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ATTENDED NOISE MONITORING – September 2022 New Berrima Clay/Shale Quarry New Berrima, NSW

Prepared for:
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EXECUTIVE SUMMARY

Attended noise monitoring has been carried out for the New Berrima Clay/Shale Quarry (NBCSQ) on 30th September 2022. Monitoring was carried out in accordance with requirements of EPL20377, Project Approval 08_0212, the New Berrima Clay/Shale Quarry Noise Management (NBCSQ) Plan and other relevant Australian Standards and guidelines.

The site-specific operational criteria were not exceeded at any location or at any time throughout the monitoring period.

Noise from NBCSQ operations was inaudible at all locations throughout the monitoring period.

NBCSQ was compliant with Environmental Protection Licence (EPL) 20377 and New Berrima Clay/Shale Quarry Project Approval 08_0212 conditions for September 2022.

1.0 INTRODUCTION

This report presents the results of attended noise compliance monitoring and measurements conducted for the New Berrima Clay/Shale Quarry (NBCSQ) on 30th September 2022. Monitoring was undertaken in accordance with requirements of the NBCSQ Noise Management Plan (NMP) dated September 2018. The noise monitoring programme and procedures in the NMP have been developed in accordance with the NBCSQ Environmental Protection Licence (EPL) no 20377, and the Project Approval (PA 08_0212). To aid in the understanding of this report a description of acoustical terms is attached as **Appendix A**.

1.1 Noise Monitoring Locations

The NMP (Section 3.2) contains a table (Table 4) detailing the on-site locations for attended noise monitoring as reproduced below in **Table 1**. On-site monitoring locations are adopted as proxies for off-site receivers. Compliance with the limits at the on-site locations implies compliance with the (lower) criteria at off-site receivers. The monitoring locations are shown on **Figure 1**.

Table 1
NBCSQ Noise Monitoring Locations

Monitoring Point	Description
N1	North of the extraction area
N2	East of the extraction area
N3	South east of the extraction area

The NBCSQ has a meteorological station installed on site with all meteorological data available through an online portal. This data is used to supplement the attended noise monitoring data.

1.2 Monitoring Frequency and Duration

The NMP indicates that attended monitoring is to be conducted quarterly at each location during construction activities, and annually once extraction activities begin. Each survey is to consist of one 15 minute measurement at each location. For the purposes of attended noise monitoring, operating hours are defined in the NMP as being 7:00am - 5:00pm Monday to Friday and 8:00am – 1:00pm Saturdays, with no operations commencing on Sundays or Public Holidays. Monitoring is conducted as required in Condition L2.1 of the EPL.

