to the DEC and affected residents as soon as possible, or within a reasonable period in the case of emergency.

Noise Monitoring

3. Within 6 months of the date of this consent, the Applicant shall prepare and implement a Noise Monitoring Program for the development to evaluate compliance with the noise impact assessment criteria in this consent, in consultation with the DEC, and to the satisfaction of the Director-General.

¹ Incorporates DEC GTAs

B.2 Environmental monitoring program

4.3 Blast Monitoring

In accordance with Schedule 3, Condition 6 of the Development Consent, blasting will only be conducted between 9.00 am and 3.00 pm Monday to Friday, and within a maximum of one blast per week. No blasting will occur on weekends or public holidays. Any blasting outside of these hours will be conducted with prior approval of NSW Planning.

It should be noted that the blast event, may consist of a number of blasts in the same vicinity, within a short period of time, typically less than two minutes.

In accordance with Schedule 4, Condition 4 and Condition 5 of the Development Consent, all blasts will be monitored for overpressure and ground vibration at the nearest residential receptor, currently located on Mill Hill Close, as illustrated in **Figure 4**, to ensure blasting remains within compliance criteria summarised by **Table 8**.

Table 8 Summary of Blasting Compliance Criteria.

Location	Airblast Overpressure [dBL (Lin Peak)]	Ground Vibration, PPV (mm/s)	Allowable Exceedance
Any residence on privately-owned land	120	10	0%
	115	5	5% of the total number of blasts over a period of 12-months

4.4 Noise Monitoring

Schedule 3, Condition 11 of the Development Consent provides noise impact assessment criteria for the site as summarised by **Table 9**. The noise monitoring regime is outlined below.

Table 9 Summary of Noise Compliance Criteria.

Assessment Period	Time Period	Noise Limits [dB(A) LA _{eq} (15min)]
Day	7am to 6pm Monday to Friday; and 7am to 1pm Saturday	48
Evening	6 pm to 10pm Monday to Friday	47
	At all other times	46

Noise monitoring rounds occur on a six-monthly basis consisting of both attended and unattended noise monitoring at the two nearest residential receivers (NM1 and NM2) located on Mill Hill Close, as illustrated by **Figure 4**.

The continuous unattended monitoring will occur over a period of at least four full days; and the attended monitoring will be undertaken for 15-minute intervals during both day and evening assessment periods by a suitably qualified noise consultant.

During the attended monitoring surveys, on-site climatic data will be logged to ensure that the noise assessment periods will be completed during favourable weather conditions as defined by the EPA's *Approved methods for the measurement and analysis of environmental noise in NSW*.

Document Number	Version Number	Version Date	Revision Date	Document Owner	Page
ENV-MP-KHRQ001	Version 7A	16/04/2025	16/04/2030	E&D Manager	19 of 33

Appendix C

Calibration certificates



Sound Level Meter

IEC 61672-3:2013

Calibration Certificate

Calibration Number C24877

Client Details	EMM Consulting Suite 9.10, Level 9, 454 Collins Street Melbourne VIC, 3000
-----------------------	--

Equipment Tested/ Model Number :	ARL Ngara
Instrument Serial Number :	878017
Microphone Serial Number :	21991
Pre-amplifier Serial Number :	27806
Firmware Version :	v12.6

Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditions
Ambient Temperature : 24.7 °C	Ambient Temperature : 24.8 °C
Relative Humidity : 48.4 %	Relative Humidity : 48.2 %
Barometric Pressure : 101.25 kPa	Barometric Pressure : 101.22 kPa

Calibration Technician : Jeff Yu	Secondary Check: Cooper Sallway
Calibration Date : 20 Nov 2024	Report Issue Date : 25 Nov 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	N/A
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	N/A
15: Long Term Stability	Pass	20: Overload Indication	Pass
16: Level linearity on the reference level range	Pass	21: High Level Stability	Pass

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

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

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



Sound Level Meter IEC 61672-3:2013 Calibration Test Report

Calibration Number C24877

Client Details	EMM Consulting Suite 9.10, Level 9, 454 Collins Street Melbourne VIC, 3000
-----------------------	--

Equipment Tested/ Model Number :	ARL Ngara
Instrument Serial Number :	878017
Microphone Serial Number :	21991
Pre-amplifier Serial Number :	27806
Firmware Version :	v12.6

Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditions
Ambient Temperature : 24.7 °C	Ambient Temperature : 24.8 °C
Relative Humidity : 48.4 %	Relative Humidity : 48.2 %
Barometric Pressure : 101.25 kPa	Barometric Pressure : 101.22 kPa

Calibration Technician : Jeff Yu	Secondary Check: Cooper Sallway
Calibration Date : 20 Nov 2024	Report Issue Date : 25 Nov 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	N/A
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	N/A
15: Long Term Stability	Pass	20: Overload Indication	Pass
16: Level linearity on the reference level range	Pass	21: High Level Stability	Pass

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

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

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

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.

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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1. OVERVIEW

This report presents the calibration test results of a ARL Ngara Sound Level Meter, and associated equipment. Calibration is carried out in accordance with *IEC 61672-3:2013, Electroacoustics - Sound Level Meters - Part 3: Periodic Tests*.

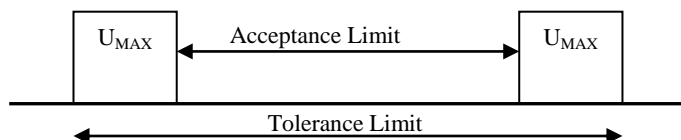
Relevant clauses from this standard have been used for periodic testing in conjunction with Acoustic Research Labs internal test methods described in Section 1 of the calibration work instruction manual.

Where required, reference is made to manual version v41 as provided by the manufacturer.

1.1 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

1.2 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.

2. GENERAL

2.1 ENVIRONMENTAL CONDITIONS DURING TEST

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

2.2 CALIBRATION TESTS

Where applicable the following tests were performed in accordance with the requirements of *IEC 61672-3:2013*. These clauses are used to define the periodic testing of Sound Level Meters.

Clause 10	Indication at the Calibration Check Frequency
Clause 11	Self Generated Noise
Clause 12	Acoustical Signal Tests of Frequency Weighting
Clause 13	Electrical Signal Tests of Frequency Weightings
Clause 14	Frequency and Time Weightings at 1kHz
Clause 15	Long Term Stability
Clause 16	Level Linearity on the Reference Level Range
Clause 17	Level Linearity including the level range control
Clause 18	Toneburst Response
Clause 19	Peak C Sound Level
Clause 20	Overload Indication
Clause 21	High Level Stability

2.3 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.

2.3.1 Multi-function Acoustic Calibrator

A Bruel & Kjaer 4226 Multi-function calibrator (S/N - 2985012) was used for frequency response testing of the entire instrument (including microphone). This instrument was used as a reference calibrator and for frequency response verification.

2.3.2 Microphone Electrical Equivalent Circuit

Calibration of most instrument parameters is carried out using electrical signals fed to the unit via a two-port electrical equivalent circuit of the microphone.

A 13pF capacitance dummy microphone was used during testing.

2.3.3 Adjustable Attenuator

A means for varying the attenuation of electrical signals via the dummy microphone was provided by a JFW Industries dual rotary attenuator (S/N - 792819 2132). The attenuator is switchable in 1dB steps between 0dB and 60dB.

2.3.4 Arbitrary Function Generator

A Keysight 33511B (S/N – MY58001621) was used to generate the required electrical signals.

2.3.5 Environmental Monitoring

A MHB-382SD (S/N – AG44204) was used for measuring environmental conditions during device calibration. It is capable of providing temperature, relative humidity and pressure measurements.

3. CALIBRATION TEST RESULTS

3.1 INDICATION AT THE CALIBRATION CHECK FREQUENCY

The indication of the sound level meter at the calibration check frequency was checked by application of an acoustic signal at the reference sound pressure level and frequency.

Stated reference conditions as found in manual are

Reference Level : 94.0 dB

Reference Frequency : 1000.0 Hz

Indications before and after adjustments were recorded and are shown in Table 1 (all measurements in dB) -

Table 1 - Check Frequency Calibration Results

Frequency Weighting	Initial Response	B&K 4226 Corrected	FreeField Corrected	Final Corrected Response
A	94.62	94.08	94.08	94.00
C	94.58	94.04	94.04	93.96
Z	N/A	N/A	N/A	N/A

Free field adjustment data as provided by the manufacturer. Windscreen correction factors applied.

3.2 SELF GENERATED NOISE

3.2.1 Microphone Installed

Self generated noise was measured with the microphone installed on the sound level meter, in the configuration submitted for periodic testing. The sound level meter was set to the most-sensitive level range and with frequency weighting A selected.

Ten (10) time weighted observations were made over a period of 60 seconds.

Random Readings dB(A)

18.80	18.70	18.70	18.70	18.70
18.70	18.70	18.70	18.70	18.70

Acoustic Noise Floor : 18.7 dB(A)

3.2.2 Electrical Input Signal Device

With the microphone replaced by the electrical input signal device and terminated as specified, the sound level meter was set to the most-sensitive level range and with frequency weightings Z, C and A selected as provided.

Ten (10) time weighted observations were made over a period of 60 seconds.

