Boral Cement Limited

Berrima Cement Works

Annual Environmental Management Review

Development Consents Addressed:	Development Consent No. 401-11-2002-i (Kiln 6) Development Consent No. 85-4-2005-i (Mill 7)
Review Period:	1 May 2020 - 30 April 2021
Approved By:	Environmental Manager - Cement

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1 ANNUAL REVIEW INFORMATION

Table 1 AEMR authorisation

Name of operation	Berrima Cement Works
Name of operator	Boral Cement Limited
Development consent no.	Development Consent No. 401-11-2002-i (Kiln 6) Development Consent No. 85-4-2005-i (Mill 7)
Name of holder of development consents	Boral Cement Limited
AEMR start date	1 May 2020
AEMR end date	30 April 2021

I, Greg Johnson, certify that this audit report is a true and accurate record of the compliance status of the Berrima Cement Works for the period 1 May 2020 to 30 April 2021 and that I am authorised to make this statement on behalf of Boral Cement Limited.

Note.

a) *The AEMR 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 of $22,000, or both).*

Name of authorised reporting officer	Greg Johnson
Title of authorising reporting officer	Environmental Sustainability Manager, Boral Cement
Signature of authorised reporting officer	
Date: 24 June 2021	

2 STATEMENT OF COMPLIANCE

This annual environmental management review (AEMR) summarises compliance with the following development consents applicable to the Berrima Cement Works (the Works):

- Development Consent No. DA 401-11-2002-i - approved in 2003 to upgrade and increase the capacity of Kiln 6 at the Works; and
- Development Consent No. DA 85-4-2005-i - approved in 2005 for the establishment and operation of a new cement mill (Mill 7).

It has been prepared in accordance with the *Post-approval requirements for State significant mining developments Annual Review Guideline* (NSW Government 2015) (the Guideline).

The compliance status of the Works is shown in Table 2.

Table 2: Statement of compliance

Were all conditions of the relevant development consents complied with?	
Development Consent No. No. 401-11-2002-i (Kiln 6)	No
Development Consent No. No. 85-4-2005-i (Mill 7)	YES

Table 3 summarises non-compliances with the development consents, based on the key in Table 4.

Table 3 Non-compliances

Relevant approval	Condition	Condition summary	Compliance status	Comment	Where addressed in AEMR?
Air Quality Discharge	1.6	The applicant shall ensure that all necessary licences, permits & approvals are obtained & kept up to date throughout the life of the cement works. No condition of this consent removes the obligation for the Applicant to obtain, renew or comply with such licences….	Low	1 relating to one gravimetric dust sample not collected in August due to bottle breakage	Section 7 Incidents and Non-compliances

Table 4 Compliance status key for Table 3

Risk level	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: ● 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: ● potential for moderate environmental consequences, but is unlikely to occur; or ● potential for low environmental consequences, but is likely to occur.
Administrative non-compliance	Non-compliant	Only to be applied where the non-compliance does not result in any risk of environmental harm (eg submitting a report to government later than required under approval conditions).

3 INTRODUCTION

3.1 Overview

Boral Cement Limited (Boral Cement) operates the Works off Taylor Road, New Berrima, in the Wingecarribee Local Government Area (LGA) (Figure 1). The Works was built in 1929 and has operated continuously ever since predominantly on the basis of continuing use rights and two development consents issued under the NSW Environmental Planning and Assessment Act 1979 (EP&A Act).

The Works produces cement products (cement and clinker) for sale in NSW, the ACT and for export. The Works has approval to produce up to 1.56 million tonnes per annum (tpa) of cement products which has historically represented approximately 60% of cement sold for building and construction in NSW. Cement products are transported to domestic customers (both internal to Boral companies or external), by train and truck and international customers through Port Kembla. Clinker is also transported to Boral Cement's Maldon Cement Works by rail which also produces cement products, including premixed dry concrete.

The Works operates 24 hours per day, 365, six days per year, including various maintenance periods.

Operational infrastructure includes one kiln (Kiln 6) and two cement mills (Mill 6 and 7), and storage and stockpiling facilities.

The main raw material inputs to the production of cement and clinker are limestone, sourced from Boral Cement's Marulan South Limestone Mine (transported via rail), and shale, sourced both on site at a shale quarry or from off-site, steel slag from BlueScope Steel in Port Kembla and granulated blast furnace slag from Japan.

The limestone, shale and slag are blended together, ground into a fine powder (also known as a meal) and fused at a very high temperatures (up to 1,500 degrees Celsius (˚C)) in the kiln (Kiln 6). The fused material is called clinker.

Clinker is either stored ready for reclamation or distribution to customers by road and rail transport, or is mixed with gypsum into one of two cement mills (Mill 6 and 7), where it is crushed to produce cement. It is then fed into cement silos from where it is despatched by either road tanker or rail tanker/wagon for delivery to Boral Cement's customers (internal Boral customers or external).

Refer to the process flow diagrams in Figure 2 and Figure 3.

Cement manufacture is an energy intensive process due to the high temperatures required for the production of clinker. Up to 225,000 tonnes per year of coal is generally used to heat the kiln. Up until 2013 coal was sourced from the nearby Medway Colliery (also known as the Berrima Colliery) but since the colliery's closure, coal has been sourced from mines in the Illawarra area. As outlined in the table below the Works has approval to use standard fuels such as natural gas, fuel oil, diesel and coke fines to heat the kiln along with a number of non-standard fuels.

Fuel	Category	Tonnes Per Annum
Natural Gas, Fuel Oil, Diesel	Standard Fuel	No Limit
Coal	Standard Fuel	No Limit
Coke Fines	Standard Fuel	No Limit
HiCal50	Non-Standard Fuel	10,000
AKF1	Non-Standard Fuel	20,000

AKF5	Non-Standard Fuel	30,000	≤ 100,000 combined
Wood Waste	Non-Standard Fuel	50,000	
RDF	Non-Standard Fuel	80,000	
Woodchip	Standard Fuel	50,000	

SWDFs used include wood waste and refuse derived fuel (RDF) which are combustible materials recovered and processed from waste streams, such as papers, cardboards, packaging, and construction and demolition materials.

Primarily the fuel mix is made up of coal, diesel (kiln start-up), a small amount of AKF1 (carbon anode) and SWDFs. The business will be progressively increasing its use of SWDFs to lower its reliance on coal and to reduce the embodied carbon in its cementitious products.

Commencing in August 2018 the Works commenced the use of SWDFs, with a Proof of Performance Trial undertaken as required as per the consent. The PoPT six monthly report was approved by both the EPA and the Secretary on 23/04/2019 which permitted the continued use of SWDFs upto 40% of total fuel.

The Works supports a direct workforce of 130 employees, a further 20 in engineering and procurement, as well as many indirect jobs in the region through logistics, contractors and suppliers.

The Works is located on a 149 hectare (ha) site immediately south of the village of New Berrima and approximately 2.5 km east of the Hume Highway. The village of New Berrima was initially developed by Boral Cement's predecessors to provide housing for employees of the Works.

The Works is the most physically dominating feature of the New Berrima area, being roughly equivalent in size to the adjacent village, with the tallest structure on the site being a pre-heater tower, which is approximately 85 m high. The closest residential dwellings in the village of New Berrima are approximately 650 m north of Kiln 6.

The site is zoned IN3 Heavy Industrial in the Wingecarribee Local Environmental Plan 2010.

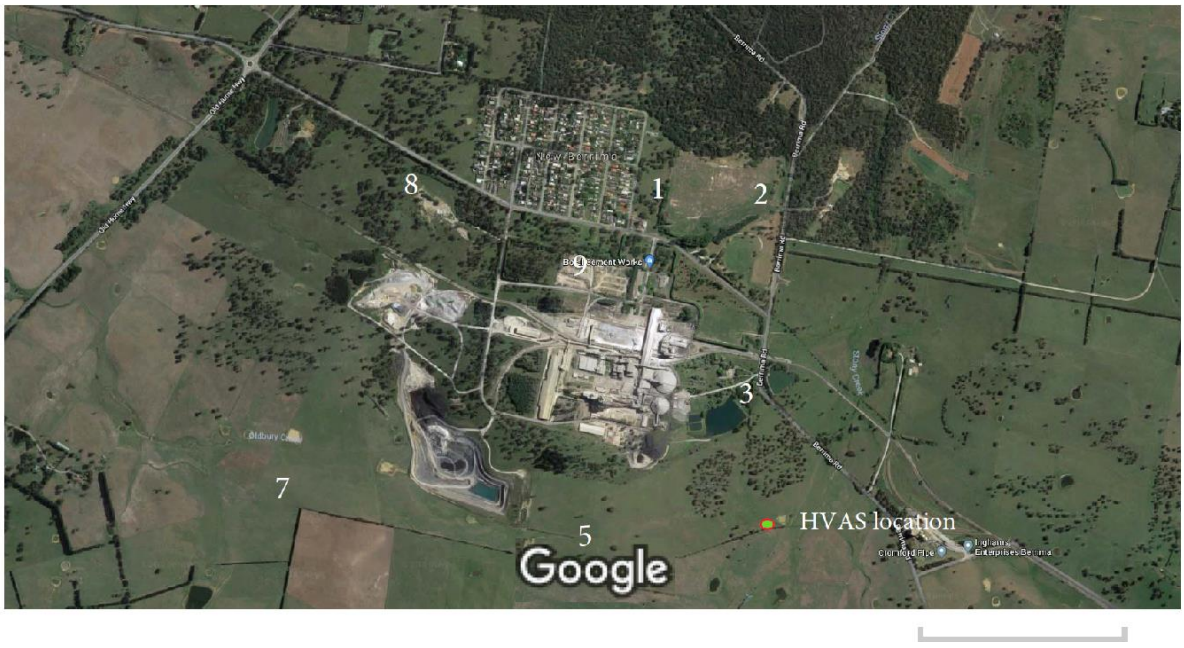


Figure 1 Location and monitoring points

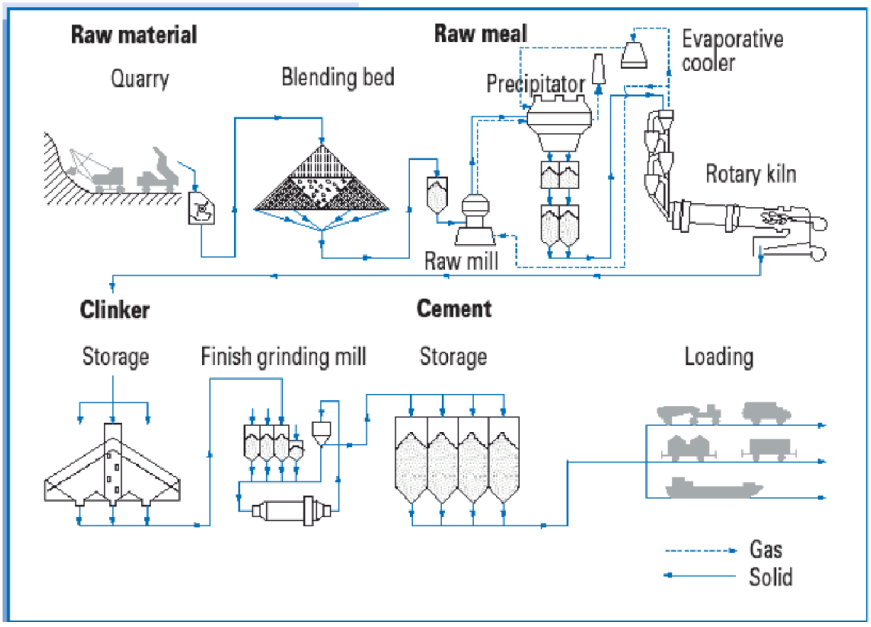
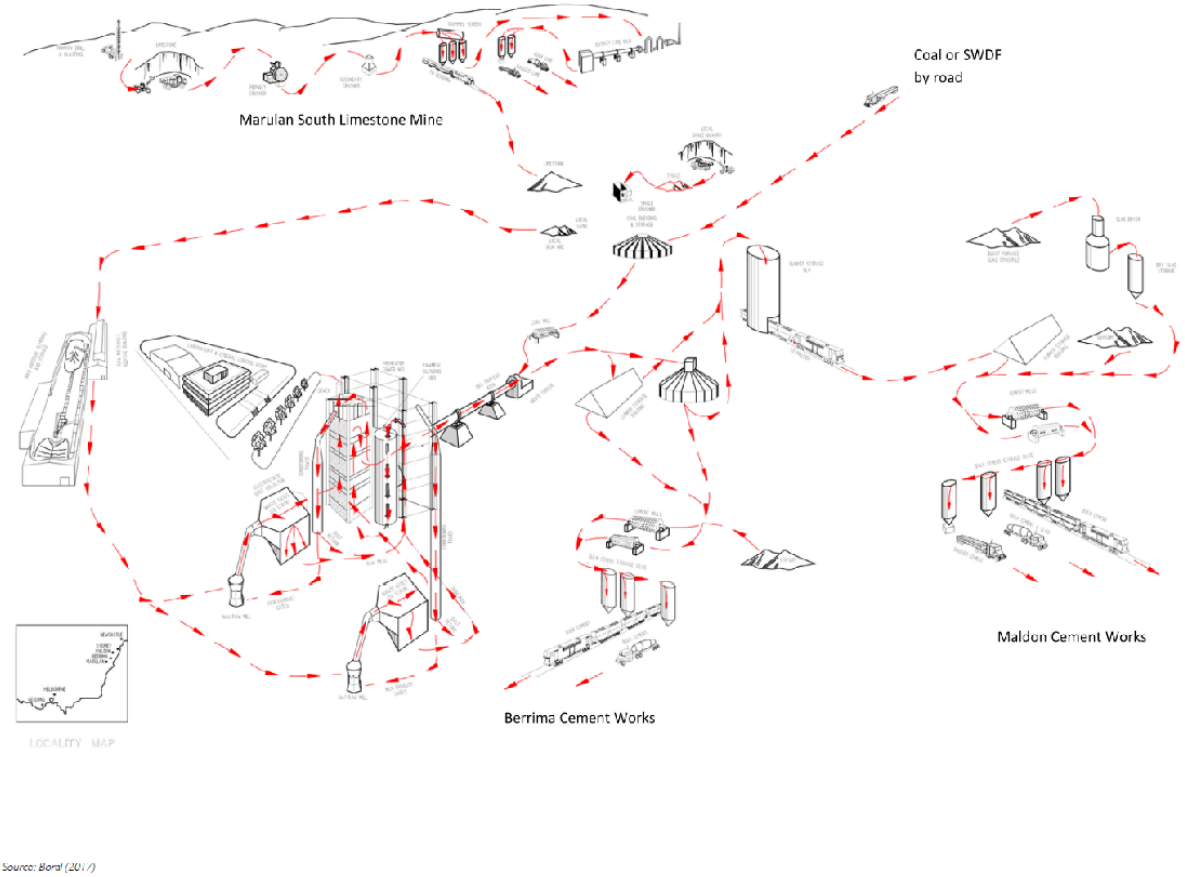


Figure 2 Process flow diagram



Source: Boral (2017)

Figure 3 Process flow diagram incorporating receipt of materials and dispatch of products

3.2 Key personnel

Details of key personnel who are responsible for environmental management at the Works are provided in Table 5.

Table 5 Key personnel responsible for environmental management

Name	Role	Phone number	Email address
Dean Beltrame	Operations Manager (NSW) Boral Cement	(02) 4860 2222	dean.beltrame@boral.com.au
Greg Johnson	Environment and Sustainability Manager - Boral Cement	0401 893 420	greg.johnson@boral.com.au

3.3 Approvals

The Works operates under a combination of continuing use rights and two development consents under the EP&A Act. It also operates under an environment protection licence (EPL) issued under the NSW *Protection of the Environment Operations Act 1997* (POEO Act).

Water used at the Works is drawn from the Wingecarribee River which is regulated by five mining purpose leases (MPLs) issued under the NSW *Mining Act 1906*. In addition, one MPL regulates the provision of power to the Works.

Shale used at the Works is extracted from a quarry on the site which is regulated under a mining lease (ML) issued under the NSW *Mining Act 1992*.

3.3.1Consents

The Works operates under a combination of continuing use rights and the following two development consents approved by the NSW Minister for Planning:

- Development Consent No. DA 401-11-2002-i - approved in 2003 to upgrade and increase the capacity of Kiln 6 at the Works; and
- Development Consent No. DA 85-4-2005-i - approved in 2005 for the establishment and operation of a new cement mill (Mill 7).

Continuing existing use rights are available to the Works given it commenced operations in 1929, before any planning approvals were required.

The development consent for Mill 7 has never been modified.

Subsequent modifications to the development consent for Kiln 6, approved by delegates of the NSW Minister for Planning, have allowed the trialling and use of certain non-standard fuels, the use of alternative 'low cost' raw materials in the manufacture of clinker (such as granulated blast furnace slag), the use of rail for coal deliveries, and the stockpiling of coal on the site. Table 6 outlines the various modifications to the development consent.

Table 6 Approvals for Kiln 6

Application	Description	Date approved
DA 401-11-2002-i	Upgrade of Kiln 6 to allow for burning of non-standard fuels, installation of continuous monitoring equipment, increase in Kiln 6 output, upgrade of coal mill capacity and intermittent use of Kiln 5.	12 May 2003
MOD 1	Use of non-standard fuels, including used tyres, liquid oil residues and spent aluminium electrode carbon.	26 September 2005
MOD 2	Removal of prohibition on the acceptance of materials classified as hazardous waste under the EPA's waste guidelines.	22 September 2006
MOD 3	Small scale trial use of tyre chips over a six month period.	13 February 2007
MOD 4	Increase in usage of coal fines from 1.5 tonnes per hour (tph) to 10 tph.	8 May 2008
MOD 5	Approval to use rail for coal deliveries.	31 August 2009
~~MOD 6~~	~~Stockpiling of coal from Berrima Colliery for sale and transport to Port Kembla.~~ Note: As part of MOD 9, conditions relating to MOD 6 (the stockpiling of coal from Berrima Colliery for sale and transport to Port Kembla) were deleted.	~~20 June 2012~~
MOD 7	Trial and use of granulated blast furnace slag as a raw material additive, not exceeding 150,000 tpa.	16 April 2012
MOD 8	Administrative changes to align consent and EPL conditions.	5 August 2012
MOD 9	The use of up to 100,000 tpa of SWDF as a non-standard fuel for Kiln 6, including the construction of a fuel storage and kiln feeding system, and the deletion of conditions relating to MOD 6.	5 October 2016
MOD 10	SWDF Fuel storage shed extension	11 April 2019
MOD 11	Use of HiCal 50 during start-up conditions	25 October 2019
MOD 12	Isotainer handling and whole of site noise limit.	7 April 2020
MOD 13	Chloride Bypass System and approval to consume wood chips sourced from fire impacted plantation forestry operations as a standard fuel.	31 May 2021

3.3.2Licenses

The Works operates under EPL 1968 issued by the EPA which has been subject to numerous variations. The EPL permits the following scheduled activities listed in Schedule 1 of the POEO Act:

- cement or lime works;
- extractive activities; and
- resource recovery.

On 18 December 2019, the EPL was amended to reflect the outcome of the Proof of Performance Trials to limit SWDF to 40% until further performance testing is undertaken at a higher rate. The amendment also included changes from MOD 11 which permitted HiCal 50 during start up conditions and to finalise the whole of site noise PRP and setting a single whole of site noise limit.

This whole of site noise limit was then used to amend the consent noise limit during the MOD 12 assessment process.

The Works also operates under a ML and six MPLs as summarised in Table 7.

Table 7 Mining leases

Mining title	Purpose	Expiry date
ML 1723	Extraction of blue shale from the quarry and rehabilitation of previously disturbed land.	18 December 2036
MPL 559	Water supply access.	20 September 2028
MPL 592	Water supply access.	20 September 2028
MPL 622	Water supply access.	20 September 2028
MPL 623	Water supply access.	20 September 2028
MPL 628	Power supply.	20 September 2028
MPL 654	Water supply access.	20 September 2028

The Annual Mining Lease Review for these licences is due annually for the previous Calendar year at the end of February. The 2019 report was submitted to the Resources Regulator in February 2021, RR reference MAAG0010117.

3.4 Operations summary

Table 8 provides a summary of production at the Works for the 2020/21 reporting period (May 2020 and April 2021) compared to the previous 3 reporting periods.

Table 8 Production summary

Material	Approval limit	16/17 FY	17/18 FY	18/19 Reporting Period	19/20 Reporting Period	20/21 Reporting Period
Limestone used	Nil	1,918,289 t	1,873,921	2,008,50	1,803,196	1,803,564
Shale used	Nil	308,199 t	278,720	201,990	142,586	145,521
Slag used	Nil	123,128 t	71,676	113,510	129,640	
Other Raw Materials					153,150	
Gypsum used	Nil	76,864 t	82,901	81,250	70,276	
Coal used	Nil	222,586 t	225,891	208,610	184,446	176,070
SWDFs used	100,000 t	Nil	Nil	21,870	28,997	34,767
Clinker production	1,560,000 t	1,484,700 t	1,470,989	1,443,830	1,314,466	1,292,278
Cement production	1,560,000 t	1,185,461 t	1,264,081	1,209,500	1,104,195	1,043,993

Coal is predominantly used as a fuel for the kiln at the Works. However, small amounts of diesel are used during kiln start-ups.

The Works is approved to produce up to 1.56 Mtpa of cement products. In the 2020/21 reporting period the Works produced 1,292,278 tonnes of clinker. Of this clinker, 1,043,993 tonnes of cement was produced on site. Clinker is also sent to Maldon and other customers.

Boral continued the use of SWDFs during the 2020/21. A total of 34,767t of SWDF was consumed during the reporting period, an increase of 5770t on 2019/10 reporting period.

3.5 Environmental management

The Guideline requires that AEMRs focus on the environmental outcomes of a reporting period that are intended by the relevant approval. As such, this AEMR addresses the outcomes of the relevant conditions of the development consents rather than focus on management plans and monitoring data. Notwithstanding this, addressing environmental outcomes is a result of analysing monitoring data, and this has been undertaken in this AMER, particularly for key environmental areas at the Works, including air quality and noise.

Berrima Cement Works – Operational Environmental Management Plan (Boral 2018) (OEMP) and subordinate plans received their three yearly review and were revised in accordance with conditions 6.3A and 6.4A of DA 401-11-2002-i. The OEMP was submitted to DPE for approval on 5 April 2018, and received approval in a letter dated 21 May 2018.

Boral undertook a review of the OEMP, and the sites Air Quality Management Plan & Noise Management Plan in April 2020 to reflect the recent Mod 11 and 12 to the consent and changes to the EPL completed by the EPA on 18 December 2019. These were submitted to the Department on 5 June 2020 and approved on the 29 June 2020. A copy of the updated OEMP is available on the Boral Berrima Cement website along with the approval letter from the Department of Planning, Industry and the Environment.

https://www.boral.com.au/locations/boral-cement-works-berrima

4 ACTIONS REQUIRED FROM PREVIOUS AEMR

The 2020 AEMR was submitted to the DPIE on 24 June 2020 with the DPIE completing their assessment on 13 July 2021. The Department considered that the Annual Report generally satisfied Conditions 7.3 and 6.3 of the approvals.

Note: The approval of the Annual Report by the Department is not an endorsement of the compliance status of the project.

Table 9 DPIE requested actions from previous AEMR

Action required from previous AEMRs	Action taken	Where discussed in AEMR
Nil	-	-

5 ENVIRONMENTAL PERFORMANCE

5.1 Overview

This section reports performance against the environmental performance conditions in Development Consent No. 401-11-2002-i (Kiln 6) and Development Consent No. 85-4-2005-i (Mill 7). It is divided into sections based on the environmental matters in the consents and comprises a conditions table and Boral's reporting against the conditions.

5.2 Noise

The consent requirements for noise for Kiln 6 are in conditions 3.1 to 3.3 of Development Consent No. 401-11-2002-i and for Mill 7 in conditions 2.1 to 2.6 of Development Consent No. 85-4-2005-i, which are replicated in Table 10. Noise was monitored and reported against the Kiln 6 and Mill 7 contribution criteria in October 2020 (see Appendix A – *Berrima Cement Plant – Annual Environmental Noise Assessment 18 December 2020* (Recognition Research 2020)), with performance described in Table 11.

Boral manages noise on site in accordance with the *Berrima Cement Works – Noise Management Plan* (Boral 2018, updated April 2020), which describes the monitoring points, frequency and criteria.

The Executive Summary of the Annual Noise Assessment noted the following:

The Boral Cement Berrima works has a single noise limit condition for the total site, of $L_{A90,15\text{-}minute}$ not greater than 58 dBA at Location 20 in the Store Yard. This replaced former conditions for major projects Kiln 6 Upgrade and Cement Mill No. 7 only. Monitoring for total site emissions at Location 20 over a 17 day period in October 2020 has confirmed that total site emissions are in compliance with the licence condition. Times when that sound level limit was exceeded at the site were caused by weather conditions and extraneous sources not relevant to the compliance assessment.

Sound levels at the plant and in the residential community affected by the noise emissions from the total site have been measured regularly since 2002 and since the completion of each of these projects. Monitoring of both site source sound levels and residential receiver sound levels on an annual basis since 2008 confirmed that both of the projects were in compliance with their noise limit conditions at the time.

The annual environmental noise assessment evaluates noise emission from the Cement Plant by the following methods:

• Monitoring of sound levels at Location 20 for compliance assessment;

• comparative measurements at the same locations around major plant sources of noise which have been assessed previously as in compliance with the limit conditions;

• calculation of the contribution sound levels at residential receiver locations from those source emission locations which are higher than in the past and comparison with a contribution objective;

• monitoring of sound levels in one residential receiver location with unattended monitoring over long-term periods of two weeks and attended monitoring in day, evening and night-time at four residential receiver locations to compare with long-term averages from previous years and assess the audible acceptability of the received sound levels.

The finding of this 2020 annual environmental noise assessment is that total site noise emissions are considered to be in compliance with the licence condition.

Sound levels from the two projects are also considered to be in compliance with their noise objectives at the nearest residential receiver locations.

It is also the finding of this assessment that the long-term average statistical sound levels have not increased and indicate that the Cement Plant is not increasing its emissions.

Source	Sound Power Level – dB(A)	Sound Pressure Level dB(A)		
		Objective	Measured 2005	Measured 2019
Coal Mill and Clinker cooler fans	117	100 @ 3m	93 @ 2m	Coal mill wall vent 88 @ 1m, Courtyard cooler fans 87 to 99 @ 1m
New Radicon Cooler	103	92 @ 1m	81 @ 1m West 80 @ 2m East	82 to 86 @ 1m Area Average 85 @ 1m E side 77 @ 2.4m E
New Pre-heater fan FA249	97	89 @ 1m	77 @ 2m	81 to 84 @ 1m
New Baghouse fan FA250	102	94 @ 1m	82 @ 2m	82 to 86 @ 1m
Raw Mill 7 Building	117	100 @ 3m	Vents 83 to 86 @ 1m	Vents 78 to 83 @ 1m Roof 81 to 90 @1m

Figure 4 Kiln 6 – Plant Items and Objective Sound Power Levels and Sound Pressure Levels required to achieve compliance with objective sound levels

Receiver	Source	Predicted sound level – dB(A)		
	Weather Condition	Wind 0 m/s Lapse 0°C/100m	Wind 3 m/s Lapse 0°C/100m	Wind 2 m/s Lapse 3°C/100m
Adelaide Street	Mill Room northern wall	23	29	29
	BE Tower northern wall	22	25	26
	Compressor room vents	15	20	21
	Total	**26**	**31**	**31**
Argyle Street	Western wall Mill room	17	28	28
	Western Roll door Mill room	14	25	26
	Western Wall vents I & J	13	19	20
	Western Wall BE Tower	10	17	17
	Western Roll door compressor room	9	16	16
	Total	**21**	**30**	**31**

Figure 5 Cement Mill 7 predicted contribution levels at receivers for 2007 sound levels

Table 10: Noise conditions

Number	Condition
K3.1 Noise	Construction activities associated with the cement works upgrade shall only be carried out: a) between 7:00 am and 6:00 pm, Monday to Friday inclusive, during periods in which the cement works is shut-down, and construction noise is audible at the boundary of the site; b) between 7:00 am and 1:00 pm on Saturdays, during periods in which the cement works is shut-down, and construction noise is audible at the boundary of the site; c) at no time on Sundays or public holidays, during periods when the cement works is shutdown, and construction noise is audible at the boundary of the site; d) at any time during periods in which the cement works is in operation; and e) at any time if construction noise is inaudible at the boundary of the site.
K3.1A	The Development shall be constructed with the aim of achieving the construction noise management levels detailed in the Interim Construction Noise Guideline (Department of Environment and Climate Change, 2009). All feasible and reasonable noise mitigation measures shall be implemented and any activities that could exceed the construction noise management levels shall be identified and managed in accordance with the CEMP. Note: The Interim Construction Noise Guideline identifies 'particularly annoying' activities that require the addition of 5dB(A) to the predicted level before comparing to the construction NML
K3.1B	Where Feasible and Reasonable, operation noise mitigation measures shall be implemented at the start of Construction (or at other times during construction) to minimise construction noise impacts.
M2.1 Noise Impacts	Construction activities associated with the cement works upgrade shall only be carried out: a) between 7:00 am and 6:00 pm, Monday to Friday inclusive, during periods in which the cement works is shut-down, and construction noise is audible at the boundary of the site; b) between 7:00 am and 1:00 pm on Saturdays, during periods in which the cement works is shut-down, and construction noise is audible at the boundary of the site; c) at no time on Sundays or public holidays, during periods when the cement works is shut-down, and construction noise is audible at the boundary of the site; d) at any time during periods in which the cement works is in operation; and e) at any time if construction noise is inaudible at the boundary of the site.
K3.2 Operational Noise	Subject to compliance with the requirements of this consent, the cement works upgrade may be operated 24 hours per day, 7 days per week.

K3.3

Noise generated at the site must not exceed the noise limits at the times and location specified in Table 2 below.

Former Limits

Table 2 – Maximum Allowable Noise Contribution Limit (dB(A))

Receiver Location	Day[a] $L_{Aeq(15\ minute)}$	Evening[b] $L_{Aeq(15\ minute)}$	Night[c] $L_{Aeq(15\ minute)}$
4 Melbourne Street	37	37	37
Chelsey Park Farm	30	30	30
Candowie Farm	37	37	37

New Limits (MOD 12) 7 April 2020

Table 2 – Maximum Allowable Noise Limit (dB(A))

Location	Day[a] $L_{A90(15\ minute)}$	Evening[b] $L_{A90(15\ minute)}$	Night[c] $L_{A90(15\ minute)}$
The Noise Compliance Point (Point 20) – Store Yard Close	58	58	58

a. Day is defined as the period from 7:00am to 6:00pm Monday to Saturday and 8:00am to 6:00pm on Sundays and public holidays.

b. Evening is defined as the period from 6:00pm to 10:00pm.

c. Night is defined as the period from 10:00pm to 7:00am Monday to Saturday and 10:00pm to 8:00am on Sundays and public holidays.

Note: Noise contributions specified in Table 2 are to be interpreted as contributions from the new and upgraded components forming part of cement works upgrade only and not as noise limits for the site as a whole. (Footnote: 2 Incorporates EPA General Terms of Approval (L6.1 and L6.2)

K3.3A	Any new or upgrade development projects the subject of any modification to this consent must give consideration to the Project Specific Noise Levels identified in the document titled 'PRP-7 Response – Identifying Environmental Noise Objectives For Berrima Cement Plant' dated 27 March 2018, prepared by Recognition Research.
K3.4	All vehicles associated with the isotainer loading operations at the site must use a broad-band type reversing alarm instead of tonal beeper reversing alarm.
K3.5	The locomotive of the train transporting isotainers to the site must be relocated to the eastern end of the train as soon as practically possible after arrival during daytime to avoid such movements in evening or night-time periods.
K3.6	The applicant must implement best practice technology with respect to the isotainer reach stacker to reduce LAmax noise events.
M2.2	Subject to compliance with the requirements of this consent, the cement works upgrade may be operated 24 hours per day, 7 days per week.
M2.3	[2]The Applicant shall design, construct, operate and maintain all new and upgraded components forming part of the cement works upgrade to ensure that for each receiver location listed in Table 1 below, the noise level at each receiver location does not exceed the maximum allowable noise contribution limit at the receiver location specified.

Table 1 – Maximum Allowable Noise Contribution Limit (dB(A))

Receiver Location	Day[a] $L_{Aeq(15\ minute)}$	Evening[b] $L_{Aeq(15\ minute)}$	Night[c] $L_{Aeq(15\ minute)}$
Adelaide Street, near Taylor Avenue, New Berrima	43	43	40
Argyle Street, near Taylor Avenue, New Berrima	43	43	40
Candowie Farm House	43	43	40

a. Day is defined as the period from 7.00am to 6.00pm Monday to Saturday and 8.00am to 6.00pm on Sundays and public holidays.

b. Evening is defined as the period from 6.00pm to 10.00pm.

c. Night is defined as the period from 10.00[pm to 7.00am Monday to Saturday and 10.00pm to 8.00am on Sundays and public holidays.

Note: Noise contributions specified in Table 1 are to be interpreted as contributions from the new and upgraded components forming part of cement works upgrade only and not as noise limits for the site as a whole. (Footnote: 2 Incorporates EPA General Terms of Approval (L4.1 and L4.2))

M2.4	[3]The maximum allowable noise contributions identified in condition 2.3 apply under all meteorological conditions, except: a) during wind speeds greater than 3ms-1 measured at 10 metres above ground level; or b) during temperature inversion conditions of greater than 3oC/100m and wind speeds of greater than 2ms-1 measured at 10 metres above ground. (Footnote: 3 Incorporates an EPA General Term of Approval (L4.4))
M2.5	[4]For the purpose of assessment of noise contributions specified under condition 2.3, noise from the cement works upgrade shall be: a) measured at the most affected point on or within the receptor site boundary or at the most affected point within 30m of the dwelling (rural situations), where the dwelling is more than 30m from the property boundary; and b) where applicable, subject to the modification factors provided in Section 4 of the New South Wales Industrial Noise Policy (EPA, 2000). (Footnote: 4 Incorporates an EPA General Term of Approval (L4.3))
M2.6	Notwithstanding condition 2.5 of this consent, should direct measurement of noise from the site be impractical, the Applicant may employ an alternative noise assessment method deemed acceptable by the EPA (refer to Section 11 of the New South Wales Industrial Noise Policy (EPA, 2000)). Details of such an alternative noise assessment method accepted by the EPA shall be submitted to the Director-General prior to the implementation of the assessment method.

Note: (K = Kiln 6, M = Mill 7)

Table 11: Response to noise conditions

Condition / EIS prediction	Performance during reporting period	Trend / management implications	Implemented / proposed management actions
K3.1	No construction related activities during the reporting period.	Construction is a short-term activity which cannot be used to establish trends.	The CEMP will be required to be updated prior to the commencement of the Chloride By-pass installation.
K3.1A	No construction related activities during the reporting period.	Construction is a short-term activity which cannot be used to establish trends.	The CEMP will be required to be updated prior to the commencement of the Chloride By-pass installation.
K3.1B	No construction related activities during the reporting period.	Construction is a short-term activity which cannot be used to establish trends.	The CEMP will be required to be updated prior to the commencement of the Chloride By-pass installation.
K3.2	The noise assessment and annual monitoring demonstrated that Kiln 6 operated within the objectives required to achieve contribution criteria during the reporting period and should be allowed to continue operating 24 hours/day, 7 days/week.	Over all, the sound levels associated with Kiln 6 sources were calculated to be less than the objective at Location 20. They are also considered to not exceed the contribution objectives at the nearest residential receivers to the northern and southern sides of the plant, apart from those associated with the new kiln shell cooler fans on the central pedestal of Kiln 6. Some closer-to-source location measured sound levels had increased but these were calculated to not exceed the previous objectives at the residential receiver locations. More distant measurements of the total emissions from the Kiln 6 area on the roof of the Control Building had not increased significantly from previous measurements, which also indicates compliance with the objectives.	Existing management measures effectively contain noise levels below contribution criteria. However, Boral will consider the recommendations to review the new kiln shed cooling fans, FA215 and FA250.
K3.3	The noise assessment demonstrated that Kiln 6 operated within the objectives required to achieve contribution criteria at the residential locations during the reporting period.	As above	
K3.3A	Any new MOD must give consideration to the PSNL in the PRP dated March 2018	Condition requirement to give consideration	The Chloride By-Pass noise assessment took into consideration the PSNL.

K3.4	All vehicles associated with the isotainer operation must use a broad-band type reversing beeper alarm.	Broadband alarms installed. Site procedure prepared and incorporated into Noise Management Plan	Implemented
K3.5	Locomotive must be relocate to eastern end of train as soon as practical to avoid such movements at night	Site procedure prepared and incorporated into Noise Management Plan	Implemented
K3.6	Best practice technology implemented with respect to reach stacker to reduce noise events	Site procedure prepared and incorporated into Noise Management Plan. Operators trained.	Implemented
M2.1	No construction activity during the reporting period.		
M2.2	The noise assessment predicted and monitoring confirmed that Mill 7 operated within the contribution criteria during the reporting period and should be allowed to continue operating 24 hours/day, 7 days/week.	See Appendix 1 for Noise Assessment Report	Compliant
M2.3	The noise assessment predicted that Mill 7 operated within the contribution criteria at the residential locations during the reporting period, including for the worst case weather scenario.	See Appendix 1 for Noise Assessment Report	Compliant
M2.4	Monitoring has shown compliance with limits.	See Appendix 1 for Noise Assessment Report	Compliant
M2.5	Noise was measured at the following locations: ● 72 Taylor Avenue (near Adelaide St); ● 12 Brisbane Street; ● 4 Melbourne Street; ● Northern Boundary; and ● Store Yard (close).	See Appendix 1 for Noise Assessment Report	Compliant
M2.6	Section 11 of the INP provides the following alternate methods for determining compliance: 1. measuring existing noise levels with and without the premises operating; 2. measuring the noise emissions from each of the premises at reference locations and then calculating the noise-emission levels back to the receiver; and 3. using an accepted noise model calibrated for the particular locality and source.	This method has been used in previous AEMRs for the site with the results accepted by DP&E.	No management measures required.

	Method 2 was used for Mill 7.		

Note: (K = Kiln 6, M = Mill 7)

Table 3.4: 2020 Annual Environmental Noise Assessment for Kiln 6 Upgrade -
Measurement locations with increase in sound level > 3 dB and calculated contribution sound level at receivers

Location	Year	Time	Period ceo	Sound Level dB(A) L_{Aeq}	Comments	Distance measured metres	Distance to Receivers Distance Attenuation to receiver Calculated LAEQ level at receiver distance only Adelaide	Brisbane	Melbourne	Argyle	South	Loc.20
Kiln 6 Upgrade						Objective	37	37	37	37	37	58
PHT L8 Top platform EL16 Gbox @ 2m to motor S side	2020	11:00 AM		78		2	666	754	745	890	1506	470
	2017			73	Source after directivity		80	80	80	80	81	80
Difference 2020 - 2017			*Difference*	4	Distance reduction		-50	-52	-51	-53	-58	-47
					Calculated SPL without barriers		*30*	*29*	*29*	*27*	*4*	*33*
PHT L8 Lower platform - stack	2020	11:39 AM	31	81		18	656	748	725	875	1508	434
	2019			74	Source after directivity		72	73	72	72	73	72
Difference 2020 - 2019			*Difference*	7	Distance reduction		-31	-32	-34	-38	-38	-28
					Calculated SPL without barriers		*41*	*40*	*40*	*39*	*34*	*45*
PHT Level 8 FA283 motor & casing F22	2020	11:44 AM	21	90	Distance	1	666	754	745	890	1506	470
	2012			81	Source after directivity		80	80	80	80	88	80
Difference 2020 - 2012			*Difference*	9	Distance reduction		-56	-58	-57	-59	-64	-53
					Calculated SPL without barriers		*34*	*33*	*33*	*31*	*5*	*37*
PHT L7 Alt Fuels Platform L2: 1m NW side of conveyor drive motor F38	2020	11:44 AM	36	77	Distance	1	661	751	747	894	1536	447
	2019			73	Source after directivity		77	77	77	77	64	77
Difference 2020 - 2019			*Difference*	4	Distance reduction		-56	-58	-57	-59	-64	-53
					Calculated SPL without barriers		*20*	*19*	*19*	*18*	*-9*	*24*
EL13 platform SW side motor & EL & coupling @ 1m F48	2020	12:12 PM	30	83	Distance	1	666	754	745	890	1506	438
Difference 2020 - 2017	2017			78	Source after directivity		84	84	84	83	83	84
			Difference	6	Distance reduction		-56	-58	-57	-59	-64	-53
					Calculated SPL without barriers		*8*	*7*	*7*	*4*	*-1*	*11*
PHT L8 RM silo Top FA280 NE side @ 1m casing & motor F67	2020	12:26 PM	21	90	Distance	1	692	782	765	905	1473	470
Difference 2020 - 2013	2013			85	Source after directivity		80	80	80	80	80	80
			Difference	6	Distance reduction		-57	-58	-58	-59	-63	-53
					Calculated SPL without barriers		*33*	*32*	*33*	*31*	*27*	*37*
PHT L8 RM silo Top EL16 S side Gbox @ 1m F81	2020	12:29 PM	20	81	Distance	1	692	782	765	905	1473	470
Difference 2020 - 2019	2019			77	Source after directivity		83	83	83	84	81	83
			Difference	4	Distance reduction		-57	-58	-58	-59	-63	-53
					Calculated SPL without barriers		*6*	*6*	*6*	*5*	*17*	*10*
RM silo top inside E doors open F80	2020	12:55pm	30	84	Distance reduction	1	692	782	765	905	1473	470
	2015			80	Source after directivity		74	88	88	88	88	89
Difference 2020 - 2019			*Difference*	4	Distance reduction		-57	-58	-58	-59	-63	-53
Calculated level at nearest house E 2.33km = 17 dBA					*Calculated SPL without barriers*		*17*	*11*	*11*	*10*	*6*	*16*
PHT Level 4 new centre S side F100	2020	1:23 PM	00d 00:00:40	77	Distance	5	666	754	745	890	1506	438
	2017			71	Source after directivity		77	77	77	77	77	77
Difference 2020 - 2017			*Difference*	6	Distance reduction		-42	-44	-43	-45	-50	-39
Includes air cannon. Ambient 71					*Calculated SPL without barriers*		*34*	*33*	*33*	*32*	*27*	*38*
ESP top NE corner at barrier F104	2020	1:30 PM	30	73	Distance	10	642	730	711	850	1485	417
	2016			70	Source after directivity		58	82	82	86	82	82
Difference 2020 - 2016			*Difference*	3	Distance reduction		-36	-37	-37	-39	-43	-32
					Calculated SPL without barriers		*22*	*24*	*25*	*27*	*18*	*29*
PHT Level 2.6 by centre by kiln entry W side F113	2020	1:46 PM	31	88	Distance	2.5	666	754	745	890	1506	438
	2014			82	Source after directivity		88	88	88	88	88	88
Difference 2020 - 2014			*Difference*	7	Distance reduction		-48	-50	-49	-51	-56	-45
Air cannon operation included, normal is 82					*Calculated SPL without barriers*		*40*	*38*	*39*	*37*	*32*	*43*
PHT Level 2 FA63 discharge @ 1.5m faces WSW F120	2020	1:55 PM	21	91	Distance	1.5	666	754	745	890	1506	438
	2014			85	Source after directivity		83	83	84	86	91	84
Difference 2020 - 2014			*Difference*	6	Distance reduction		-53	-54	-54	-55	-60	-45
					Calculated SPL without barriers		*30*	*29*	*30*	*30*	*31*	*35*
PHT Level 2 FA86 inlet filter @ 1m in front F122	2020	1:57 PM	28	88	Distance	1	666	754	745	890	1506	438
	2014			84	Source after directivity		88	88	88	88	76	88
Difference 2020 - 2014			*Difference*	4	Distance reduction		-56	-58	-57	-59	-64	-53
This source is not causing the sound level - it is other sources, lower than 2018					*Calculated SPL without barriers*		*31*	*30*	*30*	*29*	*12*	*35*
FA59 E side @2.3m in line with columns F138	2020	3:00 PM	31	91	Distance	2.3	656	748	725	875	1508	434
	2019			83	Source after directivity		76	76	72	72	72	72
Difference 2020 - 2019			*Difference*	8	Distance reduction		-48	-50	-50	-52	-56	-46
Fan is at higher speed than 2019, similar to earlier years					*Calculated SPL without barriers*		*26*	*25*	*22*	*20*	*15*	*26*
FA59 motor platform centre E side@ 1m F141	2020	3:03 PM	30	98	Distance	1	643	731	715	858	1512	425
	2019			90	Source after directivity		82	82	78	78	78	78
Difference 2020 - 2019			*Difference*	8	Distance reduction		-56	-57	-57	-59	-64	-53
Fan is at higher speed than 2019, similar to earlier years					*Calculated SPL without barriers*		*26*	*25*	*21*	*20*	*15*	*26*
FA59 motor N end @ 2.7 to end plate/stop button at line F144	2020	3:05 PM	27	83	Distance	2.7	643	731	715	858	1512	425
	2019			80	Source after directivity		83	83	83	83	67	83
Difference 2020 - 2019			*Difference*	3	Distance reduction		-48	-49	-48	-50	-55	-44
Fan is at higher speed than 2019, similar to earlier years					*Calculated SPL without barriers*		*35*	*34*	*34*	*33*	*2*	*39*

Figure 6 Measurement locations with increase in sound level >3 dB and calculated contribution at receivers (see pages 56-60 of Appendix 1 for full table)

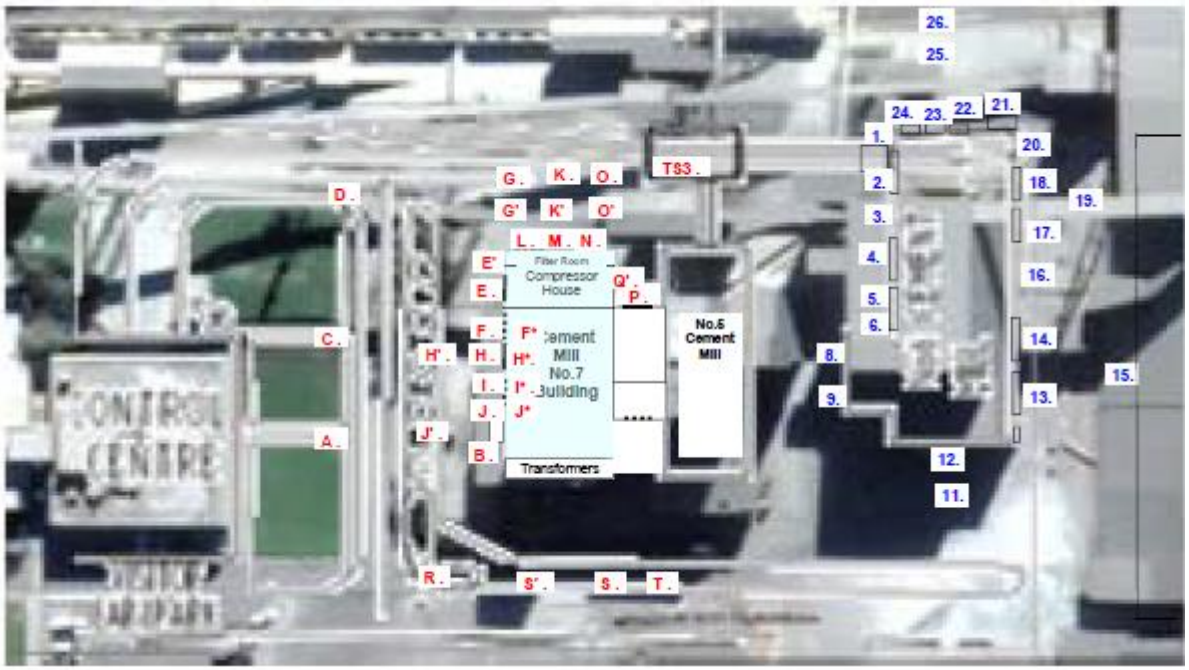


Figure 7 Kiln 6 and Cement Mill 7 noise measurement locations

5.3 Air quality

Boral Cement is acutely aware that elevated fugitive dust emissions from the site can occur and to combat this has active dust management controls in place as set out in the *Berrima Cement Works – Dust Management Plan* (Boral 2020), which is operated across the site.

During the reporting period the site implemented the trial real-time dust monitor which links directly to the control room along with the site Trigger Action Response Management Plan (TARP) for dust which the site monitors current and forecast weather to manage potentially dust generating activities on site.

Table 13 sets out the relevant air quality conditions for the site within the two development consents. Table 14 sets out the site's performance during the past year relating to air quality and the key management measures that are used to minimise dust being generated and leaving the site which include:

- controlling dust from stockpiles using methods including the compaction of stockpile batters (being pushed up with a loader), wetting down with a water cart in dry weather conditions and stopping loading/unloading operations in high winds;
- controlling vehicles (ensuring they are covered and have used wheel washes for example);
- revegetating areas and planting trees to act as wind breaks;
- sealing roads or closing off unused roads;
- using a road sweeper and water carts to minimise traffic generated and wind blown dust from trafficable areas; and
- modifying its activities such as loading, unloading and crushing of materials in open areas to minimise wind blown dust by the use of a water carts, stopping or postponing the activities during times of high wind, modifying the process to take place under cover where possible.
- Baghouses at key transfer points within the cement mill and raw material processing areas.

In addition to controlling fugitive dust emissions by implementing the actions outlined above, Boral Cement operates its plant to ensure point source emissions meet required standards. The continuous monitoring data of particles (Kiln 6) showed compliance with agreed standards. The specialised testing of Kiln 6 and Mill 7 throughout the year showed no non-compliances with agreed standards.

Boral Cement maintains a dust deposition monitoring program, currently consisting of seven dust deposition gauges and one high volume air sampler (HVAS) located around the perimeter of the site. Samples are collected from each gauge on a monthly basis to assess compliance against the EPA's dust deposition guidelines.

As discussed in the body of this section, average dust deposition data for dust gauges for the reporting period have values well below the EPA guideline of 4g/m2/month. These results confirm that the current dust control measures on site are generally working well.

During the reporting period the site received 14 complaints directly relating to dust concerns, this is significantly down on last year when 78 complaints were received. All the complainants were contacted after the complaints were received. Further details are provided in Appendix 2 Complaints Summary.

Table 12: Air quality conditions

Number	Condition
K3.7	The Applicant shall design, construct, operate and maintain the cement works upgrade in a manner that minimises dust emissions from the site and complies with the EPL.
K3.7A	The Applicant shall apply all reasonable and feasible measures to minimise the generation of dust from coal stockpiles, including but not necessarily limited to: a) compaction of stockpile batters to minimise pick up of dust; b) installation of water sprays or use of a water cart to keep stockpile surfaces wet, if dust is being generated; and c) cessation of stockpile generation during periods of high wind, if dust generation cannot be controlled.
K3.8	The Applicant shall take all practicable measures to ensure that all vehicles entering or leaving the site and carrying a load that may generate dust are covered at all times, except during loading and unloading. Any such vehicles shall be covered or enclosed in a manner that will prevent emissions of dust from the vehicle at all times.
K3.9	All trafficable areas and vehicle manoeuvring areas on the site shall be maintained in a condition that will minimise the generation or emission of wind blown or traffic generated dust from the site at all times.
M2.7 Dust Emissions	[5]The Applicant shall design, construct, operate and maintain the cement works upgrade in a manner that minimises dust emissions from the site. The raw material storage bunker associated with the cement works upgrade shall be maintained in a condition that effectively eliminates wind generated dust emissions. Dust collection systems shall be provided to all potential sources of dust production associated with the cement works upgrade. (Footnote: 5 Incorporates EPA General Terms of Approval (O2.1 and O2.2))
M2.8	The Applicant shall take all practicable measures to ensure that all vehicles entering or leaving the site and carrying a load that may generate dust are covered at all times, except during loading and unloading. Any such vehicles shall be covered or enclosed in a manner that will prevent emissions of dust from the vehicle at all times.
M2.9	All trafficable areas and vehicle manoeuvring areas associated with the cement works upgrade shall be maintained in a condition that will minimise the generation or emission of wind blown or traffic generated dust from the site at all times.
K3.10 Air Quality Discharges	The Applicant shall install and operate equipment in line with best practice to ensure that the Development complies with all load limits, air emission limits and air quality monitoring requirements as specified in the EPL for the site.
K3.10A	Deleted
M2.10 Discharge Limits	[6] The Applicant shall design, construct, operate and maintain the cement works upgrade to ensure that total solid particle emission from the exhaust stack on Cement Mill No.7 (EPA Identification Point 10) does not exceed 20mg/m^3 (100% concentration limit). The concentration limit specified above is based on 101.3 kPa, 273 K, dry reference conditions and shall be determined in accordance with the monitoring requirements described under condition 3.1. To avoid any doubt, this condition does not authorise the discharge or emission of any other pollutants. (Footnote: 6 Incorporates EPA General Terms of Approval (P1.1, L2.1 and L2.2))

Note: (K = Kiln 6, M = Mill 7)

Table 13: Response to air quality conditions

Condition / EIS prediction	Performance during reporting period	Trend / management implications	Implemented / proposed management actions
K3.7	**Dust monitoring** There are seven dust monitoring gauges and one HVAS around the perimeter of the site and in New Berrima. The locations of the gauges are shown on Figure 1. Samples are collected from the dust gauges each month and each week for the HVAS. The samples are assessed for compliance against the dust deposition and total suspended particulates (TSP) guidelines in *Approved Methods and Guidance for Analysis for the Modelling and Assessment of Air Pollutants in NSW* (DEC 2005) and *National Environment Protection Measure for Ambient Air Quality* (NEPC 1998) PM_{10} guideline. As there is no emission limit specified in the Licence, the following guidelines have been adopted: ● EPA dust deposition guideline of 4 g/m_2/month (expressed as a 12-month rolling average). ● NEPM PM_{10} 24 hr standard of 50 $\mu g/m^3$. ● EPA TSP annual goal of 90 $\mu g/m^3$. As can be seen in figure 8 and 9, the dust gauges and HVAS have values below the guidelines for the reporting period. **Stack emissions** Yearly stack emission monitoring for Kiln 6 as required by the EPL was undertaken in July and November 2019 and February and April 2020. Figure 10 shows that the Works maintained emissions well under the EPA limits. 14 complaints were received from the community in relation to the deposition of dust on vehicles and properties. The complainants were contacted after the complaints were received. Further details are provided in Appendix 2.	Figure 8 shows the results of the analysis of the HVAS from May 2017 to April 2021. The trend during the year has been down. As can be seen, the current data shows that we remain below the EPA guideline of 4 g/m_2/month. Figure 9 shows the results of the analysis of the dust gauges located around the site and the New Berrima community from Jan 2017 to April 2021. As can be seen, the current data shows that we remain below the EPA guideline of 4 g/m_2/month. Boral Cement Berrima will continue to respond rapidly to, thoroughly investigate, and rectify any dust complaints received from the local community.	Dust control is a fundamental part of the operational management of this site. Dust is controlled through the implementation of the Dust Management Plan. As sound control measures are in place and this is supported by monitoring data, these operations will continue. During 2020/21 the site commissioned the recently purchased real-time dust monitor and embed the use of the new site Dust Trigger Action Response Plan.
K3.7A	See K3.7 above under Dust monitoring.	Reasonable and feasible measures are being implemented to minimise fugitive dust from coal stockpiles. This includes compaction of stockpile batters (being pushed up with a loader), wetting down with a water cart in dry weather conditions and stopping loading/unloading operations in high winds.	

		The site's re-vegetation program is maturing in the areas surrounding the stockpiles to create a windbreak and a dust screen.	
K3.8	No complaints were received during this period and no related issues arose during this period.	All transport contractors are made aware of this requirement during site inductions. Section 3 of the *Driver Code of Conduct – Truck and Heavy Vehicles Operator*, which is part of the *Berrima Cement Works – Traffic Management Plan* (Boral 2017) includes requirements for all drivers of heavy vehicles on site to ensure they cover their loads and prevent spillages.	
K3.9	See K3.7 above under Dust monitoring. During this reporting period Boral Cement has actively worked to reduce the generation of dust from vehicles and internal haul roads through implementation of the Dust Management Plan.	Some of the unsealed roads on site have been sealed in the previous years and some have been closed off and recently re-vegetated. Two wheel wash stations were installed in 2016, one at the exit of a shale pad, the other at the end of Quarry Road. The wheel wash stations continue to be routinely used. Boral Cement operates a road sweeper and water carts to minimise traffic generated and wind blown dust from trafficable areas and vehicle manoeuvring areas. Mechanical sweepers undergo regular maintenance to ensure sweepers are working efficiently. Boral Cement modified its activities such as loading, unloading and crushing of materials in open areas to minimise wind blown dust. Actions included the use of a water cart, stopping or postponing the activities until wind subsides, modifying the process to take place under cover where possible, etc.	Boral Cement continues to investigate opportunities to reduce fugitive dust throughout the site. Issues are managed through immediate corrective action and reporting through the incident management database SEQuence. The real-time dust monitor commissioned during the reporting period is an extra tool to alert the site to potential fugitive dust events that could impact the New Berrima village residents.
M2.7	Covered under KK3.7 and K3.7A		
M2.8	Covered under K3.8		
M2.9	Covered under K3.9		
K3.10	Stack emission monitoring for Kiln 6 for standard fuels was conducted by Ektimo July, November 2019 and February and April 2020 in accordance with the sampling methods specified under EPL 1698. The reports demonstrated compliance with the emission limits for standard fuels for all monitoring parameters (see Figure 12).	No exceedances demonstrated for continuous particulate monitoring for Kiln 6 from May 2019 – April 2020 as demonstrated in Figure 10.	
M2.10	Ektimo monitored solid particle emissions from the Mill 7 stack in July 2019 in accordance with the sampling methods specified under EPL 1698. The report demonstrated compliance with the emission limit as shown in Figure 12.		

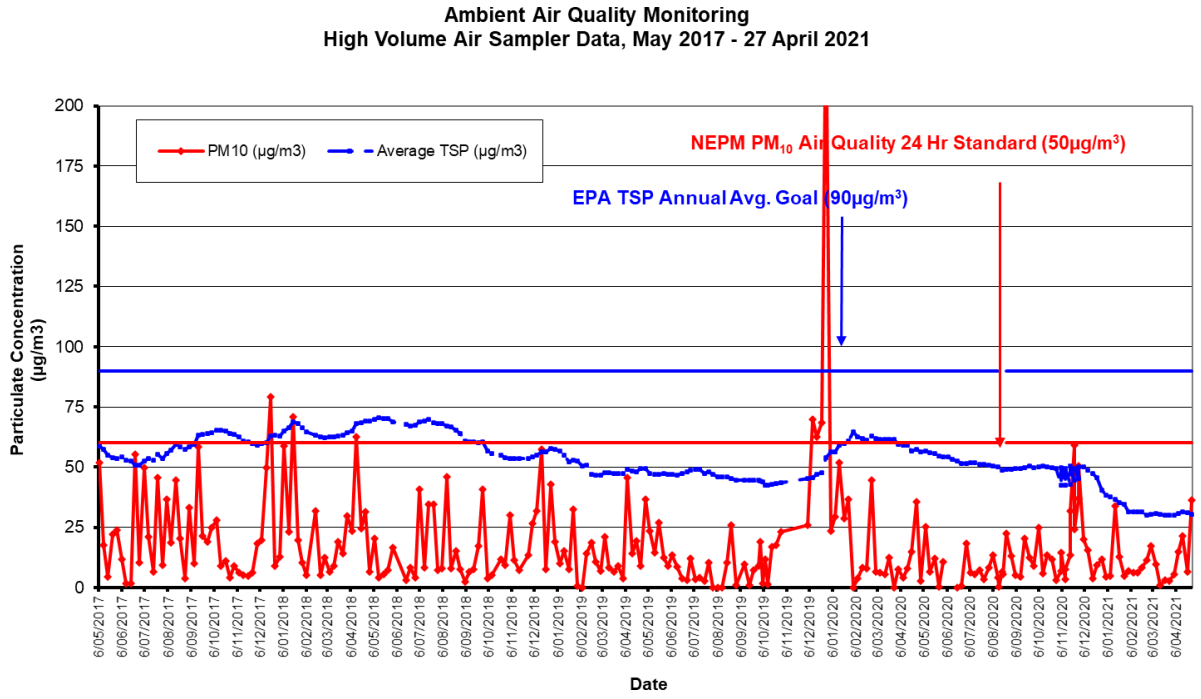


Figure 8 Ambient air quality monitoring May 2017 – April 2021

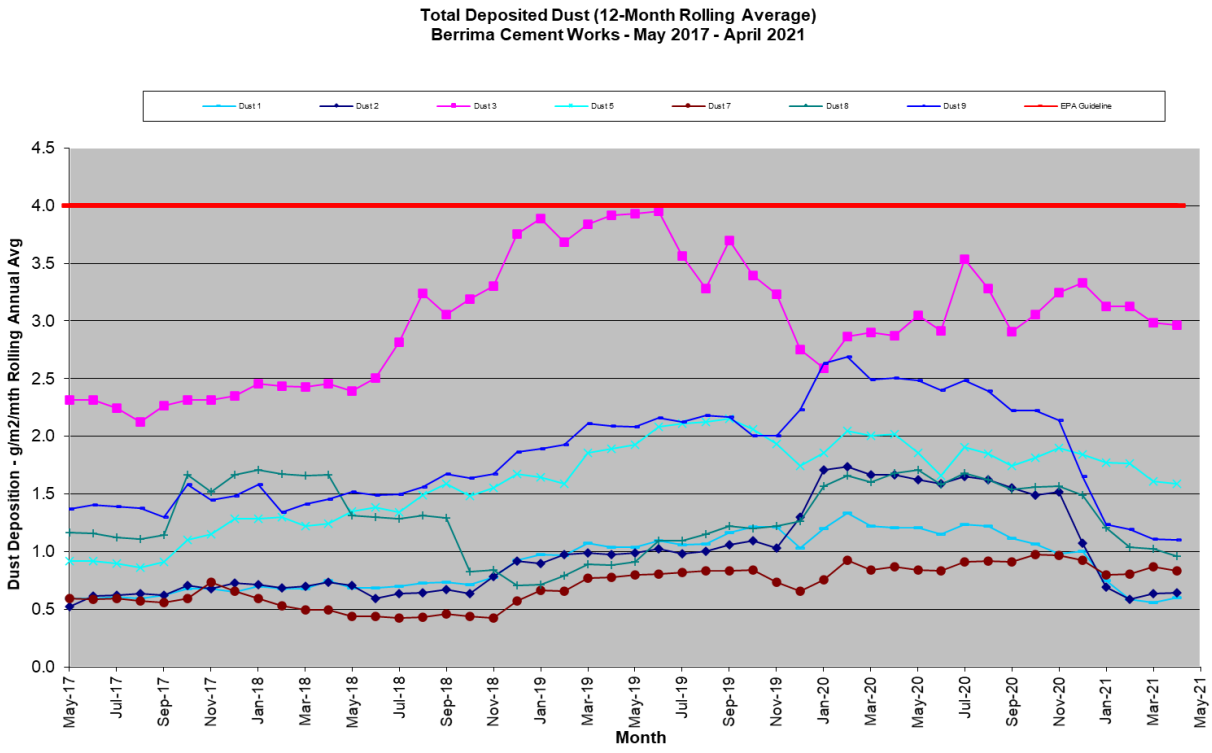
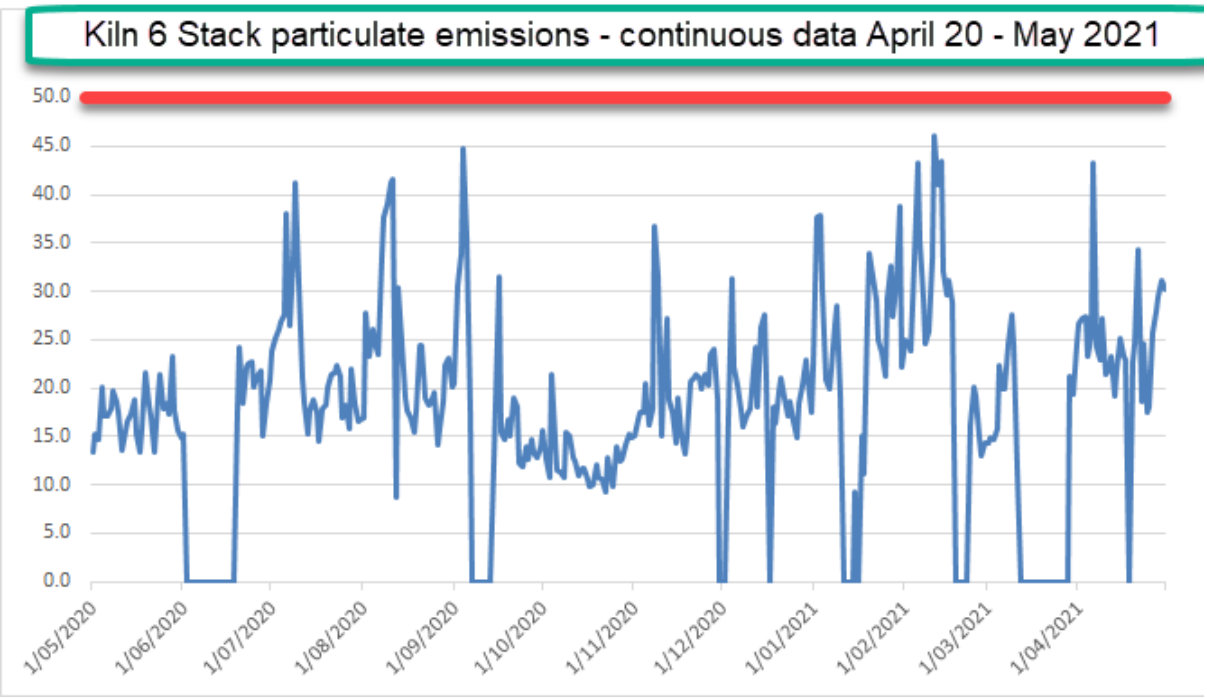


Figure 9 Total deposited dust (12-month rolling average) January 2017 – April 2021



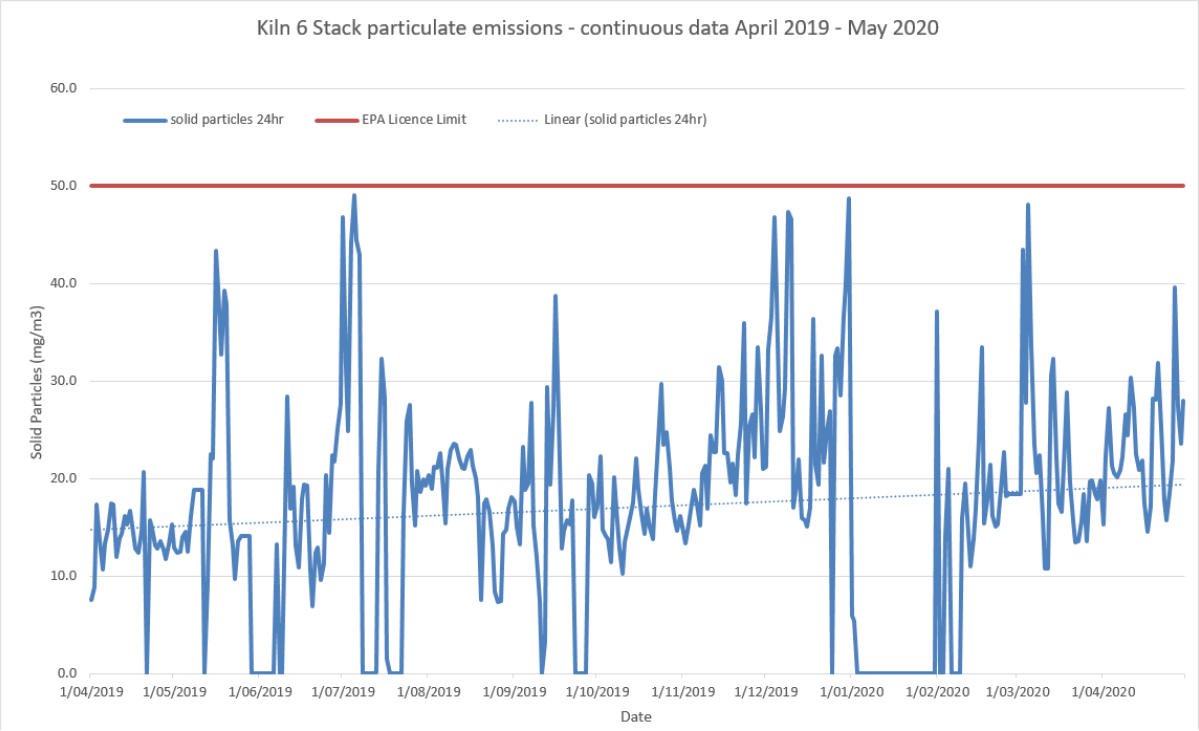


Figure 10 Continuous particulate monitoring for Kiln 6 April 2019 – May 2021

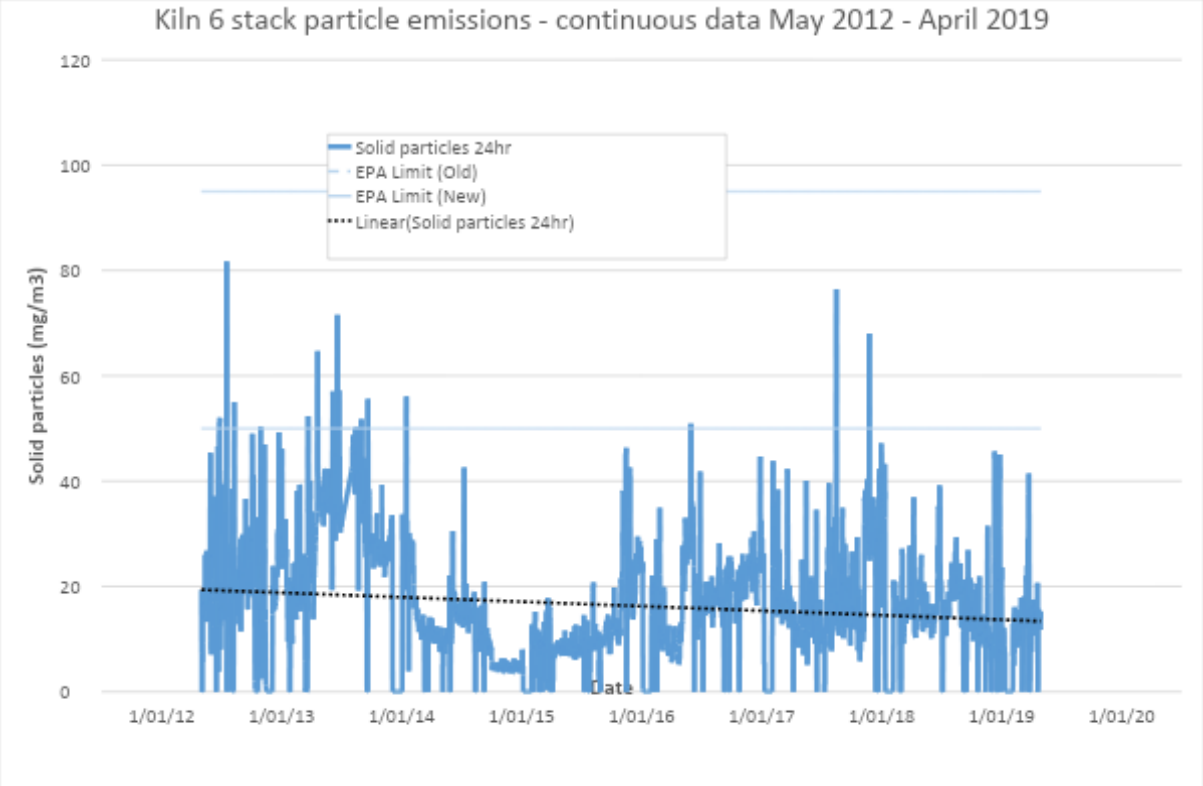


Figure 11 Continuous particulate monitoring for Kiln 6 May 2012 – April 2019

2020-2021 EPL 1698 Stack Testing Summary Results

Report dated 7 October – Reference: R009302-1

Location	Test Date	Test Parameters*
EPA 2 – No.6 Kiln Stack	22 June 2020	Sulfur dioxide, sulfur acid mist and sulfur trioxide (as SO_3) Metals type 1 & 2 substances in aggregate (Sb, As, Cd, Pb, Hg, Be, Cr, Co, Mn, Ni, Se, Sn, V) thallium Total fluoride, hydrogen chloride, chlorine
	23 June 2020	Speciated volatile organic compounds (VOCs) Dioxins and furans (PCDD & PCDF) Nitrogen oxides, carbon monoxide, carbon dioxide, oxygen Hexavalent chromium
	25 September 2020	Solid particles Carbon dioxide, oxygen
EPA 4 – No.6 Cement Mill Duct 1	16 July 2020	Solid particles
EPA 4 – No.6 Cement Mill Duct 2		
EPA 5 – No.6 Kiln Cooler Stack	25 June 2020	
EPA 10 – No.7 Cement Mill Stack		

EPA	Parameter	Units	Licence limit	Detected values	Detected values (corrected to 10% O_2)
EPA 2 - Kiln Stack No. 6	Mercury	mg/m^3	0.05	0.0029	0.0037
	Type 1 and Type 2 substances in aggregate	mg/m^3	0.5	≤0.037	≤0.046
	Solid particles	mg/m^3	50	32	27
	Nitrogen oxides	mg/m^3	1250	970	930
	Cadmium + Thallium	mg/m^3	0.05	0.0022	0.0028
	Chlorine	mg/m^3	50	<0.01	<0.01
	Dioxins & furans (I-TEQ middle bound)	ng/m^3	0.1	0.0019	0.0018
	Hydrogen chloride	mg/m^3	10	0.15	0.22
	Hydrogen fluoride	mg/m^3	1	≤0.02	≤0.03
	Sulfur dioxide	mg/m^3	50	0.0028	0.037
	Sulfuric acid mist and sulfur trioxide (as SO_3)	mg/m^3	50	≤0.025	≤0.033
	Volatile organic compounds	mg/m^3	40	2.2	2.1
EPA 4 - No.6 Cement Mill Stack Duct 1	Solid particles	mg/m^3	100	35	NA
EPA 4 - No.6 Cement Mill Stack Duct 2	Solid particles	mg/m^3	100	7.9	NA
EPA 5 - No. 6 Kiln Cooler Stack	Solid particles	mg/m^3	100	1.9	NA
EPA 10 - No.7 Cement Mill Stack	Solid particles	mg/m^3	20	6.9	NA

Report dated 11/05/2021 Reference: R010398

Location	Test Date	Test Parameters*
EPA 2 – No.6 Kiln Stack	9 February 2021	Solid particles Fine particulates (PM_{10}) by particle size analysis (PSA) Fine particulates ($PM_{2.5}$) by particle size analysis (PSA) Coarse particulates Sulfur dioxide, sulfur acid mist and sulfur trioxide (as SO_3) Total fluoride, hydrogen chloride, chlorine
	10 February 2021	Speciated volatile organic compounds (VOCs) Dioxins and furans (PCDD & PCDF) Polycyclic aromatic hydrocarbons (PAHs) Nitrogen oxides, carbon monoxide, carbon dioxide, oxygen
	7 April 2021	Metals type 1 & 2 substances in aggregate (Sb, As, Cd, Pb, Hg, Be, Cr, Co, Mn, Ni, Se, Sn, V), thallium, copper & zinc Hexavalent chromium

EPA	Parameter	Units	Licence limit	Detected values	Detected values (corrected to 10% O_2)
EPA 2 - Kiln Stack No. 6	Mercury	mg/m^3	0.05	0.0094	0.008
	Type 1 and Type 2 substances in aggregate	mg/m^3	0.5	≤0.4	≤0.3
	Solid particles	mg/m^3	50	21	20
	Nitrogen oxides	mg/m^3	1250	1100	980
	Cadmium + Thallium	mg/m^3	0.05	≤0.08	≤0.07
	Chlorine	mg/m^3	50	0.025	0.023
	Dioxins & furans (I-TEQ middle bound)	ng/m^3	0.1	0.002	0.0018
	Hydrogen chloride	mg/m^3	10	0.093	0.087
	Hydrogen fluoride	mg/m^3	1	≤0.091	≤0.084
	Sulfur dioxide	mg/m^3	50	0.057	0.054
	Sulfuric acid mist and sulfur trioxide (as SO_3)	mg/m^3	50	0.072	0.068
	Volatile organic compounds	mg/m^3	40	1.4	1.3

Figure 12 Stack testing license comparison tables

5.4 Soils and water quality

The consent requirements for soils and water quality for Kiln 6 are in conditions 3.11 to 3.14 of Development Consent No. 401-11-2002-i and for Mill 7 in conditions 2.11 to 2.14 of Development Consent No. 85-4-2005-i, which are replicated in Table 14. The consents refer to EPL 1698, however, there are no water discharge limits in the EPL.

Table 16 sets out the site's performance during the past year relating to soils and water quality and the key management measures that are used at the site.

Boral manages water on site in accordance with the *Berrima Cement Works – Water Management Plan* (Boral 2020), which describes the monitoring points, frequency and parameters. Storm water and residual process water from all areas of the Works (including Kiln 6 and Mill 7) is harvested and used on site with water quality in the storages (Lake Quality and Lake Breed) tested monthly, and water quality in the receiving waterway (Wingecarribee River) tested every three months. Water is only discharged from site during very heavy rainfall, with five overflow events during the reporting period.

Three of the conditions relate to construction, with the SWDF facility partially built during the reporting period. It is demonstrated in Table 15 that the overall water management performance of the site is good. This indicates that the water management performance at Kiln 6 and Mill 7 is also good and that the conditions have been complied with during the reporting period.

Above average rainfall was reported during the 2020/21 reporting period, with the site sourcing a large portion of its daily usage requirements from waters collected within the shale pit voids. The business will continue to prioritise waters harvested onsite, however as a large consumer of water this will require the Wingecarribee River to be the main source of water. In the longer term the aim will be to source waters from the former Berrima Colliery.

Table 14: Soils and water quality conditions

Number	Condition
K3.11 Construction Soil and Water Management	Soil and water management measures consistent with Managing Urban Stormwater – Soils and Construction Vol.1 (Landcom, 2004) (the Blue Book) shall be employed during construction of the Development to minimise soil erosion and the discharge of sediment and other pollutants to land and/or waters.
K3.12	All construction vehicles exiting the site, having had access to unpaved areas, shall depart via a wheel-wash facility.
K3.13	All erosion and sedimentation controls required as part of this consent shall be maintained for the duration of the construction works, and until such time as all ground disturbed by the construction works, has been stabilised and rehabilitated so that it no longer acts as a source of sediment.
K3.14 Water Discharge Limits	The Applicant shall ensure that all surface water discharges from the site comply with the: a) discharge limits (both volume and quality) set for the development in any EPL; or b) relevant provisions of the POEO Act.
M2.11 Water Quality Impacts	[7]Except as may be expressly provided by a licence under the Protection of the Environment Operations Act 1997 in relation to the cement works upgrade, section 120 of that Act (pollution of waters) shall be complied with in, and in connection with, the carrying out of the cement works upgrade. (Footnote 7: 7 Incorporates an EPA General Term of Approval (L1.1))
M2.12 Erosion and Sediment Control	All construction vehicles exiting the site, having had access to unpaved areas, shall depart via a wheel-wash facility.
M2.13	All erosion and sedimentation controls required as part of this consent shall be maintained for the duration of the construction works, and until such time as all ground disturbed by the construction works, has been stabilised and rehabilitated so that it no longer acts as a source of sediment.
M2.14 Site Drainage and Stormwater	The Applicant shall ensure that the cement works upgrade does not lead to an increase in the volume or flow rate of stormwater leaving the site over and above pre-development flow conditions.

Note: (K = Kiln 6, M = Mill 7)

Table 15: Response to soils and water quality conditions

Condition / EIS prediction	Performance during reporting period	Trend / management implications	Implemented / proposed management actions
K3.11	There was two overflows from Lake Quality during the reporting period (10/2/2020 & 14/2/2020). Water was sampled at the overflow point (EPA Point 9), which had the following results: ● Biochemical oxygen demand (mg/L) – 2-3 ● (guideline: 20) ● Oil and grease (mg/L) – <5 - <5 (guideline: 10) ● pH – 9.3, 8.0 ● Total suspended solids (mg/L) – 8-72 (guideline: 30-50) The results were within guideline values apart from pH, which was slightly elevated and one sample of suspended solids was elevated in July which coincided with over 120mm rain falling over two days.	The discharge water quality is similar to previous years, with five overflow events for the year. The higher discharge events is a reflection on the wetter than average year.	In order to ensure sufficient capacity in Lake Quality in the event of a rain event, water for production will primarily be taken from Lake Quality prior to extracting water from Wingecarribee River.
K3.12	Construction vehicles exited the site via a wheel wash.	NA	
K3.13	Refer to K3.11.	Construction is a short-term activity which cannot be used to establish trends.	
K3.14	No water volume and quality discharge limits are specified in EPL 1698 and water was not regarded as a project risk (SLR 2015). Notwithstanding, the EPL requires monitoring at the Lake Quality overflow point during overflows. There were tfiveoverflows from Lake Quality during the reporting period (10/2/2020 & 14/2/2020). Water was sampled at the overflow point (EPA Point 9), which had the following results: ● Biochemical oxygen demand (mg/L) – 2-3 ● (guideline: 20) ● Oil and grease (mg/L) – <5 - <5 (guideline: 10) ● pH – 9.3, 8.0 ● Total suspended solids (mg/L) – 8-72 (guideline: 30-50)	The water in Lake Quality is reused in site processes and the lake only overflows during heavy rainfall. There were five overflow events during the reporting period. Sampling demonstrated that water quality met the typical NSW discharge criteria. Occasionally, an exceedance of pH may occur in the overflow due to alkaline nature of raw materials and products handled on site. One TSS result in July 2020 recorded 72 ppm, this coincided with a deluge event of over 120mm rain in two days.	*Berrima Cement Works – Water Management Plan* (Boral 2020) is implemented at the Works, which includes the Kiln 6 area and is reviewed every three years or after an incident and is revised/improved as deficiencies become apparent.

M2.11	No water volume and quality discharge limits are specified in EPL 1698.	Refer to K3.14.	*Berrima Cement Works – Water Management Plan* (Boral 2020) is implemented at the Works, which includes the Mill 7 area and is reviewed every three years or after an incident and is revised/improved as deficiencies become apparent.
M2.12	Refer to K3.11.	Construction is a short-term activity which cannot be used to establish trends.	
M2.13	Refer to K3.12.	Construction is a short-term activity which cannot be used to establish trends.	
M2.14	Refer to K3.11.	Construction is a short-term activity which cannot be used to establish trends.	

Note: (K = Kiln 6, M = Mill 7)

5.5 Traffic and transport

The requirements for traffic and transport for Kiln 6 are in conditions 3.15 to 3.16A of Development Consent No. 401-11-2002-i and for Mill 7 in conditions 2.15 to 2.17 of Development Consent No. 85-4-2005-i, which are replicated in Table 17.

Table 18 summarises the site's performance during the past year relating to traffic and transport and the key management measures that are used at the site.

Boral manages traffic on site in accordance with the Traffic Management Plan.

Four of the conditions relate to construction, with most of the SWDF facility constructed during the reporting period. The *Berrima Solid Waste Derived Fuels Project – Construction Traffic Management Plan* (Boral 2017) was implemented to prevent incidents and queuing on public roads. No community complaints were received regarding construction or operational traffic.

Two of the conditions relate to parking provision and truck queuing. Sufficient car parking has historically, and continues to be, provided to accommodate employee and visitor vehicles on site without the need to park on surrounding public roads. Deliveries of fuel and ingredient materials for Kiln 6, and ingredient materials for Mill 7, have not historically, and continue to not, require queuing of trucks along Taylor Avenue. Therefore, operations at Kiln 6 and Mill 7 complied with the traffic and transport consent conditions during the reporting period.

Table 16: Traffic and transport conditions

Number	Condition
K3.15	Traffic and Transport Impacts The Applicant shall establish a bus transport system generally consistent with that identified in section 6.9 of the SEE to transport construction employees to and from the site during the construction period.
K3.16	The Applicant shall ensure that vehicles associated with the cement works upgrade do not stand or park on any public road or footpath adjacent to the site. Measures provided by the Applicant shall include sufficient parking for all employees and contractors during construction and operation of the cement works upgrade and management measures to ensure that heavy vehicles entering the site are not permitted to queue on Taylor Avenue at any time.
K 3.16A 3.16B 3.16C 3.16D 3.16E Port Kembla Coal Haulage Campaigns Deleted.	
K3.16A	The Applicant shall pay a road maintenance levy to Council of 4 cents/tonne/km for the transport of SWDF.
M2.15 Traffic and Transport Impacts	The Applicant shall establish a bus transport system generally consistent with that identified in section 6.6.7 of the SEE referred to in condition 1.2b to transport construction employees to and from the site during the construction period.
M2.16	The Applicant shall ensure that vehicles associated with the cement works upgrade do not stand or park on any public road or footpath adjacent to the site. Measures provided by the Applicant shall include sufficient on-site parking for all employees and contractors during construction and operation of the cement works upgrade and management measures to ensure that heavy vehicles entering the site are not permitted to queue on Taylor Avenue at any time.
M2.17	The Applicant shall install an advance warning signage along Taylor Avenue to advise vehicles approaching the entrance to the site of turning truck traffic in the area. This signage is to be installed prior to the commencement of operations of the cement works upgrade. Details of the design and installation of this signage are to be provided to the satisfaction of the Director-General prior to the commencement of operations at the cement works upgrade.

Note: (K = Kiln 6, M = Mill 7)

Table 17: Response to traffic and transport conditions

Condition / EIS prediction	Performance during reporting period	Trend / management implications	Implemented / proposed management actions
K3.15	Only a small workforce was required to construct the alternative waste facility with employees travelling to site from different directions. Therefore, a bus service was not implemented for construction during this reporting period as it was not required nor practical.	Construction timeframes are short and no performance trends can be established.	The Construction Traffic Management Plan will continue to be updated when the by-pass construction commences.
K3.16	No construction vehicles stood or parked on public roads or footpaths as there is sufficient room on roads within the site and parking areas to accommodate vehicles. Employee car parking was extended three years ago. The employee car park has unused capacity.	Construction timeframes are short and no performance trends can be established.	The Construction Traffic Management Plan will continue to be updated when the by-pass construction commences.
K3.16A	34 767 of SWDF were used in the reporting period, at the time of writing the levy has yet to be paid to Council. The levy payable should = (Reporting Year SWDF tonnes x 0.04) x 2.6 Boral sent an email to Wingecarribee Council on 29/07/2020 seeking approval of the calculation method and to issue an invoice for the calculated amounts for 2018/19 & 2019/20. No response or invoice was received. An email was also sent on 15 June 2021 following up this levy payment invoice and request for one to be sent for 2020/21 reporting period.	SWDF vehicles travel 2km from the highway to the site entrance and return to the highway. Based on 21869t in 2018/19 a levy of $2274.31 would be payable. Based on 28997t in 2019/20 a levy of $3015.69 would be payable. Based on 34767t on 2020/21 a levy of $3615.78	As of the date of this report the levy is still to be paid for the SWDF transport of Council roads. Boral has now been contacted by Council who will shortly issue invoices for the outstanding levies.
M2.15	NA	NA	NA
M2.16	No construction vehicles stood or parked on public roads or footpaths as there is sufficient room on roads within the site and parking areas to accommodate vehicles. Employee car parking was extended three years ago. The employee car park has unused capacity.	Construction timeframes are short and no performance trends can be established.	NA
M2.17	As previously reported, warning signage was installed along Taylor Avenue.	This was a one-off activity with no associated trends.	Signs will be replaced if damaged or defaced.

Note: (K = Kiln 6, M = Mill 7)

5.6 Waste management

The consent requirements relating to waste management for Kiln 6 are in conditions 3.17 to 3.17C of Development Consent No. 401-11-2002-i and for Mill 7 in Condition 2.18 of Development Consent No. 85-4-2005-i, which are replicated in Table 19. The consents refer to EPL 1698, which provides waste requirements in conditions L4, O5, O6.1/2/3/4/5/6/7, E3 and E4.

Table 20 sets out the site's performance during the past year relating to waste management and the key management measures that are used at the site.

Boral manages waste on site in accordance with *Berrima Cement Works – Waste Management Plan* (Boral 2020), which describes recycling and disposal requirements for the different waste categories generated and used on site.

During the reporting period the site have changed their bulk skip bin supplier. These skip bins are taken to the Resource Co alternative fuel facility in Wetherill Park which in turn sort out the biomass to product SWDFs back to our site at Berrima.

The waste conditions and the EPL 1698 specifically detail what wastes can be received on site for storage, treatment, processing, reprocessing or disposal such as granulated blast furnace slag (slag). These conditions exclude non-standard fuels approved for use at Kiln 6.

Table 18: Waste conditions

Number	Condition
K3.17 Waste Management Impacts	Except as otherwise permitted by this consent and a licence issued under the Protection of the Environment Operations Act 1997 the Applicant shall not cause, permit or allow any waste generated outside the site to be received at the site for storage, treatment, processing, reprocessing or disposal, or any waste generated at the site to be disposed of at the site.
K3.17A	Condition 3.17 of this consent only applies to the storage, treatment, processing, reprocessing or disposal of waste at the premises if those activities require a licence under the Protection of the Environment Operations Act 1997 (POEO Act), and does not include: a) any Non-Standard Fuels approved for use at the upgraded Kiln 6 under this consent; b) any material normally brought to the site for the purpose of cement clinker production (as detailed in the documents listed under condition 1.2 of this consent); c) any material normally recycled or reused within the cement works; and d) any material that is subject to a specific waste recovery exemption (RRE) issued by the EPA to exempt that material from the specific clauses of the Protection of the Environment(Waste) Regulation 2005.
M2.18 Waste Management Impacts	[8]The Applicant shall not cause, permit or allow any waste generated outside Cement Mill 7 to be received at Cement Mill 7 for storage, treatment, processing, reprocessing or disposal, or any waste generated at Cement Mill 7 to be disposed of at Cement Mill 7, except as expressly permitted by a licence under the Protection of the Environment Operations Act 1997. This condition only applies to the storage, treatment, processing, reprocessing or disposal of waste at the premises if it requires an environment protection licence under the Protection of the Environment Operations Act 1997. (Footnote 8: 8 Incorporates an EPA General Term of Approval (L3.1 and L3.2))
K3.17AB Alternative Raw material Trial - Granulated Blast Furnace Slag (GBFS)	Prior to the receipt of GBFS on-site, the Applicant must obtain a specific waste Resource Recovery Exemption (RRE) for GBFS from the EPA.
K3.17AC GBFS Trial Requirements	Provided that the specific waste RRE is obtained for GBFS, the Applicant shall trial the use of up to 3,000 tonnes of GBFS as an alternate raw material in Kiln 6. The Applicant shall: a) undertake the trial over a continuous 3 day period, unless otherwise agreed in writing by the Secretary; b) conduct stack testing of all relevant air emissions and trace elements, to the satisfaction of the EPA; and c) use quality controlled GBFS only.
K3.17AD GBFS Trial Verification Report	Within 1 month of the completion of the GBFS trial, the Applicant shall prepare and submit a Verification Report to the Department to the satisfaction of the Director-General and the EPA. The Verification Report shall include: (a) stack emissions monitoring data measured for the duration of the trial; (b) copies of all analytical test reports for all substances sampled and tested; (c) a comparison of monitoring results from the trial with the relevant EPA standards and requirements, as determined by the EPA.

K3.17AE	Provided the results of stack testing for the GBFS trial confirm that the air pollutants emitted from the cement Kiln 6 meet the relevant EPA standards and requirements, the Applicant may commence full-scale usage of GBFS as a raw material additive in Kiln 6 at a maximum usage rate that is determined in writing by the Secretary in consultation with the EPA. Note: the Applicant must not commence full-scale usage of GBFS as a raw material additive in Kiln 6 until it has received written approval from the Secretary. In addition, the maximum usage rate per annum of GBFS in cement Kiln 6 must not exceed 150,000 tonnes per annum.
K3.17B	Except as provided by any condition of a licence under the Protection of the Environment Operations Act 1997, only the following 'Group A' waste may be stored at the site: a) AKF1.
K3.17C	Except as provided by the condition of a licence under the Protection of the Environment Operations Act 1997, the Applicant must assess, classify and dispose of all wastes generated as a result of the use of Non-Standard Fuels in a accordance with the NSW EPA's Waste Classification Guidelines.

Note: (K = Kiln 6, M = Mill 7)

Table 19: Response to waste conditions

Condition / EIS prediction	Performance during reporting period	Trend / management implications	Implemented / proposed management actions
K3.17	Except for raw materials and SWDF non-standard fuels and HiCal 50 approved in EPL 1698 no waste generated outside the Works was received at the site during the reporting period.	The Operational Environmental Management Plan was updated in April 2018 in accordance with Condition 6.7 to incorporate measures for management of nonstandard fuels prior to their use at the site (approval letter received from DPE on 21/05/2018).	Boral undertook a review of the OEMP, and the to reflect the recent Mod 11 and 12 to the consent and changes to the EPL completed by the EPA on 18 December 2019. These were submitted to the Department on 5 June 2020 and approved on the 29 June 2020.
K3.17A	As described above and prohibited by Condition L4.1 of the EPL, no waste generated outside the Works was received at the site during the reporting period.	The Operational Environmental Management Plan was updated in April 2018 in accordance with Condition 6.7 to incorporate measures for management of nonstandard fuels prior to their use at the site (approval letter received from DPE on 21/05/2018).	Boral undertook a review of the OEMP, and the to reflect the recent Mod 11 and 12 to the consent and changes to the EPL completed by the EPA on 18 December 2019. These were submitted to the Department on 5 June 2020 and approved on the 29 June 2020.
M2.18	Landfilling of waste is prevented by crushing and recycling old refractory bricks through the kiln.	No waste materials are disposed on site.	
K3.17AB	The site-specific resource recovery exemption for full-scale GBFS use was issued by EPA on 19 September 2012.	The use of GBFS since 2012 has not resulted in an increase in stack emissions (see responses to air quality).	Current management measures for the use of GBFS are achieving desired outcomes.
K3.17AC	Compliance with this condition was detailed in the AEMR for 2013 – the trial was conducted between 14-16 May 2012 with stack testing on 15 May, the use of quality controlled GBFS and provision of a report on 13 July 2013.	The use of GBFS since 2012 has not resulted in an increase in stack emissions (see responses to air quality).	Current management measures for the use of GBFS are achieving desired outcomes.
K3.17AD	Compliance with this condition was detailed in the AEMR for 2013 – the verification report was provided on 13 July 2013 which reported that there were no stack contributions from the GBFS, coal use decreased and CO_2/CO emissions decreased.	The use of GBFS since 2012 has not resulted in an increase in stack emissions (see responses to air quality).	Current management measures for the use of GBFS are achieving desired outcomes.
K3.17AE	Compliance with this condition was detailed in the AEMR for 2013 – the Secretary approved the ongoing use of GBFS in a letter dated 7 September 2012.	Boral has been using less GBFS than the approved rate of 150,000 tonnes per annum.	Current management measures for the use of GBFS are achieving desired outcomes.

K3.17B	No AKF1 or other Group A wastes were stored on site during the reporting period.	The Operational Environmental Management Plan was updated in April 2018 in accordance with Condition 6.7 to incorporate measures for management of nonstandard fuels prior to their use at the site (approval letter received from DPE on 21/05/2018).	Boral undertook a review of the OEMP, and the to reflect the recent Mod 11 and 12 to the consent and changes to the EPL completed by the EPA on 18 December 2019. These were submitted to the Department on 5 June 2020 and approved on the 29 June 2020.
K3.17C	There has been no generation of wastes from the use of the SWDF non-standard fuels. No wastes can be generated when consumed in the kiln as any ash forms part of the clinker product. Minor spillages near the shed entrance are either swept into the shed or if contaminated with other materials such as aggregates etc this material is swept up and placed into the site skip bins used for other site waste. These skip bins are sent to Resource Co who intern make SWDF to supply to site.	Wastes generated from the use of nonstandard fuels on site will be classified using the NSW EPA's Waste Classification Guidelines in accordance with EPL Condition L4.2.	Wastes generated from the use of nonstandard fuels on site will be classified using the NSW EPA's Waste Classification Guidelines in accordance with EPL Condition L4.2.

Note: (K = Kiln 6, M = Mill 7)

5.7 Non-standard fuels

The non-standard fuels consent requirements for Kiln 6 are in conditions 3.20 to 3.28 of Development Consent No. 401-11-2002-i, which are replicated in Table 21 and considered in Table 22. The consent refers to EPL 1698, which provides non-standard fuel requirements in conditions O5, O6.1/2/3/4/5/6/7 and E4.

In August 2018 Boral Cement commenced the use of Solid Waste Derived Fuels (SWDF) including Wood Waste (WW) and Refuse Derived Fuels (RDF). As per condition 3.25 a Proof of Performance Trial was undertaken with the six month report submitted to the Department for approval on 28 February 2018.

On the 23 April 2019 the Secretary approved the ongoing use of SWDF subject to:

a) limiting the amount of SWDF to be fired in Kiln 6 to 40%, as a percentage of total fuel,
b) periodic stack testing being undertaken every three months for the first 12 months of use of SWDF. The monitored pollutants must be consistent with the requirements of the Environment Protection Licence (EPL 1698)
c) provision of a monitoring report that outlines the results of the quarterly stack testing required in (b) above and provides an assessment of compliance against the air emissions limits for the facility, to the satisfaction of the Secretary
d) periodic measurements of hydrogen chloride (HCl) taken every three months until such time the Secretary agrees the accuracy of the HCl CEMS is confirmed through successful calibration audits undertaken in accordance with the USEPA Performance Specification 18.

The EPA updated the licence to reflect these changes in December 2019.

During the reporting period SWDF usage increased from 28 997t to 44 767t.

On the 16 November 2018 Boral sought approval from the Department to store up to 17 500t of carbon anode material (Hi Cal 50), sourced from the former Hydro Aluminium Kurri Kurri smelter for a period of 36 months. The Department reviewed the request and the additional information provided in consultation with the EPA and on 4 April 2019 confirmed approval of:

- the 'Hi Cal 50 Storage and Handling Procedure', Version 3 dated 27 March 2019 and
- the 'Hi Cal 50 (Carbon anode ex-Hydro Kurri Kurri) Recovered Resource Specification Version 3 dated 27 March 2019

During the 2019/20 reporting period (October 2019) MOD 11 was approved to permit the use of Hi Cal 50 during start up conditions. The site consumed 7410t during the 2020/21 reporting period, using HiCal historically stored prior to the Hi Cal stored ex-Hydro Kurri Kurri. The site will commence consuming the ex- Hydro Kurri Kurri in July 2021. At a rate of 500t per month this should be consumed within 26 Months. Boral will seek an extension on the initial 36 month approval by March 2022.

Table 20: Non-standard fuels conditions

<table>
<tr><th>Number</th><th>Condition</th></tr>
<tr><td>K1.4A Use of non standard fuels</td><td>Subject to meeting the requirements of this consent, and the requirements of a licence issued under the Protection of the Environment Operations Act 1997 for the site, the following fuels are permitted to be received at the site for use at the upgraded Kiln 6 development at the quantities, firing rates and proportions specified in Table 1.

Table 1 – Permitted Fuels for use in upgraded Kiln 6
<table>
<tr><th>Fuel</th><th>Category</th><th colspan="2">Tonnes per annum</th></tr>
<tr><td>Natural Gas, Fuel Oil, Diesel</td><td>Standard Fuel</td><td colspan="2">No limits</td></tr>
<tr><td>Coal</td><td>Standard Fuel</td><td colspan="2">No Limit</td></tr>
<tr><td>Coke Fines</td><td>Standard Fuel</td><td colspan="2">No Limit</td></tr>
<tr><td>Hi Cal 50</td><td>Non-Standard Fuel</td><td colspan="2">10,000</td></tr>
<tr><td>AKF1</td><td>Non-Standard Fuel</td><td colspan="2">20,000</td></tr>
<tr><td>AKF5</td><td>Non-Standard Fuel</td><td>30,000</td><td rowspan="3">≤100,000 combined</td></tr>
<tr><td>Wood Waste</td><td>Non-Standard Fuel</td><td>50,000</td></tr>
<tr><td>RDF</td><td>Non-Standard Fuel</td><td>80,000</td></tr>
</table>
Note: The consent, as modified, permits only the use of the fuels listed above at the specified quantities. The use of any additional fuels would be the subject of appropriate assessment and determination under the Act. This consent, as modified, does NOT approve the establishment of a protocol for general use of Non-Standard Fuels.</td></tr>
<tr><td>K1.4B</td><td>AKF5 is approved for use at the development under this consent subject to the necessary approvals under the Act being obtained for storage facilities and kiln feeding infrastructure. No

AKF5 is permitted to be received at the site until the necessary storage facilities and kiln feeding infrastructure have been constructed in accordance with any such approvals. Storage of AKF5 must be in accordance with Fire & Rescue NSW (Fire Safety Branch) Guidelines for Bulk Storage of Rubber Tyres.

If the Applicant proposes to exceed the stockpile sizes and heights within the above Guidelines, the Applicant must obtain written approval from Fire and Rescue NSW, to the satisfaction of the

Secretary.</td></tr>
<tr><td>K1.4C</td><td>Hi Cal 50 and AKF1 are approved for use at the development under this consent subject to the detailed design for any necessary storage facilities and kiln feeding infrastructure being approved to the Secretary. In particular, the detailed design shall:

a) demonstrate that the storage facilities would be appropriately bunded in accordance with the relevant Australian Standards, especially Australian Standard AS1940-2004 (for AKF1, this would include having a minimum capacity sufficient to accommodate catastrophic failure of the tank and that adequate measures are in place to ensure a catastrophic failure of a tanker during transfer was adequately contained to ensure no off-site discharge;

b) include appropriate measures to ensure liquids draining from the bund (and other containment areas) are kept separate and adequately treated prior to discharge to the onsite stormwater management system, and demonstrate that these measures were developed in consultation with the Sydney Catchment Authority and Wingecarribee Shire Council; and

c) include a Fire Safety Study prepared in accordance with the Department’s guideline Hazardous Industry Planning Advisory Paper No. 2: Fire Safety Study and in consultation with Fire and Rescue NSW. A construction certificate must not be issued in relation to any necessary storage facilities and kiln feeding infrastructure until the Secretary has approved the detailed design parameters. No Hi Cal 50 or AKF1 is permitted to be received at the site under this consent until any necessary storage facilities and kiln feeding infrastructure have been constructed in accordance with the detailed design parameters approved by the Secretary.</td></tr>
</table>

K1.4CA	Notwithstanding condition 1.4C of this consent, the Applicant is permitted to undertake a single trial of chipped tyres in the development, ahead of the construction of storage facilities and kiln feeding infrastructure for AKF5, provided that the trial meets the following requirements: a) no more than 205 tonnes of 2" chipped tyres is to be received at the site for the trial; b) the trial shall be conducted over no more than six months from the date of first receipt of the trial materials, after which any remaining trial materials shall be removed from the site to a facility lawfully permitted to accept the materials; c) the trial shall be undertaken for the purpose of investigating design and operational aspects of the full-scale use of AKF5; d) the trial shall be undertaken in full compliance with the environmental performance standards stipulated in this consent, and the requirements of the Environmental Protection Licence for the site; e) the Applicant shall consult with and meet the requirements of the EPA with respect to undertaking the trial, and shall not commence the trial without the prior written approval of the EPA; f) trial materials shall be stored in an area that is sealed, or otherwise treated to the satisfaction of the Secretary, and away from all potential ignition sources; g) the Applicant shall notify Fire and Rescue NSW prior to the receipt of trial materials on the site, and address any requirements with respect to the safe storage of the trial materials; h) the Applicant shall notify the Secretary, the EPA and the Community Liaison Group prior to the commencement of the trial; and i) the Applicant shall report the status and outcomes of the trial to the Secretary and the EPA on a monthly basis from the date that trial materials are first received on the site until conclusion of the trial.
K1.4D	Only Standard Fuels and the Group 1 Non-Standard Fuel, Hi Cal 50, are permitted to be used at the development during start-up and shut-down.
K1.4E	Non-Standard Fuels are not permitted to be stored at the site for longer than 3 months, except with the written permission of the Secretary.
K1.4F	No Non-Standard Fuel is permitted to be received at, or used at the development, unless it complies with: a) the handling, transporting, sampling, analysis and quality control requirements of this consent; b) any requirements of a licence issued under the Protection of the Environment Operations Act 1997 for the site; and c) the fuel specification for that specific fuel.
K1.4G	Prior to the receipt of the first batch of a Group 1 Non-Standard Fuel from a particular supplier, the Applicant shall certify in writing to the Secretary that the supplier has implemented appropriate quality control and quality assurance procedures to ensure the Applicant's responsibilities under this consent can be met. At the request of the Secretary, the Applicant shall forward a copy of the supplier's quality control and quality assurance procedures to the Department demonstrating how those procedures cause the Applicant to meet the requirements of this consent.
K1.4H	Prior to the receipt of the first batch of a Group 2 Non-Standard Fuel from a particular supplier, the Applicant shall certify in writing to the Secretary that the supplier has met the pre-qualification requirements set out in the approved Quality Assurance and Control Procedure for Receipt and NSW Government Department of Planning and Environment 8 Use of Solid Waste Derived Fuels (Appendix 1 of this consent) and that the Applicant's responsibilities under this consent can be met. At the request of the Secretary, the Applicant shall forward a copy of the supplier's quality control and quality assurance procedures to the Department demonstrating how those procedures cause the Applicant to meet the requirements of this consent.

K1.4I	Prior to the receipt of the first batch of SWDF the Applicant shall develop and submit operational procedures for co-firing SWDF to ensure that the temperature of gas generated in the process is raised to a minimum temperature of 8500C for a minimum of two seconds. Operational procedures must include interlocks in the process control system.
K1.4J	Hi Cal 50 must only be used in Kiln 6 when lended with coal to create a homogenous blend. The concentration of Hi Cal 50 in the blend must not exceed 4%.
K3.20 Non-Standard Fuel Specifications	For each Group 1 or Group 2 Non-Standard Fuel approved for use at the development the Applicant shall provide a fuel specification, to be approved by the Secretary and the EPA prior to the use of that Non-Standard Fuel at the development under this consent. The Non-Standard Fuel specification shall include, but not be limited to, the minimum calorific value and the maximum quantity of all relevant pollutants, particularly the listed pollutants.
K3.21	Based on the Non-Standard Fuel specification specified in condition 3.20 the following Non-Standard Fuel specification criteria are required to be met: a) deleted MOD-109-9-2006-i; b) for Hi CAL 50 a mercury specification no greater than 1 mg/kg and a cadmium specification no greater than 10 mg/kg; c) for AKF1 a mercury specification no greater than 2 mg/kg and a cadmium specification no greater than 5 mg/kg; d) organohalogen compounds, expressed as chlorine, in any Non-Standard Fuel not to exceed 1% by weight; and e) the waste materials to be used as Non-Standard Fuels must not be diluted or blended to meet any of the fuel specification requirements.
K3.22 Non-Standard Fuels Pollution Tracking	Prior to the use of any Group 1 or Group 2 Non-Standard Fuels at the development in accordance with this consent, the Applicant shall implement a Tracking Program that meets the requirements of the Secretary. The Tracking Program shall include, but not be limited to, the identification and recording of the following information in accordance with the time periods specified in condition 3.23: a) batch analyses of Non-Standard Fuels received at the development as provided by the suppliers, and the results of any check analyses carried out by the Applicant as part of the quality control management procedures required under condition 6.7 and condition 6.8 of this consent; NSW Government Department of Planning and Environment 13 b) a mass inventory of each listed pollutant entering the process in raw materials, conventional fuels and Non-Standard Fuels, with particular attention to, but not limited to chlorine, mercury, cadmium and chromium; c) emission factors for each listed pollutant calculated from inputs, outputs, and measured air emissions, variance in the emissions factors from period to period and an assessment with regards to the reasons for any such variance; and d) any adjustments that may be necessary to Non-Standard Fuel specifications arising from the Tracking Program analysis.
K3.23	The Applicant shall submit a Report that details and assesses the results of the Tracking Program prescribed in condition 3.22 of this consent to the Secretary. The Report shall be submitted to the Secretary: a) every three months in the first year of operation using Non-Standard Fuels under this consent, (to be synchronised with stack monitoring); and b) thereafter every six months, or as otherwise agreed to by the Secretary.
K3.24 Process Parameters	The Applicant shall cease to burn Non-Standard Fuels in Kiln 6 if: a) the temperature is below 8500C in the zone where Non-Standard Fuels are fired or in the vicinity of the pre-calciner; or b) the temperature is below 3000C at the outlet of the preheater strings.
K3.25	The Applicant must undertake PoP trials for the burning of SWDF. The maximum length of the trial will be eight months. At least one month prior to the PoP trials, the Applicant shall submit a detailed plan(s) for the PoP trials, to the satisfaction of the Secretary. The plan(s) must be prepared for the co-incineration of each permitted SWDF and be prepared in consultation with the EPA. The plan(s) must, as a minimum:

	a) verify the residence time, the minimum temperature and the oxygen content of the exhaust gas which will be achieved during normal operation and under the most unfavourable operating condition anticipated; b) establish all criteria for operation, control and management of the abatement equipment to ensure compliance with the emission limit values specified in the EPL; c) assess the performance of any monitors on the abatement system and establish a maintenance and calibration program for each monitor; d) establish criteria for the control of all alternative fuel input including the maximum flow and maximum calorific value; e) confirm that all measurement equipment of devices (including thermocouples) used for the purpose of establishing compliance with this approval have been subjected, in situ, to normal operating temperatures to prove their operation under such conditions; f) detail procedures for testing the performance of all major process components and emission control systems associated with the processing and burning of SWDF; and g) address all relevant requirements of the EPL for the project.
K3.24A	The temperature requirement of Condition 3.24(b) does not apply to the Group 1 Non-Standard Fuel Hi Cal 50, when Hi Cal 50 is blended with coal in accordance with the requirements of condition 1.4J.
K3.24B	Notwithstanding Condition 3.24A, the feed rate of the Group 1 Non-Standard Fuel, Hi Cal 50, must not exceed 400kg/hr when the temperature is below 300°C at the outlet of the preheater strings.
K3.26	The PoP trials shall: a) be carried out in accordance with a detailed PoP plan(s) approved by the Secretary; b) be undertaken by a suitably qualified and experienced person(s); c) test performance of all major process components including emission control systems using no SWDF, and representative fuels containing SWDF designed to cover the range of materials and compositions of SWDF; d) identify changes to the Kiln 6 emission control system that may be necessary to achieve compliance with the consent and the EPL; and e) demonstrate compliance with the relevant requirements of the EPL, development consent and relevant environmental and safety criteria.
K3.27	The Applicant is to report on each PoP trial to the Secretary and EPA. The reports shall be submitted at: a) monthly intervals during the PoP trial. The information to be contained in these reports is to be determined in consultation with the EPA as part of the PoP Trial Plan required under condition 3.25; and b) six months after the commencement of the PoP trial. The six month report shall contain but not be limited to the following information: i. the total quantity of SWDF used during the previous six months; ii. the dates and times when the trial commenced and will conclude; iii. the results of stack emissions testing for the analytes and properties specified in any relevant trial plan and baseline emissions for comparison, where applicable; iv. all monitoring data collected for the project during the previous six months; v. identification of any non-compliance with the conditions of this consent and the EPL; vi. details of additional measures to be implemented to address any non-compliance; and vii. an assessment of the suitability of the SWDF for ongoing use.

	Copies of the POP Trial Reports shall be made available to the public upon request.
K3.28	Use of SWDF is not permitted (outside of the approved PoP trials) until such time as the Secretary has indicated in writing that it is satisfied with the results of the six month PoP trial report specified under condition 3.27 b) for an individual SWDF.
K7.3A	In each Annual Management Report submitted after the First Year Monitoring and Modelling Assessment Report required in accordance with condition 7.6 has been submitted, the applicant shall include details of the use of all Non-Standard fuels at the development including but not limited to: a) the nature, quantity and quality of Non-Standard Fuels used at the development b) details of any fuels that did not meed the Fuel Specification, including the source of the fuels and how the rejected fuels were managed or disposed of; c) a review of the results of the Non-Standard Fuels Tracking Program and Non-Standard Fuels Quality Control Management Procedures; and d) the results of all monitoring undertaken in accordance with the requirements of this consent and an assessment of these monitoring results, including comparison of stack emissions against the concentration limits set in condition 3.10.
K7.6	One year after the commencement of the use of Non-Standard Fuels in accordance with this consent, the Applicant shall prepare a First-Year Monitoring and Modelling Assessment Report. The Report shall be submitted to the Secretary, the NSW Department of Health and the EPA not more than 15 months after the commencement of the use of Non-Standard Fuels in accordance with this consent.

Note: (K = Kiln 6, M = Mill 7)

Table 21: Response to non-standard fuels conditions

Condition / EIS prediction	Performance during reporting period	Trend / management implications	Implemented / proposed management actions
K1.4A	The majority of fuel consumed was coal. Small amounts of diesel are used during kiln start-ups. The site commenced the use of SWDF's in August 2018.	SWDF are now in use. Usage has increase from 21809t in 2018/19 to 28997t in 2019/20	Boral undertook a review of the OEMP, and the to reflect the recent Mod 11 and 12 to the consent and changes to the EPL completed by the EPA on 18 December 2019. These were submitted to the Department on 5 June 2020 and approved on the 29 June 2020.
K1.4B	No AKF 5 was received, stored or used at the site during the reporting year.	NA	
K1.4C	Compliance was confirmed in the 2007-2008 AEMR.	The site will be recommencing the use of HiCal50 in 2020/21	
K1.4CA	Boral did not conduct any tyre trials in the reporting period.	Trials are one-off events that do not display reportable trends.	No trials were conducted and no associated management actions were required.
K1.4D	No non-standard fuels were used during start-up or shut-down conditions.	SWDF are currently the only non-standard fuels in use. These are fed into the Calciner and are easily removed during start-up and shut down conditions	Modification 11 was approved on 25 October 2020 which permits the use of HiCal50 when blended with coal at 4% HiCal 50 to 96% coal during start-up and shut down conditions.
K1.4E	Written approval from the Secretary received (4/4/2019) to store up to 17 500t of HiCal 50 for three years.	NA	Manage as per approved HiCal50 Storage and Handling Procedure and Hi Cal 50 Recovered Resource Specification. Request to extend will be required during the reporting period.
K1.4F	All non-standard fuels received and used at site are tested to ensure compliance with approved specifications.		
K1.4G	Boral provided and had approved from the Secretary their own procedures for the Group 1 HiCal 50 Specification and Storage procedures as Boral are processing and testing for supply.	NA	NA
K1.4H	Boral provided in writing to the Secretary on 12 July 219 that the Group 2 SWDF supplier Veolia had implemented appropriate quality control and quality assurance procedures with		Boral will continue to review suppliers prior to the receipt of the first batch SWDFs from a particular supplier. No change or new supplier in the 2020/21 reporting period.

	correspondence from DPIE on 5/9/19 acknowledging receipt of review.		
K1.4I	Operational procedures were submitted as part of the PoPT plan process.		
K1.4J	HiCal will be blended within the coal blending plant when in use.		
K3.20	HiCal50 specification was approved on 4/4/2019. PoPT for SWDF including specification approved 28/8/2018.		
K3.21	All non-standard fuels have met the specified non-standard fuel specifications.	The review of results is undertaken on a routine basis.	
K3.22	The Non-Standard Fuels pollutant tracking procedure (SP10-01-10 Non-Standard Fuels Pollutant Tracking Procedure) was issued on 1 March 2003 and a copy was provided to DP&E by email on 2 March 2003. The procedure addresses all requirements of Condition 3.22.		
K3.23	The first Tracking Program report will be submitted within two weeks of the first quarterly stack test post PoPT trial approval then every six months following receipt of stack test results.	Six monthly reports to be submitted.	The second report for the reporting period is due to be submitted.
K3.24	This is complied with.		
K3.25	PoPT plan was approved in consultation with the EPA		
K3.26	The PoPT was approved by the DPE 28/8/2018	PoPT was completed during the 2019/20 reporting period.	
K3.27	All PoPT monthly reports and the six monthly report were submitted to the Secretary and the EPA. The reports are available on request.	The PoPT six month report was accepted and approved by the DPE with continual use (with conditions) of SWDF approved by the Secretary on 23/4/2019.	The site will need to engage with the EPA and DPIE if we are to go to 50% SWDFs to undertake some PoPT at that rate.
K3.28	The continual use of SWDF was approved by the Secretary on 23/4/2019.		
K3.24B	HiCal is used at the approved rate.		
K7.3A	Only SWDFs were is use during the reporting period. This material came from the three approved suppliers. Two Wood Waste and one Refuse Derived Fuel. A total of 34767t was used during the reporting period. Weekly meetings are		

	held with suppliers to provide updates on operational demands and to review quality and the contracted specifications. All material met the consented specification during the reporting year. 1 out of the 2 six monthly non-standard fuel tracking program reports were submitted for the reporting period with the final report to be completed shortly. An independent 3rd party audit was undertaken on QC management procedures of all suppliers in April 2021, with no non-compliances raised. Table 12 under section 5.3 summarises stack emission test results against the licence limits. All stack tests undertaken during 2020/21 were compliant with licence limits.		
K7.6	A first year assessment report was submitted in November 2019 to the DPIE.		

Note: (K = Kiln 6, M = Mill 7)

5.8 Visual amenity

The visual amenity consent requirements for Kiln 6 are in conditions 3.18 to 3.19A of Development Consent No. 401-11-2002-i and for Mill 7 in Condition 2.19 of Development Consent No. 85-4-2005-i, which are replicated in Table 23.

Compliance with the construction requirements of the second Kiln 6 pre-heat tower was demonstrated in previous AEMRs. It is demonstrated in Table 24 that the community has not historically lodged complaints about the visual amenity of the site and this continues for the current reporting period.

Table 22: Visual amenity conditions

Number	Condition
K3.18 Visual Amenity Impacts	The Applicant shall ensure that all external lighting associated with the cement works upgrade, and including those lights already erected, is mounted, screened, and directed in such a manner so as not to create a nuisance to surrounding properties or roadways. The lighting shall be the minimum level of illumination necessary and shall comply with AS 4282(INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting.
K3.19	The second pre-heater tower shall be designed, constructed, operated and maintained in a manner that minimises the visual impact to surrounding properties and roadways. Note: The second pre-heater tower shall be built in a manner consistent with that described in the additional information provided (identified in condition 1.2 f)). This includes using the building materials identified and minimising the height of the pre-heater tower.
K3.19A	Operational stockpiling of RDF in the external bale material storage area (identified on Drawing No.GE-B-2278-01 Revision DP, dated 15 January 2015) is limited to periods of extended kiln downtime for maintenance or repair only. RDF for stockpiling must be delivered in plastic wrapped 1 cubic metre bales. Stockpiles must not exceed a maximum height of five metres.
M2.19 Visual Amenity	Impacts The Applicant shall ensure that all external lighting associated with the cement works upgrade, and including those lights already erected, is mounted, screened, and directed in such a manner so as not to create a nuisance to surrounding properties or roadways. The lighting shall be the minimum level of illumination necessary and shall comply with AS 4282(INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting.

Note: (K = Kiln 6, M = Mill 7)

Table 23: Response to visual amenity conditions

Condition / EIS prediction	Performance during reporting period	Trend / management implications	Implemented / proposed management actions
K3.18 Visual Amenity Impacts	Provision of lighting at the Berrima Cement Works complies with AS 4282(INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting.	No community complaints regarding light spill have been received during the reporting period – the community has not previously complained about light spill from the site.	A minimum amount of lights must be on during nigh time for safety, however, management measures are implemented to prevent significant light spill from the site.
K3.19	Compliance with this condition has been confirmed previously.	No community complaints regarding light spill have been received during the reporting period – the community has not previously complained about light spill from the site.	Planting of trees for visual screening is effectively shielding the tower from sensitive receivers – this screening will become more effective as plantings mature.
K3.19A	Managed by the site EMP	No community complaints were received in relation to stockpiling	N/A
M2.19 Visual Amenity	Provision of lighting at the Berrima Cement Works complies with AS 4282(INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting.	No community complaints regarding light spill have been received during the reporting period – the community has not previously complained about light spill from the site.	A minimum amount of lights must be on during nigh time for safety, however, management measures are implemented to prevent significant light spill from the site.

Note: (K = Kiln 6, M = Mill 7)

5.9 Rehabilitation

The Guideline requirement for reporting on rehabilitation activities focuses on mining, however, Development Consent No. 401-11-2002-i and Development Consent No. 85-4-2005-i relate to activities in a cement production facility. Areas disturbed during construction of the SWDF facility are being rehabilitated in accordance with *Construction Environmental Management Plan – Solid Waste Derived Fuels Project* (Boral 2017).

5.10 Community

The community relations conditions for Kiln 6 are in conditions 5.1 to 5.5 of Development Consent No. 401-11-2002-i and in conditions 4.1 to 4.3 of Development Consent No. 85-4-2005-i for Mill 7 (Table 25). Performance for both consents are reported under the conditions for Kiln 6 in Table 26 because the conditions are the largely the same in both consents.

14 community complaints were received during the reporting period, all of which related to dust generation and deposition. These were addressed individually with each complainant. Due to Covid-19 no whole of community meetings were held during the reporting period.

The Community Liaison Group (CLG) was re-established during the 2019/20 reporting period with the members endorsed by the DPIE on 30 August 2019.

Only two meetings were held during the reporting period on 3 September 2020 and 10 December 2020. These were held virtually due to Covid-19.

Details of these meetings are held on the (**www.boral.com.au/berrimacement**) website.

Table 24: Community conditions

Number	Condition
K5.1	Subject to confidentiality, the Applicant shall make all documents required under this consent available for public inspection upon request. This shall include provision of all documents at the site for inspection by visitors, and in an appropriate electronic format on the Applicant's internet site, should one exist.
K5.2	Prior to the commencement of construction for the cement works upgrade, the Applicant shall ensure that the following are available for community complaints for the life of the cement works upgrade (including construction and operation): a) a telephone number on which complaints about operations on the site may be registered; b) a postal address to which written complaints may be sent; and c) an email address to which electronic complaints may be transmitted, should the Applicant have email capabilities. The telephone number, the postal address and the email address shall be displayed on a sign near the entrance to the site, in a position that is clearly visible to the public. These details shall also be provided on the Applicant's internet site, should one exist.
K5.3	The Applicant shall record details of all complaints received through the means listed under condition 5.2 of this consent in an up-to-date Complaints Register. The Register shall record, but not necessarily be limited to: a) the date and time, where relevant, of the complaint; b) the means by which the complaint was made (telephone, mail or email); c) any personal details of the complainant that were provided, or if no details were provided, a note to that effect; d) the nature of the complaint; e) any action(s) taken by the Applicant in relation to the complaint, including any follow-up contact with the complainant; and f) if no action was taken by the Applicant in relation to the complaint, the reason(s) why no action was taken. The Complaints Register shall be made available for inspection by the EPA or the Secretary upon request.
K5.4	Prior to the use of Non-Standard Fuels at the development the Applicant shall establish a Community Liaison Group that has access to all environmental management plans and monitoring data, environmental reporting and tracking and audit reports required by this consent. The Group shall: a) be comprised of the following, whose appointment has been approved by the Secretary: i) 1 or 2 representatives from the Applicant, including the person responsible for environmental management at the development; ii) 1 representative from Council; and iii) 3 or 4 representatives from the local community. b) be chaired by a representative agreed to by the Group and approved by the Secretary; c) meet a minimum of once in every 6 month period; and d) review and provide advice on the environmental performance of the development, including providing comment where necessary on any environmental management plans, monitoring results, audit reports, or complaints.
K5.5	The Applicant shall at its own expense: a) ensure that 1 or 2 of its representatives attend the Group's meetings; b) provide the Group with regular information on the environmental management and performance of the development; c) provide access to independent scientific/technical support to assist member in understanding and interpreting information provided, if requested; d) provide meeting facilities for the Group, where necessary; e) arrange site inspections for the Group, if requested; f) take minutes of the Group's meetings and make these minutes available to the public for inspection within 14 days of the Group meeting, or as agreed to by the Group; g) respond to any advice or recommendations the Group may have in relation to the environmental management or performance of the development; and h) maintain a record and a copy of the minutes of each Group meeting, and any responses to the Group's recommendations, to be provided to the Secretary upon request. Note: The above condition's also cover all elements of conditions 4.1 to 4.3 of the conditions set out for the development on Cement Mills 7.

Note: (K = Kiln 6, M = Mill 7)

Table 25: Response to community conditions

Condition / EIS prediction	Performance during reporting period	Trend / management implications	Implemented / proposed management actions
K5.1	Development Consent No. 401-11-2002-i, Development Consent No. 85-4-2005-i and EPL 1698 are available for inspection on request at the Berrima Cement Works. Current environmental monitoring data under the EPL is available at https://www.boral.com.au/our-commitment/environmental-reporting The site's environmental management plans and some previous AEMRs are available at (www.boral.com.au/berrimacement)	Boral historically and continues to make information available on request at the site and on the site's website.	Boral will continue to make information available on request at the site and on the site's website.
K5.2	Berrima Cement Plant's complaints procedures are documented in the operational environmental management plan and subordinate plans. Contact details for Boral Cement Berrima are included on all site entrance signage, and include a telephone number, postal address and email address. Additionally, contact details are provided on the website (www.boral.com.au/berrimacement)	Boral historically and continues to provide contact information on signs and on the site's website.	Boral will continue to make information available on request at the site and on the site's website.
K5.3	Berrima Cement Plant's complaints procedures are documented in the Operation Environmental Management Plan and subordinate plans. A summary of all complaints (by type) received during this reporting period of 1/05/2019 – 30/04/2020 is provided in Appendix 2. There were 78 complaints, each of which related to dust.	The number of complaints were higher than last year and is largely reflective of the Dust event that occurred in late June 2019 which resulted in a Penalty Infringement Notice from the EPA issued in December 2019.	Boral will continue to implement the Operational Environmental Management Plan to prevent nuisance impacts on neighbouring properties and implement the real-time dust monitor.
K5.4	The community liaison committee (CLC) was originally established in April 2004. Since 2010, the CLC was converted to public meetings, including invitations to the CLC members, as, at the time the CLC format proved unsuccessful in communicating meeting contents and outcomes to the broader community. In 2019/20 the Community Liaison Group was re-established. In 2020/21 the Community Liaison Group met twice with meetings held virtually.	The aim is for the CLG to meet quarterly and there will be one whole of community meeting held annually.	The CLG only met twice during the reporting period due to COVID disruptions and restrictions. No whole of community meeting held in the reporting period.

	No whole community meeting was held during this reporting period. Notes of meetings and copies of presentations made at the community meetings are sent to all meeting participants and are displayed in the community section of the Berrima website: (www.boral.com.au/berrimacement)		
K5.5	The Berrima Cement Management Team is represented by the Site Operations Manager and the Environmental Sustainability Manager, together with Boral's Stakeholder Relations Manager - Southern Region (NSW/VIC/TAS/SA), and a representative from Boral Cement's Group Engineering Team. Minutes from the CLG meetings have been posted on the website.	Boral has historically, and will continue to, respond to requests from CLG members and post the meeting minutes on the website.	Boral will continue to respond to requests from CLG members and post the meeting minutes on the website.

Note: (K = Kiln 6, M = Mill 7)

6 INDEPENDENT AUDIT

Condition 4.5 of the Kiln 6 development consent and Condition 3.3 of Cement Mill 7 development consent require Boral Cement to audit the site once every three years. Both conditions are nearly identical and the audit is undertaken as a single operation. Condition 4.5 of the Kiln 6 development consent states:

Within three years of the commencement of operation of the cement works upgrade, and every three years thereafter or as otherwise required by the Director-General, the Applicant shall commission an independent person or team to undertake an Environmental Audit of the cement works upgrade. The independent person or team shall be approved by the Director-General, prior to the commencement of the Audit. An Environmental Audit Report shall be submitted for comment to the Director-General, the EPA and Council, within one month of the completion of the Audit. The Audit shall:

- *be carried out in accordance with ISO 14010 - Guidelines and General Principles for Environmental Auditing and ISO 14011 - Procedures for Environmental Auditing;*
- *assess compliance with the requirements of this consent, and other licences and approvals that apply to the cement works upgrade;*
- *assess the cement works upgrade operations against the predictions made and conclusions drawn in the SEE and other documents listed under conditions 1.2a to 1.2q inclusive; and*
- *review the effectiveness of the environmental management of the cement works upgrade, including any environmental impact mitigation works.*

The Secretary may, having considered any submission made by the EPA and/or Council in response to the Environmental Audit Report, require the Applicant to undertake works to address the findings or recommendations presented in the Report. Any such works shall be completed within such time as the Director-General may agree.

The above wording is replicated in Condition 3.3 of the Mill 7 development consent.

2020 Audit

During November 2020 Robert Byrnes from International Environmental Consultants undertook the three yearly audit. This was finalised on 3 February 2021. This audit was undertaken as per condition 4.5 of DA401-11-2002i and condition 3.3 of DA85-4-2005i.

The DPIE accepted the audit report on 11 March 2021, and requested that an update be provided in the next AEMR and future AEMRs until actions are completed. The audit report is also available on the Berrima Cement webpage.

Boral has reviewed the audit report and believed it complied with the requirements of the audit conditions.

The audit identified 5 non-compliances through the 3-year period which related to Condition 1.6, which is a general condition requiring the operations meet all other statutory obligations. These non-compliances all related to reported non-compliances to the EPA under EPL 1698 which were all appropriately reported and addressed at the time. These are outlined in Table 3.1 of the audit report and reproduced below.

Table 3.1 – Compliance Status Summary

Instrument	Condition	Year of Non-Compliance	Details
DA401-11-2002i	1.6	2019, 2020	Five Non-compliances with EPL conditions in relation to monitoring and emissions (as outlined in below)
EPL1698	L3.3	2018	Cadmium and Thallium exceedance of limits
	L3.3	2018	Solid particles exceedance of limits
	L3.3	2018	Hydrogen Chloride exceedance of limits
	M2.2	2019	HVAS failure to run on 4 occasions
	O2.1	2019	Failure of bag house filtration system resulting in excessive dust emissions. EPA infringement notice issued

The 2018 non-compliances were during the Solid Waste Derived Fuels Proof of Performance Trials, were of short duration and addressed at the time as part of the commissioning process.

Regarding the HVAS failure, as per the EPL the HVAS it is required to run every 6 days. On occasion it can fail to run due to power interruptions, programming failures or equipment failure. During the reporting period of 2019 this occurred on four occasions. These instances were beyond the control of the site. As a corrective action the site undertakes additional testing to make up for missed events. To reflect this approach the site Air Quality Management Plan was updated in June 2020 with the following:

'As with any type of monitoring equipment there is potential for failure to run. Should a sample not be collected due to equipment error and unintentional human error, this would not be considered a non-compliant event and an additional day will be added to make up for the missed sample.'

The baghouse failure incident resulted in a Penalty Infringement of $15000. Boral addressed this issue at the time of the event. The community were appropriately consulted, improvements made to the baghouse and a real-time dust monitor installed along with the implementation of a Trigger Action Response Plan (TARP) to reduce the risk of dust emissions on the community of New Berrima.

The audit identified the following recommendations:

1) Consideration should be given to either amalgamating the two current consents as they both have elements that overlap or updating the Cement Mill 7 consent to align with DA 401-11-2002-i-MOD12
2) The noise assessment criteria contained in the Cement Mill 7 Consent DA 401-11- 2002-I needs to be updated to align with the EPL and DA 401-11-2002-i-MOD12.
3) Bank erosion on the main batter slopes of the shale quarry should be corrected and the drainage system on the banks re-established.
4) Seek approval from Wingecarribee Shire Council to reinstate the truck warning signage on Taylor Road.

Boral took on these recommendations, and made the following comments and proposed to undertake the following to address the recommendations.

- Cement Mill 7 consent alignment – Boral will request a Modification to the current noise condition to align to DA 401-11-2002-I and EPL 1698. We will aim to undertake this by August 2021.
    - June 2021 update – We are still aiming to submit by August 2021.

- Bank erosion on main batter – this is an ongoing maintenance issue and will continually be addressed operationally as required.
    - June 2021 update – This continues to monitored. Higher than average rainfall during the reporting period has highlighted the ongoing need to manage.
- Signage – Truck warning. Boral will request the Council to reinstate truck warning signage on Taylor Avenue.
    - June 2021 update: A request was made to Council on 26 February 2021. A subsequent inspection identified that a warning sign is in place

7 INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD

There was only one non-compliance reported during the reporting period. This relates to condition 1.6 and a non-compliance reported to the EPA in our annual return. This is a low risk non-compliance and was beyond the control of the operations.

See details of non-compliance submitted to the EPA below.

C2. Details of Non-Compliance with Licence

Licence condition number not complied with ▼
M2.2 Point 13 - Dust deposition guage No.3
Summary of particulars of the non-compliance ▼
No sample analysed for August 2020 as the bottle was found destroyed.
Further details on particulars of non-compliance, if required ▼
NA
Number of times occurred ▼
1
Date(s) when the non-compliance occurred, if applicable ▼
August 2020
Cause of non-compliance ▼
Vandalism likely.
Action taken or that will be taken to mitigate any adverse effects of the non-compliance ▼
HVAS during the month of August 2020 at the same location for PM10 averaged 9.31 ug/m3 which is low.
Action taken or that will be taken to prevent a recurrence of the non-compliance ▼
Nil. This was the first breakage in some years. HVAS is also taken at this location for PM10.
Uploaded Document Name ▼
Uploaded Document Description ▼
NA

8 ACTIVITIES TO BE COMPLETED DURING THE NEXT REPORTING PERIOD

During the 2021-22 reporting period, in addition to the annual kiln shutdowns, the following projects will be undertaken or be progressed:

- Commence the installation of the Chloride By-pass
- Commence design and approval process to install a pilot carbon capture system pilot scale carbon capture and use project to improve the quality of recycled concrete, masonry and steel slag aggregates as part of a $2.4m grant from the Federal Government Carbon Capture, Use and Storage Development Fund.
- Update the OEMP to reflect recent Modifications to the consent.

APPENDIX 1 – ANNUAL ENVIRONMENTAL NOISE ASSESSMENT (SEE ATTACHED)

APPENDIX 2 – COMMUNITY COMPLAINTS REGISTER APRIL 2020-MAY 2021

DUST COMPLAINTS 2020

DATE	COMPLAINT ADDRESS	Complaint	HOW REPORTED	DEATIL & ACTION
15-May-2020	Brisbane Street, New Berrima	DUST	Called Central Control Room	Dust on car.
15-May-2020	Melbourne Street, New Berrima	DUST	Call CCR	Dust on car.
8-Jul-2020	Melbourne Street New Berrima	DUST	Phone call to Dean.	Dust on car.
8-Jan-2021	Sydney Street New Berrima	DUST	Phone call to CCR	Dust on car, voucher provided.
8-Jan-2021	Taylor Avenue New Berrima	DUST	Phone call to CCR	Dust on car, voucher provided.
8-Jan-2021	Brisbane street New Berrima	DUST	Phone call to CCR	Dust on car, voucher provided.
7-Jan-2021	Howard Street New Berrima	DUST	Attended site	Dust on car, voucher provided.
16-Feb-2021	Melbourne Street New Berrima	DUST	Phone call to CCR	Dust on car.
16-Feb-2021	Melbourne Street New Berrima	DUST	Phone call to CCR	Dust on car.
16-Feb-2021	Brisbane street New Berrima	DUST	SMS to Gabriel	Dust on car.
19-Feb-2021	Brisbane Street New Berrima	DUST	Call Branko	Dust on car, voucher provided.
22-Feb-2021	Brisbane Street New Berrima	DUST	Call Branko	Dust on car, voucher provided.
15-Mar-2021	Argyle Street, New Berrima	DUST	Dean	Dust on car, voucher provided.
27-Apr-2021	Brisbane Road New Berrima	DUST	Called Reception	Dust on car, voucher provided.

Recognition Research

Boral Cement

Annual Environmental Noise Assessment October 2020

For

Berrima Cement Plant

18 December, 2020

Recognition Research Pty Ltd
Unit 2 No 5 Thalassa Ave
East Corrimal NSW 2518

ABN: 25 153 946 064
ACN: 153 946 064

Boral Cement Berrima

Annual Environmental Noise Assessment
October 2020

Report of assessment

18 December 2020

RRRep:035

2019.12.17	0	Final Draft	Colin Tickell	Stephen Collings		Gabriel Paicu
Date	**Rev.**	**Status**	**Prepared By**	**Checked By**	**Approved By**	**Approved By**
Recognition Research						**Client**

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ABN: 25 153 946 064
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Table of Contents

ABN: 25 153 946 064
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Disclaimer

This report was prepared Recognition Research Pty Ltd, for the sole and exclusive benefit of Boral Cement (the "Owner") for the purpose of assisting the Owner to assess noise at the owner's site at Berrima Cement works, and may not be provided to, relied upon or used by any third party. Any use of this report by the Owner is subject to the terms and conditions of the agreement provided with the proposal RRPR-032 between Recognition Research and the Owner dated 6 August 2020, including the limitations on liability set out therein.

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This report contains the expression of the professional opinion of Recognition Research, based upon information available at the time of preparation. The quality of the information, conclusions and estimates contained herein is consistent with the intended level of accuracy as set out in this report, as well as the circumstances and constraints under which this report was prepared.

However, this report is a review of an existing facility and, accordingly, all estimates and projections contained herein are based on limited and incomplete data. Therefore, while the work, results, estimates and projections herein may be considered to be generally indicative of the nature and quality of the Project, they are not definitive. No representations or predictions are intended as to the results of future work, nor can there be any promises that the estimates and projections in this report will be sustained in future work.

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Executive Summary

The Boral Cement Berrima works has a single noise limit condition for the total site, of $L_{A90,15\text{-minute}}$ not greater than 58 dBA at Location 20 in the Store Yard. This replaced former conditions for major projects Kiln 6 Upgrade and Cement Mill No. 7 only. Monitoring for total site emissions at Location 20 over a 17 day period in October 2020 has confirmed that total site emissions are in compliance with the licence condition. Times when that sound level limit was exceeded at the site were caused by weather conditions and extraneous sources not relevant to the compliance assessment.

Sound levels at the plant and in the residential community affected by the noise emissions from the total site have been measured regularly since 2002 and since the completion of each of these projects. Monitoring of both site source sound levels and residential receiver sound levels on an annual basis since 2008 confirmed that both of the projects were in compliance with their noise limit conditions at the time.

The annual environmental noise assessment evaluates noise emission from the Cement Plant by the following methods:

- Monitoring of sound levels at Location 20 for compliance assessment;
- comparative measurements at the same locations around major plant sources of noise which have been assessed previously as in compliance with the limit conditions;
- calculation of the contribution sound levels at residential receiver locations from those source emission locations which are higher than in the past and comparison with a contribution objective;
- monitoring of sound levels in one residential receiver location with unattended monitoring over long-term periods of two weeks and attended monitoring in day, evening and night-time at four residential receiver locations to compare with long-term averages from previous years and assess the audible acceptability of the received sound levels.

The finding of this 2020 annual environmental noise assessment is that total site noise emissions are considered to be in compliance with the licence condition.

Sound levels from the two projects are also considered to be in compliance with their noise objectives at the nearest residential receiver locations.

It is also the finding of this assessment that the long-term average statistical sound levels have not increased and indicate that the Cement Plant is not increasing its emissions.

Measurements at the new location also assessed potential sleep disturbance and low-frequency impacts according to the 2017 release of the Noise Policy for Industry.

Calculations of sleep disturbance potential use $L_{A01.1\text{-minute}} - L_{A90.15\text{-minute}}$ at night-time to provide comparisons with recommended maximum values for night-time of 60 dBA for $L_{A01.1\text{-minute}}$ night-time for the Northern Boundary location and not greater than 15 dB difference for $L_{A01.1\text{-minute}} - L_{A90.15\text{-minute}}$. From the analyses it is considered that the number or times that the objectives of $\mathbf{L_{A01,1\text{-minute}}}$ greater than 60 dBA and $\mathbf{L_{A01.1\text{-minute}} - L_{A90.15\text{-minute}}}$ difference results greater than 15 dB are relatively low and the noise emissions from the Cement Plant have a low potential for sleep disturbance.

Only warning signals from train horns, train operations and truck bumps were likely to cause the 60 dBA objective to be exceeded.

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For low frequency assessment, an initial screening test is made of the C-weighted minus A-weighted (L_C-L_A) period sound level exceeding more than 15 dB. If the screening value is exceeded a one-third octave band frequency analyses is then made of un-weighted (or Z-weighted L_Z) sound levels in the low-frequency bands from 10 Hz to 160 Hz, compared to a specific value.

From the measurements in the residential receiver locations, the low frequency assessment was made on both $L_{Aeq,15\text{-}min}$ and $L_{A90,15\text{-}min}$ values. Exceedances were reported on three occasions at 12 Brisbane St and once at Adelaide St near Taylor Ave (20m) in line with 72 Taylor façade.

From the assessment of this survey it is considered that the main source of low-frequency noise events exceeding the policy objectives is from road traffic noise associated with trucks, either from within New Berrima or on distant roads and the freeway. The plant can be a source at times but this is not considered to be significant.

Site noise sources

Some sources of noise at the Cement Plant had increased sound levels from previous measurements. Recommendations for review of plant item performance or maintenance were made for the following:

For No.6 Kiln

- PHT Level 2.5 - A review of the condition of FA63 and its discharge silencer for 63 Hz band sound levels. This recommendation was also made in 2018 and 2019.
- The new kiln shell cooling fans have significantly increased the sound levels at locations on the northern side of the centre of Kiln 6. A review of alternatives for cooling of this area is recommended from a long-term aspect.
- Sound levels in the low frequency bands have increased around fan FA215. A review of the maintenance condition of the fan is recommended to identify if there is a reason for this increase.

For the No.7 Cement Mill and Cement Mill No.6:

- Cement Mill No.6 western wall fans discharge silencer.
- Cement Mill No.5 building FA502 and northern wall annex fan (DC702) fan discharges.
- Openings at the bottom of all main roller doors be able to seal to ground, not left open 50 to 100mm, or totally open.
- Openings of all smaller doorways be cleaned so they can close fully.
- Cement Mill No.6 - edges of the main northern wall doors have edge seals installed.

It is recommended that these items be reviewed for condition and silencers cleaned, replaced or installed if appropriate.

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1 Introduction

Boral Cement Limited operates the cement works at New Berrima, near Berrima and Moss Vale in the New South Wales' Southern Highlands region. In 2003, approval was granted to construct and operate an upgrade to Kiln 6 at the Site. In 2005, approval was granted to construct and operate No.7 Cement Mill at the site. Both of these developments had conditions of approval which included contribution noise objectives for different receiver areas in the adjacent residential and rural areas. Demonstration of compliance with these contribution objectives was required as a condition of approval for both projects.

Contribution noise objectives for the rest of the Berrima cement works have now been included in a consolidated Pollution Control Licence for the site, issued in 2019, and revised approval conditions for the projects, issued in early 2020. The new condition replaces several monitoring locations with different contribution sound levels, into just one single location with one contribution sound level to achieve from the plant. The location is known as Monitoring Location No.20 at the south-eastern corner of the western storage yard. Figure 1.1 shows an aerial view of the cement works and surrounding area, with the locations of Kiln 6 and No.7 Cement Mill and monitoring Location 20 indicated. Figure 1.2 shows an aerial view of the plant immediate locality with boundary environmental noise monitoring locations shown. A site layout plan of the works is shown in Figure 1.3.

Compliance assessment is now based on not exceeding the licence and approval condition of $L_{A90,15\text{-}min}$ not greater than 58 dBA. Reports of compliance assessment of the two projects were provided in 2005 for Kiln 6 Upgrade and in 2007 for Cement Mill No.7.

Noise monitoring of environmental noise and source noise is undertaken regularly on an annual basis in the neighbourhood of the plant and on site. Annual reporting of compliance assessments for the two projects was made from 2007 to 2019. Annual environmental noise assessments are provided to the NSW EPA and other statutory authorities.

Given the changes in the approval conditions, the annual noise assessment monitoring methods have been modified slightly. Attended monitoring continues at the same residential receiver locations as in the past. Unattended monitoring continues only at Location 20 (monitored since 2015), the North Fence location (monitored since 2008) and the residential receiver at 4 Melbourne Street (monitored since 2002.

For this 2020 annual noise compliance assessment, measurements of sound levels at the site and in residential areas of New Berrima were obtained from 9 to 27 October 2020.

During the period of measurements, the Kiln was operating for all of the monitoring period. Figures 1.4 to 1.6 show the idle times of the major plant items for short periods at different times. Table 1.1 shows the times of non-operation of the major plant items. Figure 1.4 shows the non-operating periods graphically for the whole period monitored, with Figures 1.5 and 1.6 showing the period split into two 9-day periods. CM6 and CM7 had short and longer periods of idle, from 30 minutes to two days, while RM6 had idle periods of up to 6 hours and RM7 up to 12 hours idle. Total idle periods were as follows:

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Plant Item	**Total time idle**	**Percent of monitoring period** (438 hrs) idle
CM6	132.25 hrs	30%
CM7	132.5 hrs	30%
RM6	62.75 hrs	14%
RM7	79.25 hrs	18%

Some of these periods may have affected measured sound levels at the residential receivers but most will not.

Measurements of continuous sound levels over the period 9 to 27 October were taken with logging sound level meters at previously measured site Location 20, Northern Boundary and one residential location at 4 Melbourne Street. The location at 30 Adelaide Street used in 2018 and 2019 to obtain background sound levels for residences potentially affected by truck movements from the proposed Austral Bricks quarry in East Berrima was not monitored. Locations monitored using unattended continuous sound level meters were:

- 4 Melbourne Street;
- Northern Boundary
- Location 20 Store Yard (close)

Measurements of attended sound levels were made during 15-minute periods in daytime, evening and night-time within the monitoring period. Locations monitored were the same as used in previous years. These were:

Residential Receivers:

- Argyle Street opposite the general store
- 4 Melbourne Street;
- 12 Brisbane Street
- Corner Adelaide and Taylor at 20m back from the edge of Taylor Ave to be in-line with the front of houses. This location provides the same immission as 72 Taylor Avenue used previously.

Cement Plant Site locations

- Northern Boundary
- Location 20 Store Yard (close)

This report provides an assessment of compliance of the current operation of the total Cement Plant site. Results are compared to those taken in 2005, and 2006, then the continuous annual reviews from 2010 to 2019.

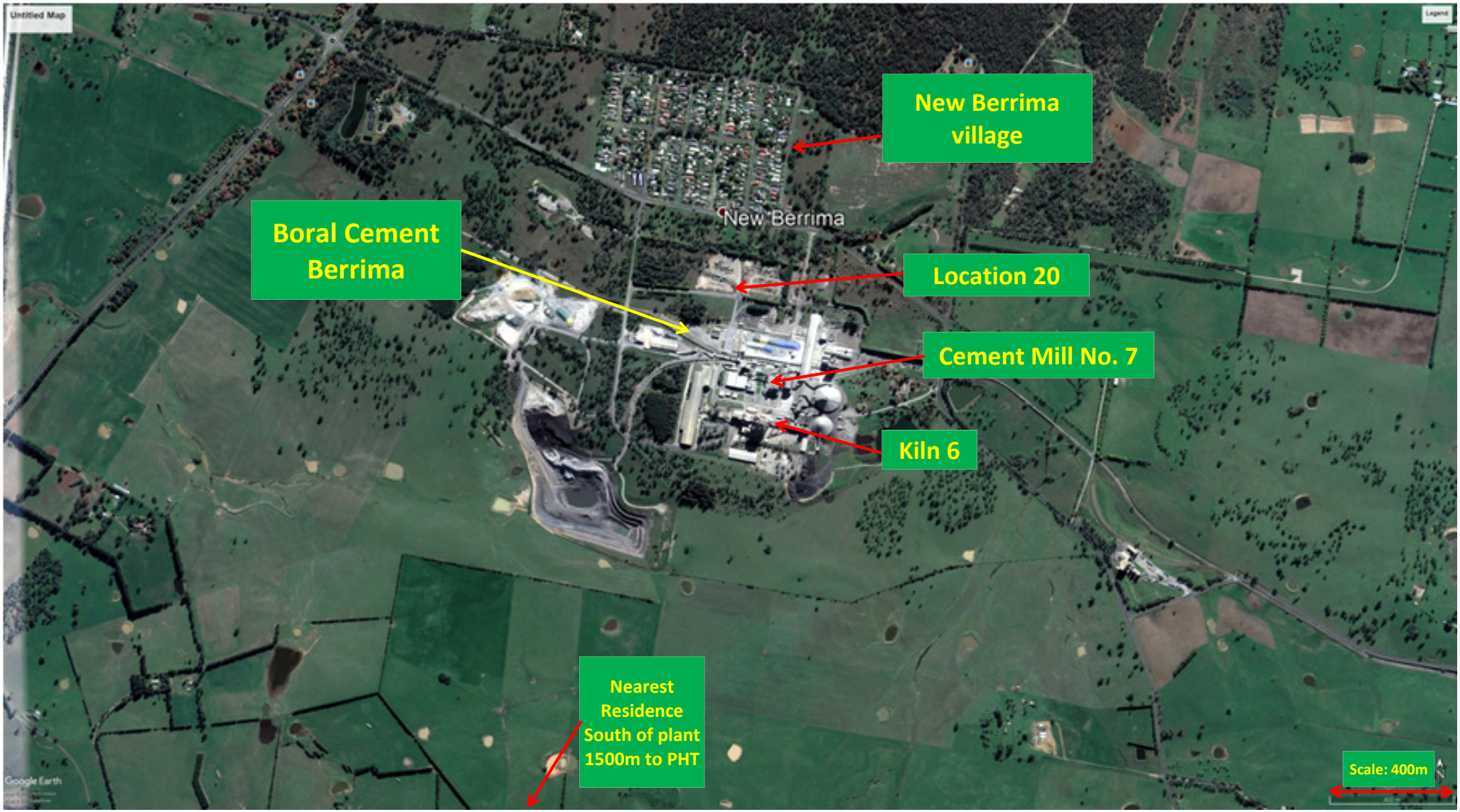


Figure 1.1: Boral Cement Berrima Annual Environmental Noise 2020 - Plant location and surrounds

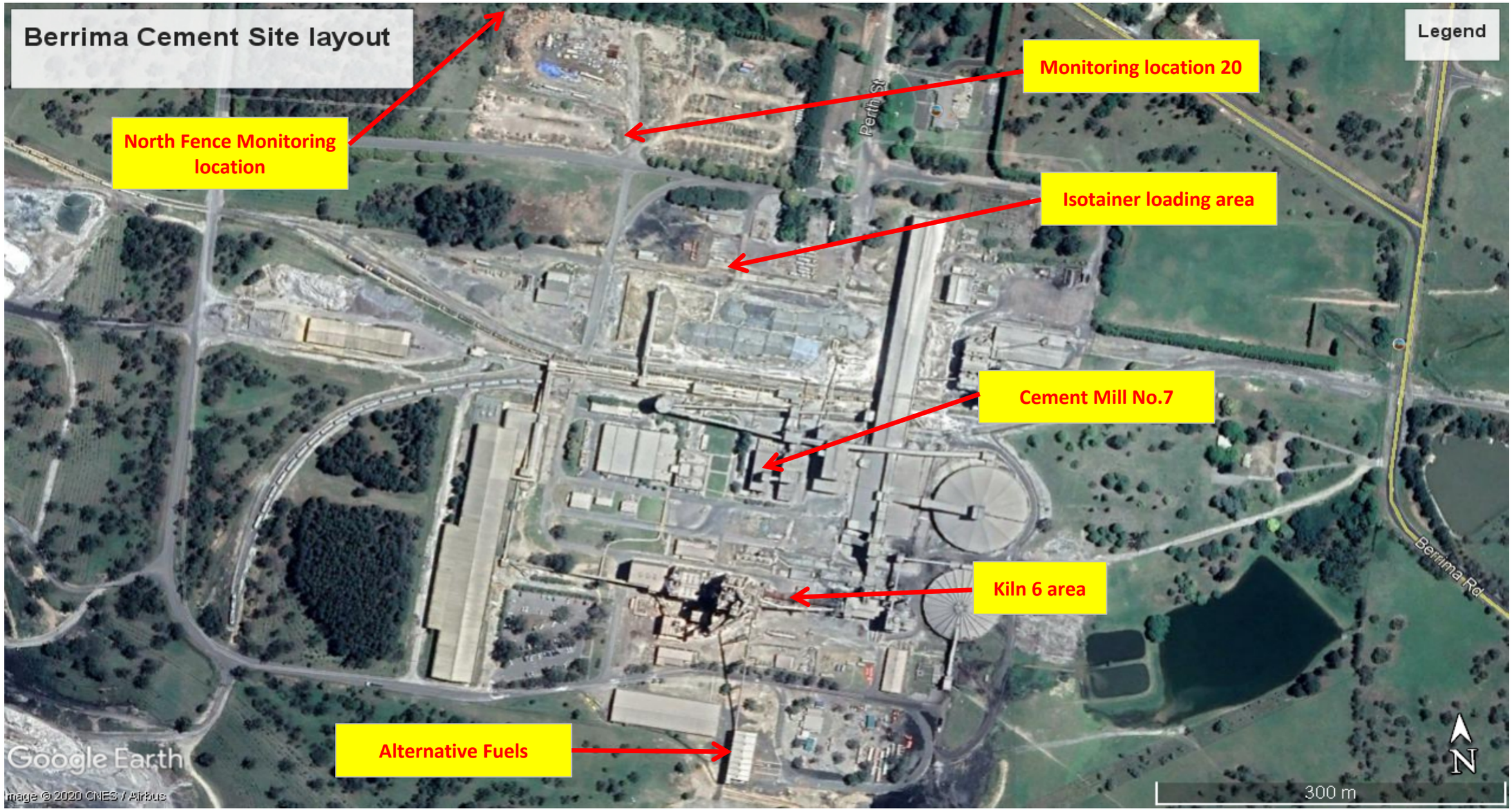


Figure 1.2: Boral Cement Berrima Annual Environmental Noise 2020 - Plant major items and site monitoring locations

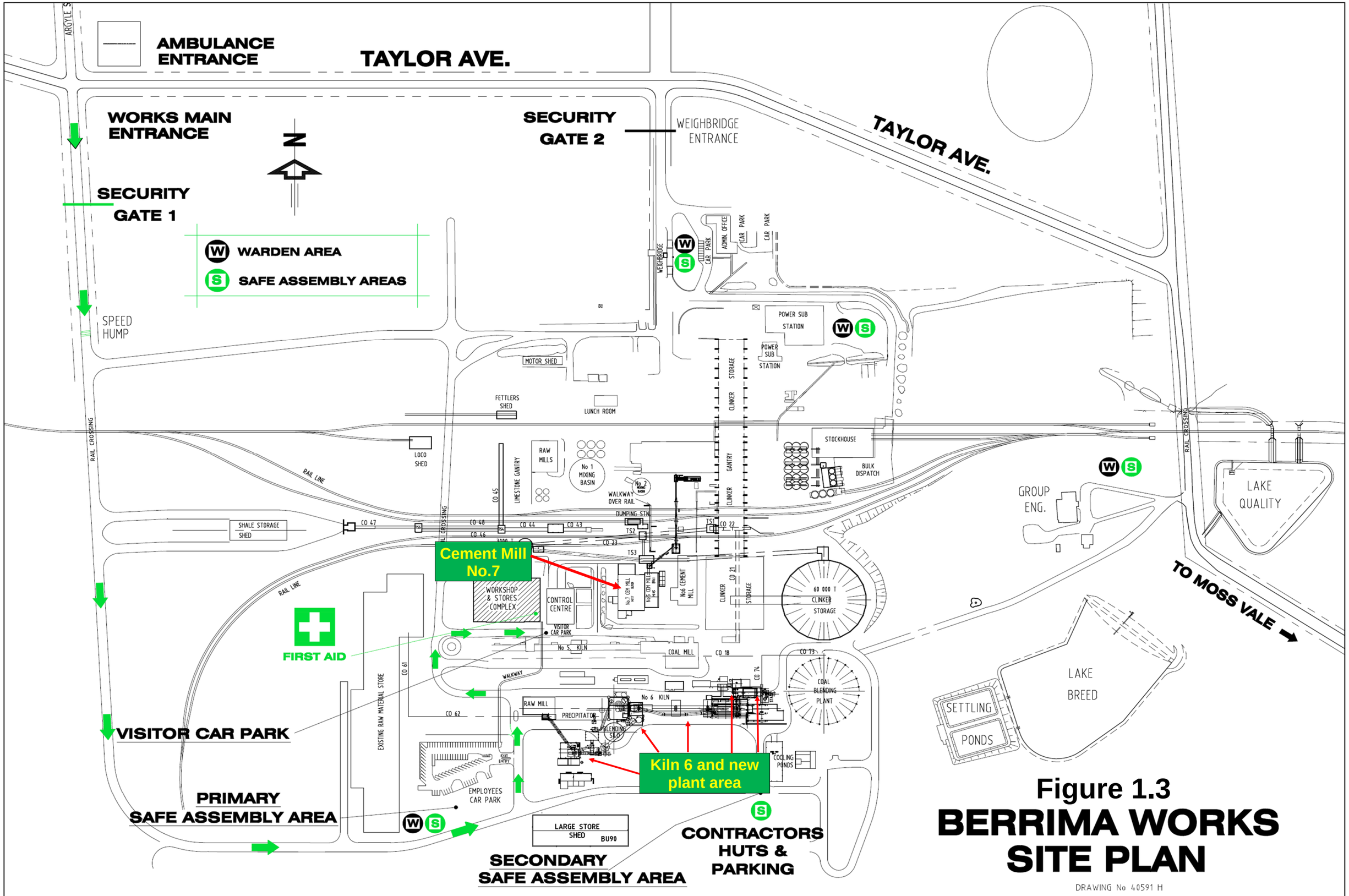

AMBULANCE ENTRANCE
TAYLOR AVE.
WORKS MAIN ENTRANCE
SECURITY GATE 2
WEIGHBRIDGE ENTRANCE
TAYLOR AVE.
N
SECURITY GATE 1
W WARDEN AREA
S SAFE ASSEMBLY AREAS
SPEED HUMP
ARGYLE S
RAIL CROSSING
RAIL LINE
MOTOR SHED
FETTLERS SHED
LUNCH ROOM
LOCO SHED
SHALE STORAGE SHED
RAW MILLS
No 1 MIXING BASIN
No 2 MIXING BASIN
WALKWAY OVER RAIL
LIMESTONE GANTRY
CLINKER GANTRY
DUMPING STN
CO 45
CO 47
CO 48
CO 46
CO 44
CO 43
CO 23
TS1
TS2
TS3
CO 22
CO 21
Cement Mill No.7
WORKSHOP & STORES COMPLEX
CONTROL CENTRE
VISITOR CAR PARK
No 5 KILN
COAL MILL
CO 18
CO 73
CO 74
CO 61
CO 62
WALKWAY
RAW MILL
PRECIPITATOR
BLENDING SILO
No 6 KILN
COAL BLENDING PLANT
COOLING PONDS
EXISTING RAW MATERIAL STORE
EMPLOYEES CAR PARK
LARGE STORE SHED BU90
FIRST AID
VISITOR CAR PARK
PRIMARY SAFE ASSEMBLY AREA
SECONDARY SAFE ASSEMBLY AREA
Kiln 6 and new plant area
CONTRACTORS HUTS & PARKING
WEIGHBRIDGE
CAR PARK
ADMIN. OFFICE
CAR PARK
CAR PARK
POWER SUB STATION
POWER SUB STATION
STOCKHOUSE
BULK DISPATCH
60 000 T CLINKER STORAGE
GROUP ENG.
LAKE QUALITY
TO MOSS VALE
LAKE BREED
SETTLING PONDS
Figure 1.3
BERRIMA WORKS SITE PLAN
DRAWING No 40591 H

Figure 1.3:

Table 1.1: Boral Cement Annual Noise Assessment 2020 - Idle times of major plant items

CM6		CM7		Kiln		RM6		RM7	
State	Time Stamp	State	Time Stamp	State	Time Stamp	State	Time Stamp	State	Time Stamp
ON	9/10/2020 0:58	ON	8/10/2020 14:55	ON	16/09/2020 13:24	Off	9/10/2020 10:35	Off	10/10/2020 0:16
Off	9/10/2020 1:12	Off	11/10/2020 21:53			ON	9/10/2020 12:05	ON	10/10/2020 1:58
ON	9/10/2020 1:19	ON	12/10/2020 15:55			Off	9/10/2020 16:57	Off	10/10/2020 15:50
Off	9/10/2020 7:40	Off	15/10/2020 15:09			ON	9/10/2020 17:17	ON	11/10/2020 5:49
ON	9/10/2020 11:55	ON	15/10/2020 15:31			Off	10/10/2020 0:15	Off	11/10/2020 13:43
Off	9/10/2020 15:34	Off	15/10/2020 16:37			ON	10/10/2020 1:32	ON	11/10/2020 14:45
ON	9/10/2020 20:23	ON	15/10/2020 16:57			Off	10/10/2020 5:18	Off	13/10/2020 10:51
Off	9/10/2020 23:56	Off	15/10/2020 16:58			ON	10/10/2020 5:29	ON	13/10/2020 11:19
ON	10/10/2020 0:41	ON	15/10/2020 17:14			Off	10/10/2020 18:05	Off	15/10/2020 6:30
Off	10/10/2020 6:07	Off	18/10/2020 9:14			ON	10/10/2020 18:45	ON	15/10/2020 14:24
ON	10/10/2020 13:30	ON	19/10/2020 20:45			Off	11/10/2020 0:20	Off	15/10/2020 16:15
Off	10/10/2020 16:47	Off	19/10/2020 21:04			ON	11/10/2020 0:32	ON	15/10/2020 16:35
ON	10/10/2020 17:23	ON	20/10/2020 0:59			Off	11/10/2020 13:43	Off	19/10/2020 18:13
Off	10/10/2020 18:29	Off	20/10/2020 1:39			ON	11/10/2020 14:46	ON	20/10/2020 10:34
ON	10/10/2020 18:38	ON	20/10/2020 1:55			Off	12/10/2020 0:12	Off	20/10/2020 14:26
Off	10/10/2020 21:52	Off	20/10/2020 18:21			ON	12/10/2020 0:23	ON	20/10/2020 16:10
ON	10/10/2020 22:04	ON	20/10/2020 18:48			Off	13/10/2020 6:56	Off	20/10/2020 21:20
Off	11/10/2020 1:23	Off	20/10/2020 19:13			ON	13/10/2020 7:48	ON	20/10/2020 21:31
ON	11/10/2020 1:40	ON	20/10/2020 20:53			Off	13/10/2020 10:45	Off	22/10/2020 10:17
Off	11/10/2020 4:36	Off	21/10/2020 10:39			ON	13/10/2020 11:16	ON	22/10/2020 17:17
ON	11/10/2020 5:03	ON	22/10/2020 23:50			Off	13/10/2020 20:50	Off	22/10/2020 18:00
Off	11/10/2020 18:54	Off	23/10/2020 14:13			ON	14/10/2020 2:04	ON	22/10/2020 19:25
ON	12/10/2020 22:54	ON	23/10/2020 18:19			Off	15/10/2020 1:53	Off	22/10/2020 19:30
Off	13/10/2020 5:07	Off	23/10/2020 18:31			ON	15/10/2020 2:07	ON	22/10/2020 19:51
ON	13/10/2020 15:00	ON	23/10/2020 19:41			Off	15/10/2020 6:22	Off	23/10/2020 0:36
Off	14/10/2020 3:15	Off	24/10/2020 23:42			ON	15/10/2020 17:32	ON	23/10/2020 2:35
ON	14/10/2020 4:44	ON	25/10/2020 0:39			Off	16/10/2020 17:13	Off	23/10/2020 6:41
Off	16/10/2020 13:12	Off	25/10/2020 1:12			ON	16/10/2020 20:04	ON	23/10/2020 11:19
ON	16/10/2020 14:08	ON	25/10/2020 3:14			Off	17/10/2020 4:52	Off	23/10/2020 14:16
Off	17/10/2020 0:17	Off	25/10/2020 10:09			ON	17/10/2020 5:09	ON	23/10/2020 15:02
ON	17/10/2020 1:00	ON	25/10/2020 16:42			Off	18/10/2020 6:57	Off	23/10/2020 16:47
Off	17/10/2020 4:22	Off	26/10/2020 5:36			ON	18/10/2020 8:46	ON	23/10/2020 17:11
ON	17/10/2020 5:18	ON	26/10/2020 14:12			Off	18/10/2020 14:55	Off	24/10/2020 8:53
Off	17/10/2020 20:00	Off	26/10/2020 17:10			ON	18/10/2020 15:50	ON	24/10/2020 9:09
ON	19/10/2020 6:49	ON	26/10/2020 18:53			Off	18/10/2020 21:26	Off	24/10/2020 22:15
Off	20/10/2020 19:11	Off	27/10/2020 17:00			ON	18/10/2020 21:45	ON	25/10/2020 4:12
ON	20/10/2020 20:18					Off	19/10/2020 7:21	Off	25/10/2020 4:15
Off	21/10/2020 7:20					ON	19/10/2020 7:45	ON	25/10/2020 4:25
ON	21/10/2020 15:29					Off	19/10/2020 9:03	Off	25/10/2020 8:55
Off	21/10/2020 16:33					ON	19/10/2020 9:31	ON	25/10/2020 9:09
ON	21/10/2020 16:52					Off	20/10/2020 5:11	Off	25/10/2020 17:27
Off	22/10/2020 23:41					ON	20/10/2020 9:35	ON	25/10/2020 17:43
ON	23/10/2020 7:38					Off	20/10/2020 14:26	Off	25/10/2020 18:07
Off	23/10/2020 14:11					ON	20/10/2020 15:19	ON	25/10/2020 18:38
ON	23/10/2020 19:33					Off	21/10/2020 6:29	Off	25/10/2020 18:39
Off	25/10/2020 8:16					ON	21/10/2020 7:09	ON	25/10/2020 19:16
ON	25/10/2020 16:50					Off	21/10/2020 22:38	Off	26/10/2020 3:55
Off	26/10/2020 3:59					ON	21/10/2020 23:08	ON	26/10/2020 9:25
ON	26/10/2020 14:56					Off	22/10/2020 17:08	Off	26/10/2020 21:30
Off	26/10/2020 23:25					ON	22/10/2020 17:56	ON	26/10/2020 21:40
ON	26/10/2020 23:39					Off	23/10/2020 0:21	Off	26/10/2020 21:55
Off	26/10/2020 23:43					ON	23/10/2020 2:30	ON	26/10/2020 22:06
ON	27/10/2020 0:14					Off	23/10/2020 4:18		
Off	27/10/2020 0:18					ON	23/10/2020 4:37		
ON	27/10/2020 0:25					Off	23/10/2020 6:41		
Off	28/10/2020 4:11					ON	23/10/2020 12:48		
ON	28/10/2020 5:04					Off	23/10/2020 13:51		
						ON	23/10/2020 14:04		
						Off	24/10/2020 8:25		
						ON	24/10/2020 8:54		
						Off	24/10/2020 11:04		
						ON	24/10/2020 11:22		
						Off	24/10/2020 22:14		
						ON	25/10/2020 3:12		
						Off	25/10/2020 8:59		
						ON	25/10/2020 9:31		
						Off	26/10/2020 3:54		
						ON	26/10/2020 9:08		
						Off	26/10/2020 14:31		
						ON	26/10/2020 14:42		
						Off	26/10/2020 21:21		
						ON	26/10/2020 22:05		

Figure 1.4: Boral Cement Berrima Annual Noise Assessment - Idle times of major plant items 9 to 27 October 2020

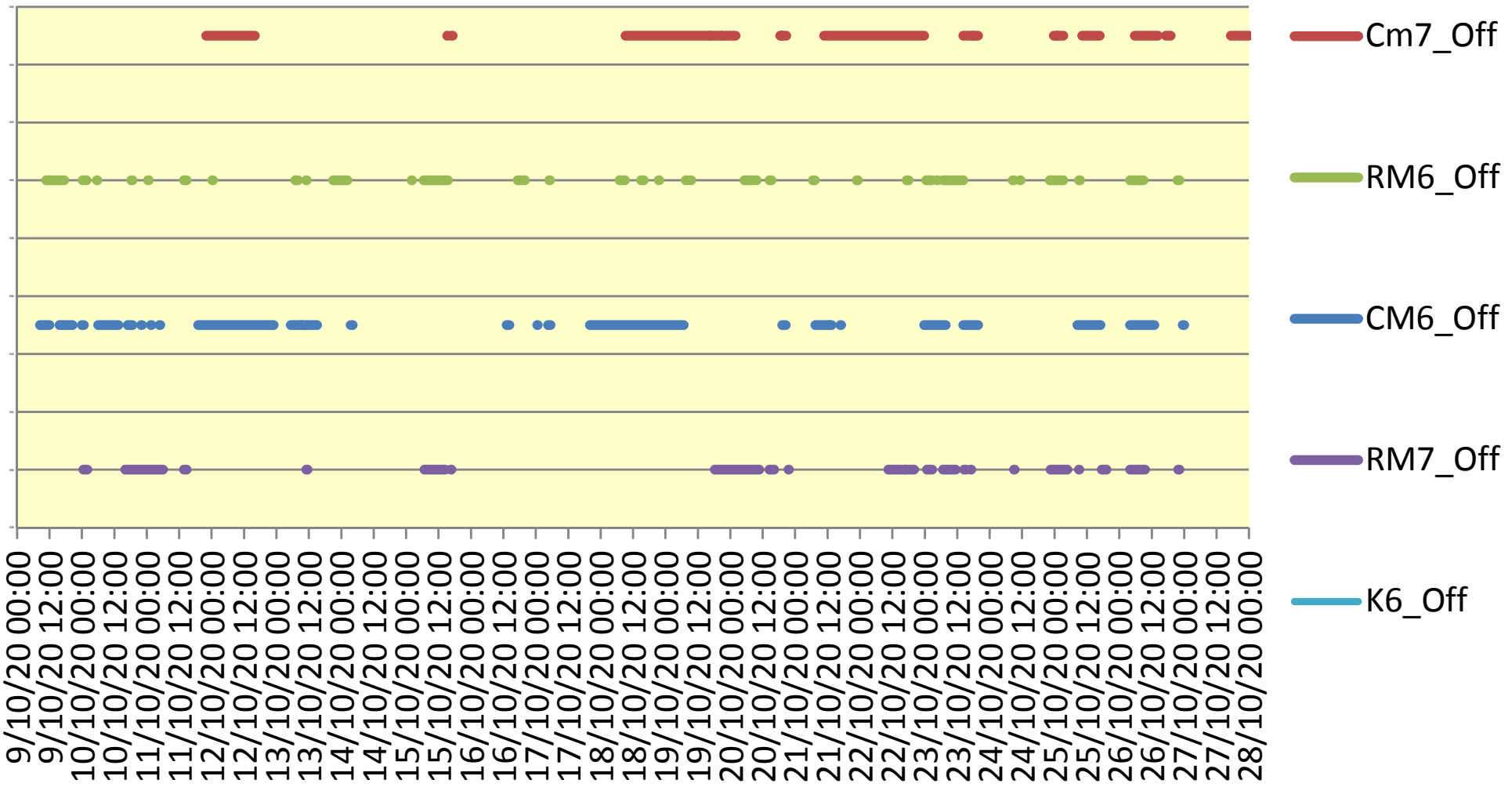


Figure 1.5: Boral Cement Berrima Annual Noise Assessment - Idle times of major plant items 9 to 18 October 2020

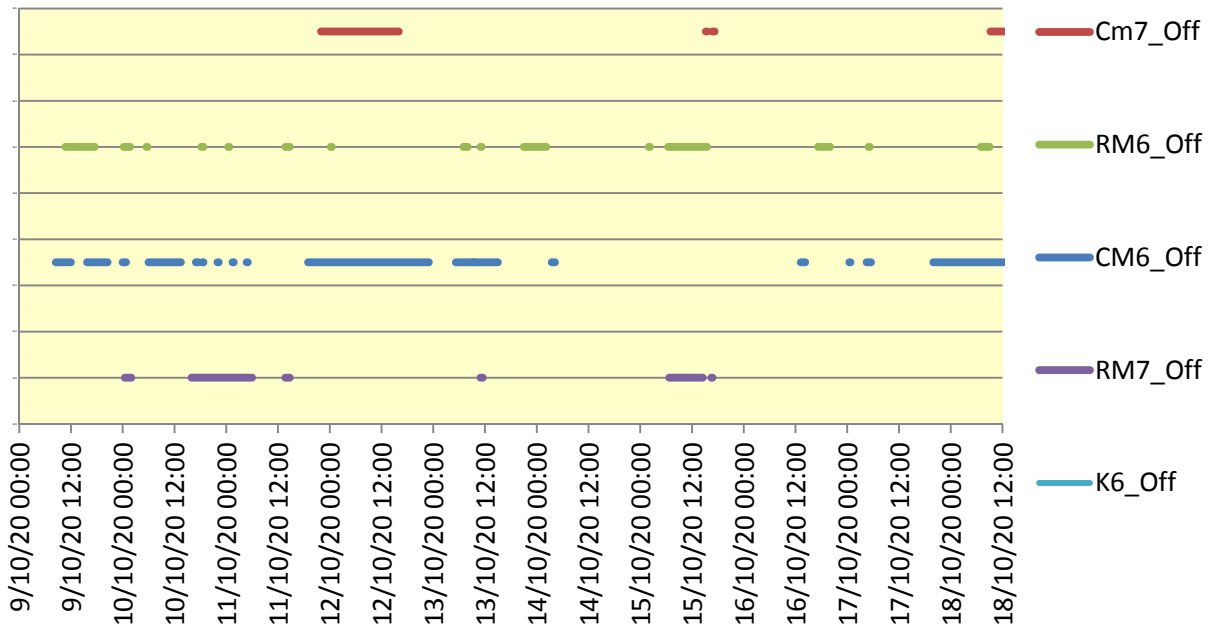
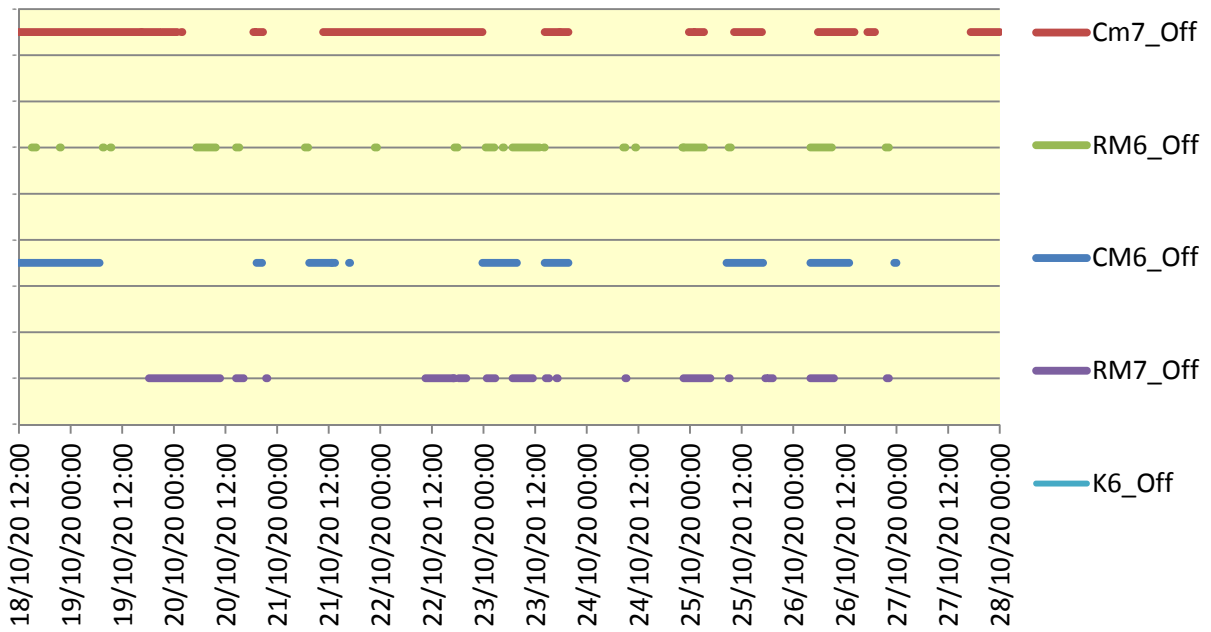


Figure 1.6: Boral Cement Berrima Annual Noise Assessment - Idle times of major plant items 18 to 28 October 2020



2 Contribution sound level objectives and method of measurement and assessment

2.1 Modification of Development Consent

In early 2020 the Development Consent for the site was modified to allow loading of isotainers on the site and set a single site-wide noise limit. The noise limit condition is shown in Table 2.1. From the Consent Modification document. Noise generated at the site must not exceed the noise limits at the times and location specified in Table 2.1 below.

Table 2.1 – Maximum Allowable Noise Contribution Limit (dB(A))

Location	Day $L_{A90\ (15\text{-minute})}$	Evening $L_{A90\ (15\text{-minute})}$	Night $L_{A90\ (15\text{-minute})}$
The noise compliance point (Point 20) Store Yard Close	58	58	58

a. Day is defined as the period from 7:00am to 6:00pm Monday to Saturday and 8:00am to 6:00pm on Sundays and public holidays.

b. Evening is defined as the period from 6:00pm to 10:00pm.

c. Night is defined as the period from 10:00pm to 7:00am Monday to Saturday and 10:00pm to 8:00am on Sundays and public holidays

Note: The location of Noise Compliance Point (Point 20) – Store Yard is shown in Appendix 2 (Figure 2.1 below).

2.2 Previous Project consent contribution sound level objectives -

While this assessment is to assess compliance with the single-site-wide noise limit, the conditions related to each project are also used in the assessment to further demonstrate that received contribution sound levels are achieved in the residential receiver locations. These contribution objective sound levels for the residential receiver locations were as follows:

Table 2.2: Kiln 6 Upgrade Maximum Allowable Noise Contribution Limit dBA

Receiver Location	Day[a] $L_{Aeq(15\ minute)}$	Evening[b] $L_{Aeq(15\ minute)}$	Night[c] $L_{Aeq(15\ minute)}$
4 Melbourne Street	37	37	37
Chesley Park Farm*	30	30	30
Candowie Farm*	37	37	37

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Table 2.3: Cement Mill No.7 Maximum allowable noise contribution limit dBA

Receiver Location	Day[a] $L_{Aeq(15\ minute)}$	Evening[b] $L_{Aeq(15\ minute)}$	Night[c] $L_{Aeq(15\ minute)}$
Adelaide Street, near Taylor Avenue	43	43	40
Argyle Street, near Taylor Avenue	43	43	40
Candowie Farm House*	43	43	40

These levels were to be considered as the contributions from the new plant associated with Kiln 6 or Cement Mill No. 7.The modified consent conditions apply to all the noise emissions from the plant at Berrima.

As advised in the 2017 assessment, in 2015 Chesley Park Farm was acquired by Austral Bricks for their proposed development and the residence demolished. This effectively removed the assessment location as there was no receiver and no access available to the site. Similarly, Candowie Farm access is no longer available as it is no longer apparently occupied as a residence, the land having been acquired for a future industrial development. This location has also been effectively removed from the assessment.

2.3 Method of measurement and assessment

Total plant sound levels

Sound levels of the plant are measured by attended and unattended monitoring methods at Location 20.

Sound levels are also measured at the Northern Boundary to compare with previous measurements and also indicate potential for sleep disturbance during night periods. This is done on the assumption that if the Sleep Disturbance objectives are achieved at the boundary location, they will also be achieved at the residential receivers, which are 150m more distant from the plant. If the low-frequency spectra indicate relative compliance at the boundary, they will also indicate compliance at the residential locations.

Kiln 6 Upgrade

While assessment of compliance for Kiln 6 Upgrade has been replaced by monitoring at Location 20, continued review of Kiln 6 noise emissions is continued to demonstrate or identify if sound levels have not increased significantly. The environmental impact assessment report for Kiln 6 Upgrade provided allowable sound power levels for each major source in the upgrade required to ensure the contribution sound level objective was achieved. From those calculated sound power levels, allowable sound pressure levels at different locations and distances from each major source in each plant area were also calculated. The measured sound levels from the operating individual sources were then

compared with the calculated allowable sound levels. If the measured sound levels were less than the allowable sound levels, then compliance was achieved. These measurements were reported in the nominated compliance reports for each plant item.

For Kiln 6 Upgrade, sound power levels and associated sound pressure levels of the new sources were identified as required in the noise impact assessment. These are given in Table 2.4 below. In the compliance assessment report for the Kiln 6 Upgrade provided in 2005, the measured sound levels were compared with the previous objective sound levels. These are also shown in Table 2.4.

Table 2.4: Kiln 6 Upgrade Plant Items and Objective Sound Power Levels and Sound Pressure Levels required to achieve compliance with objective sound levels

Source	Sound Power Level – dB(A)	Sound Pressure Level dB(A)		
		Objective	Measured 2005	Measured 2020
Coal Mill and Clinker cooler fans	117	100 @ 3m	93 @ 2m	Coal mill wall vent 85 @ 2m, Courtyard cooler fans 87 to 92 @ 1m
New Radicon Cooler	103	92 @ 1m	81 @ 1m West 80 @ 2m East	81 to 85 @ 1m Area Average 83 @ 1m E side 78 @ 2.4m E
New Pre-heater fan FA249	97	89 @ 1m	77 @ 2m	75 to 82 @ 1m
New Baghouse fan FA250	102	94 @ 1m	82 @ 2m	80 to 84 @ 1m
Raw Mill 7 Building	117	100 @ 3m	Vents 83 to 86 @ 1m	Vents 79 to 80 @ 1m Roof 79 to 91 @1m

This comparison showed in 2005 that the noise emissions for the Kiln 6 Upgrade items were well below the objectives required to achieve compliance.

Comparison of current measured sound levels at the same or similar locations, with those measured for the compliance assessment, will be sufficient to indicate if the contribution objectives are currently being achieved. Results for 2020, some shown above, are similar to previous and lower than the objective maximum levels

Increases of more than 5 dBA would be required to indicate potential non-compliance with the licence conditions. Radicon cooler sound levels vary depending on load and sometimes in the past have

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exceeded the objective by 4 to 5 dB. Sound levels measured in 2020 were 81 to 85 dBA at 1m, much lower than the objective of 92 dBA.

Cement Mill No.7

As with Kiln 6 Upgrade, assessment of Cement Mill No.7 has continued as previously to demonstrate if source sound levels have remained the same or significantly changed. This was made by measuring the noise emissions from the building and then calculating the contributions from these at the relevant residential receiver locations, using a recognised computer noise model. Three different meteorological conditions were used in the modelling. The results of these predictions are given in Table 2.5 below. The DECCW considered this approach a good example of a method to assess contributions from new noise sources in the presence of a relatively high background sound level.

Table 2.5: Cement Mill No.7 Predicted Contribution Levels at receivers for 2007 sound levels

Receiver	Source	Predicted sound level – dB(A)		
	Weather Condition	**Wind 0 m/s Lapse 0°C/100m**	**Wind 3 m/s Lapse 0°C/100m**	**Wind 2 m/s Lapse 3°C/100m**
Adelaide Street	Mill Room northern wall	23	29	29
	BE Tower northern wall	22	25	26
	Compressor room vents	15	20	21
	Total	**26**	**31**	**31**
Argyle Street	Western wall Mill room	17	28	28
	Western Roll door Mill room	14	25	26
	Western Wall vents I & J	13	19	20
	Western Wall BE Tower	10	17	17
	Western Roll door compressor room	9	16	16
	Total	**21**	**30**	**31**

As with the Kiln 6 Upgrade items measurements, comparison of current measured sound levels at the same or similar locations, with those measured for the compliance assessment, will be sufficient to indicate if the contribution objectives are currently being achieved. Increases of more than 9 dBA would be required to indicate potential non-compliance with the licence conditions.

Results from 2020 are shown later in Section 3 in Tables 3.7 and 3.8. They again indicate that compliance with the previous limit conditions is being achieved by Cement Mill No.7.

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2020 receiver and boundary monitoring

As well as the site noise source monitoring, environmental receiver sound levels are measured. The set of measurements for 2020 was done between 9 to 27 October 2020, with attended measurements on 7 October (day periods) and 27 October (daytime, evening and night-time periods).

Results of long-term unattended receiver environmental noise monitoring have also been collated for monitoring undertaken at regular intervals since 2002. Comparison of these results also indicate any trends in receiver location sound levels occurring over the monitoring period since 2002.

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3 Measured site source sound levels in 2020 compared to previous measurements

3.1 Kiln 6 area sound levels

The plan view of the Kiln 6 area and upgrade plant items are shown in Figure 3.1. Figures 3.2 to 3.5 show measurement locations around the Kiln and upgrade items area.

Sound levels measured at locations around Kiln 6 Upgrade plant items are shown summarised in Table 3.1. Table 3.2 shows the spectra of each measurement, with the tonality assessment shown in Table 3.2A and figures given in Appendix A. Table 3.3 compares the results of sound levels measured at the same location on previous occasions from 2010 to 2019 and shows the calculated differences.

If the 2020 measured sound level exceeds the previous sound levels by more than 3dB, the cell difference in Table 3.3 is highlighted pink. A difference value of 3 dB is considered to be indicative of a potentially significant change in emission, as less than this is within measurement error or variation expected from location or source load differences. The locations with increased sound levels are shown in Table 3.3A.

There were 87 locations out of approximately 360 measured where 2020 sound levels have been calculated to be above those of previous years back to 2010. Some of these increases are caused by open doorways, a different load condition, other mobile equipment or vehicle operations nearby or a different measurement location. In the RM7 FA250 baghouse area, increases often occur from the high frequencies associated with squeaking screw conveyors.

For locations with an increase of 3 dB or more, other than for noise from passing traffic or open doors or vehicles or other non-normal noise source nearby, calculations of the effects of those increases on received sound are provided in Table 3.4. These are described below, with reference to increases shown in Table 3.3 and the effects calculated in Table 3.4. One-third octave band spectra and calculated tonality for each measurement location are shown in Appendix A in Figures A1 to A41. Locations where increased sound levels occurred are described below.

For the locations shown with calculations in Table 3.4, most had calculated contributions below the objectives for Kiln 6 Upgrade.

Sound levels in the area of the air slide tower at the top of the pre-heater tower (PHT) had increased sound levels by 4 to 5 dB, although the specific source if there was one, was not clear. Calculated sound levels at Location 20 shown in Table 3.4, assuming the source was the top of the stack as a worst case, were well below the objective and for the calculated contribution at residential locations, the distance only attenuated sound level was not greater than 3 dB above the previous objectives.

Sound levels at only one of the locations on the Alternate Fuels platform had 4 dB higher sound levels than 2019. This was calculated to have relatively low contribution levels at all receiver locations.

On Level 4 centre of the old PHT by the stairs, an increase of 6 dB was measured compared to that of 2017, similar to the measurement in 2019. This was caused by the operation of an air-cannon during the measurement period. The calculated increase at residential receivers for this instantaneous event measured over a 40 second period was below the objectives. The PHT Level 4 spectra shown in Figure A9 show the sound levels were broad band and not tonal.

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Sound levels were higher in the FA250 baghouse hopper area compared to previous years by up to 18 dB. This was caused by high-frequency noise from squeaking screw conveyors. The calculated contribution in Table 3.4 is 11 dB below the objective at Location 20 but above previous residential contribution objectives by 5 to 7 dB. There are significant barriers in place between the source location and receivers, which with atmospheric absorption of the higher frequencies involved, would be expected to reduce the contribution sound levels to the objectives.

