

# Noise Compliance Monitoring Report - June 2021

25-Jun-2021 Commercial-in-Confidence



Delivering a better world

# Noise Compliance Monitoring Report - June 2021

#### Client: National Ceramics Industries Australia

ABN: 83100467267

#### Prepared by

#### AECOM Australia Pty Ltd

17 Warabrook Boulevard, Warabrook NSW 2304, PO Box 73, Hunter Region MC NSW 2310, Australia T +61 2 4911 4900 F +61 2 4911 4999 www.aecom.com ABN 20 093 846 925

25-Jun-2021

Job No.: 60613063

AECOM in Australia and New Zealand is certified to ISO9001, ISO14001 AS/NZS4801 and OHSAS18001.

© AECOM Australia Pty Ltd (AECOM). All rights reserved.

AECOM has prepared this document for the sole use of the Client and for a specific purpose, each as expressly stated in the document. No other party should rely on this document without the prior written consent of AECOM. AECOM undertakes no duty, nor accepts any responsibility, to any third party who may rely upon or use this document. This document has been prepared based on the Client's description of its requirements and AECOM's experience, having regard to assumptions that AECOM can reasonably be expected to make in accordance with sound professional principles. AECOM may also have relied upon information provided by the Client and other third parties to prepare this document, some of which may not have been verified. Subject to the above conditions, this document may be transmitted, reproduced or disseminated only in its entirety.

# **Quality Information**

Document Noise Compliance Monitoring Report - June 2021

Ref 60613063

Date 25-Jun-2021

Prepared by Cye Buckland

Reviewed by Paul Wenta

#### **Revision History**

Rev	Devision Data	Detaile	Authorised       Name/Position     Signature       Paul Wenta     Paul Wenta	
	Revision Date	Details	Name/Position	Signature
0	25 June 2021	Final Report	Paul Wenta Principal Scientist	Pour Wenter

This page has been left blank intentionally.

# Table of Contents

1.0	Introdu	Introduction				
	1.1	Background	1			
	1.2	Site	1			
2.0	Regula	Regulatory Conditions				
	2.1	Project Approval Requirements	1			
	2.2	EPL Requirements	1			
3.0	Metho	dology	2			
	3.1	Boundary Noise Monitoring	3			
	3.2	Instrumentation	3			
	3.3	NSW Noise Policy for Industry	3			
4.0	Monito	Monitoring				
	4.1	Attended Monitoring	2 3 3 3 3 3 3 3 3 3 3 3 3 3 3			
		4.1.1 Weather Conditions	3			
		4.1.2 Site Operations	3			
	4.2	Monitoring Locations	3			
5.0	Result	ts	4			
	5.1	Receiver Location Monitoring	4			
	5.2	Site Boundary Monitoring	6			
	5.3	Predicted Noise Levels	7			
	5.4	Assessment Against Short-Term Night Time Criteria	7 7			
6.0	Conclu	usion	8			
Apper	ndix A					
		ary of Acoustic Terms	A			

#### List of Tables

Table 1	EPL Noise limits	1
Table 2	June 2021 Attended Noise Monitoring Results Summary	5
Table 3	June 2021 – Site Boundary Measurement Results	6
Table 4	June 2021 – Calculated Noise Levels at the Receiver Locations	7

#### List of Figures

Figure 1	Site and Receiver Monitoring Locations	4
----------	--	---

This page has been left blank intentionally.

1

### 1.0 Introduction

#### 1.1 Background

National Ceramics Industries Australia Pty Ltd (NCIA or the Site) has engaged AECOM Australia Pty Ltd (AECOM) to conduct compliance noise monitoring to satisfy the requirements of the Project Approval (09\_0006, 19 January 2012) and the sites Environmental Protection Licence (EPL 11956).

Acoustic terminology used in this report is defined in **Appendix A**.

#### 1.2 Site

The site is located at 175 Racecourse Rd, Rutherford NSW and is bounded by industrial facilities to the west, vacant land immediately to the south, a golf driving range to the east and an RSPCA facility and Racecourse Rd to the north.