Random Readings dB(A)

16.60	16.80	16.70	16.50	16.40
16.70	16.70	16.50	16.50	16.40

Random Readings dB(C)

18.10	18.40	18.20	18.30	17.90
18.60	18.30	18.20	18.10	18.00

Random Readings dB(Z)

N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A

Electric Noise Floor :

dB(A)	dB(C)	dB(Z)
16.6	18.2	N/A

3.3 ACOUSTICAL SIGNAL TESTS OF A FREQUENCY WEIGHTING

The sound level meter was set to measure frequency weighting C with a FAST response. The test was carried out using a multi-function acoustic calibrator set to pressure mode.

Three (3) readings were made at each test frequency. The average of the readings was then corrected to the multi-function acoustic calibrator.

Table 2 - Frequency Weighting C Response

Freq Hz	Reading 1	Reading 2	Reading 3	Uncertainty (dB)
125	93.9	93.9	93.9	0.13
1 000	94.0	94.0	94.0	0.13
8 000	87.8	87.8	87.8	0.14

Actual Freq Hz	B&K 4226 Corrections	Corrected Response dB(C)		Uncertainty (dB)
		Actual	re 1kHz	
125.90	-0.06	93.84	-0.08	0.13
1005.10	-0.08	93.92	0.00	0.13
7915.10	0.07	87.87	-6.05	0.14

Adjustments were then applied to correct for free field and sound level meter body effects with data supplied by the manufacturer as per Table 3. Windscreen correction factors applied.

Table 3 - Correction Data

Actual Freq (Hz)	Pressure to Freefield (dB)	Uncertainty (dB)	Body Effects (dB)	Uncertainty (dB)	WS Effects (dB)	Uncertainty (dB)
125.90	0.00	0.20	0.00	0.00	0.00	0.20
1005.10	0.00	0.20	0.00	0.00	0.10	0.20
7915.10	3.00	0.30	0.00	0.00	0.20	0.30

Finally, the corrected responses are normalised to the response at 1kHz and compared to the tolerance limits stated in Table 2 of IEC 61672.1-2013.

Table 4 - Acoustic C Response

Actual Freq (Hz)	Corrected Response dB(C)		Expected Response dB(C)		Deviation (dB)	P/F	Uncertainty (dB)	Maximum Permitted Uncertainty (dB)
	Actual	re 1kHz	re 1kHz	Tolerance Limit				
125.90	93.84	-0.18	-0.2	±1.0	0.02	P	0.31	0.60
1005.10	94.02	0.00	0.0	±0.7	0.00	P	0.31	0.60
7915.10	91.07	-2.95	-3.0	+1.5 / -2.5	0.05	P	0.45	0.70

3.4 ELECTRICAL SIGNAL TESTS OF FREQUENCY WEIGHTINGS

Frequency weighting responses for Z, C and A were determined relative to the response at 1kHz using steady sinusoidal electrical input signals.

On the reference level range, and for each frequency weighting under test, the level of a 1kHz input signal was adjusted to yield 75dB. At test frequencies other than 1kHz, the input signal level was adjusted to compensate for the design goal attenuations as specified in Table 2 of IEC 61672.1-2013.

Table 5 - Measured Electrical Frequency Response

Freq (Hz)	A Weighting (dB)	C Weighting (dB)	Z Weighting (dB)	Uncertainty (dB)
63	74.7	74.7	N/A	0.13
125	74.8	74.9	N/A	0.11
250	74.9	74.9	N/A	0.10
500	74.9	75.0	N/A	0.10
1 000	75.0	75.0	N/A	0.10
2 000	75.0	75.0	N/A	0.10
4 000	75.0	75.0	N/A	0.10
8 000	74.9	74.8	N/A	0.10
15 850	72.2	72.1	N/A	0.13

Adjustments were then applied to correct for a uniform free field response and sound level meter body effects with data supplied by the manufacturer as per Table 6. Windscreen correction factors applied.

Table 6 - Correction Data

Freq (Hz)	Ufreq (dB)	Uncertainty (dB)	Body Effects (dB)	Uncertainty (dB)	WS Effects (dB)	Uncertainty (dB)
63	0.10	0.30	0.00	0.00	0.00	0.20
125	0.10	0.30	0.00	0.00	0.00	0.20
250	0.10	0.20	0.00	0.00	0.00	0.20
500	0.00	0.20	0.00	0.00	0.00	0.20
1 000	0.00	0.20	0.00	0.00	0.10	0.20
2 000	0.00	0.30	0.00	0.00	0.40	0.20
4 000	0.10	0.30	0.00	0.00	0.20	0.20
8 000	0.00	0.30	0.00	0.00	0.20	0.30
15 850	-0.80	0.50	0.00	0.00	0.40	0.30

Finally, the corrected responses were referenced to the response at 1kHz and compared to the tolerance limits stated in Table 2 of IEC 61672.1-2013.

Table 7 - A Weighted Electrical Response

Freq (Hz)	Response (dB)		Tolerance Limit (dB)	P/F	Uncertainty (dB)	Maximum Permitted Uncertainty (dB)
	Corrected	re 1kHz				
63	74.80	-0.30	±1.0	P	0.39	0.60
125	74.90	-0.20	±1.0	P	0.38	0.60
250	75.00	-0.10	±1.0	P	0.30	0.60
500	74.90	-0.20	±1.0	P	0.30	0.60
1 000	75.10	0.00	±0.7	P	0.30	0.60
2 000	75.40	0.30	±1.0	P	0.38	0.60
4 000	75.30	0.20	±1.0	P	0.38	0.60
8 000	75.10	0.00	+1.5 / -2.5	P	0.44	0.70
15 850	71.80	-3.30	+2.5 / -16	P	0.60	1.00

Table 8 - C Weighted Electrical Response

Freq (Hz)	Response (dB)		Tolerance Limit (dB)	P/F	Uncertainty (dB)	Maximum Permitted Uncertainty (dB)
	Corrected	re 1kHz				
63	74.80	-0.30	±1.0	P	0.39	0.60
125	75.00	-0.10	±1.0	P	0.38	0.60
250	75.00	-0.10	±1.0	P	0.30	0.60
500	75.00	-0.10	±1.0	P	0.30	0.60
1 000	75.10	0.00	±0.7	P	0.30	0.60
2 000	75.40	0.30	±1.0	P	0.38	0.60
4 000	75.30	0.20	±1.0	P	0.38	0.60
8 000	75.00	-0.10	+1.5 / -2.5	P	0.44	0.70
15 850	71.70	-3.40	+2.5 / -16	P	0.60	1.00

Table 9 - Z Weighted Electrical Response

Freq (Hz)	Response (dB)		Tolerance Limit (dB)	P/F	Uncertainty (dB)	Maximum Permitted Uncertainty (dB)
	Corrected	re 1kHz				
63	N/A	N/A	±1.0	N/A	0.39	0.60
125	N/A	N/A	±1.0	N/A	0.38	0.60
250	N/A	N/A	±1.0	N/A	0.30	0.60
500	N/A	N/A	±1.0	N/A	0.30	0.60
1 000	N/A	N/A	±0.7	N/A	0.30	0.60
2 000	N/A	N/A	±1.0	N/A	0.38	0.60
4 000	N/A	N/A	±1.0	N/A	0.38	0.60
8 000	N/A	N/A	+1.5 / -2.5	N/A	0.44	0.70
15 850	N/A	N/A	+2.5 / -16	N/A	0.60	1.00

3.5 FREQUENCY AND TIME WEIGHTINGS AT 1KHZ

A steady sinusoidal electrical input signal of 1kHz at the reference sound pressure level was applied to the reference level range.

The deviations of the indicated level of C and Z frequency weightings were recorded, along with the deviations of the indication of A weighted time averaged, and SLOW weighted response.

Table 10 - Frequency and Time Weighting Results

Frequency Weighting	Time Weighting	Response (dB)	Deviation (dB)	P/F	Tolerance Limit (dB)	Uncertainty (dB)	Maximum Permitted Uncertainty (dB)
A	Fast	94.0	0.0	P	±0.2	0.10	0.20
	Leq	94.0	0.0	P	±0.2	0.10	0.20
	Slow	94.0	0.0	P	±0.2	0.10	0.20
C	Fast	94.0	0.0	P	±0.2	0.10	0.20
Z	Fast	N/A	N/A	N/A	±0.2	0.10	0.20

3.6 LONG-TERM STABILITY

Long-term stability was tested by comparing a steady sinusoidal electrical signal applied at the start, and at the end of testing. The applied signal level was set to the reference level and frequency and was maintained constant. The difference between the indicated levels was recorded.

Table 11 - Frequency and Time Weighting Results

Signal Level (mV)	Initial Response (dB)	Final Response (dB)	Deviation (dB)	P/F	Tolerance Limit (dB)	Uncertainty (dB)	Maximum Permitted Uncertainty (dB)
72.8	94	94.0	0.0	P	±0.1	0.10	0.10

3.7 LEVEL LINEARITY ON THE REFERENCE LEVEL RANGE

Level linearity was tested with a steady sinusoidal electrical signal at a frequency of 8kHz, with the meter set to display frequency weighted A, FAST response.