Another location where increases in sound levels caused calculated contribution sound levels above the residential objectives, but not the Location 20 objective, was at Location 60 opposite the Conditioning Tower. Sound levels at the location may have also been influenced by increases in Fan 39 sound levels compared to the previous year when the fan speed was lower, causing the sound level to be 6 dB higher. The calculated contribution sound levels from distance attenuation only were below the Location 20 objective but 7 to 13 dB above the residential objective. However, a comparison with the FA39 emissions also calculated in Table 3.4 show the contribution from Fan 39 at the residential receivers was less than the objectives.

Two locations on the northern side of the kiln opposite or near the four or more new additional central kiln-shell cooler fans, locations 64 and 66, had higher calculated contribution sound levels at residential receivers than the previous objectives. The sound levels were 3 to 4 dB above measurements in 2013 and 2014, when there were no fans at that location. The calculated distance only attenuated contribution sound levels were below the Location 20 objective but up to 15 dB above the previous residential objectives. When additional attenuation from ground and air absorption are included and the sound levels averaged over the length of the kiln, these additional fans may result in slightly increased sound levels at the residential receiver locations. Spectra for the location are shown in Figure A37 and are broad-band and non-tonal.

It is recommended that a review be made of alternatives for kiln shell cooling fans with reduced noise emissions.

Increases in sound levels at other locations were found to have contribution sound levels below all objectives at Location 20 and residential receivers.

Sound levels near fan FA215 had increased, especially around the inlet box. The sound had a strong tonality at 125 Hz and 250 Hz, shown in Figure A41. Figure E1 provides a narrow-band spectral analysis of the measurement next to the inlet box of the fan. This indicates the main components of the noise are the fundamental and first and third harmonics of probably the blade pass frequency of the fan, at 63.5 Hz. This tone has not been noted in previous annual measurements. It is recommended that a review be made of this fan to assess its maintenance condition.

Sound levels measured on top of the Control Building roof indicate the sound coming from the PHT and kiln area towards the residential receivers. The sound levels on the southern side of the building have remained relatively constant since commencing these measurements since 2016. Frequency spectra are shown in Figure A58 and are very broad-band and non-tonal. Sound levels at the north-eastern corner of the roof are the same as in 2017 to 2019 but are 3 dB above that measured in 2016, which is likely to have been when the cement mills were not operating at the time of the measurements.

Sound measured on the old southern fence-line also indicate the spectra of sound coming from the kiln and PHT area towards the south. The spectra of these are shown in figure A31 and are also seen to be broad-band and non-tonal.

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Assessment of Kiln 6 noise emissions

Over all, the sound levels associated with Kiln 6 sources were calculated to be less than the objective at Location 20. They are also considered to not exceed the contribution objectives at the nearest residential receivers to the northern and southern sides of the plant, apart from those associated with the new kiln shell cooler fans on the central pedestal of Kiln 6. Some closer-to-source location measured sound levels had increased but these were calculated to not exceed the previous objectives at the residential receiver locations. More distant measurements of the total emissions from the Kiln 6 area on the roof of the Control Building had not increased significantly from previous measurements, which also indicates compliance with the objectives.

On the basis of the measurements and assessment, it is considered that the Kiln 6 source emissions are in compliance both the condition of approval for sound levels at Location 20 and the community noise level objectives at residential receivers.

Some specific sources are recommended for review because of increased sound levels above what is expected or to avoid potentially annoying sound levels developing further. These items are noted below:

- The new kiln shell cooling fans have significantly increased the sound levels at locations on the northern side of the centre of Kiln 6. A review of alternatives for cooling of this area is recommended.
- Sound levels from fan FA215 have an increased tonality, probably related to the fan blade pass frequency. This has not been noticed in previous surveys and may indicate a maintenance issue with the fan, which is recommended for review.
- Sound levels around the FA250 baghouse hopper were much higher from squealing associated with some of the screw conveyors, particularly SC12. These are unlikely to cause increased sound levels at residential receivers.

Figure 3.1: Boral Cement Berrima Annual Environmental Noise 2020 - Kiln 6 survey area

Figure 3.2: Boral Cement Berrima - Kiln 6 Layout and measurement locations with aerial overlay

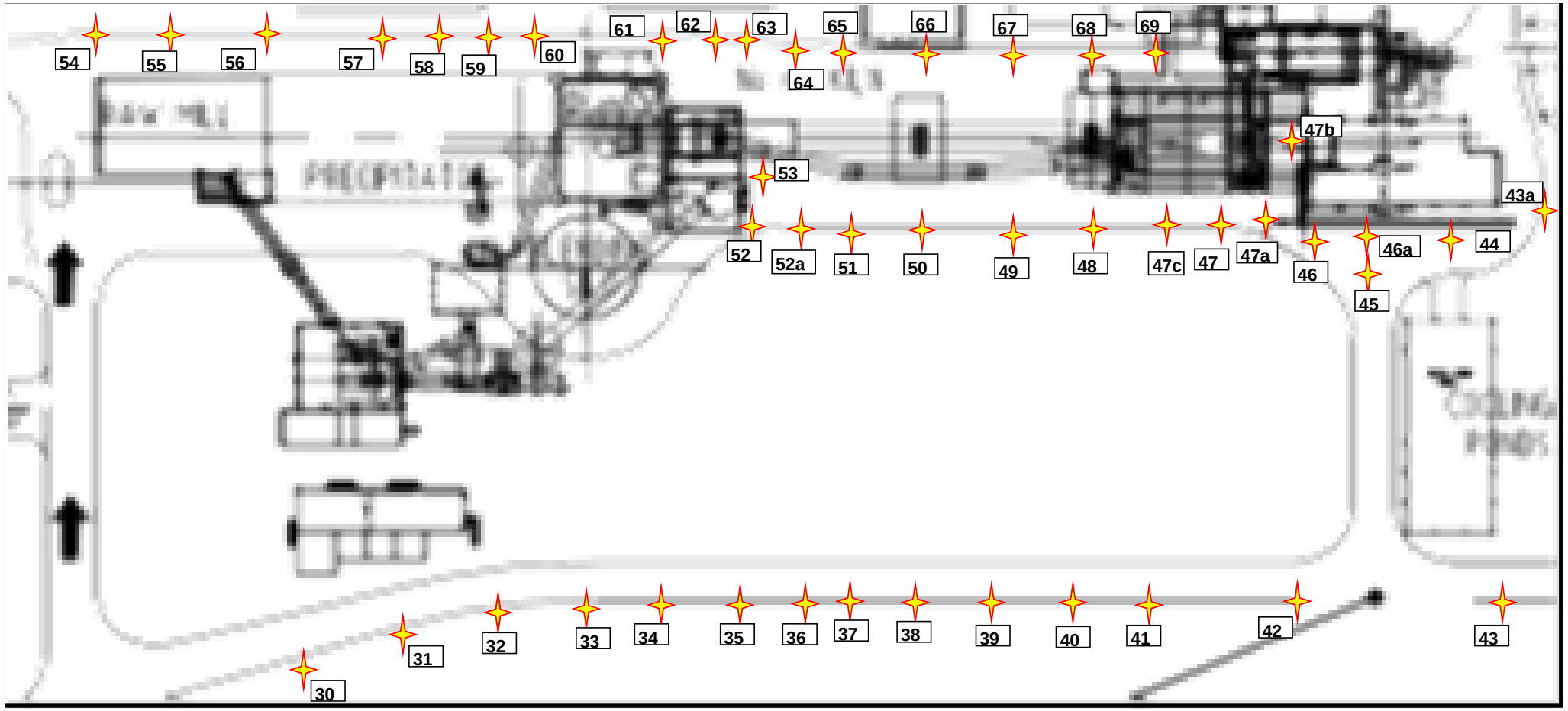

Figure 3.3: Boral Cement Berrima - Noise Assessment - Measurement locations plan for Kiln 6 & RM7

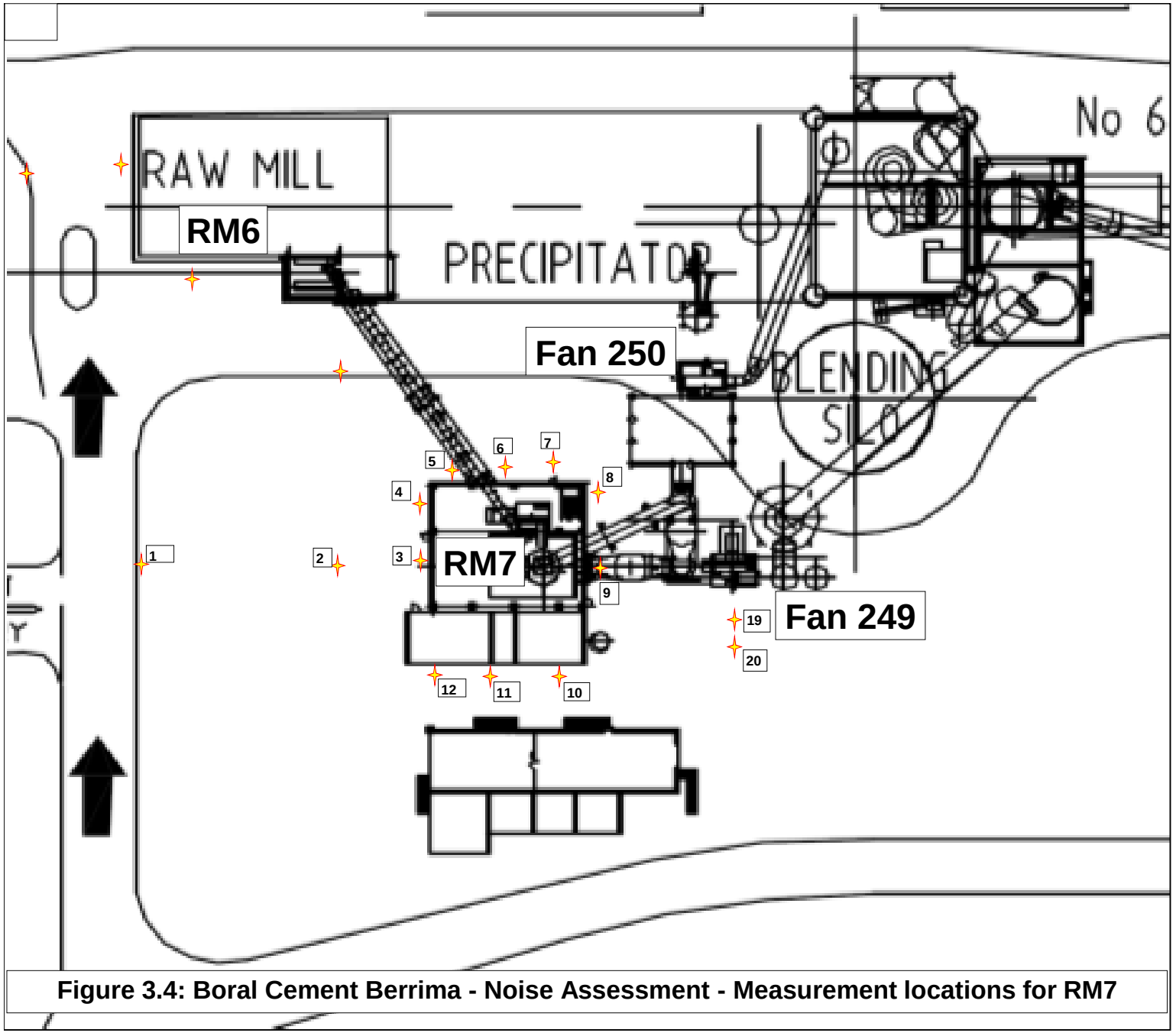

Figure 3.4: Boral Cement Berrima - Noise Assessment - Measurement locations for RM7

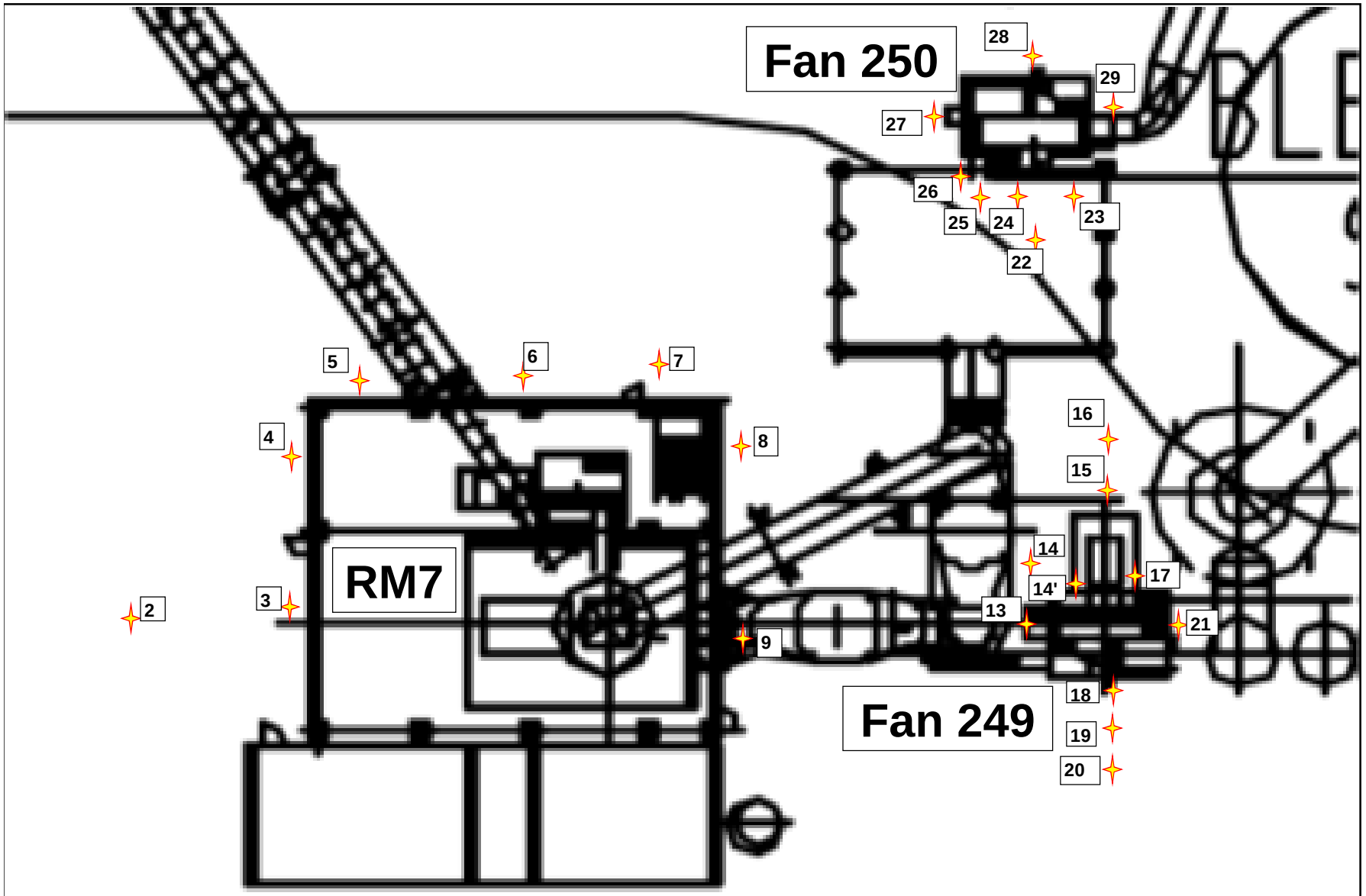

Figure 3.5: Boral Cement Berrima - Noise Assessment - Measurement locations RM7 & FA249 & FA250

Table 3.1: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6

Area	Source or location	File No Address	Date	Start	Period hh:mm:ss	Statistical Sound Level - dBA						Comments
						$L_{Aeq,t}$	$L_{A01,t}$	$L_{A10,t}$	$L_{A90,t}$	$L_{Ceq,t}$	L_{Ceq}-$L_{Aeq,t}$	
PHT Level 8	PHT L8 Top platform level with top of stack	14	9/10/2020	11:34 AM	d 00:00:30	79	81	80	78	96	16.7	Wind 7 m/s
	PHT L8 Top platform EL16 Gbox @ 1m to NE side	15	9/10/2020	11:35 AM	d 00:00:21	79	80	80	79	92	12.9	-
	PHT L8 Top platform EL16 Gbox @ 1m to coupling SW side	16	9/10/2020	11:36 AM	d 00:00:21	79	80	79	79	93	13.5	-
	PHT L8 Top platform EL16 Gbox @ 2m to motor S side	17	9/10/2020	11:36 AM	d 00:00:21	77	78	78	76	91	13.7	-
	PHT L8 Top platform EL16 Gbox @ 1m to coupling NW side	18	9/10/2020	11:37 AM	d 00:00:22	80	81	81	80	96	15.8	-
	PHT L8 Top Platform S side BE	19	9/10/2020	11:38 AM	d 00:00:20	73	74	74	73	89	15.9	Shielded from Stack noise
	PHT L8 Lower platform	20	9/10/2020	11:39 AM	d 00:00:31	81	83	82	80	97	15.9	-
	PHT L8 Top platform EL16 Gbox @ 3m to N side	21	9/10/2020	11:40 AM	d 00:00:22	78	80	79	77	92	14.1	-
	PHT L8 proper FA263 motor & casing @ 1m	22	9/10/2020	11:44 AM	d 00:00:21	90	91	91	90	95	5.3	-
	PHT L8 proper 1m to vent on FA263 filter room	23	9/10/2020	11:44 AM	d 00:00:21	80	81	80	79	91	11.5	-
	PHT L8 centre tower W side	24	9/10/2020	11:46 AM	d 00:00:28	81	83	82	80	92	11.2	-
	L8 new PHT centre	25	9/10/2020	11:47 AM	d 00:00:31	74	75	75	73	86	12.4	-
	PHT L8 centre tower N side	26	9/10/2020	11:48 AM	d 00:00:31	74	75	74	73	89	15.7	-
	PHT L8 centre tower E side	27	9/10/2020	11:49 AM	d 00:00:30	73	74	74	72	85	12.3	-
	PHT L8 centre tower S side	28	9/10/2020	11:50 AM	d 00:00:30	68	69	69	68	83	14.9	-
PHT Level 7	PHT L7 New S side centre	29	9/10/2020	11:52 AM	d 00:00:30	70	71	70	69	84	14.1	-
	PHT L7 New E side centre	30	9/10/2020	11:53 AM	d 00:00:30	74	74	74	73	84	10.0	Alt. fuels conveyor impact
	PHT L7 New N side centre	31	9/10/2020	11:54 AM	d 00:00:31	72	73	73	72	86	13.6	-
PHT L7 Alt Fuels Platform	PHT L7 Alt Fuels Platform L1: E side of feeder @ 1m	32	9/10/2020	11:55 AM	d 00:00:30	75	80	76	74	82	6.9	Subjectively more impact noise than 2019
	PHT L7 Alt Fuels Platform L1: E side of mixer @ 1m	33	9/10/2020	11:56 AM	d 00:00:33	74	75	74	73	83	9.0	-
	PHT L7 New E side 4m to base of Alt Fuel chute, 1m to bin W	34	9/10/2020	11:58 AM	d 00:00:30	74	77	75	73	83	8.2	-
	PHT L7 Alt Fuels Platform L2: N side of conveyor discharge	35	9/10/2020	11:59 AM	d 00:00:33	76	80	77	75	84	8.2	-
	PHT L7 Alt Fuels Platform L2: 1m E side of chute inlet	36	9/10/2020	12:00 PM	d 00:00:30	74	76	74	73	83	9.3	-
	PHT L7 Alt Fuels Platform L2: 1m E side of conveyor 3m from entry to chute	37	9/10/2020	12:01 PM	d 00:00:30	73	74	73	72	82	9.5	-
	PHT L7 Alt Fuels Platform L2: 1m NW side of conveyor drive motor	38	9/10/2020	12:02 PM	d 00:00:36	77	78	77	76	84	7.5	HF noise
	PHT L7 Alt Fuels Platform L2: 1m SW side of conveyor drive gearbox	39	9/10/2020	12:02 PM	d 00:00:31	76	78	77	75	84	8.0	-
	PHT L7 Alt Fuels Platform L1: 3m N of feeder	40	9/10/2020	12:04 PM	d 00:00:36	74	75	74	73	83	9.1	-
PHT Level 7	PHT L7 New centre between towers faces S	41	9/10/2020	12:05 PM	d 00:00:30	73	75	74	73	87	13.8	-
	L7 between PHTs centre facing W	42	9/10/2020	12:06 PM	d 00:00:30	73	74	73	72	87	14.4	-
	PHT L7 Old S side centre, faces W	43	9/10/2020	12:07 PM	d 00:00:32	75	76	76	74	88	12.7	-
	PHT L7 under EL13 platform E side	44	9/10/2020	12:08 PM	d 00:00:30	75	76	75	74	90	15.0	-
	EL13 platform E side Gbox & coupling @ 0.5m	45	9/10/2020	12:09 PM	d 00:00:21	84	84	84	83	91	7.6	-
	EL13 platform N side GB end & side EL @ 1m	46	9/10/2020	12:10 PM	d 00:00:21	78	79	79	78	91	12.3	-
	L7 BE drive platform N side @ 1m to BE	47	9/10/2020	12:11 PM	d 00:00:26	76	77	77	75	89	12.9	-
	EL13 platform SW side motor & EL & coupling @ 1m	48	9/10/2020	12:12 PM	d 00:00:30	83	84	83	82	95	11.8	-
	EL13 platform W side 0.5m	49	9/10/2020	12:13 PM	d 00:00:30	77	79	78	77	90	12.7	-
	EL13 platform motor end @ 0.6m	50	9/10/2020	12:14 PM	d 00:00:20	85	86	85	85	93	8.1	-
	L7 centre between cylinders	51	9/10/2020	12:15 PM	d 00:00:31	75	76	75	74	90	15.0	-
	PHT L7 old NW corner 1.5m to stack	52	9/10/2020	12:16 PM	d 00:00:30	73	75	74	72	92	19.0	-
	PHT L7 old centre N side on new platform	53	9/10/2020	12:17 PM	d 00:00:35	75	77	76	73	91	16.8	-
	PHT L7 old centre N side	54	9/10/2020	12:18 PM	d 00:00:30	75	78	76	74	91	16.0	-
	PHT Level 7: FA213 @ 1m, door closed	55	9/10/2020	12:21 PM	d 00:00:30	76	77	77	75	93	16.9	-

Table 3.1: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6

Area	Source or location	File No Address	Date	Start	Period hh:mm:ss	Statistical Sound Level - dBA						Comments
						$L_{Aeq,t}$	$L_{A01,t}$	$L_{A10,t}$	$L_{A90,t}$	$L_{Ceq,t}$	L_{Ceq}-$L_{Aeq,t}$	
PHT Level 6 RM Silo Top	PHT L6 RM silo above baghouse discharge @ 2m at base of stairs to EL, level with floor	56	9/10/2020	12:25 PM	d 00:00:21	83	84	84	82	91	8.4	
	PHT L6 RM silo Top FA260 NE side @ 1m casing & motor	57	9/10/2020	12:26 PM	d 00:00:21	90	92	91	89	95	5.0	-
	PHT L6 RM Silo top EL15 platform motor side 0.6m	58	9/10/2020	12:27 PM	d 00:00:21	82	83	82	81	88	5.7	-
	EL15 W side @ 1m	59	9/10/2020	12:28 PM	d 00:00:20	74	76	75	73	97	23.1	-
	L6 RM silo top on BE EL15 platform SW side @ 0.8m	60	9/10/2020	12:28 PM	d 00:00:20	73	75	74	73	93	19.9	-
	EL15 S side Gbox @ 1m	61	9/10/2020	12:29 PM	d 00:00:20	81	82	82	79	98	17.3	-
	EL15 E side Gbox @ 0.5m	62	9/10/2020	12:30 PM	d 00:00:20	80	82	82	78	103	23.1	-
	RM silo top baghouse fan DC30 discharge @ 1.5m	63	9/10/2020	12:31 PM	d 00:00:20	86	87	87	85	98	11.6	-
	RM Silo top N side 12.7m to FA260	64	9/10/2020	12:33 PM	d 00:00:30	74	76	75	74	90	15.8	-
	RM Silo top E side 12.7m to FA260	65	9/10/2020	12:36 PM	d 00:00:32	74	76	75	73	88	14.0	-
PHT Level 6	PHT L6 centre W side	66	9/10/2020	12:37 PM	d 00:00:31	74	75	75	74	86	11.3	Wind 7 to 10 m/s
	PHT L6 stack test port 100mm diam @ 200mm S side	67	9/10/2020	12:39 PM	d 00:00:21	88	89	88	87	96	8.4	-
	PHT L6 stack test port 100mm diam @ 200mm W side	68	9/10/2020	12:40 PM	d 00:00:20	90	91	90	89	99	9.8	-
	PHT L6 stack test port 200mm diam @ 200mm W side	69	9/10/2020	12:41 PM	d 00:00:22	96	97	97	95	102	5.7	-
	PHT L6 NW corner 1m to stack	70	9/10/2020	12:42 PM	d 00:00:30	77	79	78	77	93	16.0	-
	PHT L6 centre N side by platform	71	9/10/2020	12:44 PM	d 00:00:30	73	74	74	73	86	13.3	-
	PHT L6 centre N side on platform	72	9/10/2020	12:45 PM	d 00:00:31	72	73	73	72	88	15.9	-
	PHT L6 centre between towers	73	9/10/2020	12:45 PM	d 00:00:30	73	73	73	72	84	11.5	-
	PHT L6 new N side centre	74	9/10/2020	12:46 PM	d 00:00:33	73	74	73	72	84	11.1	-
	PHT L6 new E side centre	75	9/10/2020	12:47 PM	d 00:00:31	72	73	72	71	84	11.9	-
	PHT L6 new S side centre	76	9/10/2020	12:48 PM	d 00:00:32	72	76	72	72	83	10.4	-
	L6 centre S side old PHT by elevator	77	9/10/2020	12:52 PM	d 00:00:30	74	74	74	73	87	13.4	-
PHT Level 6 Inside Silo Top	L6 inside doorway to top RM silo room	78	9/10/2020	12:53 PM	d 00:00:30	81	82	82	80	92	11.4	-
	RM Silo top inside centre	79	9/10/2020	12:54 PM	d 00:00:31	87	89	88	86	92	5.1	Screw conveyor noise
	RM silo top inside E doors open	80	9/10/2020	12:55 PM	d 00:00:30	84	87	86	83	91	6.5	Screw conveyor noise
	L6 RM silo top room inside S man door	81	9/10/2020	12:57 PM	d 00:00:37	84	85	85	83	91	7.2	Screw conveyor noise
	RM silo top outside S man door	82	9/10/2020	12:58 PM	d 00:00:21	76	80	77	74	98	22.3	Wind noise
PHT Level 5	PHT Level 5 old centre S side by stairs	83	9/10/2020	1:01 PM	d 00:00:54	74	78	75	74	84	9.3	-
	PHT Level 5 old centre W side by gas valves @ 1m	84	9/10/2020	1:02 PM	d 00:00:31	77	79	78	77	93	15.4	-
	PHT Level 5 old NW corner @ 1m to stack	85	9/10/2020	1:03 PM	d 00:00:30	75	76	76	75	93	17.7	-
	PHT Level 5 old centre N side	86	9/10/2020	1:04 PM	d 00:00:50	74	76	74	73	87	12.9	-
	PHT Level 5 centre between towers	87	9/10/2020	1:05 PM	d 00:00:30	73	73	73	72	84	11.7	-
	PHT Level 5 New centre N side	88	9/10/2020	1:06 PM	d 00:00:30	73	73	73	72	83	10.3	-
	PHT Level 5 New centre E side above kiln	89	9/10/2020	1:07 PM	d 00:00:33	72	73	72	71	84	12.2	-
	PHT Level 5 New centre S side	90	9/10/2020	1:08 PM	d 00:00:30	71	72	71	70	86	15.5	-
PHT Level 4	PHT Level 4 old centre S side by stairs	91	9/10/2020	1:12 PM	d 00:00:37	76	77	76	75	87	10.9	No air cannons
	PHT Level 4 old SW corner by water pumps SV09 @ 1m N	92	9/10/2020	1:13 PM	d 00:00:31	79	83	79	78	91	12.5	-
	PHT Level 4 old centre W side	93	9/10/2020	1:14 PM	d 00:00:30	77	81	77	76	88	11.9	-
	PHT Level 4 old NW corner @ 1.2m to stack	94	9/10/2020	1:15 PM	d 00:00:30	75	77	76	74	87	12.5	-
	PHT Level 4 old centre N side	95	9/10/2020	1:16 PM	d 00:00:46	74	83	73	72	84	10.4	Some air cannons to 100 @ 7m
	PHT Level 4 centre between towers by air cannon @ 2m	96	9/10/2020	1:18 PM	d 00:02:00	74	77	74	73	86	11.7	-
	PHT Level 4 centre between towers by air cannon @ 2m	97	9/10/2020	1:21 PM	d 00:00:30	73	75	73	72	84	11.5	-
	PHT Level 4 new centre N side	98	9/10/2020	1:21 PM	d 00:00:31	73	75	74	73	84	10.3	-
	PHT Level 4 new centre E side above kiln	99	9/10/2020	1:22 PM	d 00:00:30	73	74	73	73	83	10.2	-
	PHT Level 4 new centre S side	100	9/10/2020	1:23 PM	d 00:00:40	77	90	72	71	84	7.1	Ambient 71, Air cannon 96
ESP	ESP Centre E side top walkway looking E to PHT	101	9/10/2020	1:26 PM	d 00:00:41	74	75	74	73	85	11.8	-
	ESP top SE corner at barrier	102	9/10/2020	1:27 PM	d 00:00:30	73	75	73	72	86	13.4	-
	ESP top SE corner at barrier - facing ESP	103	9/10/2020	1:28 PM	d 00:00:44	71	74	72	70	85	13.7	-
	ESP top NE corner at barrier	104	9/10/2020	1:30 PM	d 00:00:30	73	74	73	72	87	14.0	-
	ESP top NE corner at barrier - facing west	105	9/10/2020	1:31 PM	d 00:00:30	71	72	71	70	84	13.6	-

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PHT Level 3	L3 old PHT centre S side @ 2m to edge facing centre	106	9/10/2020	1:34 PM	d 00:00:30	77	82	78	76	89	11.7	-
	PHT Level 3 old centre W side above FA39 face E	107	9/10/2020	1:35 PM	d 00:00:31	79	80	79	78	91	12.4	-
	PHT Level 3 old centre N side	108	9/10/2020	1:36 PM	d 00:00:32	76	79	77	74	90	13.6	-
	PHT Level 3 old centre E side above kiln	109	9/10/2020	1:37 PM	d 00:00:40	75	77	75	74	87	12.5	-
	PHT Level 3 old NW corner by stack @ 1.5m, above FA39 inlet	110	9/10/2020	1:38 PM	d 00:00:30	78	80	79	78	91	12.9	-
PHT Level 2.5	PHT Level 2.5 by DC31 drives @ 0.6m	111				89						
	PHT Level 2.5 by DC31 discharge @ 1m	112	9/10/2020	1:44 PM	d 00:00:21	87	89	88	87	101	13.6	-
	PHT Level 2.5 by centre by kiln entry W side	113	9/10/2020	1:46 PM	d 00:00:31	88	103	82	79	97	8.2	-
	PHT Level 2.25 by centre by kiln entry Air cannons	114	9/10/2020	1:47 PM	d 00:00:29	86	89	88	84	94	7.4	-
	PHT Level 2.25 North Side centre	115	9/10/2020	1:48 PM	d 00:00:39	80	82	81	80	98	17.2	-
	PHT Level 2.5 by Radicon Gbox drive E end @ 2.5m	116	9/10/2020	1:50 PM	d 00:00:36	87	91	89	84	93	6.0	-
	L2.25 PHT centre W side facing fan discharge DC70 FA63 @ 4.66m, stack @ 6.35m and stack entry duct @ 6.23m	117	9/10/2020	1:51 PM	d 00:00:21	88	89	89	88	108	19.4	-
PHT Level 2	PHT Level 2 by E side drive coupling & casing DC70 FA03 centre N side	118	9/10/2020	1:52 PM	d 00:00:26	87	88	88	86	95	8.4	-
	L2 PHT FA03 casing @ 1m E side	119	9/10/2020	1:54 PM	d 00:00:20	87	89	88	86	98	10.8	-
	PHT Level 2 FA03 discharge @ 1.5m	120	9/10/2020	1:55 PM	d 00:00:21	91	91	91	90	108	17.4	-
	PHT Level 2 @ 1m to south side FA39 stack entry duct	121	9/10/2020	1:56 PM	d 00:00:34	87	88	88	87	102	14.5	-
	PHT Level 2 FA65 inlet filter @ 1m in front	122	9/10/2020	1:57 PM	d 00:00:28	88	89	89	87	102	13.9	-
	PHT Level 2 FA65 rear side 1m	123	9/10/2020	1:59 PM	d 00:00:33	87	88	87	86	104	17.6	LF noise likely FA03 disch
	L2 PHT centre N side edge @ 2m facing centre	124	9/10/2020	2:01 PM	d 00:00:30	83	89	83	81	93	10.7	-
	PHT Level 2 @ 1m to north side FA39 stack entry duct	125	9/10/2020	2:02 PM	d 00:00:36	87	90	88	87	100	12.8	-
	PHT Level 2 FA65 inlet filter @ 1m in front	129	9/10/2020	2:51 PM	d 00:00:20	88	89	89	88	102	14.1	-
	PHT Level 2 FA65 rear side 1m	130	9/10/2020	2:52 PM	d 00:00:20	86	88	87	86	104	17.4	-
	PHT Level 2 @ 1m to north side FA39 stack entry duct	131	9/10/2020	2:53 PM	d 00:00:22	87	89	88	86	100	13.4	-
PHT Level 1 Ground	PHT Level 1 RM silo base blower room N side man door @ 1m	132	9/10/2020	2:54 PM	d 00:00:30	79	81	80	78	90	11.1	-
	PHT Level 1 FA92 silo vent fan casing & drive @ 1m NW side	133	9/10/2020	2:55 PM	d 00:00:30	78	81	79	78	91	12.7	-
	PHT Level 1 FA92 silo vent fan casing & drive @ 1m E side	134	9/10/2020	2:56 PM	d 00:00:30	81	83	81	80	89	8.1	-
	PHT Level 1 FA92 silo vent fan inlet duct @ 1m SE side	135	9/10/2020	2:57 PM	d 00:00:30	76	77	76	76	88	12.4	-
	PHT Level 1 FA92 silo vent fan inlet front @ 1m	136	9/10/2020	2:57 PM	d 00:00:32	75	76	75	74	90	14.8	-
FA38 & 39	FA39 E side at concrete line 5.4m to motor	137	9/10/2020	2:59 PM	d 00:00:20	87	89	89	86	94	6.9	-
	FA39 E side @2.3m in line with columns	138	9/10/2020	3:00 PM	d 00:00:31	91	92	92	91	97	5.7	-
	FA39 under discharge duct @ 1m	139	9/10/2020	3:01 PM	d 00:00:49	84	85	85	83	99	15.1	-
	FA39 E side motor platform @ 0.82m to coupling cover	140	9/10/2020	3:02 PM	d 00:00:30	94	95	95	92	98	4.7	-
	FA39 motor platform centre E side@ 1m	141	9/10/2020	3:03 PM	d 00:00:30	98	99	99	96	101	3.4	-
	FA39 motor platform centre E side@ 1m	142	9/10/2020	3:03 PM	d 00:00:20	98	99	99	97	101	3.0	-
	FA39 motor platform centre E side@ 1m & vent @ 0.5m	143	9/10/2020	3:04 PM	d 00:00:20	96	97	97	96	99	2.5	-
	FA39 motor N end @ 2.7 to end plates/stop button at line	144	9/10/2020	3:05 PM	d 00:00:27	83	84	84	81	92	9.5	-
	FA 39 N side on kerb	145	9/10/2020	3:06 PM	d 00:00:20	81	83	82	80	91	9.3	-
	FA39 W side at metal strip 5.25m to motor	146	9/10/2020	3:08 PM	d 00:00:22	87	89	88	86	93	5.8	-
	FA39 W side at columns @2.7m to plinth	147	9/10/2020	3:08 PM	d 00:00:20	88	89	89	88	94	5.6	-
	FA39 W side @ 1m to cladding door closed, 1.33m to casing	148	9/10/2020	3:09 PM	d 00:00:20	88	89	89	87	98	10.0	-
	FA39 W side motor platform at 0.8m to coupling cover & 1m to coupling	149	9/10/2020	3:09 PM	d 00:00:21	93	95	95	92	99	5.4	-
	FA39 S side @ columns 2.7m to bearing	150	9/10/2020	3:10 PM	d 00:00:20	84	86	85	84	97	12.4	-
	FA39 S side platform bearing cover @ 0.8m	151	9/10/2020	3:11 PM	d 00:00:30	86	88	87	86	97	10.8	-
	Centre between FA38 & FA39 @ 11.2m at line facing E	152	9/10/2020	3:12 PM	d 00:00:31	88	89	89	87	93	5.4	-

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FA38 & 39	Centre between FA38 & FA39 @ 7.7 m facing FA 38	153	9/10/2020	3:12 PM	d 00:00:30	88	90	89	87	93	5.3	-
	FA38 @ 3.9m to E side	154	9/10/2020	3:52 PM	d 00:00:30	91	93	93	89	95	3.9	-
	FA38 @ 3m to N side	155	9/10/2020	3:53 PM	d 00:00:27	88	91	90	87	94	5.8	-
	FA38 @ 5m to NW side at NW column	156	9/10/2020	3:55 PM	d 00:00:31	87	89	88	86	92	5.0	-
	FA38 @ 5m to NW side at W column	157	9/10/2020	3:55 PM	d 00:00:30	89	91	90	87	93	4.3	-
	FA38 @ 5m to W side at W column	158	9/10/2020	3:56 PM	d 00:00:20	88	90	89	87	93	4.7	-
	In centre opening of wall on W side	159	9/10/2020	3:57 PM	d 00:00:30	86	88	87	84	92	6.1	-
	FA38 motor platform W side @ 1m to coupling cover, 1.9m to casing, 0.7m to motor side	160	9/10/2020	3:58 PM	d 00:00:30	97	99	98	96	98	1.4	-
	FA38 at opening on S side of road facing FA38 opening	161	9/10/2020	3:59 PM	d 00:00:31	81	86	82	80	89	7.4	-
	56 Road kerb N side opp E side R	8	9/10/2020	11:19 AM	d 00:01:09	78	81	79	76	91	13.6	
	56 Road kerb N side opp E side R	162	9/10/2020	4:00 PM	d 00:00:43	76	80	77	75	85	9.1	-
	56' Road kerb N side opp. Opening to FA38	9	9/10/2020	11:20 AM	d 00:00:30	77	80	77	76	90	13.6	
	56' Road kerb N side opp. Opening to FA38	163	9/10/2020	4:01 PM	d 00:00:31	77	78	77	76	87	9.8	-
	57 Road N side opp FA38 doorway	10	9/10/2020	11:21 AM	d 00:00:31	79	80	80	78	90	10.6	
	58 Road N side between FA38 & FA39	11	9/10/2020	11:22 AM	d 00:00:31	80	81	80	79	89	9.8	
	59 Road N side kerb opp end FA39	12	9/10/2020	11:23 AM	d 00:00:34	83	84	83	82	91	8.2	
	59 Road N side kerb opp end FA39	13	9/10/2020	11:24 AM	d 00:00:22	82	84	83	81	90	8.0	
RM6 West side	1 RM6 W door @ 1m	164	9/10/2020	4:04 PM	d 00:00:31	76	77	77	75	84	8.1	Door well sealed
	1' RM6 W door at kerb W side @ 13.3m	165	9/10/2020	4:05 PM	d 00:00:31	69	70	70	69	80	10.3	-
RM7 ground level	1 RM7 at roadside kerb ~32m	166	9/10/2020	4:06 PM	d 00:01:05	67	68	68	66	79	11.8	-
	2 Rm7 @ 15.5m to W door	167	9/10/2020	4:08 PM	d 00:00:42	72	73	73	71	82	10.3	-
	3 RM7 W wall door @ 1m	168	9/10/2020	4:09 PM	d 00:00:32	78	83	80	77	85	6.9	-
	4 RM7 NE corner wall vents @ 1m	169	9/10/2020	4:10 PM	d 00:00:30	79	83	80	77	87	8.3	-
	4 RM7 NE corner wall vents @ 1m	170	9/10/2020	4:10 PM	d 00:00:20	78	81	80	77	88	9.2	-
	5 RM7 N side NW roll door @ 1m	171	9/10/2020	4:11 PM	d 00:00:35	78	81	79	78	89	10.4	-
	6 RM7 N wall vents centre next to Roll door	172	9/10/2020	4:12 PM	d 00:00:31	81	84	81	80	89	8.2	-
	RM7 vents N wall W of man door	173	9/10/2020	4:13 PM	d 00:00:30	81	83	82	80	90	8.7	-
	7 RM7 N wall man door	174	9/10/2020	4:13 PM	d 00:00:30	80	81	80	79	89	9.7	-
	8 RM7 E wall vents NE corner @ 1m	175	9/10/2020	4:14 PM	d 00:00:30	80	84	81	79	90	9.2	-
	9 RM7 E side under duct	176	9/10/2020	4:15 PM	d 00:00:31	77	79	78	76	88	10.8	-
	10 RM7 By E door RM7 floor	177	9/10/2020	4:16 PM	d 00:00:30	76	78	76	75	87	11.7	-
	10' RM7 By E door Hydraulics room closed	178	9/10/2020	4:17 PM	d 00:00:30	71	72	72	71	82	11.4	-
	11 RM7 Centre Compressor room door @ 1m closed	179	9/10/2020	4:18 PM	d 00:00:30	71	72	72	71	82	11.3	-
	11A RM7 compressor room W door @ 1m closed	180	9/10/2020	4:18 PM	d 00:00:31	76	91	72	71	83	6.1	Discharge 84
	12 RM7 Under E inlet for switchroom fan	181	9/10/2020	4:20 PM	d 00:00:30	82	84	83	81	91	9.2	Rattling cowling stopped
	12 RM7 Under E inlet for switchroom fan rattling cowling	182	9/10/2020	4:20 PM	d 00:00:30	83	84	84	82	91	8.8	Rattling cowling occurring
	12B Under switchroom fan duct W	183	9/10/2020	4:21 PM	d 00:00:35	75	76	76	75	85	9.7	-
	12 RM7 E inlet for switchroom fan @ 1m to N side and 0.6m below	184	9/10/2020	4:22 PM	d 00:00:31	75	76	76	75	85	9.2	-
FA249	13 FA249 under inlet duct W side	185	9/10/2020	4:24 PM	d 00:00:20	76	77	77	75	90	14.0	-
	14 FA249 2m W side ground level	186	9/10/2020	4:24 PM	d 00:00:20	79	80	80	79	90	10.9	-
	14' FA249 motor platform fan coupling & casing W side @ 1m	187	9/10/2020	4:25 PM	d 00:00:20	82	83	82	81	92	10.3	-
	15 FA249 1m motor end	188	9/10/2020	4:26 PM	d 00:00:32	81	82	81	80	89	8.4	-
	16 FA249 end at column 4.3m N of motor plinth	189	9/10/2020	4:27 PM	d 00:00:30	78	79	79	78	90	11.7	-
	17 FA249 motor platform E side coupling & casing 1m	190	9/10/2020	4:28 PM	d 00:00:31	83	84	84	83	94	10.4	-
	18 FA249 Platform S side centre @ 1m	191	9/10/2020	4:30 PM	d 00:00:30	75	76	75	75	87	12.1	-
	18' FA249 platform S side under discharge duct E side	192	9/10/2020	4:30 PM	d 00:00:30	75	77	76	75	86	10.9	-
	18' FA249 platform S side under discharge duct E side	193	9/10/2020	4:31 PM	d 00:00:20	75	77	76	75	86	10.8	-
	19 FA249 S side @ 3.8m	194	9/10/2020	4:33 PM	d 00:00:20	71	73	72	71	85	13.2	At edge line
	19 FA249 S side @ 5.5m	195	9/10/2020	4:34 PM	d 00:00:30	71	72	72	71	84	12.9	-
	20 FA 249 S side @ 10.9m	196	9/10/2020	4:35 PM	d 00:00:41	72	73	72	71	84	12.2	-
	21 FA249 E side of fan casing ground level @ 2m	197	9/10/2020	4:37 PM	d 00:00:33	73	74	73	73	88	14.7	-

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FA250	22 FA250 S side 4.2 m to motor end	198	9/10/2020	4:39 PM	d 00:00:30	80	80	80	79	89	9.9	-
	22' FA250 Motor end S side @ 1m	199	9/10/2020	4:40 PM	d 00:00:30	81	82	82	81	90	8.6	-
	23 FA250 E side platform coupling & casing	200	9/10/2020	4:41 PM	d 00:00:30	83	84	84	83	93	10.1	-
	23' FA250 E side centre motor @ 1m	201	9/10/2020	4:42 PM	d 00:00:32	83	84	83	82	93	10.5	-
	FA250 W side motor shaft @ casing @ 1m	202	9/10/2020	4:43 PM	d 00:00:22	84	85	85	84	95	10.8	-
	25 FA250 coupling & casing W side motor centre @1m	203	9/10/2020	4:43 PM	d 00:00:34	84	85	85	84	95	11.1	-
	26 FA250 W side casing @ 1m & coupling @ 3m	204	9/10/2020	4:44 PM	d 00:00:32	82	83	83	82	92	9.6	-
	26 FA250 W side casing @ 1m & coupling @ 3m	205	9/10/2020	4:45 PM	d 00:00:20	82	82	82	81	91	9.4	-
	27 FA250 W side 1m under inlet casing expansion joint	206	9/10/2020	4:46 PM	d 00:00:20	81	83	82	80	91	9.8	-
	28 FA250 N side casing shaft platform @ 1m	207	9/10/2020	4:47 PM	d 00:00:20	83	84	84	82	94	11.1	-
	29 FA250 E side under discharge duct @ 1.5m, at lower step of concrete	208	9/10/2020	4:48 PM	d 00:00:20	82	83	83	82	94	11.5	-
RM7 Roof Platform lower	Lower platform E side 1m to Magnete plate	209	9/10/2020	4:52 PM	d 00:00:32	90	92	90	89	91	1.0	-
	Lower platform S side @ 1m to magnete plate	210	9/10/2020	4:53 PM	d 00:00:30	91	95	93	90	92	0.9	-
	Lower platform W side @ 0.9m to magnete plate	211	9/10/2020	4:54 PM	d 00:00:30	88	91	90	86	91	2.6	-
	Lower platform N side @ 2m to magnete plate (scaffolding)	212	9/10/2020	4:55 PM	d 00:00:30	86	88	87	84	89	3.3	-
	Lower platform N side @ 1m to BE casing	213	9/10/2020	4:55 PM	d 00:00:30	83	85	84	81	89	6.3	-
	Platform S of Magnete 2m to S side	214	9/10/2020	4:56 PM	d 00:00:30	84	88	85	82	87	3.2	-
RM7 Roof platform Upper	Upper Platform Gbox @ 1m E side & 0.5m casing	215	9/10/2020	4:57 PM	d 00:00:30	79	82	80	78	88	8.6	-
	Upper Platform Gbox @ 1m N side	216	9/10/2020	4:58 PM	d 00:00:30	80	82	81	79	89	9.2	-
	Upper Platform Gbox @ 1m N side	217	9/10/2020	4:59 PM	d 00:00:19	80	83	81	79	88	8.2	-
	Upper Platform motor end @ 1m W side	218	9/10/2020	4:59 PM	d 00:00:30	79	81	80	78	88	8.7	-
	Upper Platform BE casing @ 0.9m W side	219	9/10/2020	5:00 PM	d 00:00:30	78	79	79	77	87	9.3	-
	Upper Platform BE casing @ 1m S side	220	9/10/2020	5:00 PM	d 00:00:32	80	82	80	79	89	9.4	-
	Upper Platform BE casing @ 1m E side	221	9/10/2020	5:01 PM	d 00:00:31	79	80	79	78	87	8.2	-
RM7 Baghouse Tower	On tower to baghouse top S side above FA249 same level as roof RM7	222	9/10/2020	5:03 PM	d 00:00:30	68	69	69	68	82	14.2	-
	On tower to baghouse top S side above FA249 halfway up level	223	9/10/2020	5:04 PM	d 00:00:30	71	73	72	70	86	15.0	-
	On tower to baghouse top S side above FA249 top level	224	9/10/2020	5:05 PM	d 00:00:30	69	72	70	68	86	17.2	-
	Baghouse S doorway open	225	9/10/2020	5:06 PM	d 00:01:00	80	93	75	71	86	6.9	Ambient 72
	Inside centre baghouse top	226	9/10/2020	5:08 PM	d 00:01:01	81	95	73	69	83	2.3	Ambient 69
Admin Roof	Admin roof NE corner	5	9/10/2020	10:59 AM	d 00:01:00	72	74	73	70	81	9.6	
	Admin roof SE corner	6	9/10/2020	11:01 AM	d 00:01:00	71	73	72	71	81	9.6	
	Admin roof SW corner	7	9/10/2020	11:02 AM	d 00:01:05	70	72	71	69	79	9.1	
	SW corner	229	27/10/2020	9:57 AM	d 00:02:01	71	73	72	70	80	9.0	-
	SE corner	230	27/10/2020	10:00 AM	d 00:02:00	71	73	72	71	82	10.3	-
	NE corner	231	27/10/2020	10:03 AM	d 00:02:00	71	72	71	70	80	9.2	-
RM7 Baghouse hopper area	On screw conveyor SC212 platform Level 1 W end side by fan motor @ 1m	265	27/10/2020	10:54 AM	d 00:00:25	84	86	85	83	89	4.6	-
	Centre S side of screw in line with motor FA250	266	27/10/2020	10:55 AM	d 00:00:30	91	94	92	89	94	3.6	-
	Centre S side of screw by squeal point	267	27/10/2020	10:56 AM	d 00:00:30	89	92	91	87	92	2.9	-
	E end of SC212 body @ 2m and other N-S aligned screw	268	27/10/2020	10:58 AM	d 00:00:20	94	97	96	93	96	1.7	-
	Main platform of baghouse hopper screws S end chute W side between SC211 & gate valve	269	27/10/2020	10:59 AM	d 00:00:30	83	85	84	82	88	4.8	-
	Centre W side	270	27/10/2020	11:00 AM	d 00:00:27	84	87	85	84	90	5.3	-
	Centre E side - on	271	27/10/2020	11:01 AM	d 00:00:31	86	88	87	85	90	4.1	-
	N end Sc211 but S of duct	272	27/10/2020	11:02 AM	d 00:00:22	83	84	83	82	90	6.6	-
	By FA252 @ 0.8m shaft S side, casing & discharge box	273	27/10/2020	11:03 AM	d 00:00:30	85	86	85	84	92	7.5	-
	By FA252 @ 0.8m shaft N side, casing & inlet	274	27/10/2020	11:04 AM	d 00:00:22	87	89	88	87	95	7.8	-
	Baghouse hopper platform level N end	275	27/10/2020	11:05 AM	d 00:00:30	84	85	85	84	89	5.3	-
	Baghouse hopper centre platform	276	27/10/2020	11:06 AM	d 00:00:35	93	93	93	92	95	2.1	Air vibrator noise
	By FA252 @ 1m to side discharge box top grill	277	27/10/2020	11:08 AM	d 00:00:17	86	88	87	85	94	7.5	Screw conveyor squeal

Table 3.1: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6

Area	Source or location	File No Address	Date	Start	Period hh:mm:ss	Statistical Sound Level - dBA						Comments
						$L_{Aeq,t}$	$L_{A01,t}$	$L_{A10,t}$	$L_{A90,t}$	$L_{Ceq,t}$	L_{Ceq}-$L_{Aeq,t}$	
Coal Road South	30 Coal Road S side in line W side RM7	59	21/10/2020	6:48 PM	61	66	68	68	65	79	12	
	31 Coal Road S side in-line E side RM7	60	21/10/2020	6:49 PM	61	66	67	67	65	78	12	
	32 Coal Road S side in-line FA249	61	21/10/2020	6:51 PM	61	67	68	67	66	79	12	
	33 Coal Road S side Centre Blending Silo	62	21/10/2020	6:52 PM	61	68	69	68	67	79	12	
	34 Coal Road S side E side PHT	63	21/10/2020	6:54 PM	62	68	71	69	68	80	11	
	35 Coal Road S side E side new PHT	64	21/10/2020	6:56 PM	61	69	70	70	69	81	11	
	36 Coal Road S side E side drive platform	65	21/10/2020	6:57 PM	62	69	72	70	69	81	12	
	37 Coal Road S side centre column W support duct	66	21/10/2020	6:59 PM	62	69	71	70	68	81	12	
	38 Coal Road S side centre pedestal	67	21/10/2020	7:00 PM	62	69	72	69	68	81	12	
	39 Coal Road S side Between centre & E pedestal	69	21/10/2020	7:02 PM	62	69	70	69	68	79	11	
	40 Coal Road S side E pedestal	70	21/10/2020	7:04 PM	61	68	70	69	68	79	11	
	41 Coal Road S side W end Firing floor building	71	21/10/2020	7:05 PM	61	67	68	68	67	78	11	
	42 Coal Road S side opposite grate	72	21/10/2020	7:07 PM	71	69	70	70	68	79	10	
	43 Coal Road S side W side coal receival bin 25m to truck	73	21/10/2020	7:09 PM	61	65	66	65	64	74	10	
Old Fenceline South	Former Gate site opp W end Firing floor	282	27/10/2020	11:20 AM	d 00:00:50	59	60	60	58	72	13.4	-
	Former Gate site opp W end Firing floor	283	27/10/2020	11:21 AM	d 00:00:21	60	66	60	58	72	12.0	-
	Top N edge of bank 21m S of centre Alt Fuels Building	284	27/10/2020	11:22 AM	d 00:00:25	60	62	61	59	74	13.8	-
	Top N edge of bank opposite centre pedestal	285	27/10/2020	11:23 AM	d 00:00:41	52	53	53	52	68	15.7	-
	Top N edge bank Opposite E side old PHT	286	27/10/2020	11:25 AM	d 00:00:30	58	59	58	57	71	13.7	-
	Bottom N edge of bank 13m S of centre Alt Fuels Building	287	27/10/2020	11:26 AM	d 00:00:39	50	51	51	49	66	15.9	-
K6 S side	43A Kerb E side CM opp CM fan discharge	288	27/10/2020	11:32 AM	d 00:00:25	78	80	79	77	86	7.4	Open door to fan room
	44A Under Coal Mill fan discharge	289	27/10/2020	11:33 AM	d 00:00:25	88	89	88	87	93	5.6	Open door to fan room
	44 CM fan room roll door @ 2m	290	27/10/2020	11:34 AM	d 00:00:25	88	89	88	87	94	5.7	Open door to fan room
	44' CM S wall E door @1m,	291	27/10/2020	11:35 AM	d 00:00:23	88	89	89	87	92	4.2	Door closed
	45 CM S roll door and wall vent @ 9.9m S side	292	27/10/2020	11:36 AM	d 00:00:30	80	81	80	79	87	6.9	-
	46 CM room wall vent @ 2m	293	27/10/2020	11:37 AM	d 00:00:33	85	86	85	84	91	6.3	-
	46A Coal Mill Room S roll door W @ 1m	294	27/10/2020	11:38 AM	d 00:00:26	90	91	90	89	92	2.6	Door open 2m
	47B Centre between Grate & CM blower room roll door	295	27/10/2020	11:39 AM	d 00:00:30	88	88	88	88	93	5.1	-
	47A Centre between CM Room and grate, S side	296	27/10/2020	11:40 AM	d 00:00:30	83	85	84	83	89	5.9	-
	47 Opp FA264 @ 8m	297	27/10/2020	11:41 AM	d 00:00:26	83	83	83	83	89	6.0	-
	47C Between FA264 & FA200	298	27/10/2020	11:41 AM	d 00:00:30	82	83	82	82	89	6.8	-
	47D FA 200 S Side @ 5m	299	27/10/2020	11:42 AM	d 00:00:25	83	83	83	82	90	7.5	-
	48 Opp. E pedestal roller	300	27/10/2020	11:43 AM	d 00:00:30	83	83	83	82	90	7.4	-
	49 Half way between centre & E pedestals	301	27/10/2020	11:44 AM	d 00:00:30	83	83	83	82	90	6.9	Fans on S side not on
	50 Opp. Centre pedestal	302	27/10/2020	11:45 AM	d 00:00:42	80	81	81	80	88	7.1	Fans on S side not on
	51 Half way between Centre & Western pedestals, by duct support trestle	303	27/10/2020	11:46 AM	d 00:00:29	79	81	80	79	87	7.1	-
	52A Opp E end of kiln drive platform	304	27/10/2020	11:47 AM	d 00:00:30	78	79	79	78	86	7.7	-
	52 Opp W pedestal roller	305	27/10/2020	11:48 AM	d 00:00:30	79	81	79	78	87	8.0	-
	53 Kiln drive platform Centre E end on platform (ground level)	306	27/10/2020	11:48 AM	d 00:00:30	84	85	85	84	91	6.8	-
Kiln Drive platform	S side S motor end @ 1.5m kiln drive	307	27/10/2020	11:50 AM	d 00:00:25	83	84	83	83	91	8.2	-
	S side of S Gbox @ 1.5m	308	27/10/2020	11:51 AM	d 00:00:29	82	85	83	82	91	8.6	-
	E side of S drive motor @ 1.5m, 2m to Gbox	309	27/10/2020	11:52 AM	d 00:00:30	85	85	85	84	93	8.4	-
	53 Kiln drive platform Centre E end on platform between motors	310	27/10/2020	11:53 AM	d 00:00:31	86	87	86	86	93	7.1	-
	53 Kiln drive platform Centre E end on platform between gearboxes	311	27/10/2020	11:54 AM	d 00:00:38	85	85	85	84	92	7.7	-
	N side motor end @ 1m kiln drive	312	27/10/2020	11:55 AM	d 00:00:33	86	86	86	85	94	8.5	-
	N side motor N end @ 1.5m kiln drive	313	27/10/2020	11:56 AM	d 00:00:30	84	85	84	83	92	7.8	-
	N side of N drive & Gbox @ 1.5m	314	27/10/2020	11:57 AM	d 00:00:35	85	85	85	84	92	7.0	-

Table 3.1: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6

Area	Source or location	File No Address	Date	Start	Period hh:mm:ss	Statistical Sound Level - dBA						Comments
						$L_{Aeq,t}$	$L_{A01,t}$	$L_{A10,t}$	$L_{A90,t}$	$L_{Ceq,t}$	L_{Ceq}-$L_{Aeq,t}$	
Kiln 6 road Northern side	1' RM6 W door at kerb W side @ 13.3m	239	27/10/2020	10:20 AM	d 00:00:30	79.7	81.4	80.6	78.6	84.7	5	-
	54 W end RM6	315	27/10/2020	12:01 PM	d 00:00:39	72	73	73	71	82	9.9	W roll door open
	55 Centre RM6	316	27/10/2020	12:02 PM	d 00:00:30	73	74	73	72	83	10.6	Internal noise
	55 Centre RM6	317	27/10/2020	12:03 PM	d 00:00:25	73	74	74	72	83	10.5	-
	56 E End RM6	318	27/10/2020	12:04 PM	d 00:00:41	76	80	77	76	85	8.7	Air discharge 80
	56' Between RM6 & New wall for FA38	319	27/10/2020	12:06 PM	d 00:00:20	76	77	77	76	86	10.0	-
	57 Door opp FA38	320	27/10/2020	12:07 PM	d 00:00:30	80	82	81	79	89	8.9	-
	58 Half way between FA38 & FA39, opposite big column	321	27/10/2020	12:08 PM	d 00:00:33	82	83	83	81	90	7.6	-
	59 Opp FA39 end	322	27/10/2020	12:09 PM	d 00:00:30	81	82	82	80	90	9.1	-
	59 Opp FA39 end	323	27/10/2020	12:10 PM	d 00:00:25	82	83	82	81	90	8.6	-
	60 Opp Conditioning Tower	324	27/10/2020	12:11 PM	d 00:00:20	84	85	85	83	90	6.2	-
	60 Opp Conditioning Tower	325	27/10/2020	12:11 PM	d 00:00:25	83	85	84	82	90	7.0	-
	60' Opp. Stack	326	27/10/2020	12:12 PM	d 00:00:28	79	81	80	79	89	9.7	-
	61 Opp. Centre PHT	327	27/10/2020	12:13 PM	d 00:00:27	80	81	80	79	89	9.1	-
	62 Opp E side PHT	328	27/10/2020	12:14 PM	d 00:00:31	78	79	79	77	88	9.8	-
	63 Opp. W pedestal	329	27/10/2020	12:15 PM	d 00:00:30	78	81	79	78	87	9.2	-
	64 E end drive platform	330	27/10/2020	12:16 PM	d 00:00:30	81	82	81	81	88	7.2	-
	65 Opp column for return duct W side	331	27/10/2020	12:17 PM	d 00:00:26	83	84	84	83	89	6.0	-
	66 Opp centre pedestal	332	27/10/2020	12:18 PM	d 00:00:25	86	87	87	86	91	5.1	-
	67 Half way between centre & e pedestals	333	27/10/2020	12:18 PM	d 00:00:25	86	87	86	86	92	6.0	-
	68 Opp E pedestal	334	27/10/2020	12:19 PM	d 00:00:27	86	86	86	85	94	7.9	-
Grate Cooler Fan Courtyard	69 Centre courtyard - opposite F201	335	27/10/2020	12:20 PM	d 00:00:27	87	88	88	87	95	7.9	-
	69 Centre courtyard - opposite F203	336	27/10/2020	12:21 PM	d 00:00:26	87	88	87	87	96	8.8	-
	FA201 @ 2m to motor & casing	337	27/10/2020	12:22 PM	d 00:00:21	90	90	90	89	97	7.1	-
	FA201 N side inlet & casing @ 1m	338	27/10/2020	12:23 PM	d 00:00:25	91	96	91	90	98	7.3	-
	Between FA201 & 203 & 202	339	27/10/2020	12:24 PM	d 00:00:21	92	93	92	92	100	7.7	-
	FA203 inlet & casing @ 2m	340	27/10/2020	12:24 PM	d 00:00:21	88	89	88	88	98	9.5	-
	FA203,FA204 & FA205 @ 1m	341	27/10/2020	12:25 PM	d 00:00:20	88	89	89	88	99	10.4	-
	Between inlet filters FA206 & FA207	342	27/10/2020	12:26 PM	d 00:00:27	85	86	85	85	95	9.9	-
Grate Northern area	Centre between Grate & CM blower room roll door	343	27/10/2020	12:27 PM	d 00:00:25	86	87	86	86	93	6.9	-
	Coal Mill Building N roll door @ 2m	344	27/10/2020	12:28 PM	d 00:00:29	86	86	86	85	91	5.2	Door open bottom 80mm
Kiln Firing Floor	Centre N side opening face E	345	27/10/2020	12:30 PM	d 00:00:30	82	82	82	82	90	7.8	-
	Centre N side opening face W	346	27/10/2020	12:31 PM	d 00:00:30	82	83	83	82	90	7.7	-
	FA209 E side inlet & filter silencer	347	27/10/2020	12:32 PM	d 00:00:30	86	87	87	86	93	6.9	-
	FA209 Kiln Discharge Seal Fan N inlet W side @ 1.5m	348	27/10/2020	12:33 PM	d 00:00:25	91	92	92	91	96	4.3	-
	Centre S side opening face E	349	27/10/2020	12:34 PM	d 00:00:30	81	82	81	80	87	6.0	-
	Centre S side opening face W	350	27/10/2020	12:35 PM	d 00:00:30	81	82	81	81	87	5.6	-
	FA210 Kiln Discharge Seal Fan S inlet @ 1.5m	351	27/10/2020	12:36 PM	d 00:00:25	93	94	94	93	96	2.6	-
	FA200 inlet side @ 1.5m	352	27/10/2020	12:37 PM	d 00:00:25	87	89	88	87	95	7.9	-
	New replacement FA211 centre under kiln, inlet @ 1m	353	27/10/2020	12:38 PM	d 00:00:25	97	98	97	96	102	5.0	-
	FA210 S side seal fan inlet W side & casing @ 1m	354	27/10/2020	12:39 PM	d 00:00:30	85	87	86	85	93	7.3	-
	Kiln floor centre E S of duct/clinker elevator	355	27/10/2020	12:40 PM	d 00:00:35	80	83	81	80	86	5.8	-
	KFF burner air cannon N side @ 2m	356	27/10/2020	12:41 PM	d 00:01:09	87	87	87	86	90	3.1	No air cannon
	KFF burner by air cannon S side @ 2m	357	27/10/2020	12:43 PM	d 00:00:42	83	85	84	83	88	4.9	No air cannon
Radicon Cooler	RC L1 centre fan @ 1m	358	27/10/2020	12:44 PM	d 00:00:25	83	84	84	83	90	6.6	-
	RC L1 S fan @ 0.5m	359	27/10/2020	12:45 PM	d 00:00:25	84	85	85	84	90	6.0	-
	RC L1 N fan @ 1m	360	27/10/2020	12:46 PM	d 00:00:25	82	82	82	81	90	8.5	-
	RC L2 centre fan @ 1m	361	27/10/2020	12:46 PM	d 00:00:25	82	83	83	82	89	7.0	-
	RC L2 S fan @ 0.7m	362	27/10/2020	12:47 PM	d 00:00:22	84	84	84	83	89	5.5	-
	RC L2 N fan @ 1m	363	27/10/2020	12:48 PM	d 00:00:26	81	82	82	81	89	7.7	-
	RC L3 Centre fan @ 1m	364	27/10/2020	12:48 PM	d 00:00:41	83	85	84	83	89	6.0	Belt noise
	RC L3 S fan @ 0.7m	365	27/10/2020	12:49 PM	d 00:00:27	83	83	83	82	88	5.9	-
	RC L3 N fan @ 1m	366	27/10/2020	12:50 PM	d 00:00:27	81	82	81	81	89	7.8	-
	RC L4 Centre fan @ 1m	367	27/10/2020	12:51 PM	d 00:00:26	84	85	85	84	91	6.1	-
	RC L4 S fan @ 0.7m	368	27/10/2020	12:51 PM	d 00:00:25	85	86	85	84	89	3.9	-
	RC L4 N fan @ 1m	369	27/10/2020	12:52 PM	d 00:00:26	82	83	83	82	92	9.4	-
	RC L5 face E	370	27/10/2020	12:53 PM	d 00:00:30	78	79	79	78	88	10.1	-
	RC L5 face W	371	27/10/2020	12:53 PM	d 00:00:25	79	80	80	78	87	8.4	-
	L1 E side 2.4m	372	27/10/2020	12:56 PM	d 00:00:25	78	79	78	77	90	12.5	-
	L1 E side 6m	373	27/10/2020	12:57 PM	d 00:00:25	77	78	77	76	90	13.0	-
	L1 E side 12m	374	27/10/2020	12:58 PM	d 00:00:25	74	76	75	74	86	11.1	Fan 215 behind noise

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						$L_{Aeq,t}$	$L_{A01,t}$	$L_{A10,t}$	$L_{A90,t}$	$L_{Ceq,t}$	L_{Ceq}-$L_{Aeq,t}$	
FA215	Motor S end @ 2.5m	375	27/10/2020	1:02 PM	d 00:00:25	79	80	79	79	88	9.4	Tone 125 Hz for this area
	Platform E side drive coupling @ casing @ 1m	376	27/10/2020	1:03 PM	d 00:00:30	83	84	84	82	90	6.6	-
	W side platform @ 1m to coupling & casing	377	27/10/2020	1:04 PM	d 00:00:27	81	83	82	80	96	14.8	-
	Under expansion joint discharge duct to stack @ 1m	378	27/10/2020	1:04 PM	d 00:00:25	82	82	82	81	97	14.8	-
	N side inlet box platform @ 1m to discharge duct & inlet box	379	27/10/2020	1:05 PM	d 00:00:21	76	77	77	75	88	12.3	-
	Platform centre N side inlet box	380	27/10/2020	1:06 PM	d 00:00:24	81	83	82	80	96	14.9	-
	Under Inlet box W side entry duct	381	27/10/2020	1:07 PM	d 00:00:25	79	80	80	79	92	12.9	-
	Inlet box N side ground level @ 1m	382	27/10/2020	1:08 PM	d 00:00:25	77	78	78	76	91	13.7	-

Table 3.2: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - One-third Octave Band Spectra

Area	Source or location	File No.	Total C dBC	Total A dBA	A-weighted LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency Hz																																
					12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
PHT Level 8	PHT L8 Top platform level with top of stack	14	96	79	27	33	40	46	51	54	57	60	61	69	64	71	73	67	65	70	66	63	65	64	64	63	60	59	56	57	54	54	49	42	36	26	15
	PHT L8 Top platform EL16 Gbox @ 1m to NE side	15	92	79	24	28	35	39	44	48	48	52	60	69	59	65	68	65	64	69	66	66	66	67	69	69	67	66	62	61	60	60	55	49	44	34	24
	PHT L8 Top platform EL16 Gbox @ 1m to coupling SW side	16	93	79	27	33	38	43	47	51	52	54	55	64	59	62	69	66	65	68	65	65	65	66	68	71	66	67	63	62	62	64	58	51	47	36	26
	PHT L8 Top platform EL16 Gbox @ 2m to motor S side	17	91	77	23	28	35	38	44	50	51	54	56	64	61	66	68	61	62	72	64	62	62	64	65	63	62	62	59	58	58	59	53	47	43	31	21
	PHT L8 Top platform EL16 Gbox @ 1m to coupling NW side	18	96	80	33	39	44	47	50	53	54	56	59	65	60	65	67	66	67	74	66	65	67	69	70	69	68	66	63	63	63	64	58	52	48	37	27
	PHT L8 Top Platform S side BE	19	89	73	20	24	29	37	38	46	48	48	53	68	60	62	64	60	57	66	54	55	56	55	57	58	52	53	55	55	54	52	48	43	38	30	22
	PHT L8 Lower platform	20	97	81	28	34	41	46	51	55	57	59	61	69	64	77	76	66	63	66	64	62	62	61	61	63	59	58	56	55	53	52	48	43	37	28	16
	PHT L8 Top platform EL16 Gbox @ 3m to N side	21	92	78	25	30	36	40	44	48	50	52	55	66	60	70	73	66	63	66	64	62	63	62	65	63	60	64	57	55	54	54	50	44	40	28	18
	PHT L8 proper FA263 motor & casing @ 1m	22	95	90	26	33	38	42	47	49	53	54	57	69	65	70	75	69	69	69	74	75	87	73	74	85	73	71	68	67	65	62	60	56	52	44	38
	PHT L8 proper 1m to vent on FA263 filter room	23	91	80	22	30	30	34	42	47	50	53	58	62	58	70	73	69	65	65	65	66	72	63	63	70	63	61	60	58	57	55	52	49	45	38	29
	PHT L8 centre tower W side	24	92	81	23	30	32	38	42	43	48	53	58	68	65	71	74	66	64	64	63	65	75	64	65	75	63	62	62	60	58	56	54	51	47	40	31
	L8 new PHT centre	25	86	74	18	22	23	31	35	41	46	52	54	61	60	64	64	61	63	63	64	62	63	62	61	63	59	59	57	54	51	50	46	43	39	33	23
	PHT L8 centre tower N side	26	89	74	23	31	35	40	43	46	49	52	54	58	60	64	66	61	62	62	63	61	63	60	60	60	57	56	55	54	51	48	45	41	36	28	17
	PHT L8 centre tower E side	27	85	73	17	28	29	36	36	38	42	49	49	54	57	64	65	60	62	61	62	62	61	61	61	60	57	56	55	51	46	43	38	32	26	17	7
	PHT L8 centre tower S side	28	83	68	12	21	27	34	38	43	43	47	47	49	53	60	62	54	53	54	57	54	55	54	54	55	53	55	54	48	42	44	38	32	29	18	7
PHT Level 7	PHT L7 New S side centre	29	84	70	19	24	30	36	40	42	43	45	46	50	53	58	57	57	58	58	59	60	60	60	59	60	55	55	53	53	49	46	43	39	35	23	13
	PHT L7 New E side centre	30	84	74	18	21	21	28	35	40	44	44	48	54	56	62	61	59	61	61	62	62	63	63	62	62	61	60	59	60	56	53	52	44	36	28	17
	PHT L7 New N side centre	31	86	72	20	26	30	35	42	42	47	46	47	52	57	62	62	59	61	60	61	62	62	61	61	60	58	56	55	53	49	45	40	34	27	18	7
PHT L7 Alt Fuels Platform	PHT L7 Alt Fuels Platform L1: E side of feeder @ 1m	32	82	75	15	19	21	26	35	38	42	43	47	53	55	58	59	60	60	60	61	62	63	64	64	64	64	66	65	65	61	58	55	49	41	34	25
	PHT L7 Alt Fuels Platform L1: E side of mixer @ 1m	33	83	74	16	19	23	27	34	39	43	45	49	51	55	60	60	62	61	60	62	63	62	62	63	62	61	61	61	62	57	54	54	47	40	33	23
	PHT L7 New E side 4m to base of Alt Fuel chute, 1m to bin W	34	83	74	15	18	22	30	35	38	42	45	47	53	55	60	60	61	62	61	62	63	63	63	64	63	63	63	63	63	59	55	52	45	39	30	20
	PHT L7 Alt Fuels Platform L2: N side of conveyor discharge	35	84	76	17	21	24	33	37	41	42	43	48	54	59	59	61	62	63	63	64	64	64	65	64	63	64	63	64	66	64	59	56	51	45	38	30
	PHT L7 Alt Fuels Platform L2: 1m E side of chute inlet	36	83	74	18	19	24	30	37	40	40	45	50	52	59	59	59	61	61	62	62	62	63	63	63	62	62	60	61	62	60	56	53	47	42	34	25
	PHT L7 Alt Fuels Platform L2: 1m E side of conveyor 3m from entry to chute	37	82	73	17	19	23	30	33	37	40	43	48	53	55	59	59	63	62	61	62	62	62	62	61	61	58	57	56	58	52	49	47	40	33	25	16
	PHT L7 Alt Fuels Platform L2: 1m NW side of conveyor drive motor	38	84	77	19	23	26	35	38	39	40	44	49	51	56	60	61	62	63	61	63	63	64	65	63	63	63	67	66	68	66	62	59	53	48	41	34
	PHT L7 Alt Fuels Platform L2: 1m SW side of conveyor drive gearbox	39	84	76	20	22	27	32	38	40	41	44	49	53	58	61	62	62	61	62	63	63	64	65	63	63	63	65	65	69	65	61	58	52	47	39	31
	PHT L7 Alt Fuels Platform L1: 3m N of feeder	40	83	74	15	19	23	31	35	37	42	45	48	53	56	60	60	60	61	62	63	63	62	62	63	62	61	61	61	60	57	54	50	44	38	29	19
PHT Level 7	PHT L7 New centre between towers faces S	41	87	73	25	30	33	36	42	42	44	44	47	53	55	65	66	60	61	62	61	61	62	61	60	63	58	57	56	56	52	48	45	40	34	24	13
	L7 between PHTs centre facing W	42	87	73	25	31	34	36	43	42	43	43	47	52	56	63	63	61	61	62	61	61	63	61	60	62	58	57	56	55	52	48	45	40	34	25	14
	PHT L7 Old S side centre, faces W	43	88	75	22	29	34	37	42	43	46	43	49	52	58	65	67	61	64	63	65	63	64	61	62	66	58	56	54	52	49	47	44	39	35	24	13
	PHT L7 under EL13 platform E side	44	90	75	22	30	34	41	47	46	48	50	52	55	54	63	68	60	65	63	63	63	64	62	61	64	58	56	57	54	51	49	44	39	34	24	13
	EL13 platform E side Gbox & coupling @ 0.5m	45	91	84	21	28	31	37	41	45	48	49	50	56	57	70	73	66	76	70	75	72	72	74	73	72	69	66	64	61	58	55	52	48	44	37	28
	EL13 platform N side GB end & side EL @ 1m	46	91	78	24	31	37	40	45	48	52	53	53	54	57	64	67	63	69	67	69	67	69	70	67	66	61	60	57	54	51	47	43	38	33	24	14
	L7 BE drive platform N side @ 1m to BE	47	89	76	23	29	33	38	42	45	48	49	50	52	58	67	67	63	70	63	63	63	64	64	62	62	57	56	54	51	47	44	40	35	29	19	9
	EL13 platform SW side motor & EL & coupling @ 1m	48	95	83	27	34	40	46	50	52	55	57	57	59	65	71	70	66	70	72	73	74	74	74	73	71	66	63	62	60	57	55	52	48	43	34	25
	EL13 platform W side 0.5m	49	90	77	19	26	32	37	42	44	48	48	52	54	59	73	71	60	65	63	66	62	63	61	62	62	57	54	52	49	46	43	39	33	27	16	6
	EL13 platform motor end @ 0.6m	50	93	85	23	30	33	38	42	46	49	52	50	54	60	74	75	67	73	74	76	76	75	74	74	70	69	70	67	64	63	60	58	55	51	45	37
	L7 centre between cylinders	51	90	75	25	31	35	42	46	45	47	44	49	52	57	67	69	61	62	62	62	61	64	60	60	64	58	56	54	53	50	48	45	41	35	26	15
	PHT L7 old NW corner 1.5m to stack	52	92	73	27	34	37	42	48	51	52	50	53	57	60	66	65	63	63	63	60	58	58	57	57	56	53	51	49	48	45	44	39	33	27	19	8
	PHT L7 old centre N side on new platform	53	91	75	26	36	40	40	45	47	45	44	52	56	63	69	69	61	63	62	61	59	59	58	57	58	54	52	51	48	46	44	41	36	30	22	11
	PHT L7 old centre N side	54	91	75	25	33	37	41	46	47	48	46	47	54	61	70	71	60	59	59	57	56	56	55	54	55	53	52	51	50	49	47	43	39	36	32	26
	PHT Level 7: FA213 @ 1m, door closed	55	93	76	29	35	40	42	47	50	52	52	54	55	62	68	68	65	63	67	64	62	62	61	61	63	59	57	55	52	50	47	44	39	33	26	14

Table 3.2: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - One-third Octave Band Spectra

Area	Source or location	File No.	Total C dBC	Total A dBA	A-weighted LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency Hz																																
					12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
PHT Level 6 RM Silo Top	PHT L6 RM silo above baghouse discharge @ 2m at base of stairs to EL, level with floor	56	91	83	21	27	32	35	42	45	52	54	55	63	63	69	71	68	69	72	70	73	73	71	72	75	66	65	63	62	62	63	65	66	66	52	42
	PHT L6 RM silo Top FA260 NE side @ 1m casing & motor	57	95	90	30	35	42	44	48	50	51	56	55	60	64	68	71	68	72	73	76	79	77	74	78	88	74	70	68	66	65	66	64	62	61	48	40
	PHT L6 RM Silo top EL15 platform motor side 0.6m	58	88	82	16	23	28	31	39	41	45	50	52	60	61	63	64	62	64	68	69	69	76	75	72	70	66	66	66	62	59	59	59	58	57	42	33
	EL15 W side @ 1m	59	97	74	35	40	45	48	52	55	57	59	60	61	61	63	62	59	59	67	60	60	63	61	60	61	57	56	55	54	52	53	55	54	53	41	32
	L6 RM silo top on BE EL15 platform SW side @ 0.8m	60	93	73	31	36	40	44	48	51	52	55	56	57	56	60	61	56	58	68	58	59	60	66	62	58	56	55	55	53	50	48	49	47	45	33	23
	EL15 S side Gbox @ 1m	61	98	81	35	40	45	50	53	56	58	59	60	60	61	62	62	60	61	73	62	63	74	75	71	64	65	62	64	61	52	49	48	46	44	31	23
	EL15 E side Gbox @ 0.5m	62	103	80	38	46	50	55	58	62	64	66	68	69	69	69	68	66	66	70	65	64	70	69	66	65	62	62	63	61	53	52	52	49	47	35	27
	RM silo top baghouse fan DC30 discharge @ 1.5m	63	98	86	30	35	42	47	51	54	58	62	64	66	70	74	75	75	72	74	71	76	75	77	75	74	69	67	64	64	65	68	71	72	71	58	49
	RM Silo top N side 12.7m to FA260	64	90	74	25	32	37	41	44	48	52	53	53	54	56	61	62	58	65	63	61	63	64	62	61	62	57	57	57	59	59	62	62	58	54	43	33
	RM Silo top E side 12.7m to FA260	65	88	74	24	29	33	38	43	46	47	50	50	51	56	64	66	59	60	62	62	63	62	62	62	66	58	57	56	55	54	55	54	52	50	37	26
PHT Level 6	PHT L6 centre W side	66	86	74	16	27	28	35	37	40	41	44	47	56	58	65	66	59	63	64	64	61	62	62	62	62	58	57	56	55	52	51	48	44	39	31	20
	PHT L6 stack test port 100mm diam @ 200mm S side	67	96	88	28	35	40	43	47	49	52	54	56	66	66	75	76	70	72	78	80	75	77	80	76	74	72	69	67	64	61	60	59	57	50	46	38
	PHT L6 stack test port 100mm diam @ 200mm W side	68	99	90	31	38	44	48	51	54	56	58	64	69	70	75	80	75	81	82	79	77	76	80	78	74	73	73	69	67	63	59	57	52	46	41	33
	PHT L6 stack test port 200mm diam @ 200mm W side	69	102	96	29	35	41	43	47	49	51	54	64	70	69	74	79	76	88	92	85	84	85	83	83	80	77	75	72	69	65	62	59	55	47	41	33
	PHT L6 NW corner 1m to stack	70	93	77	28	34	39	44	48	51	55	56	58	61	62	64	67	65	67	71	67	64	66	66	64	63	62	61	59	57	55	52	49	44	38	31	27
	PHT L6 centre N side by platform	71	86	73	23	30	32	36	40	40	43	44	48	57	57	62	63	60	62	62	63	62	62	62	62	61	59	58	56	55	51	48	44	39	33	25	14
	PHT L6 centre N side on platform	72	88	72	23	30	34	40	42	44	45	47	48	63	58	60	60	59	60	62	62	61	61	61	61	60	58	56	55	53	49	45	42	36	30	23	13
	PHT L6 centre between towers	73	84	73	21	29	31	30	36	36	38	41	47	58	56	59	61	59	61	62	62	62	62	61	62	62	59	58	58	55	54	53	52	49	45	40	31
	PHT L6 new N side centre	74	84	73	17	26	30	35	37	36	42	44	46	49	57	60	59	58	61	63	64	63	63	62	61	61	59	57	55	52	49	47	43	39	33	26	17
	PHT L6 new E side centre	75	84	72	21	28	28	36	31	33	40	45	46	55	56	59	57	58	61	61	61	62	62	62	61	60	58	57	55	53	51	48	45	41	36	29	19
	PHT L6 new S side centre	76	83	72	17	26	29	30	33	35	41	43	46	52	56	59	58	59	60	61	62	62	62	62	62	61	59	58	58	56	54	51	48	44	39	32	23
	L6 centre S side old PHT by elevator	77	87	74	18	27	32	36	40	39	42	44	47	65	58	58	59	60	61	63	62	62	63	63	63	62	58	57	56	54	52	51	48	43	39	26	15
PHT Level 6 Inside Silo Top	L6 inside doorway to top RM silo room	78	92	81	18	26	32	39	51	48	56	55	57	60	60	65	64	64	67	70	75	67	68	72	74	70	62	64	60	56	52	50	44	39	33	23	13
	RM Silo top inside centre	79	92	87	0	10	26	32	38	45	50	60	57	64	62	66	69	67	71	73	79	72	73	80	82	77	70	72	68	63	60	58	51	47	40	33	25
	RM silo top inside E doors open	80	91	84	9	21	25	31	45	47	53	56	52	59	64	68	68	67	70	71	76	71	71	75	78	77	66	67	65	60	58	57	47	41	35	28	19
	L6 RM silo top room inside S man door	81	91	84	11	24	25	35	46	47	52	54	52	62	62	65	68	70	70	71	78	71	70	74	77	74	65	65	63	58	56	54	47	42	36	30	20
	RM silo top outside S man door	82	98	76	33	39	45	48	54	57	59	61	63	68	65	65	64	62	61	60	62	63	63	62	63	63	59	58	57	55	54	52	53	50	48	34	24
PHT Level 5	PHT Level 5 old centre S side by stairs	83	84	74	16	23	28	33	37	39	41	43	46	55	56	60	60	59	62	62	62	64	64	64	64	64	62	62	61	60	58	56	52	47	44	36	27
	PHT Level 5 old centre W side by gas valves @ 1m	84	93	77	29	34	39	44	48	50	53	54	56	63	61	64	65	62	64	64	62	63	64	63	67	65	61	64	61	68	65	66	63	57	61	47	37
	PHT Level 5 old NW corner @ 1m to stack	85	93	75	29	34	39	44	48	51	53	55	55	60	61	64	66	64	66	64	62	62	62	62	64	63	59	58	56	58	55	54	50	44	43	32	23
	PHT Level 5 old centre N side	86	87	74	19	25	37	39	36	41	42	44	46	52	59	62	63	59	62	62	63	63	63	63	63	62	59	58	56	56	53	50	46	40	36	26	16
	PHT Level 5 centre between towers	87	84	73	18	24	33	35	35	39	40	42	46	54	56	59	60	58	61	62	62	62	62	62	62	61	59	58	57	57	54	52	48	43	38	30	20
	PHT Level 5 New centre N side	88	83	73	13	23	24	33	35	36	41	46	48	51	58	61	59	59	61	62	62	63	63	63	62	61	59	57	55	53	49	47	42	37	32	25	18
	PHT Level 5 New centre E side above kiln	89	84	72	19	25	30	35	38	40	42	44	46	51	57	60	57	58	61	62	61	62	62	61	61	60	58	57	56	54	52	48	44	39	33	26	15
	PHT Level 5 New centre S side	90	86	71	21	28	33	37	42	44	46	48	49	52	56	58	56	57	59	60	60	60	60	60	60	58	58	56	55	55	53	49	45	41	36	30	20
PHT Level 4	PHT Level 4 old centre S side by stairs	91	87	76	19	26	31	35	38	41	45	57	52	50	57	59	61	59	63	63	63	65	65	66	66	66	65	65	63	61	59	54	50	44	38	31	21
	PHT Level 4 old SW corner by water pumps SV09 @ 1m N	92	91	79	27	33	38	42	46	49	51	56	55	54	58	60	62	61	65	64	64	67	67	68	70	69	67	69	66	64	62	59	55	51	46	40	37
	PHT Level 4 old centre W side	93	88	77	23	29	35	40	42	45	45	50	49	51	58	65	67	61	64	64	62	63	64	65	68	67	63	64	62	60	58	54	50	44	38	28	16
	PHT Level 4 old NW corner @ 1.2m to stack	94	87	75	20	26	34	40	42	44	46	46	50	51	59	63	67	63	65	64	62	62	63	63	66	64	59	59	56	55	52	48	43	38	33	22	11
	PHT Level 4 old centre N side	95	84	74	15	23	30	34	39	39	43	46	47	51	58	60	60	59	62	62	62	63	62	62	63	63	61	61	60	59	59	57	55	53	48	41	31
	PHT Level 4 centre between towers by air cannon @ 2m	96	86	74	17	28	33	37	40	40	43	48	50	50	59	60	61	60	63	62	62	64	63	63	64	63	62	62	60	58	55	52	48	44	39	32	23
	PHT Level 4 centre between towers by air cannon @ 2m	97	84	73	15	26	31	34	37	37	42	48	46	52	57	60	59	59	63	62	62	62	62	62	61	60	59	58	56	53	50	46	45	41	34	28	18
	PHT Level 4 new centre N side	98	84	73	13	25	27	32	33	35	43	47	48	52	58	61	60	60	63	63	63	64	63	63	62	61	59	58	55	52	48	44	41	36	30	22	12
	PHT Level 4 new centre E side above kiln	99	83	73	10	24	27	31	35	35	41	50	48	51	58	60	57	58	62	63	63	64	63	63	62	61	59	57	55	52	48	46	39	33	26	19	7
	PHT Level 4 new centre S side	100	84	77	16	24	30	32	36	38	43	51	48	51	57	58	57	59	61	61	62	63	63	64	64	65	67	67	67	67	66	65	64	61	56	51	44

Table 3.2: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - One-third Octave Band Spectra

Area	Source or location	File No.	Total C dBC	Total A dBA	A-weighted LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency Hz																																
					12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
ESP	ESP Centre E side top walkway looking E to PHT	101	85	74	19	26	35	36	38	40	42	47	46	50	56	62	63	58	60	61	61	63	64	63	65	64	59	58	55	54	51	49	45	40	32	22	11
	ESP top SE corner at barrier	102	86	73	20	27	36	37	39	42	43	48	48	50	55	60	62	58	59	60	61	63	62	62	64	63	59	59	56	54	52	48	44	39	33	25	15
	ESP top SE corner at barrier - facing ESP	103	85	71	16	24	36	36	36	40	41	45	47	49	55	61	61	57	59	60	59	60	60	60	60	60	57	55	53	51	49	45	41	37	35	24	15
	ESP top NE corner at barrier	104	87	73	20	27	34	38	41	42	43	52	50	52	57	63	64	59	61	61	61	62	61	61	63	62	57	56	53	52	49	46	42	37	33	23	14
	ESP top NE corner at barrier - facing west	105	84	71	19	26	31	35	37	39	40	48	48	51	57	61	61	59	60	60	59	59	58	59	59	59	56	54	51	49	47	43	39	34	28	18	9
PHT Level 3	L3 old PHT centre S side @ 2m to edge facing centre	106	89	77	22	28	33	33	40	46	47	59	54	53	58	62	64	60	65	65	64	68	65	71	67	64	64	63	61	60	58	55	53	48	44	36	27
	PHT Level 3 old centre W side above FA39 face E	107	91	79	26	31	35	34	43	51	47	60	56	56	60	67	68	65	68	68	67	68	67	68	69	67	63	63	62	60	57	54	50	47	42	37	29
	PHT Level 3 old centre N side	108	90	76	23	28	34	40	44	45	47	58	55	54	59	64	67	64	67	65	64	65	64	65	66	64	60	59	57	54	51	49	47	46	43	38	31
	PHT Level 3 old centre E side above kiln	109	87	75	23	29	30	34	39	41	44	55	52	53	60	62	63	62	65	64	64	64	63	63	64	62	61	59	57	53	51	46	44	41	38	31	23
	PHT Level 3 old NW corner by stack @ 1.5m, above FA39 inlet	110	91	78	24	30	35	41	45	51	51	57	55	56	60	66	68	67	69	68	66	67	66	67	69	67	62	61	59	57	54	50	47	42	36	29	21
PHT Level 2.5	PHT Level 2.5 by DC31 drives @ 0.6m	111																																			
	PHT Level 2.5 by DC31 discharge @ 1m	112	101	87	25	30	37	46	50	55	58	73	69	68	71	75	74	73	77	78	75	77	75	76	76	75	72	72	70	69	67	66	64	60	54	48	39
	PHT Level 2.5 by centre by kiln entry W side	113	97	88	20	28	38	39	42	53	52	69	64	60	63	65	68	65	68	72	68	73	70	75	76	75	78	79	79	78	78	77	76	75	72	68	62
	PHT Level 2.25 by centre by kiln entry Air cannons	114	94	86	19	24	36	45	48	54	51	60	58	58	61	65	68	65	69	70	70	79	71	84	75	69	71	68	69	66	64	60	55	49	43	35	25
	PHT Level 2.25 North Side centre	115	98	80	20	23	32	41	47	50	52	71	66	57	62	67	69	66	68	69	68	70	67	72	69	66	65	63	60	59	56	52	47	44	41	34	27
	PHT Level 2.5 by Radicon Gbox drive E end @ 2.5m	116	93	87	16	25	33	40	43	49	49	63	60	59	63	67	67	64	68	70	73	78	75	84	76	71	75	71	72	70	69	66	63	59	52	45	34
	L2.25 PHT centre W side facing fan discharge DC70 FA63 @ 4.66m, stack @ 6.35m and stack entry duct @ 6.23m	117	108	88	25	29	37	42	51	51	58	82	76	67	68	73	75	68	74	76	75	78	74	79	76	73	73	72	70	69	66	62	58	54	48	39	30
PHT Level 2	PHT Level 2 by E side drive coupling & casing DC70 FA03 centre N side	118	95	87	23	28	40	42	49	55	53	59	60	65	67	71	72	68	72	74	75	80	74	81	74	72	74	74	74	74	74	68	67	64	62	58	51	44
	L2 PHT FA03 casing @ 1m E side	119	98	87	26	32	41	45	51	54	55	69	64	64	67	71	73	67	72	73	74	80	74	79	75	75	75	76	74	72	67	65	60	57	52	44	38
	PHT Level 2 FA03 discharge @ 1.5m	120	108	91	26	30	41	49	54	56	60	82	77	73	72	74	76	73	77	79	78	79	79	82	80	78	76	77	76	76	73	71	68	65	60	53	43
	PHT Level 2 @ 1m to south side FA39 stack entry duct	121	102	87	25	30	46	50	55	57	57	74	68	63	69	75	77	70	74	76	74	78	76	78	79	75	74	73	70	69	65	61	57	52	45	36	26
	PHT Level 2 FA65 inlet filter @ 1m in front	122	102	88	27	32	41	45	53	55	59	75	69	65	72	73	75	74	73	75	77	81	75	79	77	74	73	73	70	70	66	63	59	54	48	40	31
	PHT Level 2 FA65 rear side 1m	123	104	87	24	30	39	41	48	51	58	79	73	63	65	71	74	70	72	74	74	77	73	79	76	72	72	74	68	68	64	61	58	53	48	39	30
	L2 PHT centre N side edge @ 2m facing centre	124	93	83	23	29	35	42	47	50	50	62	59	59	63	69	70	67	70	72	69	74	69	73	72	71	70	71	68	68	65	63	63	61	58	52	42
	PHT Level 2 @ 1m to north side FA39 stack entry duct	125	100	87	25	30	48	51	55	56	54	66	63	63	69	77	81	71	74	77	73	74	74	78	77	76	73	72	68	65	62	58	53	48	42	33	23
	PHT Level 2 FA65 inlet filter @ 1m in front	129	102	88	24	29	40	44	53	56	60	75	70	69	70	72	75	75	74	78	77	79	75	80	76	73	74	75	72	70	67	64	59	54	48	40	31
	PHT Level 2 FA65 rear side 1m	130	104	86	26	31	39	43	50	52	58	78	72	65	68	71	73	70	72	74	76	76	73	79	74	72	71	72	69	68	64	61	58	53	47	39	30
	PHT Level 2 @ 1m to north side FA39 stack entry duct	131	100	87	26	31	48	51	55	55	52	69	65	64	70	76	79	72	72	75	74	74	75	76	78	76	73	72	70	68	64	61	59	54	48	42	31
PHT Level 1 Ground	PHT Level 1 RM silo base blower room N side man door @ 1m	132	90	79	16	25	38	40	42	46	48	56	53	56	67	63	69	62	63	65	67	69	66	68	72	69	66	67	64	65	60	57	54	49	44	41	34
	PHT Level 1 FA92 silo vent fan casing & drive @ 1m NW side	133	91	78	21	29	35	47	43	46	49	50	55	60	63	65	66	64	66	68	67	68	67	69	67	64	64	63	64	64	63	59	56	52	44	34	22
	PHT Level 1 FA92 silo vent fan casing & drive @ 1m E side	134	89	81	20	25	32	41	39	43	46	54	52	57	62	64	65	64	65	71	71	71	70	73	71	69	68	66	67	64	64	59	58	54	47	40	30
	PHT Level 1 FA92 silo vent fan inlet duct @ 1m SE side	135	88	76	21	26	31	43	41	45	48	50	52	56	59	63	63	63	63	67	66	66	64	67	65	62	61	59	58	57	55	51	47	42	34	26	16
	PHT Level 1 FA92 silo vent fan inlet front @ 1m	136	90	75	25	30	37	43	40	44	49	52	57	59	58	63	63	63	62	63	65	64	64	64	63	62	62	60	58	55	52	48	45	40	35	28	19

Table 3.2: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - One-third Octave Band Spectra

Area	Source or location	File No.	Total C dBC	Total A dBA	A-weighted LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency Hz																																
					12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
FA38 & 39	FA39 E side at concrete line 5.4m to motor	137	94	87	26	32	37	40	45	52	53	62	59	60	64	69	72	66	69	74	69	71	71	76	85	80	71	70	70	68	61	57	53	47	41	32	22
	FA39 E side @2.3m in line with columns	138	97	91	27	33	42	44	50	57	53	60	57	59	64	70	76	70	72	77	72	73	73	78	90	82	73	71	69	68	62	57	54	48	41	32	21
	FA39 under discharge duct @ 1m	139	99	84	30	37	49	48	54	59	59	61	60	65	66	70	73	70	69	71	71	73	73	73	78	75	69	69	67	65	61	56	51	46	39	31	20
	FA39 E side motor platform @ 0.82m to coupling cover	140	98	94	27	31	41	46	49	58	54	61	59	63	65	71	77	76	77	81	80	77	80	82	91	84	79	80	76	78	71	67	64	59	53	44	33
	FA39 motor platform centre E side@ 1m	141	101	98	26	31	38	44	48	52	53	59	58	64	64	75	85	81	77	86	78	78	77	83	96	87	78	79	76	78	71	65	63	55	48	40	30
	FA39 motor platform centre E side@ 1m	142	101	98	27	31	38	44	48	52	53	59	58	64	64	75	84	81	76	87	78	78	77	82	97	88	78	81	77	77	70	64	62	55	48	39	29
	FA39 motor platform centre E side@ 1m & vent @ 0.5m	143	99	96	25	30	38	42	46	52	52	59	60	62	64	70	79	76	76	85	75	75	78	86	91	91	83	81	80	78	73	68	64	59	52	44	33
	FA39 motor N end @ 2.7 to end plates/stop button at line	144	92	83	23	27	38	42	46	52	49	57	55	56	60	66	70	66	67	73	68	69	68	69	79	74	66	66	63	62	57	52	48	42	35	26	14
	FA 39 N side on kerb	145	91	81	21	28	34	37	43	50	49	55	55	58	61	68	70	65	67	71	67	68	69	70	77	73	65	64	61	60	55	50	46	39	31	21	9
	FA39 W side at metal strip 5.25m to motor	146	93	87	24	33	37	43	45	49	49	57	57	57	62	68	69	69	70	72	71	73	74	73	82	82	73	72	70	69	63	58	55	48	41	33	22
	FA39 W side at columns @2.7m to plinth	147	94	88	24	32	38	44	48	51	50	57	56	57	62	69	71	71	71	75	72	73	74	76	84	83	74	75	71	70	64	59	56	50	44	36	25
	FA39 W side @ 1m to cladding door closed, 1.33m to casing	148	98	88	25	33	39	45	51	56	56	61	57	59	68	78	78	69	70	71	72	73	75	72	82	82	70	69	66	64	61	57	52	46	39	31	20
	FA39 W side motor platform at 0.8m to coupling cover & 1m to coupling	149	99	93	24	31	43	44	50	59	54	61	60	63	65	71	78	78	76	78	77	80	79	80	90	83	78	79	75	77	70	66	62	57	51	43	33
	FA39 S side @ columns 2.7m to bearing	150	97	84	27	37	47	45	47	55	54	64	60	59	63	69	71	67	70	72	72	76	77	71	75	77	69	68	67	65	63	57	52	49	43	35	26
	FA39 S side platform bearing cover @ 0.8m	151	97	86	28	37	46	44	49	56	56	63	64	62	64	70	72	72	73	75	75	79	75	74	77	79	72	70	69	68	65	62	58	55	50	44	36
	Centre between FA38 & FA39 @ 11.2m at line facing E	152	93	88	24	30	37	43	47	49	53	56	55	58	62	69	70	68	69	71	71	73	74	74	83	84	71	70	68	66	62	58	53	46	39	29	18
FA38 & 39	Centre between FA38 & FA39 @ 7.7 m facing FA 38	153	93	88	24	30	36	42	47	50	51	54	55	57	62	69	70	68	69	72	72	73	73	75	83	84	71	70	68	66	64	60	56	50	45	37	29
	FA38 @ 3.9m to E side	154	95	91	25	33	37	42	50	48	53	57	56	58	63	70	72	68	70	72	72	74	74	74	85	89	74	71	70	68	66	63	58	53	47	40	32
	FA38 @ 3m to N side	155	94	88	22	31	40	41	49	49	52	56	55	57	63	69	73	68	71	73	75	74	75	75	83	83	72	71	70	67	64	60	55	50	44	37	28
	FA38 @ 5m to NW side at NW column	156	92	87	25	34	37	43	45	47	50	52	54	57	61	65	69	67	69	71	72	73	73	74	82	84	72	71	70	68	65	62	57	52	46	38	28
	FA38 @ 5m to NW side at W column	157	93	89	27	36	31	37	45	48	49	54	57	58	62	66	68	66	70	72	71	73	74	73	86	83	72	71	70	68	66	63	60	54	49	42	35
	FA38 @ 5m to W side at W column	158	93	88	27	36	30	37	46	48	49	54	57	58	63	67	69	67	69	71	71	72	73	73	83	85	72	72	71	68	66	64	60	55	50	43	35
	In centre opening of wall on W side	159	92	86	24	31	31	40	46	48	49	56	54	58	61	67	68	65	68	71	70	72	71	72	79	82	70	70	69	66	64	61	58	52	45	38	28
	FA38 motor platform W side @ 1m to coupling cover, 1.9m to casing, 0.7m to motor side	160	98	97	29	39	35	40	47	49	52	58	59	61	64	69	73	72	75	78	78	79	78	79	92	94	79	83	81	78	77	74	70	65	60	54	45
	FA38 at opening on S side of road facing FA38 opening	161	89	81	24	30	31	37	41	43	46	52	53	57	59	63	65	62	64	67	66	70	69	68	75	75	67	67	67	67	65	64	59	55	52	43	34
	56 Road kerb N side opp E side RM6	8																																			
	56 Road kerb N side opp E side RM6	162	85	76	18	24	29	36	38	42	44	49	48	51	57	61	62	57	61	63	62	64	64	64	69	70	62	62	61	61	59	56	52	47	43	34	22
	56' Road kerb N side opp. Opening to FA38	9	90	77	13	21	29	37	38	41	45	51	52	70	60	60	60	59	63	65	61	61	65	64	70	66	60	59	58	58	57	56	52	46	42	34	23
	56' Road kerb N side opp. Opening to FA38	163	87	77	19	25	32	38	40	43	45	51	50	53	56	61	62	58	64	67	63	64	64	64	70	70	63	62	61	59	57	54	51	45	39	31	20
	57 Road N side opp FA38 doorway	10	90	79	16	21	34	37	41	43	47	57	54	66	60	63	65	62	67	70	65	65	68	67	74	68	63	62	59	58	54	50	46	39	30	19	6
	58 Road N side between FA38 & FA39	11	89	80	18	24	34	38	42	46	49	55	56	62	60	64	66	64	66	68	65	66	67	69	75	71	64	64	60	61	56	52	48	41	33	21	8
	59 Road N side kerb opp end FA39	12	91	83	19	24	32	38	41	49	51	54	56	65	61	64	68	65	67	71	67	68	69	70	80	72	66	65	62	62	58	55	52	47	39	29	17
	59 Road N side kerb opp end FA39	13	90	82	22	24	33	38	41	49	51	54	55	62	60	65	70	65	68	70	67	67	69	69	79	72	66	66	62	63	58	55	53	48	39	30	17
RM6 West side	1 RM6 W door @ 1m	164	84	76	18	27	31	32	34	40	42	41	44	48	52	58	62	59	61	62	62	69	68	67	66	65	60	58	58	56	51	46	41	35	28	20	10
	1' RM6 W door at kerb W side @ 13.3m	165	80	69	14	20	25	30	33	34	38	41	43	46	50	53	58	54	57	60	56	61	60	59	59	58	55	53	51	48	44	39	33	26	18	9	1

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Area	Source or location	File No.	Total C dBC	Total A dBA	A-weighted LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency Hz																																
					12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
RM7 ground level	1 RM7 at roadside kerb ~32m	166	79	67	13	22	23	27	30	35	38	42	44	46	48	55	57	53	52	55	54	57	57	56	56	56	54	53	52	49	46	42	36	29	22	13	3
	2 Rm7 @ 15.5m to W door	167	82	72	16	23	26	30	35	39	42	45	47	49	52	59	60	56	57	60	59	62	63	63	62	61	59	58	56	53	50	46	41	35	26	16	5
	3 RM7 W wall door @ 1m	168	85	78	15	27	28	33	38	39	44	44	49	53	53	60	64	63	64	68	68	69	71	69	66	66	64	63	64	61	57	54	49	43	35	26	13
	4 RM7 NE corner wall vents @ 1m	169	87	79	18	29	30	33	37	42	45	50	51	54	57	63	66	64	64	67	67	70	70	69	67	67	66	65	65	60	56	52	47	41	34	26	14
	4 RM7 NE corner wall vents @ 1m	170	88	78	20	29	32	36	39	44	47	51	51	54	57	63	66	64	64	68	68	69	70	68	67	67	66	65	64	60	56	52	47	41	35	27	17
	5 RM7 N side NW roll door @ 1m	171	89	78	21	31	32	39	41	45	49	54	52	53	56	63	64	64	65	67	67	69	69	68	69	68	65	64	63	61	58	54	48	42	36	27	17
	6 RM7 N wall vents centre next to Roll door	172	89	81	20	30	32	37	41	44	49	51	54	57	57	64	67	65	67	69	70	71	72	71	70	70	69	67	66	63	60	57	52	47	40	33	23
	RM7 vents N wall W of man door	173	90	81	18	27	35	37	43	47	51	50	51	57	59	66	68	65	66	72	69	71	72	70	70	70	68	67	67	65	62	59	52	47	40	32	21
	7 RM7 N wall man door	174	89	80	20	29	35	37	42	46	50	52	53	59	60	65	67	64	65	68	69	71	70	68	69	70	68	66	65	62	59	56	51	45	37	28	17
	8 RM7 E wall vents NE corner @ 1m	175	90	80	18	26	33	35	40	46	49	58	55	55	58	65	67	64	66	69	69	72	71	70	71	70	68	67	67	64	61	57	53	49	43	37	26
	9 RM7 E side under duct	176	88	77	18	26	34	36	41	43	48	50	52	55	61	66	66	62	64	66	65	67	67	66	67	66	63	62	61	59	55	52	47	41	34	24	13
	10 RM7 By E door RM7 floor	177	87	76	17	28	31	35	40	44	49	54	52	53	56	64	66	63	61	65	64	65	66	64	66	64	62	60	60	59	55	51	47	41	35	25	14
	10' RM7 By E door Hydraulics room closed	178	82	71	16	21	24	34	36	40	44	46	47	48	51	57	57	57	59	59	59	61	60	61	63	60	59	57	55	53	50	47	43	38	32	23	13
	11 RM7 Centre Compressor room door @ 1m closed	179	82	71	14	23	25	33	34	41	44	47	46	45	52	59	58	58	58	59	59	61	61	61	62	60	59	57	55	53	51	47	44	41	35	28	18
	11A RM7 compressor room W door @ 1m closed	180	83	76	13	23	25	32	35	39	44	47	46	46	51	56	56	59	60	60	60	60	62	64	65	65	64	65	66	67	67	66	64	61	55	49	40
	12 RM7 Under E inlet for switchroom fan	181	91	82	12	21	26	34	35	39	42	47	53	62	67	71	65	75	78	66	65	68	66	67	68	66	65	65	62	60	58	56	53	49	47	41	38
	12 RM7 Under E inlet for switchroom fan rattling cowling	182	91	83	15	22	28	34	36	40	42	47	53	63	67	70	66	75	78	67	67	68	68	68	68	68	67	67	66	65	62	61	58	54	51	45	40
	12B Under switchroom fan duct W	183	85	75	14	22	26	33	35	39	42	46	47	50	58	65	61	66	69	60	62	63	64	63	64	62	60	59	57	56	53	51	48	43	38	30	22
	12 RM7 E inlet for switchroom fan @ 1m to N side and 0.6m below	184	85	75	15	23	27	32	35	38	42	47	48	50	57	65	63	63	68	63	63	63	63	63	65	64	62	62	60	58	57	54	53	50	45	40	36
FA249	13 FA249 under inlet duct W side	185	90	76	19	26	31	39	43	51	53	55	54	55	62	67	65	61	62	64	63	65	65	64	66	65	62	61	59	59	56	52	48	42	35	26	16
	14 FA249 2m W side ground level	186	90	79	19	27	34	38	40	46	51	54	54	57	60	70	69	65	66	67	65	67	68	67	71	67	65	64	62	61	58	55	50	45	39	31	21
	14' FA249 motor platform fan coupling & casing W side @ 1m	187	92	82	18	26	35	38	41	49	55	54	59	61	63	72	71	65	69	70	69	70	71	70	73	71	70	68	67	67	64	61	58	55	51	46	38
	15 FA249 1m motor end	188	89	81	18	25	29	33	40	46	52	54	55	58	62	64	67	65	66	68	69	70	70	70	74	70	68	67	66	65	62	59	56	53	48	42	34
	16 FA249 end at column 4.3m N of motor plinth	189	90	78	17	24	30	37	38	45	53	60	56	56	64	67	68	62	63	65	66	67	68	67	71	68	65	64	62	61	58	55	52	47	41	34	25
	17 FA249 motor platform E side coupling & casing 1m	190	94	83	18	26	32	36	40	53	58	55	58	61	63	74	73	68	69	70	70	69	72	72	75	73	70	70	68	68	65	63	61	58	53	48	40
	18 FA249 Platform S side centre @ 1m	191	87	75	18	26	28	33	40	47	49	52	50	52	57	65	63	59	59	59	60	61	63	63	63	63	63	63	62	60	62	62	61	58	52	45	38
	18' FA249 platform S side under discharge duct E side	192	86	75	19	26	26	33	39	45	49	47	48	52	59	66	63	58	58	61	63	63	65	64	69	65	61	62	60	59	55	55	52	47	41	34	24
	18' FA249 platform S side under discharge duct E side	193	86	75	18	25	26	33	40	46	49	47	48	52	58	65	63	58	59	61	62	63	66	65	68	66	62	62	60	59	56	55	53	48	43	34	24
	19 FA249 S side @ 3.8m	194	85	71	16	24	27	34	40	43	46	47	47	51	55	63	62	57	57	58	59	60	60	60	62	60	57	56	55	54	52	49	48	45	40	33	25
	19 FA249 S side @ 5.5m	195	84	71	17	24	28	34	39	43	45	46	48	52	55	60	60	58	58	60	60	60	60	60	62	60	57	56	55	54	51	49	48	45	40	32	24
	20 FA 249 S side @ 10.9m	196	84	72	15	23	27	32	37	42	44	49	49	53	56	61	60	57	59	60	61	61	61	60	62	60	58	57	55	54	51	49	46	42	36	28	19
	21 FA249 E side of fan casing ground level @ 2m	197	88	73	17	24	28	39	45	47	48	50	50	53	56	64	62	57	58	59	60	60	61	61	65	62	60	59	58	57	55	53	52	49	50	39	27

Table 3.2: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - One-third Octave Band Spectra

Area	Source or location	File No.	Total C dBC	Total A dBA	A-weighted LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency Hz																																
					12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
FA250	22 FA250 S side 4.2 m to motor end	198	89	80	16	26	33	39	40	47	51	57	56	56	58	65	66	62	65	68	68	69	70	69	71	69	67	67	65	64	63	60	56	52	46	37	28
	22' FA250 Motor end S side @ 1m	199	90	81	16	25	35	37	39	46	50	51	56	58	63	68	69	64	67	68	69	71	71	70	72	71	70	68	67	66	63	61	57	54	49	43	35
	23 FA250 E side platform coupling & casing	200	93	83	17	22	33	38	44	50	57	56	60	62	64	72	73	67	70	71	71	71	73	72	73	71	70	69	69	69	66	64	61	58	53	46	38
	23' FA250 E side centre motor @ 1m	201	93	83	18	24	32	36	41	47	55	56	59	62	64	74	76	67	68	69	70	71	71	70	71	70	70	69	67	68	65	62	58	55	50	43	34
	FA250 W side motor shaft @ casing @ 1m	202	95	84	15	24	33	40	44	51	61	61	60	61	66	73	75	66	70	72	73	72	73	73	75	72	72	71	70	70	68	65	63	59	54	47	39
	25 FA250 coupling & casing W side motor centre @1m	203	95	84	15	24	35	42	44	52	61	61	60	61	66	73	75	67	69	71	73	72	73	73	74	72	71	71	70	70	67	65	62	58	53	46	38
	26 FA250 W side casing @ 1m & coupling @ 3m	204	92	82	16	26	34	40	41	47	52	55	56	57	62	72	73	66	67	69	69	71	71	70	73	71	68	69	67	67	64	62	58	55	49	41	32
	26 FA250 W side casing @ 1m & coupling @ 3m	205	91	82	16	27	33	39	41	47	52	55	57	57	62	70	71	66	66	69	69	71	71	70	73	70	68	69	67	66	64	62	58	55	49	41	32
	27 FA250 W side 1m under inlet casing expansion joint	206	91	81	20	30	37	39	44	48	51	52	56	58	62	69	70	66	66	67	69	74	73	68	70	70	67	67	65	64	62	60	56	55	50	42	39
	28 FA250 N side casing shaft platform @ 1m	207	94	83	22	32	40	41	43	54	56	59	57	58	64	71	72	65	67	72	71	74	73	71	72	72	71	68	67	66	65	64	63	61	57	50	41
	29 FA250 E side under discharge duct @ 1.5m, at lower step of concrete	208	94	82	21	30	38	38	42	50	52	56	57	57	66	75	75	64	66	69	68	70	70	68	69	70	69	68	67	66	63	59	53	49	43	35	27
RM7 Roof Platform lower	Lower platform E side 1m to Magnete plate	209	91	90	14	27	29	32	36	42	49	51	51	59	58	65	66	66	65	68	70	70	73	75	77	77	78	79	80	81	80	80	79	74	68	65	65
	Lower platform S side @ 1m to magnete plate	210	92	91	18	27	30	34	38	41	47	50	53	61	61	64	64	72	66	69	73	74	77	79	81	82	82	81	82	82	81	80	78	72	65	59	55
	Lower platform W side @ 0.9m to magnete plate	211	91	88	23	31	33	37	41	44	48	50	52	61	57	65	65	67	65	67	69	70	74	76	77	78	79	80	80	79	77	75	73	68	60	56	51
	Lower platform N side @ 2m to magnete plate (scaffolding)	212	89	86	18	25	31	34	38	42	48	50	51	59	60	66	66	63	63	66	67	68	69	71	73	74	75	77	79	77	74	73	71	66	60	57	54
	Lower platform N side @ 1m to BE casing	213	89	83	20	27	34	36	41	45	51	52	51	59	59	64	66	63	64	65	66	67	69	69	71	71	71	73	75	74	72	69	67	62	55	49	46
	Platform S of Magnete 2m to S side	214	87	84	20	27	31	35	39	41	44	47	49	55	56	62	62	63	62	63	66	67	70	71	72	72	74	75	75	76	73	72	70	66	59	55	52
RM7 Roof platform Upper	Upper Platform Gbox @ 1m E side & 0.5m casing	215	88	79	18	26	30	36	39	44	51	54	55	58	57	61	62	61	62	64	65	66	67	71	69	69	68	69	69	67	65	62	60	55	48	41	35
	Upper Platform Gbox @ 1m N side	216	89	80	15	24	28	33	36	45	55	55	56	60	61	65	64	61	62	65	66	67	68	73	69	69	68	69	70	69	66	64	61	55	49	43	36
	Upper Platform Gbox @ 1m N side	217	88	80	17	26	32	35	37	42	48	52	56	60	61	66	65	61	61	65	66	66	68	70	69	69	68	69	70	69	66	63	59	54	48	41	35
	Upper Platform motor end @ 1m W side	218	88	79	21	26	31	35	38	43	49	52	52	61	59	64	63	61	61	64	65	67	67	68	68	69	68	70	69	67	66	63	60	55	49	44	39
	Upper Platform BE casing @ 0.9m W side	219	87	78	19	23	29	33	36	42	48	52	53	62	57	61	60	61	60	63	64	64	66	66	67	67	67	67	68	66	64	61	59	54	47	43	38
	Upper Platform BE casing @ 1m S side	220	89	80	24	30	34	39	42	46	51	54	53	57	57	61	60	61	58	64	64	63	67	68	69	69	69	70	71	70	68	66	65	61	53	48	46
	Upper Platform BE casing @ 1m E side	221	87	79	18	25	28	32	38	43	47	54	55	57	58	63	64	60	61	66	64	65	67	67	68	68	67	68	68	67	66	63	61	57	49	44	41
RM7 Baghouse Tower	On tower to baghouse top S side above FA249 same level as roof RM7	222	82	68	18	23	26	30	34	41	46	48	48	48	53	58	56	56	54	56	56	57	57	57	60	57	54	53	51	51	46	43	39	34	27	19	9
	On tower to baghouse top S side above FA249 halfway up level	223	86	71	21	26	31	36	40	45	47	49	51	50	58	59	59	56	57	58	58	59	59	60	63	60	57	57	55	54	52	49	45	39	32	23	12
	On tower to baghouse top S side above FA249 top level	224	86	69	25	28	32	37	40	45	46	49	48	49	53	58	58	57	56	57	56	56	57	58	58	57	56	56	56	55	53	50	48	45	41	35	27
	Baghouse S doorway open	225	86	80	20	26	32	37	42	45	46	48	49	50	52	57	57	56	57	61	62	62	63	64	65	66	68	70	70	72	71	69	68	65	62	57	49
	Inside centre baghouse top	226	83	81	12	16	21	30	33	41	43	49	46	48	52	57	58	57	59	62	62	63	64	64	66	67	70	72	73	74	72	70	69	66	62	56	49
Admin Roof	Admin roof NE corner	5	81	72	13	18	23	28	37	37	40	46	46	51	52	56	57	56	58	62	63	62	61	62	61	60	58	57	55	51	49	43	36	28	18	7	0
	Admin roof SE corner	6	81	71	11	18	23	29	36	36	39	46	47	50	52	56	57	56	61	63	61	61	61	61	62	60	58	56	53	50	47	42	38	31	20	8	1
	Admin roof SW corner	7	79	70	9	16	23	28	33	33	39	44	45	49	51	54	57	55	58	61	60	61	60	60	61	59	57	55	52	49	44	39	33	25	15	8	0
	SW corner	229	80	71	9	16	26	29	35	33	39	44	45	48	52	56	57	55	59	61	61	62	61	61	62	61	57	56	54	51	47	43	38	30	19	7	1
	SE corner	230	82	71	15	21	27	31	36	38	41	44	46	48	53	56	56	56	60	62	62	62	61	61	61	60	57	56	54	52	48	43	37	29	20	10	3
	NE corner	231	80	71	7	13	20	26	36	36	39	46	45	48	52	56	56	56	59	61	61	62	61	61	61	60	57	55	53	50	46	41	36	30	21	10	1

Table 3.2: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - One-third Octave Band Spectra

Area	Source or location	File No.	Total C dBC	Total A dBA	A-weighted LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency Hz																																
					12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
RM7 Baghouse hopper area	On screw conveyor SC212 platform Level 1 W end side by fan motor @ 1m	265	89	84	15	20	28	31	37	41	47	49	53	56	60	64	68	64	70	71	67	78	79	69	75	71	71	68	66	65	61	58	55	51	47	41	32
	Centre S side of screw in line with motor FA250	266	94	91	14	21	32	34	36	42	51	63	58	56	61	65	68	65	68	66	69	88	86	70	79	74	74	72	70	68	65	61	58	55	49	43	34
	Centre S side of screw by squeal point	267	92	89	16	19	28	34	36	41	47	57	53	55	64	65	66	64	65	66	66	85	85	69	76	76	74	70	69	67	64	60	58	55	49	42	32
	E end of SC212 body @ 2m and other N-S aligned screw	268	96	94	14	20	31	34	38	41	49	59	55	56	61	71	70	65	72	66	71	89	90	81	87	84	81	80	77	76	71	68	61	55	49	41	30
	Main platform of baghouse hopper screws S end chute W side between SC211 & gate valve	269	88	83	18	23	29	31	36	41	48	49	52	54	57	63	66	63	69	67	67	78	76	69	73	70	71	68	67	66	63	61	59	56	53	49	42
	Centre W side	270	90	84	20	23	28	33	37	41	49	55	54	56	59	68	70	65	66	68	68	78	76	72	74	72	73	72	71	70	68	67	64	62	59	54	47
	Centre E side - on	271	90	86	20	22	28	34	38	43	47	52	53	55	60	67	70	66	69	68	69	81	79	72	74	74	73	72	72	71	69	69	67	65	62	57	50
	N end Sc211 but S of duct	272	90	83	20	21	30	37	38	44	51	58	55	54	59	64	67	63	66	68	67	76	75	70	73	72	71	70	68	69	66	64	60	58	54	48	40
	By FA252 @ 0.8m shaft S side, casing & discharge box	273	92	85	14	19	31	34	37	43	58	59	56	56	64	66	69	72	73	71	67	78	78	70	74	72	70	68	67	66	65	63	64	61	55	49	41
	By FA252 @ 0.8m shaft N side, casing & inlet	274	95	87	12	20	32	33	37	46	60	63	58	56	62	65	68	71	83	70	67	80	78	69	75	72	72	69	69	68	67	68	67	64	58	52	46
	Baghouse hopper platform level N end	275	89	84	21	23	33	42	41	45	47	54	53	55	58	62	65	62	66	66	67	76	76	74	73	73	72	72	71	72	72	70	67	65	62	58	52
	Baghouse hopper centre platform	276	95	93	24	28	34	39	41	43	49	56	58	61	65	70	73	72	74	75	76	78	80	82	80	81	79	82	83	83	81	81	80	78	76	73	68
	By FA252 @ 1m to side discharge box top grill	277	94	86	15	21	35	37	42	42	57	58	57	55	64	67	71	74	81	74	71	78	78	70	73	71	70	68	66	65	63	60	59	55	51	45	36
Coal Road South	30 Coal Road S side in line W side RM7	59	66	79	12	16	21	26	29	31	37	39	43	47	50	60	59	51	54	54	53	54	54	53	54	52	51	49	48	46	43	39	35	28	22		
	31 Coal Road S side in-line E side RM7	60	66	78	11	15	22	25	29	33	36	41	44	47	51	58	56	52	54	54	53	54	54	55	55	52	51	49	48	45	41	37	34	28	23		
	32 Coal Road S side in-line FA249	61	67	79	11	16	23	28	31	35	39	43	46	49	51	57	55	52	55	55	55	57	55	56	58	54	53	51	49	47	44	41	37	31	24		
	33 Coal Road S side Centre Blending Silo	62	68	79	10	19	24	28	31	37	39	44	46	49	54	55	52	53	56	56	55	58	57	58	58	56	54	52	51	49	46	43	39	33	25		
	34 Coal Road S side E side PHT	63	68	80	10	18	24	27	30	35	39	44	47	49	53	56	54	53	55	56	56	59	59	59	58	56	55	53	52	50	47	44	40	34	26		
	35 Coal Road S side E side new PHT	64	69	81	10	16	21	27	30	35	40	48	48	50	56	57	56	54	56	56	57	59	59	60	61	57	56	54	52	50	46	43	38	32	23		
	36 Coal Road S side E side drive platform	65	69	81	11	14	23	28	29	34	40	49	49	50	58	58	58	54	56	56	57	59	59	59	59	57	55	54	53	50	47	44	39	32	23		
	37 Coal Road S side centre column W support duct	66	69	81	12	16	24	28	29	35	40	45	47	50	59	57	56	54	56	56	56	59	59	59	59	57	55	54	52	49	45	42	38	29	20		
	38 Coal Road S side centre pedestal	67	69	81	10	15	22	26	30	35	40	49	49	51	56	57	55	55	57	56	56	58	58	58	59	56	55	54	53	51	48	45	42	35	26		
	39 Coal Road S side Between centre & E pedestal	69	69	79	9	16	21	26	30	35	39	42	47	50	56	56	54	56	58	57	56	58	58	58	59	57	56	54	53	50	47	44	41	32	22		
	40 Coal Road S side E pedestal	70	68	79	10	17	20	26	30	33	37	44	47	49	55	57	54	57	58	56	56	57	58	58	59	57	55	53	52	50	47	43	40	32	23		
	41 Coal Road S side W end Firing floor building	71	67	78	9	16	20	25	29	32	37	45	46	48	52	54	53	54	58	55	55	56	57	57	57	56	54	53	52	49	46	44	42	33	22		
	42 Coal Road S side opposite grate	72	69	79	10	17	21	24	30	32	36	43	45	50	53	57	56	54	57	57	57	58	59	60	59	57	56	55	53	51	48	45	42	34	24		
	43 Coal Road S side W side coal receival bin 25m to truck	73	65	74	11	14	19	23	29	29	33	37	40	40	44	48	48	47	52	55	56	56	55	54	53	53	52	51	49	47	45	42	39	34	29		
Old Fenceline South	Former Gate site opp W end Firing floor	282	72	59	7	13	18	23	26	28	31	36	38	42	44	45	44	47	50	49	48	48	48	47	48	47	44	43	40	38	34	29	24	17	11	5	0
	Former Gate site opp W end Firing floor	283	72	60	5	12	16	21	25	27	31	38	38	42	43	45	45	48	51	50	49	48	49	48	49	49	46	45	43	41	37	32	27	20	14	7	0
	Top N edge of bank 21m S of centre Alt Fuels Building	284	74	60	9	14	19	23	27	30	35	36	40	43	46	48	46	48	47	49	50	50	50	49	50	48	46	44	42	38	35	31	23	17	11	6	0
	Top N edge of bank opposite centre pedestal	285	68	52	4	11	13	16	21	25	28	32	33	38	39	41	39	37	41	41	41	42	41	41	41	39	38	39	38	34	32	31	23	13	8	4	-1
	Top N edge bank Opposite E side old PHT	286	71	58	6	13	17	21	26	29	30	33	35	38	41	45	46	42	47	48	45	49	48	46	46	45	42	41	40	38	33	30	28	18	14	8	0
	Bottom N edge of bank 13m S of centre Alt Fuels Building	287	66	50	3	9	11	16	17	20	26	28	31	33	36	40	41	37	37	37	38	40	38	37	37	36	35	35	34	31	28	26	21	14	8	4	-1

Table 3.2: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - One-third Octave Band Spectra

Area	Source or location	File No.	Total C dBC	Total A dBA	A-weighted LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency Hz																																
					12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
K6 S side	43A Kerb E side CM opp CM fan discharge	288	86	78	13	18	23	30	39	40	48	48	48	52	55	57	56	58	73	73	66	70	66	64	61	62	62	60	58	56	52	48	44	38	29	20	8
	44A Under Coal Mill fan discharge	289	93	88	19	24	29	36	44	46	52	49	53	59	61	66	68	73	83	77	76	78	77	76	75	75	74	73	71	69	66	61	57	50	43	35	24
	44 CM fan room roll door @ 2m	290	94	88	16	24	29	38	45	49	49	49	55	60	62	69	71	73	80	78	78	78	77	76	75	76	75	74	72	72	68	63	60	52	46	36	25
	44' CM S wall E door @1m,	291	92	88	15	26	26	34	44	44	50	57	54	60	61	67	71	71	74	76	74	75	79	78	78	78	78	77	76	75	74	69	65	57	46	32	17
	45 CM S roll door and wall vent @ 9.9m S side	292	87	80	11	21	24	32	38	40	46	51	53	58	58	62	64	63	69	70	69	68	69	68	69	69	70	68	67	66	63	59	55	47	37	30	13
	46 CM room wall vent @ 2m	293	91	85	13	21	26	39	39	43	49	59	56	64	60	64	68	68	70	73	73	74	75	74	75	75	74	73	72	71	68	64	58	51	41	28	15
	46A Coal Mill Room S roll door W @ 1m	294	92	90	12	25	30	37	37	41	47	50	54	59	59	63	66	70	73	80	77	79	84	78	79	78	78	78	76	74	72	68	63	56	47	40	27
	47B Centre between Grate & CM blower room roll door	295	93	88	18	29	32	38	41	43	53	54	60	62	65	67	68	71	74	75	76	79	79	77	77	77	76	75	74	73	72	73	73	70	63	56	46
	47A Centre between CM Room and grate, S side	296	89	83	17	31	33	34	37	43	48	50	57	61	59	62	65	67	69	70	71	72	74	73	73	73	72	72	71	70	68	69	69	63	56	55	39
	47 Opp FA264 @ 8m	297	89	83	13	27	31	35	37	43	49	52	55	58	60	62	63	70	68	70	71	76	72	71	72	71	71	70	69	68	66	66	66	58	52	53	37
	47C Between FA264 & FA200	298	89	82	14	25	29	34	36	42	48	51	56	60	61	63	66	71	69	69	71	74	73	71	71	71	69	68	67	66	64	63	61	55	48	45	32
	47D FA 200 S Side @ 5m	299	90	83	12	23	28	32	36	43	46	53	57	62	62	65	67	75	73	71	72	72	72	72	70	70	69	67	66	64	62	61	59	53	47	44	36
	48 Opp. E pedestal roller	300	90	83	15	24	28	33	36	41	45	50	56	59	64	65	66	76	72	71	72	71	72	72	71	70	68	67	65	64	61	59	57	52	46	41	31
	49 Half way between centre & E pedestals	301	90	83	14	23	26	30	35	40	47	52	57	59	64	65	64	73	72	72	73	72	73	72	72	71	69	68	66	64	61	58	54	50	43	35	23
	50 Opp. Centre pedestal	302	88	80	15	22	24	30	34	38	44	51	54	58	63	64	63	68	70	70	71	70	71	70	70	69	67	65	63	61	58	55	51	46	39	31	19
	51 Half way between Centre & Western pedestals, by duct support trestle	303	87	79	15	20	26	32	34	40	44	50	54	56	61	62	62	66	69	69	69	70	69	70	70	68	67	64	62	60	57	53	49	43	35	25	13
	52A Opp E end of kiln drive platform	304	86	78	14	22	25	31	37	40	43	49	53	56	60	62	62	65	67	68	68	69	68	69	68	67	65	63	61	58	55	51	46	40	32	22	9
	52 Opp W pedestal roller	305	87	79	14	21	25	33	37	40	44	54	53	56	60	63	61	67	67	69	70	69	68	69	68	66	65	63	61	58	56	52	48	44	37	27	15
	53 Kiln drive platform Centre E end on platform (ground level)	306	91	84	18	24	30	32	35	39	45	54	60	56	66	67	69	71	73	73	74	74	75	75	74	73	71	69	66	64	61	56	51	45	37	27	14
Kiln Drive platform	S side S motor end @ 1.5m kiln drive	307	91	83	13	25	29	33	37	44	49	59	56	59	64	68	69	70	76	70	73	74	72	72	72	70	69	68	67	66	64	60	55	50	45	37	27
	S side of S Gbox @ 1.5m	308	91	82	15	26	29	34	37	45	48	60	59	59	65	67	68	69	72	71	72	73	72	72	72	70	69	68	67	66	65	64	60	54	46	38	26
	E side of S drive motor @ 1.5m, 2m to Gbox	309	93	85	15	25	31	34	38	44	51	62	60	60	66	68	71	70	76	72	75	75	74	74	74	73	71	70	68	68	67	63	58	52	47	39	29
	53 Kiln drive platform Centre E end on platform between motors	310	93	86	16	28	33	37	41	46	47	58	60	61	67	68	69	71	80	72	75	79	76	74	73	72	72	73	69	70	69	62	57	52	44	35	25
	53 Kiln drive platform Centre E end on platform between gearboxes	311	92	85	18	30	33	38	40	45	47	58	61	63	67	66	67	70	74	72	76	75	75	73	75	74	72	70	68	68	66	60	55	49	41	33	21
	N side motor end @ 1m kiln drive	312	94	86	24	30	36	38	41	45	49	59	58	64	65	70	77	71	77	71	75	74	74	73	73	72	72	76	68	70	70	64	58	52	46	38	27
	N side motor N end @ 1.5m kiln drive	313	92	84	13	23	29	33	36	43	48	55	57	63	68	67	70	69	77	70	73	75	73	72	72	71	70	71	65	67	67	59	55	49	41	32	20
	N side of N drive & Gbox @ 1.5m	314	92	85	14	26	28	33	37	44	47	56	57	61	66	68	71	69	77	71	74	77	76	72	72	72	70	70	66	67	66	58	54	49	41	31	21
Kiln 6 road Northern side	1' RM6 W door at kerb W side @ 13.3m	239	85	80	18	24	29	33	36	39	41	46	47	50	53	55	62	59	64	68	62	64	74	73	73	69	63	62	60	58	55	52	49	44	39	29	17
	54 W end RM6	315	82	72	18	21	28	30	36	37	40	44	46	49	53	58	60	55	58	61	57	59	64	64	65	61	54	53	51	48	45	40	34	28	20	9	1
	55 Centre RM6	316	83	73	19	22	28	32	35	39	42	48	48	50	54	59	60	55	59	63	58	60	65	64	65	62	55	55	53	50	46	42	37	30	21	11	1
	55 Centre RM6	317	83	73	19	22	29	32	35	39	42	48	49	50	54	59	61	56	59	62	58	60	64	63	67	63	56	55	53	52	48	45	39	32	26	16	3
	56 E End RM6	318	85	76	23	23	29	36	38	42	44	49	48	50	56	60	61	58	61	63	60	64	68	66	70	68	61	62	60	59	58	57	53	49	46	35	25
	56' Between RM6 & New wall for FA38	319	86	76	26	23	31	38	39	42	44	51	49	52	56	60	62	59	62	66	62	65	68	66	70	66	62	61	60	58	56	54	50	45	39	31	20
	57 Door opp FA38	320	89	80	22	25	36	39	41	43	47	56	53	54	58	64	66	63	67	68	64	68	68	69	76	70	64	63	61	59	57	53	48	42	36	25	12
	58 Half way between FA38 & FA39, opposite big column	321	90	82	25	26	35	38	42	45	48	56	54	55	59	65	66	63	67	68	65	70	67	71	79	74	65	65	61	59	55	51	45	38	31	20	7
	59 Opp FA39 end	322	90	81	25	26	33	38	41	49	49	55	54	59	60	67	70	63	67	69	66	69	68	71	76	71	65	65	62	60	55	51	46	40	33	23	10
	59 Opp FA39 end	323	90	82	25	26	33	38	41	48	48	54	53	59	60	67	70	63	67	68	66	69	67	71	77	73	65	65	62	61	56	51	46	40	33	23	10
	60 Opp Conditioning Tower	324	90	84	22	23	32	38	44	47	50	55	55	59	61	64	66	64	68	70	65	70	67	70	82	72	66	67	63	62	58	54	51	46	40	32	19
	60 Opp Conditioning Tower	325	90	83	22	23	31	40	44	48	50	54	55	59	61	64	67	64	67	70	66	69	68	70	81	71	66	67	63	61	57	53	50	45	38	29	17
	60' Opp. Stack	326	89	79	21	23	36	41	42	43	47	54	54	57	62	64	65	63	65	67	66	68	67	70	74	70	66	65	62	61	56	51	46	40	33	23	11
	61 Opp. Centre PHT	327	89	80	14	20	34	38	40	43	46	55	55	58	62	65	66	63	66	66	66	68	67	69	75	69	65	64	62	59	56	51	48	42	35	25	13
	62 Opp E side PHT	328	88	78	17	23	31	37	43	42	44	51	54	58	63	64	64	62	64	66	67	68	67	68	71	67	65	63	61	58	54	50	45	38	31	21	7
	63 Opp. W pedestal	329	87	78	17	22	27	35	39	43	44	53	55	58	63	64	64	62	65	67	68	69	68	69	69	67	65	64	61	59	56	52	47	41	34	25	11
	64 E end drive platform	330	88	81	13	20	28	31	38	41	44	52	56	60	63	64	62	64	70	71	70	71	72	71	71	70	69	67	65	62	59	55	51	46	39	30	18
	65 Opp column for return duct W side	331	89	83	16	22	26	32	37	42	44	54	57	58	62	64	65	68	72	72	73	74	74	74	73	72	71	69	67	65	62	58	54	49	43	35	24
	66 Opp centre pedestal	332	91	86	17	23	27	33	38	42	45	47	55	62	64	67	71	73	74	76	77	76	76	76	76	75	74	72	70	68	65	61	57	52	46	38	27
	67 Half way between centre & e pedestals	333	92	86	14	24	27	31	37	42	50	54	60	64	65	67	67	71	75	75	76	77	76	76	76	75	73	72	70	68	65	62	59	54	47	39	28
	68 Opp E pedestal	334	94	86	14	29	31	30	37	45	55	59	61	66	67	69	69	71	74	76	76	77	76	75	75	74	72	71	70	68	64	63	60	55	48	39	29

Table 3.2: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - One-third Octave Band Spectra

Area	Source or location	File No.	Total C dBC	Total A dBA	A-weighted LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency Hz																																
					12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
Grate Cooler Fan Courtyard	69 Centre courtyard - opposite F201	335	95	87	15	30	32	36	42	47	53	61	65	67	68	70	70	76	75	76	78	78	77	76	76	75	74	73	72	71	67	66	64	59	52	44	35
	69 Centre courtyard - opposite F203	336	96	87	17	33	37	38	38	50	57	59	65	70	68	70	70	73	75	76	77	78	77	76	75	75	74	73	72	72	69	68	67	63	56	48	39
	FA201 @ 2m to motor & casing	337	97	90	17	35	38	38	41	47	56	61	64	68	70	72	72	75	77	78	81	81	80	79	79	78	77	76	74	73	70	68	65	61	55	47	37
	FA201 N side inlet & casing @ 1m	338	98	91	17	33	35	36	43	52	59	61	67	71	72	74	73	77	77	78	82	82	82	81	80	79	79	78	77	76	73	71	70	66	60	53	44
	Between FA201 & 203 & 202	339	100	92	18	33	35	41	46	53	63	64	67	71	72	74	72	82	80	80	82	84	82	81	80	79	78	77	77	75	72	69	67	63	56	49	40
	FA203 inlet & casing @ 2m	340	98	88	16	35	38	42	46	53	60	61	68	69	69	74	71	76	76	77	79	79	78	77	78	76	74	74	73	73	69	67	66	61	55	47	38
	FA203,FA204 & FA205 @ 1m	341	99	88	17	37	41	46	44	53	63	62	69	71	68	72	70	77	76	76	78	78	77	76	79	76	75	75	75	75	72	71	70	66	60	53	43
	Between inlet filters FA206 & FA207	342	95	85	16	30	37	40	45	50	55	60	66	67	66	70	70	70	72	72	74	75	74	73	73	73	72	71	71	71	69	71	71	67	61	53	43
Grate Northern area	Centre between Grate & CM blower room roll door	343	93	86	14	30	32	35	41	48	53	58	62	63	63	67	67	72	73	76	72	75	76	75	74	74	73	72	72	71	70	74	74	72	66	59	49
	Coal Mill Building N roll door @ 2m	344	91	86	12	23	29	31	39	46	51	56	57	62	60	63	65	67	72	75	75	76	76	75	75	75	74	73	73	72	71	69	66	62	53	44	31
Kiln Firing Floor	Centre N side opening face E	345	90	82	13	24	27	31	35	43	53	50	56	61	65	66	65	68	70	69	71	71	70	71	72	71	70	68	66	66	66	68	66	62	56	47	33
	Centre N side opening face W	346	90	82	13	23	27	32	35	43	53	50	55	63	66	68	65	67	69	71	72	72	71	72	73	72	71	69	67	66	65	65	62	58	52	43	32
	FA209 E side inlet & filter silencer	347	93	86	13	27	30	31	37	45	50	54	59	66	68	72	70	72	74	75	78	79	77	76	76	74	73	71	69	67	65	63	59	54	48	41	31
	FA209 Kiln Discharge Seal Fan N inlet W side @ 1.5m	348	96	91	13	28	32	31	38	45	52	56	61	66	68	71	71	75	77	79	81	83	83	83	82	81	79	78	75	73	70	68	64	60	56	50	40
	Centre S side opening face E	349	87	81	13	23	27	33	36	41	50	49	51	56	58	61	64	66	65	67	68	70	73	72	73	71	70	68	66	64	63	63	60	56	53	46	33
	Centre S side opening face W	350	87	81	14	24	27	33	36	40	48	50	51	57	58	61	63	65	65	67	69	70	72	73	73	71	70	68	66	64	62	61	57	53	49	41	31
	FA210 Kiln Discharge Seal Fan S inlet @ 1.5m	351	96	93	14	24	29	32	36	43	49	52	57	68	66	69	70	73	74	77	81	84	87	86	84	82	80	80	77	75	73	70	66	62	58	53	45
	FA200 inlet side @ 1.5m	352	95	87	18	27	33	38	41	46	52	58	63	65	68	72	72	81	77	76	76	76	77	76	75	74	73	72	71	69	66	63	60	57	52	45	36
	New replacement FA211 centre under kiln, inlet @ 1m	353	102	97	19	30	35	37	42	49	60	60	63	69	76	79	80	84	83	88	88	86	85	86	85	85	85	84	82	81	80	77	74	70	66	60	53
	FA210 S side seal fan inlet W side & casing @ 1m	354	93	85	22	28	32	37	40	46	52	54	58	66	66	68	70	71	70	73	75	75	78	77	75	74	72	70	68	67	63	61	57	54	49	42	33
	Kiln floor centre E S of duct/clinker elevator	355	86	80	13	21	24	30	36	43	48	48	52	57	58	61	62	65	66	66	69	69	69	71	73	70	69	68	66	64	64	65	62	57	52	47	31
	KFF burner air cannon N side @ 2m	356	90	87	14	26	31	33	37	44	48	51	57	60	62	62	62	67	67	67	70	70	70	72	74	74	75	73	74	75	77	80	77	74	70	58	47
	KFF burner by air cannon S side @ 2m	357	88	83	15	23	30	35	38	42	48	51	56	59	60	62	62	65	66	67	69	70	70	73	75	74	75	72	70	69	69	72	69	65	61	52	42
Radicon Cooler	RC L1 centre fan @ 1m	358	90	83	10	24	28	33	39	43	48	53	58	62	64	65	67	71	71	70	72	72	71	70	75	77	73	66	66	65	60	59	58	52	44	35	23
	RC L1 S fan @ 0.5m	359	90	84	11	22	29	34	40	44	50	53	59	61	63	66	67	71	70	69	72	72	72	72	79	77	72	69	69	69	64	64	62	58	51	43	32
	RC L1 N fan @ 1m	360	90	82	10	25	28	33	38	44	49	52	60	63	64	66	66	72	69	69	71	72	71	70	71	73	69	66	66	65	59	57	55	49	41	31	19
	RC L2 centre fan @ 1m	361	89	82	11	21	27	35	39	43	48	50	57	61	63	65	66	69	70	69	71	72	71	70	74	75	69	66	65	64	59	57	55	49	40	32	20
	RC L2 S fan @ 0.7m	362	89	84	11	21	28	35	40	43	49	50	57	59	62	66	65	70	70	69	71	71	72	72	76	78	74	67	67	66	61	60	58	53	45	37	25
	RC L2 N fan @ 1m	363	89	81	9	23	26	33	38	43	47	51	58	60	63	67	66	70	69	69	71	72	71	70	71	72	68	66	66	64	59	56	53	47	38	29	18
	RC L3 Centre fan @ 1m	364	89	83	12	20	26	35	41	43	48	50	56	61	63	66	65	69	69	69	70	70	69	69	72	80	71	66	67	64	60	59	56	48	40	32	21
	RC L3 S fan @ 0.7m	365	88	83	13	19	26	34	41	43	47	50	55	58	62	64	65	66	69	68	69	70	69	69	73	79	71	66	66	63	60	58	56	51	43	34	23
	RC L3 N fan @ 1m	366	89	81	10	19	24	32	41	44	46	51	56	60	64	66	64	69	69	69	70	71	70	70	71	73	68	66	66	65	60	61	56	48	40	35	20
	RC L4 Centre fan @ 1m	367	91	84	12	20	26	32	42	48	51	52	57	62	66	65	65	67	69	69	71	71	69	69	71	82	73	67	67	64	60	58	56	48	42	35	25
	RC L4 S fan @ 0.7m	368	89	85	12	20	26	31	41	45	47	50	55	58	63	65	63	66	68	67	67	69	68	68	71	83	76	69	67	62	58	56	54	48	40	31	19
	RC L4 N fan @ 1m	369	92	82	12	20	25	31	45	48	54	56	59	62	68	67	66	69	69	70	72	73	72	71	71	73	70	68	67	66	61	59	56	49	43	36	28
	RC L5 face E	370	88	78	11	18	24	31	40	45	48	51	54	56	66	68	63	66	67	66	67	67	66	65	65	71	66	62	60	59	55	52	49	42	33	23	11
	RC L5 face W	371	87	79	11	17	24	31	39	44	45	48	53	61	63	63	64	67	66	67	68	68	68	67	68	73	67	64	63	60	56	54	51	44	36	26	12
	L1 E side 2.4m	372	90	78	12	21	26	29	37	42	46	50	56	58	72	63	63	68	66	65	66	65	65	63	64	67	62	60	58	58	56	57	56	51	44	35	26
	L1 E side 6m	373	90	77	11	23	26	29	35	40	44	49	53	57	72	61	61	65	63	65	63	64	62	62	63	67	62	58	57	56	53	53	51	46	39	31	21
	L1 E side 12m	374	86	74	7	19	27	28	35	39	44	48	51	54	65	57	58	69	61	61	62	62	62	61	60	63	60	58	59	58	53	54	53	49	41	32	19
FA215	Motor S end @ 2.5m	375	88	79	12	23	27	29	39	41	48	49	52	58	69	60	62	67	65	67	68	67	66	66	65	66	67	67	67	70	63	62	61	58	49	39	27
	Platform E side drive coupling @ casing @ 1m	376	90	83	10	22	27	29	39	41	45	52	53	57	70	64	65	70	66	70	68	69	69	68	68	68	71	72	74	77	68	67	64	60	55	51	42
	W side platform @ 1m to coupling & casing	377	96	81	13	23	31	35	38	40	47	51	54	62	80	62	59	67	63	64	64	63	63	62	62	62	64	65	67	69	60	56	52	48	41	34	22
	Under expansion joint discharge duct to stack @ 1m	378	97	82	13	25	31	35	38	40	47	52	54	62	80	63	59	65	63	64	65	63	63	62	62	62	64	65	68	69	61	56	52	48	41	35	23
	N side inlet box platform @ 1m to discharge duct & inlet box	379	88	76	13	23	29	28	37	38	51	52	50	55	68	58	59	73	61	63	64	61	61	60	59	59	59	60	59	58	53	51	49	44	35	25	13
	Platform centre N side inlet box	380	96	81	10	23	27	28	36	38	45	53	52	60	79	62	59	72	62	63	63	63	62	61	60	59	58	58	58	57	51	51	50	45	38	30	18
	Under Inlet box W side entry duct	381	92	79	11	25	30	30	35	40	48	51	59	60	75	59	61	66	66	66	66	66	67	66	65	64	64	64	67	65	59	60	59	55	47	38	26
	Inlet box N side ground level @ 1m	382	91	77	12	23	29	30	39	41	47	47	52	57	74	60	60	69	62	63	64	63	63	62	62	61	60	59	60	60	53	53	52	47	38	28	15

Table 3.2A: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - Tonality in One-third Octave Band Spectra

Area	Source or location	File	Tonality dB in One-third Octave Band Centre Frequency - Hz																											
			31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
	Tonality Criteria		15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
PHT Level 8	PHT L8 Top platform level with top of stack	14	0.5	0.8	0.3	1.0	3.8	6.9	6.0	2.1	4.4	1.9	3.8	4.7	0.8	2.2	1.6	0.8	1.0	0.6	1.1	1.2	1.8	1.5	1.2	2.8	0.4	0.2	2.2	0.5
	PHT L8 Top platform EL16 Gbox @ 1m to NE side	15	0.6	2.0	1.8	2.5	0.3	9.6	8.1	2.0	2.3	0.5	3.4	4.0	1.0	0.4	0.7	0.3	1.0	1.2	0.5	1.2	1.3	0.0	0.8	2.9	0.4	0.5	2.6	0.1
	PHT L8 Top platform EL16 Gbox @ 1m to coupling SW side	16	0.1	1.4	0.7	0.5	4.0	7.1	3.9	2.1	4.8	0.8	2.1	3.0	1.3	0.7	0.1	0.8	0.3	4.2	3.3	2.4	1.6	0.0	1.4	4.4	0.2	0.8	3.3	1.0
	PHT L8 Top platform EL16 Gbox @ 2m to motor S side	17	0.2	2.2	1.0	0.9	3.2	5.5	4.4	2.1	4.3	4.1	4.1	8.6	3.3	0.6	0.8	0.0	1.3	0.0	0.6	1.2	0.9	0.4	0.6	3.6	0.1	0.9	3.4	0.7
	PHT L8 Top platform EL16 Gbox @ 1m to coupling NW side	18	0.4	0.9	1.1	0.2	2.0	5.3	4.6	1.8	1.0	1.0	2.9	7.4	3.2	1.6	0.1	0.5	1.3	0.2	0.2	0.9	1.3	0.4	0.5	3.4	0.2	1.1	3.7	0.7
	PHT L8 Top Platform S side BE	19	3.8	3.0	1.1	2.7	4.9	11.5	5.4	0.5	3.1	1.1	5.4	10.2	6.5	0.4	1.6	1.6	0.5	3.0	2.9	1.1	1.7	0.2	0.5	0.9	0.6	0.3	1.2	0.4
	PHT L8 Lower platform	20	0.2	0.9	0.4	0.0	3.1	6.2	8.6	6.4	4.8	3.3	3.4	2.9	0.3	1.0	0.6	0.5	1.2	3.4	1.7	0.3	0.1	0.0	0.2	1.7	0.4	0.3	1.9	1.0
	PHT L8 Top platform EL16 Gbox @ 3m to N side	21	0.2	0.5	0.8	1.3	3.4	8.2	7.9	3.5	5.1	2.0	3.2	2.4	0.1	1.6	1.5	2.5	2.4	0.9	3.6	5.3	2.7	0.4	0.3	2.2	0.3	0.2	3.3	0.6
	PHT L8 proper FA263 motor & casing @ 1m	22	1.2	0.5	1.3	1.0	4.2	7.6	4.4	0.3	6.0	3.3	0.1	2.3	1.6	5.4	13.2	7.5	4.9	11.4	5.0	0.1	0.4	0.2	0.6	0.3	1.0	0.1	1.6	0.2
	PHT L8 proper 1m to vent on FA263 filter room	23	1.5	1.0	0.5	0.4	0.1	4.6	8.4	4.8	3.6	0.0	2.4	0.2	0.4	2.2	7.0	4.6	3.2	6.9	2.3	0.6	0.2	0.2	0.7	0.3	0.3	0.9	1.3	1.0
	PHT L8 centre tower W side	24	1.4	1.8	0.4	0.3	2.7	6.6	4.6	1.6	5.1	2.6	1.2	0.5	1.0	4.5	10.6	5.8	4.8	10.7	4.8	0.7	0.8	0.1	0.2	0.2	0.1	0.6	1.6	1.3
	L8 new PHT centre	25	0.6	0.3	0.3	1.6	2.5	4.2	2.5	2.1	0.9	1.7	0.8	0.6	1.1	0.7	0.5	0.1	1.2	3.1	2.2	0.5	0.9	0.0	0.7	0.9	0.1	0.6	1.1	1.5
	PHT L8 centre tower N side	26	0.0	0.3	0.3	0.2	0.8	1.0	0.9	1.3	2.8	2.4	0.3	0.8	1.7	1.6	2.0	1.2	0.3	1.5	0.8	0.0	0.2	0.5	0.4	0.0	0.2	0.9	1.2	1.8
	PHT L8 centre tower E side	27	0.5	1.4	1.2	3.2	2.0	0.4	1.6	3.1	2.7	3.5	1.8	1.1	0.6	0.1	0.0	0.1	0.9	0.5	1.0	0.3	1.2	0.7	1.1	1.2	0.5	0.1	1.3	0.9
	PHT L8 centre tower S side	28	0.4	2.1	1.7	1.8	0.5	1.6	1.1	2.0	5.4	3.7	1.1	1.3	3.4	2.0	0.9	0.1	1.0	2.0	2.1	1.3	2.6	0.3	3.6	3.5	0.3	1.5	3.7	0.3
PHT Level 7	PHT L7 New S side centre	29	1.2	0.3	0.5	0.3	1.4	0.7	1.1	2.6	0.1	0.5	0.4	0.3	0.1	0.5	0.1	0.4	1.0	3.1	2.3	0.5	0.5	2.0	1.0	0.3	0.8	0.4	4.1	0.7
	PHT L7 New E side centre	30	1.3	0.1	2.0	1.9	0.9	1.9	2.1	4.0	0.0	2.2	1.4	0.6	0.7	0.5	0.2	0.5	0.1	0.4	0.5	0.5	1.0	2.6	0.7	1.0	3.4	0.2	0.2	1.7
	PHT L7 New N side centre	31	4.0	2.5	2.9	1.4	1.3	0.6	0.5	2.2	1.6	2.5	1.3	0.8	0.4	0.0	0.5	0.2	0.3	0.8	0.5	0.1	0.4	1.1	0.1	0.2	0.5	0.6	1.1	1.0
PHT L7 Alt Fuels Platform	PHT L7 Alt Fuels Platform L1: E side of feeder @ 1m	32	2.5	0.3	1.3	1.1	1.3	2.1	0.3	1.0	0.1	0.2	0.1	0.4	0.2	0.2	0.2	0.0	0.6	0.3	0.5	0.7	0.1	1.7	0.0	0.6	2.2	0.2	0.3	0.7
	PHT L7 Alt Fuels Platform L1: E side of mixer @ 1m	33	0.6	0.6	1.1	0.8	0.8	0.9	0.8	2.7	0.9	1.4	0.1	1.5	0.4	1.4	1.0	0.0	0.6	0.1	0.4	0.2	0.7	3.1	1.2	0.9	3.0	0.1	0.3	1.9
	PHT L7 New E side 4m to base of Alt Fuel chute, 1m to bin W	34	1.3	0.8	1.0	0.0	1.5	1.6	1.1	2.1	0.6	0.2	1.3	1.4	0.4	0.1	0.1	0.1	0.4	0.0	0.3	0.3	0.1	1.9	0.0	0.1	1.5	0.2	1.0	0.8
	PHT L7 Alt Fuels Platform L2: N side of conveyor discharge	35	0.8	1.0	0.2	2.4	0.1	0.6	2.3	0.7	0.2	0.3	0.2	0.5	0.8	0.0	0.5	0.8	0.1	0.9	0.6	0.8	0.3	1.8	1.8	1.3	1.1	0.6	0.4	0.8
	PHT L7 Alt Fuels Platform L2: 1m E side of chute inlet	36	2.7	1.2	2.5	0.1	1.3	1.9	2.7	0.8	1.5	1.1	0.2	0.3	0.1	0.1	0.4	0.2	0.2	0.1	0.9	1.3	0.0	1.4	0.8	0.5	1.5	0.0	1.0	0.6
	PHT L7 Alt Fuels Platform L2: 1m E side of conveyor 3m from entry to chute	37	0.5	0.5	0.0	1.0	0.0	1.3	0.7	2.2	2.4	2.7	0.4	0.3	0.1	0.4	0.4	0.6	0.1	0.7	0.5	0.1	1.5	3.5	0.9	1.1	2.9	0.3	0.1	1.2
	PHT L7 Alt Fuels Platform L2: 1m NW side of conveyor drive motor	38	1.7	0.5	1.6	0.3	1.1	1.2	0.2	2.1	0.7	0.3	1.4	1.4	0.1	0.4	0.5	1.3	0.7	0.2	1.8	2.4	1.6	2.0	1.3	0.4	1.2	0.6	1.2	0.0
	PHT L7 Alt Fuels Platform L2: 1m SW side of conveyor drive gearbox	39	1.6	0.5	1.1	0.9	0.2	0.1	0.7	1.1	0.1	0.7	0.5	0.5	0.7	0.4	0.5	2.0	0.9	0.4	1.0	1.6	2.5	4.0	0.3	0.1	1.3	0.8	1.6	0.1
	PHT L7 Alt Fuels Platform L1: 3m N of feeder	40	1.2	1.2	0.7	0.3	1.4	1.3	0.6	2.1	0.5	0.0	0.2	0.4	0.5	0.6	0.8	0.3	1.1	0.3	0.5	0.4	0.1	1.2	0.2	0.2	1.3	0.0	0.9	0.9
PHT Level 7	PHT L7 New centre between towers faces S	41	3.2	1.1	0.6	1.1	1.5	2.1	4.2	4.6	3.7	4.0	0.6	0.7	0.5	0.3	0.9	0.4	1.5	3.7	2.0	0.2	0.3	1.4	0.2	0.4	1.3	0.0	2.2	0.5
	L7 between PHTs centre facing W	42	3.4	1.1	0.8	2.3	0.3	0.7	1.8	3.3	1.4	1.4	0.4	0.9	0.6	0.8	2.3	1.1	1.1	2.7	1.4	0.3	0.3	0.9	0.5	0.4	1.2	0.1	2.0	0.6
	PHT L7 Old S side centre, faces W	43	1.9	0.5	2.5	4.3	1.1	1.2	0.7	2.8	3.9	4.9	2.3	1.1	1.6	1.7	2.5	2.1	1.5	5.9	2.9	0.0	0.0	0.4	0.2	0.1	1.1	0.0	3.2	0.1
	PHT L7 under EL13 platform E side	44	4.0	1.6	0.0	0.5	0.0	1.8	4.6	1.7	6.5	6.2	3.1	0.5	0.4	0.4	1.7	1.1	1.3	4.2	2.4	0.6	1.3	0.3	0.3	1.6	0.1	0.1	2.3	0.8
	EL13 platform E side Gbox & coupling @ 0.5m	45	0.4	0.1	1.6	0.5	2.2	2.2	5.7	4.8	5.3	9.1	8.3	5.2	3.7	1.6	0.6	1.0	0.4	0.9	0.0	0.4	0.5	0.3	0.1	0.3	0.6	0.1	1.1	1.1
	EL13 platform N side GB end & side EL @ 1m	46	0.8	0.1	0.8	0.8	0.1	1.4	2.3	2.3	3.9	5.3	4.0	2.0	2.0	1.9	0.2	2.2	0.5	1.6	2.1	1.2	0.0	0.1	0.2	0.3	0.5	0.3	1.6	0.7
	L7 BE drive platform N side @ 1m to BE	47	0.1	0.5	0.9	0.3	0.1	1.8	2.0	4.4	2.5	5.7	6.9	3.5	0.2	0.9	1.0	0.7	1.1	2.6	1.9	0.9	0.2	0.1	0.1	0.1	0.8	0.1	2.1	0.4
	EL13 platform SW side motor & EL & coupling @ 1m	48	0.4	0.4	0.0	0.8	0.5	2.2	0.1	3.4	1.4	4.1	1.1	0.5	0.1	0.8	0.1	0.0	1.0	1.3	1.1	0.8	0.8	0.0	0.3	0.3	0.9	0.0	2.6	0.2
	EL13 platform W side 0.5m	49	1.7	1.4	2.0	2.0	1.1	1.8	4.0	7.6	5.0	8.1	3.3	2.4	3.3	2.1	1.4	1.5	0.4	2.4	1.1	0.1	0.1	0.1	0.5	0.1	1.1	0.1	2.7	0.6
	EL13 platform motor end @ 0.6m	50	0.0	0.4	0.1	2.6	3.0	1.2	4.2	6.7	4.7	7.3	2.3	0.3	1.3	0.1	0.4	0.3	1.5	1.3	0.8	1.6	0.4	1.3	1.0	0.1	0.4	0.4	1.2	0.8
	L7 centre between cylinders	51	2.2	1.4	3.0	4.7	1.4	1.2	2.2	3.9	4.7	4.3	0.3	0.3	0.6	2.0	3.2	2.1	1.5	4.7	1.9	0.3	0.1	0.3	0.1	0.4	0.7	0.8	1.3	1.7
	PHT L7 old NW corner 1.5m to stack	52	1.3	0.9	1.8	2.4	1.1	0.8	1.1	2.8	1.1	1.6	0.7	0.9	0.0	1.2	0.5	0.6	0.5	1.3	0.8	0.1	0.1	0.4	0.6	1.9	0.5	0.3	0.9	1.2
	PHT L7 old centre N side on new platform	53	2.0	1.5	0.6	4.4	1.9	1.3	0.6	2.8	3.8	4.4	0.8	0.5	0.4	1.3	1.1	0.7	0.4	2.3	1.2	0.2	0.2	0.1	0.1	0.4	0.6	0.9	1.1	1.4
	PHT L7 old centre N side	54	2.2	0.4	2.1	2.0	2.7	0.4	0.9	4.6	5.5	5.0	0.8	1.3	0.3	0.8	0.9	0.6	0.4	1.0	0.1	0.4	0.0	0.3	1.1	0.6	0.1	0.6	0.6	1.5
	PHT Level 7: FA213 @ 1m, door closed	55	1.4	0.2	0.8	0.6	0.5	3.3	0.8	2.6	1.8	0.7	2.6	3.2	0.8	0.8	0.5	0.6	0.5	2.5	0.7	0.2	0.5	0.2	0.1	0.6	0.5	0.7	0.8	2.5

Table 3.2A: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - Tonality in One-third Octave Band Spectra

Area	Source or location	File	Tonality dB in One-third Octave Band Centre Frequency - Hz																											
			31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
	Tonality Criteria		15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
PHT Level 6 RM Silo Top	PHT L6 RM silo above baghouse discharge @ 2m at base of stairs to EL, level with floor	56	2.6	2.5	2.3	1.1	3.6	3.8	3.2	2.3	2.7	2.6	0.4	2.0	2.0	1.5	0.5	0.8	1.4	5.8	3.7	0.1	0.2	0.5	0.5	0.5	0.7	0.5	6.6	1.8
	PHT L6 RM silo Top FA260 NE side @ 1m casing & motor	57	0.5	0.8	1.6	2.2	2.5	0.6	0.2	0.3	3.2	3.3	1.6	1.4	0.2	2.5	0.4	3.2	3.4	12.2	4.8	1.1	0.2	0.1	1.6	2.0	0.2	0.4	5.7	2.5
	PHT L6 RM Silo top EL15 platform motor side 0.6m	58	2.6	0.8	0.1	0.7	2.2	2.8	0.3	0.5	1.9	2.8	0.5	1.3	0.8	4.1	4.4	0.9	0.4	0.8	1.9	0.2	2.2	0.6	1.3	0.5	1.0	0.1	6.7	2.8
	EL15 W side @ 1m	59	1.0	0.4	0.0	0.5	0.2	0.3	0.8	1.0	1.9	2.2	4.0	8.0	3.8	1.3	2.2	0.2	1.0	2.4	1.6	0.0	0.5	0.0	1.3	0.4	1.3	0.1	5.6	1.6
	L6 RM silo top on BE EL15 platform SW side @ 0.8m	60	0.8	0.7	0.8	1.1	0.2	0.9	1.9	1.1	2.9	3.6	4.1	10.5	5.8	0.0	2.6	5.1	0.0	1.1	0.6	0.4	1.2	0.6	1.2	0.8	1.2	0.3	5.7	1.7
	EL15 S side Gbox @ 1m	61	0.1	0.7	0.0	0.5	0.2	0.3	0.1	0.1	1.3	1.2	5.8	11.3	5.7	5.1	4.7	3.1	1.1	3.9	1.8	2.6	2.9	2.9	3.2	0.9	0.9	0.4	5.7	2.5
	EL15 E side Gbox @ 0.5m	62	0.5	0.8	0.3	0.3	0.2	0.9	0.1	0.3	0.6	0.4	2.5	4.5	2.2	3.2	3.2	1.4	1.0	0.6	1.3	0.3	1.4	2.6	3.0	0.5	1.1	0.3	5.0	2.1
	RM silo top baghouse fan DC30 discharge @ 1.5m	63	0.4	0.4	0.2	1.0	0.0	1.2	0.0	1.5	0.4	1.3	1.8	2.0	4.1	2.9	0.9	1.6	0.5	2.3	1.5	0.0	1.1	0.2	1.3	0.2	1.3	0.6	6.6	2.4
	RM Silo top N side 12.7m to FA260	64	0.2	0.1	1.3	0.1	0.1	0.4	1.4	1.7	2.8	5.4	4.4	0.1	1.8	0.1	2.1	0.8	1.4	3.4	2.7	0.2	0.9	0.8	1.5	1.5	2.2	0.2	3.5	0.5
	RM Silo top E side 12.7m to FA260	65	0.7	1.3	1.2	1.6	1.0	1.6	1.1	2.6	4.3	3.5	1.0	1.3	0.4	0.5	0.1	0.4	2.4	5.7	3.3	0.0	0.2	0.0	1.3	1.1	0.4	0.0	5.9	1.4
PHT Level 6	PHT L6 centre W side	66	0.1	0.5	0.5	0.4	2.9	3.5	2.6	3.5	3.4	5.3	1.5	0.9	1.1	2.1	0.6	0.1	0.3	1.5	1.5	0.4	0.5	1.1	0.5	0.4	0.5	1.1	1.1	1.2
	PHT L6 stack test port 100mm diam @ 200mm S side	67	0.8	0.3	0.6	0.1	4.3	5.3	4.7	4.0	3.7	4.3	1.8	1.7	4.0	3.9	0.4	3.6	1.1	0.0	0.5	0.4	0.3	0.2	0.7	0.6	0.8	2.6	1.5	1.8
	PHT L6 stack test port 100mm diam @ 200mm W side	68	0.5	0.3	0.9	2.5	0.5	1.9	2.1	0.7	4.4	5.7	3.0	1.9	0.5	0.7	2.2	2.8	1.2	2.1	0.0	1.7	0.7	0.8	0.0	0.8	1.1	0.7	0.1	0.8
	PHT L6 stack test port 200mm diam @ 200mm W side	69	0.7	0.4	0.0	3.5	1.8	3.4	2.7	0.0	3.8	7.4	3.6	6.2	3.5	0.8	1.1	0.3	0.8	0.6	1.0	0.7	0.2	0.2	0.2	0.4	1.1	1.6	0.8	0.8
	PHT L6 NW corner 1m to stack	70	0.4	0.1	0.7	0.1	0.8	1.4	0.6	0.8	2.7	2.4	0.5	3.7	0.3	2.8	1.7	0.5	0.8	0.5	0.0	0.3	0.1	0.1	1.2	0.4	0.9	0.8	0.1	1.1
	PHT L6 centre N side by platform	71	1.7	1.1	1.0	1.8	2.1	4.4	2.5	1.9	1.8	2.1	0.7	0.0	0.4	0.4	0.2	0.0	0.1	1.3	1.0	0.1	0.4	0.9	0.4	0.3	0.8	0.6	0.8	1.4
	PHT L6 centre N side on platform	72	0.3	0.5	0.1	0.2	6.6	10.1	3.2	0.5	0.9	1.5	0.0	0.8	0.2	0.1	0.1	0.0	0.2	0.7	0.4	0.0	0.3	1.2	0.4	0.1	0.7	0.4	0.5	1.6
	PHT L6 centre between towers	73	2.9	0.9	0.7	1.2	2.9	6.5	2.7	0.9	2.0	2.3	0.6	0.5	0.1	0.2	0.4	0.3	0.0	1.5	0.8	0.9	1.7	0.8	0.1	0.2	0.8	0.9	0.2	2.1
	PHT L6 new N side centre	74	1.6	3.7	2.1	0.1	0.7	2.4	2.9	1.3	0.4	2.0	0.1	1.2	0.3	0.2	0.1	0.1	0.1	0.9	0.3	0.0	0.5	0.1	0.1	0.4	0.4	0.5	0.8	1.2
	PHT L6 new E side centre	75	3.1	2.7	0.6	2.5	4.5	4.2	0.8	2.4	1.8	0.8	1.3	0.2	0.5	0.6	0.0	0.5	0.3	0.6	0.3	0.1	0.3	0.1	0.1	0.4	0.1	0.8	1.0	1.2
	PHT L6 new S side centre	76	0.4	2.2	2.5	1.2	0.6	0.1	1.2	1.8	0.9	0.1	0.1	0.0	0.4	0.1	0.1	0.2	0.4	0.5	0.7	0.0	0.6	0.2	0.2	0.2	0.4	0.6	1.2	1.0
	L6 centre S side old PHT by elevator	77	3.1	1.9	0.1	0.3	7.4	12.9	4.3	0.1	0.3	0.6	0.1	1.0	0.1	0.3	0.1	0.5	0.2	2.0	1.6	0.4	0.3	0.6	0.6	0.7	1.3	0.3	3.8	0.4
PHT Level 6 Inside Silo Top	L6 inside doorway to top RM silo room	78	7.6	5.4	4.7	1.7	0.6	1.5	2.4	2.8	0.0	1.8	0.0	1.2	6.5	4.1	1.9	1.3	2.7	2.1	4.5	2.6	0.1	0.0	0.9	2.0	0.3	0.5	1.7	0.1
	RM Silo top inside centre	79	0.6	0.6	2.2	6.7	5.4	4.7	2.7	0.2	2.9	3.0	1.3	2.8	7.0	4.1	3.1	2.3	3.9	0.5	4.1	2.7	0.9	0.9	0.9	2.7	1.7	1.3	0.2	0.6
	RM silo top inside E doors open	80	6.0	2.1	1.6	3.2	5.3	1.5	0.1	1.8	0.5	1.8	0.7	1.7	5.1	2.8	1.8	0.2	2.4	4.9	6.3	1.9	1.3	1.1	1.3	5.2	2.5	0.0	1.0	0.6
	L6 RM silo top room inside S man door	81	4.6	1.9	1.8	1.6	5.8	4.9	1.1	0.6	0.7	1.1	0.3	2.9	6.7	3.3	2.1	0.7	2.6	3.0	4.2	1.1	0.9	0.7	0.4	2.2	0.8	0.4	0.5	1.6
	RM silo top outside S man door	82	1.3	0.5	0.0	0.1	1.5	3.8	1.3	0.3	0.8	0.8	0.0	1.4	0.8	0.0	0.8	0.9	0.5	2.5	2.2	0.3	0.3	0.0	0.1	0.8	1.5	0.5	6.2	2.1
PHT Level 5	PHT Level 5 old centre S side by stairs	83	0.3	0.6	0.3	0.3	3.2	3.6	0.8	1.4	1.1	2.3	1.1	0.8	1.4	0.8	0.1	0.3	0.1	1.2	1.3	0.7	0.4	1.2	0.6	1.2	0.5	0.6	2.2	0.4
	PHT Level 5 old centre W side by gas valves @ 1m	84	1.7	0.5	0.6	0.3	2.4	4.3	2.3	1.1	1.9	2.4	0.8	0.9	1.0	0.1	0.5	2.0	3.0	1.3	3.9	3.3	5.5	5.3	2.0	2.1	1.2	4.6	8.7	1.8
	PHT Level 5 old NW corner @ 1m to stack	85	0.3	0.8	0.0	0.7	2.6	2.6	1.3	0.3	2.1	1.8	1.9	0.3	0.7	0.5	0.4	0.9	1.5	1.5	1.9	0.9	2.4	3.2	1.7	2.3	0.3	2.0	4.9	1.2
	PHT Level 5 old centre N side	86	3.5	1.5	0.8	0.6	2.6	0.2	2.0	1.2	1.9	3.1	1.5	0.1	0.1	0.3	0.1	0.4	1.2	0.4	0.6	0.5	0.7	1.2	0.5	0.9	1.0	0.6	2.7	0.0
	PHT Level 5 centre between towers	87	1.5	1.2	0.8	0.6	2.0	2.9	0.5	0.9	1.3	2.1	0.9	0.6	0.3	0.1	0.1	0.2	0.2	0.6	0.6	0.1	0.1	0.9	0.2	0.8	0.3	0.5	1.3	1.2
	PHT Level 5 New centre N side	88	0.6	2.0	0.1	1.7	0.6	2.3	2.7	2.2	1.1	1.3	0.8	0.6	0.3	0.3	0.1	0.4	0.4	0.1	0.1	0.1	0.3	0.4	0.6	1.3	0.1	0.1	0.7	0.8
	PHT Level 5 New centre E side above kiln	89	0.6	0.1	0.4	0.2	1.5	0.5	1.5	2.9	2.1	0.8	0.9	0.8	0.7	0.7	0.0	0.2	0.0	0.3	0.1	0.0	0.1	0.3	1.2	0.2	0.5	0.3	0.8	1.6
	PHT Level 5 New centre S side	90	1.1	0.1	0.3	0.5	1.4	0.0	0.6	2.2	1.7	0.4	1.1	0.3	0.4	0.1	0.5	0.5	0.6	0.6	0.7	0.3	0.3	0.7	0.9	0.1	0.3	0.1	0.9	2.0
PHT Level 4	PHT Level 4 old centre S side by stairs	91	0.5	0.1	4.5	8.5	1.3	4.4	2.0	0.5	1.8	2.9	1.8	0.3	1.2	1.0	0.6	0.5	0.3	0.3	0.8	1.4	0.3	0.3	1.1	0.3	0.5	0.1	0.8	1.2
	PHT Level 4 old SW corner by water pumps SV09 @ 1m N	92	0.7	0.1	0.9	2.8	0.4	2.1	0.7	0.5	1.3	3.0	3.0	0.4	1.4	1.0	0.0	1.0	1.8	0.3	1.6	1.8	0.3	0.7	0.9	0.3	0.4	0.2	0.4	1.1
	PHT Level 4 old centre W side	93	0.2	1.6	2.4	2.7	1.1	2.6	0.4	2.8	4.3	5.1	2.2	0.6	1.6	0.2	0.0	0.5	1.3	1.7	2.6	1.9	0.4	0.3	0.8	0.3	0.7	0.1	2.2	0.8
	PHT Level 4 old NW corner @ 1.2m to stack	94	0.3	0.6	0.2	1.1	0.9	3.3	1.8	0.3	4.1	3.3	1.5	0.3	0.9	0.0	0.0	1.2	2.3	1.3	2.1	1.2	0.8	1.0	0.3	0.3	0.4	0.0	2.9	0.1
	PHT Level 4 old centre N side	95	2.8	2.4	0.7	0.9	2.0	1.1	2.5	1.2	0.4	2.2	1.6	0.1	0.3	0.6	0.4	0.3	0.8	0.2	0.5	0.4	0.1	0.5	0.8	0.2	0.0	1.0	1.8	1.3
	PHT Level 4 centre between towers by air cannon @ 2m	96	1.3	1.6	1.3	2.1	0.8	4.6	3.6	0.8	0.6	2.2	2.1	0.2	1.2	1.5	0.8	0.1	1.0	0.1	0.8	1.2	0.1	0.0	0.6	0.2	0.2	0.3	1.1	1.0
	PHT Level 4 centre between towers by air cannon @ 2m	97	1.5	2.7	0.5	3.9	3.8	0.4	1.3	1.6	0.1	1.7	1.9	0.4	0.1	0.4	0.3	0.4	0.0	0.0	0.3	0.5	0.1	0.0	0.5	1.3	1.6	1.1	0.3	1.9
	PHT Level 4 new centre N side	98	0.4	3.3	1.8	1.8	1.3	1.6	1.8	2.5	1.1	1.3	1.4	0.1	0.0	0.5	0.3	0.4	0.4	0.1	0.1	0.6	0.2	0.1	0.6	0.5	0.7	0.6	0.6	1.3
	PHT Level 4 new centre E side above kiln	99	2.2	2.9	1.4	5.5	2.9	1.3	1.9	2.3	1.7	1.2	0.8	1.1	0.5	0.7	0.5	0.7	0.1	0.0	0.0	0.4	0.4	0.2	0.7	2.3	0.5	0.7	0.4	3.0
	PHT Level 4 new centre S side	100	0.9	1.5	1.9	5.9	2.8	2.1	2.7	1.3	1.6	0.1	0.9	0.3	0.0	0.3	0.6	0.7	0.5	0.3	1.0	0.0	0.1	0.2	0.4	0.3	0.7	0.6	0.3	1.4

Table 3.2A: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - Tonality in One-third Octave Band Spectra

Area	Source or location	File	Tonality dB in One-third Octave Band Centre Frequency - Hz																											
			31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
	Tonality Criteria		15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
ESP	ESP Centre E side top walkway looking E to PHT	101	0.4	0.5	2.2	3.5	2.4	0.8	0.4	2.4	3.1	3.0	0.1	0.3	1.0	0.6	1.3	1.8	1.4	2.1	1.7	0.5	0.6	0.5	0.1	0.8	0.4	1.6	0.8	0.9
	ESP top SE corner at barrier	102	1.0	1.6	2.4	2.3	1.0	1.3	0.1	2.0	2.6	2.6	0.0	0.0	0.4	1.2	0.1	1.1	1.3	1.4	1.5	1.1	0.4	0.2	0.8	0.0	0.5	0.6	1.2	0.8
	ESP top SE corner at barrier - facing ESP	103	1.5	1.4	1.7	1.3	0.3	1.7	0.4	3.2	2.2	3.1	0.5	0.9	1.0	1.0	0.5	0.3	0.7	1.1	0.5	0.1	0.1	0.3	0.8	0.4	0.2	0.8	4.3	0.6
	ESP top NE corner at barrier	104	0.9	0.0	4.2	6.0	2.3	1.5	0.5	2.6	2.9	3.4	1.2	0.3	0.5	0.8	0.3	0.8	1.2	2.2	1.9	0.8	0.9	1.0	0.0	0.5	0.5	0.7	3.3	0.4
	ESP top NE corner at barrier - facing west	105	0.4	0.1	3.1	3.9	1.6	1.6	1.6	1.5	1.2	1.8	0.7	0.4	0.3	0.4	0.8	0.1	0.4	1.7	1.0	0.6	0.5	0.0	1.5	0.6	0.9	0.3	1.7	0.2
PHT Level 3	L3 old PHT centre S side @ 2m to edge facing centre	106	0.9	2.3	5.3	8.3	1.6	3.3	0.3	1.6	2.2	3.9	2.4	0.3	2.3	3.5	4.5	4.8	0.3	1.5	0.6	0.0	0.2	0.1	0.4	0.0	0.8	0.4	1.3	0.8
	PHT Level 3 old centre W side above FA39 face E	107	0.6	5.8	8.2	8.2	1.9	1.9	1.7	2.8	2.4	3.5	1.9	0.7	1.3	1.0	1.2	0.2	1.5	1.1	1.8	0.3	0.5	0.2	0.2	0.8	0.8	0.8	0.4	1.5
	PHT Level 3 old centre N side	108	1.6	0.5	4.6	7.2	1.2	2.8	0.1	0.4	3.7	3.4	2.5	0.6	0.7	0.8	0.8	0.1	1.6	0.8	1.1	0.4	0.1	0.0	0.0	0.7	0.1	0.8	1.2	1.1
	PHT Level 3 old centre E side above kiln	109	0.8	0.3	4.6	7.2	2.0	3.1	2.4	0.8	0.8	1.5	1.7	0.5	0.3	0.8	0.5	0.1	1.1	0.5	0.4	0.4	0.5	0.6	1.2	1.1	0.2	0.5	1.4	0.8
	PHT Level 3 old NW corner by stack @ 1.5m, above FA39 inlet	110	0.1	2.3	2.6	3.7	1.2	1.6	1.1	1.6	2.2	1.9	1.5	0.5	1.7	1.3	1.0	0.3	1.7	1.5	1.8	0.8	0.4	0.5	0.5	0.5	0.9	0.5	0.8	0.7
PHT Level 2.5	PHT Level 2.5 by DC31 drives @ 0.6m	111																												
	PHT Level 2.5 by DC31 discharge @ 1m	112	0.7	0.7	5.6	9.3	1.7	1.7	0.7	2.8	0.6	2.4	2.1	1.3	2.0	1.4	1.3	0.6	0.6	0.9	1.3	0.7	0.0	0.1	0.4	0.5	0.6	1.5	0.1	1.3
	PHT Level 2.5 by centre by kiln entry W side	113	4.7	6.9	9.9	11.7	0.8	3.3	0.2	0.1	2.3	2.6	0.3	3.5	4.2	3.9	3.8	2.0	0.6	1.3	0.6	0.4	0.5	0.3	0.4	0.1	0.2	0.8	0.7	1.1
	PHT Level 2.25 by centre by kiln entry Air cannons	114	1.5	4.7	6.1	5.3	0.7	1.6	0.8	0.9	2.8	3.7	2.0	0.1	3.7	7.7	9.8	10.7	1.6	3.9	2.8	2.6	2.5	0.7	1.4	0.1	0.5	0.1	0.7	1.2
	PHT Level 2.25 North Side centre	115	1.7	0.2	8.3	12.1	2.0	7.2	0.1	1.6	2.6	2.3	0.0	1.4	1.6	3.0	4.6	3.9	0.6	1.3	0.3	0.4	0.6	0.7	0.9	0.1	0.7	0.2	1.7	0.4
	PHT Level 2.5 by Radicon Gbox drive E end @ 2.5m	116	1.2	2.5	6.6	8.2	0.7	3.0	0.8	1.2	1.8	3.1	0.2	0.1	1.2	3.8	5.6	7.8	1.0	4.6	4.0	2.7	1.5	0.3	1.2	0.0	0.5	1.1	0.7	1.5
	L2.25 PHT centre W side facing fan discharge DC70 FA63 @ 4.66m, stack @ 6.35m and stack entry duct @ 6.23m	117	4.7	3.2	9.0	15.1	1.9	5.0	2.3	1.6	4.6	6.7	2.0	1.5	2.3	3.9	4.1	3.4	0.1	1.4	0.6	0.5	0.6	1.0	0.4	0.0	0.4	0.7	1.2	0.8
PHT Level 2	PHT Level 2 by E side drive coupling & casing DC70 FA03 centre N side	118	0.9	3.6	4.3	2.9	2.1	1.8	1.7	2.0	2.6	4.0	1.0	0.0	1.5	5.2	6.1	6.7	2.6	1.5	0.7	0.0	0.2	2.8	2.7	1.0	0.0	0.4	2.2	0.3
	L2 PHT FA03 casing @ 1m E side	119	1.3	1.0	6.4	9.4	2.3	1.6	0.4	1.1	3.6	5.3	2.1	0.3	3.1	6.3	5.4	4.3	1.7	0.2	0.7	1.8	0.1	1.2	1.0	0.8	0.5	1.0	1.5	1.1
	PHT Level 2 FA03 discharge @ 1.5m	120	1.5	0.9	9.4	13.9	0.5	1.6	1.2	0.1	2.1	3.0	0.7	1.7	1.4	1.1	1.9	2.5	0.2	0.0	1.6	1.1	0.6	1.3	0.5	0.7	0.3	0.8	0.8	1.2
	PHT Level 2 @ 1m to south side FA39 stack entry duct	121	1.4	1.2	8.5	11.2	0.3	5.2	0.5	2.1	4.6	5.3	0.8	1.9	3.0	2.9	1.7	0.6	1.9	1.0	0.3	1.1	0.7	1.5	0.5	0.5	0.3	1.0	1.1	0.8
	PHT Level 2 FA65 inlet filter @ 1m in front	122	3.7	1.4	5.7	10.4	0.3	6.1	3.8	1.1	1.3	0.5	1.8	0.2	1.2	5.0	5.1	3.3	0.5	1.6	0.1	1.0	0.9	1.7	0.3	0.4	0.5	0.5	0.9	0.6
	PHT Level 2 FA65 rear side 1m	123	1.8	1.7	7.3	13.6	2.0	6.1	2.2	1.5	4.0	3.6	0.3	1.0	1.6	3.6	4.6	4.1	0.3	1.9	1.1	3.8	2.3	1.2	0.1	0.4	0.2	0.9	1.4	0.3
	L2 PHT centre N side edge @ 2m facing centre	124	1.2	1.8	6.6	7.7	1.3	2.2	1.1	3.0	1.7	3.4	1.3	1.8	3.3	4.3	4.1	2.7	0.3	0.3	0.8	2.1	1.6	1.4	0.4	0.8	0.9	0.2	1.8	2.0
	PHT Level 2 @ 1m to north side FA39 stack entry duct	125	1.5	2.0	7.6	7.6	1.1	3.4	1.3	2.6	6.5	6.3	0.4	2.7	2.0	0.7	2.2	2.3	0.1	1.0	0.8	1.2	0.3	0.3	0.0	0.5	0.3	0.6	1.2	0.3
	PHT Level 2 FA65 inlet filter @ 1m in front	129	2.9	0.5	5.3	9.6	1.4	1.8	0.0	0.4	1.1	0.5	2.1	2.6	2.1	3.3	4.3	4.3	0.6	1.8	0.2	2.1	0.4	0.8	0.4	0.7	0.4	0.6	0.4	1.0
	PHT Level 2 FA65 rear side 1m	130	2.6	1.9	7.0	13.1	0.3	4.8	0.1	0.4	2.7	2.5	0.2	0.2	0.8	2.0	4.8	5.4	1.3	0.8	0.8	2.1	0.8	0.9	0.3	0.6	0.9	0.7	1.2	0.5
	PHT Level 2 @ 1m to north side FA39 stack entry duct	131	1.2	2.1	10.2	10.5	1.3	3.8	0.3	1.1	5.4	3.8	1.6	2.3	0.8	0.1	0.8	0.1	1.5	0.8	0.9	0.3	0.0	0.7	0.2	0.3	1.1	0.6	0.5	2.1
PHT Level 1 Ground	PHT Level 1 RM silo base blower room N side man door @ 1m	132	1.0	1.4	3.7	5.9	2.8	4.6	8.0	5.0	6.1	3.6	0.8	0.3	0.4	2.8	2.9	0.7	3.5	0.0	2.1	2.0	1.6	2.5	0.4	0.4	0.8	0.3	0.9	1.9
	PHT Level 1 FA92 silo vent fan casing & drive @ 1m NW side	133	2.9	0.7	1.1	1.6	0.3	1.0	0.4	0.8	1.1	1.7	0.2	1.3	0.5	0.7	1.8	2.4	0.4	1.1	0.1	0.5	0.1	0.8	1.7	0.9	0.9	1.4	1.6	0.6
	PHT Level 1 FA92 silo vent fan casing & drive @ 1m E side	134	3.2	0.8	2.7	5.0	3.4	0.1	1.9	0.2	1.0	1.2	2.6	3.4	0.0	0.4	2.3	2.9	0.6	0.0	0.5	1.6	2.1	1.9	3.1	2.2	1.5	1.4	0.0	1.6
	PHT Level 1 FA92 silo vent fan inlet duct @ 1m SE side	135	3.1	1.0	0.1	0.2	1.0	0.4	0.0	1.3	0.7	0.4	2.2	2.7	0.4	1.0	2.3	2.3	0.6	0.8	0.0	0.0	0.4	0.9	1.0	0.3	0.9	1.2	0.0	1.2
	PHT Level 1 FA92 silo vent fan inlet front @ 1m	136	3.9	0.6	1.1	0.8	1.6	1.2	2.7	2.3	0.1	0.2	0.5	1.0	1.6	0.0	0.7	0.7	0.1	0.3	0.5	0.4	0.2	0.3	0.1	0.0	0.4	0.7	0.5	1.4

Table 3.2A: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - Tonality in One-third Octave Band Spectra