Site noise is generally characterised as continual general process noise (automated process machinery, conveyors, air emissions stacks and associated fans etc.), with some heavy vehicle traffic as well as a loader and fork lifts that operate intermittently. Traffic is predominantly limited to the day time and evening period with trucks only permitted between 7am and 10pm. Occasional sporadic impact noises were also observed.

The site is operational 24 hours a day, seven days a week however as stated there are limitations on truck deliveries to between 7am and 10pm.

# 2.0 Regulatory Conditions

The site is required to satisfy the conditions and noise limits outlined both in the Project Approval (09\_0006) and EPL (no. 11956). The requirements of these documents are outlined below.

#### 2.1 Project Approval Requirements

Project Approval reference 09\_0006 issued 19 January 2012 states the following in regard to Noise Limits:

26. The Proponent shall ensure that noise generated from the project does not exceed the noise limits presented in Table 5. 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.

Location	Day	Evening	Night	
	L <sub>Aeq</sub> (15 minutes)	L <sub>Aeq</sub> (15 minutes)	L <sub>Aeq</sub> (15 minutes)	L <sub>AMax</sub>
Kenvil Close	35	35	35	45
Wollombi Road	35	35	35	45

Table 5: Project Noise Limits dB(A)

#### 2.2 EPL Requirements

The noise limits defined in EPL 11956 are shown in **Table 1**, with the noise from the premises not to exceed these limits.

Table 1 EPL Noise limits

	Day (7am – 6pm)	Evening (6pm – 10pm)	Other Times (Night)
Noise Limit (dB(A))	41	39	35

Other EPL conditions relating to noise are:

- L5.2 Noise from the premises is to be measured at the most affected point on or within the receptor site boundary to determine compliance with this condition.
- L5.3 Noise from the premises shall not exceed the LA1 (1 minute) noise level of 45 dB(A) at the nearest residential receiver most affected by noise from activities at the premises. The noise limit applies 1 metre from the dwelling façade and shall apply during the night period only.
- L5.4 The noise emission limits specified above apply under all meteorological conditions except:
  - a) During rain and wind speeds greater than 3 m/s; and
  - b) From 6pm to 7am during intense inversions, which are indicated by cloud cover less than 40per cent and wind speeds less than 1.0 m/s.

With the exception of the LA1 monitoring location defined as the 'nearest residential receiver' in Condition L5.3, the EPL does not define monitoring locations. With the exception of the LA1 measurement required at the nearest residential receiver, the EPL monitoring locations (receptors) are assumed to be those outlined by the Project Approval. As the Project Approval stipulates either lower or equivalent L<sub>Aeq</sub> values to the EPL, the Project Approval noise limits have been applied as a conservative approach to assessing the noise impact of the facility on the receiver locations.

## 3.0 Methodology

The influence of extraneous noise, i.e. road and rail traffic as well as other community noise, makes it difficult to determine the noise contribution from the site in isolation, and therefore difficult to determine compliance with Approval and EPL limits.

Where direct measurement of noise contribution from an industrial facility is not possible due to persistent extraneous noise sources, the Environment Protection Authority's Noise Policy for Industry (NPfI) makes an allowance for assessment by other methods.

Section 7.1.1 Options for noise monitoring of the NPfl states:

#### Direct measurement at alternative or intermediate location/s

Where direct measurement of noise at a compliance location is not practical because of poor signal-to-noise ratios (that is, extraneous noise is louder than the noise under investigation), or where access to the location has been denied or is unavailable, measurements at intermediate locations between the source and the receiver location, where signal-to-noise ratios are higher, may be a viable option. For this approach to be effective there needs to be well-established theoretical and/or empirical relationships between the intermediate location and the receiver location in terms of noise exposure. Noise modelling may be one option to establish this relationship. The techniques under the above section 'Direct measurement at a receiver location' would also be relevant in terms of quantifying the level of noise from the source at the intermediate location(s). Where this technique is relied upon, it is the responsibility of the proponent to demonstrate a robust acoustic relationship between the compliance location and the intermediate location.

