REPORT

CALGA SAND QUARRY

LOT 151 PEATS RIDGE ROAD, CALGA, NSW, 2250

QUARTERLY COMPLIANCE NOISE MONITORING – 2022 Q3
RWDI # 2200854.05
27 September 2022

SUBMITTED TO

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RWDI

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This firm is a member firm of the Association of Australasian Acoustical Consultants and the work here reported has been carried out in accordance with the terms of that membership.

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GLOSSARY OF ACOUSTIC TERMS

Most environments are affected by environmental noise which continuously varies, largely as a result of road traffic. To describe the overall noise environment, a number of noise descriptors have been developed and these involve statistical and other analysis of the varying noise over sampling periods, typically taken as 15 minutes. These descriptors, which are demonstrated in the graph below, are here defined.

Maximum Noise Level (LAmax) – The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

L_{A1} – The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

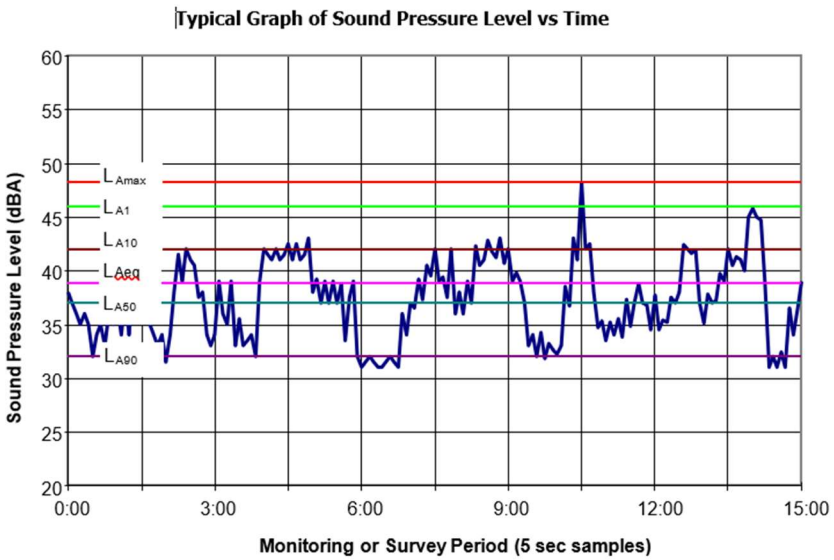
L_{A10} – The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

L_{Aeq} – The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

ABL – The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night time) for each day. It is determined by calculating the 10th percentile (lowest 10th percent) background level (L_{A90}) for each period.

RBL – The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and night time.



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1 INTRODUCTION

RWDI Australia (RWDI) was commissioned by Hanson Construction Pty Ltd to conduct the quarterly compliance noise monitoring of the Calga Sand Quarry located at Lot 151, Peats Ridge Road in Calga (the Site).

This report summarises the results of the quarterly attended noise monitoring conducted on 20 September 2022 and assess them against the operational noise criteria set in Development Consent DA 94-4-2004.

The Noise Monitoring Program prepared by R.W. Corkery & Co. Pty Ltd summarises all relevant criteria, monitoring locations, and frequency / timing of monitoring.

2 OPERATIONAL NOISE CRITERIA

Table 2-1 summarises the daytime operational noise criteria as summarised in Condition 2, Schedule 3, of Development Consent DA 94-4-2004 (as consolidated). Noise levels emanating from the Site must not exceed the relevant criteria when measured within 30 metres (m) of the dwelling.

Table 2-1 Operational Daytime Noise Criteria

Assessment Location	Daytime $L_{Aeq,15min}$ Operational Noise Criteria (dBA)
CN-1	41
CN-2	40
CN-3	39
CN-6	36