The starting point for level linearity testing was set to 94.0dB as stated in the instruction manual.

Level linearity was measured in 5dB steps of increasing input signal level from the starting point up to within 5dB of the stated upper limit, then at 1dB steps up to (but not including) the first indication of overload.

Table 12 - Level Linearity - Increasing

Ideal (dB)	Response (dB)	Deviation (dB)	Tolerance Limit (dB)	P/F	Uncertainty (dB)	Maximum Permitted Uncertainty (dB)
94.0	94.0	0.0	±0.8	P	0.1	0.3
99.0	99.0	0.0	±0.8	P	0.1	0.3
104.0	104.0	0.0	±0.8	P	0.1	0.3
109.0	109.0	0.0	±0.8	P	0.1	0.3
114.0	114.0	0.0	±0.8	P	0.1	0.3
115.0	115.0	0.0	±0.8	P	0.1	0.3
116.0	116.0	0.0	±0.8	P	0.1	0.3
117.0	117.0	0.0	±0.8	P	0.1	0.3
118.0	118.0	0.0	±0.8	P	0.1	0.3
119.0	119.0	0.0	±0.8	P	0.1	0.3
120.0	120.0	0.0	±0.8	P	0.1	0.3
121.0	120.9	-0.1	±0.8	P	0.1	0.3

Overload indication at 122.0dB.

Level linearity test was the continued in 5dB steps of decreasing input signal level from the starting point up to within 5dB of the stated lower limit, then at 1dB steps up to (but not including) the first indication of under range.

Table 13 - Level Linearity - Decreasing

Ideal (dB)	Response (dB)	Deviation (dB)	Tolerance Limit (dB)	P/F	Uncertainty (dB)	Maximum Permitted Uncertainty (dB)
94.0	94.0	0.0	±0.8	P	0.1	0.3
89.0	89.0	0.0	±0.8	P	0.1	0.3
84.0	84.0	0.0	±0.8	P	0.1	0.3
79.0	79.0	0.0	±0.8	P	0.1	0.3
74.0	74.0	0.0	±0.8	P	0.1	0.3
69.0	69.0	0.0	±0.8	P	0.1	0.3
64.0	64.0	0.0	±0.8	P	0.1	0.3
59.0	59.0	0.0	±0.8	P	0.1	0.3
54.0	54.0	0.0	±0.8	P	0.1	0.3
49.0	49.0	0.0	±0.8	P	0.1	0.3
44.0	44.0	0.0	±0.8	P	0.1	0.3
39.0	39.0	0.0	±0.8	P	0.1	0.3
34.0	34.1	0.1	±0.8	P	0.1	0.3
30.0	30.1	0.1	±0.8	P	0.1	0.3
29.0	29.2	0.2	±0.8	P	0.1	0.3
28.0	28.2	0.2	±0.8	P	0.1	0.3
27.0	27.3	0.3	±0.8	P	0.1	0.3
26.0	26.4	0.4	±0.8	P	0.1	0.3
25.0	25.5	0.5	±0.8	P	0.1	0.3

No under range indicated.

3.8 TONEBURST RESPONSE

The response of the sound level meter to short-duration signals was tested on the reference range with 4kHz tone bursts.

The tone bursts were generated from a steady sinusoidal signal at a level of 117.0dB.

Table 14 - FAST Weighted Response

Burst Length	Response dB(A)	Deviation (dB)	Tolerance Limit (dB)	P/F	Uncertainty (dB)	Maximum Permitted Uncertainty (dB)
200ms	116.0	0.0	±0.5	P	0.1	0.3
2ms	99.0	0.0	+1.0 / -1.5	P	0.1	0.3
0.25ms	89.9	-0.1	+1.0 / -3	P	0.1	0.3

Table 15 - SLOW Weighted Response

Burst Length	Response dB(A)	Deviation (dB)	Tolerance Limit (dB)	P/F	Uncertainty (dB)	Maximum Permitted Uncertainty (dB)
200ms	109.6	0.0	±0.5	P	0.1	0.3
2ms	90.0	0.0	+1.0 / -3	P	0.1	0.3

Table 16 - Sound Exposure Level Response

Burst Length	Response dB(A)	Deviation (dB)	Tolerance Limit (dB)	P/F	Uncertainty (dB)	Maximum Permitted Uncertainty (dB)
200ms	109.8	-0.2	±0.5	P	0.1	0.3
2ms	89.8	-0.2	+1.0 / -1.5	P	0.1	0.3
0.25ms	80.6	-0.4	+1.0 / -3	P	0.1	0.3

3.9 PEAK C RESPONSE

Indication of Peak C sound level was tested on the least sensitive level range. Test signals used were -

- A single complete cycle of an 8kHz sinusoid, starting and stopping at zero crossings
- Positive and negative half cycles of a 500Hz sinusoid, starting and stopping at zero crossings.

The level of the steady 8kHz sinusoid was adjusted to display dB(C).

3.10 OVERLOAD INDICATION

The overload indication was tested on the least sensitive level range, with the sound level meter set to display frequency weighted A, time averaged values.

Positive and negative half cycle sinusoidal electrical signals at 4kHz were used. The test began at an indicated time averaged level of 119.0dB(A).

Using the positive half cycle signal, the signal level was increased in steps of 0.5dB up to, but not including, the first indication of overload. The level of the input signal was then increased in steps of 0.1dB until the first indication of overload. These steps were repeated using the negative half cycle signal.

Table 17 - Overload Indication

Signal Orientation	Overload Response (dB)	Difference (dB)	Tolerance Limit (dB)	P/F	Uncertainty (dB)	Maximum Permitted Uncertainty (dB)
Positive	119.8	-0.3	±1.5	P	0.10	0.25
Negative	120.0					

Overload indication was verified.

Overload latch indication was verified.

3.11 HIGH LEVEL STABILITY

High level stability was tested by measuring the response of the meter to high signal levels. The result was evaluated as the difference between the A-Weighted indicated levels in response to a steady 1kHz signal applied over 5 minutes.

Table 18 - FAST Weighted Response

Time Weighting	Initial Response (dB)	Final Response (dB)	Deviation (dB)	Tolerance Limit (dB)	P/F	Uncertainty (dB)	Maximum Permitted Uncertainty (dB)
Fast	119.0	119.0	0.0	±0.1	P	0.10	0.10
Slow	N/A	N/A	N/A	±0.1	N/A	0.10	0.10
Leq	119.0	119.0	0.0	±0.1	P	0.10	0.10



Sound Level Meter

IEC 61672-3:2013

Calibration Certificate

Calibration Number C24453

Client Details	EMM Consulting PO Box 21, Ground Floor, Suite 01, 20 Chandos Street St Leonards NSW, 2065
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Equipment Tested/ Model Number :	ARL Ngara
Instrument Serial Number :	87801F
Microphone Serial Number :	22143
Pre-amplifier Serial Number :	28696
Firmware Version :	12.6

Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditions
Ambient Temperature : 23 °C	Ambient Temperature : 22.2 °C
Relative Humidity : 36.5 %	Relative Humidity : 37.5 %
Barometric Pressure : 100.46 kPa	Barometric Pressure : 100.45 kPa

Calibration Technician : Shaheen Boaz	Secondary Check: Cooper Sallway
Calibration Date : 20 Jun 2024	Report Issue Date : 21 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	N/A
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	N/A
15: Long Term Stability	Pass	20: Overload Indication	Pass
16: Level linearity on the reference level range	Pass	21: High Level Stability	Pass

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

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

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



Sound Level Meter IEC 61672-3:2013 Calibration Test Report

Calibration Number C24453

Client Details	EMM Consulting PO Box 21, Ground Floor, Suite 01, 20 Chandos Street St Leonards NSW, 2065
Equipment Tested/ Model Number :	ARL Ngara
Instrument Serial Number :	87801F
Microphone Serial Number :	22143
Pre-amplifier Serial Number :	28696
Firmware Version :	12.6
Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditions
Ambient Temperature : 23 °C	Ambient Temperature : 22.2 °C
Relative Humidity : 36.5 %	Relative Humidity : 37.5 %
Barometric Pressure : 100.46 kPa	Barometric Pressure : 100.45 kPa
Calibration Technician : Shaheen Boaz	Secondary Check: Cooper Sallway
Calibration Date : 20 Jun 2024	Report Issue Date : 21 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	N/A
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	N/A
15: Long Term Stability	Pass	20: Overload Indication	Pass
16: Level linearity on the reference level range	Pass	21: High Level Stability	Pass

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

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Uncertainties of Measurement -			
Acoustic Tests		Environmental Conditions	
125Hz	±0.13 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 report applies only to the item tested and shall only be reproduced in full, unless approved in writing by Acoustic Research Labs.

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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1. OVERVIEW

This report presents the calibration test results of a ARL Ngara Sound Level Meter, and associated equipment. Calibration is carried out in accordance with *IEC 61672-3:2013, Electroacoustics - Sound Level Meters - Part 3: Periodic Tests*.

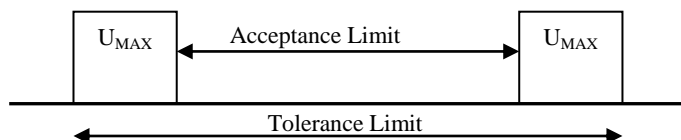
Relevant clauses from this standard have been used for periodic testing in conjunction with Acoustic Research Labs internal test methods described in Section 1 of the calibration work instruction manual.

