

# **Bago Forest Quarry**

## **Annual Noise Monitoring Assessment - 2023**

Project Bago Forest Quarry Noise Monitoring Assessment - 2023  
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Date 09/08/2023  
Client CTK Natural Resources Pty Ltd  
Recipient Graham Lockett  
Author Greer Laing  
Description Summary of the annual attended noise monitoring assessment completed on 11 July 2023 to determine compliance against the Conditions of Environment Protection Licence 20983

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## Document Control

Version	Date	Author	Description
1	08/08/2023	Greer Laing	Assessment for comment by CTK Natural Resources
2	09/08/2023	Greer Laing	Incorporate comment from Graham Lockett - CTK

## Terms and Abbreviations

Term or Abbreviation	Definition
Ambient noise	All-encompassing noise associated within a given environment
AWS	Automatic weather station
A-weighted	An adjustment made to sound-level measurement to approximate the response of the human ear
Background noise	Underlying level of noise present in ambient noise, generally excluding the noise source under investigation when extraneous noise is removed
BFQ	Bago Forest Quarry
CTK	CTK Natural Resources Pty Ltd
Decibel (dB)	A logarithmic ratio that may be power, sound pressure, voltage, intensity of other parameters. In the case of sound pressure, it is equivalent to 10 times the logarithm (to base 10) of the ratio of a given sound pressure squared to a reference sound pressure squared. An A-weighted scale i.e. dB(A) attempts to approximate the frequency response of the human ear.
EPL	Environment Protection Licence issued by NSW Environmental Protection Authority
Extraneous noise	Noise resulting from activities that are not typical of the area, such as construction, traffic during holiday periods or special events.
INP	NSW EPA Industrial Noise Policy, 2000
Intrusive noise	Noise that intrudes above the background level by more than 5 dB
LAeq	Descriptor that represents the level of average noise energy over the relevant period of measurement and takes account of peak noise levels as well as the degree of noise fluctuation. The descriptor is most widely correlated with the subjective effect of noise.
LAFmax	Descriptor used to measure and quantify maximum noise level events
LAF90	Descriptor used to measure background noise levels, representing the noise level that is exceeded for 90% of the time over the relevant period of measurement. Set to A-weighted fast time weighting.
NPfi	NSW EPA Noise Policy for Industry, 2017
RBL	Rating background level, the figure that represents background noise level for assessment purposes.
Receiver	Noise-sensitive land use at which noise from a development can be heard.
SLM	Sound level meter
T	Tonnes

## 1. Introduction

### 1.1. Overview

CTK Natural Resources Pty Ltd (CTK) commissioned Ecosphere Science & Technology Pty Ltd (Ecosphere) to complete an independent noise monitoring assessment for Bago Forest Quarry (BFQ), located at 31 Lookout Road, Herons Creek, NSW 2443. BFQ is a hard rock quarry which commenced operation in March 2022, supplying product for road base, concrete, ballast, landscaping material, general fill and stabilisation material.

The site is licenced to carry out scheduled activities of crushing, grinding and separating to >30,000 – 100,000 tonnes (T) and extractive activities >50,000 – 100,000 T for an annual period under Environmental Protection Licence (EPL) 20983 (NSW EPA, 2023). Noise monitoring is required annually by the EPL. This report has been prepared to cover the noise assessment requirement for the reporting period commencing 1 November 2022 until 31 October 2023.

### 1.2. Scope of this report

This report is presented in the following sections:

- Project location, operational details and monitoring locations (Section 2).
- Monitoring methodology and relevant noise limits (Section 3).
- Results and Discussion (Section 4).
- Conclusion (Section 5).

Noise monitoring was completed by Greer Laing from Ecosphere on 11 July 2023 at BFQ.

## 2. Project Description

### 2.1. Project location

The site is located within Broken Bago State Forest with rural land to the south and west (see map in Figure 1). A vineyard and associated public venues are located to the west of the site.