Section 7.1.1 goes on to discuss assessment through the use of computer noise modelling. It states:

"The use of intermediate means of model validation or calibration can be a useful technique"

Determining compliance by prediction from site boundary noise levels is therefore deemed to be appropriate in this instance.

#### 3.1 Boundary Noise Monitoring

Definitive compliance with Project Approval and EPL noise limits at the nominated receiver locations is difficult to determine through direct measurement due to the influence of extraneous noise sources during the day, evening and night periods. Therefore, in order to determine the noise contribution of the facility at the receiver locations, an alternative method of determining compliance, in accordance with the NPfl was considered appropriate. In this case site boundary measurements were used to predict noise impacts at each receiver location. Boundary noise monitoring was carried out at a single monitoring location on the eastern boundary of the NCIA site in order to predict the noise levels at the Project Approval and EPL monitoring locations in the absence of external noise sources.

#### 3.2 Instrumentation

Attended measurements were conducted using a Larson Davis SoundTrack LxT. This instrument has Class 1 characteristics as defined in AS IEC 61672.1-2004 "Electroacoustics - Sound Level Meters". Measurements were conducted over 15-minute intervals.

Calibration of the instrument was confirmed with a Larson Davis CAL150 Sound Level Calibrator prior to, and at the completion of monitoring with all calibration checks returning results within 0.1dB of the expected value. All equipment used for the monitoring has current calibration certificates (i.e. calibrated in the last year).

The sound level meter was set to 'fast' time weighting and programmed to store  $L_{10(15 \text{ min})}$ ,  $L_{Aeq(15 \text{ min})}$  and  $L_{A90(15 \text{ min})}$  noise levels during each measurement period.

#### 3.3 NSW Noise Policy for Industry

In reference to determining compliance with noise conditions, the Noise Policy for Industry (NPfI) notes that where noise levels are less than 2 dB above noise limit then the exceedance can be considered negligible.

# 4.0 Monitoring

#### 4.1 Attended Monitoring

Attended measurements were conducted by an AECOM technician during June 2021 at the monitoring locations listed in **Section 2.0** during daytime (0700 – 1800), evening (1800 – 2200) and night time (2200 - 0700) periods with measurements conducted at a height of 1.5m above ground level. Evening and night time measurements were conducted on 1 June while daytime measurements were performed on 24 June.

#### 4.1.1 Weather Conditions

Weather conditions at the time of the evening and night monitoring performed on 1 June 2021 were clear skies with calm to light winds (generally <1m/s). Winds for the Day period on 24 June were relatively calm with some high cloud present.

#### 4.1.2 Site Operations

On 1 and 24 June 2021 the NCIA facility was operating under normal conditions. Noise emission characteristics of the site are outlined in **Section 1.2**.

#### 4.2 Monitoring Locations

The two Project Approval monitoring locations are:

- Kenvil Close, Rutherford (assumed to be adjacent to 3 Kenvil Close)
- Wollombi Road, Farley (assumed to be in the clearing to the east of 256 Wollombi Rd).

While the EPL does not specifically define monitoring locations, it does require compliance at the nearest residential receiver for assessment of night time noise only. This location is deemed to be:

• 26 Fairway Street, Rutherford.

These monitoring locations are shown in Figure 1 along with the site boundary monitoring location.



Figure 1 Site and Receiver Monitoring Locations

Due to external noise sources often dominating at the EPL monitoring locations, attended noise measurements were also conducted at the site boundary during day, evening and night periods in order to quantify site noise emissions for the prediction of the noise level at each of the required receiver locations in the absence of extraneous noise.

## 5.0 Results

#### 5.1 Receiver Location Monitoring

Attended noise monitoring was conducted at the two Project Approval defined receiver locations during the day, evening and night time periods. The results in the form of the  $L_{Aeq (15min)}$  (the equivalent continuous sound level) and the  $L_{A90 (15min)}$  (the sound pressure level exceeded for 90% of the measurement period i.e. for 90% of the measurement period it was louder than the  $L_{A90 (15min)}$ ). Results from the attended noise monitoring carried out during June 2021 are presented in **Table 2**.