Where required, reference is made to manual version V41 as provided by the manufacturer.

1.1 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

1.2 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.

2. GENERAL

2.1 ENVIRONMENTAL CONDITIONS DURING TEST

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

2.2 CALIBRATION TESTS

Where applicable the following tests were performed in accordance with the requirements of *IEC 61672-3:2013*. These clauses are used to define the periodic testing of Sound Level Meters.

Clause 10	Indication at the Calibration Check Frequency
Clause 11	Self Generated Noise
Clause 12	Acoustical Signal Tests of Frequency Weighting
Clause 13	Electrical Signal Tests of Frequency Weightings
Clause 14	Frequency and Time Weightings at 1kHz
Clause 15	Long Term Stability
Clause 16	Level Linearity on the Reference Level Range
Clause 17	Level Linearity including the level range control
Clause 18	Toneburst Response
Clause 19	Peak C Sound Level
Clause 20	Overload Indication
Clause 21	High Level Stability

2.3 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.

2.3.1 Multi-function Acoustic Calibrator

A Bruel & Kjaer 4226 Multi-function calibrator (S/N - 3215300) was used for frequency response testing of the entire instrument (including microphone). This instrument was used as a reference calibrator and for frequency response verification.

2.3.2 Microphone Electrical Equivalent Circuit

Calibration of most instrument parameters is carried out using electrical signals fed to the unit via a two-port electrical equivalent circuit of the microphone.

A 13pF capacitance dummy microphone was used during testing.

2.3.3 Adjustable Attenuator

A means for varying the attenuation of electrical signals via the dummy microphone was provided by a JFW Industries dual rotary attenuator (S/N - 792819 2132). The attenuator is switchable in 1dB steps between 0dB and 60dB.

2.3.4 Arbitrary Function Generator

A Keysight 33511B (S/N – MY58001621) was used to generate the required electrical signals.

2.3.5 Environmental Monitoring

A MHB-382SD (S/N – AH.88227) was used for measuring environmental conditions during device calibration. It is capable of providing temperature, relative humidity and pressure measurements.

3. CALIBRATION TEST RESULTS

3.1 INDICATION AT THE CALIBRATION CHECK FREQUENCY

The indication of the sound level meter at the calibration check frequency was checked by application of an acoustic signal at the reference sound pressure level and frequency.

Stated reference conditions as found in manual are

Reference Level : 94.0 dB

Reference Frequency : 100.0 Hz

Indications before and after adjustments were recorded and are shown in Table 1 (all measurements in dB) -

Table 1 - Check Frequency Calibration Results

Frequency Weighting	Initial Response	B&K 4226 Corrected	FreeField Corrected	Final Corrected Response
A	94.21	94.09	94.09	94.00
C	94.17	94.05	94.05	93.96
Z	N/A	N/A	N/A	N/A

Free field adjustment data as provided by the manufacturer. Windscreen correction factors applied.

3.2 SELF GENERATED NOISE

3.2.1 Microphone Installed

Self generated noise was measured with the microphone installed on the sound level meter, in the configuration submitted for periodic testing. The sound level meter was set to the most-sensitive level range and with frequency weighting A selected.

Ten (10) time weighted observations were made over a period of 60 seconds.

Random Readings dB(A)

19.40	19.20	19.50	19.20	19.20
19.20	19.30	18.90	19.10	18.80

Acoustic Noise Floor : 19.2 dB(A)

3.2.2 Electrical Input Signal Device

With the microphone replaced by the electrical input signal device and terminated as specified, the sound level meter was set to the most-sensitive level range and with frequency weightings Z, C and A selected as provided.

Ten (10) time weighted observations were made over a period of 60 seconds.

Random Readings dB(A)

16.50	16.60	16.50	16.50	16.60
16.50	16.50	16.50	16.50	16.60

Random Readings dB(C)

18.00	17.90	17.70	17.90	17.70
18.10	18.00	18.40	18.00	17.80

Random Readings dB(Z)

N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A

	dB(A)	dB(C)	dB(Z)
Electric Noise Floor :	16.5	18.0	N/A

3.3 ACOUSTICAL SIGNAL TESTS OF A FREQUENCY WEIGHTING

The sound level meter was set to measure frequency weighting C with a FAST response. The test was carried out using a multi-function acoustic calibrator set to pressure mode.

Three (3) readings were made at each test frequency. The average of the readings was then corrected to the multi-function acoustic calibrator.

Table 2 - Frequency Weighting C Response

Freq Hz		Reading 1	Reading 2	Reading 3	Uncertainty (dB)
125		93.9	93.9	93.9	0.13
1 000		94.0	94.0	94.0	0.13
8 000		88.2	88.2	88.2	0.14

Actual Freq Hz	B&K 4226 Corrections	Corrected Response dB(C)		Uncertainty (dB)
		Actual	re 1kHz	
125.90	-0.03	93.87	-0.04	0.13
1005.10	-0.09	93.91	0.00	0.13
7915.10	-0.11	88.09	-5.82	0.14

Adjustments were then applied to correct for free field and sound level meter body effects with data supplied by the manufacturer as per Table 3. Windscreen correction factors applied.

Table 3 - Correction Data

Actual Freq (Hz)	Pressure to Freefield (dB)	Uncertainty (dB)	Body Effects (dB)	Uncertainty (dB)	WS Effects (dB)	Uncertainty (dB)
125.90	0.00	0.20	0.00	0.00	0.00	0.20
1005.10	0.00	0.20	0.00	0.00	0.10	0.20
7915.10	3.00	0.30	0.00	0.00	0.20	0.30

Finally, the corrected responses are normalised to the response at 1kHz and compared to the tolerance limits stated in Table 2 of IEC 61672.1-2013.

Table 4 - Acoustic C Response

Actual Freq (Hz)	Corrected Response dB(C)		Expected Response dB(C)		Deviation (dB)	P/F	Uncertainty (dB)	Maximum Permitted Uncertainty (dB)
	Actual	re 1kHz	re 1kHz	Tolerance Limit				
125.90	93.87	-0.14	-0.2	±1.0	0.06	P	0.31	0.60
1005.10	94.01	0.00	0.0	±0.7	0.00	P	0.31	0.60
7915.10	91.29	-2.72	-3.0	+1.5 / -2.5	0.28	P	0.45	0.70

3.4 ELECTRICAL SIGNAL TESTS OF FREQUENCY WEIGHTINGS

Frequency weighting responses for Z, C and A were determined relative to the response at 1kHz using steady sinusoidal electrical input signals.

On the reference level range, and for each frequency weighting under test, the level of a 1kHz input signal was adjusted to yield 75dB. At test frequencies other than 1kHz, the input signal level was adjusted to compensate for the design goal attenuations as specified in Table 2 of IEC 61672.1-2013.

Table 5 - Measured Electrical Frequency Response

Freq (Hz)	A Weighting (dB)	C Weighting (dB)	Z Weighting (dB)	Uncertainty (dB)
63	74.8	74.8	N/A	0.13
125	74.8	75.0	N/A	0.11
250	74.9	75.0	N/A	0.10
500	74.9	75.0	N/A	0.10
1 000	75.0	75.0	N/A	0.10
2 000	75.0	75.0	N/A	0.10
4 000	75.0	75.0	N/A	0.10
8 000	74.9	74.9	N/A	0.10
15 850	72.3	72.2	N/A	0.13

Adjustments were then applied to correct for a uniform free field response and sound level meter body effects with data supplied by the manufacturer as per Table 6. Windscreen correction factors applied.

Table 6 - Correction Data

Freq (Hz)	Ufreq (dB)	Uncertainty (dB)	Body Effects (dB)	Uncertainty (dB)	WS Effects (dB)	Uncertainty (dB)
63	0.10	0.30	0.00	0.00	0.00	0.20
125	0.10	0.30	0.00	0.00	0.00	0.20
250	0.10	0.20	0.00	0.00	0.00	0.20
500	0.00	0.20	0.00	0.00	0.00	0.20
1 000	0.00	0.20	0.00	0.00	0.10	0.20
2 000	0.00	0.30	0.00	0.00	0.40	0.20
4 000	0.10	0.30	0.00	0.00	0.20	0.20
8 000	0.00	0.30	0.00	0.00	0.20	0.30
15 850	-0.80	0.50	0.00	0.00	0.40	0.30

Finally, the corrected responses were referenced to the response at 1kHz and compared to the tolerance limits stated in Table 2 of IEC 61672.1-2013.