Area	Source or location	File	Tonality dB in One-third Octave Band Centre Frequency - Hz																												
			31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
	Tonality Criteria		15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
FA38 & 39	FA39 E side at concrete line 5.4m to motor	137	0.8	2.6	3.6	5.7	2.0	1.1	1.3	1.7	4.2	4.2	1.1	4.5	2.9	0.8	2.2	2.4	7.1	2.1	4.3	0.2	0.6	2.2	1.0	0.0	0.4	0.8	0.8	1.3
	FA39 E side @2.3m in line with columns	138	0.5	5.2	5.1	5.1	3.2	0.6	1.2	0.3	5.6	3.3	2.1	5.1	2.8	0.4	2.6	3.1	9.6	0.9	4.1	0.5	0.5	2.2	0.5	0.5	1.0	0.4	1.1	1.2
	FA39 under discharge duct @ 1m	139	0.0	3.2	1.3	1.1	2.7	2.2	1.8	0.9	3.0	1.1	1.7	1.1	1.0	0.6	0.4	2.4	3.7	1.6	2.8	0.8	0.2	1.2	0.5	0.2	0.1	0.9	0.9	1.1
	FA39 E side motor platform @ 0.82m to coupling cover	140	2.7	6.2	5.0	4.2	2.8	0.9	2.2	0.4	3.1	0.8	1.7	2.8	0.8	2.5	0.0	3.0	7.3	0.5	3.0	2.3	2.8	4.3	1.6	0.3	0.9	0.7	1.0	1.3
	FA39 motor platform centre E side@ 1m	141	0.3	1.7	2.3	3.1	3.2	2.8	5.4	0.9	6.3	0.8	7.2	9.1	4.4	0.8	3.8	3.1	10.9	0.0	5.3	2.1	2.1	4.3	0.5	2.2	2.8	0.0	0.5	0.8
	FA39 motor platform centre E side@ 1m	142	0.3	2.2	3.0	3.2	2.9	2.8	5.6	1.1	5.8	1.1	7.7	9.7	4.5	0.7	3.4	4.5	11.7	0.3	6.3	3.2	1.9	3.7	0.7	1.4	2.2	0.2	0.8	1.1
	FA39 motor platform centre E side@ 1m & vent @ 0.5m	143	1.6	3.6	4.1	3.7	1.0	0.2	2.1	1.5	6.1	1.7	4.4	9.8	5.6	1.0	3.1	2.0	2.3	4.6	3.9	0.0	0.4	2.0	0.8	0.2	0.8	0.5	0.8	1.6
	FA39 motor N end @ 2.7 to end plates/stop button at line	144	1.3	4.5	5.3	5.0	1.9	1.2	1.2	1.4	3.7	2.3	2.6	5.6	2.9	0.9	1.3	4.1	7.3	1.9	4.5	1.8	1.4	2.7	0.5	0.8	1.6	0.3	1.1	1.3
	FA 39 N side on kerb	145	0.8	3.9	3.5	3.2	1.4	0.2	2.1	2.7	3.4	3.4	1.2	3.8	2.5	0.7	0.5	3.0	5.5	2.1	4.0	1.5	1.1	2.3	0.3	0.3	1.3	0.7	0.9	0.8
	FA39 W side at metal strip 5.25m to motor	146	0.8	2.1	4.2	4.3	0.5	2.2	0.4	2.1	0.6	0.1	0.5	1.0	1.2	0.8	0.7	4.6	3.9	5.0	4.1	0.8	1.1	2.9	0.9	0.6	1.9	0.1	0.8	1.1
	FA39 W side at columns @2.7m to plinth	147	0.1	2.5	4.5	4.5	1.1	1.9	1.2	2.1	1.8	0.4	2.0	3.4	1.6	0.3	0.6	2.6	4.1	3.9	4.8	2.7	1.5	2.4	0.9	0.6	1.6	0.2	0.8	1.3
	FA39 W side @ 1m to cladding door closed, 1.33m to casing	148	0.1	3.0	2.5	4.0	2.5	3.9	0.1	4.7	4.8	5.4	0.3	0.2	0.6	0.0	2.1	6.3	5.3	5.7	5.4	0.8	0.5	0.9	0.3	0.3	0.6	0.5	0.4	1.4
	FA39 W side motor platform at 0.8m to coupling cover & 1m to coupling	149	1.3	6.9	6.0	3.8	1.9	0.5	2.3	0.1	3.0	1.2	2.0	1.2	1.5	1.8	1.1	4.7	8.8	0.8	3.3	2.7	3.4	4.8	1.6	0.1	0.5	0.6	0.8	1.3
	FA39 S side @ columns 2.7m to bearing	150	3.1	4.4	5.2	7.1	2.1	2.1	0.7	1.6	2.6	2.8	0.0	1.2	2.0	1.4	3.2	4.6	1.3	4.3	3.1	0.1	0.5	0.3	1.8	0.4	0.9	1.4	0.6	0.7
	FA39 S side platform bearing cover @ 0.8m	151	0.4	3.0	3.4	3.5	1.0	1.8	2.1	1.9	1.1	0.5	0.8	1.5	2.4	4.2	1.2	2.6	0.8	4.5	2.8	0.3	0.5	0.2	0.7	0.2	0.3	0.5	0.8	1.1
	Centre between FA38 & FA39 @ 11.2m at line facing E	152	0.5	0.3	0.1	2.1	1.8	0.4	1.8	3.1	1.3	1.3	0.4	0.7	0.6	0.5	0.1	3.9	4.3	6.4	5.8	0.6	0.1	1.3	0.0	0.4	0.6	0.2	1.4	0.9
	Centre between FA38 & FA39 @ 7.7 m facing FA 38	153	0.9	1.1	0.6	0.5	0.4	1.5	1.0	2.9	1.6	1.2	1.3	1.6	0.7	0.5	0.6	3.6	4.1	6.7	5.8	0.4	0.1	0.3	0.6	0.5	0.3	0.1	1.1	0.6
	FA38 @ 3.9m to E side	154	4.9	3.6	0.7	2.4	1.8	0.8	1.6	2.8	2.6	2.6	0.1	0.7	0.8	1.3	0.3	5.9	4.4	8.9	6.2	0.6	0.5	0.0	0.6	0.5	0.5	0.3	0.8	0.5
	FA38 @ 3m to N side	155	3.7	1.2	0.6	2.7	1.7	1.8	0.4	1.3	4.3	3.6	0.3	0.2	1.1	0.7	0.7	4.4	4.3	5.6	5.3	0.4	0.5	0.5	0.2	0.4	0.6	0.3	0.5	0.6
	FA38 @ 5m to NW side at NW column	156	0.0	0.5	0.6	0.0	0.1	0.8	0.4	0.7	2.5	2.0	0.2	0.5	0.3	0.2	0.1	3.6	2.8	6.8	5.0	0.3	0.6	0.2	0.2	0.9	0.3	0.0	1.4	1.0
	FA38 @ 5m to NW side at W column	157	3.3	0.4	1.9	1.3	0.8	1.8	0.4	1.0	2.1	3.0	1.0	1.3	1.2	0.6	0.5	6.5	7.7	4.0	5.1	0.3	0.8	0.5	0.3	0.5	1.1	0.2	0.8	0.4
	FA38 @ 5m to W side at W column	158	3.3	0.4	2.1	1.5	0.3	1.3	0.2	1.1	1.9	2.3	0.3	0.9	0.5	0.1	0.6	5.1	4.3	7.0	6.1	0.3	0.9	0.5	0.2	0.8	0.8	0.3	1.2	0.5
	In centre opening of wall on W side	159	2.0	0.6	2.9	4.4	3.1	0.5	1.1	1.8	2.6	3.5	0.4	1.8	1.7	1.5	0.5	3.4	1.7	7.8	5.7	0.2	0.7	0.1	0.5	0.1	1.1	0.3	0.8	0.9
	FA38 motor platform W side @ 1m to coupling cover, 1.9m to casing, 0.7m to motor side	160	2.5	0.7	1.5	3.0	0.8	0.6	1.2	0.6	2.8	2.1	0.2	1.5	0.6	1.1	0.8	5.9	5.1	8.6	9.4	3.0	0.7	1.2	1.1	0.3	0.5	0.1	0.9	1.1
	FA38 at opening on S side of road facing FA38 opening	161	0.6	0.1	2.1	2.8	1.4	0.9	1.4	1.7	2.2	2.9	0.3	1.3	2.0	2.1	0.3	3.4	3.2	4.2	3.9	0.2	0.2	1.2	0.2	1.4	0.0	0.5	2.7	0.4
	56 Road kerb N side opp E side RM6	8	0.9	0.9	2.2	1.4	8.7	15.7	4.5	0.8	0.7	0.6	1.4	3.1	1.6	1.9	1.6	4.7	0.2	1.5	2.7	0.4	0.6	0.4	1.0	0.6	0.1	0.3	3.1	0.3
	56 Road kerb N side opp E side RM6	162	0.4	0.5	1.1	2.7	1.7	1.7	0.8	1.9	2.6	4.0	0.4	2.1	1.9	1.3	0.3	2.7	2.2	4.6	4.0	0.6	0.5	0.9	0.1	1.2	0.0	0.0	2.0	1.6
	56' Road kerb N side opp. Opening to FA38	9	0.9	0.5	1.4	3.2	9.1	14.3	4.5	0.8	1.3	3.1	0.8	3.7	2.4	2.2	2.8	3.5	5.1	0.5	2.1	0.1	0.6	0.8	0.5	2.0	0.7	1.0	2.2	1.3
	56' Road kerb N side opp. Opening to FA38	163	0.7	1.3	2.6	3.4	1.6	0.4	0.6	1.7	2.8	5.0	1.4	3.3	2.6	0.8	0.3	3.6	3.8	2.9	3.0	0.1	0.2	0.5	0.0	0.6	1.0	0.4	0.8	1.5
	57 Road N side opp FA38 doorway	10	0.6	0.9	2.9	6.1	7.0	9.0	4.7	0.4	2.3	3.6	0.8	4.0	2.6	0.9	1.3	3.6	6.0	0.0	2.0	0.7	0.9	1.6	0.1	0.2	1.3	1.2	0.9	0.7
	58 Road N side between FA38 & FA39	11	0.3	0.5	1.1	2.4	2.8	4.3	3.4	1.5	2.0	2.1	0.1	2.3	1.5	0.5	0.4	1.8	5.1	1.1	3.1	1.4	1.7	2.5	0.5	0.5	0.9	1.1	1.7	0.7
	59 Road N side kerb opp end FA39	12	2.5	2.7	0.4	0.7	4.1	7.2	4.1	0.3	3.6	2.8	0.4	3.6	2.3	0.4	0.3	4.5	8.7	0.8	2.7	1.1	1.5	2.2	0.8	0.1	1.3	1.6	0.8	1.1
	59 Road N side kerb opp end FA39	13	3.0	2.9	0.3	0.8	2.8	4.6	3.8	0.0	4.9	3.6	0.0	2.7	1.5	0.9	0.6	4.7	8.9	1.0	2.8	1.5	1.8	2.6	1.0	0.3	1.3	1.8	0.5	1.8
RM6 West side	1 RM6 W door @ 1m	164	2.8	2.8	1.1	2.4	0.1	0.3	1.7	1.4	3.7	2.7	0.2	1.0	3.8	4.3	0.3	0.3	0.3	2.3	1.8	0.8	1.3	0.9	0.6	0.3	0.5	0.3	0.7	0.8
	1' RM6 W door at kerb W side @ 13.3m	165	0.9	1.3	0.8	0.3	0.0	0.5	0.4	1.4	5.1	3.9	0.2	3.5	4.5	3.2	0.1	0.6	0.4	1.4	0.8	0.4	0.3	0.4	0.4	1.0	0.1	0.7	0.4	0.7

Table 3.2A: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - Tonality in One-third Octave Band Spectra

Area	Source or location	File	Tonality dB in One-third Octave Band Centre Frequency - Hz																											
			31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
	Tonality Criteria		15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
RM7 ground level	1 RM7 at roadside kerb ~32m	166	0.6	1.0	0.9	1.6	0.6	0.5	2.9	2.5	3.5	2.3	1.1	1.1	1.2	1.1	0.3	0.3	0.0	1.0	0.4	0.1	0.8	0.2	0.3	0.9	1.1	0.3	0.7	0.8
	2 Rm7 @ 15.5m to W door	167	0.2	0.4	0.3	0.2	0.3	0.7	2.1	2.8	2.8	2.4	1.7	2.5	2.0	0.7	0.8	0.3	0.0	0.5	0.0	0.1	0.6	0.2	0.2	0.9	0.4	1.0	1.1	0.2
	3 RM7 W wall door @ 1m	168	1.6	1.6	2.2	2.4	0.5	2.2	3.8	1.6	2.4	0.6	1.6	1.9	1.0	0.1	1.7	0.7	1.3	0.7	0.3	0.7	1.4	0.5	0.0	0.5	0.7	0.9	0.8	1.8
	4 RM7 NE corner wall vents @ 1m	169	0.1	0.3	0.3	1.8	1.1	0.0	2.0	2.2	2.2	1.2	1.4	1.6	1.2	1.1	0.6	0.3	0.8	0.9	0.4	0.5	2.3	0.2	0.0	0.6	0.3	0.5	0.4	2.3
	4 RM7 NE corner wall vents @ 1m	170	0.6	0.6	0.8	2.1	1.4	0.4	1.8	1.5	2.5	1.3	1.6	1.7	0.0	0.2	1.3	0.7	0.1	0.8	0.4	0.3	1.7	0.0	0.1	0.8	0.0	0.3	0.8	1.0
	5 RM7 N side NW roll door @ 1m	171	0.4	0.4	0.5	3.6	1.3	1.4	1.4	2.3	1.3	1.0	0.9	1.8	1.5	1.1	0.4	0.8	0.9	0.7	0.5	0.3	0.3	0.9	0.4	1.1	0.1	0.2	1.3	1.2
	6 RM7 N wall vents centre next to Roll door	172	1.0	1.1	1.5	0.6	0.3	1.7	3.3	2.1	2.2	1.8	0.1	0.9	0.4	0.3	1.0	0.3	0.3	0.6	0.3	0.7	1.5	0.3	0.1	1.2	0.0	0.7	0.2	1.6
	RM7 vents N wall W of man door	173	0.7	0.5	2.6	1.3	2.5	2.0	2.4	2.6	2.5	2.5	1.9	4.3	2.3	0.5	1.1	0.7	0.0	1.1	0.8	0.3	0.9	0.9	0.2	1.8	0.8	0.5	1.2	1.1
	7 RM7 N wall man door	174	1.0	0.0	1.2	0.3	2.5	2.8	2.5	1.8	2.3	1.9	0.9	1.0	0.6	1.5	0.5	1.5	0.4	1.3	0.3	0.5	1.1	0.0	0.3	0.9	0.5	0.6	0.8	1.2
	8 RM7 E wall vents NE corner @ 1m	175	0.1	0.8	2.7	6.0	1.2	1.9	2.0	2.8	2.5	2.7	0.6	1.6	1.6	1.6	0.8	1.2	0.8	0.6	0.6	0.2	1.3	0.0	0.1	0.4	0.0	1.2	0.3	2.1
	9 RM7 E side under duct	176	1.4	1.2	1.5	0.3	0.6	0.9	0.0	2.8	1.8	3.0	0.1	1.3	0.9	0.2	1.2	1.5	1.3	0.6	0.6	0.0	0.0	1.4	0.1	0.4	0.8	0.6	1.2	0.9
	10 RM7 By E door RM7 floor	177	0.5	0.7	0.2	3.8	1.8	0.8	2.5	3.3	2.2	1.0	2.3	2.3	1.3	0.5	1.1	1.8	1.6	0.5	0.5	0.5	0.0	2.1	0.4	0.1	1.0	0.3	1.5	1.1
	10' RM7 By E door Hydraulics room closed	178	1.5	0.0	1.2	0.8	0.7	0.5	1.5	2.9	0.1	1.1	0.5	0.6	1.1	1.0	0.6	0.5	2.8	1.3	0.2	0.2	0.2	0.5	0.1	0.6	0.3	1.0	0.8	1.3
	11 RM7 Centre Compressor room door @ 1m closed	179	2.7	1.2	0.9	1.4	0.1	3.6	0.6	4.2	0.1	0.0	1.0	0.9	0.9	0.5	0.5	0.9	1.7	0.7	0.4	0.2	0.0	0.0	0.6	0.0	0.1	1.2	0.2	1.7
	11A RM7 compressor room W door @ 1m closed	180	0.4	0.2	0.7	2.1	0.2	2.8	0.0	2.3	1.2	0.7	0.5	0.4	0.2	0.5	0.6	0.5	1.0	0.2	0.5	0.5	0.3	0.5	0.6	0.2	0.9	1.2	0.1	1.8
	12 RM7 Under E inlet for switchroom fan	181	1.4	0.3	0.6	0.8	1.7	2.5	0.3	4.4	7.4	3.4	7.8	6.1	1.3	1.8	1.2	0.2	1.1	0.6	0.2	0.7	0.1	0.2	0.2	0.3	0.8	1.1	1.8	1.2
	12 RM7 Under E inlet for switchroom fan rattling cowling	182	1.2	0.8	1.4	0.5	1.9	2.9	0.1	4.3	7.2	3.2	7.3	6.0	0.2	0.6	0.3	0.1	0.4	0.5	0.9	0.6	0.6	0.3	0.6	1.0	0.4	0.1	1.2	0.8
	12B Under switchroom fan duct W	183	0.9	0.1	0.1	1.0	0.5	3.1	0.9	5.5	4.5	0.7	6.0	5.0	0.0	0.6	0.3	0.5	1.0	0.3	0.4	0.8	0.7	0.8	0.1	0.1	0.9	0.1	1.6	0.1
	12 RM7 E inlet for switchroom fan @ 1m to N side and 0.6m below	184	0.1	0.3	0.5	2.2	0.6	2.6	0.4	4.6	0.5	2.6	4.7	2.1	0.4	0.1	0.2	0.9	1.7	0.3	0.6	0.7	0.1	0.5	1.4	1.6	1.7	0.8	0.2	0.6
FA249	13 FA249 under inlet duct W side	185	1.9	2.8	0.3	1.7	1.0	2.9	1.1	3.2	1.4	3.0	0.0	1.1	1.3	0.7	0.8	1.6	1.9	0.5	0.9	0.5	0.6	1.3	0.0	0.6	0.3	1.0	1.2	0.4
	14 FA249 2m W side ground level	186	2.1	1.0	0.2	2.1	1.9	0.4	4.0	5.6	1.8	2.4	0.3	1.4	2.0	1.0	0.6	2.6	4.2	0.9	0.7	0.4	0.4	1.2	0.0	0.6	0.3	0.8	0.7	0.9
	14' FA249 motor platform fan coupling & casing W side @ 1m	187	2.5	1.2	3.1	2.7	1.6	0.1	3.8	5.2	2.6	4.6	1.0	1.1	0.9	0.2	0.7	1.8	2.9	1.2	0.9	0.5	0.7	1.8	0.3	0.1	0.5	0.1	0.9	1.2
	15 FA249 1m motor end	188	0.7	0.0	2.2	0.1	0.3	0.7	0.6	0.0	2.1	1.6	0.1	0.3	0.1	0.0	0.5	1.9	3.4	0.7	0.4	0.1	0.2	1.1	0.3	0.2	0.4	0.5	0.5	1.3
	16 FA249 end at column 4.3m N of motor plinth	189	2.8	0.3	0.6	5.3	2.4	3.5	2.5	0.9	3.5	3.8	0.3	0.9	0.4	0.0	1.2	2.3	3.2	0.2	0.9	0.5	0.4	1.1	0.2	0.4	0.7	0.6	0.4	1.1
	17 FA249 motor platform E side coupling & casing 1m	190	4.1	3.9	3.6	2.6	0.1	0.4	4.4	5.8	2.3	3.1	0.3	0.8	0.3	1.9	1.8	1.6	2.2	0.7	1.7	0.9	0.5	1.2	0.7	0.4	0.4	0.7	0.4	1.2
	18 FA249 Platform S side centre @ 1m	191	0.1	2.8	1.1	3.0	2.2	1.1	2.3	5.5	1.2	2.1	0.1	0.5	0.4	1.0	1.1	0.1	0.3	0.0	0.0	0.3	0.7	2.2	1.4	0.4	0.7	1.5	0.5	0.4
	18' FA249 platform S side under discharge duct E side	192	0.1	1.4	2.3	0.9	1.9	1.1	0.3	4.7	1.7	3.0	1.2	0.3	1.1	1.2	1.3	2.3	3.8	0.0	1.9	1.0	0.5	1.3	1.4	0.9	1.3	0.5	0.5	1.6
	18' FA249 platform S side under discharge duct E side	193	0.3	2.0	2.3	1.7	1.3	0.8	0.6	4.4	1.5	2.6	0.9	0.4	0.1	0.6	1.5	1.9	2.8	0.9	2.2	1.2	0.6	1.3	1.5	1.0	1.2	0.1	1.9	0.9
	19 FA249 S side @ 3.8m	194	1.7	0.1	0.5	0.9	1.9	0.5	1.3	4.2	1.5	2.1	0.3	0.5	0.6	0.1	0.1	0.9	2.0	0.0	0.6	0.4	0.3	0.4	0.0	0.5	1.1	1.0	0.9	0.1
	19 FA249 S side @ 5.5m	195	0.9	0.8	0.2	0.1	1.0	0.3	1.2	3.1	0.6	1.3	0.4	0.8	0.2	0.0	0.3	1.2	2.2	0.1	0.5	0.1	0.3	1.1	0.7	0.3	1.1	1.2	1.0	0.2
	20 FA 249 S side @ 10.9m	196	0.2	1.3	1.5	2.6	1.9	0.0	0.4	2.8	0.8	2.0	0.3	0.6	0.3	0.1	0.1	0.8	1.7	0.0	0.4	0.0	0.3	0.3	0.1	0.1	1.1	0.8	1.0	0.3
	21 FA249 E side of fan casing ground level @ 2m	197	1.9	0.7	0.6	1.1	1.6	0.4	2.9	4.9	1.7	3.4	0.6	0.3	0.3	0.1	0.1	1.7	3.4	0.5	0.8	0.3	0.0	0.5	0.2	0.2	0.7	1.5	5.5	0.5
FA250	22 FA250 S side 4.2 m to motor end	198	3.1	1.5	1.1	3.9	1.1	0.7	2.5	3.3	2.0	2.9	0.3	1.6	0.9	0.7	0.4	1.1	1.6	0.1	0.5	0.5	0.6	0.5	0.4	0.9	0.1	0.7	1.3	0.2
	22' FA250 Motor end S side @ 1m	199	2.4	1.0	2.0	1.8	1.1	1.5	0.0	2.3	2.4	3.5	0.7	0.5	1.2	1.5	0.0	1.1	1.6	0.2	0.1	0.3	0.6	1.0	0.1	0.6	0.1	0.8	0.9	0.7
	23 FA250 E side platform coupling & casing	200	0.3	0.8	4.5	2.7	1.0	0.1	2.6	2.8	4.0	4.7	1.3	0.3	0.0	0.7	1.1	1.2	2.0	0.7	0.1	0.0	0.6	1.7	0.3	0.3	0.0	1.1	0.7	0.9
	23' FA250 E side centre motor @ 1m	201	1.3	0.3	3.1	1.0	0.0	0.4	4.0	4.5	5.3	5.2	0.1	0.2	0.2	0.8	0.0	1.0	1.2	0.4	0.6	0.0	0.9	1.3	0.5	0.2	0.3	1.3	0.7	1.0
	FA250 W side motor shaft @ casing @ 1m	202	1.6	1.4	5.2	0.3	0.9	2.0	1.2	2.5	5.3	6.1	1.0	0.2	1.2	1.5	0.9	0.8	2.0	0.8	0.1	0.3	0.9	1.6	0.2	0.1	0.7	0.5	0.9	0.6
	25 FA250 coupling & casing W side motor centre @1m	203	2.8	1.0	5.0	0.2	0.8	1.9	1.2	2.3	5.3	5.0	0.0	0.1	1.1	0.7	0.8	0.9	1.6	0.7	0.3	0.7	1.0	1.8	0.3	0.2	0.6	0.7	0.9	0.6
	26 FA250 W side casing @ 1m & coupling @ 3m	204	2.0	0.0	1.2	1.1	0.0	1.9	2.6	4.5	4.0	4.2	0.7	1.4	1.0	0.8	0.8	1.9	2.4	0.2	1.5	1.1	0.5	1.0	0.5	1.6	0.8	1.1	1.2	0.8
	26 FA250 W side casing @ 1m & coupling @ 3m	205	1.8	0.2	1.3	0.5	0.5	2.0	1.8	3.6	3.3	3.0	1.0	1.0	0.4	0.3	1.1	2.4	3.4	0.7	1.2	1.1	0.6	1.0	0.5	1.6	0.7	1.2	1.3	0.8
	27 FA250 W side 1m under inlet casing expansion joint	206	0.0	0.5	1.1	1.5	1.1	1.1	1.5	2.8	2.6	1.7	0.8	0.5	1.5	3.2	1.8	3.2	0.9	1.1	1.0	0.5	0.1	0.1	0.6	0.4	1.1	1.8	1.6	2.5
	28 FA250 N side casing shaft platform @ 1m	207	3.9	4.0	0.3	2.4	2.0	1.6	1.3	3.4	4.1	4.5	1.7	3.4	2.1	1.8	0.5	1.3	0.5	0.3	1.2	1.3	0.5	0.6	0.4	0.2	0.1	1.1	1.5	1.2
	29 FA250 E side under discharge duct @ 1.5m, at lower step of concrete	208	1.4	2.2	0.5	1.7	0.4	4.4	0.4	4.6	5.8	6.7	0.3	1.7	1.5	1.3	1.1	2.1	0.5	0.6	0.2	0.1	0.1	0.8	0.9	0.6	1.2	1.2	1.2	0.0

Table 3.2A: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - Tonality in One-third Octave Band Spectra

Area	Source or location	File	Tonality dB in One-third Octave Band Centre Frequency - Hz																												
			31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
	Tonality Criteria		15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
RM7 Roof Platform lower	Lower platform E side 1m to Magnete plate	209	0.6	1.2	2.8	0.9	3.6	4.1	3.8	2.8	0.4	0.9	2.3	1.0	0.4	1.3	0.5	0.2	0.5	0.3	0.2	0.0	0.3	0.3	0.1	0.8	1.4	0.8	1.5	1.4
	Lower platform S side @ 1m to magnete plate	210	0.7	1.9	1.7	0.4	3.2	4.3	1.3	1.3	4.2	7.3	4.5	0.7	1.5	1.0	0.8	0.3	0.8	0.4	0.1	0.5	0.2	0.8	0.3	0.4	2.2	0.5	0.6	0.9
	Lower platform W side @ 0.9m to magnete plate	211	0.4	0.1	0.6	0.3	3.1	6.8	6.4	3.9	0.5	1.9	2.5	0.5	0.4	1.2	0.6	0.5	0.1	0.3	0.5	0.8	0.3	0.8	0.2	0.2	1.8	1.2	1.4	0.3
	Lower platform N side @ 2m to magnete plate (scaffolding)	212	0.5	0.5	1.8	0.2	3.2	3.6	2.5	3.2	0.8	1.0	1.4	0.8	0.0	0.2	0.1	0.1	0.0	0.3	0.4	0.1	2.1	0.0	0.4	0.2	1.3	1.0	1.8	0.0
	Lower platform N side @ 1m to BE casing	213	0.3	0.8	2.1	1.5	4.6	3.8	2.3	1.3	2.8	2.3	0.2	0.0	0.4	0.3	0.5	0.9	1.3	0.6	0.2	0.8	2.0	0.7	0.0	0.3	1.2	1.5	1.1	1.1
	Platform S of Magnete 2m to S side	214	1.3	1.1	0.4	0.3	1.8	2.6	2.5	2.6	0.1	1.2	1.6	0.7	1.1	1.3	1.4	0.7	0.8	0.7	0.5	0.2	0.1	1.6	0.3	0.4	1.9	1.1	1.5	0.9
RM7 Roof platform Upper	Upper Platform Gbox @ 1m E side & 0.5m casing	215	1.3	0.4	1.5	1.0	0.6	1.9	2.7	1.7	0.6	0.5	0.8	0.5	0.1	0.3	1.7	3.3	1.1	0.3	0.6	0.0	1.1	0.5	0.0	0.1	1.3	0.8	0.1	0.3
	Upper Platform Gbox @ 1m N side	216	2.6	0.8	5.1	0.8	1.3	1.5	1.4	2.2	1.3	1.8	1.6	1.4	0.0	0.4	1.4	3.8	1.6	0.6	1.1	0.0	1.1	0.6	0.0	0.0	2.0	0.5	0.3	0.7
	Upper Platform Gbox @ 1m N side	217	1.4	0.6	1.4	0.3	0.3	1.6	1.6	2.5	1.8	2.1	1.9	1.8	0.2	0.5	0.3	2.1	1.1	0.5	0.5	0.5	1.4	0.8	0.0	0.5	0.8	0.3	0.1	0.1
	Upper Platform motor end @ 1m W side	218	1.1	0.8	2.0	0.8	4.1	5.5	3.9	3.3	0.5	1.3	1.1	0.6	0.3	1.0	0.7	0.5	0.1	0.3	1.0	0.9	0.9	0.3	0.5	0.3	0.9	0.5	0.6	0.1
	Upper Platform BE casing @ 0.9m W side	219	1.8	0.1	1.6	0.6	3.6	7.0	4.4	2.5	1.4	1.3	1.8	0.5	1.1	1.5	1.0	0.1	0.1	0.3	0.3	0.2	1.2	0.5	0.0	0.0	1.0	1.4	1.6	0.3
	Upper Platform BE casing @ 1m S side	220	0.2	0.8	1.1	1.6	2.0	1.8	1.7	2.0	0.5	1.5	3.8	2.4	0.5	1.9	1.0	0.2	0.2	0.3	0.3	0.0	0.8	0.4	0.1	0.1	1.2	1.9	1.4	1.3
	Upper Platform BE casing @ 1m E side	221	0.6	0.3	1.3	3.0	0.7	0.8	2.0	2.0	2.0	1.7	2.4	3.2	1.3	0.4	1.2	0.9	0.7	0.1	0.5	0.2	0.7	0.4	0.3	0.1	0.7	2.2	1.5	1.3
RM7 Baghouse Tower	On tower to baghouse top S side above FA249 same level as roof RM7	222	0.8	0.5	1.4	1.3	0.3	3.1	0.4	3.1	0.4	0.5	1.4	0.5	0.2	0.4	0.0	1.9	3.2	0.3	1.1	0.4	1.1	2.3	0.7	0.6	0.5	0.9	0.8	0.6
	On tower to baghouse top S side above FA249 halfway up level	223	0.0	1.3	0.0	0.1	1.5	4.5	3.5	0.6	1.3	1.7	0.2	0.4	0.5	0.7	0.4	1.6	3.3	0.3	1.6	0.7	0.6	1.1	0.3	0.4	0.7	0.9	0.9	0.9
	On tower to baghouse top S side above FA249 top level	224	1.1	2.2	0.9	1.7	0.9	1.4	0.6	2.2	0.9	0.1	1.2	1.0	0.3	0.8	0.6	0.3	0.9	0.2	0.7	0.0	0.4	0.6	0.6	0.9	1.1	0.0	1.1	1.5
	Baghouse S doorway open	225	1.1	0.5	0.1	0.4	0.2	1.1	1.2	2.6	0.5	1.1	1.4	1.9	0.3	0.0	0.2	0.2	0.0	0.7	0.0	1.0	0.9	1.3	0.4	0.3	0.9	0.2	1.1	1.3
	Inside centre baghouse top	226	2.9	3.7	2.4	4.5	2.3	1.1	0.5	2.4	0.4	1.0	0.6	1.3	0.2	0.1	0.1	0.3	0.2	0.7	0.5	0.5	0.3	1.4	0.2	0.1	0.7	0.4	0.7	1.2
Admin Roof	Admin roof NE corner	5	4.2	1.6	1.1	2.9	2.6	2.0	1.3	1.3	0.9	1.3	0.9	1.6	0.7	0.1	0.9	1.3	0.1	0.1	0.0	0.5	0.4	0.7	2.5	0.0	0.5	1.1	0.3	1.7
	Admin roof SE corner	6	3.2	1.3	1.8	2.7	0.9	0.6	1.1	1.2	1.3	3.1	1.8	1.6	1.1	0.5	0.4	0.2	1.2	0.4	0.3	0.5	0.3	0.3	0.2	0.0	1.5	2.0	0.5	2.2
	Admin roof SW corner	7	2.5	3.0	0.3	2.3	1.9	1.5	1.1	0.5	2.4	2.8	0.4	1.9	0.8	0.7	0.6	0.3	1.3	0.4	0.3	0.5	0.1	0.5	0.5	0.7	0.8	0.8	1.5	0.6
	SW corner	229	4.2	3.5	0.1	2.0	1.2	0.3	0.0	1.4	1.5	2.7	0.6	1.3	0.9	1.4	0.3	1.0	1.3	1.1	1.0	0.5	0.2	0.3	0.3	0.6	1.6	1.3	0.4	2.7
	SE corner	230	1.3	0.2	0.4	0.5	0.0	1.0	0.5	2.0	0.1	2.5	1.5	0.8	0.3	0.8	0.5	0.1	0.6	1.2	1.3	0.7	0.0	0.8	0.3	0.9	0.9	0.7	0.2	1.3
	NE corner	231	4.2	1.3	1.6	3.5	1.5	0.9	0.0	2.0	0.4	2.1	0.9	0.9	0.2	0.5	0.5	0.3	0.5	0.7	0.3	0.1	0.2	0.6	0.5	0.2	0.6	1.2	1.1	1.1
RM7 Baghouse hopper area	On screw conveyor SC212 platform Level 1 W end side by fan motor @ 1m	265	1.2	1.3	2.1	0.9	0.6	0.8	0.1	0.2	4.1	5.4	2.4	2.9	7.8	5.3	5.4	7.8	4.7	2.2	2.0	0.9	0.2	0.8	0.2	0.1	0.5	0.2	0.7	1.9
	Centre S side of screw in line with motor FA250	266	1.9	1.1	2.0	8.6	1.1	4.0	0.6	0.8	2.7	3.5	3.1	2.6	8.1	10.8	6.3	11.7	6.5	2.4	1.1	0.3	0.3	0.5	0.3	0.5	0.5	0.9	0.5	1.0
	Centre S side of screw by squeal point	267	1.8	0.5	2.0	6.8	2.8	3.2	3.4	0.3	1.7	1.7	0.2	0.1	8.9	9.1	8.5	12.0	3.8	1.1	0.6	1.1	0.4	0.3	0.4	0.6	0.4	1.3	0.6	1.5
	E end of SC212 body @ 2m and other N-S aligned screw	268	0.1	1.9	1.1	6.7	1.9	2.6	2.1	4.9	2.3	5.8	6.6	5.5	6.6	8.5	4.6	6.7	4.1	0.3	0.3	0.7	1.1	1.7	0.4	1.5	0.4	0.3	1.1	1.0
	Main platform of baghouse hopper screws S end chute W side between SC211 & gate valve	269	0.3	1.0	2.9	0.9	0.4	0.5	1.3	1.7	2.5	4.2	4.0	1.1	5.6	6.5	2.6	5.3	3.3	1.6	1.6	0.8	0.2	0.8	0.1	0.1	0.2	0.1	0.7	1.0
	Centre W side	270	0.7	1.3	0.4	3.9	1.5	1.0	2.3	2.8	3.8	2.9	0.7	0.9	4.9	5.9	1.4	3.1	1.7	1.3	0.6	0.7	0.5	0.9	0.7	0.7	0.1	0.1	1.0	0.9
	Centre E side - on	271	0.4	0.2	0.4	2.3	0.9	1.2	1.6	2.6	3.3	3.6	2.0	1.1	5.6	7.4	2.2	4.4	1.4	0.1	0.3	0.2	0.0	0.6	0.9	1.1	0.0	0.4	1.0	0.8
	N end Sc211 but S of duct	272	2.2	0.3	0.0	4.7	0.9	2.9	0.1	1.4	2.8	2.7	0.0	1.6	5.4	5.3	2.4	4.6	2.5	0.3	0.3	0.2	0.9	1.2	0.3	0.4	0.6	0.6	1.4	0.4
	By FA252 @ 0.8m shaft S side, casing & discharge box	273	1.3	4.8	6.8	2.3	1.7	4.0	3.2	0.7	0.1	1.3	1.3	0.6	7.1	5.8	3.8	6.3	3.2	0.3	0.4	0.5	0.1	0.1	0.0	1.1	2.2	1.4	0.1	0.8
	By FA252 @ 0.8m shaft N side, casing & inlet	274	2.6	3.1	6.2	3.7	1.4	4.3	2.0	0.3	0.0	4.5	12.5	4.8	8.4	8.0	3.3	7.8	4.9	1.5	1.4	1.6	0.4	0.5	1.2	0.8	1.0	1.2	0.3	0.4
	Baghouse hopper platform level N end	275	2.3	0.6	2.4	4.1	1.7	0.3	0.6	1.1	2.2	3.1	2.0	0.4	4.5	5.1	0.5	0.3	0.5	0.9	1.2	1.0	1.0	0.3	1.1	0.2	0.0	0.1	0.9	1.2
	Baghouse hopper centre platform	276	0.1	1.7	0.7	2.3	0.6	0.0	0.8	1.1	1.7	1.1	0.1	0.5	0.6	0.2	0.2	1.6	1.1	1.5	2.4	0.8	0.1	1.6	1.2	0.6	0.2	0.0	1.1	0.8
	By FA252 @ 1m to side discharge box top grill	277	2.5	7.6	7.0	1.0	0.6	5.4	3.0	1.1	1.1	2.3	7.3	2.0	5.3	4.2	3.1	5.0	2.6	0.4	0.2	0.1	0.4	0.6	0.0	0.6	1.4	0.3	0.9	1.5

Table 3.2A: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - Tonality in One-third Octave Band Spectra

Area	Source or location	File	Tonality dB in One-third Octave Band Centre Frequency - Hz																											
			31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
	Tonality Criteria		15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Coal Road South	30 Coal Road S side in line W side RM7	59	0.8	1.8	1.2	0.3	0.1	0.4	3.6	5.9	3.0	4.9	1.0	0.8	1.0	0.5	0.0	0.3	1.0	0.3	0.3	0.3	0.6	0.4	0.5	0.1	1.5	0.0		
	31 Coal Road S side in-line E side RM7	60	0.3	0.2	0.4	0.5	0.6	0.7	1.8	4.3	1.4	2.9	0.6	0.5	0.8	0.5	0.4	0.0	1.6	0.8	0.3	0.0	0.3	0.6	0.1	0.3	1.4	0.6		
	32 Coal Road S side in-line FA249	61	0.4	0.0	0.2	0.6	0.1	0.1	1.4	3.6	0.7	2.8	1.3	0.3	1.4	2.0	1.2	0.4	2.6	1.1	0.0	0.2	0.3	0.3	0.1	0.4	1.2	0.2		
	33 Coal Road S side Centre Blending Silo	62	0.9	1.6	1.2	1.1	0.2	1.5	2.3	1.5	1.6	1.1	1.6	0.5	1.8	1.6	0.9	0.4	1.4	0.6	0.3	0.1	0.3	0.4	0.1	0.3	1.4	0.6		
	34 Coal Road S side E side PHT	63	0.7	0.0	0.3	1.3	0.3	1.1	0.4	2.6	0.4	1.5	0.6	0.3	1.6	1.8	0.3	0.3	0.9	0.6	0.3	0.0	0.3	0.3	0.1	0.4	1.3	0.6		
	35 Coal Road S side E side new PHT	64	1.5	0.1	1.5	4.0	0.9	1.8	1.8	1.3	0.9	2.4	0.6	0.3	1.2	1.3	0.3	0.3	2.2	0.8	0.0	0.2	0.2	0.4	0.3	0.2	1.1	1.1		
	36 Coal Road S side E side drive platform	65	1.4	0.8	1.3	4.5	0.6	3.6	4.1	0.4	1.4	2.7	0.6	0.4	0.4	1.3	0.4	0.3	1.1	0.4	0.1	0.3	0.4	0.1	0.4	0.4	1.6	0.8		
	37 Coal Road S side centre column W support duct	66	1.8	0.3	0.2	1.6	0.3	3.2	5.5	0.6	1.1	2.8	1.4	0.1	1.4	1.3	0.3	0.1	1.3	0.4	0.1	0.3	0.4	0.6	0.0	0.1	2.2	0.6		
	38 Coal Road S side centre pedestal	67	0.8	0.0	1.8	4.6	1.4	1.7	2.5	1.3	1.1	0.9	1.5	0.4	1.1	1.3	0.5	0.1	1.4	0.6	0.0	0.0	0.6	0.0	0.6	0.2	1.8	1.3		
	39 Coal Road S side Between centre & E pedestal	69	0.3	0.0	1.1	1.0	0.9	1.9	3.3	1.1	2.3	0.4	1.6	0.3	1.7	1.3	0.2	0.0	1.1	0.4	0.1	0.1	0.4	0.3	0.2	0.2	3.1	0.7		
	40 Coal Road S side E pedestal	70	0.1	0.5	1.0	1.7	0.2	1.7	2.1	2.0	2.3	0.5	1.5	0.9	0.5	0.4	0.2	0.1	1.2	0.1	0.3	0.0	0.4	0.3	0.3	0.0	2.0	0.9		
	41 Coal Road S side W end Firing floor building	71	0.1	0.7	1.5	3.5	0.6	0.6	0.2	2.1	1.3	1.3	3.3	1.8	0.1	0.3	0.0	0.1	0.9	0.1	0.1	0.3	0.3	0.2	0.1	0.5	3.7	0.6		
	42 Coal Road S side opposite grate	72	2.1	1.2	0.9	1.9	0.9	0.5	0.3	2.6	0.3	2.6	1.7	0.1	0.6	0.1	0.3	0.6	0.5	0.2	0.1	0.0	0.4	0.3	0.1	0.0	2.7	1.1		
	43 Coal Road S side W side coal receival bin 25m to truck	73	2.6	2.1	0.3	0.1	2.1	2.3	0.5	2.5	0.5	3.4	1.5	1.1	0.0	0.9	0.5	0.4	0.8	0.7	0.1	0.0	0.4	0.1	0.1	0.5	0.5	0.5		
Old Fenceline South	Former Gate site opp W end Firing floor	282	0.5	0.3	1.3	2.1	1.5	1.4	0.1	1.0	2.0	0.4	1.7	0.1	0.4	0.0	0.1	0.4	0.8	0.8	0.8	0.6	0.2	0.6	0.3	0.3	0.7	0.1	0.2	0.0
	Former Gate site opp W end Firing floor	283	0.6	0.8	1.4	3.2	2.0	1.5	0.3	1.2	1.8	0.1	2.0	0.5	0.3	1.2	1.1	0.8	0.6	1.1	1.1	0.9	0.2	1.1	0.3	0.6	0.5	0.4	0.4	0.1
	Top N edge of bank 21m S of centre Alt Fuels Building	284	0.6	1.4	2.4	1.8	0.7	0.0	0.7	1.7	2.1	1.5	1.3	0.4	0.7	0.5	0.9	1.2	1.6	0.1	0.3	0.4	0.6	0.2	0.3	1.8	0.4	0.6	0.0	0.2
	Top N edge of bank opposite centre pedestal	285	0.9	0.1	0.3	1.2	1.4	1.3	0.0	1.7	0.3	3.1	1.9	0.1	0.1	0.8	0.5	0.0	0.6	0.1	1.2	0.5	1.9	0.9	0.3	3.4	0.9	2.5	0.5	0.4
	Top N edge bank Opposite E side old PHT	286	1.3	0.4	0.4	0.0	0.4	0.1	0.5	1.6	2.4	4.4	1.7	2.1	3.3	2.4	0.9	1.8	1.3	0.6	1.1	0.1	0.7	1.6	1.1	0.7	4.4	3.2	1.4	0.5
	Bottom N edge of bank 13m S of centre Alt Fuels Building	287	1.1	1.4	2.2	0.5	0.3	0.3	0.8	1.7	2.8	2.3	0.0	0.1	0.9	1.7	0.1	0.6	0.5	0.4	1.1	0.6	0.8	0.0	0.1	0.6	1.8	1.0	0.7	0.2
K6 S side	43A Kerb E side CM opp CM fan discharge	288	3.9	3.1	3.4	0.6	2.5	0.9	0.6	0.8	0.9	7.1	8.3	2.8	5.2	3.6	0.5	0.3	2.0	0.9	0.3	0.5	0.5	1.2	0.1	0.1	1.5	0.9	0.5	1.1
	44A Under Coal Mill fan discharge	289	3.2	1.9	4.4	3.0	1.5	1.9	1.6	2.0	1.9	2.4	7.7	2.3	1.2	1.3	0.3	0.3	0.5	0.3	0.3	0.5	0.3	0.9	0.5	0.2	1.3	0.2	0.8	0.9
	44 CM fan room roll door @ 2m	290	2.4	1.2	0.7	3.5	0.6	1.8	2.8	2.6	0.3	2.2	4.3	0.7	0.4	0.6	0.3	0.4	0.3	0.2	0.5	0.2	0.9	2.3	0.0	0.7	2.3	0.5	1.6	0.3
	44' CM S wall E door @1m,	291	5.2	3.0	0.7	5.0	4.3	2.4	2.7	1.3	1.9	1.6	0.6	1.7	1.3	1.1	2.0	0.4	0.2	0.0	0.0	0.7	0.2	0.1	1.7	0.1	1.6	1.7	1.2	0.6
	45 CM S roll door and wall vent @ 9.9m S side	292	2.1	1.6	0.2	2.2	2.0	3.0	2.3	0.9	1.4	3.2	2.4	1.0	0.3	0.5	0.7	0.3	0.1	0.3	1.1	0.0	0.0	0.6	0.5	0.6	1.2	1.4	1.2	4.6
	46 CM room wall vent @ 2m	293	1.8	1.1	1.7	5.9	5.0	5.9	4.3	0.5	1.7	1.1	0.0	1.0	0.2	0.1	1.2	1.0	0.3	0.3	0.2	0.1	0.2	0.4	0.9	0.5	1.0	1.5	0.9	0.8
	46A Coal Mill Room S roll door W @ 1m	294	1.8	0.7	1.3	0.8	0.3	2.7	1.8	0.1	0.3	0.7	2.1	5.0	2.7	1.6	5.8	3.3	0.4	0.3	0.4	0.5	0.2	0.2	0.8	0.5	1.3	0.6	0.6	2.7
	47B Centre between Grate & CM blower room roll door	295	0.6	3.6	4.0	2.0	1.5	0.2	0.3	1.0	1.1	0.2	1.4	0.2	1.3	2.0	0.5	1.0	0.3	0.5	0.3	0.0	0.2	0.1	1.4	0.9	1.3	1.8	0.2	2.1
	47A Centre between CM Room and grate, S side	296	2.0	0.5	1.6	2.4	1.5	2.7	2.1	0.1	0.4	0.5	1.1	0.0	0.5	0.2	1.1	0.8	0.3	0.6	0.2	0.1	0.1	0.1	0.9	0.1	2.9	0.8	3.3	7.9
	47 Opp FA264 @ 8m	297	1.5	0.5	1.8	0.4	0.3	0.6	0.5	0.8	2.9	4.5	1.6	0.0	2.2	4.9	1.4	1.2	0.8	0.2	0.3	0.2	0.4	0.1	0.3	0.6	4.0	0.9	3.6	8.8
	47C Between FA264 & FA200	298	2.2	0.4	1.1	1.0	0.7	1.3	0.8	0.1	1.1	3.3	0.7	1.0	0.7	2.5	0.0	0.9	0.1	0.7	0.1	0.2	0.3	0.1	0.2	0.1	2.6	0.1	1.9	5.2
	47D FA 200 S Side @ 5m	299	1.6	2.0	1.9	1.0	0.1	2.1	1.3	0.7	3.3	5.3	0.5	0.7	0.3	0.5	0.2	0.8	0.5	0.2	0.3	0.1	0.2	0.3	0.8	0.7	1.8	0.3	1.9	3.1
	48 Opp. E pedestal roller	300	0.9	0.6	0.5	0.4	1.5	1.1	2.0	0.4	3.9	6.7	1.3	1.2	1.0	0.6	0.4	0.3	0.0	0.3	0.0	0.0	0.1	0.4	0.4	0.1	1.6	0.5	0.6	2.5
	49 Half way between centre & E pedestals	301	0.3	1.1	1.4	0.6	1.7	1.0	1.2	1.5	4.7	4.3	0.1	0.6	0.8	0.6	0.7	0.2	0.3	0.1	0.3	0.0	0.2	0.5	0.2	0.4	0.6	1.0	0.7	1.8
	50 Opp. Centre pedestal	302	0.3	0.6	0.9	2.3	0.9	0.2	2.1	0.6	2.7	1.6	0.5	0.2	0.8	0.4	0.1	0.3	0.3	0.1	0.5	0.2	0.1	0.4	0.1	0.3	0.8	0.8	0.7	1.6
	51 Half way between Centre & Western pedestals, by duct support trestle	303	2.2	0.9	0.7	1.0	1.2	2.0	2.6	0.1	1.7	0.3	1.5	0.2	0.1	0.3	0.4	0.5	0.5	0.0	0.5	0.2	0.2	0.3	0.4	0.3	0.8	1.0	1.0	1.5
	52A Opp E end of kiln drive platform	304	1.1	0.4	1.6	1.0	0.4	0.8	1.4	1.1	1.8	0.7	0.3	0.6	0.1	0.4	0.5	0.6	0.5	0.1	0.3	0.2	0.0	0.5	0.4	0.3	0.9	0.8	0.9	1.3
	52 Opp W pedestal roller	305	0.4	0.8	3.0	5.6	2.0	0.8	0.8	2.2	4.0	3.1	1.0	0.5	1.2	0.5	0.4	0.5	0.6	0.1	0.1	0.4	0.2	0.2	0.9	0.4	0.4	1.4	1.3	1.5
	53 Kiln drive platform Centre E end on platform (ground level)	306	0.2	1.3	1.2	1.4	5.1	6.8	4.1	0.4	0.4	0.2	0.8	0.3	0.4	0.1	0.1	0.6	0.3	0.3	0.3	0.0	0.0	0.4	0.5	0.1	0.8	1.0	0.7	1.7

Table 3.2A: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - Tonality in One-third Octave Band Spectra

Area	Source or location	File	Tonality dB in One-third Octave Band Centre Frequency - Hz																												
			31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
	Tonality Criteria		15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Kiln Drive platform	S side S motor end @ 1.5m kiln drive	307	1.7	0.7	2.1	6.1	2.7	1.1	0.8	1.3	0.2	2.8	6.4	4.3	0.7	1.5	1.1	0.3	0.8	0.3	0.3	0.3	0.4	0.9	0.6	0.6	0.2	0.2	1.1	1.5
	S side of S Gbox @ 1.5m	308	2.2	2.3	4.8	6.6	0.2	3.0	1.7	0.8	0.6	0.3	1.9	1.5	0.5	0.5	0.2	0.4	0.5	0.4	0.1	0.2	0.2	0.3	0.0	1.4	1.3	0.4	0.7	1.3
	E side of S drive motor @ 1.5m, 2m to Gbox	309	1.5	0.4	2.1	6.9	1.5	2.9	2.3	0.7	2.1	3.4	4.5	2.8	1.3	0.0	0.1	0.2	0.2	0.4	0.5	0.7	1.1	0.7	1.3	0.5	0.4	0.2	1.4	0.9
	53 Kiln drive platform Centre E end on platform between motors	310	1.0	2.4	5.1	4.2	0.7	2.4	2.3	0.4	1.0	3.2	8.5	6.0	0.1	3.2	0.7	0.3	0.0	0.1	0.9	2.4	2.8	1.6	2.6	0.9	0.3	1.3	0.1	0.8
	53 Kiln drive platform Centre E end on platform between gearboxes	311	1.5	1.1	3.9	3.8	0.5	1.2	2.4	0.7	0.8	0.8	2.9	3.1	2.6	0.3	0.6	1.4	1.0	0.7	0.4	0.5	1.4	1.1	2.3	1.0	0.6	1.3	0.2	1.5
	N side motor end @ 1m kiln drive	312	1.1	0.4	3.1	5.6	3.6	2.3	1.7	1.4	6.7	5.8	5.7	4.7	2.1	0.4	0.7	0.5	0.4	0.6	1.8	5.8	4.8	1.1	2.9	0.4	0.3	0.3	0.8	1.3
	N side motor N end @ 1.5m kiln drive	313	2.0	0.9	1.2	3.2	2.5	0.8	2.6	1.6	1.6	3.8	7.1	5.1	0.5	2.3	0.6	0.7	0.8	0.4	0.7	3.3	3.4	0.5	3.6	1.2	0.2	1.6	0.3	1.5
	N side of N drive & Gbox @ 1.5m	314	1.5	1.9	3.1	3.8	1.2	0.5	1.8	0.8	2.3	4.8	6.9	4.0	0.3	1.7	1.5	1.3	0.6	1.1	0.6	1.6	2.1	0.5	3.7	1.6	0.0	1.7	0.5	0.8
Kiln 6 road Northern side	1' RM6 W door at kerb W side @ 13.3m	239	0.3	0.4	1.0	1.5	1.0	0.1	0.5	2.5	5.1	3.9	0.5	4.8	4.0	3.7	4.9	0.1	2.3	0.8	2.6	0.4	0.2	0.6	0.1	0.1	0.8	0.5	1.8	1.6
	54 W end RM6	315	2.3	1.1	0.4	0.8	0.3	0.8	0.0	1.1	3.3	3.6	0.2	3.7	2.7	2.2	2.9	0.3	2.2	1.3	2.5	0.0	0.6	0.4	0.5	0.8	0.3	0.4	1.7	1.2
	55 Centre RM6	316	0.0	0.6	2.0	3.0	0.4	1.7	0.1	1.7	3.0	4.3	0.0	4.8	3.8	1.6	3.0	0.9	2.0	2.1	3.2	0.6	0.5	0.4	0.2	0.3	1.4	0.6	1.1	0.3
	55 Centre RM6	317	0.6	0.8	1.9	2.9	0.5	1.3	0.3	1.4	3.2	3.5	0.2	3.5	3.3	0.8	2.6	2.5	3.5	2.2	3.4	0.3	0.0	1.1	0.1	1.2	0.6	0.4	2.4	1.0
	56 E End RM6	318	0.9	0.8	1.6	2.9	1.2	2.2	1.1	1.4	2.3	3.3	0.2	3.2	4.0	0.4	2.6	2.8	3.1	2.4	3.8	1.2	0.4	0.3	0.0	1.2	0.0	0.2	3.6	0.1
	56' Between RM6 & New wall for FA38	319	0.6	0.8	2.8	4.5	2.4	0.9	0.6	0.9	2.2	2.7	0.7	4.1	3.6	0.3	1.9	2.4	3.5	0.5	2.0	0.6	0.1	0.1	0.4	0.6	0.4	0.8	0.9	1.2
	57 Door opp FA38	320	0.1	0.6	2.8	5.8	1.8	1.5	0.6	1.4	2.9	3.5	0.9	3.2	4.4	2.6	1.1	2.5	6.2	0.5	3.1	1.0	0.5	0.4	0.5	0.8	0.4	0.0	2.5	1.3
	58 Half way between FA38 & FA39, opposite big column	321	0.6	0.3	1.9	4.4	1.4	1.2	1.0	2.0	2.1	3.2	1.6	2.0	4.3	4.1	3.5	1.7	6.1	2.3	5.1	2.3	1.2	1.4	0.3	0.8	0.6	0.4	1.8	1.2
	59 Opp FA39 end	322	1.9	3.6	3.0	3.3	2.6	1.5	2.5	2.1	4.3	4.9	0.9	2.1	2.6	2.4	2.8	0.6	5.0	0.5	2.9	1.5	0.6	1.4	0.0	0.1	0.4	0.8	1.3	1.5
	59 Opp FA39 end	323	1.6	3.3	2.9	3.4	3.1	1.9	2.7	2.3	4.3	4.8	0.8	1.8	2.3	2.3	2.8	1.1	4.8	2.2	4.2	1.9	1.0	1.7	0.1	0.1	0.5	0.8	1.3	1.5
	60 Opp Conditioning Tower	324	1.5	0.3	0.8	2.6	2.1	0.7	0.2	0.6	1.9	2.8	0.7	3.3	4.3	3.2	2.2	5.2	11.5	2.4	3.0	1.8	0.9	1.4	0.3	0.3	0.9	0.5	1.1	2.2
	60 Opp Conditioning Tower	325	0.7	0.6	1.4	2.2	1.7	0.5	0.1	0.0	3.2	3.2	0.3	3.2	3.6	2.5	2.1	4.3	10.6	2.4	2.9	1.9	0.5	0.9	0.1	0.3	0.4	1.5	1.0	1.6
	60' Opp. Stack	326	0.0	1.0	2.1	3.7	1.2	1.3	1.3	0.8	1.6	2.0	0.2	1.4	1.7	1.7	2.1	0.6	4.5	0.5	1.4	1.3	1.0	1.9	0.2	0.1	0.6	0.8	0.8	1.2
	61 Opp. Centre PHT	327	0.3	0.6	2.4	4.1	1.3	0.5	0.1	1.5	1.6	2.5	1.0	0.4	1.4	1.6	1.2	2.3	5.9	0.5	2.0	0.8	0.1	0.6	0.2	0.1	1.0	0.7	1.3	1.3
	62 Opp E side PHT	328	3.1	1.7	2.3	2.2	0.8	0.0	1.5	0.5	1.1	1.8	0.2	0.8	0.3	1.1	1.2	0.8	3.4	0.6	0.6	0.6	0.0	0.8	0.1	0.4	0.6	0.7	1.1	1.8
	63 Opp. W pedestal	329	0.1	1.7	4.5	3.9	0.9	0.4	1.5	0.5	0.9	2.3	0.9	0.1	0.5	0.7	0.9	0.2	1.1	0.2	0.4	0.5	0.1	0.2	0.5	0.3	0.6	0.6	1.3	1.9
	64 E end drive platform	330	2.0	0.1	2.9	2.3	0.3	0.3	1.7	1.2	1.9	1.8	2.4	0.6	0.7	0.5	0.2	0.1	0.4	0.0	0.7	0.1	0.2	0.2	0.4	0.2	0.6	0.8	1.1	1.4
	65 Opp column for return duct W side	331	0.5	1.2	4.2	3.7	1.1	1.7	1.1	0.3	0.6	0.8	2.2	0.5	0.2	0.1	0.6	0.1	0.1	0.1	0.6	0.0	0.3	0.5	0.1	0.5	0.5	0.4	1.1	1.5
	66 Opp centre pedestal	332	1.3	0.0	0.6	3.0	0.9	2.3	0.8	0.0	0.9	0.3	0.8	1.1	0.7	0.4	0.2	0.1	0.5	0.4	0.0	0.2	0.2	0.4	0.0	0.4	0.6	0.5	0.9	1.4
	67 Half way between centre & e pedestals	333	0.9	1.7	2.5	1.3	0.7	1.8	0.5	1.3	2.3	0.0	2.1	0.5	0.1	1.1	0.3	0.1	0.5	0.2	0.1	0.0	0.2	0.5	0.2	0.5	0.6	0.9	0.7	1.8
	68 Opp E pedestal	334	0.5	0.8	2.8	1.0	1.4	2.0	0.7	1.4	1.5	0.3	0.9	0.4	0.1	0.4	0.4	0.3	0.3	0.3	0.2	0.1	0.5	0.6	0.8	0.4	1.3	1.1	1.0	0.5
Grate Cooler Fan Courtyard	69 Centre courtyard - opposite F201	335	0.3	0.4	1.4	2.5	0.8	0.6	0.7	1.1	3.1	3.3	0.7	0.5	0.9	0.3	0.1	0.3	0.1	0.3	0.1	0.1	0.1	0.8	0.8	0.3	1.1	1.4	0.6	0.6
	69 Centre courtyard - opposite F203	336	6.2	2.6	2.5	2.1	0.7	3.3	2.1	1.3	1.6	0.8	0.3	0.3	0.5	0.6	0.2	0.4	0.2	0.9	0.6	0.0	0.1	1.2	1.4	0.5	1.5	1.4	0.4	0.9
	FA201 @ 2m to motor & casing	337	1.5	1.4	1.9	0.5	0.2	0.6	0.5	0.6	1.4	0.6	0.4	0.8	1.2	0.9	0.5	0.0	0.0	0.2	0.1	0.3	0.0	0.5	0.6	0.7	0.8	1.0	0.8	0.8
	FA201 N side inlet & casing @ 1m	338	0.7	1.0	2.4	2.0	1.0	1.7	0.5	0.9	2.1	2.0	0.3	1.5	1.5	0.3	0.8	0.3	0.3	0.0	0.4	0.1	0.1	1.0	0.6	0.3	1.6	0.8	0.3	1.4
	Between FA201 & 203 & 202	339	0.8	1.4	4.6	1.5	0.0	1.7	1.1	2.6	6.2	6.0	1.3	0.8	0.4	1.5	0.4	0.0	0.1	0.2	0.3	0.0	0.6	0.9	0.5	0.3	1.2	1.1	0.4	0.9
	FA203 inlet & casing @ 2m	340	1.7	0.1	3.3	3.0	2.5	1.0	2.3	3.3	3.5	2.4	0.5	0.4	0.8	0.4	0.1	0.7	1.2	0.1	0.5	0.0	0.0	1.8	1.3	0.1	1.3	1.1	0.6	0.7
	FA203,FA204 & FA205 @ 1m	341	5.7	0.0	5.2	4.5	3.0	2.4	3.3	2.8	4.3	3.8	0.3	1.0	1.0	0.1	0.3	1.9	2.5	0.3	1.0	0.3	0.1	1.5	0.8	0.1	1.3	1.3	0.3	1.4
	Between inlet filters FA206 & FA207	342	0.0	0.1	0.0	0.7	2.6	0.9	2.3	1.9	0.0	0.8	0.5	0.3	0.1	0.8	0.2	0.6	0.2	0.3	0.0	0.3	0.1	0.7	2.0	1.5	1.5	1.4	0.5	1.1
Grate Northern area	Centre between Grate & CM blower room roll door	343	0.4	1.0	0.1	0.2	1.9	0.2	1.7	1.7	2.1	1.7	1.1	3.3	2.8	0.5	1.3	0.2	0.5	0.4	0.1	0.0	0.0	0.0	2.0	1.6	1.0	2.3	0.2	1.7
	Coal Mill Building N roll door @ 2m	344	0.4	0.8	0.1	1.9	1.5	3.1	2.6	0.7	0.1	1.7	1.0	2.0	1.1	0.6	0.4	0.0	0.6	1.0	0.1	0.6	0.3	0.4	0.3	0.1	1.3	1.8	0.8	1.6

Table 3.2A: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - Tonality in One-third Octave Band Spectra

Area	Source or location	File	Tonality dB in One-third Octave Band Centre Frequency - Hz																											
			31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
	Tonality Criteria		15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Kiln Firing Floor	Centre N side opening face E	345	2.2	1.2	6.5	3.9	0.2	1.2	0.8	1.7	2.5	0.3	2.0	1.6	1.1	0.1	0.8	0.1	1.1	0.4	1.1	0.7	0.5	0.4	0.7	2.1	0.9	1.0	1.3	2.6
	Centre N side opening face W	346	2.6	0.8	6.7	4.4	1.0	2.3	0.3	2.3	2.0	0.1	0.3	0.8	0.6	0.3	0.8	0.1	1.1	0.4	0.8	0.1	0.2	0.1	0.9	1.8	0.5	1.3	1.5	0.7
	FA209 E side inlet & filter silencer	347	0.3	0.7	0.9	0.5	0.6	2.1	0.9	2.7	1.6	0.2	0.5	0.8	0.8	1.4	0.7	0.1	0.8	0.3	0.2	0.1	0.1	0.2	0.3	0.9	0.5	0.6	0.8	1.5
	FA209 Kiln Discharge Seal Fan N inlet W side @ 1.5m	348	0.7	0.6	1.3	0.5	0.3	1.8	0.5	1.5	1.9	0.6	0.6	0.2	0.2	1.0	0.2	1.0	0.3	0.4	0.3	0.7	0.3	0.6	0.4	0.5	0.2	0.4	0.6	1.8
	Centre S side opening face E	349	0.4	2.2	4.7	1.2	1.7	1.5	0.2	0.0	0.3	1.5	1.0	0.1	0.1	0.5	1.5	0.3	1.2	0.8	0.8	0.0	0.0	0.5	0.8	1.9	0.1	0.2	1.6	3.5
	Centre S side opening face W	350	0.5	1.6	2.8	0.4	2.4	2.1	0.4	0.3	0.3	1.3	0.8	0.0	0.2	0.4	0.4	0.9	0.8	0.3	0.2	0.2	0.2	0.1	0.3	1.3	0.3	0.0	1.9	1.4
	FA210 Kiln Discharge Seal Fan S inlet @ 1.5m	351	0.9	0.2	1.7	0.7	3.5	6.7	2.2	0.5	0.9	1.5	1.6	0.2	0.1	0.4	2.0	0.3	0.0	0.0	0.7	1.3	0.4	0.0	0.5	0.1	0.4	0.0	0.6	1.3
	FA200 inlet side @ 1.5m	352	0.4	0.6	0.2	0.5	1.2	0.2	1.1	2.8	5.1	6.8	1.8	0.1	0.0	0.7	1.0	0.2	0.1	0.2	0.2	0.1	0.3	0.7	0.4	0.3	0.3	0.5	1.0	1.3
	New replacement FA211 centre under kiln, inlet @ 1m	353	1.0	2.1	5.2	0.8	2.2	0.0	1.8	1.0	1.7	2.6	2.9	2.9	0.7	0.6	1.1	1.1	0.5	0.1	0.6	0.3	0.3	0.2	0.7	0.6	0.1	0.4	0.8	0.9
	FA210 S side seal fan inlet W side & casing @ 1m	354	1.1	0.2	1.9	0.9	1.8	3.7	0.9	0.0	0.4	1.2	2.1	0.7	0.4	1.1	1.8	1.0	0.7	0.2	0.1	0.2	0.2	0.8	0.2	0.2	0.3	0.7	0.9	1.3
	Kiln floor centre E S of duct/clinker elevator	355	0.1	0.9	2.1	1.7	0.3	1.7	1.3	1.5	1.2	1.0	0.3	1.1	1.2	0.0	0.8	0.4	2.9	1.3	0.5	0.2	0.4	0.4	0.9	2.6	0.6	0.1	0.1	5.1
	KFF burner air cannon N side @ 2m	356	1.1	0.8	1.1	1.8	1.4	0.9	0.8	0.2	2.6	2.5	0.4	0.9	1.2	0.0	0.8	0.1	1.1	0.6	1.1	1.1	0.0	0.5	0.9	3.2	0.3	0.0	4.2	0.2
	KFF burner by air cannon S side @ 2m	357	0.5	1.1	2.0	1.2	0.5	1.5	0.5	1.1	1.6	1.4	0.3	1.1	1.2	0.3	1.3	0.3	1.6	1.3	2.4	0.7	0.4	0.7	1.7	3.5	0.1	0.6	2.3	0.5
Radicon Cooler	RC L1 centre fan @ 1m	358	1.3	0.9	0.6	0.4	0.5	1.2	0.3	0.5	1.0	2.5	0.1	1.5	0.6	1.1	0.5	2.5	0.8	3.5	1.3	3.3	0.4	1.6	1.7	0.4	2.0	1.1	0.7	1.5
	RC L1 S fan @ 0.5m	359	0.3	0.5	1.3	1.6	2.3	0.6	0.1	1.0	1.8	2.5	0.0	1.5	0.8	0.5	0.1	3.5	4.1	2.1	1.5	1.1	0.3	2.4	1.9	0.3	1.6	1.3	0.3	1.5
	RC L1 N fan @ 1m	360	0.3	0.5	0.5	1.8	2.0	1.1	0.7	1.4	2.8	3.8	1.0	1.2	0.8	0.6	0.0	0.6	0.9	3.2	0.7	1.1	0.1	2.4	1.6	0.0	1.6	1.3	0.6	1.3
	RC L2 centre fan @ 1m	361	0.6	0.6	1.5	2.6	1.5	1.3	0.5	0.6	0.6	0.6	1.1	1.4	0.9	0.3	0.4	2.3	0.8	3.9	1.2	1.6	0.5	1.6	1.4	0.0	2.5	0.7	0.1	1.8
	RC L2 S fan @ 0.7m	362	0.7	1.0	1.9	2.5	2.3	0.6	0.1	2.0	2.7	2.3	0.0	0.8	0.6	0.1	0.1	1.6	0.4	3.4	1.4	3.5	0.7	1.6	1.5	0.0	1.8	1.3	0.3	1.6
	RC L2 N fan @ 1m	363	0.0	0.6	0.1	1.2	2.2	0.3	0.5	2.3	2.4	2.3	0.3	0.9	0.4	0.8	0.4	1.0	0.5	2.8	1.2	0.5	0.3	2.0	1.3	0.1	1.8	0.9	0.3	1.3
	RC L3 Centre fan @ 1m	364	1.6	1.1	1.3	2.2	0.9	1.5	0.8	1.8	1.8	1.3	0.4	1.0	0.7	0.7	0.4	2.1	2.2	8.6	2.2	2.8	1.3	1.4	1.9	0.8	2.7	0.1	0.1	1.7
	RC L3 S fan @ 0.7m	365	2.7	1.2	0.9	1.3	1.2	0.5	1.1	0.5	0.3	0.5	1.6	0.8	0.2	0.5	0.1	2.3	1.3	7.2	1.5	2.4	1.3	0.6	1.2	0.0	2.0	1.1	0.2	1.6
	RC L3 N fan @ 1m	366	3.1	0.0	1.1	0.0	0.7	0.2	0.9	2.0	3.2	2.0	0.6	0.9	0.4	0.5	0.2	0.5	0.6	3.3	1.5	0.7	0.4	2.3	3.4	3.5	1.1	0.3	1.8	5.3
	RC L4 Centre fan @ 1m	367	2.0	1.7	0.8	1.9	0.1	0.4	2.5	0.8	1.0	0.5	0.6	0.8	0.8	0.9	0.5	1.2	4.8	10.3	1.8	2.8	1.3	0.8	1.3	0.1	2.9	0.8	0.7	1.1
	RC L4 S fan @ 0.7m	368	3.0	1.1	0.9	0.5	0.9	1.3	1.8	1.6	1.9	0.3	1.6	1.0	0.2	0.7	0.1	1.8	4.6	9.6	0.2	2.8	1.6	0.4	0.9	0.0	1.8	1.1	0.6	1.1
	RC L4 N fan @ 1m	369	4.8	0.8	1.7	0.8	0.3	1.7	3.7	0.1	1.9	1.2	0.3	0.4	0.8	0.7	0.5	0.0	0.8	2.4	0.7	0.5	0.3	1.8	1.6	0.8	1.9	0.5	0.4	0.9
	RC L5 face E	370	1.7	1.4	0.0	0.1	0.3	3.7	3.8	3.6	4.3	1.0	1.3	1.1	0.3	0.8	0.3	0.2	3.0	5.7	0.8	1.4	0.3	1.1	0.6	0.3	1.9	0.8	0.8	1.1
	RC L5 face W	371	1.5	2.1	0.9	0.9	1.6	2.8	1.0	0.4	0.6	1.6	0.9	0.3	0.8	0.1	0.6	0.8	2.2	5.4	1.3	1.1	0.8	0.5	0.6	0.4	1.5	1.1	0.8	1.5
	L1 E side 2.4m	372	0.9	1.1	0.5	0.6	1.5	5.8	12.1	5.1	2.6	3.8	0.7	0.7	0.4	0.0	0.8	1.1	1.6	4.5	1.7	0.5	0.2	0.5	1.3	1.2	1.6	1.4	0.5	0.6
	L1 E side 6m	373	0.3	0.4	0.2	0.5	0.1	5.6	13.1	5.4	2.0	2.7	1.7	1.5	0.7	0.8	0.5	0.6	1.5	4.5	0.7	1.0	0.3	0.9	1.5	0.8	1.7	1.3	0.4	0.9
	L1 E side 12m	374	1.8	0.5	0.6	0.3	0.2	4.1	9.5	4.4	4.8	9.2	4.1	0.1	0.1	0.3	0.4	0.4	1.2	2.7	0.9	0.9	0.4	2.3	3.1	1.3	1.4	1.8	0.7	1.5
FA215	Motor S end @ 2.5m	375	4.1	2.3	2.5	0.9	1.4	2.4	9.8	5.2	2.1	4.1	2.6	1.0	0.9	0.2	0.3	0.3	0.7	0.4	0.6	0.3	0.9	4.6	3.1	0.1	1.4	2.5	0.4	1.6
	Platform E side drive coupling @ casing @ 1m	376	3.7	0.9	1.6	3.1	1.6	4.3	9.2	3.6	1.4	3.8	3.7	2.7	1.1	0.1	0.9	0.2	0.6	1.2	1.0	0.6	0.5	6.1	3.6	0.6	0.3	0.5	0.3	2.9
	W side platform @ 1m to coupling & casing	377	0.7	2.9	1.5	0.6	2.1	5.6	18.0	6.9	6.1	6.2	2.5	0.4	0.7	0.7	0.5	0.2	0.2	1.2	0.7	0.6	0.1	5.4	2.5	0.3	0.4	1.7	0.7	2.9
	Under expansion joint discharge duct to stack @ 1m	378	0.8	3.1	1.6	0.9	2.4	5.7	18.1	6.8	4.9	4.0	1.8	0.5	1.2	0.9	0.4	0.1	0.4	1.0	0.6	0.8	0.8	4.3	1.3	0.6	0.3	1.6	0.6	2.7
	N side inlet box platform @ 1m to discharge duct & inlet box	379	4.0	5.8	5.6	2.0	3.9	3.8	11.3	5.5	6.0	12.2	6.3	0.1	1.9	1.1	0.0	0.3	0.4	0.1	0.4	1.0	0.2	2.1	1.5	0.2	1.9	1.9	0.6	1.2
	Platform centre N side inlet box	380	2.3	2.4	0.4	4.7	4.7	5.6	18.2	7.1	7.6	10.9	5.3	0.8	0.1	0.3	0.1	0.1	0.1	0.0	0.3	0.1	0.3	3.0	2.8	0.4	1.6	1.1	0.6	2.1
	Under Inlet box W side entry duct	381	0.5	1.4	2.5	2.1	3.3	7.3	15.5	9.0	1.3	2.8	0.7	0.1	0.1	0.2	0.8	0.2	0.1	0.0	0.4	1.2	2.3	1.7	3.0	0.5	1.7	2.3	0.4	1.6
	Inlet box N side ground level @ 1m	382	2.8	1.4	2.6	2.2	0.3	6.0	15.8	7.5	4.1	8.0	4.2	0.1	1.0	0.1	0.0	0.1	0.0	0.3	0.3	0.9	0.5	3.6	3.2	0.3	1.8	2.1	0.5	1.6

Table 3.3: Boral Cement Berrima Annual Noise 2020 - Comparison of LAeq results with those of Previous Years for Kiln 6 Upgrade

Area	Location	Statistical Sound Level Result for Annual Assessment											Difference 2020 to Previous LAeq results								
		LAeq 2020	LA90 2020	LAeq 2019	LAeq 2018	LAeq 2017	LAeq 2016	LAeq 2015	LAeq 2014	LAeq 2013	LAeq 2012	LAeq 2011	2020-2019	2020-2018	2020-2017	2020-2016	2020-2015	2020-2014	2020-2013	2020-2012	2020-2011
PHT Level 8	PHT L8 Top platform level with top of stack	79	78	76	79	79	80	80	81	80	80		3	0	0	-1	-1	-2	-1	-1	
	PHT L8 Top platform EL16 Gbox @ 1m to coupling NW side	80	80	79	80	80	81	82					1	1	0	-1	-2				
	PHT L8 Top platform EL16 Gbox @ 1m to coupling SW side	79	79	78	82	79	82	80					1	-3	0	-3	-1				
	PHT L8 Top platform EL16 Gbox @ 2m to motor S side	77	76	78	77	73	78	81					0	0	4	-1	-3				
	PHT L8 Top platform EL16 Gbox @ 1m to NE side	79	79	78	79	80	79	82					1	0	-1	0	-3				
	PHT L8 Top Platform S side BE	73	73																		
	PHT L8 Lower platform	81	80	74	76	76	78	80	80	80	79	77	7	5	5	4	1	1	1	2	4
	PHT L8 Top platform EL16 Gbox @ 3m to N side	78	77	75	77	77	76						3	1	1	2					
	PHT L8 proper FA263 motor & casing @ 1m	90	90	88	89	84	85	86	89	85	81		2	1	6	5	4	1	5	9	
	PHT L8 proper 1m to vent on FA263 filter room	80	79	77	77	77	74	80					3	3	2	6	0				
	PHT L8 centre tower W side	81	80	74	78	78	76	76					8	4	3	5	5				
	L8 new PHT centre	74	73	72	74	73							2	1	1						
	PHT L8 centre tower N side	74	73	72	72	73	71	75	74				1	2	1	3	-1	-1			
	PHT L8 centre tower E side	73	72	72	72	73	71	74					1	1	0	3	-1				
	PHT L8 centre tower S side	68	68	67	67	68	67	69					1	1	0	1	0				
PHT Level 7 new	PHT L7 New S side centre	70	69	70	69	70	70	70					0	1	0	0	0				
	PHT L7 New E side centre	74	73	71	70	73	72	72					2	4	1	2	1				
	PHT L7 New N side centre	72	72	72	72	72	71	72					0	0	0	1	0				
PHT L7 Alt Fuels Platform L1	PHT L7 Alt Fuels Platform L1: E side of feeder @ 1m	75	74	72									3								
	PHT L7 New E side 4m to base of Alt Fuel chute, 1m to bin W	74	73	71	70								3	4							
	PHT L7 Alt Fuels Platform L1: E side of mixer @ 1m	74	73	73									1								
	PHT L7 Alt Fuels Platform L1: 3m N of feeder	74	73																		
PHT L7 Alt Fuels Platform L2	PHT L7 Alt Fuels Platform L2: N side of conveyor discharge	76	75	74									2								
	PHT L7 Alt Fuels Platform L2: 1m E side of chute inlet	74	73	73									1								
	PHT L7 Alt Fuels Platform L2: 1m E side of conveyor 3m from entry to chute	73	72	72									0								
	PHT L7 Alt Fuels Platform L2: 1m NW side of conveyor drive motor	77	76	73									4								
	PHT L7 Alt Fuels Platform L2: 1m SW side of conveyor drive gearbox	76	75	72									4								
PHT Level 7	PHT L7 New centre between towers faces S	73	73	72	73	73	75	73	75	71			1	0	0	-1	0	-1	2		
	L7 between PHTs centre facing W	73	72	72	72	73							1	0	0						
	PHT L7 Old S side centre, faces W	75	74	74	74	74	75	73					1	1	0	0	2				
	PHT L7 under EL13 platform E side	75	74	75	76	74	75	76					0	-2	1	-1	-2				
	EL13 platform E side Gbox & coupling @ 0.5m	84	83	82	80	80	81	83					1	4	4	3	1				
	EL13 platform N side GB end & side EL @ 1m	78	78	77	77	77	77	79	79	79	80		1	1	1	1	-1	-1	-1	-1	
	L7 BE drive platform N side @ 1m to BE	76	75	74	74	76							2	2	0						
	EL13 platform SW side motor & EL & coupling @ 1m	83	82	81	79	78	79						2	4	5	4					
	EL13 platform W side 0.5m	77	77	77	76	75	75						0	1	2	2					
		85	85	85	*80*		*78*	*78*					1	5		7	7				
	L7 centre between cylinders	75	74	73	74	74							2	1	0						
	PHT L7 old NW corner 1.5m to stack	73	72	72	72	74	71	74	77	77	77	77	1	0	-1	2	-1	-4	-4	-5	-4
	PHT L7 old centre N side	75	74	73	73	74	74	74					2	2	1	1	1				
	PHT L7 old centre N side on new platform	75	73	71	73	0	69						4	2		5					
	PHT Level 7: FA213 @ 1m, door closed	76	75	81									-5								
PHT Level 6 RM Silo Top	PHT L6 RM silo above baghouse discharge @ 2m at base of stairs to EL, level with floor	83	82	79	86	83	87	90	86	87	85	85	4	-4	0	-5	-7	-3	-4	-2	-2
	PHT L6 RM silo Top FA260 NE side @ 1m casing & motor	90	89	86	88	87	89	88		85			4	2	3	1	2		5		
	PHT L6 RM Silo top EL15 platform motor side 0.6m	82	81	80	82	87	80						2	0	-6	2					
	EL15 W side @ 1m	74	73	73	74	74	74	74	81	81	80	80	2	0	0	0	0	-7	-7	-6	-6
	L6 RM silo top on BE EL15 platform SW side @ 0.8m	73	73	70	77	76							4	-3	-3						
	EL15 S side Gbox @ 1m	81	79	77	80	80	80	77	78	80			4	1	1	1	3	3	1		
	EL15 E side Gbox @ 0.5m	80	78	79	78	82	80	80					1	2	-2	0	0				
	RM silo top baghouse fan DC30 discharge @ 1.5m	86	85	87	87	89	88	90	87	86			-1	-1	-3	-2	-4	-1	0		
	RM Silo top E side 12.7m to FA260	74	73	74	*89*		*74*						0	-15		0					
	RM Silo top N side 12.7m to FA260	74	74	74									1								
PHT Level 6	PHT L6 centre W side	74	74	73	74	75	72	75					1	0	-1	2	-1				
	PHT L6 stack test port 100mm diam @ 200mm S side	88	87	87	91	90	86		90	90	90		1	-3	-3	2		-2	-2	-2	
	PHT L6 stack test port 100mm diam @ 200mm W side	90	89	87	91	90	86		90	90	90		2	-1	-1	4		0	-1	0	
	PHT L6 stack test port 200mm diam @ 200mm W side	96	95																		
	PHT L6 NW corner 1m to stack	77	77	77	78	77	75	83	90	90	90		0	-1	0	2	-6	-12	-13	-12	
	PHT L6 centre N side by platform	73	73	72	72	73	72	73					1	1	0	1	0				
	PHT L6 centre N side on platform	72	72	73	*72*	*73*	*72*	*73*					0	0	-1	0	-1				
	PHT L6 centre between towers	73	72	72	72	74	73	73	74	74			1	1	-2	0	-1	-1	-1		
	PHT L6 new N side centre	73	72	73	73	73	73	74					-1	0	0	0	-1				
	PHT L6 new E side centre	72	71	73	72	73	74	74					-1	0	-1	-2	-2				
	PHT L6 new S side centre	72	72	74	74	72	86	73					-2	-1	0	-14	-1				
	L6 centre S side old PHT by elevator	74	73	73	73	73							1	0	0						
PHT Level 6 Inside RM Silo Top	L6 inside doorway to top RM silo room	81	80	81	83	83							0	-2	-3						
	RM Silo top inside centre	87	86	82	89	87	89	89	91	87			5	-2	0	-2	-1	-4	0		
	RM silo top inside E doors open	84	83	80	88	85	84	85	86	83	86	83	4	-4	-1	1	-1	-1	2	-2	2
	L6 RM silo top room inside S man door	84	83	81	86	86							3	-2	-2						
	RM silo top outside S man door	76	74	73	73	73	74	74	84	82			2	3	2	2	1	-8	-6		
PHT Level 5	PHT Level 5 old centre S side by stairs	74	74	75	73	75	74						0	1	-1	0					
	PHT Level 5 old centre W side by gas valves @ 1m	77	77	79	78	81	78	80	80	80			-2	-1	-3	-1	-3	-3	-2		
	PHT Level 5 old NW corner @ 1m to stack	75	75	74	74	75	74	76					1	1	0	1	-1				
	PHT Level 5 old centre N side	74	73	74	74	74	73	75					-1	0	0	0	-1				
	PHT Level 5 centre between towers	73	72	73	72	74	73	74	75	74	79	78	0	0	-1	-1	-1	-3	-1	-6	-5
	PHT Level 5 New centre N side	73	72	74	73	73	73	74					-1	0	0	0	-1				
	PHT Level 5 New centre E side above kiln	72	71	74	72	75	75	74					-2	-1	-3	-3	-2				
	PHT Level 5 New centre S side	71	70	73	70	71	70	72					-2	1	0	1	-1				
PHT Level 4	PHT Level 4 old centre S side by stairs	76	75	82	76	76	77						-6	0	0	-1					
	PHT Level 4 old SW corner by water pumps SV09 @ 1m N	79	78	80	78	80	79	80	80	79			-2	1	-2	-1	-1	-1	0		
	PHT Level 4 old centre W side	77	76	77	76	77	76	77					-1	0	-1	0	-1				
	PHT Level 4 old NW corner @ 1.2m to stack	75	74	75	75	75	75	75					0	0	0	0	0				
	PHT Level 4 old centre N side	74	72	75	73	72	72	74					-2	1	1	2	0				
	PHT Level 4 centre between towers by air cannon @ 2m	73	72	77	73	73	77	75	75	75			-4	-1	-1	-5	-2	-3	-2		
	PHT Level 4 new centre N side	73	73	75	73	73	73						-2	0	0	0					
	PHT Level 4 new centre E side above kiln	73	73	74	73	73	75						-1	0	0	-2					
	PHT Level 4 new centre S side - air cannon in Leq	77	71	76	72	71	72						1	5	6	5					
ESP	ESP Centre E side top walkway looking E to PHT	74	73	75	75	73	74	74					-1	-1	0	0	-1				
	ESP top SE corner at barrier	73	72	75	74	74	75	72					-2	-2	-1	-2	1				
	ESP top SE corner at barrier - facing ESP	71	70	72									-1								
	ESP top NE corner at barrier	73	72	73	73	73	70	71					-1	0	0	3	2				
	ESP top NE corner at barrier - facing west	71	70	71									-1								
PHT Level 3	L3 old PHT centre S side @ 2m to edge facing centre	77	76	79	78	78							-2	-1	-1						
	PHT Level 3 old centre W side above FA39 face E	79	78	79	78	78	78						0	0	0	0					
	PHT Level 3 old centre N side	76	74	78	77	76	76						-2	-1	0	1					
	PHT Level 3 old centre E side above kiln	75	74	79	76	74	76	77	77	77			-5	-1	0	-2	-3	-3	-2		
PHT Level 2.5	PHT Level 3 old NW corner by stack @ 1.5m, above FA39 inlet	78	78	80	89	92	87	86	86	88			-2	-10	-14	-9	-8	-8	-10		
	PHT Level 3 old NW corner by stack @ 1.5m, above FA39 inlet	78	78	80	80		78						-2	-2		1					

Red highlight indicates >3dB increase to an earlier year

Table 3.3: Boral Cement Berrima Annual Noise 2020 - Comparison of LAeq results with those of Previous Years for Kiln 6 Upgrade

Area	Location	Statistical Sound Level Result for Annual Assessment											Difference 2020 to Previous LAeq results								
		LAeq 2020	LA90 2020	LAeq 2019	LAeq 2018	LAeq 2017	LAeq 2016	LAeq 2015	LAeq 2014	LAeq 2013	LAeq 2012	LAeq 2011	2020-2019	2020-2018	2020-2017	2020-2016	2020-2015	2020-2014	2020-2013	2020-2012	2020-2011
PHT Level 2.25	PHT Level 2.5 by centre by kiln entry W side, air cannon	88	79		88	83	86	84	82					0	5	2	5	7			
	PHT Level 2.5 by DC31 discharge @ 1m	87	87	88	89	92	87	86		85			-1	-2	-5	0	1		2		
					86	91	88	84					0	-86	-91	-88	-84	0	0	0	0
	PHT Level 2.25 by centre by kiln entry Air cannons	86	84	88	*88*	*83*	*86*	*84*	*82*				-2	-2	3	0	3	5			
	PHT Level 2.25 North Side centre	80	80	84									-3								
	PHT Level 2.5 by Radicon Gbox drive E end @ 2.5m	87	84	87	*86*	*91*	*88*	*84*					0	1	-4	-1	3				
	L2.25 PHT centre W side facing fan discharge DC70 FA63 @ 4.66m, stack @ 6.35m and stack entry duct @ 6.23m	88	88	88	89	89							0	0	-1						
PHT Level 2	PHT Level 2 by E side drive coupling & casing DC70 FA03 centre N side	87	86		86	86	86	84	85	85				1	1	1	3	2	2		
	L2 PHT FA03 casing @ 1m E side	87	86	85	86	87							2	1	0						
	PHT Level 2 @ 1m to south side FA39 stack entry duct	87	87		87	89	85	91						0	-2	2	-4				
	PHT Level 2 FA03 discharge @ 1.5m	91	90	89	90	92	89	86	85	86	88	91	2	1	-1	1	4	6	5	3	-1
	PHT Level 2 @ 1m to south side FA39 stack entry duct	87	87	87	*87*	*89*	*85*	*91*					0	0	-2	2	-4				
	PHT Level 2 FA65 inlet filter @ 1m in front	88	87	87	88	88	87	84	84	84			0	-1	0	1	4	4	4		
	PHT Level 2 FA65 rear side 1m	87	86	87	87	87	86	83	83	83			0	-1	-1	1	3	4	3		
	L2 PHT centre N side edge @ 2m facing centre	83	81	83	82	84							0	1	-1						
	PHT Level 2 @ 1m to north side FA39 stack entry duct	87	87	86	*87*	*88*							1	0	0						
PHT Level 1	PHT Level 1 RM silo base blower room N side man door @ 1m	79	78	81	80	79	79	79					-2	-1	0	0	0				
	PHT Level 1 FA92 silo vent fan casing & drive @ 1m NW side	78	78	83									-4								
	PHT Level 1 FA92 silo vent fan casing & drive @ 1m E side	81	80	83									-2								
	PHT Level 1 FA92 silo vent fan inlet duct @ 1m SE side	76	76	80									-4								
	PHT Level 1 FA92 silo vent fan inlet front @ 1m	75	74	80									-5								
FA39	FA39 E side at concrete line 5.4m to motor	87	86	83	85	86	87						4	2	2	1					
	FA39 E side @2.3m in line with columns	91	91	84	91	87							7	1	4						
	FA39 under discharge duct @ 1m	84	83	85	84	85	85						-1	0	-1	-1					
	FA39 E side motor platform @ 0.82m to coupling cover	94	92	91	94	98							3	-1	-4						
	FA39 motor platform centre E side@ 1m	98	96	90	93	95							8	5	3						
	FA39 motor platform centre E side@ 1m	98	97	90	93	95							8	5	3						
	FA39 motor platform centre E side@ 1m & vent @ 0.5m	96	96																		
	FA39 motor N end @ 2.7 to end plates/stop button at line	83	81	80	*85*	*83*							3	-2	0						
	FA 39 N side on kerb	81	80	79	80	81	80	81	81	86	85		2	2	0	2	1	0	-5	-3	
	59 Road N side kerb opp end FA39	83	82																		
	59 Road N side kerb opp end FA39	82	81																		
	FA39 W side at metal strip 5.25m to motor	87	86	84	86	88	88	91					3	1	-1	-1	-4				
	FA39 W side at columns @2.7m to plinth	88	88	87	90	89							1	-2	-1						
	FA39 W side motor platform at 0.8m to coupling cover & 1m to coupling	93	92	90	94	99							3	-1	-6						
	FA39 W side @ 1m to cladding door closed, 1.33m to casing	88	87	86	87	88							2	1	0						
	FA39 S side @ columns 2.7m to bearing	84	84	87	83	83							-3	1	1						
	FA39 S side platform bearing cover @ 0.8m	86	86	88	84	86							-2	2	1						
FA39 &38 centre	Centre between FA38 & FA39 @ 11.2m at line facing E	88	87	83	*85*	*88*	*91*						4	3	0	-3					
	Centre between FA38 & FA39 @ 7.7 m facing FA 38	88	87	82	*85*	*88*	*91*						6	3	0	-3					
FA38	FA38 @ 3.9m to E side	91	89	82	87	92	93	89					9	4	-1	-2	2				
	FA38 @ 3m to N side	88	87	82	86	88	87						6	2	0	1					
	FA38 @ 5m to NW side at NW column	87	86	81	91	91	88	88					6	-4	-3	-1	-1				
	FA38 @ 5m to NW side at W column	89	87	81	83								7	6							
	FA38 @ 5m to W side at W column	88	87																		
	In centre opening of wall on W side	86	84	81	83	87	82						5	3	-1	4					
	FA38 motor platform W side @ 1m to coupling cover, 1.9m to casing, 0.7m to motor side	97	96	88	92	100							9	5	-3						
	FA38 at opening on S side of road facing FA38 opening	81	80	78	80	82							3	1	-1						
	56' Road kerb N side opp. Opening to FA38	77	76	75	76	78	77	79	82	84	86		1	0	-2	0	-3	-6	-7	-10	
	56' Road kerb N side opp. Opening to FA38	77	76																		
	57 Road N side opp FA38 doorway	79	78	77	79	82	79	80	83	84	89		2	0	-3	0	-1	-4	-5	-10	
	58 Road N side between FA38 & FA39	80	79	77	79	81	79						3	1	-1	0					
RM6	1 RM6 W door @ 1m	76	75	78	81	77	78	81	87	70	70	73	-3	-5	-1	-2	-5	-11	6	5	3
	1' RM6 W door at kerb W side @ 13.3m	69	69	70	72	69	70	72	76	76	80	83	-1	-3	0	-1	-3	-7	-7	-10	-13
	1' RM6 W door at kerb W side @ 13.3m	80	79																		
RM7 Building Ground Level	1 RM7 at roadside kerb ~32m	67	66	67	68	69	69	70	69	68	70	69	-1	-1	-2	-3	-3	-2	-1	-3	-3
	2 Rm7 @ 15.5m to W door	72	71	72	73	73	72	72	73	73	76	75	0	-1	-1	0	0	-1	-1	-4	-4
	3 RM7 W wall door @ 1m	78	77	78	80	82	79	80	80	79	82	81	0	-2	-4	0	-2	-2	-1	-3	-2
	4 RM7 NE corner wall vents 2 1m	79	77	80	81	80	81	82	83	81	83	83	-1	-3	-2	-2	-4	-5	-3	-5	-5
	5 RM7 N side NW roll door @ 1m	78	78	80	79	86	79	80	78	81	81	81	-1	0	-7	-1	-1	0	-2	-3	-2
	6 RM7 N wall vents centre next to Roll door	81	80	82	82	81	82	83	84	84	85	85	-2	-2	-1	-2	-3	-3	-4	-5	-4
	RM7 vents N wall W of man door	81	80	83	82								-2	-1							
	7 RM7 N wall man door	80	79	80	80	79	83	80	79	83	82	82	-1	0	1	-3	-1	0	-4	-2	-2
	8 RM7 E wall vents NE corner @ 1m	80	79	83	83	82	85	84	83	84	85	82	-3	-3	-1	-5	-3	-2	-4	-5	-2
	9 RM7 E side under duct	77	76	81	80	78	81	81	79	81	82	81	-4	-3	-1	-4	-4	-2	-4	-5	-4
	10 RM7 By E door RM7 floor	76	75	78									-2								
	10' RM7 By E door Hydraulics room closed	71	71	73	72	72	74	73	73	72	74	74	-2	-1	-1	-3	-2	-2	-1	-3	-3
	11 RM7 Centre Compressor room door @ 1m closed	71	71	72	73	74	74	74	73	71	72	71	-1	-2	-3	-3	-3	-2	1	-1	1
	11A RM7 compressor room W door @ 1m closed, discharge	76	71	71	72								5	5							
	12 RM7 Under E inlet for switchroom fan	82	81	84	85	84	84	87	83				-2	-3	-2	-1	-5	-1			
	12 RM7 Under E inlet for switchroom fan rattling cowling	83	82																		
	12B Under switchroom fan duct W	75	75	78	78	89							-2	-2	-13						
	12 RM7 E inlet for switchroom fan @ 1m to N side and 0.6m below	75	75	77									-1								
FA249	13 FA249 under inlet duct W side	76	75	81	75	78	78	78	80	80			-6	1	-2	-3	-2	-4	-5		
	14 FA249 2m W side ground level	79	79	84	77	79	82	80	80	80			-5	2	1	-3	-1	-1	-1		
	14' FA249 motor platform fan coupling & casing W side @ 1m	82	81	82	80	81	82	82	80	81	82	81	-1	2	1	0	0	2	1	0	1
	15 FA249 1m motor end	81	80	84	79	81	82	81	80	81	81		-3	2	0	-1	0	1	0	-1	
	16 FA249 end at column 4.3m N of motor plinth	78	78	84	77	79	80	79	77	79	81	82	-6	1	0	-2	0	1	-1	-2	-3
	17 FA249 motor platform E side coupling & casing 1m	83	83	82	81	82	84	82	81	82	84	82	1	3	1	-1	1	3	1	-1	1
	18 FA249 Platform S side centre @ 1m	75	75	74	76	76	78	78	78	78	76	77	1	-1	-1	-3	-3	-3	-3	-1	-2
	18' FA249 platform S side under discharge duct E side	75	75	77	73	75	74						-2	3	0	1					
	19 FA249 S side @ 5.5m	71	71	73	*71*	*71*	*73*	*72*	*72*	*73*	*73*	*73*	-2	1	0	-1	-1	0	-2	-2	-2
	19 FA249 S side @ 3.8m	71	71	*72*									0								
	20 FA 249 S side @ 10.9m	72	71	75	*71*	*72*	*73*	*72*	*72*	*73*	*73*	*73*	-4	0	0	-1	-1	-1	-2	-2	-2
	21 FA249 E side of fan casing ground level @ 2m	73	73	75	71	77	76	76	76	76	77	76	-2	2	-4	-4	-3	-3	-3	-5	-3
FA250	22 FA250 S side 4.2 m to motor end	80	79		79	80	83	79	78					1	-1	-4	1	1			
	22' FA250 Motor end S side @ 1m	81	81	84	81	81	84	82	80	82	83	82	-3	0	0	-3	-1	1	0	-2	-1
	23 FA250 E side platform coupling & casing	83	83	86	85	85	86	84	83	83	85	84	-3	-1	-2	-2	-1	0	0	-2	-1
	23' FA250 E side centre motor @ 1m	83	82	84	83	82	84	85	80	85	86		-1	0	1	-1	-2	3	-2	-3	
	FA250 W side motor shaft @ casing @ 1m	84	84	86	87	85							-2	-3	0						
	25 FA250 coupling & casing W side motor centre @1m	84	84	84	84	82	86	84	80	85	86		1	1	2	-1	0	4	0	-2	
	29 FA250 E side under discharge duct @ 1.5m, at lower step of concrete	82	82	84	80	81	82	82					-2	2	1	1	0				
	26 FA250 W side casing @ 1m & coupling @ 3m	82	82	83	81	82	83	81	79	83	83	84	-1	1	1	-1	1	3	-1	-1	-2
	27 FA250 W side 1m under inlet casing expansion joint	81	80	82	79	79	83	80	78	85	84		-1	2	2	-1	1	3	-4	-3	
	28 FA250 N side casing shaft platform @ 1m	83	82	84	81	81	85	84	84	91	86	85	-1	2	2	-2	-2	-1	-8	-4	-2

Red highlight indicates >3dB increase to an earlier year

Table 3.3: Boral Cement Berrima Annual Noise 2020 - Comparison of LAeq results with those of Previous Years for Kiln 6 Upgrade

Area	Location	Statistical Sound Level Result for Annual Assessment											Difference 2020 to Previous LAeq results								
		LAeq 2020	LA90 2020	LAeq 2019	LAeq 2018	LAeq 2017	LAeq 2016	LAeq 2015	LAeq 2014	LAeq 2013	LAeq 2012	LAeq 2011	2020-2019	2020-2018	2020-2017	2020-2016	2020-2015	2020-2014	2020-2013	2020-2012	2020-2011
RM7 Roof Platform	Lower platform E side 1m to Magnete plate	90	89	90	92	89	86	89	83	88	87	85	-1	-2	0	3	1	7	1	3	5
	Lower platform S side @ 1m to magnete plate	91	90	91	93	92	89	90	82	91	91	87	0	-2	-1	3	2	10	1	0	5
	Lower platform W side @ 0.9m to magnete plate	88	86	90	91	89	86	88	81	87	85		-2	-3	-1	2	0	7	1	3	
	Lower platform N side @ 2m to magnete plate (scaffolding)	86	84	89	91	90	88		84	92	84	85	-4	-6	-5	-2		2	-6	2	1
	Lower platform N side @ 1m to BE casing	83	81	85	86	85	83	84	83	86	81		-3	-3	-3	0	-2	0	-3	2	
	Platform S of Magnete 2m to S side	84	82	86	88	78	85	87					-2	-4	6	-1	-3				
	Upper Platform Gbox @ 1m E side & 0.5m casing	79	78	82	81	82	80	81	77	80	79		-3	-2	-3	-1	-2	2	-1	0	
	Upper Platform Gbox @ 1m N side	80	79	82	81	82	81	83	81	83			-2	-1	-2	0	-3	-1	-3		
	Upper Platform motor end @ 1m W side	79	78	82	82	82	80	81					-3	-2	-3	-1	-2				
	Upper Platform BE casing @ 0.9m W side	78	77	82	81	80	78	79	78	81	79	78	-4	-4	-3	0	-1	0	-3	-1	-1
	Upper Platform BE casing @ 1m S side	80	79	85	88	87	84	81	83	85	83	78	-6	-8	-7	-4	-1	-3	-5	-4	2
	Upper Platform BE casing @ 1m E side	79	78	82	80	80	79	79					-4	-2	-2	-1	-1				
RM7 Baghouse area	On tower to baghouse top S side above FA249 same level as roof RM7	68	68	72	68	71	74	70	69	70	71	71	-4	0	-3	-6	-1	-1	-2	-3	-3
	On tower to baghouse top S side above FA249 halfway up level	71	70																		
	On tower to baghouse top S side above FA249 top level	69	68	69	68	82	70	69	71	68			0	1	-13	-1	0	-2	1		
	Baghouse S doorway open, discharges	80	71	81	78	80	81	80	78	72	87	96	-2	2	-1	-1	0	2	7	-7	-17
	Inside centre baghouse top, discharges	81	69	83	82	82	82	83	81				-2	-1	-1	-1	-2	1			
RM7 Inside Top level	Top floor E open doorway	82	81	85	86	89	85	86					-3	-4	-7	-3	-4				
	Centre top 2m N of BE casing	86	85	88	90	89	89	92					-2	-4	-3	-3	-5				
	Top level 1m E side entry of conveyor to chute	90	88	91	93	94	90	89					-2	-3	-4	0	0				
	Top level by top of RM7	90	89	92	93	92	94	92	94	96	98	95	-2	-3	-2	-4	-2	-4	-6	-8	-5
	Top level W side of chute entry end of conveyor	90	89	92	94	94	92	93	92	94			-2	-4	-3	-2	-3	-2	-4		
	Top level W side of chute opening entry of conveyor	89	88	92	93	93							-3	-4	-3						
	Top level centre W side platform	87	86	89	91	89	89	91					-3	-4	-2	-2	-4				
	Top level in doorway of conveyor from RM6	84	83	86	87	87	86	86	85	88	88		-3	-4	-3	-2	-3	-2	-5	-5	
	On conveyor walkway on centre from RM6 at centre light	80	79	79	77	80	78	78	76	79	78	87	1	3	0	2	2	4	0	1	-8
RM7 Inside L3	Level 3 2m N of BE casing	87	86	89	90	89	90	91					-2	-3	-2	-4	-4				
	Level 3 between chute & duct on platform on top of Mill	93	92	93	94	95	94	94					0	-1	-3	-2	-2				
RM7 Inside	Level 2 2m N side of BE casing	87	86	90	91	89	90	92					-3	-4	-2	-4	-5				
	Level 2 1m N of cone top of Mill by entry door	90	90	92	92	91	92	94					-2	-2	-1	-1	-4				
	Level 1 2m N of BE casing is work bench	87	86	91	92	89	91	94					-3	-5	-2	-4	-6				
	Level 1 2m to RM7 body N side	91	88	92	94	93	93	97					-2	-4	-2	-3	-6				
	Level 1 2m W side of RM7 on platform	90	89	92	94	92	94						-2	-4	-2	-4					
	L0 1m E side of feeder VF100 inlet chute & RM7 body	95	92	97	99	94	95						-2	-3	1	0					
	L0 Ground Floor 3m N of BE casing	90	89	92	93	90	95						-2	-3	0	-5					
	L0 Inside man door N side	90	88	92	93	88	94						-3	-3	2	-5					
	L0 Inside W roll door @ 1m	88	88	91	92	91	92	93					-2	-3	-3	-3	-5				
	L0 Drive motor N @ 2m to N side & 3m to mill body	91	90	94	95	93	94	97					-2	-3	-2	-3	-6				
	L0 Drive motor S side @ 2m and RM7 body @ 2m	90	89	92	94	93	93						-2	-4	-3	-3					
	L0 RM7 body S side @ 2m	89	88	91	93	92	93						-2	-4	-3	-4					
	L0 NW corner 1.5m to roll door and vents	87	87	89	91								-2	-4							
RM7 bag-house hopper area	On screw conveyor SC212 platform Level 1 W end side by fan motor @ 1m	84	83	79	79	82	81						5	6	3	3					
	Centre S side of screw in line with motor FA250	91	89	78	77	80	80						13	14	10	11					
	Centre S side of screw by squeal point	89	87																		
	E end of SC212 body @ 2m and other N-S aligned screw	94	93	78	76	79	95						16	18	15	-1					
	Centre E side - on	86	85	79	*79*	*79*	*83*	*79*	*78*	*77*	*78*		7	7	7	3	7	9	9	8	
	Main platform of baghouse hopper screws S end chute W side between SC211 & gate valve	83	82	78	77	77	85						5	6	6	-3					
	Centre W side	84	84	79	78	78	91	80	78	79	79	80	6	7	6	-6	5	7	5	6	5
	N end Sc211 but S of duct	83	82	80	78	76	84						3	5	7	-1					
	By FA252 @ 0.8m shaft S side, casing & discharge box	85	84	79	*76*		*83*	*83*					6	8		2	2				
	By FA252 @ 0.8m shaft N side, casing & inlet	87	87	81									7								
	Baghouse hopper platform level N end	84	84	78	77	77	80	78	76				6	7	7	4	6	8			
	Baghouse hopper centre platform	93	92	78	75	76	81	76	78	77	78		15	17	16	11	17	15	16	15	
	By FA252 @ 1m to side discharge box top grill	86	85	79									7								
Kiln 6 South side coal road	30 Coal Road S side in line W side RM7	66	65	66	67								0	-1							
	31 Coal Road S side in-line E side RM7	66	65	67	65								-1	1							
	32 Coal Road S side in-line FA249	67	66	69	67	66	68	67	67	68	70	68	-2	0	1	-1	0	0	-1	-3	-1
	33 Coal Road S side Centre Blending Silo	68	67	70	69	67	68	68	69	69	71	69	-2	-1	1	0	0	-1	-1	-3	-2
	34 Coal Road S side E side PHT	68	68	70	68	67	67	68	71	69	70	69	-2	0	1	1	1	-3	0	-2	-1
	35 Coal Road S side E side new PHT	69	69	71	68	67	68	68	70	68	71	70	-1	1	2	1	1	-1	1	-1	0
	36 Coal Road S side E side drive platform	69	69	72	67	67	69	68	70	69	70	70	-2	2	2	1	1	-1	0	-1	0
	37 Coal Road S side centre column W support duct	69	68	69	67	68	69	69	69	69	70	70	0	2	1	-1	0	0	0	-1	-1
Kiln 6 South side coal road	38 Coal Road S side centre pedestal	69	68	69	68	69	69	68	69	68	71	69	0	1	0	-1	1	0	1	-2	-1
	39 Coal Road S side Between centre & E pedestal	69	68	70	69	68	69	68	69	68	69	69	-2	0	1	-1	0	0	0	0	-1
	40 Coal Road S side E pedestal	68	68	69	68	68	69	68	68	68	70	69	-1	1	0	0	1	1	1	-1	-1
	41 Coal Road S side W end Firing floor building	67	67	69	66	66	68	66	67	67	70	69	-1	1	2	0	1	1	1	-3	-1
	42 Coal Road S side opposite grate	69	68	68	67	67	69	66					1	2	2	0	3				
	43 Coal Road S side W side coal receival bin 25m to truck	65	64	62	68	64	67	64					2	-4	1	-3	0				
Fenceline South	Former Gate site opp W end Firing floor	60	58	57	58								3	2							
	Top N edge of bank 21m S of centre Alt Fuels Building	60	59	59	60								1	1							
	Top N edge of bank opposite centre pedestal	52	52	51	54								2	-2							
	Top N edge bank Opposite E side old PHT	58	57	60	56								-2	1							
	Bottom N edge of bank 13m S of centre Alt Fuels Building	50	49	50									0								
Kiln 6 S side Coal Mill Room Area	43A Kerb E side CM opp CM fan discharge	78	77	77	72	75	80	77	78	79	78		1	6	4	-2	1	0	0	0	
	44A Under Coal Mill fan discharge	88	87	88	*88*								-1	-1							
	44 CM fan room roll door @ 2m	88	87	*84*	*83*	*85*	*84*	*84*	*85*	*83*			3	5	3	3	3	3	5		
	44' CM S wall E door @1m,	88	87	88	*85*	*92*	*83*						0	3	-4	5					
	45 CM S roll door and wall vent @ 9.9m S side	80	79	80	*75*	*78*	*78*	*76*	*79*	*78*			0	4	2	2	4	1	2		
	46 CM room wall vent @ 2m	85	84	84	80								1	5							
	46A Coal Mill Room S roll door W @ 1m	90	89	*84*	81								6	8							
	47B Centre between Grate & CM blower room roll door	88	88	87	87	86	86	89	89	92			1	1	2	2	-1	-2	-4		
	47A Centre between CM Room and grate, S side	83	83	80	78	79	79	78	81	82			3	5	4	4	5	2	2		
Kiln 6 South side	47 Opp FA264 @ 8m	83	83	81	*85*	*81*	*80*	*80*	*81*	*81*			2	-2	2	3	3	2	2		
	47C Between FA264 & FA200	82	82	81	82		80						1	0		2					
	47D FA 200 S Side @ 5m	83	82	83	84	82	82	81					0	-2	0	1	1				
	48 Opp. E pedestal roller	83	82	83	84	83	81	81	81	80	83	81	-1	-1	0	2	1	1	2	0	1
	49 Half way between centre & E pedestals	83	82	84	83	83	81	82					-2	-1	-1	1	1				
	50 Opp. Centre pedestal	80	80	82	80	80	81	81	80	81	85	84	-1	0	1	0	-1	0	-1	-4	-4
	51 Half way between Centre & Western pedestals, by duct support trestle	79	79	81	79	76	77	81	80	80	83	82	-1	1	3	2	-1	-1	0	-3	-3
	52A Opp E end of kiln drive platform	78	78	81	76	77	78	79	78	78	83	80	-3	2	1	1	-1	0	0	-4	-1
	52 Opp W pedestal roller	79	78	82	76	76	76	79	76	76			-4	2	3	3	0	2	2		
	53 Kiln drive platform Centre E end on platform (ground level)	84	84	85	81	74	87	88	88				-1	4	10	-3	-4	-4			
Kiln Drive platform	S side S motor end @ 1.5m kiln drive	83	83	84	81	84							-1	2	-1						
	S side of S Gbox @ 1.5m	82	82	85	83	88	87	88					-2	-1	-5	-4	-5				
	E side of S drive motor @ 1.5m, 2m to Gbox	85	84	86	84	88	86						-2	1	-3	-2					
	53 Kiln drive platform Centre E end on platform between motors	86	86	88	86	89	87	88	88				-2	0	-3	-1	-2	-2			
	53 Kiln drive platform Centre E end on platform between gearboxes	85	84	86	87								-2	-3							
	N side motor end @ 1m kiln drive	86	85	85	85	86							0	0	0						
	N side motor N end @ 1.5m kiln drive	84	83	85	84	84							-1	-1	0						
	N side of N drive & Gbox @ 1.5m	85	84	86	85	86	86	87	88				-1	-1	-2	-2	-2	-4			

Red highlight indicates >3dB increase to an earlier year

Table 3.3: Boral Cement Berrima Annual Noise 2020 - Comparison of LAeq results with those of Previous Years for Kiln 6 Upgrade

Area	Location	Statistical Sound Level Result for Annual Assessment											Difference 2020 to Previous LAeq results								
		LAeq 2020	LA90 2020	LAeq 2019	LAeq 2018	LAeq 2017	LAeq 2016	LAeq 2015	LAeq 2014	LAeq 2013	LAeq 2012	LAeq 2011	2020-2019	2020-2018	2020-2017	2020-2016	2020-2015	2020-2014	2020-2013	2020-2012	2020-2011
Kiln 6 road Northern side	54 W end RM6	72	71	71	71	69	70	73	76	76	80	83	1	1	3	2	-1	-4	-5	-8	-11
	55 Centre RM6	73	72	72	72	71	72	74	73	75	74		1	1	1	1	-1	0	-2	-1	
	56 E End RM6	76	76	74	76	76	76	78	79	80	81		3	0	1	0	-1	-3	-3	-5	
	56' Between RM6 & New wall for FA38	76	76	75	75	78	82	79	82	84	86		1	1	-2	-5	-3	-6	-7	-10	
	57 Door opp FA38	80	79	77	79	79	79	80	83	84	89		3	1	1	1	0	-3	-4	-9	
	58 Half way between FA38 & FA39, opposite big column	82	81	77	*79*	*80*	*79*	*80*					5	3	2	3	2				
	59 Opp FA39 end	82	81	78	80	82	79	81	81	86	85		4	1	0	3	1	0	-5	-3	
	60 Opp Conditioning Tower	*84*	*83*	*78*	81	81	80	84	80	82	81	84	6	3	3	4	0	4	2	3	0
	60' Opp. Stack	79	79	79	79								1	0							
	61 Opp. Centre PHT	80	79		78	77	77							2	3	3					
	62 Opp E side PHT	78	77		78	78	76	78	78	78	79	79		1	0	2	0	0	0	-1	-1
	63 Opp. W pedestal	78	78		77	77	77	80	77	78	79	81		1	2	1	-2	1	0	-1	-2
	64 E end drive platform	81	81	83	79	78	79	82	78	80	82	82	-2	2	3	2	-1	3	1	-1	-1
	65 Opp column for return duct W side	83	83	85	81	80	81	85	81	86	85	85	-1	2	3	2	-1	3	-3	-2	-1
	66 Opp centre pedestal	86	86	88	86	85	85	87	84	83	88	88	-1	1	1	1	-1	2	4	-2	-2
	67 Half way between centre & e pedestals	86	86	87	86	85	85	87	87	87	87	88	-1	0	1	1	-1	-1	-1	-1	-2
	68 Opp E pedestal	86	85	89	86	86	86	86	86	87	88	88	-4	-1	0	0	-1	0	-1	-2	-3
Grate Cooler Fan Courtyard	69 Centre courtyard - opposite F201	87	87	93	*88*	*85*	*89*	*89*	*88*	*88*	*88*	*89*	-6	-1	2	-1	-2	-1	0	-1	-2
	69 Centre courtyard - opposite F203	87	87	93	*88*	*85*	*89*	*89*	*88*	*88*	*88*	*89*	-6	-1	2	-2	-2	-1	-1	-1	-2
	FA201 @ 2m to motor & casing	90	89	96	90	90	90	91					-7	0	-1	0	-1				
	FA201 N side inlet & casing @ 1m	91	90	98	91	92							-7	0	-1						
	Between FA201 & 203 & 202	92	92	99	93	94	93	93	93	87	88	89	-7	-1	-2	-1	-1	-1	5	4	3
	FA203 inlet & casing @ 2m	88	88	93	89	89	89	90					-5	-1	-1	-1	-2				
	FA203,FA204 & FA205 @ 1m	88	88	92	89								-4	0							
	Between inlet filters FA206 & FA207	85	85	88	85	89	85	89	89				-3	0	-4	0	-4	-4			
Grate area north	Centre between Grate & CM blower room roll door	86	86	87	87	86	86	89	89	92			-1	-1	0	0	-3	-3	-6		
	Coal Mill Building N roll door @ 2m	86	85	86	83	86	84	84	90	88			0	3	0	2	2	-4	-2		
Kiln Firing Floor	Centre N side opening face E	82	82	85	85	85	82	83	83	81		86	-3	-3	-3	0	-1	-2	1		-4
	FA209 E side inlet & filter silencer	86	86	87	86	86							0	0	1						
	FA209 Kiln Discharge Seal Fan N inlet W side @ 1.5m	91	91	93	94	93	92	93	92	90		94	-2	-2	-2	-1	-1	0	1		-3
	Centre S side opening face E	81	80	82	82	83	82	84	82	81		81	-1	-1	-2	-1	-3	-1	0		0
	Centre S side opening face W	81	81	81	81								0	0							
	FA210 Kiln Discharge Seal Fan S inlet @ 1.5m	93	93	92	*92*	*92*	*94*	*95*	*85*	*96*	*94*	*96*	1	1	1	-1	-2	8	-3	-1	-3
	FA200 inlet side @ 1.5m	87	87	86	85	85							1	2	2						
	FA210 S side seal fan inlet W side & casing @ 1m	85	85	89	87	87	85	87					-4	-2	-2	0	-2				
	New replacement FA211 centre under kiln, inlet @ 1m	97	96	97	96	96			96				0	1	0			1			
	Kiln floor centre E S of duct/clinker elevator	80	80	82	81	81	79	81	82	85	82	84	-1	0	-1	1	0	-2	-4	-2	-4
	KFF burner air cannon N side @ 2m	87	86	88	89	90							-1	-3	-4						
	KFF burner by air cannon S side @ 2m	83	83	85	89	90							-2	-5	-7						
Radicon Cooler	RC L1 centre fan @ 1m	83	83	86	83	92	91	84	93	93	83	93	-3	0	-9	-7	0	-10	-10	0	-9
	RC L1 S fan @ 0.5m	84	84	87	83	90	92	84		95			-2	1	-6	-8	0		-10		
	RC L1 N fan @ 1m	82	81	86	83	89	90	85	94	97			-4	-1	-7	-9	-3	-12	-16		
	RC L2 centre fan @ 1m	82	82	85	83	94	94	85	96	96	84	95	-3	-1	-12	-12	-3	-13	-14	-2	-13
	RC L2 S fan @ 0.7m	84	83	86	84	95	95	84		95			-2	0	-11	-11	-1		-11		
	RC L2 N fan @ 1m	81	81	85	84	95	95	86	96	97			-4	-2	-14	-14	-4	-14	-16		
	RC L3 Centre fan @ 1m	83	83	85	85	94	95	85	95	96	83	94	-2	-1	-11	-11	-2	-11	-12	0	-11
	RC L3 S fan @ 0.7m	83	82	85	83	94	93	83		93			-2	0	-11	-11	0		-11		
	RC L3 N fan @ 1m	81	81	85	84	95	94	91	97	97			-4	-3	-14	-13	-10	-16	-16		
	RC L4 Centre fan @ 1m	84	84	85	85	95	92	92	92	88	82	88	-1	0	-11	-8	-8	-8	-4	3	-4
	RC L4 S fan @ 0.7m	85	84	86	87	93	91	90	86	89			-1	-2	-9	-7	-5	-1	-4		
	RC L4 N fan @ 1m	82	82	82	84	90	93	91	97	97			1	-2	-7	-11	-8	-15	-15		
	RC L5 face E	78	78	80	79	85	84	86	84				-2	-1	-7	-5	-7	-6			
	RC L5 face W	79	78	81	80	86	85	87					-2	-1	-7	-6	-8				
	L1 E side 2.4m	78	77	77	77								1	1							
	L1 E side 6m	77	76	75	75								2	2							
	L1 E side 12m	74	74	72	73								2	1							
FA215	Motor S end @ 2.5m	79	79	78	80	81	80	81	87	85	85	86	1	-1	-2	-1	-2	-8	-6	-6	-7
	Platform E side drive coupling @ casing @ 1m	83	82	81	84	84	85	85	85	85			3	-1	-1	-2	-2	-2	-2		
	W side platform @ 1m to coupling & casing	81	80	81	85	85	85	86	87	85	86	87	0	-4	-4	-4	-5	-6	-3	-5	-5
	Under expansion joint discharge duct to stack @ 1m	82	81	75	79	79	79	80	81	78	81	80	7	3	3	3	2	1	3	1	2
	N side inlet box platform @ 1m to discharge duct & inlet box	76	75	71	74	78	77	79	79	75			5	2	-2	-1	-3	-3	2		
	Platform centre N side inlet box	81	80	72	73	77	76	79	79	74	78	78	8	7	4	5	2	2	6	2	3
	Under Inlet box W side entry duct	79	79	76	78	80	79	81	83				4	1	-1	0	-2	-4			
	Inlet box N side ground level @ 1m	77	76	73	74		75	78	77				5	3		2	0	0			

Red highlight indicates >3dB increase to an earlier year

Table 3.3A: Boral Cement Berrima Annual Noise 2020 - Locations with an increase of LAeq results with those of Previous Years for Kiln 6 Upgrade

Area	Location	Statistical Sound Level Result for Annual Assessment													Difference 2020 to Previous LAeq results									Comment
		LAeq 2020	LA90 2020	LAeq 2019	LAeq 2018	LA90 2018	LAeq 2017	LA90 2017	LAeq 2016	LAeq 2015	LAeq 2014	LAeq 2013	LAeq 2012	LAeq 2011	2020-2019	2020-2018	2020-2017	2020-2016	2020-2015	2020-2014	2020-2013	2020-2012	2020-2011	
PHT Level 8	PHT L8 Top platform EL16 Gbox @ 2m to motor S side	77	76	78	77	76	73	73	78	81					0	0	4	-1	-3					Similar to previous years
	PHT L8 Lower platform	81	80	74	76	75	76	76	78	80	80	80	79	77	7	5	5	4	1	1	1	2	4	Use stack distance as source
	PHT L8 proper FA263 motor & casing @ 1m	90	90	88	89	88	84	84	85	86	89	85	81		2	1	6	5	4	1	5	9		
	PHT L8 proper 1m to vent on FA263 filter room	80	79	77	77	76	77	77	74	80					3	3	2	6	0					
	PHT L8 centre tower W side	81	80	74	78	77	78	77	76	76					8	4	3	5	5					General noise no distance to compare to for PWL
PHT Level 7 new	PHT L7 New E side centre	74	73	71	70	70	73	72	72	72					2	4	1	2	1					
PHT L7 Alt Fuels Platform L1	PHT L7 Alt Fuels Platform L1: E side of feeder @ 1m	75	74	72											3									
	PHT L7 New E side 4m to base of Alt Fuel chute, 1m to bin W	74	73	71	70	70									3	4								Comparison 2018 probably off
PHT L7 Alt Fuels Platform L2	PHT L7 Alt Fuels Platform L2: 1m NW side of conveyor drive motor	77	76	73											4									
	PHT L7 Alt Fuels Platform L2: 1m SW side of conveyor drive gearbox	76	75	72											4									
PHT Level 7	EL13 platform E side Gbox & coupling @ 0.5m	84	83	82	80	79	80	79	81	83					1	4	4	3	1					
	EL13 platform SW side motor & EL & coupling @ 1m	83	82	81	79	79	78	78	79						2	4	5	4						
		85	85	85	80	79			78	78					1	5		7	7					
	PHT L7 old centre N side on new platform	75	73	71	73	72	0	0	69						4	2		5						
PHT Level 6 RM Silo Top	PHT L6 RM silo above baghouse discharge @ 2m at base of stairs to EL, level with floor	83	82	79	86	85	83	82	87	90	86	87	85	85	4	-4	0	-5	-7	-3	-4	-2	-2	
	PHT L6 RM silo Top FA260 NE side @ 1m casing & motor	90	89	86	88	87	87	86	89	88		85			4	2	3	1	2		5			
	L6 RM silo top on BE EL15 platform SW side @ 0.8m	73	73	70	77	76	76	76							4	-3	-3							
	EL15 S side Gbox @ 1m	81	79	77	80	80	80	79	80	77	78	80			4	1	1	1	3	3	1			
PHT Level 6	PHT L6 stack test port 100mm diam @ 200mm W side	90	89	87	91	90	90	90	86		90	90	90		2	-1	-1	4		0	-1	0		
PHT Level 6 Inside RM Silo Top	RM Silo top inside centre	87	86	82	89	87	87	86	89	89	91	87			5	-2	0	-2	-1	-4	0			
	RM silo top inside E doors open	84	83	80	88	87	85	84	84	85	86	83	86	83	4	-4	-1	1	-1	-1	2	-2	2	2.32km to nearest residence E at0d.or to 72 Taylor
PHT L 4	PHT Level 4 new centre S side - air cannon in Leq	77	71	76	72	71	71	71	72						1	5	6	5						Air cannon
ESP	ESP top NE corner at barrier	73	72	73	73	73	73	72	70	71					-1	0	0	3	2					
PHT Level 2.25	PHT Level 2.5 by centre by kiln entry W side, air cannon	88	79		88	81	83	81	86	84	82					0	5	2	5	7				Air cannon
	PHT Level 2.25 by centre by kiln entry Air cannons	86	84	88	88	81	83	81	86	84	82				-2	-2	3	0	3	5				Air cannon
PHT Level 2	PHT Level 2 FA03 discharge @ 1.5m	91	90	89	90	89	92	91	89	86	85	86	88	91	2	1	-1	1	4	6	5	3	-1	Same as previous 2 years
	PHT Level 2 FA65 inlet filter @ 1m in front	88	87	87	88	88	88	88	87	84	84	84			0	-1	0	1	4	4	4			Not this source, is fa03
	PHT Level 2 FA65 rear side 1m	87	86	87	87	87	87	86	86	83	83	83			0	-1	-1	1	3	4	3			
FA39	FA39 E side at concrete line 5.4m to motor	87	86	83	85	85	86	85	87						4	2	2	1						Higher speed than some years
	FA39 E side @2.3m in line with columns	91	91	84	91	90	87	86							7	1	4							
	FA39 motor platform centre E side@ 1m	98	96	90	93	92	95	94							8	5	3							
	FA39 motor platform centre E side@ 1m	98	97	90	93	92	95	94							8	5	3							
	FA39 motor N end @ 2.7 to end plates/stop button at line	83	81	80	85	84	83	82							3	-2	0							
	FA39 W side motor platform at 0.8m to coupling cover & 1m to coupling	93	92	90	94	93	99	98							3	-1	-6							
	Centre between FA38 & FA39 @ 11.2m at line facing E	88	87	83	85	84	88	87	91						4	3	0	-3						
	Centre between FA38 & FA39 @ 7.7 m facing FA 38	88	87	82	85	84	88	87	91						6	3	0	-3						
FA38	FA38 @ 3.9m to E side	91	89	82	87	86	92	90	93	89					9	4	-1	-2	2					Higher speed thanpast 2 years
	FA38 @ 3m to N side	88	87	82	86	85	88	87	87						6	2	0	1						
	FA38 @ 5m to NW side at NW column	87	86	81	91	90	91	89	88	88					6	-4	-3	-1	-1					
	FA38 @ 5m to NW side at W column	89	87	81	83	82									7	6								
	In centre opening of wall on W side	86	84	81	83	82	87	85	82						5	3	-1	4						
	FA38 motor platform W side @ 1m to coupling cover, 1.9m to casing, 0.7m to motor side	97	96	88	92	91	100	98							9	5	-3							
	FA38 at opening on S side of road facing FA38 opening	81	80	78	80	79	82	81							3	1	-1							
RM6	1 RM6 W door @ 1m	76	75	78	81	80	77	76	78	81	87	70	70	73	-3	-5	-1	-2	-5	-11	6	5	3	Earlier years may have been off
RM7 Ground Level	11A RM7 compressor room W door @ 1m closed, discharge	76	71	71	72	71									5	5								Discharge on Laeq, not signigicant at houses
FA250	25 FA250 coupling & casing W side motor centre @1m	84	84	84	84	83	82	82	86	84	80	85	86		1	1	2	-1	0	4	0	-2		Not a significant increase or level
RM7 Roof Platform	Lower platform E side 1m to Magnete plate	90	89	90	92	91	89	88	86	89	83	88	87	85	-1	-2	0	3	1	7	1	3	5	
	Lower platform S side @ 1m to magnete plate	91	90	91	93	92	92	91	89	90	82	91	91	87	0	-2	-1	3	2	10	1	0	5	Similar to previous
	Lower platform W side @ 0.9m to magnete plate	88	86	90	91	90	89	88	86	88	81	87	85		-2	-3	-1	2	0	7	1	3		
	Platform S of Magnete 2m to S side	84	82	86	88	86	78	77	85	87					-2	-4	6	-1	-3					Similar to previous
RM7 Baghouse	On tower to baghouse top S side above FA249 same level as roof RM7	68	68	72	68	68	71	70	74	70	69	70	71	71	-4	0	-3	-6	-1	-1	-2	-3	-3	
RM7 Baghouse	Baghouse S doorway open, discharges	80	71	81	78	71	80	75	81	80	78	72	87	96	-2	2	-1	-1	0	2	7	-7	-17	Includes discharges
RM7 Inside Top level	On conveyor walkway on centre from RM6 at centre light	80	79	79	77	76	80	79	78	78	76	79	78	87	1	3	0	2	2	4	0	1	-8	
RM7 bag-house hopper area	On screw conveyor SC212 platform Level 1 W end side by fan motor @ 1m	84	83	79	79	78	82	81	81						5	6	3	3						Screw conveyor noise
	Centre S side of screw in line with motor FA250	91	89	78	77	76	80	80	80						13	14	10	11						
	E end of SC212 body @ 2m and other N-S aligned screw	94	93	78	76	75	79	78	95						16	18	15	-1						
	Centre E side - on	86	85	79	79	78	79	78	83	79	78	77	78		7	7	7	3	7	9	9	8		
	Main platform of baghouse hopper screws S end chute W side between SC211 & gate valve	83	82	78	77	77	77	77	85						5	6	6	-3						
	Centre W side	84	84	79	78	77	78	78	91	80	78	79	79	80	6	7	6	-6	5	7	5	6	5	
	N end Sc211 but S of duct	83	82	80	78	78	76	75	84						3	5	7	-1						
	By FA252 @ 0.8m shaft S side, casing & discharge box	85	84	79	76	74			83	83					6	8		2	2					
	By FA252 @ 0.8m shaft N side, casing & inlet	87	87	81											7									
	Baghouse hopper platform level N end	84	84	78	77	76	77	76	80	78	76				6	7	7	4	6	8				
	Baghouse hopper centre platform	93	92	78	75	75	76	76	81	76	78	77	78		15	17	16	11	17	15	16	15		
	By FA252 @ 1m to side discharge box top grill	86	85	79											7									
Kiln 6 S side Coal Mill Room Area	43A Kerb E side CM opp CM fan discharge	78	77	77	72	72	75	74	80	77	78	79	78		1	6	4	-2	1	0	0	0		
	44 CM fan room roll door @ 2m	88	87	84	83	83	85	85	84	84	85	83			3	5	3	3	3	3	5			Door open
	44' CM S wall E door @1m	88	87	88	85	85	92	92	83						0	3	-4	5						
	45 CM S roll door and wall vent @ 9.9m S side	80	79	80	75	75	78	78	78	76	79	78			0	4	2	2	4	1	2			
	46 CM room wall vent @ 2m	85	84	84	80	79									1	5								
	46A Coal Mill Room S roll door W @ 1m	90	89	84	81	81									6	8								Door open
	47A Centre between CM Room and grate, S side	83	83	80	78	78	79	79	79	78	81	82			3	5	4	4	5	2	2			
	47 Opp FA264 @ 8m	83	83	81	85	85	81	81	80	80	81	81			2	-2	2	3	3	2	2			
	51 Half way between Centre & Western pedestals, by duct support trestle	79	79	81	79	79	76	76	77	81	80	80	83	82	-1	1	3	2	-1	-1	0	-3	-3	Other locations similar, possibly KSCFs
	52 Opp W pedestal roller	79	78	82	76	76	76	75	76	79	76	76			-4	2	3	3	0	2	2			
	53 Kiln drive platform Centre E end on platform (ground level)	84	84	85	81	80	74	73	87	88	88				-1	4	10	-3	-4	-4				Reason unclear
Kiln 6 road Northern side	58 Half way between FA38 & FA39, opposite big column	82	81	77	79	78	80	79	79	80					5	3	2	3	2					
	59 Opp FA39 end	82	81	78	80	79	82	81	79	81	81	86	85		4	1	0	3	1	0	-5	-3		
	60 Opp Conditioning Tower	84	83	78	81	80	81	80	80	84	80	82	81	84	6	3	3	4	0	4	2	3	0	Prob due to FA39
	64 E end drive platform	81	81	83	79	79	78	77	79	82	78	80	82	82	-2	2	3	2	-1	3	1	-1	-1	Possibly new fans
	66 Opp centre pedestal	86	86	88	86	85	85	85	85	87	84	83	88	88	-1	1	1	1	-1	2	4	-2	-2	Possibly new fans
Grate Cooler Fan Courtyard	Between FA201 & 203 & 202	92	92	99	93	93	94	93	93	93	93	87	88	89	-7	-1	-2	-1	-1	-1	5	4	3	Similar to previous, probably different location for earlier years
FA215	Under expansion joint discharge duct to stack @ 1m	82	81	75	79	78	79	78	79	80	81	78	81	80	7	3	3	3	2	1	3	1	2	
	N side inlet box platform @ 1m to discharge duct & inlet box	76	75	71	74	74	78	77	77	79	79	75			5	2	-2	-1	-3	-3	2			
	Platform centre N side inlet box	81	80	72	73	73	77	76	76	79	79	74	78	78	8	7	4	5	2	2	6	2	3	Tonal noise from fan
	Under Inlet box W side entry duct	79	79	76	78	78	80	80	79	81	83				4	1	-1	0	-2	-4				
	Inlet box N side ground level @ 1m	77	76	73	74	74			75	78	77				5	3		2	0	0				
Control Building Roof	Admin roof NE corner	72	70	72	70	70	72	71	68						0	1	0	3						2016 may be CM7 off

Red highlight indicates >3dB increase to an earlier year

Table 3.4: 2020 Annual Environmental Noise Assessment for Kiln 6 Upgrade -
Measurement locations with increase in sound level > 3 dB and calculated contribution sound level at receivers

Location	Year	Time	Period sec	Sound Level dB(A) $L_{AEQ.t}$	Comments	Distance measured metres	Distance to Receivers Distance Attenuation to receiver Calculated LAEQ level at receiver distance only					
							Adelaide	Brisbane	Melbourne	Argyle	South	Loc.20
Kiln 6 Upgrade						**Objective**	**37**	**37**	**37**	**37**	**37**	**58**
PHT L8 Top platform EL16 Gbox @ 2m to motor S side	**2020**	11:00 AM		78		**2**	666	754	745	890	1506	470
	2017			73	Source after directivity		**80**	**80**	**80**	**80**	**61**	**80**
Difference 2020 - 2017			*Difference*	**4**	Distance reduction		-50	-52	-51	-53	-58	-47
					Calculated SPL without barriers		***30***	***29***	***29***	***27***	***4***	***33***
PHT L8 Lower platform - stack	**2020**	11:39 AM	31	81		**18**	656	748	725	875	1508	434
	2019			74	Source after directivity		**72**	**72**	**72**	**72**	**72**	**72**
Difference 2020 - 2019			*Difference*	**7**	Distance reduction		-31	-32	-32	-34	-38	-28
					Calculated SPL without barriers		***41***	***40***	***40***	***39***	***34***	***45***
PHT Level 8 FA263 motor & casing F22	**2020**	11:44 AM	21	90	Distance	**1**	666	754	745	890	1506	**470**
	2012			**81**	Source after directivity		**90**	**90**	**90**	**90**	**68**	**90**
Difference 2020 - 2012			*Difference*	**9**	Distance reduction		-56	-58	-57	-59	-64	-53
					Calculated SPL without barriers		***34***	***33***	***33***	***31***	***5***	***37***
PHT L7 Alt Fuels Platform L2: 1m NW side of conveyor drive motor F38	**2020**	11:44 AM	36	77	Distance	**1**	661	751	747	894	1536	447
	2019			73	Source after directivity		**77**	**77**	**77**	**77**	**54**	**77**
Difference 2020 - 2019			*Difference*	**4**	Distance reduction		-56	-58	-57	-59	-64	-53
					Calculated SPL without barriers		***20***	***19***	***19***	***18***	***-9***	***24***
EL13 platform SW side motor & EL & coupling @ 1m F48	**2020**	12:12 PM	30	83	Distance	**1**	666	754	745	890	1506	438
Difference 2020 - 2017	**2017**			78	Source after directivity		**64**	**64**	**64**	**63**	**63**	**64**
			Difference	**5**	Distance reduction		-56	-58	-57	-59	-64	-53
					Calculated SPL without barriers		***8***	***7***	***7***	***4***	***-1***	***11***
PHT L6 RM silo Top FA260 NE side @ 1m casing & motor F57	**2020**	12:26 PM	21	90	Distance	**1**	692	782	765	905	1473	470
Difference 2020 - 2013	**2013**			85	Source after directivity		**90**	**90**	**90**	**90**	**90**	**90**
			Difference	**5**	Distance reduction		-57	-58	-58	-59	-63	-53
					Calculated SPL without barriers		***33***	***32***	***33***	***31***	***27***	***37***
PHT L6 RM silo Top EL15 S side Gbox @ 1m F61	**2020**	12:29 PM	20	81	Distance	**1**	692	782	765	905	1473	470
Difference 2020 - 2019	**2019**			77	Source after directivity		**63**	**63**	**63**	**64**	**81**	**63**
			Difference	**4**	Distance reduction		-57	-58	-58	-59	-63	-53
					Calculated SPL without barriers		***6***	***6***	***6***	***5***	***17***	***10***
RM silo top inside E doors open F80	**2020**	12:55pm	30	84	Distance reduction	1	692	782	765	905	1473	470
	2019			80	Source after directivity		**74**	**69**	**69**	**69**	**69**	**69**
Difference 2020 - 2019			*Difference*	**4**	Distance reduction		-57	-58	-58	-59	-63	-53
Calculated level at nearest house E 2.32km = 17 dBA					*Calculated SPL without barriers*		***17***	***11***	***11***	***10***	***6***	***16***
PHT Level 4 new centre S side F100	**2020**	1:23 PM	00d 00:00:40	77	Distance	5	666	754	745	890	1506	438
	2017			71	Source after directivity		**77**	**77**	**77**	**77**	**77**	**77**
Difference 2020 - 2017			*Difference*	**6**	Distance reduction		-42	-44	-43	-45	-50	-39
Includes air cannon. Ambient 71					*Calculated SPL without barriers*		***34***	***33***	***33***	***32***	***27***	***38***
ESP top NE corner at barrier F104	**2020**	1:30 PM	30	73	Distance	10	642	730	711	850	1485	417
	2016			70	Source after directivity		**58**	**62**	**62**	**65**	**62**	**62**
Difference 2020 - 2016			*Difference*	**3**	Distance reduction		-36	-37	-37	-39	-43	-32
					Calculated SPL without barriers		***22***	***24***	***25***	***27***	***18***	***29***
PHT Level 2.5 by centre by kiln entry W side F113	**2020**	1:46 PM	31	88	Distance	2.5	666	754	745	890	1506	438
	2014			82	Source after directivity		**88**	**88**	**88**	**88**	**88**	**88**
Difference 2020 - 2014			*Difference*	**7**	Distance reduction		-49	-50	-49	-51	-56	-45
Air cannon operation included, normal is 82					*Calculated SPL without barriers*		***40***	***38***	***39***	***37***	***32***	***43***
PHT Level 2 FA63 discharge @ 1.5m faces WSW F120	**2020**	1:55 PM	21	91	Distance	1.5	666	754	745	890	1506	438
	2014			85	Source after directivity		**83**	**83**	**84**	**86**	**91**	**84**
Difference 2020 - 2014			*Difference*	**6**	Distance reduction		-53	-54	-54	-55	-60	-49
					Calculated SPL without barriers		***30***	***29***	***30***	***30***	***31***	***35***
PHT Level 2 FA65 inlet filter @ 1m in front F122	**2020**	1:57 PM	28	88	Distance	1	666	754	745	890	1506	438
	2014			84	Source after directivity		**88**	**88**	**88**	**88**	**75**	**88**
Difference 2020 - 2014			*Difference*	**4**	Distance reduction		-56	-58	-57	-59	-64	-53
This source is not causing the sound level - it is other sources, lower than 2018					*Calculated SPL without barriers*		***31***	***30***	***30***	***29***	***12***	***35***
FA39 E side @2.3m in line with columns F138	**2020**	3:00 PM	31	91	Distance	2.3	656	748	725	875	1508	434
	2019			83	Source after directivity		**75**	**75**	**72**	**72**	**72**	**72**
Difference 2020 - 2019			*Difference*	**8**	Distance reduction		-49	-50	-50	-52	-56	-46
Fan is at higher speed than 2019, similar to earlier years					*Calculated SPL without barriers*		***26***	***25***	***22***	***20***	***15***	***26***
FA39 motor platform centre E side@ 1m F141	**2020**	3:03 PM	30	98	Distance	1	643	731	715	858	1512	425
	2019			90	Source after directivity		**82**	**82**	**78**	**78**	**78**	**78**
Difference 2020 - 2019			*Difference*	**8**	Distance reduction		-56	-57	-57	-59	-64	-53
Fan is at higher speed than 2019, similar to earlier years					*Calculated SPL without barriers*		***26***	***25***	***21***	***20***	***15***	***26***
FA39 motor N end @ 2.7 to end plates/stop button at line F144	**2020**	3:05 PM	27	83	Distance	2.7	643	731	715	858	1512	425
	2019			80	Source after directivity		**83**	**83**	**83**	**83**	**57**	**83**
Difference 2020 - 2019			*Difference*	**3**	Distance reduction		-48	-49	-48	-50	-55	-44
Fan is at higher speed than 2019, similar to earlier years					*Calculated SPL without barriers*		***35***	***34***	***34***	***33***	***2***	***39***

Pink shaded cells and red text indicates exceeds contribution objective by 3dB+

Table 3.4: 2020 Annual Environmental Noise Assessment for Kiln 6 Upgrade -
Measurement locations with increase in sound level > 3 dB and calculated contribution sound level at receivers

Location	Year	Time	Period sec	Sound Level dB(A) $L_{AEQ.t}$	Comments	Distance measured metres	Distance to Receivers — Distance Attenuation to receiver — Calculated LAEQ level at receiver distance only					
							Adelaide	Brisbane	Melbourne	Argyle	South	Loc.20
Kiln 6 Upgrade						**Objective**	**37**	**37**	**37**	**37**	**37**	**58**
FA39 motor N end @ 2.7 to end plates/stop button at line F161	**2020**	3:59 PM	31	81	Distance	5	643	731	715	858	1512	425
	2019			78	Source after directivity		**62**	**62**	**64**	**64**	**43**	**64**
Difference 2020 - 2019			*Difference*	**3**	Distance reduction		-42	-43	-43	-45	-50	-39
Fan is at higher speed than 2019, similar to earlier years					*Calculated SPL without barriers*		***20***	***19***	***21***	***19***	***-6***	***25***
RM7 Roof Lower platform S side @ 1m to magnete plate F210	**2020**	4:53 PM	30	91	Distance	1	692	778	758	886	1459	464
	2014			82	Source after directivity		**59**	**59**	**61**	**64**	**71**	**61**
Difference 2020 - 2014			*Difference*	**10**	Distance reduction		-57	-58	-58	-59	-63	-53
Is lower than 2018					*Calculated SPL without barriers*		***2***	***1***	***4***	***5***	***8***	***8***
RM7 Roof Lower platform W side @ 0.9m to magnete plate F211	**2020**	4:54 PM	30	88	Distance	0.9	692	778	758	886	1459	464
	2014			81	Source after directivity		**73**	**76**	**76**	**80**	**84**	**76**
Difference 2020 - 2014			*Difference*	**7**	Distance reduction		-58	-59	-59	-60	-64	-54
					Calculated SPL without barriers		***15***	***18***	***18***	***20***	***20***	***22***
RM7 roof Platform S of Magnete 2m to S side F214	**2020**	4:56 PM	00d 00:00:30	84	Distance	2	692	778	758	886	1459	464
	2017			78	Source after directivity		**54**	**56**	**56**	**58**	**84**	**56**
Difference 2020 - 2017			*Difference*	**6**	Distance reduction		-51	-52	-52	-53	-57	-47
					Calculated SPL without barriers		***4***	***4***	***4***	***5***	***27***	***9***
RM7 Baghouse S doorway open F225	**2020**	5:06 PM	60	80	Distance	1	695	771	748	879	1447	461
	2013			72	Source after directivity		**80**	**80**	**80**	**80**	**53**	**80**
Difference 2020 - 2013			*Difference*	**7**	Distance reduction		-57	-58	-57	-59	-63	-53
					Calculated SPL without barriers		***23***	***22***	***22***	***21***	***-11***	***26***
Significant barriers in place for receivers S												
RM7 Walkway from RM6 centre on conveyor F248	**2020**	10:34 AM	26	80	Distance	10	543	645	641	808	1623	353
	2014			76	Source after directivity		**50**	**50**	**51**	**51**	**79**	**51**
Difference 2020 - 2013			*Difference*	**4**	Distance reduction		-35	-36	-36	-38	-44	-31
					Calculated SPL without barriers		***15***	***14***	***15***	***13***	***35***	***20***
Significant barriers in place for all village receivers												
F250 Baghouse hopper area E end of SC212 body @ 2m and other N-S aligned screw F268	**2020**	10:58 AM	20	94	Distance	2	677	765	751	885	1483	463
	2018			76	Source after directivity		**94**	**94**	**94**	**94**	**94**	**94**
Difference 2020 - 2018			*Difference*	**18**	Distance reduction		-51	-52	-51	-53	-57	-47
Screw conveyor HF squeal					*Calculated SPL without barriers*		***44***	***43***	***43***	***42***	***37***	***47***
Significant barriers in place for all village receivers and air absorption for higher frequencies of source												
43A Kerb E side CM opp CM fan discharge F288	**2020**	11:32 AM	25	78	Distance	18	715	810	820	930	1545	536
	2018			72	Source after directivity		**64**	**62**	**60**	**60**	**62**	**60**
Difference 2020 - 2018			*Difference*	**6**	Distance reduction		-32	-33	-33	-34	-39	-29
Significant barriers in path to village receivers					*Calculated SPL without barriers*		***32***	***29***	***27***	***26***	***24***	***30***
44 CM fan room roll door @ 2m F290	**2020**	11:33 AM	25	88	Distance	2	715	810	820	930	1545	536
	2018			83	Source after directivity		**62**	**65**	**65**	**68**	**85**	**65**
Difference 2020 - 2018			*Difference*	**5**	Distance reduction		-51	-52	-52	-53	-58	-49
Significant barriers in place for all village receivers					*Calculated SPL without barriers*		***11***	***13***	***13***	***14***	***27***	***16***
46A Coal Mill Room S roll door W @ 1m F294	**2020**	11:38 AM	26	90	Distance	1	715	810	820	930	1545	536
	2018			81	Source after directivity		**55**	**58**	**58**	**62**	**85**	**58**
Difference 2020 - 2018			*Difference*	**8**	Distance reduction		-57	-58	-58	-59	-64	-55
Significant barriers in place for all village receivers					*Calculated SPL without barriers*		***-2***	***0***	***0***	***3***	***21***	***4***
K6 S side 51 Half way between Centre & Western pedestals, by duct support trestle	**2020**	11:46 AM	29	79	Distance	13	700	799	801	962	1518	514
	2017			76	Source after directivity		**50**	**53**	**53**	**56**	**79**	**53**
Difference 2020 - 2017			*Difference*	**3**	Distance reduction		-35	-36	-36	-37	-41	-32
Significant barriers in place for all village receivers.					*Calculated SPL without barriers*		***16***	***17***	***17***	***19***	***38***	***21***
K6 S side #53 Kiln drive platform Centre E end on platform (ground level) F306	**2020**	11:48 AM	30	84	Distance	5	676	773	770	923	1521	484
	2017			74	Source after directivity		**48**	**48**	**55**	**61**	**84**	**55**
Difference 2020 - 2017			*Difference*	**10**	Distance reduction		-43	-44	-44	-45	-50	-40
Reason for difference unclear, potentially more KSCFs, no consequence					*Calculated SPL without barriers*		***6***	***5***	***12***	***15***	***34***	***16***
K6 N side 60 Opp Conditioning Tower F324	**2020**	12:11 PM	20	84	Distance	13	659	734	747	895	1524	458
	2019			78	Source after directivity		**84**	**84**	**84**	**81**	**53**	**84**
Difference 2020 - 2019			*Difference*	**6**	Distance reduction		-34	-35	-35	-37	-41	-31
Increase may be more new centre fans operating or FA39					*Calculated SPL without barriers*		***50***	***49***	***49***	***44***	***11***	***53***
K6 N side 64 64 E end drive platform F330	**2020**	12:16 PM	30	81	Distance	13	659	734	747	895	1524	458
	2014			78	Source after directivity		**81**	**81**	**81**	**78**	**52**	**81**
Difference 2020 - 2019			*Difference*	**3**	Distance reduction		-34	-35	-35	-37	-41	-31
Increase may be more new centre fans operating or FA39					*Calculated SPL without barriers*		***47***	***46***	***46***	***42***	***11***	***50***

Pink shaded cells and red text indicates exceeds contribution objective by 3dB+

Table 3.4: 2020 Annual Environmental Noise Assessment for Kiln 6 Upgrade -
Measurement locations with increase in sound level > 3 dB and calculated contribution sound level at receivers

Location	Year	Time	Period sec	Sound Level dB(A) $L_{AEQ.t}$	Comments	Distance measured metres	Distance to Receivers					
							Distance Attenuation to receiver					
							Calculated LAEQ level at receiver distance only					
							Adelaide	Brisbane	Melbourne	Argyle	South	Loc.20
Kiln 6 Upgrade						**Objective**	**37**	**37**	**37**	**37**	**37**	**58**
K6 N side #66 Opp centre pedestal F332	**2020**	12:18 PM	25	86	Distance	13	664	761	758	911	1533	472
	2013			83	Source after directivity		**86**	**86**	**86**	**84**	**56**	**86**
Difference 2019 - 2013			*Difference*	**4**	Distance reduction		-34	-35	-35	-37	-41	-31
Increase may be more new centre fans operating					*Calculated SPL without barriers*		***52***	***51***	***51***	***47***	***15***	***55***
Grate cooler fan courtyard Between FA201 & 203 & 202 F339	**2020**	12:24 PM	21	92	Distance	0.8	671	772	775	937	1557	484
	2013			87	Source after directivity		**92**	**92**	**92**	**92**	**75**	**92**
Difference 2020 - 2013			*Difference*	**5**	Distance reduction		-58	-60	-60	-61	-66	-56
Potentially different location compared to previous. Significant barriers to receivers					*Calculated SPL without barriers*		***33***	***32***	***32***	***30***	***9***	***36***
FA210 Kiln Discharge Seal Fan S inlet @ 1.5m E side F351	**2020**	12:36 PM	25	93	Distance	1.5	683	784	787	949	1545	496
	2014			85	Source after directivity		**77**	**75**	**75**	**69**	**69**	**75**
Difference 2019 - 2014			*Difference*	**8**	Distance reduction		-53	-54	-54	-56	-60	-50
Barrier to village side					*Calculated SPL without barriers*		***24***	***21***	***21***	***13***	***9***	***25***
FA215 N side platform N side of inlet box centre F 380	2020	1:06 PM	12:00 AM	81	Distance	1	680	785	793	962	1575	504
	2019			72	Source before directivity		**81**	**81**	**81**	**81**	**60**	**81**
Difference 2020 - 2019			*Difference*	**8**	Distance reduction		-57	-58	-58	-60	-64	-54
					Calculated SPL without barriers		***24***	***23***	***23***	***21***	***-4***	***27***
					Source after DIR		**79**	**79**	***63***	***69***	***57***	***0***

Pink shaded cells and red text indicates exceeds contribution objective by 3dB+

3.2 No.7 Cement Mill sound levels

Figure 3.6 shows an aerial view of the area around the No. 7 Cement Mill and Cement Mill No.6. Figure 3.7 shows a plan view of the buildings and measurement locations used. Figure 3.8 shows these locations on an aerial view.

Results of sound levels measured around Cement Mill No.7 are shown in Table 3.5. Measurements were taken with CM7 mill operating on 27 October 2020. Measurements in previous years have shown that at some locations, especially on the southern side of CM7, other Cement Plant sources are the main source of noise at the location – for example the kiln shell cooling fans, PHT fans and fan emissions from CM5 and CM6 buildings.

Measurements of sound levels around the Cement Mill No.6 area were also obtained on the same days as for CM7 and are also shown in Table 3.5.

One-third octave band frequency sound levels for CM7 and CM6 are shown in Table 3.6 and calculation of the tonality of the measured sound levels is shown in Table 3.6A. Graphs of the spectra and tonality for the areas of No.7 Cement Mill and surrounds are shown in Appendix A Figures A42 to A7. Figures for inside of CM7 are shown in Figures A48 to A52. CM6 spectra are shown in Figures A53 to A57.

The difference in sound levels at the same locations between the 2020 operating sound levels and 2010 to 2019 operating sound levels of CM7 for external locations are shown in Table 3.7. If the differences in sound levels between 2018 and those of previous years are greater than 3 dB, the difference is highlighted (as was done for the Kiln 6 Upgrade assessment shown in Table 3.3). Measurements inside the CM7 building are shown in Table 3.7A.

Locations with an increased sound level are shown in Table 3.7B. Table 3.8 provides a calculation of the contribution sound level at residential locations and a comparison of that with the previous residential receiver objectives for CM7.

For sound levels outside around the CM7 building and its associated plant, there were 10 out of 32 locations with sound levels increased by more than 3 dB compared to those of years 2010 to 2019. Most of these were on the western side of the building where noise emissions from other parts of the Cement Plant are the main source, rather than the CM7 building.

Sound levels at the corner of the site road north-west of CM7, (Location D in Figure 3.6) were 6 dB higher than in 2010 but similar to those measured since. Sound levels were 73 dBA with CM7 operating and 67 dBA when it was not (in 2010). The calculated contribution assuming a distance of 23m to the source did not exceed the Location 20 objective but was 2 to 5 dB above the previous objective for village side receivers. Spectra and tonality are shown for this area in Figure A42 and show there are no tonal qualities for the measurements. Sound levels in this location are from a combination of sources including the Kiln, CM6 and train unloading activities. If the contributions from the kiln and CM6 were removed, the actual contribution sound level without considering air or ground absorption attenuation would be lower and considered to be below the objectives. These results are similar to those since 2013.

The same effects are considered to occur at locations G, J', K and O, which have also had 3 to 6 dB increases compared to 2010. The source of these increased sound levels is likely to have been the north-western roll door of CM6, which was fully open. Spectra for these locations shown in Figure A42 and A43 show they are also non-tonal.

Calculated sound level contributions for these locations in Table 3.8 also show that for locations G and O, they exceed the residential receiver objectives at Adelaide St because the assumed source distance was 20m. The calculations for locations J' and K showed calculated contribution sound levels were less than 20 dBA at all receivers.

The only other location for CM7 where sound levels increased were for the location on the southern side stairway of TS3 where the small fan discharge on the annex to CM5 building is measured. Sound levels increased by just under 3 dB compared to 2018. The open north-western roll door of CM6 is the likely source of this increase. Calculated contributions sound levels from this source were 1 to 2 dB above the objectives at the residential receivers but less than the objective at Location 20. Sound levels at this location are also affected by noise emissions from CM6 (where the north-western door was fully open) and CM6 western wall fans. There is also the barrier of TS3 in the pathway to the residential receivers as well. Figure A46 (F76) shows the sound for this location is broad-band and non-tonal. It is considered unlikely that this source would be audible at the residential receiver locations.

Differences for CM7 internal sound levels are shown in Table 3.7B. There were eight locations of 40 measured where increases of more than 3 dB occurred. The increased level locations are likely to have been caused by a slightly different location close to a source such as a drive motor and did not result in increased sound levels outside of same side of the building.

Assessment for No.7 Cement Mill Project

The comparison of sound levels measured in 2020 with those of previous measurements was found to not be significantly different to those measured in the initial assessment of 2008. Some locations had increased sound levels but these are considered to have been from sources other than CM7. Predicted contribution sound levels from measurement locations with higher sound levels were calculated to not cause sound levels above the objectives for Location 20. They are also considered to not exceed residential receiver objectives when they were solely CM7 sources. The main contributors to sound levels around CM7, as identified also in previous surveys, include CM6 western wall fan and doorway emissions, Kiln 6 and the PHT, rail unloading operations at the bin north of CM7 and site truck movements.

Based on these results, indicating most internal sound levels have not significantly increased since 2017, external sound levels in many locations have also not increased and locations where external sound levels have increased are significantly influenced by other external sources, it is considered that while the No.7 Cement Mill is a major source which affects total received sound levels at Location 20 and residential receivers, the sound level objectives applied to it are achieved.

A number of locations had higher sound levels which could potentially be reduced. The main recommendations are noted below:

- Noise emissions from fan discharges in CM6 western wall, CM5 western wall (FA502) and CM5 annex northern wall fan discharge (DC702) add to the emissions from CM7 and have the potential to exceed objectives at residential receivers. This was also identified in 2018. It is recommended that a review be made of these fans and the condition of their associated silencers where present, to determine how reductions in emissions can be achieved.

No.6 Cement Mill

Sound levels were also measured around Cement Mill No.6 for comparison with previous measurements and the results are also shown in Tables 3.5 to 3.7, for locations shown in Figures 3.7 and 3.8. Spectra are shown in Figures A53 to A57 in Appendix A. Sound levels had increased at 10 of 26 locations, mostly from open doorways.

The large roll doors along the eastern side of the CM6 building adjacent to the mill and drive rooms were open for 500m to 1m from the ground during the measurements and this caused higher sound levels along the eastern side locations compared to some previous measurements. Sound levels on the western side of the building were also higher because the large door at the north-western corner was open. Sound levels at other locations remote from open doors were similar to those of previous years.

Sound spectrum levels shown in Figures A53 to 57 showed they were broad-band and non-tonal.

Table 3.8 provides a calculation of contribution sound levels for all locations with increased sound levels in 2020 compared to 2010 to 2019, and shows that even if the noise was coming from the CM6 building at the measurement location, the contribution at Location 20 and residential receivers is well below or not above the objective.

For location 25, 11m north of CM6 building, the sound level was 4 dB higher than in 2017. The calculated contribution at residences shown in Table 3.8 was equal to the objective for 72 Taylor Avenue and within 1 dB of the objective for Brisbane St and Melbourne St. Sound levels at these locations are also influenced by other site sources such as rail activities and conveyors and these were occurring during the measurements. It is considered that sound levels from Cement Mill No. 6 are likely to have not increased significantly such that increased total sound levels from the plant are received at residential locations. Sound level spectra are also considered to be acceptable at residential receiver locations.

It is recommended that the large doors – roll doors on both sides of the building and wall openings on the northern side of the building, be kept closed during normal operations. Improved sealing around these doors is recommended; this can be by:

- cleaning the bottom seal area of the roll doors so they close all the way to the ground;
- cleaning the bottom seal area of the man-doors so they are able to be closed against the door jamb seals; and,
- adding sound barrier insulation strips around the edges of the wall doors on Level 1. This could be 300mm wide strips of flexible loaded vinyl material such as 8kg/m^2 4mm thick Wavebar© or similar material, so that the strips overlap the wall edges.

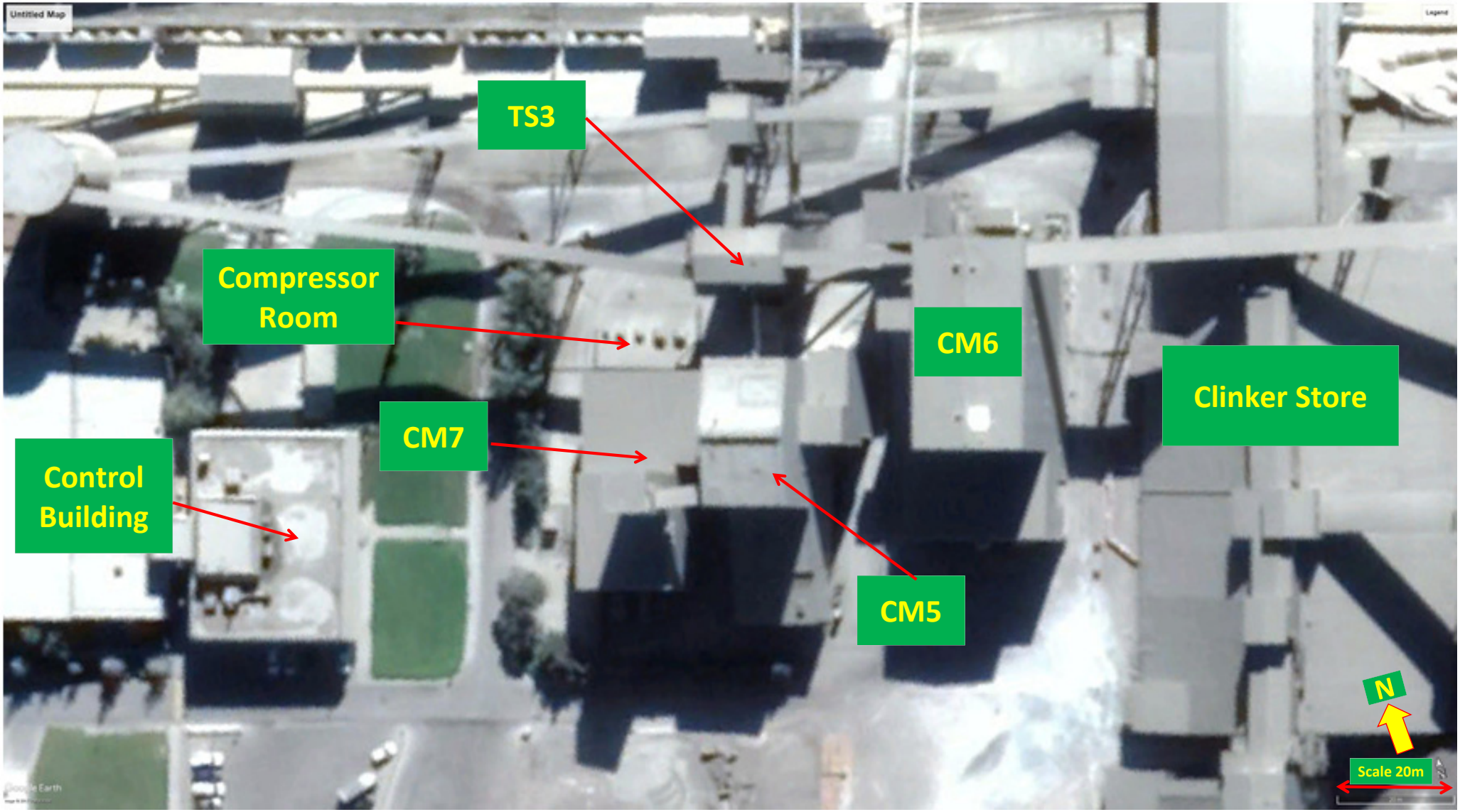

Figure 3.6: Boral Cement Berrima - Aerial view of layout of No.7 Cement Mill area

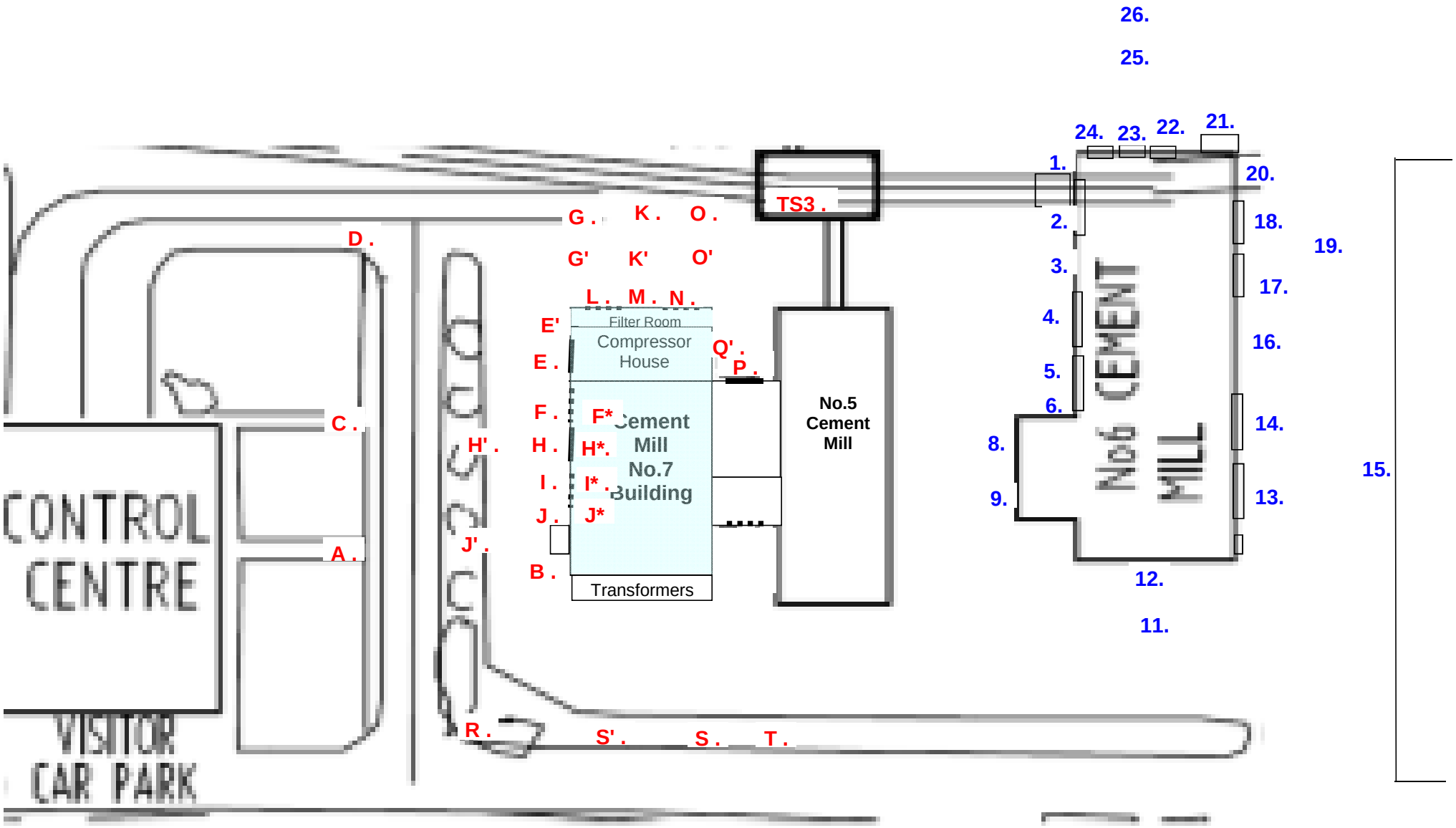

Figure 3.7: Boral Cement Berrima - Noise Assessment - Measurement locations for CM6 & CM7

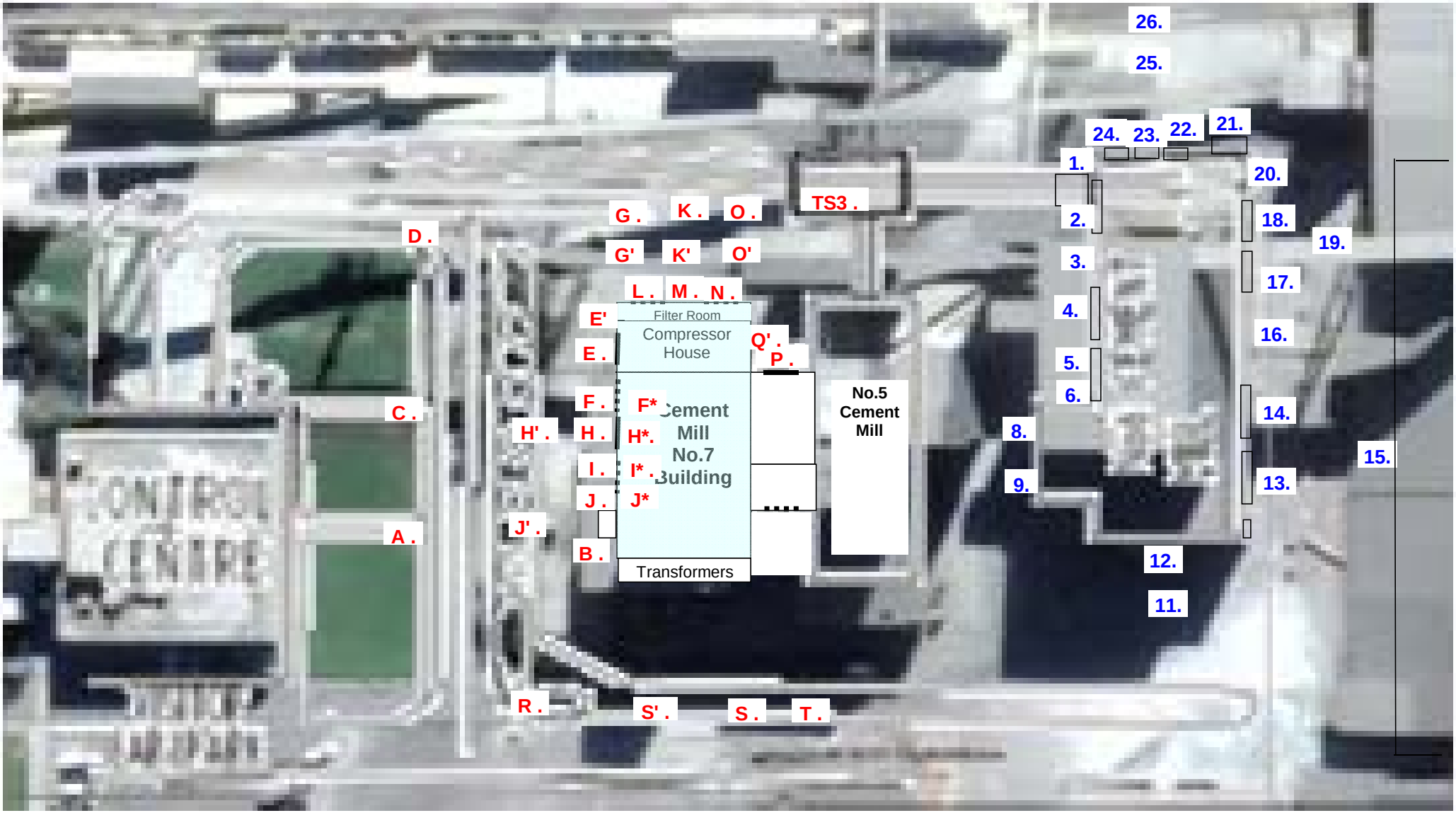

Figure 3.8: Boral Cement Berrima - Noise Assessment - Measurement locations for CM6 & CM7 with aerial overlay

Berrima Location Maps figures 2020

Table 3.5: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Cement Mill 7 and Cement Mill 6

Area	Source or location	File No Address	Date	Start	Period hh:mm:ss	Statistical Sound Level - dBA $L_{Aeq,t}$	$L_{A01,t}$	$L_{A10,t}$	$L_{A90,t}$	$L_{Ceq,t}$	L_{Ceq}-$L_{Aeq,t}$	Comments
CM7	A Top of stairs S	48	27/10/2020	12:20 PM	60	72	74	73	72	83	11	
	B 2m W of wall, edge of barrier facing baghouse	59	27/10/2020	12:42 PM	61	78	79	79	78	90	11.9	
	C Top of stairs N	49	27/10/2020	12:22 PM	61	72	73	72	71	84	12.8	
	D At corner N of Admin	51	27/10/2020	12:27 PM	61	73	74	73	72	82	9.6	
	E Compressor room door @ 1m	53	27/10/2020	12:31 PM	60	73	74	73	72	83	10.6	
	E' Man door to compressor filter room@ 1m	52	27/10/2020	12:29 PM	61	70	71	71	70	83	12.3	
	F Wall vents N on W side @ 1m	54	27/10/2020	12:33 PM	62	77	78	77	76	86	9.3	
	G - Line N side of transfer house 13.5m to it, in-line W edge CM7	71	27/10/2020	1:05 PM	61	73	74	74	73	82	8.4	
	I Vent S of door @ 1m	57	27/10/2020	12:38 PM	63	78	79	79	78	89	10.8	
	J Vents N of baghouse	58	27/10/2020	12:40 PM	61	80	81	81	80	91	10.4	
	J' Edge of concrete opp, J. - 9.6m away	61	27/10/2020	12:46 PM	72	73	74	73	72	86	12.8	
	J* SW corner by vents at baghouse	426	27/10/2020	3:27 PM	d 00:00:25	78	79	79	78	90	11.9	-
	H W roller door @ 1m	55	27/10/2020	12:35 PM	62	79	79	79	78	87	8.4	
	H' Edge concrete opp door H - 9.7m away	62	27/10/2020	12:48 PM	65	74	75	74	73	84	10	
	K Line level with G centre of compressor house	69	27/10/2020	1:02 PM	62	72	73	73	72	82	9.5	
	L N wall vent W side @ 1m	63	27/10/2020	12:50 PM	62	72	73	72	71	83	11.1	Dump station
	M Between wall vents @ 1m to wall	64	27/10/2020	12:52 PM	61	72	74	73	71	85	12.8	Dump station
	N Wall vents N wall E side @ 1m	65	27/10/2020	12:54 PM	62	73	74	74	72	83	9.9	Dump station
	O Line E side of Comp House 20.5m to control point	68	27/10/2020	1:00 PM	62	73	74	73	72	83	10.4	Dump station
	P 1m N roll door CM7	67	27/10/2020	12:58 PM	61	79	80	79	79	89	9.5	
	P 1m outside Roll door N	432	27/10/2020	3:32 PM	d 00:00:25	79	80	80	79	88	8.8	
	Q 1m Man door Compressor House E side	66	27/10/2020	12:56 PM	63	77	78	77	76	88	11.1	
	Under TS3 ground level 6.5 m from CM5	84	27/10/2020	3:01 PM	61	77	77	77	76	86	9.4	
	Transfer Station #TS3 Level 1 N side opening	74	27/10/2020	2:39 PM	62	75	76	75	74	85	10.5	
	TS3 Stairway opp small fan discharge CM5	76	27/10/2020	2:44 PM	62	77	78	78	77	89	11.7	
	TS3 Top Platform opp large fan discharge CM5	79	27/10/2020	2:48 PM	61	77	78	77	76	86	9.5	
	R corner SW of CM7	72	27/10/2020	1:09 PM	61	75	77	76	74	86	11.1	
	S' Kerb opp W wall CM7	447	27/10/2020	4:07 PM	d 00:00:25	74	75	75	74	86	11.6	-
	S" Kerb S of W wall CM7 tower	448	27/10/2020	4:08 PM	d 00:00:25	75	75	75	74	86	11.3	-
	S Kerb S of E side CM7 tower	449	27/10/2020	4:09 PM	d 00:00:25	76	77	76	75	86	10.2	-
	T Kerb S of W wall CM5	450	27/10/2020	4:09 PM	d 00:00:25	76	76	76	75	85	9.6	-
	T Kerb Opp W wall CM5	119	27/10/2020	4:00 PM	25	75	76	76	75	85	9.8	
CM6	1 North West Corner @ 1m	85	27/10/2020	3:04 PM	61	84	85	84	83	96	12.2	
	2 Front of Roller Door @ 1m (doo	86	27/10/2020	3:05 PM	61	89	89	89	88	95	6.7	
	2 NW roll door @ 1m open	446	27/10/2020	3:56 PM	d 00:00:30	87	88	88	87	95	8.2	-
	3 Between Door @ 2.4m due to p	88	27/10/2020	3:08 PM	61	81	82	81	81	91	10.0	
	4 Front of Roller Door @ 1m	89	27/10/2020	3:10 PM	68	83	84	83	82	92	9.1	
	5 Front of Southern Roller Door @	90	27/10/2020	3:12 PM	61	81	82	82	81	91	9.9	
	6 Northern face of western ext. @	92	27/10/2020	3:15 PM	64	80	81	81	80	92	11.7	
	7 On CM5 Platform (N) @ 6.8m	96	27/10/2020	3:23 PM	62	77	78	77	76	88	10.7	
	8 Western face (N) of western ext	93	27/10/2020	3:17 PM	61	76	77	77	76	92	15.5	
	9 Western face(S) of western ext	94	27/10/2020	3:19 PM	61	76	77	77	76	89	12.4	
	10 On CM5 Platform (S) @ 7.6m	95	27/10/2020	3:21 PM	61	76	77	76	75	89	13.2	
	11 14.4m from S wall at joint	100	27/10/2020	3:29 PM	62	77	78	77	76	85	8.0	
	12 2.7m from S wall CM6 at joint 6	99	27/10/2020	3:27 PM	62	81	83	82	80	87	5.6	
	13 E side S roll door @ 1m	101	27/10/2020	3:31 PM	61	77	78	77	76	85	8.3	
	14 CM6 E side centre door @ 1m	102	27/10/2020	3:33 PM	61	88	93	89	87	94	6.0	
	15 2m from Clinker Building opp 1	115	27/10/2020	3:55 PM	67	78	80	79	78	86	7.9	
	16 E wall centre @ 1m	103	27/10/2020	3:35 PM	61	77	78	77	76	85	8.5	
	17 E roll door opp Mill	104	27/10/2020	3:36 PM	62	84	85	84	83	89	5.0	
	18 Door opp Comp Room @ 1m	105	27/10/2020	3:38 PM	62	79	89	80	75	84	4.9	
	19 Clinker Building @ 2m opp 18	114	27/10/2020	3:53 PM	68	74	76	75	73	82	8.0	
	20 Man door - open 100mm	107	27/10/2020	3:41 PM	62	75	76	75	74	83	8.2	
	21 1m Outside vent fan filter louvr	108	27/10/2020	3:43 PM	61	75	77	76	74	87	12.0	
	22 E side N wall vent @ 1m	109	27/10/2020	3:45 PM	61	78	79	79	78	89	10.9	
	23 Centre N wall vent @ 1m	110	27/10/2020	3:47 PM	62	84	86	84	83	91	7.1	
	24 W side N wall vent @ 1m	111	27/10/2020	3:48 PM	62	79	80	79	79	88	9.1	
	25 11m N of CM6 at joint	442	27/10/2020	3:50 PM	d 00:00:25	74	74	74	73	84	10.6	L1 door half open
	26 22.6m N of CM6	443	27/10/2020	3:52 PM	d 00:00:27	70	71	71	70	82	11.2	-
	27 4m N of Conveyor transfer out of Clinker Building	445	27/10/2020	3:54 PM	d 00:00:25	63	64	64	62	75	12.0	-
	28 4m N of dust collector on next building W , conveyor transfer noise	444	27/10/2020	3:53 PM	d 00:00:25	61	62	61	60	73	12.2	-
	CM6 W wall fan discharge at platform ~8m	441	27/10/2020	3:44 PM	d 00:00:30	86	87	87	84	101	14.9	
	Door platform near CM6 W wall fan @ 7.5m	80	27/10/2020	2:50 PM	61	86	87	86	85	101	15.5	
	Door platform near CM6 W wall fan @ 3.5m	83	27/10/2020	2:54 PM	61	91	92	92	91	106	15.0	

Table 3.6: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Cement Mills No.7 and No.6 - One-third Octave Band Spectra

Area	Source or location	File	Total C	Total A	A-weighted LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency Hz																																
			dBC	dBA	12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
CM7	A Top of stairs S	48	83	72	13	21	23	32	37	39	42	47	51	51	55	58	59	57	59	66	64	63	61	61	61	59	57	56	53	50	46	41	34	26	18		
	B 2m W of wall, edge of barrier facing baghouse	59	90	78	15	24	31	43	43	42	49	49	56	60	63	70	67	67	69	68	68	67	66	68	65	65	61	60	56	53	48	43	37	32	28		
	C Top of stairs N	49	84	72	13	19	24	33	44	39	43	47	47	51	55	59	58	57	59	63	64	62	60	61	61	59	57	56	54	51	45	39	32	24	16		
	D At corner N of Admin	51	82	73	9	17	23	35	36	36	41	46	49	50	54	56	56	58	59	63	65	63	63	63	61	61	60	58	55	52	46	41	34	27	19		
	E Compressor room door @ 1m	53	83	73	10	19	24	34	37	38	43	46	49	53	57	60	60	58	61	62	63	64	64	62	62	60	58	56	54	51	46	41	34	28	22		
	E' Man door to compressor filter room@ 1m	52	83	70	10	18	24	36	38	39	44	45	48	51	54	57	58	56	58	59	61	60	60	61	60	58	57	56	54	51	46	42	34	29	22		
	F Wall vents N on W side @ 1m	54	86	77	11	21	25	33	40	39	44	48	53	56	59	63	64	65	65	67	67	68	67	66	65	65	63	60	57	54	49	42	34	27	19		
	G - Line N side of transfer house 13.5m to it, in-line W edge CM7	71	82	73	8	18	20	27	35	38	43	46	48	50	53	55	59	59	58	63	68	63	61	62	61	61	60	59	58	55	51	46	39	32	23		
	I Vent S of door @ 1m	57	89	78	14	21	26	34	44	46	49	53	54	57	62	67	66	65	68	68	69	70	68	66	63	67	62	58	54	52	46	40	32	26	19		
	J Vents N of baghouse	58	91	80	15	22	27	35	46	47	52	56	56	55	61	68	67	65	74	72	69	71	69	67	64	67	62	59	55	52	46	39	32	27	20		
	J' Edge of concrete opp, J. - 9.6m away	61	86	73	13	19	24	35	43	40	45	48	50	55	58	64	62	61	63	62	60	61	63	62	61	60	58	57	55	52	47	42	36	31	25		
	J'* SW corner by vents at baghouse	426	90	78	15	21	27	36	47	47	51	56	57	58	61	67	67	65	68	67	68	70	68	69	64	65	62	59	56	53	47	41	34	28	20	13	7
	H W roller door @ 1m	55	87	79	11	19	26	35	41	41	45	49	52	56	61	66	63	63	64	67	70	69	69	69	68	68	67	64	64	60	55	48	41	32	23		
	H' Edge concrete opp door H - 9.7m away	62	84	74	11	19	24	32	39	39	43	47	51	53	56	60	61	59	60	61	63	65	65	64	63	63	60	59	58	56	49	43	37	28	22		
	K Line level with G centre of compressor house	69	82	72	9	17	22	33	34	38	42	45	47	49	53	55	60	61	58	62	64	63	62	61	61	61	59	59	57	54	50	45	39	32	23		
	L N wall vent W side @ 1m	63	83	72	10	16	21	33	34	41	46	43	47	49	56	57	59	59	60	62	65	62	61	61	60	58	57	55	53	51	46	41	34	30	22		
	M Between wall vents @ 1m to wall	64	85	72	9	16	23	36	34	46	50	43	46	50	57	56	58	59	59	61	64	62	63	61	61	60	60	58	56	54	49	45	39	35	28		
	N Wall vents N wall E side @ 1m	65	83	73	10	17	22	28	30	39	44	45	49	51	58	58	60	67	61	63	63	63	62	61	60	59	57	55	54	52	47	46	44	36	29		
	O Line E side of Comp House 20.5m to control point	68	83	73	9	16	25	38	35	37	44	45	47	50	54	57	59	61	60	63	67	63	62	61	61	60	58	57	54	52	48	44	37	31	25		
	P 1m N roll door CM7	67	89	79	11	23	31	42	40	43	47	47	54	59	60	65	65	66	65	68	70	70	71	69	68	67	66	64	61	58	51	44	37	32	27		
	P 1m outside Roll door N	432	88	79	12	23	30	37	42	42	46	48	56	58	60	65	66	67	65	67	70	70	70	69	68	67	66	64	62	58	52	45	38	32	28	17	6
	Q 1m Man door Compressor House E side	66	88	77	10	22	30	43	40	41	48	49	53	55	59	63	64	64	64	68	68	67	67	67	66	64	63	60	58	54	49	46	38	33	28		
	Under TS3 ground level 6.5 m from CM5	84	86	77	10	21	23	34	38	41	49	51	52	55	57	61	62	63	63	68	67	67	69	66	66	64	62	59	56	54	49	45	39	33	27		
	Transfer Station #TS3 Level 1 N side opening	74	85	75	4	14	21	38	34	45	50	46	48	48	51	55	56	58	58	61	64	66	66	65	67	64	61	60	58	55	51	50	43	38	33		
	TS3 Stairway opp small fan discharge CM5	76	89	77	9	19	30	46	39	43	46	48	51	54	57	61	62	63	63	66	67	68	70	67	68	66	63	60	57	54	50	45	39	32	25		
	TS3 Top Platform opp large fan discharge CM5	79	86	77	13	26	27	41	36	40	45	45	48	54	58	61	62	64	63	68	67	68	70	65	66	64	61	59	57	54	49	44	39	34	29		
	R corner SW of CM7	72	86	75	14	22	28	33	44	43	44	49	49	51	58	59	60	59	69	67	65	63	64	64	63	62	59	58	55	52	48	43	37	31	25		
	S' Kerb opp W wall CM7	447	86	74	18	22	28	34	45	41	42	50	49	51	56	61	61	59	66	65	67	63	63	63	63	62	59	58	55	53	48	44	38	32	26	18	7
	S'' Kerb S of W wall CM7 tower	448	86	75	18	23	31	35	44	41	42	50	49	52	55	61	63	61	65	62	64	66	64	64	64	63	60	58	55	52	48	43	37	29	20	10	3
	S Kerb S of E side CM7 tower	449	86	76	17	22	28	34	43	41	42	51	50	53	57	61	63	62	65	65	65	67	65	65	65	64	61	59	57	55	52	47	42	34	24	13	2
	T Kerb S of W wall CM5	450	85	76	15	21	28	34	40	40	42	48	49	53	58	63	64	61	64	63	64	68	65	66	65	64	62	59	57	53	49	44	38	30	21	11	3
	T Kerb Opp W wall CM5	119	85	75	13	22	28	35	39	40	43	47	50	53	57	62	63	61	66	64	64	67	66	65	65	64	62	59	57	54	49	44	39	31	22		

Table 3.6: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Cement Mills No.7 and No.6 - One-third Octave Band Spectra