Sensitive receivers identified for noise monitoring in the EPL are located to the south-east and south-west of the quarry. Each of the four receivers are residential dwellings located on rural land.

### 2.2. Operational details

The site was operational during the monitoring assessment. Two crushers were running in series on the day as a short term trial. Hauling and deliveries were observed to and from the site. In addition to the crushing equipment, a scalping screen and triple deck screening equipment were also being operated at the time of the monitoring assessment.

Coastal Quarry Products, an adjacent quarrying operation located approximately 2 km to the west of BFQ, was audible at one location during the monitoring. This quarry was assessed as a cumulative source in the noise impact assessment addendum (EMM, 2016).

### 2.3. Monitoring locations

The locations identified in Figure 1 from the original approval application site map (de Groot & Benson, 2015) are referenced in the EPL. The receivers identified in the original map and EPL were used in this assessment, but the specific location of monitoring was determined by the recommendations of the Approved Methods for the measurement and analysis of environmental noise in NSW (NSW EPA, 2022; 'Approved Methods') and accessibility. The locations monitored for this assessment are provided as coordinates in Table 1.

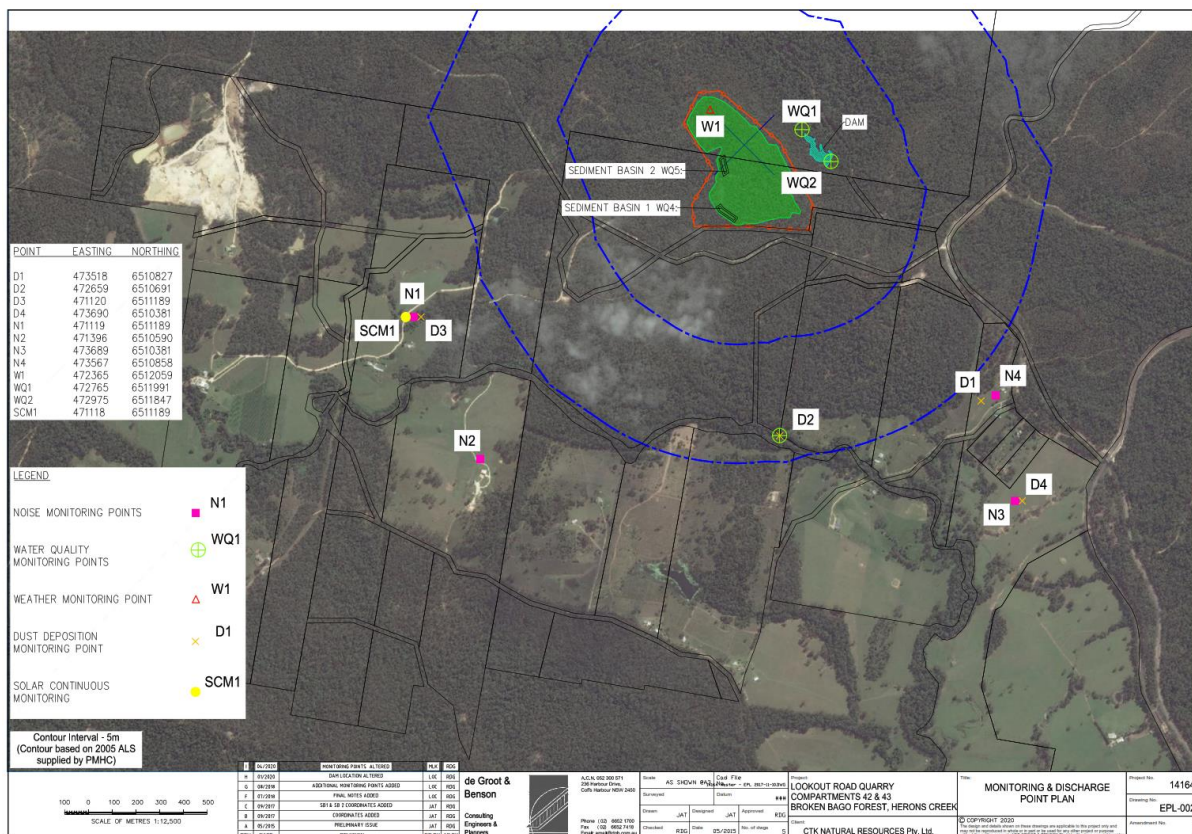


Figure 1: Map of Bago Forest Quarry (de Groot & Benson, 2015)