Table 7 - A Weighted Electrical Response

Freq (Hz)	Response (dB)		Tolerance Limit (dB)	P/F	Uncertainty (dB)	Maximum Permitted Uncertainty (dB)
	Corrected	re 1kHz				
63	74.90	-0.20	±1.0	P	0.39	0.60
125	74.90	-0.20	±1.0	P	0.38	0.60
250	75.00	-0.10	±1.0	P	0.30	0.60
500	74.90	-0.20	±1.0	P	0.30	0.60
1 000	75.10	0.00	±0.7	P	0.30	0.60
2 000	75.40	0.30	±1.0	P	0.38	0.60
4 000	75.30	0.20	±1.0	P	0.38	0.60
8 000	75.10	0.00	+1.5 / -2.5	P	0.44	0.70
15 850	71.90	-3.20	+2.5 / -16	P	0.60	1.00

Table 8 - C Weighted Electrical Response

Freq (Hz)	Response (dB)		Tolerance Limit (dB)	P/F	Uncertainty (dB)	Maximum Permitted Uncertainty (dB)
	Corrected	re 1kHz				
63	74.90	-0.20	±1.0	P	0.39	0.60
125	75.10	0.00	±1.0	P	0.38	0.60
250	75.10	0.00	±1.0	P	0.30	0.60
500	75.00	-0.10	±1.0	P	0.30	0.60
1 000	75.10	0.00	±0.7	P	0.30	0.60
2 000	75.40	0.30	±1.0	P	0.38	0.60
4 000	75.30	0.20	±1.0	P	0.38	0.60
8 000	75.10	0.00	+1.5 / -2.5	P	0.44	0.70
15 850	71.80	-3.30	+2.5 / -16	P	0.60	1.00

Table 9 - Z Weighted Electrical Response

Freq (Hz)	Response (dB)		Tolerance Limit (dB)	P/F	Uncertainty (dB)	Maximum Permitted Uncertainty (dB)
	Corrected	re 1kHz				
63	N/A	N/A	±1.0	N/A	0.39	0.60
125	N/A	N/A	±1.0	N/A	0.38	0.60
250	N/A	N/A	±1.0	N/A	0.30	0.60
500	N/A	N/A	±1.0	N/A	0.30	0.60
1 000	N/A	N/A	±0.7	N/A	0.30	0.60
2 000	N/A	N/A	±1.0	N/A	0.38	0.60
4 000	N/A	N/A	±1.0	N/A	0.38	0.60
8 000	N/A	N/A	+1.5 / -2.5	N/A	0.44	0.70
15 850	N/A	N/A	+2.5 / -16	N/A	0.60	1.00

3.5 FREQUENCY AND TIME WEIGHTINGS AT 1KHZ

A steady sinusoidal electrical input signal of 1kHz at the reference sound pressure level was applied to the reference level range.

The deviations of the indicated level of C and Z frequency weightings were recorded, along with the deviations of the indication of A weighted time averaged, and SLOW weighted response.

Table 10 - Frequency and Time Weighting Results

Frequency Weighting	Time Weighting	Response (dB)	Deviation (dB)	P/F	Tolerance Limit (dB)	Uncertainty (dB)	Maximum Permitted Uncertainty (dB)
A	Fast	94.0	0.0	P	±0.2	0.10	0.20
	Leq	94.0	0.0	P	±0.2	0.10	0.20
	Slow	94.0	0.0	P	±0.2	0.10	0.20
C	Fast	94.0	0.0	P	±0.2	0.10	0.20
Z	Fast	N/A	N/A	N/A	±0.2	0.10	0.20

3.6 LONG-TERM STABILITY

Long-term stability was tested by comparing a steady sinusoidal electrical signal applied at the start, and at the end of testing. The applied signal level was set to the reference level and frequency and was maintained constant. The difference between the indicated levels was recorded.

Table 11 - Frequency and Time Weighting Results

Signal Level (mV)	Initial Response (dB)	Final Response (dB)	Deviation (dB)	P/F	Tolerance Limit (dB)	Uncertainty (dB)	Maximum Permitted Uncertainty (dB)
72.8	94	94.0	0.0	P	±0.1	0.10	0.10

3.7 LEVEL LINEARITY ON THE REFERENCE LEVEL RANGE

Level linearity was tested with a steady sinusoidal electrical signal at a frequency of 8kHz, with the meter set to display frequency weighted A, FAST response.

The starting point for level linearity testing was set to 94.0dB as stated in the instruction manual.

Level linearity was measured in 5dB steps of increasing input signal level from the starting point up to within 5dB of the stated upper limit, then at 1dB steps up to (but not including) the first indication of overload.

Table 12 - Level Linearity - Increasing

Ideal (dB)	Response (dB)	Deviation (dB)	Tolerance Limit (dB)	P/F	Uncertainty (dB)	Maximum Permitted Uncertainty (dB)
94.0	94.0	0.0	±0.8	P	0.1	0.3
99.0	99.0	0.0	±0.8	P	0.1	0.3
104.0	104.0	0.0	±0.8	P	0.1	0.3
109.0	109.0	0.0	±0.8	P	0.1	0.3
114.0	114.0	0.0	±0.8	P	0.1	0.3
115.0	115.0	0.0	±0.8	P	0.1	0.3
116.0	116.0	0.0	±0.8	P	0.1	0.3
117.0	117.0	0.0	±0.8	P	0.1	0.3
118.0	118.0	0.0	±0.8	P	0.1	0.3
119.0	119.0	0.0	±0.8	P	0.1	0.3
120.0	120.0	0.0	±0.8	P	0.1	0.3
121.0	121.0	0.0	±0.8	P	0.1	0.3

Overload indication at 122.0dB.

Level linearity test was the continued in 5dB steps of decreasing input signal level from the starting point up to within 5dB of the stated lower limit, then at 1dB steps up to (but not including) the first indication of under range.

Table 13 - Level Linearity - Decreasing

Ideal (dB)	Response (dB)	Deviation (dB)	Tolerance Limit (dB)	P/F	Uncertainty (dB)	Maximum Permitted Uncertainty (dB)
94.0	94.0	0.0	±0.8	P	0.1	0.3
89.0	89.0	0.0	±0.8	P	0.1	0.3
84.0	84.0	0.0	±0.8	P	0.1	0.3
79.0	79.0	0.0	±0.8	P	0.1	0.3
74.0	74.0	0.0	±0.8	P	0.1	0.3
69.0	69.0	0.0	±0.8	P	0.1	0.3
64.0	64.0	0.0	±0.8	P	0.1	0.3
59.0	59.0	0.0	±0.8	P	0.1	0.3
54.0	54.0	0.0	±0.8	P	0.1	0.3
49.0	49.0	0.0	±0.8	P	0.1	0.3
44.0	44.0	0.0	±0.8	P	0.1	0.3
39.0	39.0	0.0	±0.8	P	0.1	0.3
34.0	34.1	0.1	±0.8	P	0.1	0.3
30.0	30.1	0.1	±0.8	P	0.1	0.3
29.0	29.2	0.2	±0.8	P	0.1	0.3
28.0	28.3	0.3	±0.8	P	0.1	0.3
27.0	27.4	0.4	±0.8	P	0.1	0.3
26.0	26.5	0.5	±0.8	P	0.1	0.3
25.0	25.6	0.6	±0.8	P	0.1	0.3

No under range indicated.

3.8 TONEBURST RESPONSE

The response of the sound level meter to short-duration signals was tested on the reference range with 4kHz tone bursts.

The tone bursts were generated from a steady sinusoidal signal at a level of 117.0dB.

Table 14 - FAST Weighted Response

Burst Length	Response dB(A)	Deviation (dB)	Tolerance Limit (dB)	P/F	Uncertainty (dB)	Maximum Permitted Uncertainty (dB)
200ms	116.0	0.0	±0.5	P	0.1	0.3
2ms	99.0	0.0	+1.0 / -1.5	P	0.1	0.3
0.25ms	89.9	-0.1	+1.0 / -3	P	0.1	0.3

Table 15 - SLOW Weighted Response

Burst Length	Response dB(A)	Deviation (dB)	Tolerance Limit (dB)	P/F	Uncertainty (dB)	Maximum Permitted Uncertainty (dB)
200ms	109.6	0.0	±0.5	P	0.1	0.3
2ms	90.0	0.0	+1.0 / -3	P	0.1	0.3

Table 16 - Sound Exposure Level Response

Burst Length	Response dB(A)	Deviation (dB)	Tolerance Limit (dB)	P/F	Uncertainty (dB)	Maximum Permitted Uncertainty (dB)
200ms	110.0	0.0	±0.5	P	0.1	0.3
2ms	89.9	-0.1	+1.0 / -1.5	P	0.1	0.3
0.25ms	80.8	-0.2	+1.0 / -3	P	0.1	0.3

3.9 PEAK C RESPONSE

Indication of Peak C sound level was tested on the least sensitive level range. Test signals used were -

- A single complete cycle of an 8kHz sinusoid, starting and stopping at zero crossings
- Positive and negative half cycles of a 500Hz sinusoid, starting and stopping at zero crossings.

The level of the steady 8kHz sinusoid was adjusted to display dB(C).

3.10 OVERLOAD INDICATION

The overload indication was tested on the least sensitive level range, with the sound level meter set to display frequency weighted A, time averaged values.

Positive and negative half cycle sinusoidal electrical signals at 4kHz were used. The test began at an indicated time averaged level of 119.0dB(A).

Using the positive half cycle signal, the signal level was increased in steps of 0.5dB up to, but not including, the first indication of overload. The level of the input signal was then increased in steps of 0.1dB until the first indication of overload. These steps were repeated using the negative half cycle signal.