Area	Source or location	File	Total C	Total A	A-weighted LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency Hz																																
			dBC	dBA	12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
CM6	1 North West Corner @ 1m	85	84	96	12	20	37	55	45	49	56	52	53	55	60	65	68	69	71	72	73	72	73	73	75	75	74	71	66	62	57	51	44	36			
	2 Front of Roller Door @ 1m (door open)	86	89	95	12	21	34	51	41	44	54	53	58	62	65	68	72	75	77	78	78	77	77	78	79	79	79	76	72	68	62	58	52	45			
	2 NW roll door @ 1m open	446	95	87	10	22	40	52	41	43	52	53	56	59	64	66	68	71	75	75	76	76	75	75	77	78	78	77	75	71	67	62	57	50	44	38	33
	3 Between Door @ 2.4m due to pile	88	81	91	12	21	32	46	41	47	53	51	56	56	60	64	67	67	69	72	72	71	70	71	70	69	68	65	61	57	51	45	39	33			
	4 Front of Roller Door @ 1m	89	83	92	14	21	33	47	41	46	52	53	55	58	62	67	68	72	75	75	75	73	71	70	69	67	66	64	63	60	52	46	39	32			
	5 Front of Southern Roller Door @ 1m	90	81	91	14	21	30	46	39	46	52	53	54	58	62	66	69	70	70	71	72	73	71	70	68	66	64	61	58	54	48	44	42	34			
	6 Northern face of western ext. @ 1m	92	80	92	15	23	34	49	40	46	53	46	49	55	60	65	67	70	71	71	71	70	69	69	68	66	63	61	58	54	48	42	36	29			
	7 On CM5 Platform (N) @ 6.8m	96	77	88	11	20	27	42	38	43	52	48	51	53	56	61	61	64	65	66	69	69	67	67	65	63	60	58	55	51	46	42	37	27			
	8 Western face (N) of western ext. @ 1m	93	76	92	14	29	34	50	42	44	51	52	51	51	55	59	60	63	64	67	69	68	67	67	65	62	60	57	54	49	45	38	34	24			
	9 Western face(S) of western ext. @ 1m	94	76	89	15	23	29	46	39	38	51	52	52	52	56	61	62	64	64	66	68	68	68	67	65	63	60	58	55	50	45	39	30	20			
	10 On CM5 Platform (S) @ 7.6m	95	76	89	9	21	30	47	37	42	50	49	51	52	56	60	62	63	63	65	67	67	67	66	65	62	60	57	54	50	45	39	32	25			
	11 14.4m from S wall at joint	100	77	85	13	21	26	34	34	37	44	51	52	52	56	60	61	62	63	66	68	68	69	67	65	64	64	60	59	53	47	41	33	25			
	12 2.7m from S wall CM6 at joint 6.7m from fan	99	81	87	14	20	29	34	35	37	43	53	53	54	55	62	66	67	64	65	67	72	77	71	68	67	70	65	64	58	52	46	38	28			
	13 E side S roll door @ 1m	101	77	85	8	16	24	32	34	39	43	46	49	53	56	62	66	69	65	65	67	67	66	65	63	62	60	58	55	54	50	46	44	36			
	14 CM6 E side centre door @ 1m (door 1/2 open)	102	88	94	10	19	27	36	37	42	49	53	57	63	68	71	74	78	78	79	79	78	77	76	75	75	74	72	71	71	71	67	66	62			
	15 2m from Clinker Building opp 13 & 14	115	78	86	11	20	26	32	33	38	42	43	50	58	63	62	66	67	68	67	69	69	69	68	66	65	64	62	59	57	57	52	49	43			
	16 E wall centre @ 1m	103	77	85	11	17	24	33	33	38	44	46	51	54	57	63	65	67	66	66	67	66	66	66	64	62	61	58	56	52	48	46	43	39			
	17 E roll door opp Mill	104	84	89	11	17	24	36	34	40	45	48	52	56	61	64	66	71	73	73	73	74	74	76	74	71	70	65	62	58	56	53	47	40			
	18 Door opp Comp Room @ 1m	105	79	84	10	16	23	29	33	38	44	45	48	51	56	61	61	65	66	67	69	69	69	72	70	70	67	65	62	59	56	51	47	41			
	19 Clinker Building @ 2m opp 18	114	74	82	8	16	23	34	32	37	42	42	47	51	54	59	60	63	62	62	63	64	64	67	63	62	59	58	56	55	51	48	47	37			
	20 Man door - open 100mm	107	75	83	11	15	21	31	35	37	43	45	48	52	55	60	61	64	65	64	64	63	63	65	63	63	62	60	54	50	44	38	33	25			
	21 1m Outside vent fan filter louvre	108	75	87	9	23	30	41	39	44	47	49	52	55	56	60	61	64	65	65	65	66	63	63	61	60	59	56	55	52	47	43	39	38			
	22 E side N wall vent @ 1m	109	78	89	8	18	28	45	37	40	45	47	56	59	60	63	64	70	71	70	68	67	65	64	64	62	59	56	52	52	44	37	32	25			
	23 Centre N wall vent @ 1m	110	84	91	9	19	24	35	42	44	49	53	60	61	63	66	68	73	75	74	73	72	73	73	73	73	72	66	61	59	51	46	43	38			
	24 W side N wall vent @ 1m	111	79	88	8	17	26	43	37	42	48	47	52	55	59	63	66	69	70	71	71	69	68	67	66	64	62	58	54	49	43	38	32	25			
	25 11m N of CM6 at joint	442	84	74	5	14	27	39	33	36	46	43	48	52	55	58	59	60	63	63	63	63	64	63	64	63	62	60	56	51	47	41	35	29	22	13	3
	26 22.6m N of CM6	443	82	70	3	14	25	37	32	36	42	41	47	50	53	54	55	57	61	61	58	59	59	59	62	60	59	58	52	47	43	37	31	24	16	7	1
	27 4m N of Conveyor transfer out of Clinker Building	445	75	63	7	13	20	26	29	30	37	37	41	44	47	49	49	51	54	53	52	54	54	52	53	51	48	47	43	40	35	30	25	19	14	7	1
	28 4m N of dust collector on next building W , conveyor transfer noise	444	73	61	3	12	17	22	27	29	35	36	40	41	45	48	50	50	50	49	51	51	50	49	50	48	46	44	40	37	33	28	23	19	13	6	0
	CM6 W wall fan discharge at platform ~8m	441	101	86	24	31	46	58	50	55	58	62	64	61	61	61	62	65	66	73	76	76	79	76	78	76	72	67	64	64	63	60	55	48	41	33	25
	Door platform near CM6 W wall fan @ 7.5m	80	95	87	22	28	43	60	48	55	58	62	65	62	61	62	63	65	72	76	77	78	76	77	76	72	67	65	64	63	59	55	48	42			
	Door platform near CM6 W wall fan @ 3.5m	83	86	74	25	33	48	65	55	61	67	66	69	63	61	65	68	71	77	83	83	81	83	84	81	78	73	70	70	67	64	60	55	49			

Table 3.6A: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels CM7 and CM6 - Tonality in One-third Octave Band Spectra

Area	Source or location	File	Tonality dB in One-third Octave Band Centre Frequency - Hz																									
			31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
	Tonality Criteria		15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
CM7	A Top of stairs S	48	1.8	0.1	1.3	0.4	1.8	1.5	0.2	1.9	1.0	2.1	2.3	4.6	0.8	0.4	0.6	0.2	1.0	0.0	0.1	0.4	0.2	0.7	0.5	0.6	0.5	0.4		
	B 2m W of wall, edge of barrier facing baghouse	59	0.3	3.8	3.3	3.3	1.5	0.6	1.7	4.6	1.7	0.7	1.6	0.3	0.1	0.3	1.4	2.4	1.1	1.4	0.9	1.3	0.6	0.9	0.3	0.3	0.8	0.1		
	C Top of stairs N	49	8.3	4.7	0.0	1.7	1.6	0.3	0.4	2.3	0.6	2.0	1.1	2.2	1.1	0.3	1.1	0.4	0.9	0.1	0.4	0.5	0.6	1.1	0.2	0.7	0.4	0.1		
	D At corner N of Admin	51	0.5	2.8	0.6	0.8	0.7	1.2	0.9	0.8	0.6	0.0	0.8	0.7	2.1	1.5	0.5	0.7	0.4	0.0	0.7	0.4	0.1	1.1	0.2	1.1	0.1	0.6		
	E Compressor room door @ 1m	53	1.3	2.2	0.9	0.3	0.8	0.1	0.5	1.6	0.8	2.0	0.6	0.1	0.1	0.5	1.3	1.2	1.0	0.1	0.2	0.4	0.3	1.1	0.3	0.6	0.6	0.5		
	E' Man door to compressor filter room@ 1m	52	0.2	1.6	1.7	0.9	0.0	0.2	0.2	1.2	0.9	1.3	0.0	0.1	0.8	0.1	0.3	0.5	0.4	0.3	0.1	0.6	0.2	1.0	0.1	1.2	0.8	0.6		
	F Wall vents N on W side @ 1m	54	4.1	3.1	0.8	1.0	1.3	0.2	1.2	2.2	0.2	0.4	1.2	0.9	0.0	0.6	0.3	0.1	0.8	1.0	0.5	0.3	0.4	1.3	0.7	0.5	0.4	0.6		
	G - Line N side of transfer house 13.5m to it, in-line W edge CM7	71	2.9	1.1	0.7	0.5	0.3	0.4	0.1	0.5	1.6	0.6	2.9	0.3	5.2	1.6	1.2	0.4	0.3	0.0	0.0	0.1	0.9	1.1	0.2	1.0	0.1	1.1		
	I Vent S of door @ 1m	57	4.6	1.2	0.2	1.7	1.5	0.3	0.4	3.0	0.2	1.9	2.0	0.9	0.4	1.9	0.3	0.0	3.0	4.4	0.6	0.3	0.4	1.4	0.6	0.3	0.7	0.5		
	J Vents N of baghouse	58	4.4	1.6	0.2	2.3	0.0	3.1	0.5	4.0	0.1	5.3	5.9	0.4	3.0	2.6	0.6	0.9	2.9	3.8	0.9	0.2	0.3	1.3	0.9	0.4	0.6	0.5		
	J' Edge of concrete opp, J. - 9.6m away	61	5.3	4.1	1.1	0.1	0.6	0.4	1.5	4.3	0.9	1.1	1.6	0.1	1.5	0.1	1.0	0.0	0.1	0.6	0.5	0.3	0.5	1.3	0.1	0.6	0.7	0.3		
	J'* SW corner by vents at baghouse	426	5.7	2.3	0.3	1.8	0.4	1.5	0.8	2.3	1.4	2.8	2.4	1.6	0.0	2.0	2.0	3.3	2.9	2.1	0.3	0.2	0.3	1.6	0.2	0.0	0.2	0.4		
	H W roller door @ 1m	55	2.6	1.5	0.1	0.1	0.3	0.1	0.8	4.4	1.4	0.6	1.0	0.4	1.2	0.3	0.4	0.4	0.1	0.1	0.8	0.8	1.3	1.3	0.3	0.3	1.2	0.4		
	H' Edge concrete opp door H - 9.7m away	62	3.4	1.8	0.4	0.3	1.1	0.6	0.6	2.0	1.3	1.9	0.1	0.1	0.7	1.2	0.7	0.0	0.8	1.7	0.8	0.4	1.1	2.2	0.6	0.2	1.1	0.8		
	K Line level with G centre of compressor house	69	1.1	0.6	0.8	0.3	0.1	1.2	1.2	1.1	1.5	1.9	2.8	0.5	1.4	0.2	0.4	0.0	0.3	0.3	0.3	0.5	0.4	0.9	0.1	0.9	0.8	0.6		
	L N wall vent W side @ 1m	63	3.2	1.2	4.0	3.3	0.6	2.0	2.7	0.5	0.8	0.1	0.8	0.5	3.0	1.3	0.3	0.5	0.4	0.3	0.2	0.0	0.3	1.6	0.1	0.6	1.0	1.8		
	M Between wall vents @ 1m to wall	64	7.3	4.1	5.5	4.8	0.3	2.0	4.0	1.2	0.5	0.3	0.9	0.4	1.9	0.6	0.7	0.4	0.4	0.5	0.6	0.3	0.1	1.0	0.1	1.0	0.9	1.5		
	N Wall vents N wall E side @ 1m	65	2.9	2.2	1.5	1.4	1.3	3.0	3.9	0.8	3.1	6.9	4.1	0.6	0.3	0.5	0.0	0.1	0.0	0.5	0.5	0.1	0.4	1.2	1.4	0.1	2.9	0.0		
	O Line E side of Comp House 20.5m to control point	68	3.2	2.2	3.0	0.6	0.5	0.1	0.3	0.3	0.5	0.9	1.7	0.4	3.7	1.1	0.7	0.0	0.5	0.2	0.0	0.3	0.1	0.8	0.3	1.6	0.4	0.3		
	P 1m N roll door CM7	67	2.1	1.3	2.7	4.1	1.5	1.8	2.0	2.2	0.0	1.0	2.4	0.8	1.0	1.1	2.2	0.8	0.4	0.2	0.3	0.7	0.2	1.4	0.5	0.1	0.6	0.3		
	P 1m outside Roll door N	432	2.4	2.2	0.9	2.7	2.6	0.7	2.2	2.3	0.1	1.3	2.1	0.0	1.0	0.2	0.7	0.3	0.3	0.0	0.3	0.4	0.5	1.3	0.3	0.2	0.6	0.5		
	Q 1m Man door Compressor House E side	66	2.1	2.8	2.8	1.1	0.7	1.1	0.1	1.5	0.7	0.0	2.3	2.1	0.1	0.2	0.2	0.4	0.1	0.0	0.5	0.1	0.4	0.8	0.9	2.2	1.5	0.2		
	Under TS3 ground level 6.5 m from CM5	84	0.7	2.3	2.8	0.4	1.0	0.5	0.6	1.3	0.3	0.8	2.6	2.8	0.0	1.4	3.0	1.9	1.1	0.1	0.1	0.1	0.1	1.2	0.3	0.9	0.0	0.1		
	Transfer Station #TS3 Level 1 N side opening	74	8.1	3.5	4.6	3.0	0.6	0.8	1.0	1.4	0.1	0.8	1.5	0.1	0.5	1.0	0.9	1.7	2.2	0.1	0.6	0.4	0.4	0.3	1.1	2.6	0.8	0.1		
	TS3 Stairway opp small fan discharge CM5	76	5.4	0.2	0.9	0.6	0.0	0.1	0.5	1.4	0.1	0.5	2.0	1.7	0.5	0.2	2.7	2.1	1.3	0.5	0.1	0.4	0.4	0.5	0.3	0.6	0.3	0.0		
	TS3 Top Platform opp large fan discharge CM5	79	4.2	0.9	2.5	1.4	1.5	1.1	0.4	0.8	0.2	1.2	2.5	2.9	1.2	0.7	4.0	3.0	1.3	0.4	0.1	0.2	0.5	0.9	0.1	0.1	0.5	0.6		
	R corner SW of CM7	72	5.9	0.9	2.2	2.4	0.7	2.7	3.1	0.2	0.4	4.9	6.0	0.5	0.3	1.6	0.5	0.1	0.6	0.5	0.4	0.4	0.3	0.6	0.3	0.4	0.4	0.4		
	S' Kerb opp W wall CM7	447	8.0	2.8	3.2	4.3	1.5	1.4	0.3	2.6	1.2	4.5	3.8	1.6	2.8	1.5	0.5	0.2	0.6	0.9	0.9	0.8	0.1	0.7	0.3	0.3	0.7	0.5		
	S" Kerb S of W wall CM7 tower	448	5.8	1.9	3.1	4.3	2.1	0.4	0.8	1.3	2.7	3.6	4.0	2.7	0.2	2.3	1.1	0.3	0.2	0.9	0.3	0.2	0.3	0.4	0.4	0.7	1.2	0.3		
	S Kerb S of E side CM7 tower	449	5.3	1.2	4.5	5.3	1.8	0.8	0.2	1.7	0.8	1.6	1.3	0.3	1.0	1.7	1.0	0.1	0.6	0.6	0.1	0.3	0.2	0.5	0.4	0.6	1.6	0.6		
	T Kerb S of W wall CM5	450	2.7	1.2	1.6	2.2	1.5	0.6	0.0	2.5	1.5	2.4	1.4	1.0	1.0	2.9	1.5	0.8	0.3	0.4	0.0	0.2	0.3	0.5	0.1	0.8	1.1	0.9		
	T Kerb Opp W wall CM5	119	1.8	1.4	0.8	0.9	0.3	1.0	0.5	2.4	1.2	3.2	3.4	1.2	1.3	1.9	0.2	0.0	0.3	0.6	0.1	0.0	0.4	0.5	0.5	0.2	1.3	0.7		

Red highlighted cell means exceeds criteria

Table 3.6A: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels CM7 and CM6 - Tonality in One-third Octave Band Spectra

Area	Source or location	File	Tonality dB in One-third Octave Band Centre Frequency - Hz																										
			31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
	Tonality Criteria		15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
CM6	1 North West Corner @ 1m	85	6.8	1.9	6.1	3.1	0.5	0.9	0.7	1.2	1.1	0.5	0.1	0.6	0.4	0.6	0.3	0.4	0.4	0.5	1.2	1.0	0.3	0.6	0.1	0.6	0.4			
	2 Front of Roller Door @ 1m (door open)	86	6.7	3.5	5.7	3.2	0.6	0.4	0.2	0.1	0.1	0.3	0.6	0.7	0.3	0.6	0.4	0.3	0.3	0.5	1.1	0.5	0.1	0.5	0.3	0.2	1.1			
	2 NW roll door @ 1m open	446	6.9	3.1	4.0	1.2	0.1	0.8	1.1	0.3	0.6	0.3	1.5	0.0	0.0	1.0	0.8	0.6	0.5	0.1	0.4	1.1	0.6	0.0	0.4	0.1	0.5			
	3 Between Door @ 2.4m due to pile	88	5.4	0.2	4.2	3.6	2.0	1.4	0.4	0.8	1.3	0.9	0.6	1.8	0.2	0.8	1.4	0.8	0.6	0.2	0.7	0.7	0.1	0.9	0.1	0.2	0.4			
	4 Front of Roller Door @ 1m	89	5.0	0.7	2.3	0.3	0.7	0.4	0.6	1.8	0.9	0.1	1.7	0.3	1.0	0.1	0.4	0.1	0.3	0.0	0.1	0.2	1.3	1.8	0.5	0.4	0.1			
	5 Front of Southern Roller Door @ 1m	90	6.9	0.6	2.5	0.1	1.7	0.3	0.5	1.2	0.5	0.5	0.3	0.1	0.3	1.1	0.1	0.0	0.3	0.1	0.6	0.1	0.1	1.3	1.0	1.4	3.3			
	6 Northern face of western ext. @ 1m	92	7.2	0.4	6.7	5.3	0.8	0.1	0.2	2.0	1.1	1.3	0.0	0.4	0.3	0.2	0.5	0.7	0.0	0.5	0.1	0.5	0.4	0.7	0.4	0.0	0.3			
	7 On CM5 Platform (N) @ 6.8m	96	5.2	1.6	6.1	3.1	0.3	0.3	1.0	2.2	1.3	1.2	0.7	0.4	1.1	0.8	0.6	0.9	0.1	0.3	0.2	0.5	0.3	0.5	0.1	0.1	2.9			
	8 Western face (N) of western ext. @ 1m	93	5.3	2.2	2.5	1.4	0.8	1.9	0.2	1.4	0.6	0.9	0.9	0.0	2.3	0.4	0.5	0.7	0.8	0.2	0.0	0.1	1.0	0.1	0.9	1.0	3.1			
	9 Western face(S) of western ext. @ 1m	94	3.0	7.0	6.2	0.5	0.1	1.9	0.5	1.5	0.1	0.8	0.8	0.5	1.2	0.0	0.7	0.2	0.4	0.1	0.0	0.4	0.9	0.1	0.6	1.2	0.8			
	10 On CM5 Platform (S) @ 7.6m	95	6.9	1.6	4.6	2.0	0.8	1.3	0.5	1.4	0.5	0.1	0.4	0.2	0.8	0.1	0.3	0.7	0.2	0.1	0.0	0.3	0.8	0.1	0.4	0.4	0.4			
	11 14.4m from S wall at joint	100	1.6	2.0	0.2	3.2	0.3	2.0	0.1	1.3	0.2	0.4	0.9	0.3	0.8	0.3	1.2	0.4	0.7	0.0	1.5	1.3	2.0	0.6	0.4	1.0	0.4			
	12 2.7m from S wall CM6 at joint 6.7m from fan	99	0.5	2.2	2.2	5.4	0.5	0.5	2.7	1.3	1.3	2.3	2.0	0.8	1.3	0.3	4.9	1.2	1.0	1.8	3.8	2.3	2.7	0.4	0.5	1.4	0.6			
	13 E side S roll door @ 1m	101	0.8	0.0	0.9	0.3	0.5	0.8	2.0	1.7	0.1	3.3	1.5	1.5	1.3	0.2	0.2	0.4	0.1	0.2	0.7	0.2	0.2	0.7	0.4	1.2	3.5			
	14 CM6 E side centre door @ 1m (door 1/2 open)	102	1.9	1.3	1.7	0.0	0.9	0.8	0.5	0.3	0.7	2.1	0.4	0.3	0.6	0.1	0.0	0.0	0.3	0.3	0.3	0.2	0.3	0.6	2.4	1.3	1.3			
	15 2m from Clinker Building opp 13 & 14	115	1.7	1.0	0.9	2.7	1.0	1.8	3.0	2.1	1.1	0.0	0.8	0.9	0.5	0.2	0.7	0.0	0.0	0.1	0.4	0.0	0.0	0.9	2.3	0.9	1.0			
	16 E wall centre @ 1m	103	2.5	0.8	2.2	1.4	0.9	0.4	1.0	1.8	0.2	1.3	0.0	0.9	0.9	0.5	0.2	1.0	0.0	0.9	1.5	0.4	0.6	0.1	0.7	0.0	0.9			
	17 E roll door opp Mill	104	3.3	0.0	1.5	0.9	0.1	0.5	1.0	0.8	2.1	1.9	0.8	0.2	0.2	0.1	1.3	2.4	0.5	1.2	2.0	0.7	0.4	0.9	0.0	1.8	0.8			
	18 Door opp Comp Room @ 1m	105	0.5	0.8	2.7	0.9	0.1	1.4	0.5	2.2	1.5	1.3	0.3	0.1	0.8	0.0	1.7	2.6	0.9	1.6	0.6	0.6	0.2	0.1	0.9	0.8	1.5			
	19 Clinker Building @ 2m opp 18	114	3.7	0.2	2.2	2.4	0.8	0.5	1.2	1.6	0.4	1.5	0.3	0.5	0.1	0.3	1.1	3.2	1.8	1.2	0.8	0.4	0.4	1.2	0.4	0.7	4.3			
	20 Man door - open 100mm	107	0.4	1.6	2.2	1.1	0.1	0.3	0.5	1.3	0.7	1.3	0.6	0.4	0.1	0.1	0.6	1.4	1.0	0.6	0.8	1.6	1.0	1.0	0.1	0.5	1.6			
	21 1m Outside vent fan filter louvre	108	3.1	0.3	1.2	1.2	0.4	0.8	1.2	1.0	0.5	1.1	0.0	0.1	0.2	1.9	1.6	0.8	0.3	0.3	0.6	0.9	1.4	0.5	0.4	0.2	1.2			
	22 E side N wall vent @ 1m	109	5.6	1.0	1.2	3.2	3.3	0.6	1.3	1.3	2.1	2.2	0.7	0.7	0.0	0.1	0.4	0.0	0.6	0.4	0.5	0.2	2.1	4.1	0.6	0.9	1.3			
	23 Centre N wall vent @ 1m	110	1.9	1.1	0.4	1.6	3.1	0.8	0.1	0.2	1.4	1.7	1.3	0.5	0.5	0.5	0.3	0.5	0.3	0.0	2.7	0.8	1.3	3.1	1.7	0.7	1.0			
	24 W side N wall vent @ 1m	111	5.1	0.9	3.7	2.8	0.9	0.6	0.0	0.3	0.3	0.7	0.5	0.1	1.0	0.4	0.1	0.2	0.4	0.3	0.6	0.1	0.4	0.5	0.3	0.3	0.7			
	25 11m N of CM6 at joint	442	4.3	3.2	6.1	4.4	0.9	0.7	0.0	0.5	0.4	1.1	1.3	0.1	0.3	0.0	0.5	1.0	1.3	0.0	0.4	1.4	0.3	1.1	1.3	0.2	0.1			
	26 22.6m N of CM6	443	4.6	0.5	2.9	3.1	1.5	0.0	0.9	0.3	0.1	0.6	1.6	1.3	1.5	0.1	0.0	1.2	1.8	0.2	0.7	2.8	0.5	0.4	0.9	0.1	0.6			
	27 4m N of Conveyor transfer out of Clinker Building	445	1.1	3.6	4.2	2.7	0.8	0.3	0.3	1.6	0.9	0.8	2.1	0.4	1.0	0.7	1.3	1.3	0.7	1.1	0.9	0.9	0.0	0.5	0.4	0.3	0.2			
	28 4m N of dust collector on next building W , conveyor transfer noise	444	1.2	2.0	2.6	1.5	1.4	1.2	0.1	1.2	0.6	0.4	0.1	1.1	1.0	0.1	0.3	1.1	1.4	0.1	0.3	0.7	0.5	0.8	0.4	0.1	0.2			
	CM6 W wall fan discharge at platform ~8m	441	6.9	1.2	0.4	1.2	2.2	1.3	0.0	0.6	1.1	1.6	3.5	1.8	2.0	1.8	3.4	2.7	1.9	0.8	0.8	1.4	0.9	0.4	0.8	0.7	1.5			
	Door platform near CM6 W wall fan @ 7.5m	80	9.2	1.9	0.2	0.1	3.3	1.2	0.9	0.1	0.5	2.9	1.8	1.5	0.3	1.1	1.7	1.4	1.3	0.7	1.4	1.0	0.5	0.9	0.5	1.2	0.1			
	Door platform near CM6 W wall fan @ 3.5m	83	7.9	0.3	3.6	2.2	4.1	1.5	3.1	0.0	0.6	1.7	0.4	3.3	1.2	1.9	0.3	1.7	0.6	0.6	1.0	1.2	1.1	0.2	0.5	0.8	0.1			

Red highlighted cell means exceeds criteria

Table 3.7: Boral Cement Berrima Annual Noise 2020 - Comparison of LAeq results with those pf Previous Years for Cement Mill No.7 and CM6

Area	Location	Statistical Sound Level Result for Annual Assessment											Difference 2020 to Previous LAeq results								
		LAeq 2020	LA90 2020	LAeq 2019	LAeq 2018	LAeq 2017	LAeq 2016	LAeq 2015	LAeq 2014	LAeq 2013	LAeq 2012	LAeq 2011	2020-2019	2020-2018	2020-2017	2020-2016	2020-2015	2020-2014	2020-2013	2020-2012	2020-2011
CM7	A Top of stairs S	72	72	73	73	72	72	73	73	72	71	73	0	0	1	0	-1	0	1	1	0
	B 2m W of wall, edge of barrier facing baghouse	78	78	79									0								
	C Top of stairs N	72	71	72	73	72	72	73	71	71	71	71	-1	-1	-1	-1	-1	0	0	1	0
	D At corner N of Admin	73	72	74	75	71	72	72	72	70	69	68	-1	-3	2	0	0	1	2	3	4
	E Compressor room door @ 1m	73	72	70	72	69	71	72	74	73	74	75	2	0	4	2	1	-2	0	-1	-2
	E' Man door to compressor filter room@ 1m	70	70	69	71	69	69	71	70	69	71	71	1	-1	1	1	0	0	1	-1	-1
	F Wall vents N on W side @ 1m	77	76	75	78	76	76	76	77	77	77	75	2	-1	1	0	0	0	0	0	2
	G - Line N side of transfer house 13.5m to it, in-line W e	73	73	74	74	73	75	75	74	72	70	68	0	-1	0	-2	-1	-1	1	4	6
	I Vent S of door @ 1m	78	78	76	79	77	77	78	78	79	79	87	2	0	1	1	0	0	-1	-1	-9
	J Vents N of baghouse	80	80	78	80	77	78	77	79	80	86	89	2	1	3	3	3	2	1	-6	-9
	J' Edge of concrete opp, J. - 9.6m away	73	72	76	72	73	74	75	74	75	78	84	-3	1	-1	-1	-2	-2	-2	-5	-12
	J'* SW corner by vents at baghouse	78	78																		
	J'' under the baghouse Fan	81	81																		
	H W roller door @ 1m	79	78	81	81	82	81	80	80	81	80	77	-3	-2	-3	-2	-1	-1	-2	-2	2
	H' Edge concrete opp door H - 9.7m away	74	73	73	74	78	75	74	75	75	76	74	0	-1	-4	-1	-1	-1	-2	-2	0
	K Line level with G centre of compressor house	72	72	72	74	74	72	74	72	71	72	68	0	-2	-1	0	-2	0	1	0	5
	L N wall vent W side @ 1m	72	71	72	74	71	73	74	73	72	70	79	0	-2	0	-1	-2	-2	0	2	-7
	M Between wall vents @ 1m to wall	72	71	71	77	70	73	74	73	72	70	79	2	-5	2	-1	-2	-1	0	2	-7
	N Wall vents N wall E side @ 1m	73	72	71	73	71	71	71	71	69	69	67	2	0	2	2	2	2	4	5	6
	O Line E side of Comp House 20.5m to control point	73	72	72	76	72	73	75	73	72	70	67	1	-3	1	0	-2	0	1	3	6
	P 1m N roll door CM7	79	79	80	82	81	81	81	80	81	81	76	-1	-3	-1	-2	-2	-1	-2	-2	3
	P 1m outside Roll door N	79	79		67									12							
	Q 1m Man door Compressor House E side	77	76																		
	R corner SW of CM7	75	74	75	75	77	76	75					0	0	-2	-1	0				
	S' Kerb opp W wall CM7	74	74	74	74	74	74	74					1	0	0	0	0				
	S'' Kerb S of W wall CM7 tower	75	74	75	74	74	74	74					0	0	1	0	0				
	S Kerb S of E side CM7 tower	76	75	75	75	75	75	76					0	1	1	1	-1				
	T Kerb S of W wall CM5	76	75	73	75	74	75	76					2	1	2	1	0				
	T Kerb Opp W wall CM5	75	75	76	75	74	75	76					0	1	2	1	0				
	Under TS3 ground level 6.5 m from CM5	77	76	72									5								
	Transfer Station #TS3 Level 1 N side opening	75	74	74	73	73	71	71					1	1	2	4	3				
	TS3 Top Platform opp large fan discharge CM5	77	76	74	74	74	75	75	77	75	77	75	3	3	3	2	2	0	2	0	2
	TS3 S side platform opp main CM5 fan disch	76	76																		
	TS3 Stairway opp small fan discharge CM5	77	77		73	75	75	75	77	75	77	75		4	2	2	2	0	2	0	2
	TS3 stair S side opp CM5 fan	79	78																		

Red highlight indicates >3dB increase to an earlier year

Table 3.7: Boral Cement Berrima Annual Noise 2020 - Comparison of LAeq results with those pf Previous Years for Cement Mill No.7 and CM6

Area	Location	Statistical Sound Level Result for Annual Assessment											Difference 2020 to Previous LAeq results								
		LAeq 2020	LA90 2020	LAeq 2019	LAeq 2018	LAeq 2017	LAeq 2016	LAeq 2015	LAeq 2014	LAeq 2013	LAeq 2012	LAeq 2011	2020-2019	2020-2018	2020-2017	2020-2016	2020-2015	2020-2014	2020-2013	2020-2012	2020-2011
CM6	1 North West Corner @ 1m	84	83	79	85	79		80	82	80	81		5	-2	5		4	2	4	3	
	2 Front of Roller Door @ 1m (door open)	89	88	80	89			81	83	81	81		8	-1			8	6	8	8	
	2 NW roll door @ 1m open	87	87	87	89			81	83	81	81		0	-2			6	4	6	7	
	3 Between Door @ 2.4m due to pile	81	81	80	81			79	80	80	81		1	0			2	1	1	0	
	4 Front of Roller Door @ 1m	83	82	81	84			83	83	82	82		2	-1			0	0	1	1	
	5 Front of Southern Roller Door @ 1m	81	81	80	82			81	81	84	81		1	0			0	0	-3	0	
	6 Northern face of western ext. @ 1m	80	80	78	79			82	79	80	79		3	1			-2	1	0	1	
	7 On CM5 Platform (N) @ 6.8m	77	76	77	77			77	78	79			-1	0			0	-1	-2		
	8 Western face (N) of western ext. @ 1m	76	76	76	77			76	77	77	78		0	0			0	-1	-1	-1	
	9 Western face(S) of western ext. @ 1m	76	76	76	76			75	77	76	77		0	1			1	-1	0	-1	
	10 On CM5 Platform (S) @ 7.6m	76	75	75	77			75	78	76			1	-1			1	-2	0		
	11 14.4m from S wall at joint	77	76	78	76	77	78	76	78	77	79		-1	1	0	-1	1	-1	-1	-2	
	12 2.7m from S wall CM6 at joint 6.7m from fan	81	80	80	83								1	-2							
	13 E side S roll door @ 1m	77	76	77	76	73	75	80	81	82	82		0	0	4	1	-3	-5	-5	-5	
	14 CM6 E side centre door @ 1m (door 1/2 open)	88	87	84	80	75	76	74	75	77	74		4	8	13	13	14	14	11	15	
	15 2m from Clinker Building opp 13 & 14	78	78	75	76	72	73	78	78	89	79		4	2	6	6	1	0	-11	0	
	16 E wall centre @ 1m	77	76	75	80	72	73	74	75	80	74		2	-3	4	4	3	2	-3	2	
	17 E roll door opp Mill	84	83	83	96	80	82	74	75	78	77		1	-12	4	2	9	8	6	7	
	18 Door opp Comp Room @ 1m	79	75	79	81	79	76	82	83	85	82		0	-1	1	3	-3	-4	-6	-3	
	19 Clinker Building @ 2m opp 18	74	73	74	79	74	72	77	77	75	77		0	-5	1	2	-2	-3	-1	-3	
	20 Man door - open 100mm	75	74	75									-1								
	21 1m Outside vent fan filter louvre	75	74	74	76	72	72	73	75	72	74		1	-1	3	3	1	0	2	0	
	22 E side N wall vent @ 1m	78	78	81	84	75	82	82	84	81	83		-3	-6	3	-4	-4	-6	-3	-5	
	23 Centre N wall vent @ 1m	84	83	84	85	80	83	84	86	84	85		0	-1	3	1	0	-2	0	-1	
	24 W side N wall vent @ 1m	79	79	80	82	78	80	78	81	81	81		-1	-3	2	-1	1	-2	-2	-2	
	25 11m N of CM6 at joint	74	73	74	74	70	74	74	75	74			0	0	4	-1	0	-2	0		
	26 22.6m N of CM6	70	70	71	71	69	80	71	72	74	75		-1	0	2	-10	-1	-2	-3	-5	
	27 4m N of Conveyor transfer out of Clinker Building	63	62	77									-14								
	28 4m N of dust collector on next building W , conveyor transfer noise	61	60	77									-17								
	Door platform near CM6 W wall fan @ 7.5m	86	85	85									1								
	Door platform near CM6 W wall fan @ 3.5m	91	91	92									-1								
	CM6 W wall fan discharge at platform ~8m	86	84	85																	

Red highlight indicates >3dB increase to an earlier year

Table 3.7A: Site Sound Levels for CM7 Project - Inside CM7 building - changes compared to2020

Location	Measured LAeq,t				Differences		
	2020	2019	2018	2017	2020-2019	2020-2018	2020-2017
H* Inside main W roll door @ 1m	97	95	93	95	3	4	2
F* Inside NW corner	94	92	90	92	2	4	2
I* W side by hydraulics bench	96	94	93	95	1	3	1
J* inside vents	93	92	91	92	2	2	2
J'* SW corner by vents at baghouse	90	89	90	89	1	0	1
N end under centre axis, ground level	98	96	92	94	2	6	4
N end ground @ 2m to Mill N end	100	94	93		6	7	
Centre axis N end @ 2m at L1	97.4	97.8		95	0		2
Inside Door P N end of mill building @ 1m	96	94		94	2		2
Inside E side mill centre at columns N end	103	100		101	3		2
Inside E side mill centre at columns S end	101	98			3		
Inside NE corner mill room	96						
C701 platform 1.5m to N wall	94	91	90	92	2	4	2
Platform above centre centre mill	95	92	92	93	3	3	2
Inside, above Mill drive gear S end	93	91			2		
Tower stairs at roof level	91	89	89	91	2	2	1
1st platform above roof level in BE tower W side	87	86	85	86	1	2	1
2nd platform in BE tower by fans FA703 & FA720, W side wall @ 1m	83	82	82	83	1	1	1
Between Fans FA703 on & FA720 off	84	84	83	84	1	1	1
At crossway to CM5 level, N side at transfer to conveyor	82	82	81	82	0	0	0
At crossway to CM5 level, W side by wall @ 1m, BE @ 1.8m	81	82	81	82	0	0	-1
At W end crossway to CM5 by vent in S wall	79	79	79	77	0	0	2
Top level BE tower W side NW corner	82	83	82	82	-1	0	-1
Top level BE tower S side BE @ 0.8m	81	82	81	81	-1	-1	-1
Top level BE tower E side by drive motor end @ 0.8m & door @ 0.5m	83	84	80	84	-1	3	-1
Top level BE tower N side by drive motor end @ 0.8m	82	83			-1		
Crossway to CM5 E end by opening in floor, fan @ 3m	77	76	77	77	1	0	0
Crossway to CM5 by centre S wall vent	77	77			0		
Main baghouse SE corner top, 4m to E wall	85	83			2		
Main baghouse NE corner top, 4m to E wall	87	84	86	86	3	1	1
Base of main baghouse SW corner	87	85	86	86	2	1	1
CM7 FA701 motor & casing NE side @ 1.5m	90	89		89	1		1
CM7 SW corner 1m to FA701 discharge duct	86	86	87	86	1	0	0
CM7 FA701 inlet & casing SE side @ 1.m	88						
CM7 Mill g'box W side @ 1m	98						
J'* SW corner by vents at baghouse	78						
Compressor house inside W man door	76	95			-19		
Compressor house inside by purge filter	78	90			-12		
Compressor house inside E man door	76	75			2		
Compressor house inside centre	76	76			0		

Red highlight indicates >3dB increase to an earlier year

Table 3.7B: Boral Cement Berrima Annual Noise 2020 - Locations with an increase in LAeq results with those pf Previous Years for Cement Mill No.7 and CM6

Area	Location	Statistical Sound Level Result for Annual Assessment													Difference 2020 to Previous LAeq results								Comment
		LAeq 2020	LA90 2020	LAeq 2019	LAeq 2018	LA90 2018	LAeq 2017	LA90 2017	LAeq 2016	LAeq 2015	LAeq 2014	LAeq 2013	LAeq 2012	LAeq 2011	2020-2019	2020-2018	2020-2017	2020-2016	2020-2015	2020-2014	2020-2013	2020-2012	2020-2011	
CM7	D At corner N of Admin	73	72	74	75	74	71	70	72	72	72	70	69	68	-1	-3	2	0	0	1	2	3	4	Similar to previous 7 years
	E Compressor room door @ 1m	73	72	70	72	72	69	69	71	72	74	73	74	75	2	0	4	2	1	-2	0	-1	-2	Depends on cycle of compressor, is relatively low
	G - Line N side of transfer house 13.5m to it, in-line W ed	73	73	74	74	74	73	72	75	75	74	72	70	68	0	-1	0	-2	-1	-1	1	4	6	Similar to previous 7 years
	J Vents N of baghouse	80	80	78	80	79	77	77	78	77	79	80	86	89	2	1	3	3	3	2	1	-6	-9	
	N Wall vents N wall E side @ 1m	73	72	71	73	72	71	70	71	71	71	69	69	67	2	0	2	2	2	2	4	5	6	Assume low values are when plant off?
	O Line E side of Comp House 20.5m to control point	73	72	72	76	75	72	71	73	75	73	72	70	67	1	-3	1	0	-2	0	1	3	6	?
	P 1m outside Roll door N	79	79		67	67										12								Would have been CM7 off
	Under TS3 ground level 6.5 m from CM5	77	76	72											5									May be a different location
	Transfer Station #TS3 Level 1 N side opening	75	74	74	73	73	73	72	71	71					1	1	2	4	3					Depends on operating condition and is not significant
	TS3 Stairway opp small fan discharge CM5	77	77		73	72	75	74	75	75	77	75	77	75		4	2	2	2	0	2	0	2	
CM6	1 North West Corner @ 1m	84	83	79	85	85	79			80	82	80	81		5	-2	5		4	2	4	3		
	2 Front of Roller Door @ 1m (door open)	89	88	80	89	89				81	83	81	81		8	-1			8	6	8	8		Door open
	2 NW roll door @ 1m open	87	87	87	89	89				81	83	81	81		0	-2			6	4	6	7		
	13 E side S roll door @ 1m	77	76	77	76	76	73	73	75	80	81	82	82		0	0	4	1	-3	-5	-5	-5		
	14 CM6 E side centre door @ 1m (door 1/2 open)	88	87	84	80	80	75	75	76	74	75	77	74		4	8	13	13	14	14	11	15		Door open
	15 2m from Clinker Building opp 13 & 14	78	78	75	76	76	72	71	73	78	78	89	79		4	2	6	6	1	0	-11	0		
	16 E wall centre @ 1m	77	76	75	80	79	72	72	73	74	75	80	74		2	-3	4	4	3	2	-3	2		
	17 E roll door opp Mill	84	83	83	96	95	80	79	82	74	75	78	77		1	-12	4	2	9	8	6	7		Door probably open
	23 Centre N wall vent @ 1m	84	83	84	85	85	80	80	83	84	86	84	85		0	-1	3	1	0	-2	0	-1		
	25 11m N of CM6 at joint	74	73	74	74	73	70	69	74	74	75	74			0	0	4	-1	0	-2	0			

Red highlight indicates >3dB increase to an earlier year

Table 3.8: Boral Cement Berrima Works 2020 Annual Environmental Noise Assessment for CM7 Project - and CM6
Measurement locations with increase in sound level > 3 dB and calculated contribution sound level at receivers

Location	Year	Time	Period sec	Sound Level dB(A) $L_{AEQ.t}$	Comments	Distance measured metres	Distance to Receivers					
							Distance Attenuation to receiver					
							Calculated LAEQ level at receiver distance only					
							Adelaide	Brisbane	Melbourne	Argyle	South	Loc.20
						Objective Night	40	40	40	40	37	58
CM7												
D At corner N of Admin F51	**2020**	12:27 PM	61	73	Distance	23	**514**	**611**	**615**	**781**	**1664**	**324**
	2010			67	Source after DIR		**72**	**72**	**72**	**72**	**48**	**72**
Difference 2020 - 2010			*Difference*	**6**	Distance reduction		-27	-28	-29	-31	-37	-23
					Calculated SPL without barriers		***45***	***44***	***44***	***42***	***11***	***49***
Noise is from other sources, not just CM7												
E Compressor room door @ 1m F53	**2020**	12:31 PM	60	73	Distance	1	**546**	**636**	**628**	**791**	**1615**	**335**
	2017			69	Source after DIR		**61**	**64**	**67**	**70**	**64**	**67**
Difference 2020 - 2017			*Difference*	**4**	Distance reduction		-55	-56	-56	-58	-64	-51
					Calculated SPL without barriers		***6***	***8***	***11***	***12***	***0***	***16***
Noise is from other sources, not just CM7												
G - Line N side of transfer house 20m to it, in-line W edge CM7 F71	**2020**	1:05 PM	61	73	Distance	20	**517**	**611**	**610**	**773**	**1647**	**321**
	2011			68	Source after DIR		**73**	**73**	**73**	**73**	**38**	**73**
Difference 2020 - 2011			*Difference*	**6**	Distance reduction		-28	-30	-30	-32	-38	-24
					Calculated SPL without barriers		***45***	***43***	***43***	***41***	***0***	***49***
Noise is from other sources, including CM6 open doorway, not just CM7												
J Vents N of baghouse F58	**2020**	12:40 PM	61	80	Distance	1	**551**	**641**	**633**	**796**	**1610**	**330**
	2017			77	Source after DIR		**73**	**75**	**77**	**77**	**75**	**77**
Difference 2020 - 2017			*Difference*	**3**	Distance reduction		-55	-56	-56	-58	-64	-50
					Calculated SPL without barriers		***18***	***19***	***21***	***19***	***11***	***27***
Noise is from other sources, including CM6, not just CM7												
K Line level with G centre of compressor house F69	**2020**	1:02 PM	62	72	Distance	1	**517**	**611**	**610**	**773**	**1647**	**321**
	2011			68	Source after DIR		**72**	**72**	**72**	**72**	**44**	**72**
Difference 2020 - 2011			*Difference*	**5**	Distance reduction		-54	-56	-56	-58	-64	-50
					Calculated SPL without barriers		***18***	***16***	***16***	***14***	***-20***	***22***
Transfer Station #TS3 Level 1 N side opening F74	**2020**	2:39 PM	62	**74**	Distance	1	**514**	**611**	**615**	**781**	**1664**	**324**
	2016			71	Source after DIR		**74**	**74**	**74**	**74**	**49**	**74**
Difference 2020 - 2016			*Difference*	3	Distance reduction		-54	-56	-56	-58	-64	-50
					Calculated SPL without barriers		***20***	***19***	***19***	***17***	***-15***	***24***
TS3 Stairway opp small fan discharge CM5 F76	**2020**	2:44 PM	62	**76**	Distance	10	**534**	**633**	**637**	**806**	**1652**	**347**
	2018			73	Source after DIR		**77**	**77**	**77**	**74**	**54**	**77**
Difference 2020 - 2018			*Difference*	3	Distance reduction		-35	-36	-36	-38	-44	-31
					Calculated SPL without barriers		***42***	***41***	***41***	***35***	***10***	***46***
Likely caused by CM6 open doorway; Barrier in place to village receivers.												
N Wall vents N wall E side @ 1m F65	**2020**	12:54 PM	62	**73**	Distance	1	**517**	**611**	**610**	**773**	**1647**	**321**
	2011			67	Source after DIR		**72**	**72**	**72**	**70**	**46**	**72**
Difference 2020 - 2011			*Difference*	**6**	Distance reduction		-54	-56	-56	-58	-64	-50
					Calculated SPL without barriers		***18***	***16***	***16***	***12***	***-19***	***22***
No change since 2013 but influenced by FA502 and dependent on other sources e.g. K6												
O Line E side of Comp House 20m to control point F68	**2020**	1:00 PM	62	**73**	Distance	20	**517**	**611**	**610**	**773**	**1647**	**321**
	2011			67	Source after DIR		**73**	**73**	**73**	**70**	**38**	**73**
Difference 2018 - 2011			*Difference*	**6**	Distance reduction		-28	-30	-30	-32	-38	-24
					Calculated SPL without barriers		***44***	***43***	***43***	***38***	***0***	***49***
Noise is from other sources including CM6 western doorway, not just CM7												

Table 3.8: Boral Cement Berrima Works 2020 Annual Environmental Noise Assessment for CM7 Project - and CM6
Measurement locations with increase in sound level > 3 dB and calculated contribution sound level at receivers

Location	Year	Time	Period sec	Sound Level dB(A) $L_{AEQ.t}$	Comments	Distance measured metres	Distance to Receivers					
							Distance Attenuation to receiver					
							Calculated LAEQ level at receiver distance only					
							Adelaide	Brisbane	Melbourne	Argyle	South	Loc.20
						Objective Night	40	40	40	40	37	58
CM6												
2 Front of Roller Door @ 1m	**2020**	3:05 PM	61	**89**	Distance	1	**532**	**633**	**639**	**813**	**1665**	**353**
	2019			80	Source after DIR		**70**	**74**	**78**	**78**	**74**	**78**
Difference 2020 - 2019			*Difference*	**8**	Distance reduction		-39	-41	-41	-43	-49	-49
					Calculated SPL without barriers		***31***	***33***	***37***	***35***	***25***	***29***
Door is fully open												
14 CM6 E side centre door @ 1m F102	**2020**	3:33 PM	61	**88**	Distance	1	**541**	**653**	**658**	**833**	**1660**	**373**
	2012			74	Source after DIR		**66**	**64**	**60**	**54**	**65**	**60**
Difference 2020 - 2012			*Difference*	**15**	Distance reduction		-55	-56	-56	-58	-64	-51
					Calculated SPL without barriers		***12***	***7***	***3***	***-4***	***0***	***8***
Significant barriers also to each receiver. Door half open												
15 2m from Clinker Building opp 13 & 14, 10.7m to CM6 F115	**2020**	3:55 PM	67	78	Distance	10.7	**541**	**653**	**658**	**833**	**1660**	**373**
	2017			72	Source after DIR		**57**	**54**	**51**	**45**	**56**	**54**
Difference 2019 - 2016			*Difference*	**6**	Distance reduction		-34	-36	-36	-38	-44	-31
					Calculated SPL without barriers		***23***	***19***	***15***	***8***	***12***	***24***
Significant barriers also to each receiver. Influenced by the partly open doors at position 14												
17 E roll door opp Mill - door open F104	**2020**	3:36 PM	62	**84**	Distance	1	**541**	**653**	**658**	**833**	**1660**	**373**
	2015			74	Source after DIR		**66**	**63**	**59**	**53**	**66**	**63**
Difference 2020 - 2015			*Difference*	**9**	Distance reduction		-55	-56	-56	-58	-64	-51
					Calculated SPL without barriers		***12***	***7***	***3***	***-5***	***2***	***11***
Significant barriers also to each receiver, also influenced by the open door at position 17												
23 Centre N wall vent @ 1m F110	**2020**	3:47 PM	62	**84**	Distance	1	**525**	**626**	**639**	**812**	**1677**	**350**
	2017			80	Source after DIR		**84**	**84**	**84**	**81**	**65**	**84**
Difference 2020 - 2017			*Difference*	**3**	Distance reduction		-54	-56	-56	-58	-64	-51
					Calculated SPL without barriers		***29***	***28***	***27***	***23***	***0***	***33***
25 11m N of CM6 at joint	**2020**	3:50 PM	25	**74**	Distance	11	**525**	**626**	**639**	**812**	**1677**	**350**
	2017			70	Source after DIR		**74**	**74**	**74**	**68**	**40**	**74**
Difference 2020 - 2017			*Difference*	**4**	Distance reduction		-34	-35	-35	-37	-44	-30
					Calculated SPL without barriers		***40***	***38***	***38***	***31***	***-3***	***44***
Other sources contributing here as well as CM6												

ABN: 25 153 946 064
ACN: 153 946 064

3.3 Isotainer Loading Operations Facility sound levels

A new Isotainer Loading Operations facility has been implemented at Berrima works. Operations at this facility commenced during the monitoring period, consequently there are some measured periods before and after the operations commenced. Operations from this facility include loading directly from truck to train and stack on three days a week (Monday, Wednesday and Friday from 8am to 5pm), with train loading operations from 9:30am to 4:30pm. On the other two days of the week (Tuesday, Thursday), loading to stack occurs, generally from 8am to 5pm, although it can occur until 10:00pm.

Figure 3.9 describes the site layout, sound level measurement location and typical truck and loader / "Reacher" movements during operations. Figures 3.10 through to 3.12 are the photographs of the views that are described on that layout. Also indicated on the layout is the position where the measurements are taken. The activities and sound levels are shown in Table 3.9 and the Spectra and tonality of the movements are presented in Table 3.10 and Table 3.10A

Measurements were also taken at Location 20 during isotainer loading activities. This included a period with a train runout (a train idling then departing). At the isotainer measurement location, Reacher and truck activities were measured while loading trains. It is noted that the $\mathbf{L_{A90.15\text{-}minute}}$ values at Location 20 and the isotainer measurement location during measurement of operations were 50 dBA, indicating that the isotainer loading operations did not cause sound levels at Location 20 to increase or exceed the licence limit of $\mathbf{L_{A90.15\text{-}minute}}$ of 58 dBA.

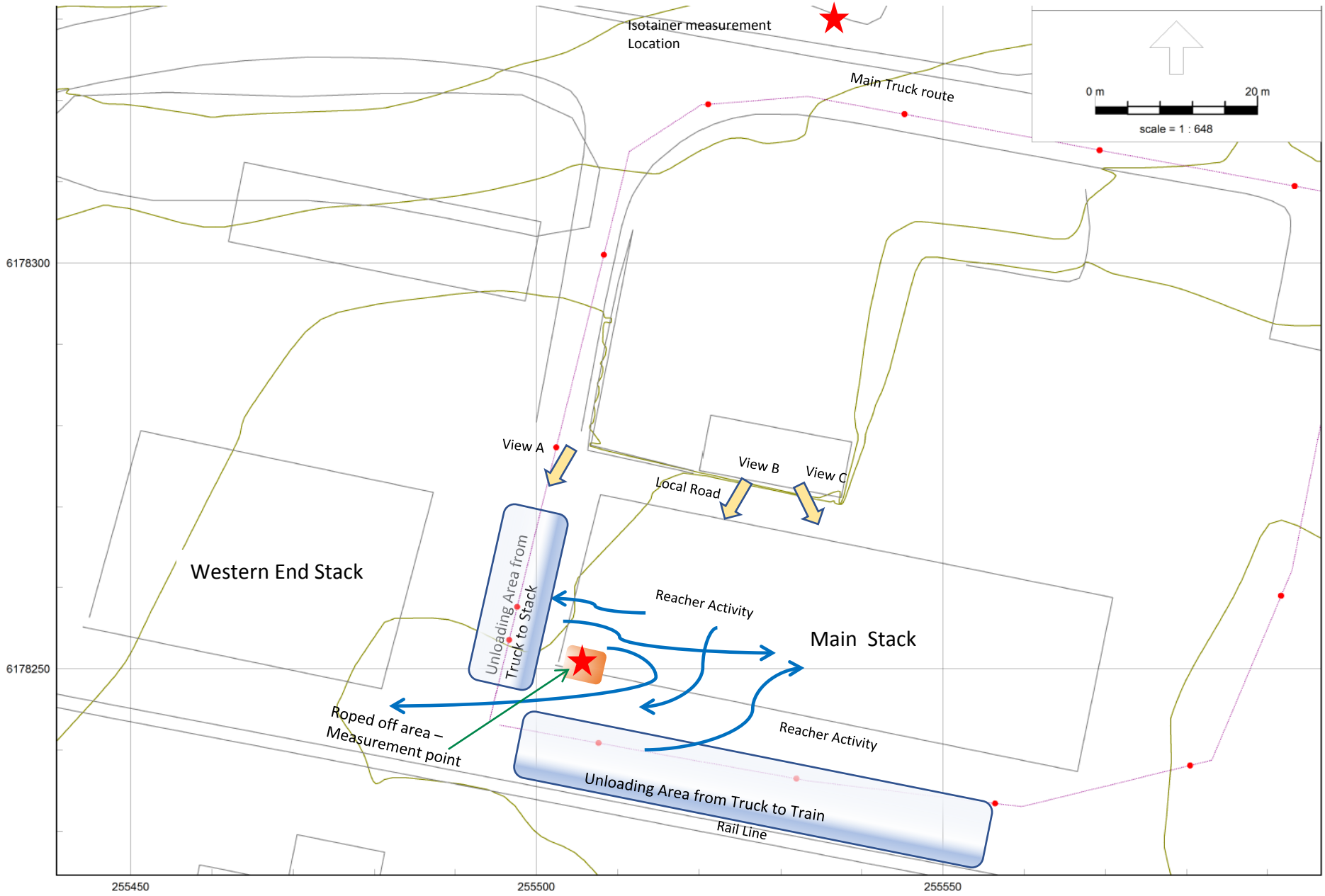

Figure 3.9 The layout of the Intermodal operations

Figure 3.10 View A :- Looking down the truck loading road and at the western stack

Figure 3.11 View C :- Looking at the Main Stack

Figure 3.12 View B Looking at the measurement point (behind the ropes) and reach loader

Table 3.9 Berrima Cement Annual Noise Assessment 2020

Measurements of source activities at the Isotainer Loading facility

Date	Time	File No.	Wav No.	Period t	Statistical Sound Level Parameter - dBA						Activity measured
				mm:ss	$L_{Aeq,t}$	$L_{A01,t}$	$L_{A10,t}$	$L_{A90,t}$	$L_{Ceq,t}$	L_{Ceq}-L_{Aeq}	
21/10/20	2:41 pm	42	99	01:54	69	80	74	60	77	8	pickup from train & put to ground
21/10/20	2:44 pm	43	100	02:18	70	77	75	60	78	9	pickup from train & put to isotainer stack - western end
21/10/20	2:46 pm	44	102	01:36	72	79	77	61	79	8	pickup full iso container from ground load to train
21/10/20	2:49 pm	45	103	04:50	72	80	76	59	80	8	truck enter - unload truck (1:34) Train Moving (2m to 2min 20) load train (4m 8) unload from train 4min 47 in frontsay 10-15m
21/10/20	2:55 pm	46	104	02:35	66	77	67	60	75	10	pickup from train 50sec load to eastern stack to ground 15m
21/10/20	2:59 pm	47	105	02:14	71	79	76	58	80	9	piuckup from train ; load to western stack
21/10/20	3:01 pm	48	106	01:31	72	79	76	61	80	8	pickup from train (18mtres) load to stack west
21/10/20	3:03 pm	49	107	01:42	72	79	77	66	80	8	unload from train (13m) - load to middle stack
21/10/20	3:06 pm	50	108	02:27	70	78	74	61	79	10	pickup from stack (top) : load to train 15m memory card full
21/10/20	3:13 pm	51		02:00	71	78	74	61	81	11	unload train to stack west
21/10/20	3:15 pm	52		02:29	71	81	74	58	81	9	pick up from stack 10m from ground then moved and put to ground train moved
21/10/20	3:18 pm	53		01:13	72	78	76	65	83	11	while train was idling (eastern end) lifted from ground to train
21/10/20	3:22 pm	54		02:02	76	78	76	76	92	16	train idling (6m) leq 76.2
27/10/20	10:54 am	43S		08:55	72	83	77	60	81	9	the empty iso placed on truck ; truck moves out ;Next truck in ; reacher in 1:34 ;lift from truck ; 2:09 Place onto stack 3:53 to 4:21 ;Pick up Empty iso - Western stack 23m+ 6m 5:30 ;Completre lift; 7:20 ; Empty iso on truck; 8:55
27/10/20	11:22 am	44S		06:10	72	82	76	63	80	8	Next truck in ; Pick up iso 1:13 83. dbA ; Place onto stack 2:43. 16m ; Pick up Empty iso - Bay 3 (22 + 18m) ; Put down empty 5:00 ; Truck out
27/10/20	11:28 am	45S		07:23	73	84	77	63	81	7	Truck in 13 sec ; Pick up full 1:23 - 84 dbA ; Put down full Bay 2 3:01 63 dbA ; Pick up Empty iso - Western stack 23m+ 6m 4:50 65dBA ; Load Empty to Truck 6:00 76-82 dbA ; Truck out reversed parked ;
27/10/20	11:36 am	46S		13:04	71	81	75	64	80	9	truck in 0:20 ; pickup 0:32 ; Lift 0:58. 82 dBA ; (there was train movement) ; Put down full 2:46 (8m) ;wait ; 6:20 Reacher moving ; Pickup Bay 4 (way down) ; idle in front 11:30 (8m) ; start moving 12:00 ; Down on truck 12:30 ; Truck out
27/10/20	11:49 am	47S		05:44	72	82	76	62	80	8	Truck in ; Lift off Truck 0:22 to 0:48. 83 dBA ; Put down Bay 2 2:09 ; Pick up empty Western Stack 3:20 ; Put down on truck 4:40 ; Reacher parks 5:04 ; Truck out 5:34 ;

Table 3.10 Berrima Cement Annual Noise Assessment 2020

One-third Octave Band Spectra at the Isotainer Loading facility

			Sound Level $L_{Aeq,t}$ dBA in One-third octave frequency band Hz																										
File	$L_{Ceq,t}$	$L_{Aeq,t}$	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	####
42	77	69	19	25	34	37	42	51	47	51	53	50	50	54	54	55	57	56	57	61	66	57	54	52	49	46	42	38	32
43	78	70	19	25	34	37	45	52	46	53	54	51	51	54	54	58	59	58	61	61	62	59	57	54	53	50	47	46	41
44	79	72	19	26	36	36	40	53	48	53	54	53	53	66	54	57	61	58	61	64	63	61	58	56	53	51	47	43	39
45	80	72	20	26	39	45	46	51	49	53	54	52	53	60	56	59	61	61	64	63	63	62	59	58	56	55	52	50	47
46	75	66	19	24	32	33	40	48	44	51	51	48	49	53	50	52	55	54	55	59	56	55	53	50	47	45	41	36	31
47	80	71	21	25	37	42	46	54	49	53	54	54	55	59	55	59	60	59	60	63	62	60	58	56	54	52	48	44	38
48	80	72	20	25	37	42	45	53	49	57	56	55	54	56	57	59	60	60	63	64	64	61	60	58	55	54	50	45	39
49	80	72	19	25	36	41	46	53	48	56	56	53	54	60	57	60	62	61	63	63	64	62	59	58	56	54	51	46	42
50	79	70	19	25	37	42	46	51	48	53	54	53	54	55	54	57	57	57	62	61	61	60	57	54	52	50	46	42	38
51	81	71	20	25	38	43	45	55	49	52	54	53	56	59	57	59	60	59	61	61	62	60	58	56	53	51	46	42	36
52	81	71	22	27	40	44	43	51	48	52	51	51	56	59	56	59	60	60	61	62	63	62	59	57	55	54	49	47	43
53	83	72	21	26	41	45	46	56	50	56	55	52	55	60	57	60	62	60	61	63	63	63	59	57	57	54	51	46	43
54	92	76	25	38	59	45	42	53	53	53	55	55	55	61	67	67	68	70	64	61	60	66	59	59	57	56	55	54	52
43S	81	72	30	29	36	42	44	50	48	54	55	55	54	63	55	59	62	61	62	62	63	62	59	58	55	54	52	50	47
44S	80	72	30	29	36	39	45	49	49	55	54	54	54	61	57	59	61	62	63	63	64	62	60	58	55	55	51	50	47
45S	81	73	30	29	35	41	44	51	48	55	55	53	54	62	56	60	65	62	63	64	65	63	61	60	56	55	53	50	46
46S	80	71	30	30	37	42	44	48	48	53	52	54	54	61	57	58	61	60	61	62	61	60	58	55	53	52	47	46	42
47S	80	72	29	28	36	39	44	50	49	55	56	55	55	62	57	59	62	61	63	63	63	62	60	57	55	53	50	48	45

Table 3.10A Berrima Cement Annual Noise Assessment 2020

Tonality in the One-third Octave Band Spectra at the Isotainer Loading facility

	Tonality of $L_{Aeq,t}$ dB in One-third octave frequency band Hz - Red highlight indicates exceedance of Tonality objective																							
File	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000
Criterion	15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5
42	2.2	3.7	1.5	1.8	6.2	3.6	0.8	2.4	1.0	2.6	2.6	0.8	0.6	1.8	1.4	1.3	0.2	6.6	3.2	0.0	0.3	0.3	0.8	0.3	0.3
43	1.8	2.7	2.1	0.4	6.3	6.3	2.7	2.4	1.4	1.5	1.1	1.5	1.2	1.1	2.2	1.5	0.0	1.7	0.4	0.3	0.6	0.5	0.1	0.5	1.6
44	1.9	5.0	1.6	5.1	9.6	5.7	2.3	1.4	1.2	6.0	12.1	7.0	0.8	3.2	2.5	0.4	2.3	0.0	1.1	0.7	0.4	0.4	0.7	0.3	0.4
45	3.9	4.0	2.5	2.5	4.1	3.5	1.8	0.9	1.0	2.7	4.9	3.4	0.6	1.4	1.9	1.7	0.2	0.4	1.1	0.8	0.1	0.1	0.5	0.3	0.8
46	1.6	3.5	3.1	0.4	5.9	5.3	3.3	1.7	2.1	1.3	3.0	2.3	0.3	1.6	0.7	1.4	3.1	0.6	0.5	0.4	0.4	0.3	1.2	0.3	0.2
47	3.9	3.9	0.2	1.5	6.8	5.2	2.1	0.3	0.7	1.2	4.0	4.1	1.2	1.3	1.1	0.6	1.4	0.9	0.2	0.5	0.2	0.2	0.8	0.5	0.3
48	3.5	3.5	0.6	1.9	5.8	6.3	4.5	0.4	0.6	1.0	0.3	0.7	0.5	0.8	1.6	1.4	0.0	1.4	0.5	0.3	0.1	0.4	1.3	0.5	0.3
49	3.2	3.5	0.1	1.2	5.7	6.1	4.0	1.3	1.6	3.0	4.8	3.0	0.3	1.9	2.0	1.3	0.2	0.9	0.8	0.6	0.2	0.2	0.8	0.4	0.4
50	3.0	3.2	0.3	0.1	4.0	3.7	1.5	1.4	1.3	0.1	1.1	2.4	1.8	0.3	1.9	2.3	0.4	0.9	0.5	0.3	0.3	0.3	1.0	0.1	0.5
51	4.0	3.8	2.0	4.3	8.2	4.8	0.7	1.1	1.4	0.3	2.7	2.5	1.0	0.8	1.8	1.2	0.1	0.8	0.6	0.4	0.3	0.3	0.6	0.1	0.8
52	4.1	4.6	2.7	4.8	5.8	3.6	2.5	0.7	1.9	0.5	3.0	2.7	0.9	0.2	0.5	0.3	0.3	0.5	1.1	0.2	0.1	0.5	1.7	1.0	0.6
53	4.7	4.9	1.9	4.5	7.9	5.9	3.1	1.4	3.2	0.5	3.3	2.3	0.0	2.3	1.9	0.0	0.5	0.5	1.6	0.7	0.6	0.7	0.7	0.4	0.3
54	4.1	17.5	5.4	7.2	5.7	0.0	1.1	0.6	0.1	2.6	0.3	3.1	0.6	0.4	4.1	1.7	0.9	3.6	6.6	3.3	0.5	0.4	0.0	0.3	0.2
43S	3.6	0.3	1.9	1.9	4.1	4.2	3.0	0.1	0.1	4.6	8.4	5.8	0.6	2.1	1.5	0.6	0.2	0.8	0.9	0.6	0.8	1.3	1.0	0.5	1.0
44S	4.1	2.0	1.3	1.0	2.3	3.5	3.8	0.8	0.1	3.3	5.3	3.1	0.1	0.7	0.2	0.3	0.1	1.0	0.1	0.5	0.1	1.3	2.0	1.7	1.3
45S	3.6	0.2	1.2	1.8	4.9	5.1	3.7	1.1	1.5	3.6	6.9	4.6	1.1	4.2	1.9	0.2	0.1	1.0	0.6	0.8	1.5	1.5	1.0	0.4	0.9
46S	3.9	1.4	1.5	0.8	1.8	2.8	3.4	1.2	0.6	3.5	5.4	2.3	0.8	1.3	0.6	0.1	0.7	0.4	0.5	0.2	0.1	0.8	1.9	1.8	1.6
47S	4.6	2.6	1.5	0.1	3.7	3.6	2.1	1.3	0.2	4.0	6.3	3.6	0.8	2.6	1.7	0.4	0.6	0.6	0.4	0.2	0.2	0.2	0.9	1.1	1.0

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4. Licence Monitoring location and Residential receiver sound levels - review for 2020

Environmental sound levels are measured at the Licence monitoring Location 20 and at residential receiver locations in New Berrima. A combination of unattended and attended monitoring is used at three locations –

- Location 20 – the Store Yard Close – monitored since 2015
- North Fence – Monitored since 2007
- 4 Melbourne Street, New Berrima – monitored since 2002

Measurements are to assess changes at the locations, acceptability of received sound levels and compliance with the licence conditions.

Attended monitoring is also made at three other residential receiver locations to provide comparisons with previous measurements.

- Argyle St opposite the General Store
- 12 Brisbane St
- Adelaide St back 20m from Taylor Avenue top match the front façade of 72 Taylor Avenue, monitored previously

Attended measurements were made on 9, 12, 21 and 27 October 2020.

An additional residential location at 30 Adelaide Street was added for the 2018 and 2019 surveys to provide a background prior to commencement of the Austral Bricks Quarry. This was not monitored in 2020.

4.1 Unattended measurement results

Unattended measurements were made using logging sound level meters at 3 locations, shown in Figure 1.2:

- Residential:
  - 4 Melbourne Street, New Berrima (full results provided in Appendix B) for the period 9 to 22 October 2020.
- Boral Cement industrial site:
  - Northern Boundary at the north-western corner of the Stores Yard (full results provided in Appendix C) for the period for the period 9 to 27 October 2020.
  - Location 20 at the south-western corner of the Stores Yard, north of the internal cross road north of the Fettler's Shed (full results provided in Appendix D) for the period for the period 9 to 27 October 2020.

Monitoring instruments measured the sound levels continuously and stored the statistical results every 15-minutes. The loggers at the Northern Boundary and Location 20 also stored all of the sound levels to allow processing of other parameters, such as $L_{A01.1\text{-minute}}$. The logger at Location 20 also stored directional information of sound level quality from which the direction of a significant source can be identified.

During the period of measurements, the Kiln was operating for the whole period. Table 1.1 shows the times of non-operation of the major plant items and Figures 1.4 to 1.6 show the non-operating periods

graphically. Some of these periods will have affected measured sound levels at the residential receivers and some will not.

The two fans which feed the stack, FA39 from the ESP and FA250 from RM7 baghouse, operated at different speeds at different times. Figure 4.1 shows the speed variations over the monitoring period. FA39 had a maximum of 879 rpm and a minimum of 850 rpm and most of the time was between 857 and 877 rpm. FA250 operated at a maximum speed of 906 rpm, a minimum speed of 857 rpm and most of the time was between 900 and 904 rpm. While the speed variation might cause a change in sound pressure level emitted from the fans of perhaps 1 dB (based on sound power level proportional to the speed$^{5th\ power}$), the main effect of the speed variation is to change the blade-pass frequency of the fans which is noted in environmental noise measurements. For the 12 bladed fan FA39 this variation between maximum and minimum speed would be approximately 6 Hz while for FA250 this variation would be approximately 10 Hz.

Statistical sound level parameters measured include the following:

$L_{Aeq.15\text{-}minute}$ The equivalent A-weighted continuous or time averaged sound level over each 15-minute period as units of dB. This single sound level represents the equivalent of the sound energy in all of the sound levels in the period, using a logarithmic average. This value is compared with objective sound levels for amenity and intrusiveness.

$L_{A90.15\text{-}minute}$ The 90% exceedance sound level over a 15-minute period. This is the sound level exceeded for 90% of the time or 13.5 minutes in each 15-minute period. It is often referred to as the background sound level and is used for comparison with objectives.

$L_{A01.1\text{-}minute}$ The 1% exceedance sound level over a 1-minute period. This is the sound level exceeded for 1% of the time or 0.6 seconds in each minute. It is used for assessment of typical maximum night-time sound levels and for comparison of the **$L_{A01.1\text{-}minute}$** - **$L_{A90.15\text{-}minute}$** difference with a maximum 15 dB difference objective for not causing sleep disturbance.

From these parameters, long-term averages are calculated for each period of day, evening and night in a 24-hour period, then averages or medians of these are obtained for the full length of the measurement periods of 12 to 16 days.

$L_{AEQ.period\ average}$ this is the energy average of the period (day, evening or night) L_{AEQ} for all of the periods monitored

$L_{A90.average}$ this is the arithmetic average of the average period $L_{A90.15\text{-}min}$ for the periods monitored.

10%$L_{A90.average}$ this is the median of the period 10% $L_{A90.15\text{-}min}$ for the monitoring period

Weather conditions

Weather is measured at the site meteorology station to the south of the Raw Materials Store. A summary of the weather conditions for the period 10 to 26 September when the residential monitoring was done is shown in Figure 4.2, with those relevant to noise propagation and measurement (wind speed, wind direction and rainfall) is shown in Figure 4.3.

Wind speed and rainfall are shown in Figure 4.3, wind speed and direction is shown on Figure 4.4. Weather conditions for subsequent groups of three-day periods are shown in Figures 4.5 to Figure 4.10.

Daytime temperatures ranged from cool 15ºC to mild 25^{o}C - See Figure 4.2A. Night-times were cool with a range of 5 to 15^{o}C.Wind direction was mainly westerly when there was wind greater than 1m/s, but there were also periods when it was South to South-east. At times the wind speed was strong, averaging above 10m/s for long periods on 9th, 10th, 11th, 16th 17th and 26th October, but most of the time the average wind speeds were in the range 2 to 6 m/s. Data for the high wind speed periods greater than 10m/s were discarded as it was likely wind speeds at or close to the microphones were above 5m/s. During very low wind speed periods the wind direction was variable. Westerly winds assist with enhancing noise propagation from the Hume freeway to New Berrima but are not significant for propagation from the Cement Plant towards New Berrima.

Rain occurred on about four days for brief periods, with the highest period having 5.5mm in 15-minutes on 18th. There were regular rain periods from 24th to 26th October. Data from rain periods was deleted for this assessment.

Table 4.1 provides a summary of the statistical data for all sites over the full period of the monitoring. Results for 4 Melbourne St, the Northern Fence and Location 20 are based on the long-term average sound levels over two weeks, while for the other residential locations they are based on attended monitoring.

The results show that for average period L_{Aeq} values, Location 20 averaged 55 to 56 dBA. $L_{A90,period}$ averages were 52 to 53 dBA.

For the residential receivers attended monitoring, 4 Melbourne Street was the quietest of the three usual residential locations for the day period with 54 dBA, while the Northern Boundary had 51 dBA daytime averages, the same as in 2019. Evening sound levels were lowest at 12 Brisbane St with 41 dBA while at 4 Melbourne St. the period average was 49 dBA. For night-time, at 12 Brisbane St was the lowest with 42 dBA with 4 Melbourne St. having 47 dBA. The Adelaide St / Taylor Avenue receiver had the highest residential receiver results with 61 dBA daytime, 51 dBA evening and 52 dBA night-time.

For average period L_{A90} values at residential receivers, 4 Melbourne St. had the lowest sound levels in daytime period with 43 dBA and 42 dBA in evening and 41 dBA at night-time. Adelaide St - 72 Taylor Avenue had the highest residential values for this parameter with 51 dBA average in daytime and 43 dBA in evening and 44 dBA in night-time periods. Location 20 - Store Yard Close location had average period L_{A90} values of 52 to 53 dBA, which are below the objective of 58 dBA.

As in previous years, these results continue to demonstrate that road traffic noise has a more significant effect on residential receiver L_{Aeq} sound levels than the Cement Plant.

The Store Yard Close - Location 20 had period average $L_{A90.period}$ sound levels of 52 dBA in daytime and evening and 53 dBA in night-time, which are all less than the licence condition objective of 58 dBA. These are similar to the results of previous measurements.

Table 4.2 compares the long-term average results for 2020 with those measured since 2002.

For Location 20, the long-term average $L_{Aeq,period}$ results were lower than in 2019 and lower than or equal to the overall average of all results since 2015.

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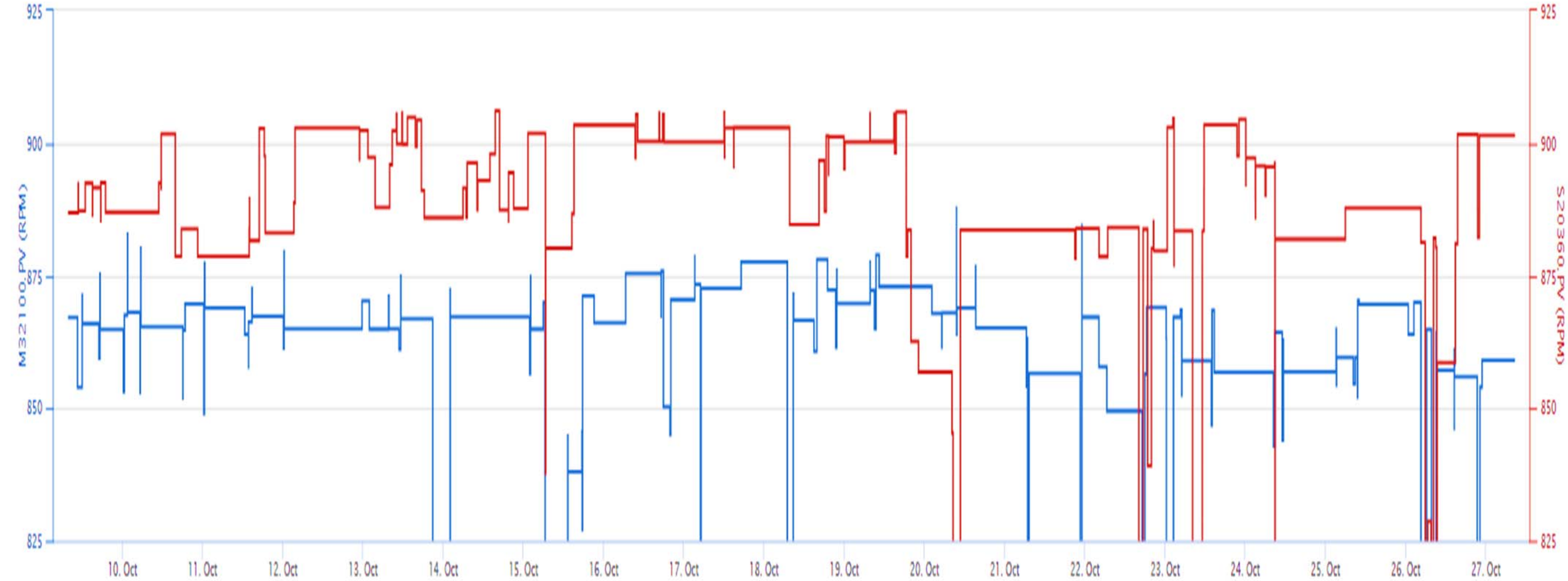
The $L_{A90,period}$ average was 51 dBA for daytime and evening and 53 dBA night-time, compared to the 15-minute licence condition of 58 dBA and the long-term period objective of 56 dBA.

Results for the Northern Fence were the same as in 2019 for most parameters but the $L_{A90,period}$ average for night-time was 45 dBA, 4 dB lower than in 2019 and the long-term average of all results of 47 dBA.

Results for residential locations were 1 dB higher than 2019 for 4 Melbourne St $L_{Aeq,period}$ in day and evening and the same for night-time, but lower than the long-term average of all values since measurements commenced. Overall there were no significant changes or increases in long-term average sound levels. These are described in the following sections for each location. The higher average wind speeds may have contributed to the higher period L_{Aeq} sound levels which occurred at the Location 20.

Figures 4.11 to 4.15 show graphs of the long-term average results as a type of time history comparison for each site. These graphs also indicate there have been no significant increases in long-term sound levels from 2018 to 2020 or since measurements commenced in 2002. For 12 Brisbane St in Figure 4.13, the increase in Daytime $L_{Aeq,period}$ value was caused by passing vehicles during the measurement – this result and that for Taylor / Adelaide St were from attended measurements only in 2020. The absence of significant increases in long-term average sound levels for logger monitored locations further indicates that the noise emissions from the total plant are achieving compliance with the objectives.



Name	Description	Value	Units	Quality	Low Range	High Range
M32100.PV	PCIP FAN SPEED	859.0698	RPM	Good	0	1000
S20360.PV	FA250 SPEED	901.5098	RPM	Good	0	1000

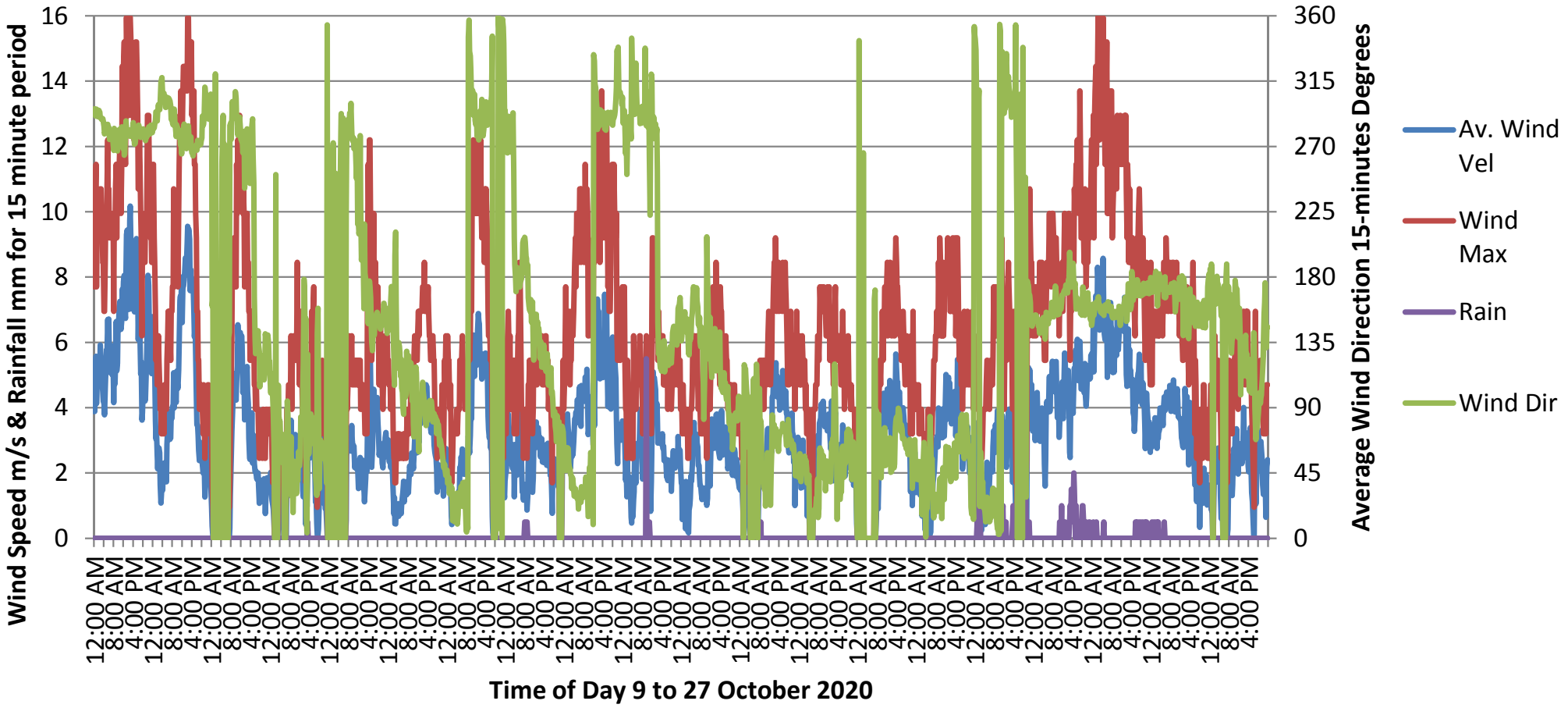
+ Add Pens

10/27/2020 8:43:05 AM

Figure 4.1: Berrima Cement Annual Noise 2020 - Operating speeds of Fans FA39 and FA250 during the monitoring period

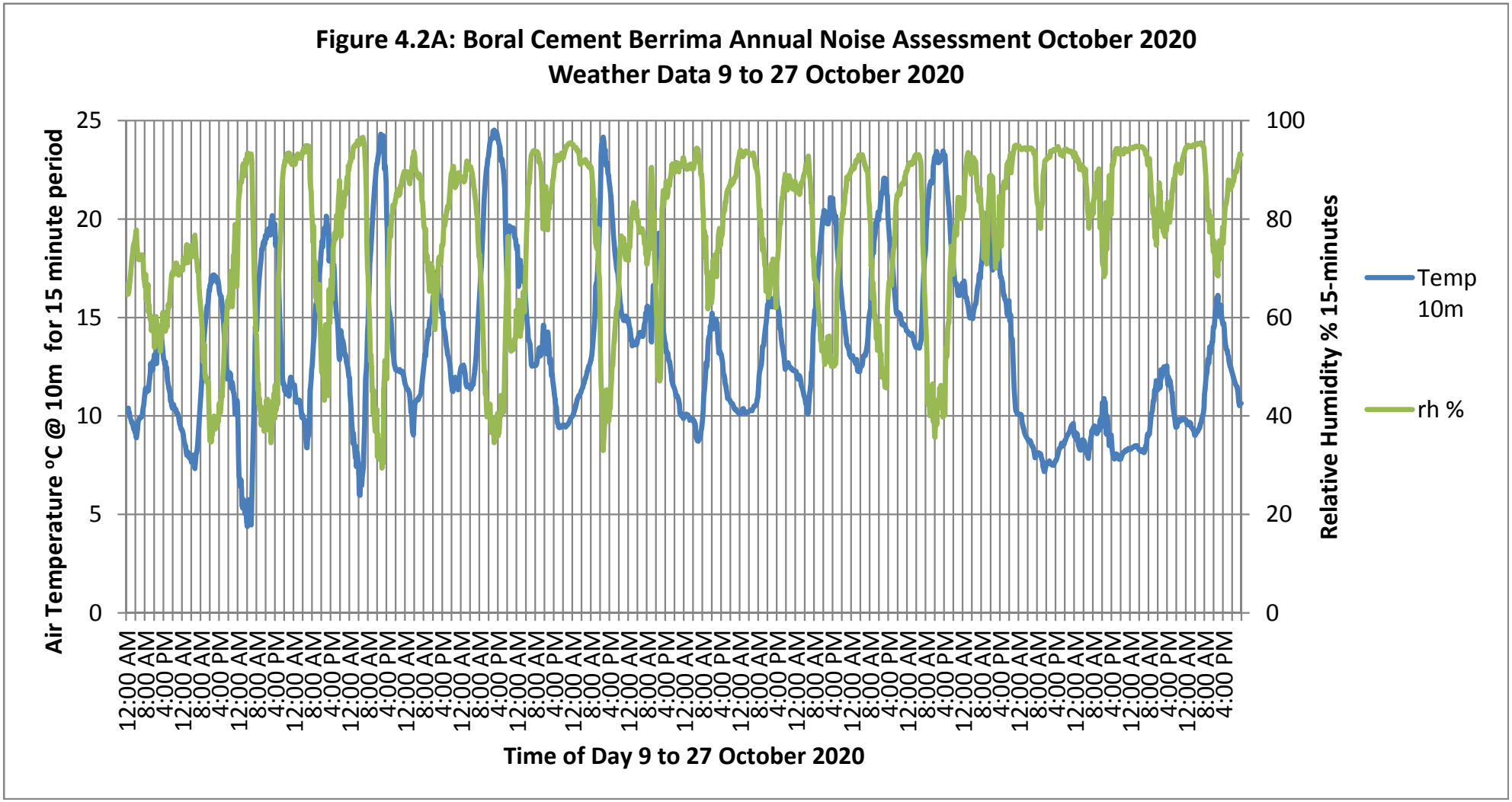
2020 fan speeds

Figure 4.2: Boral Cement Berrima Annual Noise Assessment October 2020
Weather Data 9 to 27 October 2020



BerrimaCement_Min15 weather data

Figure 4.2A: Boral Cement Berrima Annual Noise Assessment October 2020
Weather Data 9 to 27 October 2020



BerrimaCement_Min15 weather data

Figure 4.3: Boral Cement Berrima Annual Noise Assessment October 2020
Weather Data 9 to 27 October 2020 - Wind speed and Rain

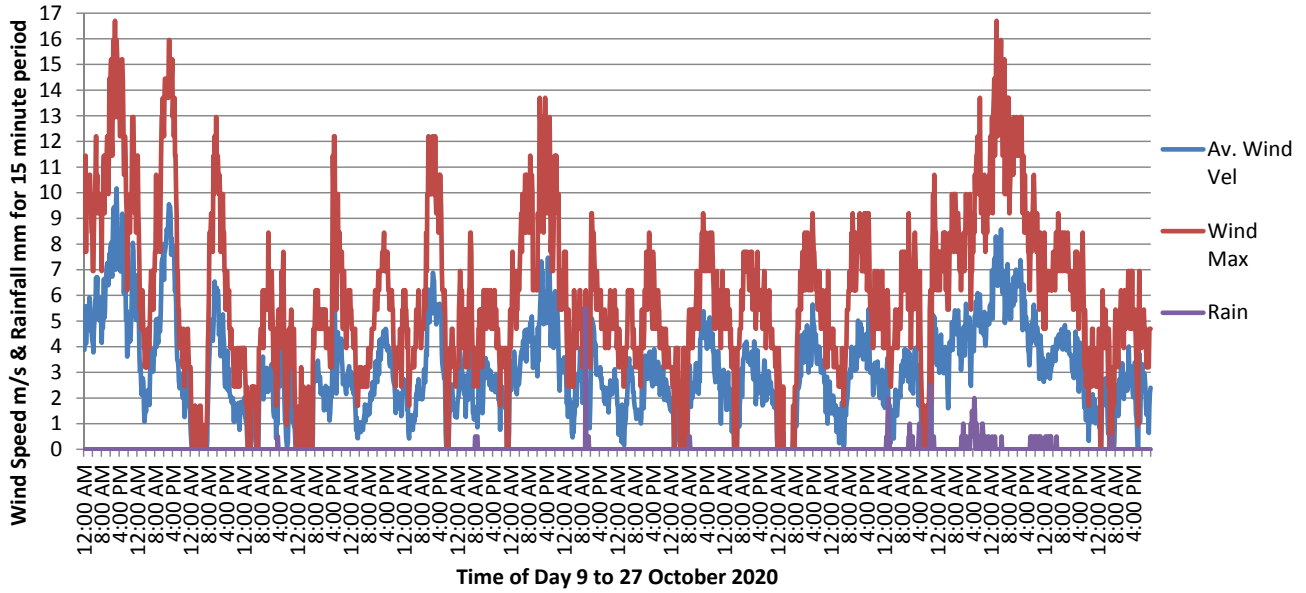


Figure 4.4: Boral Cement Berrima Annual Noise Assessment October 2020
Weather Data 9 to 27 October 2020 - Wind in degrees

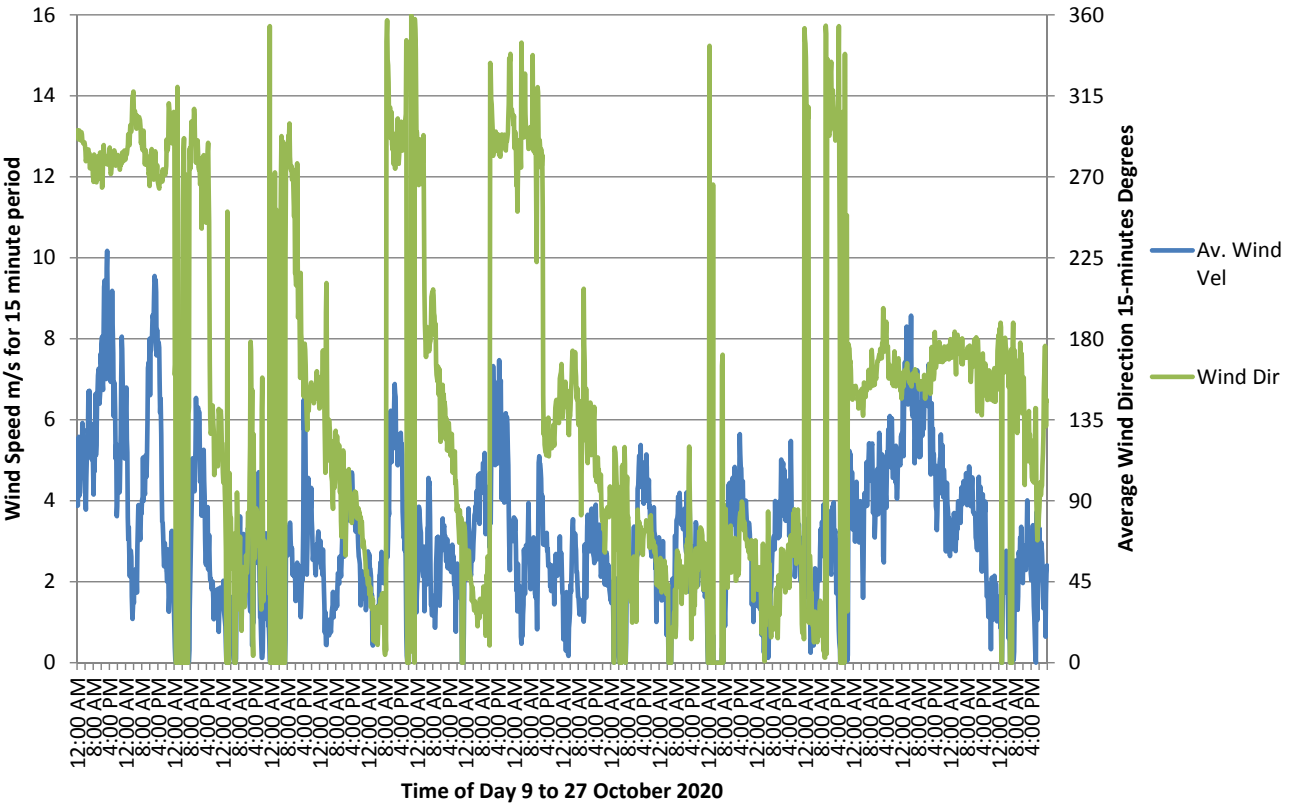


Figure 4.5: Boral Cement Berrima Annual Noise Assessment October 2020
Weather Data 9 to 27 October 2020 - Rainfall

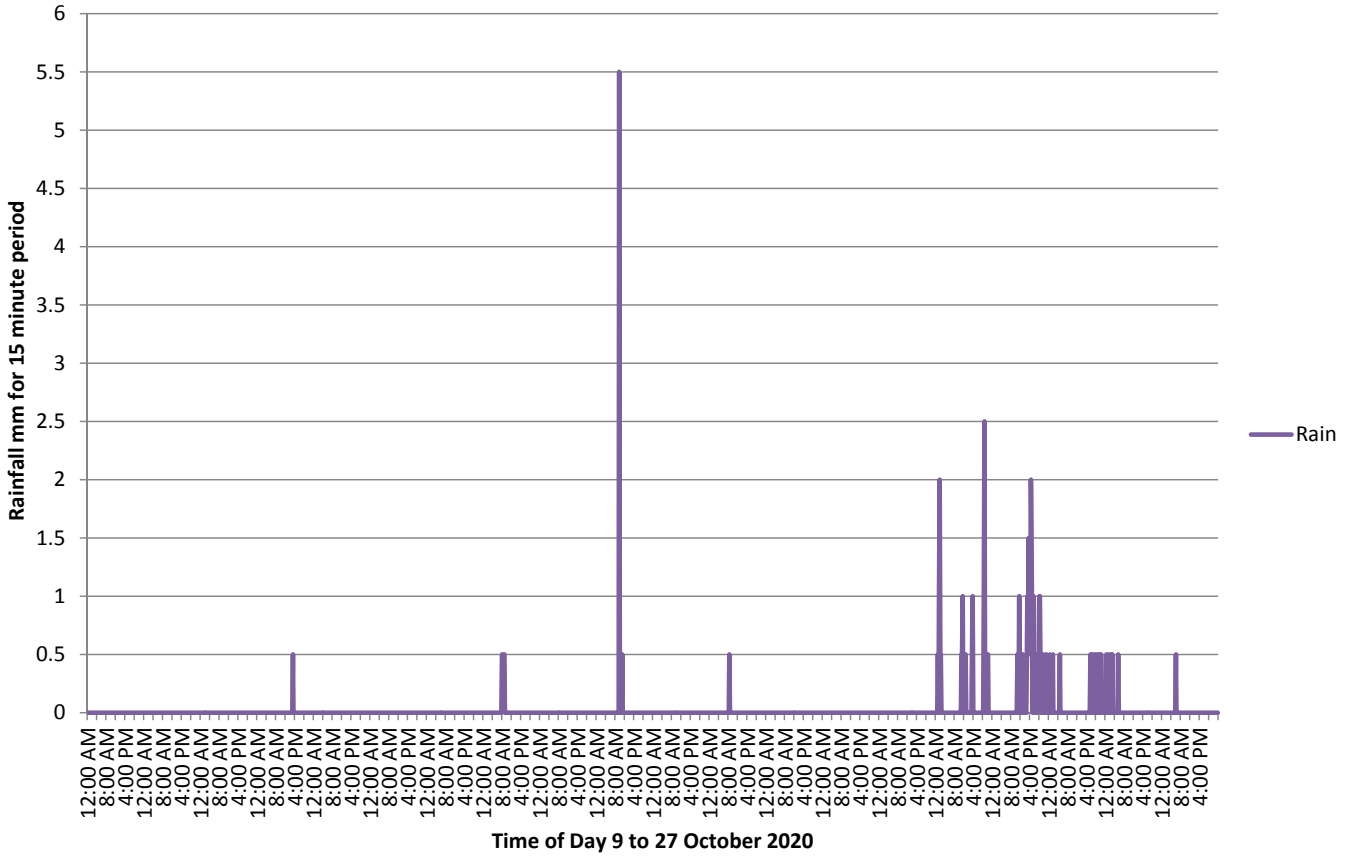


Figure 4.6: Boral Cement Berrima Annual Noise Assessment October 2020
Weather Data 9 to 27 October 2020

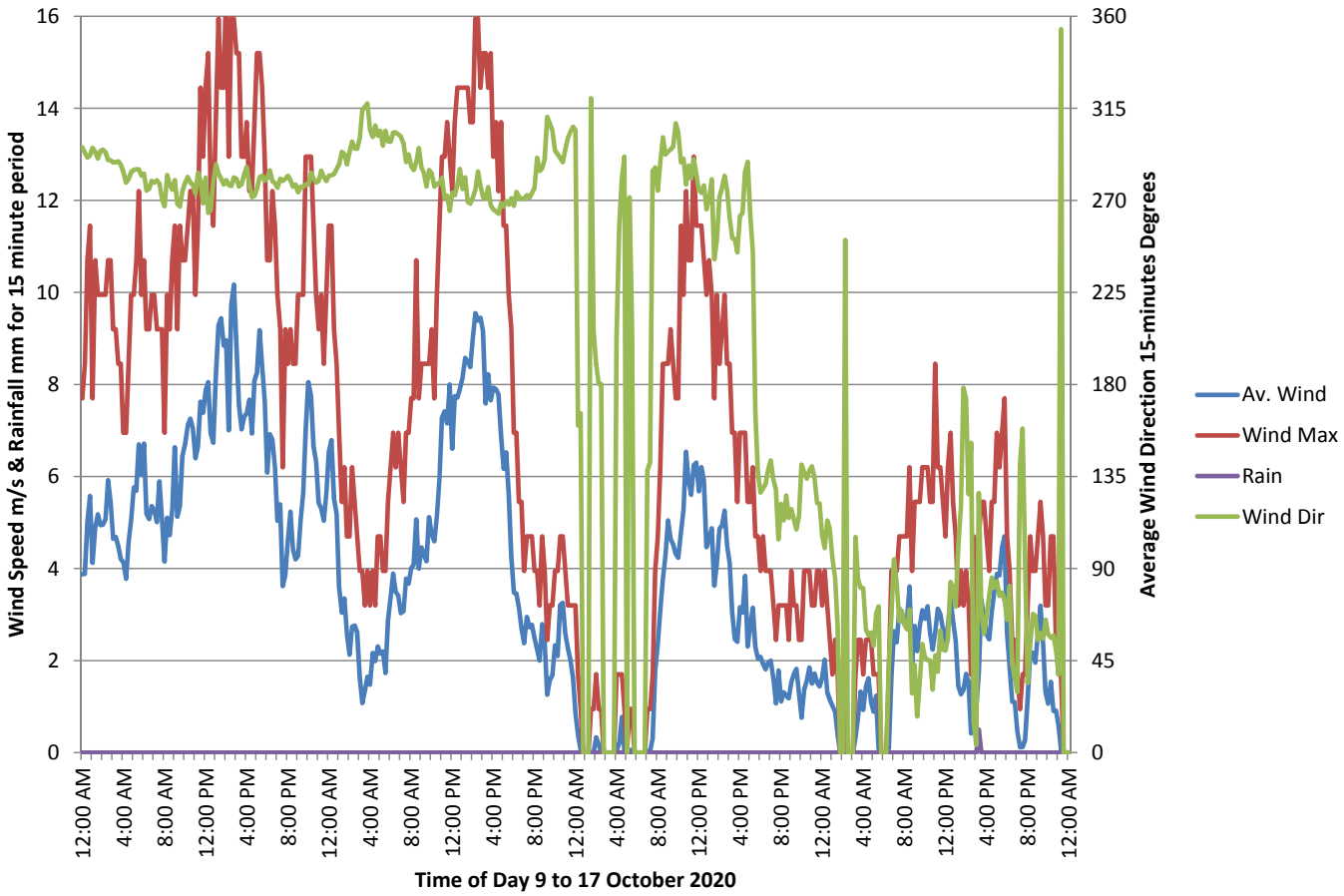


Figure 4.7: Boral Cement Berrima Annual Noise Assessment October 2020
Weather Data 9 to 27 October 2020

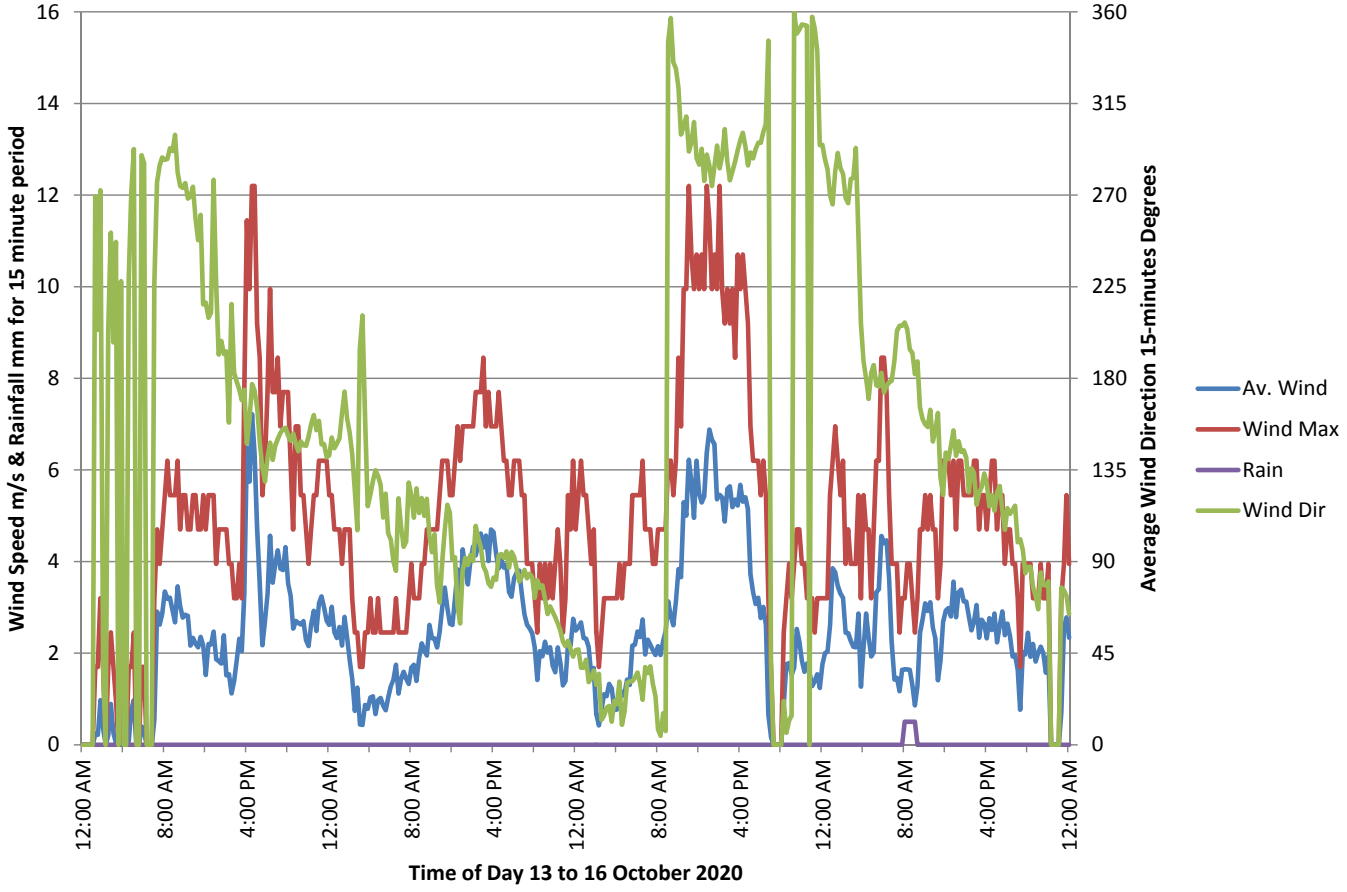


Figure 4.8: Boral Cement Berrima Annual Noise Assessment October 2020
Weather Data 9 to 27 October 2020

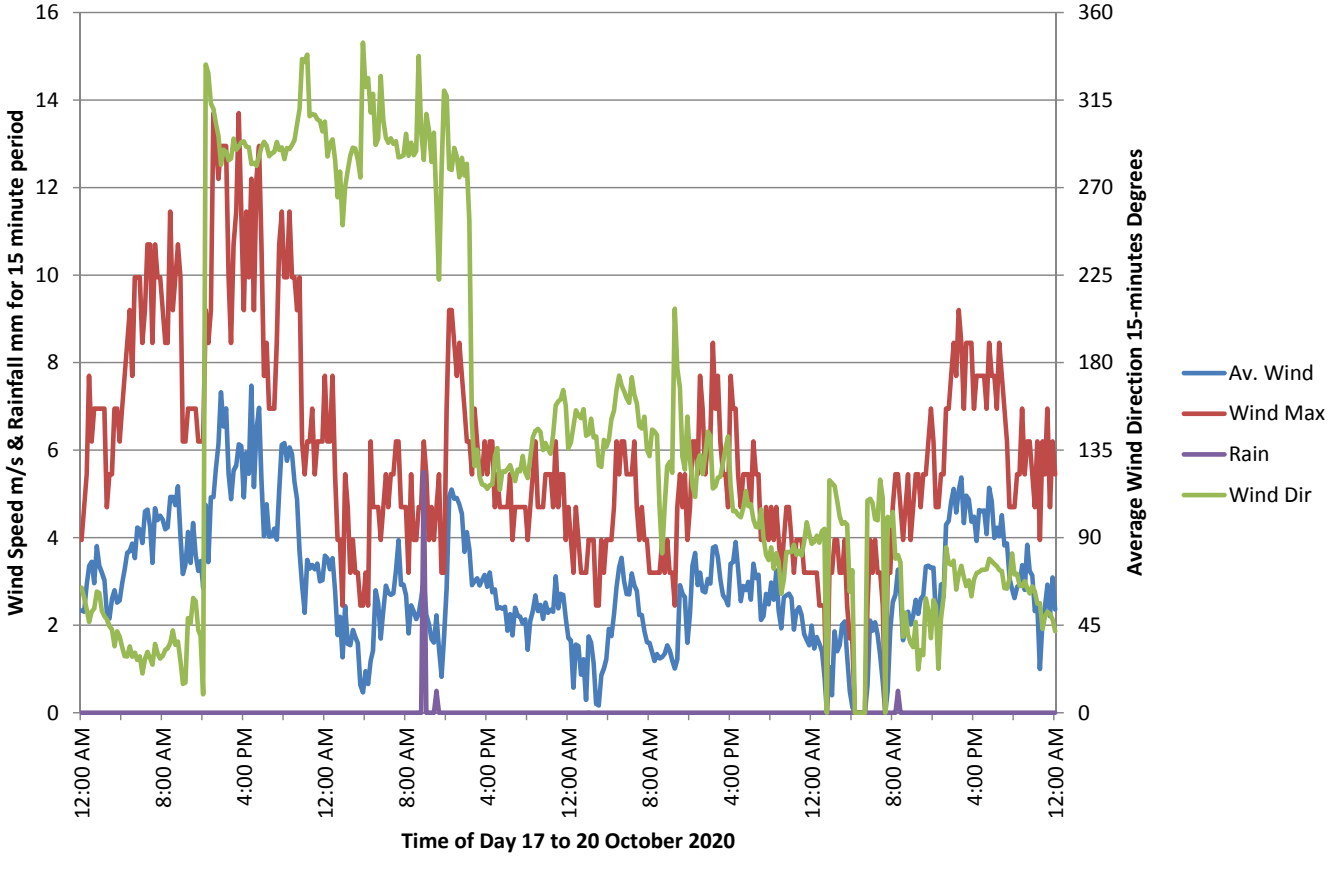


Figure 4.9: Boral Cement Berrima Annual Noise Assessment October 2020
Weather Data 9 to 27 October 2020

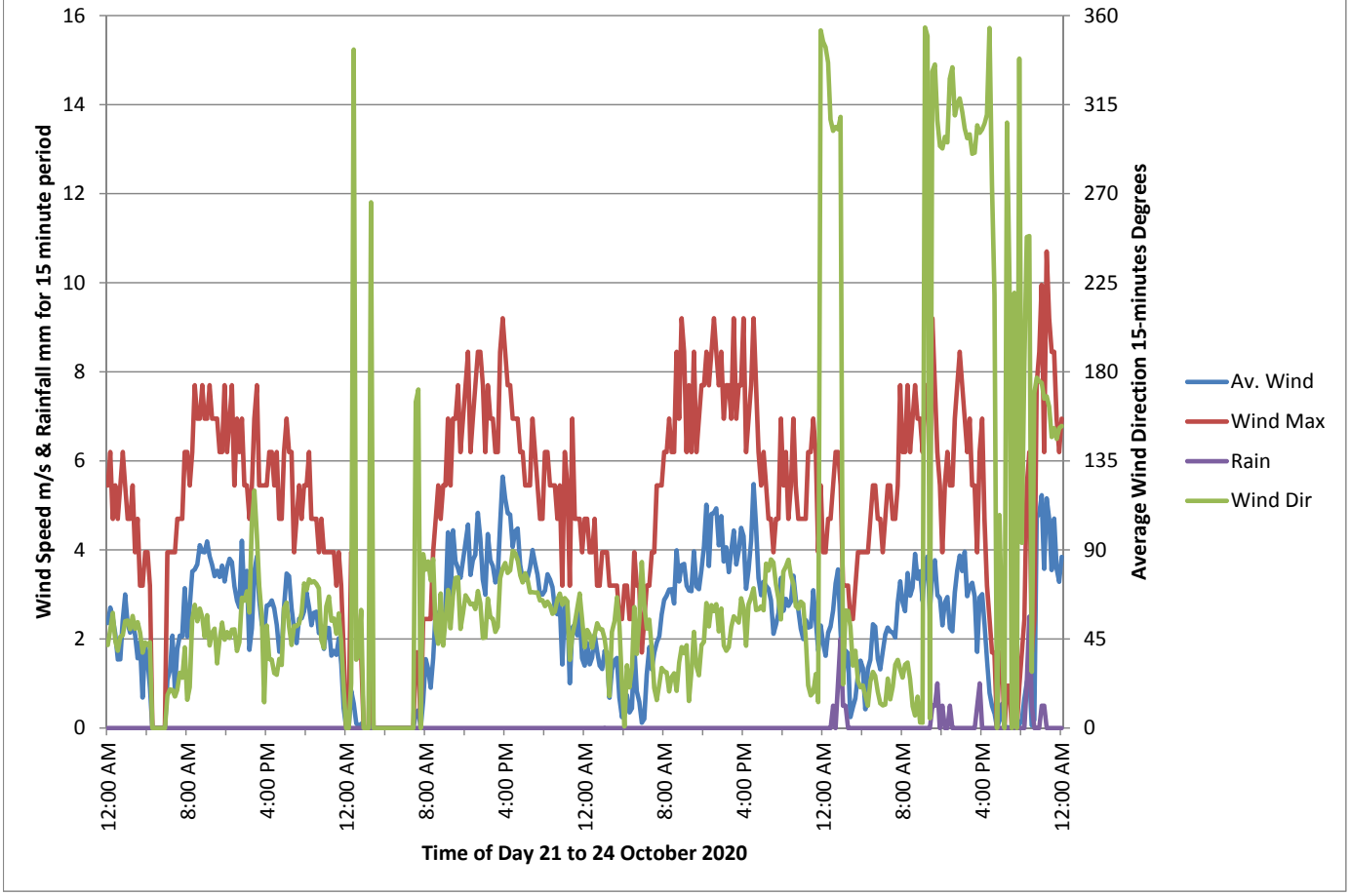


Figure 4.10: Boral Cement Berrima Annual Noise Assessment October 2020
Weather Data 9 to 27 October 2020

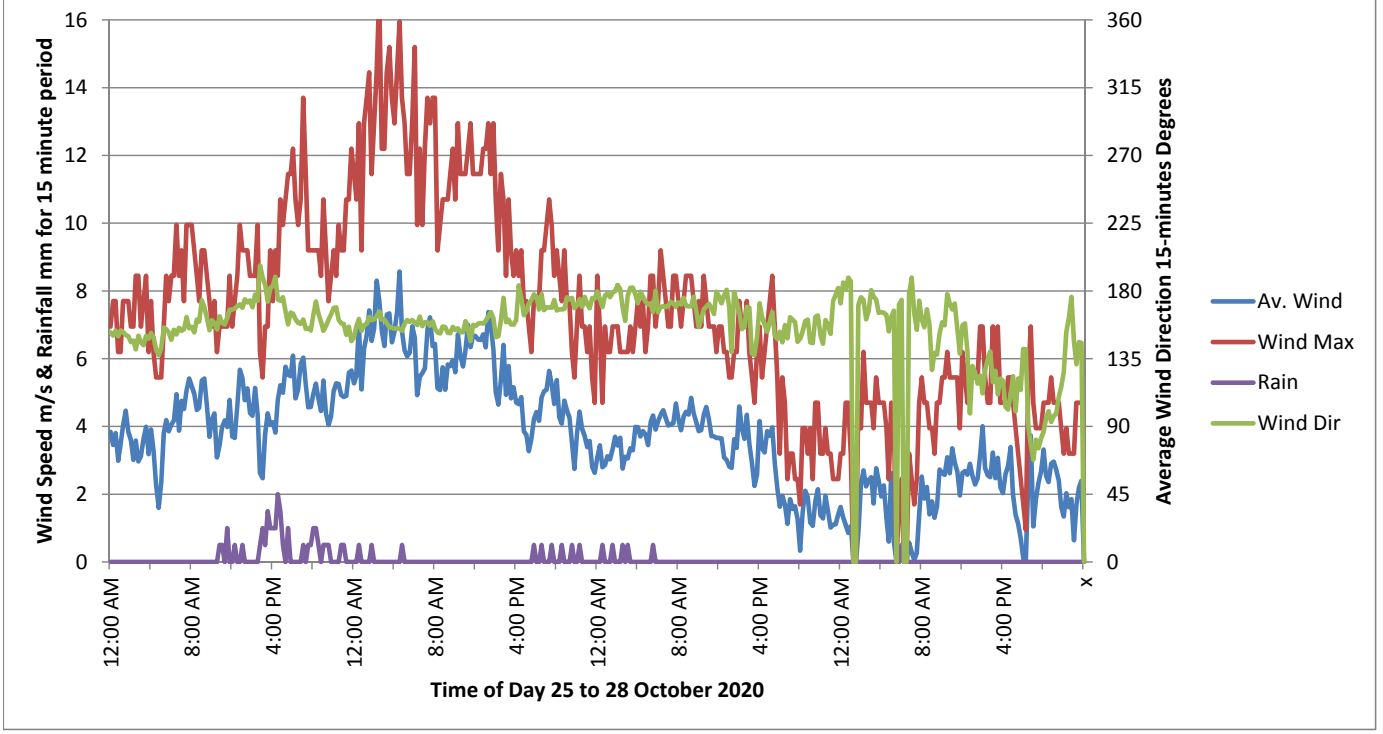


Table 4.1 : Boral Cement Berrima - 2020 Annual Environmental Noise Compliance - residential and boundary receiver locations
Comparison of Period L_{AEQ}, Period Average L_{A90} and Period 90% L_{A90} Results
Summary of Statistical Data - Note: Results at Adelaide St, Argyle St and Brisbane St are from attended results only.

$L_{AEQ.15min}$	Day			Evening			Night			24 hour		
	Max $L_{AEQ.Day}$	Min $L_{AEQ.Day}$	Ave $L_{AEQ.Day}$	Max $L_{AEQ.Eve.}$	Min $L_{AEQ.Eve.}$	Ave $L_{AEQ.Eve.}$	Max $L_{AEQ.Night}$	Min $L_{AEQ.Night}$	Ave $L_{AEQ.Night}$	Max $L_{AEQ.24hr}$	Min $L_{AEQ.24hr}$	Ave. $L_{AEQ.24hr}$
4 Melbourne St, New Berrima NSW	57	50	54	52	47	49	49	43	47	59	41	51
12 Brisbane St. New Berrima NSW			59	41	40	41			42			
Corner Adelaide & Taylor, New Berrima NSW			61	54	48	51			52			
Argyle St opp General Store			57			54			51			
Northern Fence, Boral Cement	57	48	51	57	47	50	58	48	51	56	47	51
Store Yard Close, Boral Cement	60	53	56	61	52	55	60	54	55	61	52	56

$L_{90.15\text{-}min\ 10\%}$	Day				Evening				Night			
	Max $L_{A90.Day}$	Min $L_{A90.Day}$	Ave $L_{A90.Day}$	Median $L_{A90.Day}$	Max $L_{A90.Eve.}$	Min $L_{A90.Eve.}$	Ave $L_{A90.Eve.}$	Median $L_{A90.Eve.}$	Max $L_{A90.Night}$	Min $L_{A90.Night}$	Ave $L_{A90.Night}$	Median $L_{A90.Night}$
4 Melbourne St, New Berrima NSW	46	39	41	41	45	37	41	41	45	37	39	38
12 Brisbane St. New Berrima NSW												
Corner Adelaide & Taylor, New Berrima NSW												
Argyle St opp General Store												
Northern Fence, Boral Cement	53	42	46	45	53	43	47	47	54	43	47	45
Store Yard Close, Boral Cement	56	49	51	51	57	49	51	51	57	49	52	51

$L_{90.15\text{-}min}$	Day				Evening				Night			
	Max $L_{A90.Day}$	Min $L_{A90.Day}$	Ave $L_{A90.Day}$	Median $L_{A90.Day}$	Max $L_{A90.Eve.}$	Min $L_{A90.Eve.}$	Ave $L_{A90.Eve.}$	Median $L_{A90.Eve.}$	Max $L_{A90.Night}$	Min $L_{A90.Night}$	Ave $L_{A90.Night}$	Median $L_{A90.Night}$
4 Melbourne St, New Berrima NSW	48	40	43	42	47	39	42	42	45	38	41	41
12 Brisbane St. New Berrima NSW			47		37	36	37				38	
Corner Adelaide & Taylor, New Berrima NSW			51		44	41	43				44	
Argyle St opp General Store			49				39				42	
Northern Fence, Boral Cement	54	44	48	46	54	44	48	48	55	45	48	47
Store Yard Close, Boral Cement	57	50	52	52	57	49	52	52	57	51	53	52

Difference Average L_{Aeq} - Median 10%L_{A90}	$L_{AEq.period}$ - Median 10% $L_{A90.period}$ dB		
	Day	Evening	Night
4 Melbourne St, New Berrima NSW	13	8	10
12 Brisbane St. New Berrima NSW			
72 Taylor Ave, New Berrima NSW			
30 Adelaide St. New Berrima NSW			
Northern Fence, Boral Cement	7	4	6
Store Yard Close, Boral Cement	5	3	4

Table 4.2: Boral Cement Berrima - 2020 Annual Environmental Noise Review: Comparison of statistical sound levels 2002 to 2020

Receiver Location 4 Melbourne Street

Parameter	Period	Survey Dates																											Statistics			
		Sep-02	Jan-03	Feb-03	Feb-04	Mar-04	Apr-04	May-04	Sep-04	Jan-06	Feb-06	Jun-06	Apr-07	Jun-08	Dec-08	Sep-10	Jun-11	Jul-11	Jul-12	Oct-12	Oct-12	Sep-13	Aug-14	Jul-15	Apr-16	May-16	Jul-16	Sep-17	Jul-18	Sep-19	Oct-20	Max	Min	Ave	SD
LAEQ.ave	Day	57	50	54	55	54	56	54	54	56	56	58	56	55	57	56	52	56	56	55	56	53	56	57			56	53	52	53	54	58	50	55	1.8
	Evening	53	48	54	54	65	53	51	50	60	57	53	52	54	59	53	52	51	51	50	52	50	53	52			53	49	49	48	49	65	48	53	3.8
	Night	53	44	49	47	49	50	51	49	51	51	51	52	51	56	52	50	50	51	49	51	51	52	52			52	48	48	47	47	56	44	50	2.3
LA90.ave	Day	46	40	43	43	44	45	45	44	44	45	47	46	47	50	47	45	46	46	43	45	43	48	48			48	44	43	43	43	50	40	45	2.2
	Evening	44	39	42	42	42	44	45	43	45	46	47	46	46	49	46	39	39	45	40	39	42	47	46			46	42	42	42	42	49	39	43	2.8
	Night	44	37	41	39	40	44	45	43	42	46	46	46	45	50	46	38	38	44	36	40	42	47	45			46	42	42	42	41	50	36	43	3.4
10%LA90.med	Day	44	38	41	39	41	43	43	42	43	43	45	45	45	43	45	42	44	43	40	43	41	45	46			45	42	41	40	41	46	38	43	2.1
	Evening	42	37	40	40	39	42	44	42	43	43	45	44	45	46	43	38	41	42	33	34	41	45	44			45	41	41	40	41	46	33	41	3.2
	Night	42	35	39	37	37	42	43	41	42	43	44	44	44	44	44	38	40	41	29	34	40	44	43			43	40	40	39	38	44	29	40	3.6

		INP Acceptable*	Kiln 6 Contribution	CM7 Contribution	NL Rec PRP7 20
LAEQ	Day	60	43	43	46
	Evening	50	43	43	42
	Night	45	40	40	40

* Based on Suburban/Industrial Interface from NSW INP Table 2.1

Most Off Most on Most Off Most on

Ave L90 from attended for Jun & Dec 2008

44126

Table 4.2: Boral Cement Berrima - 2020 Annual Environmental Noise Review: Comparison of statistical sound levels 2002 to 2020 continued

Receiver Location 4 Melbourne Street

Receiver Location 72 Taylor Ave near Adelaide St - Note for 2020 results are from attended monitoring

Parameter	Period	Survey Dates																											Statistics			
		Sep-02	Jan-03	Feb-03	Feb-04	Mar-04	Apr-04	May-04	Jan-06	Feb-06	Feb-06	Jun-06	Apr-07	Jun-08	Dec-08	Sep-10	Jun-11	Jul-11	Jul-12	Oct-12	Oct-12	Sep-13	Aug-14	Jul-15	Apr-16	May-16	Jul-16	Sep-17	Jul-18	Sep-19	Oct-20	Max	Min	Ave	SD
LAEQ.ave	Day								61	62	54	63	62	63	63	60	57	60	60	60	59	61	61	52			63	58	60	60	61	63	52	60	2.9
	Evening								57	58	50	59	57	59	59	56	57	53	55	54	48	57	55	47			58	54	55	54	51	59	47	55	3.5
	Night								56	56	49	58	56	59	58	56	55	56	55	52	48	60	55	50			58	53	55	54	52	60	48	55	3.3
LA90.ave	Day								47	45	41	48	48	49	49	47	46	47	49	45	48	50	47	49			50	46	47	48	51	51	41	47	2.2
	Evening								46	44	40	47	46	46	47	45	37	42	48	40	41	49	47	46			48	44	46	47	43	49	37	45	3.1
	Night								45	42	40	47	46	45	48	46	36	42	47	38	41	47	47	46			48	44	46	47	44	48	36	44	3.3
10%LA90.ave	Day								45	43	39	47	46	47	45	45	43	43	46	42	46	48	46	47			47	44	44	45	51	51	39	45	2.5
	Evening								45	42	40	46	45	46	44	44	39	44	46	39	40	49	46	44			46	43	45	45	41	49	39	44	2.7
	Night								44	41	39	46	45	46	43	43	38	42	46	35	39	45	46	45			45	44	45	44	44	46	35	43	3.0

		INP Acceptable*	Kiln 6 Contribution	CM7 Contribution	NL Rec PRP7 20
LAEQ	Day	60	43	43	48
	Evening	50	43	43	44
	Night	45	40	40	43

Most Off Most on Most Off Most on

Ave L90 from attended for Jun & Dec 2008

Receiver Location 12 Brisbane Street - Note for 2020 results are from attended monitoring

Parameter	Period	Survey Dates																											Statistics			
		Sep-02	Jan-03	Feb-03	Feb-04	Mar-04	Apr-04	May-04	Sep-04	Jan-06	Feb-06	Jun-06	Apr-07	Jun-08	Aug-10	Sep-10	Jun-11	Jul-11				Sep-13	Aug-14	Jul-15	Apr-16	May-16	Jul-16	Sep-17	Jul-18	Sep-19	Oct-20	Max	Min	Ave	SD
LAEQ.ave	Day														51	50	52	52				50	52	56			53	51	51	54	59	59	50	53	2.6
	Evening														46	46	48	47				47	48	49			49	47	49	51	41	51	41	47	2.4
	Night														48	47	45	46				48	48	48			48	46	49	49	42	49	42	47	1.9
LA90.ave	Day														44	44	43	45				41	45	47			47	43	46	46	47	47	41	45	1.9
	Evening														42	43	41	42				43	41	45			45	41	47	46	37	47	37	43	2.6
	Night														44	42	38	42				42	41	45			44	40	45	45	38	45	38	42	2.5
10%LA90.ave	Day														42	42	40	42				42	42	46			44	42	43	42	47	47	40	43	1.9
	Evening														41	41	37	41				42	42	43			43	41	44	43	36	44	36	41	2.4
	Night														39	41	35	40				39	42	44			41	40	44	43	38	44	35	41	2.5

Most Off Most on

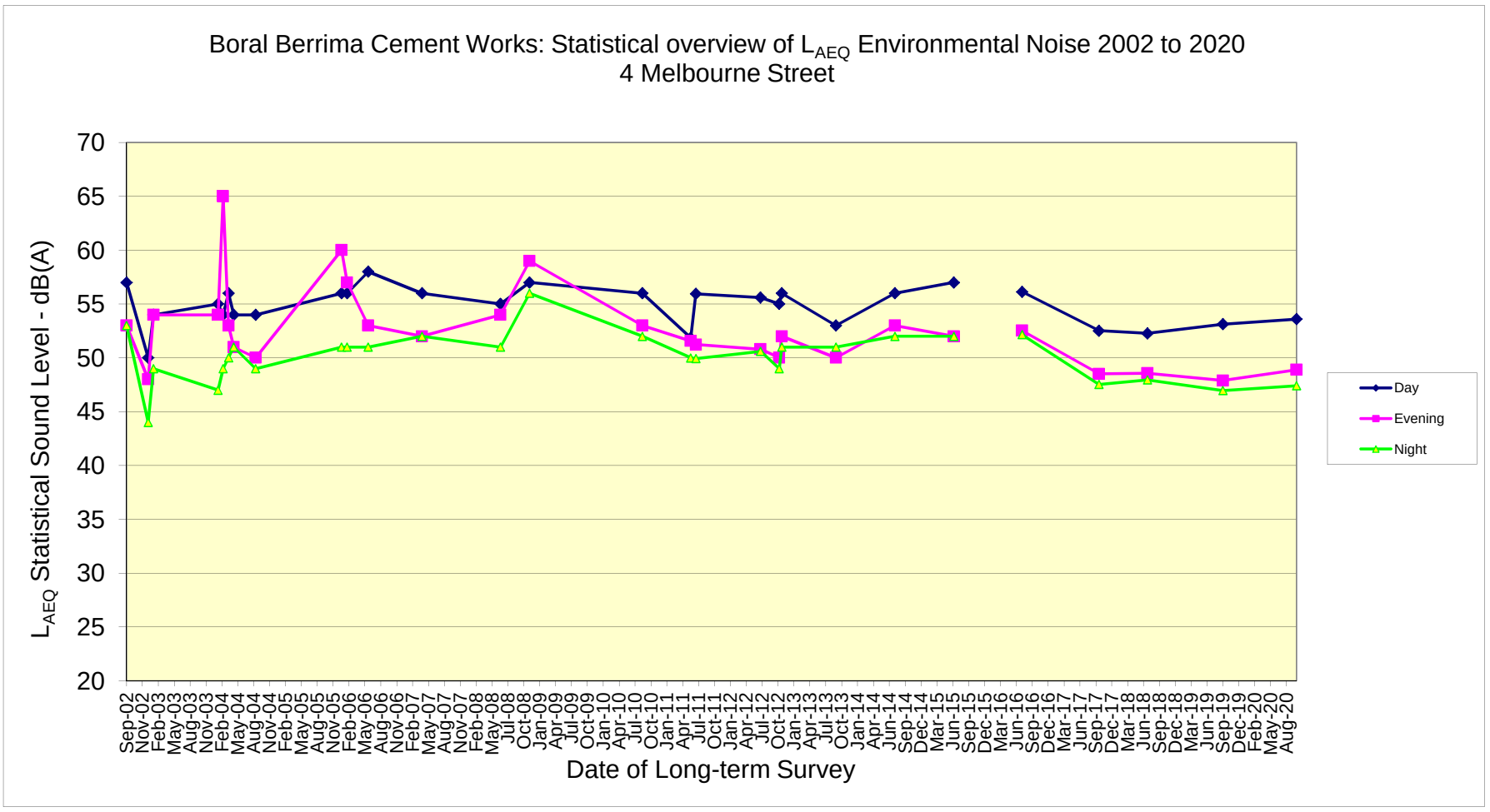
Receiver Location 4 Northern Boundary

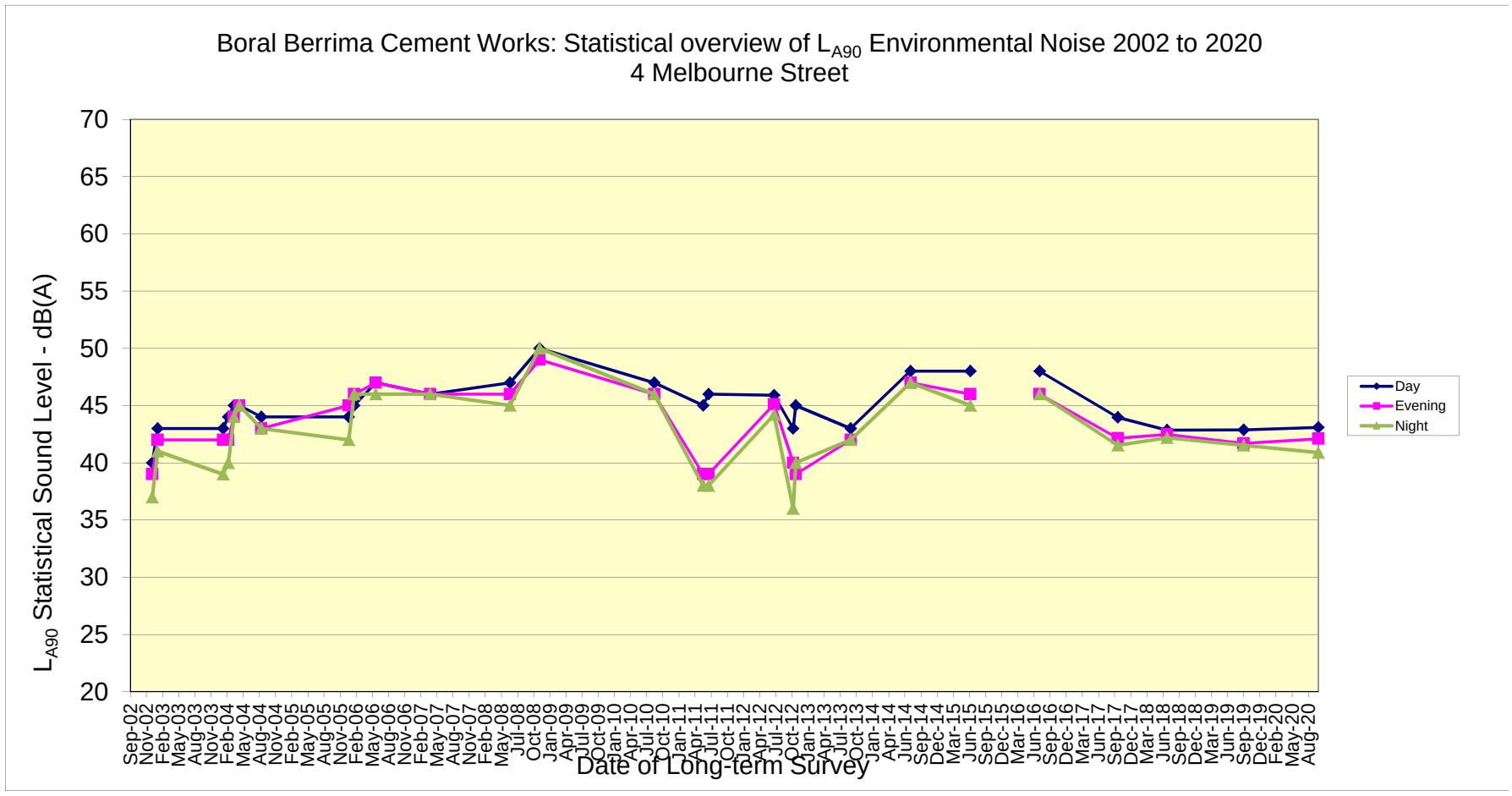
Parameter	Period	Survey Dates																											Statistics			
		Sep-02	Jan-03	Feb-03	Feb-04	Mar-04	Apr-04	May-04	Sep-04	Jan-06	Feb-06	Jun-06	Apr-07	Jun-08	Aug-10	Sep-10	Jun-11	Jul-11	Jul-12	Oct-12	Oct-12	Sep-13	Aug-14	Jul-15	Apr-16	May-16	Jul-16	Sep-17	Jul-18	Sep-19	Oct-20	Max	Min	Ave	SD
LAEQ.ave	Day	52												63	53	50	52	55	52	49	50	51	51	52	51	54	53	51	53	51	51	63	49	52	3.0
	Evening	52												54	51	49	49	51	50	45	49	50	50	51	50	51	53	49	53	51	51	54	45	50	2.0
	Night	53												54	51	50	47	52	51	44	50	49	51	52	51	52	52	49	52	51	51	54	44	51	2.2
LA90.ave	Day	48												53	49	47	47	51	48	43	46	44	47	49	49	51	49	47	49	48	48	53	43	48	2.3
	Evening	50												53	48	47	45	49	48	41	47	47	48	48	48	50	49	47	51	48	48	53	41	48	2.4
	Night	50												53	49	47	43	49	48	39	47	46	48	48	46	50	49	47	49	49	45	53	39	47	3.0
10%LA90.ave	Day	46												51	48	46	44	49	46	41	45	46	46	47	47	49	47	45	47	45	45	51	41	46	2.2
	Evening	48												51	47	46	42	49	46	40	46	45	47	47	46	49	47	45	50	46	47	51	40	47	2.6
	Night	48												51	47	47	42	48	46	37	45	44	47	48	48	49	47	45	48	46	45	51	37	46	3.0

Most Off Most on Most Off Most on

Receiver Location 20 Store Yard Close from 2015

Parameter	Period	Survey Dates																											Statistics			
																								Jul-15	Apr-16	May-16	Jul-16	Sep-17	Jul-18	Nov-19	Oct-20	Max	Min	Ave	SD
LAEQ.ave	Day																							58		58	58	59	56	62	56	62	56	58	2.0
	Evening																							56		56	53	55	55	59	55	59	53	55	1.8
	Night																							57		56	53	57	55	57	55	57	53	56	1.4
LA90.ave	Day																							54		53	53	53	52	53	52	54	52	53	0.8
	Evening																							54		53	50	53	53	52	52	54	50	52	1.2
	Night																							54		53	50	54	53	53	53	54	50	53	1.3
10%LA90.ave	Day																							52		52	52	52	51	53	51	53	51	52	0.7
	Evening																							53		52	51	53	51	51	51	53	51	52	0.7
	Night																							51		52	51	53	52	52	51	53	51	52	0.7





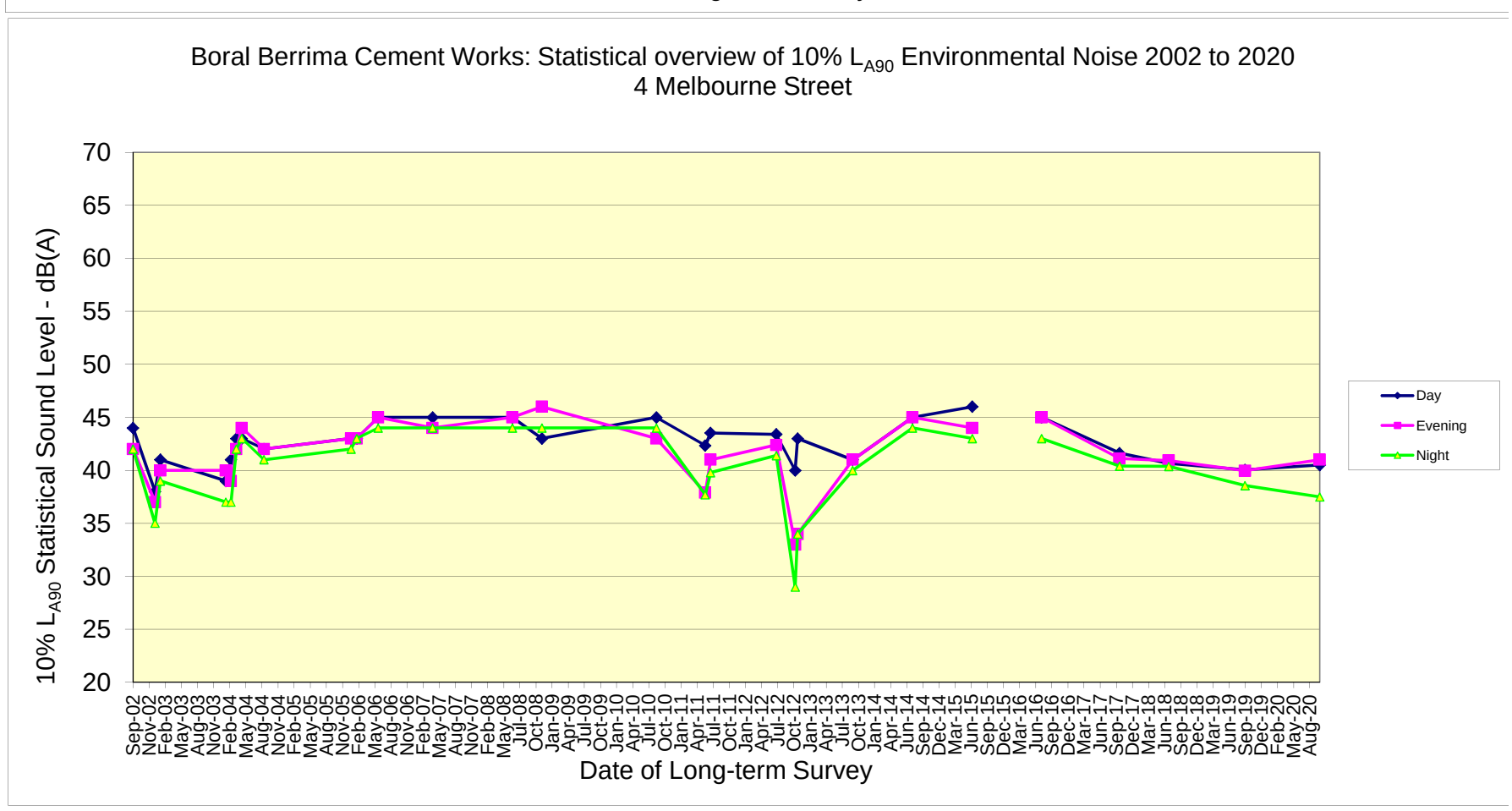
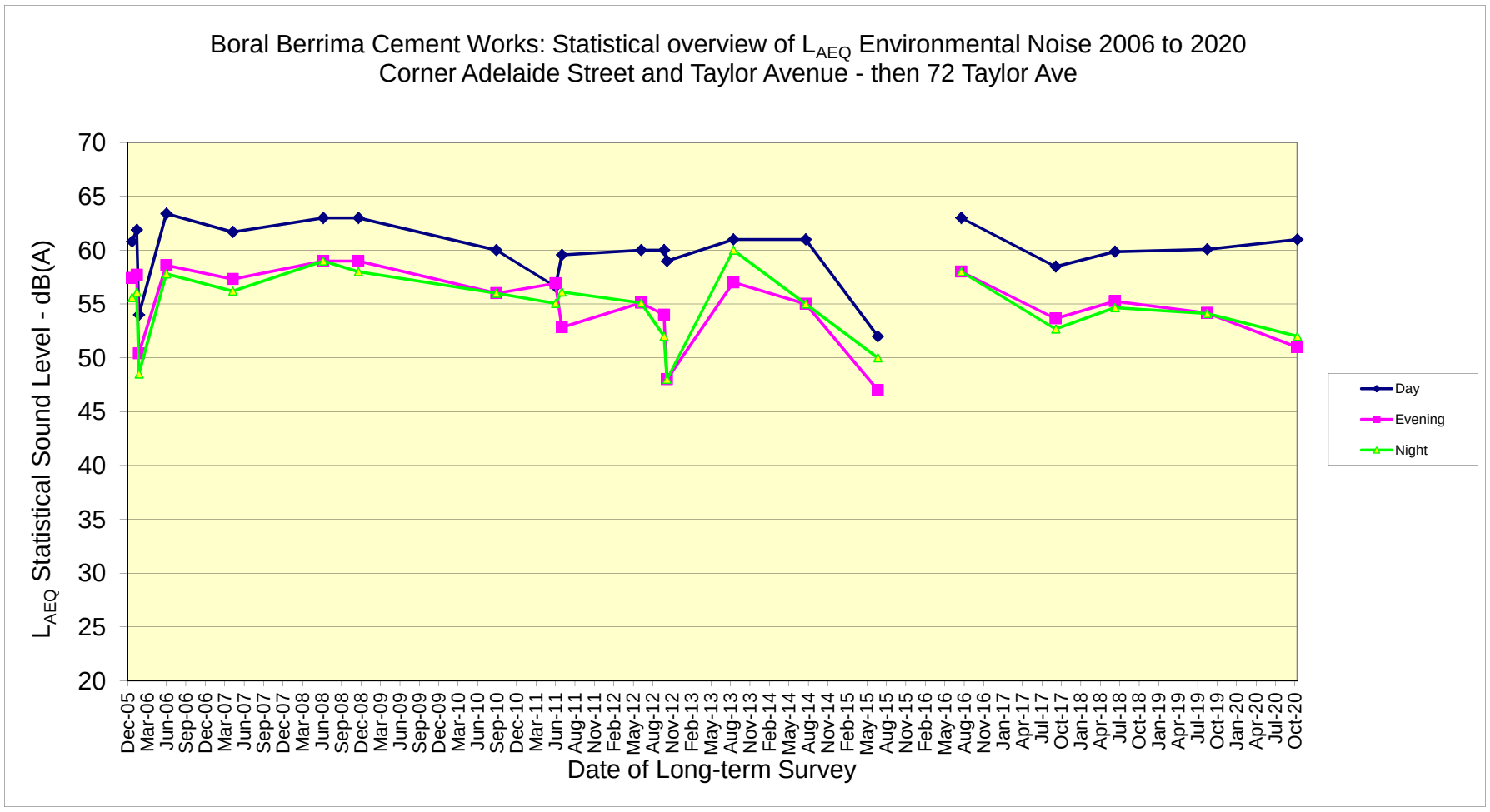


Figure 4.11: Comparison of statistical sound levels for 4 Melbourne Street location



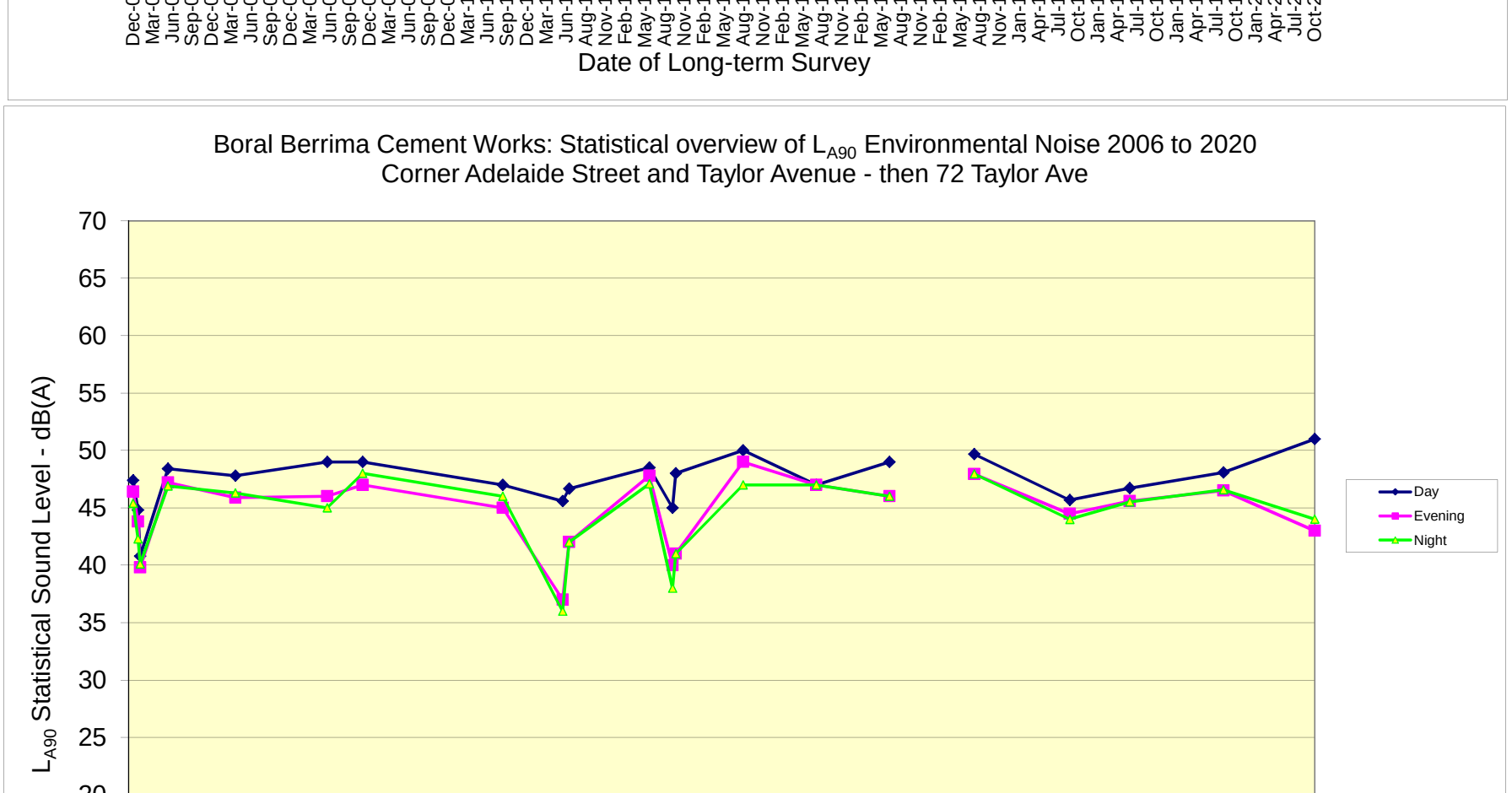
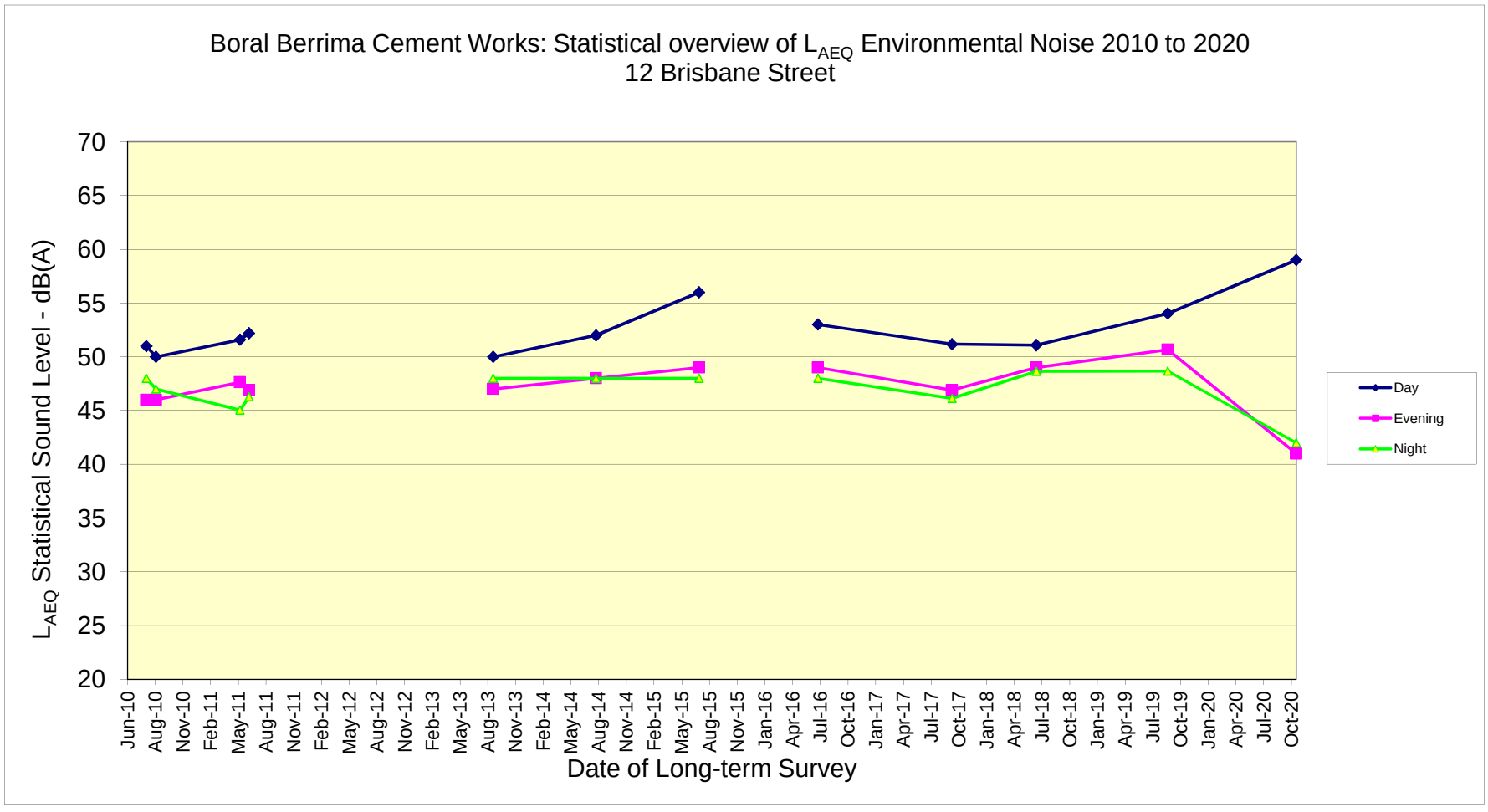


Figure 4.12: Comparison of statistical sound levels for 72 Taylor Ave location



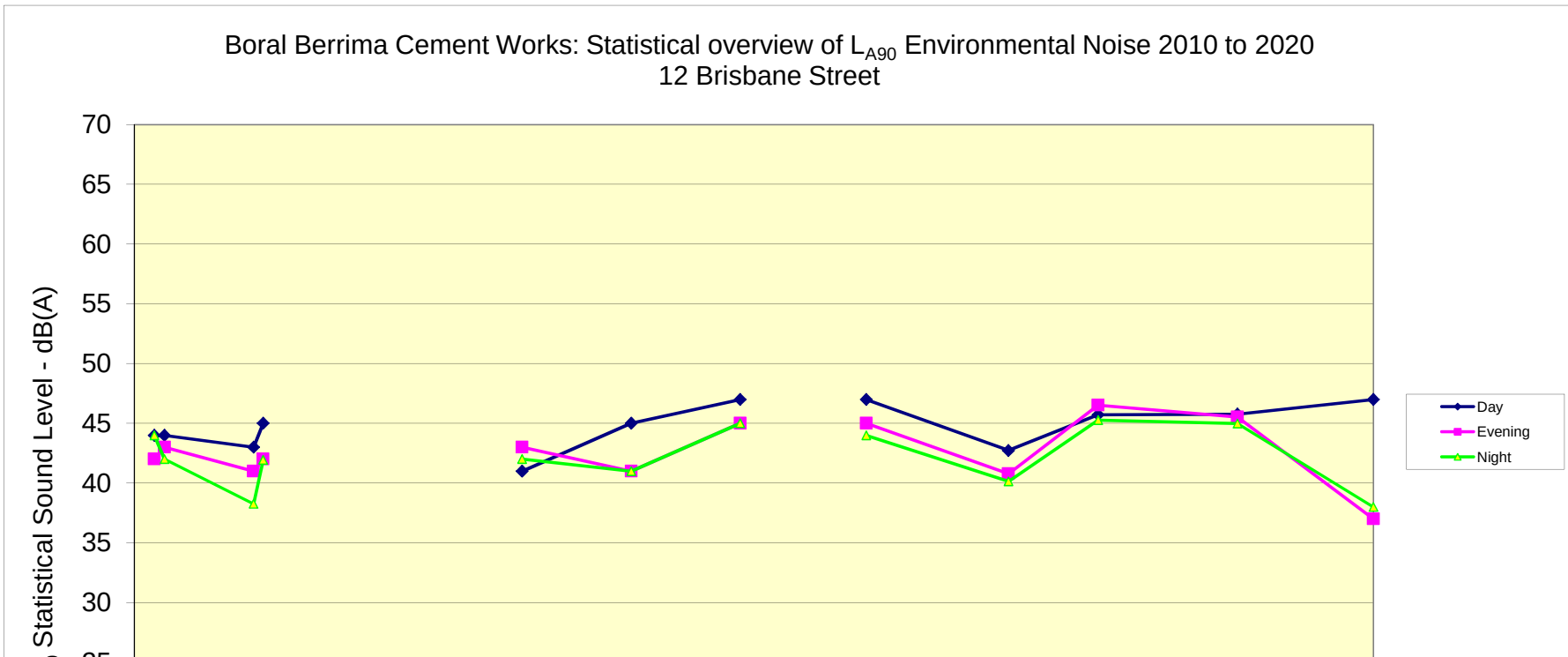
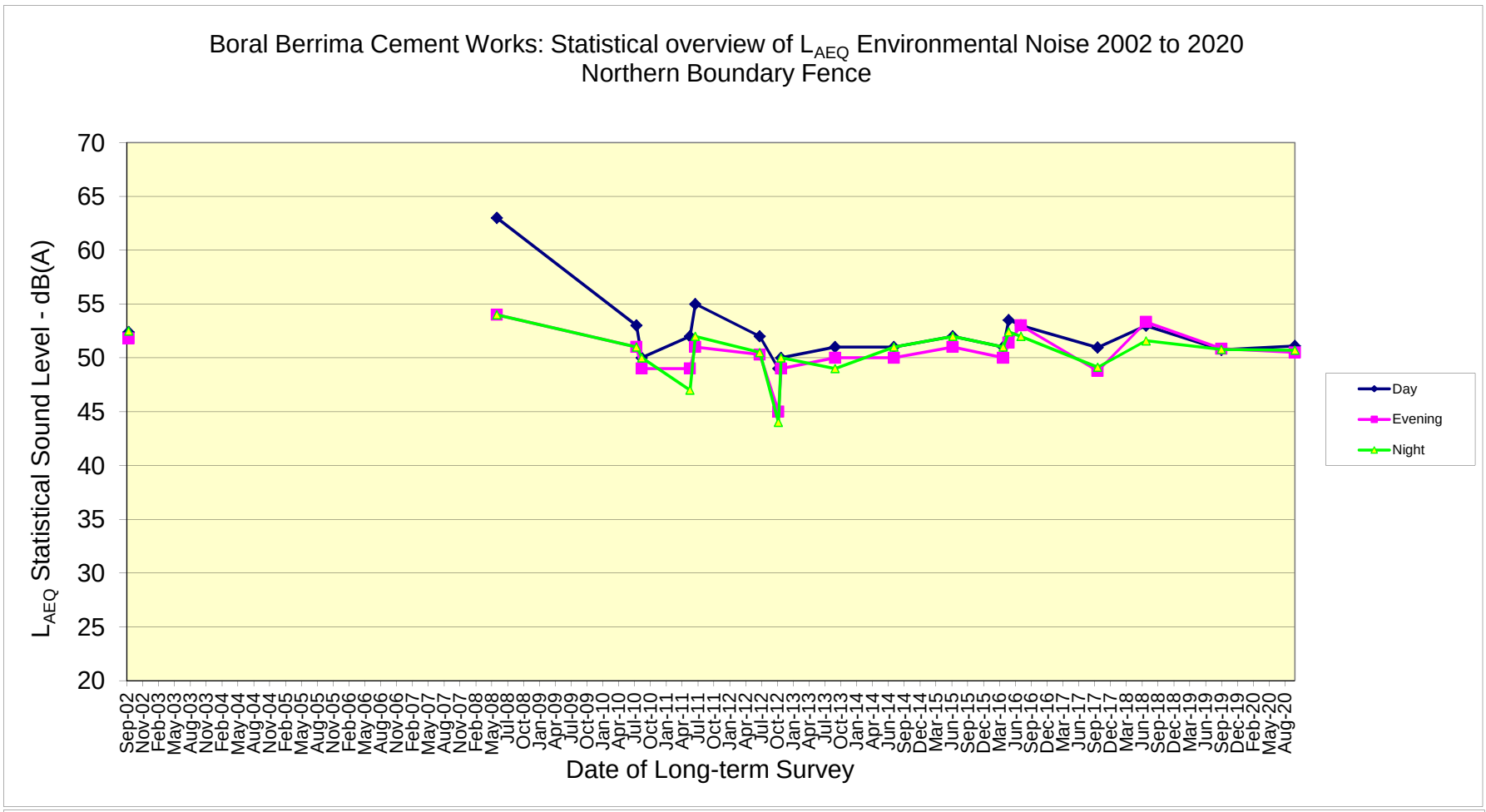
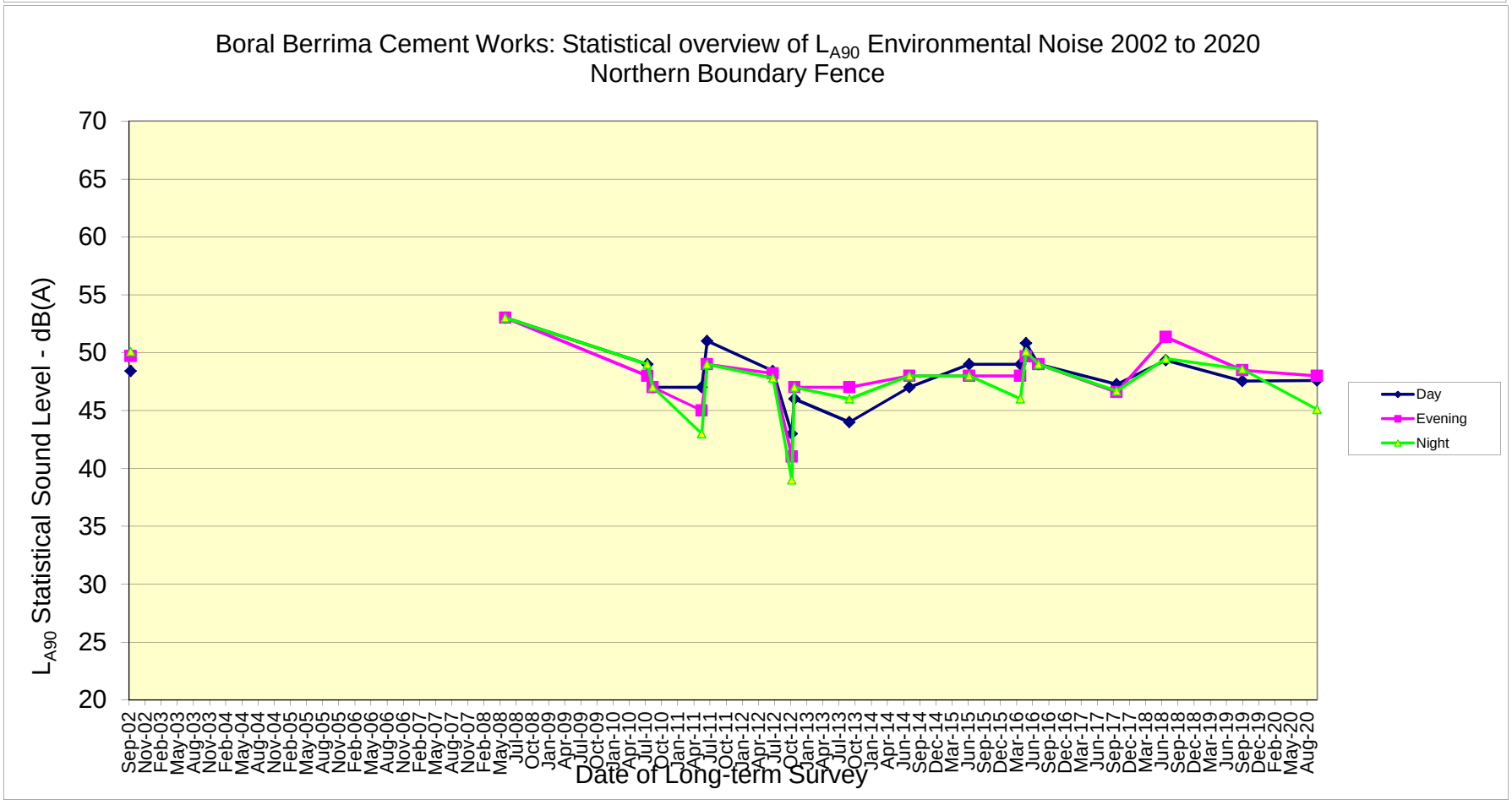


Figure 4.13: Comparison of statistical sound levels for 12 Brisbane Street location





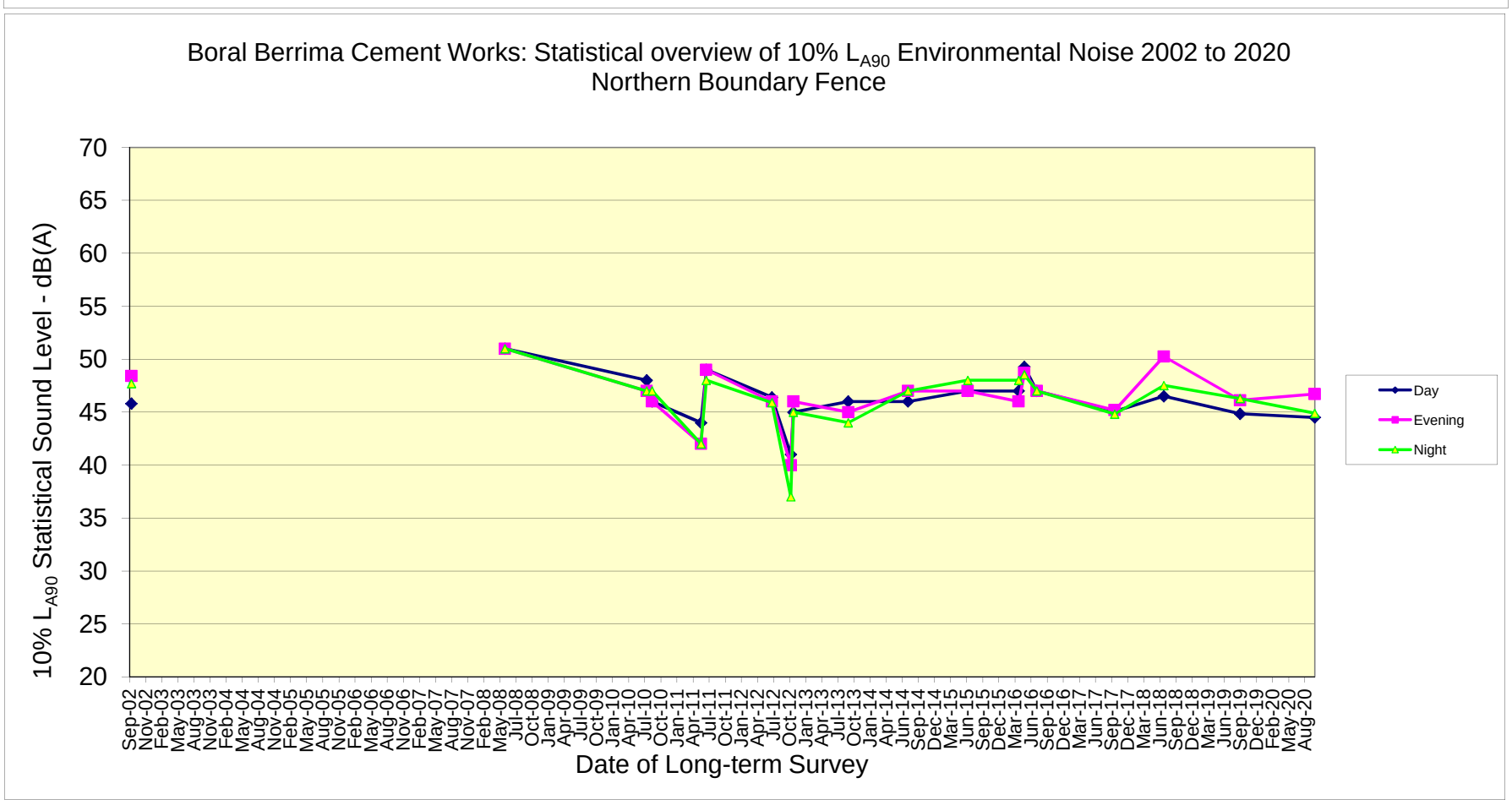
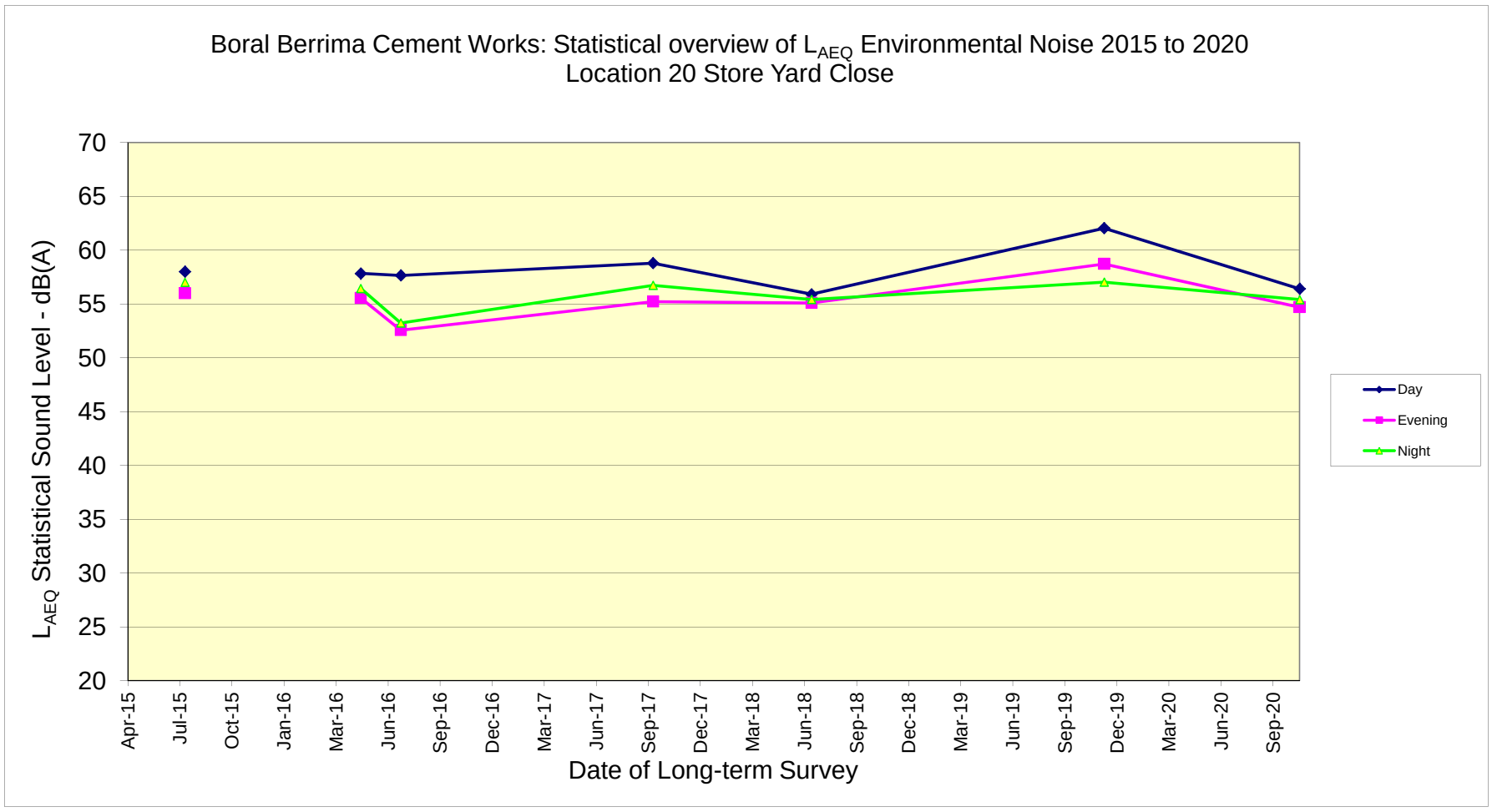


Figure 4.14: Comparison of statistical sound levels for Northern Boundary Fence location



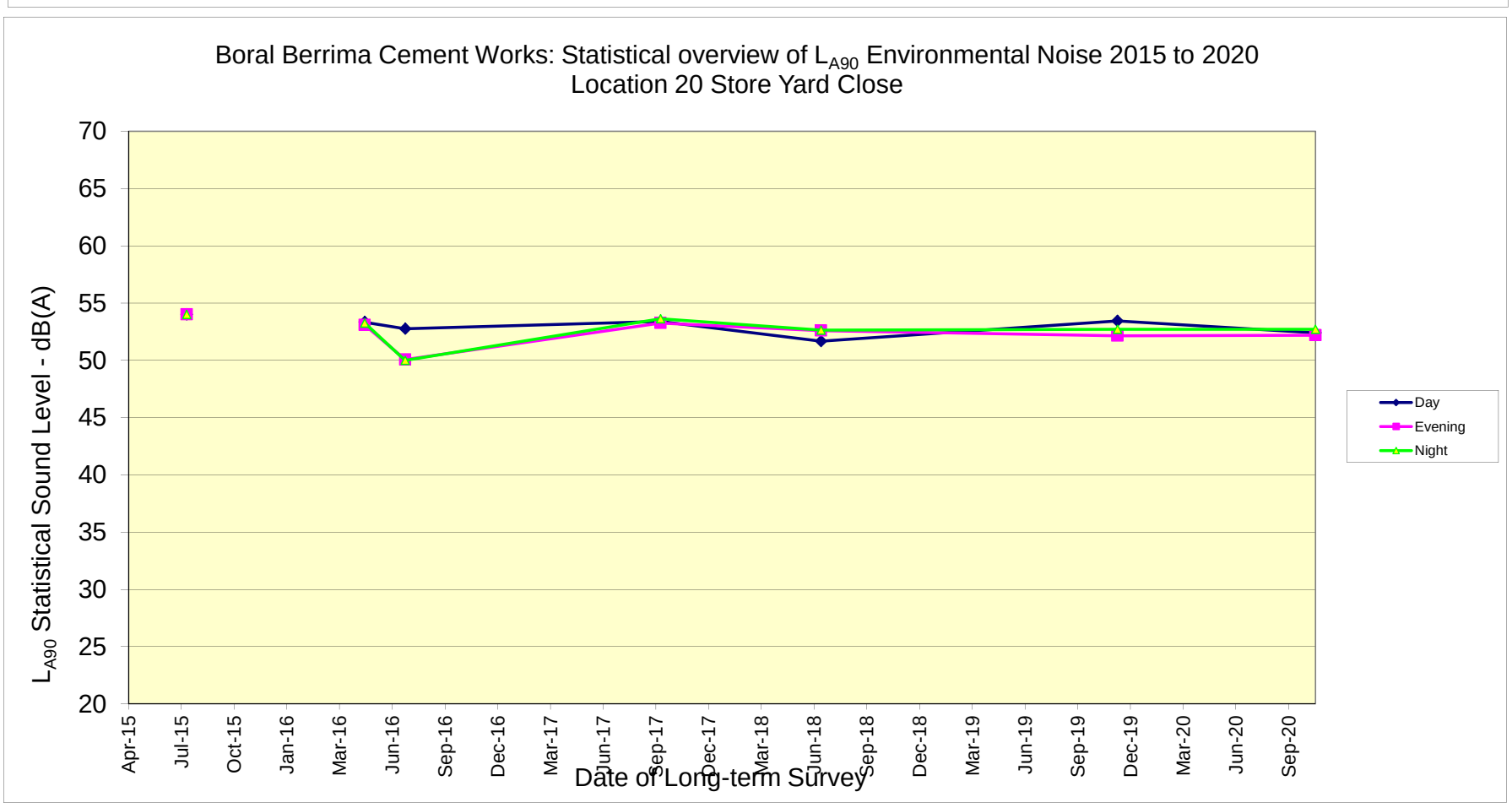


Figure 4.15: Comparison of statistical sound levels for Store Yard Close location

4.2 Store Yard Close location results compared to licence conditions and recommendations

4.2.1 $L_{A90,period}$ sound levels

The licence condition for noise emissions from the site is now consolidated into measurements at Location 20, with $L_{A90,15\text{-minutes}}$ not to exceed 58 dBA. This came from the recommended PRP objectives for the Store Yard Close location are a long-term average $L_{A90.period}$ not greater than 56 dBA or 58 dBA for any period. Measurements have to be as generally required as acceptable in the Noise Policy for Industry – this means omission of results during high wind speed or rainfall or from extraneous sources.

For the 17 days of measurements the highest 15-minute period value for $L_{A90,15\text{-min}}$ was 59 dBA, which is the same as in 2018 and 2019. This occurred in the 15-minute period to 7:00am on 19 October. Other periods with sound levels at 58 dBA occurred during periods when the wind speed was close to 10m/s and general environmental noise was likely to be high, on 25 and 26th October. All other day, evening or night periods had no period $L_{A90,15\text{-min}}$ greater than 57 dBA. The highest period average on any day was 57 dBA on 26th and the average over the 14 day period was 52 dBA daytime and evening and 53 dBA night-time. Table 4.3 below shows the statistics for the $L_{A90.15minute}$ period values and Figure 4.17 to 4.20 show graphs of these results.

Of the 1556 periods measured with wind speeds less than 10m/s and no rainfall events, 12 15-minute periods or 0.1% of the total number had $L_{A90.15\text{-minute}}$ sound levels greater than the recommended maximum for any period of 58.0 dBA. Most of these were for periods with high wind speeds on 25 and 26 October.

One event with the maximum sound level of 59 dBA $L_{A90,15\text{-min}}$ was for the period to 7:00am on 19 October. Review of the logger data indicated that the event with higher sound levels commenced at approximately 6:33am and continued until about 7:02am Figure 4.21 shows the 0.1 second graphs for the period. The main frequencies were found to be in the 100 and 125 Hz one-third octave bands. When this period was reviewed using the directional information, the source direction of the major sound was SSE, the same as the period immediately beforehand, as shown in Figures 4.22 (before) and 4.23 (during). However during the event the 'quality' of the sound increased, which means that the sound source was more specific to that direction.

A comparative measurement of sound level difference between the Location 20 monitor and North Fence monitor indicated that the distance from the event source to Location 20 was approximately 20m. Along with the spectral data for before and during the event shown in Figures 4.24 and 4.25, the analysis indicates the source was likely to have been a truck which parked on the road near the monitor for several minutes and then moved away. Such a source is considered extraneous and is not included in the assessment level. The difference in sound level calculated between the Location 20 and North Fence also indicated that the sound level would not affect the $L_{A90,15\text{-min}}$ or other sound level received at the residential locations.

ABN: 25 153 946 064
ACN: 153 946 064

Table 4.3: Boral Cement Berrima - Store Yard Close Location

Statistics for individual $L_{A90.15\text{-}minute}$ data periods for 2020 measurements

Value $L_{A90,15\text{-}min}$ dBA	No. of periods greater than	No. of periods at Value	% Greater than	% At value
47.5	1556	1	100.0%	0.1%
48	1555	7	99.9%	0.4%
48.5	1548	23	99.5%	1.5%
49	1525	36	98.0%	2.3%
49.5	1489	70	95.7%	4.5%
50	1419	76	91.2%	4.9%
50.5	1343	97	86.3%	6.2%
51	1246	184	80.1%	11.8%
51.5	1062	254	68.3%	16.3%
52	808	189	51.9%	12.1%
52.5	619	129	39.8%	8.3%
53	490	79	31.5%	5.1%
53.5	411	55	26.4%	3.5%
54	356	64	22.9%	4.1%
54.5	292	67	18.8%	4.3%
55	225	37	14.5%	2.4%
55.5	188	45	12.1%	2.9%
56	143	35	9.2%	2.2%
56.5	108	46	6.9%	3.0%
57	62	30	4.0%	1.9%
57.5	32	20	2.1%	1.3%
58	12	11	0.8%	0.7%
58.5	1	1	0.1%	0.1%
59	0	0	0	0

This analysis of acceptable sound level periods monitored at Location 20 for the full 17 day period are considered to be less than or not greater than the licence condition and compliance is achieved.