	Project Measured Noise				
Location	Date / Time	Approval L <sub>Aeq(15mins)</sub>	Level	, dB(A) L <sub>A90</sub>	Description of Noise Environment
		dB(A)	(15 min)	(15 min)	
		Da	ay (7:00 a	m – 18:00	pm)
Kenvil Pl	24/6/21 12:20	35	47	43	<ul> <li>Site inaudible</li> <li>Highway traffic and birds dominant</li> <li>Dog barking occasionally but minimal local residential noise</li> </ul>
Wollombi Rd	24/6/21 13:02	35	65	45	<ul> <li>Site inaudible</li> <li>Traffic on Wollombi Rd dominant</li> <li>Birds and trees rustling</li> </ul>
		Even	ing (18:0	0 pm – 22:	00 pm)
Kenvil Pl	1/6/21 20:35	35	45	44	<ul> <li>Unable to determine whether site audible</li> <li>Highway traffic dominant with minimal local traffic</li> <li>Trucks on the highway particularly audible.</li> <li>Some local residential noise</li> <li>Paused for passing trains and loud vehicles</li> </ul>
Wollombi Rd	1/6/21 21:40	35	41	39	<ul> <li>Some industrial noise audible, likely some site contribution</li> <li>Crickets at times but otherwise minimal local noise</li> <li>Paused for regular traffic on Wollombi Rd</li> <li>Paused for passing trains</li> </ul>
		Nig	pht (22:00	) pm – 7:00	) am)
Kenvil Pl	1/6/21 22:40	35	42	40	<ul> <li>Site barely audible</li> <li>Highway traffic the dominant source</li> <li>Some industrial noise from other sites on Racecourse Rd</li> <li>Very minimal local noise</li> <li>Paused for loud vehicles and passing trains</li> </ul>
Wollombi Rd	1/6/21 10:01	35	40	36	<ul> <li>Some industrial noise audible, likely some site contribution</li> <li>Crickets at times but otherwise minimal local noise</li> <li>Paused for regular traffic on Wollombi Rd</li> <li>Paused for passing trains</li> </ul>

#### Table 2 June 2021 Attended Noise Monitoring Results Summary

Bold values indicate measured noise level above Project Approval criteria

The results in **Table 2** show that the measured  $L_{Aeq(15 min)}$  noise levels at both the Kenvil Place and Wollombi Rd monitoring locations are above the 35 dB(A) Project Approval limit for each of the three time periods.

In most cases traffic was noted to be the dominant noise source with the site noted to be inaudible during the day, potentially audible in the evening and barely audible at night.

In order to determine the noise contribution from the facility alone at the receiver locations, an alternative method of determining compliance, in accordance with the NPfI was considered appropriate. In this case site boundary measurements were used to predict noise impacts for each receiver location.

#### 5.2 Site Boundary Monitoring

Boundary noise measurements were conducted during the day, evening and night time periods at a single location considered to be representative on the eastern boundary of the site. Results from the site boundary monitoring carried out during June 2021 are presented in **Table 3**, with the calculated predicted receiver results provided in **Section 5.3**.

Location	Time		L <sub>Aeq(15 min)</sub> a	Noise Level, and L <sub>A90(15 min)</sub> B(A)	Site Operation	
			L <sub>Aeq(15 min)</sub>	L <sub>A90(15 min)</sub>		
	Day	24/6/21 10:59	51.1	50.2	<ul> <li>Site dominant with majority of noise generated by continuous processes.</li> <li>Highway traffic occasionally audible</li> <li>Birds</li> <li>Minimal extraneous noise</li> </ul>	
Boundary	Evening	1/6/21 19:24	52.8	52.1	<ul> <li>Plant noise dominant and very constant</li> <li>Dogs occasionally barking at nearby RSPCA facility</li> <li>Paused for passing trains and planes</li> </ul>	
	Night	1/6/21 23:13	52.6	51.9	<ul> <li>Plant noise dominant</li> <li>Very little other noise</li> <li>Paused for passing trains</li> </ul>	

Table 3 June 2021 – Site Boundary Measurement Results

The results of the site boundary measurements demonstrate there is very little extraneous noise present at this location with the  $L_{A90}$  results relatively close to the  $LA_{eq}$  results for all three time periods. The  $LA_{90}$  represents the lowest 10% of the noise measured.