Table 17 - Overload Indication

Signal Orientation	Overload Response (dB)	Difference (dB)	Tolerance Limit (dB)	P/F	Uncertainty (dB)	Maximum Permitted Uncertainty (dB)
Positive	119.7	-0.2	±1.5	P	0.10	0.25
Negative	119.9					

Overload indication was verified.

Overload latch indication was verified.

3.11 HIGH LEVEL STABILITY

High level stability was tested by measuring the response of the meter to high signal levels. The result was evaluated as the difference between the A-Weighted indicated levels in response to a steady 1kHz signal applied over 5 minutes.

Table 18 - FAST Weighted Response

Time Weighting	Initial Response (dB)	Final Response (dB)	Deviation (dB)	Tolerance Limit (dB)	P/F	Uncertainty (dB)	Maximum Permitted Uncertainty (dB)
Fast	119.0	119.0	0.0	±0.1	P	0.10	0.10
Slow	N/A	N/A	N/A	±0.1	N/A	0.10	0.10
Leq	119.0	119.0	0.0	±0.1	P	0.10	0.10

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 weightings, 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	Mic. Correction C4226	Body Influence	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB]	[dB]	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB]	[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	Measured	Uncertainty
	[dB SPL]	[dB SPL]	[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	Measured	Uncertainty
	[dB SPL]	[dB SPL]	[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
-----------------------	---

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.



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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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*.

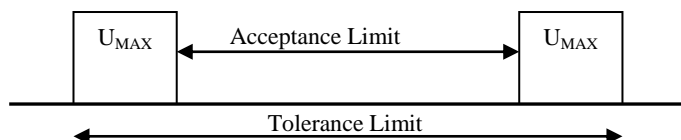
Relevant clauses from this standard have been used for periodic testing in conjunction with Acoustic Research Labs internal test methods described in Section 2 of the calibration work instruction manual.

This report was generated using template version identifier of 69876974.

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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Appendix 4 – KHRQ IEA 2024: Status Update



KHRQ IEA 2024 – Response to Audit Recommendations

2025 Annual Review
Status Update

Karuah Hard Rock Quarry (DA 265-10-2004) – 2024 IEA Findings and HQPL Response			
No	Requirement	2024 IEA Assessment & Recommendation	2024 HQPL Response & Action
S2, C4	<p>Terms of Approval The Applicant shall comply with any reasonable requirement/s of the Director-General arising from the Department’s assessment of:</p> <p>(a) any reports, plans or correspondence that are submitted in accordance with this development consent; and</p> <p>(b) the implementation of any actions or measures contained in these reports, plans or correspondence.</p>	<p>ASSESSMENT: There was one instance identified where the Secretary of DPIE provided that HQPL did not comply with the following requirements, being: 1) Warning Letter from DPIE dated 03 July 2020 Breach of Section 4.2 of the EP&A Act 1979 i.e., "...alleges that HQPL has breached schedule 4, condition 19 of DA 265-10-2004. HQPL failed to implement FFMP for Karuah Quarry as approved by the Secretary in 2008". DPIE requested a revised FFMP be submitted by 2 September 2020 and review and, if required, revise the EMP and EMS.</p> <p>HQPL undertook a review of the FFMP and Environmental Management Strategy (EMS) which was submitted to DPIE for approval 26 August 2020. There was no evidence that the Environmental Monitoring Program (EMP) was reviewed per DPIEs request until it was resubmitted and approved September 2023.</p> <p>RECOMMENDATION: Action closed. Refer opportunity for improvement in section 4.2.</p> <p>A number of non-compliances were identified during the audit period where review of management plans and key dates were missed. Given this it is recommended that HQPL establish a compliance tracking system or similar to record all compliance tasks and due dates including management plan reviews, requirements arising from government agencies and actions following audits.</p>	<p>RESPONSE: HQPL acknowledges that various directions were received by NSW Planning to review or update documents may have not been completed within the designated timeframes.</p> <p>ACTION: HQPL have since updated our processes (inclusive of task calendars and checklists) to ensure that these directions are completed in a timely and responsive fashion.</p> <p>STATUS: HQPL considers this matter to be resolved.</p>
S2, C13	<p>Section 94 Contributions The Applicant shall pay a contribution of 4.7 cents per cubic meter of material per kilometer hauled to Council for the maintenance/repair of public roads in accordance with Council’s Section 94 Plan for road haulage, to the satisfaction of Council.</p> <p>Note: The applicable contribution rate is reviewed annually by Council and new rates, if applicable become operational from 1 July each year. The contribution is to be paid at the rate that is current at the time.</p>	<p>ASSESSMENT: There was no evidence that section 94 contributions had been paid to Council on a yearly basis within 14 days of 31 December or that the annual payments were calculated accordingly.</p> <p>Invoices were sighted to show that payments for the years 2018 – 2022 were made to Council as a lump sum payment, June 2023 and annual payments made August 2023 and July 2024.</p> <p>RECOMMENDATION: If is recommended that HQPL make annual payments to Council within 14 days of 31 December each year and that the annual payment amount is verified to be correct for each payment made between 2019 and 2024 and for each future payment.</p>	<p>RESPONSE: HQPL notes the recent upload to the NSW Planning Portal of the consolidated Development Consent (DA 265-10-2004) inclusive of the instrument changes made by the NSW Land and Environment Court on 29 September 2006.</p> <p>This court determination provided the legal basis for the calculated section 94 Contributions payable to MidCoast Council.</p> <p>ACTION: HQPL will review the calculation methodology used to determine the payments made between 2019 and 2024 to confirm compliance with the amended condition.</p> <p>DUE: HQPL will complete the review by 31 December 2025 (or prior to the next payment round).</p> <p style="color: red;">2025 Annual Review Update: On-going – DUE 30/06/2026. HQPL has completed a review of the contributions paid between 2019 and 2024. The next step will be to engage with MidCoast Council regarding the outcome of the review within the context of the roll-out of HQPL’s new financial management system.</p>



KHRQ IEA 2024 – Response to Audit Recommendations

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Status Update

Karuah Hard Rock Quarry (DA 265-10-2004) – 2024 IEA Findings and HQPL Response			
No	Requirement	2024 IEA Assessment & Recommendation	2024 HQPL Response & Action
S3, C3	<p>Noise Monitoring Within 6 months of the date of this consent, the Applicant shall prepare and implement a Noise Monitoring Program for the development to evaluate compliance with the noise impact assessment criteria in this consent, in consultation with the DEC, and to the satisfaction of the Director-General.</p>	<p>ASSESSMENT: A revised Noise Monitoring Program (NMP) has been prepared and contained in the EMP (revision 6C, dated 11 September 2023). The EMP has been approved by DPE however, there is no evidence to confirm that the NMP (contained within the EMP) has undergone consultation and / or approved to supersede the previous approved version (Version 5, December 2014).</p> <p>RECOMMENDATION: It is recommended that HQPL seek clarification from DPHI to confirm the NMP has been approved by virtue of approval of the EMP or otherwise seek approval from DPHI for the NMP.</p>	<p>RESPONSE: HQPL notes that the Noise Monitoring Program is detailed in Environmental Management Strategy & Monitoring Program (EMS&MP) approved by NSW Planning on 18 December 2024.</p> <p>ACTION: HQPL will consult with NSW Planning to seek approval for HQPL's management plan structure.</p> <p>DUE: HQPL will seek approval by 04 April 2025.</p> <p>2025 Annual Review Update: Complete. Consultation was conducted with NSW Planning via the NSW Major Projects Portal on 05 March 2025, with consolidation of the constituent management plan elements into the single EMS&MP document was approved by NSW Planning on 02 April 2025.</p>
S3, C13	<p>Air Quality Impact Assessment Criteria The Applicant shall ensure that the dust emissions generated by the development do not cause additional exceedances of the ambient air quality impact assessment criteria listed in Tables 6, 7, and 8 at any residence on, or on more than 25 percent of, any privately owned land.</p>	<p>ASSESSMENT: Particulate matter monitoring using high volume air samplers established by HQPL for the Karuah East Quarry is being used by HQPL to assess compliance against the criteria listed in Table 6 and 7 at Karuah Quarry. This is not consistent with the Air Quality Monitoring Program (AQMP) and therefore the data collected for Karuah East cannot be verified as adequate and representative of Karuah Quarry to demonstrate compliance with the condition.</p> <p>Further, exceedances of the depositional dust criteria have been reported. These exceedances include:</p> <ul style="list-style-type: none"> June 2023 monitoring period (6 June to 4 July 2023) monitoring results indicated that total dust from DDG4 exceeded the limit of 4 g/m2/month due to becoming contaminated with combustible organic material; and November 2023 monitoring period (2 November to 30 November 2023) monitoring results indicated that DDG2 exceeded the monthly limit of 4 g/m2/month due to becoming contaminated with combustible organic material. <p>RECOMMENDATION: It is recommended that HQPL undertake air quality monitoring in accordance with conditions of approval to ensure that compliance with the air quality impact assessment criteria is being met and can be verified. An amendment to the AQMP and / or Development Consent may be required to ensure consistency.</p>	<p>RESPONSE: HQPL acknowledges the potential for various exceedances of air quality performance criteria due both quarry-related contributions and ambient or third-party sources.</p> <p>HQPL notes all exceedances have been investigated to determine a potential source, as far as reasonably practicable, and reported to NSW Planning, the NSW EPA and surrounding landholders in accordance with the Development Consent.</p> <p>ACTION: HQPL considers no actions to be necessary.</p> <p>STATUS: HQPL considers this matter to be resolved.</p>