Table 1: Noise monitoring locations during 2023 assessment, Herons Creek NSW 2439 (Zone 56 J)

EPL ID	ID	Location	Easting (m, E)	Northing (m, S)
17	N1	125 Lambs Road	471070	6511070
18	N2	85 Lambs Road	471392	6510570
19	N3	3 Little Bago Lane	473803	6510683
20	N4	41 Little Bago Lane	473638	6510890

## 3. Methodology

### 3.1. EPL requirements and noise limits

This report has been prepared to meet the requirements of Condition M8 of the EPL, reproduced below.

## **M8 Noise Monitoring**

*M8.1 To assess compliance with the noise limits for this premises attended noise monitoring must be undertaken in accordance with the noise conditions and:*

- a. At the two most affected residential receivers;*
- b. Occur annually in any reporting period;*
- c. Occur during each day period as defined by the NSW Industrial Noise Policy; and*
- d. Occur during a period of normal quarry operations.*

Noise limits that apply to the project are outlined in Condition L4 of the EPL and reproduced below in Table 2.

*Table 2: Noise limits for each of four monitoring locations (EPL 230627)*

<b>Time Period</b>	<b>Measurement parameter</b>	<b>Measurement frequency</b>	<b>Noise level dB(A)</b>
Day	Day-LAeq (15 minute)	Yearly	35

Note: 'Day' defined as 7 am to 6 pm Monday to Saturday and 8 am to 6 pm Sunday and public holidays.

The EPL also specifies the following conditions relevant to monitoring and assessment potential noise impacts.

The noise limits do not apply in:

- 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 the ground.
- Stability category G temperature inversion conditions.

The EPL states that data from the meteorological station within the licensed premises must be used to determine meteorological conditions. It is noted that the BFQ meteorological station has been procured but CTK are in the process of requesting an alternative location so that the equipment is not positioned within the extraction zone. Meteorological data from the Bureau of Meteorology (Bureau) was reviewed from the nearest location at Port Macquarie Airport automatic weather station (AWS) for this assessment. The station is located approximately 18 km to the north-east of BFQ, in conditions that are not considered representative of the BFQ site.

### **3.2. NSW noise policy**

The EPL references the NSW Industrial Noise Policy (NSW EPA, 2000; INP) which has since been replaced by the Noise Policy for Industry (NSW EPA, 2017; NPfI). The INP continues to be used where it is referred to in a licence, except for Section 4 (i.e. modifying factors) which has been replaced by the Fact Sheet C of

the NPfI. The NPI does not apply to vehicles associated with an industrial premise that is on a public road, or any other roadways or railways.

### 3.3. Sampling approach

Direct measurement at receiver locations was used to determine compliance with the noise limit using a sound level meter (SLM). The SLM was a Class 1 as specified in AS/NZS IEC 61672.1:2019 *Electroacoustics: sound level meter specifications*.

Monitoring was completed while the quarry was operating under normal conditions. Wind speeds were measured in-situ with a handheld anemometer during the monitoring campaign, and during all monitoring periods the conditions were still and calm. The monitoring equipment was located at the property boundary, within 30 m of the dwelling façade but no closer than 3.5 m to measure free-field noise levels.

The SLM was field checked using a NATA calibrated acoustic calibrator compliant with Class 1, as specified in IEC 60942:2017 *Electroacoustics: sound calibrators*. All pre-measurement and pos-measurement checks were within specification. A windscreen was fitted over the microphone during monitoring. The instrument was mounted to a tripod at approximately 1.3 m above the ground and positioned at least 3.5 m from nearby reflective surfaces. Monitoring was completed using a ‘fast’ time weighting and ‘A’ frequency rating.