Figure 4.17: Boral Cement Berrima Annual Noise 2020-
Statistics Location 20 Number of $L_{A90,15\text{-}min}$ periods at a sound level

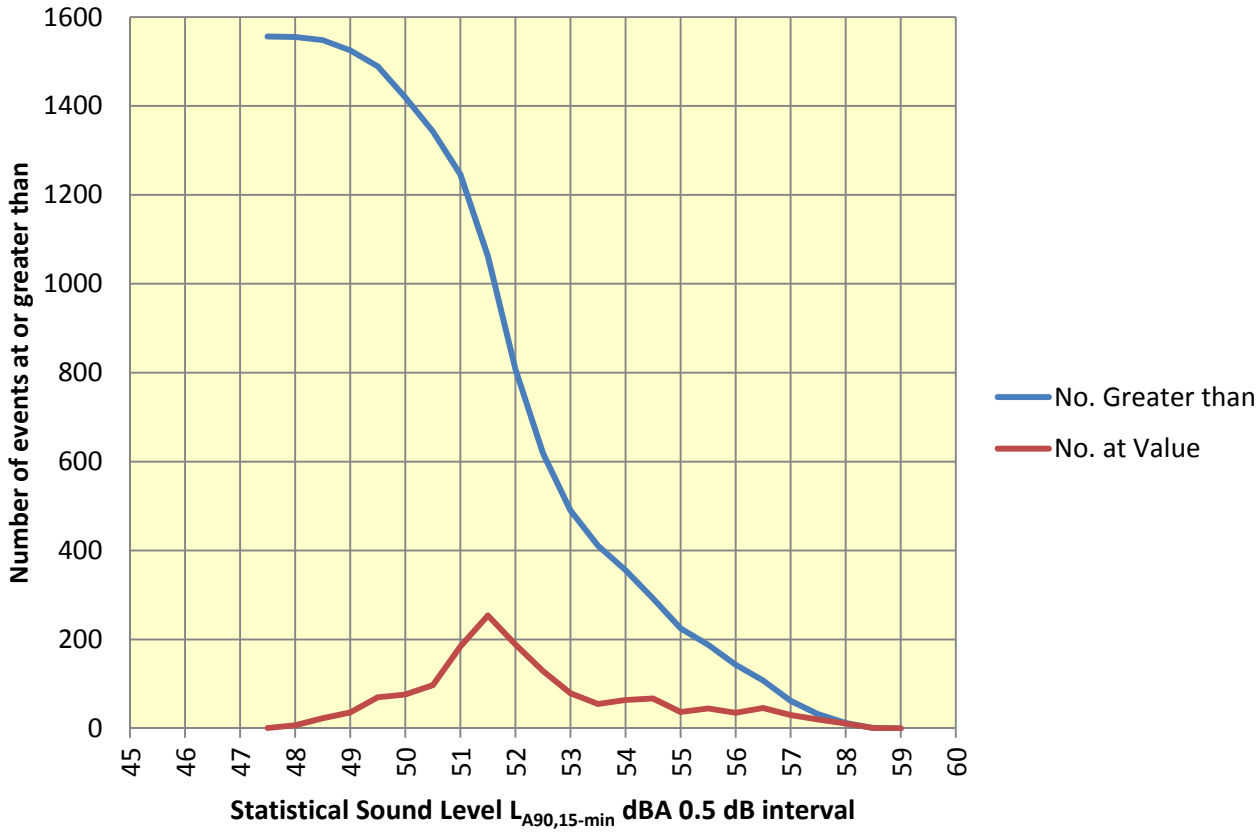
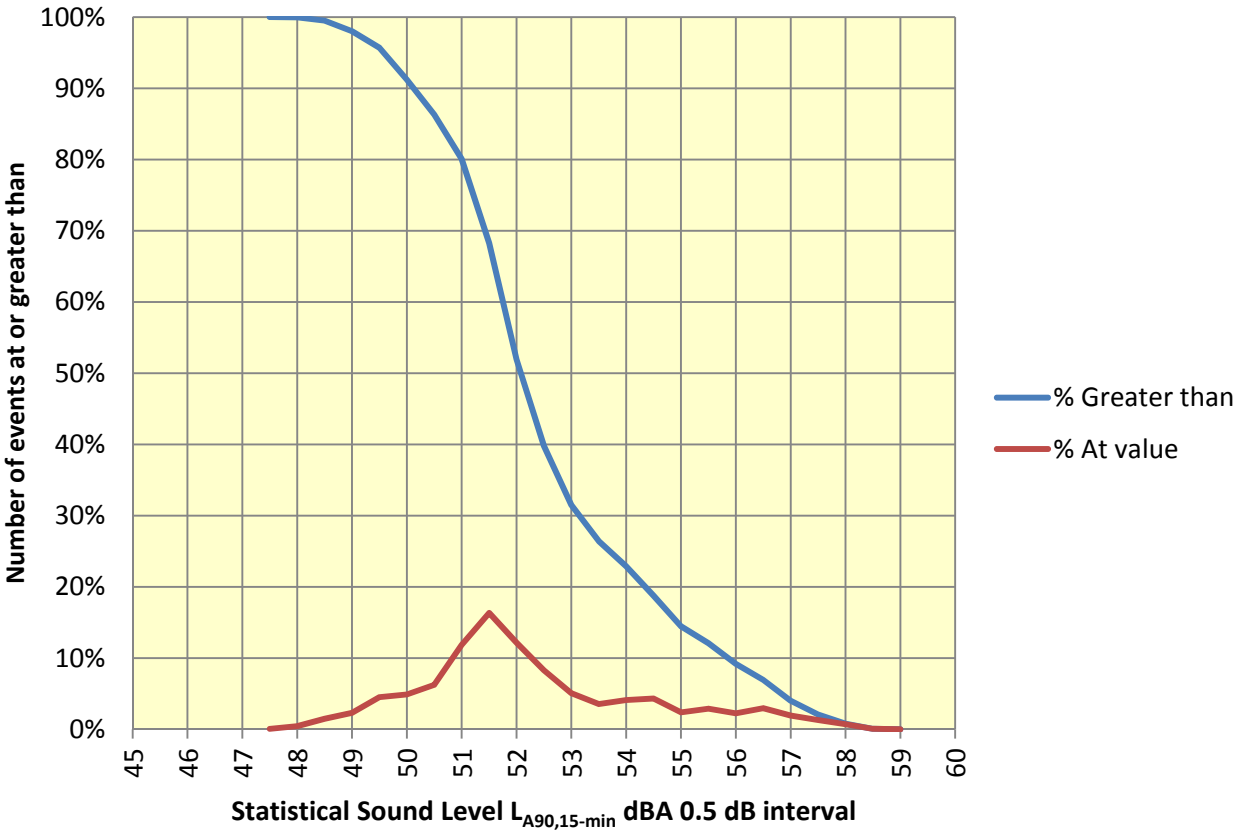


Figure 4.18: Boral Cement Berrima Annual Noise 2020
Statistics Location 20 % of $L_{A90,15\text{-}min}$ periods at a sound level



2020 Loc 20 L90 graphs stats

Figure 4.19: Boral Cement Berrima Annual Noise 2020
Statistics Location 20 Number of $L_{A90,15\text{-}min}$ periods at a sound level

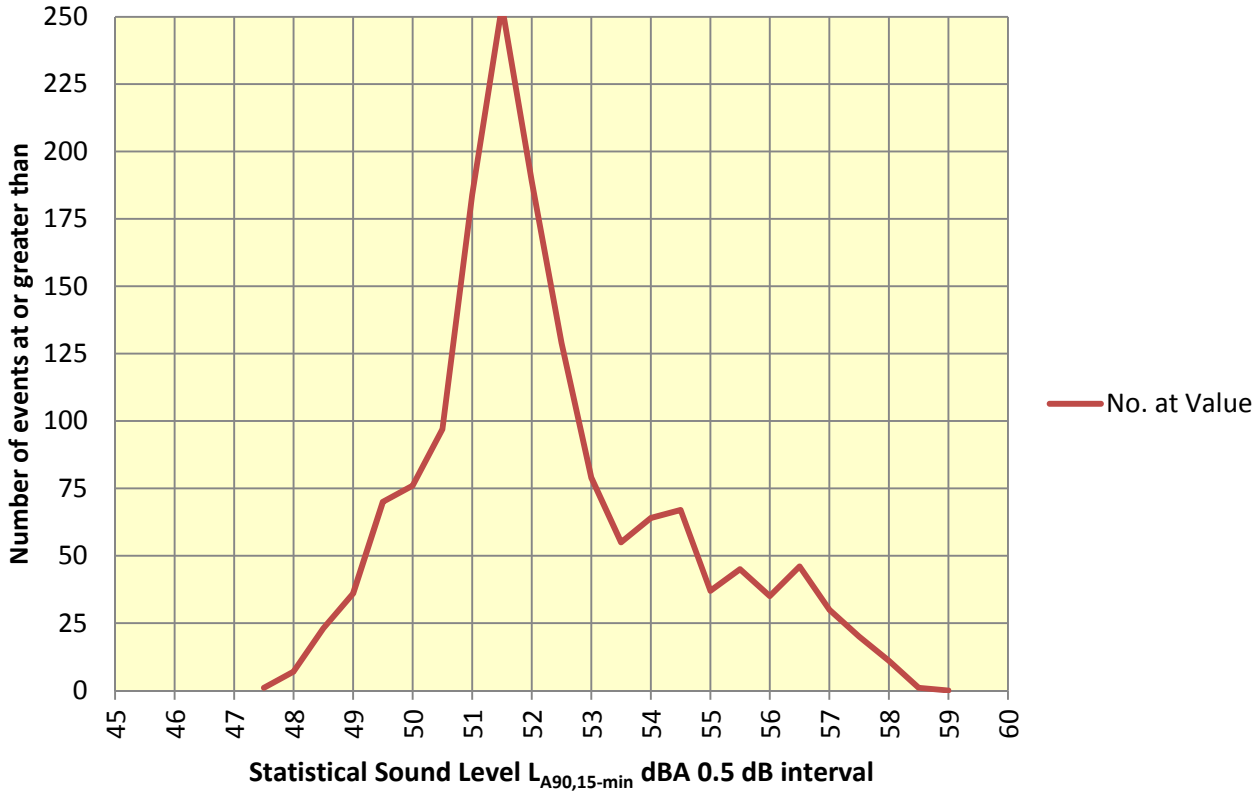
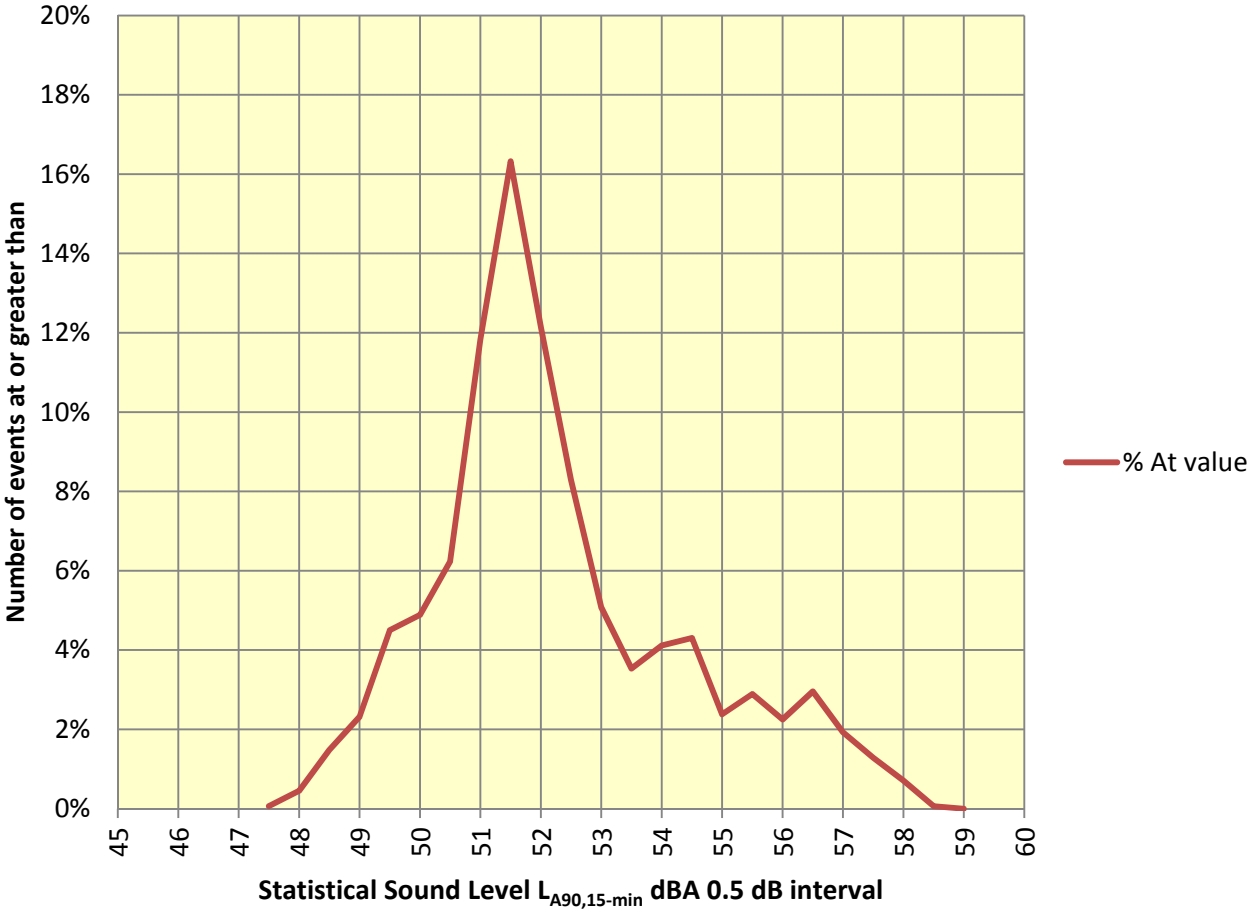


Figure 4.20: Boral Cement Berrima Annual Noise 2020
Statistics Location 20 % of $L_{A90,15\text{-}min}$ periods at a sound level



2020 Loc 20 L90 graphs stats

Figure 4.21 Runtime of the event at Location 20 from 6:30 to 7:15am 19/10/20

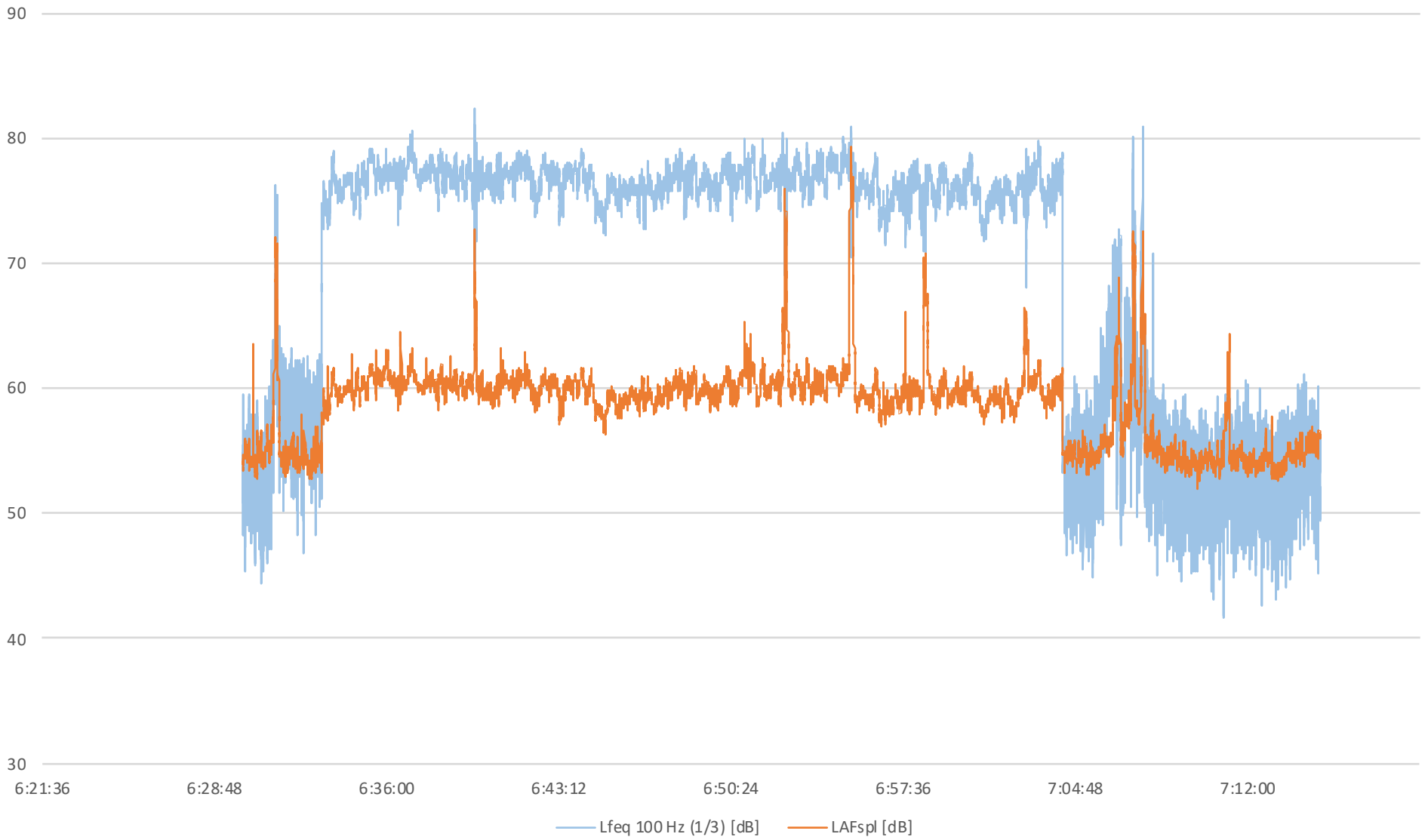


Figure 4.22 Spectrum before the Location 20 Event measured from 6:30 to 6:32am 19/10/20

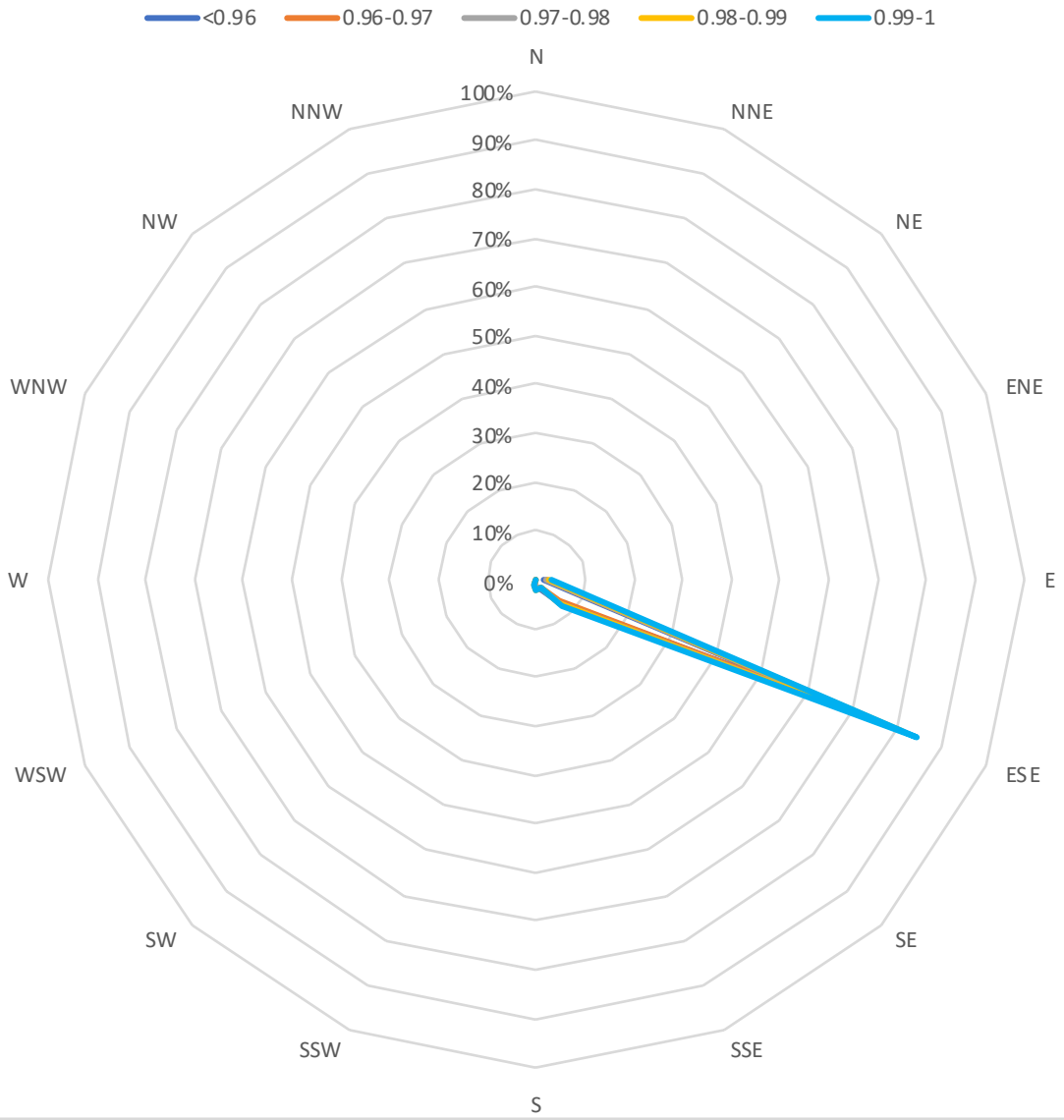


Figure 4.23 Spectrum afetr the Location 20 Event measured from 6:34 to 6:40am 19/10/20

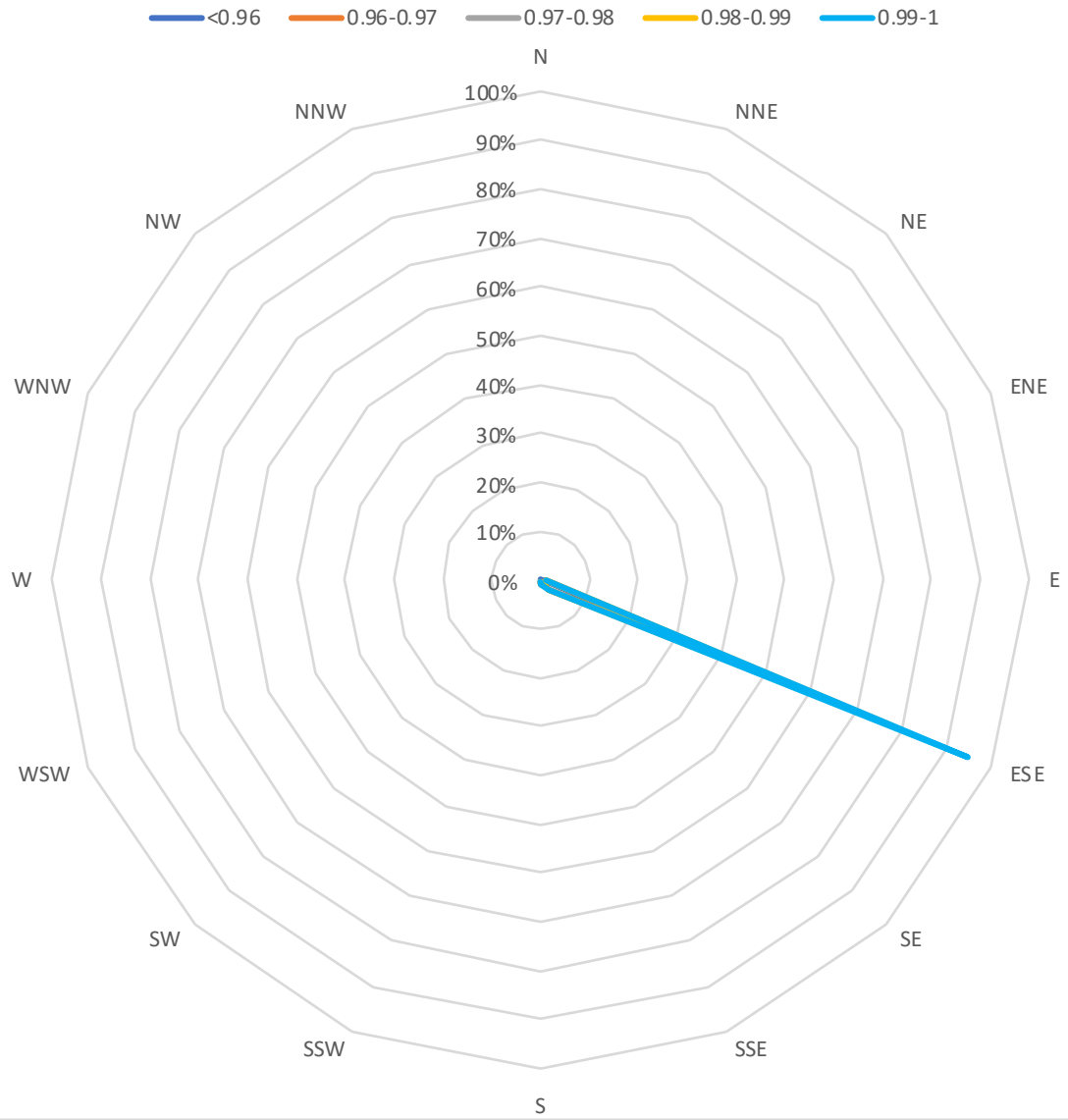


Figure 4.24 Spectrum before the Location 20 Event measured at 6:32am 19/10/20

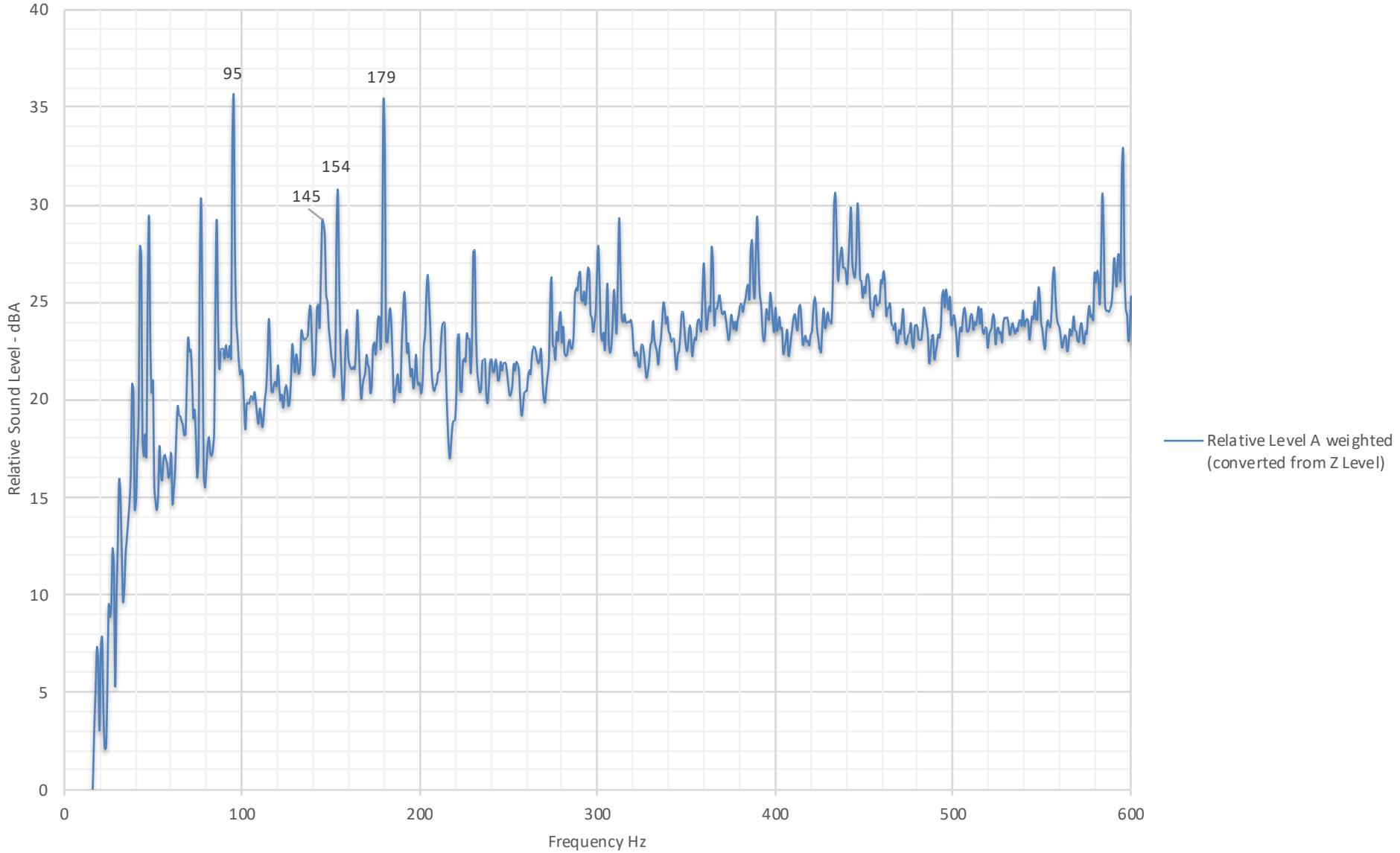
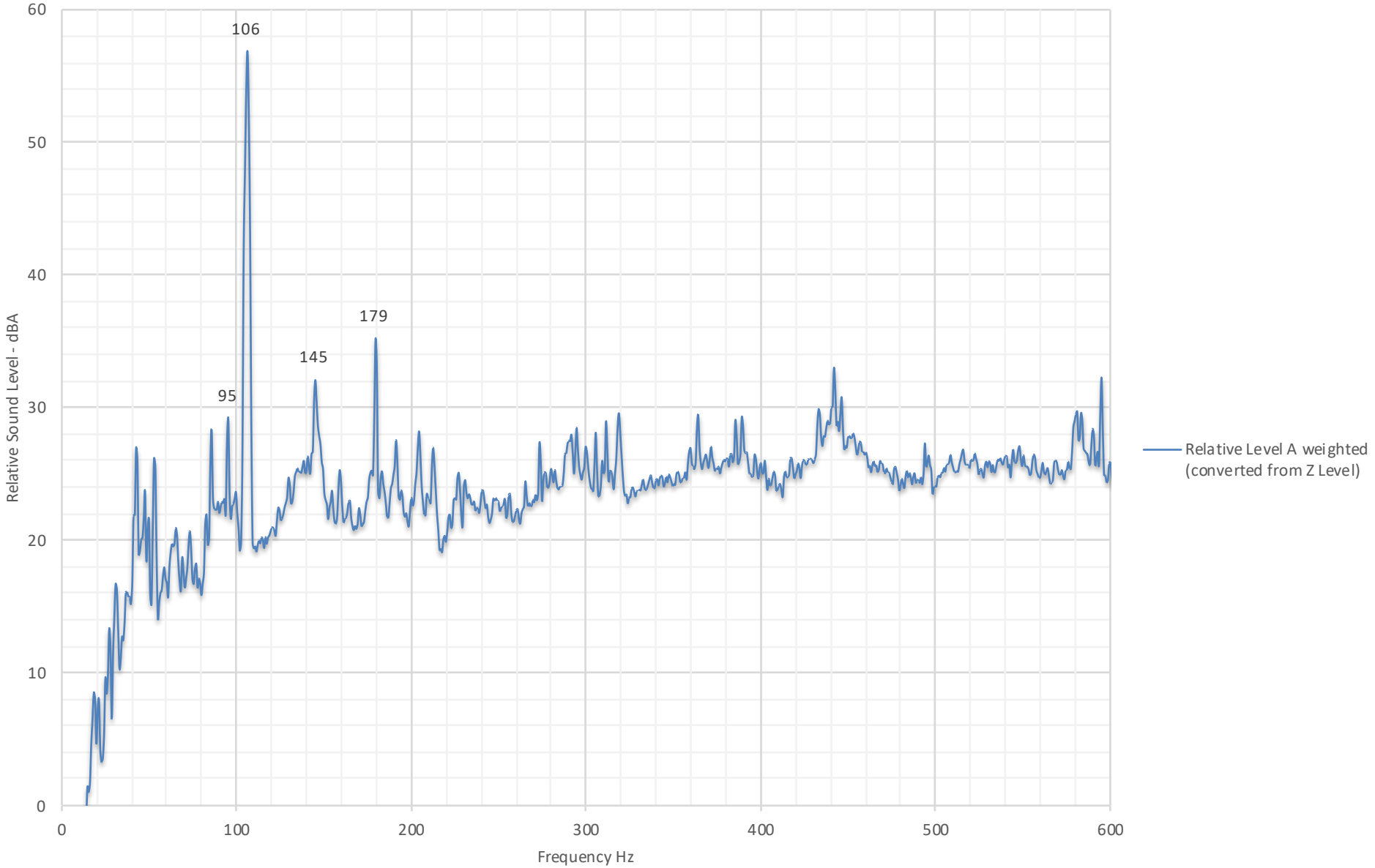


Figure 4.25 Spectrum during the Location 20 Event measured at 6:34am 19/10/20



ABN: 25 153 946 064
ACN: 153 946 064

4.2.2 $L_{A01.1\text{-minute}}$ and $L_{A01.1\text{-minute}} - L_{A90.15\text{-minute}}$ results for the Northern Boundary

Sound levels measured at the Northern Boundary locations included $L_{A01.1\text{-minute}}$ to allow calculations of $L_{A01.1\text{-minute}} - L_{A90.15\text{-minute}}$ at night-time to be made to provide comparisons with recommended maximum values for night-time. The recommended maximum objective of 60 dBA for $L_{A01.1\text{-minute}}$ night-time for the Northern Boundary location and not greater than 15 dB difference for $L_{A01.1\text{-minute}} - L_{A90.15\text{-minute}}$ are to indicate sleep disturbance potential and were provided as recommendations in the PRP report.

The analyses made for the Northern Boundary location showed that for this location, there were 99 events which exceeded the objective of $\mathbf{L_{A01.1\text{-minute}} - L_{A90.15\text{-minute}}}$ not greater than 15 dB. 16 groups of these periods occurred and sound recordings of specific periods within those 16 groups with $\mathbf{L_{A01.1\text{-minute}} - L_{A90.15\text{-minute}}}$ difference results greater than 15 dB were listened to determine sources of noise occurring in the period. These periods were assumed to be typical of the events in adjoining or near-in-time periods.

Of the 99 events identified with a difference of greater than 15 dB at night-time, 24 had a difference of greater than 20 dB and 2 were greater than 25 dB. The maximum difference was 30 dB.

Figure 4.26 is a graph showing the times of events with the $\mathbf{L_{A01.1\text{-minute}} - L_{A90.15\text{-minute}}}$ difference results greater than 15 dB for each night of the whole survey. On some or most night periods the events occurred in one particular segment of the period, such as just before and until after dawn; on other nights there were some events also prior to midnight and other nights where the noise occurred several times.

The approach to listening to the events to determine the sources of noise was to listen to a representative sample for the monitoring period. The sampling was determined on the time sequence and difference level, for example if there was a run of events one period following directly after each other the period with the highest difference was investigated. If the exceedances were outside the typical period, for example, 2:15am, these were listened to as well. Table 4.4 indicates that a total of 39 events were observed from the listening sample set. Also shown in Table 4.4, birds were identified on 23 of the 39 occasions. This is main cause of exceedances in the hour between 6am and 7am. As observed from Figures 4.27 to Figures 4.31 these periods are the main cause of all the total 47 periods which had exceedances. Other sources identified were rail wheel squeal on 8 occasions, locomotive horns on 3 occasions, heavy vehicles which had a whining gearbox, train activity, impacts and thumps, trucks passing, rain on 1 occasion.

Table 4.5 shows the Noise observed from the sample set that did not contain birds or insects which indicated Cement plant site activities. Also included in Table 4.5 are the Sleep disturbance criteria $\mathbf{L_{A01.1\text{-minute}}}$, $\mathbf{L_{A90.15\text{-minute}}}$ calculated at 4 Melbourne St and the difference. The attenuation between the North Fence and 4 Melbourne St was calculated from the distance attenuation of approximately 5 dBA and the added attenuation from high frequency component assumed to be at 3000Hz of 3 dBA which is referenced by ISO 9613 Part 1. The table also shows the difference between $\mathbf{L_{A01.1\text{-minute}}}$ calculated at Melbourne St and the measured $\mathbf{L_{A01.15\text{-minute}}}$ at Melbourne St. If that difference is not between -3 and +3, then it is assumed that the likelihood of the observed noise at the North fence was not propagated to 4 Melbourne St as the source of the measured $\mathbf{L_{A01.15\text{-minute}}}$.

As indicated from Table 4.5 out of the 5 observed exceedances of the Sleep disturbance criteria, when cross referenced with the $L_{A1\text{-North Fence}} - L_{A1\text{-Melbourne St}}$ parameter, the sample set is reduced to 2 observations.

A comparison of the event sound levels received at the Northern Boundary indicated that the high levels of $\mathbf{L_{A01,1\text{-}minute}}$ which measured were caused by birds, insects or animals, the highest of 77 dBA. Rail squeal was noted to have $\mathbf{L_{A01,1\text{-}minute}}$ sound levels of greater than 60 dBA at the Northern boundary.

From these analyses it is considered that the number or times that the objectives of $\mathbf{L_{A01,1\text{-}minute}}$ greater than 60 dBA and $\mathbf{L_{A01.1\text{-}minute} - L_{A90.15\text{-}minute}}$ difference results greater than 15 dB are relatively low and the noise emissions from the Cement Plant have a low potential for sleep disturbance. Indication from the available information is that the most likely cause of site sources to exceed criteria is rail associated noise, but not all rail events cause exceedances.

4.2.3 Low frequency noise

The NSW Noise Policy for Industry has a section for assessment of low frequency noise from industry as received at residential locations. This is based on an initial screening test of the C-weighted minus A-weighted (L_C-L_A) period sound level exceeding more than 15 dB. If the screening value is exceeded a one-third octave band frequency analyses is then made of un-weighted (or Z-weighted L_Z) sound levels in the low-frequency bands from 10 Hz to 160 Hz, compared to a specific value. The values for the community attended monitoring locations are shown in Table 4.6.

If the threshold levels are exceeded by up to and including 5 dB in evening or night-time, a positive adjustment of 2 dB is added to the measured sound level. If the exceedance in any band is more than 5 dB, a positive adjustment of 2 dB is added to the measured sound level for daytime and 5 dB added for evening and night-time.

The initial screening test on attended measurements indicated that exceedances were reported on three occasions at 12 Brisbane St and once at Adelaide St near Taylor Ave (20m) in line with 72 Taylor façade. On further analysis of the one third octave band spectra, minor exceedance of less than 0.3 dB in the 160 Hz band was observed at 12 Brisbane St, displayed as 0 in the table, and small exceedances in the 40 Hz, 50 Hz, 125 Hz band, and exceeded more than 5dB in the 160 Hz band at the Taylor and Adelaide St location.

Further investigation at this location, indicate that “Highway traffic was equally prominent as the works” was noted in the attended monitoring report, and the wind was from the NNE direction. Also noted was a “surge in noise” in the 160Hz and 200Hz bands discerned from the Cement works. This surge in these two bands was also observed at the other locations in this period, which did not affect the LFN analysis at those other locations. It should also be noted that this observation failed the screening test by only 0.5 dB.

On this assessment it is considered that the main source of low-frequency noise events exceeding the policy objectives is from road traffic noise associated with trucks, either from within New Berrima or on distant roads and the freeway. The plant can be a source at times but this is not considered to be significant.

Figure 4.26 Boral Cement Berrima Annual Noise Assessment - Sleep Disturbance Criteria exceedances at North Fence Total Survey Period

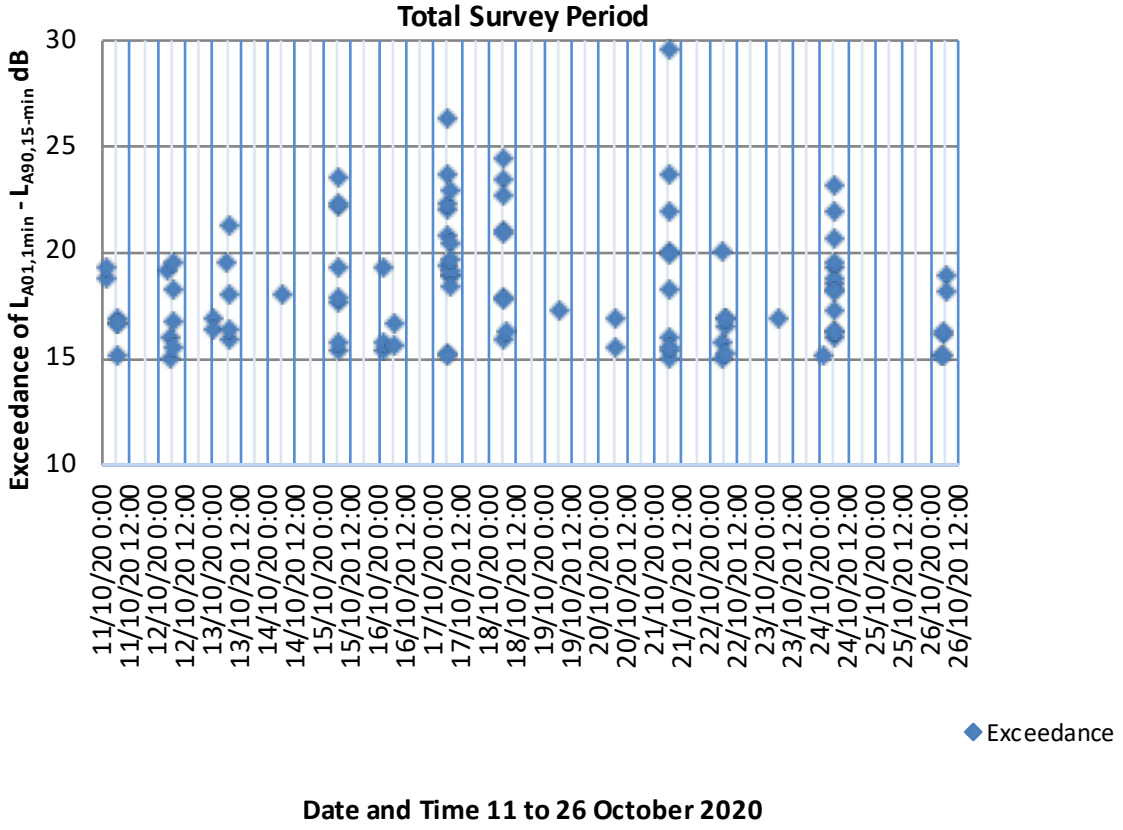


Figure 4.27 Boral Cement Berrima Annual Noise Assessment - Sleep Disturbance Criteria exceedances at North Fence

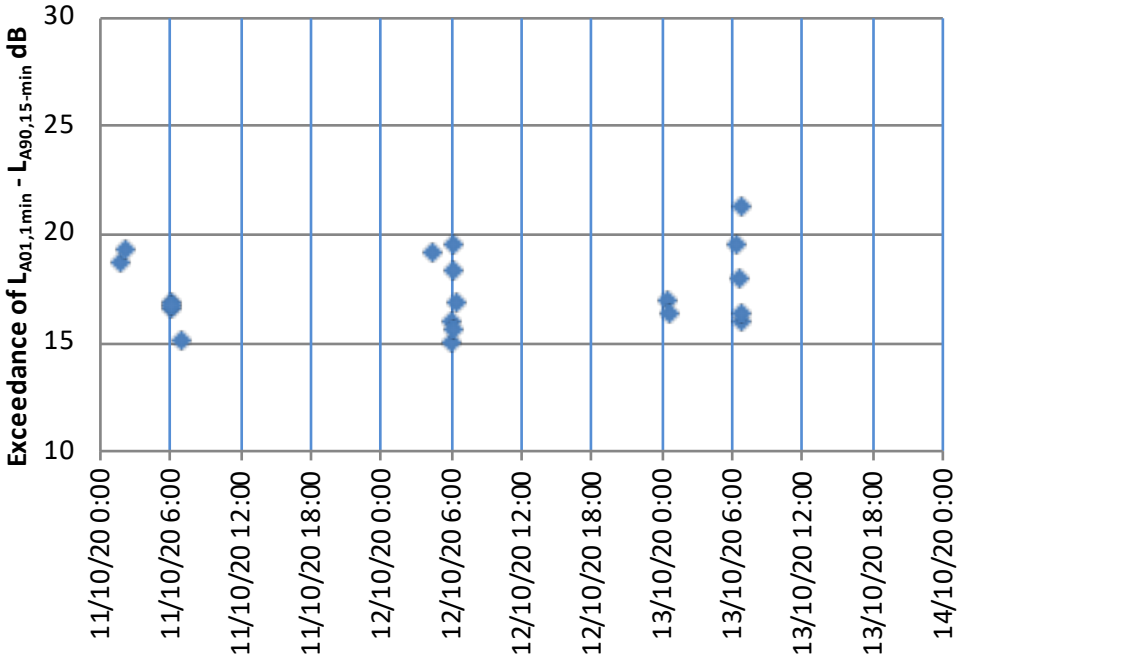


Figure 4.28 Boral Cement Berrima Annual Noise Assessment - Sleep Disturbance Criteria exceedances at North Fence

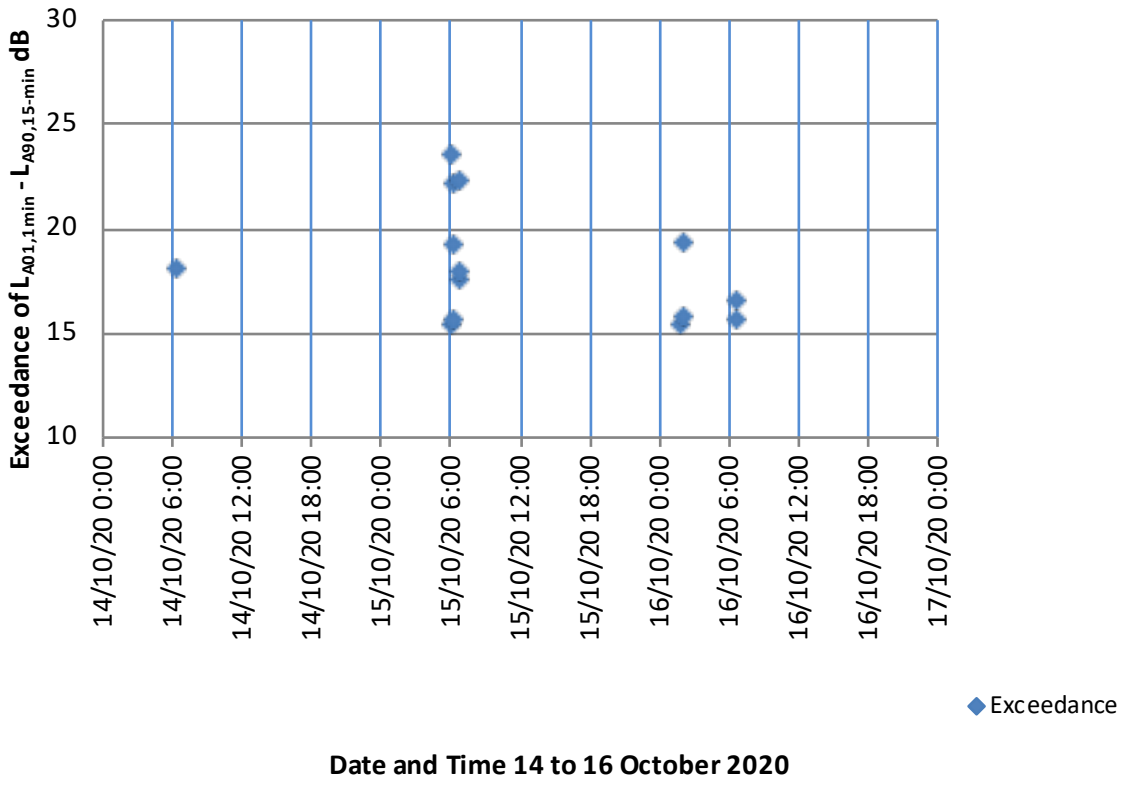


Figure 4.29 Boral Cement Berrima Annual Noise Assessment - Sleep Disturbance Criteria exceedances at North Fence

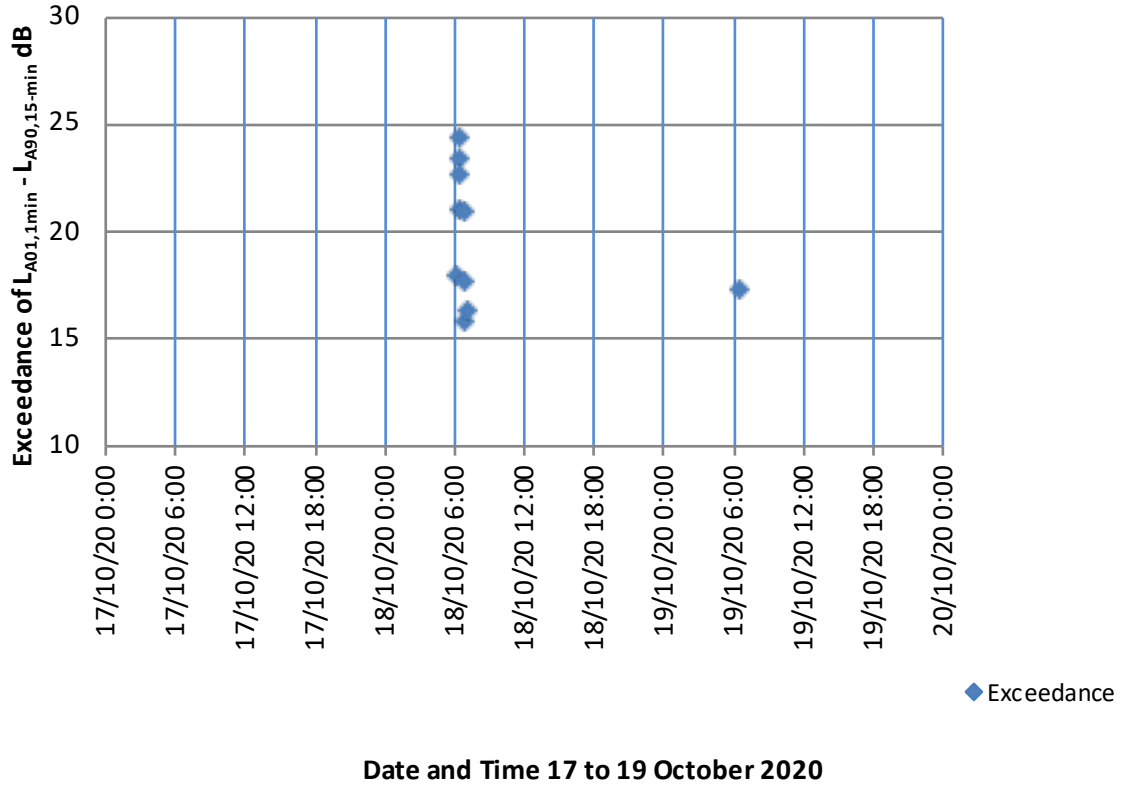


Figure 4.30 Boral Cement Berrima Annual Noise Assessment - Sleep Disturbance Criteria exceedances at North Fence

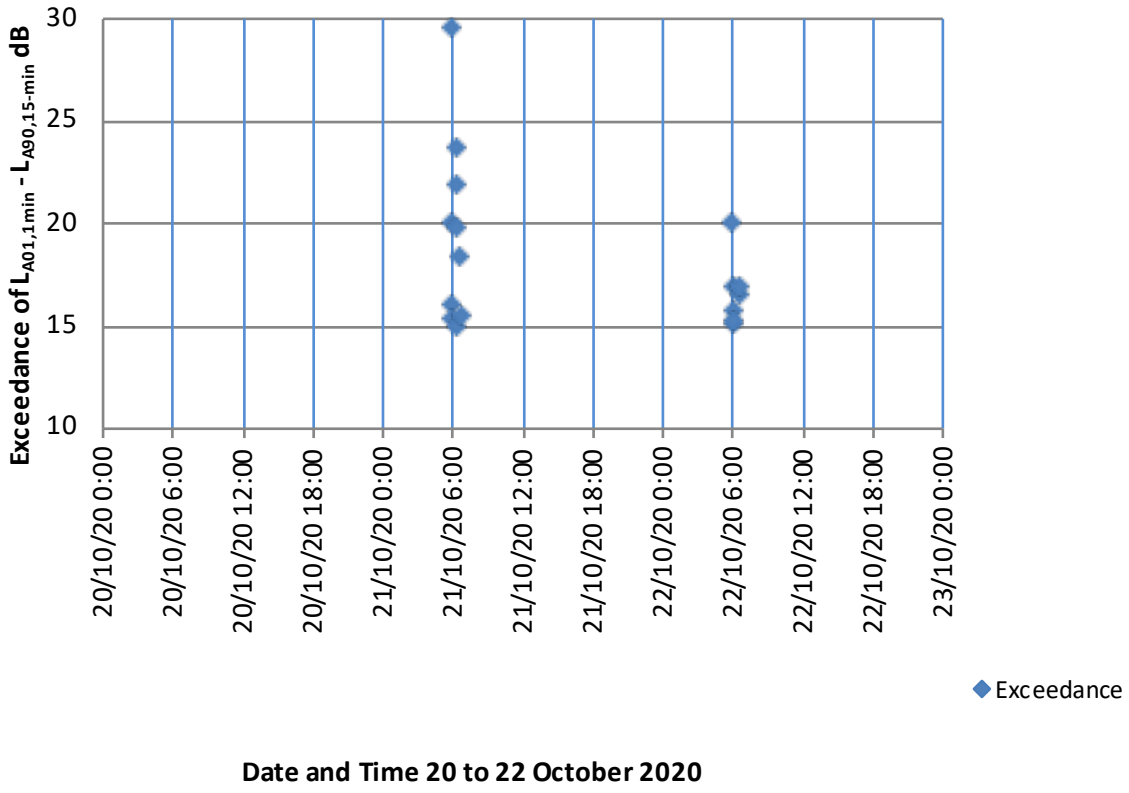


Figure 4.31 Boral Cement Berrima Annual Noise Assessment - Sleep Disturbance Criteria exceedances at North Fence

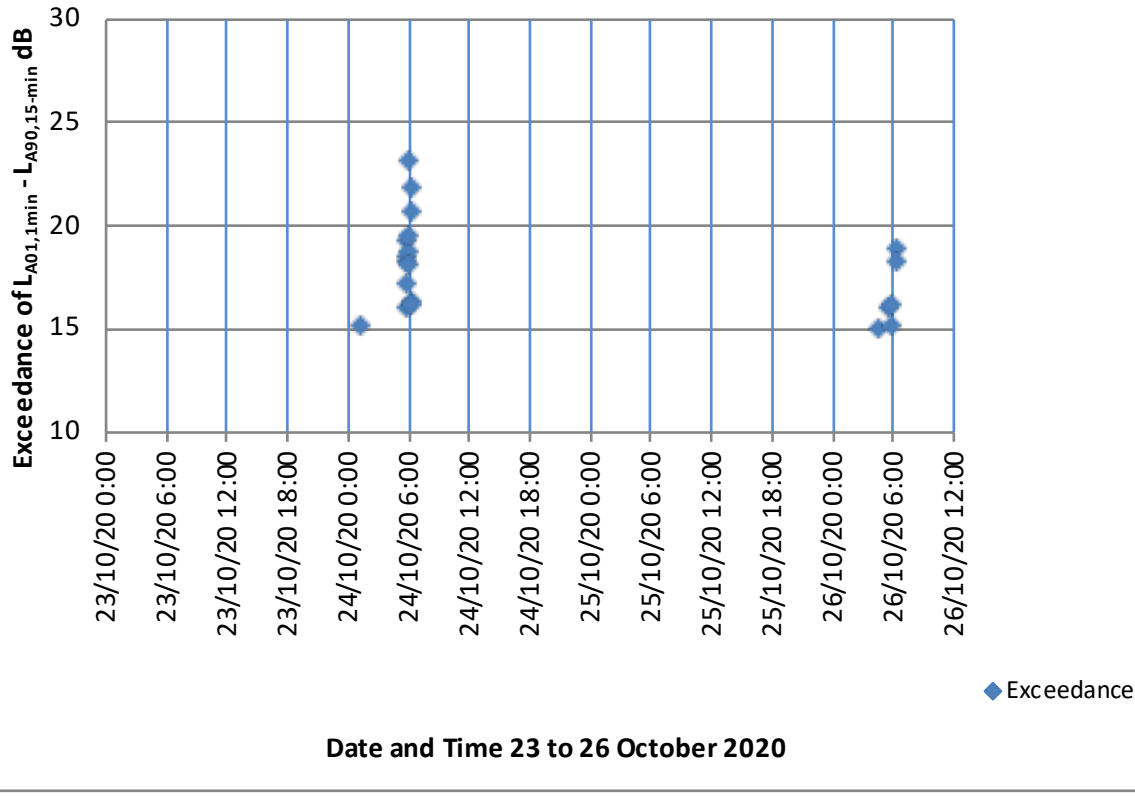


Table 4.4 Berrima Cement Annual Noise Assessment 2020

Analysis of audible sources of the Sleep Disturbance parameter $L_{A01.1min} - L_{A90.15-min} > 15$ dBA for Night-time exceedances at the **Berrima Cement** North Fence monitoring location 9 to 27 October 2020

Date	Time	No. of events in 15-min period	Maximum Exceedance dB	Maximum LA01.1min dB	Identified source comments
11/10/20	1:45	1	19	66	Rail squeal - wagon collide
11/10/20	2:15	1	19	66	Rail squeal
11/10/20	6:00	1	17	66	
11/10/20	6:15	2	17	65	
11/10/20	7:00	1	15	64	
12/10/20	4:30	1	19	68	Train horn
12/10/20	6:15	5	20	68	Birds; birds, truck gearbox; truck air brake; birds
12/10/20	6:30	1	17	66	rail squeal; horn
13/10/20	0:45	2	17	64	rail
13/10/20	6:30	2	20	69	
13/10/20	7:00	3	21	73	Birds; rail squeal; horn
14/10/20	6:15	1	18	69	
15/10/20	6:15	3	24	71	
15/10/20	6:30	2	22	69	
15/10/20	6:45	3	22	69	
16/10/20	1:45	1	15	64	Rail squeal, wagon movement
16/10/20	2:00	1	19	68	Rail squeal
16/10/20	2:15	1	16	64	Rail squeal
16/10/20	6:45	2	17	69	
17/10/20	6:00	1	15	60	
17/10/20	6:15	3	22	68	
17/10/20	6:30	4	26	71	
17/10/20	6:45	5	23	68	All birds
17/10/20	7:00	2	20	65	
18/10/20	6:15	1	18	64	
18/10/20	6:30	4	24	70	
18/10/20	6:45	1	16	61	
18/10/20	7:00	3	21	66	
19/10/20	6:30	1	17	67	
20/10/20	7:00	2	17	67	
21/10/20	6:00	4	30	77	All birds
21/10/20	6:15	1	15	61	
21/10/20	6:30	4	24	71	
21/10/20	7:00	1	16	62	
22/10/20	6:00	3	20	70	
22/10/20	6:15	2	17	67	
22/10/20	6:30	1	17	67	
22/10/20	6:45	1	17	66	
23/10/20	6:15	1	17	65	
24/10/20	1:15	1	15	59	3 impacts
24/10/20	5:45	2	17	61	
24/10/20	6:00	7	23	69	All birds
24/10/20	6:30	4	22	67	Birds; birds/truck; birds; birds
26/10/20	4:30	1	15	70	Rain
26/10/20	5:45	1	16	71	
26/10/20	6:00	2	16	71	
26/10/20	6:30	2	19	72	

Table 4.5 The effect of the Noise sources to the closest receiver of 4 Melbourne St

Date Time of period	Noise observed at North Fence	Measured $L_{A01,15\text{-}min}$ at Melbourne St	Measured $L_{A90,15\text{-}min}$ at Melbourne St	L_{A01}-L_{A90} Difference Melbourne St	If L1NF-L1MS is between -3 and 3	Measured $L_{A01,1min}$ at North Fence	Calculated NF $L_{A01,1\text{-}min}$ at Melbourne St	Calculated NF $L_{A01,1\text{-}min}$ - $L_{A90,15\text{-}min}$ at Melbourne St	Criteria
11/10/20 1:45	Rail squeal - wagon collide	49	41	8	9	66	58	17.0	15
11/10/20 2:15	Rail squeal	52	40	13	6	66	58	18.5	15
12/10/20 4:30	Train horn	61	44	17	-1	68	60	16.2	15
12/10/20 6:30	rail squeal; horn	66	45	21	-7	66	58	13.3	15
13/10/20 0:45	rail	57	38	19	-1	64	56	18.1	15
16/10/20 1:45	Rail squeal, wagon movement	52	43	9	4	64	56	12.6	15
16/10/20 2:00	Rail squeal	52	43	9	8	68	60	16.5	15
16/10/20 2:15	Rail squeal	52	41	11	4	64	56	14.6	15

Table 4.6 Low Frequency Noise Analysis for Attended Monitoring : Community Locations

						Frequency (Hz)												
						10	***13***	***16***	***20***	***25***	***32***	***40***	***50***	***63***	***80***	***100***	***125***	***160***
					Criteria	**92**	**89**	**86**	**77**	**69**	**61**	**54**	**50**	**50**	**48**	**48**	**46**	**44**
						One third Octave Band Spectra												
Description	Condition	MeasureDateTime	Laeq	Lceq	initial screening (diff >15?)	10 Hz	12_5 Hz	16 Hz	20 Hz	25 Hz	31_5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz
4 Melbourne St	Evening Time - Before Intermodal	12/10/2020 20:51	47	61	13.8	70	61	59	58	54	55	52	49	49	48	49	49	49
12 Brisbane St	Evening Time - Before Intermodal	12/10/2020 21:17	41	59	17.6	70	62	59	56	55	54	49	49	46	45	42	44	44
Adelaide St near Taylor Ave (20m) in line with 72 Taylor Façade	Evening Time - Before Intermodal	12/10/2020 21:41	54	67	12.9	70	61	60	57	58	60	55	66	56	53	53	51	55
Arglye St (near pole)	Evening Time	21/10/2020 20:13	54	66	12.0	70	71	65	61	59	55	54	57	57	49	49	52	50
4 Melbourne St	Evening Time	21/10/2020 20:36	54	68	14.2	70	62	58	58	60	53	53	55	60	63	57	61	59
12 Brisbane St	Evening Time	21/10/2020 21:00	40	61	20.9	70	61	57	57	61	52	51	47	45	45	42	42	44
Adelaide St near Taylor Ave (20m) in line with 72 Taylor Façade	Evening Time	21/10/2020 21:27	48	64	15.5	70	61	59	59	64	56	52	52	51	48	47	49	52
Adelaide St near Taylor Ave (20m) in line with 72 Taylor Façade	Night Time	21/10/2020 22:00	53	66	13.3	70	66	61	61	66	59	55	56	53	52	51	51	55
4 Melbourne St	Night Time	21/10/2020 22:21	49	64	15.0	70	61	59	60	62	54	55	52	52	50	50	51	55
12 Brisbane St.	Night Time	22/10/2020 0:04	43	63	19.7	70	62	58	59	64	55	49	47	46	45	43	43	44
Arglye St (near pole)	Night Time	22/10/2020 0:26	52	65	13.7	70	61	58	58	60	54	53	57	60	56	55	55	51
12 Brisbane St.	Day Time	27/10/2020 17:27	59	68	9.1	58	58	57	59	62	56	57	53	54	61	56	54	57
Adelaide St near Taylor Ave (20m) in line with 72 Taylor Façade	Day Time	27/10/2020 17:48	61	71	10.5	59	59	59	61	66	60	59	59	59	65	61	62	60
4 Melbourne St	Day Time	9/10/2020 9:10	58	70	11.5	70	64	64	62	61	61	61	60	63	61	57	61	58
4 Melbourne St	Day Time	27/10/2020 17:30	57	69	12.1	70	61	61	61	63	59	59	63	61	60	59	57	55
Arglye St (near pole)	Day Time	27/10/2020 17:48	57	68	10.8	70	64	63	62	62	58	58	62	58	54	55	57	55

Frequency (values)

10	***13***	***16***	***20***	***25***	***32***	***40***	***50***	***63***	***80***	***100***	***125***	***160***
Exceedance of One third Octave Band Spectra Criteria values												
10 Hz	12_5 Hz	16 Hz	20 Hz	25 Hz	31_5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz
0	0	0	0	0	0	0	0	0	0	0	0	0
-22	-27	-27	-21	-14	-7	-5	-1	-4	-3	-6	-2	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
-22	-28	-29	-20	-8	-9	-3	-3	-5	-4	-6	-4	0
-22	-28	-28	-18	-5	-5	-2	2	1	0	-1	3	8
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
-22	-27	-28	-18	-5	-6	-5	-3	-4	-3	-5	-3	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

issues with Low freq Noise : +ve
exceeds 5 dB

4.3 Attended measurement results and specific receiver locations

Attended measurements were taken at the same residential locations as the unattended measurements to identify the sources of noise occurring that were audible at the time, as well as other conditions. Attended measurements were also taken in Argyle Street on the western side, 30m north of Taylor Avenue, and the same distance as the front of the first house on the eastern side of Argyle Street not facing Taylor Avenue. Table 4.1 has the collated long-term average results for each unattended monitoring location and figures 4.11 to 4.15 the graphs of those average results since 2002.

Environmental Noise Level Assessment Report shows the collated results and comments for the attended measurements, given in Appendix F. Table 4.7 shows the one-third octave band spectra from the attended monitoring. Figures A59 to A65 in Appendix A show the one-third octave band spectra and tonality graphs for each attended monitoring location. Figures E2 to E18 in Appendix E show the narrow band spectra analysed from the site sound recordings. Table 4.8 provides a summary of the attended statistical sound level results and figures 4.32 to 4.39 compare these statistical results.

4.3.1 Comments on sound levels and results at residential 4 Melbourne St

Results for 4 Melbourne St attended measurements are shown in Appendix F: Environmental Noise Level Assessment Report, with unattended measurements shown in Appendix B and Table 4.1, long-term unattended results in Table 4.2. Results have been collected for this location since 2002. Attended measurements were obtained for daytime on 9 and 27 October, evening on 12 and 21 October and night-time on 21 October.

Sound levels in residential receiver areas continue to be mainly caused by road traffic noise, both on Taylor Avenue or Melbourne Street, and from the Hume Freeway at night-time. The noise emissions from the Cement Plant form the background sound levels on most occasions. Cement Plant sources audible included fans and some rail operations (loco horns, curving wheel-squeal). Tonal noise was not evident on most occasions or for 15-minute sample periods. Night time sound levels were ranging typically from 44 to 50 dBA.

One-third octave band sound levels are shown in Appendix A, Table 4.7 and spectra and tonality graphs are combined in Figure A60. The spectra are relatively broad-band with very little tonality evident in either L_{Aeq} or L_{A90} results.

Unattended sound levels shown on the two-day graphs of Appendix B show sound levels vary mainly diurnally with some influence from wind speed occasionally correlating with wind direction, but not all occasions, and there is little correlation of the effect from wind direction.

Average night-time $L_{A90.15\text{-minute}}$ sound levels were in the range 38 to 45 dBA and averaged 41 dBA.

Narrow band analyses of the attended monitoring recordings are provided in Appendix E Figures E4, E8 and E14. Graphs are presented in linear frequency scales. They show a spectral peak at 179 to 180 Hz or thereabouts related to the speed of the main PHT ESP fan and RM7 baghouse fan FA250, with the height depending on the time of the day. These peaks are not seen as tonal in the one-third octave band analyses and would need to be over 25 dB high at this resolution to be significant.

4.3.2 Taylor Avenue – Corner Adelaide St

The location used for the attended measurements this year was in Adelaide Street, 20m north of Taylor Avenue which is in-line with the front façade of the residence at 72 Taylor Ave. Attended measurements were obtained for daytime on 27th October, evening on 12th and evening and night on 21st October.

Results for attended measurements are shown in Appendix F: Environmental Noise Level Assessment Report, with the summary of attended measurements shown in Table 4.1, long-term averages of unattended results in Table 4.2 and Figure 4.12. Appendix A Table 4.7 has the one-third octave band spectra and tonality assessment with Figure A62 showing graphs of the spectra and tonality.

L_{Aeq} results for this location are controlled by motor vehicle noise passing on Taylor Avenue and whether trucks pass over bumps in the road surface, with high wind speeds also having an effect, as seen in the attended monitoring report of Appendix F.

Attended L_{A90} sound levels were 51 dBA during daytime and 41 to 44 dBA in the evening and 44 dBA in night-time. Late at night Hume Freeway traffic can also be audible.

Cement Plant site sources identified included the gate alarm from the eastern (Truck) access gate opening and closing and occasional reversing alarms or horns.

Narrow-band spectra are shown in Appendix E figures E6, E12, E18 and E19. As with 4 Melbourne Street analyses, the main peak visible is at 179 to 180 Hz, related to speed variation in the main fans fan. Lower level peaks in the 1300 to 1500 Hz range do not match any site plant sources.

4.3.3 12 Brisbane Street

Monitoring locations used for 12 Brisbane Street were the same as in the previous measurements. L_{Aeq} results are affected by road traffic noise from Taylor Avenue and Brisbane Street as well as the Hume Freeway at times of westerly winds. Cement Plant noise emissions also contribute at this location.

Results for attended measurements are shown in Appendix F: Environmental Noise Level Assessment Report. Tables 4.1 and 4.2 show long-term averages of results, which are also shown graphically as a time history in Figure 4.13. Table 4.7 has the one-third octave band spectra and tonality assessment with Figure A61 showing graphs of the spectra and tonality.

Attended daytime L_{Aeq} result was 59 dBA, a higher value than usual because of the number of vehicle movements in the street and Taylor Avenue at the time of the measurements. Evening and night-time measurements had 41 to 42 dBA L_{Aeq}. L_{A90} results for the same periods were 47 dBA daytime, evening 36 to 37 dBA and 38 dBA at night.

Long-term average night-time sound levels from unattended monitoring were 49 dBA L_{Aeq} and 43 dBA L_{A90}, compared to the PRP recommended objectives of 40 and 35 dBA respectively. As with the other measurements the total sound levels include sources other than the Cement Plant. Average sound levels were higher than 2018 and the long-term average by 0 to 3 dB.

Road traffic on Taylor Avenue is the source of the highest sound levels. Hume Freeway traffic is also significant at night-time with westerly winds. Site noise was noted as general industrial with observed

increases at times in the 160 and 200 Hz spectral bands. The PHT fan noise would have been the source of a minor tonal noise in the 160 to 200 Hz one-third octave bands.

One-third octave band sound level graphs of the attended measurements, shown in Figures A61 are generally broad-band and non-tonal, as occurred for the other residential measurements.

Narrow-band spectra from attended measurements are shown in Appendix E figures E3, E7, E13 and E20. The daytime spectra have few stand-out peaks, apart from those associated with the fans at 178 to 180 Hz again. None of the measurements are considered to have tonal aspects.

4.3.4 Argyle St

Attended sound levels are measured at the western side of Argyle Street 30m north of Taylor Avenue. Measurements have been done in the daytime, evening and night-time but daytime measurements are affected by noise from the adjacent shop and road traffic noise. Attended sound levels are shown in Appendix F: Environmental Noise Level Assessment Report and summarised in Table 4.8. One-third octave band sound levels are shown in Figures A65 and narrow band spectra in Figures E9, E15 and E21.

The main noise sources at this location are traffic along Taylor Avenue and its extension to the Hume Highway to the west, and Hume Freeway noise. Cement Plant noise is audible at times as a general industrial noise, but is lower than in other monitored locations because of the additional distance.

One-third octave band spectra from the measurements are shown in Appendix A, Table 4.7 and Figure A65. Spectra are broad-band and non-tonal.

Narrow-band spectra shown in Appendix E figures E9, E15 and E21 show that the frequency peak at 179 Hz was easily observable.

The Cement plant is considered to not be a significant source at this location.

4.3.5 Northern Boundary

Attended sound levels at the Northern Boundary have been measured at the northern end of the stockyard, this survey the attended measurements were made at the inside location next to the unattended meter.

Results for attended measurements are shown in Appendix F: Environmental Noise Level Assessment Report, and summarised in Table 4.8, with unattended measurements shown in Appendix C Table 4.1, long-term unattended results in Table 4.2 and Figures 4.14 . Sound levels were measured between 9 and 27 October. The results of the reliable data points are similar to those of previous years. Statistical averages are similar to the previous years and long-term averages.

Taylor Avenue vehicle movement sound levels are lower at this location than for the residential locations but are still an influence. Site sources identified in the attended monitoring included vehicle movements, train activities and general industrial noise.

Measured attended L_{Aeq} sound levels were 54 dBA daytime (from birds), 46 to 47 dBA in evening and 49 dBA night-time. For L_{A90} sound levels 44-47 dBA for evening and night and 51 dBA daytime .

One-third octave band spectra of attended measurements are shown in Appendix A, Table 4.7 and Figure A63. Spectra were broad-band and non-tonal.

Narrow-band spectra are shown in Appendix E Figures E5, E11 and E17. As with other measurements they show a peak at 178 to 180 Hz related to FA39 for daytime and evening.

4.3.6 Location 20 Store Yard Close location

This location has become the EP Licence noise monitoring location to indicate achievement of compliance, without significant intrusion from other external noise sources (traffic) outside the plant boundary. The licence condition is for the $L_{A90,15\text{-minutes}}$ not to exceed 58 dBA (measured according to the methods of the Noise Policy for Industry, without transient or extraneous noise sources). Objectives are also for a long-term $L_{A90.period}$ over 7 days of 56 dBA . Earlier discussion of the results of this monitoring was provided in Section 4.2.

Results discussed in this section are for attended monitoring and one-third octave band and narrow-band analyses. Results of the attended monitoring are given in Appendix F: Environmental Noise Level Assessment Report, and summarised in Table 4.8. Appendix D provides the unattended sound level results and Appendix E the analysed narrow band spectra of attended sound level recordings.

Main sources were industrial noise of fans from the main parts of the plant, locomotive and train movements at times (sometimes with wheel squeal) and internal traffic movements. Mobile equipment loading and stockpile operations on the southern side of the rail line were noted during some measurements. Specific measurements during operation of the Isotainer Loading facility were occasionally audible but did not cause observable variation in received sound levels.

Appendix A and Table 4.7 show one-third octave band and tonality assessments, with Figures A64 showing the spectra and tonality assessment. The spectra are relatively broad-band and non-tonal. An event measured on 19 October showed increased sound levels from a vehicle movement which has been described earlier.

Narrow-band spectra are shown in Appendix E figures E2, E10 and E16. They show a similar peak in the spectrum to measurements at other sites – 178 to 180 Hz for FA39/FA250.

Unattended sound levels shown in the two-day graphs of Appendix D show fairly constant sound levels for $L_{Aeq,15\text{-min}}$ between 53 and 62 dBA and for $L_{A90,15\text{-min}}$ 50 to 56 dBA. Wind speed and direction had an observable effect on both $L_{Aeq,15\text{-min}}$ and $L_{A90,15\text{-min}}$ sound levels when the wind direction changed from westerly to southerly early on the morning of 16 October – $L_{A90,15\text{-min}}$ changed from 52 to 55 dBA with little change in wind speed; $L_{Aeq,15\text{-min}}$ increased a similar amount but this may have also been related to the onset of daytime.

A period of 3 hours on the morning of 26 October included times when all major plant items except the kiln were idle, as shown in figure 1.6.

The time history of this period shows little change in sound level from before or after, but wind speeds were also relatively high at the time, while wind direction was directly from the plant towards the monitor.

Weather conditions during the measurement period for the Store Yard Close location included extended periods of high wind speeds, mostly westerlies. Figures 4.2 to 4.10 show a summary of the weather conditions for the monitoring period. Rain for extended periods did not occur during the period. Wind speeds exceeded 10m/s for 6% of the period and 5m/s for 51% of the period. There were only 6% of periods with calm wind conditions. Long-term average statistical sound levels shown

ABN: 25 153 946 064
ACN: 153 946 064

in Table 4.2 and Figure 4.15 were lower than 2019 but similar to previous years. Sound levels over all have not changed significantly since monitoring at this location commenced.

Table 4.7: Boral Cement Berrima - 2020 Annual Noise Assessment: Monitoring location Spectrum Sound Levels

Location	Time	File	Date	Total dB		A-weighted LAeq,t Sound Level dBA in One Third Octave Frequency Band Hz																														
	of Day	No		dBC	dBA	12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
4 Melbourne St	D	1	9-Oct	70	58	1	7	12	17	21	26	30	37	38	38	45	44	44	43	46	46	46	47	48	49	50	48	46	44	42	41	39	36	32	28	21	13
4 Melbourne St	D	454	27-Oct	69	57	-3	4	10	19	19	25	33	34	38	40	41	42	42	42	46	45	45	46	48	49	48	46	44	41	39	38	34	31	27	23	18	8
4 Melbourne St	E	35	12-Oct	61	47	-2	2	7	10	15	18	19	23	25	30	33	36	36	30	33	36	35	35	38	38	37	35	32	29	27	24	21	19	16	13	10	
4 Melbourne St	E	78	21-Oct	68	54	-2	2	8	15	14	18	25	34	40	38	45	46	44	39	41	39	38	39	41	41	40	39	39	38	37	34	33	31	27	22	16	
4 Melbourne St	N	82	21-Oct	64	49	-2	2	9	17	15	20	22	26	28	31	35	41	40	32	35	36	36	37	39	38	37	36	34	31	29	27	26	23	19	15	10	
12 Brisbane St	E	36	12-Oct	59	41	-1	2	5	11	14	15	19	19	23	23	28	31	30	29	31	30	30	30	31	31	29	28	27	25	24	22	20	17	14	11	8	
12 Brisbane St	E	79	21-Oct	61	40	-2	0	6	17	13	17	17	19	22	23	26	31	28	25	26	27	28	30	32	28	26	24	23	21	21	21	19	18	15	12	8	
12 Brisbane St	N	85	22-Oct	63	43	-2	2	8	19	16	15	17	20	23	24	27	31	31	27	28	29	31	32	34	35	33	28	27	27	28	27	26	25	22	20	16	
12 Brisbane St	D	121S	27-Oct	68	59	-5	1	8	17	16	22	23	28	38	36	38	43	40	46	49	52	50	47	47	47	46	45	43	40	38	38	34	30	27	24	19	
Taylor / Adelaide St	E	37	12-Oct	67	54	-2	3	7	13	20	20	36	30	30	34	35	42	42	38	39	44	43	43	44	45	45	43	41	40	39	36	34	31	27	22	16	
Taylor / Adelaide St	E	80	21-Oct	64	48	-2	2	8	19	17	18	22	25	25	28	32	38	37	31	32	34	35	36	39	41	38	37	35	32	30	27	25	22	18	14	9	
Taylor / Adelaide St	N	81	21-Oct	66	53	2	5	10	21	19	20	26	27	29	32	35	41	42	36	37	38	38	39	41	43	42	41	41	40	44	35	31	29	27	29	21	
Taylor / Adelaide St	D	123S	27-Oct	71	61	-5	2	10	22	21	24	29	32	43	42	46	47	47	45	45	47	49	50	51	52	51	49	48	46	45	43	41	39	35	31	29	
North Fence	E	34	12-Oct	64	47	-2	7	13	14	20	20	22	23	26	30	31	31	30	29	33	38	40	39	38	36	34	32	29	27	23	20	19	17	16	13	11	
North Fence	E	75	21-Oct	67	46	6	6	14	23	19	26	23	29	27	28	30	38	37	31	33	34	33	35	35	36	36	34	33	30	28	26	24	23	20	18	15	
North Fence	N	84	21-Oct	68	49	7	7	15	24	19	25	24	26	30	30	30	40	39	32	34	38	38	39	40	39	38	36	34	31	30	27	25	24	21	18	15	
North Fence	D	120S	27-Oct	70	54	-1	6	14	26	23	27	28	34	35	35	37	37	39	36	39	44	46	45	44	43	42	40	38	36	34	31	33	31	26	19	16	
Location 20	D	55	21-Oct	71	53	7	9	16	25	23	29	29	32	34	36	39	45	44	38	38	40	40	40	40	41	42	39	39	38	35	33	34	29	28	21	15	
Location 20	D	56	21-Oct	70	52	8	8	16	25	21	28	27	32	33	33	37	45	44	34	37	39	39	39	40	40	40	38	36	34	29	25	23	20	17	14	11	
Location 20	D	57	21-Oct	69	54	7	8	15	20	22	28	29	33	37	37	39	45	44	37	40	40	39	41	42	42	42	42	41	39	39	38	35	31	26	20	16	
Location 20	E	74	21-Oct	70	51	7	7	16	26	18	25	28	32	32	33	38	45	43	35	38	38	38	39	39	39	40	39	38	34	31	28	24	20	15	13	10	
Location 20	N	83	21-Oct	71	53	7	5	15	27	19	26	29	35	35	37	44	45	38	35	40	41	40	42	43	42	42	41	40	38	36	33	31	28	25	22	17	
Location 20	D	451	27-Oct	73	59	1	7	18	26	23	30	36	41	40	40	42	45	43	42	44	47	48	49	49	48	48	48	46	46	45	44	40	37	31	23	17	7
Location 20/Traffic Island	D	453	27-Oct	72	58	3	9	19	27	23	29	31	34	38	39	42	44	43	38	42	49	51	49	48	47	46	45	43	41	38	35	32	25	20	14	8	4
Argyle St	D	455	27-Oct	68	57	1	6	12	17	19	23	31	32	32	36	41	42	43	44	48	44	46	48	48	48	47	45	43	40	38	36	33	30	26	21	16	6
Argyle St	E	77	21	66	54	8	9	11	15	16	19	26	31	27	30	36	37	37	38	47	42	41	44	44	44	43	41	40	38	36	34	31	28	25	22	23	
Argyle St	N	86	22	65	52	-3	1	7	15	15	18	27	34	34	36	39	38	37	36	36	38	39	40	42	42	42	40	39	39	36	34	34	31	28	25	22	

Table 4.7A: Boral Cement Berrima - 2020 Annual Noise Assessment: Tonality of Monitoring location Spectrum Sound Levels

Location										A-weighted LAeq,t Sound Level dBA in One Third Octave Frequency Band Hz																										
										31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
4 Melbourne St	D	1	9-Oct							3.1	3.0	0.7	0.9	0.8	0.5	0.3	1.0	2.6	3.2	0.1	0.8	0.5	1.4	0.6	1.1	1.1	1.3	1.1	0.2	0.3	0.3	0.5	0.0	1.3	0.9	0.3	1.1
4 Melbourne St	D	454	27-Oct							3.1	3.0	0.7	0.9	0.8	0.5	0.3	1.0	2.6	3.2	0.1	0.8	0.5	1.4	0.6	1.1	1.1	1.3	1.1	0.2	0.3	0.3	0.5	0.0	1.3	0.9	0.3	1.1
4 Melbourne St	E	35	12-Oct							1.7	1.8	0.4	1.4	1.0	1.1	0.6	0.0	1.4	3.2	4.3	0.1	1.5	0.0	1.7	1.0	1.1	0.3	0.5	0.1	0.3	0.3	0.1	0.3	0.3	0.2	0.0	0.0
4 Melbourne St	E	78	21-Oct							4.2	2.9	0.9	1.4	1.4	4.1	4.4	3.2	1.3	1.6	4.0	2.5	0.5	1.0	0.4	0.9	0.3	0.4	0.4	0.3	0.0	1.0	0.9	0.2	1.3	0.5	0.0	0.0
4 Melbourne St	N	82	21-Oct							5.5	3.9	1.9	1.5	1.6	1.1	0.4	0.8	3.7	3.2	5.6	1.0	0.9	0.9	0.4	1.3	0.0	0.1	0.9	0.3	0.1	0.6	0.1	0.8	0.3	0.3	0.0	0.0
12 Brisbane St	E	36	12-Oct							0.8	1.8	1.8	1.5	1.1	1.3	2.2	1.0	1.9	0.3	1.9	1.8	0.5	0.3	0.0	0.3	0.7	0.2	0.0	0.3	0.1	0.1	0.3	0.1	0.4	0.4	0.0	0.0
12 Brisbane St	E	79	21-Oct							7.1	3.9	1.8	0.6	0.9	1.4	1.6	0.3	3.4	0.4	2.1	0.2	0.3	0.2	0.2	2.4	0.6	0.2	0.3	0.4	1.1	0.1	0.8	0.0	0.6	0.4	0.0	0.0
12 Brisbane St	N	85	22-Oct							7.3	1.2	1.9	0.1	0.1	0.7	0.8	0.5	1.8	2.2	2.6	0.1	0.5	0.4	0.8	0.9	1.5	1.0	1.5	0.9	0.1	0.6	0.1	0.2	0.6	0.0	0.0	0.0
12 Brisbane St	D	121S	27-Oct							5.1	3.4	2.3	2.0	2.7	6.1	1.8	1.7	4.2	4.7	1.6	0.0	2.5	0.8	1.8	0.2	0.8	0.1	0.8	0.2	0.6	0.8	1.9	0.2	0.0	0.1	0.0	0.0
Taylor / Adelaide St	E	37	12-Oct							0.4	3.6	7.7	10.6	3.2	1.5	1.1	2.4	2.9	2.3	2.7	2.1	3.4	0.8	0.4	0.4	0.1	0.7	0.1	0.0	0.3	0.8	0.1	0.2	0.7	0.2	0.0	0.0
Taylor / Adelaide St	E	80	21-Oct							6.8	1.6	1.6	0.2	1.5	0.9	1.3	0.5	3.5	2.4	3.3	0.6	0.6	0.5	0.6	0.6	2.2	0.5	0.1	0.2	0.2	0.0	0.1	0.2	0.7	0.0	0.0	0.0
Taylor / Adelaide St	N	81	21-Oct							6.4	1.6	2.2	2.4	0.9	0.1	0.4	1.5	2.8	3.3	3.0	0.8	0.8	0.5	0.1	0.3	1.1	0.1	0.0	0.0	2.2	6.3	2.6	0.6	0.3	2.3	0.0	0.0
Taylor / Adelaide St	D	123S	27-Oct							5.9	1.8	0.8	0.6	3.3	5.4	2.0	1.2	0.4	1.4	1.4	1.0	0.4	0.0	0.2	0.3	0.7	0.8	0.6	0.5	0.6	0.6	0.1	0.5	1.4	0.3	0.0	0.0
North Fence	E	34	12-Oct							1.9	2.6	0.9	0.7	1.4	0.3	1.3	0.5	0.4	0.3	2.6	0.8	1.7	1.3	0.6	0.1	0.2	0.1	0.7	0.7	1.1	0.4	0.7	0.0	0.3	0.8	0.0	0.0
North Fence	E	75	21-Oct							6.8	5.6	4.7	4.3	3.7	1.2	0.5	3.0	4.3	2.8	4.1	0.1	1.3	1.4	0.5	0.2	0.0	1.0	0.0	0.6	0.6	0.2	0.2	0.2	0.7	0.6	0.0	0.0
North Fence	N	84	21-Oct							7.3	5.1	2.9	1.2	1.0	2.0	0.1	5.3	6.1	2.8	4.5	1.0	2.0	0.5	0.1	0.8	0.3	0.4	0.0	0.3	0.7	0.5	0.2	0.3	0.9	0.2	0.0	0.0
North Fence	D	120S	27-Oct							6.9	3.3	1.6	2.4	2.5	0.0	0.3	0.5	1.0	3.0	3.5	0.6	1.4	1.5	0.4	0.7	0.4	0.5	0.1	0.3	0.1	0.4	2.6	2.0	1.9	0.4	0.0	0.0
Location 20	D	55	21-Oct							5.9	4.6	3.4	1.4	0.3	0.2	0.6	1.5	3.6	2.3	3.2	0.5	1.0	0.5	0.3	0.1	0.4	2.1	1.2	0.3	1.8	1.1	1.3	3.0	1.9	2.7	0.0	0.0
Location 20	D	56	21-Oct							6.8	6.0	4.4	3.0	1.9	0.6	2.0	2.5	5.1	4.1	6.5	0.5	1.0	0.2	0.5	0.2	0.4	0.8	0.4	0.4	1.5	0.7	0.8	0.4	0.1	0.1	0.0	0.0
Location 20	D	57	21-Oct							1.5	2.0	2.8	1.8	0.3	2.0	1.5	1.9	4.0	2.7	5.1	1.8	0.2	0.9	0.1	0.2	0.8	0.5	0.4	0.7	0.9	0.6	0.9	0.4	0.6	0.1	0.0	0.0
Location 20	E	74	21-Oct							9.0	7.2	2.0	0.6	1.9	0.5	2.0	0.8	4.3	2.8	4.9	0.9	0.2	0.4	0.5	0.3	0.2	0.9	0.2	1.7	0.4	0.1	0.3	0.5	0.3	1.4	0.0	0.0
Location 20	N	83	21-Oct							9.8	7.2	1.9	1.9	3.6	1.3	2.5	3.4	3.3	1.6	3.8	1.5	1.3	1.7	0.8	0.7	0.3	0.5	0.4	0.2	0.3	0.4	0.0	0.1	0.0	0.4	0.0	0.0
Location 20	D	451	27-Oct							5.3	5.2	1.1	0.1	3.2	0.9	0.6	0.6	2.5	0.3	1.7	0.6	1.1	0.3	0.4	0.1	0.2	0.0	1.2	1.7	1.1	0.1	1.2	0.5	1.3	1.4	0.3	1.1
Location 20/Traffic Island	D	453	27-Oct							5.9	4.7	1.7	0.3	0.9	1.8	1.1	0.1	1.7	2.1	4.3	1.5	2.2	2.0	0.3	0.3	0.5	0.4	0.6	0.5	0.8	0.0	0.2	1.7	0.8	0.4	0.3	1.1
Argyle St	D	455	27-Oct							1.9	1.4	2.0	4.1	0.0	1.9	0.7	2.1	0.0	0.4	1.8	3.7	2.7	0.0	0.9	0.3	0.1	0.7	0.1	0.1	0.0	0.1	0.4	0.1	0.9	0.3	0.3	1.1
Argyle St	E	77	21							1.4	1.2	1.9	1.3	4.4	3.9	1.3	2.5	0.4	0.2	4.2	7.2	2.2	1.7	1.1	0.3	0.6	0.0	0.0	0.4	0.2	0.1	0.4	0.1	0.4	0.2	0.3	1.1
Argyle St	N	86	22							3.8	1.7	2.7	1.1	3.2	0.9	0.6	2.4	0.5	0.5	0.8	0.9	0.8	0.1	0.8	1.0	0.5	0.3	0.1	0.9	1.9	0.6	0.9	1.3	0.3	0.2	0.3	1.1

Table 4.8: Boral Cement Berrima Annual Noise Assessment 2020

Summary and Statistics of Attended Monitoring

Location	File No.	Date	Time	Time of Day	Statistical Sound Level - dB				
					$L_{A01,15\text{-}min}$	$L_{A90,15\text{-}min}$	$L_{Aeq,15\text{-}min}$	$L_{Ceq,15\text{-}min}$	L_{Ceq}-L_{Aeq}
4 Melbourne St	1	9/10/2020	9:10	Day	69	49	58	70	11.5
	35	12/10/2020	20:51	Evening	59	42	47	61	13.8
	78	21/10/2020	20:36	Evening	66	40	54	68	14.2
	82	21/10/2020	22:21	Night	60	44	48	63	15
	454	27/10/2020	17:30	Day	67	50	57	69	12.1
Cnr Adelaide & Taylor	37	12/10/2020	21:41	Evening	66	44	54	67	12.9
	80	21/10/2020	21:27	Evening	61	41	48	64	15.5
	81	21/10/2020	22:00	Night	65	44	52	66	13.3
	123	27/10/2020	17:28	Day	73	51	61	71	10.5
12 Brisbane	36	12/10/2020	21:17	Evening	54	36	41	59	17.6
	79	21/10/2020	21:00	Evening	47	37	40	61	20.9
	85	22/10/2020	0:04	Night	51	38	42	62	19.7
	121	27/10/2020	17:27	Day	68	47	59	68	9.1
Argyle St	77	21/10/2020	20:13	Evening	66	39	54	66	12
	86	22/10/2020	0:26	Night	65	42	51	65	13.7
	455	27/10/2020	17:48	Day	69	49	57	68	10.8
North Fence	34	12/10/2020	20:10	Evening	49	46	47	64	16.6
	75	21/10/2020	19:43	Evening	51	44	46	67	20.7
	84	21/10/2020	23:10	Night	52	47	49	68	18.8
	120	27/10/2020	16:19	Day	58	51	54	70	16.3
Location 20	55	21/10/2020	15:55	Day	63	49	53	71	18
	56	21/10/2020	16:06	Day	55	50	52	70	18.2
	57	21/10/2020	16:39	Day	62	50	54	69	15.6
	74	21/10/2020	19:20	Evening	55	50	51	70	18.6
	83	21/01/1900	22:46	Night	64	50	53	70	17.4
	451	27/10/2020	16:20	Day	70	54	59	73	14.5

Berrima 2020 attended monitoring stats

5 Summary and Conclusions

The Boral Cement Berrima works has a single noise limit condition for the total site, of $L_{A90,15\text{-minute}}$ not greater than 58 dBA at Location 20 in the Store Yard. This replaced former conditions for major projects Kiln 6 Upgrade and Cement Mill No. 7 only. Monitoring for total site emissions at Location 20 over a 17 day period in October 2020 has confirmed that total site emissions are in compliance with the licence condition. Times when that sound level limit was exceeded at the site were caused by weather conditions and extraneous sources not relevant to the compliance assessment.

Sound levels at the plant and in the residential community affected by the noise emissions from the total site have been measured regularly since 2002 and since the completion of each of these projects. Monitoring of both site source sound levels and residential receiver sound levels on an annual basis since 2008 confirmed that both of the projects were in compliance with their noise limit conditions at the time.

The annual environmental noise assessment evaluates noise emission from the Cement Plant by the following methods:

- Monitoring of sound levels at Location 20 for compliance assessment;
- comparative measurements at the same locations around major plant sources of noise which have been assessed previously as in compliance with the limit conditions;
- calculation of the contribution sound levels at residential receiver locations from those source emission locations which are higher than in the past and comparison with a contribution objective;
- monitoring of sound levels in one residential receiver location with unattended monitoring over long-term periods of two weeks and attended monitoring in day, evening and night-time at four residential receiver locations to compare with long-term averages from previous years and assess the audible acceptability of the received sound levels.

The finding of this 2020 annual environmental noise assessment is that total site noise emissions are considered to be in compliance with the licence condition.

Sound levels from the two projects are also considered to be in compliance with their noise objectives at the nearest residential receiver locations.

It is also the finding of this assessment that the long-term average statistical sound levels have not increased and indicate that the Cement Plant is not increasing its emissions.

Measurements at the new location also assessed potential sleep disturbance and low-frequency impacts according to the 2017 release of the Noise Policy for Industry.

Calculations of sleep disturbance potential use $L_{A01.1\text{-minute}} - L_{A90.15\text{-minute}}$ at night-time to provide comparisons with recommended maximum values for night-time of 60 dBA for $L_{A01.1\text{-minute}}$ night-time for the Northern Boundary location and not greater than 15 dB difference for $L_{A01.1\text{-minute}} - L_{A90.15\text{-minute}}$. From the analyses it is considered that the number or times that the objectives of $\mathbf{L_{A01,1\text{-minute}}}$ greater than 60 dBA and $\mathbf{L_{A01.1\text{-minute}} - L_{A90.15\text{-minute}}}$ difference results greater than 15 dB are relatively low and the noise emissions from the Cement Plant have a low potential for sleep disturbance. Only warning signals from train horns, train operations and truck bumps were likely to cause the 60 dBA objective to be exceeded.

For low frequency assessment, an initial screening test is made of the C-weighted minus A-weighted (L_C-L_A) period sound level exceeding more than 15 dB. If the screening value is exceeded a one-third octave band frequency analyses is then made of un-weighted (or Z-weighted L_Z) sound levels in the low-frequency bands from 10 Hz to 160 Hz, compared to a specific value.

From the measurements in the residential receiver locations, the low frequency assessment was made on both $L_{Aeq,15\text{-}min}$ and $L_{A90,15\text{-}min}$ values. Exceedances were reported on three occasions at 12 Brisbane St and once at Adelaide St near Taylor Ave (20m) in line with 72 Taylor façade.

From the assessment of this survey it is considered that the main source of low-frequency noise events exceeding the policy objectives is from road traffic noise associated with trucks, either from within New Berrima or on distant roads and the freeway. The plant can be a source at times but this is not considered to be significant.

Site noise sources

Some sources of noise at the Cement Plant had increased sound levels from previous measurements. Recommendations for review of plant item performance or maintenance were made for the following:

For No.6 Kiln

- PHT Level 2.5 - A review of the condition of FA63 and its discharge silencer for 63 Hz band sound levels. This recommendation was also made in 2018 and 2019.
- The new kiln shell cooling fans have significantly increased the sound levels at locations on the northern side of the centre of Kiln 6. A review of alternatives for cooling of this area is recommended from a long-term aspect.
- Sound levels in the low frequency bands have increased around fan FA215. A review of the maintenance condition of the fan is recommended to identify if there is a reason for this increase.

For the No.7 Cement Mill and Cement Mill No.6:

- Cement Mill No.6 western wall fans discharge silencer.
- Cement Mill No.5 building FA502 and northern wall annex fan (DC702) fan discharges.
- Openings at the bottom of all main roller doors be able to seal to ground, not left open 50 to 100mm
- Openings of all smaller doorways be cleaned so they can close fully.
- Cement Mill No.6 - edges of the main northern wall doors have edge seals installed.

It is recommended that these items be reviewed for condition and silencers cleaned, replaced or installed if appropriate.

Recognition Research
ABN: 25 153 946 064
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Appendix A: One-third octave band frequency spectra of measurements and tonality graphs

Table 3.2: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - One-third Octave Band Spectra

Area	Source or location	File No.	Total C dBC	Total A dBA	A-weighted LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency Hz																																
					12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
PHT Level 8	PHT L8 Top platform level with top of stack	14	96	79	27	33	40	46	51	54	57	60	61	69	64	71	73	67	65	70	66	63	65	64	64	63	60	59	56	57	54	54	49	42	36	26	15
	PHT L8 Top platform EL16 Gbox @ 1m to NE side	15	92	79	24	28	35	39	44	48	48	52	60	69	59	65	68	65	64	69	66	66	66	67	69	69	67	66	62	61	60	60	55	49	44	34	24
	PHT L8 Top platform EL16 Gbox @ 1m to coupling SW side	16	93	79	27	33	38	43	47	51	52	54	55	64	59	62	69	66	65	68	65	65	65	66	68	71	66	67	63	62	62	64	58	51	47	36	26
	PHT L8 Top platform EL16 Gbox @ 2m to motor S side	17	91	77	23	28	35	38	44	50	51	54	56	64	61	66	68	61	62	72	64	62	62	64	65	63	62	62	59	58	58	59	53	47	43	31	21
	PHT L8 Top platform EL16 Gbox @ 1m to coupling NW side	18	96	80	33	39	44	47	50	53	54	56	59	65	60	65	67	66	67	74	66	65	67	69	70	69	68	66	63	63	63	64	58	52	48	37	27
	PHT L8 Top Platform S side BE	19	89	73	20	24	29	37	38	46	48	48	53	68	60	62	64	60	57	66	54	55	56	55	57	58	52	53	55	55	54	52	48	43	38	30	22
	PHT L8 Lower platform	20	97	81	28	34	41	46	51	55	57	59	61	69	64	77	76	66	63	66	64	62	62	61	61	63	59	58	56	55	53	52	48	43	37	28	16
	PHT L8 Top platform EL16 Gbox @ 3m to N side	21	92	78	25	30	36	40	44	48	50	52	55	66	60	70	73	66	63	66	64	62	63	62	65	63	60	64	57	55	54	54	50	44	40	28	18
	PHT L8 proper FA263 motor & casing @ 1m	22	95	90	26	33	38	42	47	49	53	54	57	69	65	70	75	69	69	69	74	75	87	73	74	85	73	71	68	67	65	62	60	56	52	44	38
	PHT L8 proper 1m to vent on FA263 filter room	23	91	80	22	30	30	34	42	47	50	53	58	62	58	70	73	69	65	65	65	66	72	63	63	70	63	61	60	58	57	55	52	49	45	38	29
	PHT L8 centre tower W side	24	92	81	23	30	32	38	42	43	48	53	58	68	65	71	74	66	64	64	63	65	75	64	65	75	63	62	62	60	58	56	54	51	47	40	31
	L8 new PHT centre	25	86	74	18	22	23	31	35	41	46	52	54	61	60	64	64	61	63	63	64	62	63	62	61	63	59	59	57	54	51	50	46	43	39	33	23
	PHT L8 centre tower N side	26	89	74	23	31	35	40	43	46	49	52	54	58	60	64	66	61	62	62	63	61	63	60	60	60	57	56	55	54	51	48	45	41	36	28	17
	PHT L8 centre tower E side	27	85	73	17	28	29	36	36	38	42	49	49	54	57	64	65	60	62	61	62	62	61	61	61	60	57	56	55	51	46	43	38	32	26	17	7
	PHT L8 centre tower S side	28	83	68	12	21	27	34	38	43	43	47	47	49	53	60	62	54	53	54	57	54	55	54	54	55	53	55	54	48	42	44	38	32	29	18	7
PHT Level 7	PHT L7 New S side centre	29	84	70	19	24	30	36	40	42	43	45	46	50	53	58	57	57	58	58	59	60	60	60	59	60	55	55	53	53	49	46	43	39	35	23	13
	PHT L7 New E side centre	30	84	74	18	21	21	28	35	40	44	44	48	54	56	62	61	59	61	61	62	62	63	63	62	62	61	60	59	60	56	53	52	44	36	28	17
	PHT L7 New N side centre	31	86	72	20	26	30	35	42	42	47	46	47	52	57	62	62	59	61	60	61	62	62	61	61	60	58	56	55	53	49	45	40	34	27	18	7
PHT L7 Alt Fuels Platform	PHT L7 Alt Fuels Platform L1: E side of feeder @ 1m	32	82	75	15	19	21	26	35	38	42	43	47	53	55	58	59	60	60	60	61	62	63	64	64	64	64	66	65	65	61	58	55	49	41	34	25
	PHT L7 Alt Fuels Platform L1: E side of mixer @ 1m	33	83	74	16	19	23	27	34	39	43	45	49	51	55	60	60	62	61	60	62	63	62	62	63	62	61	61	61	62	57	54	54	47	40	33	23
	PHT L7 New E side 4m to base of Alt Fuel chute, 1m to bin W	34	83	74	15	18	22	30	35	38	42	45	47	53	55	60	60	61	62	61	62	63	63	63	64	63	63	63	63	63	59	55	52	45	39	30	20
	PHT L7 Alt Fuels Platform L2: N side of conveyor discharge	35	84	76	17	21	24	33	37	41	42	43	48	54	59	59	61	62	63	63	64	64	64	65	64	63	64	63	64	66	64	59	56	51	45	38	30
	PHT L7 Alt Fuels Platform L2: 1m E side of chute inlet	36	83	74	18	19	24	30	37	40	40	45	50	52	59	59	59	61	61	62	62	62	63	63	63	62	62	60	61	62	60	56	53	47	42	34	25
	PHT L7 Alt Fuels Platform L2: 1m E side of conveyor 3m from entry to chute	37	82	73	17	19	23	30	33	37	40	43	48	53	55	59	59	63	62	61	62	62	62	62	61	61	58	57	56	58	52	49	47	40	33	25	16
	PHT L7 Alt Fuels Platform L2: 1m NW side of conveyor drive motor	38	84	77	19	23	26	35	38	39	40	44	49	51	56	60	61	62	63	61	63	63	64	65	63	63	63	67	66	68	66	62	59	53	48	41	34
	PHT L7 Alt Fuels Platform L2: 1m SW side of conveyor drive gearbox	39	84	76	20	22	27	32	38	40	41	44	49	53	58	61	62	62	61	62	63	63	64	65	63	63	63	65	65	69	65	61	58	52	47	39	31
	PHT L7 Alt Fuels Platform L1: 3m N of feeder	40	83	74	15	19	23	31	35	37	42	45	48	53	56	60	60	60	61	62	63	63	62	62	63	62	61	61	61	60	57	54	50	44	38	29	19
PHT Level 7	PHT L7 New centre between towers faces S	41	87	73	25	30	33	36	42	42	44	44	47	53	55	65	66	60	61	62	61	61	62	61	60	63	58	57	56	56	52	48	45	40	34	24	13
	L7 between PHTs centre facing W	42	87	73	25	31	34	36	43	42	43	43	47	52	56	63	63	61	61	62	61	61	63	61	60	62	58	57	56	55	52	48	45	40	34	25	14
	PHT L7 Old S side centre, faces W	43	88	75	22	29	34	37	42	43	46	43	49	52	58	65	67	61	64	63	65	63	64	61	62	66	58	56	54	52	49	47	44	39	35	24	13
	PHT L7 under EL13 platform E side	44	90	75	22	30	34	41	47	46	48	50	52	55	54	63	68	60	65	63	63	63	64	62	61	64	58	56	57	54	51	49	44	39	34	24	13
	EL13 platform E side Gbox & coupling @ 0.5m	45	91	84	21	28	31	37	41	45	48	49	50	56	57	70	73	66	76	70	75	72	72	74	73	72	69	66	64	61	58	55	52	48	44	37	28
	EL13 platform N side GB end & side EL @ 1m	46	91	78	24	31	37	40	45	48	52	53	53	54	57	64	67	63	69	67	69	67	69	70	67	66	61	60	57	54	51	47	43	38	33	24	14
	L7 BE drive platform N side @ 1m to BE	47	89	76	23	29	33	38	42	45	48	49	50	52	58	67	67	63	70	63	63	63	64	64	62	62	57	56	54	51	47	44	40	35	29	19	9
	EL13 platform SW side motor & EL & coupling @ 1m	48	95	83	27	34	40	46	50	52	55	57	57	59	65	71	70	66	70	72	73	74	74	74	73	71	66	63	62	60	57	55	52	48	43	34	25
	EL13 platform W side 0.5m	49	90	77	19	26	32	37	42	44	48	48	52	54	59	73	71	60	65	63	66	62	63	61	62	62	57	54	52	49	46	43	39	33	27	16	6
	EL13 platform motor end @ 0.6m	50	93	85	23	30	33	38	42	46	49	52	50	54	60	74	75	67	73	74	76	76	75	74	74	70	69	70	67	64	63	60	58	55	51	45	37
	L7 centre between cylinders	51	90	75	25	31	35	42	46	45	47	44	49	52	57	67	69	61	62	62	62	61	64	60	60	64	58	56	54	53	50	48	45	41	35	26	15
	PHT L7 old NW corner 1.5m to stack	52	92	73	27	34	37	42	48	51	52	50	53	57	60	66	65	63	63	63	60	58	58	57	57	56	53	51	49	48	45	44	39	33	27	19	8
	PHT L7 old centre N side on new platform	53	91	75	26	36	40	40	45	47	45	44	52	56	63	69	69	61	63	62	61	59	59	58	57	58	54	52	51	48	46	44	41	36	30	22	11
	PHT L7 old centre N side	54	91	75	25	33	37	41	46	47	48	46	47	54	61	70	71	60	59	59	57	56	56	55	54	55	53	52	51	50	49	47	43	39	36	32	26
	PHT Level 7: FA213 @ 1m, door closed	55	93	76	29	35	40	42	47	50	52	52	54	55	62	68	68	65	63	67	64	62	62	61	61	63	59	57	55	52	50	47	44	39	33	26	14

Table 3.2: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - One-third Octave Band Spectra

Area	Source or location	File No.	Total C dBC	Total A dBA	A-weighted LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency Hz																																
					12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
PHT Level 6 RM Silo Top	PHT L6 RM silo above baghouse discharge @ 2m at base of stairs to EL, level with floor	56	91	83	21	27	32	35	42	45	52	54	55	63	63	69	71	68	69	72	70	73	73	71	72	75	66	65	63	62	62	63	65	66	66	52	42
	PHT L6 RM silo Top FA260 NE side @ 1m casing & motor	57	95	90	30	35	42	44	48	50	51	56	55	60	64	68	71	68	72	73	76	79	77	74	78	88	74	70	68	66	65	66	64	62	61	48	40
	PHT L6 RM Silo top EL15 platform motor side 0.6m	58	88	82	16	23	28	31	39	41	45	50	52	60	61	63	64	62	64	68	69	69	76	75	72	70	66	66	66	62	59	59	59	58	57	42	33
	EL15 W side @ 1m	59	97	74	35	40	45	48	52	55	57	59	60	61	61	63	62	59	59	67	60	60	63	61	60	61	57	56	55	54	52	53	55	54	53	41	32
	L6 RM silo top on BE EL15 platform SW side @ 0.8m	60	93	73	31	36	40	44	48	51	52	55	56	57	56	60	61	56	58	68	58	59	60	66	62	58	56	55	55	53	50	48	49	47	45	33	23
	EL15 S side Gbox @ 1m	61	98	81	35	40	45	50	53	56	58	59	60	60	61	62	62	60	61	73	62	63	74	75	71	64	65	62	64	61	52	49	48	46	44	31	23
	EL15 E side Gbox @ 0.5m	62	103	80	38	46	50	55	58	62	64	66	68	69	69	69	68	66	66	70	65	64	70	69	66	65	62	62	63	61	53	52	52	49	47	35	27
	RM silo top baghouse fan DC30 discharge @ 1.5m	63	98	86	30	35	42	47	51	54	58	62	64	66	70	74	75	75	72	74	71	76	75	77	75	74	69	67	64	64	65	68	71	72	71	58	49
	RM Silo top N side 12.7m to FA260	64	90	74	25	32	37	41	44	48	52	53	53	54	56	61	62	58	65	63	61	63	64	62	61	62	57	57	57	59	59	62	62	58	54	43	33
	RM Silo top E side 12.7m to FA260	65	88	74	24	29	33	38	43	46	47	50	50	51	56	64	66	59	60	62	62	63	62	62	62	66	58	57	56	55	54	55	54	52	50	37	26
PHT Level 6	PHT L6 centre W side	66	86	74	16	27	28	35	37	40	41	44	47	56	58	65	66	59	63	64	64	61	62	62	62	62	58	57	56	55	52	51	48	44	39	31	20
	PHT L6 stack test port 100mm diam @ 200mm S side	67	96	88	28	35	40	43	47	49	52	54	56	66	66	75	76	70	72	78	80	75	77	80	76	74	72	69	67	64	61	60	59	57	50	46	38
	PHT L6 stack test port 100mm diam @ 200mm W side	68	99	90	31	38	44	48	51	54	56	58	64	69	70	75	80	75	81	82	79	77	76	80	78	74	73	73	69	67	63	59	57	52	46	41	33
	PHT L6 stack test port 200mm diam @ 200mm W side	69	102	96	29	35	41	43	47	49	51	54	64	70	69	74	79	76	88	92	85	84	85	83	83	80	77	75	72	69	65	62	59	55	47	41	33
	PHT L6 NW corner 1m to stack	70	93	77	28	34	39	44	48	51	55	56	58	61	62	64	67	65	67	71	67	64	66	66	64	63	62	61	59	57	55	52	49	44	38	31	27
	PHT L6 centre N side by platform	71	86	73	23	30	32	36	40	40	43	44	48	57	57	62	63	60	62	62	63	62	62	62	62	61	59	58	56	55	51	48	44	39	33	25	14
	PHT L6 centre N side on platform	72	88	72	23	30	34	40	42	44	45	47	48	63	58	60	60	59	60	62	62	61	61	61	61	60	58	56	55	53	49	45	42	36	30	23	13
	PHT L6 centre between towers	73	84	73	21	29	31	30	36	36	38	41	47	58	56	59	61	59	61	62	62	62	62	61	62	62	59	58	58	55	54	53	52	49	45	40	31
	PHT L6 new N side centre	74	84	73	17	26	30	35	37	36	42	44	46	49	57	60	59	58	61	63	64	63	63	62	61	61	59	57	55	52	49	47	43	39	33	26	17
	PHT L6 new E side centre	75	84	72	21	28	28	36	31	33	40	45	46	55	56	59	57	58	61	61	61	62	62	62	61	60	58	57	55	53	51	48	45	41	36	29	19
	PHT L6 new S side centre	76	83	72	17	26	29	30	33	35	41	43	46	52	56	59	58	59	60	61	62	62	62	62	62	61	59	58	58	56	54	51	48	44	39	32	23
	L6 centre S side old PHT by elevator	77	87	74	18	27	32	36	40	39	42	44	47	65	58	58	59	60	61	63	62	62	63	63	63	62	58	57	56	54	52	51	48	43	39	26	15
PHT Level 6 Inside Silo Top	L6 inside doorway to top RM silo room	78	92	81	18	26	32	39	51	48	56	55	57	60	60	65	64	64	67	70	75	67	68	72	74	70	62	64	60	56	52	50	44	39	33	23	13
	RM Silo top inside centre	79	92	87	0	10	26	32	38	45	50	60	57	64	62	66	69	67	71	73	79	72	73	80	82	77	70	72	68	63	60	58	51	47	40	33	25
	RM silo top inside E doors open	80	91	84	9	21	25	31	45	47	53	56	52	59	64	68	68	67	70	71	76	71	71	75	78	77	66	67	65	60	58	57	47	41	35	28	19
	L6 RM silo top room inside S man door	81	91	84	11	24	25	35	46	47	52	54	52	62	62	65	68	70	70	71	78	71	70	74	77	74	65	65	63	58	56	54	47	42	36	30	20
	RM silo top outside S man door	82	98	76	33	39	45	48	54	57	59	61	63	68	65	65	64	62	61	60	62	63	63	62	63	63	59	58	57	55	54	52	53	50	48	34	24
PHT Level 5	PHT Level 5 old centre S side by stairs	83	84	74	16	23	28	33	37	39	41	43	46	55	56	60	60	59	62	62	62	64	64	64	64	64	62	62	61	60	58	56	52	47	44	36	27
	PHT Level 5 old centre W side by gas valves @ 1m	84	93	77	29	34	39	44	48	50	53	54	56	63	61	64	65	62	64	64	62	63	64	63	67	65	61	64	61	68	65	66	63	57	61	47	37
	PHT Level 5 old NW corner @ 1m to stack	85	93	75	29	34	39	44	48	51	53	55	55	60	61	64	66	64	66	64	62	62	62	62	64	63	59	58	56	58	55	54	50	44	43	32	23
	PHT Level 5 old centre N side	86	87	74	19	25	37	39	36	41	42	44	46	52	59	62	63	59	62	62	63	63	63	63	63	62	59	58	56	56	53	50	46	40	36	26	16
	PHT Level 5 centre between towers	87	84	73	18	24	33	35	35	39	40	42	46	54	56	59	60	58	61	62	62	62	62	62	62	61	59	58	57	57	54	52	48	43	38	30	20
	PHT Level 5 New centre N side	88	83	73	13	23	24	33	35	36	41	46	48	51	58	61	59	59	61	62	62	63	63	63	62	61	59	57	55	53	49	47	42	37	32	25	18
	PHT Level 5 New centre E side above kiln	89	84	72	19	25	30	35	38	40	42	44	46	51	57	60	57	58	61	62	61	62	62	61	61	60	58	57	56	54	52	48	44	39	33	26	15
	PHT Level 5 New centre S side	90	86	71	21	28	33	37	42	44	46	48	49	52	56	58	56	57	59	60	60	60	60	60	60	58	58	56	55	55	53	49	45	41	36	30	20
PHT Level 4	PHT Level 4 old centre S side by stairs	91	87	76	19	26	31	35	38	41	45	57	52	50	57	59	61	59	63	63	63	65	65	66	66	66	65	65	63	61	59	54	50	44	38	31	21
	PHT Level 4 old SW corner by water pumps SV09 @ 1m N	92	91	79	27	33	38	42	46	49	51	56	55	54	58	60	62	61	65	64	64	67	67	68	70	69	67	69	66	64	62	59	55	51	46	40	37
	PHT Level 4 old centre W side	93	88	77	23	29	35	40	42	45	45	50	49	51	58	65	67	61	64	64	62	63	64	65	68	67	63	64	62	60	58	54	50	44	38	28	16
	PHT Level 4 old NW corner @ 1.2m to stack	94	87	75	20	26	34	40	42	44	46	46	50	51	59	63	67	63	65	64	62	62	63	63	66	64	59	59	56	55	52	48	43	38	33	22	11
	PHT Level 4 old centre N side	95	84	74	15	23	30	34	39	39	43	46	47	51	58	60	60	59	62	62	62	63	62	62	63	63	61	61	60	59	59	57	55	53	48	41	31
	PHT Level 4 centre between towers by air cannon @ 2m	96	86	74	17	28	33	37	40	40	43	48	50	50	59	60	61	60	63	62	62	64	63	63	64	63	62	62	60	58	55	52	48	44	39	32	23
	PHT Level 4 centre between towers by air cannon @ 2m	97	84	73	15	26	31	34	37	37	42	48	46	52	57	60	59	59	63	62	62	62	62	62	61	60	59	58	56	53	50	46	45	41	34	28	18
	PHT Level 4 new centre N side	98	84	73	13	25	27	32	33	35	43	47	48	52	58	61	60	60	63	63	63	64	63	63	62	61	59	58	55	52	48	44	41	36	30	22	12
	PHT Level 4 new centre E side above kiln	99	83	73	10	24	27	31	35	35	41	50	48	51	58	60	57	58	62	63	63	64	63	63	62	61	59	57	55	52	48	46	39	33	26	19	7
	PHT Level 4 new centre S side	100	84	77	16	24	30	32	36	38	43	51	48	51	57	58	57	59	61	61	62	63	63	64	64	65	67	67	67	67	66	65	64	61	56	51	44

Table 3.2: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - One-third Octave Band Spectra

Area	Source or location	File No.	Total C dBC	Total A dBA	A-weighted LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency Hz																																
					12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
ESP	ESP Centre E side top walkway looking E to PHT	101	85	74	19	26	35	36	38	40	42	47	46	50	56	62	63	58	60	61	61	63	64	63	65	64	59	58	55	54	51	49	45	40	32	22	11
	ESP top SE corner at barrier	102	86	73	20	27	36	37	39	42	43	48	48	50	55	60	62	58	59	60	61	63	62	62	64	63	59	59	56	54	52	48	44	39	33	25	15
	ESP top SE corner at barrier - facing ESP	103	85	71	16	24	36	36	36	40	41	45	47	49	55	61	61	57	59	60	59	60	60	60	60	60	57	55	53	51	49	45	41	37	35	24	15
	ESP top NE corner at barrier	104	87	73	20	27	34	38	41	42	43	52	50	52	57	63	64	59	61	61	61	62	61	61	63	62	57	56	53	52	49	46	42	37	33	23	14
	ESP top NE corner at barrier - facing west	105	84	71	19	26	31	35	37	39	40	48	48	51	57	61	61	59	60	60	59	59	58	59	59	59	56	54	51	49	47	43	39	34	28	18	9
PHT Level 3	L3 old PHT centre S side @ 2m to edge facing centre	106	89	77	22	28	33	33	40	46	47	59	54	53	58	62	64	60	65	65	64	68	65	71	67	64	64	63	61	60	58	55	53	48	44	36	27
	PHT Level 3 old centre W side above FA39 face E	107	91	79	26	31	35	34	43	51	47	60	56	56	60	67	68	65	68	68	67	68	67	68	69	67	63	63	62	60	57	54	50	47	42	37	29
	PHT Level 3 old centre N side	108	90	76	23	28	34	40	44	45	47	58	55	54	59	64	67	64	67	65	64	65	64	65	66	64	60	59	57	54	51	49	47	46	43	38	31
	PHT Level 3 old centre E side above kiln	109	87	75	23	29	30	34	39	41	44	55	52	53	60	62	63	62	65	64	64	64	63	63	64	62	61	59	57	53	51	46	44	41	38	31	23
	PHT Level 3 old NW corner by stack @ 1.5m, above FA39 inlet	110	91	78	24	30	35	41	45	51	51	57	55	56	60	66	68	67	69	68	66	67	66	67	69	67	62	61	59	57	54	50	47	42	36	29	21
PHT Level 2.5	PHT Level 2.5 by DC31 drives @ 0.6m	111																																			
	PHT Level 2.5 by DC31 discharge @ 1m	112	101	87	25	30	37	46	50	55	58	73	69	68	71	75	74	73	77	78	75	77	75	76	76	75	72	72	70	69	67	66	64	60	54	48	39
	PHT Level 2.5 by centre by kiln entry W side	113	97	88	20	28	38	39	42	53	52	69	64	60	63	65	68	65	68	72	68	73	70	75	76	75	78	79	79	78	78	77	76	75	72	68	62
	PHT Level 2.25 by centre by kiln entry Air cannons	114	94	86	19	24	36	45	48	54	51	60	58	58	61	65	68	65	69	70	70	79	71	84	75	69	71	68	69	66	64	60	55	49	43	35	25
	PHT Level 2.25 North Side centre	115	98	80	20	23	32	41	47	50	52	71	66	57	62	67	69	66	68	69	68	70	67	72	69	66	65	63	60	59	56	52	47	44	41	34	27
	PHT Level 2.5 by Radicon Gbox drive E end @ 2.5m	116	93	87	16	25	33	40	43	49	49	63	60	59	63	67	67	64	68	70	73	78	75	84	76	71	75	71	72	70	69	66	63	59	52	45	34
	L2.25 PHT centre W side facing fan discharge DC70 FA63 @ 4.66m, stack @ 6.35m and stack entry duct @ 6.23m	117	108	88	25	29	37	42	51	51	58	82	76	67	68	73	75	68	74	76	75	78	74	79	76	73	73	72	70	69	66	62	58	54	48	39	30
PHT Level 2	PHT Level 2 by E side drive coupling & casing DC70 FA03 centre N side	118	95	87	23	28	40	42	49	55	53	59	60	65	67	71	72	68	72	74	75	80	74	81	74	72	74	74	74	74	74	68	67	64	62	58	51	44
	L2 PHT FA03 casing @ 1m E side	119	98	87	26	32	41	45	51	54	55	69	64	64	67	71	73	67	72	73	74	80	74	79	75	75	75	76	74	72	67	65	60	57	52	44	38
	PHT Level 2 FA03 discharge @ 1.5m	120	108	91	26	30	41	49	54	56	60	82	77	73	72	74	76	73	77	79	78	79	79	82	80	78	76	77	76	76	73	71	68	65	60	53	43
	PHT Level 2 @ 1m to south side FA39 stack entry duct	121	102	87	25	30	46	50	55	57	57	74	68	63	69	75	77	70	74	76	74	78	76	78	79	75	74	73	70	69	65	61	57	52	45	36	26
	PHT Level 2 FA65 inlet filter @ 1m in front	122	102	88	27	32	41	45	53	55	59	75	69	65	72	73	75	74	73	75	77	81	75	79	77	74	73	73	70	70	66	63	59	54	48	40	31
	PHT Level 2 FA65 rear side 1m	123	104	87	24	30	39	41	48	51	58	79	73	63	65	71	74	70	72	74	74	77	73	79	76	72	72	74	68	68	64	61	58	53	48	39	30
	L2 PHT centre N side edge @ 2m facing centre	124	93	83	23	29	35	42	47	50	50	62	59	59	63	69	70	67	70	72	69	74	69	73	72	71	70	71	68	68	65	63	63	61	58	52	42
	PHT Level 2 @ 1m to north side FA39 stack entry duct	125	100	87	25	30	48	51	55	56	54	66	63	63	69	77	81	71	74	77	73	74	74	78	77	76	73	72	68	65	62	58	53	48	42	33	23
	PHT Level 2 FA65 inlet filter @ 1m in front	129	102	88	24	29	40	44	53	56	60	75	70	69	70	72	75	75	74	78	77	79	75	80	76	73	74	75	72	70	67	64	59	54	48	40	31
	PHT Level 2 FA65 rear side 1m	130	104	86	26	31	39	43	50	52	58	78	72	65	68	71	73	70	72	74	76	76	73	79	74	72	71	72	69	68	64	61	58	53	47	39	30
	PHT Level 2 @ 1m to north side FA39 stack entry duct	131	100	87	26	31	48	51	55	55	52	69	65	64	70	76	79	72	72	75	74	74	75	76	78	76	73	72	70	68	64	61	59	54	48	42	31
PHT Level 1 Ground	PHT Level 1 RM silo base blower room N side man door @ 1m	132	90	79	16	25	38	40	42	46	48	56	53	56	67	63	69	62	63	65	67	69	66	68	72	69	66	67	64	65	60	57	54	49	44	41	34
	PHT Level 1 FA92 silo vent fan casing & drive @ 1m NW side	133	91	78	21	29	35	47	43	46	49	50	55	60	63	65	66	64	66	68	67	68	67	69	67	64	64	63	64	64	63	59	56	52	44	34	22
	PHT Level 1 FA92 silo vent fan casing & drive @ 1m E side	134	89	81	20	25	32	41	39	43	46	54	52	57	62	64	65	64	65	71	71	71	70	73	71	69	68	66	67	64	64	59	58	54	47	40	30
	PHT Level 1 FA92 silo vent fan inlet duct @ 1m SE side	135	88	76	21	26	31	43	41	45	48	50	52	56	59	63	63	63	63	67	66	66	64	67	65	62	61	59	58	57	55	51	47	42	34	26	16
	PHT Level 1 FA92 silo vent fan inlet front @ 1m	136	90	75	25	30	37	43	40	44	49	52	57	59	58	63	63	63	62	63	65	64	64	64	63	62	62	60	58	55	52	48	45	40	35	28	19

Table 3.2: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - One-third Octave Band Spectra

Area	Source or location	File No.	Total C dBC	Total A dBA	A-weighted LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency Hz																																
					12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
FA38 & 39	FA39 E side at concrete line 5.4m to motor	137	94	87	26	32	37	40	45	52	53	62	59	60	64	69	72	66	69	74	69	71	71	76	85	80	71	70	70	68	61	57	53	47	41	32	22
	FA39 E side @2.3m in line with columns	138	97	91	27	33	42	44	50	57	53	60	57	59	64	70	76	70	72	77	72	73	73	78	90	82	73	71	69	68	62	57	54	48	41	32	21
	FA39 under discharge duct @ 1m	139	99	84	30	37	49	48	54	59	59	61	60	65	66	70	73	70	69	71	71	73	73	73	78	75	69	69	67	65	61	56	51	46	39	31	20
	FA39 E side motor platform @ 0.82m to coupling cover	140	98	94	27	31	41	46	49	58	54	61	59	63	65	71	77	76	77	81	80	77	80	82	91	84	79	80	76	78	71	67	64	59	53	44	33
	FA39 motor platform centre E side@ 1m	141	101	98	26	31	38	44	48	52	53	59	58	64	64	75	85	81	77	86	78	78	77	83	96	87	78	79	76	78	71	65	63	55	48	40	30
	FA39 motor platform centre E side@ 1m	142	101	98	27	31	38	44	48	52	53	59	58	64	64	75	84	81	76	87	78	78	77	82	97	88	78	81	77	77	70	64	62	55	48	39	29
	FA39 motor platform centre E side@ 1m & vent @ 0.5m	143	99	96	25	30	38	42	46	52	52	59	60	62	64	70	79	76	76	85	75	75	78	86	91	91	83	81	80	78	73	68	64	59	52	44	33
	FA39 motor N end @ 2.7 to end plates/stop button at line	144	92	83	23	27	38	42	46	52	49	57	55	56	60	66	70	66	67	73	68	69	68	69	79	74	66	66	63	62	57	52	48	42	35	26	14
	FA 39 N side on kerb	145	91	81	21	28	34	37	43	50	49	55	55	58	61	68	70	65	67	71	67	68	69	70	77	73	65	64	61	60	55	50	46	39	31	21	9
	FA39 W side at metal strip 5.25m to motor	146	93	87	24	33	37	43	45	49	49	57	57	57	62	68	69	69	70	72	71	73	74	73	82	82	73	72	70	69	63	58	55	48	41	33	22
	FA39 W side at columns @2.7m to plinth	147	94	88	24	32	38	44	48	51	50	57	56	57	62	69	71	71	71	75	72	73	74	76	84	83	74	75	71	70	64	59	56	50	44	36	25
	FA39 W side @ 1m to cladding door closed, 1.33m to casing	148	98	88	25	33	39	45	51	56	56	61	57	59	68	78	78	69	70	71	72	73	75	72	82	82	70	69	66	64	61	57	52	46	39	31	20
	FA39 W side motor platform at 0.8m to coupling cover & 1m to coupling	149	99	93	24	31	43	44	50	59	54	61	60	63	65	71	78	78	76	78	77	80	79	80	90	83	78	79	75	77	70	66	62	57	51	43	33
	FA39 S side @ columns 2.7m to bearing	150	97	84	27	37	47	45	47	55	54	64	60	59	63	69	71	67	70	72	72	76	77	71	75	77	69	68	67	65	63	57	52	49	43	35	26
	FA39 S side platform bearing cover @ 0.8m	151	97	86	28	37	46	44	49	56	56	63	64	62	64	70	72	72	73	75	75	79	75	74	77	79	72	70	69	68	65	62	58	55	50	44	36
	Centre between FA38 & FA39 @ 11.2m at line facing E	152	93	88	24	30	37	43	47	49	53	56	55	58	62	69	70	68	69	71	71	73	74	74	83	84	71	70	68	66	62	58	53	46	39	29	18
FA38 & 39	Centre between FA38 & FA39 @ 7.7 m facing FA 38	153	93	88	24	30	36	42	47	50	51	54	55	57	62	69	70	68	69	72	72	73	73	75	83	84	71	70	68	66	64	60	56	50	45	37	29
	FA38 @ 3.9m to E side	154	95	91	25	33	37	42	50	48	53	57	56	58	63	70	72	68	70	72	72	74	74	74	85	89	74	71	70	68	66	63	58	53	47	40	32
	FA38 @ 3m to N side	155	94	88	22	31	40	41	49	49	52	56	55	57	63	69	73	68	71	73	75	74	75	75	83	83	72	71	70	67	64	60	55	50	44	37	28
	FA38 @ 5m to NW side at NW column	156	92	87	25	34	37	43	45	47	50	52	54	57	61	65	69	67	69	71	72	73	73	74	82	84	72	71	70	68	65	62	57	52	46	38	28
	FA38 @ 5m to NW side at W column	157	93	89	27	36	31	37	45	48	49	54	57	58	62	66	68	66	70	72	71	73	74	73	86	83	72	71	70	68	66	63	60	54	49	42	35
	FA38 @ 5m to W side at W column	158	93	88	27	36	30	37	46	48	49	54	57	58	63	67	69	67	69	71	71	72	73	73	83	85	72	72	71	68	66	64	60	55	50	43	35
	In centre opening of wall on W side	159	92	86	24	31	31	40	46	48	49	56	54	58	61	67	68	65	68	71	70	72	71	72	79	82	70	70	69	66	64	61	58	52	45	38	28
	FA38 motor platform W side @ 1m to coupling cover, 1.9m to casing, 0.7m to motor side	160	98	97	29	39	35	40	47	49	52	58	59	61	64	69	73	72	75	78	78	79	78	79	92	94	79	83	81	78	77	74	70	65	60	54	45
	FA38 at opening on S side of road facing FA38 opening	161	89	81	24	30	31	37	41	43	46	52	53	57	59	63	65	62	64	67	66	70	69	68	75	75	67	67	67	67	65	64	59	55	52	43	34
	56 Road kerb N side opp E side RM6	8																																			
	56 Road kerb N side opp E side RM6	162	85	76	18	24	29	36	38	42	44	49	48	51	57	61	62	57	61	63	62	64	64	64	69	70	62	62	61	61	59	56	52	47	43	34	22
	56' Road kerb N side opp. Opening to FA38	9	90	77	13	21	29	37	38	41	45	51	52	70	60	60	60	59	63	65	61	61	65	64	70	66	60	59	58	58	57	56	52	46	42	34	23
	56' Road kerb N side opp. Opening to FA38	163	87	77	19	25	32	38	40	43	45	51	50	53	56	61	62	58	64	67	63	64	64	64	70	70	63	62	61	59	57	54	51	45	39	31	20
	57 Road N side opp FA38 doorway	10	90	79	16	21	34	37	41	43	47	57	54	66	60	63	65	62	67	70	65	65	68	67	74	68	63	62	59	58	54	50	46	39	30	19	6
	58 Road N side between FA38 & FA39	11	89	80	18	24	34	38	42	46	49	55	56	62	60	64	66	64	66	68	65	66	67	69	75	71	64	64	60	61	56	52	48	41	33	21	8
	59 Road N side kerb opp end FA39	12	91	83	19	24	32	38	41	49	51	54	56	65	61	64	68	65	67	71	67	68	69	70	80	72	66	65	62	62	58	55	52	47	39	29	17
	59 Road N side kerb opp end FA39	13	90	82	22	24	33	38	41	49	51	54	55	62	60	65	70	65	68	70	67	67	69	69	79	72	66	66	62	63	58	55	53	48	39	30	17
RM6 West side	1 RM6 W door @ 1m	164	84	76	18	27	31	32	34	40	42	41	44	48	52	58	62	59	61	62	62	69	68	67	66	65	60	58	58	56	51	46	41	35	28	20	10
	1' RM6 W door at kerb W side @ 13.3m	165	80	69	14	20	25	30	33	34	38	41	43	46	50	53	58	54	57	60	56	61	60	59	59	58	55	53	51	48	44	39	33	26	18	9	1

Table 3.2: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - One-third Octave Band Spectra

Area	Source or location	File No.	Total C dBC	Total A dBA	A-weighted LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency Hz																																
					12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
RM7 ground level	1 RM7 at roadside kerb ~32m	166	79	67	13	22	23	27	30	35	38	42	44	46	48	55	57	53	52	55	54	57	57	56	56	56	54	53	52	49	46	42	36	29	22	13	3
	2 Rm7 @ 15.5m to W door	167	82	72	16	23	26	30	35	39	42	45	47	49	52	59	60	56	57	60	59	62	63	63	62	61	59	58	56	53	50	46	41	35	26	16	5
	3 RM7 W wall door @ 1m	168	85	78	15	27	28	33	38	39	44	44	49	53	53	60	64	63	64	68	68	69	71	69	66	66	64	63	64	61	57	54	49	43	35	26	13
	4 RM7 NE corner wall vents @ 1m	169	87	79	18	29	30	33	37	42	45	50	51	54	57	63	66	64	64	67	67	70	70	69	67	67	66	65	65	60	56	52	47	41	34	26	14
	4 RM7 NE corner wall vents @ 1m	170	88	78	20	29	32	36	39	44	47	51	51	54	57	63	66	64	64	68	68	69	70	68	67	67	66	65	64	60	56	52	47	41	35	27	17
	5 RM7 N side NW roll door @ 1m	171	89	78	21	31	32	39	41	45	49	54	52	53	56	63	64	64	65	67	67	69	69	68	69	68	65	64	63	61	58	54	48	42	36	27	17
	6 RM7 N wall vents centre next to Roll door	172	89	81	20	30	32	37	41	44	49	51	54	57	57	64	67	65	67	69	70	71	72	71	70	70	69	67	66	63	60	57	52	47	40	33	23
	RM7 vents N wall W of man door	173	90	81	18	27	35	37	43	47	51	50	51	57	59	66	68	65	66	72	69	71	72	70	70	70	68	67	67	65	62	59	52	47	40	32	21
	7 RM7 N wall man door	174	89	80	20	29	35	37	42	46	50	52	53	59	60	65	67	64	65	68	69	71	70	68	69	70	68	66	65	62	59	56	51	45	37	28	17
	8 RM7 E wall vents NE corner @ 1m	175	90	80	18	26	33	35	40	46	49	58	55	55	58	65	67	64	66	69	69	72	71	70	71	70	68	67	67	64	61	57	53	49	43	37	26
	9 RM7 E side under duct	176	88	77	18	26	34	36	41	43	48	50	52	55	61	66	66	62	64	66	65	67	67	66	67	66	63	62	61	59	55	52	47	41	34	24	13
	10 RM7 By E door RM7 floor	177	87	76	17	28	31	35	40	44	49	54	52	53	56	64	66	63	61	65	64	65	66	64	66	64	62	60	60	59	55	51	47	41	35	25	14
	10' RM7 By E door Hydraulics room closed	178	82	71	16	21	24	34	36	40	44	46	47	48	51	57	57	57	59	59	59	61	60	61	63	60	59	57	55	53	50	47	43	38	32	23	13
	11 RM7 Centre Compressor room door @ 1m closed	179	82	71	14	23	25	33	34	41	44	47	46	45	52	59	58	58	58	59	59	61	61	61	62	60	59	57	55	53	51	47	44	41	35	28	18
	11A RM7 compressor room W door @ 1m closed	180	83	76	13	23	25	32	35	39	44	47	46	46	51	56	56	59	60	60	60	60	62	64	65	65	64	65	66	67	67	66	64	61	55	49	40
	12 RM7 Under E inlet for switchroom fan	181	91	82	12	21	26	34	35	39	42	47	53	62	67	71	65	75	78	66	65	68	66	67	68	66	65	65	62	60	58	56	53	49	47	41	38
	12 RM7 Under E inlet for switchroom fan rattling cowling	182	91	83	15	22	28	34	36	40	42	47	53	63	67	70	66	75	78	67	67	68	68	68	68	68	67	67	66	65	62	61	58	54	51	45	40
	12B Under switchroom fan duct W	183	85	75	14	22	26	33	35	39	42	46	47	50	58	65	61	66	69	60	62	63	64	63	64	62	60	59	57	56	53	51	48	43	38	30	22
	12 RM7 E inlet for switchroom fan @ 1m to N side and 0.6m below	184	85	75	15	23	27	32	35	38	42	47	48	50	57	65	63	63	68	63	63	63	63	63	65	64	62	62	60	58	57	54	53	50	45	40	36
FA249	13 FA249 under inlet duct W side	185	90	76	19	26	31	39	43	51	53	55	54	55	62	67	65	61	62	64	63	65	65	64	66	65	62	61	59	59	56	52	48	42	35	26	16
	14 FA249 2m W side ground level	186	90	79	19	27	34	38	40	46	51	54	54	57	60	70	69	65	66	67	65	67	68	67	71	67	65	64	62	61	58	55	50	45	39	31	21
	14' FA249 motor platform fan coupling & casing W side @ 1m	187	92	82	18	26	35	38	41	49	55	54	59	61	63	72	71	65	69	70	69	70	71	70	73	71	70	68	67	67	64	61	58	55	51	46	38
	15 FA249 1m motor end	188	89	81	18	25	29	33	40	46	52	54	55	58	62	64	67	65	66	68	69	70	70	70	74	70	68	67	66	65	62	59	56	53	48	42	34
	16 FA249 end at column 4.3m N of motor plinth	189	90	78	17	24	30	37	38	45	53	60	56	56	64	67	68	62	63	65	66	67	68	67	71	68	65	64	62	61	58	55	52	47	41	34	25
	17 FA249 motor platform E side coupling & casing 1m	190	94	83	18	26	32	36	40	53	58	55	58	61	63	74	73	68	69	70	70	69	72	72	75	73	70	70	68	68	65	63	61	58	53	48	40
	18 FA249 Platform S side centre @ 1m	191	87	75	18	26	28	33	40	47	49	52	50	52	57	65	63	59	59	59	60	61	63	63	63	63	63	63	62	60	62	62	61	58	52	45	38
	18' FA249 platform S side under discharge duct E side	192	86	75	19	26	26	33	39	45	49	47	48	52	59	66	63	58	58	61	63	63	65	64	69	65	61	62	60	59	55	55	52	47	41	34	24
	18' FA249 platform S side under discharge duct E side	193	86	75	18	25	26	33	40	46	49	47	48	52	58	65	63	58	59	61	62	63	66	65	68	66	62	62	60	59	56	55	53	48	43	34	24
	19 FA249 S side @ 3.8m	194	85	71	16	24	27	34	40	43	46	47	47	51	55	63	62	57	57	58	59	60	60	60	62	60	57	56	55	54	52	49	48	45	40	33	25
	19 FA249 S side @ 5.5m	195	84	71	17	24	28	34	39	43	45	46	48	52	55	60	60	58	58	60	60	60	60	60	62	60	57	56	55	54	51	49	48	45	40	32	24
	20 FA 249 S side @ 10.9m	196	84	72	15	23	27	32	37	42	44	49	49	53	56	61	60	57	59	60	61	61	61	60	62	60	58	57	55	54	51	49	46	42	36	28	19
	21 FA249 E side of fan casing ground level @ 2m	197	88	73	17	24	28	39	45	47	48	50	50	53	56	64	62	57	58	59	60	60	61	61	65	62	60	59	58	57	55	53	52	49	50	39	27

Table 3.2: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - One-third Octave Band Spectra

Area	Source or location	File No.	Total C dBC	Total A dBA	A-weighted LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency Hz																																
					12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
FA250	22 FA250 S side 4.2 m to motor end	198	89	80	16	26	33	39	40	47	51	57	56	56	58	65	66	62	65	68	68	69	70	69	71	69	67	67	65	64	63	60	56	52	46	37	28
	22' FA250 Motor end S side @ 1m	199	90	81	16	25	35	37	39	46	50	51	56	58	63	68	69	64	67	68	69	71	71	70	72	71	70	68	67	66	63	61	57	54	49	43	35
	23 FA250 E side platform coupling & casing	200	93	83	17	22	33	38	44	50	57	56	60	62	64	72	73	67	70	71	71	71	73	72	73	71	70	69	69	69	66	64	61	58	53	46	38
	23' FA250 E side centre motor @ 1m	201	93	83	18	24	32	36	41	47	55	56	59	62	64	74	76	67	68	69	70	71	71	70	71	70	70	69	67	68	65	62	58	55	50	43	34
	FA250 W side motor shaft @ casing @ 1m	202	95	84	15	24	33	40	44	51	61	61	60	61	66	73	75	66	70	72	73	72	73	73	75	72	72	71	70	70	68	65	63	59	54	47	39
	25 FA250 coupling & casing W side motor centre @1m	203	95	84	15	24	35	42	44	52	61	61	60	61	66	73	75	67	69	71	73	72	73	73	74	72	71	71	70	70	67	65	62	58	53	46	38
	26 FA250 W side casing @ 1m & coupling @ 3m	204	92	82	16	26	34	40	41	47	52	55	56	57	62	72	73	66	67	69	69	71	71	70	73	71	68	69	67	67	64	62	58	55	49	41	32
	26 FA250 W side casing @ 1m & coupling @ 3m	205	91	82	16	27	33	39	41	47	52	55	57	57	62	70	71	66	66	69	69	71	71	70	73	70	68	69	67	66	64	62	58	55	49	41	32
	27 FA250 W side 1m under inlet casing expansion joint	206	91	81	20	30	37	39	44	48	51	52	56	58	62	69	70	66	66	67	69	74	73	68	70	70	67	67	65	64	62	60	56	55	50	42	39
	28 FA250 N side casing shaft platform @ 1m	207	94	83	22	32	40	41	43	54	56	59	57	58	64	71	72	65	67	72	71	74	73	71	72	72	71	68	67	66	65	64	63	61	57	50	41
	29 FA250 E side under discharge duct @ 1.5m, at lower step of concrete	208	94	82	21	30	38	38	42	50	52	56	57	57	66	75	75	64	66	69	68	70	70	68	69	70	69	68	67	66	63	59	53	49	43	35	27
RM7 Roof Platform lower	Lower platform E side 1m to Magnete plate	209	91	90	14	27	29	32	36	42	49	51	51	59	58	65	66	66	65	68	70	70	73	75	77	77	78	79	80	81	80	80	79	74	68	65	65
	Lower platform S side @ 1m to magnete plate	210	92	91	18	27	30	34	38	41	47	50	53	61	61	64	64	72	66	69	73	74	77	79	81	82	82	81	82	82	81	80	78	72	65	59	55
	Lower platform W side @ 0.9m to magnete plate	211	91	88	23	31	33	37	41	44	48	50	52	61	57	65	65	67	65	67	69	70	74	76	77	78	79	80	80	79	77	75	73	68	60	56	51
	Lower platform N side @ 2m to magnete plate (scaffolding)	212	89	86	18	25	31	34	38	42	48	50	51	59	60	66	66	63	63	66	67	68	69	71	73	74	75	77	79	77	74	73	71	66	60	57	54
	Lower platform N side @ 1m to BE casing	213	89	83	20	27	34	36	41	45	51	52	51	59	59	64	66	63	64	65	66	67	69	69	71	71	71	73	75	74	72	69	67	62	55	49	46
	Platform S of Magnete 2m to S side	214	87	84	20	27	31	35	39	41	44	47	49	55	56	62	62	63	62	63	66	67	70	71	72	72	74	75	75	76	73	72	70	66	59	55	52
RM7 Roof platform Upper	Upper Platform Gbox @ 1m E side & 0.5m casing	215	88	79	18	26	30	36	39	44	51	54	55	58	57	61	62	61	62	64	65	66	67	71	69	69	68	69	69	67	65	62	60	55	48	41	35
	Upper Platform Gbox @ 1m N side	216	89	80	15	24	28	33	36	45	55	55	56	60	61	65	64	61	62	65	66	67	68	73	69	69	68	69	70	69	66	64	61	55	49	43	36
	Upper Platform Gbox @ 1m N side	217	88	80	17	26	32	35	37	42	48	52	56	60	61	66	65	61	61	65	66	66	68	70	69	69	68	69	70	69	66	63	59	54	48	41	35
	Upper Platform motor end @ 1m W side	218	88	79	21	26	31	35	38	43	49	52	52	61	59	64	63	61	61	64	65	67	67	68	68	69	68	70	69	67	66	63	60	55	49	44	39
	Upper Platform BE casing @ 0.9m W side	219	87	78	19	23	29	33	36	42	48	52	53	62	57	61	60	61	60	63	64	64	66	66	67	67	67	67	68	66	64	61	59	54	47	43	38
	Upper Platform BE casing @ 1m S side	220	89	80	24	30	34	39	42	46	51	54	53	57	57	61	60	61	58	64	64	63	67	68	69	69	69	70	71	70	68	66	65	61	53	48	46
	Upper Platform BE casing @ 1m E side	221	87	79	18	25	28	32	38	43	47	54	55	57	58	63	64	60	61	66	64	65	67	67	68	68	67	68	68	67	66	63	61	57	49	44	41
RM7 Baghouse Tower	On tower to baghouse top S side above FA249 same level as roof RM7	222	82	68	18	23	26	30	34	41	46	48	48	48	53	58	56	56	54	56	56	57	57	57	60	57	54	53	51	51	46	43	39	34	27	19	9
	On tower to baghouse top S side above FA249 halfway up level	223	86	71	21	26	31	36	40	45	47	49	51	50	58	59	59	56	57	58	58	59	59	60	63	60	57	57	55	54	52	49	45	39	32	23	12
	On tower to baghouse top S side above FA249 top level	224	86	69	25	28	32	37	40	45	46	49	48	49	53	58	58	57	56	57	56	56	57	58	58	57	56	56	56	55	53	50	48	45	41	35	27
	Baghouse S doorway open	225	86	80	20	26	32	37	42	45	46	48	49	50	52	57	57	56	57	61	62	62	63	64	65	66	68	70	70	72	71	69	68	65	62	57	49
	Inside centre baghouse top	226	83	81	12	16	21	30	33	41	43	49	46	48	52	57	58	57	59	62	62	63	64	64	66	67	70	72	73	74	72	70	69	66	62	56	49
Admin Roof	Admin roof NE corner	5	81	72	13	18	23	28	37	37	40	46	46	51	52	56	57	56	58	62	63	62	61	62	61	60	58	57	55	51	49	43	36	28	18	7	0
	Admin roof SE corner	6	81	71	11	18	23	29	36	36	39	46	47	50	52	56	57	56	61	63	61	61	61	61	62	60	58	56	53	50	47	42	38	31	20	8	1
	Admin roof SW corner	7	79	70	9	16	23	28	33	33	39	44	45	49	51	54	57	55	58	61	60	61	60	60	61	59	57	55	52	49	44	39	33	25	15	8	0
	SW corner	229	80	71	9	16	26	29	35	33	39	44	45	48	52	56	57	55	59	61	61	62	61	61	62	61	57	56	54	51	47	43	38	30	19	7	1
	SE corner	230	82	71	15	21	27	31	36	38	41	44	46	48	53	56	56	56	60	62	62	62	61	61	61	60	57	56	54	52	48	43	37	29	20	10	3
	NE corner	231	80	71	7	13	20	26	36	36	39	46	45	48	52	56	56	56	59	61	61	62	61	61	61	60	57	55	53	50	46	41	36	30	21	10	1

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Area	Source or location	File No.	Total C dBC	Total A dBA	A-weighted LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency Hz																																
					12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
RM7 Baghouse hopper area	On screw conveyor SC212 platform Level 1 W end side by fan motor @ 1m	265	89	84	15	20	28	31	37	41	47	49	53	56	60	64	68	64	70	71	67	78	79	69	75	71	71	68	66	65	61	58	55	51	47	41	32
	Centre S side of screw in line with motor FA250	266	94	91	14	21	32	34	36	42	51	63	58	56	61	65	68	65	68	66	69	88	86	70	79	74	74	72	70	68	65	61	58	55	49	43	34
	Centre S side of screw by squeal point	267	92	89	16	19	28	34	36	41	47	57	53	55	64	65	66	64	65	66	66	85	85	69	76	76	74	70	69	67	64	60	58	55	49	42	32
	E end of SC212 body @ 2m and other N-S aligned screw	268	96	94	14	20	31	34	38	41	49	59	55	56	61	71	70	65	72	66	71	89	90	81	87	84	81	80	77	76	71	68	61	55	49	41	30
	Main platform of baghouse hopper screws S end chute W side between SC211 & gate valve	269	88	83	18	23	29	31	36	41	48	49	52	54	57	63	66	63	69	67	67	78	76	69	73	70	71	68	67	66	63	61	59	56	53	49	42
	Centre W side	270	90	84	20	23	28	33	37	41	49	55	54	56	59	68	70	65	66	68	68	78	76	72	74	72	73	72	71	70	68	67	64	62	59	54	47
	Centre E side - on	271	90	86	20	22	28	34	38	43	47	52	53	55	60	67	70	66	69	68	69	81	79	72	74	74	73	72	72	71	69	69	67	65	62	57	50
	N end Sc211 but S of duct	272	90	83	20	21	30	37	38	44	51	58	55	54	59	64	67	63	66	68	67	76	75	70	73	72	71	70	68	69	66	64	60	58	54	48	40
	By FA252 @ 0.8m shaft S side, casing & discharge box	273	92	85	14	19	31	34	37	43	58	59	56	56	64	66	69	72	73	71	67	78	78	70	74	72	70	68	67	66	65	63	64	61	55	49	41
	By FA252 @ 0.8m shaft N side, casing & inlet	274	95	87	12	20	32	33	37	46	60	63	58	56	62	65	68	71	83	70	67	80	78	69	75	72	72	69	69	68	67	68	67	64	58	52	46
	Baghouse hopper platform level N end	275	89	84	21	23	33	42	41	45	47	54	53	55	58	62	65	62	66	66	67	76	76	74	73	73	72	72	71	72	72	70	67	65	62	58	52
	Baghouse hopper centre platform	276	95	93	24	28	34	39	41	43	49	56	58	61	65	70	73	72	74	75	76	78	80	82	80	81	79	82	83	83	81	81	80	78	76	73	68
	By FA252 @ 1m to side discharge box top grill	277	94	86	15	21	35	37	42	42	57	58	57	55	64	67	71	74	81	74	71	78	78	70	73	71	70	68	66	65	63	60	59	55	51	45	36
Coal Road South	30 Coal Road S side in line W side RM7	59	66	79	12	16	21	26	29	31	37	39	43	47	50	60	59	51	54	54	53	54	54	53	54	52	51	49	48	46	43	39	35	28	22		
	31 Coal Road S side in-line E side RM7	60	66	78	11	15	22	25	29	33	36	41	44	47	51	58	56	52	54	54	53	54	54	55	55	52	51	49	48	45	41	37	34	28	23		
	32 Coal Road S side in-line FA249	61	67	79	11	16	23	28	31	35	39	43	46	49	51	57	55	52	55	55	55	57	55	56	58	54	53	51	49	47	44	41	37	31	24		
	33 Coal Road S side Centre Blending Silo	62	68	79	10	19	24	28	31	37	39	44	46	49	54	55	52	53	56	56	55	58	57	58	58	56	54	52	51	49	46	43	39	33	25		
	34 Coal Road S side E side PHT	63	68	80	10	18	24	27	30	35	39	44	47	49	53	56	54	53	55	56	56	59	59	59	58	56	55	53	52	50	47	44	40	34	26		
	35 Coal Road S side E side new PHT	64	69	81	10	16	21	27	30	35	40	48	48	50	56	57	56	54	56	56	57	59	59	60	61	57	56	54	52	50	46	43	38	32	23		
	36 Coal Road S side E side drive platform	65	69	81	11	14	23	28	29	34	40	49	49	50	58	58	58	54	56	56	57	59	59	59	59	57	55	54	53	50	47	44	39	32	23		
	37 Coal Road S side centre column W support duct	66	69	81	12	16	24	28	29	35	40	45	47	50	59	57	56	54	56	56	56	59	59	59	59	57	55	54	52	49	45	42	38	29	20		
	38 Coal Road S side centre pedestal	67	69	81	10	15	22	26	30	35	40	49	49	51	56	57	55	55	57	56	56	58	58	58	59	56	55	54	53	51	48	45	42	35	26		
	39 Coal Road S side Between centre & E pedestal	69	69	79	9	16	21	26	30	35	39	42	47	50	56	56	54	56	58	57	56	58	58	58	59	57	56	54	53	50	47	44	41	32	22		
	40 Coal Road S side E pedestal	70	68	79	10	17	20	26	30	33	37	44	47	49	55	57	54	57	58	56	56	57	58	58	59	57	55	53	52	50	47	43	40	32	23		
	41 Coal Road S side W end Firing floor building	71	67	78	9	16	20	25	29	32	37	45	46	48	52	54	53	54	58	55	55	56	57	57	57	56	54	53	52	49	46	44	42	33	22		
	42 Coal Road S side opposite grate	72	69	79	10	17	21	24	30	32	36	43	45	50	53	57	56	54	57	57	57	58	59	60	59	57	56	55	53	51	48	45	42	34	24		
	43 Coal Road S side W side coal receival bin 25m to truck	73	65	74	11	14	19	23	29	29	33	37	40	40	44	48	48	47	52	55	56	56	55	54	53	53	52	51	49	47	45	42	39	34	29		
Old Fenceline South	Former Gate site opp W end Firing floor	282	72	59	7	13	18	23	26	28	31	36	38	42	44	45	44	47	50	49	48	48	48	47	48	47	44	43	40	38	34	29	24	17	11	5	0
	Former Gate site opp W end Firing floor	283	72	60	5	12	16	21	25	27	31	38	38	42	43	45	45	48	51	50	49	48	49	48	49	49	46	45	43	41	37	32	27	20	14	7	0
	Top N edge of bank 21m S of centre Alt Fuels Building	284	74	60	9	14	19	23	27	30	35	36	40	43	46	48	46	48	47	49	50	50	50	49	50	48	46	44	42	38	35	31	23	17	11	6	0
	Top N edge of bank opposite centre pedestal	285	68	52	4	11	13	16	21	25	28	32	33	38	39	41	39	37	41	41	41	42	41	41	41	39	38	39	38	34	32	31	23	13	8	4	-1
	Top N edge bank Opposite E side old PHT	286	71	58	6	13	17	21	26	29	30	33	35	38	41	45	46	42	47	48	45	49	48	46	46	45	42	41	40	38	33	30	28	18	14	8	0
	Bottom N edge of bank 13m S of centre Alt Fuels Building	287	66	50	3	9	11	16	17	20	26	28	31	33	36	40	41	37	37	37	38	40	38	37	37	36	35	35	34	31	28	26	21	14	8	4	-1

Table 3.2: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - One-third Octave Band Spectra

Area	Source or location	File No.	Total C dBC	Total A dBA	A-weighted LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency Hz																																
					12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
K6 S side	43A Kerb E side CM opp CM fan discharge	288	86	78	13	18	23	30	39	40	48	48	48	52	55	57	56	58	73	73	66	70	66	64	61	62	62	60	58	56	52	48	44	38	29	20	8
	44A Under Coal Mill fan discharge	289	93	88	19	24	29	36	44	46	52	49	53	59	61	66	68	73	83	77	76	78	77	76	75	75	74	73	71	69	66	61	57	50	43	35	24
	44 CM fan room roll door @ 2m	290	94	88	16	24	29	38	45	49	49	49	55	60	62	69	71	73	80	78	78	78	77	76	75	76	75	74	72	72	68	63	60	52	46	36	25
	44' CM S wall E door @1m,	291	92	88	15	26	26	34	44	44	50	57	54	60	61	67	71	71	74	76	74	75	79	78	78	78	78	77	76	75	74	69	65	57	46	32	17
	45 CM S roll door and wall vent @ 9.9m S side	292	87	80	11	21	24	32	38	40	46	51	53	58	58	62	64	63	69	70	69	68	69	68	69	69	70	68	67	66	63	59	55	47	37	30	13
	46 CM room wall vent @ 2m	293	91	85	13	21	26	39	39	43	49	59	56	64	60	64	68	68	70	73	73	74	75	74	75	75	74	73	72	71	68	64	58	51	41	28	15
	46A Coal Mill Room S roll door W @ 1m	294	92	90	12	25	30	37	37	41	47	50	54	59	59	63	66	70	73	80	77	79	84	78	79	78	78	78	76	74	72	68	63	56	47	40	27
	47B Centre between Grate & CM blower room roll door	295	93	88	18	29	32	38	41	43	53	54	60	62	65	67	68	71	74	75	76	79	79	77	77	77	76	75	74	73	72	73	73	70	63	56	46
	47A Centre between CM Room and grate, S side	296	89	83	17	31	33	34	37	43	48	50	57	61	59	62	65	67	69	70	71	72	74	73	73	73	72	72	71	70	68	69	69	63	56	55	39
	47 Opp FA264 @ 8m	297	89	83	13	27	31	35	37	43	49	52	55	58	60	62	63	70	68	70	71	76	72	71	72	71	71	70	69	68	66	66	66	58	52	53	37
	47C Between FA264 & FA200	298	89	82	14	25	29	34	36	42	48	51	56	60	61	63	66	71	69	69	71	74	73	71	71	71	69	68	67	66	64	63	61	55	48	45	32
	47D FA 200 S Side @ 5m	299	90	83	12	23	28	32	36	43	46	53	57	62	62	65	67	75	73	71	72	72	72	72	70	70	69	67	66	64	62	61	59	53	47	44	36
	48 Opp. E pedestal roller	300	90	83	15	24	28	33	36	41	45	50	56	59	64	65	66	76	72	71	72	71	72	72	71	70	68	67	65	64	61	59	57	52	46	41	31
	49 Half way between centre & E pedestals	301	90	83	14	23	26	30	35	40	47	52	57	59	64	65	64	73	72	72	73	72	73	72	72	71	69	68	66	64	61	58	54	50	43	35	23
	50 Opp. Centre pedestal	302	88	80	15	22	24	30	34	38	44	51	54	58	63	64	63	68	70	70	71	70	71	70	70	69	67	65	63	61	58	55	51	46	39	31	19
	51 Half way between Centre & Western pedestals, by duct support trestle	303	87	79	15	20	26	32	34	40	44	50	54	56	61	62	62	66	69	69	69	70	69	70	70	68	67	64	62	60	57	53	49	43	35	25	13
	52A Opp E end of kiln drive platform	304	86	78	14	22	25	31	37	40	43	49	53	56	60	62	62	65	67	68	68	69	68	69	68	67	65	63	61	58	55	51	46	40	32	22	9
	52 Opp W pedestal roller	305	87	79	14	21	25	33	37	40	44	54	53	56	60	63	61	67	67	69	70	69	68	69	68	66	65	63	61	58	56	52	48	44	37	27	15
	53 Kiln drive platform Centre E end on platform (ground level)	306	91	84	18	24	30	32	35	39	45	54	60	56	66	67	69	71	73	73	74	74	75	75	74	73	71	69	66	64	61	56	51	45	37	27	14
Kiln Drive platform	S side S motor end @ 1.5m kiln drive	307	91	83	13	25	29	33	37	44	49	59	56	59	64	68	69	70	76	70	73	74	72	72	72	70	69	68	67	66	64	60	55	50	45	37	27
	S side of S Gbox @ 1.5m	308	91	82	15	26	29	34	37	45	48	60	59	59	65	67	68	69	72	71	72	73	72	72	72	70	69	68	67	66	65	64	60	54	46	38	26
	E side of S drive motor @ 1.5m, 2m to Gbox	309	93	85	15	25	31	34	38	44	51	62	60	60	66	68	71	70	76	72	75	75	74	74	74	73	71	70	68	68	67	63	58	52	47	39	29
	53 Kiln drive platform Centre E end on platform between motors	310	93	86	16	28	33	37	41	46	47	58	60	61	67	68	69	71	80	72	75	79	76	74	73	72	72	73	69	70	69	62	57	52	44	35	25
	53 Kiln drive platform Centre E end on platform between gearboxes	311	92	85	18	30	33	38	40	45	47	58	61	63	67	66	67	70	74	72	76	75	75	73	75	74	72	70	68	68	66	60	55	49	41	33	21
	N side motor end @ 1m kiln drive	312	94	86	24	30	36	38	41	45	49	59	58	64	65	70	77	71	77	71	75	74	74	73	73	72	72	76	68	70	70	64	58	52	46	38	27
	N side motor N end @ 1.5m kiln drive	313	92	84	13	23	29	33	36	43	48	55	57	63	68	67	70	69	77	70	73	75	73	72	72	71	70	71	65	67	67	59	55	49	41	32	20
	N side of N drive & Gbox @ 1.5m	314	92	85	14	26	28	33	37	44	47	56	57	61	66	68	71	69	77	71	74	77	76	72	72	72	70	70	66	67	66	58	54	49	41	31	21
Kiln 6 road Northern side	1' RM6 W door at kerb W side @ 13.3m	239	85	80	18	24	29	33	36	39	41	46	47	50	53	55	62	59	64	68	62	64	74	73	73	69	63	62	60	58	55	52	49	44	39	29	17
	54 W end RM6	315	82	72	18	21	28	30	36	37	40	44	46	49	53	58	60	55	58	61	57	59	64	64	65	61	54	53	51	48	45	40	34	28	20	9	1
	55 Centre RM6	316	83	73	19	22	28	32	35	39	42	48	48	50	54	59	60	55	59	63	58	60	65	64	65	62	55	55	53	50	46	42	37	30	21	11	1
	55 Centre RM6	317	83	73	19	22	29	32	35	39	42	48	49	50	54	59	61	56	59	62	58	60	64	63	67	63	56	55	53	52	48	45	39	32	26	16	3
	56 E End RM6	318	85	76	23	23	29	36	38	42	44	49	48	50	56	60	61	58	61	63	60	64	68	66	70	68	61	62	60	59	58	57	53	49	46	35	25
	56' Between RM6 & New wall for FA38	319	86	76	26	23	31	38	39	42	44	51	49	52	56	60	62	59	62	66	62	65	68	66	70	66	62	61	60	58	56	54	50	45	39	31	20
	57 Door opp FA38	320	89	80	22	25	36	39	41	43	47	56	53	54	58	64	66	63	67	68	64	68	68	69	76	70	64	63	61	59	57	53	48	42	36	25	12
	58 Half way between FA38 & FA39, opposite big column	321	90	82	25	26	35	38	42	45	48	56	54	55	59	65	66	63	67	68	65	70	67	71	79	74	65	65	61	59	55	51	45	38	31	20	7
	59 Opp FA39 end	322	90	81	25	26	33	38	41	49	49	55	54	59	60	67	70	63	67	69	66	69	68	71	76	71	65	65	62	60	55	51	46	40	33	23	10
	59 Opp FA39 end	323	90	82	25	26	33	38	41	48	48	54	53	59	60	67	70	63	67	68	66	69	67	71	77	73	65	65	62	61	56	51	46	40	33	23	10
	60 Opp Conditioning Tower	324	90	84	22	23	32	38	44	47	50	55	55	59	61	64	66	64	68	70	65	70	67	70	82	72	66	67	63	62	58	54	51	46	40	32	19
	60 Opp Conditioning Tower	325	90	83	22	23	31	40	44	48	50	54	55	59	61	64	67	64	67	70	66	69	68	70	81	71	66	67	63	61	57	53	50	45	38	29	17
	60' Opp. Stack	326	89	79	21	23	36	41	42	43	47	54	54	57	62	64	65	63	65	67	66	68	67	70	74	70	66	65	62	61	56	51	46	40	33	23	11
	61 Opp. Centre PHT	327	89	80	14	20	34	38	40	43	46	55	55	58	62	65	66	63	66	66	66	68	67	69	75	69	65	64	62	59	56	51	48	42	35	25	13
	62 Opp E side PHT	328	88	78	17	23	31	37	43	42	44	51	54	58	63	64	64	62	64	66	67	68	67	68	71	67	65	63	61	58	54	50	45	38	31	21	7
	63 Opp. W pedestal	329	87	78	17	22	27	35	39	43	44	53	55	58	63	64	64	62	65	67	68	69	68	69	69	67	65	64	61	59	56	52	47	41	34	25	11
	64 E end drive platform	330	88	81	13	20	28	31	38	41	44	52	56	60	63	64	62	64	70	71	70	71	72	71	71	70	69	67	65	62	59	55	51	46	39	30	18
	65 Opp column for return duct W side	331	89	83	16	22	26	32	37	42	44	54	57	58	62	64	65	68	72	72	73	74	74	74	73	72	71	69	67	65	62	58	54	49	43	35	24
	66 Opp centre pedestal	332	91	86	17	23	27	33	38	42	45	47	55	62	64	67	71	73	74	76	77	76	76	76	76	75	74	72	70	68	65	61	57	52	46	38	27
	67 Half way between centre & e pedestals	333	92	86	14	24	27	31	37	42	50	54	60	64	65	67	67	71	75	75	76	77	76	76	76	75	73	72	70	68	65	62	59	54	47	39	28
	68 Opp E pedestal	334	94	86	14	29	31	30	37	45	55	59	61	66	67	69	69	71	74	76	76	77	76	75	75	74	72	71	70	68	64	63	60	55	48	39	29

Table 3.2: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - One-third Octave Band Spectra

Area	Source or location	File No.	Total C dBC	Total A dBA	A-weighted LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency Hz																																
					12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
Grate Cooler Fan Courtyard	69 Centre courtyard - opposite F201	335	95	87	15	30	32	36	42	47	53	61	65	67	68	70	70	76	75	76	78	78	77	76	76	75	74	73	72	71	67	66	64	59	52	44	35
	69 Centre courtyard - opposite F203	336	96	87	17	33	37	38	38	50	57	59	65	70	68	70	70	73	75	76	77	78	77	76	75	75	74	73	72	72	69	68	67	63	56	48	39
	FA201 @ 2m to motor & casing	337	97	90	17	35	38	38	41	47	56	61	64	68	70	72	72	75	77	78	81	81	80	79	79	78	77	76	74	73	70	68	65	61	55	47	37
	FA201 N side inlet & casing @ 1m	338	98	91	17	33	35	36	43	52	59	61	67	71	72	74	73	77	77	78	82	82	82	81	80	79	79	78	77	76	73	71	70	66	60	53	44
	Between FA201 & 203 & 202	339	100	92	18	33	35	41	46	53	63	64	67	71	72	74	72	82	80	80	82	84	82	81	80	79	78	77	77	75	72	69	67	63	56	49	40
	FA203 inlet & casing @ 2m	340	98	88	16	35	38	42	46	53	60	61	68	69	69	74	71	76	76	77	79	79	78	77	78	76	74	74	73	73	69	67	66	61	55	47	38
	FA203,FA204 & FA205 @ 1m	341	99	88	17	37	41	46	44	53	63	62	69	71	68	72	70	77	76	76	78	78	77	76	79	76	75	75	75	75	72	71	70	66	60	53	43
	Between inlet filters FA206 & FA207	342	95	85	16	30	37	40	45	50	55	60	66	67	66	70	70	70	72	72	74	75	74	73	73	73	72	71	71	71	69	71	71	67	61	53	43
Grate Northern area	Centre between Grate & CM blower room roll door	343	93	86	14	30	32	35	41	48	53	58	62	63	63	67	67	72	73	76	72	75	76	75	74	74	73	72	72	71	70	74	74	72	66	59	49
	Coal Mill Building N roll door @ 2m	344	91	86	12	23	29	31	39	46	51	56	57	62	60	63	65	67	72	75	75	76	76	75	75	75	74	73	73	72	71	69	66	62	53	44	31
Kiln Firing Floor	Centre N side opening face E	345	90	82	13	24	27	31	35	43	53	50	56	61	65	66	65	68	70	69	71	71	70	71	72	71	70	68	66	66	66	68	66	62	56	47	33
	Centre N side opening face W	346	90	82	13	23	27	32	35	43	53	50	55	63	66	68	65	67	69	71	72	72	71	72	73	72	71	69	67	66	65	65	62	58	52	43	32
	FA209 E side inlet & filter silencer	347	93	86	13	27	30	31	37	45	50	54	59	66	68	72	70	72	74	75	78	79	77	76	76	74	73	71	69	67	65	63	59	54	48	41	31
	FA209 Kiln Discharge Seal Fan N inlet W side @ 1.5m	348	96	91	13	28	32	31	38	45	52	56	61	66	68	71	71	75	77	79	81	83	83	83	82	81	79	78	75	73	70	68	64	60	56	50	40
	Centre S side opening face E	349	87	81	13	23	27	33	36	41	50	49	51	56	58	61	64	66	65	67	68	70	73	72	73	71	70	68	66	64	63	63	60	56	53	46	33
	Centre S side opening face W	350	87	81	14	24	27	33	36	40	48	50	51	57	58	61	63	65	65	67	69	70	72	73	73	71	70	68	66	64	62	61	57	53	49	41	31
	FA210 Kiln Discharge Seal Fan S inlet @ 1.5m	351	96	93	14	24	29	32	36	43	49	52	57	68	66	69	70	73	74	77	81	84	87	86	84	82	80	80	77	75	73	70	66	62	58	53	45
	FA200 inlet side @ 1.5m	352	95	87	18	27	33	38	41	46	52	58	63	65	68	72	72	81	77	76	76	76	77	76	75	74	73	72	71	69	66	63	60	57	52	45	36
	New replacement FA211 centre under kiln, inlet @ 1m	353	102	97	19	30	35	37	42	49	60	60	63	69	76	79	80	84	83	88	88	86	85	86	85	85	85	84	82	81	80	77	74	70	66	60	53
	FA210 S side seal fan inlet W side & casing @ 1m	354	93	85	22	28	32	37	40	46	52	54	58	66	66	68	70	71	70	73	75	75	78	77	75	74	72	70	68	67	63	61	57	54	49	42	33
	Kiln floor centre E S of duct/clinker elevator	355	86	80	13	21	24	30	36	43	48	48	52	57	58	61	62	65	66	66	69	69	69	71	73	70	69	68	66	64	64	65	62	57	52	47	31
	KFF burner air cannon N side @ 2m	356	90	87	14	26	31	33	37	44	48	51	57	60	62	62	62	67	67	67	70	70	70	72	74	74	75	73	74	75	77	80	77	74	70	58	47
	KFF burner by air cannon S side @ 2m	357	88	83	15	23	30	35	38	42	48	51	56	59	60	62	62	65	66	67	69	70	70	73	75	74	75	72	70	69	69	72	69	65	61	52	42
Radicon Cooler	RC L1 centre fan @ 1m	358	90	83	10	24	28	33	39	43	48	53	58	62	64	65	67	71	71	70	72	72	71	70	75	77	73	66	66	65	60	59	58	52	44	35	23
	RC L1 S fan @ 0.5m	359	90	84	11	22	29	34	40	44	50	53	59	61	63	66	67	71	70	69	72	72	72	72	79	77	72	69	69	69	64	64	62	58	51	43	32
	RC L1 N fan @ 1m	360	90	82	10	25	28	33	38	44	49	52	60	63	64	66	66	72	69	69	71	72	71	70	71	73	69	66	66	65	59	57	55	49	41	31	19
	RC L2 centre fan @ 1m	361	89	82	11	21	27	35	39	43	48	50	57	61	63	65	66	69	70	69	71	72	71	70	74	75	69	66	65	64	59	57	55	49	40	32	20
	RC L2 S fan @ 0.7m	362	89	84	11	21	28	35	40	43	49	50	57	59	62	66	65	70	70	69	71	71	72	72	76	78	74	67	67	66	61	60	58	53	45	37	25
	RC L2 N fan @ 1m	363	89	81	9	23	26	33	38	43	47	51	58	60	63	67	66	70	69	69	71	72	71	70	71	72	68	66	66	64	59	56	53	47	38	29	18
	RC L3 Centre fan @ 1m	364	89	83	12	20	26	35	41	43	48	50	56	61	63	66	65	69	69	69	70	70	69	69	72	80	71	66	67	64	60	59	56	48	40	32	21
	RC L3 S fan @ 0.7m	365	88	83	13	19	26	34	41	43	47	50	55	58	62	64	65	66	69	68	69	70	69	69	73	79	71	66	66	63	60	58	56	51	43	34	23
	RC L3 N fan @ 1m	366	89	81	10	19	24	32	41	44	46	51	56	60	64	66	64	69	69	69	70	71	70	70	71	73	68	66	66	65	60	61	56	48	40	35	20
	RC L4 Centre fan @ 1m	367	91	84	12	20	26	32	42	48	51	52	57	62	66	65	65	67	69	69	71	71	69	69	71	82	73	67	67	64	60	58	56	48	42	35	25
	RC L4 S fan @ 0.7m	368	89	85	12	20	26	31	41	45	47	50	55	58	63	65	63	66	68	67	67	69	68	68	71	83	76	69	67	62	58	56	54	48	40	31	19
	RC L4 N fan @ 1m	369	92	82	12	20	25	31	45	48	54	56	59	62	68	67	66	69	69	70	72	73	72	71	71	73	70	68	67	66	61	59	56	49	43	36	28
	RC L5 face E	370	88	78	11	18	24	31	40	45	48	51	54	56	66	68	63	66	67	66	67	67	66	65	65	71	66	62	60	59	55	52	49	42	33	23	11
	RC L5 face W	371	87	79	11	17	24	31	39	44	45	48	53	61	63	63	64	67	66	67	68	68	68	67	68	73	67	64	63	60	56	54	51	44	36	26	12
	L1 E side 2.4m	372	90	78	12	21	26	29	37	42	46	50	56	58	72	63	63	68	66	65	66	65	65	63	64	67	62	60	58	58	56	57	56	51	44	35	26
	L1 E side 6m	373	90	77	11	23	26	29	35	40	44	49	53	57	72	61	61	65	63	65	63	64	62	62	63	67	62	58	57	56	53	53	51	46	39	31	21
	L1 E side 12m	374	86	74	7	19	27	28	35	39	44	48	51	54	65	57	58	69	61	61	62	62	62	61	60	63	60	58	59	58	53	54	53	49	41	32	19
FA215	Motor S end @ 2.5m	375	88	79	12	23	27	29	39	41	48	49	52	58	69	60	62	67	65	67	68	67	66	66	65	66	67	67	67	70	63	62	61	58	49	39	27
	Platform E side drive coupling @ casing @ 1m	376	90	83	10	22	27	29	39	41	45	52	53	57	70	64	65	70	66	70	68	69	69	68	68	68	71	72	74	77	68	67	64	60	55	51	42
	W side platform @ 1m to coupling & casing	377	96	81	13	23	31	35	38	40	47	51	54	62	80	62	59	67	63	64	64	63	63	62	62	62	64	65	67	69	60	56	52	48	41	34	22
	Under expansion joint discharge duct to stack @ 1m	378	97	82	13	25	31	35	38	40	47	52	54	62	80	63	59	65	63	64	65	63	63	62	62	62	64	65	68	69	61	56	52	48	41	35	23
	N side inlet box platform @ 1m to discharge duct & inlet box	379	88	76	13	23	29	28	37	38	51	52	50	55	68	58	59	73	61	63	64	61	61	60	59	59	59	60	59	58	53	51	49	44	35	25	13
	Platform centre N side inlet box	380	96	81	10	23	27	28	36	38	45	53	52	60	79	62	59	72	62	63	63	63	62	61	60	59	58	58	58	57	51	51	50	45	38	30	18
	Under Inlet box W side entry duct	381	92	79	11	25	30	30	35	40	48	51	59	60	75	59	61	66	66	66	66	66	67	66	65	64	64	64	67	65	59	60	59	55	47	38	26
	Inlet box N side ground level @ 1m	382	91	77	12	23	29	30	39	41	47	47	52	57	74	60	60	69	62	63	64	63	63	62	62	61	60	59	60	60	53	53	52	47	38	28	15

Table 3.2A: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - Tonality in One-third Octave Band Spectra

Area	Source or location	File	Tonality dB in One-third Octave Band Centre Frequency - Hz																											
			31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
	Tonality Criteria		15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
PHT Level 8	PHT L8 Top platform level with top of stack	14	0.5	0.8	0.3	1.0	3.8	6.9	6.0	2.1	4.4	1.9	3.8	4.7	0.8	2.2	1.6	0.8	1.0	0.6	1.1	1.2	1.8	1.5	1.2	2.8	0.4	0.2	2.2	0.5
	PHT L8 Top platform EL16 Gbox @ 1m to NE side	15	0.6	2.0	1.8	2.5	0.3	9.6	8.1	2.0	2.3	0.5	3.4	4.0	1.0	0.4	0.7	0.3	1.0	1.2	0.5	1.2	1.3	0.0	0.8	2.9	0.4	0.5	2.6	0.1
	PHT L8 Top platform EL16 Gbox @ 1m to coupling SW side	16	0.1	1.4	0.7	0.5	4.0	7.1	3.9	2.1	4.8	0.8	2.1	3.0	1.3	0.7	0.1	0.8	0.3	4.2	3.3	2.4	1.6	0.0	1.4	4.4	0.2	0.8	3.3	1.0
	PHT L8 Top platform EL16 Gbox @ 2m to motor S side	17	0.2	2.2	1.0	0.9	3.2	5.5	4.4	2.1	4.3	4.1	4.1	8.6	3.3	0.6	0.8	0.0	1.3	0.0	0.6	1.2	0.9	0.4	0.6	3.6	0.1	0.9	3.4	0.7
	PHT L8 Top platform EL16 Gbox @ 1m to coupling NW side	18	0.4	0.9	1.1	0.2	2.0	5.3	4.6	1.8	1.0	1.0	2.9	7.4	3.2	1.6	0.1	0.5	1.3	0.2	0.2	0.9	1.3	0.4	0.5	3.4	0.2	1.1	3.7	0.7
	PHT L8 Top Platform S side BE	19	3.8	3.0	1.1	2.7	4.9	11.5	5.4	0.5	3.1	1.1	5.4	10.2	6.5	0.4	1.6	1.6	0.5	3.0	2.9	1.1	1.7	0.2	0.5	0.9	0.6	0.3	1.2	0.4
	PHT L8 Lower platform	20	0.2	0.9	0.4	0.0	3.1	6.2	8.6	6.4	4.8	3.3	3.4	2.9	0.3	1.0	0.6	0.5	1.2	3.4	1.7	0.3	0.1	0.0	0.2	1.7	0.4	0.3	1.9	1.0
	PHT L8 Top platform EL16 Gbox @ 3m to N side	21	0.2	0.5	0.8	1.3	3.4	8.2	7.9	3.5	5.1	2.0	3.2	2.4	0.1	1.6	1.5	2.5	2.4	0.9	3.6	5.3	2.7	0.4	0.3	2.2	0.3	0.2	3.3	0.6
	PHT L8 proper FA263 motor & casing @ 1m	22	1.2	0.5	1.3	1.0	4.2	7.6	4.4	0.3	6.0	3.3	0.1	2.3	1.6	5.4	13.2	7.5	4.9	11.4	5.0	0.1	0.4	0.2	0.6	0.3	1.0	0.1	1.6	0.2
	PHT L8 proper 1m to vent on FA263 filter room	23	1.5	1.0	0.5	0.4	0.1	4.6	8.4	4.8	3.6	0.0	2.4	0.2	0.4	2.2	7.0	4.6	3.2	6.9	2.3	0.6	0.2	0.2	0.7	0.3	0.3	0.9	1.3	1.0
	PHT L8 centre tower W side	24	1.4	1.8	0.4	0.3	2.7	6.6	4.6	1.6	5.1	2.6	1.2	0.5	1.0	4.5	10.6	5.8	4.8	10.7	4.8	0.7	0.8	0.1	0.2	0.2	0.1	0.6	1.6	1.3
	L8 new PHT centre	25	0.6	0.3	0.3	1.6	2.5	4.2	2.5	2.1	0.9	1.7	0.8	0.6	1.1	0.7	0.5	0.1	1.2	3.1	2.2	0.5	0.9	0.0	0.7	0.9	0.1	0.6	1.1	1.5
	PHT L8 centre tower N side	26	0.0	0.3	0.3	0.2	0.8	1.0	0.9	1.3	2.8	2.4	0.3	0.8	1.7	1.6	2.0	1.2	0.3	1.5	0.8	0.0	0.2	0.5	0.4	0.0	0.2	0.9	1.2	1.8
	PHT L8 centre tower E side	27	0.5	1.4	1.2	3.2	2.0	0.4	1.6	3.1	2.7	3.5	1.8	1.1	0.6	0.1	0.0	0.1	0.9	0.5	1.0	0.3	1.2	0.7	1.1	1.2	0.5	0.1	1.3	0.9
	PHT L8 centre tower S side	28	0.4	2.1	1.7	1.8	0.5	1.6	1.1	2.0	5.4	3.7	1.1	1.3	3.4	2.0	0.9	0.1	1.0	2.0	2.1	1.3	2.6	0.3	3.6	3.5	0.3	1.5	3.7	0.3
PHT Level 7	PHT L7 New S side centre	29	1.2	0.3	0.5	0.3	1.4	0.7	1.1	2.6	0.1	0.5	0.4	0.3	0.1	0.5	0.1	0.4	1.0	3.1	2.3	0.5	0.5	2.0	1.0	0.3	0.8	0.4	4.1	0.7
	PHT L7 New E side centre	30	1.3	0.1	2.0	1.9	0.9	1.9	2.1	4.0	0.0	2.2	1.4	0.6	0.7	0.5	0.2	0.5	0.1	0.4	0.5	0.5	1.0	2.6	0.7	1.0	3.4	0.2	0.2	1.7
	PHT L7 New N side centre	31	4.0	2.5	2.9	1.4	1.3	0.6	0.5	2.2	1.6	2.5	1.3	0.8	0.4	0.0	0.5	0.2	0.3	0.8	0.5	0.1	0.4	1.1	0.1	0.2	0.5	0.6	1.1	1.0
PHT L7 Alt Fuels Platform	PHT L7 Alt Fuels Platform L1: E side of feeder @ 1m	32	2.5	0.3	1.3	1.1	1.3	2.1	0.3	1.0	0.1	0.2	0.1	0.4	0.2	0.2	0.2	0.0	0.6	0.3	0.5	0.7	0.1	1.7	0.0	0.6	2.2	0.2	0.3	0.7
	PHT L7 Alt Fuels Platform L1: E side of mixer @ 1m	33	0.6	0.6	1.1	0.8	0.8	0.9	0.8	2.7	0.9	1.4	0.1	1.5	0.4	1.4	1.0	0.0	0.6	0.1	0.4	0.2	0.7	3.1	1.2	0.9	3.0	0.1	0.3	1.9
	PHT L7 New E side 4m to base of Alt Fuel chute, 1m to bin W	34	1.3	0.8	1.0	0.0	1.5	1.6	1.1	2.1	0.6	0.2	1.3	1.4	0.4	0.1	0.1	0.1	0.4	0.0	0.3	0.3	0.1	1.9	0.0	0.1	1.5	0.2	1.0	0.8
	PHT L7 Alt Fuels Platform L2: N side of conveyor discharge	35	0.8	1.0	0.2	2.4	0.1	0.6	2.3	0.7	0.2	0.3	0.2	0.5	0.8	0.0	0.5	0.8	0.1	0.9	0.6	0.8	0.3	1.8	1.8	1.3	1.1	0.6	0.4	0.8
	PHT L7 Alt Fuels Platform L2: 1m E side of chute inlet	36	2.7	1.2	2.5	0.1	1.3	1.9	2.7	0.8	1.5	1.1	0.2	0.3	0.1	0.1	0.4	0.2	0.2	0.1	0.9	1.3	0.0	1.4	0.8	0.5	1.5	0.0	1.0	0.6
	PHT L7 Alt Fuels Platform L2: 1m E side of conveyor 3m from entry to chute	37	0.5	0.5	0.0	1.0	0.0	1.3	0.7	2.2	2.4	2.7	0.4	0.3	0.1	0.4	0.4	0.6	0.1	0.7	0.5	0.1	1.5	3.5	0.9	1.1	2.9	0.3	0.1	1.2
	PHT L7 Alt Fuels Platform L2: 1m NW side of conveyor drive motor	38	1.7	0.5	1.6	0.3	1.1	1.2	0.2	2.1	0.7	0.3	1.4	1.4	0.1	0.4	0.5	1.3	0.7	0.2	1.8	2.4	1.6	2.0	1.3	0.4	1.2	0.6	1.2	0.0
	PHT L7 Alt Fuels Platform L2: 1m SW side of conveyor drive gearbox	39	1.6	0.5	1.1	0.9	0.2	0.1	0.7	1.1	0.1	0.7	0.5	0.5	0.7	0.4	0.5	2.0	0.9	0.4	1.0	1.6	2.5	4.0	0.3	0.1	1.3	0.8	1.6	0.1
	PHT L7 Alt Fuels Platform L1: 3m N of feeder	40	1.2	1.2	0.7	0.3	1.4	1.3	0.6	2.1	0.5	0.0	0.2	0.4	0.5	0.6	0.8	0.3	1.1	0.3	0.5	0.4	0.1	1.2	0.2	0.2	1.3	0.0	0.9	0.9
PHT Level 7	PHT L7 New centre between towers faces S	41	3.2	1.1	0.6	1.1	1.5	2.1	4.2	4.6	3.7	4.0	0.6	0.7	0.5	0.3	0.9	0.4	1.5	3.7	2.0	0.2	0.3	1.4	0.2	0.4	1.3	0.0	2.2	0.5
	L7 between PHTs centre facing W	42	3.4	1.1	0.8	2.3	0.3	0.7	1.8	3.3	1.4	1.4	0.4	0.9	0.6	0.8	2.3	1.1	1.1	2.7	1.4	0.3	0.3	0.9	0.5	0.4	1.2	0.1	2.0	0.6
	PHT L7 Old S side centre, faces W	43	1.9	0.5	2.5	4.3	1.1	1.2	0.7	2.8	3.9	4.9	2.3	1.1	1.6	1.7	2.5	2.1	1.5	5.9	2.9	0.0	0.0	0.4	0.2	0.1	1.1	0.0	3.2	0.1
	PHT L7 under EL13 platform E side	44	4.0	1.6	0.0	0.5	0.0	1.8	4.6	1.7	6.5	6.2	3.1	0.5	0.4	0.4	1.7	1.1	1.3	4.2	2.4	0.6	1.3	0.3	0.3	1.6	0.1	0.1	2.3	0.8
	EL13 platform E side Gbox & coupling @ 0.5m	45	0.4	0.1	1.6	0.5	2.2	2.2	5.7	4.8	5.3	9.1	8.3	5.2	3.7	1.6	0.6	1.0	0.4	0.9	0.0	0.4	0.5	0.3	0.1	0.3	0.6	0.1	1.1	1.1
	EL13 platform N side GB end & side EL @ 1m	46	0.8	0.1	0.8	0.8	0.1	1.4	2.3	2.3	3.9	5.3	4.0	2.0	2.0	1.9	0.2	2.2	0.5	1.6	2.1	1.2	0.0	0.1	0.2	0.3	0.5	0.3	1.6	0.7
	L7 BE drive platform N side @ 1m to BE	47	0.1	0.5	0.9	0.3	0.1	1.8	2.0	4.4	2.5	5.7	6.9	3.5	0.2	0.9	1.0	0.7	1.1	2.6	1.9	0.9	0.2	0.1	0.1	0.1	0.8	0.1	2.1	0.4
	EL13 platform SW side motor & EL & coupling @ 1m	48	0.4	0.4	0.0	0.8	0.5	2.2	0.1	3.4	1.4	4.1	1.1	0.5	0.1	0.8	0.1	0.0	1.0	1.3	1.1	0.8	0.8	0.0	0.3	0.3	0.9	0.0	2.6	0.2
	EL13 platform W side 0.5m	49	1.7	1.4	2.0	2.0	1.1	1.8	4.0	7.6	5.0	8.1	3.3	2.4	3.3	2.1	1.4	1.5	0.4	2.4	1.1	0.1	0.1	0.1	0.5	0.1	1.1	0.1	2.7	0.6
	EL13 platform motor end @ 0.6m	50	0.0	0.4	0.1	2.6	3.0	1.2	4.2	6.7	4.7	7.3	2.3	0.3	1.3	0.1	0.4	0.3	1.5	1.3	0.8	1.6	0.4	1.3	1.0	0.1	0.4	0.4	1.2	0.8
	L7 centre between cylinders	51	2.2	1.4	3.0	4.7	1.4	1.2	2.2	3.9	4.7	4.3	0.3	0.3	0.6	2.0	3.2	2.1	1.5	4.7	1.9	0.3	0.1	0.3	0.1	0.4	0.7	0.8	1.3	1.7
	PHT L7 old NW corner 1.5m to stack	52	1.3	0.9	1.8	2.4	1.1	0.8	1.1	2.8	1.1	1.6	0.7	0.9	0.0	1.2	0.5	0.6	0.5	1.3	0.8	0.1	0.1	0.4	0.6	1.9	0.5	0.3	0.9	1.2
	PHT L7 old centre N side on new platform	53	2.0	1.5	0.6	4.4	1.9	1.3	0.6	2.8	3.8	4.4	0.8	0.5	0.4	1.3	1.1	0.7	0.4	2.3	1.2	0.2	0.2	0.1	0.1	0.4	0.6	0.9	1.1	1.4
	PHT L7 old centre N side	54	2.2	0.4	2.1	2.0	2.7	0.4	0.9	4.6	5.5	5.0	0.8	1.3	0.3	0.8	0.9	0.6	0.4	1.0	0.1	0.4	0.0	0.3	1.1	0.6	0.1	0.6	0.6	1.5
	PHT Level 7: FA213 @ 1m, door closed	55	1.4	0.2	0.8	0.6	0.5	3.3	0.8	2.6	1.8	0.7	2.6	3.2	0.8	0.8	0.5	0.6	0.5	2.5	0.7	0.2	0.5	0.2	0.1	0.6	0.5	0.7	0.8	2.5

Table 3.2A: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - Tonality in One-third Octave Band Spectra

Area	Source or location	File	Tonality dB in One-third Octave Band Centre Frequency - Hz																											
			31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
	Tonality Criteria		15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
PHT Level 6 RM Silo Top	PHT L6 RM silo above baghouse discharge @ 2m at base of stairs to EL, level with floor	56	2.6	2.5	2.3	1.1	3.6	3.8	3.2	2.3	2.7	2.6	0.4	2.0	2.0	1.5	0.5	0.8	1.4	5.8	3.7	0.1	0.2	0.5	0.5	0.5	0.7	0.5	6.6	1.8
	PHT L6 RM silo Top FA260 NE side @ 1m casing & motor	57	0.5	0.8	1.6	2.2	2.5	0.6	0.2	0.3	3.2	3.3	1.6	1.4	0.2	2.5	0.4	3.2	3.4	12.2	4.8	1.1	0.2	0.1	1.6	2.0	0.2	0.4	5.7	2.5
	PHT L6 RM Silo top EL15 platform motor side 0.6m	58	2.6	0.8	0.1	0.7	2.2	2.8	0.3	0.5	1.9	2.8	0.5	1.3	0.8	4.1	4.4	0.9	0.4	0.8	1.9	0.2	2.2	0.6	1.3	0.5	1.0	0.1	6.7	2.8
	EL15 W side @ 1m	59	1.0	0.4	0.0	0.5	0.2	0.3	0.8	1.0	1.9	2.2	4.0	8.0	3.8	1.3	2.2	0.2	1.0	2.4	1.6	0.0	0.5	0.0	1.3	0.4	1.3	0.1	5.6	1.6
	L6 RM silo top on BE EL15 platform SW side @ 0.8m	60	0.8	0.7	0.8	1.1	0.2	0.9	1.9	1.1	2.9	3.6	4.1	10.5	5.8	0.0	2.6	5.1	0.0	1.1	0.6	0.4	1.2	0.6	1.2	0.8	1.2	0.3	5.7	1.7
	EL15 S side Gbox @ 1m	61	0.1	0.7	0.0	0.5	0.2	0.3	0.1	0.1	1.3	1.2	5.8	11.3	5.7	5.1	4.7	3.1	1.1	3.9	1.8	2.6	2.9	2.9	3.2	0.9	0.9	0.4	5.7	2.5
	EL15 E side Gbox @ 0.5m	62	0.5	0.8	0.3	0.3	0.2	0.9	0.1	0.3	0.6	0.4	2.5	4.5	2.2	3.2	3.2	1.4	1.0	0.6	1.3	0.3	1.4	2.6	3.0	0.5	1.1	0.3	5.0	2.1
	RM silo top baghouse fan DC30 discharge @ 1.5m	63	0.4	0.4	0.2	1.0	0.0	1.2	0.0	1.5	0.4	1.3	1.8	2.0	4.1	2.9	0.9	1.6	0.5	2.3	1.5	0.0	1.1	0.2	1.3	0.2	1.3	0.6	6.6	2.4
	RM Silo top N side 12.7m to FA260	64	0.2	0.1	1.3	0.1	0.1	0.4	1.4	1.7	2.8	5.4	4.4	0.1	1.8	0.1	2.1	0.8	1.4	3.4	2.7	0.2	0.9	0.8	1.5	1.5	2.2	0.2	3.5	0.5
	RM Silo top E side 12.7m to FA260	65	0.7	1.3	1.2	1.6	1.0	1.6	1.1	2.6	4.3	3.5	1.0	1.3	0.4	0.5	0.1	0.4	2.4	5.7	3.3	0.0	0.2	0.0	1.3	1.1	0.4	0.0	5.9	1.4
PHT Level 6	PHT L6 centre W side	66	0.1	0.5	0.5	0.4	2.9	3.5	2.6	3.5	3.4	5.3	1.5	0.9	1.1	2.1	0.6	0.1	0.3	1.5	1.5	0.4	0.5	1.1	0.5	0.4	0.5	1.1	1.1	1.2
	PHT L6 stack test port 100mm diam @ 200mm S side	67	0.8	0.3	0.6	0.1	4.3	5.3	4.7	4.0	3.7	4.3	1.8	1.7	4.0	3.9	0.4	3.6	1.1	0.0	0.5	0.4	0.3	0.2	0.7	0.6	0.8	2.6	1.5	1.8
	PHT L6 stack test port 100mm diam @ 200mm W side	68	0.5	0.3	0.9	2.5	0.5	1.9	2.1	0.7	4.4	5.7	3.0	1.9	0.5	0.7	2.2	2.8	1.2	2.1	0.0	1.7	0.7	0.8	0.0	0.8	1.1	0.7	0.1	0.8
	PHT L6 stack test port 200mm diam @ 200mm W side	69	0.7	0.4	0.0	3.5	1.8	3.4	2.7	0.0	3.8	7.4	3.6	6.2	3.5	0.8	1.1	0.3	0.8	0.6	1.0	0.7	0.2	0.2	0.2	0.4	1.1	1.6	0.8	0.8
	PHT L6 NW corner 1m to stack	70	0.4	0.1	0.7	0.1	0.8	1.4	0.6	0.8	2.7	2.4	0.5	3.7	0.3	2.8	1.7	0.5	0.8	0.5	0.0	0.3	0.1	0.1	1.2	0.4	0.9	0.8	0.1	1.1
	PHT L6 centre N side by platform	71	1.7	1.1	1.0	1.8	2.1	4.4	2.5	1.9	1.8	2.1	0.7	0.0	0.4	0.4	0.2	0.0	0.1	1.3	1.0	0.1	0.4	0.9	0.4	0.3	0.8	0.6	0.8	1.4
	PHT L6 centre N side on platform	72	0.3	0.5	0.1	0.2	6.6	10.1	3.2	0.5	0.9	1.5	0.0	0.8	0.2	0.1	0.1	0.0	0.2	0.7	0.4	0.0	0.3	1.2	0.4	0.1	0.7	0.4	0.5	1.6
	PHT L6 centre between towers	73	2.9	0.9	0.7	1.2	2.9	6.5	2.7	0.9	2.0	2.3	0.6	0.5	0.1	0.2	0.4	0.3	0.0	1.5	0.8	0.9	1.7	0.8	0.1	0.2	0.8	0.9	0.2	2.1
	PHT L6 new N side centre	74	1.6	3.7	2.1	0.1	0.7	2.4	2.9	1.3	0.4	2.0	0.1	1.2	0.3	0.2	0.1	0.1	0.1	0.9	0.3	0.0	0.5	0.1	0.1	0.4	0.4	0.5	0.8	1.2
	PHT L6 new E side centre	75	3.1	2.7	0.6	2.5	4.5	4.2	0.8	2.4	1.8	0.8	1.3	0.2	0.5	0.6	0.0	0.5	0.3	0.6	0.3	0.1	0.3	0.1	0.1	0.4	0.1	0.8	1.0	1.2
	PHT L6 new S side centre	76	0.4	2.2	2.5	1.2	0.6	0.1	1.2	1.8	0.9	0.1	0.1	0.0	0.4	0.1	0.1	0.2	0.4	0.5	0.7	0.0	0.6	0.2	0.2	0.2	0.4	0.6	1.2	1.0
	L6 centre S side old PHT by elevator	77	3.1	1.9	0.1	0.3	7.4	12.9	4.3	0.1	0.3	0.6	0.1	1.0	0.1	0.3	0.1	0.5	0.2	2.0	1.6	0.4	0.3	0.6	0.6	0.7	1.3	0.3	3.8	0.4
PHT Level 6 Inside Silo Top	L6 inside doorway to top RM silo room	78	7.6	5.4	4.7	1.7	0.6	1.5	2.4	2.8	0.0	1.8	0.0	1.2	6.5	4.1	1.9	1.3	2.7	2.1	4.5	2.6	0.1	0.0	0.9	2.0	0.3	0.5	1.7	0.1
	RM Silo top inside centre	79	0.6	0.6	2.2	6.7	5.4	4.7	2.7	0.2	2.9	3.0	1.3	2.8	7.0	4.1	3.1	2.3	3.9	0.5	4.1	2.7	0.9	0.9	0.9	2.7	1.7	1.3	0.2	0.6
	RM silo top inside E doors open	80	6.0	2.1	1.6	3.2	5.3	1.5	0.1	1.8	0.5	1.8	0.7	1.7	5.1	2.8	1.8	0.2	2.4	4.9	6.3	1.9	1.3	1.1	1.3	5.2	2.5	0.0	1.0	0.6
	L6 RM silo top room inside S man door	81	4.6	1.9	1.8	1.6	5.8	4.9	1.1	0.6	0.7	1.1	0.3	2.9	6.7	3.3	2.1	0.7	2.6	3.0	4.2	1.1	0.9	0.7	0.4	2.2	0.8	0.4	0.5	1.6
	RM silo top outside S man door	82	1.3	0.5	0.0	0.1	1.5	3.8	1.3	0.3	0.8	0.8	0.0	1.4	0.8	0.0	0.8	0.9	0.5	2.5	2.2	0.3	0.3	0.0	0.1	0.8	1.5	0.5	6.2	2.1
PHT Level 5	PHT Level 5 old centre S side by stairs	83	0.3	0.6	0.3	0.3	3.2	3.6	0.8	1.4	1.1	2.3	1.1	0.8	1.4	0.8	0.1	0.3	0.1	1.2	1.3	0.7	0.4	1.2	0.6	1.2	0.5	0.6	2.2	0.4
	PHT Level 5 old centre W side by gas valves @ 1m	84	1.7	0.5	0.6	0.3	2.4	4.3	2.3	1.1	1.9	2.4	0.8	0.9	1.0	0.1	0.5	2.0	3.0	1.3	3.9	3.3	5.5	5.3	2.0	2.1	1.2	4.6	8.7	1.8
	PHT Level 5 old NW corner @ 1m to stack	85	0.3	0.8	0.0	0.7	2.6	2.6	1.3	0.3	2.1	1.8	1.9	0.3	0.7	0.5	0.4	0.9	1.5	1.5	1.9	0.9	2.4	3.2	1.7	2.3	0.3	2.0	4.9	1.2
	PHT Level 5 old centre N side	86	3.5	1.5	0.8	0.6	2.6	0.2	2.0	1.2	1.9	3.1	1.5	0.1	0.1	0.3	0.1	0.4	1.2	0.4	0.6	0.5	0.7	1.2	0.5	0.9	1.0	0.6	2.7	0.0
	PHT Level 5 centre between towers	87	1.5	1.2	0.8	0.6	2.0	2.9	0.5	0.9	1.3	2.1	0.9	0.6	0.3	0.1	0.1	0.2	0.2	0.6	0.6	0.1	0.1	0.9	0.2	0.8	0.3	0.5	1.3	1.2
	PHT Level 5 New centre N side	88	0.6	2.0	0.1	1.7	0.6	2.3	2.7	2.2	1.1	1.3	0.8	0.6	0.3	0.3	0.1	0.4	0.4	0.1	0.1	0.1	0.3	0.4	0.6	1.3	0.1	0.1	0.7	0.8
	PHT Level 5 New centre E side above kiln	89	0.6	0.1	0.4	0.2	1.5	0.5	1.5	2.9	2.1	0.8	0.9	0.8	0.7	0.7	0.0	0.2	0.0	0.3	0.1	0.0	0.1	0.3	1.2	0.2	0.5	0.3	0.8	1.6
	PHT Level 5 New centre S side	90	1.1	0.1	0.3	0.5	1.4	0.0	0.6	2.2	1.7	0.4	1.1	0.3	0.4	0.1	0.5	0.5	0.6	0.6	0.7	0.3	0.3	0.7	0.9	0.1	0.3	0.1	0.9	2.0
PHT Level 4	PHT Level 4 old centre S side by stairs	91	0.5	0.1	4.5	8.5	1.3	4.4	2.0	0.5	1.8	2.9	1.8	0.3	1.2	1.0	0.6	0.5	0.3	0.3	0.8	1.4	0.3	0.3	1.1	0.3	0.5	0.1	0.8	1.2
	PHT Level 4 old SW corner by water pumps SV09 @ 1m N	92	0.7	0.1	0.9	2.8	0.4	2.1	0.7	0.5	1.3	3.0	3.0	0.4	1.4	1.0	0.0	1.0	1.8	0.3	1.6	1.8	0.3	0.7	0.9	0.3	0.4	0.2	0.4	1.1
	PHT Level 4 old centre W side	93	0.2	1.6	2.4	2.7	1.1	2.6	0.4	2.8	4.3	5.1	2.2	0.6	1.6	0.2	0.0	0.5	1.3	1.7	2.6	1.9	0.4	0.3	0.8	0.3	0.7	0.1	2.2	0.8
	PHT Level 4 old NW corner @ 1.2m to stack	94	0.3	0.6	0.2	1.1	0.9	3.3	1.8	0.3	4.1	3.3	1.5	0.3	0.9	0.0	0.0	1.2	2.3	1.3	2.1	1.2	0.8	1.0	0.3	0.3	0.4	0.0	2.9	0.1
	PHT Level 4 old centre N side	95	2.8	2.4	0.7	0.9	2.0	1.1	2.5	1.2	0.4	2.2	1.6	0.1	0.3	0.6	0.4	0.3	0.8	0.2	0.5	0.4	0.1	0.5	0.8	0.2	0.0	1.0	1.8	1.3
	PHT Level 4 centre between towers by air cannon @ 2m	96	1.3	1.6	1.3	2.1	0.8	4.6	3.6	0.8	0.6	2.2	2.1	0.2	1.2	1.5	0.8	0.1	1.0	0.1	0.8	1.2	0.1	0.0	0.6	0.2	0.2	0.3	1.1	1.0
	PHT Level 4 centre between towers by air cannon @ 2m	97	1.5	2.7	0.5	3.9	3.8	0.4	1.3	1.6	0.1	1.7	1.9	0.4	0.1	0.4	0.3	0.4	0.0	0.0	0.3	0.5	0.1	0.0	0.5	1.3	1.6	1.1	0.3	1.9
	PHT Level 4 new centre N side	98	0.4	3.3	1.8	1.8	1.3	1.6	1.8	2.5	1.1	1.3	1.4	0.1	0.0	0.5	0.3	0.4	0.4	0.1	0.1	0.6	0.2	0.1	0.6	0.5	0.7	0.6	0.6	1.3
	PHT Level 4 new centre E side above kiln	99	2.2	2.9	1.4	5.5	2.9	1.3	1.9	2.3	1.7	1.2	0.8	1.1	0.5	0.7	0.5	0.7	0.1	0.0	0.0	0.4	0.4	0.2	0.7	2.3	0.5	0.7	0.4	3.0
	PHT Level 4 new centre S side	100	0.9	1.5	1.9	5.9	2.8	2.1	2.7	1.3	1.6	0.1	0.9	0.3	0.0	0.3	0.6	0.7	0.5	0.3	1.0	0.0	0.1	0.2	0.4	0.3	0.7	0.6	0.3	1.4