KHRQ IEA 2024 – Response to Audit Recommendations

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Karuah Hard Rock Quarry (DA 265-10-2004) – 2024 IEA Findings and HQPL Response			
No	Requirement	2024 IEA Assessment & Recommendation	2024 HQPL Response & Action
S3, C15	<p>Air Quality Monitoring</p> <p>Within 6 months of the date of this consent, the Applicant shall prepare and implement an Air Quality Monitoring Program for the development to evaluate compliance with the air quality impact assessment criteria in this consent, in consultation with the DEC, and to the satisfaction of the Director-General.</p>	<p>ASSESSMENT:</p> <p>A revised AQMP has been prepared and contained in the EMP (revision 6C, dated 11 September 2023). The EMP has been approved by DPE however there is no evidence to confirm that the AQMP (contained within the EMP) has undergone consultation and / or been approved to supersede the previous version.</p> <p>Consistent with the AQMP contained in the EMP, deposition dust monitoring is being carried out at 4 monitoring locations. However, particulate matter monitoring is not being implemented consistent with the requirements of the AQMP.</p> <p>The AQMP states ‘High Volume Air Sampler (HVAS) will be used by HQPL in the event that they are required to investigate any air quality complaints unless otherwise directed by DPE, the results of the HVAS monitoring shall be reported as per Section 3.0 of this EMP’. Instead, HQPL are reporting particulate matter monitoring results from the adjoining Hunter Quarry Karuah East site and using the results to assess compliance of Karuah Quarry against the Development Consent and reporting associated non-compliances.</p> <p>RECOMMENDATION:</p> <p>It is recommended that HQPL seek clarification from DPHI to confirm the AQMP has been approved by virtue of approval of the EMP or otherwise seek approval from DPHI for the NMP.</p>	<p>RESPONSE:</p> <p>HQPL acknowledges the wording of the Environmental Monitoring Program (version 6C) could be interpreted in an inconsistent manner as outlined by the auditor’s comments.</p> <p>ACTION:</p> <p>HQPL have since revised the Air Quality Monitoring Program as detailed in Environmental Management Strategy & Monitoring Program (EMS&MP) approved by NSW Planning on 18 December 2024, which addressed this matter.</p> <p>STATUS:</p> <p>HQPL considers this matter to be resolved.</p>
S3, C19	<p>Flora and Fauna Management Plan</p> <p>Before carrying out any clearing associated with Stage 2 of the development, the Applicant shall prepare, and subsequently implement, a Flora and Fauna Management Plan for the development to the satisfaction of the Director-General. This plan must include:</p> <ul style="list-style-type: none"> (a) a Vegetation Clearing Protocol; (b) a Remnant Vegetation Conservation Plan; and (c) a Conservation Offset Management Plan. 	<p>ASSESSMENT:</p> <p>A revised FFMP has been prepared (September 2020) and approved by DPIE (October 2020) and includes the requirements of condition 19a - 19c.</p> <p>Consistent with correspondence issued from the DPIE (dated 03 July 2020) HQPL failed to implement the FFMP in 2019 and up until the approval of its revision in September 2020, as annual ecological monitoring was not undertaken annually in accordance with the requirements.</p> <p>The FFMP has been amended to require biannual monitoring and was evidenced to be implemented. Ecological monitoring reports for 2020 and 2022 were sighted.</p> <p>RECOMMENDATION:</p> <p>The FFMP has been revised during the audit period and subsequently approved by DPIE (13 October 2020). Implementation of the Program was evident from the 2020 and 2022 ecological monitoring reports. As such it is recommended that HQPL continue to implement the Program.</p>	<p>RESPONSE:</p> <p>HQPL acknowledges that no two-yearly ecology monitoring was not completed prior to 2020 (i.e. within the start of this audit period).</p> <p>HQPL have since updated our processes to ensure that the two-yearly monitoring is completed and reported in the Annual Reviews.</p> <p>ACTION:</p> <p>HQPL considers no further actions to be necessary.</p> <p>STATUS:</p> <p>HQPL considers this matter to be resolved.</p>



KHRQ IEA 2024 – Response to Audit Recommendations

Karuah Hard Rock Quarry (DA 265-10-2004) – 2024 IEA Findings and HQPL Response			
No	Requirement	2024 IEA Assessment & Recommendation	2024 HQPL Response & Action
S3, C24	<p>Pollution of Waters Except as may be expressly provided by an Environment Protection License, the Applicant shall comply with section 120 of the Protection of the Environment Operations Act 1997 during the carrying out of the development.</p>	<p>ASSESSMENT: An uncontrolled discharge occurred from sediment dam 2 (SD2) via LDP001 was experienced on 26 October 2020, where the Quarry received 278.4mm of rain in a period of 12 hours. HQPL self-reported the incident using the EPA Pollution hotline and a summary of the incident was provided to both DPIE and the NSW EPA.</p> <p>A discharge event, consisting of six days of uncontrolled discharges from SD2 occurred between 18 March 2021 to 23 March 2021. The uncontrolled discharges from this period exceeded the TSS limit of the EPL (50mg/L). The EPA Pollution Hotline was contacted to self-report the incident. DPE and the NSW EPA were also both contacted and provided with a summary of the incident and an environmental incident report.</p> <p>RECOMMENDATION: It is recommended that HQPL undertake a holistic review and risk assessment of the site water management including water monitoring devices on site and in use, the measuring and monitoring requirements of condition 27 schedule 2 and history of related water discharge incidents.</p> <p>Accordingly, HQPL should review and update to the site water management plan and the associated erosion and sediment control plan, surface water monitoring program and site water balance to address the respective condition, risks and the operations on site.</p>	<p>RESPONSE: HQPL acknowledges the potential for uncontrolled discharges of sediment-laden water following major rainfall events greater than the designated 95th percentile 5-day rainfall depth of 90.6 mm as prescribed in Landcom's Blue Book (Managing Urban Stormwater: Soils and construction - Volume 2E).</p> <p>ACTION: HQPL reviewed the Site Water Management Plan and associated subplans in 2023 and was approved by NSW Planning on 03 October 2023 and therefore considers no further actions to be necessary.</p> <p>STATUS: HQPL considers this matter to be resolved.</p>
S3, C25	<p>Water Discharge Limit The Applicant shall only discharge water from the development in accordance with the provisions of a DEC Environment Protection License.</p>	<p>ASSESSMENT: Water was discharged from the development outside of the provisions of the Environment Protection Licence and reported to the EPA as an incident. See details above.</p> <p>RECOMMENDATION: As above.</p>	Refer to commentary provided for Schedule 3, Condition 24.
S3, C26	<p>Site Water Management Plan Within 12 months of the date of this consent, the Applicant shall prepare, subsequently implement, a Site Water Management Plan for the development, in consultation with the DEC, and to the satisfaction of the Director-General. The plan shall detail how site water management on site will be integrated with existing surface water management and erosion and sediment control systems and address surface water management and erosion and sediment control at both the construction and operation phases of the development. This plan must include: (a) an Erosion and Sediment Control Plan; (b) a Surface Water Monitoring Program; and (c) a site water balance.</p>	<p>RECOMMENDATION: Several non-compliances related to site water management and water quality were identified. Given this it is recommended that HQPL undertake a holistic review and risk assessment of the site water management including water monitoring devices on site and in use, the measuring and monitoring requirements of condition 27 schedule 2 and history of related water discharge incidents.</p> <p>Accordingly, HQPL should review and update to the site water management plan and the associated erosion and sediment control plan, surface water monitoring program and site water balance to address the respective condition, risks and the operations on site.</p>	Refer to commentary provided for Schedule 3, Condition 24.