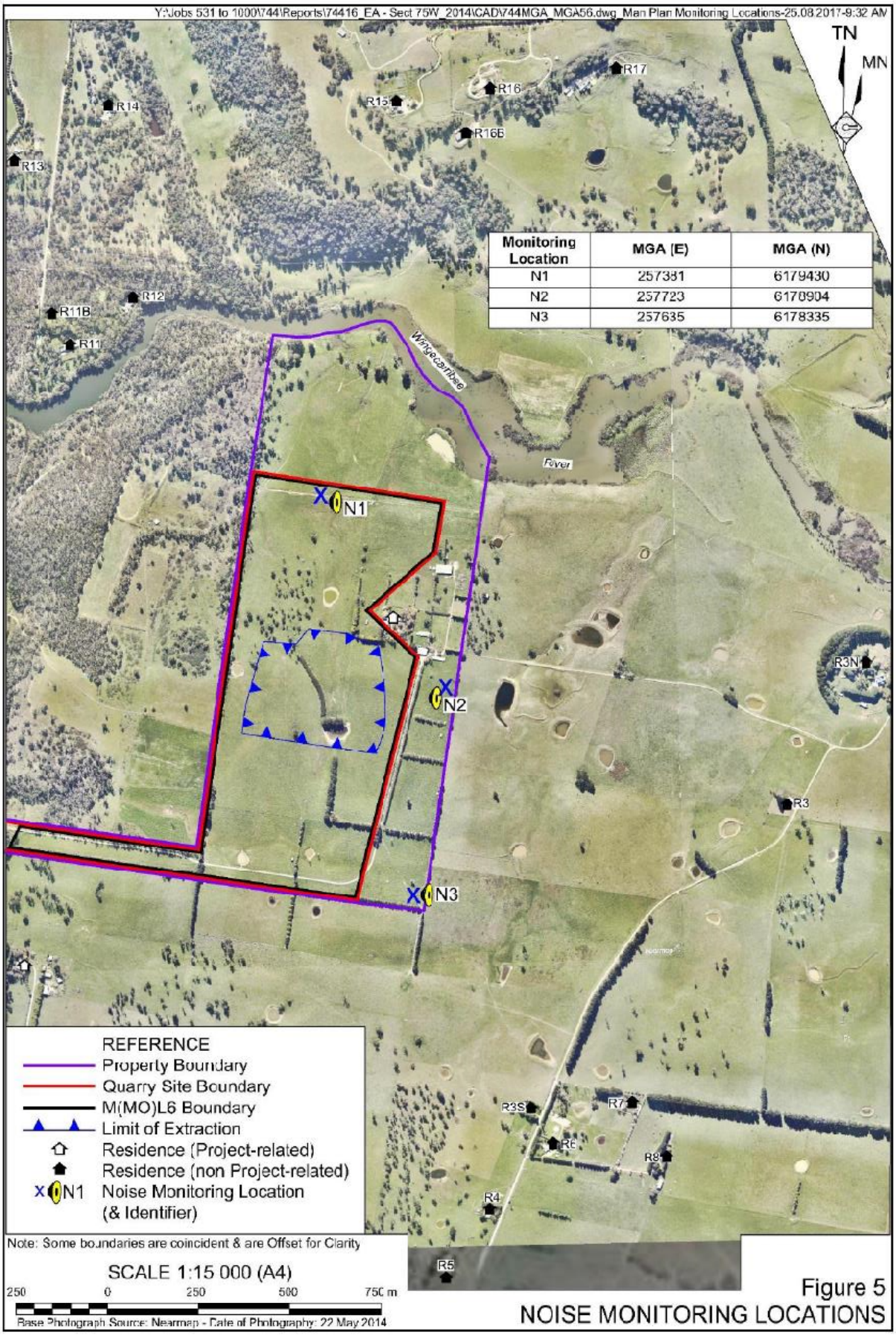

Figure 1: Noise Monitoring Locations

2.0 CRITERIA AND CONDITIONS

2.1 Noise Assessment Criteria

The noise assessment criteria are detailed in Condition L2.1 of the EPL and Table 4 of the NMP. The criteria vary for each receiver monitoring location and are shown in **Table 2**. Noise criteria for all residences listed in the EPL and NMP are shown in **Appendix B**.

Table 2
Noise Criteria, dB(A),Leq(15min)

Location	Noise Limit at any time - dB(A),Leq(15min)
N1	42
N2	49
N3	44

2.2 Applicable Meteorological Conditions

The noise limits apply under all meteorological conditions except for any one of the following;

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

2.3 Other Conditions

To determine compliance with the Leq (15 min) operational noise criteria the modification factors detailed in Fact Sheet C of the NSW Noise Policy for Industry must be applied, as appropriate, to the measured noise levels.

3.0 NOISE MONITORING PROCEDURE

3.1 Monitoring Equipment

Attended noise monitoring was conducted with a Brüel & Kjær Type 2250 Precision Sound Analyser. This instrument has Class 1 characteristics as defined in AS IEC61672.1-2019 and has current NATA calibration. Calibration certificates are included in Appendix C. Field calibration is carried out at the start and end of each monitoring period.

A-weighted noise levels were measured over the 15-minute monitoring periods with data acquired at 1 or 2 second statistical intervals and the meter set to “fast” response. Each 1 or 2 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing INP ‘modifying factors’. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.

3.2 Measurement Analysis

The 15 minute Leq noise level for each monitoring period is shown in the tables below. Bruel & Kjaer "Evaluator" analysis software was used to identify the contributing significant noise sources to the overall noise level. Both the total measured noise level and the identified noise contributing sources are shown in the tables.

3.3 Meteorological Data

Meteorological data used in this report were taken from the weather station at the NBCSQ.

4.0 RESULTS AND DISCUSSION

4.1 Measured Noise Levels

4.1.1 NBCSQ Operations

Measured noise levels for each monitoring location are summarised in **Table 3**.

Table 3
NBCSQ Operational Noise Monitoring Results – 30th September 2022

Location	Time	dB(A), Leq	NBCSQ Contribution dB(A), Leq	Criterion dB(A) Leq	Wind speed (m/s),dir	Identified Noise Sources
N1	12:02 pm	50	Inaudible	42	7.5 @ 125˚ (SE)	Wind, frogs, train, Hume highway,
N2	12:23 pm	44	Inaudible	49	7.3 @ 160˚ (SE)	Wind, frogs, birds, cattle, Hume highway
N3	12:42 pm	48	Inaudible	44	6.4 @ 166˚ (SE)	Wind, cattle, Hume highway

4.2 Discussion of Results

The results in Table 3 show that, under the operating and meteorological conditions at the times, for the 15 minute compliance measurement periods, the noise from the NBCSQ operations was inaudible at all monitoring locations.