Table 3.2A: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - Tonality in One-third Octave Band Spectra

Area	Source or location	File	Tonality dB in One-third Octave Band Centre Frequency - Hz																											
			31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
	Tonality Criteria		15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
ESP	ESP Centre E side top walkway looking E to PHT	101	0.4	0.5	2.2	3.5	2.4	0.8	0.4	2.4	3.1	3.0	0.1	0.3	1.0	0.6	1.3	1.8	1.4	2.1	1.7	0.5	0.6	0.5	0.1	0.8	0.4	1.6	0.8	0.9
	ESP top SE corner at barrier	102	1.0	1.6	2.4	2.3	1.0	1.3	0.1	2.0	2.6	2.6	0.0	0.0	0.4	1.2	0.1	1.1	1.3	1.4	1.5	1.1	0.4	0.2	0.8	0.0	0.5	0.6	1.2	0.8
	ESP top SE corner at barrier - facing ESP	103	1.5	1.4	1.7	1.3	0.3	1.7	0.4	3.2	2.2	3.1	0.5	0.9	1.0	1.0	0.5	0.3	0.7	1.1	0.5	0.1	0.1	0.3	0.8	0.4	0.2	0.8	4.3	0.6
	ESP top NE corner at barrier	104	0.9	0.0	4.2	6.0	2.3	1.5	0.5	2.6	2.9	3.4	1.2	0.3	0.5	0.8	0.3	0.8	1.2	2.2	1.9	0.8	0.9	1.0	0.0	0.5	0.5	0.7	3.3	0.4
	ESP top NE corner at barrier - facing west	105	0.4	0.1	3.1	3.9	1.6	1.6	1.6	1.5	1.2	1.8	0.7	0.4	0.3	0.4	0.8	0.1	0.4	1.7	1.0	0.6	0.5	0.0	1.5	0.6	0.9	0.3	1.7	0.2
PHT Level 3	L3 old PHT centre S side @ 2m to edge facing centre	106	0.9	2.3	5.3	8.3	1.6	3.3	0.3	1.6	2.2	3.9	2.4	0.3	2.3	3.5	4.5	4.8	0.3	1.5	0.6	0.0	0.2	0.1	0.4	0.0	0.8	0.4	1.3	0.8
	PHT Level 3 old centre W side above FA39 face E	107	0.6	5.8	8.2	8.2	1.9	1.9	1.7	2.8	2.4	3.5	1.9	0.7	1.3	1.0	1.2	0.2	1.5	1.1	1.8	0.3	0.5	0.2	0.2	0.8	0.8	0.8	0.4	1.5
	PHT Level 3 old centre N side	108	1.6	0.5	4.6	7.2	1.2	2.8	0.1	0.4	3.7	3.4	2.5	0.6	0.7	0.8	0.8	0.1	1.6	0.8	1.1	0.4	0.1	0.0	0.0	0.7	0.1	0.8	1.2	1.1
	PHT Level 3 old centre E side above kiln	109	0.8	0.3	4.6	7.2	2.0	3.1	2.4	0.8	0.8	1.5	1.7	0.5	0.3	0.8	0.5	0.1	1.1	0.5	0.4	0.4	0.5	0.6	1.2	1.1	0.2	0.5	1.4	0.8
	PHT Level 3 old NW corner by stack @ 1.5m, above FA39 inlet	110	0.1	2.3	2.6	3.7	1.2	1.6	1.1	1.6	2.2	1.9	1.5	0.5	1.7	1.3	1.0	0.3	1.7	1.5	1.8	0.8	0.4	0.5	0.5	0.5	0.9	0.5	0.8	0.7
PHT Level 2.5	PHT Level 2.5 by DC31 drives @ 0.6m	111																												
	PHT Level 2.5 by DC31 discharge @ 1m	112	0.7	0.7	5.6	9.3	1.7	1.7	0.7	2.8	0.6	2.4	2.1	1.3	2.0	1.4	1.3	0.6	0.6	0.9	1.3	0.7	0.0	0.1	0.4	0.5	0.6	1.5	0.1	1.3
	PHT Level 2.5 by centre by kiln entry W side	113	4.7	6.9	9.9	11.7	0.8	3.3	0.2	0.1	2.3	2.6	0.3	3.5	4.2	3.9	3.8	2.0	0.6	1.3	0.6	0.4	0.5	0.3	0.4	0.1	0.2	0.8	0.7	1.1
	PHT Level 2.25 by centre by kiln entry Air cannons	114	1.5	4.7	6.1	5.3	0.7	1.6	0.8	0.9	2.8	3.7	2.0	0.1	3.7	7.7	9.8	10.7	1.6	3.9	2.8	2.6	2.5	0.7	1.4	0.1	0.5	0.1	0.7	1.2
	PHT Level 2.25 North Side centre	115	1.7	0.2	8.3	12.1	2.0	7.2	0.1	1.6	2.6	2.3	0.0	1.4	1.6	3.0	4.6	3.9	0.6	1.3	0.3	0.4	0.6	0.7	0.9	0.1	0.7	0.2	1.7	0.4
	PHT Level 2.5 by Radicon Gbox drive E end @ 2.5m	116	1.2	2.5	6.6	8.2	0.7	3.0	0.8	1.2	1.8	3.1	0.2	0.1	1.2	3.8	5.6	7.8	1.0	4.6	4.0	2.7	1.5	0.3	1.2	0.0	0.5	1.1	0.7	1.5
	L2.25 PHT centre W side facing fan discharge DC70 FA63 @ 4.66m, stack @ 6.35m and stack entry duct @ 6.23m	117	4.7	3.2	9.0	15.1	1.9	5.0	2.3	1.6	4.6	6.7	2.0	1.5	2.3	3.9	4.1	3.4	0.1	1.4	0.6	0.5	0.6	1.0	0.4	0.0	0.4	0.7	1.2	0.8
PHT Level 2	PHT Level 2 by E side drive coupling & casing DC70 FA03 centre N side	118	0.9	3.6	4.3	2.9	2.1	1.8	1.7	2.0	2.6	4.0	1.0	0.0	1.5	5.2	6.1	6.7	2.6	1.5	0.7	0.0	0.2	2.8	2.7	1.0	0.0	0.4	2.2	0.3
	L2 PHT FA03 casing @ 1m E side	119	1.3	1.0	6.4	9.4	2.3	1.6	0.4	1.1	3.6	5.3	2.1	0.3	3.1	6.3	5.4	4.3	1.7	0.2	0.7	1.8	0.1	1.2	1.0	0.8	0.5	1.0	1.5	1.1
	PHT Level 2 FA03 discharge @ 1.5m	120	1.5	0.9	9.4	13.9	0.5	1.6	1.2	0.1	2.1	3.0	0.7	1.7	1.4	1.1	1.9	2.5	0.2	0.0	1.6	1.1	0.6	1.3	0.5	0.7	0.3	0.8	0.8	1.2
	PHT Level 2 @ 1m to south side FA39 stack entry duct	121	1.4	1.2	8.5	11.2	0.3	5.2	0.5	2.1	4.6	5.3	0.8	1.9	3.0	2.9	1.7	0.6	1.9	1.0	0.3	1.1	0.7	1.5	0.5	0.5	0.3	1.0	1.1	0.8
	PHT Level 2 FA65 inlet filter @ 1m in front	122	3.7	1.4	5.7	10.4	0.3	6.1	3.8	1.1	1.3	0.5	1.8	0.2	1.2	5.0	5.1	3.3	0.5	1.6	0.1	1.0	0.9	1.7	0.3	0.4	0.5	0.5	0.9	0.6
	PHT Level 2 FA65 rear side 1m	123	1.8	1.7	7.3	13.6	2.0	6.1	2.2	1.5	4.0	3.6	0.3	1.0	1.6	3.6	4.6	4.1	0.3	1.9	1.1	3.8	2.3	1.2	0.1	0.4	0.2	0.9	1.4	0.3
	L2 PHT centre N side edge @ 2m facing centre	124	1.2	1.8	6.6	7.7	1.3	2.2	1.1	3.0	1.7	3.4	1.3	1.8	3.3	4.3	4.1	2.7	0.3	0.3	0.8	2.1	1.6	1.4	0.4	0.8	0.9	0.2	1.8	2.0
	PHT Level 2 @ 1m to north side FA39 stack entry duct	125	1.5	2.0	7.6	7.6	1.1	3.4	1.3	2.6	6.5	6.3	0.4	2.7	2.0	0.7	2.2	2.3	0.1	1.0	0.8	1.2	0.3	0.3	0.0	0.5	0.3	0.6	1.2	0.3
	PHT Level 2 FA65 inlet filter @ 1m in front	129	2.9	0.5	5.3	9.6	1.4	1.8	0.0	0.4	1.1	0.5	2.1	2.6	2.1	3.3	4.3	4.3	0.6	1.8	0.2	2.1	0.4	0.8	0.4	0.7	0.4	0.6	0.4	1.0
	PHT Level 2 FA65 rear side 1m	130	2.6	1.9	7.0	13.1	0.3	4.8	0.1	0.4	2.7	2.5	0.2	0.2	0.8	2.0	4.8	5.4	1.3	0.8	0.8	2.1	0.8	0.9	0.3	0.6	0.9	0.7	1.2	0.5
	PHT Level 2 @ 1m to north side FA39 stack entry duct	131	1.2	2.1	10.2	10.5	1.3	3.8	0.3	1.1	5.4	3.8	1.6	2.3	0.8	0.1	0.8	0.1	1.5	0.8	0.9	0.3	0.0	0.7	0.2	0.3	1.1	0.6	0.5	2.1
PHT Level 1 Ground	PHT Level 1 RM silo base blower room N side man door @ 1m	132	1.0	1.4	3.7	5.9	2.8	4.6	8.0	5.0	6.1	3.6	0.8	0.3	0.4	2.8	2.9	0.7	3.5	0.0	2.1	2.0	1.6	2.5	0.4	0.4	0.8	0.3	0.9	1.9
	PHT Level 1 FA92 silo vent fan casing & drive @ 1m NW side	133	2.9	0.7	1.1	1.6	0.3	1.0	0.4	0.8	1.1	1.7	0.2	1.3	0.5	0.7	1.8	2.4	0.4	1.1	0.1	0.5	0.1	0.8	1.7	0.9	0.9	1.4	1.6	0.6
	PHT Level 1 FA92 silo vent fan casing & drive @ 1m E side	134	3.2	0.8	2.7	5.0	3.4	0.1	1.9	0.2	1.0	1.2	2.6	3.4	0.0	0.4	2.3	2.9	0.6	0.0	0.5	1.6	2.1	1.9	3.1	2.2	1.5	1.4	0.0	1.6
	PHT Level 1 FA92 silo vent fan inlet duct @ 1m SE side	135	3.1	1.0	0.1	0.2	1.0	0.4	0.0	1.3	0.7	0.4	2.2	2.7	0.4	1.0	2.3	2.3	0.6	0.8	0.0	0.0	0.4	0.9	1.0	0.3	0.9	1.2	0.0	1.2
	PHT Level 1 FA92 silo vent fan inlet front @ 1m	136	3.9	0.6	1.1	0.8	1.6	1.2	2.7	2.3	0.1	0.2	0.5	1.0	1.6	0.0	0.7	0.7	0.1	0.3	0.5	0.4	0.2	0.3	0.1	0.0	0.4	0.7	0.5	1.4

Table 3.2A: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - Tonality in One-third Octave Band Spectra

Area	Source or location	File	Tonality dB in One-third Octave Band Centre Frequency - Hz																												
			31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
	Tonality Criteria		15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
FA38 & 39	FA39 E side at concrete line 5.4m to motor	137	0.8	2.6	3.6	5.7	2.0	1.1	1.3	1.7	4.2	4.2	1.1	4.5	2.9	0.8	2.2	2.4	7.1	2.1	4.3	0.2	0.6	2.2	1.0	0.0	0.4	0.8	0.8	1.3
	FA39 E side @2.3m in line with columns	138	0.5	5.2	5.1	5.1	3.2	0.6	1.2	0.3	5.6	3.3	2.1	5.1	2.8	0.4	2.6	3.1	9.6	0.9	4.1	0.5	0.5	2.2	0.5	0.5	1.0	0.4	1.1	1.2
	FA39 under discharge duct @ 1m	139	0.0	3.2	1.3	1.1	2.7	2.2	1.8	0.9	3.0	1.1	1.7	1.1	1.0	0.6	0.4	2.4	3.7	1.6	2.8	0.8	0.2	1.2	0.5	0.2	0.1	0.9	0.9	1.1
	FA39 E side motor platform @ 0.82m to coupling cover	140	2.7	6.2	5.0	4.2	2.8	0.9	2.2	0.4	3.1	0.8	1.7	2.8	0.8	2.5	0.0	3.0	7.3	0.5	3.0	2.3	2.8	4.3	1.6	0.3	0.9	0.7	1.0	1.3
	FA39 motor platform centre E side@ 1m	141	0.3	1.7	2.3	3.1	3.2	2.8	5.4	0.9	6.3	0.8	7.2	9.1	4.4	0.8	3.8	3.1	10.9	0.0	5.3	2.1	2.1	4.3	0.5	2.2	2.8	0.0	0.5	0.8
	FA39 motor platform centre E side@ 1m	142	0.3	2.2	3.0	3.2	2.9	2.8	5.6	1.1	5.8	1.1	7.7	9.7	4.5	0.7	3.4	4.5	11.7	0.3	6.3	3.2	1.9	3.7	0.7	1.4	2.2	0.2	0.8	1.1
	FA39 motor platform centre E side@ 1m & vent @ 0.5m	143	1.6	3.6	4.1	3.7	1.0	0.2	2.1	1.5	6.1	1.7	4.4	9.8	5.6	1.0	3.1	2.0	2.3	4.6	3.9	0.0	0.4	2.0	0.8	0.2	0.8	0.5	0.8	1.6
	FA39 motor N end @ 2.7 to end plates/stop button at line	144	1.3	4.5	5.3	5.0	1.9	1.2	1.2	1.4	3.7	2.3	2.6	5.6	2.9	0.9	1.3	4.1	7.3	1.9	4.5	1.8	1.4	2.7	0.5	0.8	1.6	0.3	1.1	1.3
	FA 39 N side on kerb	145	0.8	3.9	3.5	3.2	1.4	0.2	2.1	2.7	3.4	3.4	1.2	3.8	2.5	0.7	0.5	3.0	5.5	2.1	4.0	1.5	1.1	2.3	0.3	0.3	1.3	0.7	0.9	0.8
	FA39 W side at metal strip 5.25m to motor	146	0.8	2.1	4.2	4.3	0.5	2.2	0.4	2.1	0.6	0.1	0.5	1.0	1.2	0.8	0.7	4.6	3.9	5.0	4.1	0.8	1.1	2.9	0.9	0.6	1.9	0.1	0.8	1.1
	FA39 W side at columns @2.7m to plinth	147	0.1	2.5	4.5	4.5	1.1	1.9	1.2	2.1	1.8	0.4	2.0	3.4	1.6	0.3	0.6	2.6	4.1	3.9	4.8	2.7	1.5	2.4	0.9	0.6	1.6	0.2	0.8	1.3
	FA39 W side @ 1m to cladding door closed, 1.33m to casing	148	0.1	3.0	2.5	4.0	2.5	3.9	0.1	4.7	4.8	5.4	0.3	0.2	0.6	0.0	2.1	6.3	5.3	5.7	5.4	0.8	0.5	0.9	0.3	0.3	0.6	0.5	0.4	1.4
	FA39 W side motor platform at 0.8m to coupling cover & 1m to coupling	149	1.3	6.9	6.0	3.8	1.9	0.5	2.3	0.1	3.0	1.2	2.0	1.2	1.5	1.8	1.1	4.7	8.8	0.8	3.3	2.7	3.4	4.8	1.6	0.1	0.5	0.6	0.8	1.3
	FA39 S side @ columns 2.7m to bearing	150	3.1	4.4	5.2	7.1	2.1	2.1	0.7	1.6	2.6	2.8	0.0	1.2	2.0	1.4	3.2	4.6	1.3	4.3	3.1	0.1	0.5	0.3	1.8	0.4	0.9	1.4	0.6	0.7
	FA39 S side platform bearing cover @ 0.8m	151	0.4	3.0	3.4	3.5	1.0	1.8	2.1	1.9	1.1	0.5	0.8	1.5	2.4	4.2	1.2	2.6	0.8	4.5	2.8	0.3	0.5	0.2	0.7	0.2	0.3	0.5	0.8	1.1
	Centre between FA38 & FA39 @ 11.2m at line facing E	152	0.5	0.3	0.1	2.1	1.8	0.4	1.8	3.1	1.3	1.3	0.4	0.7	0.6	0.5	0.1	3.9	4.3	6.4	5.8	0.6	0.1	1.3	0.0	0.4	0.6	0.2	1.4	0.9
	Centre between FA38 & FA39 @ 7.7 m facing FA 38	153	0.9	1.1	0.6	0.5	0.4	1.5	1.0	2.9	1.6	1.2	1.3	1.6	0.7	0.5	0.6	3.6	4.1	6.7	5.8	0.4	0.1	0.3	0.6	0.5	0.3	0.1	1.1	0.6
	FA38 @ 3.9m to E side	154	4.9	3.6	0.7	2.4	1.8	0.8	1.6	2.8	2.6	2.6	0.1	0.7	0.8	1.3	0.3	5.9	4.4	8.9	6.2	0.6	0.5	0.0	0.6	0.5	0.5	0.3	0.8	0.5
	FA38 @ 3m to N side	155	3.7	1.2	0.6	2.7	1.7	1.8	0.4	1.3	4.3	3.6	0.3	0.2	1.1	0.7	0.7	4.4	4.3	5.6	5.3	0.4	0.5	0.5	0.2	0.4	0.6	0.3	0.5	0.6
	FA38 @ 5m to NW side at NW column	156	0.0	0.5	0.6	0.0	0.1	0.8	0.4	0.7	2.5	2.0	0.2	0.5	0.3	0.2	0.1	3.6	2.8	6.8	5.0	0.3	0.6	0.2	0.2	0.9	0.3	0.0	1.4	1.0
	FA38 @ 5m to NW side at W column	157	3.3	0.4	1.9	1.3	0.8	1.8	0.4	1.0	2.1	3.0	1.0	1.3	1.2	0.6	0.5	6.5	7.7	4.0	5.1	0.3	0.8	0.5	0.3	0.5	1.1	0.2	0.8	0.4
	FA38 @ 5m to W side at W column	158	3.3	0.4	2.1	1.5	0.3	1.3	0.2	1.1	1.9	2.3	0.3	0.9	0.5	0.1	0.6	5.1	4.3	7.0	6.1	0.3	0.9	0.5	0.2	0.8	0.8	0.3	1.2	0.5
	In centre opening of wall on W side	159	2.0	0.6	2.9	4.4	3.1	0.5	1.1	1.8	2.6	3.5	0.4	1.8	1.7	1.5	0.5	3.4	1.7	7.8	5.7	0.2	0.7	0.1	0.5	0.1	1.1	0.3	0.8	0.9
	FA38 motor platform W side @ 1m to coupling cover, 1.9m to casing, 0.7m to motor side	160	2.5	0.7	1.5	3.0	0.8	0.6	1.2	0.6	2.8	2.1	0.2	1.5	0.6	1.1	0.8	5.9	5.1	8.6	9.4	3.0	0.7	1.2	1.1	0.3	0.5	0.1	0.9	1.1
	FA38 at opening on S side of road facing FA38 opening	161	0.6	0.1	2.1	2.8	1.4	0.9	1.4	1.7	2.2	2.9	0.3	1.3	2.0	2.1	0.3	3.4	3.2	4.2	3.9	0.2	0.2	1.2	0.2	1.4	0.0	0.5	2.7	0.4
	56 Road kerb N side opp E side RM6	8	0.9	0.9	2.2	1.4	8.7	15.7	4.5	0.8	0.7	0.6	1.4	3.1	1.6	1.9	1.6	4.7	0.2	1.5	2.7	0.4	0.6	0.4	1.0	0.6	0.1	0.3	3.1	0.3
	56 Road kerb N side opp E side RM6	162	0.4	0.5	1.1	2.7	1.7	1.7	0.8	1.9	2.6	4.0	0.4	2.1	1.9	1.3	0.3	2.7	2.2	4.6	4.0	0.6	0.5	0.9	0.1	1.2	0.0	0.0	2.0	1.6
	56' Road kerb N side opp. Opening to FA38	9	0.9	0.5	1.4	3.2	9.1	14.3	4.5	0.8	1.3	3.1	0.8	3.7	2.4	2.2	2.8	3.5	5.1	0.5	2.1	0.1	0.6	0.8	0.5	2.0	0.7	1.0	2.2	1.3
	56' Road kerb N side opp. Opening to FA38	163	0.7	1.3	2.6	3.4	1.6	0.4	0.6	1.7	2.8	5.0	1.4	3.3	2.6	0.8	0.3	3.6	3.8	2.9	3.0	0.1	0.2	0.5	0.0	0.6	1.0	0.4	0.8	1.5
	57 Road N side opp FA38 doorway	10	0.6	0.9	2.9	6.1	7.0	9.0	4.7	0.4	2.3	3.6	0.8	4.0	2.6	0.9	1.3	3.6	6.0	0.0	2.0	0.7	0.9	1.6	0.1	0.2	1.3	1.2	0.9	0.7
	58 Road N side between FA38 & FA39	11	0.3	0.5	1.1	2.4	2.8	4.3	3.4	1.5	2.0	2.1	0.1	2.3	1.5	0.5	0.4	1.8	5.1	1.1	3.1	1.4	1.7	2.5	0.5	0.5	0.9	1.1	1.7	0.7
	59 Road N side kerb opp end FA39	12	2.5	2.7	0.4	0.7	4.1	7.2	4.1	0.3	3.6	2.8	0.4	3.6	2.3	0.4	0.3	4.5	8.7	0.8	2.7	1.1	1.5	2.2	0.8	0.1	1.3	1.6	0.8	1.1
	59 Road N side kerb opp end FA39	13	3.0	2.9	0.3	0.8	2.8	4.6	3.8	0.0	4.9	3.6	0.0	2.7	1.5	0.9	0.6	4.7	8.9	1.0	2.8	1.5	1.8	2.6	1.0	0.3	1.3	1.8	0.5	1.8
RM6 West side	1 RM6 W door @ 1m	164	2.8	2.8	1.1	2.4	0.1	0.3	1.7	1.4	3.7	2.7	0.2	1.0	3.8	4.3	0.3	0.3	0.3	2.3	1.8	0.8	1.3	0.9	0.6	0.3	0.5	0.3	0.7	0.8
	1' RM6 W door at kerb W side @ 13.3m	165	0.9	1.3	0.8	0.3	0.0	0.5	0.4	1.4	5.1	3.9	0.2	3.5	4.5	3.2	0.1	0.6	0.4	1.4	0.8	0.4	0.3	0.4	0.4	1.0	0.1	0.7	0.4	0.7

Table 3.2A: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - Tonality in One-third Octave Band Spectra

Area	Source or location	File	Tonality dB in One-third Octave Band Centre Frequency - Hz																											
			31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
	Tonality Criteria		15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
RM7 ground level	1 RM7 at roadside kerb ~32m	166	0.6	1.0	0.9	1.6	0.6	0.5	2.9	2.5	3.5	2.3	1.1	1.1	1.2	1.1	0.3	0.3	0.0	1.0	0.4	0.1	0.8	0.2	0.3	0.9	1.1	0.3	0.7	0.8
	2 Rm7 @ 15.5m to W door	167	0.2	0.4	0.3	0.2	0.3	0.7	2.1	2.8	2.8	2.4	1.7	2.5	2.0	0.7	0.8	0.3	0.0	0.5	0.0	0.1	0.6	0.2	0.2	0.9	0.4	1.0	1.1	0.2
	3 RM7 W wall door @ 1m	168	1.6	1.6	2.2	2.4	0.5	2.2	3.8	1.6	2.4	0.6	1.6	1.9	1.0	0.1	1.7	0.7	1.3	0.7	0.3	0.7	1.4	0.5	0.0	0.5	0.7	0.9	0.8	1.8
	4 RM7 NE corner wall vents @ 1m	169	0.1	0.3	0.3	1.8	1.1	0.0	2.0	2.2	2.2	1.2	1.4	1.6	1.2	1.1	0.6	0.3	0.8	0.9	0.4	0.5	2.3	0.2	0.0	0.6	0.3	0.5	0.4	2.3
	4 RM7 NE corner wall vents @ 1m	170	0.6	0.6	0.8	2.1	1.4	0.4	1.8	1.5	2.5	1.3	1.6	1.7	0.0	0.2	1.3	0.7	0.1	0.8	0.4	0.3	1.7	0.0	0.1	0.8	0.0	0.3	0.8	1.0
	5 RM7 N side NW roll door @ 1m	171	0.4	0.4	0.5	3.6	1.3	1.4	1.4	2.3	1.3	1.0	0.9	1.8	1.5	1.1	0.4	0.8	0.9	0.7	0.5	0.3	0.3	0.9	0.4	1.1	0.1	0.2	1.3	1.2
	6 RM7 N wall vents centre next to Roll door	172	1.0	1.1	1.5	0.6	0.3	1.7	3.3	2.1	2.2	1.8	0.1	0.9	0.4	0.3	1.0	0.3	0.3	0.6	0.3	0.7	1.5	0.3	0.1	1.2	0.0	0.7	0.2	1.6
	RM7 vents N wall W of man door	173	0.7	0.5	2.6	1.3	2.5	2.0	2.4	2.6	2.5	2.5	1.9	4.3	2.3	0.5	1.1	0.7	0.0	1.1	0.8	0.3	0.9	0.9	0.2	1.8	0.8	0.5	1.2	1.1
	7 RM7 N wall man door	174	1.0	0.0	1.2	0.3	2.5	2.8	2.5	1.8	2.3	1.9	0.9	1.0	0.6	1.5	0.5	1.5	0.4	1.3	0.3	0.5	1.1	0.0	0.3	0.9	0.5	0.6	0.8	1.2
	8 RM7 E wall vents NE corner @ 1m	175	0.1	0.8	2.7	6.0	1.2	1.9	2.0	2.8	2.5	2.7	0.6	1.6	1.6	1.6	0.8	1.2	0.8	0.6	0.6	0.2	1.3	0.0	0.1	0.4	0.0	1.2	0.3	2.1
	9 RM7 E side under duct	176	1.4	1.2	1.5	0.3	0.6	0.9	0.0	2.8	1.8	3.0	0.1	1.3	0.9	0.2	1.2	1.5	1.3	0.6	0.6	0.0	0.0	1.4	0.1	0.4	0.8	0.6	1.2	0.9
	10 RM7 By E door RM7 floor	177	0.5	0.7	0.2	3.8	1.8	0.8	2.5	3.3	2.2	1.0	2.3	2.3	1.3	0.5	1.1	1.8	1.6	0.5	0.5	0.5	0.0	2.1	0.4	0.1	1.0	0.3	1.5	1.1
	10' RM7 By E door Hydraulics room closed	178	1.5	0.0	1.2	0.8	0.7	0.5	1.5	2.9	0.1	1.1	0.5	0.6	1.1	1.0	0.6	0.5	2.8	1.3	0.2	0.2	0.2	0.5	0.1	0.6	0.3	1.0	0.8	1.3
	11 RM7 Centre Compressor room door @ 1m closed	179	2.7	1.2	0.9	1.4	0.1	3.6	0.6	4.2	0.1	0.0	1.0	0.9	0.9	0.5	0.5	0.9	1.7	0.7	0.4	0.2	0.0	0.0	0.6	0.0	0.1	1.2	0.2	1.7
	11A RM7 compressor room W door @ 1m closed	180	0.4	0.2	0.7	2.1	0.2	2.8	0.0	2.3	1.2	0.7	0.5	0.4	0.2	0.5	0.6	0.5	1.0	0.2	0.5	0.5	0.3	0.5	0.6	0.2	0.9	1.2	0.1	1.8
	12 RM7 Under E inlet for switchroom fan	181	1.4	0.3	0.6	0.8	1.7	2.5	0.3	4.4	7.4	3.4	7.8	6.1	1.3	1.8	1.2	0.2	1.1	0.6	0.2	0.7	0.1	0.2	0.2	0.3	0.8	1.1	1.8	1.2
	12 RM7 Under E inlet for switchroom fan rattling cowling	182	1.2	0.8	1.4	0.5	1.9	2.9	0.1	4.3	7.2	3.2	7.3	6.0	0.2	0.6	0.3	0.1	0.4	0.5	0.9	0.6	0.6	0.3	0.6	1.0	0.4	0.1	1.2	0.8
	12B Under switchroom fan duct W	183	0.9	0.1	0.1	1.0	0.5	3.1	0.9	5.5	4.5	0.7	6.0	5.0	0.0	0.6	0.3	0.5	1.0	0.3	0.4	0.8	0.7	0.8	0.1	0.1	0.9	0.1	1.6	0.1
	12 RM7 E inlet for switchroom fan @ 1m to N side and 0.6m below	184	0.1	0.3	0.5	2.2	0.6	2.6	0.4	4.6	0.5	2.6	4.7	2.1	0.4	0.1	0.2	0.9	1.7	0.3	0.6	0.7	0.1	0.5	1.4	1.6	1.7	0.8	0.2	0.6
FA249	13 FA249 under inlet duct W side	185	1.9	2.8	0.3	1.7	1.0	2.9	1.1	3.2	1.4	3.0	0.0	1.1	1.3	0.7	0.8	1.6	1.9	0.5	0.9	0.5	0.6	1.3	0.0	0.6	0.3	1.0	1.2	0.4
	14 FA249 2m W side ground level	186	2.1	1.0	0.2	2.1	1.9	0.4	4.0	5.6	1.8	2.4	0.3	1.4	2.0	1.0	0.6	2.6	4.2	0.9	0.7	0.4	0.4	1.2	0.0	0.6	0.3	0.8	0.7	0.9
	14' FA249 motor platform fan coupling & casing W side @ 1m	187	2.5	1.2	3.1	2.7	1.6	0.1	3.8	5.2	2.6	4.6	1.0	1.1	0.9	0.2	0.7	1.8	2.9	1.2	0.9	0.5	0.7	1.8	0.3	0.1	0.5	0.1	0.9	1.2
	15 FA249 1m motor end	188	0.7	0.0	2.2	0.1	0.3	0.7	0.6	0.0	2.1	1.6	0.1	0.3	0.1	0.0	0.5	1.9	3.4	0.7	0.4	0.1	0.2	1.1	0.3	0.2	0.4	0.5	0.5	1.3
	16 FA249 end at column 4.3m N of motor plinth	189	2.8	0.3	0.6	5.3	2.4	3.5	2.5	0.9	3.5	3.8	0.3	0.9	0.4	0.0	1.2	2.3	3.2	0.2	0.9	0.5	0.4	1.1	0.2	0.4	0.7	0.6	0.4	1.1
	17 FA249 motor platform E side coupling & casing 1m	190	4.1	3.9	3.6	2.6	0.1	0.4	4.4	5.8	2.3	3.1	0.3	0.8	0.3	1.9	1.8	1.6	2.2	0.7	1.7	0.9	0.5	1.2	0.7	0.4	0.4	0.7	0.4	1.2
	18 FA249 Platform S side centre @ 1m	191	0.1	2.8	1.1	3.0	2.2	1.1	2.3	5.5	1.2	2.1	0.1	0.5	0.4	1.0	1.1	0.1	0.3	0.0	0.0	0.3	0.7	2.2	1.4	0.4	0.7	1.5	0.5	0.4
	18' FA249 platform S side under discharge duct E side	192	0.1	1.4	2.3	0.9	1.9	1.1	0.3	4.7	1.7	3.0	1.2	0.3	1.1	1.2	1.3	2.3	3.8	0.0	1.9	1.0	0.5	1.3	1.4	0.9	1.3	0.5	0.5	1.6
	18' FA249 platform S side under discharge duct E side	193	0.3	2.0	2.3	1.7	1.3	0.8	0.6	4.4	1.5	2.6	0.9	0.4	0.1	0.6	1.5	1.9	2.8	0.9	2.2	1.2	0.6	1.3	1.5	1.0	1.2	0.1	1.9	0.9
	19 FA249 S side @ 3.8m	194	1.7	0.1	0.5	0.9	1.9	0.5	1.3	4.2	1.5	2.1	0.3	0.5	0.6	0.1	0.1	0.9	2.0	0.0	0.6	0.4	0.3	0.4	0.0	0.5	1.1	1.0	0.9	0.1
	19 FA249 S side @ 5.5m	195	0.9	0.8	0.2	0.1	1.0	0.3	1.2	3.1	0.6	1.3	0.4	0.8	0.2	0.0	0.3	1.2	2.2	0.1	0.5	0.1	0.3	1.1	0.7	0.3	1.1	1.2	1.0	0.2
	20 FA 249 S side @ 10.9m	196	0.2	1.3	1.5	2.6	1.9	0.0	0.4	2.8	0.8	2.0	0.3	0.6	0.3	0.1	0.1	0.8	1.7	0.0	0.4	0.0	0.3	0.3	0.1	0.1	1.1	0.8	1.0	0.3
	21 FA249 E side of fan casing ground level @ 2m	197	1.9	0.7	0.6	1.1	1.6	0.4	2.9	4.9	1.7	3.4	0.6	0.3	0.3	0.1	0.1	1.7	3.4	0.5	0.8	0.3	0.0	0.5	0.2	0.2	0.7	1.5	5.5	0.5
FA250	22 FA250 S side 4.2 m to motor end	198	3.1	1.5	1.1	3.9	1.1	0.7	2.5	3.3	2.0	2.9	0.3	1.6	0.9	0.7	0.4	1.1	1.6	0.1	0.5	0.5	0.6	0.5	0.4	0.9	0.1	0.7	1.3	0.2
	22' FA250 Motor end S side @ 1m	199	2.4	1.0	2.0	1.8	1.1	1.5	0.0	2.3	2.4	3.5	0.7	0.5	1.2	1.5	0.0	1.1	1.6	0.2	0.1	0.3	0.6	1.0	0.1	0.6	0.1	0.8	0.9	0.7
	23 FA250 E side platform coupling & casing	200	0.3	0.8	4.5	2.7	1.0	0.1	2.6	2.8	4.0	4.7	1.3	0.3	0.0	0.7	1.1	1.2	2.0	0.7	0.1	0.0	0.6	1.7	0.3	0.3	0.0	1.1	0.7	0.9
	23' FA250 E side centre motor @ 1m	201	1.3	0.3	3.1	1.0	0.0	0.4	4.0	4.5	5.3	5.2	0.1	0.2	0.2	0.8	0.0	1.0	1.2	0.4	0.6	0.0	0.9	1.3	0.5	0.2	0.3	1.3	0.7	1.0
	FA250 W side motor shaft @ casing @ 1m	202	1.6	1.4	5.2	0.3	0.9	2.0	1.2	2.5	5.3	6.1	1.0	0.2	1.2	1.5	0.9	0.8	2.0	0.8	0.1	0.3	0.9	1.6	0.2	0.1	0.7	0.5	0.9	0.6
	25 FA250 coupling & casing W side motor centre @1m	203	2.8	1.0	5.0	0.2	0.8	1.9	1.2	2.3	5.3	5.0	0.0	0.1	1.1	0.7	0.8	0.9	1.6	0.7	0.3	0.7	1.0	1.8	0.3	0.2	0.6	0.7	0.9	0.6
	26 FA250 W side casing @ 1m & coupling @ 3m	204	2.0	0.0	1.2	1.1	0.0	1.9	2.6	4.5	4.0	4.2	0.7	1.4	1.0	0.8	0.8	1.9	2.4	0.2	1.5	1.1	0.5	1.0	0.5	1.6	0.8	1.1	1.2	0.8
	26 FA250 W side casing @ 1m & coupling @ 3m	205	1.8	0.2	1.3	0.5	0.5	2.0	1.8	3.6	3.3	3.0	1.0	1.0	0.4	0.3	1.1	2.4	3.4	0.7	1.2	1.1	0.6	1.0	0.5	1.6	0.7	1.2	1.3	0.8
	27 FA250 W side 1m under inlet casing expansion joint	206	0.0	0.5	1.1	1.5	1.1	1.1	1.5	2.8	2.6	1.7	0.8	0.5	1.5	3.2	1.8	3.2	0.9	1.1	1.0	0.5	0.1	0.1	0.6	0.4	1.1	1.8	1.6	2.5
	28 FA250 N side casing shaft platform @ 1m	207	3.9	4.0	0.3	2.4	2.0	1.6	1.3	3.4	4.1	4.5	1.7	3.4	2.1	1.8	0.5	1.3	0.5	0.3	1.2	1.3	0.5	0.6	0.4	0.2	0.1	1.1	1.5	1.2
	29 FA250 E side under discharge duct @ 1.5m, at lower step of concrete	208	1.4	2.2	0.5	1.7	0.4	4.4	0.4	4.6	5.8	6.7	0.3	1.7	1.5	1.3	1.1	2.1	0.5	0.6	0.2	0.1	0.1	0.8	0.9	0.6	1.2	1.2	1.2	0.0

Table 3.2A: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - Tonality in One-third Octave Band Spectra

Area	Source or location	File	Tonality dB in One-third Octave Band Centre Frequency - Hz																												
			31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
	Tonality Criteria		15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
RM7 Roof Platform lower	Lower platform E side 1m to Magnete plate	209	0.6	1.2	2.8	0.9	3.6	4.1	3.8	2.8	0.4	0.9	2.3	1.0	0.4	1.3	0.5	0.2	0.5	0.3	0.2	0.0	0.3	0.3	0.1	0.8	1.4	0.8	1.5	1.4
	Lower platform S side @ 1m to magnete plate	210	0.7	1.9	1.7	0.4	3.2	4.3	1.3	1.3	4.2	7.3	4.5	0.7	1.5	1.0	0.8	0.3	0.8	0.4	0.1	0.5	0.2	0.8	0.3	0.4	2.2	0.5	0.6	0.9
	Lower platform W side @ 0.9m to magnete plate	211	0.4	0.1	0.6	0.3	3.1	6.8	6.4	3.9	0.5	1.9	2.5	0.5	0.4	1.2	0.6	0.5	0.1	0.3	0.5	0.8	0.3	0.8	0.2	0.2	1.8	1.2	1.4	0.3
	Lower platform N side @ 2m to magnete plate (scaffolding)	212	0.5	0.5	1.8	0.2	3.2	3.6	2.5	3.2	0.8	1.0	1.4	0.8	0.0	0.2	0.1	0.1	0.0	0.3	0.4	0.1	2.1	0.0	0.4	0.2	1.3	1.0	1.8	0.0
	Lower platform N side @ 1m to BE casing	213	0.3	0.8	2.1	1.5	4.6	3.8	2.3	1.3	2.8	2.3	0.2	0.0	0.4	0.3	0.5	0.9	1.3	0.6	0.2	0.8	2.0	0.7	0.0	0.3	1.2	1.5	1.1	1.1
	Platform S of Magnete 2m to S side	214	1.3	1.1	0.4	0.3	1.8	2.6	2.5	2.6	0.1	1.2	1.6	0.7	1.1	1.3	1.4	0.7	0.8	0.7	0.5	0.2	0.1	1.6	0.3	0.4	1.9	1.1	1.5	0.9
RM7 Roof platform Upper	Upper Platform Gbox @ 1m E side & 0.5m casing	215	1.3	0.4	1.5	1.0	0.6	1.9	2.7	1.7	0.6	0.5	0.8	0.5	0.1	0.3	1.7	3.3	1.1	0.3	0.6	0.0	1.1	0.5	0.0	0.1	1.3	0.8	0.1	0.3
	Upper Platform Gbox @ 1m N side	216	2.6	0.8	5.1	0.8	1.3	1.5	1.4	2.2	1.3	1.8	1.6	1.4	0.0	0.4	1.4	3.8	1.6	0.6	1.1	0.0	1.1	0.6	0.0	0.0	2.0	0.5	0.3	0.7
	Upper Platform Gbox @ 1m N side	217	1.4	0.6	1.4	0.3	0.3	1.6	1.6	2.5	1.8	2.1	1.9	1.8	0.2	0.5	0.3	2.1	1.1	0.5	0.5	0.5	1.4	0.8	0.0	0.5	0.8	0.3	0.1	0.1
	Upper Platform motor end @ 1m W side	218	1.1	0.8	2.0	0.8	4.1	5.5	3.9	3.3	0.5	1.3	1.1	0.6	0.3	1.0	0.7	0.5	0.1	0.3	1.0	0.9	0.9	0.3	0.5	0.3	0.9	0.5	0.6	0.1
	Upper Platform BE casing @ 0.9m W side	219	1.8	0.1	1.6	0.6	3.6	7.0	4.4	2.5	1.4	1.3	1.8	0.5	1.1	1.5	1.0	0.1	0.1	0.3	0.3	0.2	1.2	0.5	0.0	0.0	1.0	1.4	1.6	0.3
	Upper Platform BE casing @ 1m S side	220	0.2	0.8	1.1	1.6	2.0	1.8	1.7	2.0	0.5	1.5	3.8	2.4	0.5	1.9	1.0	0.2	0.2	0.3	0.3	0.0	0.8	0.4	0.1	0.1	1.2	1.9	1.4	1.3
	Upper Platform BE casing @ 1m E side	221	0.6	0.3	1.3	3.0	0.7	0.8	2.0	2.0	2.0	1.7	2.4	3.2	1.3	0.4	1.2	0.9	0.7	0.1	0.5	0.2	0.7	0.4	0.3	0.1	0.7	2.2	1.5	1.3
RM7 Baghouse Tower	On tower to baghouse top S side above FA249 same level as roof RM7	222	0.8	0.5	1.4	1.3	0.3	3.1	0.4	3.1	0.4	0.5	1.4	0.5	0.2	0.4	0.0	1.9	3.2	0.3	1.1	0.4	1.1	2.3	0.7	0.6	0.5	0.9	0.8	0.6
	On tower to baghouse top S side above FA249 halfway up level	223	0.0	1.3	0.0	0.1	1.5	4.5	3.5	0.6	1.3	1.7	0.2	0.4	0.5	0.7	0.4	1.6	3.3	0.3	1.6	0.7	0.6	1.1	0.3	0.4	0.7	0.9	0.9	0.9
	On tower to baghouse top S side above FA249 top level	224	1.1	2.2	0.9	1.7	0.9	1.4	0.6	2.2	0.9	0.1	1.2	1.0	0.3	0.8	0.6	0.3	0.9	0.2	0.7	0.0	0.4	0.6	0.6	0.9	1.1	0.0	1.1	1.5
	Baghouse S doorway open	225	1.1	0.5	0.1	0.4	0.2	1.1	1.2	2.6	0.5	1.1	1.4	1.9	0.3	0.0	0.2	0.2	0.0	0.7	0.0	1.0	0.9	1.3	0.4	0.3	0.9	0.2	1.1	1.3
	Inside centre baghouse top	226	2.9	3.7	2.4	4.5	2.3	1.1	0.5	2.4	0.4	1.0	0.6	1.3	0.2	0.1	0.1	0.3	0.2	0.7	0.5	0.5	0.3	1.4	0.2	0.1	0.7	0.4	0.7	1.2
Admin Roof	Admin roof NE corner	5	4.2	1.6	1.1	2.9	2.6	2.0	1.3	1.3	0.9	1.3	0.9	1.6	0.7	0.1	0.9	1.3	0.1	0.1	0.0	0.5	0.4	0.7	2.5	0.0	0.5	1.1	0.3	1.7
	Admin roof SE corner	6	3.2	1.3	1.8	2.7	0.9	0.6	1.1	1.2	1.3	3.1	1.8	1.6	1.1	0.5	0.4	0.2	1.2	0.4	0.3	0.5	0.3	0.3	0.2	0.0	1.5	2.0	0.5	2.2
	Admin roof SW corner	7	2.5	3.0	0.3	2.3	1.9	1.5	1.1	0.5	2.4	2.8	0.4	1.9	0.8	0.7	0.6	0.3	1.3	0.4	0.3	0.5	0.1	0.5	0.5	0.7	0.8	0.8	1.5	0.6
	SW corner	229	4.2	3.5	0.1	2.0	1.2	0.3	0.0	1.4	1.5	2.7	0.6	1.3	0.9	1.4	0.3	1.0	1.3	1.1	1.0	0.5	0.2	0.3	0.3	0.6	1.6	1.3	0.4	2.7
	SE corner	230	1.3	0.2	0.4	0.5	0.0	1.0	0.5	2.0	0.1	2.5	1.5	0.8	0.3	0.8	0.5	0.1	0.6	1.2	1.3	0.7	0.0	0.8	0.3	0.9	0.9	0.7	0.2	1.3
	NE corner	231	4.2	1.3	1.6	3.5	1.5	0.9	0.0	2.0	0.4	2.1	0.9	0.9	0.2	0.5	0.5	0.3	0.5	0.7	0.3	0.1	0.2	0.6	0.5	0.2	0.6	1.2	1.1	1.1
RM7 Baghouse hopper area	On screw conveyor SC212 platform Level 1 W end side by fan motor @ 1m	265	1.2	1.3	2.1	0.9	0.6	0.8	0.1	0.2	4.1	5.4	2.4	2.9	7.8	5.3	5.4	7.8	4.7	2.2	2.0	0.9	0.2	0.8	0.2	0.1	0.5	0.2	0.7	1.9
	Centre S side of screw in line with motor FA250	266	1.9	1.1	2.0	8.6	1.1	4.0	0.6	0.8	2.7	3.5	3.1	2.6	8.1	10.8	6.3	11.7	6.5	2.4	1.1	0.3	0.3	0.5	0.3	0.5	0.5	0.9	0.5	1.0
	Centre S side of screw by squeal point	267	1.8	0.5	2.0	6.8	2.8	3.2	3.4	0.3	1.7	1.7	0.2	0.1	8.9	9.1	8.5	12.0	3.8	1.1	0.6	1.1	0.4	0.3	0.4	0.6	0.4	1.3	0.6	1.5
	E end of SC212 body @ 2m and other N-S aligned screw	268	0.1	1.9	1.1	6.7	1.9	2.6	2.1	4.9	2.3	5.8	6.6	5.5	6.6	8.5	4.6	6.7	4.1	0.3	0.3	0.7	1.1	1.7	0.4	1.5	0.4	0.3	1.1	1.0
	Main platform of baghouse hopper screws S end chute W side between SC211 & gate valve	269	0.3	1.0	2.9	0.9	0.4	0.5	1.3	1.7	2.5	4.2	4.0	1.1	5.6	6.5	2.6	5.3	3.3	1.6	1.6	0.8	0.2	0.8	0.1	0.1	0.2	0.1	0.7	1.0
	Centre W side	270	0.7	1.3	0.4	3.9	1.5	1.0	2.3	2.8	3.8	2.9	0.7	0.9	4.9	5.9	1.4	3.1	1.7	1.3	0.6	0.7	0.5	0.9	0.7	0.7	0.1	0.1	1.0	0.9
	Centre E side - on	271	0.4	0.2	0.4	2.3	0.9	1.2	1.6	2.6	3.3	3.6	2.0	1.1	5.6	7.4	2.2	4.4	1.4	0.1	0.3	0.2	0.0	0.6	0.9	1.1	0.0	0.4	1.0	0.8
	N end Sc211 but S of duct	272	2.2	0.3	0.0	4.7	0.9	2.9	0.1	1.4	2.8	2.7	0.0	1.6	5.4	5.3	2.4	4.6	2.5	0.3	0.3	0.2	0.9	1.2	0.3	0.4	0.6	0.6	1.4	0.4
	By FA252 @ 0.8m shaft S side, casing & discharge box	273	1.3	4.8	6.8	2.3	1.7	4.0	3.2	0.7	0.1	1.3	1.3	0.6	7.1	5.8	3.8	6.3	3.2	0.3	0.4	0.5	0.1	0.1	0.0	1.1	2.2	1.4	0.1	0.8
	By FA252 @ 0.8m shaft N side, casing & inlet	274	2.6	3.1	6.2	3.7	1.4	4.3	2.0	0.3	0.0	4.5	12.5	4.8	8.4	8.0	3.3	7.8	4.9	1.5	1.4	1.6	0.4	0.5	1.2	0.8	1.0	1.2	0.3	0.4
	Baghouse hopper platform level N end	275	2.3	0.6	2.4	4.1	1.7	0.3	0.6	1.1	2.2	3.1	2.0	0.4	4.5	5.1	0.5	0.3	0.5	0.9	1.2	1.0	1.0	0.3	1.1	0.2	0.0	0.1	0.9	1.2
	Baghouse hopper centre platform	276	0.1	1.7	0.7	2.3	0.6	0.0	0.8	1.1	1.7	1.1	0.1	0.5	0.6	0.2	0.2	1.6	1.1	1.5	2.4	0.8	0.1	1.6	1.2	0.6	0.2	0.0	1.1	0.8
	By FA252 @ 1m to side discharge box top grill	277	2.5	7.6	7.0	1.0	0.6	5.4	3.0	1.1	1.1	2.3	7.3	2.0	5.3	4.2	3.1	5.0	2.6	0.4	0.2	0.1	0.4	0.6	0.0	0.6	1.4	0.3	0.9	1.5

Table 3.2A: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - Tonality in One-third Octave Band Spectra

Area	Source or location	File	Tonality dB in One-third Octave Band Centre Frequency - Hz																											
			31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
	Tonality Criteria		15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Coal Road South	30 Coal Road S side in line W side RM7	59	0.8	1.8	1.2	0.3	0.1	0.4	3.6	5.9	3.0	4.9	1.0	0.8	1.0	0.5	0.0	0.3	1.0	0.3	0.3	0.3	0.6	0.4	0.5	0.1	1.5	0.0		
	31 Coal Road S side in-line E side RM7	60	0.3	0.2	0.4	0.5	0.6	0.7	1.8	4.3	1.4	2.9	0.6	0.5	0.8	0.5	0.4	0.0	1.6	0.8	0.3	0.0	0.3	0.6	0.1	0.3	1.4	0.6		
	32 Coal Road S side in-line FA249	61	0.4	0.0	0.2	0.6	0.1	0.1	1.4	3.6	0.7	2.8	1.3	0.3	1.4	2.0	1.2	0.4	2.6	1.1	0.0	0.2	0.3	0.3	0.1	0.4	1.2	0.2		
	33 Coal Road S side Centre Blending Silo	62	0.9	1.6	1.2	1.1	0.2	1.5	2.3	1.5	1.6	1.1	1.6	0.5	1.8	1.6	0.9	0.4	1.4	0.6	0.3	0.1	0.3	0.4	0.1	0.3	1.4	0.6		
	34 Coal Road S side E side PHT	63	0.7	0.0	0.3	1.3	0.3	1.1	0.4	2.6	0.4	1.5	0.6	0.3	1.6	1.8	0.3	0.3	0.9	0.6	0.3	0.0	0.3	0.3	0.1	0.4	1.3	0.6		
	35 Coal Road S side E side new PHT	64	1.5	0.1	1.5	4.0	0.9	1.8	1.8	1.3	0.9	2.4	0.6	0.3	1.2	1.3	0.3	0.3	2.2	0.8	0.0	0.2	0.2	0.4	0.3	0.2	1.1	1.1		
	36 Coal Road S side E side drive platform	65	1.4	0.8	1.3	4.5	0.6	3.6	4.1	0.4	1.4	2.7	0.6	0.4	0.4	1.3	0.4	0.3	1.1	0.4	0.1	0.3	0.4	0.1	0.4	0.4	1.6	0.8		
	37 Coal Road S side centre column W support duct	66	1.8	0.3	0.2	1.6	0.3	3.2	5.5	0.6	1.1	2.8	1.4	0.1	1.4	1.3	0.3	0.1	1.3	0.4	0.1	0.3	0.4	0.6	0.0	0.1	2.2	0.6		
	38 Coal Road S side centre pedestal	67	0.8	0.0	1.8	4.6	1.4	1.7	2.5	1.3	1.1	0.9	1.5	0.4	1.1	1.3	0.5	0.1	1.4	0.6	0.0	0.0	0.6	0.0	0.6	0.2	1.8	1.3		
	39 Coal Road S side Between centre & E pedestal	69	0.3	0.0	1.1	1.0	0.9	1.9	3.3	1.1	2.3	0.4	1.6	0.3	1.7	1.3	0.2	0.0	1.1	0.4	0.1	0.1	0.4	0.3	0.2	0.2	3.1	0.7		
	40 Coal Road S side E pedestal	70	0.1	0.5	1.0	1.7	0.2	1.7	2.1	2.0	2.3	0.5	1.5	0.9	0.5	0.4	0.2	0.1	1.2	0.1	0.3	0.0	0.4	0.3	0.3	0.0	2.0	0.9		
	41 Coal Road S side W end Firing floor building	71	0.1	0.7	1.5	3.5	0.6	0.6	0.2	2.1	1.3	1.3	3.3	1.8	0.1	0.3	0.0	0.1	0.9	0.1	0.1	0.3	0.3	0.2	0.1	0.5	3.7	0.6		
	42 Coal Road S side opposite grate	72	2.1	1.2	0.9	1.9	0.9	0.5	0.3	2.6	0.3	2.6	1.7	0.1	0.6	0.1	0.3	0.6	0.5	0.2	0.1	0.0	0.4	0.3	0.1	0.0	2.7	1.1		
	43 Coal Road S side W side coal receival bin 25m to truck	73	2.6	2.1	0.3	0.1	2.1	2.3	0.5	2.5	0.5	3.4	1.5	1.1	0.0	0.9	0.5	0.4	0.8	0.7	0.1	0.0	0.4	0.1	0.1	0.5	0.5	0.5		
Old Fenceline South	Former Gate site opp W end Firing floor	282	0.5	0.3	1.3	2.1	1.5	1.4	0.1	1.0	2.0	0.4	1.7	0.1	0.4	0.0	0.1	0.4	0.8	0.8	0.8	0.6	0.2	0.6	0.3	0.3	0.7	0.1	0.2	0.0
	Former Gate site opp W end Firing floor	283	0.6	0.8	1.4	3.2	2.0	1.5	0.3	1.2	1.8	0.1	2.0	0.5	0.3	1.2	1.1	0.8	0.6	1.1	1.1	0.9	0.2	1.1	0.3	0.6	0.5	0.4	0.4	0.1
	Top N edge of bank 21m S of centre Alt Fuels Building	284	0.6	1.4	2.4	1.8	0.7	0.0	0.7	1.7	2.1	1.5	1.3	0.4	0.7	0.5	0.9	1.2	1.6	0.1	0.3	0.4	0.6	0.2	0.3	1.8	0.4	0.6	0.0	0.2
	Top N edge of bank opposite centre pedestal	285	0.9	0.1	0.3	1.2	1.4	1.3	0.0	1.7	0.3	3.1	1.9	0.1	0.1	0.8	0.5	0.0	0.6	0.1	1.2	0.5	1.9	0.9	0.3	3.4	0.9	2.5	0.5	0.4
	Top N edge bank Opposite E side old PHT	286	1.3	0.4	0.4	0.0	0.4	0.1	0.5	1.6	2.4	4.4	1.7	2.1	3.3	2.4	0.9	1.8	1.3	0.6	1.1	0.1	0.7	1.6	1.1	0.7	4.4	3.2	1.4	0.5
	Bottom N edge of bank 13m S of centre Alt Fuels Building	287	1.1	1.4	2.2	0.5	0.3	0.3	0.8	1.7	2.8	2.3	0.0	0.1	0.9	1.7	0.1	0.6	0.5	0.4	1.1	0.6	0.8	0.0	0.1	0.6	1.8	1.0	0.7	0.2
K6 S side	43A Kerb E side CM opp CM fan discharge	288	3.9	3.1	3.4	0.6	2.5	0.9	0.6	0.8	0.9	7.1	8.3	2.8	5.2	3.6	0.5	0.3	2.0	0.9	0.3	0.5	0.5	1.2	0.1	0.1	1.5	0.9	0.5	1.1
	44A Under Coal Mill fan discharge	289	3.2	1.9	4.4	3.0	1.5	1.9	1.6	2.0	1.9	2.4	7.7	2.3	1.2	1.3	0.3	0.3	0.5	0.3	0.3	0.5	0.3	0.9	0.5	0.2	1.3	0.2	0.8	0.9
	44 CM fan room roll door @ 2m	290	2.4	1.2	0.7	3.5	0.6	1.8	2.8	2.6	0.3	2.2	4.3	0.7	0.4	0.6	0.3	0.4	0.3	0.2	0.5	0.2	0.9	2.3	0.0	0.7	2.3	0.5	1.6	0.3
	44' CM S wall E door @1m,	291	5.2	3.0	0.7	5.0	4.3	2.4	2.7	1.3	1.9	1.6	0.6	1.7	1.3	1.1	2.0	0.4	0.2	0.0	0.0	0.7	0.2	0.1	1.7	0.1	1.6	1.7	1.2	0.6
	45 CM S roll door and wall vent @ 9.9m S side	292	2.1	1.6	0.2	2.2	2.0	3.0	2.3	0.9	1.4	3.2	2.4	1.0	0.3	0.5	0.7	0.3	0.1	0.3	1.1	0.0	0.0	0.6	0.5	0.6	1.2	1.4	1.2	4.6
	46 CM room wall vent @ 2m	293	1.8	1.1	1.7	5.9	5.0	5.9	4.3	0.5	1.7	1.1	0.0	1.0	0.2	0.1	1.2	1.0	0.3	0.3	0.2	0.1	0.2	0.4	0.9	0.5	1.0	1.5	0.9	0.8
	46A Coal Mill Room S roll door W @ 1m	294	1.8	0.7	1.3	0.8	0.3	2.7	1.8	0.1	0.3	0.7	2.1	5.0	2.7	1.6	5.8	3.3	0.4	0.3	0.4	0.5	0.2	0.2	0.8	0.5	1.3	0.6	0.6	2.7
	47B Centre between Grate & CM blower room roll door	295	0.6	3.6	4.0	2.0	1.5	0.2	0.3	1.0	1.1	0.2	1.4	0.2	1.3	2.0	0.5	1.0	0.3	0.5	0.3	0.0	0.2	0.1	1.4	0.9	1.3	1.8	0.2	2.1
	47A Centre between CM Room and grate, S side	296	2.0	0.5	1.6	2.4	1.5	2.7	2.1	0.1	0.4	0.5	1.1	0.0	0.5	0.2	1.1	0.8	0.3	0.6	0.2	0.1	0.1	0.1	0.9	0.1	2.9	0.8	3.3	7.9
	47 Opp FA264 @ 8m	297	1.5	0.5	1.8	0.4	0.3	0.6	0.5	0.8	2.9	4.5	1.6	0.0	2.2	4.9	1.4	1.2	0.8	0.2	0.3	0.2	0.4	0.1	0.3	0.6	4.0	0.9	3.6	8.8
	47C Between FA264 & FA200	298	2.2	0.4	1.1	1.0	0.7	1.3	0.8	0.1	1.1	3.3	0.7	1.0	0.7	2.5	0.0	0.9	0.1	0.7	0.1	0.2	0.3	0.1	0.2	0.1	2.6	0.1	1.9	5.2
	47D FA 200 S Side @ 5m	299	1.6	2.0	1.9	1.0	0.1	2.1	1.3	0.7	3.3	5.3	0.5	0.7	0.3	0.5	0.2	0.8	0.5	0.2	0.3	0.1	0.2	0.3	0.8	0.7	1.8	0.3	1.9	3.1
	48 Opp. E pedestal roller	300	0.9	0.6	0.5	0.4	1.5	1.1	2.0	0.4	3.9	6.7	1.3	1.2	1.0	0.6	0.4	0.3	0.0	0.3	0.0	0.0	0.1	0.4	0.4	0.1	1.6	0.5	0.6	2.5
	49 Half way between centre & E pedestals	301	0.3	1.1	1.4	0.6	1.7	1.0	1.2	1.5	4.7	4.3	0.1	0.6	0.8	0.6	0.7	0.2	0.3	0.1	0.3	0.0	0.2	0.5	0.2	0.4	0.6	1.0	0.7	1.8
	50 Opp. Centre pedestal	302	0.3	0.6	0.9	2.3	0.9	0.2	2.1	0.6	2.7	1.6	0.5	0.2	0.8	0.4	0.1	0.3	0.3	0.1	0.5	0.2	0.1	0.4	0.1	0.3	0.8	0.8	0.7	1.6
	51 Half way between Centre & Western pedestals, by duct support trestle	303	2.2	0.9	0.7	1.0	1.2	2.0	2.6	0.1	1.7	0.3	1.5	0.2	0.1	0.3	0.4	0.5	0.5	0.0	0.5	0.2	0.2	0.3	0.4	0.3	0.8	1.0	1.0	1.5
	52A Opp E end of kiln drive platform	304	1.1	0.4	1.6	1.0	0.4	0.8	1.4	1.1	1.8	0.7	0.3	0.6	0.1	0.4	0.5	0.6	0.5	0.1	0.3	0.2	0.0	0.5	0.4	0.3	0.9	0.8	0.9	1.3
	52 Opp W pedestal roller	305	0.4	0.8	3.0	5.6	2.0	0.8	0.8	2.2	4.0	3.1	1.0	0.5	1.2	0.5	0.4	0.5	0.6	0.1	0.1	0.4	0.2	0.2	0.9	0.4	0.4	1.4	1.3	1.5
	53 Kiln drive platform Centre E end on platform (ground level)	306	0.2	1.3	1.2	1.4	5.1	6.8	4.1	0.4	0.4	0.2	0.8	0.3	0.4	0.1	0.1	0.6	0.3	0.3	0.3	0.0	0.0	0.4	0.5	0.1	0.8	1.0	0.7	1.7

Table 3.2A: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - Tonality in One-third Octave Band Spectra

Area	Source or location	File	Tonality dB in One-third Octave Band Centre Frequency - Hz																												
			31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
	Tonality Criteria		15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Kiln Drive platform	S side S motor end @ 1.5m kiln drive	307	1.7	0.7	2.1	6.1	2.7	1.1	0.8	1.3	0.2	2.8	6.4	4.3	0.7	1.5	1.1	0.3	0.8	0.3	0.3	0.3	0.4	0.9	0.6	0.6	0.2	0.2	1.1	1.5
	S side of S Gbox @ 1.5m	308	2.2	2.3	4.8	6.6	0.2	3.0	1.7	0.8	0.6	0.3	1.9	1.5	0.5	0.5	0.2	0.4	0.5	0.4	0.1	0.2	0.2	0.3	0.0	1.4	1.3	0.4	0.7	1.3
	E side of S drive motor @ 1.5m, 2m to Gbox	309	1.5	0.4	2.1	6.9	1.5	2.9	2.3	0.7	2.1	3.4	4.5	2.8	1.3	0.0	0.1	0.2	0.2	0.4	0.5	0.7	1.1	0.7	1.3	0.5	0.4	0.2	1.4	0.9
	53 Kiln drive platform Centre E end on platform between motors	310	1.0	2.4	5.1	4.2	0.7	2.4	2.3	0.4	1.0	3.2	8.5	6.0	0.1	3.2	0.7	0.3	0.0	0.1	0.9	2.4	2.8	1.6	2.6	0.9	0.3	1.3	0.1	0.8
	53 Kiln drive platform Centre E end on platform between gearboxes	311	1.5	1.1	3.9	3.8	0.5	1.2	2.4	0.7	0.8	0.8	2.9	3.1	2.6	0.3	0.6	1.4	1.0	0.7	0.4	0.5	1.4	1.1	2.3	1.0	0.6	1.3	0.2	1.5
	N side motor end @ 1m kiln drive	312	1.1	0.4	3.1	5.6	3.6	2.3	1.7	1.4	6.7	5.8	5.7	4.7	2.1	0.4	0.7	0.5	0.4	0.6	1.8	5.8	4.8	1.1	2.9	0.4	0.3	0.3	0.8	1.3
	N side motor N end @ 1.5m kiln drive	313	2.0	0.9	1.2	3.2	2.5	0.8	2.6	1.6	1.6	3.8	7.1	5.1	0.5	2.3	0.6	0.7	0.8	0.4	0.7	3.3	3.4	0.5	3.6	1.2	0.2	1.6	0.3	1.5
	N side of N drive & Gbox @ 1.5m	314	1.5	1.9	3.1	3.8	1.2	0.5	1.8	0.8	2.3	4.8	6.9	4.0	0.3	1.7	1.5	1.3	0.6	1.1	0.6	1.6	2.1	0.5	3.7	1.6	0.0	1.7	0.5	0.8
Kiln 6 road Northern side	1' RM6 W door at kerb W side @ 13.3m	239	0.3	0.4	1.0	1.5	1.0	0.1	0.5	2.5	5.1	3.9	0.5	4.8	4.0	3.7	4.9	0.1	2.3	0.8	2.6	0.4	0.2	0.6	0.1	0.1	0.8	0.5	1.8	1.6
	54 W end RM6	315	2.3	1.1	0.4	0.8	0.3	0.8	0.0	1.1	3.3	3.6	0.2	3.7	2.7	2.2	2.9	0.3	2.2	1.3	2.5	0.0	0.6	0.4	0.5	0.8	0.3	0.4	1.7	1.2
	55 Centre RM6	316	0.0	0.6	2.0	3.0	0.4	1.7	0.1	1.7	3.0	4.3	0.0	4.8	3.8	1.6	3.0	0.9	2.0	2.1	3.2	0.6	0.5	0.4	0.2	0.3	1.4	0.6	1.1	0.3
	55 Centre RM6	317	0.6	0.8	1.9	2.9	0.5	1.3	0.3	1.4	3.2	3.5	0.2	3.5	3.3	0.8	2.6	2.5	3.5	2.2	3.4	0.3	0.0	1.1	0.1	1.2	0.6	0.4	2.4	1.0
	56 E End RM6	318	0.9	0.8	1.6	2.9	1.2	2.2	1.1	1.4	2.3	3.3	0.2	3.2	4.0	0.4	2.6	2.8	3.1	2.4	3.8	1.2	0.4	0.3	0.0	1.2	0.0	0.2	3.6	0.1
	56' Between RM6 & New wall for FA38	319	0.6	0.8	2.8	4.5	2.4	0.9	0.6	0.9	2.2	2.7	0.7	4.1	3.6	0.3	1.9	2.4	3.5	0.5	2.0	0.6	0.1	0.1	0.4	0.6	0.4	0.8	0.9	1.2
	57 Door opp FA38	320	0.1	0.6	2.8	5.8	1.8	1.5	0.6	1.4	2.9	3.5	0.9	3.2	4.4	2.6	1.1	2.5	6.2	0.5	3.1	1.0	0.5	0.4	0.5	0.8	0.4	0.0	2.5	1.3
	58 Half way between FA38 & FA39, opposite big column	321	0.6	0.3	1.9	4.4	1.4	1.2	1.0	2.0	2.1	3.2	1.6	2.0	4.3	4.1	3.5	1.7	6.1	2.3	5.1	2.3	1.2	1.4	0.3	0.8	0.6	0.4	1.8	1.2
	59 Opp FA39 end	322	1.9	3.6	3.0	3.3	2.6	1.5	2.5	2.1	4.3	4.9	0.9	2.1	2.6	2.4	2.8	0.6	5.0	0.5	2.9	1.5	0.6	1.4	0.0	0.1	0.4	0.8	1.3	1.5
	59 Opp FA39 end	323	1.6	3.3	2.9	3.4	3.1	1.9	2.7	2.3	4.3	4.8	0.8	1.8	2.3	2.3	2.8	1.1	4.8	2.2	4.2	1.9	1.0	1.7	0.1	0.1	0.5	0.8	1.3	1.5
	60 Opp Conditioning Tower	324	1.5	0.3	0.8	2.6	2.1	0.7	0.2	0.6	1.9	2.8	0.7	3.3	4.3	3.2	2.2	5.2	11.5	2.4	3.0	1.8	0.9	1.4	0.3	0.3	0.9	0.5	1.1	2.2
	60 Opp Conditioning Tower	325	0.7	0.6	1.4	2.2	1.7	0.5	0.1	0.0	3.2	3.2	0.3	3.2	3.6	2.5	2.1	4.3	10.6	2.4	2.9	1.9	0.5	0.9	0.1	0.3	0.4	1.5	1.0	1.6
	60' Opp. Stack	326	0.0	1.0	2.1	3.7	1.2	1.3	1.3	0.8	1.6	2.0	0.2	1.4	1.7	1.7	2.1	0.6	4.5	0.5	1.4	1.3	1.0	1.9	0.2	0.1	0.6	0.8	0.8	1.2
	61 Opp. Centre PHT	327	0.3	0.6	2.4	4.1	1.3	0.5	0.1	1.5	1.6	2.5	1.0	0.4	1.4	1.6	1.2	2.3	5.9	0.5	2.0	0.8	0.1	0.6	0.2	0.1	1.0	0.7	1.3	1.3
	62 Opp E side PHT	328	3.1	1.7	2.3	2.2	0.8	0.0	1.5	0.5	1.1	1.8	0.2	0.8	0.3	1.1	1.2	0.8	3.4	0.6	0.6	0.6	0.0	0.8	0.1	0.4	0.6	0.7	1.1	1.8
	63 Opp. W pedestal	329	0.1	1.7	4.5	3.9	0.9	0.4	1.5	0.5	0.9	2.3	0.9	0.1	0.5	0.7	0.9	0.2	1.1	0.2	0.4	0.5	0.1	0.2	0.5	0.3	0.6	0.6	1.3	1.9
	64 E end drive platform	330	2.0	0.1	2.9	2.3	0.3	0.3	1.7	1.2	1.9	1.8	2.4	0.6	0.7	0.5	0.2	0.1	0.4	0.0	0.7	0.1	0.2	0.2	0.4	0.2	0.6	0.8	1.1	1.4
	65 Opp column for return duct W side	331	0.5	1.2	4.2	3.7	1.1	1.7	1.1	0.3	0.6	0.8	2.2	0.5	0.2	0.1	0.6	0.1	0.1	0.1	0.6	0.0	0.3	0.5	0.1	0.5	0.5	0.4	1.1	1.5
	66 Opp centre pedestal	332	1.3	0.0	0.6	3.0	0.9	2.3	0.8	0.0	0.9	0.3	0.8	1.1	0.7	0.4	0.2	0.1	0.5	0.4	0.0	0.2	0.2	0.4	0.0	0.4	0.6	0.5	0.9	1.4
	67 Half way between centre & e pedestals	333	0.9	1.7	2.5	1.3	0.7	1.8	0.5	1.3	2.3	0.0	2.1	0.5	0.1	1.1	0.3	0.1	0.5	0.2	0.1	0.0	0.2	0.5	0.2	0.5	0.6	0.9	0.7	1.8
	68 Opp E pedestal	334	0.5	0.8	2.8	1.0	1.4	2.0	0.7	1.4	1.5	0.3	0.9	0.4	0.1	0.4	0.4	0.3	0.3	0.3	0.2	0.1	0.5	0.6	0.8	0.4	1.3	1.1	1.0	0.5
Grate Cooler Fan Courtyard	69 Centre courtyard - opposite F201	335	0.3	0.4	1.4	2.5	0.8	0.6	0.7	1.1	3.1	3.3	0.7	0.5	0.9	0.3	0.1	0.3	0.1	0.3	0.1	0.1	0.1	0.8	0.8	0.3	1.1	1.4	0.6	0.6
	69 Centre courtyard - opposite F203	336	6.2	2.6	2.5	2.1	0.7	3.3	2.1	1.3	1.6	0.8	0.3	0.3	0.5	0.6	0.2	0.4	0.2	0.9	0.6	0.0	0.1	1.2	1.4	0.5	1.5	1.4	0.4	0.9
	FA201 @ 2m to motor & casing	337	1.5	1.4	1.9	0.5	0.2	0.6	0.5	0.6	1.4	0.6	0.4	0.8	1.2	0.9	0.5	0.0	0.0	0.2	0.1	0.3	0.0	0.5	0.6	0.7	0.8	1.0	0.8	0.8
	FA201 N side inlet & casing @ 1m	338	0.7	1.0	2.4	2.0	1.0	1.7	0.5	0.9	2.1	2.0	0.3	1.5	1.5	0.3	0.8	0.3	0.3	0.0	0.4	0.1	0.1	1.0	0.6	0.3	1.6	0.8	0.3	1.4
	Between FA201 & 203 & 202	339	0.8	1.4	4.6	1.5	0.0	1.7	1.1	2.6	6.2	6.0	1.3	0.8	0.4	1.5	0.4	0.0	0.1	0.2	0.3	0.0	0.6	0.9	0.5	0.3	1.2	1.1	0.4	0.9
	FA203 inlet & casing @ 2m	340	1.7	0.1	3.3	3.0	2.5	1.0	2.3	3.3	3.5	2.4	0.5	0.4	0.8	0.4	0.1	0.7	1.2	0.1	0.5	0.0	0.0	1.8	1.3	0.1	1.3	1.1	0.6	0.7
	FA203,FA204 & FA205 @ 1m	341	5.7	0.0	5.2	4.5	3.0	2.4	3.3	2.8	4.3	3.8	0.3	1.0	1.0	0.1	0.3	1.9	2.5	0.3	1.0	0.3	0.1	1.5	0.8	0.1	1.3	1.3	0.3	1.4
	Between inlet filters FA206 & FA207	342	0.0	0.1	0.0	0.7	2.6	0.9	2.3	1.9	0.0	0.8	0.5	0.3	0.1	0.8	0.2	0.6	0.2	0.3	0.0	0.3	0.1	0.7	2.0	1.5	1.5	1.4	0.5	1.1
Grate Northern area	Centre between Grate & CM blower room roll door	343	0.4	1.0	0.1	0.2	1.9	0.2	1.7	1.7	2.1	1.7	1.1	3.3	2.8	0.5	1.3	0.2	0.5	0.4	0.1	0.0	0.0	0.0	2.0	1.6	1.0	2.3	0.2	1.7
	Coal Mill Building N roll door @ 2m	344	0.4	0.8	0.1	1.9	1.5	3.1	2.6	0.7	0.1	1.7	1.0	2.0	1.1	0.6	0.4	0.0	0.6	1.0	0.1	0.6	0.3	0.4	0.3	0.1	1.3	1.8	0.8	1.6

Table 3.2A: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Kiln 6 - Tonality in One-third Octave Band Spectra

Area	Source or location	File	Tonality dB in One-third Octave Band Centre Frequency - Hz																											
			31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
	Tonality Criteria		15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Kiln Firing Floor	Centre N side opening face E	345	2.2	1.2	6.5	3.9	0.2	1.2	0.8	1.7	2.5	0.3	2.0	1.6	1.1	0.1	0.8	0.1	1.1	0.4	1.1	0.7	0.5	0.4	0.7	2.1	0.9	1.0	1.3	2.6
	Centre N side opening face W	346	2.6	0.8	6.7	4.4	1.0	2.3	0.3	2.3	2.0	0.1	0.3	0.8	0.6	0.3	0.8	0.1	1.1	0.4	0.8	0.1	0.2	0.1	0.9	1.8	0.5	1.3	1.5	0.7
	FA209 E side inlet & filter silencer	347	0.3	0.7	0.9	0.5	0.6	2.1	0.9	2.7	1.6	0.2	0.5	0.8	0.8	1.4	0.7	0.1	0.8	0.3	0.2	0.1	0.1	0.2	0.3	0.9	0.5	0.6	0.8	1.5
	FA209 Kiln Discharge Seal Fan N inlet W side @ 1.5m	348	0.7	0.6	1.3	0.5	0.3	1.8	0.5	1.5	1.9	0.6	0.6	0.2	0.2	1.0	0.2	1.0	0.3	0.4	0.3	0.7	0.3	0.6	0.4	0.5	0.2	0.4	0.6	1.8
	Centre S side opening face E	349	0.4	2.2	4.7	1.2	1.7	1.5	0.2	0.0	0.3	1.5	1.0	0.1	0.1	0.5	1.5	0.3	1.2	0.8	0.8	0.0	0.0	0.5	0.8	1.9	0.1	0.2	1.6	3.5
	Centre S side opening face W	350	0.5	1.6	2.8	0.4	2.4	2.1	0.4	0.3	0.3	1.3	0.8	0.0	0.2	0.4	0.4	0.9	0.8	0.3	0.2	0.2	0.2	0.1	0.3	1.3	0.3	0.0	1.9	1.4
	FA210 Kiln Discharge Seal Fan S inlet @ 1.5m	351	0.9	0.2	1.7	0.7	3.5	6.7	2.2	0.5	0.9	1.5	1.6	0.2	0.1	0.4	2.0	0.3	0.0	0.0	0.7	1.3	0.4	0.0	0.5	0.1	0.4	0.0	0.6	1.3
	FA200 inlet side @ 1.5m	352	0.4	0.6	0.2	0.5	1.2	0.2	1.1	2.8	5.1	6.8	1.8	0.1	0.0	0.7	1.0	0.2	0.1	0.2	0.2	0.1	0.3	0.7	0.4	0.3	0.3	0.5	1.0	1.3
	New replacement FA211 centre under kiln, inlet @ 1m	353	1.0	2.1	5.2	0.8	2.2	0.0	1.8	1.0	1.7	2.6	2.9	2.9	0.7	0.6	1.1	1.1	0.5	0.1	0.6	0.3	0.3	0.2	0.7	0.6	0.1	0.4	0.8	0.9
	FA210 S side seal fan inlet W side & casing @ 1m	354	1.1	0.2	1.9	0.9	1.8	3.7	0.9	0.0	0.4	1.2	2.1	0.7	0.4	1.1	1.8	1.0	0.7	0.2	0.1	0.2	0.2	0.8	0.2	0.2	0.3	0.7	0.9	1.3
	Kiln floor centre E S of duct/clinker elevator	355	0.1	0.9	2.1	1.7	0.3	1.7	1.3	1.5	1.2	1.0	0.3	1.1	1.2	0.0	0.8	0.4	2.9	1.3	0.5	0.2	0.4	0.4	0.9	2.6	0.6	0.1	0.1	5.1
	KFF burner air cannon N side @ 2m	356	1.1	0.8	1.1	1.8	1.4	0.9	0.8	0.2	2.6	2.5	0.4	0.9	1.2	0.0	0.8	0.1	1.1	0.6	1.1	1.1	0.0	0.5	0.9	3.2	0.3	0.0	4.2	0.2
	KFF burner by air cannon S side @ 2m	357	0.5	1.1	2.0	1.2	0.5	1.5	0.5	1.1	1.6	1.4	0.3	1.1	1.2	0.3	1.3	0.3	1.6	1.3	2.4	0.7	0.4	0.7	1.7	3.5	0.1	0.6	2.3	0.5
Radicon Cooler	RC L1 centre fan @ 1m	358	1.3	0.9	0.6	0.4	0.5	1.2	0.3	0.5	1.0	2.5	0.1	1.5	0.6	1.1	0.5	2.5	0.8	3.5	1.3	3.3	0.4	1.6	1.7	0.4	2.0	1.1	0.7	1.5
	RC L1 S fan @ 0.5m	359	0.3	0.5	1.3	1.6	2.3	0.6	0.1	1.0	1.8	2.5	0.0	1.5	0.8	0.5	0.1	3.5	4.1	2.1	1.5	1.1	0.3	2.4	1.9	0.3	1.6	1.3	0.3	1.5
	RC L1 N fan @ 1m	360	0.3	0.5	0.5	1.8	2.0	1.1	0.7	1.4	2.8	3.8	1.0	1.2	0.8	0.6	0.0	0.6	0.9	3.2	0.7	1.1	0.1	2.4	1.6	0.0	1.6	1.3	0.6	1.3
	RC L2 centre fan @ 1m	361	0.6	0.6	1.5	2.6	1.5	1.3	0.5	0.6	0.6	0.6	1.1	1.4	0.9	0.3	0.4	2.3	0.8	3.9	1.2	1.6	0.5	1.6	1.4	0.0	2.5	0.7	0.1	1.8
	RC L2 S fan @ 0.7m	362	0.7	1.0	1.9	2.5	2.3	0.6	0.1	2.0	2.7	2.3	0.0	0.8	0.6	0.1	0.1	1.6	0.4	3.4	1.4	3.5	0.7	1.6	1.5	0.0	1.8	1.3	0.3	1.6
	RC L2 N fan @ 1m	363	0.0	0.6	0.1	1.2	2.2	0.3	0.5	2.3	2.4	2.3	0.3	0.9	0.4	0.8	0.4	1.0	0.5	2.8	1.2	0.5	0.3	2.0	1.3	0.1	1.8	0.9	0.3	1.3
	RC L3 Centre fan @ 1m	364	1.6	1.1	1.3	2.2	0.9	1.5	0.8	1.8	1.8	1.3	0.4	1.0	0.7	0.7	0.4	2.1	2.2	8.6	2.2	2.8	1.3	1.4	1.9	0.8	2.7	0.1	0.1	1.7
	RC L3 S fan @ 0.7m	365	2.7	1.2	0.9	1.3	1.2	0.5	1.1	0.5	0.3	0.5	1.6	0.8	0.2	0.5	0.1	2.3	1.3	7.2	1.5	2.4	1.3	0.6	1.2	0.0	2.0	1.1	0.2	1.6
	RC L3 N fan @ 1m	366	3.1	0.0	1.1	0.0	0.7	0.2	0.9	2.0	3.2	2.0	0.6	0.9	0.4	0.5	0.2	0.5	0.6	3.3	1.5	0.7	0.4	2.3	3.4	3.5	1.1	0.3	1.8	5.3
	RC L4 Centre fan @ 1m	367	2.0	1.7	0.8	1.9	0.1	0.4	2.5	0.8	1.0	0.5	0.6	0.8	0.8	0.9	0.5	1.2	4.8	10.3	1.8	2.8	1.3	0.8	1.3	0.1	2.9	0.8	0.7	1.1
	RC L4 S fan @ 0.7m	368	3.0	1.1	0.9	0.5	0.9	1.3	1.8	1.6	1.9	0.3	1.6	1.0	0.2	0.7	0.1	1.8	4.6	9.6	0.2	2.8	1.6	0.4	0.9	0.0	1.8	1.1	0.6	1.1
	RC L4 N fan @ 1m	369	4.8	0.8	1.7	0.8	0.3	1.7	3.7	0.1	1.9	1.2	0.3	0.4	0.8	0.7	0.5	0.0	0.8	2.4	0.7	0.5	0.3	1.8	1.6	0.8	1.9	0.5	0.4	0.9
	RC L5 face E	370	1.7	1.4	0.0	0.1	0.3	3.7	3.8	3.6	4.3	1.0	1.3	1.1	0.3	0.8	0.3	0.2	3.0	5.7	0.8	1.4	0.3	1.1	0.6	0.3	1.9	0.8	0.8	1.1
	RC L5 face W	371	1.5	2.1	0.9	0.9	1.6	2.8	1.0	0.4	0.6	1.6	0.9	0.3	0.8	0.1	0.6	0.8	2.2	5.4	1.3	1.1	0.8	0.5	0.6	0.4	1.5	1.1	0.8	1.5
	L1 E side 2.4m	372	0.9	1.1	0.5	0.6	1.5	5.8	12.1	5.1	2.6	3.8	0.7	0.7	0.4	0.0	0.8	1.1	1.6	4.5	1.7	0.5	0.2	0.5	1.3	1.2	1.6	1.4	0.5	0.6
	L1 E side 6m	373	0.3	0.4	0.2	0.5	0.1	5.6	13.1	5.4	2.0	2.7	1.7	1.5	0.7	0.8	0.5	0.6	1.5	4.5	0.7	1.0	0.3	0.9	1.5	0.8	1.7	1.3	0.4	0.9
	L1 E side 12m	374	1.8	0.5	0.6	0.3	0.2	4.1	9.5	4.4	4.8	9.2	4.1	0.1	0.1	0.3	0.4	0.4	1.2	2.7	0.9	0.9	0.4	2.3	3.1	1.3	1.4	1.8	0.7	1.5
FA215	Motor S end @ 2.5m	375	4.1	2.3	2.5	0.9	1.4	2.4	9.8	5.2	2.1	4.1	2.6	1.0	0.9	0.2	0.3	0.3	0.7	0.4	0.6	0.3	0.9	4.6	3.1	0.1	1.4	2.5	0.4	1.6
	Platform E side drive coupling @ casing @ 1m	376	3.7	0.9	1.6	3.1	1.6	4.3	9.2	3.6	1.4	3.8	3.7	2.7	1.1	0.1	0.9	0.2	0.6	1.2	1.0	0.6	0.5	6.1	3.6	0.6	0.3	0.5	0.3	2.9
	W side platform @ 1m to coupling & casing	377	0.7	2.9	1.5	0.6	2.1	5.6	18.0	6.9	6.1	6.2	2.5	0.4	0.7	0.7	0.5	0.2	0.2	1.2	0.7	0.6	0.1	5.4	2.5	0.3	0.4	1.7	0.7	2.9
	Under expansion joint discharge duct to stack @ 1m	378	0.8	3.1	1.6	0.9	2.4	5.7	18.1	6.8	4.9	4.0	1.8	0.5	1.2	0.9	0.4	0.1	0.4	1.0	0.6	0.8	0.8	4.3	1.3	0.6	0.3	1.6	0.6	2.7
	N side inlet box platform @ 1m to discharge duct & inlet box	379	4.0	5.8	5.6	2.0	3.9	3.8	11.3	5.5	6.0	12.2	6.3	0.1	1.9	1.1	0.0	0.3	0.4	0.1	0.4	1.0	0.2	2.1	1.5	0.2	1.9	1.9	0.6	1.2
	Platform centre N side inlet box	380	2.3	2.4	0.4	4.7	4.7	5.6	18.2	7.1	7.6	10.9	5.3	0.8	0.1	0.3	0.1	0.1	0.1	0.0	0.3	0.1	0.3	3.0	2.8	0.4	1.6	1.1	0.6	2.1
	Under Inlet box W side entry duct	381	0.5	1.4	2.5	2.1	3.3	7.3	15.5	9.0	1.3	2.8	0.7	0.1	0.1	0.2	0.8	0.2	0.1	0.0	0.4	1.2	2.3	1.7	3.0	0.5	1.7	2.3	0.4	1.6
	Inlet box N side ground level @ 1m	382	2.8	1.4	2.6	2.2	0.3	6.0	15.8	7.5	4.1	8.0	4.2	0.1	1.0	0.1	0.0	0.1	0.0	0.3	0.3	0.9	0.5	3.6	3.2	0.3	1.8	2.1	0.5	1.6

Table 3.6: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Cement Mills No.7 and No.6 - One-third Octave Band Spectra

Area	Source or location	File	Total C	Total A	A-weighted LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency Hz																																
			dBC	dBA	12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
CM7	A Top of stairs S	48	83	72	13	21	23	32	37	39	42	47	51	51	55	58	59	57	59	66	64	63	61	61	61	59	57	56	53	50	46	41	34	26	18		
	B 2m W of wall, edge of barrier facing baghouse	59	90	78	15	24	31	43	43	42	49	49	56	60	63	70	67	67	69	68	68	67	66	68	65	65	61	60	56	53	48	43	37	32	28		
	C Top of stairs N	49	84	72	13	19	24	33	44	39	43	47	47	51	55	59	58	57	59	63	64	62	60	61	61	59	57	56	54	51	45	39	32	24	16		
	D At corner N of Admin	51	82	73	9	17	23	35	36	36	41	46	49	50	54	56	56	58	59	63	65	63	63	63	61	61	60	58	55	52	46	41	34	27	19		
	E Compressor room door @ 1m	53	83	73	10	19	24	34	37	38	43	46	49	53	57	60	60	58	61	62	63	64	64	62	62	60	58	56	54	51	46	41	34	28	22		
	E' Man door to compressor filter room@ 1m	52	83	70	10	18	24	36	38	39	44	45	48	51	54	57	58	56	58	59	61	60	60	61	60	58	57	56	54	51	46	42	34	29	22		
	F Wall vents N on W side @ 1m	54	86	77	11	21	25	33	40	39	44	48	53	56	59	63	64	65	65	67	67	68	67	66	65	65	63	60	57	54	49	42	34	27	19		
	G - Line N side of transfer house 13.5m to it, in-line W edge CM7	71	82	73	8	18	20	27	35	38	43	46	48	50	53	55	59	59	58	63	68	63	61	62	61	61	60	59	58	55	51	46	39	32	23		
	I Vent S of door @ 1m	57	89	78	14	21	26	34	44	46	49	53	54	57	62	67	66	65	68	68	69	70	68	66	63	67	62	58	54	52	46	40	32	26	19		
	J Vents N of baghouse	58	91	80	15	22	27	35	46	47	52	56	56	55	61	68	67	65	74	72	69	71	69	67	64	67	62	59	55	52	46	39	32	27	20		
	J' Edge of concrete opp, J. - 9.6m away	61	86	73	13	19	24	35	43	40	45	48	50	55	58	64	62	61	63	62	60	61	63	62	61	60	58	57	55	52	47	42	36	31	25		
	J'* SW corner by vents at baghouse	426	90	78	15	21	27	36	47	47	51	56	57	58	61	67	67	65	68	67	68	70	68	69	64	65	62	59	56	53	47	41	34	28	20	13	7
	H W roller door @ 1m	55	87	79	11	19	26	35	41	41	45	49	52	56	61	66	63	63	64	67	70	69	69	69	68	68	67	64	64	60	55	48	41	32	23		
	H' Edge concrete opp door H - 9.7m away	62	84	74	11	19	24	32	39	39	43	47	51	53	56	60	61	59	60	61	63	65	65	64	63	63	60	59	58	56	49	43	37	28	22		
	K Line level with G centre of compressor house	69	82	72	9	17	22	33	34	38	42	45	47	49	53	55	60	61	58	62	64	63	62	61	61	61	59	59	57	54	50	45	39	32	23		
	L N wall vent W side @ 1m	63	83	72	10	16	21	33	34	41	46	43	47	49	56	57	59	59	60	62	65	62	61	61	60	58	57	55	53	51	46	41	34	30	22		
	M Between wall vents @ 1m to wall	64	85	72	9	16	23	36	34	46	50	43	46	50	57	56	58	59	59	61	64	62	63	61	61	60	60	58	56	54	49	45	39	35	28		
	N Wall vents N wall E side @ 1m	65	83	73	10	17	22	28	30	39	44	45	49	51	58	58	60	67	61	63	63	63	62	61	60	59	57	55	54	52	47	46	44	36	29		
	O Line E side of Comp House 20.5m to control point	68	83	73	9	16	25	38	35	37	44	45	47	50	54	57	59	61	60	63	67	63	62	61	61	60	58	57	54	52	48	44	37	31	25		
	P 1m N roll door CM7	67	89	79	11	23	31	42	40	43	47	47	54	59	60	65	65	66	65	68	70	70	71	69	68	67	66	64	61	58	51	44	37	32	27		
	P 1m outside Roll door N	432	88	79	12	23	30	37	42	42	46	48	56	58	60	65	66	67	65	67	70	70	70	69	68	67	66	64	62	58	52	45	38	32	28	17	6
	Q 1m Man door Compressor House E side	66	88	77	10	22	30	43	40	41	48	49	53	55	59	63	64	64	64	68	68	67	67	67	66	64	63	60	58	54	49	46	38	33	28		
	Under TS3 ground level 6.5 m from CM5	84	86	77	10	21	23	34	38	41	49	51	52	55	57	61	62	63	63	68	67	67	69	66	66	64	62	59	56	54	49	45	39	33	27		
	Transfer Station #TS3 Level 1 N side opening	74	85	75	4	14	21	38	34	45	50	46	48	48	51	55	56	58	58	61	64	66	66	65	67	64	61	60	58	55	51	50	43	38	33		
	TS3 Stairway opp small fan discharge CM5	76	89	77	9	19	30	46	39	43	46	48	51	54	57	61	62	63	63	66	67	68	70	67	68	66	63	60	57	54	50	45	39	32	25		
	TS3 Top Platform opp large fan discharge CM5	79	86	77	13	26	27	41	36	40	45	45	48	54	58	61	62	64	63	68	67	68	70	65	66	64	61	59	57	54	49	44	39	34	29		
	R corner SW of CM7	72	86	75	14	22	28	33	44	43	44	49	49	51	58	59	60	59	69	67	65	63	64	64	63	62	59	58	55	52	48	43	37	31	25		
	S' Kerb opp W wall CM7	447	86	74	18	22	28	34	45	41	42	50	49	51	56	61	61	59	66	65	67	63	63	63	63	62	59	58	55	53	48	44	38	32	26	18	7
	S'' Kerb S of W wall CM7 tower	448	86	75	18	23	31	35	44	41	42	50	49	52	55	61	63	61	65	62	64	66	64	64	64	63	60	58	55	52	48	43	37	29	20	10	3
	S Kerb S of E side CM7 tower	449	86	76	17	22	28	34	43	41	42	51	50	53	57	61	63	62	65	65	65	67	65	65	65	64	61	59	57	55	52	47	42	34	24	13	2
	T Kerb S of W wall CM5	450	85	76	15	21	28	34	40	40	42	48	49	53	58	63	64	61	64	63	64	68	65	66	65	64	62	59	57	53	49	44	38	30	21	11	3
	T Kerb Opp W wall CM5	119	85	75	13	22	28	35	39	40	43	47	50	53	57	62	63	61	66	64	64	67	66	65	65	64	62	59	57	54	49	44	39	31	22		

Table 3.6: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels Cement Mills No.7 and No.6 - One-third Octave Band Spectra

Area	Source or location	File	Total C	Total A	A-weighted LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency Hz																																
			dBC	dBA	12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
CM6	1 North West Corner @ 1m	85	84	96	12	20	37	55	45	49	56	52	53	55	60	65	68	69	71	72	73	72	73	73	75	75	74	71	66	62	57	51	44	36			
	2 Front of Roller Door @ 1m (door open)	86	89	95	12	21	34	51	41	44	54	53	58	62	65	68	72	75	77	78	78	77	77	78	79	79	79	76	72	68	62	58	52	45			
	2 NW roll door @ 1m open	446	95	87	10	22	40	52	41	43	52	53	56	59	64	66	68	71	75	75	76	76	75	75	77	78	78	77	75	71	67	62	57	50	44	38	33
	3 Between Door @ 2.4m due to pile	88	81	91	12	21	32	46	41	47	53	51	56	56	60	64	67	67	69	72	72	71	70	71	70	69	68	65	61	57	51	45	39	33			
	4 Front of Roller Door @ 1m	89	83	92	14	21	33	47	41	46	52	53	55	58	62	67	68	72	75	75	75	73	71	70	69	67	66	64	63	60	52	46	39	32			
	5 Front of Southern Roller Door @ 1m	90	81	91	14	21	30	46	39	46	52	53	54	58	62	66	69	70	70	71	72	73	71	70	68	66	64	61	58	54	48	44	42	34			
	6 Northern face of western ext. @ 1m	92	80	92	15	23	34	49	40	46	53	46	49	55	60	65	67	70	71	71	71	70	69	69	68	66	63	61	58	54	48	42	36	29			
	7 On CM5 Platform (N) @ 6.8m	96	77	88	11	20	27	42	38	43	52	48	51	53	56	61	61	64	65	66	69	69	67	67	65	63	60	58	55	51	46	42	37	27			
	8 Western face (N) of western ext. @ 1m	93	76	92	14	29	34	50	42	44	51	52	51	51	55	59	60	63	64	67	69	68	67	67	65	62	60	57	54	49	45	38	34	24			
	9 Western face(S) of western ext. @ 1m	94	76	89	15	23	29	46	39	38	51	52	52	52	56	61	62	64	64	66	68	68	68	67	65	63	60	58	55	50	45	39	30	20			
	10 On CM5 Platform (S) @ 7.6m	95	76	89	9	21	30	47	37	42	50	49	51	52	56	60	62	63	63	65	67	67	67	66	65	62	60	57	54	50	45	39	32	25			
	11 14.4m from S wall at joint	100	77	85	13	21	26	34	34	37	44	51	52	52	56	60	61	62	63	66	68	68	69	67	65	64	64	60	59	53	47	41	33	25			
	12 2.7m from S wall CM6 at joint 6.7m from fan	99	81	87	14	20	29	34	35	37	43	53	53	54	55	62	66	67	64	65	67	72	77	71	68	67	70	65	64	58	52	46	38	28			
	13 E side S roll door @ 1m	101	77	85	8	16	24	32	34	39	43	46	49	53	56	62	66	69	65	65	67	67	66	65	63	62	60	58	55	54	50	46	44	36			
	14 CM6 E side centre door @ 1m (door 1/2 open)	102	88	94	10	19	27	36	37	42	49	53	57	63	68	71	74	78	78	79	79	78	77	76	75	75	74	72	71	71	71	67	66	62			
	15 2m from Clinker Building opp 13 & 14	115	78	86	11	20	26	32	33	38	42	43	50	58	63	62	66	67	68	67	69	69	69	68	66	65	64	62	59	57	57	52	49	43			
	16 E wall centre @ 1m	103	77	85	11	17	24	33	33	38	44	46	51	54	57	63	65	67	66	66	67	66	66	66	64	62	61	58	56	52	48	46	43	39			
	17 E roll door opp Mill	104	84	89	11	17	24	36	34	40	45	48	52	56	61	64	66	71	73	73	73	74	74	76	74	71	70	65	62	58	56	53	47	40			
	18 Door opp Comp Room @ 1m	105	79	84	10	16	23	29	33	38	44	45	48	51	56	61	61	65	66	67	69	69	69	72	70	70	67	65	62	59	56	51	47	41			
	19 Clinker Building @ 2m opp 18	114	74	82	8	16	23	34	32	37	42	42	47	51	54	59	60	63	62	62	63	64	64	67	63	62	59	58	56	55	51	48	47	37			
	20 Man door - open 100mm	107	75	83	11	15	21	31	35	37	43	45	48	52	55	60	61	64	65	64	64	63	63	65	63	63	62	60	54	50	44	38	33	25			
	21 1m Outside vent fan filter louvre	108	75	87	9	23	30	41	39	44	47	49	52	55	56	60	61	64	65	65	65	66	63	63	61	60	59	56	55	52	47	43	39	38			
	22 E side N wall vent @ 1m	109	78	89	8	18	28	45	37	40	45	47	56	59	60	63	64	70	71	70	68	67	65	64	64	62	59	56	52	52	44	37	32	25			
	23 Centre N wall vent @ 1m	110	84	91	9	19	24	35	42	44	49	53	60	61	63	66	68	73	75	74	73	72	73	73	73	73	72	66	61	59	51	46	43	38			
	24 W side N wall vent @ 1m	111	79	88	8	17	26	43	37	42	48	47	52	55	59	63	66	69	70	71	71	69	68	67	66	64	62	58	54	49	43	38	32	25			
	25 11m N of CM6 at joint	442	84	74	5	14	27	39	33	36	46	43	48	52	55	58	59	60	63	63	63	63	64	63	64	63	62	60	56	51	47	41	35	29	22	13	3
	26 22.6m N of CM6	443	82	70	3	14	25	37	32	36	42	41	47	50	53	54	55	57	61	61	58	59	59	59	62	60	59	58	52	47	43	37	31	24	16	7	1
	27 4m N of Conveyor transfer out of Clinker Building	445	75	63	7	13	20	26	29	30	37	37	41	44	47	49	49	51	54	53	52	54	54	52	53	51	48	47	43	40	35	30	25	19	14	7	1
	28 4m N of dust collector on next building W , conveyor transfer noise	444	73	61	3	12	17	22	27	29	35	36	40	41	45	48	50	50	50	49	51	51	50	49	50	48	46	44	40	37	33	28	23	19	13	6	0
	CM6 W wall fan discharge at platform ~8m	441	101	86	24	31	46	58	50	55	58	62	64	61	61	61	62	65	66	73	76	76	79	76	78	76	72	67	64	64	63	60	55	48	41	33	25
	Door platform near CM6 W wall fan @ 7.5m	80	95	87	22	28	43	60	48	55	58	62	65	62	61	62	63	65	72	76	77	78	76	77	76	72	67	65	64	63	59	55	48	42			
	Door platform near CM6 W wall fan @ 3.5m	83	86	74	25	33	48	65	55	61	67	66	69	63	61	65	68	71	77	83	83	81	83	84	81	78	73	70	70	67	64	60	55	49			

Table 3.6A: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels CM7 and CM6 - Tonality in One-third Octave Band Spectra

Area	Source or location	File	Tonality dB in One-third Octave Band Centre Frequency - Hz																									
			31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
	Tonality Criteria		15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
CM7	A Top of stairs S	48	1.8	0.1	1.3	0.4	1.8	1.5	0.2	1.9	1.0	2.1	2.3	4.6	0.8	0.4	0.6	0.2	1.0	0.0	0.1	0.4	0.2	0.7	0.5	0.6	0.5	0.4		
	B 2m W of wall, edge of barrier facing baghouse	59	0.3	3.8	3.3	3.3	1.5	0.6	1.7	4.6	1.7	0.7	1.6	0.3	0.1	0.3	1.4	2.4	1.1	1.4	0.9	1.3	0.6	0.9	0.3	0.3	0.8	0.1		
	C Top of stairs N	49	8.3	4.7	0.0	1.7	1.6	0.3	0.4	2.3	0.6	2.0	1.1	2.2	1.1	0.3	1.1	0.4	0.9	0.1	0.4	0.5	0.6	1.1	0.2	0.7	0.4	0.1		
	D At corner N of Admin	51	0.5	2.8	0.6	0.8	0.7	1.2	0.9	0.8	0.6	0.0	0.8	0.7	2.1	1.5	0.5	0.7	0.4	0.0	0.7	0.4	0.1	1.1	0.2	1.1	0.1	0.6		
	E Compressor room door @ 1m	53	1.3	2.2	0.9	0.3	0.8	0.1	0.5	1.6	0.8	2.0	0.6	0.1	0.1	0.5	1.3	1.2	1.0	0.1	0.2	0.4	0.3	1.1	0.3	0.6	0.6	0.5		
	E' Man door to compressor filter room@ 1m	52	0.2	1.6	1.7	0.9	0.0	0.2	0.2	1.2	0.9	1.3	0.0	0.1	0.8	0.1	0.3	0.5	0.4	0.3	0.1	0.6	0.2	1.0	0.1	1.2	0.8	0.6		
	F Wall vents N on W side @ 1m	54	4.1	3.1	0.8	1.0	1.3	0.2	1.2	2.2	0.2	0.4	1.2	0.9	0.0	0.6	0.3	0.1	0.8	1.0	0.5	0.3	0.4	1.3	0.7	0.5	0.4	0.6		
	G - Line N side of transfer house 13.5m to it, in-line W edge CM7	71	2.9	1.1	0.7	0.5	0.3	0.4	0.1	0.5	1.6	0.6	2.9	0.3	5.2	1.6	1.2	0.4	0.3	0.0	0.0	0.1	0.9	1.1	0.2	1.0	0.1	1.1		
	I Vent S of door @ 1m	57	4.6	1.2	0.2	1.7	1.5	0.3	0.4	3.0	0.2	1.9	2.0	0.9	0.4	1.9	0.3	0.0	3.0	4.4	0.6	0.3	0.4	1.4	0.6	0.3	0.7	0.5		
	J Vents N of baghouse	58	4.4	1.6	0.2	2.3	0.0	3.1	0.5	4.0	0.1	5.3	5.9	0.4	3.0	2.6	0.6	0.9	2.9	3.8	0.9	0.2	0.3	1.3	0.9	0.4	0.6	0.5		
	J' Edge of concrete opp, J. - 9.6m away	61	5.3	4.1	1.1	0.1	0.6	0.4	1.5	4.3	0.9	1.1	1.6	0.1	1.5	0.1	1.0	0.0	0.1	0.6	0.5	0.3	0.5	1.3	0.1	0.6	0.7	0.3		
	J'* SW corner by vents at baghouse	426	5.7	2.3	0.3	1.8	0.4	1.5	0.8	2.3	1.4	2.8	2.4	1.6	0.0	2.0	2.0	3.3	2.9	2.1	0.3	0.2	0.3	1.6	0.2	0.0	0.2	0.4		
	H W roller door @ 1m	55	2.6	1.5	0.1	0.1	0.3	0.1	0.8	4.4	1.4	0.6	1.0	0.4	1.2	0.3	0.4	0.4	0.1	0.1	0.8	0.8	1.3	1.3	0.3	0.3	1.2	0.4		
	H' Edge concrete opp door H - 9.7m away	62	3.4	1.8	0.4	0.3	1.1	0.6	0.6	2.0	1.3	1.9	0.1	0.1	0.7	1.2	0.7	0.0	0.8	1.7	0.8	0.4	1.1	2.2	0.6	0.2	1.1	0.8		
	K Line level with G centre of compressor house	69	1.1	0.6	0.8	0.3	0.1	1.2	1.2	1.1	1.5	1.9	2.8	0.5	1.4	0.2	0.4	0.0	0.3	0.3	0.3	0.5	0.4	0.9	0.1	0.9	0.8	0.6		
	L N wall vent W side @ 1m	63	3.2	1.2	4.0	3.3	0.6	2.0	2.7	0.5	0.8	0.1	0.8	0.5	3.0	1.3	0.3	0.5	0.4	0.3	0.2	0.0	0.3	1.6	0.1	0.6	1.0	1.8		
	M Between wall vents @ 1m to wall	64	7.3	4.1	5.5	4.8	0.3	2.0	4.0	1.2	0.5	0.3	0.9	0.4	1.9	0.6	0.7	0.4	0.4	0.5	0.6	0.3	0.1	1.0	0.1	1.0	0.9	1.5		
	N Wall vents N wall E side @ 1m	65	2.9	2.2	1.5	1.4	1.3	3.0	3.9	0.8	3.1	6.9	4.1	0.6	0.3	0.5	0.0	0.1	0.0	0.5	0.5	0.1	0.4	1.2	1.4	0.1	2.9	0.0		
	O Line E side of Comp House 20.5m to control point	68	3.2	2.2	3.0	0.6	0.5	0.1	0.3	0.3	0.5	0.9	1.7	0.4	3.7	1.1	0.7	0.0	0.5	0.2	0.0	0.3	0.1	0.8	0.3	1.6	0.4	0.3		
	P 1m N roll door CM7	67	2.1	1.3	2.7	4.1	1.5	1.8	2.0	2.2	0.0	1.0	2.4	0.8	1.0	1.1	2.2	0.8	0.4	0.2	0.3	0.7	0.2	1.4	0.5	0.1	0.6	0.3		
	P 1m outside Roll door N	432	2.4	2.2	0.9	2.7	2.6	0.7	2.2	2.3	0.1	1.3	2.1	0.0	1.0	0.2	0.7	0.3	0.3	0.0	0.3	0.4	0.5	1.3	0.3	0.2	0.6	0.5		
	Q 1m Man door Compressor House E side	66	2.1	2.8	2.8	1.1	0.7	1.1	0.1	1.5	0.7	0.0	2.3	2.1	0.1	0.2	0.2	0.4	0.1	0.0	0.5	0.1	0.4	0.8	0.9	2.2	1.5	0.2		
	Under TS3 ground level 6.5 m from CM5	84	0.7	2.3	2.8	0.4	1.0	0.5	0.6	1.3	0.3	0.8	2.6	2.8	0.0	1.4	3.0	1.9	1.1	0.1	0.1	0.1	0.1	1.2	0.3	0.9	0.0	0.1		
	Transfer Station #TS3 Level 1 N side opening	74	8.1	3.5	4.6	3.0	0.6	0.8	1.0	1.4	0.1	0.8	1.5	0.1	0.5	1.0	0.9	1.7	2.2	0.1	0.6	0.4	0.4	0.3	1.1	2.6	0.8	0.1		
	TS3 Stairway opp small fan discharge CM5	76	5.4	0.2	0.9	0.6	0.0	0.1	0.5	1.4	0.1	0.5	2.0	1.7	0.5	0.2	2.7	2.1	1.3	0.5	0.1	0.4	0.4	0.5	0.3	0.6	0.3	0.0		
	TS3 Top Platform opp large fan discharge CM5	79	4.2	0.9	2.5	1.4	1.5	1.1	0.4	0.8	0.2	1.2	2.5	2.9	1.2	0.7	4.0	3.0	1.3	0.4	0.1	0.2	0.5	0.9	0.1	0.1	0.5	0.6		
	R corner SW of CM7	72	5.9	0.9	2.2	2.4	0.7	2.7	3.1	0.2	0.4	4.9	6.0	0.5	0.3	1.6	0.5	0.1	0.6	0.5	0.4	0.4	0.3	0.6	0.3	0.4	0.4	0.4		
	S' Kerb opp W wall CM7	447	8.0	2.8	3.2	4.3	1.5	1.4	0.3	2.6	1.2	4.5	3.8	1.6	2.8	1.5	0.5	0.2	0.6	0.9	0.9	0.8	0.1	0.7	0.3	0.3	0.7	0.5		
	S" Kerb S of W wall CM7 tower	448	5.8	1.9	3.1	4.3	2.1	0.4	0.8	1.3	2.7	3.6	4.0	2.7	0.2	2.3	1.1	0.3	0.2	0.9	0.3	0.2	0.3	0.4	0.4	0.7	1.2	0.3		
	S Kerb S of E side CM7 tower	449	5.3	1.2	4.5	5.3	1.8	0.8	0.2	1.7	0.8	1.6	1.3	0.3	1.0	1.7	1.0	0.1	0.6	0.6	0.1	0.3	0.2	0.5	0.4	0.6	1.6	0.6		
	T Kerb S of W wall CM5	450	2.7	1.2	1.6	2.2	1.5	0.6	0.0	2.5	1.5	2.4	1.4	1.0	1.0	2.9	1.5	0.8	0.3	0.4	0.0	0.2	0.3	0.5	0.1	0.8	1.1	0.9		
	T Kerb Opp W wall CM5	119	1.8	1.4	0.8	0.9	0.3	1.0	0.5	2.4	1.2	3.2	3.4	1.2	1.3	1.9	0.2	0.0	0.3	0.6	0.1	0.0	0.4	0.5	0.5	0.2	1.3	0.7		

Red highlighted cell means exceeds criteria

Table 3.6A: Boral Cement Berrima - 2020 Annual Noise Assessment: Site Sound Levels CM7 and CM6 - Tonality in One-third Octave Band Spectra

Area	Source or location	File	Tonality dB in One-third Octave Band Centre Frequency - Hz																										
			31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
	Tonality Criteria		15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
CM6	1 North West Corner @ 1m	85	6.8	1.9	6.1	3.1	0.5	0.9	0.7	1.2	1.1	0.5	0.1	0.6	0.4	0.6	0.3	0.4	0.4	0.5	1.2	1.0	0.3	0.6	0.1	0.6	0.4			
	2 Front of Roller Door @ 1m (door open)	86	6.7	3.5	5.7	3.2	0.6	0.4	0.2	0.1	0.1	0.3	0.6	0.7	0.3	0.6	0.4	0.3	0.3	0.5	1.1	0.5	0.1	0.5	0.3	0.2	1.1			
	2 NW roll door @ 1m open	446	6.9	3.1	4.0	1.2	0.1	0.8	1.1	0.3	0.6	0.3	1.5	0.0	0.0	1.0	0.8	0.6	0.5	0.1	0.4	1.1	0.6	0.0	0.4	0.1	0.5			
	3 Between Door @ 2.4m due to pile	88	5.4	0.2	4.2	3.6	2.0	1.4	0.4	0.8	1.3	0.9	0.6	1.8	0.2	0.8	1.4	0.8	0.6	0.2	0.7	0.7	0.1	0.9	0.1	0.2	0.4			
	4 Front of Roller Door @ 1m	89	5.0	0.7	2.3	0.3	0.7	0.4	0.6	1.8	0.9	0.1	1.7	0.3	1.0	0.1	0.4	0.1	0.3	0.0	0.1	0.2	1.3	1.8	0.5	0.4	0.1			
	5 Front of Southern Roller Door @ 1m	90	6.9	0.6	2.5	0.1	1.7	0.3	0.5	1.2	0.5	0.5	0.3	0.1	0.3	1.1	0.1	0.0	0.3	0.1	0.6	0.1	0.1	1.3	1.0	1.4	3.3			
	6 Northern face of western ext. @ 1m	92	7.2	0.4	6.7	5.3	0.8	0.1	0.2	2.0	1.1	1.3	0.0	0.4	0.3	0.2	0.5	0.7	0.0	0.5	0.1	0.5	0.4	0.7	0.4	0.0	0.3			
	7 On CM5 Platform (N) @ 6.8m	96	5.2	1.6	6.1	3.1	0.3	0.3	1.0	2.2	1.3	1.2	0.7	0.4	1.1	0.8	0.6	0.9	0.1	0.3	0.2	0.5	0.3	0.5	0.1	0.1	2.9			
	8 Western face (N) of western ext. @ 1m	93	5.3	2.2	2.5	1.4	0.8	1.9	0.2	1.4	0.6	0.9	0.9	0.0	2.3	0.4	0.5	0.7	0.8	0.2	0.0	0.1	1.0	0.1	0.9	1.0	3.1			
	9 Western face(S) of western ext. @ 1m	94	3.0	7.0	6.2	0.5	0.1	1.9	0.5	1.5	0.1	0.8	0.8	0.5	1.2	0.0	0.7	0.2	0.4	0.1	0.0	0.4	0.9	0.1	0.6	1.2	0.8			
	10 On CM5 Platform (S) @ 7.6m	95	6.9	1.6	4.6	2.0	0.8	1.3	0.5	1.4	0.5	0.1	0.4	0.2	0.8	0.1	0.3	0.7	0.2	0.1	0.0	0.3	0.8	0.1	0.4	0.4	0.4			
	11 14.4m from S wall at joint	100	1.6	2.0	0.2	3.2	0.3	2.0	0.1	1.3	0.2	0.4	0.9	0.3	0.8	0.3	1.2	0.4	0.7	0.0	1.5	1.3	2.0	0.6	0.4	1.0	0.4			
	12 2.7m from S wall CM6 at joint 6.7m from fan	99	0.5	2.2	2.2	5.4	0.5	0.5	2.7	1.3	1.3	2.3	2.0	0.8	1.3	0.3	4.9	1.2	1.0	1.8	3.8	2.3	2.7	0.4	0.5	1.4	0.6			
	13 E side S roll door @ 1m	101	0.8	0.0	0.9	0.3	0.5	0.8	2.0	1.7	0.1	3.3	1.5	1.5	1.3	0.2	0.2	0.4	0.1	0.2	0.7	0.2	0.2	0.7	0.4	1.2	3.5			
	14 CM6 E side centre door @ 1m (door 1/2 open)	102	1.9	1.3	1.7	0.0	0.9	0.8	0.5	0.3	0.7	2.1	0.4	0.3	0.6	0.1	0.0	0.0	0.3	0.3	0.3	0.2	0.3	0.6	2.4	1.3	1.3			
	15 2m from Clinker Building opp 13 & 14	115	1.7	1.0	0.9	2.7	1.0	1.8	3.0	2.1	1.1	0.0	0.8	0.9	0.5	0.2	0.7	0.0	0.0	0.1	0.4	0.0	0.0	0.9	2.3	0.9	1.0			
	16 E wall centre @ 1m	103	2.5	0.8	2.2	1.4	0.9	0.4	1.0	1.8	0.2	1.3	0.0	0.9	0.9	0.5	0.2	1.0	0.0	0.9	1.5	0.4	0.6	0.1	0.7	0.0	0.9			
	17 E roll door opp Mill	104	3.3	0.0	1.5	0.9	0.1	0.5	1.0	0.8	2.1	1.9	0.8	0.2	0.2	0.1	1.3	2.4	0.5	1.2	2.0	0.7	0.4	0.9	0.0	1.8	0.8			
	18 Door opp Comp Room @ 1m	105	0.5	0.8	2.7	0.9	0.1	1.4	0.5	2.2	1.5	1.3	0.3	0.1	0.8	0.0	1.7	2.6	0.9	1.6	0.6	0.6	0.2	0.1	0.9	0.8	1.5			
	19 Clinker Building @ 2m opp 18	114	3.7	0.2	2.2	2.4	0.8	0.5	1.2	1.6	0.4	1.5	0.3	0.5	0.1	0.3	1.1	3.2	1.8	1.2	0.8	0.4	0.4	1.2	0.4	0.7	4.3			
	20 Man door - open 100mm	107	0.4	1.6	2.2	1.1	0.1	0.3	0.5	1.3	0.7	1.3	0.6	0.4	0.1	0.1	0.6	1.4	1.0	0.6	0.8	1.6	1.0	1.0	0.1	0.5	1.6			
	21 1m Outside vent fan filter louvre	108	3.1	0.3	1.2	1.2	0.4	0.8	1.2	1.0	0.5	1.1	0.0	0.1	0.2	1.9	1.6	0.8	0.3	0.3	0.6	0.9	1.4	0.5	0.4	0.2	1.2			
	22 E side N wall vent @ 1m	109	5.6	1.0	1.2	3.2	3.3	0.6	1.3	1.3	2.1	2.2	0.7	0.7	0.0	0.1	0.4	0.0	0.6	0.4	0.5	0.2	2.1	4.1	0.6	0.9	1.3			
	23 Centre N wall vent @ 1m	110	1.9	1.1	0.4	1.6	3.1	0.8	0.1	0.2	1.4	1.7	1.3	0.5	0.5	0.5	0.3	0.5	0.3	0.0	2.7	0.8	1.3	3.1	1.7	0.7	1.0			
	24 W side N wall vent @ 1m	111	5.1	0.9	3.7	2.8	0.9	0.6	0.0	0.3	0.3	0.7	0.5	0.1	1.0	0.4	0.1	0.2	0.4	0.3	0.6	0.1	0.4	0.5	0.3	0.3	0.7			
	25 11m N of CM6 at joint	442	4.3	3.2	6.1	4.4	0.9	0.7	0.0	0.5	0.4	1.1	1.3	0.1	0.3	0.0	0.5	1.0	1.3	0.0	0.4	1.4	0.3	1.1	1.3	0.2	0.1			
	26 22.6m N of CM6	443	4.6	0.5	2.9	3.1	1.5	0.0	0.9	0.3	0.1	0.6	1.6	1.3	1.5	0.1	0.0	1.2	1.8	0.2	0.7	2.8	0.5	0.4	0.9	0.1	0.6			
	27 4m N of Conveyor transfer out of Clinker Building	445	1.1	3.6	4.2	2.7	0.8	0.3	0.3	1.6	0.9	0.8	2.1	0.4	1.0	0.7	1.3	1.3	0.7	1.1	0.9	0.9	0.0	0.5	0.4	0.3	0.2			
	28 4m N of dust collector on next building W , conveyor transfer noise	444	1.2	2.0	2.6	1.5	1.4	1.2	0.1	1.2	0.6	0.4	0.1	1.1	1.0	0.1	0.3	1.1	1.4	0.1	0.3	0.7	0.5	0.8	0.4	0.1	0.2			
	CM6 W wall fan discharge at platform ~8m	441	6.9	1.2	0.4	1.2	2.2	1.3	0.0	0.6	1.1	1.6	3.5	1.8	2.0	1.8	3.4	2.7	1.9	0.8	0.8	1.4	0.9	0.4	0.8	0.7	1.5			
	Door platform near CM6 W wall fan @ 7.5m	80	9.2	1.9	0.2	0.1	3.3	1.2	0.9	0.1	0.5	2.9	1.8	1.5	0.3	1.1	1.7	1.4	1.3	0.7	1.4	1.0	0.5	0.9	0.5	1.2	0.1			
	Door platform near CM6 W wall fan @ 3.5m	83	7.9	0.3	3.6	2.2	4.1	1.5	3.1	0.0	0.6	1.7	0.4	3.3	1.2	1.9	0.3	1.7	0.6	0.6	1.0	1.2	1.1	0.2	0.5	0.8	0.1			

Red highlighted cell means exceeds criteria

Table 4.6: Boral Cement Berrima - 2020 Annual Noise Assessment: Monitoring location Spectrum Sound Levels

Location	Time	File	Date	Total dB		A-weighted LAeq,t Sound Level dBA in One Third Octave Frequency Band Hz																														
	of Day	No		dBC	dBA	12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
4 Melbourne St	D	1	9-Oct	70	58	7	12	17	21	26	30	37	38	38	45	44	44	43	46	46	46	47	48	49	50	48	46	44	42	41	39	36	32	28	21	13	9
4 Melbourne St	D	454	27-Oct	69	57	4	10	19	19	25	33	34	38	40	41	42	42	42	46	45	45	46	48	49	48	46	44	41	39	38	34	31	27	23	18	8	1
4 Melbourne St	E	35	12-Oct	61	-2	2	7	10	15	18	19	23	25	30	33	36	36	30	33	36	35	35	38	38	37	35	32	29	27	24	21	19	16	13	10		
4 Melbourne St	E	78	21-Oct	68	-2	2	8	15	14	18	25	34	40	38	45	46	44	39	41	39	38	39	41	41	40	39	39	38	37	34	33	31	27	22	16		
4 Melbourne St	N	82	21-Oct	64	-2	2	9	17	15	20	22	26	28	31	35	41	40	32	35	36	36	37	39	38	37	36	34	31	29	27	26	23	19	15	10		
12 Brisbane St	E	36	12-Oct	59	-1	2	5	11	14	15	19	19	23	23	28	31	30	29	31	30	30	30	31	31	29	28	27	25	24	22	20	17	14	11	8		
12 Brisbane St	E	79	21-Oct	61	-2	0	6	17	13	17	17	19	22	23	26	31	28	25	26	27	28	30	32	28	26	24	23	21	21	21	19	18	15	12	8		
12 Brisbane St	N	85	22-Oct	63	-2	2	8	19	16	15	17	20	23	24	27	31	31	27	28	29	31	32	34	35	33	28	27	27	28	27	26	25	22	20	16		
12 Brisbane St	D	121S	27-Oct	68	-5	1	8	17	16	22	23	28	38	36	38	43	40	46	49	52	50	47	47	47	46	45	43	40	38	38	34	30	27	24	19		
Taylor / Adelaide St	E	37	12-Oct	67	-2	3	7	13	20	20	36	30	30	34	35	42	42	38	39	44	43	43	44	45	45	43	41	40	39	36	34	31	27	22	16		
Taylor / Adelaide St	E	80	21-Oct	64	-2	2	8	19	17	18	22	25	25	28	32	38	37	31	32	34	35	36	39	41	38	37	35	32	30	27	25	22	18	14	9		
Taylor / Adelaide St	N	81	21-Oct	66	2	5	10	21	19	20	26	27	29	32	35	41	42	36	37	38	38	39	41	43	42	41	41	40	44	35	31	29	27	29	21		
Taylor / Adelaide St	D	123S	27-Oct	71	-5	2	10	22	21	24	29	32	43	42	46	47	47	45	45	47	49	50	51	52	51	49	48	46	45	43	41	39	35	31	29		
North Fence	E	34	12-Oct	64	-2	7	13	14	20	20	22	23	26	30	31	31	30	29	33	38	40	39	38	36	34	32	29	27	23	20	19	17	16	13	11		
North Fence	E	75	21-Oct	67	6	6	14	23	19	26	23	29	27	28	30	38	37	31	33	34	33	35	35	36	36	34	33	30	28	26	24	23	20	18	15		
North Fence	N	84	21-Oct	68	7	7	15	24	19	25	24	26	30	30	30	40	39	32	34	38	38	39	40	39	38	36	34	31	30	27	25	24	21	18	15		
North Fence	D	120S	27-Oct	70	-1	6	14	26	23	27	28	34	35	35	37	37	39	36	39	44	46	45	44	43	42	40	38	36	34	31	33	31	26	19	16		
Location 20	D	55	21-Oct	71	7	9	16	25	23	29	29	32	34	36	39	45	44	38	38	40	40	40	40	41	42	39	39	38	35	33	34	29	28	21	15		
Location 20	D	56	21-Oct	70	8	8	16	25	21	28	27	32	33	33	37	45	44	34	37	39	39	39	40	40	40	38	36	34	29	25	23	20	17	14	11		
Location 20	D	57	21-Oct	69	7	8	15	20	22	28	29	33	37	37	39	45	44	37	40	40	39	41	42	42	42	42	41	39	39	38	35	31	26	20	16		
Location 20	E	74	21-Oct	70	7	7	16	26	18	25	28	32	32	33	38	45	43	35	38	38	38	39	39	39	40	39	38	34	31	28	24	20	15	13	10		
Location 20	N	83	21-Oct	71	7	5	15	27	19	26	29	35	35	37	44	45	38	35	40	41	40	42	43	42	42	41	40	38	36	33	31	28	25	22	17		
Location 20	D	451	27-Oct	73	1	7	18	26	23	30	36	41	40	40	42	45	43	42	44	47	48	49	49	48	48	48	46	46	45	44	40	37	31	23	17	7	0
Location 20/Traffic Island	D	453	27-Oct	72	3	9	19	27	23	29	31	34	38	39	42	44	43	38	42	49	51	49	48	47	46	45	43	41	38	35	32	25	20	14	8	4	-1
Argyle St	D	455	27-Oct	68	1	6	12	17	19	23	31	32	32	36	41	42	43	44	48	44	46	48	48	48	47	45	43	40	38	36	33	30	26	21	16	6	0

Table 4.6A: Boral Cement Berrima - 2020 Annual Noise Assessment: Tonality of Monitoring location Spectrum Sound Levels

Location	Time of Day	File No	Date	Tonality dB in One-Third Octave Frequency Band - Hz																										
				31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
Criteria				15.0	15.0	15.0	15.0	15.0	15.0	15.0	8.0	8.0	8.0	8.0	8.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
4 Melbourne St	D	1	9-Oct	3.1	3.0	0.7	0.9	0.8	0.5	0.3	1.0	2.6	3.2	0.1	0.8	0.5	1.4	0.6	1.1	1.1	1.3	1.1	0.2	0.3	0.3	0.5	0.0	1.3	0.9	0.3	1.1
4 Melbourne St	D	454	27-Oct	3.1	3.0	0.7	0.9	0.8	0.5	0.3	1.0	2.6	3.2	0.1	0.8	0.5	1.4	0.6	1.1	1.1	1.3	1.1	0.2	0.3	0.3	0.5	0.0	1.3	0.9	0.3	1.1
4 Melbourne St	E	35	12-Oct	1.8	0.4	1.4	1.0	1.1	0.6	0.0	1.4	3.2	4.3	0.1	1.5	0.0	1.7	1.0	1.1	0.3	0.5	0.1	0.3	0.3	0.1	0.3	0.3	0.2	0.0		
4 Melbourne St	E	78	21-Oct	2.9	0.9	1.4	1.4	4.1	4.4	3.2	1.3	1.6	4.0	2.5	0.5	1.0	0.4	0.9	0.3	0.4	0.4	0.3	0.0	1.0	0.9	0.2	1.3	0.5	0.1		
4 Melbourne St	N	82	21-Oct	3.9	1.9	1.5	1.6	1.1	0.4	0.8	3.7	3.2	5.6	1.0	0.9	0.9	0.4	1.3	0.0	0.1	0.9	0.3	0.1	0.6	0.1	0.8	0.3	0.3	0.3		
12 Brisbane St	E	36	12-Oct	1.8	1.8	1.5	1.1	1.3	2.2	1.0	1.9	0.3	1.9	1.8	0.5	0.3	0.0	0.3	0.7	0.2	0.0	0.3	0.1	0.1	0.3	0.1	0.4	0.4	0.6		
12 Brisbane St	E	79	21-Oct	3.9	1.8	0.6	0.9	1.4	1.6	0.3	3.4	0.4	2.1	0.2	0.3	0.2	0.2	2.4	0.6	0.2	0.3	0.4	1.1	0.1	0.8	0.0	0.6	0.4	0.0		
12 Brisbane St	N	85	22-Oct	1.2	1.9	0.1	0.1	0.7	0.8	0.5	1.8	2.2	2.6	0.1	0.5	0.4	0.8	0.9	1.5	1.0	1.5	0.9	0.1	0.6	0.1	0.2	0.6	0.0	0.6		
12 Brisbane St	D	121S	27-Oct	3.4	2.3	2.0	2.7	6.1	1.8	1.7	4.2	4.7	1.6	0.0	2.5	0.8	1.8	0.2	0.8	0.1	0.8	0.2	0.6	0.8	1.9	0.2	0.0	0.1	0.4		
Taylor / Adelaide St	E	37	12-Oct	3.6	7.7	10.6	3.2	1.5	1.1	2.4	2.9	2.3	2.7	2.1	3.4	0.8	0.4	0.4	0.1	0.7	0.1	0.0	0.3	0.8	0.1	0.2	0.7	0.2	0.7		
Taylor / Adelaide St	E	80	21-Oct	1.6	1.6	0.2	1.5	0.9	1.3	0.5	3.5	2.4	3.3	0.6	0.6	0.5	0.6	0.6	2.2	0.5	0.1	0.2	0.2	0.0	0.1	0.2	0.7	0.0	0.3		
Taylor / Adelaide St	N	81	21-Oct	1.6	2.2	2.4	0.9	0.1	0.4	1.5	2.8	3.3	3.0	0.8	0.8	0.5	0.1	0.3	1.1	0.1	0.0	0.0	2.2	6.3	2.6	0.6	0.3	2.3	5.1		
Taylor / Adelaide St	D	123S	27-Oct	1.8	0.8	0.6	3.3	5.4	2.0	1.2	0.4	1.4	1.4	1.0	0.4	0.0	0.2	0.3	0.7	0.8	0.6	0.5	0.6	0.6	0.1	0.5	1.4	0.3	0.8		
North Fence	E	34	12-Oct	2.6	0.9	0.7	1.4	0.3	1.3	0.5	0.4	0.3	2.6	0.8	1.7	1.3	0.6	0.1	0.2	0.1	0.7	0.7	1.1	0.4	0.7	0.0	0.3	0.8	0.1		
North Fence	E	75	21-Oct	5.6	4.7	4.3	3.7	1.2	0.5	3.0	4.3	2.8	4.1	0.1	1.3	1.4	0.5	0.2	0.0	1.0	0.0	0.6	0.6	0.2	0.2	0.2	0.7	0.6	0.6		
North Fence	N	84	21-Oct	5.1	2.9	1.2	1.0	2.0	0.1	5.3	6.1	2.8	4.5	1.0	2.0	0.5	0.1	0.8	0.3	0.4	0.0	0.3	0.7	0.5	0.2	0.3	0.9	0.2	0.3		
North Fence	D	120S	27-Oct	3.3	1.6	2.4	2.5	0.0	0.3	0.5	1.0	3.0	3.5	0.6	1.4	1.5	0.4	0.7	0.4	0.5	0.1	0.3	0.1	0.4	2.6	2.0	1.9	0.4	1.3		
Location 20	D	55	21-Oct	4.6	3.4	1.4	0.3	0.2	0.6	1.5	3.6	2.3	3.2	0.5	1.0	0.5	0.3	0.1	0.4	2.1	1.2	0.3	1.8	1.1	1.3	3.0	1.9	2.7	0.2		
Location 20	D	56	21-Oct	6.0	4.4	3.0	1.9	0.6	2.0	2.5	5.1	4.1	6.5	0.5	1.0	0.2	0.5	0.2	0.4	0.8	0.4	0.4	1.5	0.7	0.8	0.4	0.1	0.1	0.2		
Location 20	D	57	21-Oct	2.0	2.8	1.8	0.3	2.0	1.5	1.9	4.0	2.7	5.1	1.8	0.2	0.9	0.1	0.2	0.8	0.5	0.4	0.7	0.9	0.6	0.9	0.4	0.6	0.1	0.4		
Location 20	E	74	21-Oct	7.2	2.0	0.6	1.9	0.5	2.0	0.8	4.3	2.8	4.9	0.9	0.2	0.4	0.5	0.3	0.2	0.9	0.2	1.7	0.4	0.1	0.3	0.5	0.3	1.4	0.3		
Location 20	N	83	21-Oct	7.2	1.9	1.9	3.6	1.3	2.5	3.4	3.3	1.6	3.8	1.5	1.3	1.7	0.8	0.7	0.3	0.5	0.4	0.2	0.3	0.4	0.0	0.1	0.0	0.4	0.9		
Location 20	D	451	27-Oct	3.1	3.0	0.7	0.9	0.8	0.5	0.3	1.0	2.6	3.2	0.1	0.8	0.5	1.4	0.6	1.1	1.1	1.3	1.1	0.2	0.3	0.3	0.5	0.0	1.3	0.9	0.3	1.1
Location 20/Traffic Island	D	453	27-Oct	3.1	3.0	0.7	0.9	0.8	0.5	0.3	1.0	2.6	3.2	0.1	0.8	0.5	1.4	0.6	1.1	1.1	1.3	1.1	0.2	0.3	0.3	0.5	0.0	1.3	0.9	0.3	1.1
Argyle St	D	455	27-Oct	3.1	3.0	0.7	0.9	0.8	0.5	0.3	1.0	2.6	3.2	0.1	0.8	0.5	1.4	0.6	1.1	1.1	1.3	1.1	0.2	0.3	0.3	0.5	0.0	1.3	0.9	0.3	1.1

Figure A1: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra PHT Level 8 Upper Platform

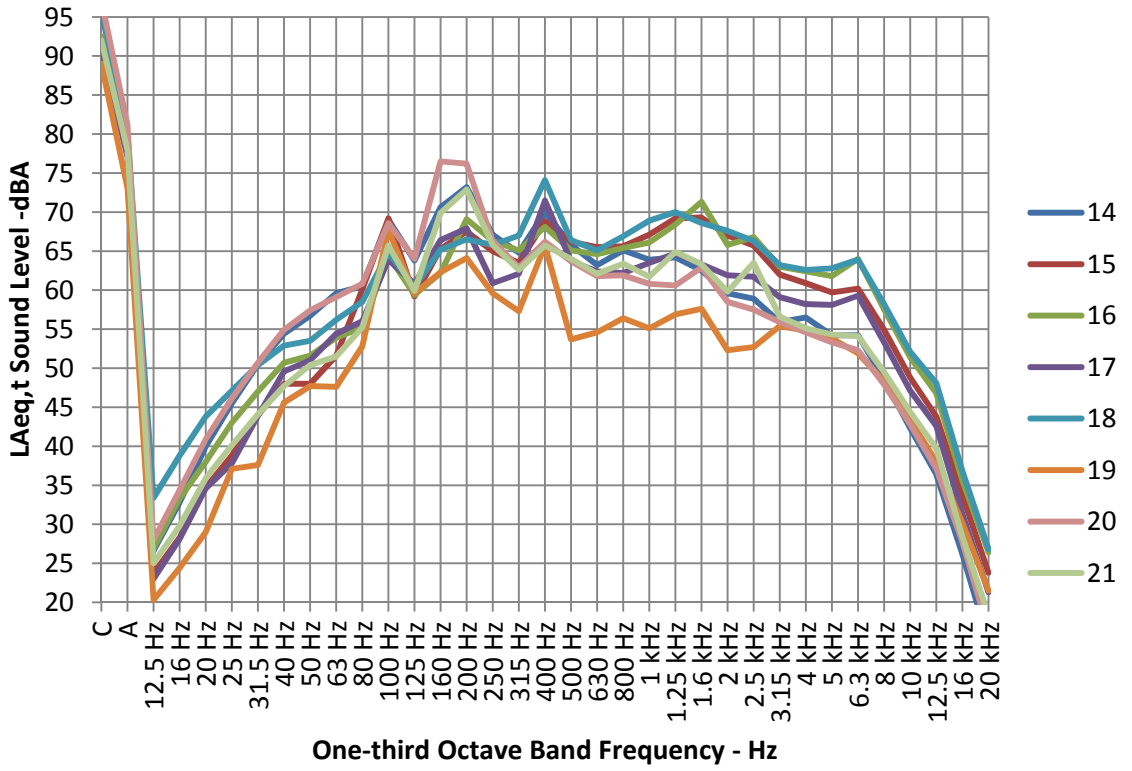


Figure A1A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra PHT Level 8 Upper Platform

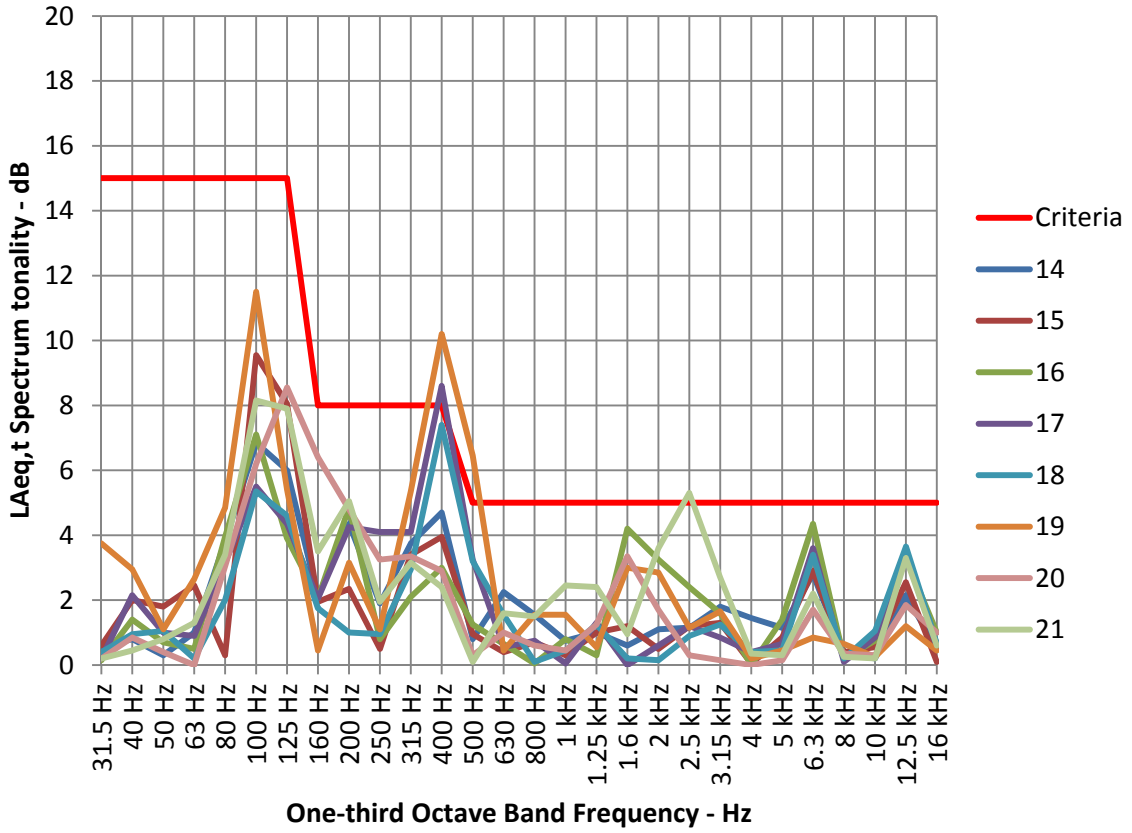


Figure A2: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra PHT Level 8 Proper

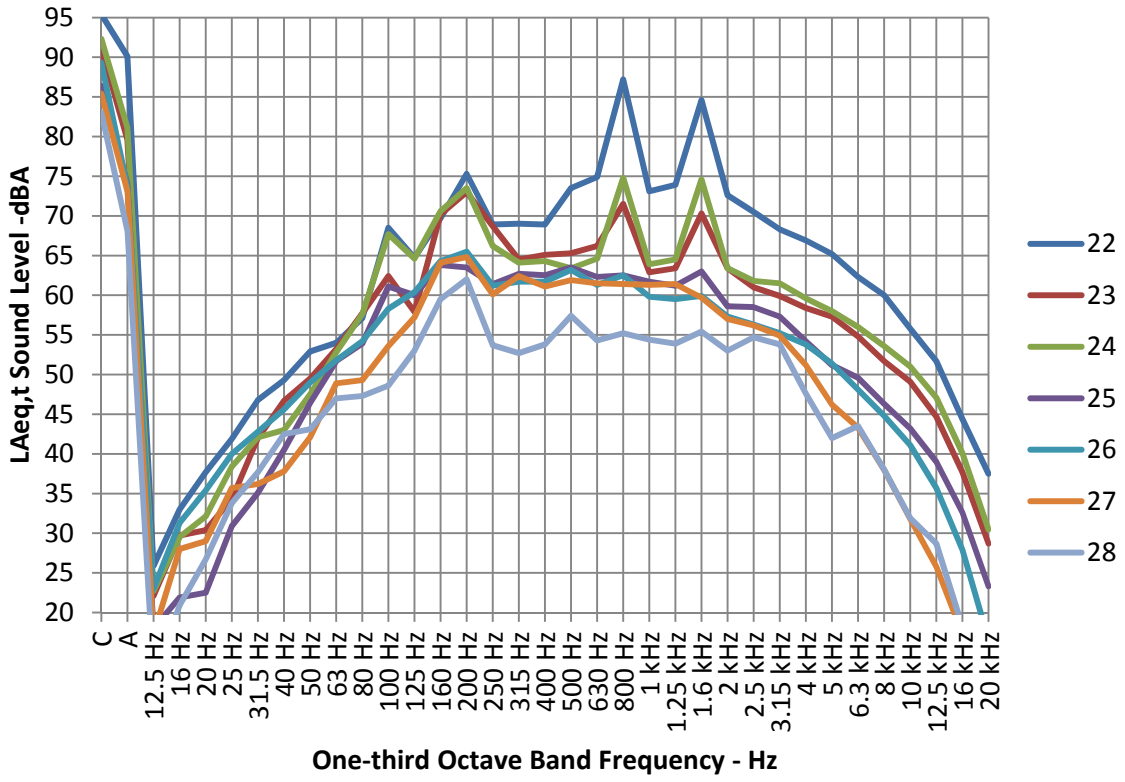


Figure A2A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra PHT Level 8 Proper

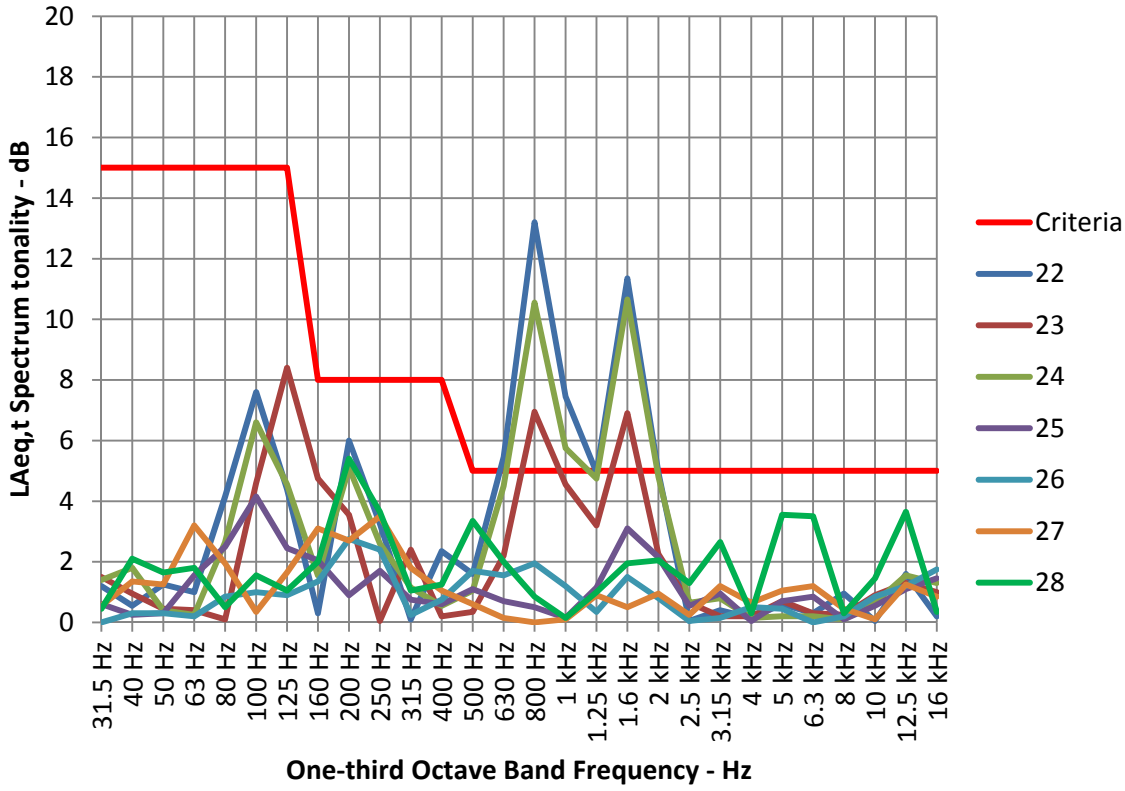


Figure A3: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra PHT Level 7

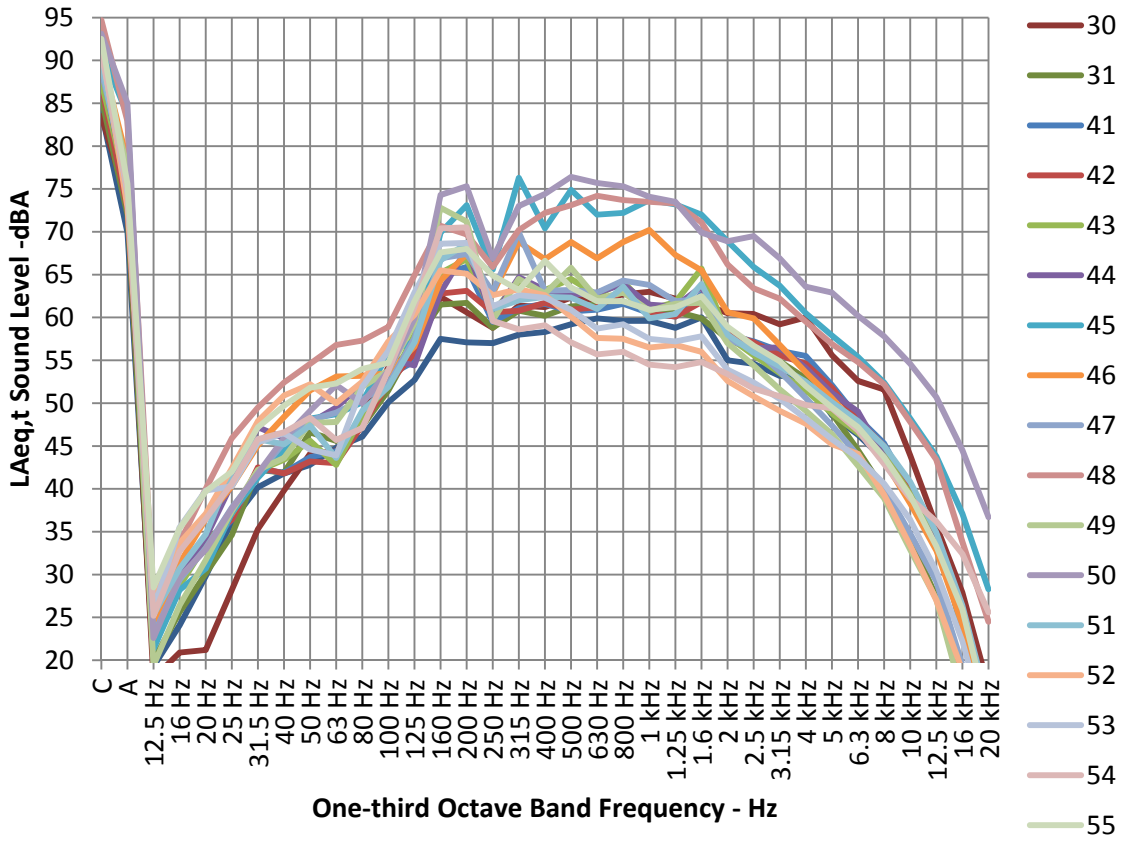


Figure A3A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra PHT Level 7

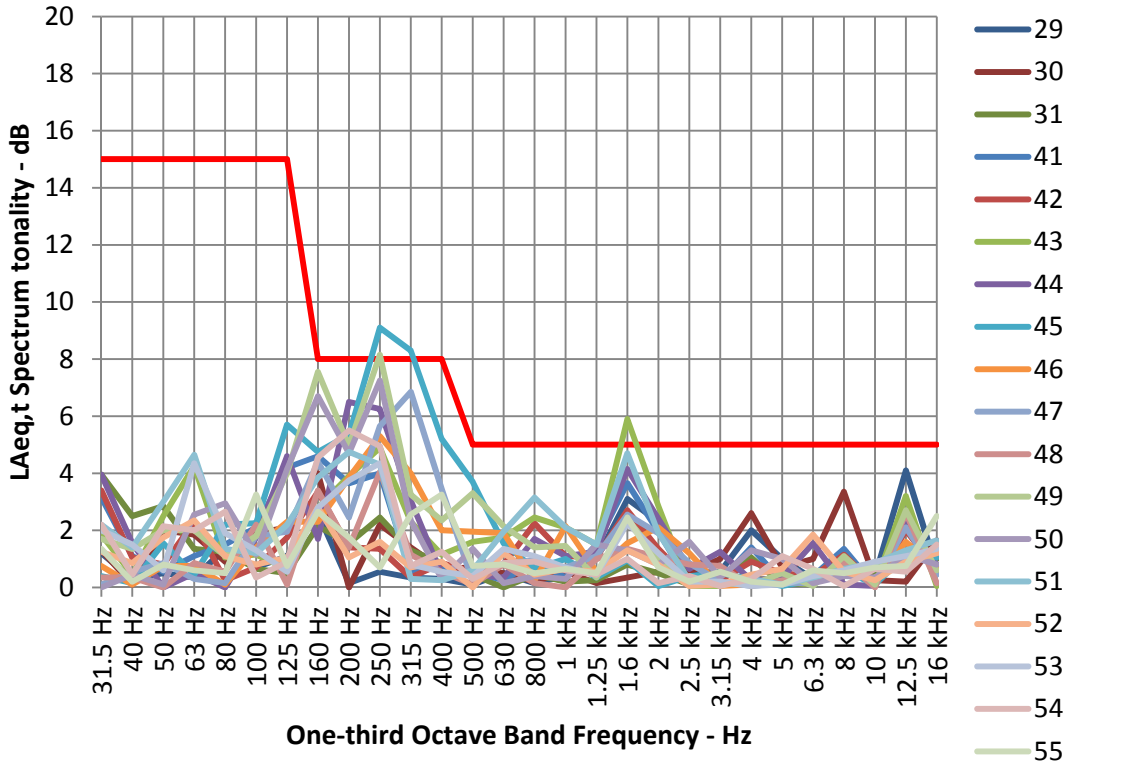


Figure A4: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra PHT Level 7 Alt. Fuels area

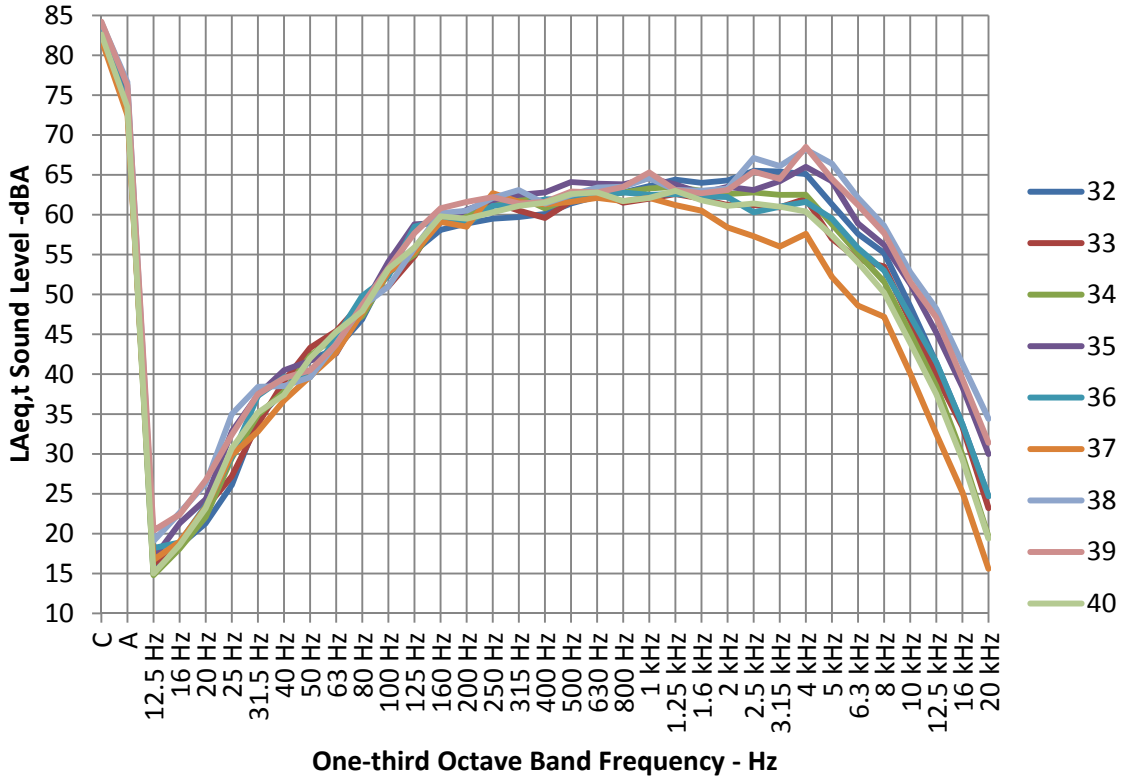


Figure A4A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra PHT Level 7 Alt. Fuels area

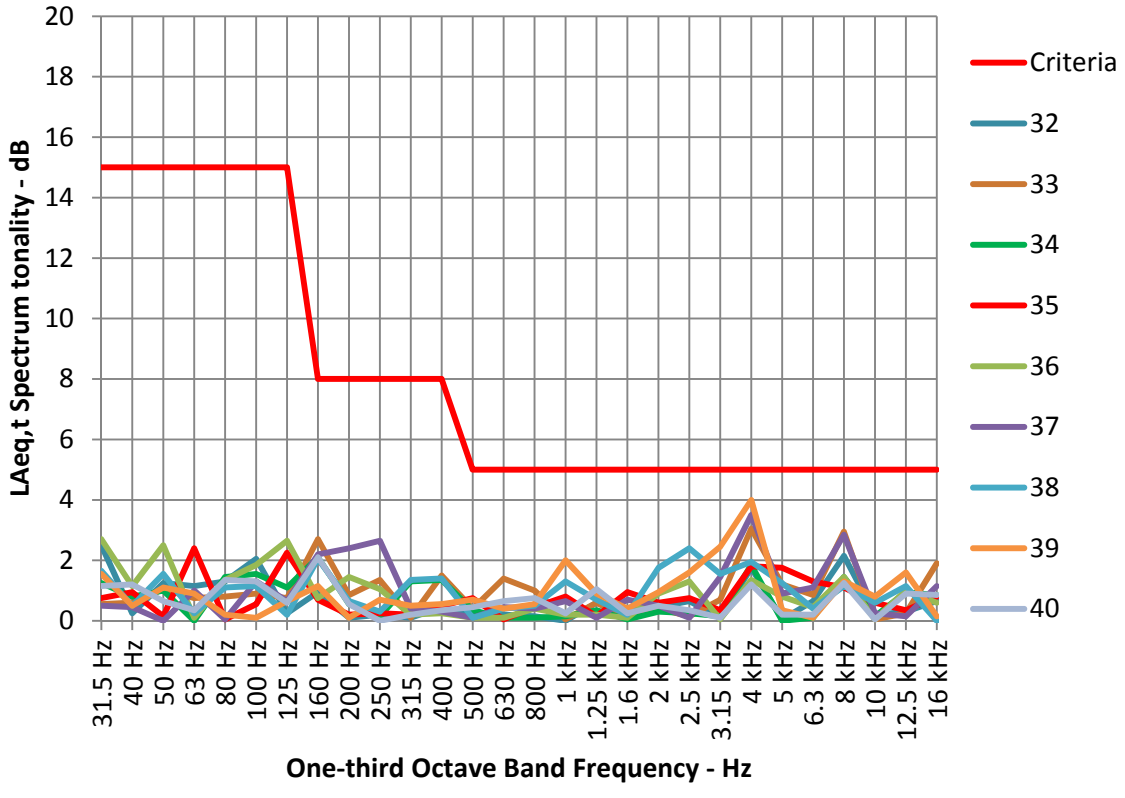


Figure A5: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra PHT Level 6 Silo Top area

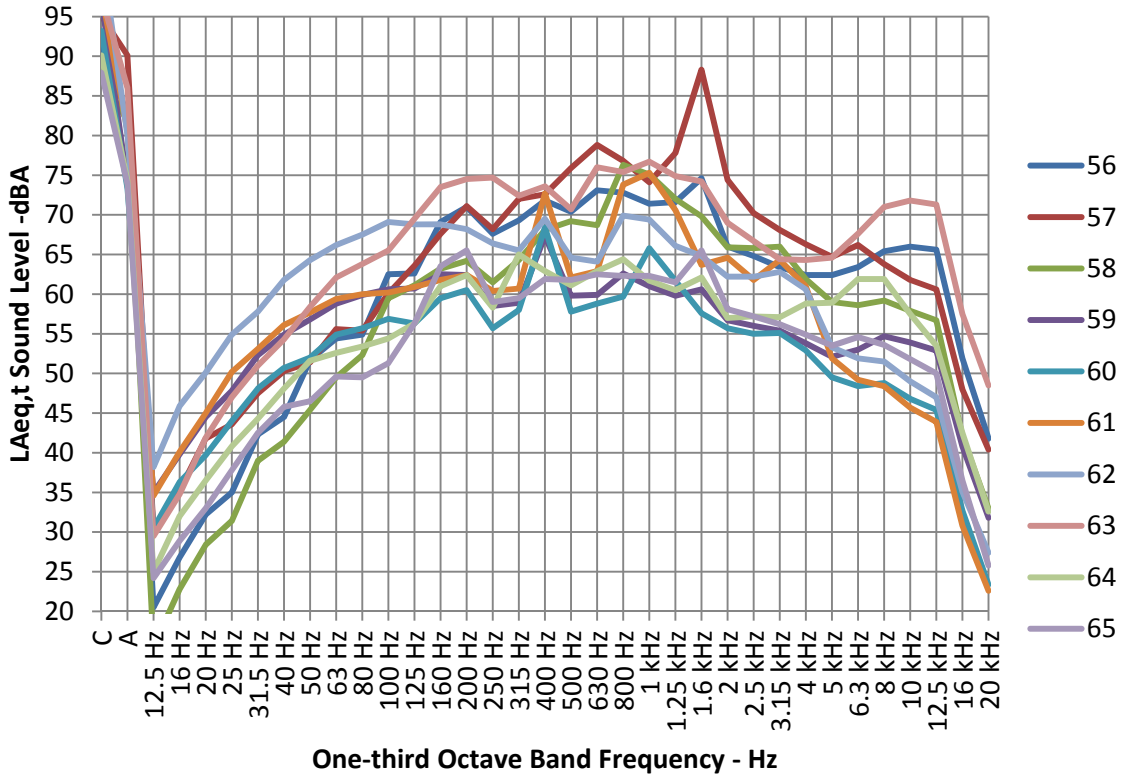


Figure A5A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra PHT Level 6 Silo Top area

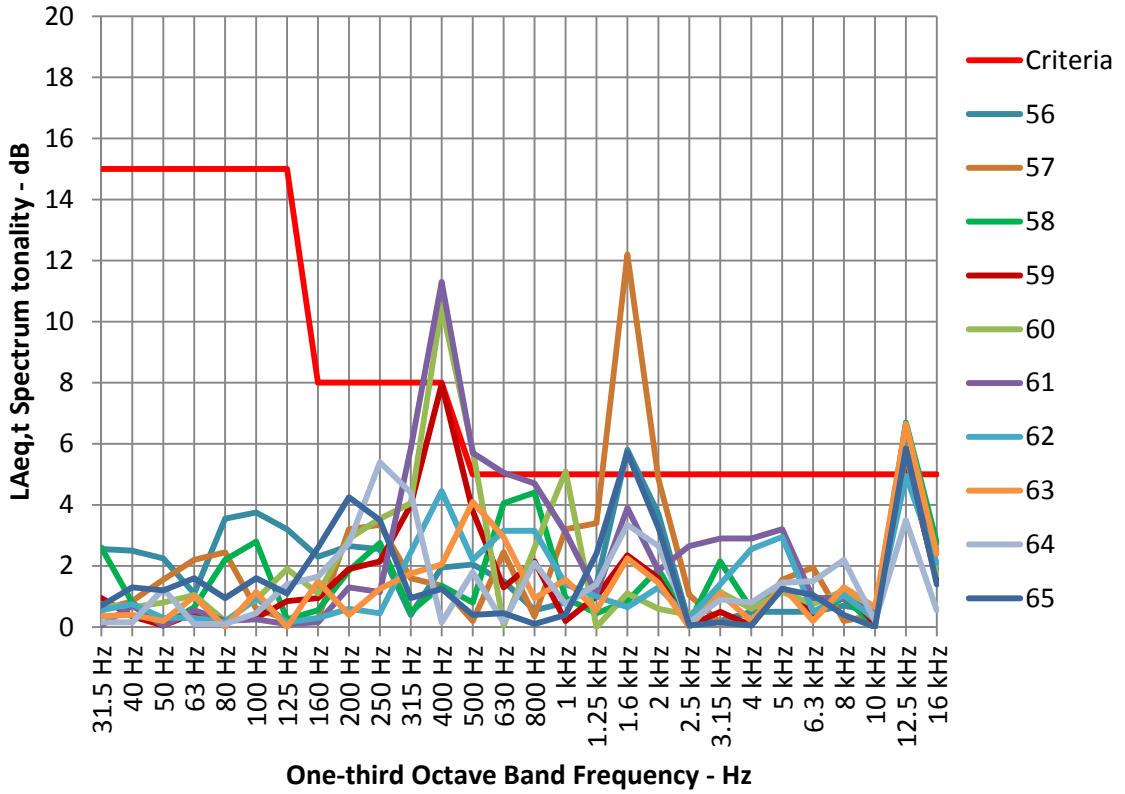


Figure A6: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra PHT Level 6 general area

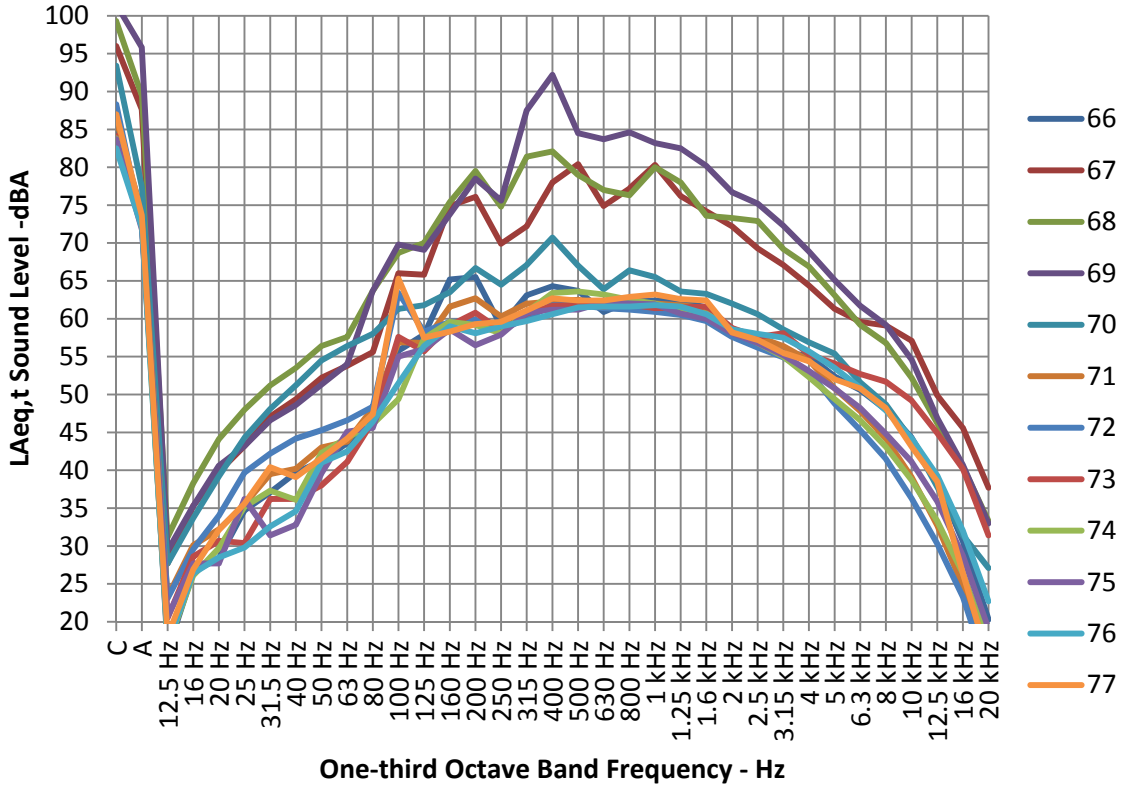


Figure A6A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra PHT Level 6 general area

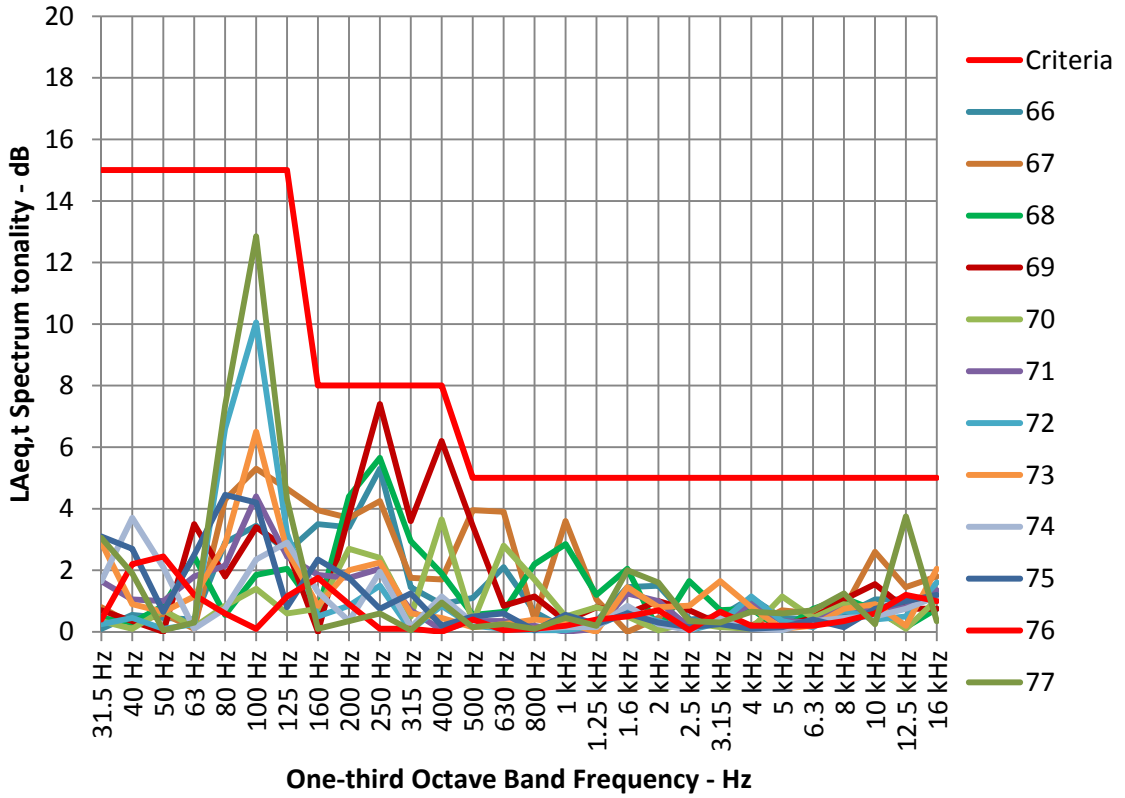


Figure A7: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra PHT Level 6 inside Silo top

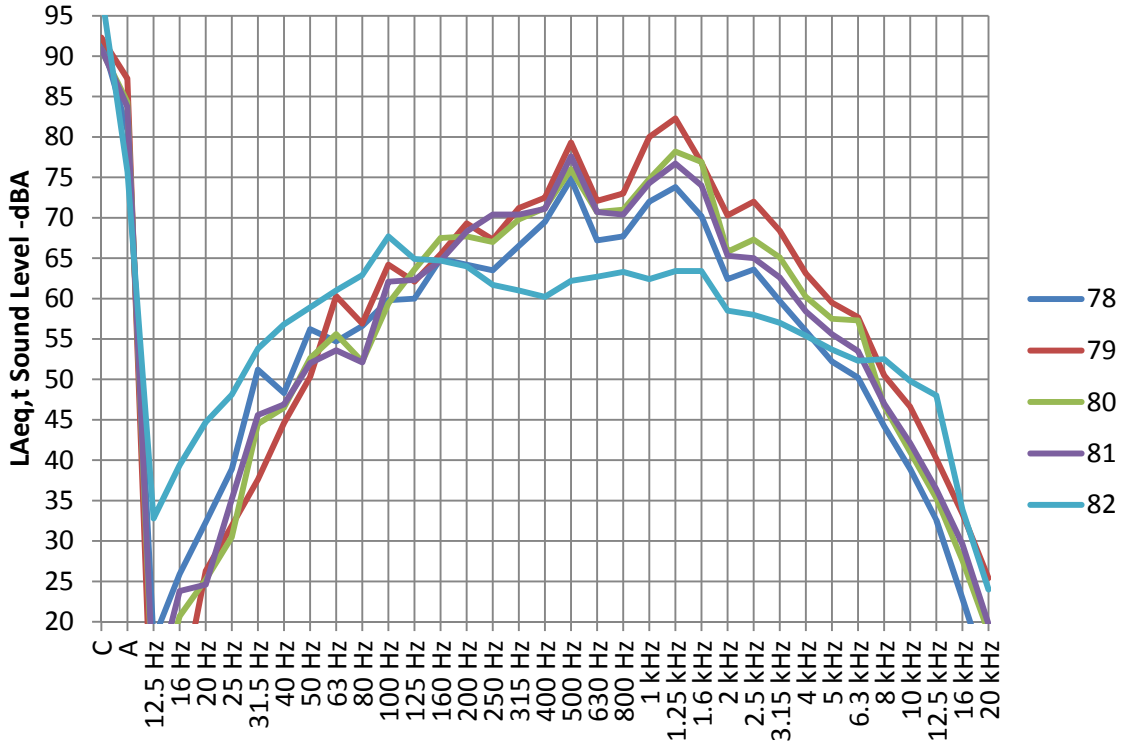


Figure A7A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra PHT Level 6 inside Silo top