The relevant assessment locations are shown in **Figure 2-1.**

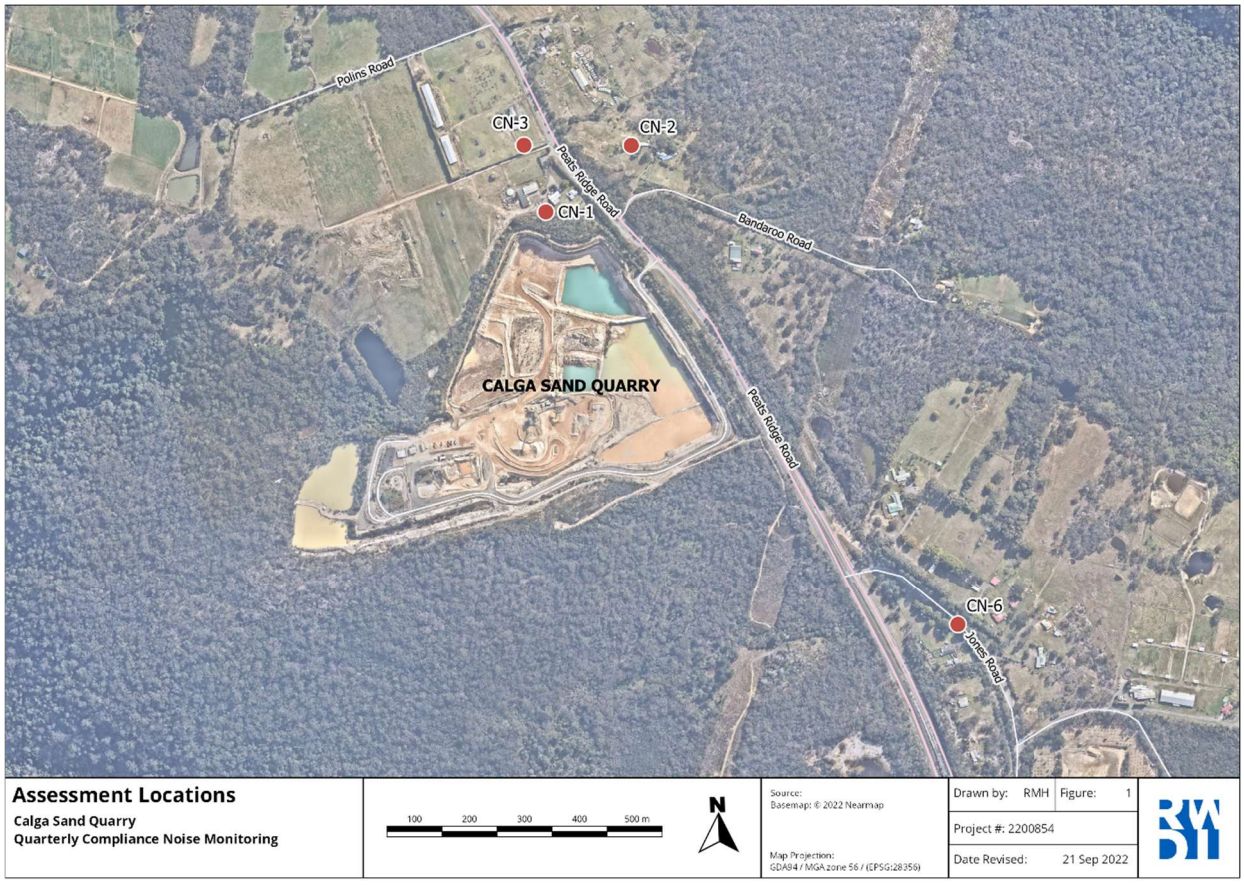

Figure 2-1 Assessment Locations

3 MONITORING METHODOLOGY

Noise compliance monitoring was conducted in accordance with the requirements of the Noise Monitoring Program and with reference to:

- *Noise Policy for Industry (NPfI)* (NSW EPA, 2017);
- *Approved Methods for the Measurement and Analysis of Environmental Noise in NSW* (EPA NSW, 2022); and
- *AS 1055 Acoustics - Description and Measurement of Environmental Noise* (Australia Standard, 2018).

Attended noise monitoring was conducted during the daytime assessment period (7:00 am – 6:00 pm) on Tuesday, 20 September 2022. One 15-minute measurement was conducted at each of the assessment locations listed in **Table 2-1**.

The noise measurements were conducted to allow for consideration of potential correction factors for noise emissions containing annoying noise characteristics (e.g., tonal noise, low-frequency noise) as per the methodology outlined in Fact Sheet C of the *NPfI*.

3.1 Monitoring Locations

Monitoring was conducted at the four assessment locations listed in **Table 2-1** and shown in **Figure 2-1**. All noise measurements were conducted at a location representative of the most affected point within the 30 metre (m) perimeter surrounding the dwelling.

3.2 Meteorological Conditions

Based on site observations, meteorological conditions were deemed suitable for conducting environmental noise measurements during the day of survey (wind less than five metres per second [m/s] at microphone height and no rain). Wind speed was determined by the RWDI operator using a hand-held digital anemometer AR816.

3.3 Instrumentation

All measurements were conducted using a NTi XL2 Sound Level Meter (SLM). This sound level meter conforms to AS IEC 61672.2-2019 *Electroacoustics – Sound level meters Pattern evaluation tests* as a Type 1 Precision Sound Level Meter which has an accuracy suitable for field and laboratory use. The A-Weighting filter of the meter was selected, and the time weighting was set to "Fast". The calibration of the meter was checked before and after the measurements with a Brüel and Kjær Type 4230 sound level calibrator and no significant drift was noted (the sound level meter calibrated 94.0 dBA before and after each of the 15-minute measurements).

The NTi XL2 sound level meter and the Brüel and Kjær Type 4230 have been laboratory calibrated within the previous two years in accordance with our in-house Quality Assurance Procedures. The Calibration Certificate for the SLM used for the monitoring is attached to this letter. Note that Calibration Certificates are valid for 2 years.

4 DESCRIPTION OF SITE OPERATIONS

Figure 4-1 shows the site layout with the active work locations on the day of the survey.