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Karuah Hard Rock Quarry (DA 265-10-2004) – 2024 IEA Findings and HQPL Response			
No	Requirement	2024 IEA Assessment & Recommendation	2024 HQPL Response & Action
S3, C28	<p>Surface Water Monitoring The Applicant shall:</p> <p>(d) measure:</p> <ul style="list-style-type: none"> the volume of water discharged from the site via licensed discharge points; water use on the site; water transfers across the site; and dam and water structure storage levels. <p>(e) regularly monitor the quality of the surface water discharged from the licensed discharge points on the site; to the satisfaction of the DEC and the Director-General.</p>	<p>ASSESSMENT: Records and evidence to demonstrate that HQPL are measuring and monitoring water discharge, use, transfer and storage in accordance with the condition was not provided.</p> <p>It was advised that HQPL, in 2024 had installed flow meters at discharge points and data loggers to record dam levels.</p> <p>RECOMMENDATION: It is recommended that HQPL establish required monitoring equipment and record keeping processes to accurately record:</p> <ul style="list-style-type: none"> the volume of water discharged from the site via licensed discharge points; water use on the site; water transfers across the site; and dam and water structure storage levels. 	<p>RESPONSE: HQPL acknowledges the continuing project to install the required surface water monitoring equipment and develop an appropriate record keeping system.</p> <p>ACTION: HQPL will finalise the installation of the required monitoring hardware and implement an appropriate record keeping system.</p> <p>DUE: HQPL will complete the works by 31 December 2025.</p> <p>2025 Annual Review Update: Complete.</p> <ul style="list-style-type: none"> In 2024, HQPL installed flowmeters on internal fixed water pipelines and VGT installed alarmed water level hardware. In 2025, Nutrien Irrigation completed replacement of the flowmeter for the Sediment Dam 2 discharge outlet. This completed site metering of Sediment Dam 2 allowing HQPL to finalise water balance record keeping.
S3, C29	<p>Visual Impact The Applicant shall:</p> <p>(a) implement all practicable measures to minimise the visual impacts of the development;</p> <p>(b) retain, re-vegetate and subsequently maintain a visual bund within the Stage 1 works area (in accordance with Figures 13 and 14 of the EIS) to minimise the visual impacts of development;</p> <p>(c) include a progress report on the re-vegetation and maintenance of the visual bund in the AEMR, to the satisfaction of the Director General.</p>	<p>ASSESSMENT: Evidence of progress reporting on the revegetation and maintenance of the visual bund within the AEMRs was not sighted.</p> <p>RECOMMENDATION: It is recommended that HQPL monitor the re-vegetation and maintenance of the visual bund and report on its progress within the AEMRs.</p>	<p>RESPONSE: HQPL acknowledges the opportunity for improved reporting of management activities undertaken to maintain the visual bund in each year's Annual Review.</p> <p>ACTION: HQPL has included an additional section in the 2024 Annual Review submission in accordance with the Development Consent.</p> <p>STATUS: HQPL considers this matter to be resolved.</p>
S3, C34	<p>Waste Management The Applicant shall:</p> <p>(a) monitor the amount of waste generated by the development;</p> <p>(b) investigate ways to minimise waste generated by the development;</p> <p>(c) implement reasonable and feasible measures to minimise waste generated by the development; and</p> <p>(d) report on waste management and minimisation in the AEMR, to the satisfaction of the Director-General.</p>	<p>ASSESSMENT: There was no evidence sighted to demonstrated methods that HQPL had used to minimise waste generation, and/or the implementation of waste minimisation methods. Further, waste management and minimisation were not reported in the AEMRs during the audit period.</p> <p>RECOMMENDATION: It is recommended that HQPL investigate, implement and report in the AEMRs actions to minimise waste generation.</p>	<p>RESPONSE: HQPL acknowledges the opportunity to review waste management processes across the site, particularly in relation to waste minimisation and diversion methodologies.</p> <p>ACTION: HQPL will complete a comprehensive review of the site's waste management processes.</p> <p>DUE: HQPL will complete the review by 31 December 2025.</p> <p>2025 Annual Review Update: On-going – DUE 31/12/2026. HQPL has developed a framework for waste management at the site. Next steps will be to process map waste management dataflows within the context of the roll-out of HQPL's new financial management system.</p>



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Karuah Hard Rock Quarry (DA 265-10-2004) – 2024 IEA Findings and HQPL Response			
No	Requirement	2024 IEA Assessment & Recommendation	2024 HQPL Response & Action
S3, C43	<p>Rehabilitation Bond Within 3 years of lodging the rehabilitation bond with the Director-General, and every 5 years thereafter, unless the Director-General directs otherwise, the Applicant shall review, and if necessary revise, the sum of the rehabilitation bond to the satisfaction of the Director-General. This review must consider:</p> <p>(a) the effects of inflation; (b) any changes to the area of disturbance; and (c) the performance of any progressive rehabilitation which has been undertaken at the site.</p>	<p>ASSESSMENT: The sum of the rehabilitation bond was not revised within 5 years as required. Instead, a revision was undertaken 2023 / 2024. The revised sum has since been approved by DPE (dated, 9 January 2024) and the Bank Guarantee lodged.</p> <p>RECOMMENDATION: The rehabilitation bond bank guarantee was reviewed and revised 2023 / 2024. As such, it is recommended that HQPL undertake the next five-year review to meet the timeframes of the condition.</p>	<p>RESPONSE: HQPL acknowledges that the site's Rehabilitation Bond was not reviewed between 2016 and 2023 (i.e. not within the required 5-year review frequency).</p> <p>ACTION: HQPL notes that the 2023 Rehabilitation Bond was approved by NSW Planning on 09 January 2024 and therefore considers no further actions to be necessary.</p> <p>STATUS: HQPL considers this matter to be resolved.</p>
S4, C2	<p>Environmental Management Strategy Within 3 months of the completion of the Independent Environmental Audit (see condition 6 below), the Applicant shall review, and if necessary revise, the Environmental Management Strategy to the satisfaction of the Director-General.</p>	<p>ASSESSMENT: The previous IEA was completed 16 October 2019. An update to the EMS following the IEA was undertaken in August 2020. There is no evidence that a review of the EMS was undertaken within 3 months of the IEA and therefore, the Auditor cannot verify compliance with this condition.</p> <p>RECOMMENDATION: The Auditor recommends that HQPL reviews and revises the EMS to the satisfaction of the Department within the specified timeframe of the completion of the IEA.</p>	<p>RESPONSE: HQPL acknowledges the Environmental Management Strategy (EMS) was not updated within the required 3-month period required by the Development Consent.</p> <p>ACTION: HQPL will review and update the site's Environmental Management Strategy and Monitoring Program (EMS&MP), incorporating any findings from this Independent Environmental Audit.</p> <p>DUE: HQPL will complete the review and re-submit any required revisions to NSW Planning for approval by 04 June 2025, subject to resolution of the HQPL's management plan structure.</p> <p>2025 Annual Review Update: Complete. Comprehensive review incorporating the findings of the 2024 IEA completed in April 2025 and approved by NSW Planning on 29 May 2025.</p>
S4, C4	<p>Environmental Monitoring Program Within 3 months of the completion of the Independent Environmental Audit (see condition 6 below), the Applicant shall review, and if necessary revise, the Environmental Monitoring Program to the satisfaction of the Director-General.</p>	<p>ASSESSMENT: No evidence has been sighted to verify that the EMP was updated following the previous IEA (October 2019). An update to the EMP following the IEA was undertaken in May 2023. There is no evidence that a review of the EMP was undertaken within 3 months of the IEA and therefore, compliance against this condition of this consent cannot be verified.</p> <p>RECOMMENDATION: The Auditor recommends that HQPL reviews and revises the EMP to the satisfaction of the Department within the specified timeframe of the completion of the IEA.</p>	<p>RESPONSE: HQPL acknowledges there is no evidence available to determine if the Environmental Monitoring Program (EMP) was reviewed within the required 3-month period required by the Development Consent.</p> <p>ACTION: HQPL will review and update the site's Environmental Management Strategy and Monitoring Program (EMS&MP), incorporating any findings from this Independent Environmental Audit.</p> <p>DUE: HQPL will complete the review and re-submit any required revisions to NSW Planning for approval by 04 June 2025, subject to resolution of the HQPL's management plan structure.</p> <p>2025 Annual Review Update: Complete. Comprehensive review incorporating the findings of the 2024 IEA completed in April 2025 and approved by NSW Planning on 29 May 2025.</p>



KHRQ IEA 2024 – Response to Audit Recommendations

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Karuah Hard Rock Quarry (DA 265-10-2004) – 2024 IEA Findings and HQPL Response			
No	Requirement	2024 IEA Assessment & Recommendation	2024 HQPL Response & Action
S4, C10	<p><u>Community Consultative Committee</u> If the Applicant does not receive at least two expressions of interest to serve on the CCC the Applicant shall instead develop a communications strategy for consulting with Council and residents within 2 km of the development, to the satisfaction of the Director-General. This strategy should outline how the Applicant will advise Council and nearby residents on its environmental management plans, monitoring results, audit reports or complaints. This communication should occur twice a year.</p> <p>Notes: If during the course of the development, a Community Consultative Committee that has been established is found to be no longer effective, the Director-General may agree to its disbandment.</p>	<p><u>ASSESSMENT:</u> A communication strategy has been prepared and contained in the EMP (revision 6C, dated 11 September 2023).</p> <p>The EMP has been approved by DPE however there is no evidence to confirm that the communications strategy (contained within the EMP) has been approved.</p> <p><u>RECOMMENDATION:</u> It is recommended that HQPL seek clarification from DPHI to confirm the communication strategy has been approved by virtue of approval of the EMP or otherwise seek approval from DPHI for the communication strategy.</p>	<p><u>RESPONSE:</u> HQPL notes that the Communications Strategy is detailed in Environmental Management Strategy & Monitoring Program (EMS&MP) approved by NSW Planning on 18 December 2024.</p> <p><u>ACTION:</u> HQPL will consult with NSW Planning to seek approval for HQPL's management plan structure.</p> <p><u>DUE:</u> HQPL will seek approval by 04 April 2025.</p> <p><u>2025 Annual Review Update:</u> Complete. Consultation was conducted with NSW Planning via the NSW Major Projects Portal on 05 March 2025, with consolidation of the constituent management plan elements into the single EMS&MP document was approved by NSW Planning on 02 April 2025.</p>