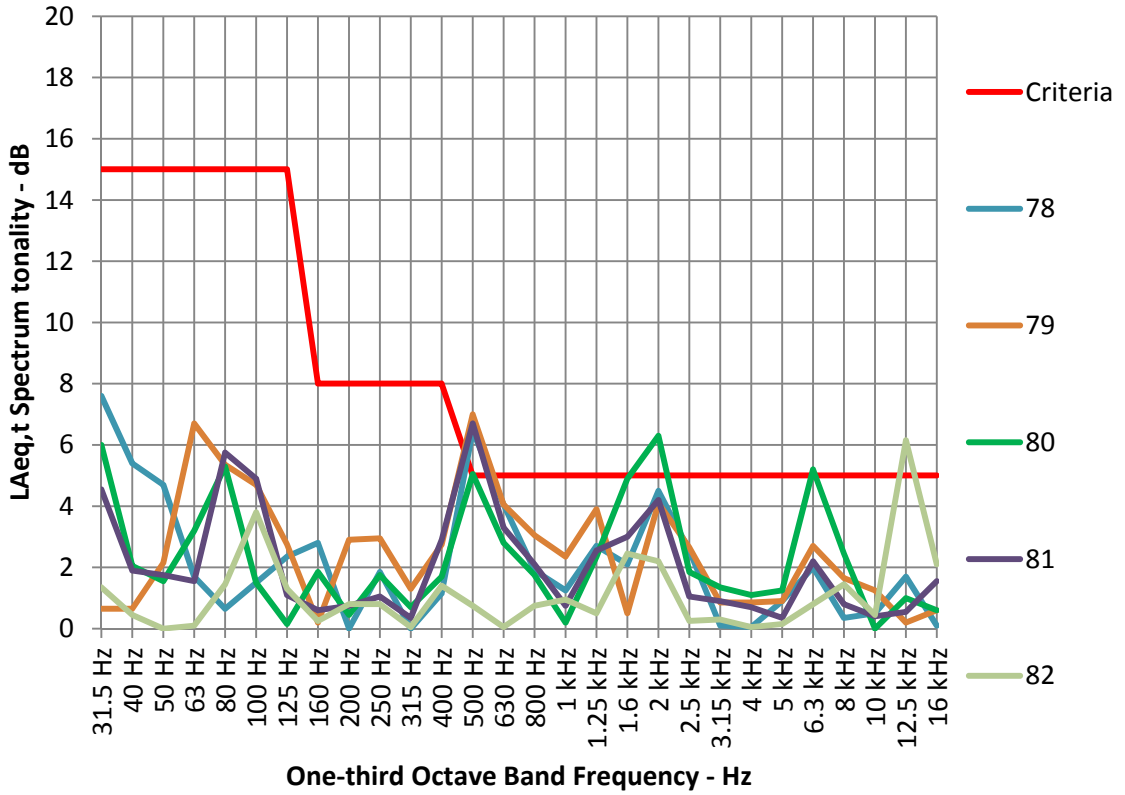


Figure A8: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra PHT Level 5

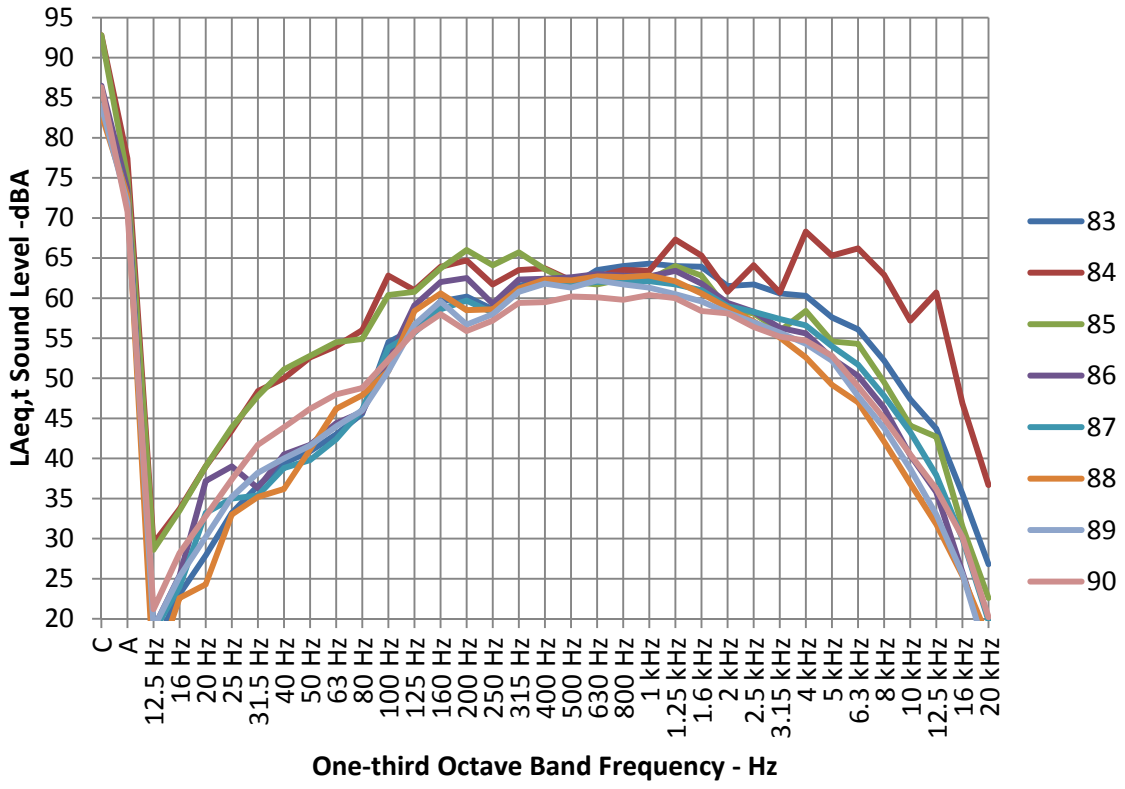


Figure A8A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra PHT Level 5

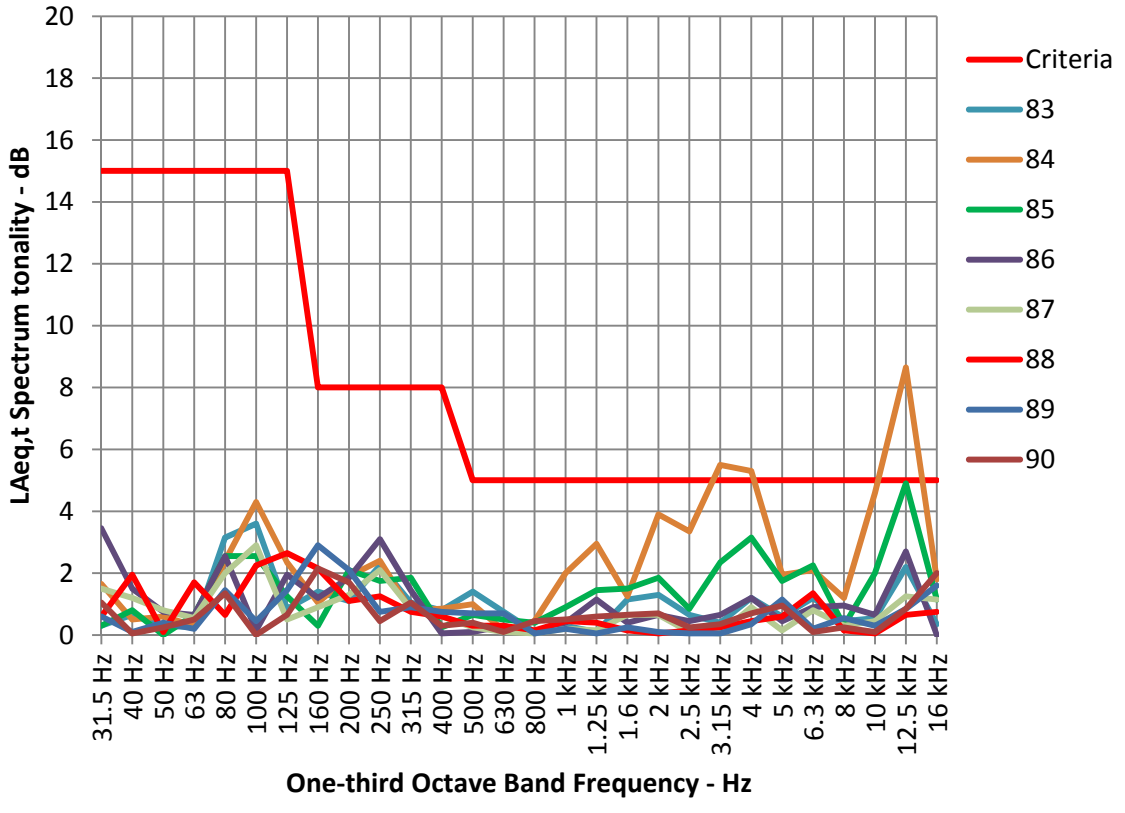


Figure A9: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra PHT Level 4

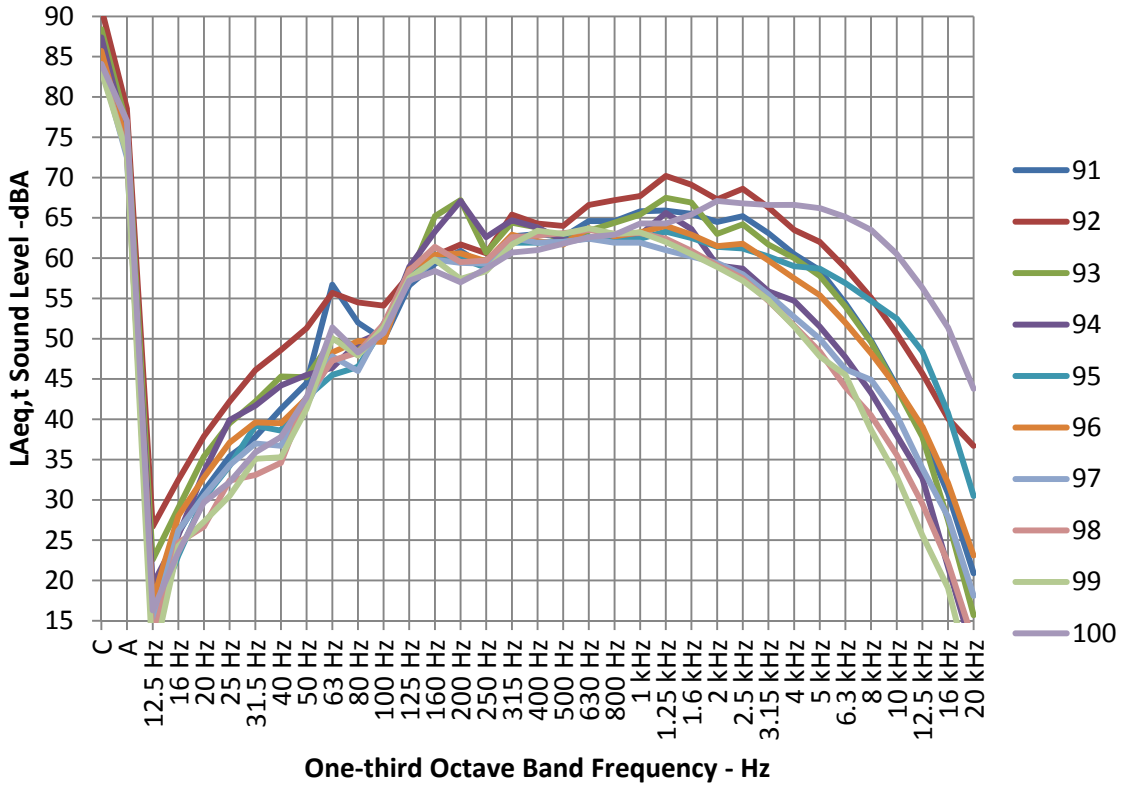


Figure A9A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra PHT Level 4

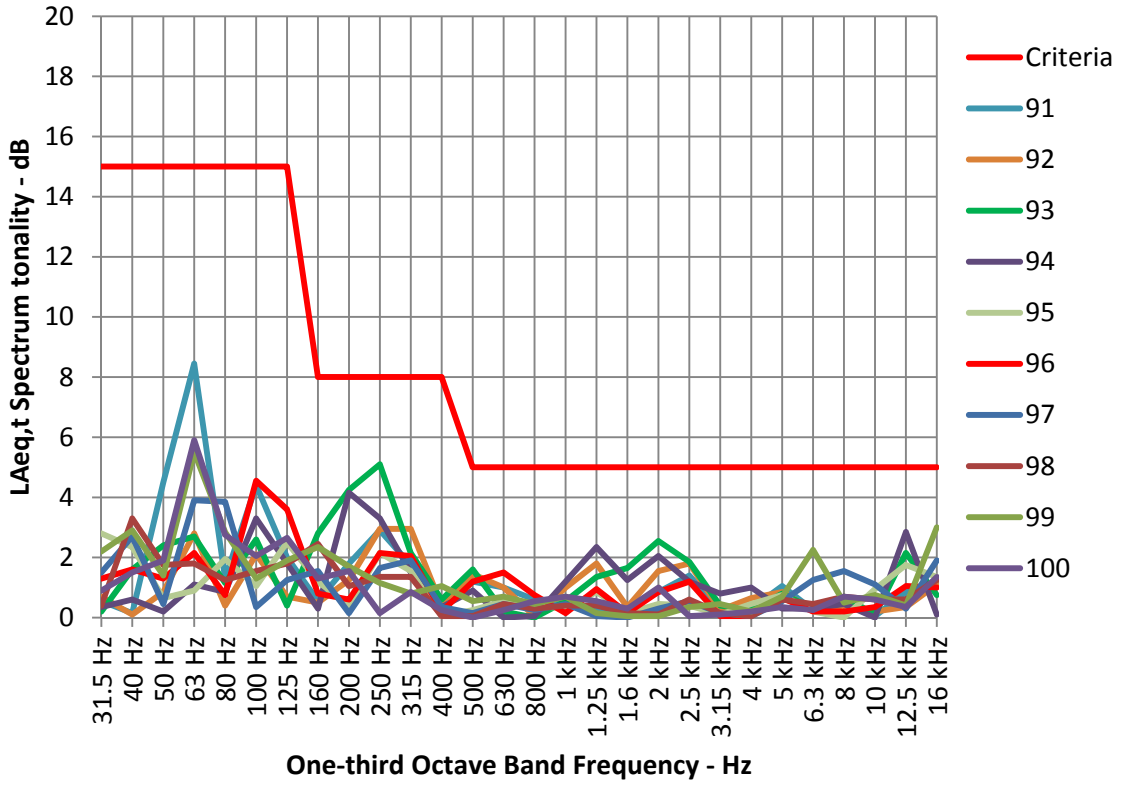


Figure A10: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra ESP Top

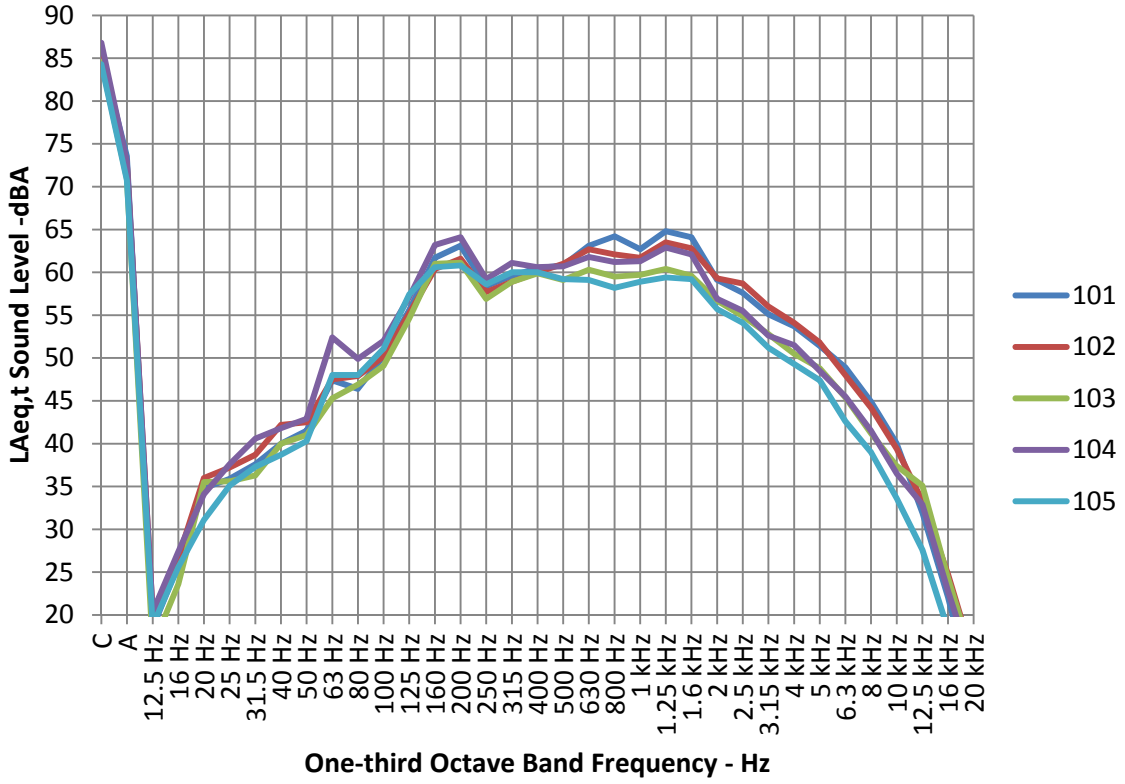


Figure A10A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra ESP top

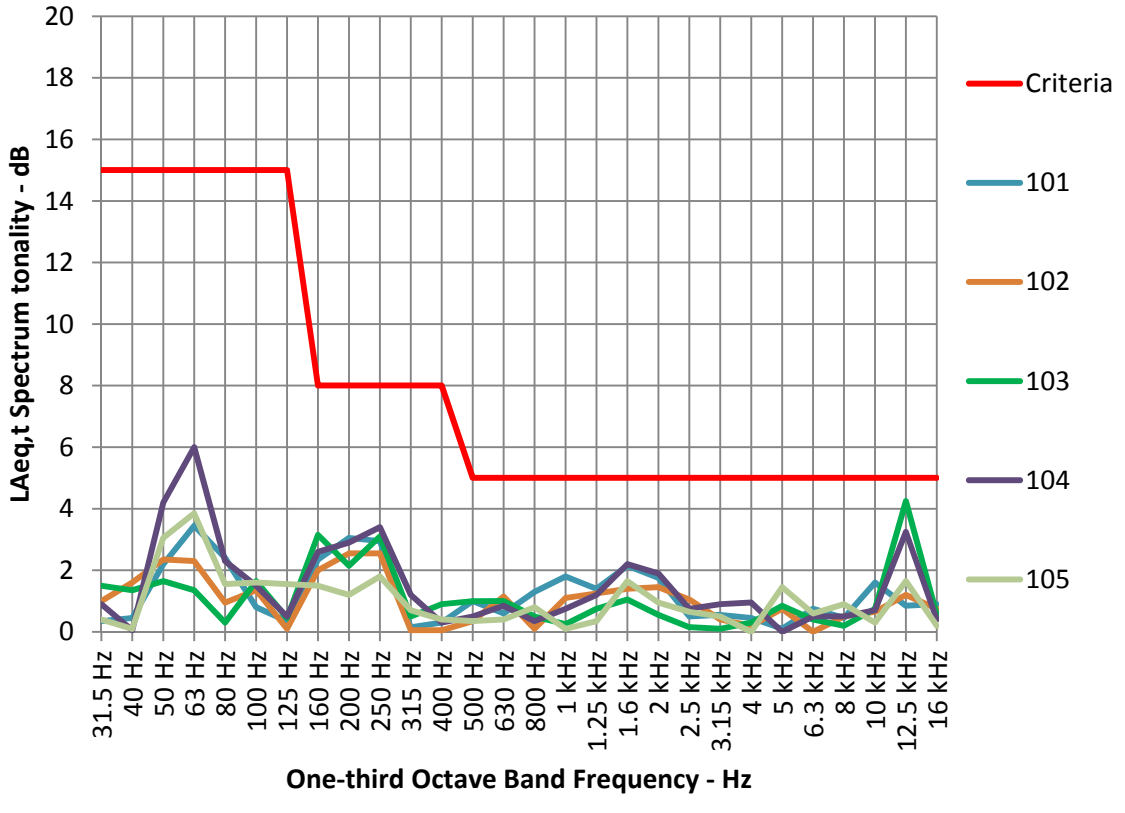


Figure A11: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra PHT Level 3

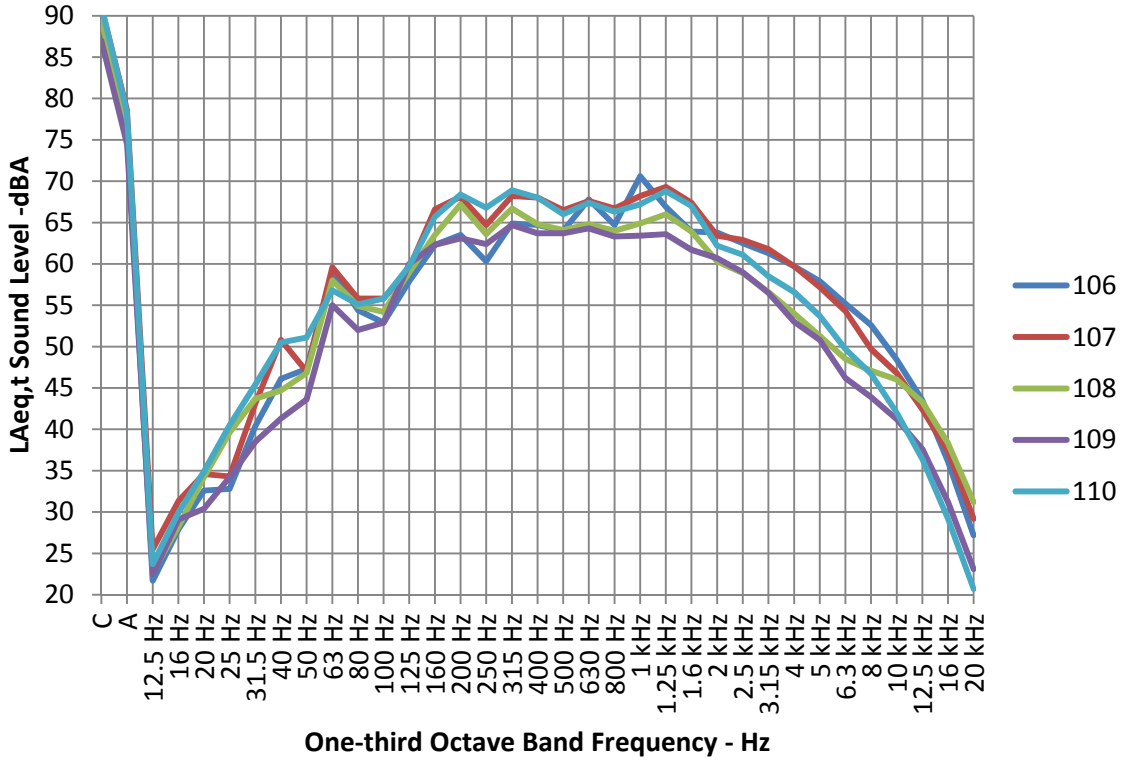


Figure A11A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra PHT Level 3

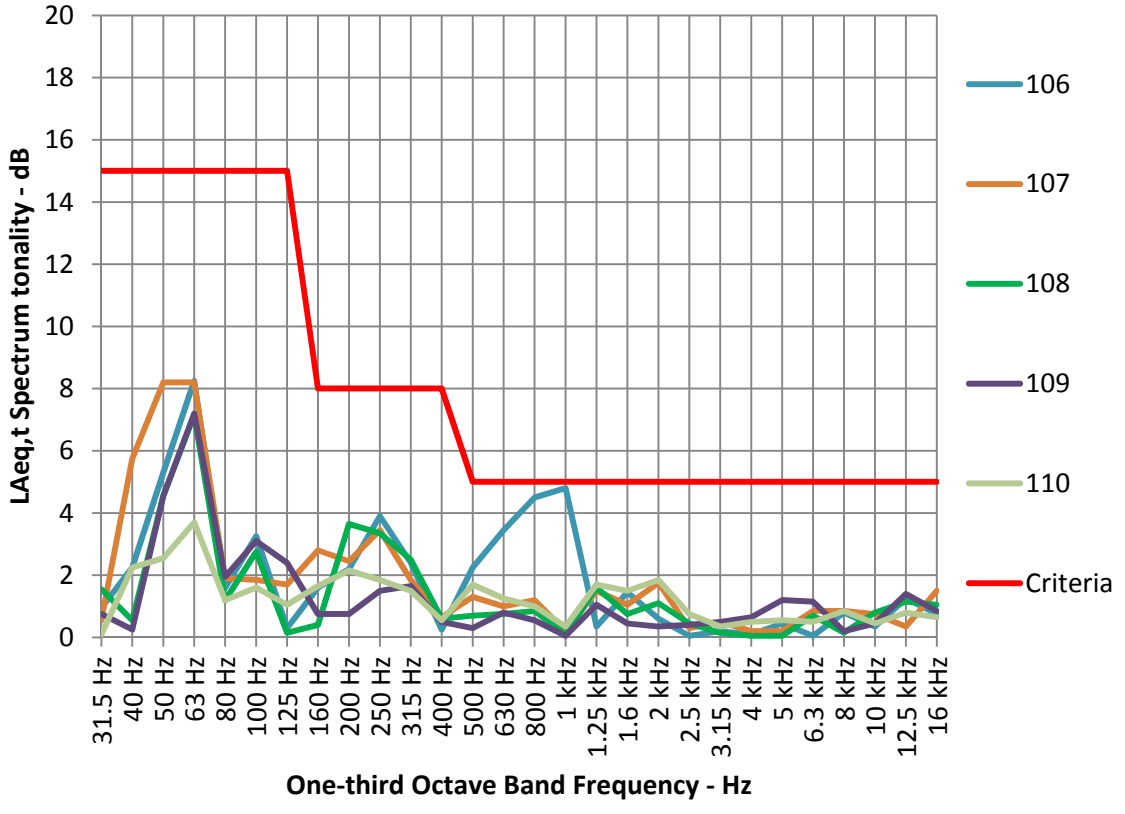


Figure A12: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra PHT Level 2.5 & 2.25

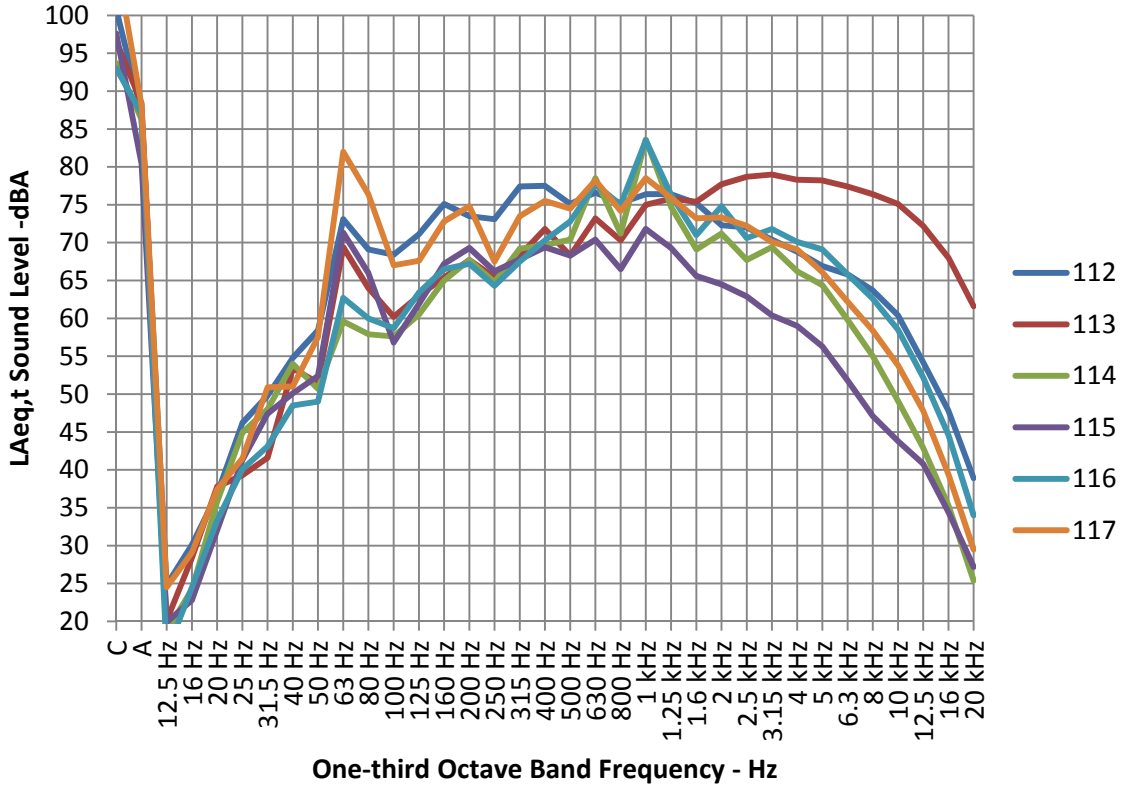


Figure A12A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra PHT Level 2.5 & 2.25

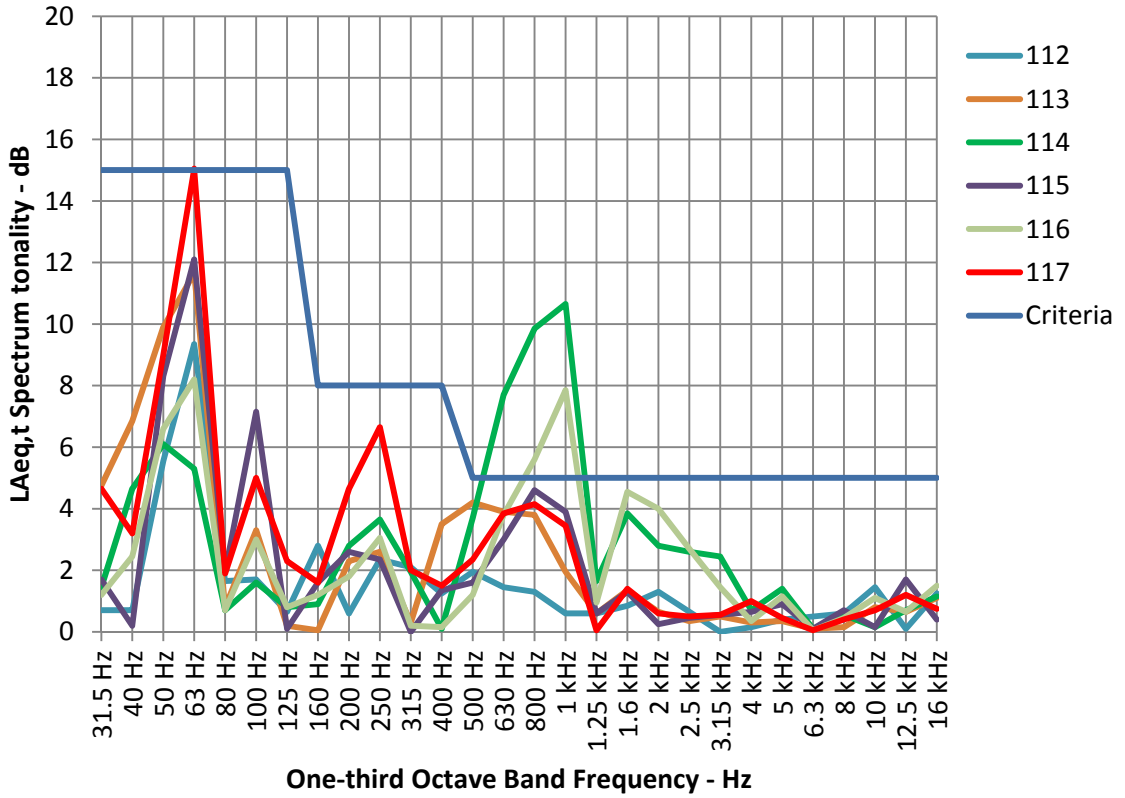


Figure A13: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra PHT Level 2

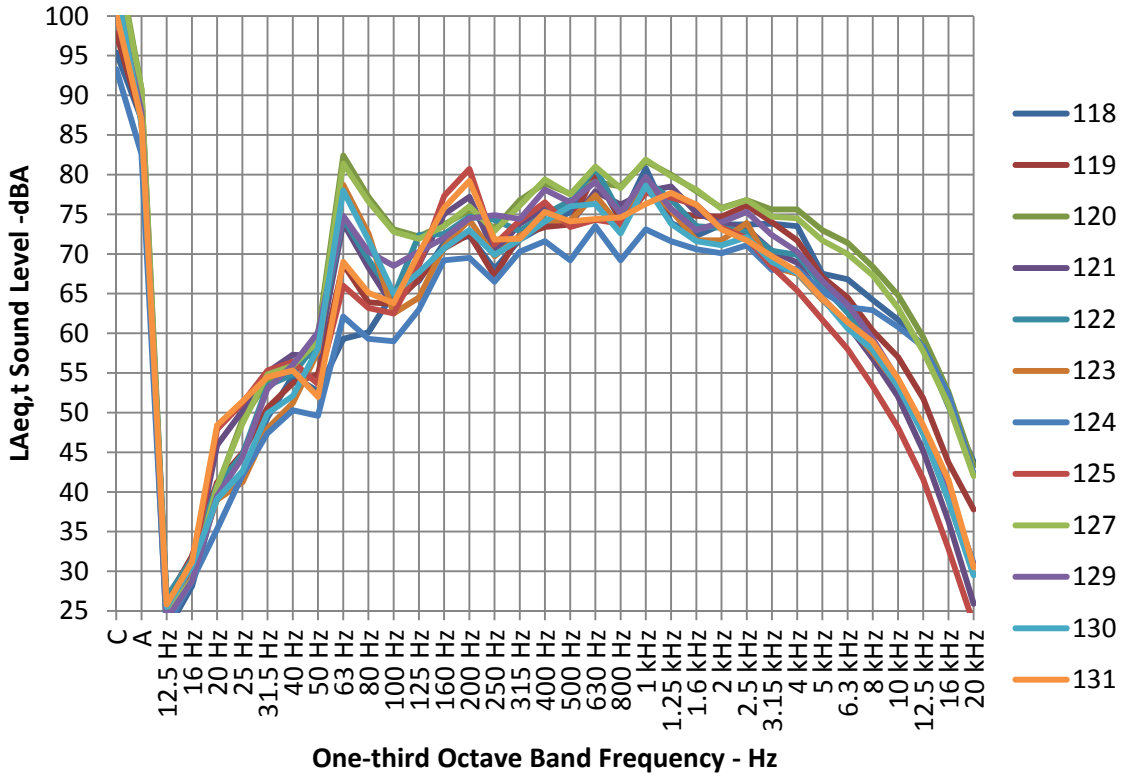


Figure A13A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra PHT Level 2

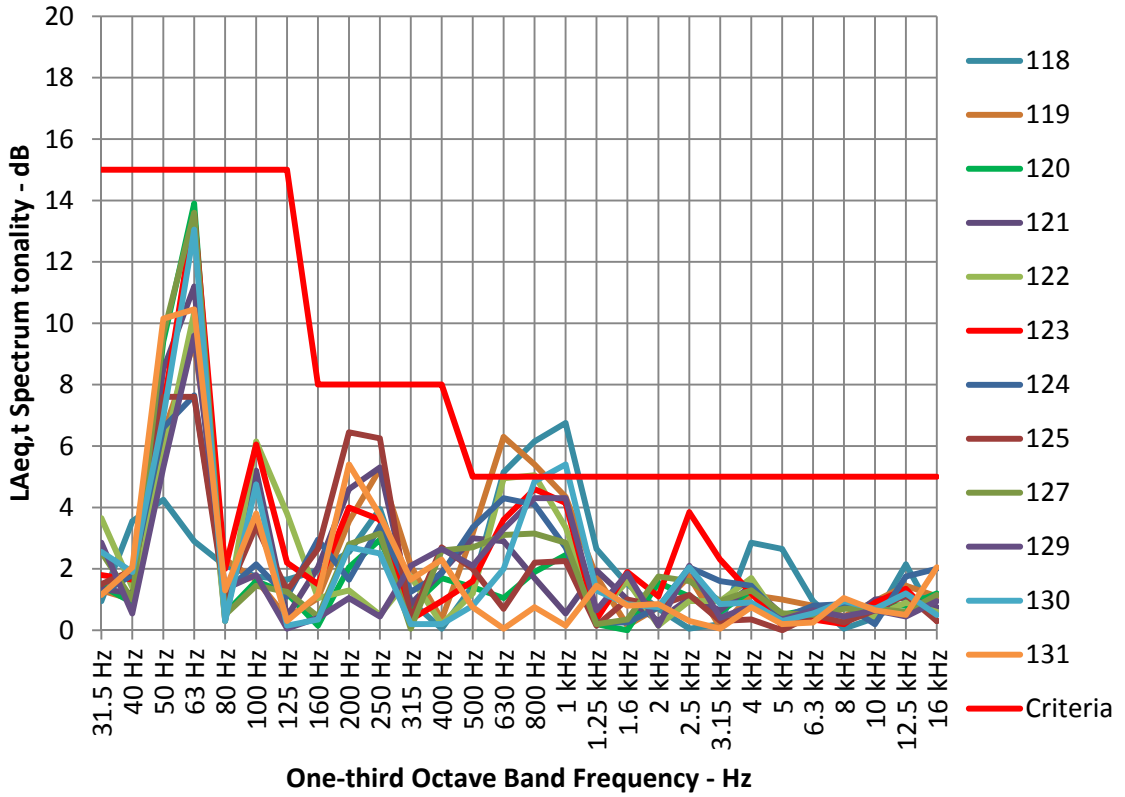


Figure A14: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra PHT Level 1

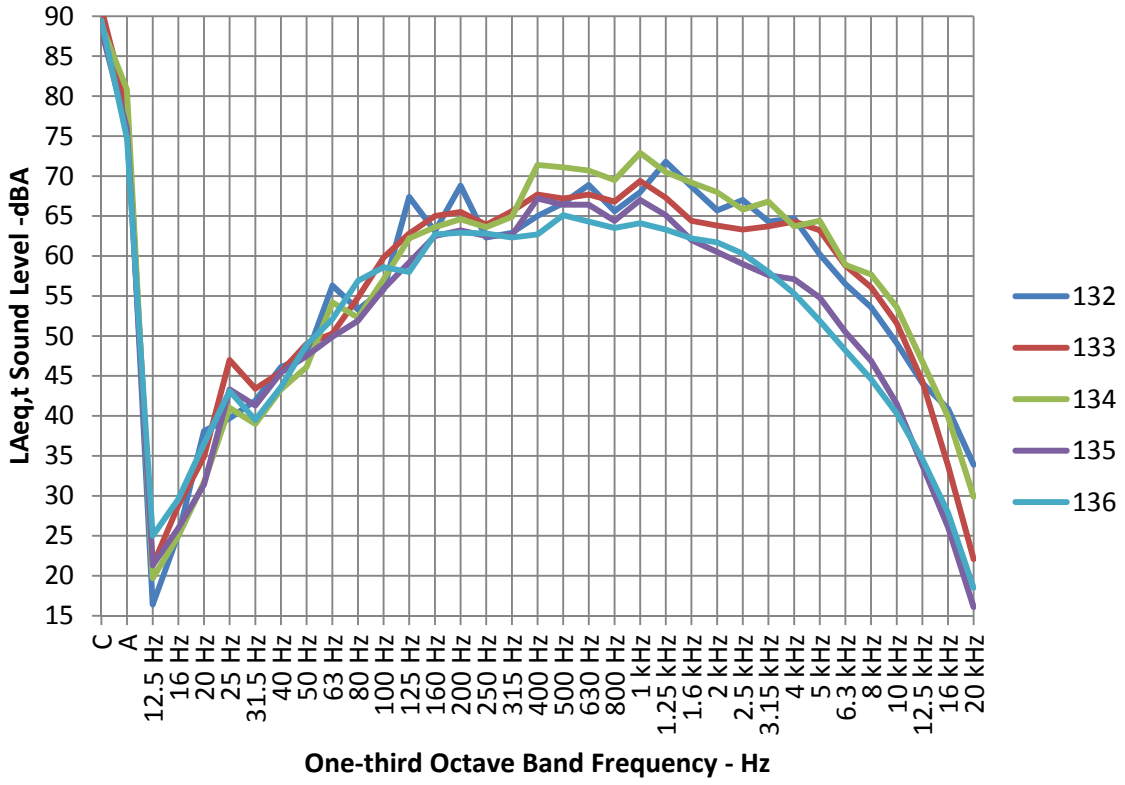


Figure A14A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra PHT Level 1

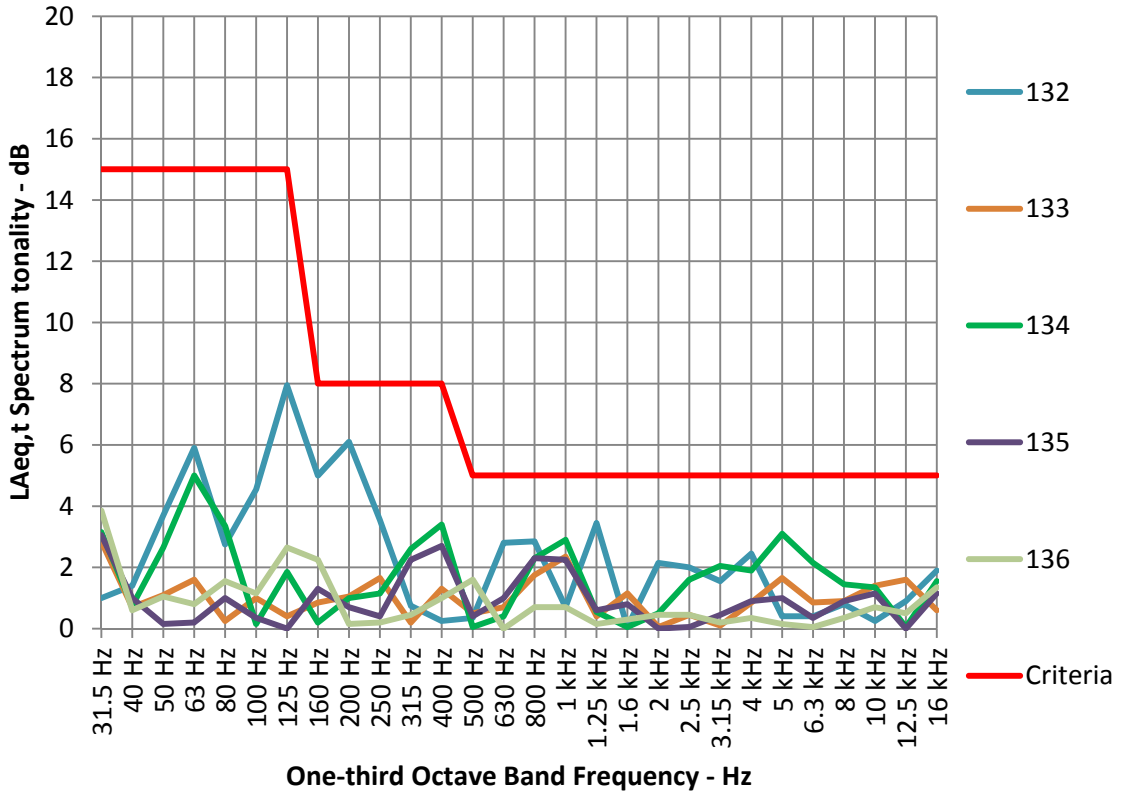


Figure A15: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra FA39 Area

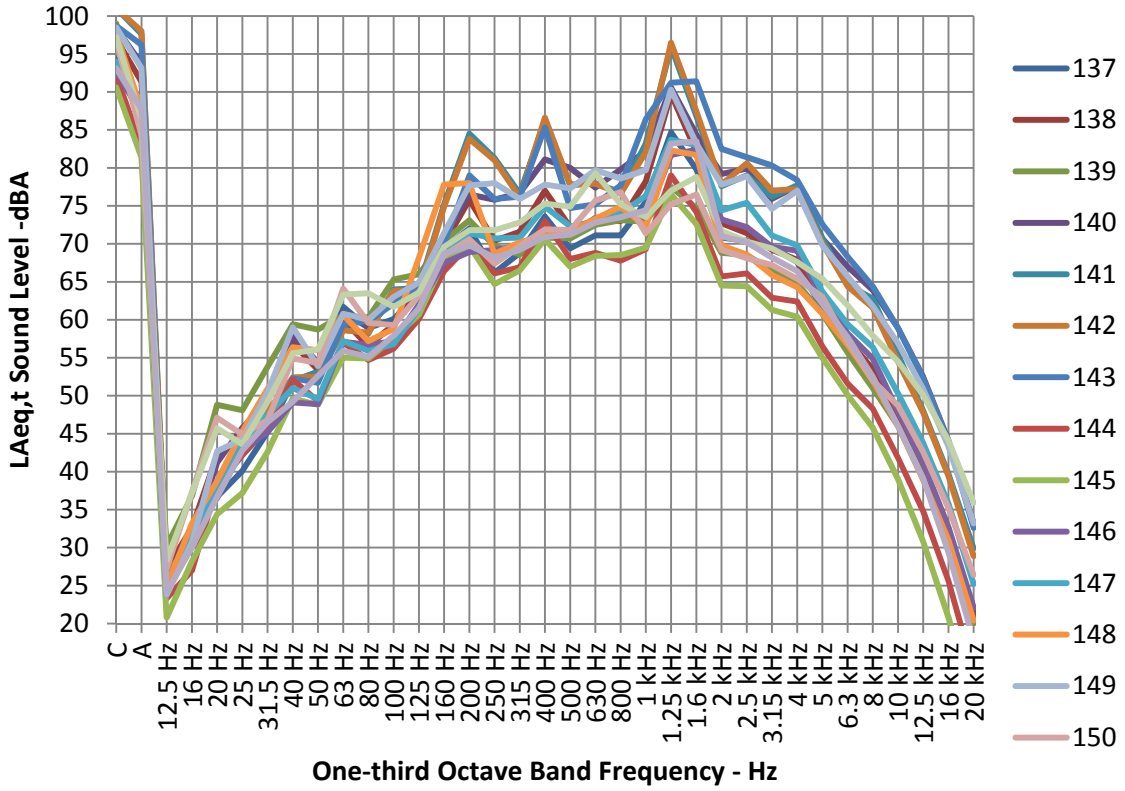


Figure A15A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra FA39 Area

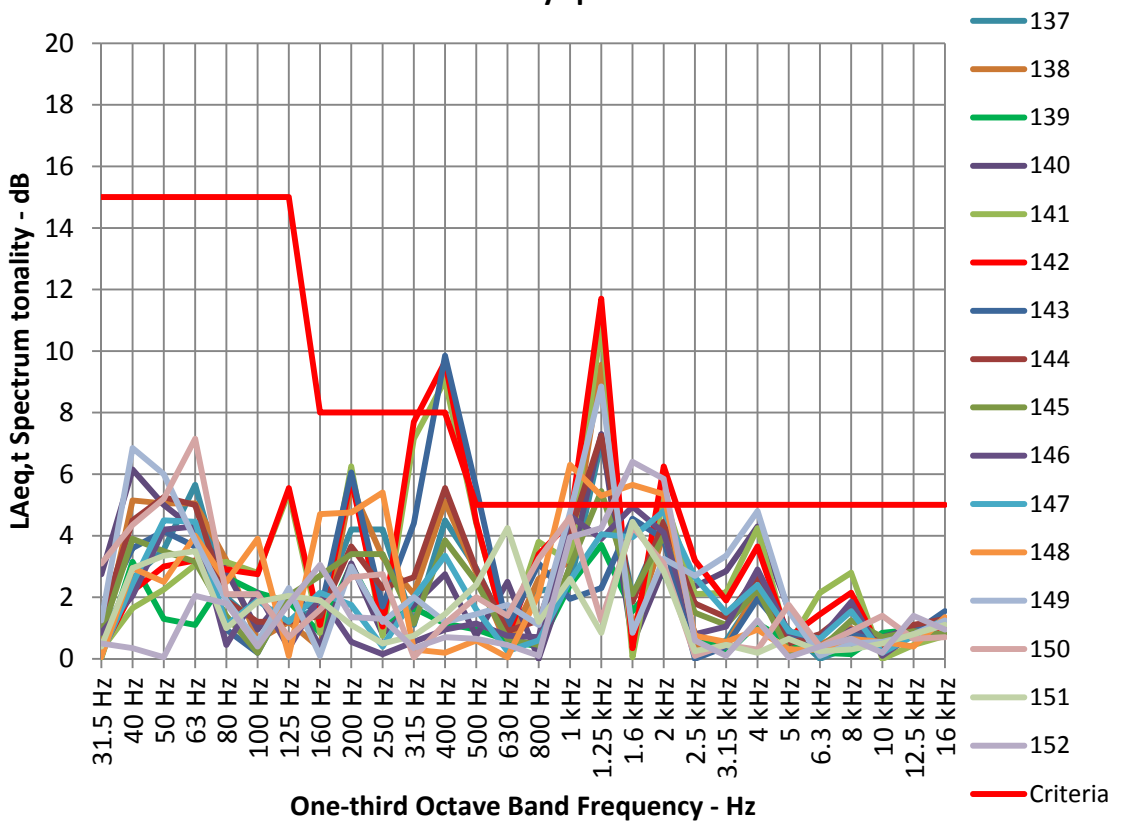


Figure A16: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra FA38 Area

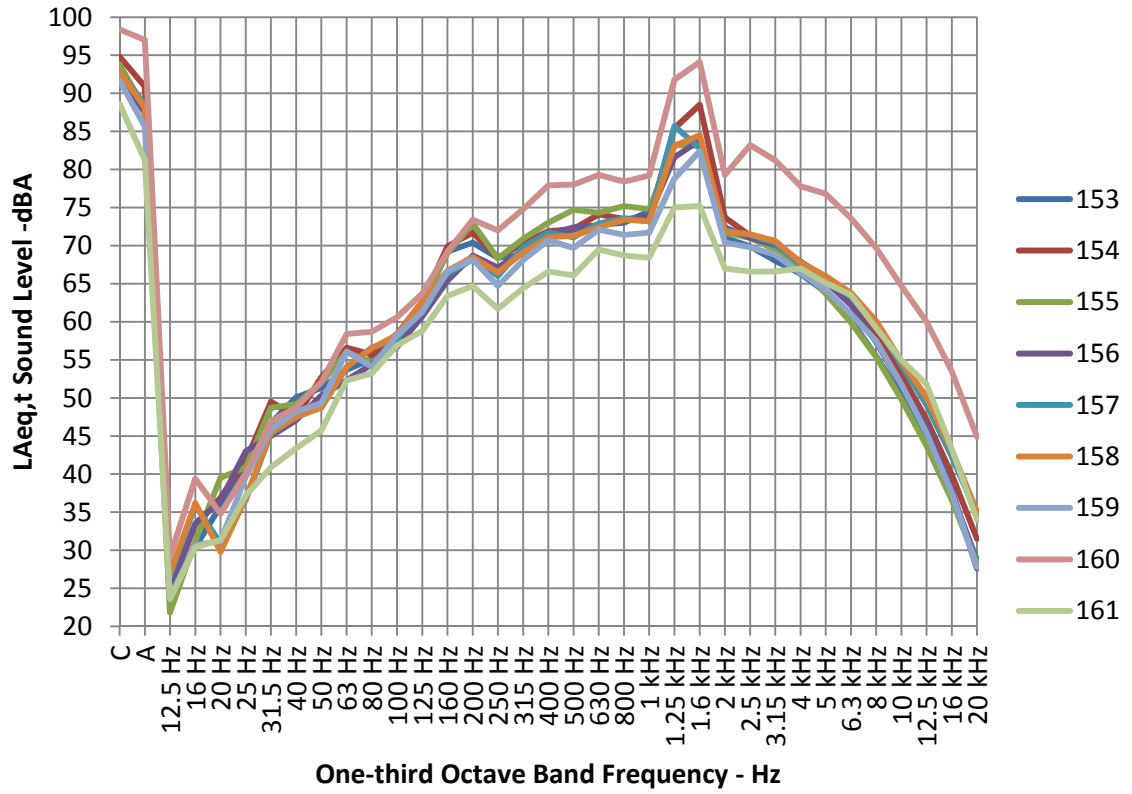


Figure A16A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra FA38 Area

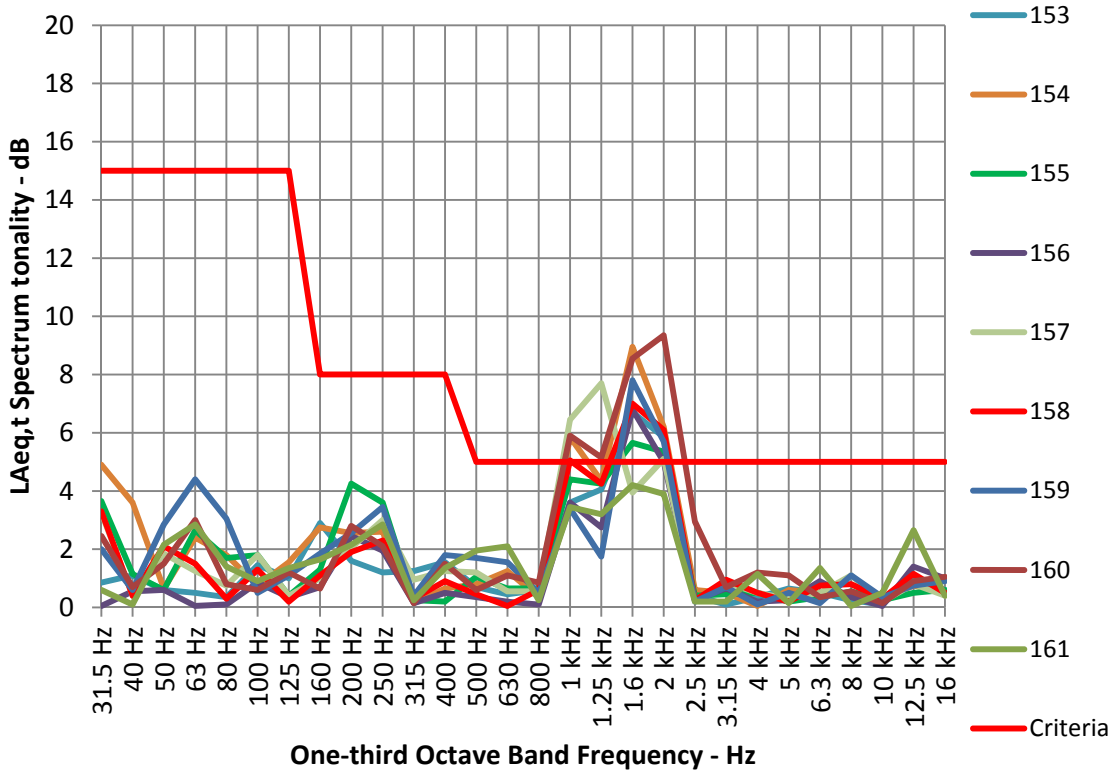


Figure A17: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra Road kerb north of FA38 & 39 Area

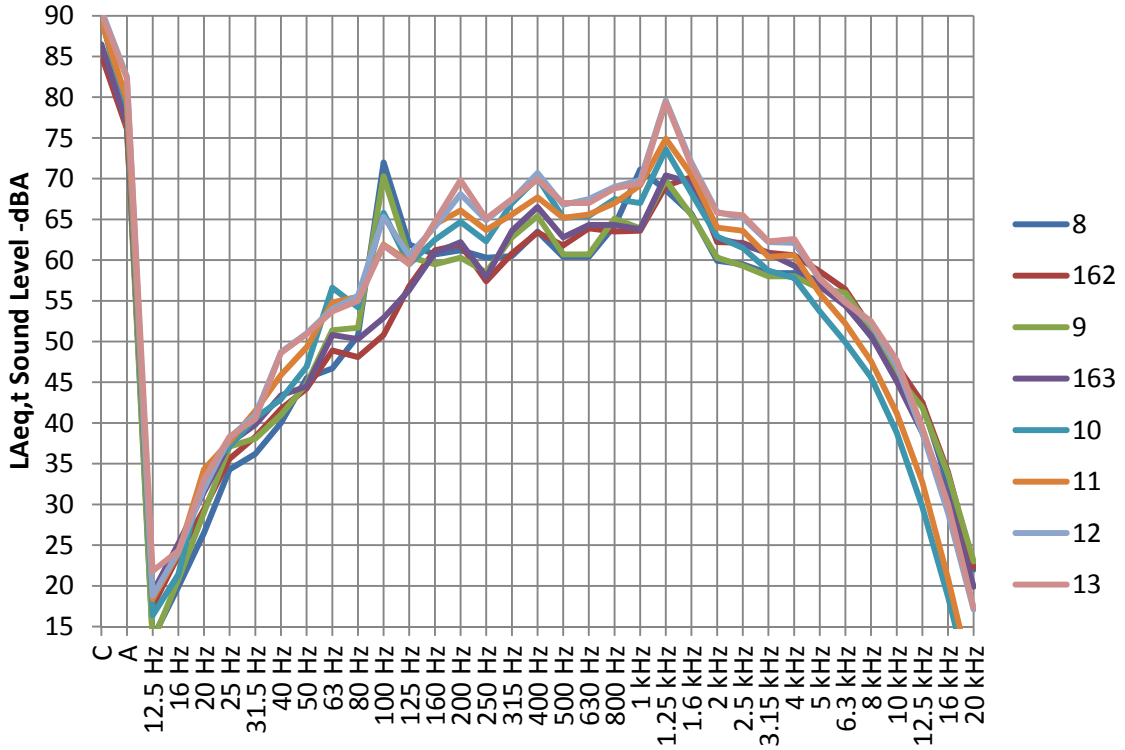


Figure A17A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra Road kerb north of FA38 & 39 Area

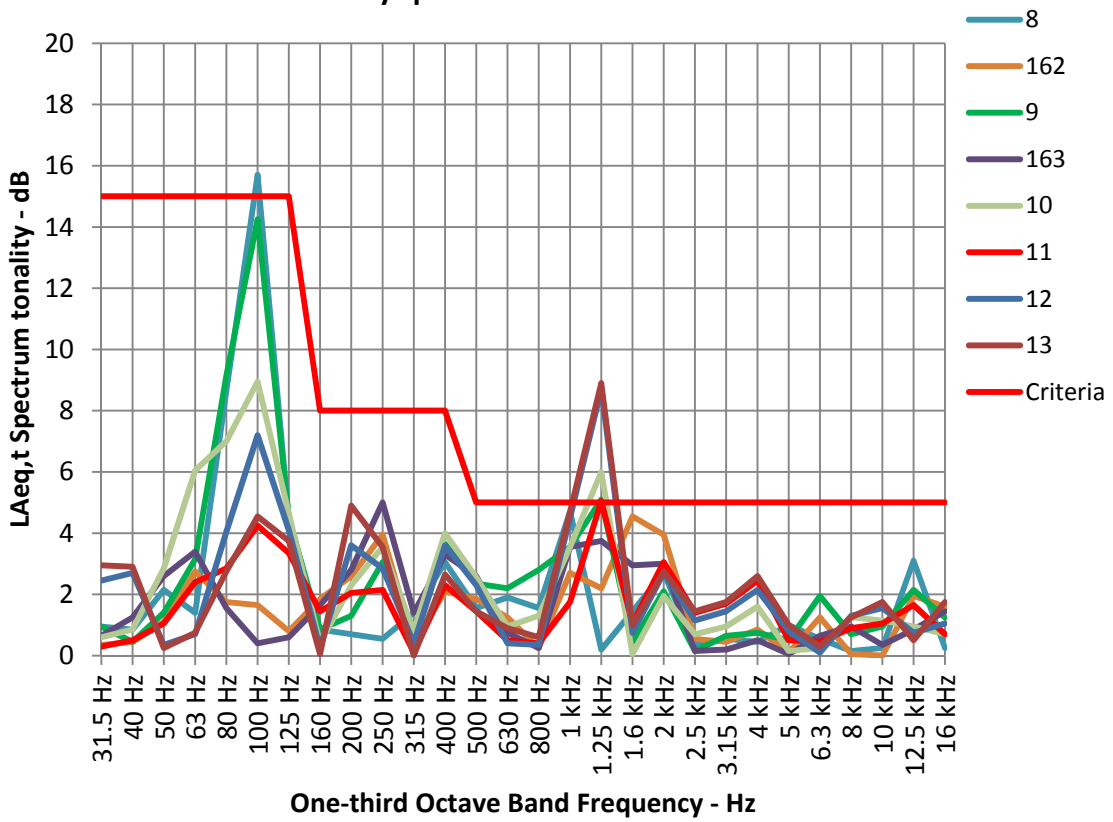


Figure A18: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra RM6 Western side Door closed and open

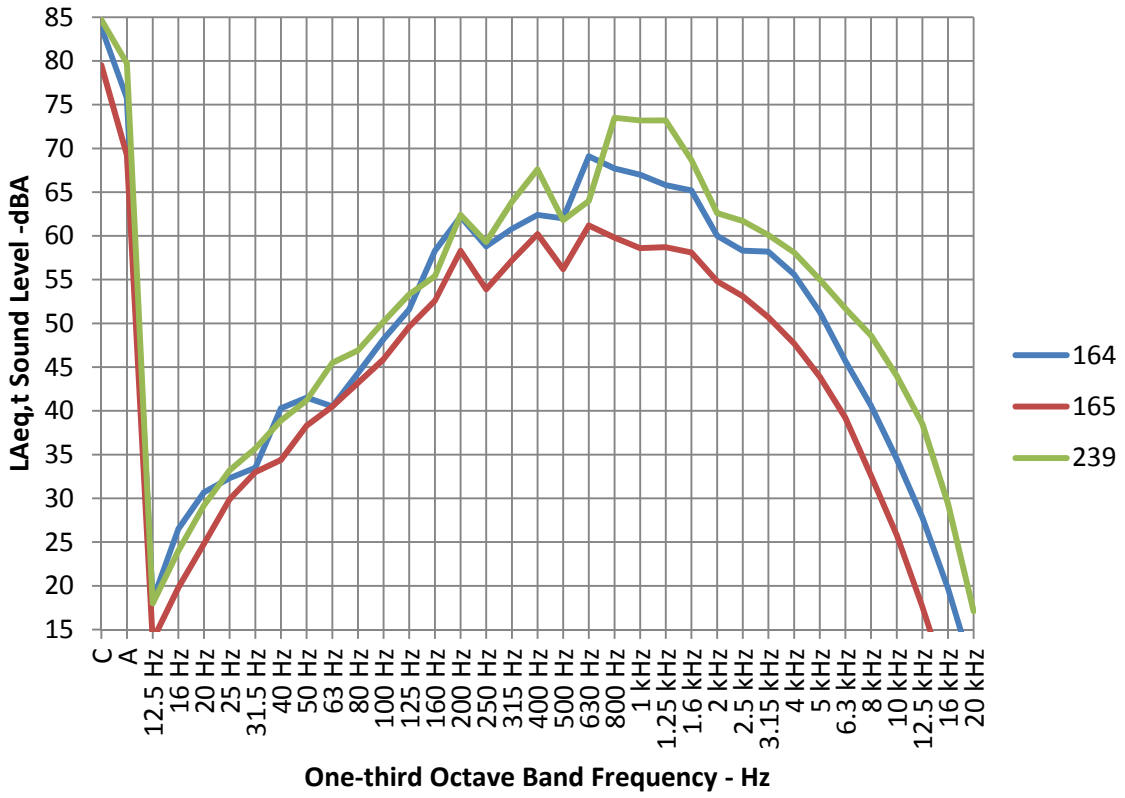


Figure A18A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra RM6 Western side door closed and open

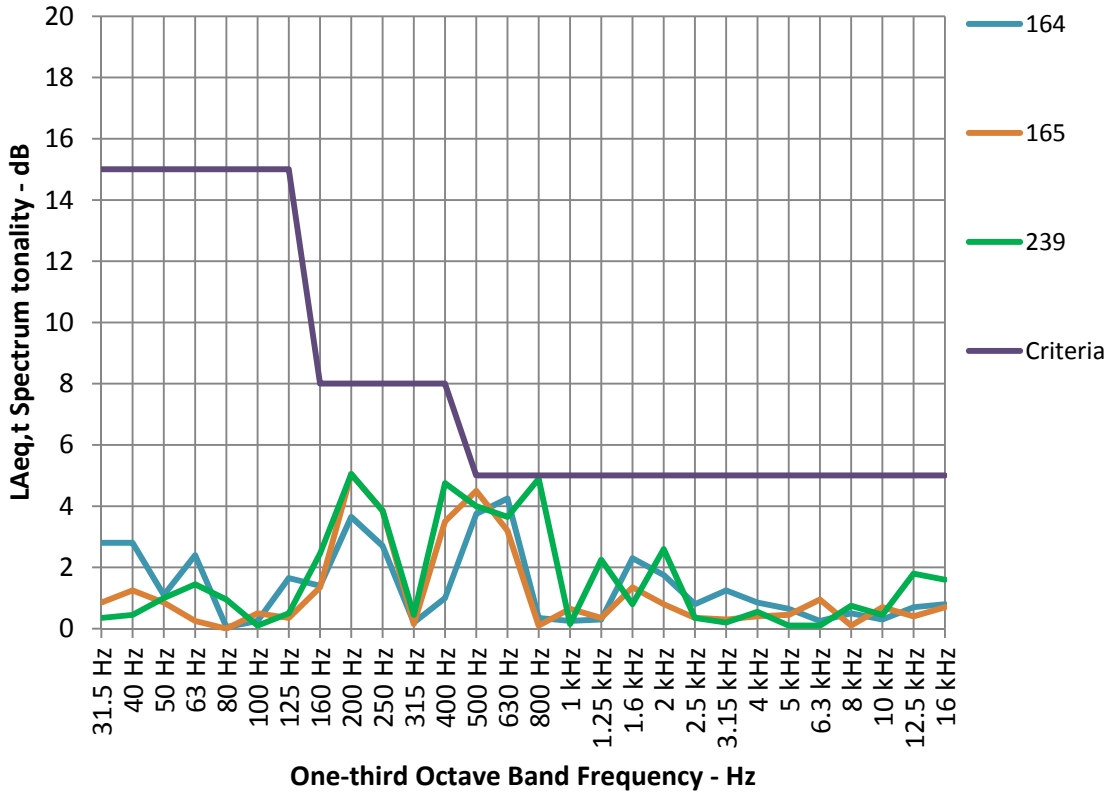


Figure A19: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra RM7 Outside Western and Northern sides

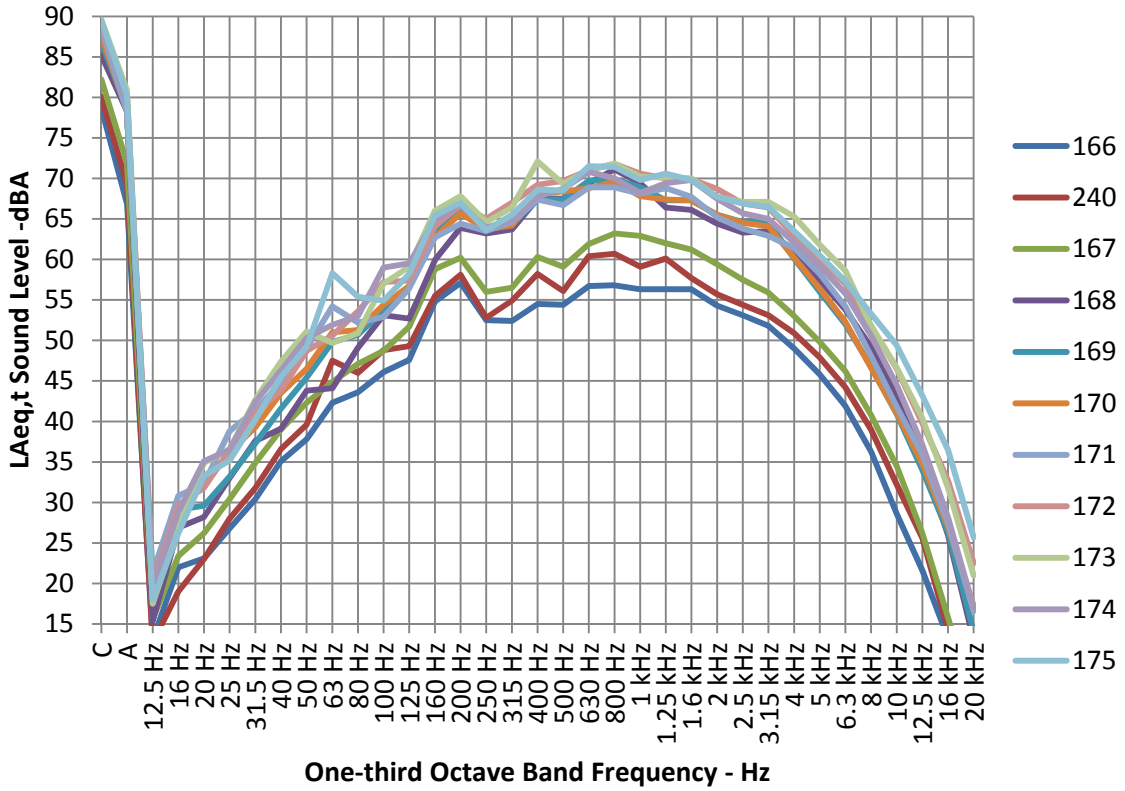


Figure A19A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra RM7 Outside West and North sides

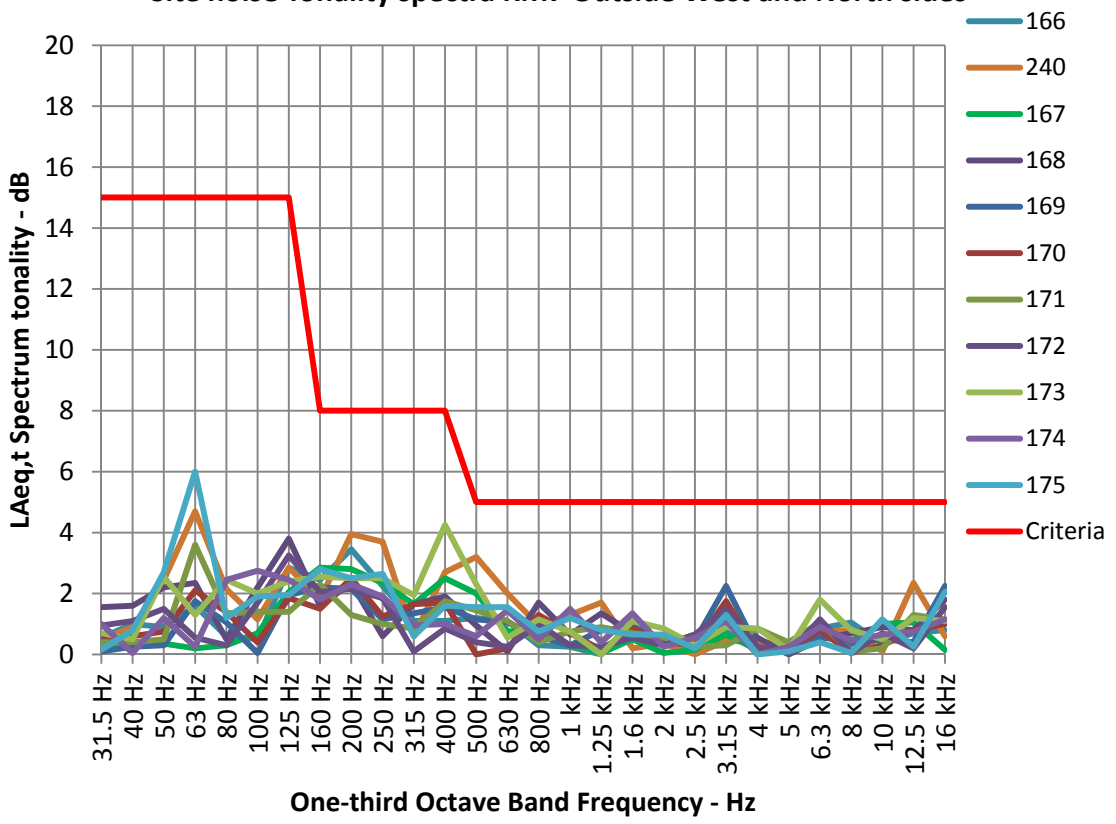


Figure A20: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra RM7 Outside Eastern and Southern sides

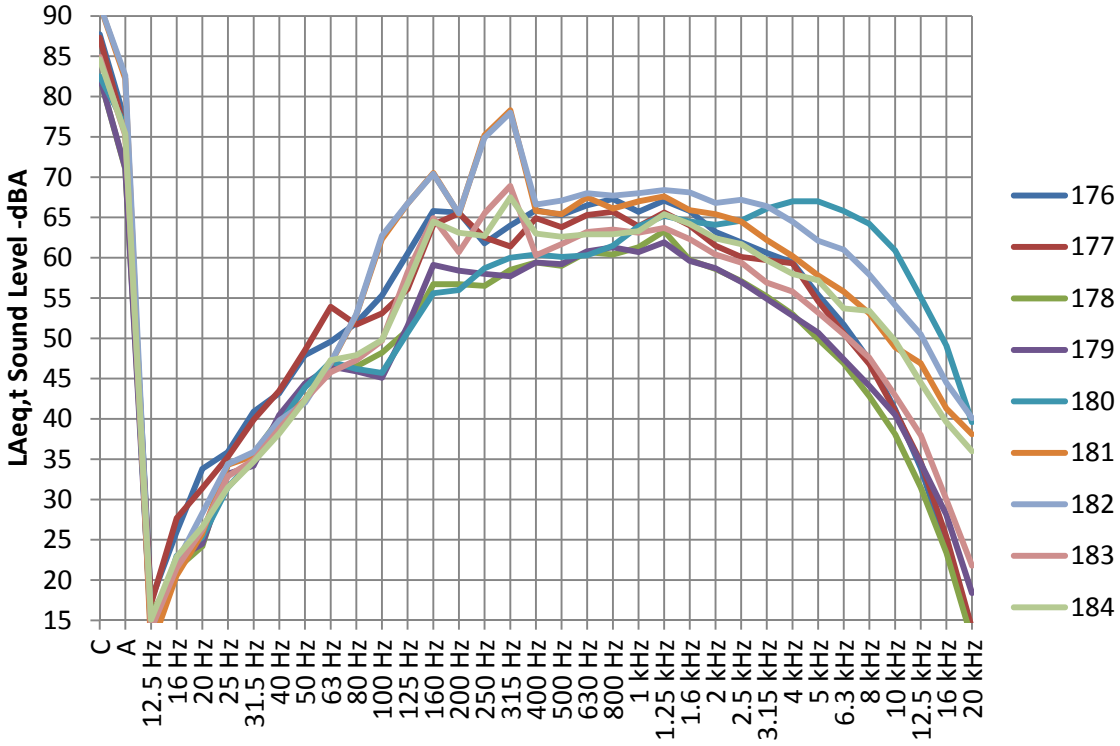


Figure A20A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra RM7 Outside East and South sides

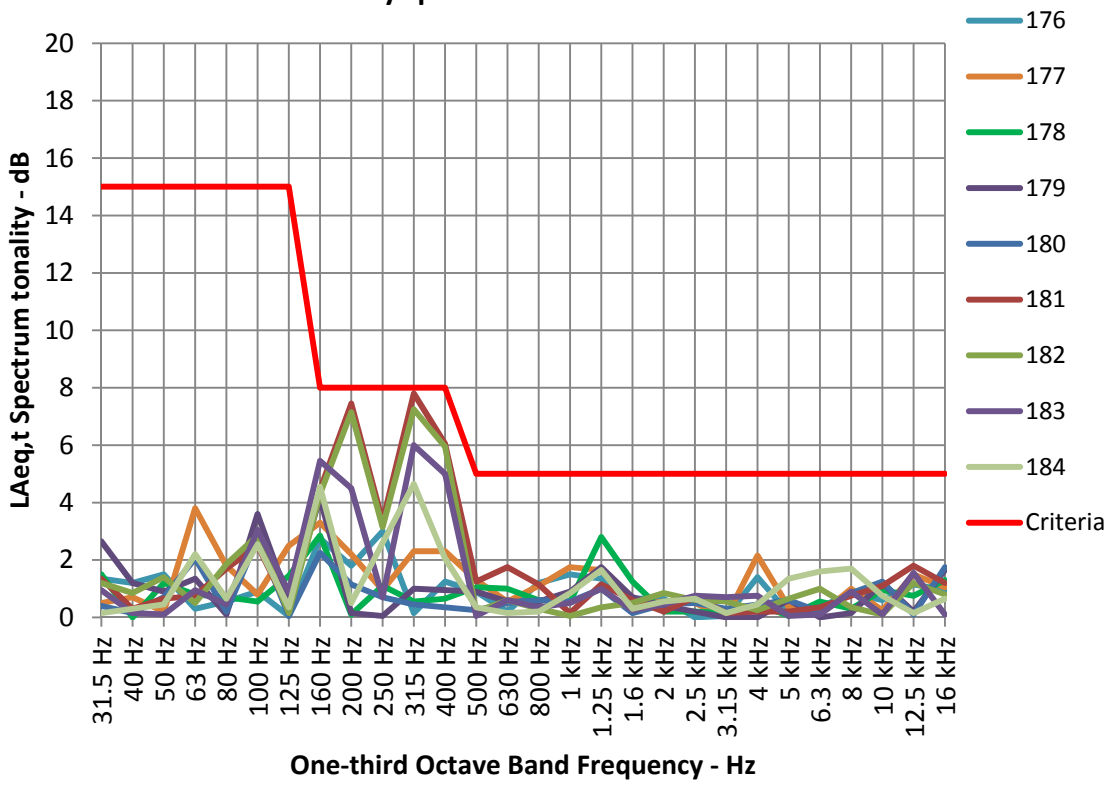


Figure A21: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra RM7 FA249 area

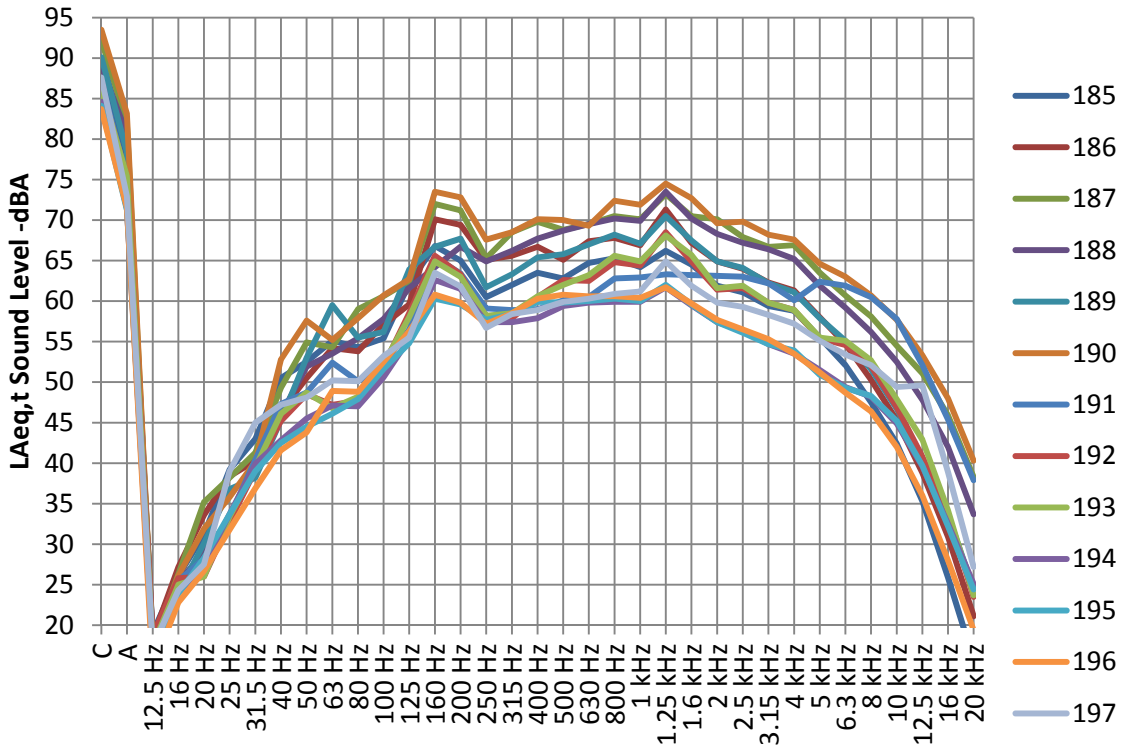


Figure A21A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra RM7 FA249 area

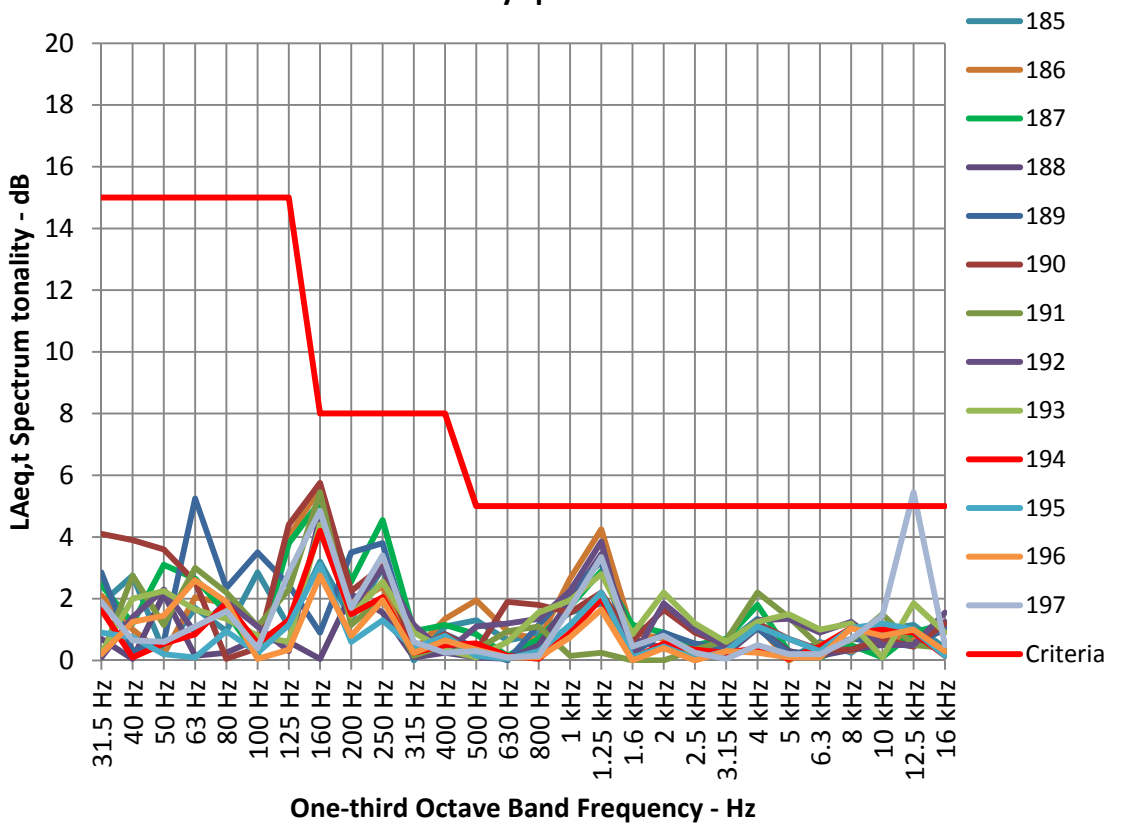


Figure A22: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra RM7 FA250 area

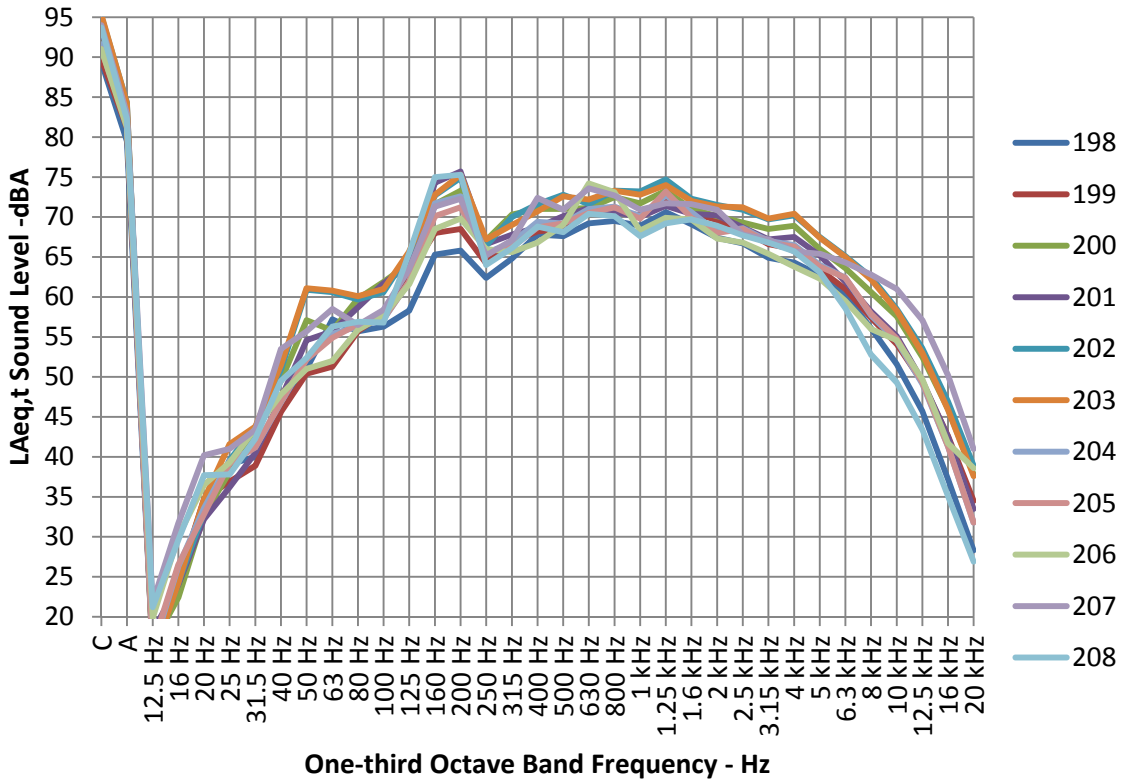


Figure A22A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra RM7 FA250 area

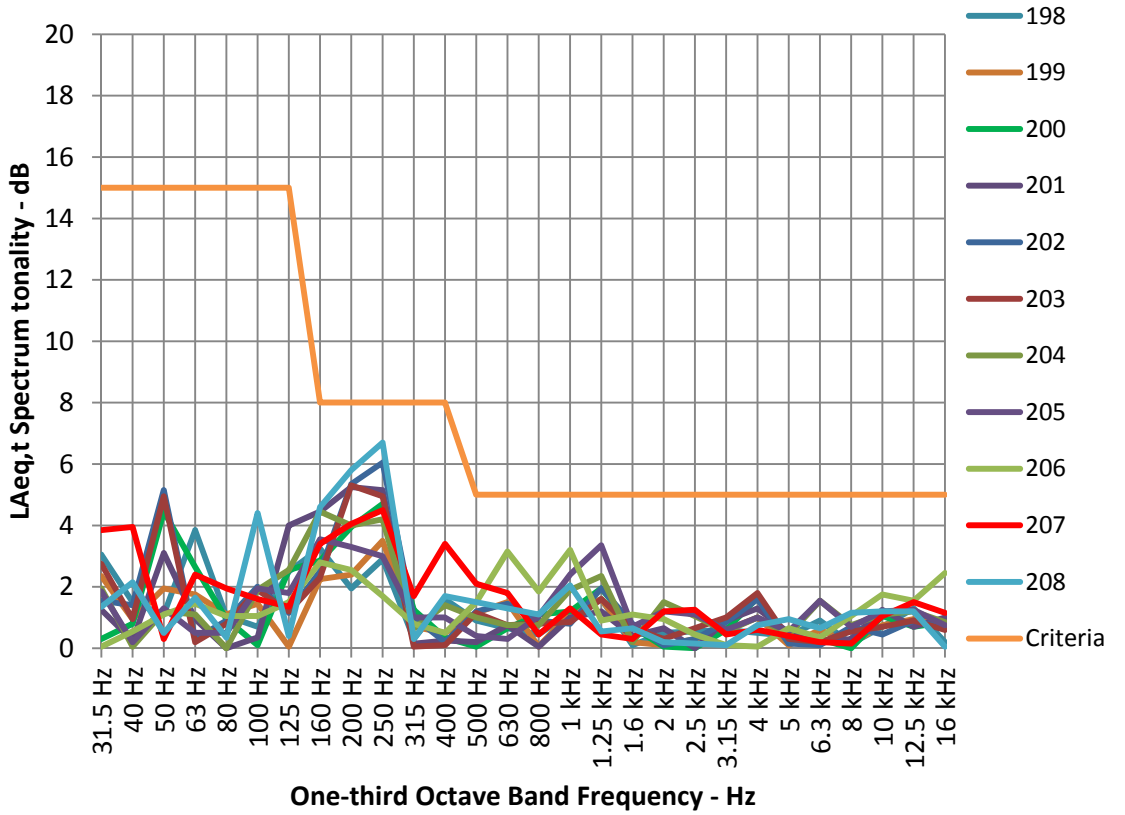


Figure A23: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra RM7 Roof lower platform

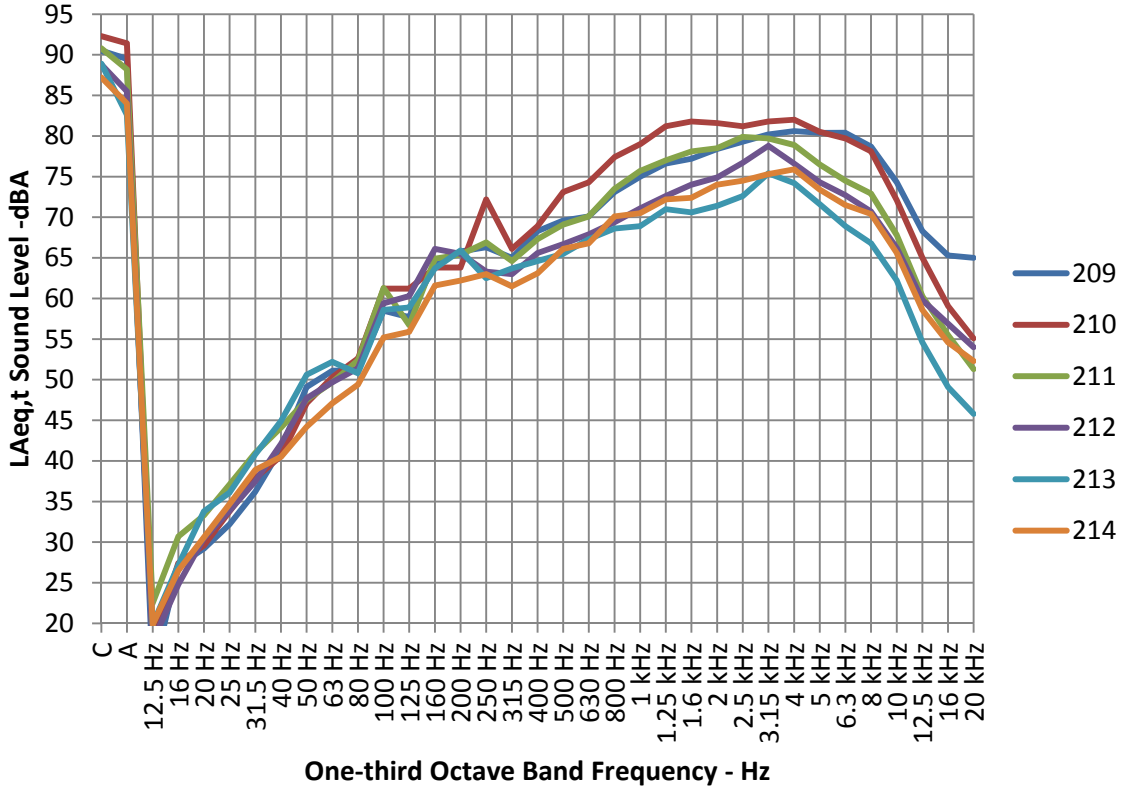


Figure A23A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra RM7 Roof lower platform

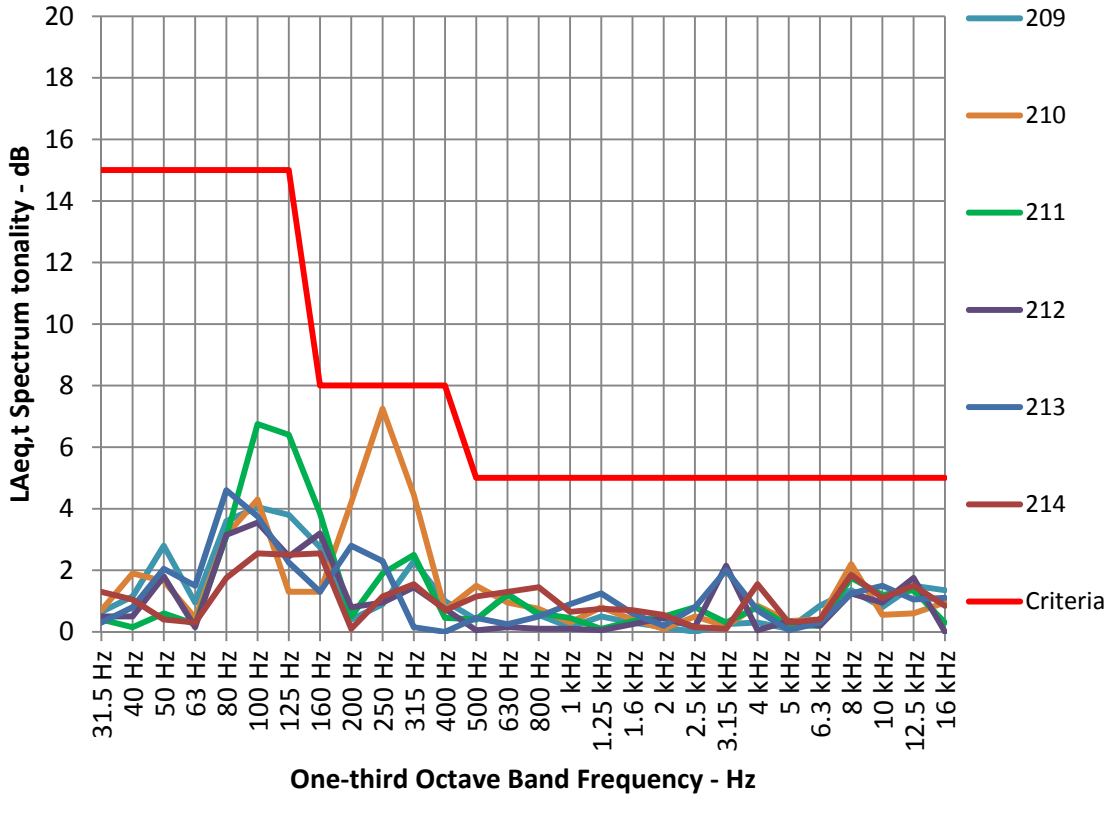


Figure A24: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra RM7 Roof upper platform

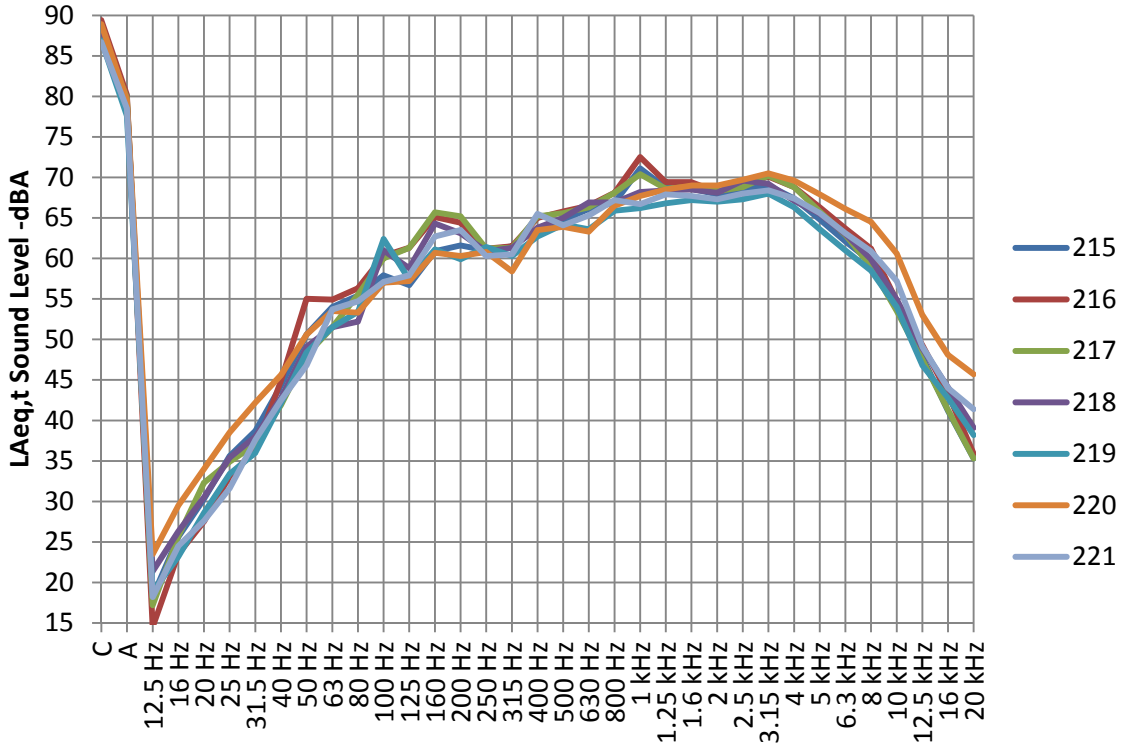


Figure A24A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra RM7 Roof upper platform

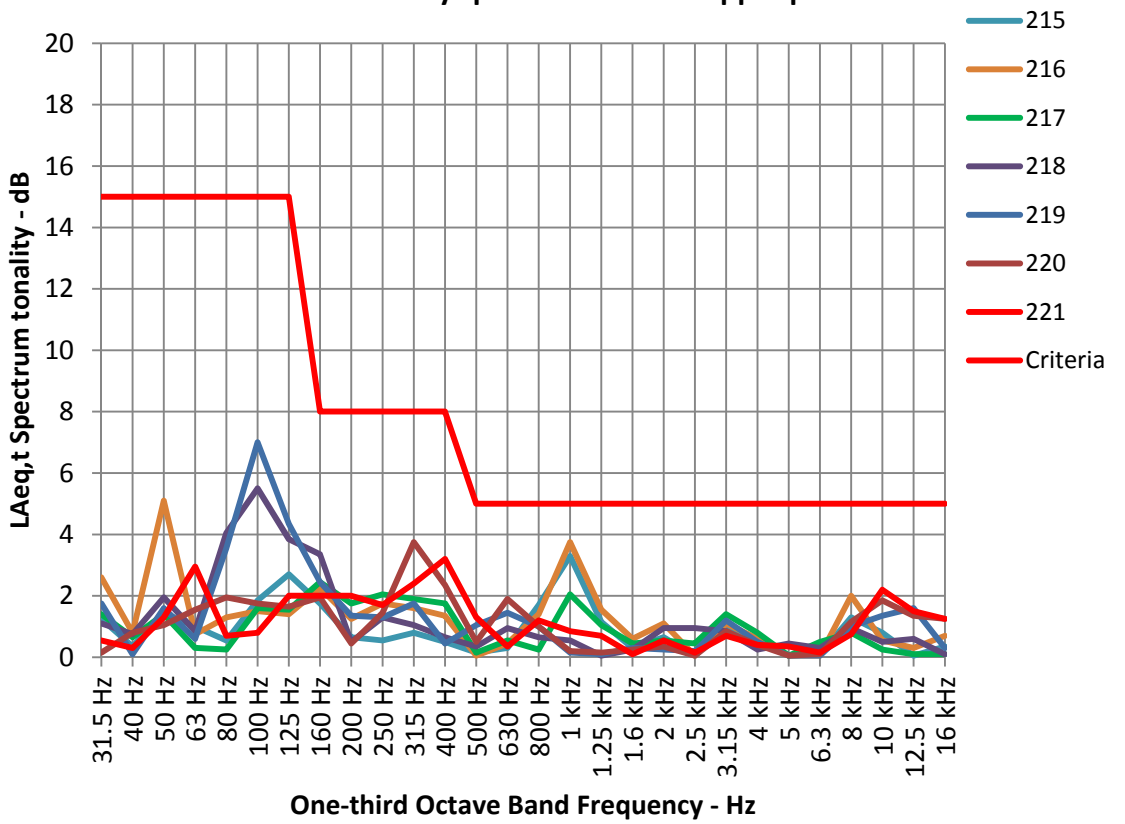


Figure A25: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra RM7 Upper Baghouse area

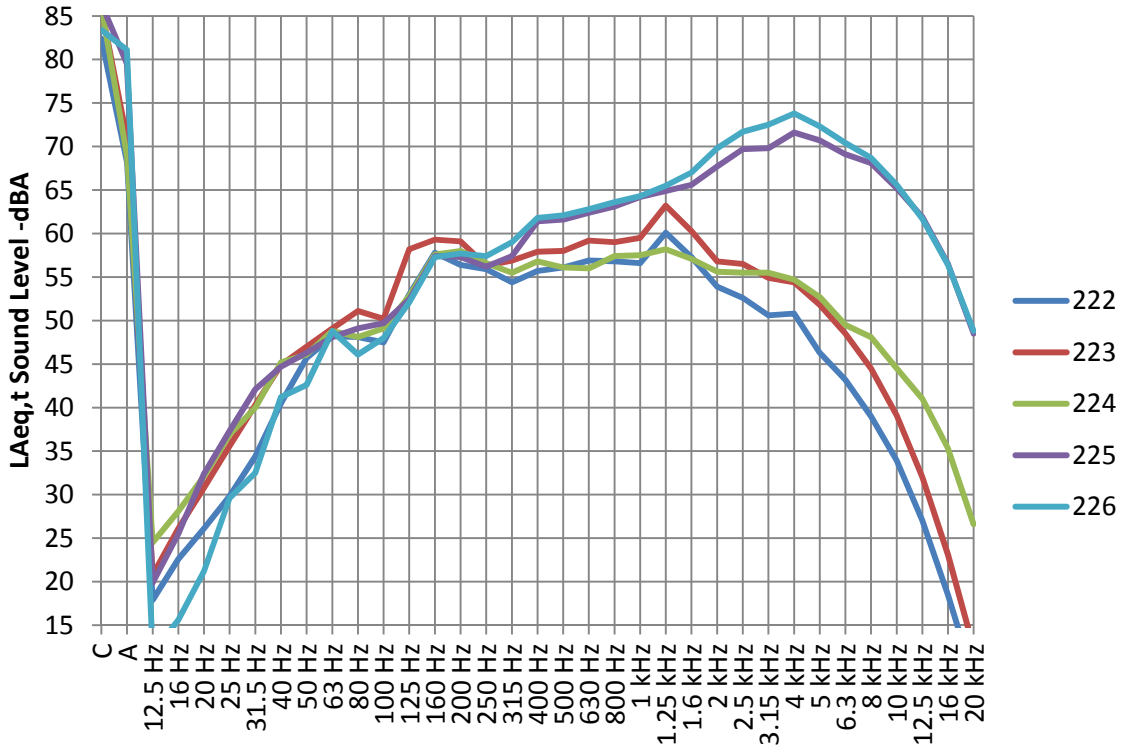


Figure A25A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra RM7 Upper Baghouse area

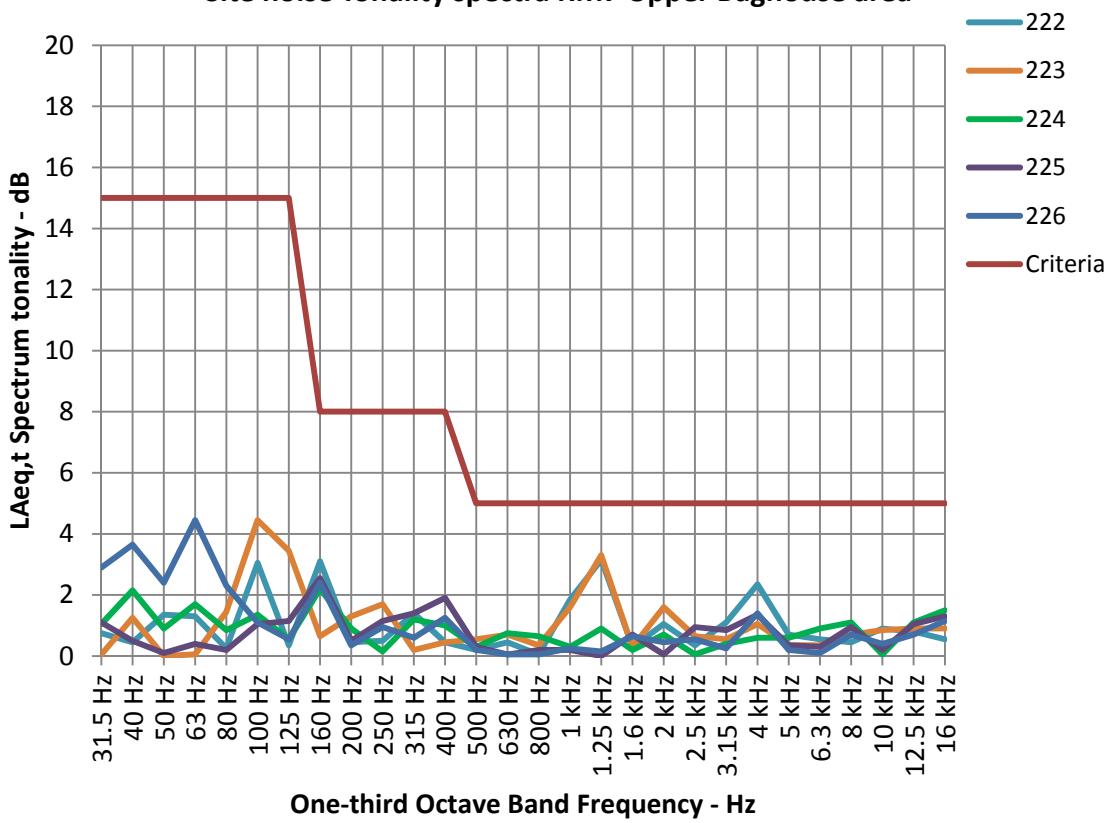


Figure A26: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra RM7 Lower Baghouse area

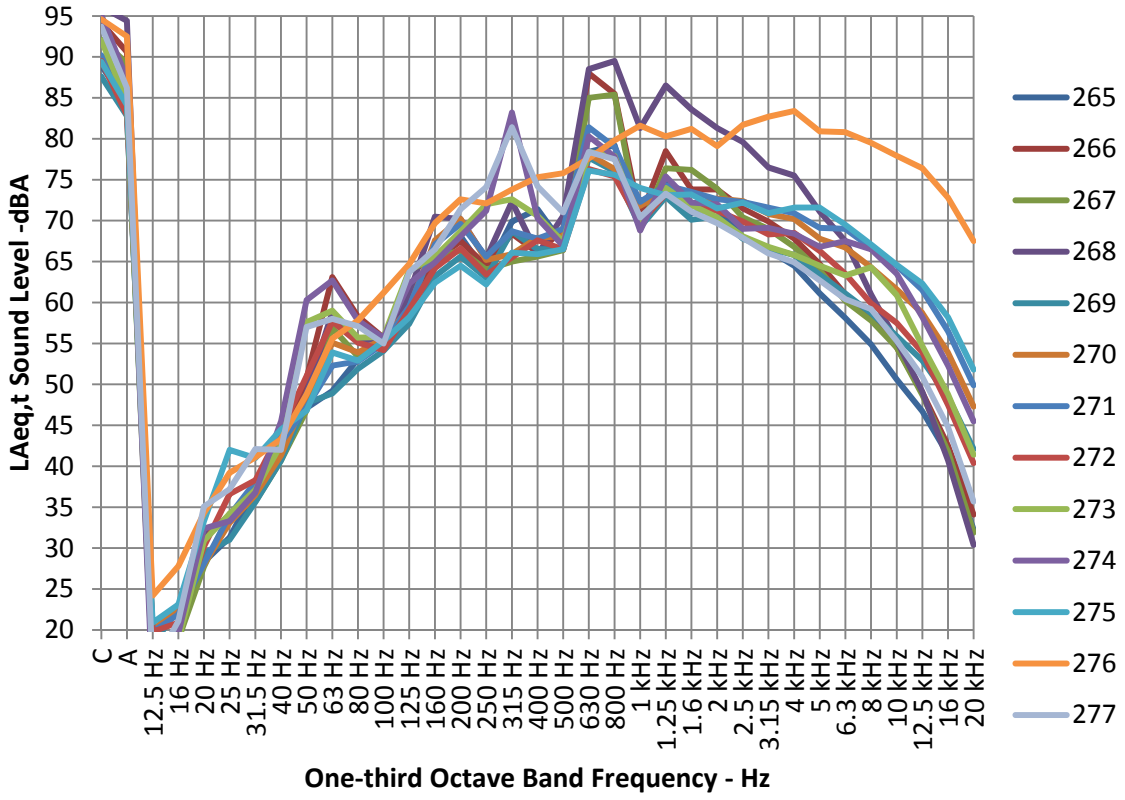


Figure A26A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra RM7 Lower Baghouse area

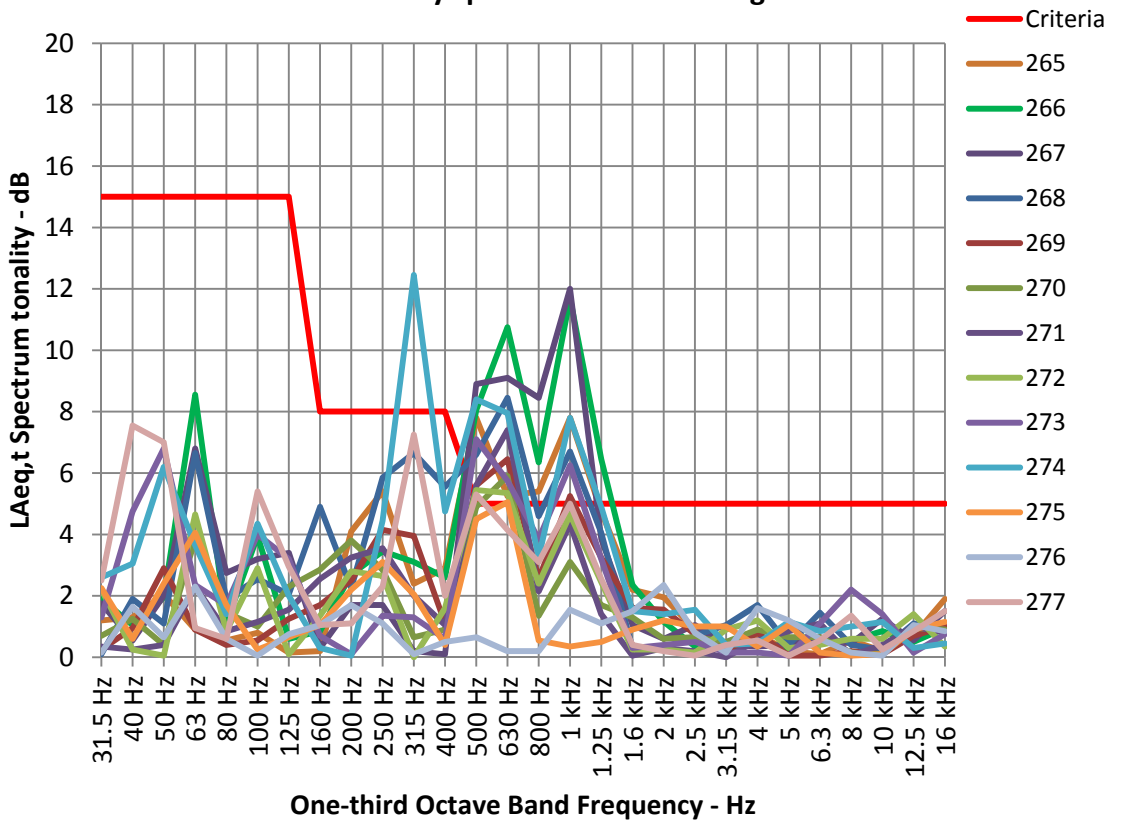


Figure A27: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra RM7 Inside Top Level

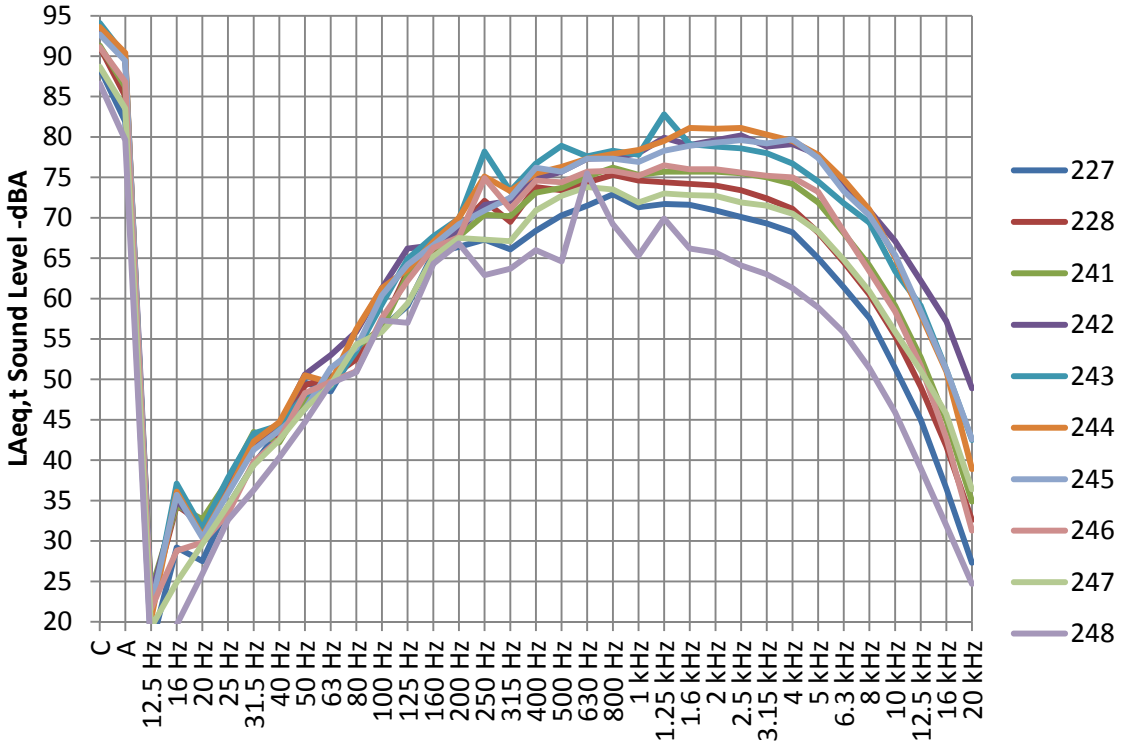


Figure A27A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra RM7 Inside top level

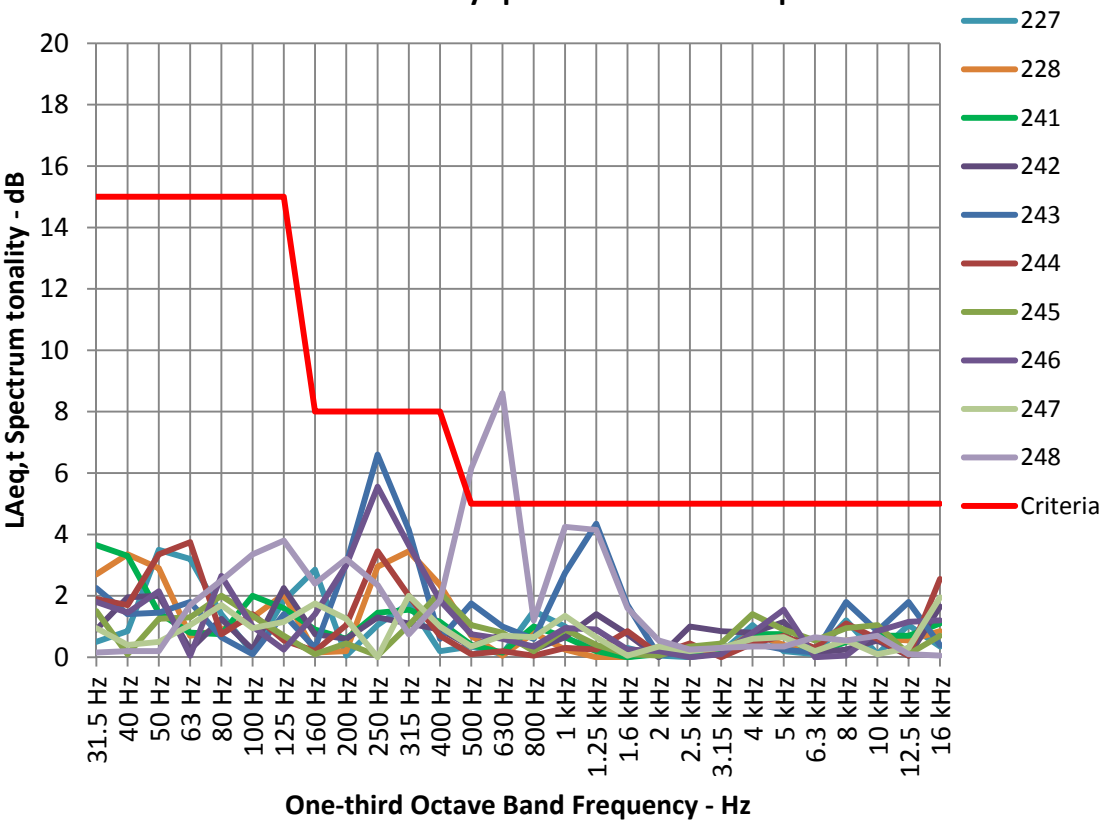


Figure A28: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra RM7 Inside Levels 3 & 2

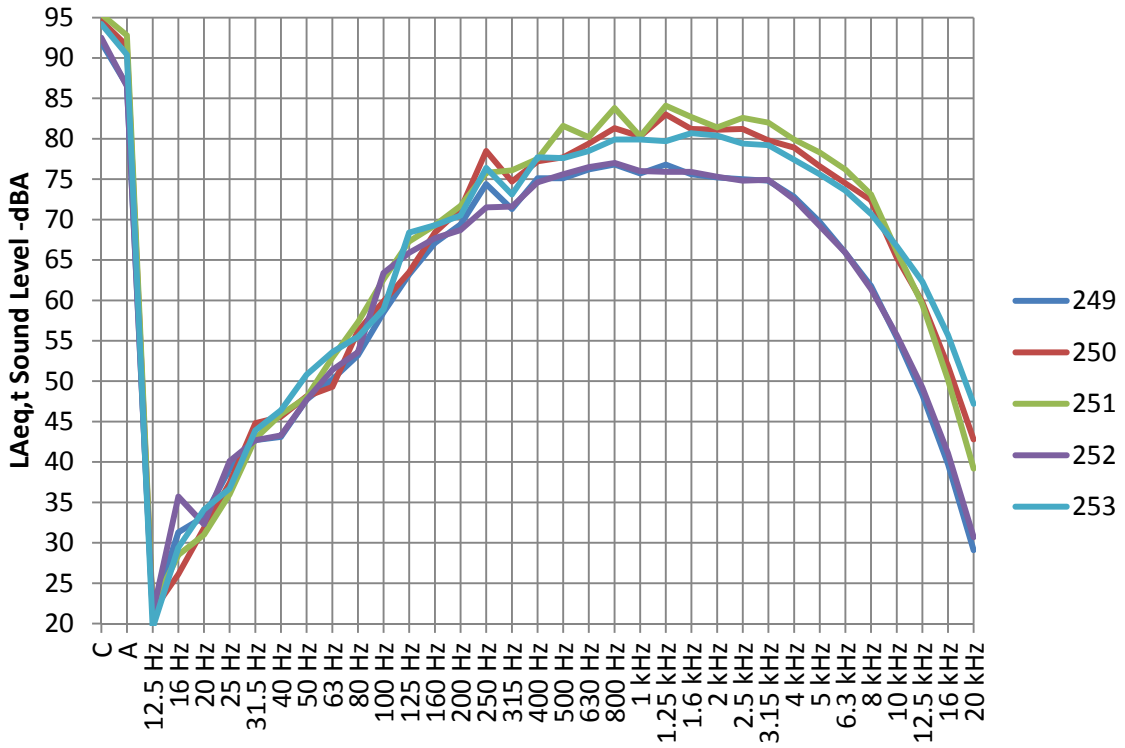


Figure A28A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra RM7 Inside Levels 3 and 2

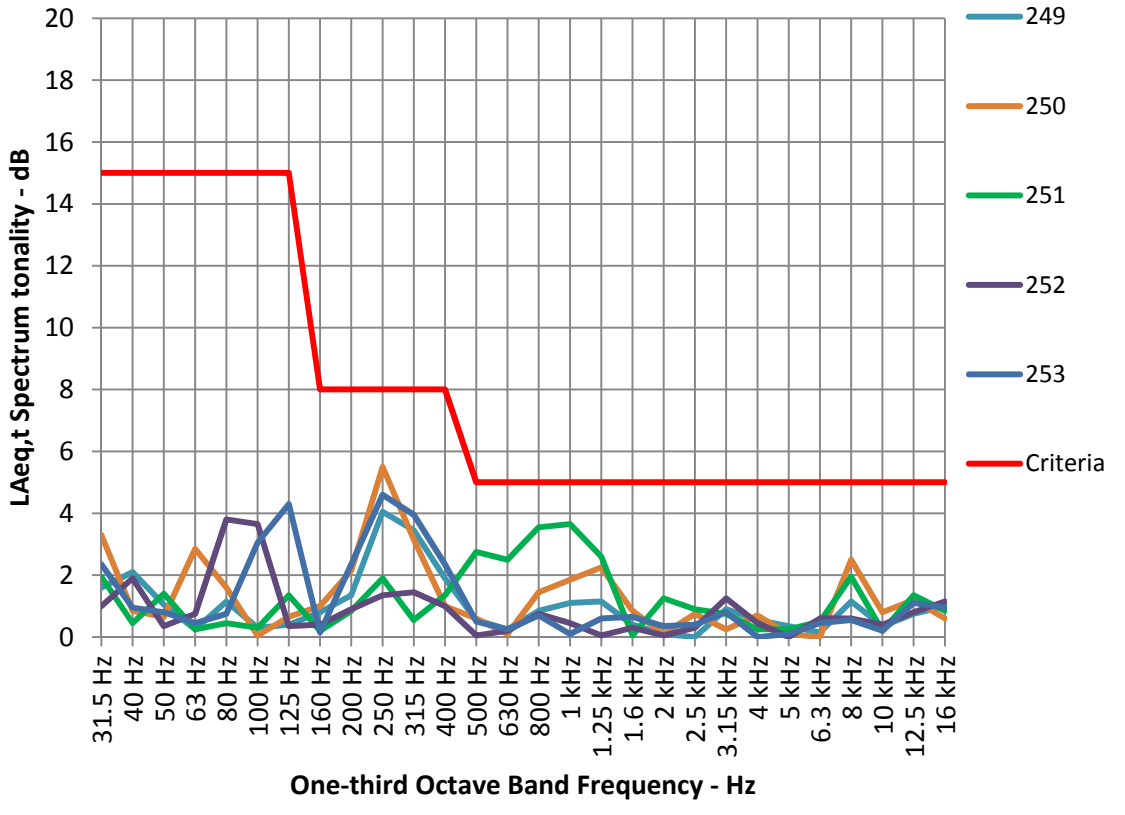


Figure A29: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra RM7 Inside Level 1

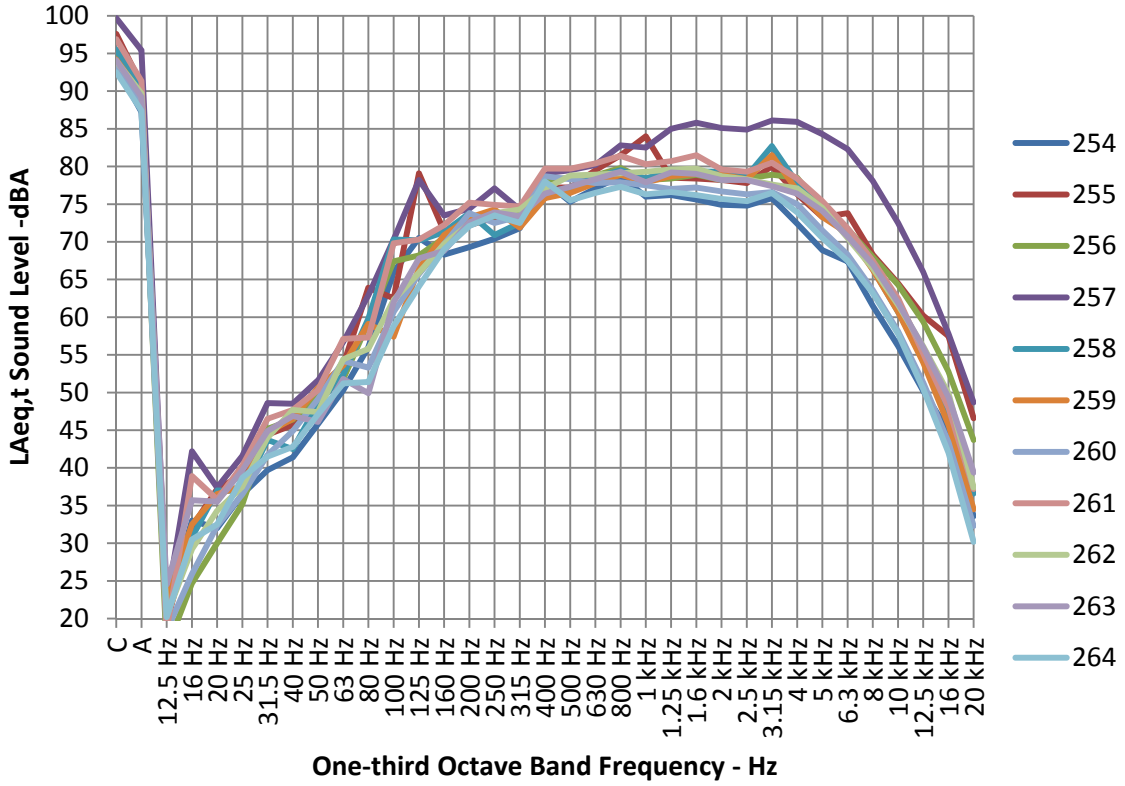


Figure A29A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra RM7 Inside Level 1

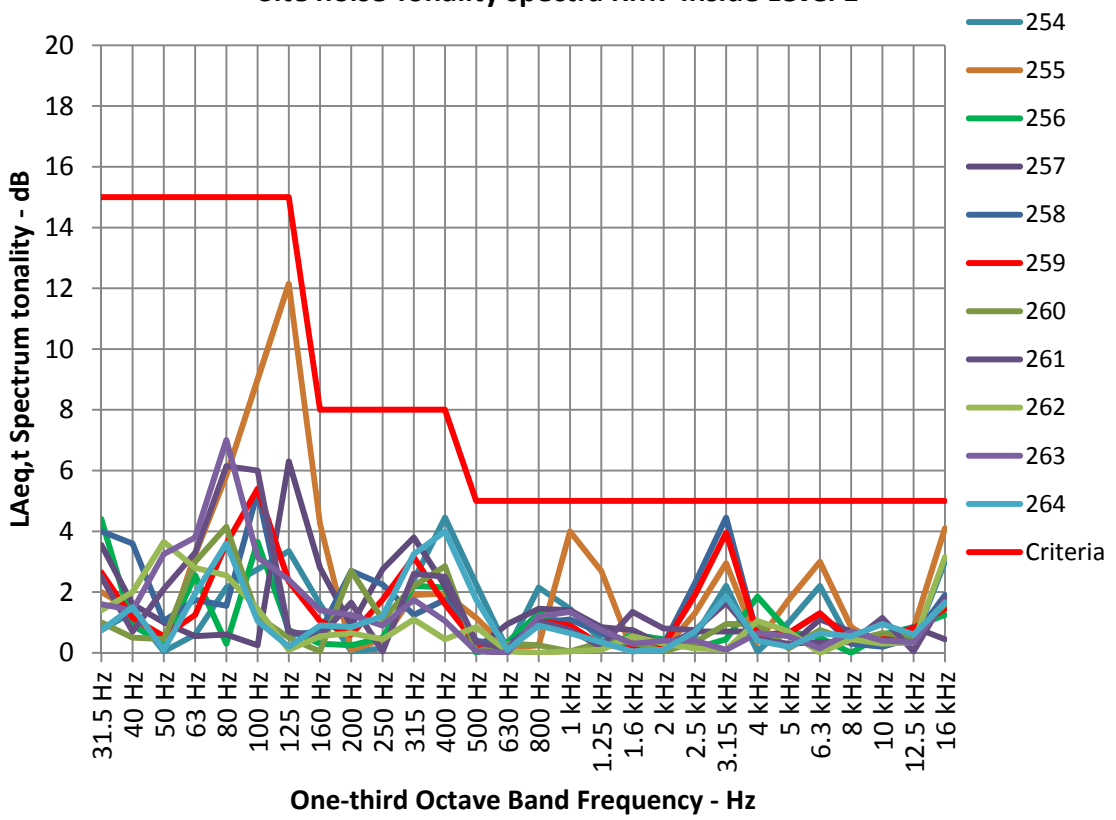


Figure A30: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra Coal Road South side

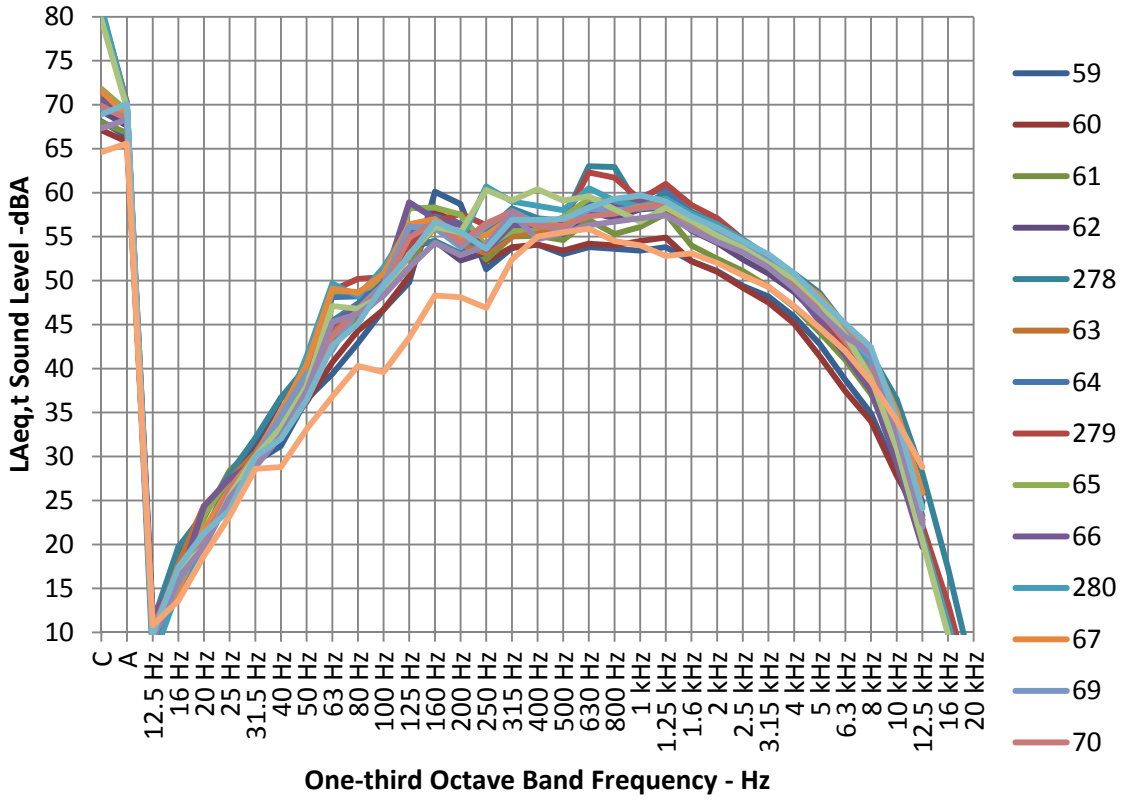


Figure A30A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra Coal Road South Side

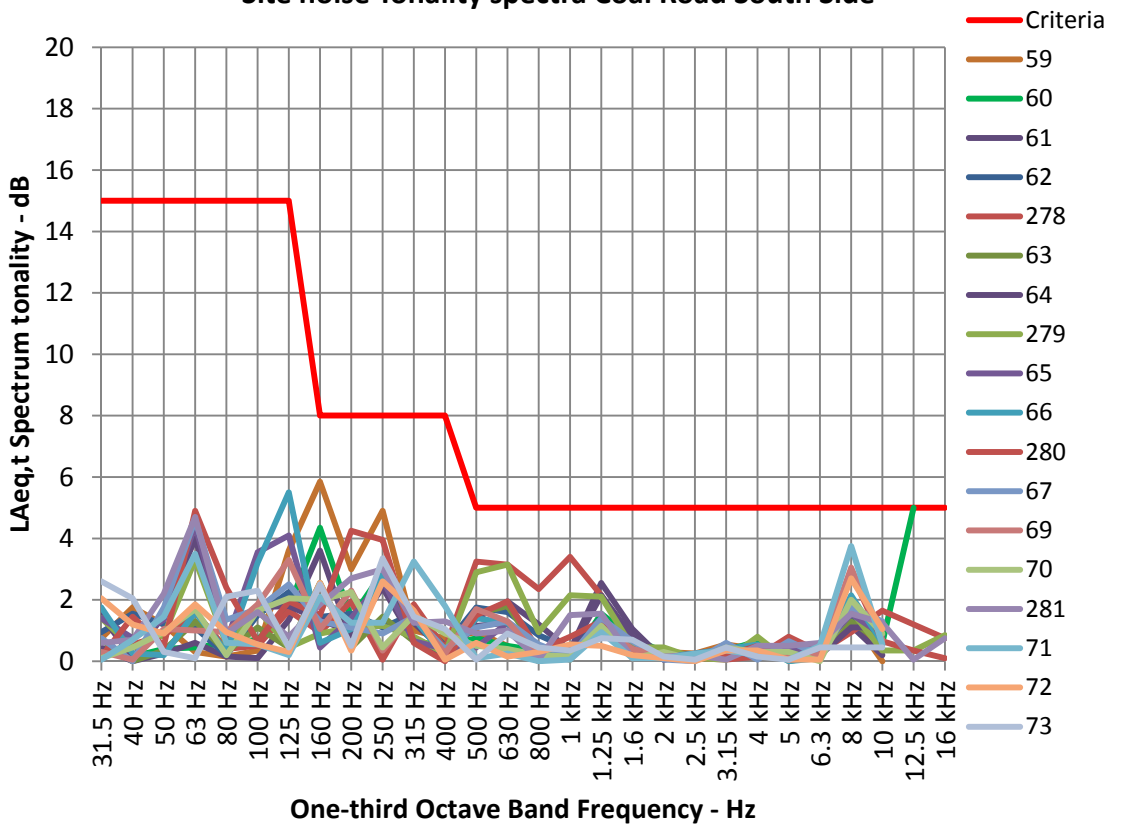


Figure A31: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra Old FencelineSouth and Alt Fuels Bld

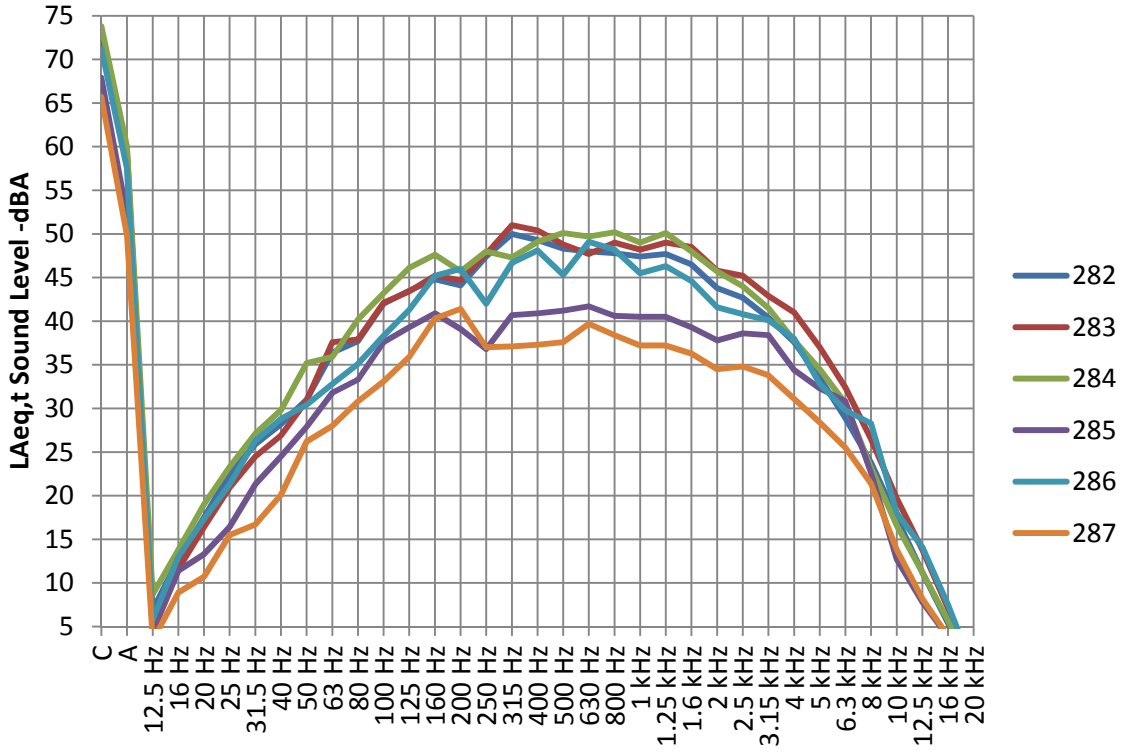


Figure A31A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra Old Fence line S side and Alt Fuel Bld

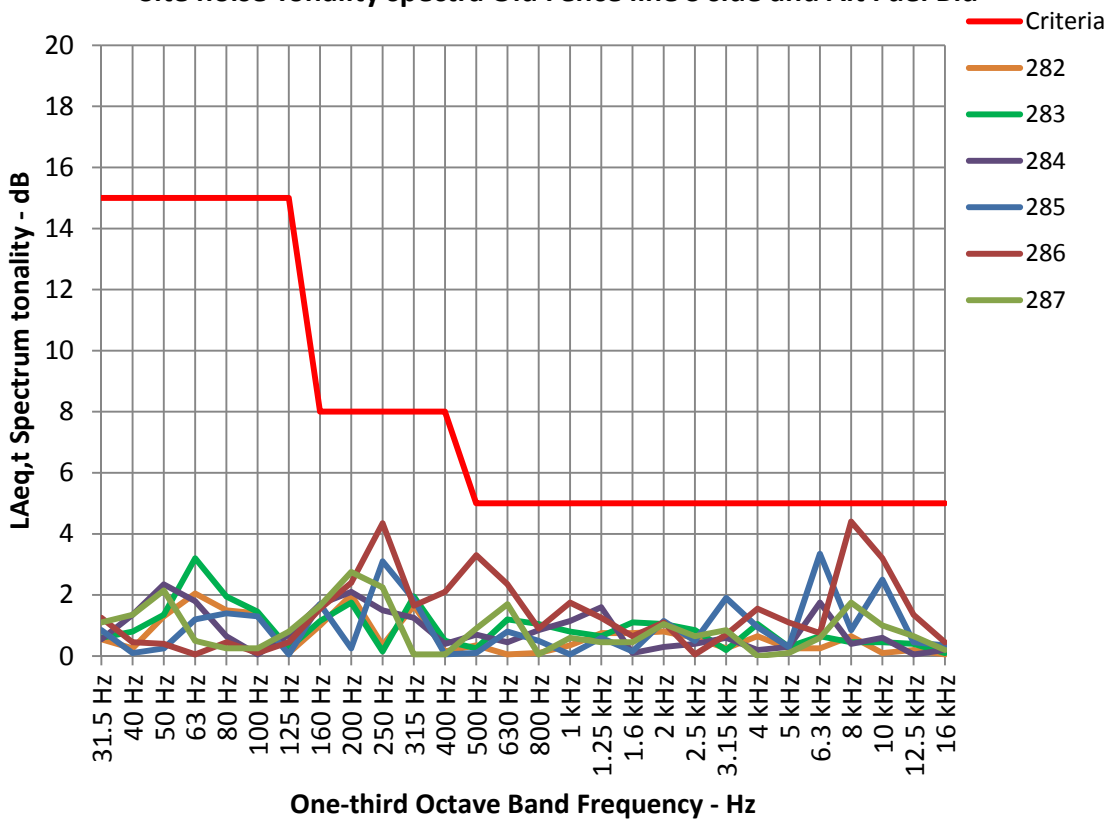


Figure A32: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra Coal Mill South side

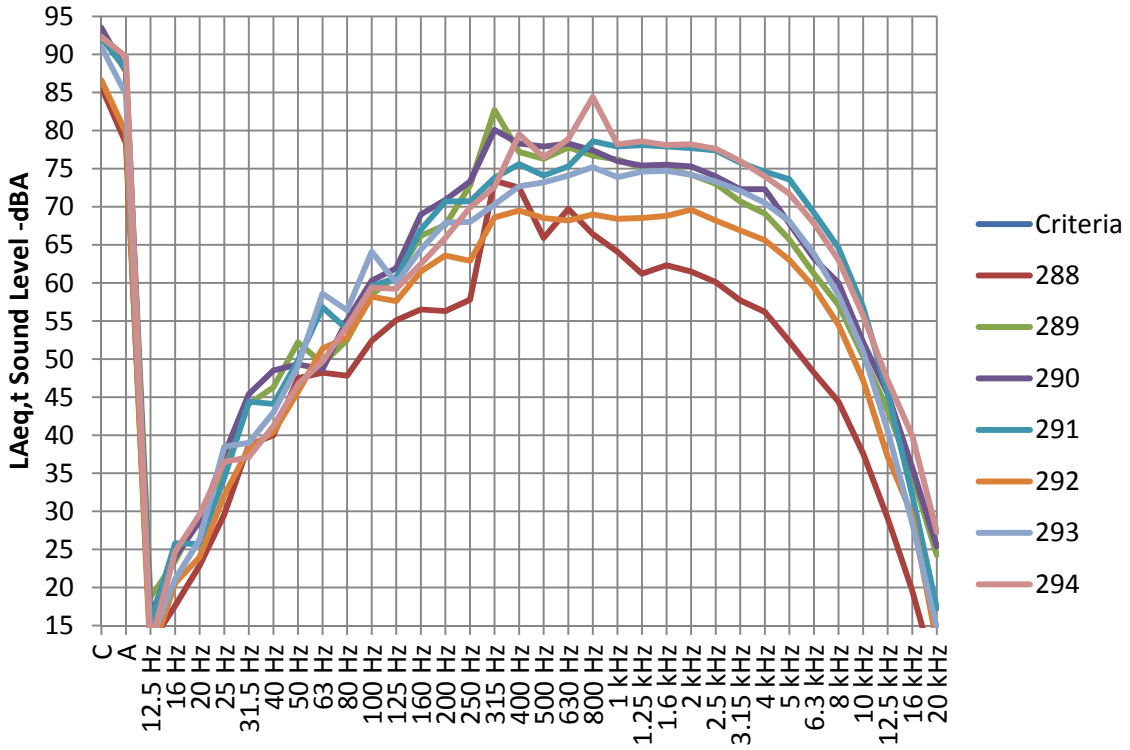


Figure A32A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra Coal Mill South side

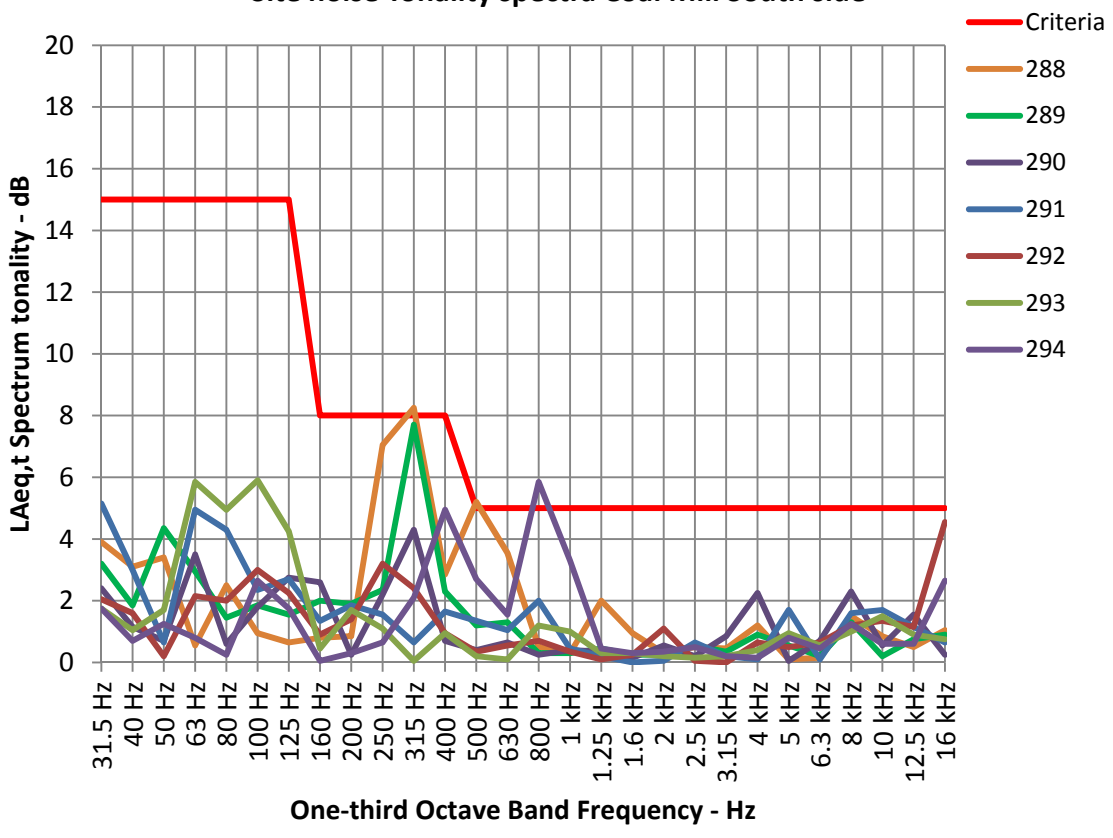


Figure A33: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra Kiln 6 South side

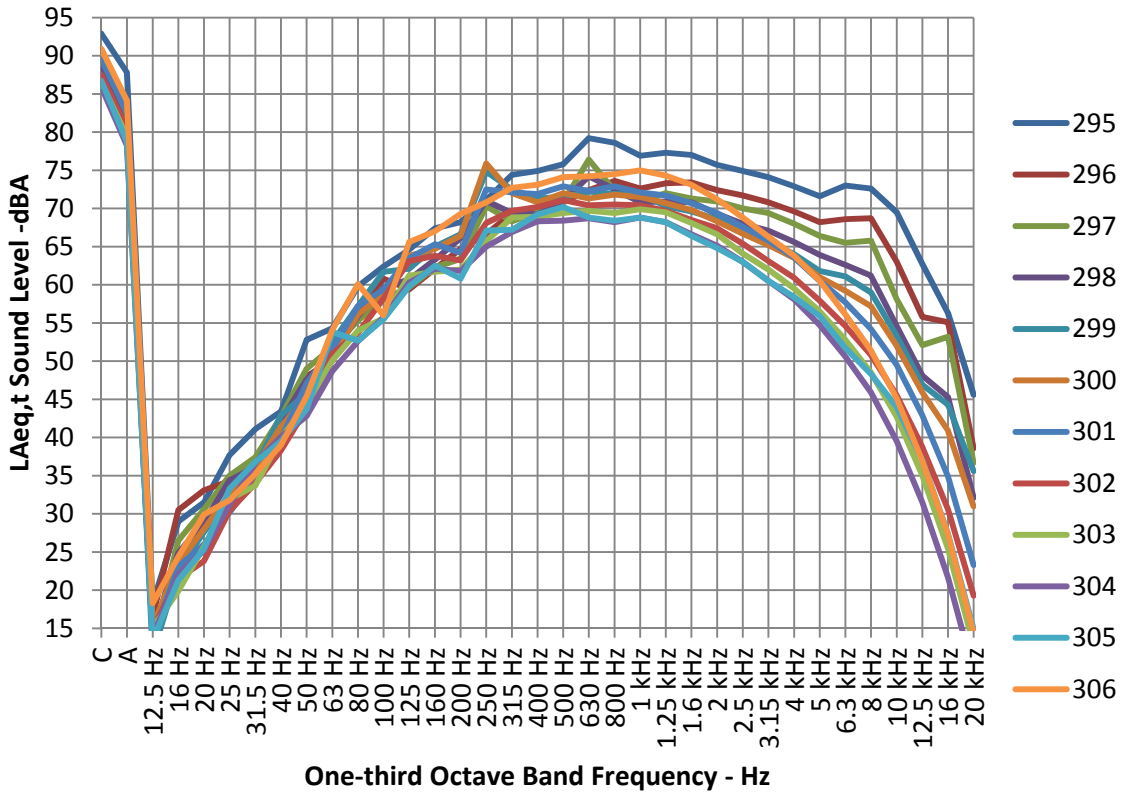


Figure A33A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra Kiln 6 South side

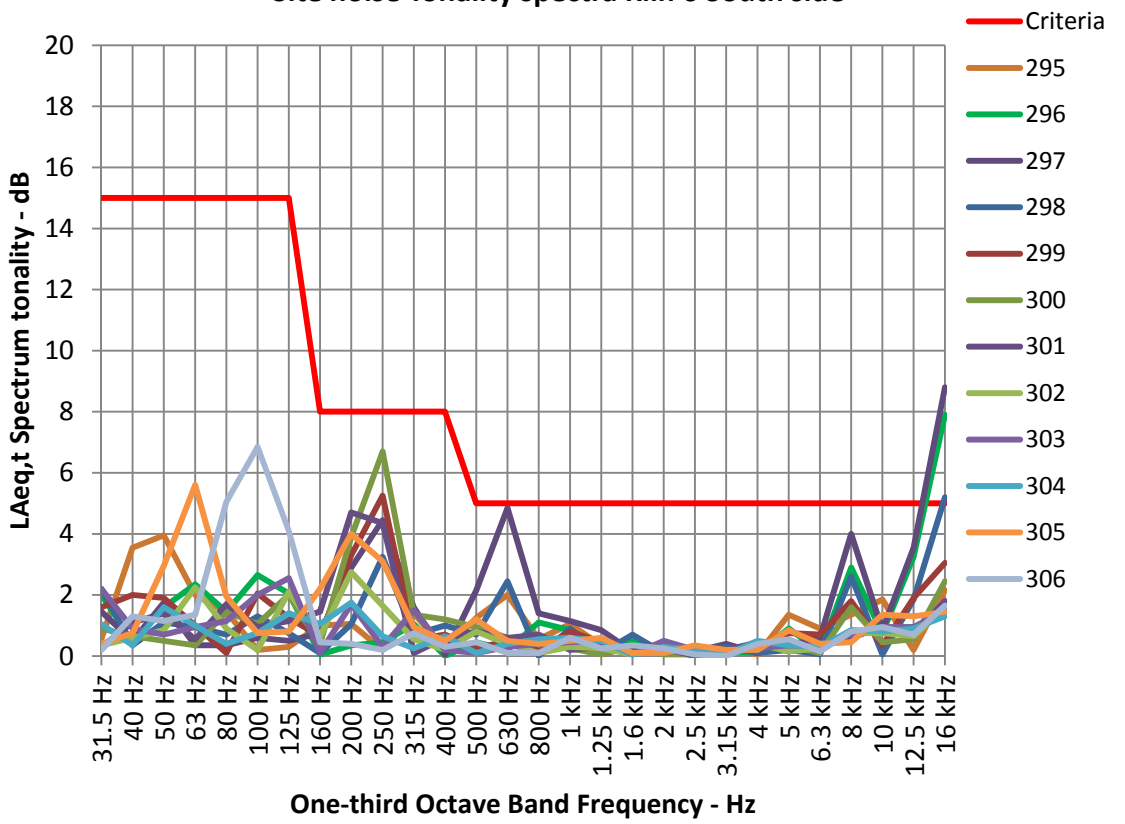


Figure A34: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra Kiln 6 Drive Platform

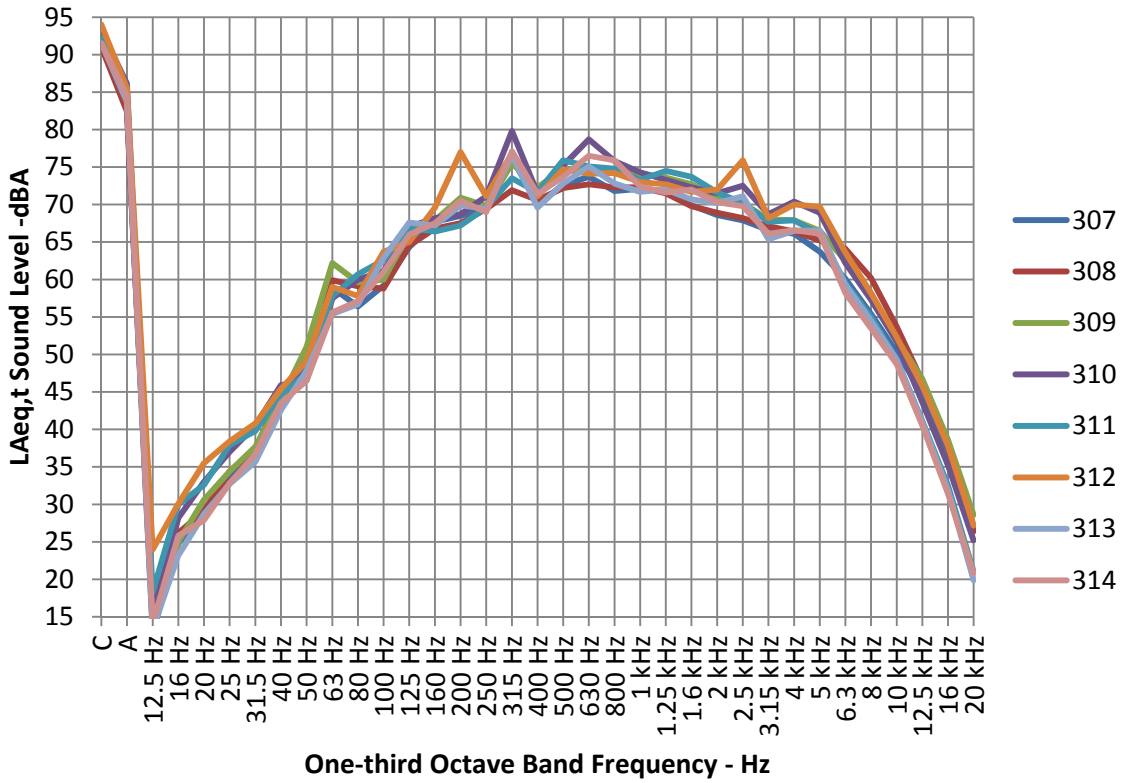


Figure A34A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra Kiln 6 Drive platform

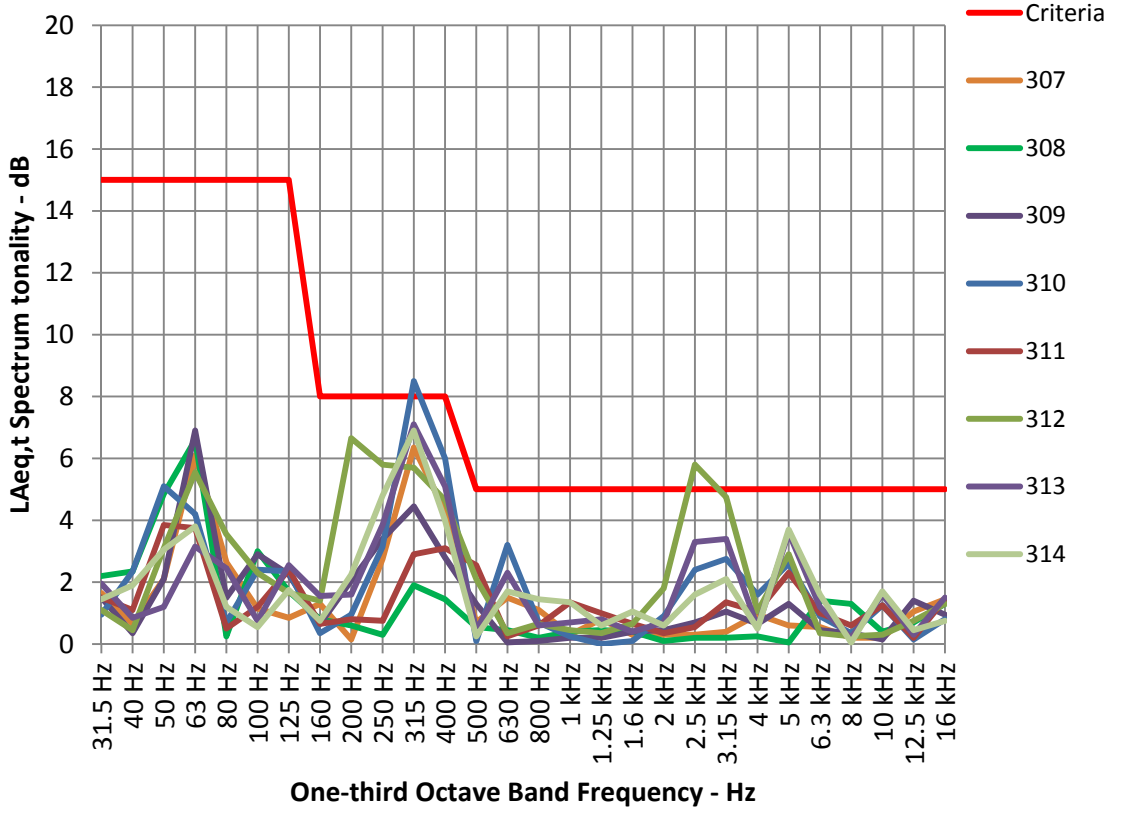


Figure A35: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra Kiln 6 North side road opp. RM6

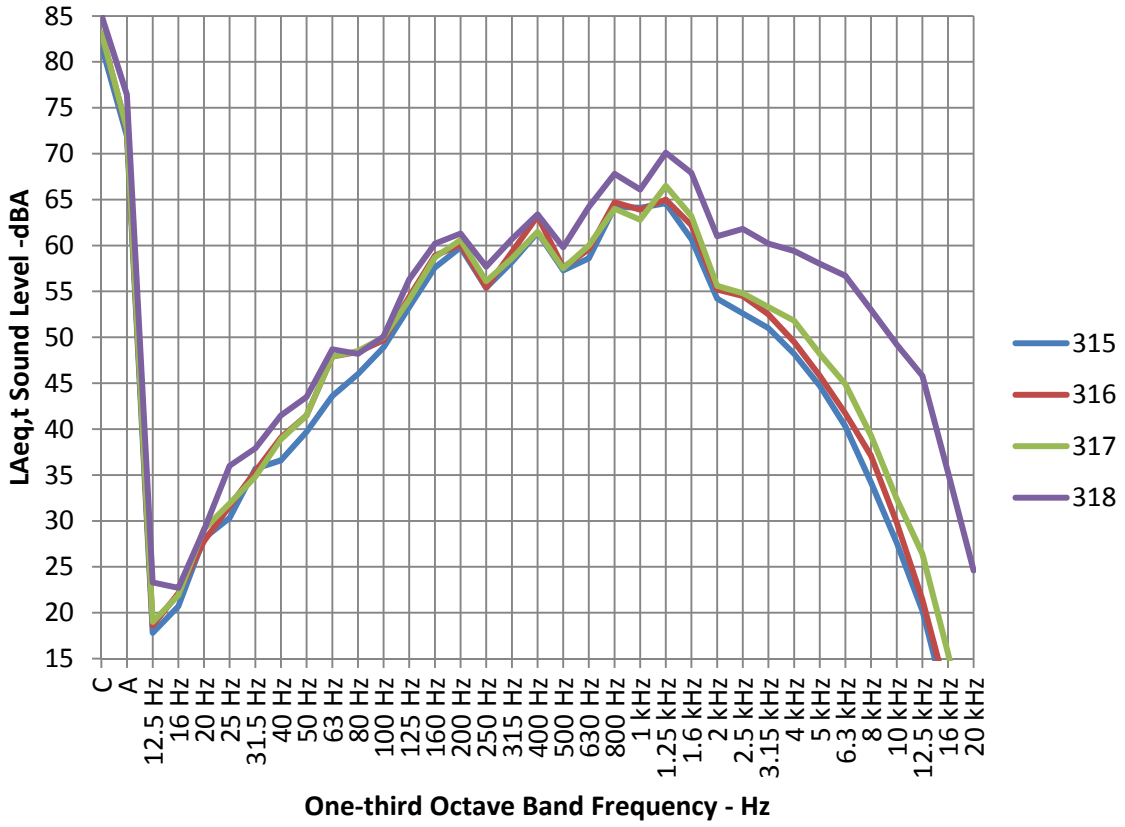


Figure A35A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra Kiln 6 North side road opp. RM6

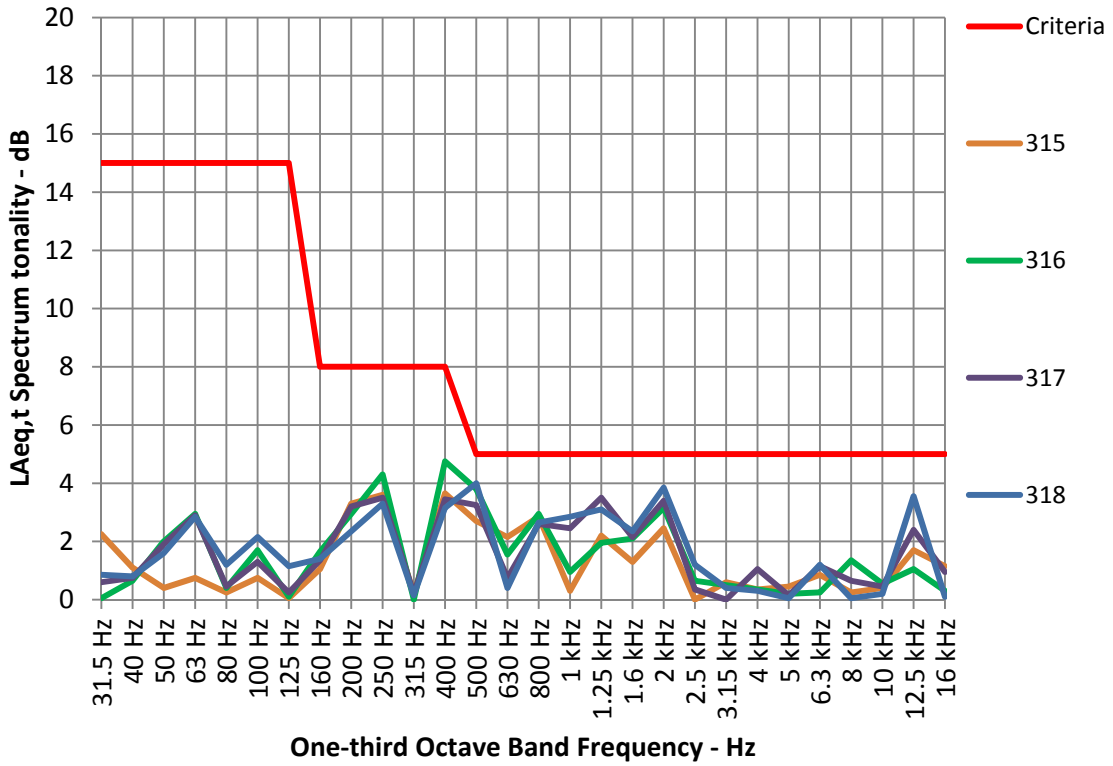


Figure A36: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra Kiln 6 North side opp FA38-39 & PHT

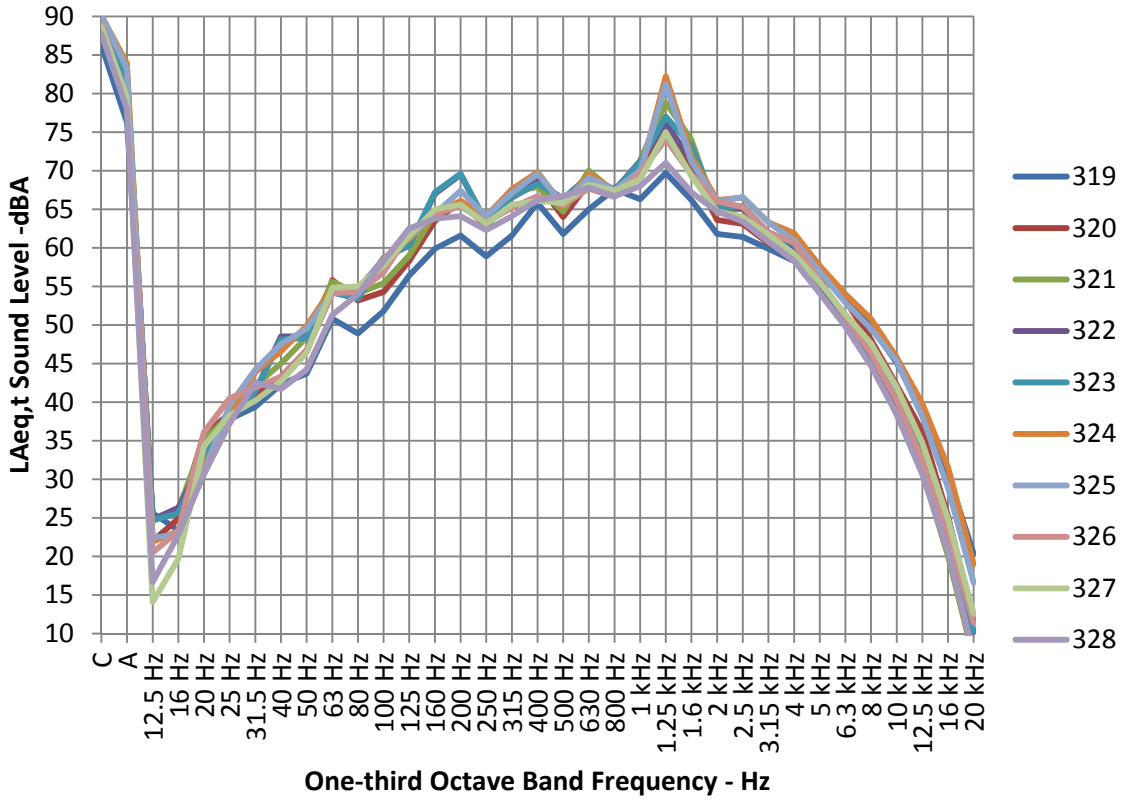


Figure A36A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra K6 North side opp. FA38-FA39 & PHT

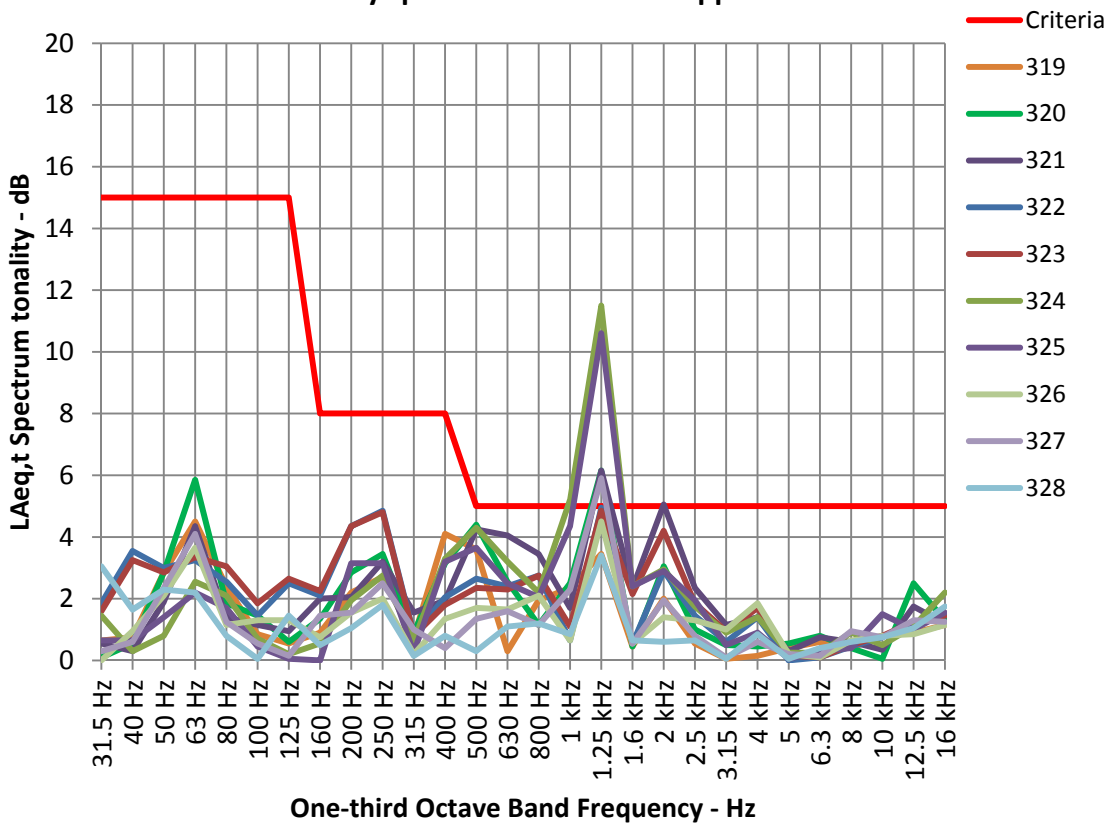


Figure A37: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra Kiln 6 North side road opp. kiln

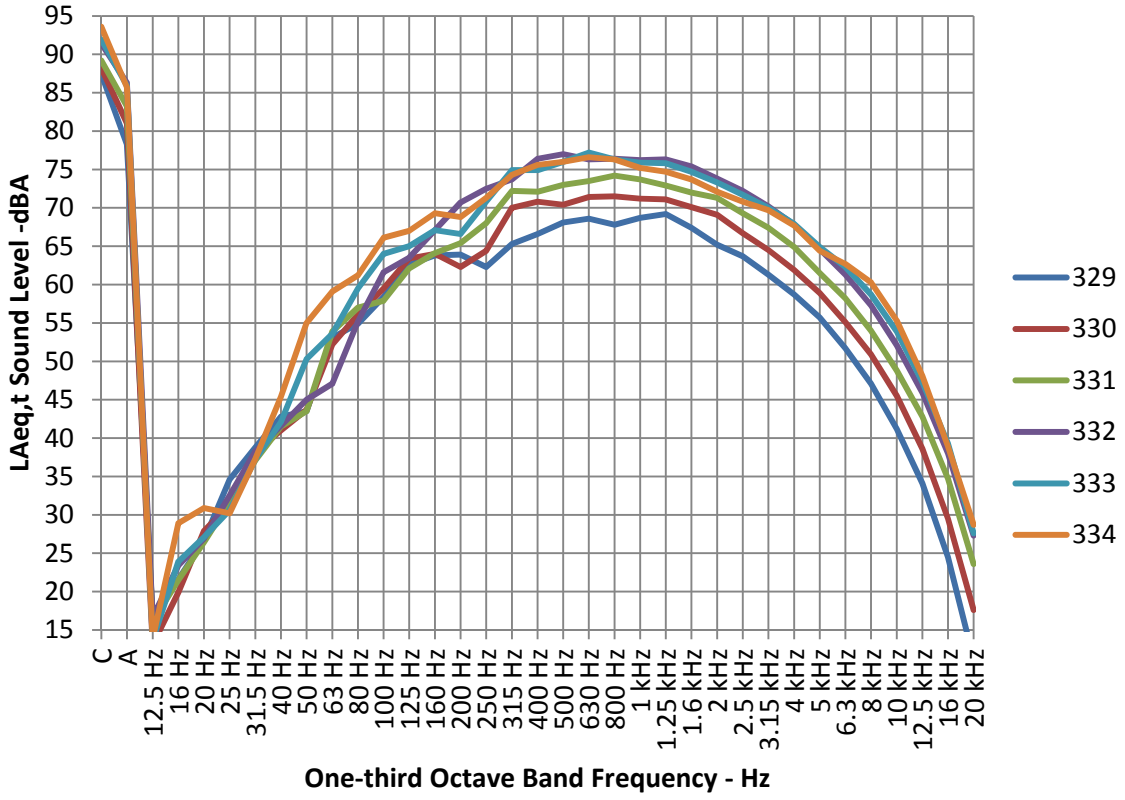


Figure A37A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra Kiln 6 North side road opp. kiln

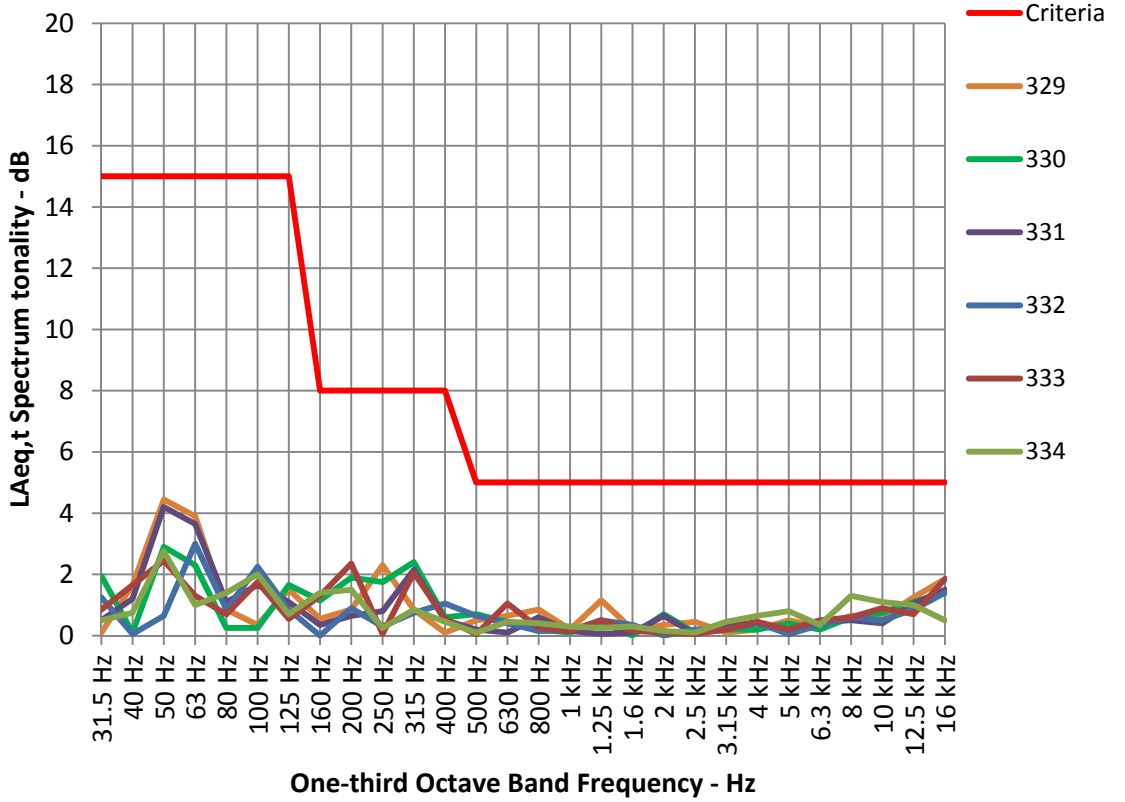


Figure A38: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra Kiln 6 Grate cooler fan court yard

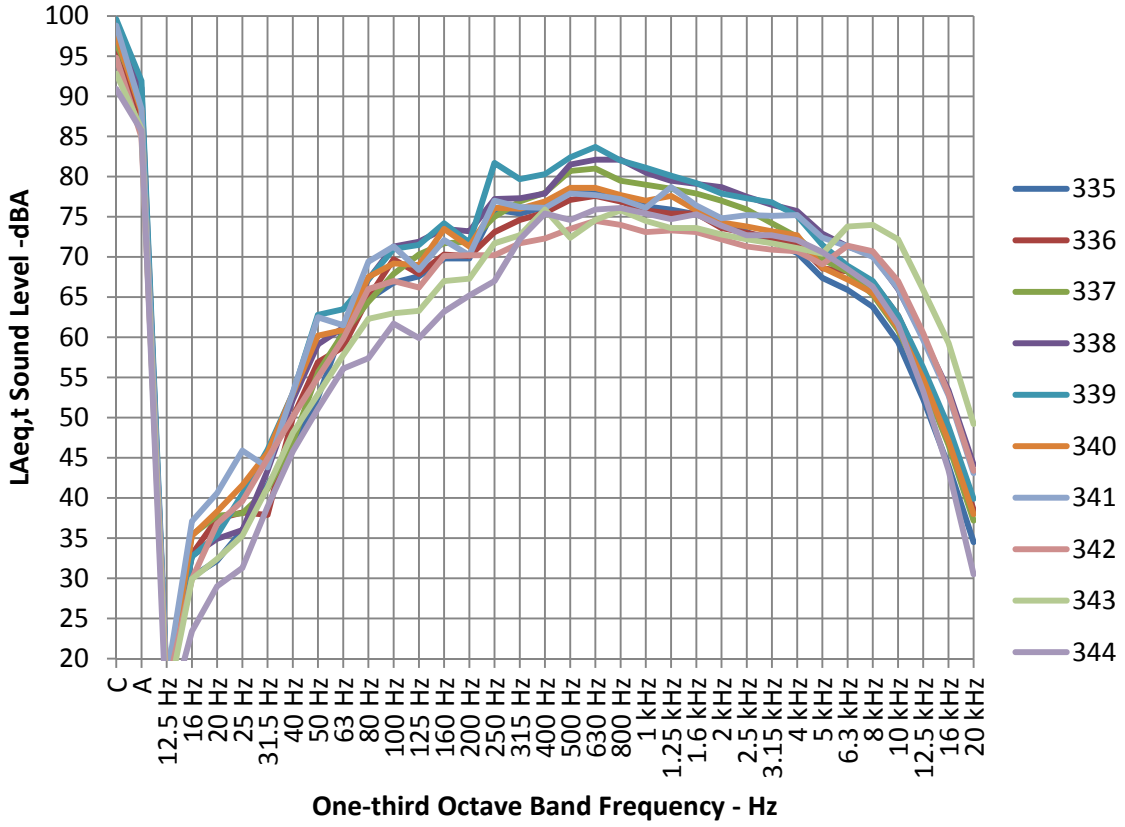


Figure A38A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra Kiln 6 Grate cooler fan courtyard

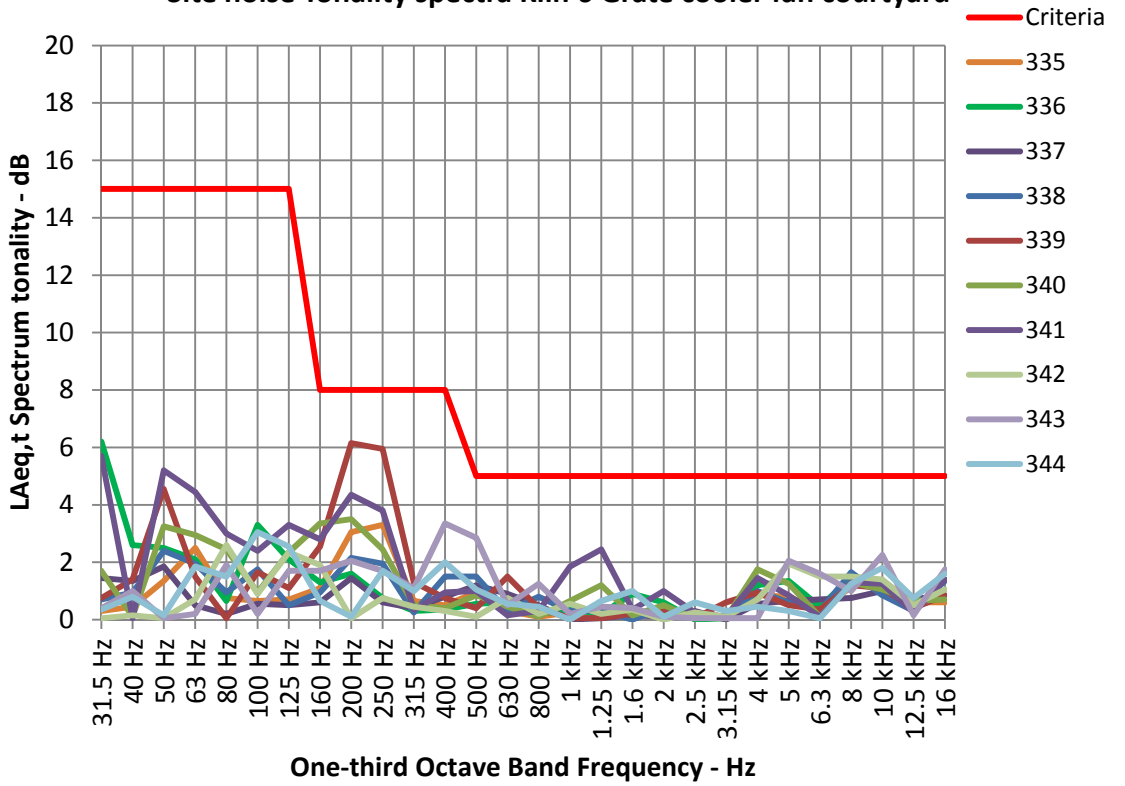


Figure A39: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra Kiln 6 Firing Floor

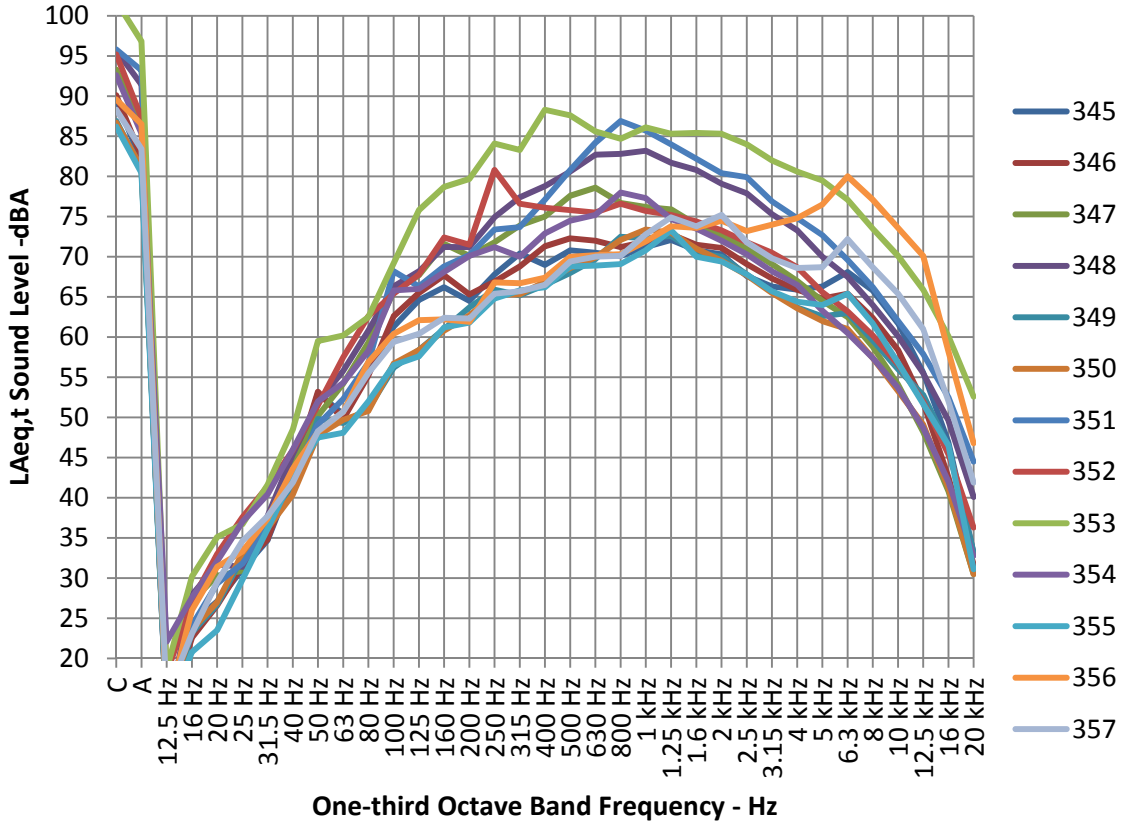


Figure A39A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra Kiln 6 Firing Floor

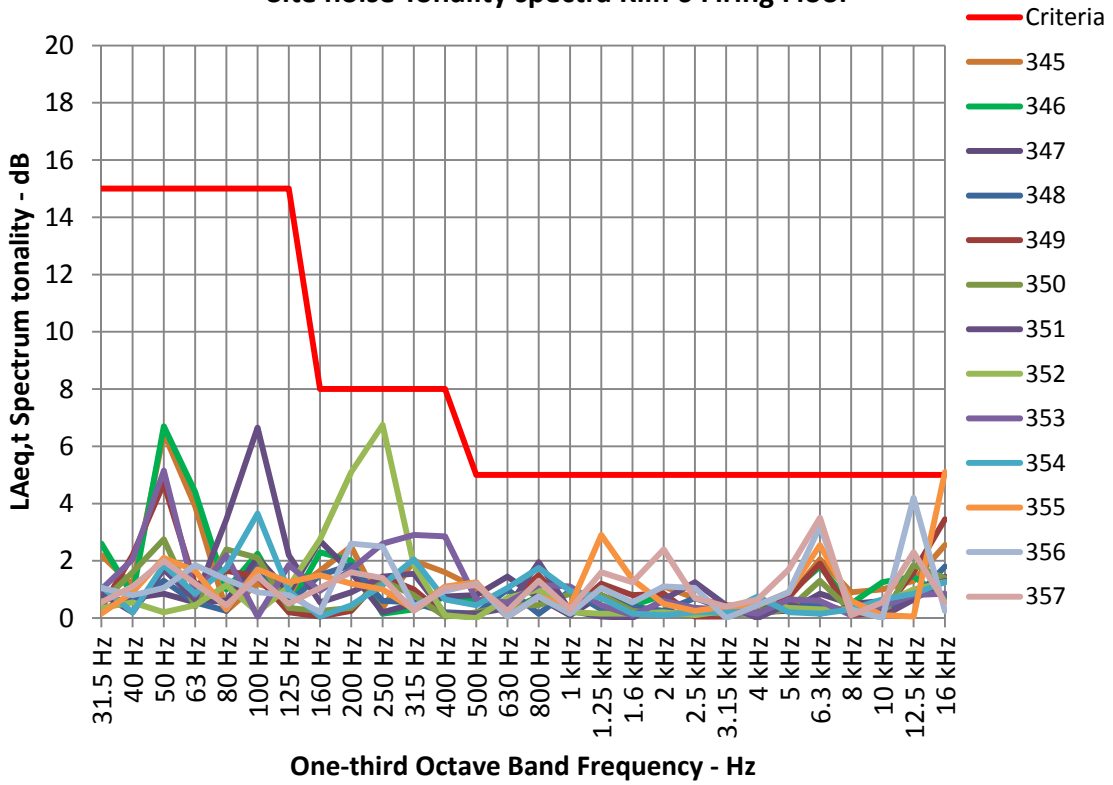


Figure A40: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra Kiln 6 Radicon Cooler

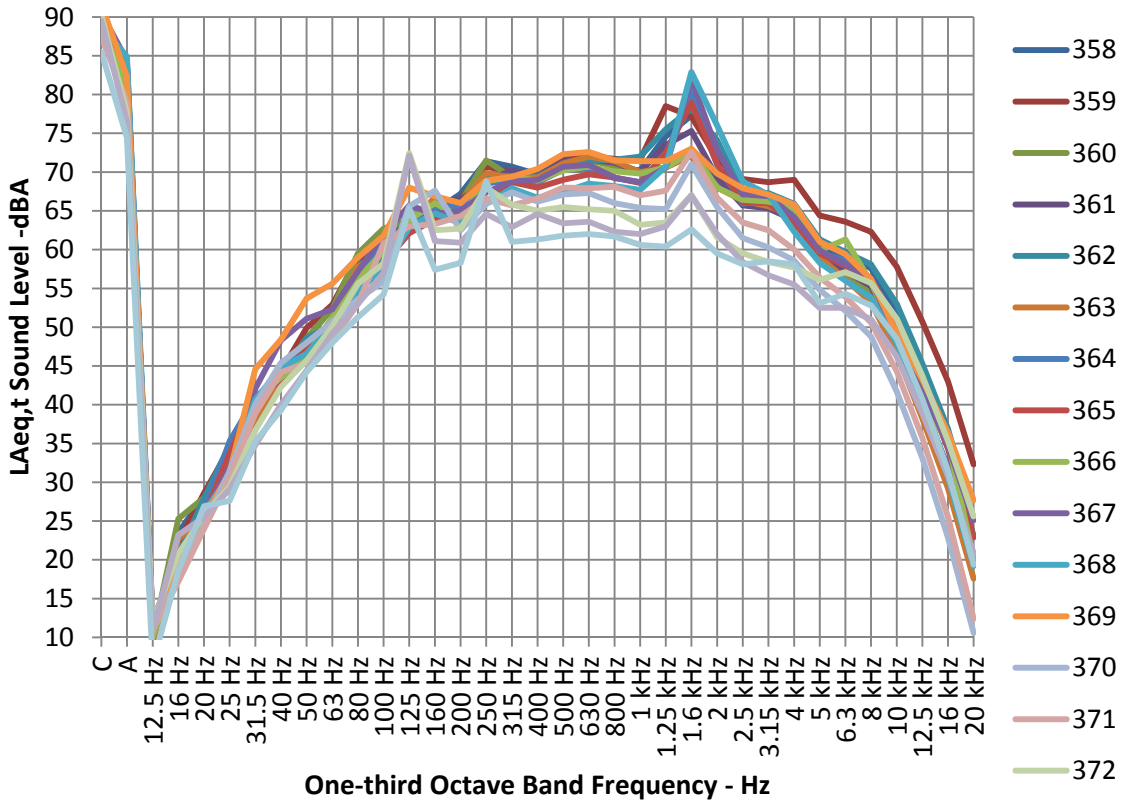


Figure A40A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra Radicon Cooler

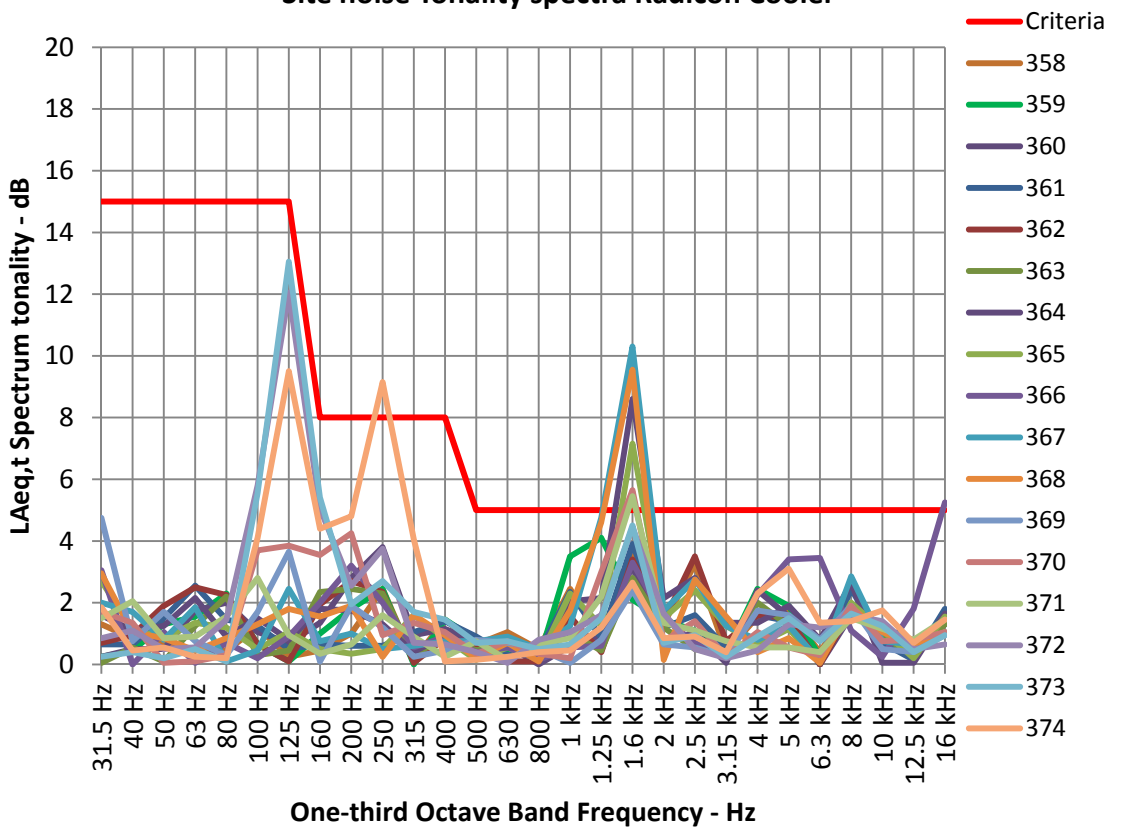


Figure A41: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra Kiln 6 Fan 215

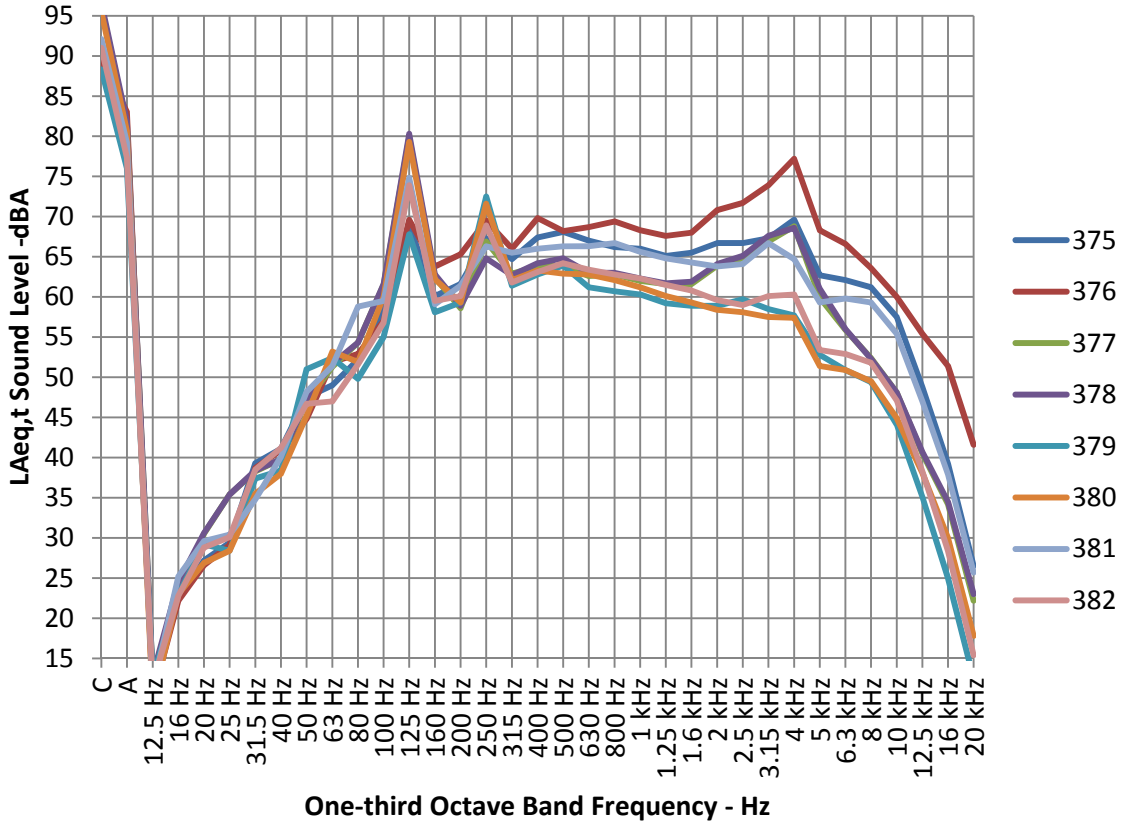


Figure A41A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra Fan 215

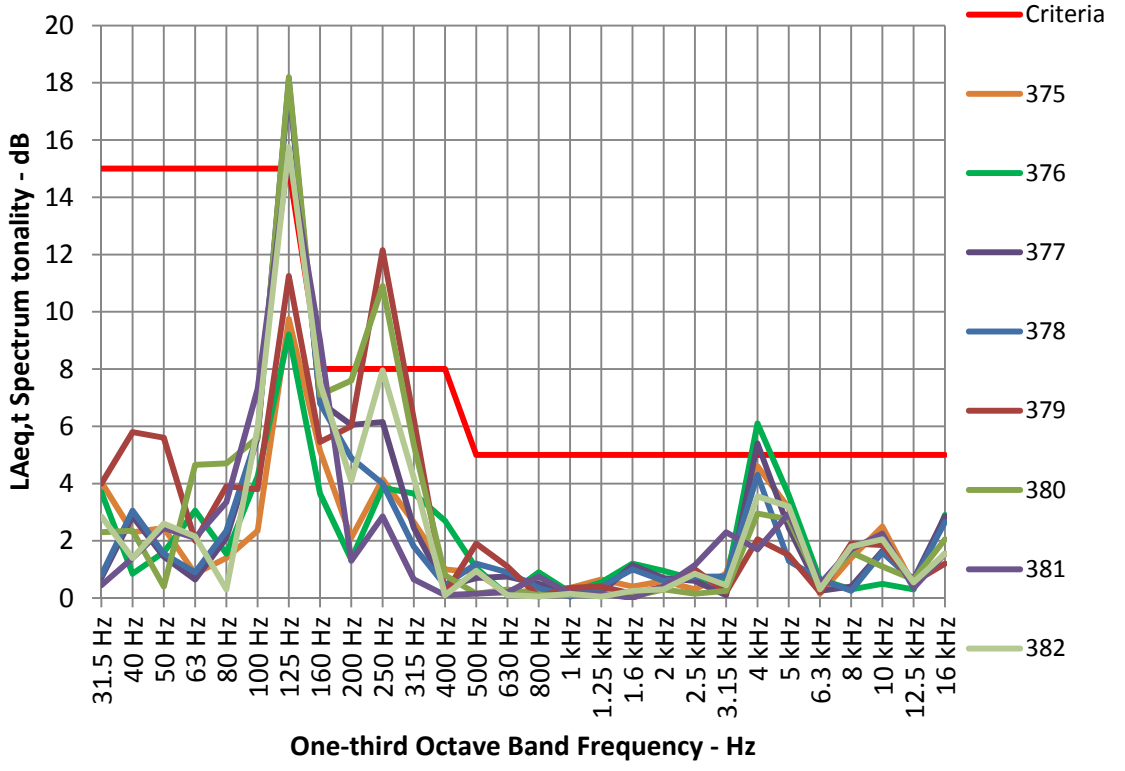


Figure A42: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra CM7 Outside western side