Figure 4-1 Site Layout and Active Work Locations (20 September 2022)

The following mobile plant and equipment were in operation during the time of the monitoring:

- Excavator working in Stage 3/6 loading mobile screen with raw material (**Figure 4-1**).
- Front-end loader loading sales trucks and moving oversize material to the oversize material stockpile (in red area shown in **Figure 4-1**).
- Water truck operational on all unsealed roadways.
- Front-end loader loading screened material onto dump truck in 3/6
- Dozer extracting raw material in stage 3/6 by ripping and pushing material into a stockpile.
- Washplant running in normal production mode with fines recovery circuit active. Being fed by Dump truck from 3/6 into feed bin at washplant

5 ASSESSMENT OF NOISE LEVELS

Table 5-1 summarises the measurement results and compares them against the relevant daytime noise criteria (**Table 2-1**).

Table 5-1 Attended Noise Measurement Results (20 September 2022)

Assessment Location	Start Time	$L_{Aeq,15min}$ due to Site Noise (dBA)	Operational Noise Criteria (dBA)	Comments
CN-1	2:00 pm	41	41	**Site-related sources**: Site audible during lulls of traffic – mobile fleet ~ 35-44 dBA. Impact noise 45 dBA. **Other dominant noise sources:** Frequent Peats Ridge Road traffic ~ 50-65 dBA . Frequent birds ~ 40-55 dBA.
CN-3	2:18 pm	35	39	**Site-related sources**: Site audible during lulls of traffic – mobile fleet ~ 33-36 dBA. **Other dominant noise sources:** Frequent Peats Ridge Road traffic ~ 55-75 dBA. Frequent birds ~ 40-55 dBA.
CN-2	2:36 pm	36	40	**Site-related sources**: Site audible during lulls of traffic – mobile fleet ~ 33-37 dBA. **Other dominant noise sources:** Frequent Peats Ridge Road traffic ~ 55-70 dBA. Frequent birds ~ 40-55 dBA.
CN-6	3:00 pm	Inaudible	36	**Site-related sources**: Site inaudible at all times. **Other dominant noise sources:** Frequent road traffic on Peats Ridge Road dominating the noise environment ~ 50-65 dBA Frequent birds ~ 45-55 dBA

Table 5-1 indicates that measured $L_{Aeq,15min}$ noise levels due to quarry operations comply with the relevant daytime noise criteria at all four receivers

7 CONCLUSION

Attended compliance noise monitoring was conducted on Monday, 20 September 2022. The results of the survey indicate that noise emissions from the Calga Sand Quarry complied with the daytime operational noise criteria set in Development Consent DA 94-4-2004 at all four identified assessment locations.

8 STATEMENT OF LIMITATIONS

This report entitled Calga Sand Quarry – Quarterly Compliance Noise Monitoring – 2022 Q3 was prepared by RWDI Australia Pty Ltd ("RWDI") for Hanson Construction Material Pty ("Client"). The findings and conclusions presented in this report have been prepared for the Client and are specific to the project described herein ("Project"). The conclusions and recommendations contained in this report are based on the information available to RWDI when this report was prepared. Because the contents of this report may not reflect the final design of the Project or subsequent changes made after the date of this report, RWDI recommends that it be retained by Client during the final stages of the project to verify that the results and recommendations provided in this report have been correctly interpreted in the final design of the Project.

The conclusions and recommendations contained in this report have also been made for the specific purpose(s) set out herein. Should the Client or any other third party utilize the report and/or implement the conclusions and recommendations contained therein for any other purpose or project without the involvement of RWDI, the Client or such third party assumes any and all risk of any and all consequences arising from such use and RWDI accepts no responsibility for any liability, loss, or damage of any kind suffered by Client or any other third party arising therefrom.

Finally, it is imperative that the Client and/or any party relying on the conclusions and recommendations in this report carefully review the stated assumptions contained herein and to understand the different factors which may impact the conclusions and recommendations provided.

APPENDIX A

CALIBRATION CERTIFICATE

Acoustic Research Labs Pty Ltd
Unit 36/14 Loyalty Rd
North Rocks NSW AUSTRALIA 2151
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119
www.acousticresearch.com.au

Sound Level Meter
IEC 61672-3.2013
Calibration Certificate

Calibration Number C21674

Client Details	RWDI Level 4, 272 Pacific Highway Crows Nest NSW 2065
Equipment Tested/ Model Number :	Nti XL2
Instrument Serial Number :	A2A-08006-E0
Microphone Serial Number :	7796
Pre-amplifier Serial Number :	09815

Pre-Test Atmospheric Conditions		**Post-Test Atmospheric Conditions**	
Ambient Temperature :	20.9°C	**Ambient Temperature :**	21.8°C
Relative Humidity :	54.9%	**Relative Humidity :**	53.6%
Barometric Pressure :	100.5kPa	**Barometric Pressure :**	100.5kPa

Calibration Technician :	Lucky Jaiswal	**Secondary Check:**	Harrison Kim
Calibration Date :	13 Oct 2021	**Report Issue Date :**	15 Oct 2021

Approved Signatory : Ken Williams

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

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

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

Least Uncertainties of Measurement -

Acoustic Tests		Environmental Conditions	
125Hz	*±0.13dB*	*Temperature*	*±0.2°C*
1kHz	*±0.13dB*	*Relative Humidity*	*±2.4%*
8kHz	*±0.14dB*	*Barometric Pressure*	*±0.015kPa*
Electrical Tests	*±0.10dB*		

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

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

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

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

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

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