APPENDIX A

DESCRIPTION OF ACOUSTICAL TERMS

Table A1

Definition of acoustical terms

Term	Description
dB(A)	The quantitative measure of sound heard by the human ear, measured by the A-Scale Weighting Network of a sound level meter expressed in decibels (dB).
SPL	Sound Pressure Level. The incremental variation of sound pressure above and below atmospheric pressure and expressed in decibels. The human ear responds to pressure fluctuations, resulting in sound being heard.
STL	Sound Transmission Loss. The ability of a partition to attenuate sound, in dB.
Lw	Sound Power Level radiated by a noise source per unit time re 1pW.
Leq	Equivalent Continuous Noise Level - taking into account the fluctuations of noise over time. The time-varying level is computed to give an equivalent dB(A) level that is equal to the energy content and time period.
L1	Average Peak Noise Level - the level exceeded for 1% of the monitoring period.
L90	"Background" Noise Level - the level exceeded for 90% of the monitoring period.

APPENDIX B

NOISE LIMITS

EPL 20377

L2 Noise limits

L2.1 Noise from the premises must not exceed the noise limits in the table below:

Identification Point	Noise Limit at any time - dB(A) LAeq(15 minute)	Location
N1	42	North of the quarry void and labelled N1 on map titled "Environmental Monitoring Locations" dated 20 November 2015 (DOC16/206245).
N2	49	East of the quarry void and labelled N2 on map titled "Environmental Monitoring Locations" dated 20 November 2015 (DOC16/206245).
N3	44	South east of the quarry void and labelled N3 on map titled "Environmental Monitoring Locations" dated 20 November 2015 (DOC16/206245).

PA 08_0212

Noise Criteria – Bund Construction

4. During the construction of the Visibility Barriers, the Proponent must ensure that the noise generated on site does not exceed the criteria in Table 1.

Table 1- Noise Criteria - Bund Construction

Receiver	***$L_{Aeq\ (15\ min)}$ dB(A)***
R2	43
All other receivers	38

Notes:

- *Receiver locations are shown in Figure 4 of APPENDIX A.*
- *Noise generated by the project is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.*

Noise Criteria

5. Except for the period when the Visibility Barriers are being constructed, the Proponent must ensure that the noise generated by the project does not exceed 38dB(a) $L_{Aeq\ (15min)}$ at any residence on privately-owned land.

However, this criterion does not apply if the Proponent has a written agreement with the relevant landowner to exceed the criteria, and the Proponent has advised the Department in writing of the terms of this agreement.

APPENDIX C

CALIBRATION CERTIFICATE

HBK HOTTINGER BRÜEL & KJÆR

NATA WORLD RECOGNISED ACCREDITATION

Australian Calibration Laboratory
Suite 4.03, Level 4, 3 Thomas Holt Drive, Macquarie Park NSW 2113, Australia
Accredited for compliance with ISO/IEC 17025 - Calibration. Laboratory No. 1301

CERTIFICATE OF CALIBRATION

Certificate No: CAU2100868

CALIBRATION OF:

Sound Level Meter:	Bruel & Kjaer	2250	No: 2747794
Microphone:	Bruel & Kjaer	4189	No: 2733511
Preamplifier:	Bruel & Kjaer	ZC-0032	No: 15339
Supplied Calibrator:	Bruel & Kjaer	4231	No: 2466354
Software version:	BZ7224 Version 4.6	Pattern Approval:	PTB
Instruction manual:	BE1712-22	Identification:	N/A

CUSTOMER:

Spectrum Acoustics Pty Ltd
Suite 1, 12 Alma Road
New Lambton NSW 2305

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 IEC61672-1:2013 class 1.
Procedures from IEC 61672-3:2013 were used to perform the periodic tests.
The measurements included in this document are traceable to Australian/National standards.

PROCEDURE:

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System B&K 3630 with application software type 7763 (version 8.3 - DB: 8.30) and test procedure 2250-4189.

RESULTS:

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

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

Date of Calibration: 06/12/2021

Sajeeb Tharayil
Calibration Technician

Certificate issued: 06/12/2021

Craig Patrick
Approved signatory