#### 5.3 Predicted Noise Levels

In order to predict resultant noise levels at each receiver from the NCIA facility alone, a 'flat ground' model was used based on hemispherical spreading, conservatively assuming no topographical shielding, ground or air absorption, directivity or meteorological effects. Calculated noise levels at each receiver location are presented in **Table 4**.

Table 4 June 2021 – Calculated Noise Levels at the Receiver Locations

Receiver Location	Time	Calculated noise impact, dB(A)	Project Approval Limit, dB(A)	Comply
	Day	35	35	Yes
Kenvil Place	Evening	37	35	Yes*
	Night	37	35	Yes*
	Day	33	35	Yes
Wollombi Road	Evening	35	35	Yes
	Night	34	35	Yes

\* Calculated noise level within 2dB of statutory noise limit and considered negligible as per the NPfI

Calculated results show that with the exception of the Kenvil Place evening and night results, all predicted results are either below of equivalent to the 35dB Project Approval limit at both receiver locations.

A result within 2dB of the criteria was calculated at the Kenvil Place receiver for the evening and night time periods with a 2dB exceedance considered negligible by the NPfI. The calculation also assumes a flat ground model with direct line of site between the source and receiver. In this case the site is not visible from Kenvil Place, with a significant amount of infrastructure between the site and this location as well as a line of trees at the site boundary. It was unable to be determined if the site was audible during the evening period, while the site was noted to be barely audible during the night time measurements. As a result it is likely that the site contribution at this location was compliant with the 35dB limit.

#### 5.4 Assessment Against Short-Term Night Time Criteria

Both the Project Approval and EPL state that a 45dB short term limit applies during the night time period (10pm – 7am). The Project Approval stipulates the  $L_{AMax}$  must not exceed 45 dB at the two receiver locations (Kenvil Place and Wollombi Road) while the EPL stipulates that the  $L_{A1}$  must not exceed 45 dB at the nearest residential receiver most affected by noise from activities at the premises (deemed to be 26 Fairway Street).

L<sub>AMax</sub> measurements performed at the Project Approval locations were elevated due to localised noise sources and are not representative of the site contribution. While a L<sub>A1</sub> measurement was not directly obtained at 26 Fairway Street, the L<sub>AMax</sub> measured at this location was 47 dB, The L<sub>Amax</sub> reading is a shorter time period than the L<sub>A1</sub> and provides a conservative assessment of short term noise potentially impacting sleep. An exceedance within 2 dB of the criteria is considered negligible under the NPfI and it is likely that an L<sub>A1</sub> result if available would be compliant. For reference the L<sub>A10</sub> result of 44dB at this location is below the 45dB L<sub>A1</sub> criteria.

Due to the proximity of the Fairway Street location to the site (357m) and the significant distance between the two Project Approval locations and the site (1050m and 1350m), a compliant result at Fairway Street implies the  $L_{AMax}$  is also compliant at both the Kenvil Place and Wollombi Road locations.

# 6.0 Conclusion

Attended noise compliance monitoring at designated NCIA Project Approval and EPL noise receivers was conducted on 1 and 24 June 2021.

Site noise from NCIA was inaudible at both Kenvil PI and Wollombi Rd during the day period, potentially audible in the evening and barely audible at night. L<sub>Aeq(15 min)</sub> levels measured at the receiver locations were largely influenced by extraneous noise sources such as road and rail traffic and other ambient sources (e.g. birds, crickets) at both locations. Extraneous noise sources present at the defined Project Approval locations means in-situ assessment of the site contribution at the receiver locations is not possible.

Due to the difficulty in determining the contribution of the facility at the nominated receiver locations, an alternative method of determining compliance, in accordance with the NPfI, was considered appropriate. In this case site boundary measurements were used to calculate noise impacts at each receiver location.