The instrumentation used in the assessment is summarised in Table 3. All equipment was within NATA laboratory calibration, where applicable. A calibration certificate for the SLM is provided in Appendix A.

Table 3: Sampling Equipment Details

Sampling / Calibration Equipment	Make / Model	Serial Number	Calibration Due
Sound level meter	Rion NL-52	00520996	15/12/2024
Acoustic calibrator	Pulsar Model 105	100368	06/07/2024
Anemometer	Kestrel 5500	2674200	1/7/2026

### 3.4. Modification factors

Field observations determined that the site noise at the audible location was not tonal, low-frequency, intermittent or event-based, therefore adjustments to measured levels were not required for annoying noise characteristics (NSW EPA, 2017).

## 4. Results and Discussion

The results of the noise monitoring are summarised in Table 4. The contribution of BFQ was determined using field observations and post-analysis of data against the  $L_{A90}$  statistic (i.e. background noise).

BFQ was inaudible at location N4 (41 Little Bago Lane), N1 (125 Lambs Road) and N3 (3 Little Bago Lane). The noise observed at N4 was dominated by road traffic and birds; at N1 by road traffic, wind in the adjacent state forest and a rooster crow; and at N3 by road traffic on Little Bago Lane.

Typically when quarry noise is not audible above the local ambient noise levels, the likely contribution of that source is at least 10 dB below the measured background ( $L_{A90}$ ) level. The measured background level ( $L_{Aeq,15 \text{ minute}}$ ) at N4 was 35 dBA, 37 dBA at N1 and 28 dBA at N3. When 10 dB is subtracted from these background values, the noise contribution of the quarry is below the 35  $L_{Aeq,15 \text{ minute}}$  noise limit at each location.

BFQ was audible at N2 (85 Lambs Road), where tipping to trucks was heard, estimated at 31 dBA. The  $L_{Aeq(15 \text{ min})}$  for all ambient noise sources at this location was 33 dBA over the monitoring period, which is below the noise limit of 35 dBA.

Meteorological data from Port Macquarie Airport AWS was reviewed to determine applicability of the criteria in accordance with the EPL. The average wind speed at 10 m height at Port Macquarie Airport AWS ranged from 3.2 to 3.7 m/s during the measurement campaign. This wind speed above the licence condition of 3 m/s, under which conditions the the noise limit does not apply. When considering the terrain and proximity to the coast, it is likely wind speeds are lower in the quarry location compared to the airport. The issue of representative meteorological data is expected to be resolved for the subsequent noise assessment, when the site meteorological station will be installed. For the purposes of this assessment it is assumed the wind speeds are within the threshold for the criteria to apply, as no wind was observed or measured in-situ while on site (refer to wind speed measurements in Table 4 collected by handheld anemometer at ground level). Conditions on the monitoring day at the site were very calm and no wind was recorded.

On that basis, BFQ noise contributions satisfied the relevant EPL noise limits at all locations.

Table 4: BFQ attended noise monitoring results – 11 July 2023

Location	Date/ Time	Descriptor, 15 min (dBA)			Meteorology	Ambient noise sources	Quarry Audible	Estimated Quarry Contribution L <sub>Aeq</sub> (15 min) (dBA)	L <sub>Aeq</sub> (15 min) Limit (EPL)
		L <sub>Amax</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>		Description and L <sub>Aeq</sub> (dBA)			
N4 – 41 Little Bago Lane	11/07/2023 10:46	64	49	35	WD: NA WS: 0 Rain: Nil	Road traffic, Bago Road: 53 - 61 Road traffic, Little Bago: 47 Bird: 35 - 36 Background: ~34	Inaudible	<25	35
N2 – 85 Lambs Road	11/07/2023 11:23	64	33	28	WD: NA WS: 0 Rain: Nil	Dog barking: 35 Birds: 35 Cows: 57 Tipping into truck: 31	Audible	<33	35
N1 – 125 Lambs Road	11/07/2023 12:28	60	44	37	WD: NA WS: 0 Rain: Nil	Road traffic: 46 Wind in trees: 39 - 43 Rooster: 37	Inaudible	<27	35
N3 – 3 Little Bago Lane	11/07/2023 12:58	69	49	28	WD: NA WS: 0 Rain: Nil	Road traffic: 51 - 69 Cars passing on Little Bago Lane	Inaudible	<18	35