As shown in **Table 4**, calculated noise levels demonstrate compliance with the Project Approval noise limits at the Wollombi Rd location for all three time periods. A compliant result was calculated for the day period at Kenvil Place, while a result within 2 dB of the limit was calculated at Kenvil Place for the evening and night periods and these are considered compliant under the NPfI. As discussed in **Section 5.3** it is likely that structures and vegetation between the site and monitoring location not accounted for in the calculation mean a result compliant with the 35 dB limit is considered probable at this location.

An assessment of the short term night time noise impacts as a result of the site found the EPL receptor at 26 Fairway Street was compliant, with the Project Approval monitoring locations significantly further from the site also deemed to be compliant.

# Appendix A

# Glossary of Acoustic Terms

# Appendix A Glossary of Acoustic Terms

The following is a brief description of acoustic terminology used in this report:

Sound power level	The total sound emitted by a source		
Sound pressure level	The amount of sound at a specified point		
Decibel [dB]	The measureme	ent unit of sound	
A Weighted decibels [dB(A])	The A weighting is a frequency filter applied to measured not levels to represent how humans hear sounds. The A-weight filter emphasises frequencies in the speech range (between and 4 kHz) which the human ear is most sensitive to, and pla less emphasis on low frequencies at which the human ear is sensitive. When an overall sound level is A-weighted it is expressed in units of dB (A).		
	The decibel scale is logarithmic in order to produce a better representation of the response of the human ear. A 3 dB increase in the sound pressure level corresponds to a doubling in the sound energy. A 10 dB increase in the sound pressure level corresponds to a perceived doubling in volume. Examples of decibel levels of common sounds are as follows:		
	0dB(A)	Threshold of human hearing	
	30dB(A)	A quiet country park	
Decibel scale	40dB(A)	Whisper in a library	
Decider scale	50dB(A)	Open office space	
	70dB(A)	Inside a car on a freeway	
	80dB(A)	Outboard motor	
	90dB(A)	Heavy truck pass-by	
	100dB(A)	Jackhammer/Subway train	
	110 dB(A)	Rock Concert	
	115dB(A)	Limit of sound permitted in industry	
	120dB(A)	747 take off at 250 metres	
Frequency [f]	The repetition rate of the cycle measured in Hertz (Hz). The frequency corresponds to the pitch of the sound. A high frequency corresponds to a high pitched sound and a low frequency to a low pitched sound.		
Equivalent continuous sound level [L <sub>Aeq</sub> ]	The constant sound level which, when occurring over the same period of time, would result in the receiver experiencing the same amount of sound energy.		
L <sub>max</sub>	The maximum sound pressure level measured over the measurement period		
L <sub>min</sub>	The minimum sound pressure level measured over the measurement period		
L <sub>10</sub>	The sound pressure level exceeded for 10% of the measurement period. For 10% of the measurement period it was louder than the $L_{10}$ .		

LA90(15 min)	The sound pressure level exceeded for 90% of the measurement period. For 90% of the measurement period it was louder than the $L_{A90 (15 \text{ min})}$ .
Ambient noise	The all-encompassing noise at a point composed of sound from all sources near and far.
Background noise	The underlying level of noise present in the ambient noise when extraneous noise (such as transient traffic and dogs barking) is removed. The $L_{A90 (15 \text{ min})}$ sound pressure level is used to quantify background noise.
Traffic noise	The total noise resulting from road traffic. The $L_{eq}$ sound pressure level is used to quantify traffic noise.
Day	The period from 0700 to 1800 h Monday to Saturday and 0800 to 1800 h Sundays and Public Holidays.
Evening	The period from 1800 to 2200 h Monday to Sunday and Public Holidays.
Night	The period from 2200 to 0700 h Monday to Saturday and 2200 to 0800 h Sundays and Public Holidays.
Assessment background level [ABL]	The overall background level for each day, evening and night period for <b>each day</b> of the noise monitoring.
Rating background level [RBL]	The overall background level for each day, evening and night period for the <b>entire length</b> of noise monitoring.

\*Definitions of a number of terms have been adapted from Australian Standard AS1633:1985 *"Acoustics – Glossary of terms and related symbols"*, the EPA's NSW Industrial Noise Policy and the EPA's NSW Road Noise Policy.