## 5. Conclusion

A noise monitoring assessment was completed by Ecosphere on 11 July 2023 to determine whether BFQ operated within the noise limits set by the EPL. The quarry was operating normally, and conditions were fine and calm on the monitoring day.

The estimated quarry contribution was below the EPL noise limit at all four monitoring locations during the assessment using the methodology applied. Therefore no additional management measures are specifically required to be implemented, per Condition R5.1 (2) of the EPL.

Monitoring should be completed again in the next reporting year, after which time the EPA will consider the frequency of the monitoring, upon request, as stated in Condition M8.1 of the EPL.

## 6. References

EMM (2022). EPL annual attended noise monitoring – 2022. RP1, version 1, 12 September 2022, reference E220789.

EMM (2015). Bago Quarry Noise and Vibration Impact Assessment. Prepared for de Groot & Benson Pty Ltd, 25 November 2015, reference H15086RP1.

EMM (2016). Bago Quarry Noise and Vibration Impact Assessment – Addendum. Prepared for de Groot & Benson Pty Ltd, 28 April 2016, reference H15086RP2.

NSW EPA (2000). NSW Industrial Noise Policy. Dated January 2000.

NSW EPA (2017). Noise Policy for Industry. EPA 2016/0524, dated October 2017.

NSW EPA (2022). Approved methods for the measurement and analysis of environmental noise in NSW. EPA 2022P3486, dated January 2022.

NSW EPA (2023). Notice of variation of Licence No. 20983. Notice Number 1629319 dated 27 June 2023.

## 7. Limitations

Ecosphere Science & Technology Pty Ltd (Ecosphere) prepared this report in accordance with the scope of work as outlined in our discussions with CTK Natural Resources Pty Ltd (CTK) and in accordance with our understanding and interpretation of the noise monitoring assessment objectives.

The conclusions presented in this report represent Ecosphere's professional judgement based on information made available during this assignment and are true and correct to the best of Ecosphere's knowledge at the date of the assessment. Ecosphere did not independently verify all the written or oral information provide to the Ecosphere during this assessment. While Ecosphere has no reason to doubt the accuracy of the information provided to it, the report is complete and accurate only to the extent that the information provided to Ecosphere was itself complete and accurate.

This report does not proport to give legal advice. The advice can only be given by qualified legal advisors.

The report has been prepared exclusively for CTK to determine compliance against the noise limits in the EPL and may not be relied upon by any other person or entity without Ecosphere's express written permission.

## Appendix A: SLM calibration certificate



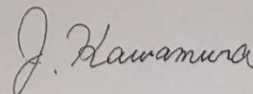
3-20-41 Higashimotomachi Kokubunji Tokyo 185-8533  
Phone:042(359)7888, Facsimile:042(359)7442

# Certificate of Calibration

**Name** : **Sound Level Meter, Class 1**  
**Model** : **NL-52**      **S/No.** : **00520996**  
**Date of Calibration** : **August, 18, 2022**

We hereby certify that the above product was tested and calibrated according to the prescribed Rion procedures, and that it fulfills specification requirements.  
The measuring equipment and reference devices used for testing and calibrating this unit are managed under the Rion traceability system and are traceable according to official Japanese standards and official standards of countries belonging to the International Committee of Weights and Measures.

**RION CO., LTD.**



Manager, Quality Control Department