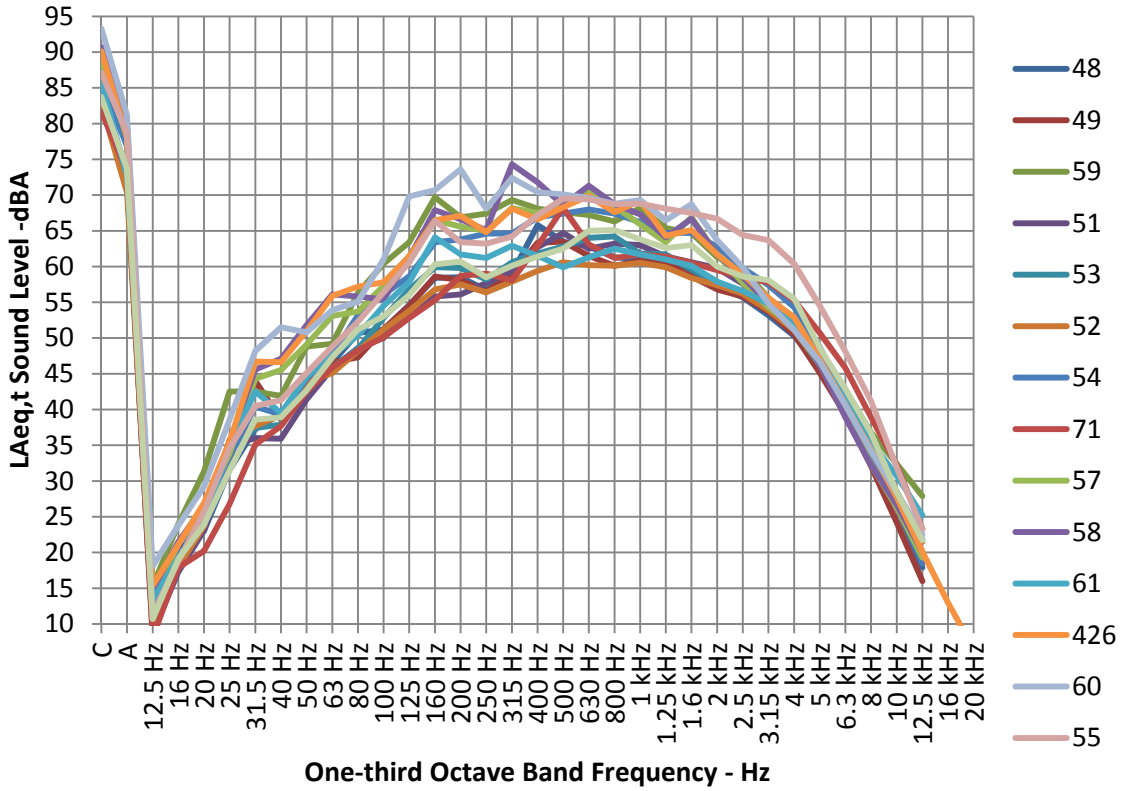


Figure A42A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra CM7 Outside Western Side

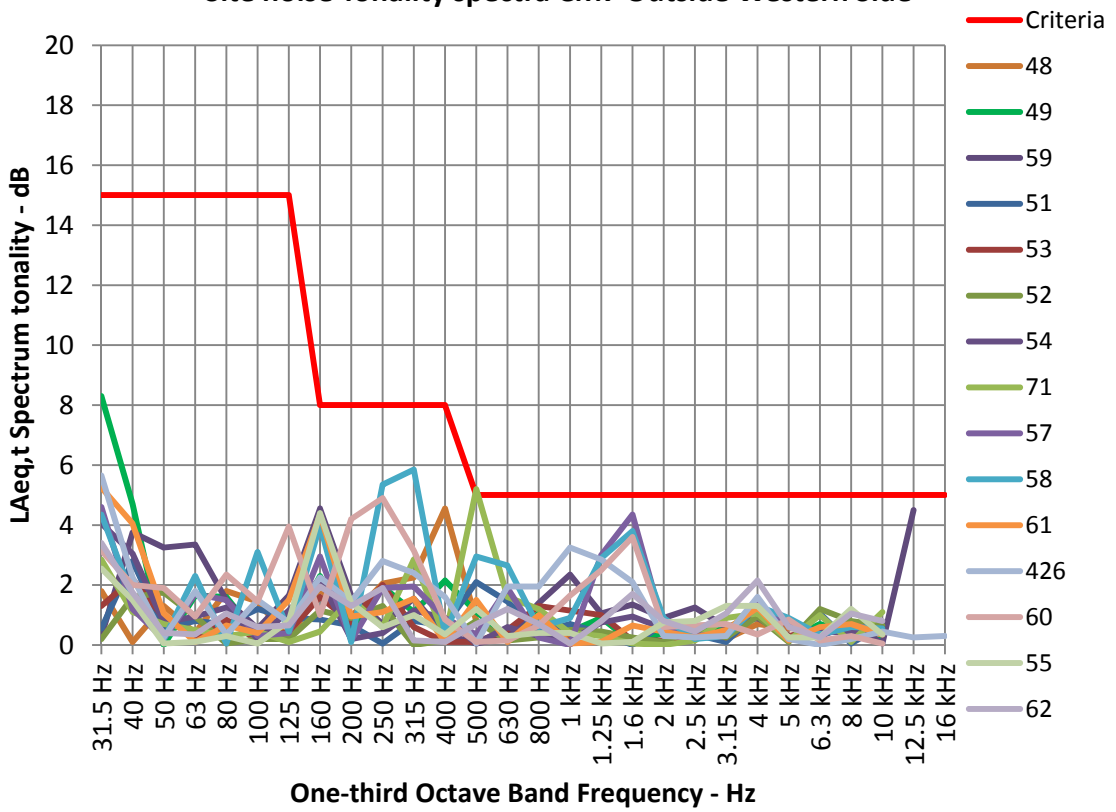


Figure A43: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra CM7 Outside northern side

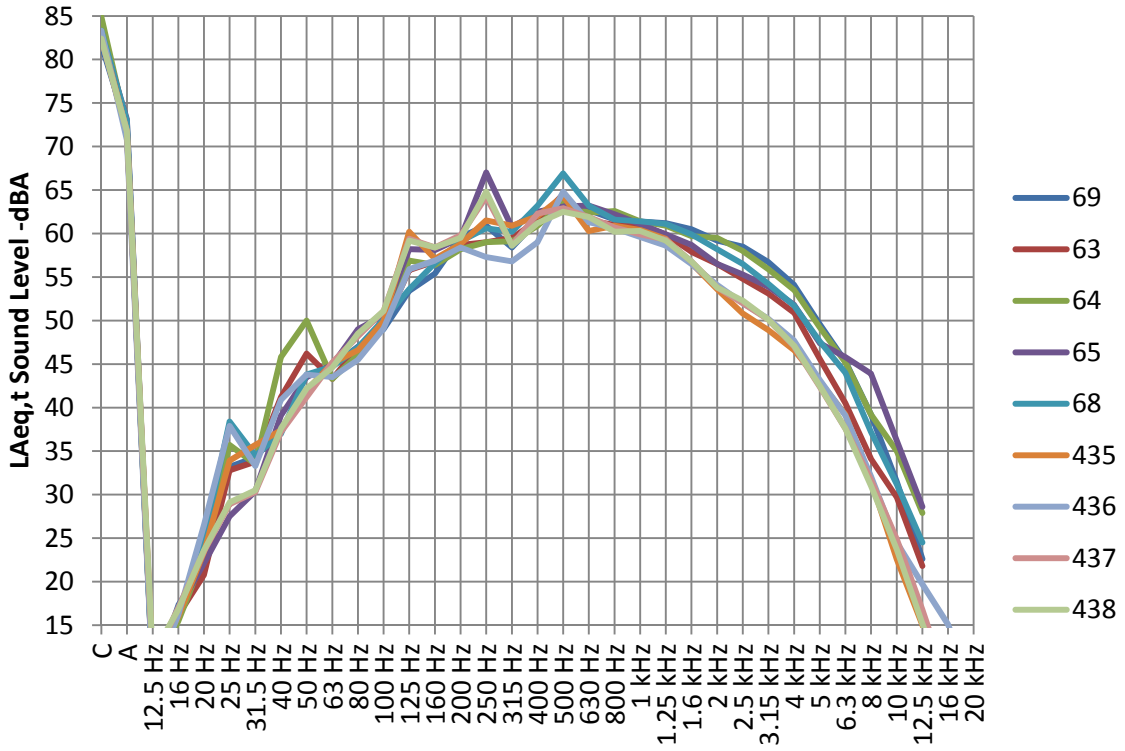


Figure A43A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra CM7 Outside Northern Side

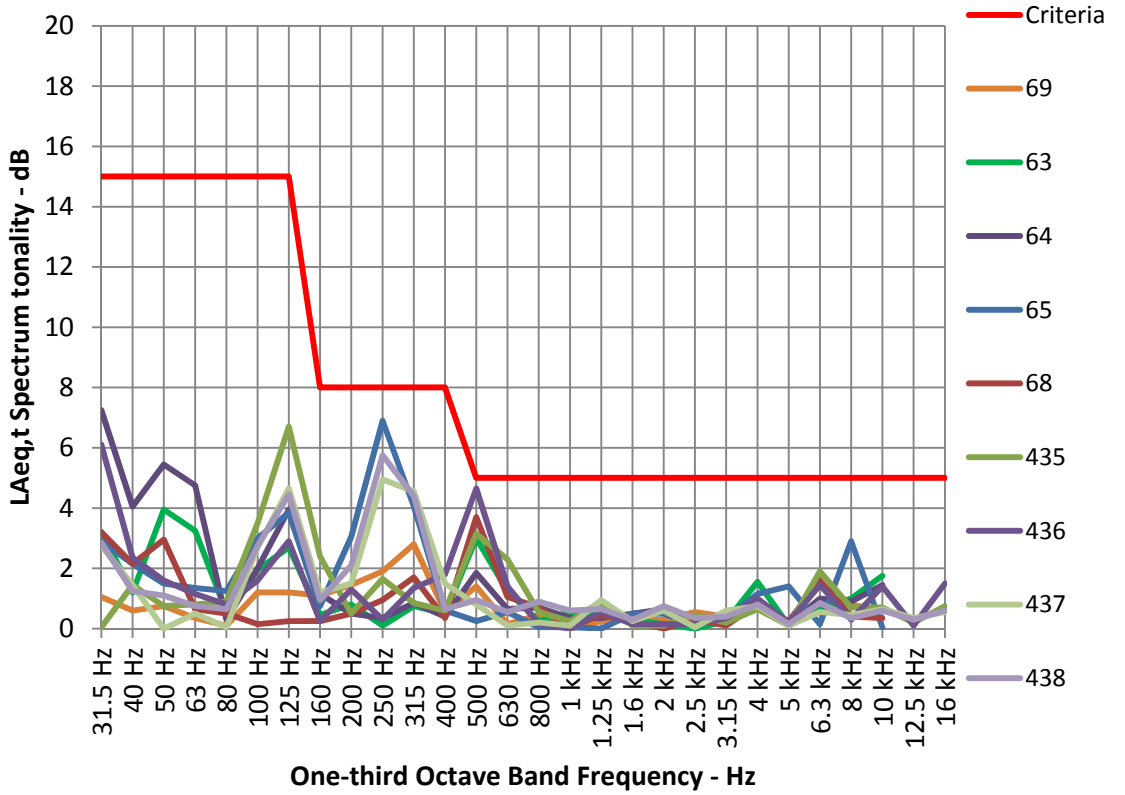


Figure A44: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra CM7 inside compressor filter room

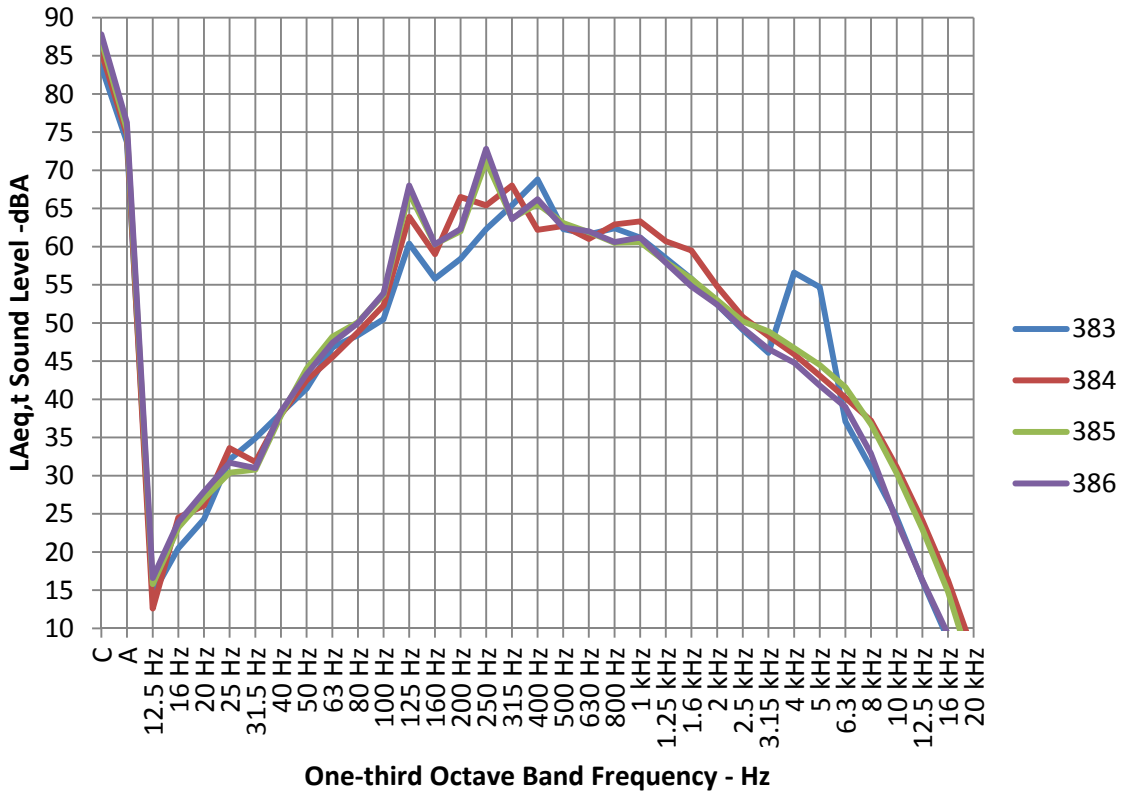


Figure A44A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra CM7 Inside compressor filter room

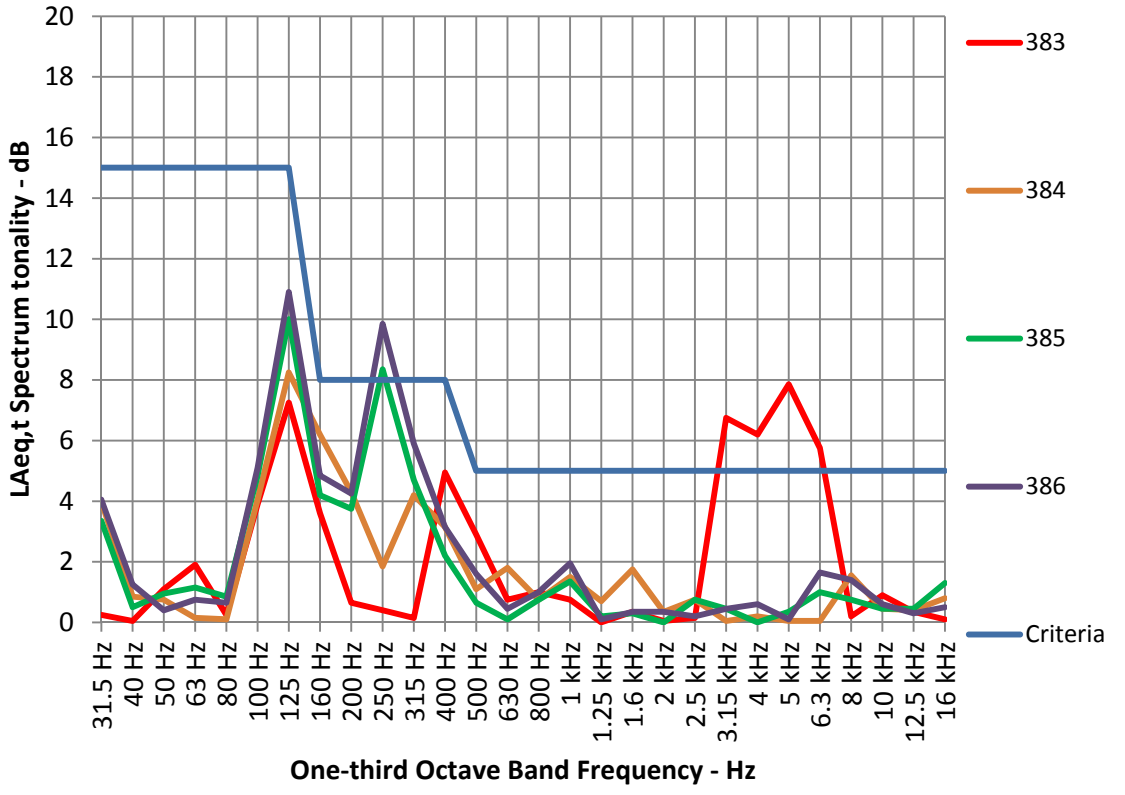


Figure A45: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra CM7 outside main northern door

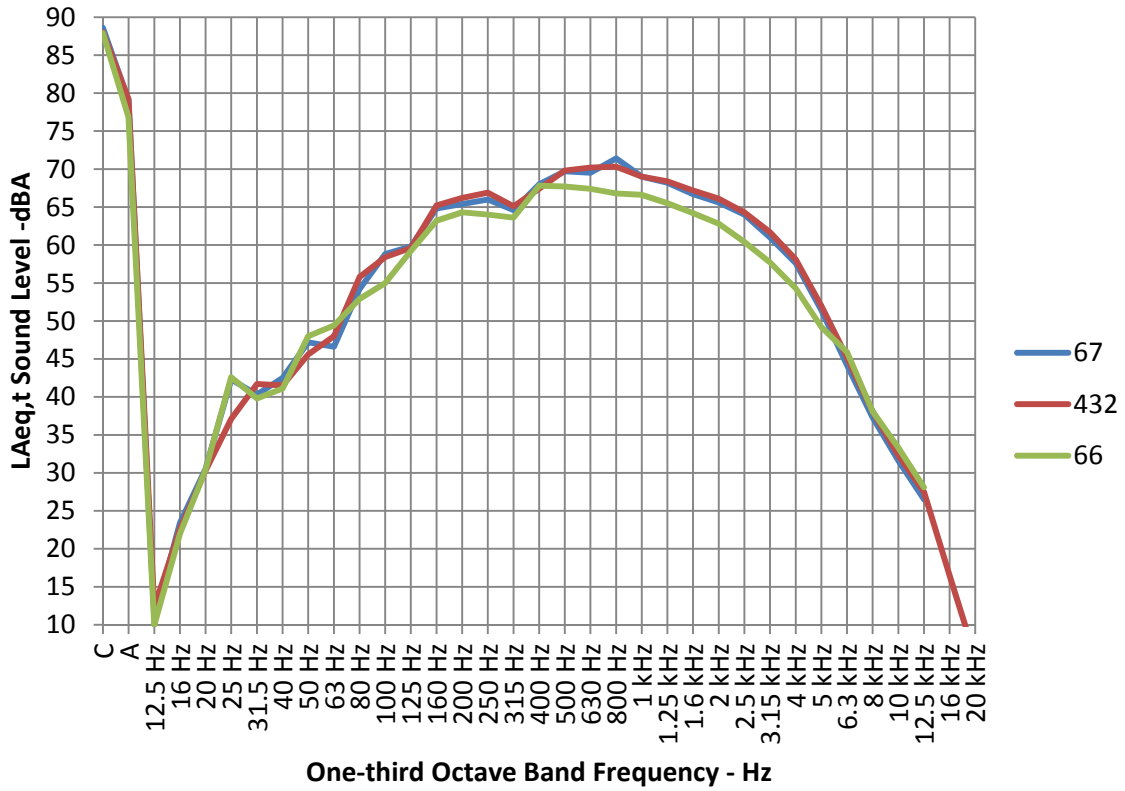


Figure A45A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra CM7 Outside main northern door

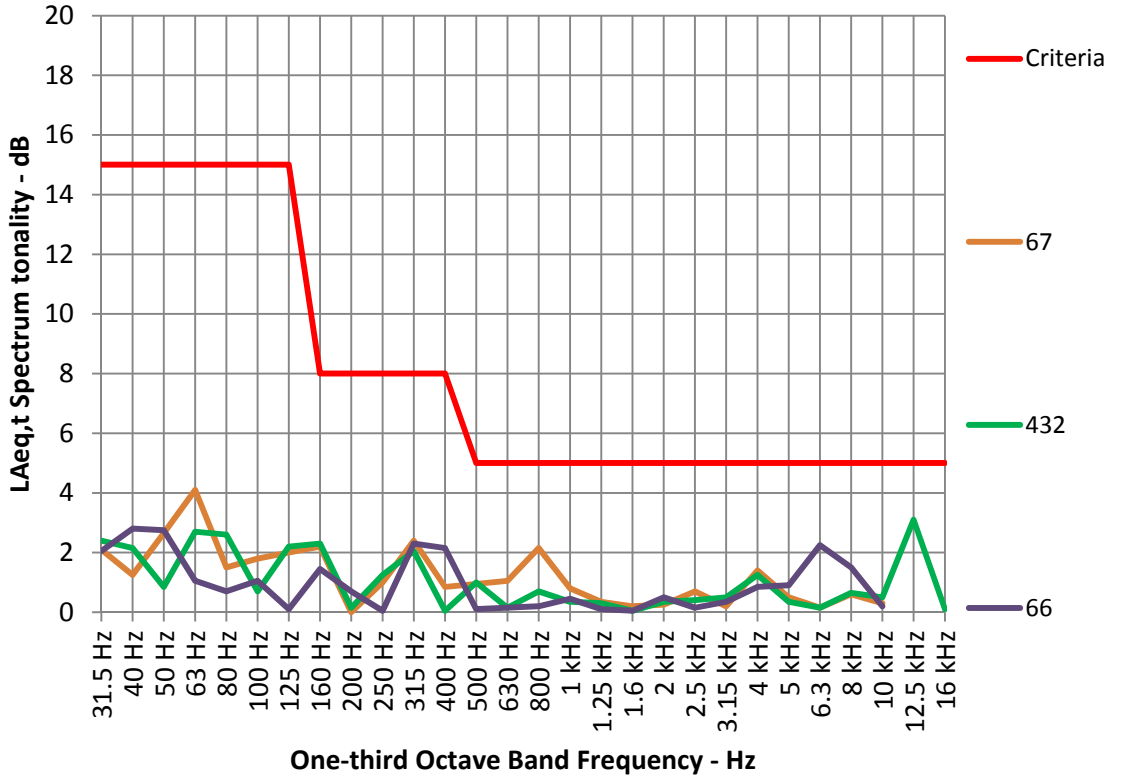


Figure A46: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra CM7 outside TS3 area

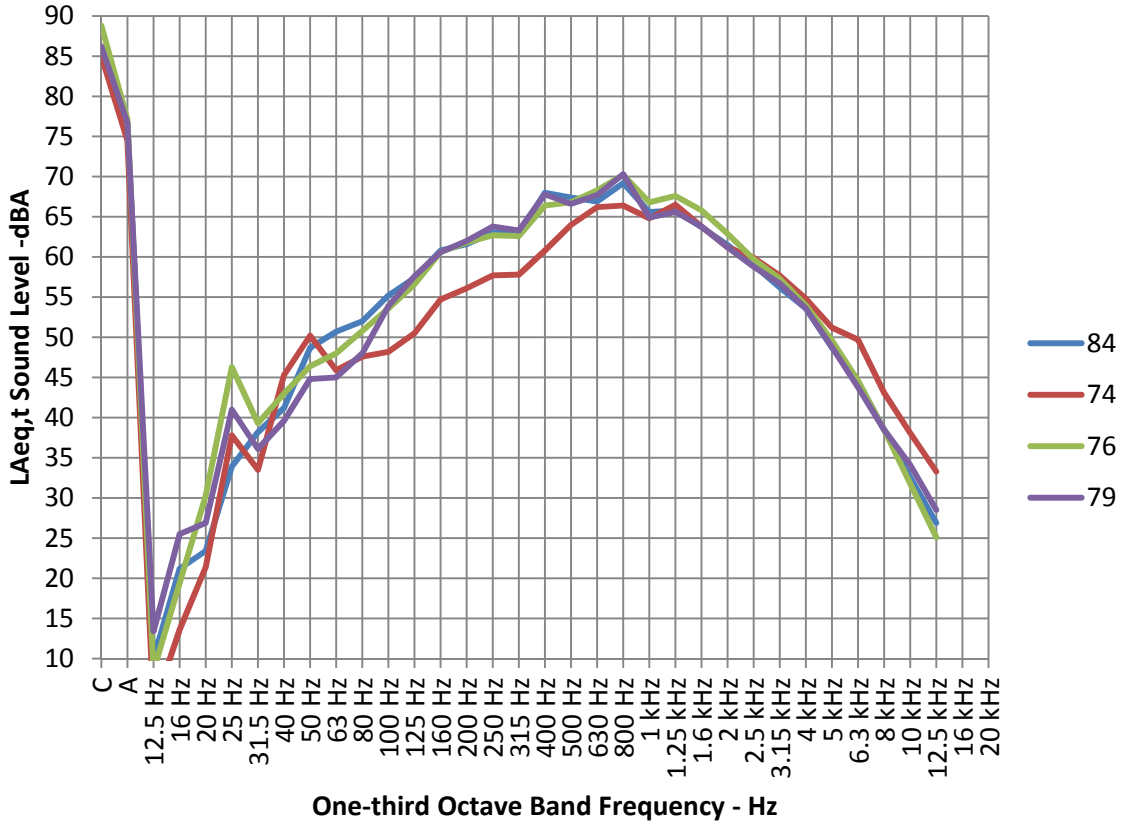


Figure A46A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra CM7 Outside TS3 area

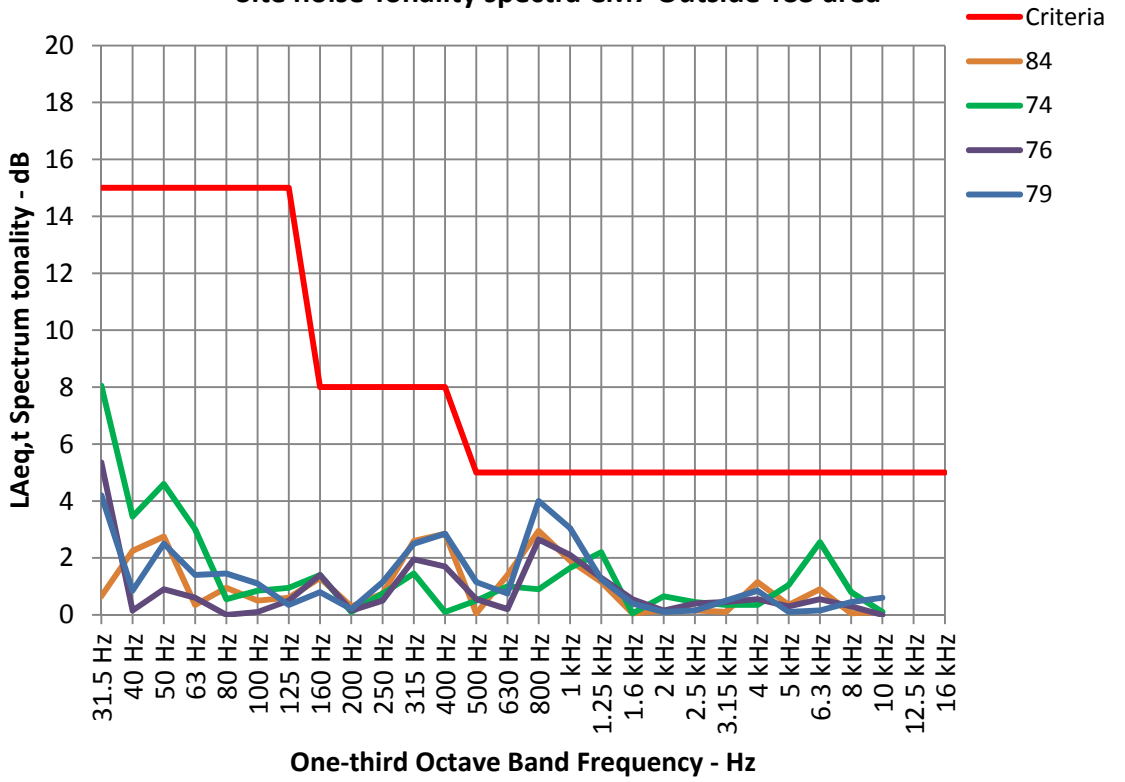


Figure A47: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra CM7 outside southern side

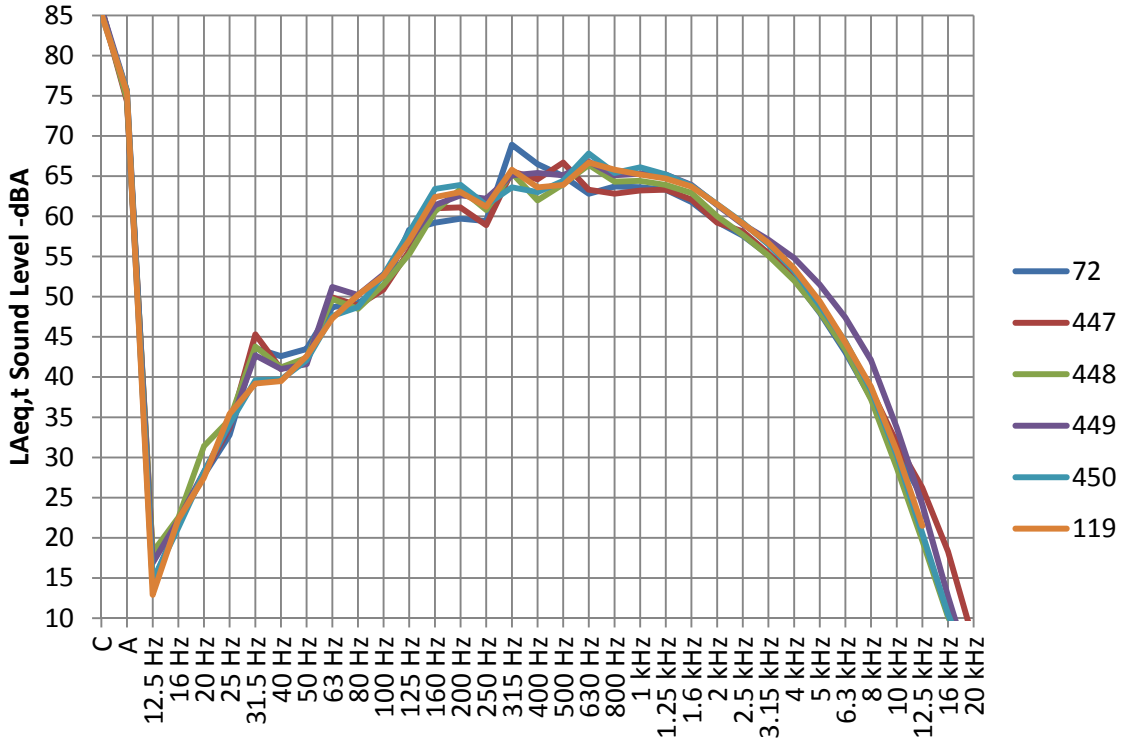


Figure A47A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra CM7 Outside southern side

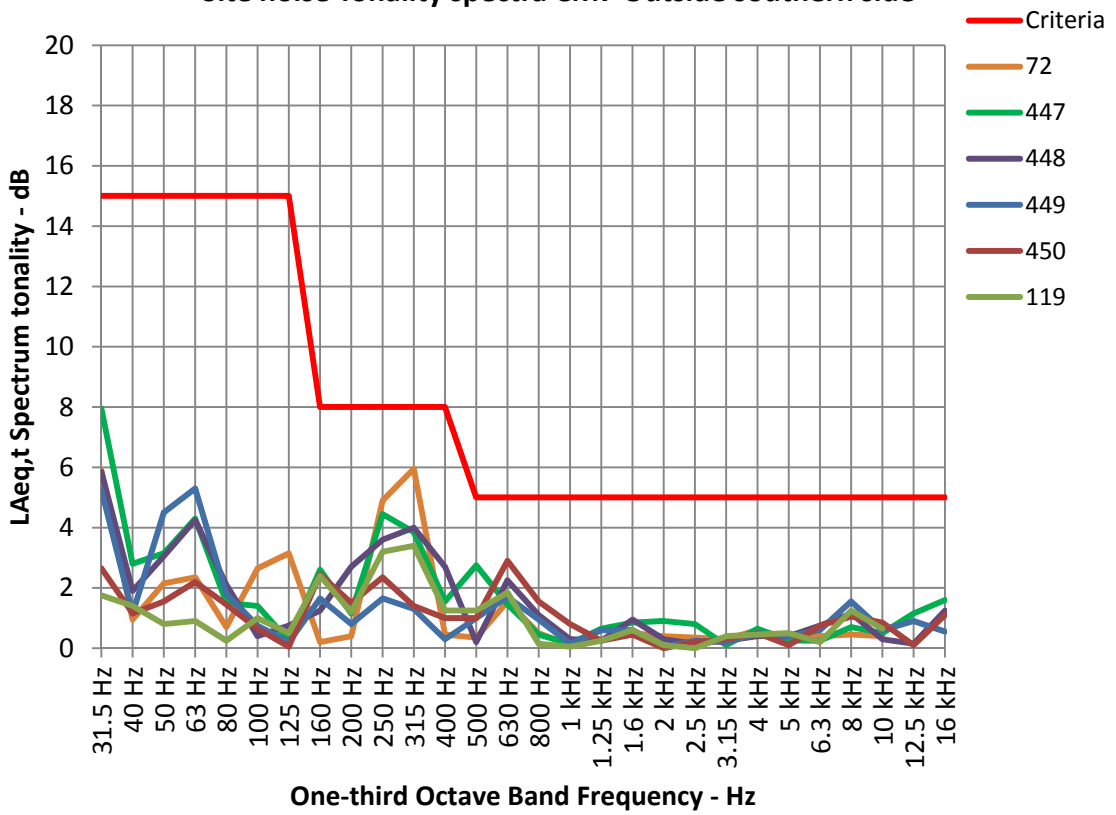


Figure A48: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra CM7 Inside L0

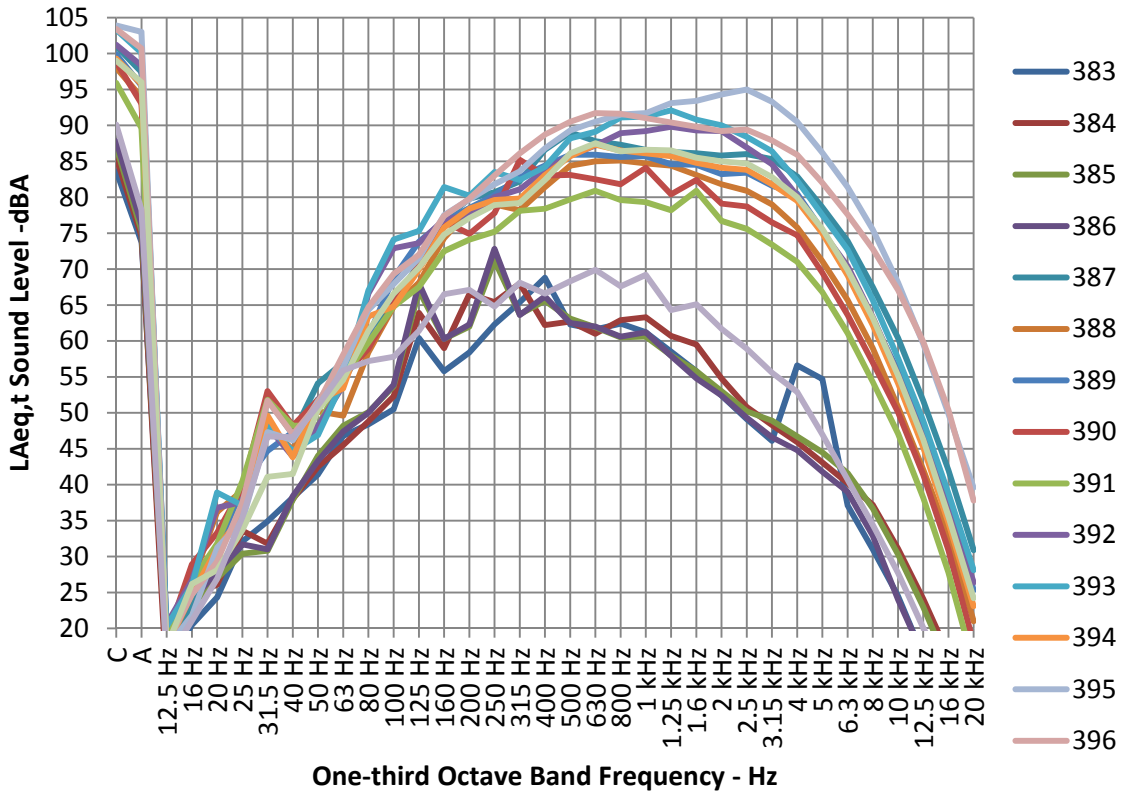


Figure A48A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra CM7 Inside L0

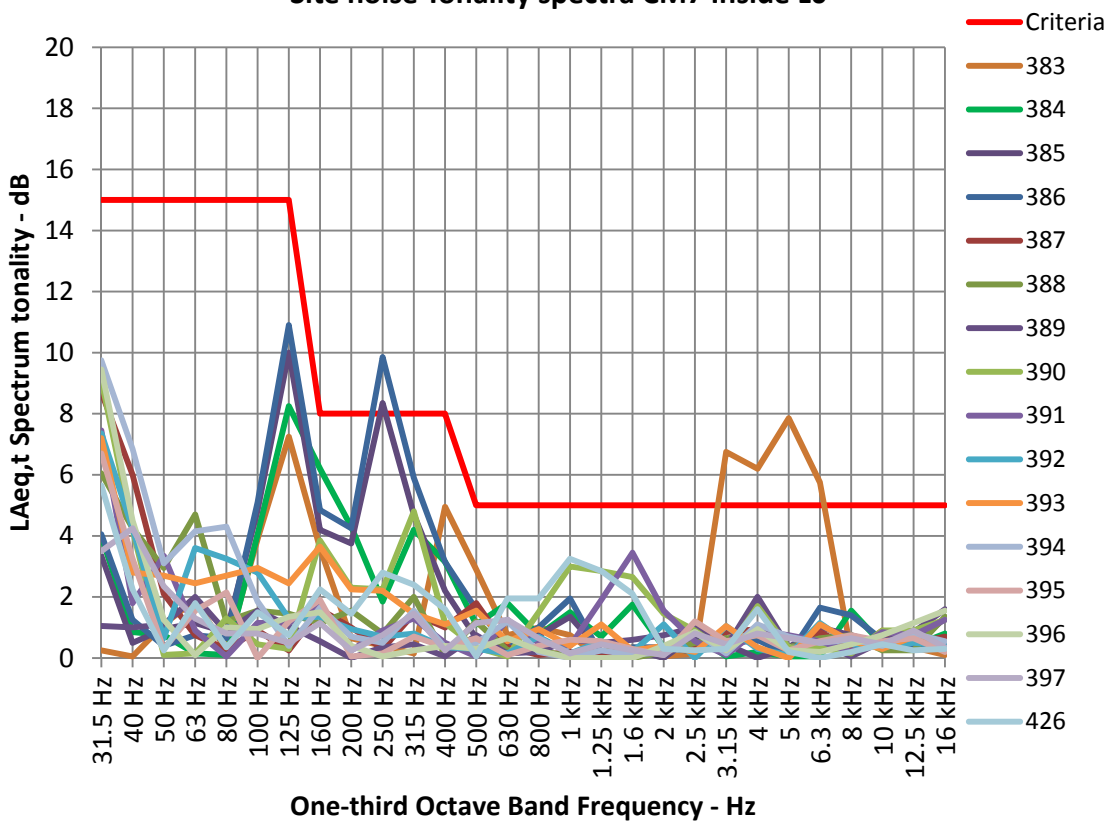


Figure A49: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra CM7 Inside L1 and top of mill

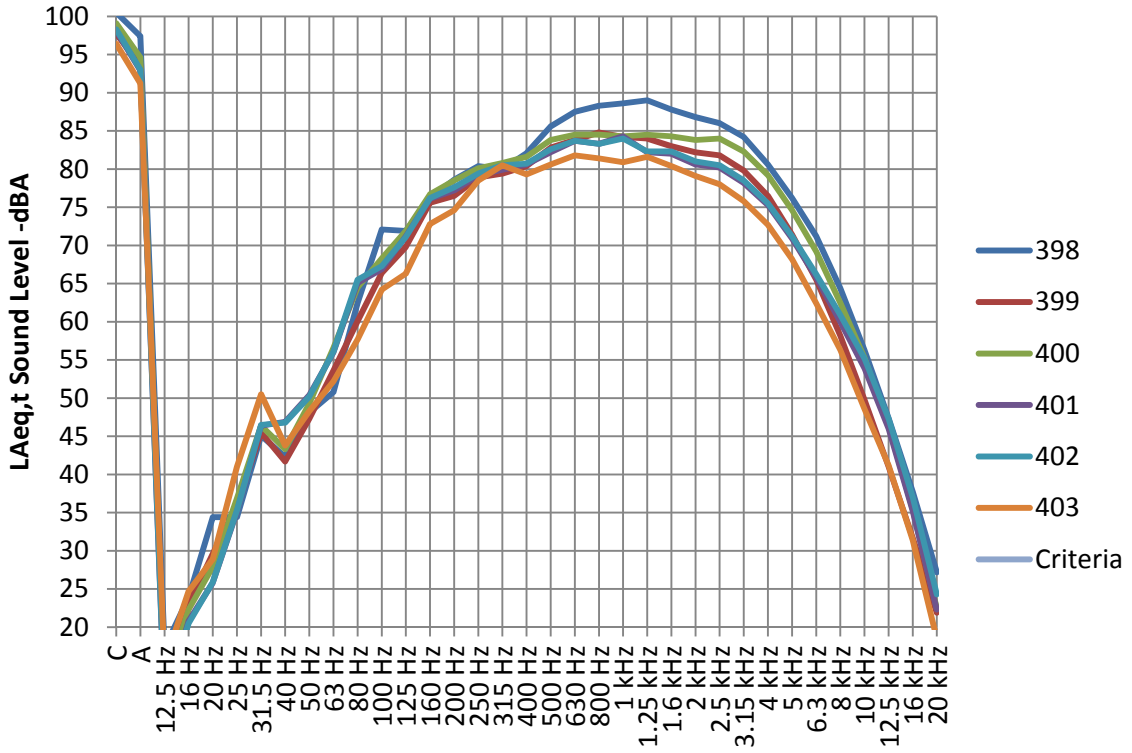


Figure A49A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra CM7 Inside L1 and top of mill

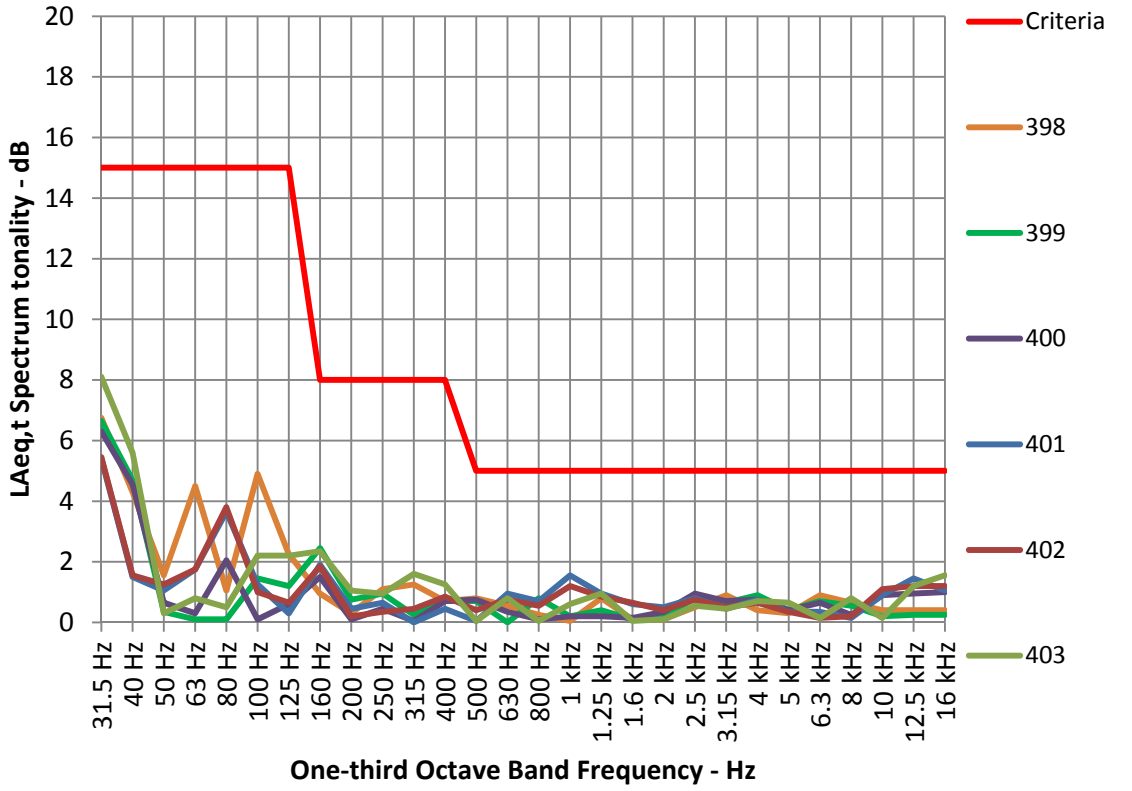


Figure A50: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra CM7 Inside BE Tower

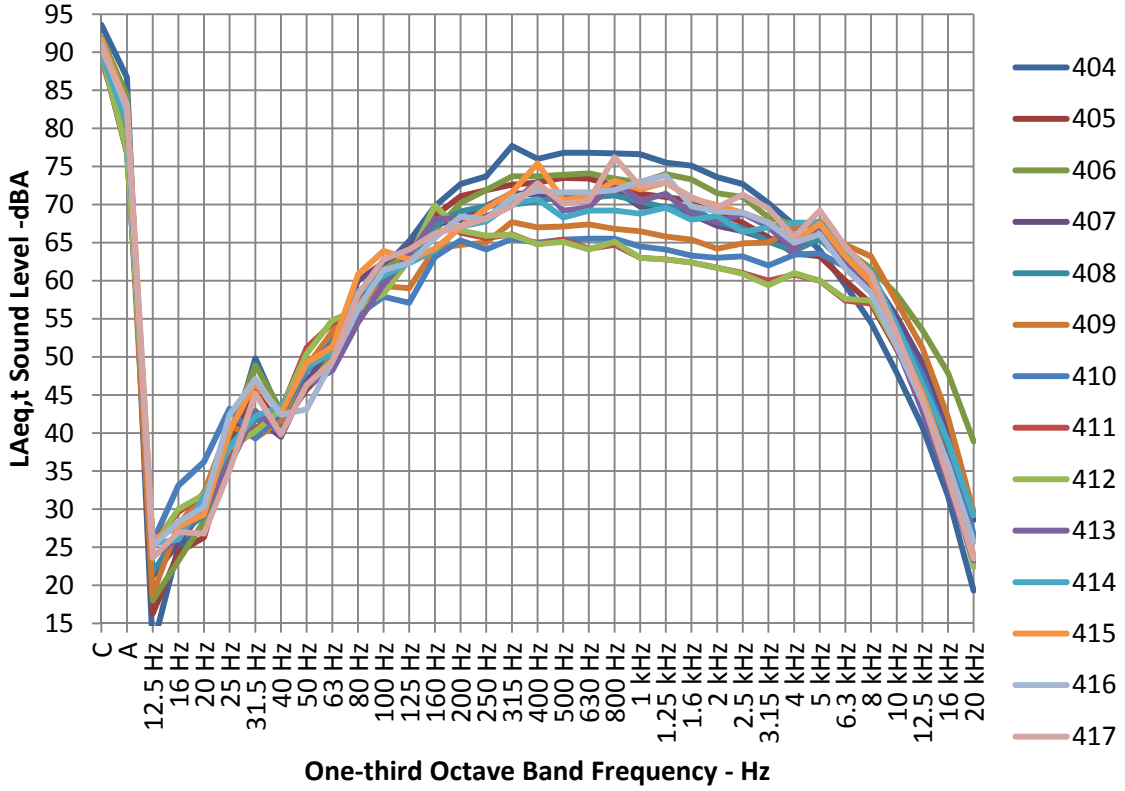


Figure A50A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra CM7 Inside BE Tower

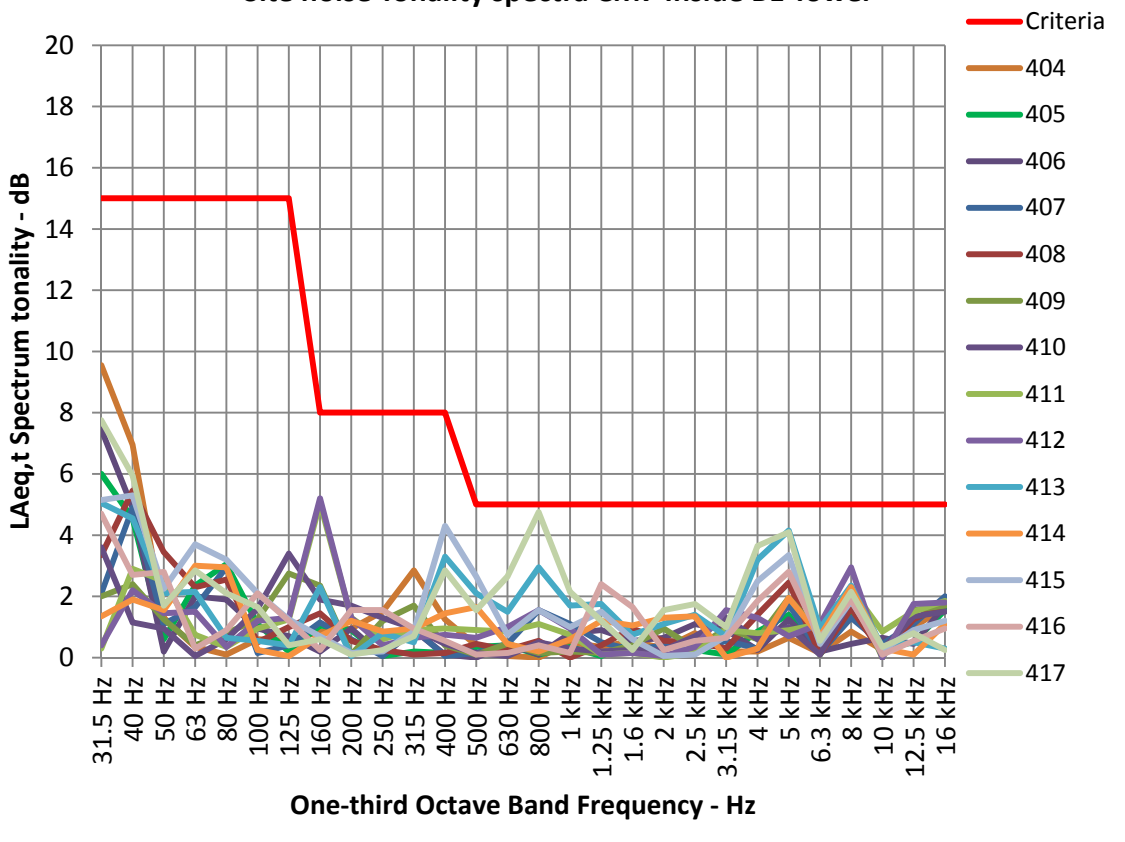


Figure A51: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra CM7 Inside main baghouse & south end

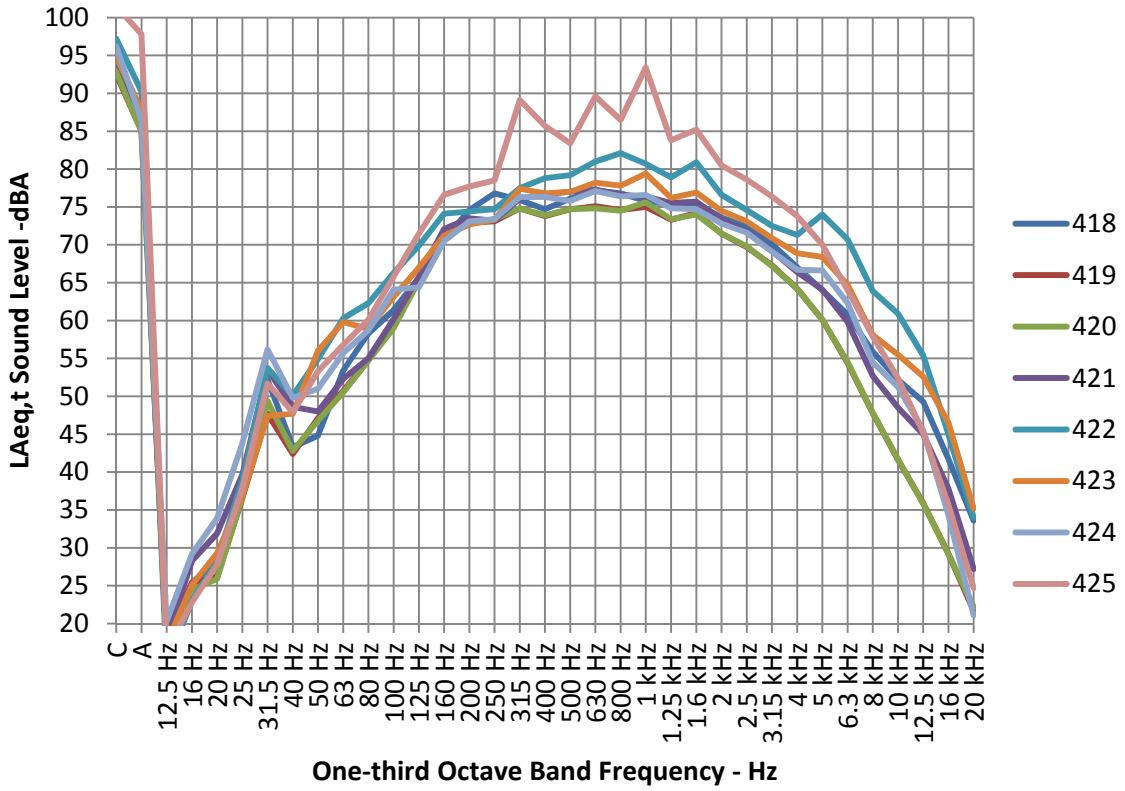


Figure A51A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra CM7 Inside main baghouse & south end

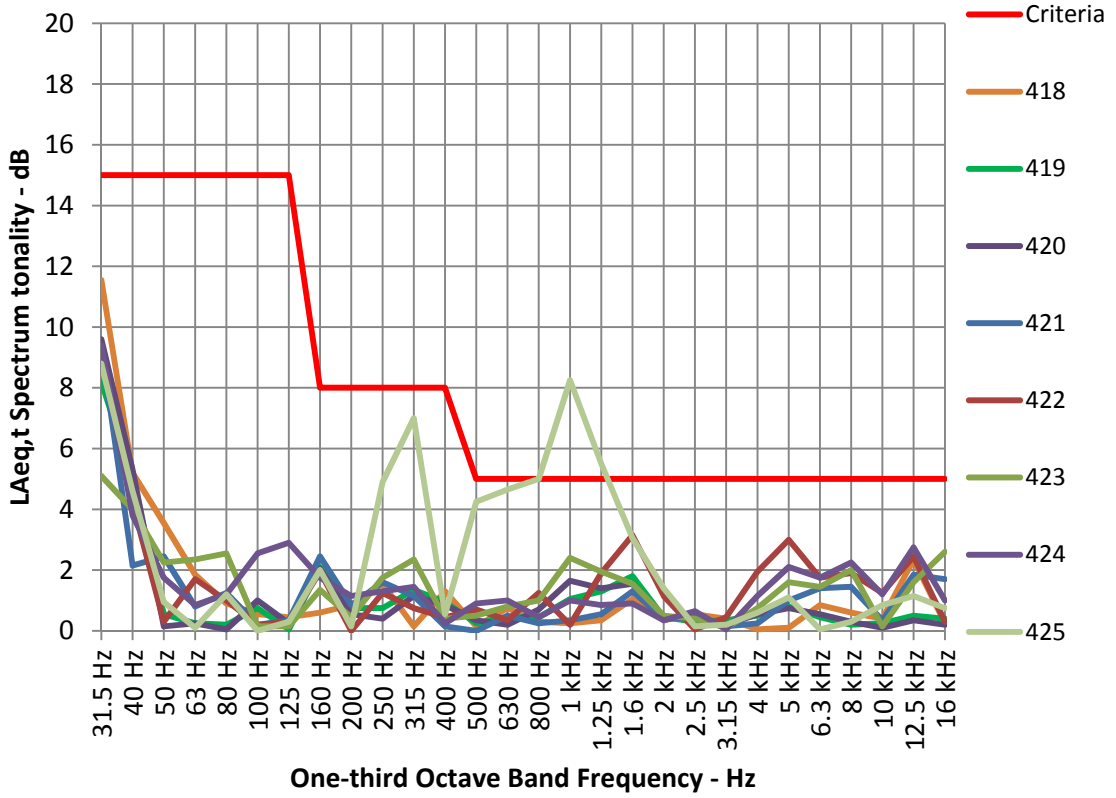


Figure A52: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra CM7 Inside compressor house

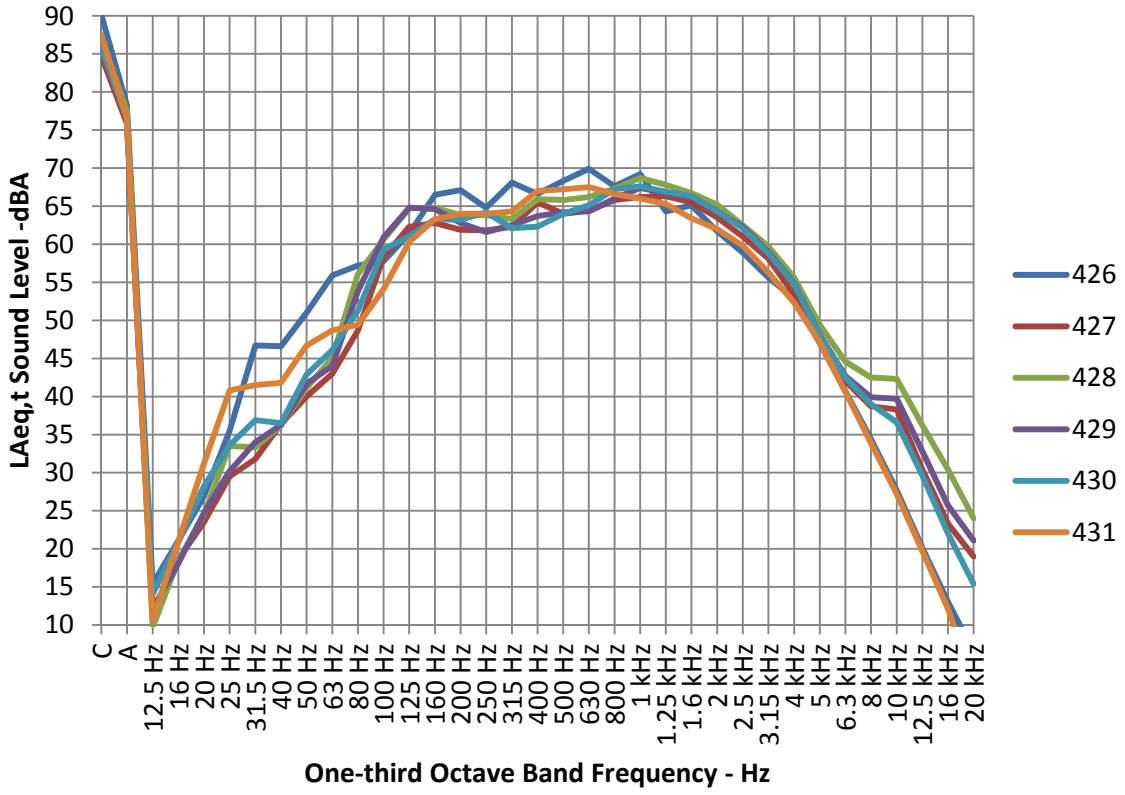


Figure A52A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra CM7 Inside compressor house

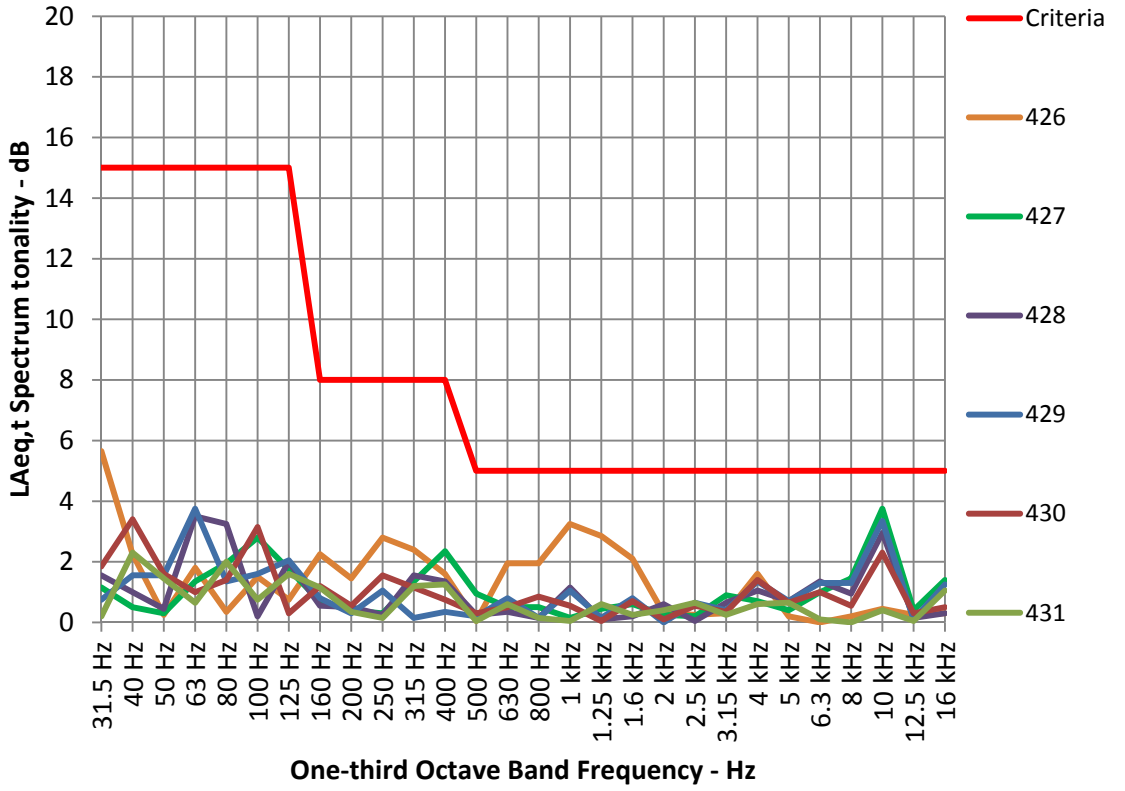


Figure A53: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra CM6 outside western side

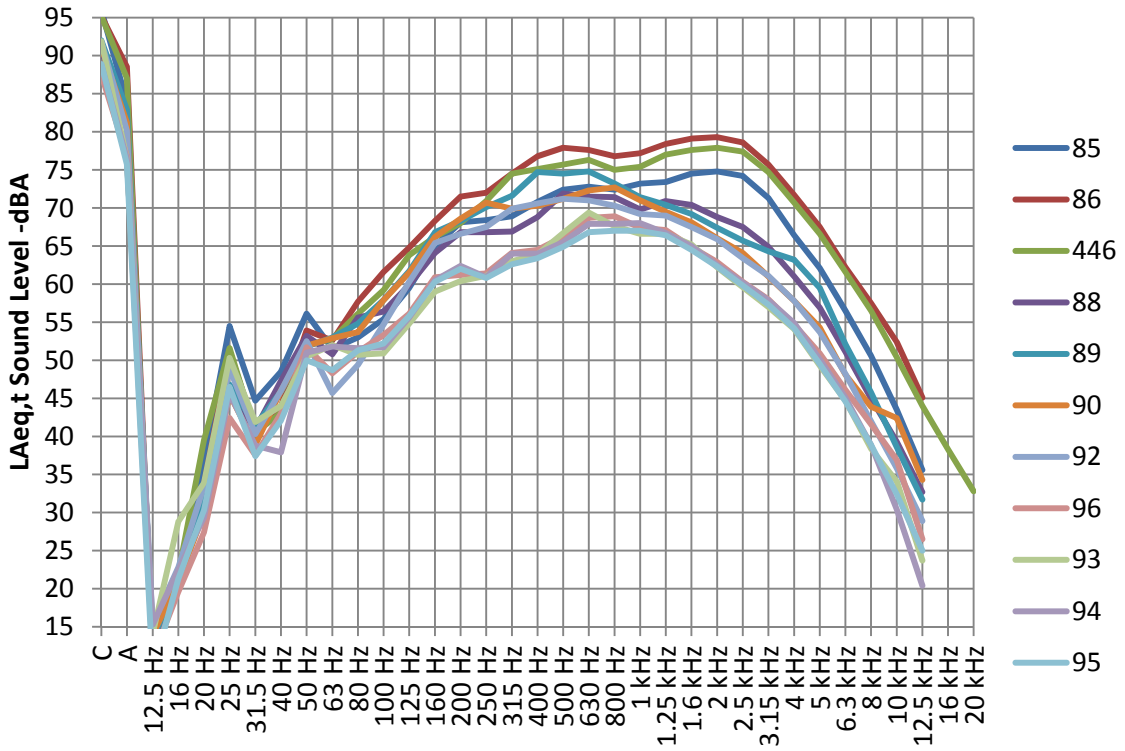


Figure A53A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra CM6 Outside western side

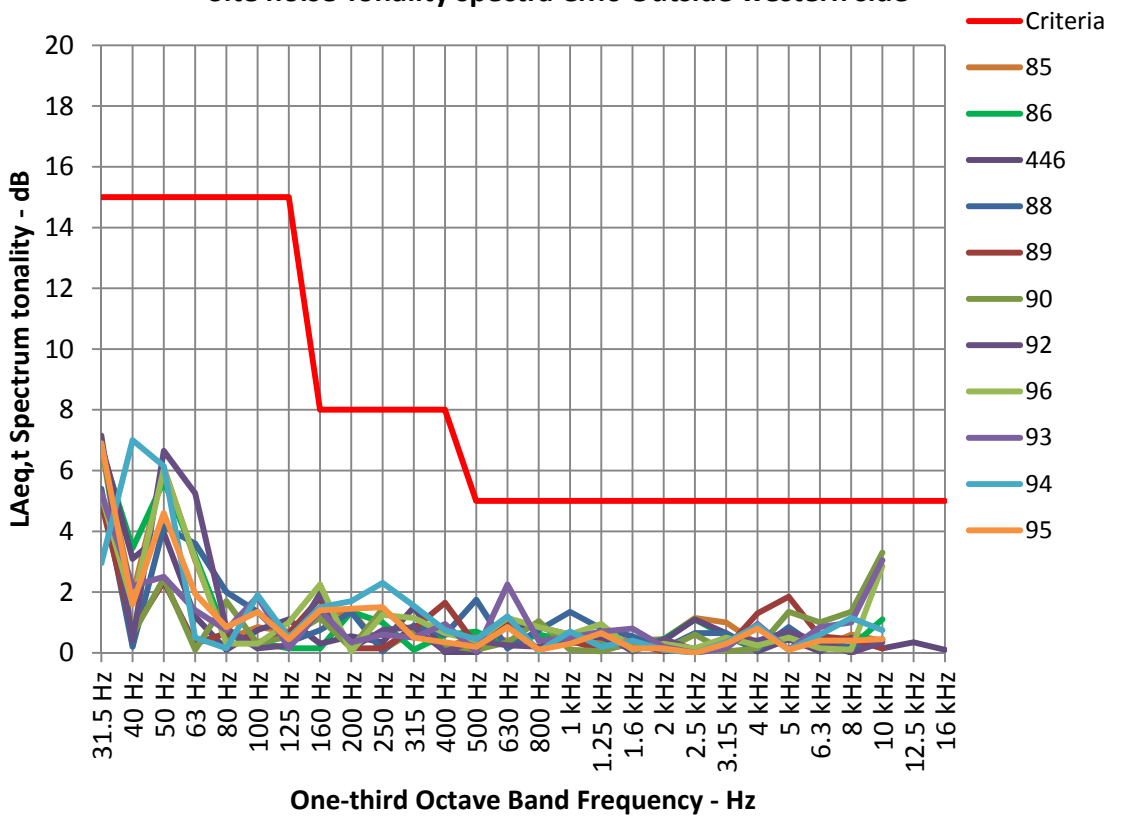


Figure A54: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra CM6 outside southern side

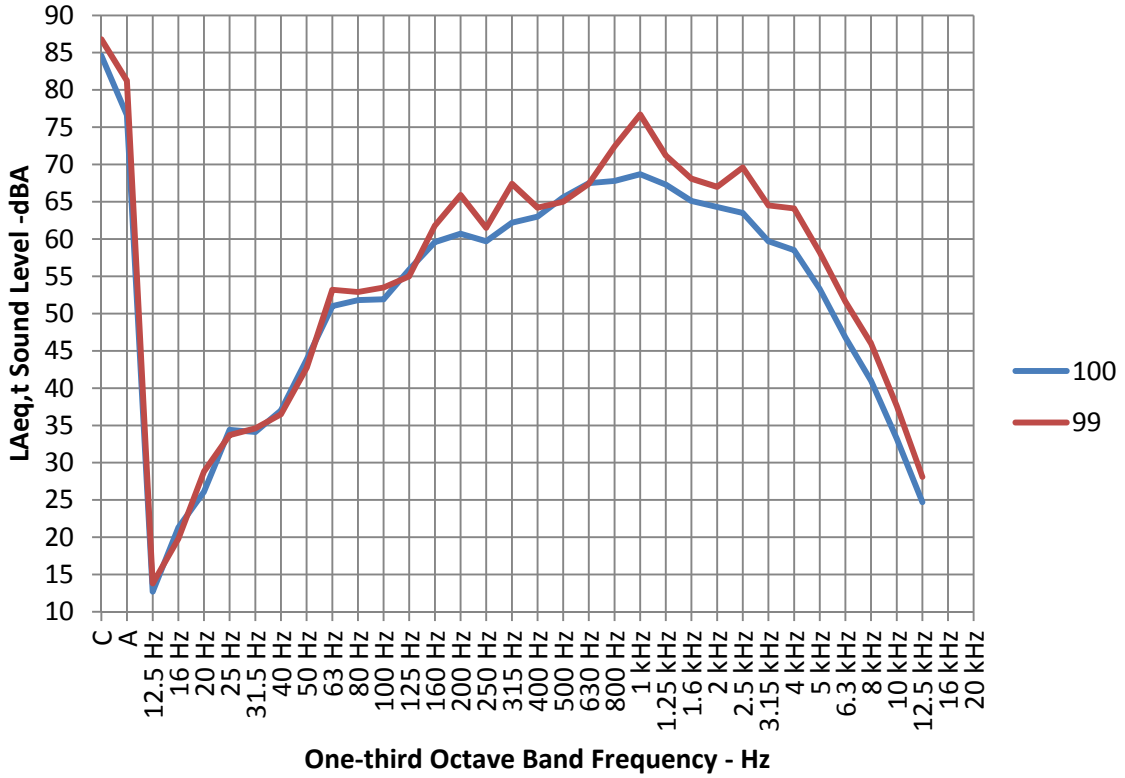


Figure A54A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra CM6 Outside southern side

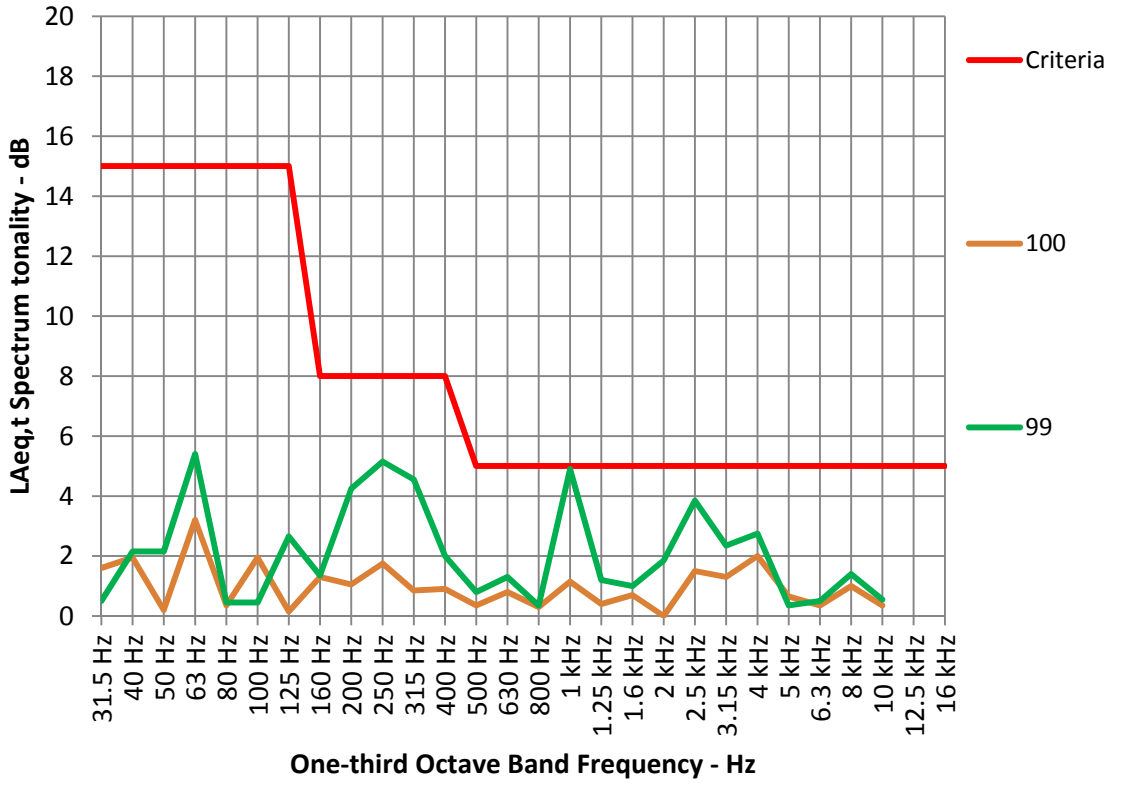


Figure A55: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra CM6 outside eastern side

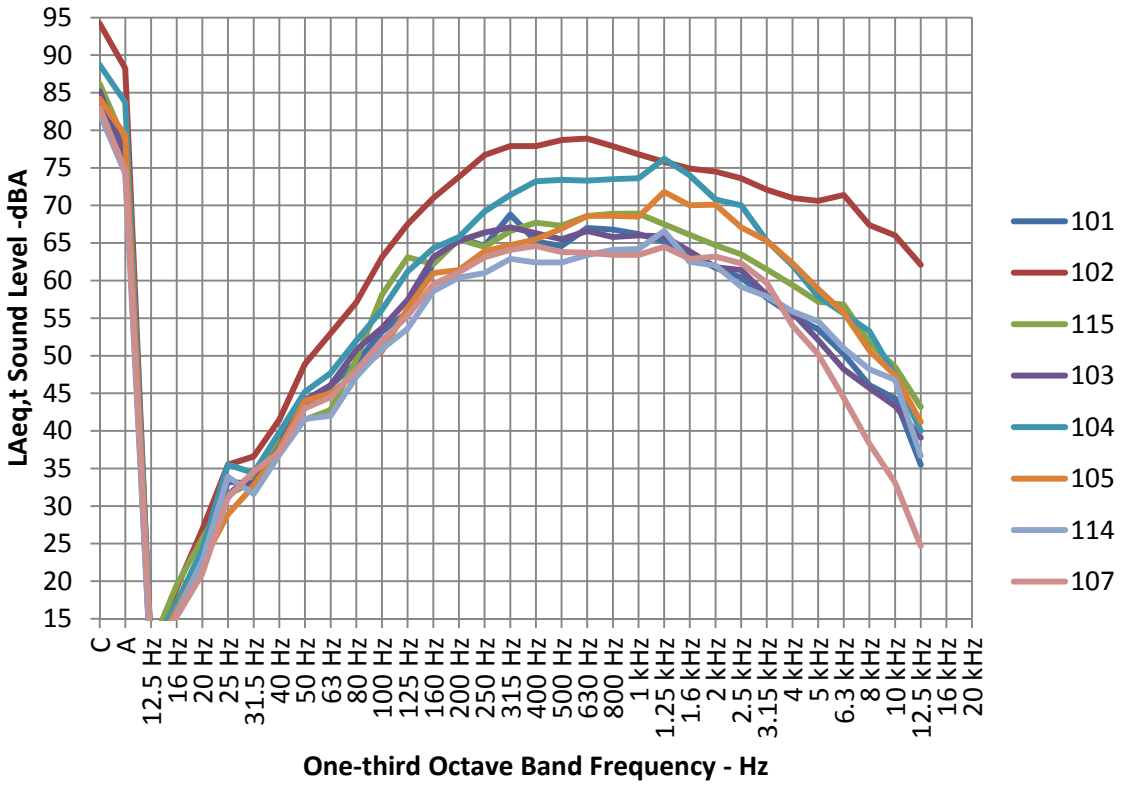


Figure A55A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra CM6 Outside eastern side

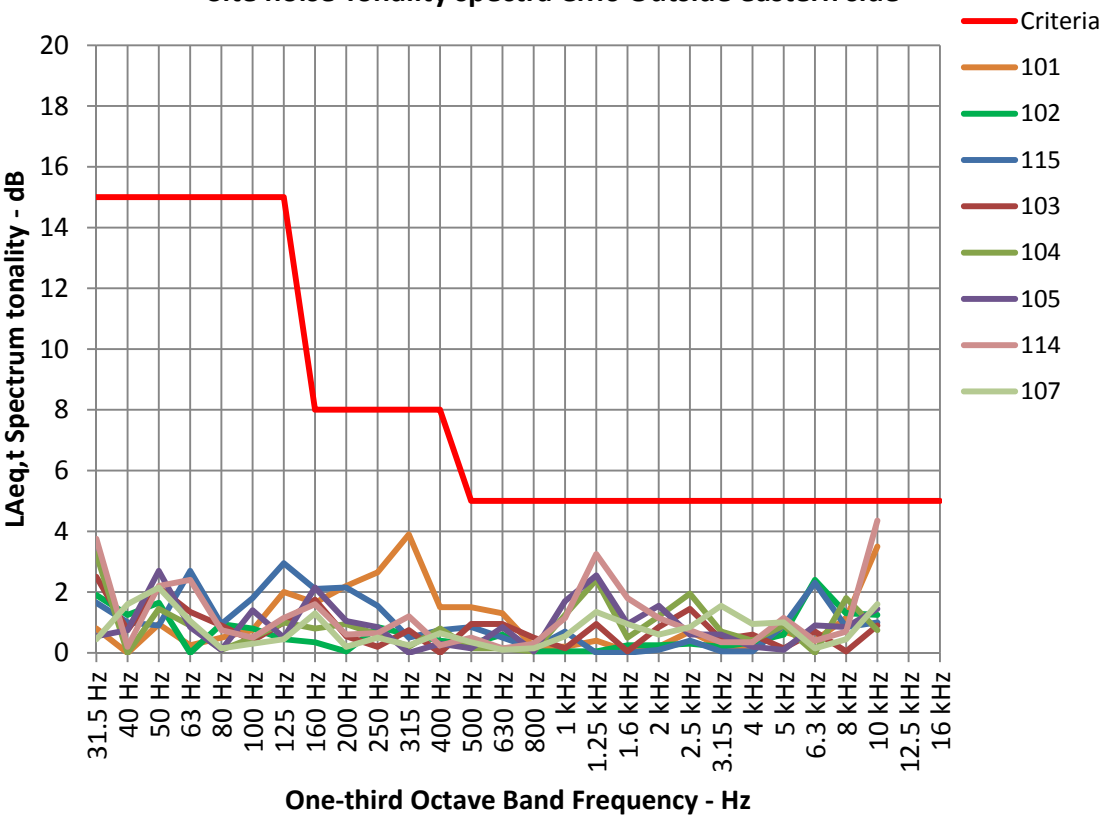


Figure A56: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra CM6 outside northern side

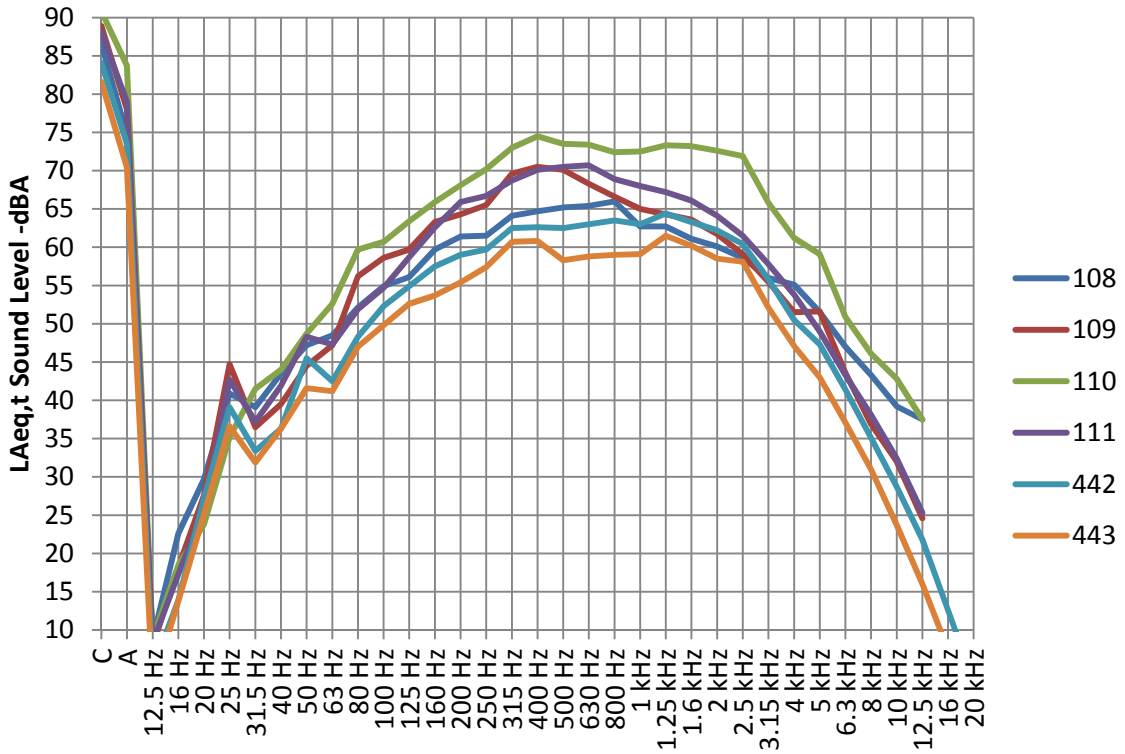


Figure A56A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra CM6 Outside northern side

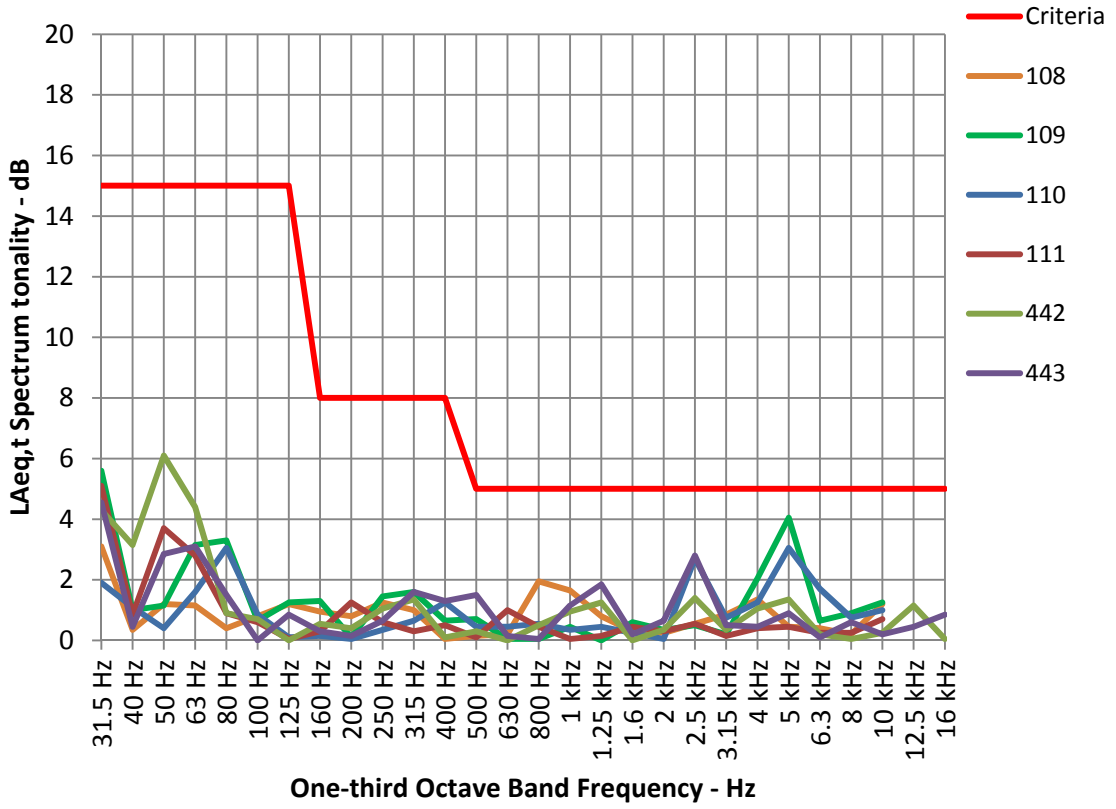


Figure A57: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra CM6 outside northern side

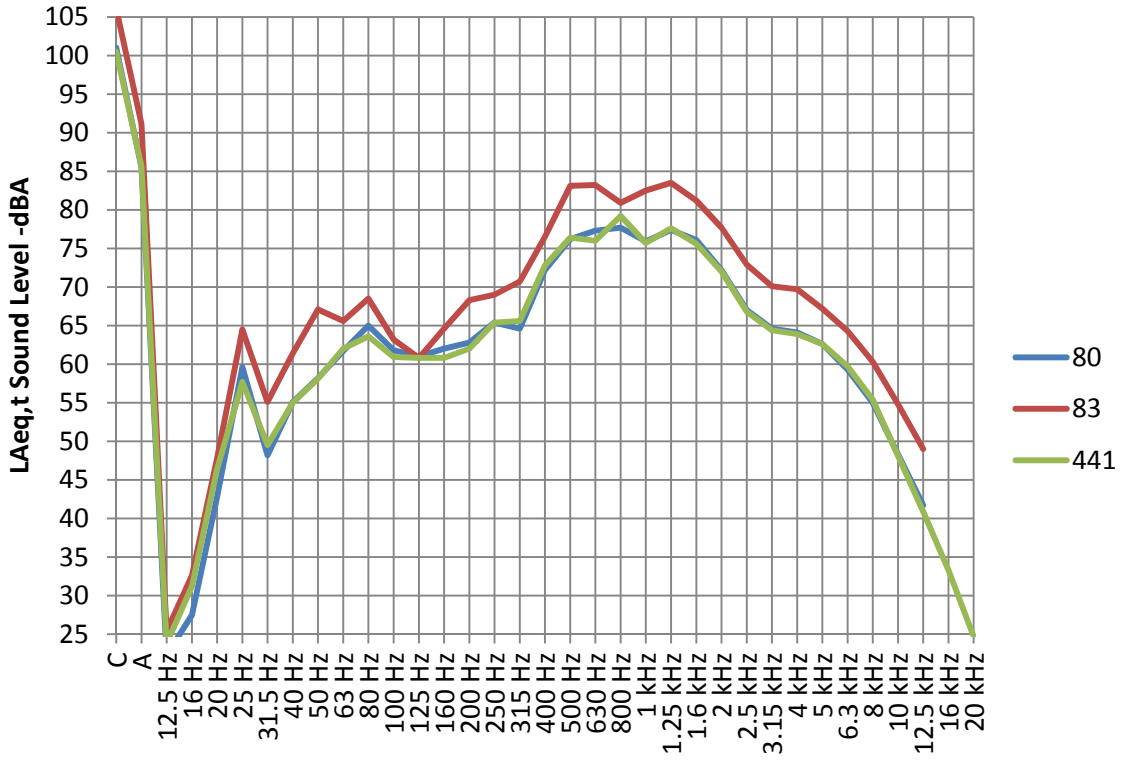


Figure A57A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra CM6 Outside western wall fans

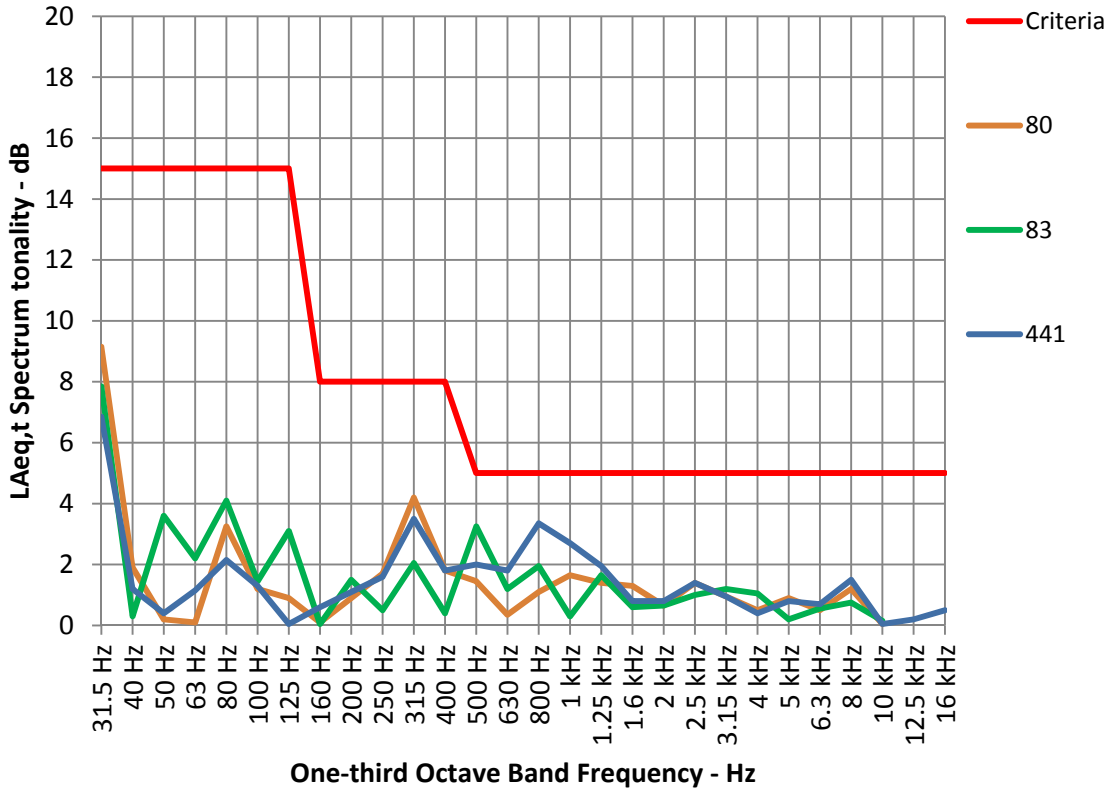


Figure A58: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra Admin Building Roof

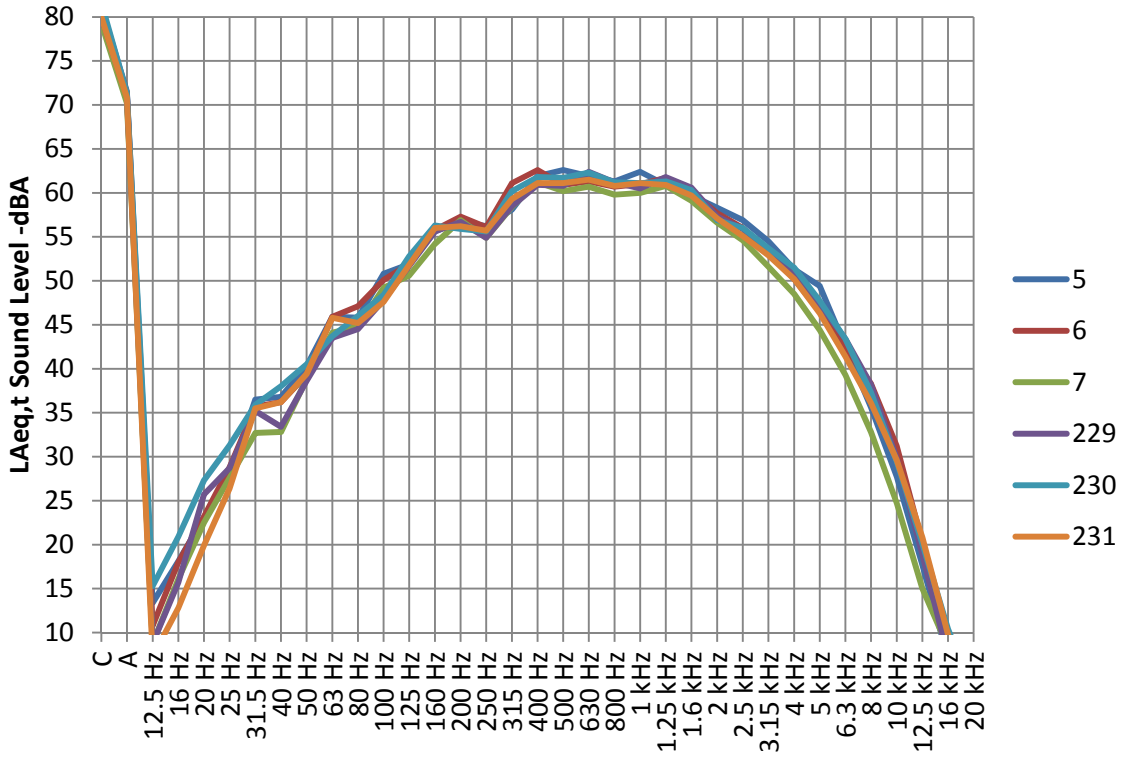


Figure A58A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra Admin Building Roof

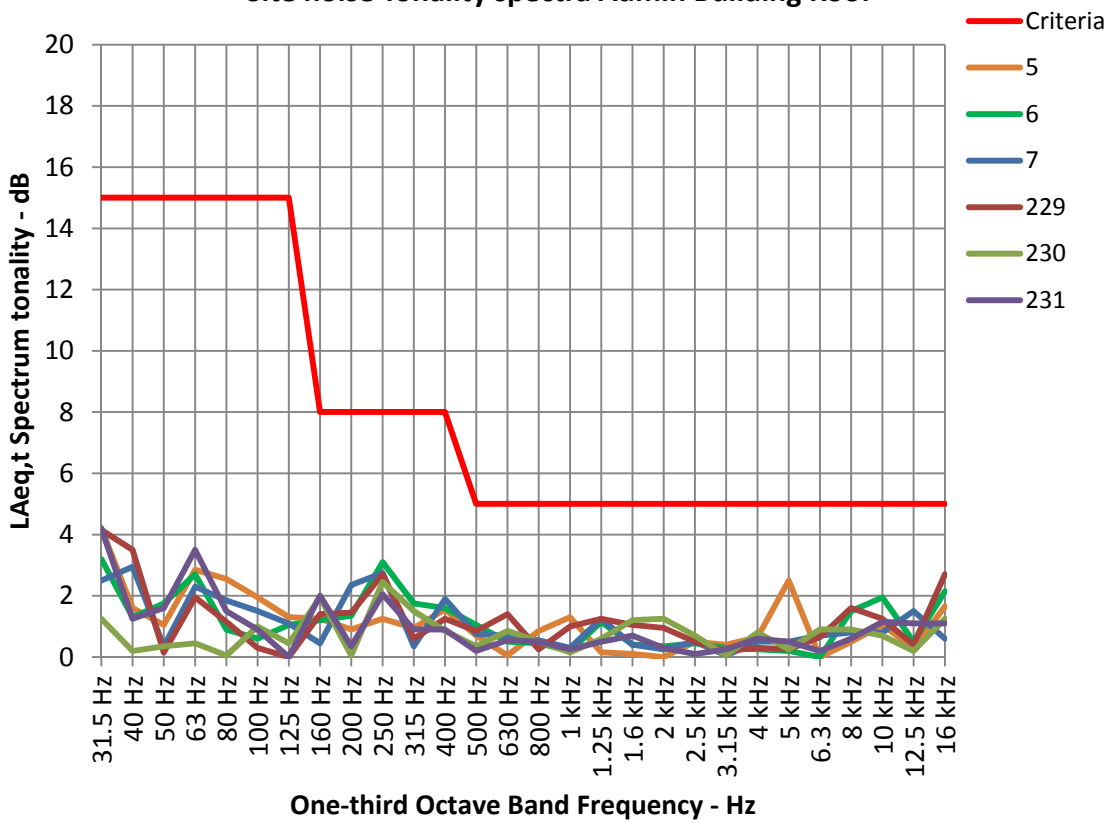


Figure A59: Boral Cement Berrima Annual Noise Assessment 2020 Site noise spectra Monitoring locations

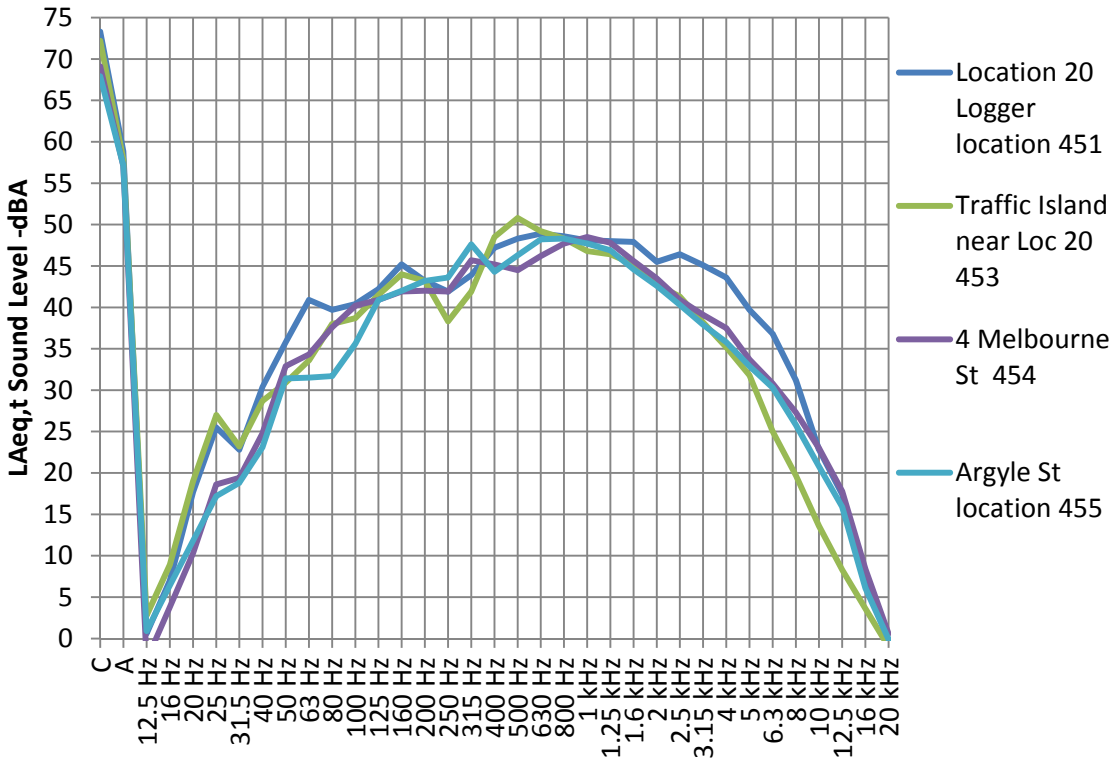


Figure A59A: Boral Cement Berrima Annual Noise Assessment 2020 Site noise Tonality spectra Monitoring locations

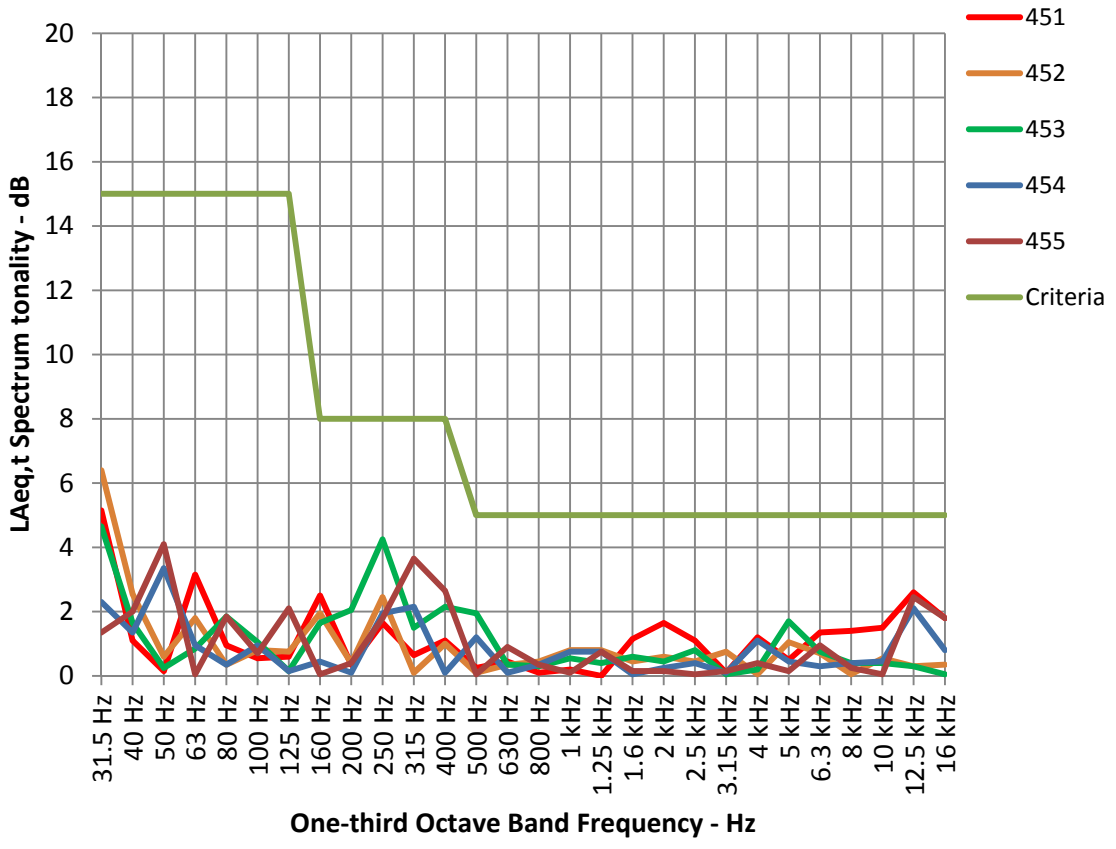


Figure A60: Boral Cement Berrima Annual Noise Assessment 2020
Site noise spectra 4 Melbourne St

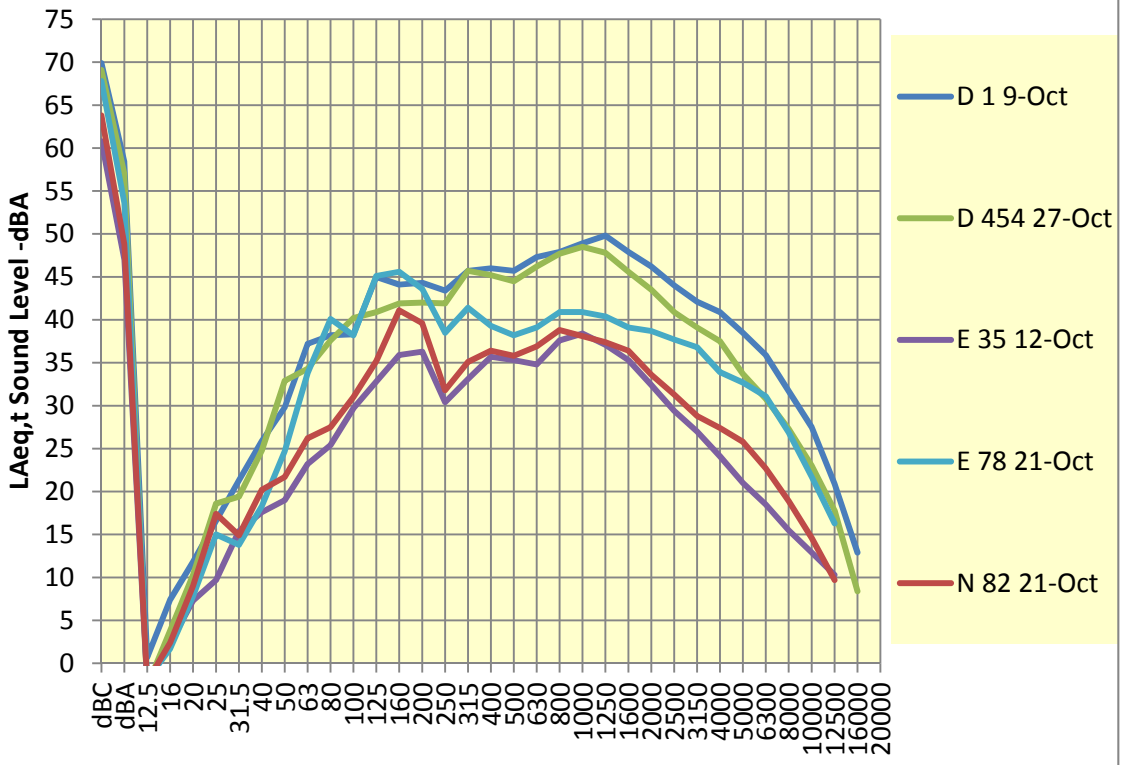


Figure A60A: Boral Cement Berrima Annual Noise Assessment 2020
Site noise Tonality spectra 4 Melbourne St

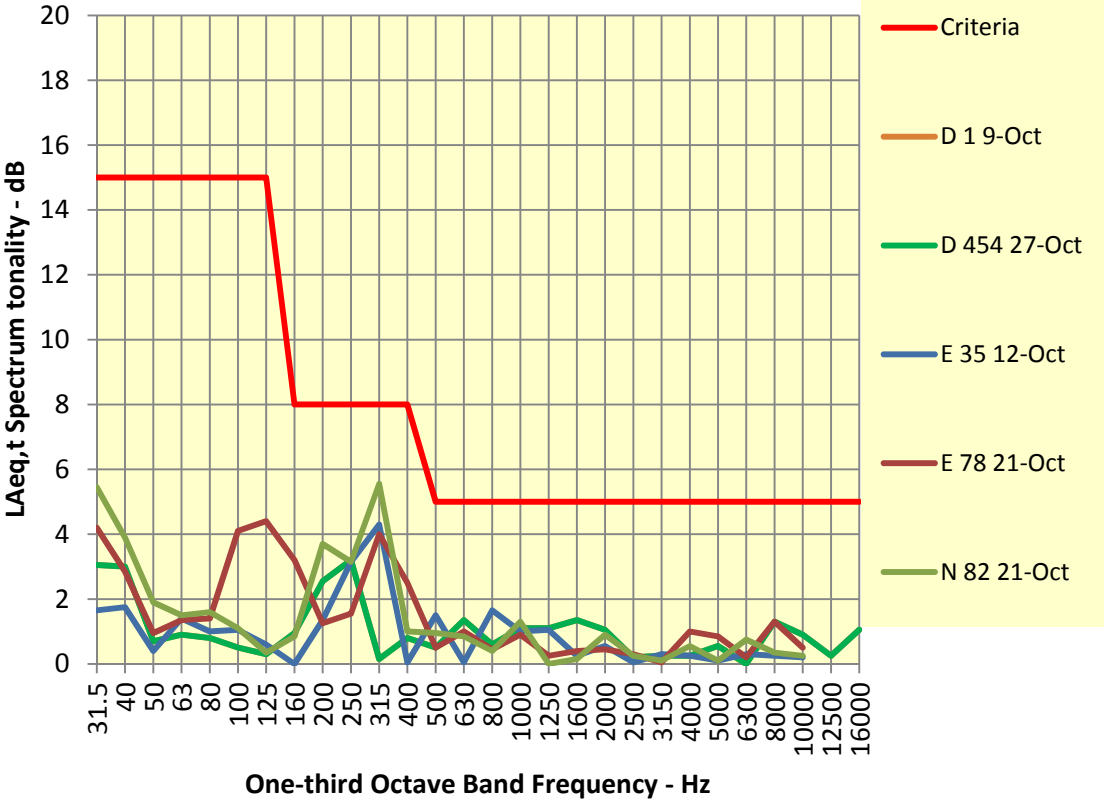


Figure A61: Boral Cement Berrima Annual Noise Assessment 2020
Site noise spectra 12 Brisbane St

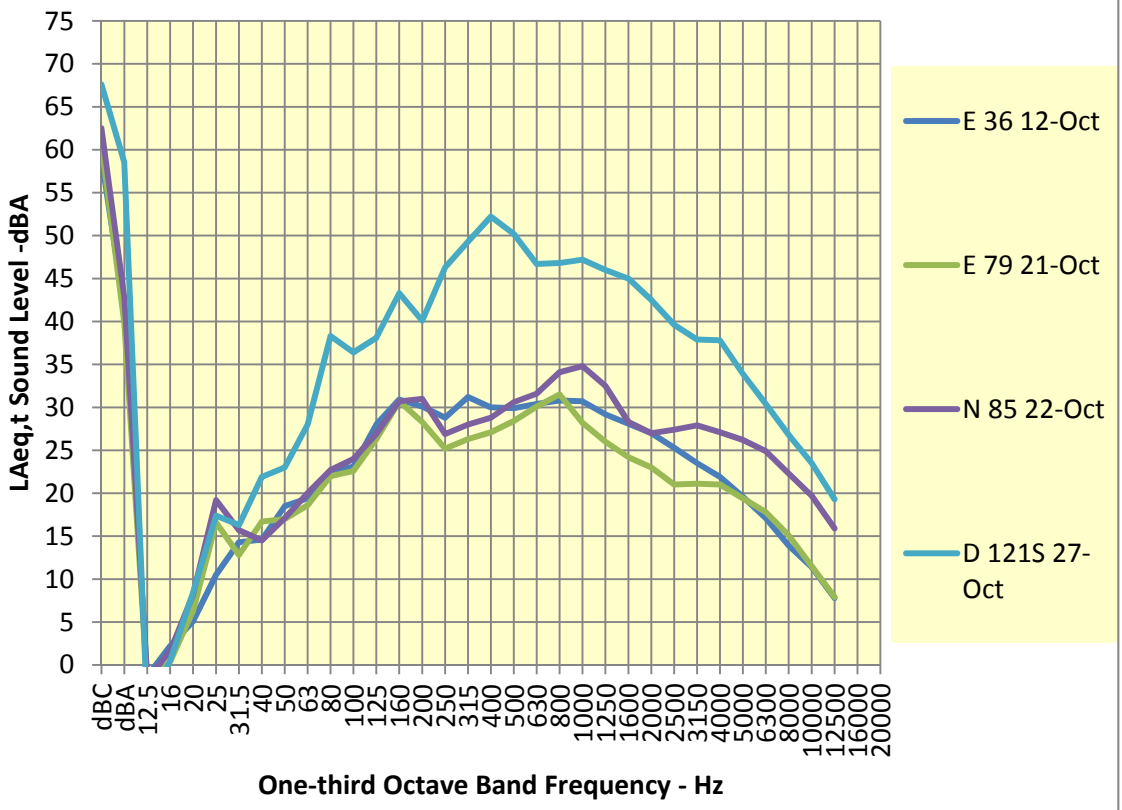


Figure A61A: Boral Cement Berrima Annual Noise Assessment 2020
Site noise Tonality spectra 12 Brisbane St

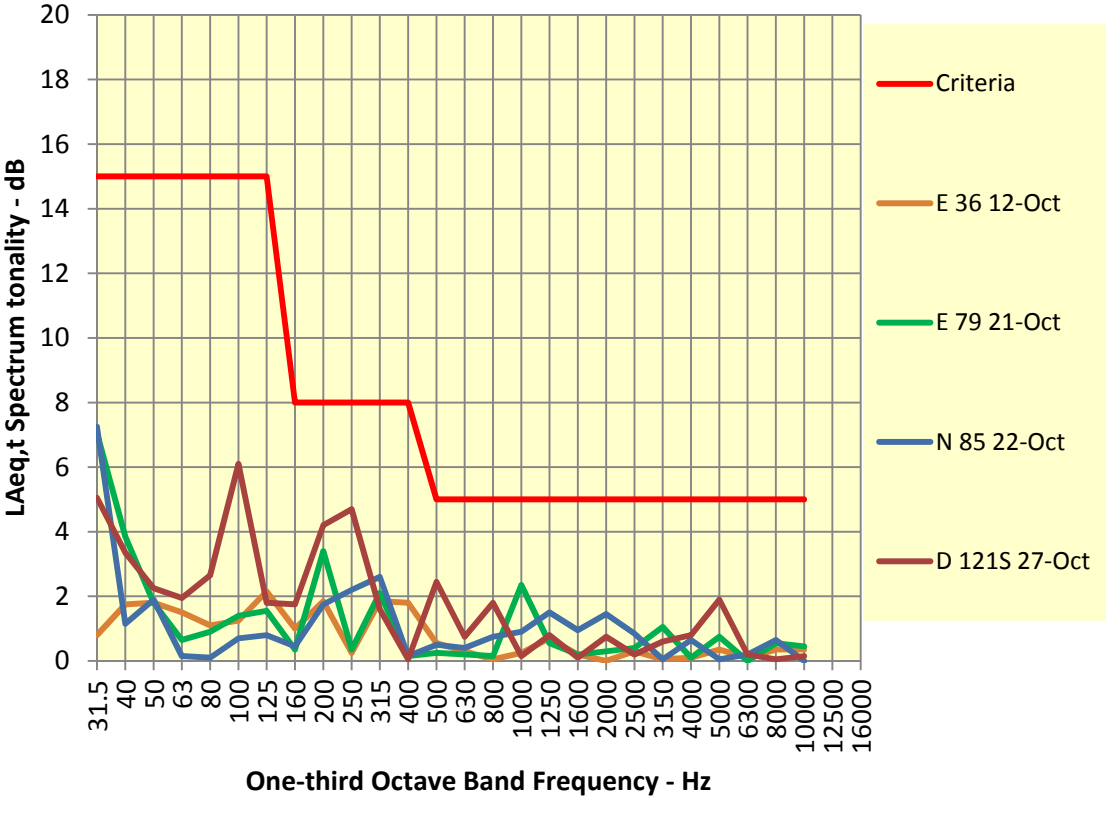


Figure A62: Boral Cement Berrima Annual Noise Assessment 2020
Site noise spectra Adelaide St - Taylor Ave

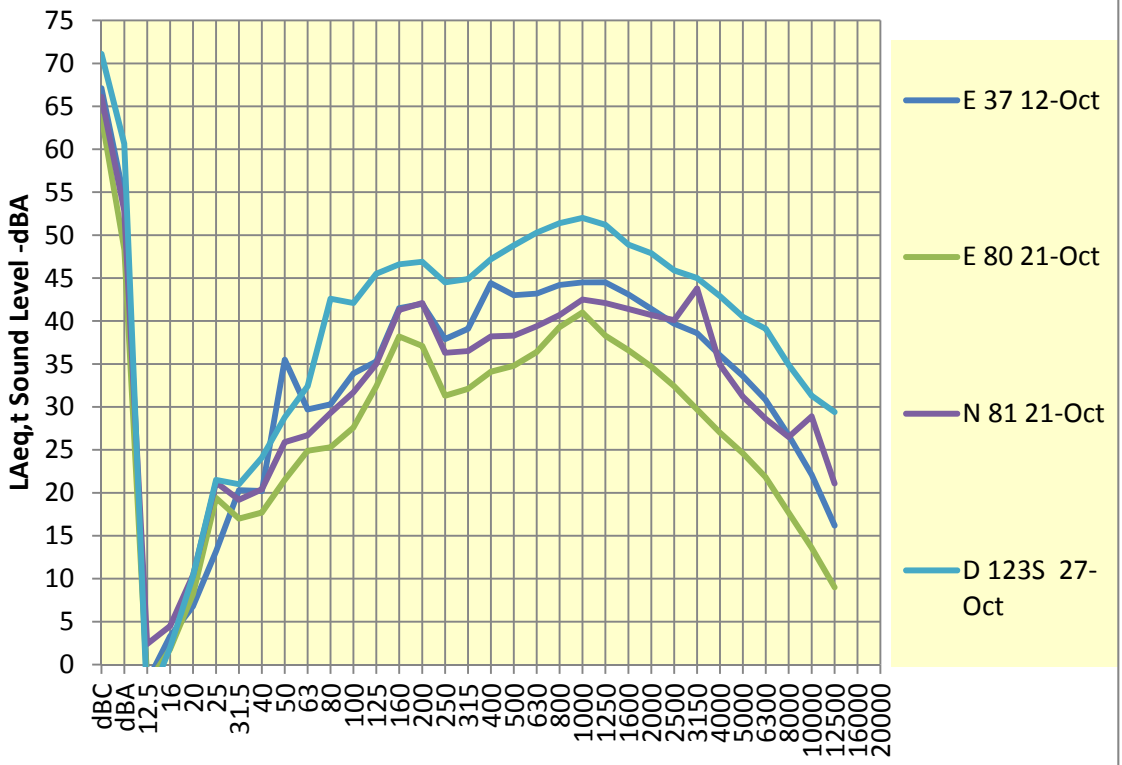


Figure A62A: Boral Cement Berrima Annual Noise Assessment 2020
Site noise Tonality spectra Adelaide St - Taylor Ave

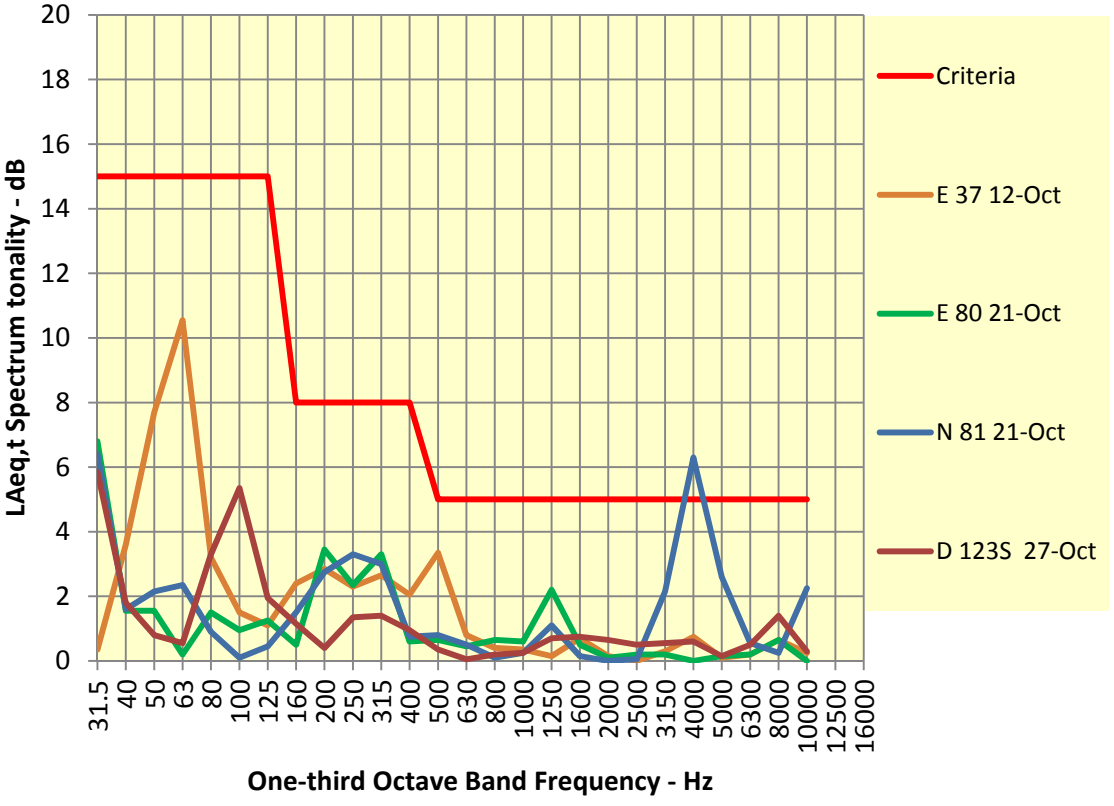


Figure A63: Boral Cement Berrima Annual Noise Assessment 2020
Site noise spectra North Fence

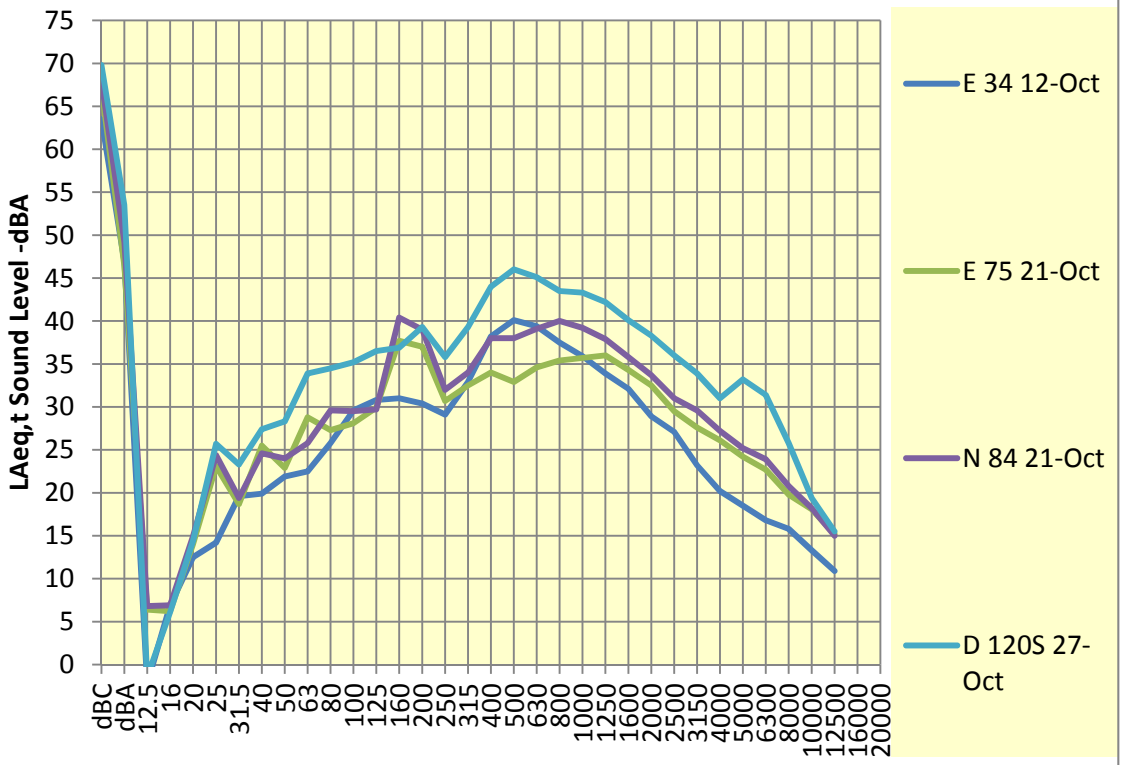


Figure A63A: Boral Cement Berrima Annual Noise Assessment 2020
Site noise Tonality spectra North Fence

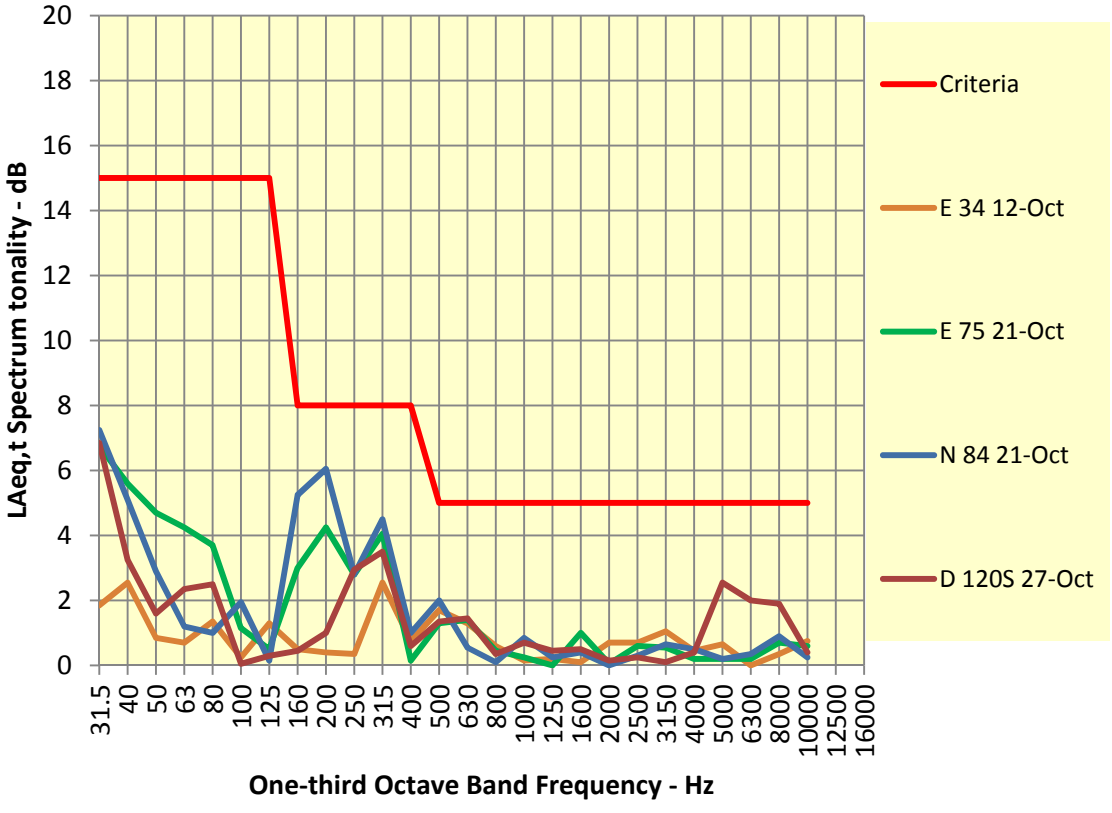


Figure A64: Boral Cement Berrima Annual Noise Assessment 2020
Site noise spectra Location 20

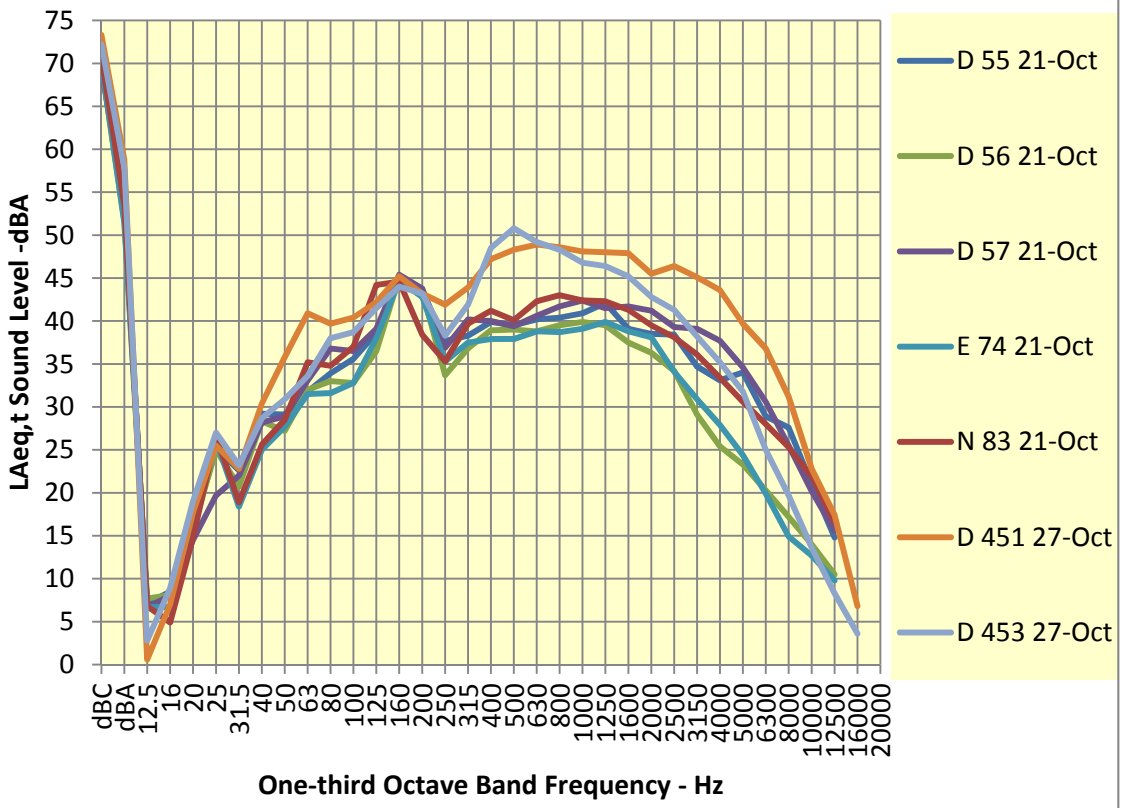


Figure A64A: Boral Cement Berrima Annual Noise Assessment 2020
Site noise Tonality spectra Location 20

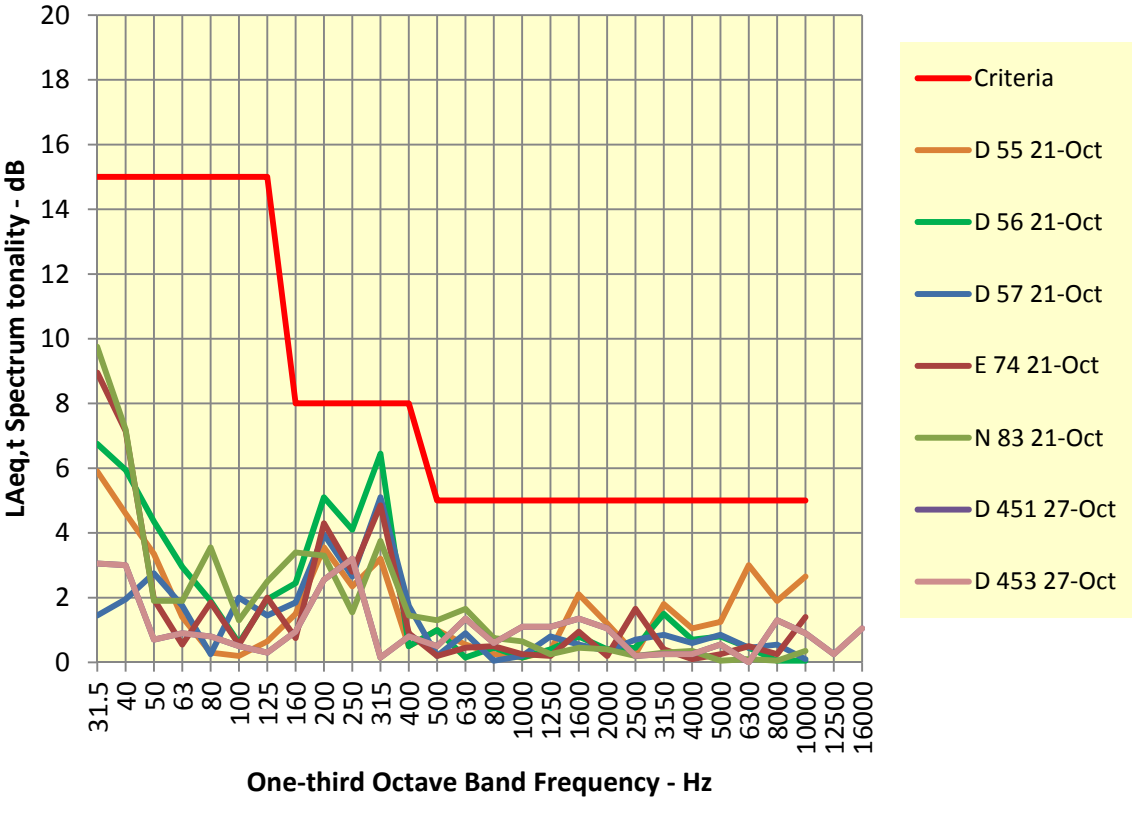


Figure A65: Boral Cement Berrima Annual Noise Assessment 2020
Site noise spectra Argyle St

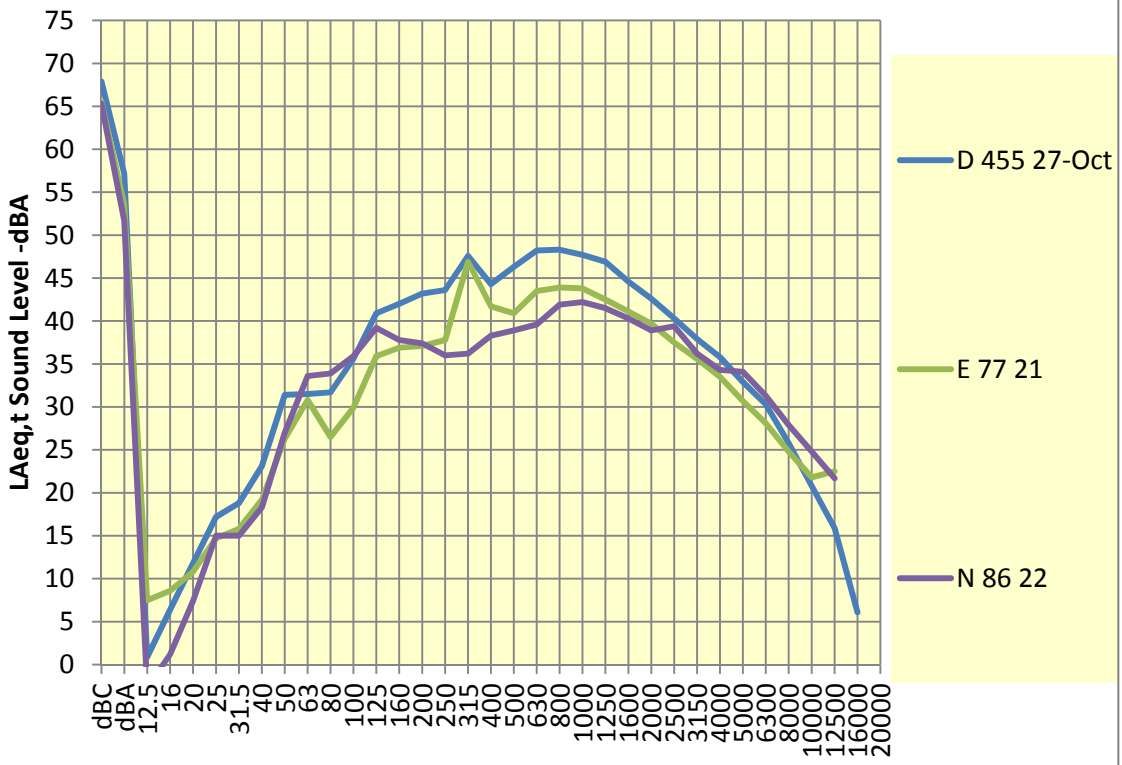
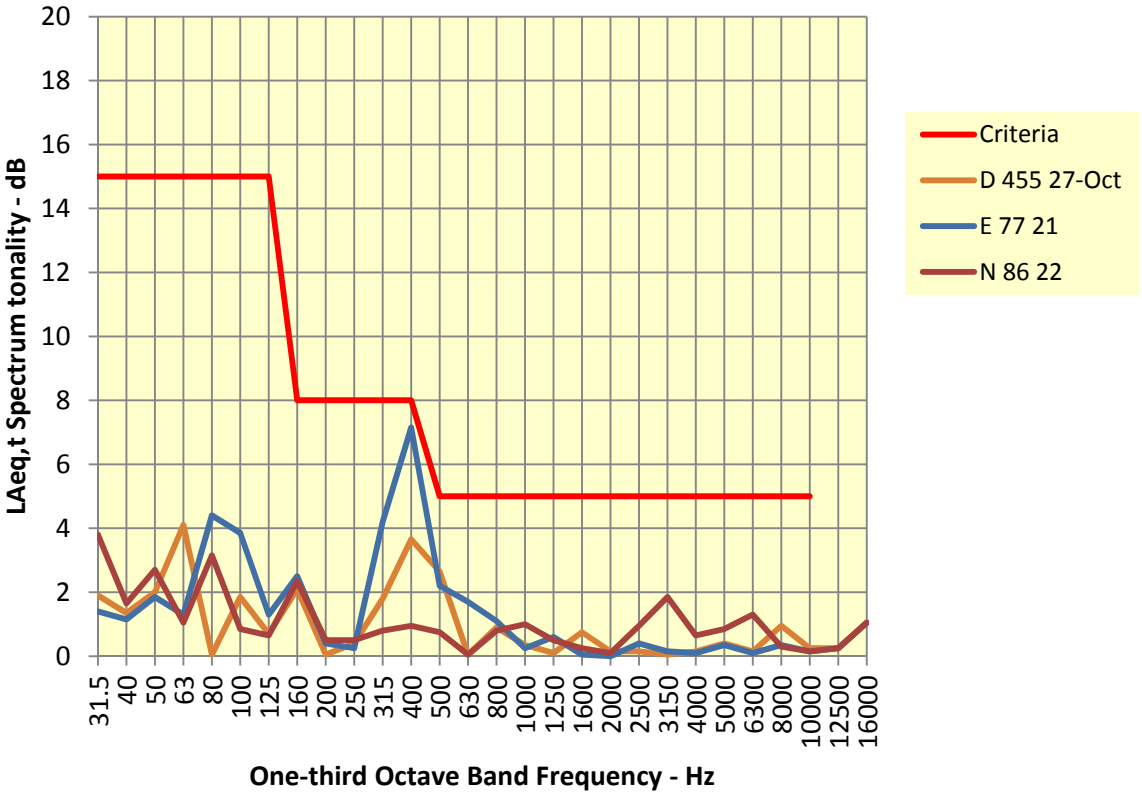


Figure A65A: Boral Cement Berrima Annual Noise Assessment 2020
Site noise Tonality spectra Argyle St



Recognition Research
ABN: 25 153 946 064
ACN: 153 946 064

Appendix B: Unattended environmental sound level results for 4 Melbourne Street

4 Melbourne St, New Berrima - 19 to 20 October 2020

Comparison of Period LAEQ, Period Average LA10 and Period 90% LA90 Results

Summary of Statistical Data

$L_{AEQ.15min}$	Day			Evening			Night			24 hour		
	Max $L_{AEQ.Day}$	Min $L_{AEQ.Day}$	Ave $L_{AEQ.Day}$	Max $L_{AEQ.Eve.}$	Min $L_{AEQ.Eve.}$	Ave $L_{AEQ.Eve.}$	Max $L_{AEQ.Night}$	Min $L_{AEQ.Night}$	Ave $L_{AEQ.Night}$	Max $L_{AEQ.24hr}$	Min $L_{AEQ.24hr}$	Ave. $L_{AEQ.24hr}$
4 Melbourne St, New Berrima	57	50	54	52	47	49	49	43	47	59	41	51
Location 20 - Stockyard	60	53	57	61	52	55	60	54	56	55	46	50
North Fence, New Berrima	57	48	51	57	47	50	58	48	51	53	48	50

L90.15-min 10%	Day				Evening				Night			
	Max $L_{A90.Day}$	Min $L_{A90.Day}$	Ave $L_{A90.Day}$	Median $L_{A90.Day}$	Max $L_{A90.Eve.}$	Min $L_{A90.Eve.}$	Ave $L_{A90.Eve.}$	Median $L_{A90.Eve.}$	Max $L_{A90.Night}$	Min $L_{A90.Night}$	Ave $L_{A90.Night}$	Median $L_{A90.Night}$
4 Melbourne St, New Berrima	46	39	41	41	45	37	41	41	45	37	39	38
Location 20 - Stockyard	56	49	51	51	57	49	52	52	57	49	52	51
North Fence, New Berrima	53	42	46	45	53	43	47	47	54	43	47	45

L90.15-min	Day				Evening				Night			
	Max $L_{A90.Day}$	Min $L_{A90.Day}$	Ave $L_{A90.Day}$	Median $L_{A90.Day}$	Max $L_{A90.Eve.}$	Min $L_{A90.Eve.}$	Ave $L_{A90.Eve.}$	Median $L_{A90.Eve.}$	Max $L_{A90.Night}$	Min $L_{A90.Night}$	Ave $L_{A90.Night}$	Median $L_{A90.Night}$
4 Melbourne St, New Berrima	48	40	43	42	47	39	42	42	45	38	41	41
Location 20 - Stockyard	57	50	53	52	57	49	52	52	57	51	53	52
North Fence, New Berrima	54	44	48	46	54	44	48	48	55	45	48	47

4 Melbourne St, New Berrima

Daytime LAEQ **9 to 27 October 2020**

Time	9/10	10/10	11/10	12/10	13/10	14/10	15/10	16/10	17/10	18/10	19/10	20/10	21/10	***Maximum***	***Minimum***	***Average***	***SD***
7:00		49	45	55	55	55	52	56	60	62	53	54	51	62	45	54	4.6
7:15		50	47	53	53	53	51	54	50	52	54	54	52	54	47	52	2.1
7:30		49	44	57	52	52	51	55	47	51	54	53	51	57	44	51	3.5
7:45		49	44	54	51	52	51	54	47	50	53	54	50	54	44	51	3.0
8:00		46	47	54	52	54	52		50	45	54	53	52	54	45	51	3.3
8:15		48	48	53	51	63	50		48	53	54	54	52	63	48	52	4.2
8:30		54	48	52	54	56	52		48	47	54		52	56	47	51	3.1
8:45		52	46	55	52	53	52		49	46	52	53	51	55	46	51	2.9
9:00		53	50	58	52	55	50		51	50	55	55	51	58	50	53	2.7
9:15		50	48	56	53	66	53	58	52	49	56	52	51	66	48	54	5.0
9:30		63	50	52	51	57	49	61	50	50	52	55	50	63	49	53	4.6
9:45		65	48	57	51	54	52	59	52		53	52	50	65	48	54	4.8
10:00		65	46	52	51	56	52	56	52	50	54	53	51	65	46	53	4.5
10:15		63	49	59	51	53	50	55	48	49	51	51	52	63	48	52	4.4
10:30		53	48	50	51	53	51	55	51	51	50	53	51	55	48	51	1.9
10:45		57	50	53	51	51	51	53	51	66	52	52	49	66	49	53	4.4
11:00		53	53	52	55	54	53	59	50		53	52	51	59	50	53	2.3
11:15	52	54	55	53	55	55	50	53	48	49	52	50	49	55	48	52	2.5
11:30	53	54	56	57	52	55	53	60	49	48	51	51	50	60	48	53	3.5
11:45	56	53	53	55	50	58	53	52	50	54	51	54	50	58	50	53	2.4
12:00	55	52	54	56	52	56	51	53	50	50	51	53	53	56	50	53	2.0
12:15	58	51	54	60	52	55	51	53	47	52	52	52	50	60	47	53	3.3
12:30	61	56	53	53	57	56	53	53	50	48	53	50	50	61	48	53	3.5
12:45	57	51	51	53	51	53	53	57	49	49	54	53	52	57	49	52	2.5
13:00	54	56	52	55	53	52	54	56	49	54	56	54	52	56	49	53	2.1
13:15	54	54	52	51	53	51	52	59	51	51	56	52	51	59	51	53	2.4
13:30	53	53	48	58	54	51	53	57	48	51	51	49	54	58	48	52	3.0
13:45	55	55	49	49	61	53	55	55	52	48	51	53	51	61	48	53	3.4
14:00	56	57	51	54	52	49	55	53	51	47	55	53	50	57	47	52	3.0
14:15	60	54	49	50	52	50	54	54	57	49	53	54	49	60	49	52	3.5
14:30	61	57	51	50	51	56	53	62	58	47	52	53	54	62	47	54	4.4
14:45		59	51	50	49	52	55	54	53	49	54	55	56	59	49	53	3.0
15:00	57	59	49	51	52	53	55	54	51	56	53	53	53	59	49	53	2.6
15:15	55	57	50		53	54	53	52	50	52	55	52	55	57	50	53	1.9
15:30	56	58	51	56	52	55	53	53	51	53	54	52	52	58	51	53	2.2
15:45	56	56	52	56	54	55	53	54	47	52	53	52	53	56	47	53	2.6
16:00	55	56	49	53	53	55	51	54	50	51	53	54	53	56	49	53	2.1
16:15	52	55	50	54	52	53	51	54	51	54	52	51	51	55	50	52	1.5
16:30	57	59	50	52	52	52	50	52	49	54	53	50	54	59	49	52	3.0
16:45	55	55	49	55	53	52	50	54	56	53	52	52	53	56	49	53	2.1
17:00	52	54	49	52	54	58	53	53	52	48	53	50	53	58	48	52	2.4
17:15	52	56	47	52	55	52	51	52	56	50	51	53	53	56	47	52	2.5
17:30	53	53	48	50	55	56	51	55	50	50	51	51	50	56	48	52	2.5
17:45	55	49	52	48	57	52	55	54	56	49	52	51	50	57	48	52	2.8
18:00	55	51	51	52	54	50	58	57	50	49	51	54	48	58	48	52	3.0
Max	61	65	56	60	61	66	58	62	60	66	56	55	56	66	55	60	3.9
Min	52	46	44	48	49	49	49	52	47	45	50	49	48	52	44	48	2.4
Ave	55	54	49	53	53	54	52	55	51	51	53	52	51	55	49	53	1.8
SD	2.5	4.3	2.7	2.8	2.0	3.1	1.8	2.6	3.0	3.7	1.5	1.4	1.6	4.3	1.4	2.5	0.9
E Ave	56	57	50	54	53	56	52	56	52	54	53	53	52	57	50	54	2.0

Evening LAEQ

Time	9/10	10/10	11/10	12/10	13/10	14/10	15/10	16/10	17/10	18/10	19/10	20/10	21/10	***Maximum***	***Minimum***	***Average***	***SD***
18:00	55	51	51	52	54	50	58	57	50	49	51	54	48	58	48	52	3.0
18:15	51	50	47	49	53	54	50	54	46	48	51	52	51	54	46	50	2.4
18:30	54	48	48	53	50	55	55	55	49	48	49	50	49	55	48	51	2.8
18:45	52	49	48	49	52	50	50	54	56	48	52	49	48	56	48	50	2.5
19:00	51	47	49	49	51	49	46	53	49	48	49	47	48	53	46	49	2.0
19:15	54	47	49	48	52	52	48	55	46	47	48	47	50	55	46	49	2.9
19:30	50	47	49	46	59	48	48	49	46	47	49	52	46	59	46	49	3.4
19:45	48	47	50	48	54	48	48	50	44	47	46	49	47	54	44	48	2.2
20:00	50	47	50	46	52	46	44	48	44	47	47	48	45	52	44	47	2.5
20:15	48	46	49	44	51	46	49	48	45	50	48	47	44	51	44	47	2.3
20:30	46	46	48	44	51	48	44	46	45	48	47	49	46	51	44	47	2.0
20:45	46	46	48	46	52	48	45	46	47	46	44	44	49	52	44	46	2.2
21:00	47	45	48	46	51	45	47	48	47	46	48	44	45	51	44	46	1.8
21:15	47	45	48	42	50	50	47	46	52	46	46	44	44	52	42	46	2.9
21:30	46	46	49	47	49	46	48	47	47	47	43	42	44	49	42	46	2.0
21:45	47	45	48	46	48	44	40	47	48	46	48	43	41	48	40	45	2.7
22:00	48	44	49	45	48	45	40	43	49	48	42	43	46	49	40	45	2.9
Max	55	51	51	53	59	55	58	57	56	50	52	54	51	59	50	54	2.9
Min	46	44	47	42	48	44	40	43	44	46	42	42	41	48	40	44	2.4
Ave	49	47	49	47	51	48	47	49	47	47	47	47	46	51	46	48	1.4
SD	3.0	1.8	1.0	2.9	2.5	3.0	4.4	4.0	3.2	1.1	2.9	3.5	2.5	4.4	1.0	2.8	1.0
E Avg	50	47	49	48	52	49	50	51	49	47	48	48	47	52	47	49	1.6

Night LAEQ

Time	9/10	10/10	11/10	12/10	13/10	14/10	15/10	16/10	17/10	18/10	19/10	20/10	21/10	***Maximum***	***Minimum***	***Average***	***SD***
22:00	48	44	49	45	48	45	40	43	49	48	42	43	46	49	40	45	2.9
22:15	48	44	47	43	49	45	43	46	46	46	44	44	45	49	43	45	1.8
22:30	48	45	47	45	49	44	42	44	46	46	41	42	43	49	41	45	2.3
22:45	48	44	46	41	47	44	43	45	42	46	43	45	43	48	41	44	2.0
23:00	48	45	46	41	47	43	43	46	42	45	46	43	40	48	40	44	2.4
23:15	48	46	47	41	50	44	40	45	42	46	45	41	43	50	40	44	2.9
23:30	46	45	46	40	49	44	43	43	41	46	41	44	45	49	40	44	2.4
23:45	47	45	47	41	48	45	41	43	41	48	42	43	41	48	41	44	2.8
0:00	46	46	46	43	50	46	43	43	42	47	43	42	43	50	42	44	2.4
0:15	47	44	47	45	49	44	45	45	45	47	45	44	43	49	43	45	1.6
0:30	45	44	45	43	48	47	42	47	41	47	45	46	41	48	41	44	2.5
0:45	45	43	47	45	49	42	41	44	42	46	44	43	43	49	41	44	2.3
1:00	45	43	46	41	49	40	43	42	42	45	42	42	42	49	40	43	2.4
1:15	45	42	45	44	48	44	43	52	40	45	46	42	43	52	40	44	3.0
1:30	44	42	45	44	49	43	46	44	41	46	45	43	43	49	41	44	2.1
1:45	44	42	45	44	47	42	45	44	41	45	42	41	41	47	41	43	2.0
2:00	44	42	44	44	47	45	46	43	42	45	43	40	40	47	40	43	2.1
2:15	43	43	45	45	48	42	45	42	42	45	43	42	42	48	42	43	1.9
2:30	47	47	44	45	47	44	44	44	42	46	45	45	44	47	42	45	1.5
2:45	45	41	43	46	47	41	43	41	43	45	45	42	41	47	41	43	2.1
3:00	44	40	42	43	47	42	44	43	42	46	46	44	44	47	40	43	1.9
3:15	47	40	43	44	47	40	43	41	41	45	45	42	41	47	40	43	2.4
3:30	43	40	43	44	47	45	44	40	41	45	46	43	43	47	40	43	2.3
3:45	44	43	45	43	47	40	44	43	41	46	47	45	45	47	40	44	2.1
4:00	44	39	47	46	49	44	44	45	42	47	45	45		49	39	44	2.5
4:15	44	54	47	46	46	43	45	41	41	44	47	45		54	41	45	3.4
4:30	45	39	49	47	48	43	46	50	42	47	49	43		50	39	46	3.3
4:45	48	41	48	49	48	44	48	41	41	47	46	46		49	41	45	3.1
5:00	47	39	47	49	51	47	50	48	42	51	48	45		51	39	47	3.7
5:15	45	40	49	49	50	50	50	42	41	48	50	47		50	40	46	3.8
5:30	47	42	49	50	51	49	50	41	41	48	51	49		51	41	47	3.9
5:45	48	41	51	51	51	48	51	43	43	52	51	52		52	41	48	3.9
6:00	48	52	51	52	53	54	52	47	53	52	56	53		56	47	52	2.5
6:15	50	45	53	53	53	55	55	48	48	55	56	52		56	45	52	3.5
6:30	49	45	54	52	53	51	54	48	47	54	52	59		59	45	51	3.8
6:45	50	46	53	54	52	52	54	51	57	53	55	56		57	46	53	2.8
7:00	49	45	55	55	55	52	56	60	62	53	54	51		62	45	54	4.6
Max	50	54	55	55	55	55	56	60	62	55	56	59	46	62	46	55	3.9
Min	43	39	42	40	46	40	40	40	40	44	41	40	40	46	39	41	2.2
Ave	46	43	47	46	49	45	45	45	43	47	46	45	42	49	42	45	1.8
SD	1.9	3.2	3.1	3.9	2.1	3.9	4.4	3.9	4.7	2.9	4.2	4.3	1.6	4.7	1.6	3.5	0.9
E Avg	46	45	48	48	49	47	48	48	49	48	49	48	43	49	43	47	1.9
24hr	54	54	49	52	52	53	50	53	50	51	51	51	50	54	42	51	2.9

4 Melbourne St, New Berrima

Daytime LA90 **9 to 27 October 2020**

Time	9/10	10/10	11/10	12/10	13/10	14/10	15/10	16/10	17/10	18/10	19/10	20/10	21/10	Maximum	Minimum	Average	SD
7:00		42	41	44	47	45	42	50	40	40	48	46	40	50	40	44	3.5
7:15		43	41	44	45	45	41	49	40	41	47	46	40	49	40	43	2.9
7:30		43	40	44	44	45	41	49	39	42	47	46	41	49	39	43	3.0
7:45		42	41	44	44	45	40	48	40	39	46	45	41	48	39	43	2.8
8:00		42	41	44	44	46	41		40	39	47	44	40	47	39	42	2.6
8:15		42	41	43	44	47	41		39	39	47	45	41	47	39	42	2.8
8:30		41	42	41	45	46	42		39	39	47		40	47	39	42	2.8
8:45		42	41	44	44	45	41		39	40	46	45	40	46	39	42	2.5
9:00		44	40	41	44	46	40		40	41	46	46	40	46	40	42	2.8
9:15		42	40	41	44	47	40	51	41	40	46	44	40	51	40	43	3.5
9:30		47	41	40	44	46	40	55	41	41	45	44	40	55	40	43	4.5
9:45		48	41	41	43	46	40	53	40		43	42	39	53	39	43	4.2
10:00		47	40	42	42	45	40	50	40	41	43	41	39	50	39	42	3.5
10:15		44	41	42	42	44	39	48	40	40	43	40	39	48	39	42	2.6
10:30		49	41	41	42	44	40	48	41	40	43	40	39	49	39	42	3.3
10:45		47	41	41	41	44	40	47	40	45	43	41	37	47	37	42	3.0
11:00	45	44	42	42	43	46	40	47	39		43	40	39	47	39	42	2.6
11:15	45	43	49	41	44	46	40	47	38	42	42	39	39	49	38	42	3.4
11:30	46	45	45	42	42	42	40	48	40	42	42	40	39	48	39	42	2.5
11:45	46	44	49	42	42	42	40	46	40	42	41	41	40	49	40	42	2.8
12:00	47	44	50	42	42	44	40	46	39	43	43	41	39	50	39	42	3.1
12:15	48	44	48	44	44	44	41	45	39	44	43	40	40	48	39	43	2.4
12:30	49	45	44	42	44	45	41	45	39	42	44	40	41	45	39	42	2.1
12:45	48	45	47	43	44	45	42	46	39	41	44	40	40	47	39	43	2.7
13:00	47	44	48	42	44	43	42	47	40	41	44	41	40	48	40	43	2.7
13:15	47	45	47	42	45	41	41	49	41	42	45	41	39	49	39	43	2.9
13:30	47	44	42	42	44	40	42	48	40	41	44	41	40	48	40	42	2.3
13:45	47	45	42	39	44	42	43	47	41	39	44	43	40	47	39	42	2.5
14:00	47	45	42	41	44	40	43	47	42	41	45	41	40	47	40	42	2.1
14:15	49	45	42	41	44	41	43	47	44	40	45	43	40	47	40	43	2.2
14:30	49	46	45	41	43	43	43	47	44	40	45	42	40	47	40	43	2.3
14:45		45	42	41	44	43	42	48	43	40	46	42	44	48	40	43	2.2
15:00	48	46	43	43	44	45	42	47	42	42	45	41	42	47	41	43	1.9
15:15	47	46	42		46	45	43	47	42	43	45	42	42	47	42	44	2.0
15:30	49	46	42	43	44	46	43	48	41	45	45	42	44	48	41	44	2.0
15:45	49	45	42	45	46	45	42	48	41	45	46	42	44	48	41	44	2.2
16:00	48	45	42	42	47	44	44	46	41	46	45	42	41	47	41	44	2.1
16:15	46	44	42	45	45	44	42	46	42	46	45	43	41	46	41	43	1.7
16:30	46	46	42	42	46	43	41	47	41	46	45	42	40	47	40	43	2.3
16:45	44	46	43	41	47	43	41	47	43	46	45	41	41	47	41	43	2.5
17:00	46	47	41	40	49	43	42	47	44	43	45	42	42	49	40	44	2.7
17:15	45	45	40	41	49	43	42	47	42	44	44	43	44	49	40	43	2.5
17:30	46	45	41	41	50	42	42	47	41	43	44	43	42	50	41	43	2.8
17:45	47	44	41	41	50	42	41	47	42	44	44	43	42	50	41	43	2.8
18:00	46	44	43	43	49	42	41	47	41	44	44	43	41	49	41	43	2.5
Max	49	49	50	45	50	47	44	55	44	46	48	46	44	55	44	47	3.2
Min	44	41	40	39	41	40	39	45	38	39	41	39	37	45	37	40	2.2
Ave	47	44	42	42	44	44	41	48	40	42	44	42	40	48	40	43	2.3
SD	1.4	1.7	2.7	1.4	2.2	1.8	1.2	2.0	1.4	2.2	1.6	1.9	1.5	2.7	1.2	1.8	0.4
90%	45	42	40	41	42	42	40	46	39	39	43	40	39	46	39	41	2.1
															Median	41	

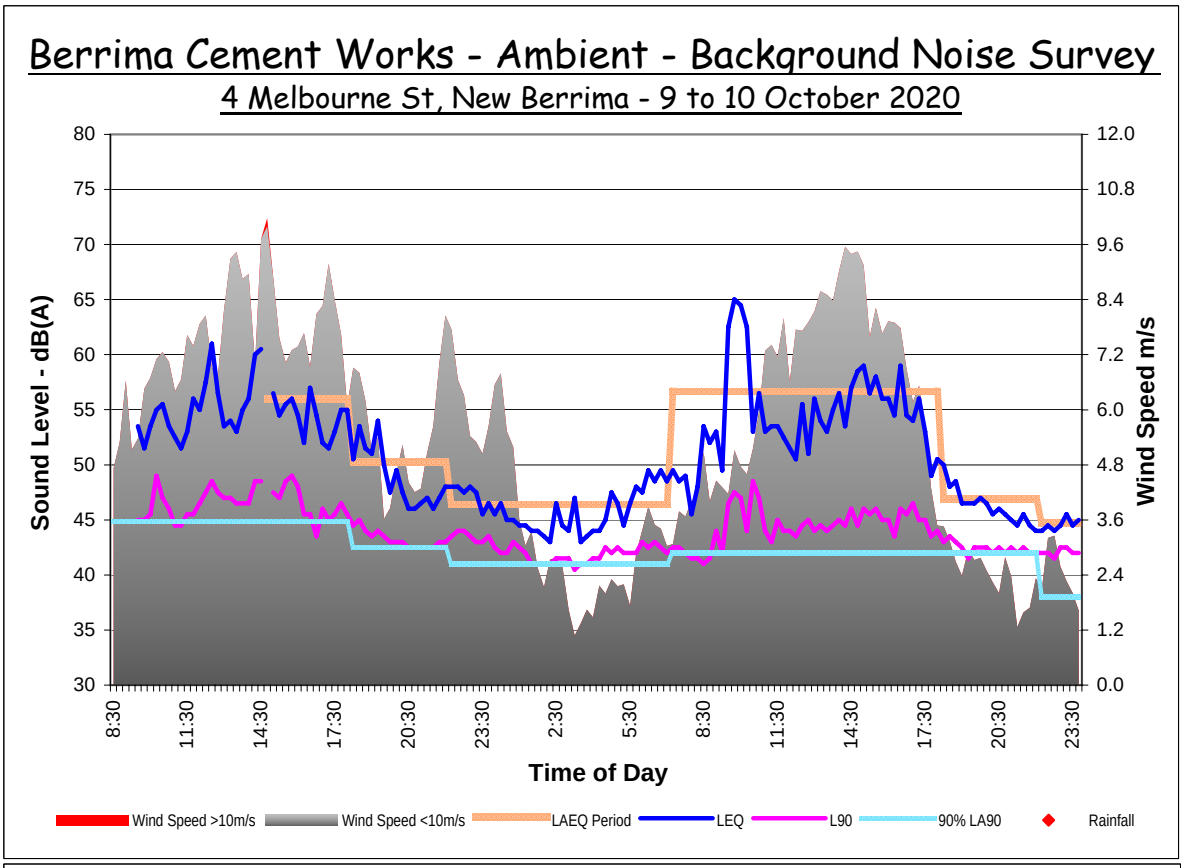
Evening LA90

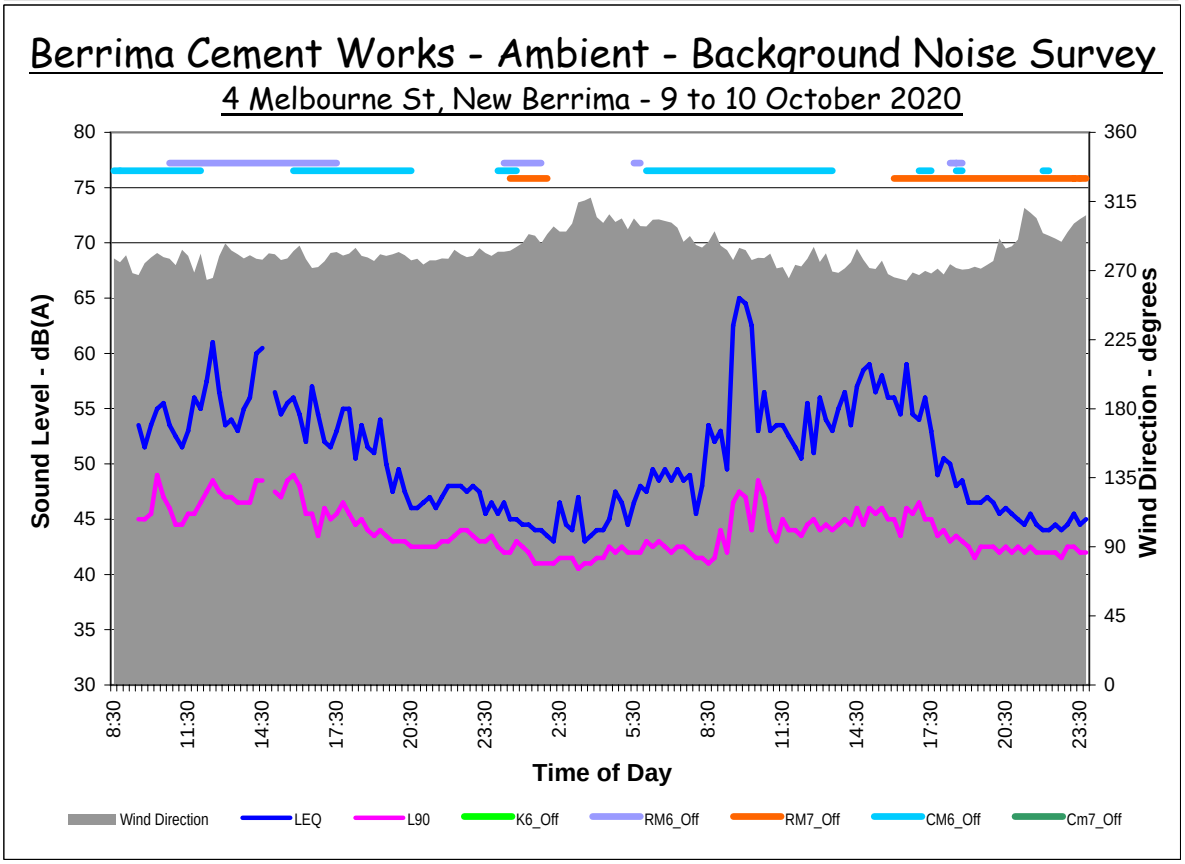
Time	9/10	10/10	11/10	12/10	13/10	14/10	15/10	16/10	17/10	18/10	19/10	20/10	21/10	Maximum	Minimum	Average	SD
18:00	46	44	43	43	49	42	41	47	41	44	44	43	41	49	41	43	2.5
18:15	45	43	44	41	47	44	41	47	41	43	44	43	42	47	41	43	2.2
18:30	45	44	45	42	47	45	40	47	42	44	44	41	43	47	40	43	2.2
18:45	44	43	45	41	46	43	40	47	41	44	44	42	40	47	40	43	2.3
19:00	44	43	46	40	47	43	39	47	40	44	43	42	39	47	39	43	2.9
19:15	44	42	46	39	48	43	40	47	40	44	42	42	40	48	39	42	3.0
19:30	44	43	46	40	50	43	40	46	40	44	42	41	38	50	38	42	3.3
19:45	43	43	46	40	51	43	41	46	39	43	42	41	39	51	39	43	3.4
20:00	43	43	46	39	49	41	40	45	40	44	42	40	38	49	38	42	3.2
20:15	43	42	46	39	48	42	40	43	39	43	41	40	38	48	38	42	2.9
20:30	43	43	46	39	49	43	40	43	39	44	41	40	37	49	37	42	3.2
20:45	43	42	45	39	48	43	40	43	41	43	40	40	38	48	38	42	2.8
21:00	43	43	46	39	48	42	39	43	40	43	42	40	37	48	37	42	2.9
21:15	43	42	46	38	47	42	38	43	40	43	41	40	37	47	37	41	3.0
21:30	43	43	47	39	46	42	37	43	41	44	40	39	37	47	37	41	3.2
21:45	43	42	46	39	45	41	37	42	40	44	39	38	37	46	37	41	3.1
22:00	43	42	47	39	45	40	37	41	41	44	37	39	39	47	37	41	3.0
Max	46	44	47	43	51	45	41	47	42	44	44	43	43	51	41	44	2.6
Min	43	42	43	38	45	40	37	41	39	43	37	38	37	45	37	40	2.6
Ave	43	43	45	40	47	42	39	44	40	43	41	40	39	47	39	42	2.6
SD	0.9	0.6	0.9	1.2	1.6	1.2	1.2	2.1	0.7	0.4	1.9	1.4	1.8	2.1	0.4	1.2	0.5
90%	43	42	44	39	45	41	37	42	39	43	39	39	37	45	37	41	2.7
															Median	41	

Night LA90

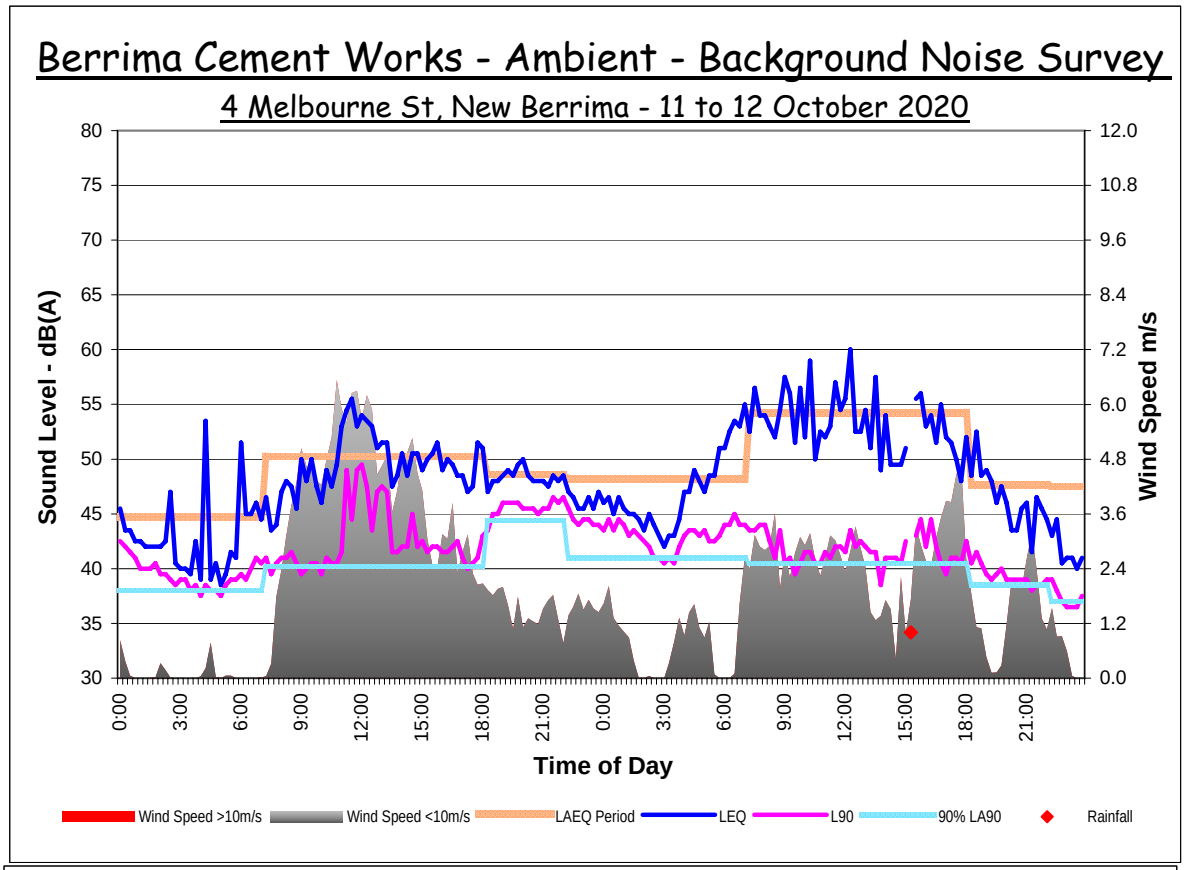
Time	9/10	10/10	11/10	12/10	13/10	14/10	15/10	16/10	17/10	18/10	19/10	20/10	21/10	Maximum	Minimum	Average	SD
22:00	43	42	47	39	45	40	37	41	41	44	37	39	39	47	37	41	3.0
22:15	44	42	46	39	45	40	37	42	39	44	39	38	40	46	37	41	2.8
22:30	44	42	45	38	45	40	38	41	38	43	40	38	39	45	38	40	2.6
22:45	44	42	44	37	45	39	38	42	38	44	40	39	38	45	37	40	2.7
23:00	44	43	45	37	45	39	38	42	38	43	40	38	38	45	37	40	2.8
23:15	43	43	45	37	46	39	38	42	38	44	40	38	39	46	37	40	3.0
23:30	43	42	44	37	45	40	38	42	37	44	39	38	39	45	37	40	2.9
23:45	44	42	44	38	46	40	38	41	38	44	40	38	39	46	38	40	2.9
0:00	43	43	44	38	46	40	37	41	38	44	40	37	39	46	37	40	2.9
0:15	42	42	45	39	46	38	38	42	39	45	40	38	38	46	38	41	2.9
0:30	42	42	44	37	46	38	39	42	38	45	41	38	38	46	37	40	3.0
0:45	43	41	45	38	46	37	39	41	39	44	41	37	38	46	37	40	3.2
1:00	43	40	44	40	46	37	39	40	38	44	41	38	38	46	37	40	2.9
1:15	42	40	43	42	46	38	40	40	38	44	42	38	38	46	38	41	2.7
1:30	41	40	44	43	45	37	42	39	38	44	41	37	38	45	37	40	2.9
1:45	41	41	43	42	45	37	43	39	38	44	41	37	38	45	37	40	2.8
2:00	41	40	43	41	44	38	43	39	39	43	41	37	38	44	37	40	2.4
2:15	41	40	42	41	45	38	41	39	40	44	42	37	39	45	37	40	2.4
2:30	42	39	41	41	46	38	41	38	39	43	43	38	40	46	38	40	2.5
2:45	42	39	41	40	46	38	41	38	39	43	43	39	39	46	38	40	2.4
3:00	42	39	41	41	45	39	41	38	40	43	43	39	39	45	38	40	2.2
3:15	41	39	41	40	45	38	41	37	39	44	44	39	39	45	37	40	2.5
3:30	41	38	41	40	45	39	42	37	40	43	44	40	40	45	37	40	2.5
3:45	41	39	42	40	45	38	42	37	39	44	43	40	40	45	37	41	2.4
4:00	42	38	43	41	45	38	42	37	39	43	42	39		45	37	40	2.7
4:15	42	39	44	41	45	38	42	37	39	42	43	39		45	37	41	2.5
4:30	43	38	44	42	46	38	42	37	40	43	43	39		46	37	41	2.7
4:45	42	38	43	43	46	38	44	37	40	44	42	39		46	37	41	3.0
5:00	43	38	44	43	46	39	45	38	40	44	43	40		46	38	42	3.0
5:15	42	39	43	43	46	39	46	37	39	44	43	40		46	37	41	3.2
5:30	42	39	43	44	46	40	46	37	39	44	43	40		46	37	42	3.2
5:45	42	39	43	43	46	39	46	38	39	46	43	40		46	38	42	3.1
6:00	43	40	44	44	47	40	47	39	40	46	45	41		47	39	43	3.2
6:15	43	39	44	44	46	42	47	39	40	46	45	41		47	39	43	3.1
6:30	43	40	45	45	46	42	47	40	40	46	46	41		47	40	43	2.9
6:45	43	41	44	47	44	41	48	40	41	47	47	41		48	40	44	3.1
7:00	42	41	44	47	45	42	50	40	40	48	46	40		50	40	44	3.7
Max	44	43	47	47	47	42	50	42	41	48	47	41	40	50	40	44	3.3
Min	41	38	41	37	44	37	37	37	37	42	37	37	38	44	37	38	2.5
Ave	42	40	43	41	45	39	41	39	39	44	42	38	38	45	38	41	2.3
SD	0.9	1.6	1.4	2.8	0.6	1.3	3.6	1.8	1.0	1.2	2.1	1.2	0.7	3.6	0.6	1.6	0.9
90%	41	38	41	37	45	37	38	37	38	43	40	37	38	45	37	39	2.5
															Median	38	

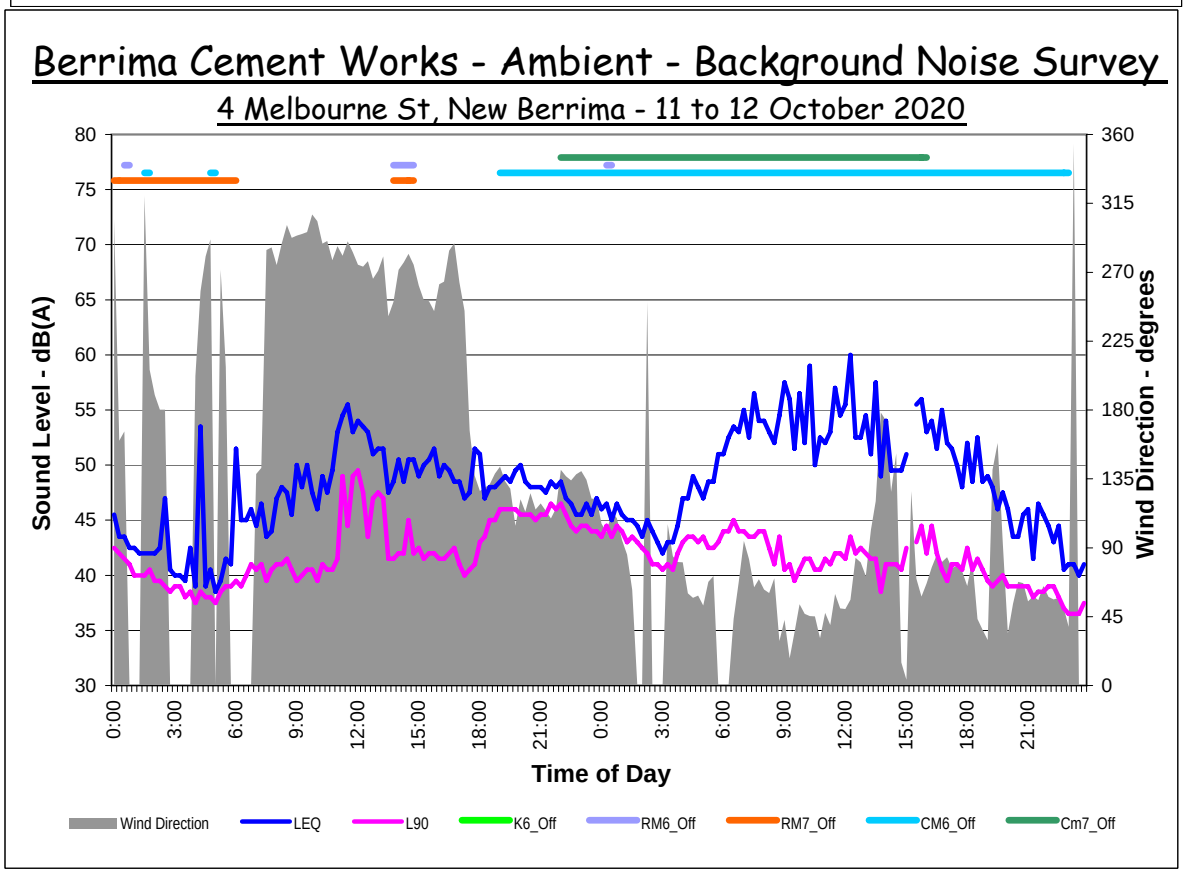
Two Day Results of Ambient Noise Monitoring



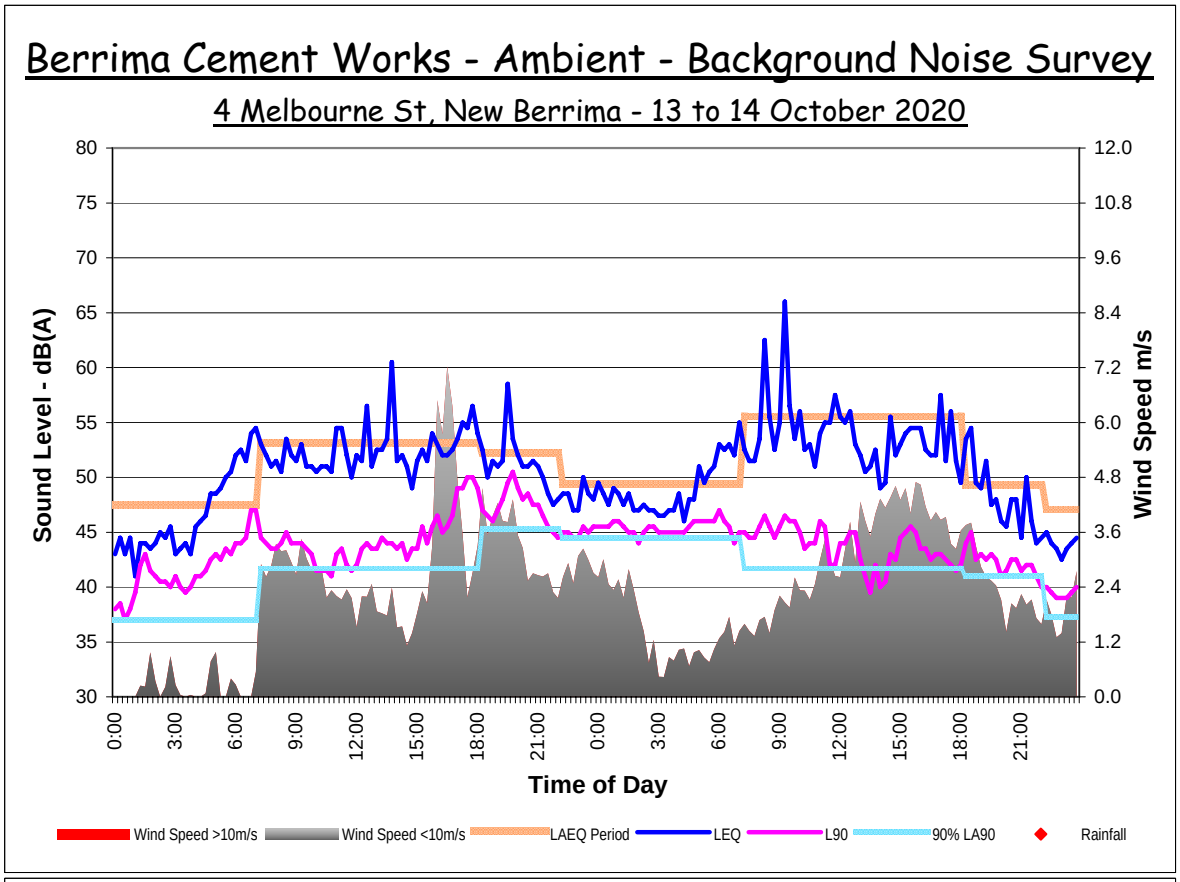


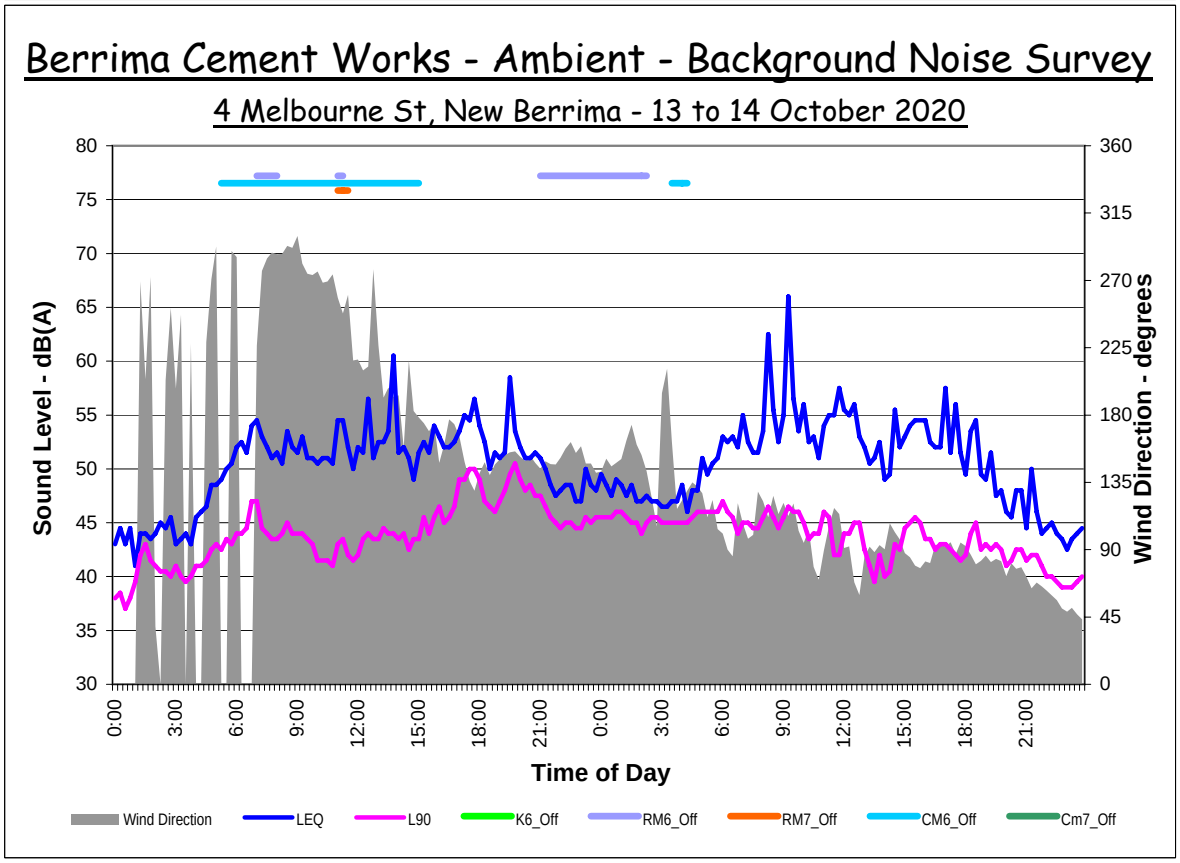
Two Day Results of Ambient Noise Monitoring



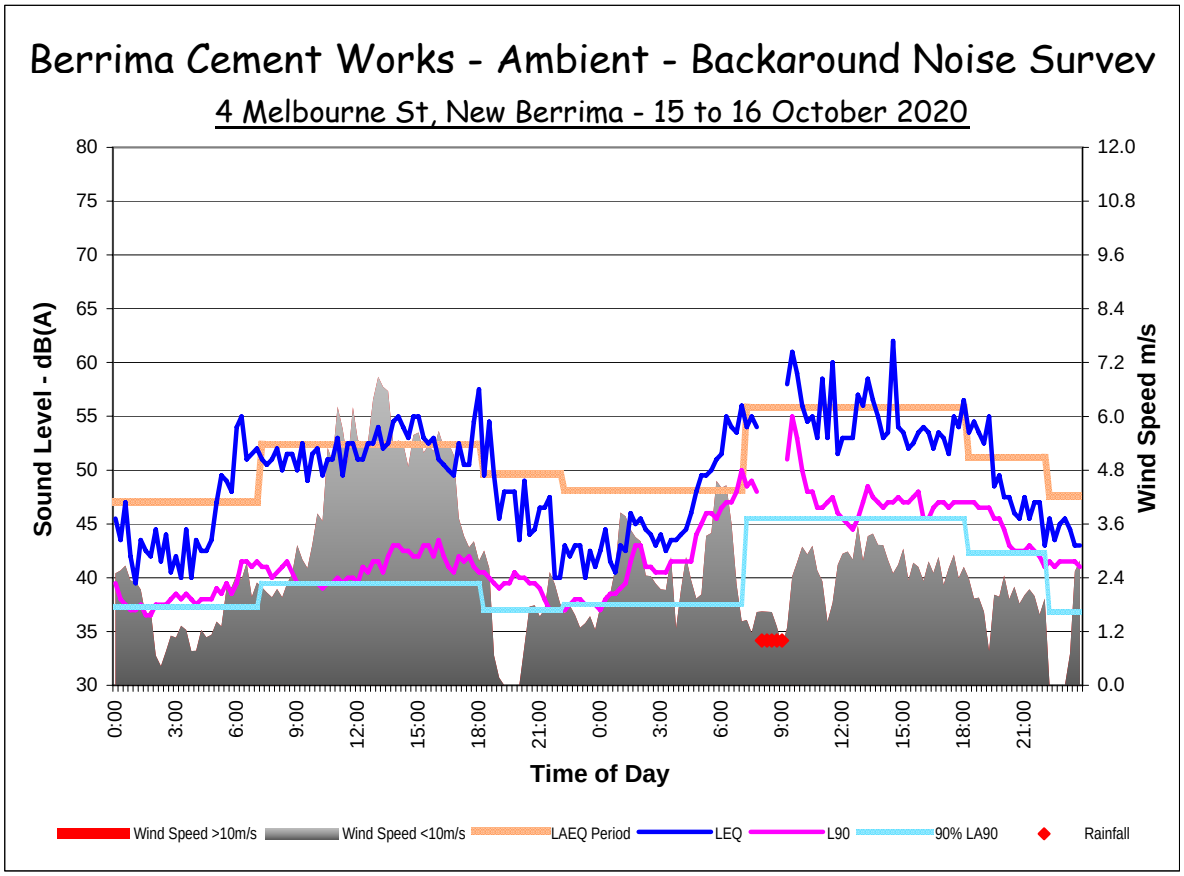


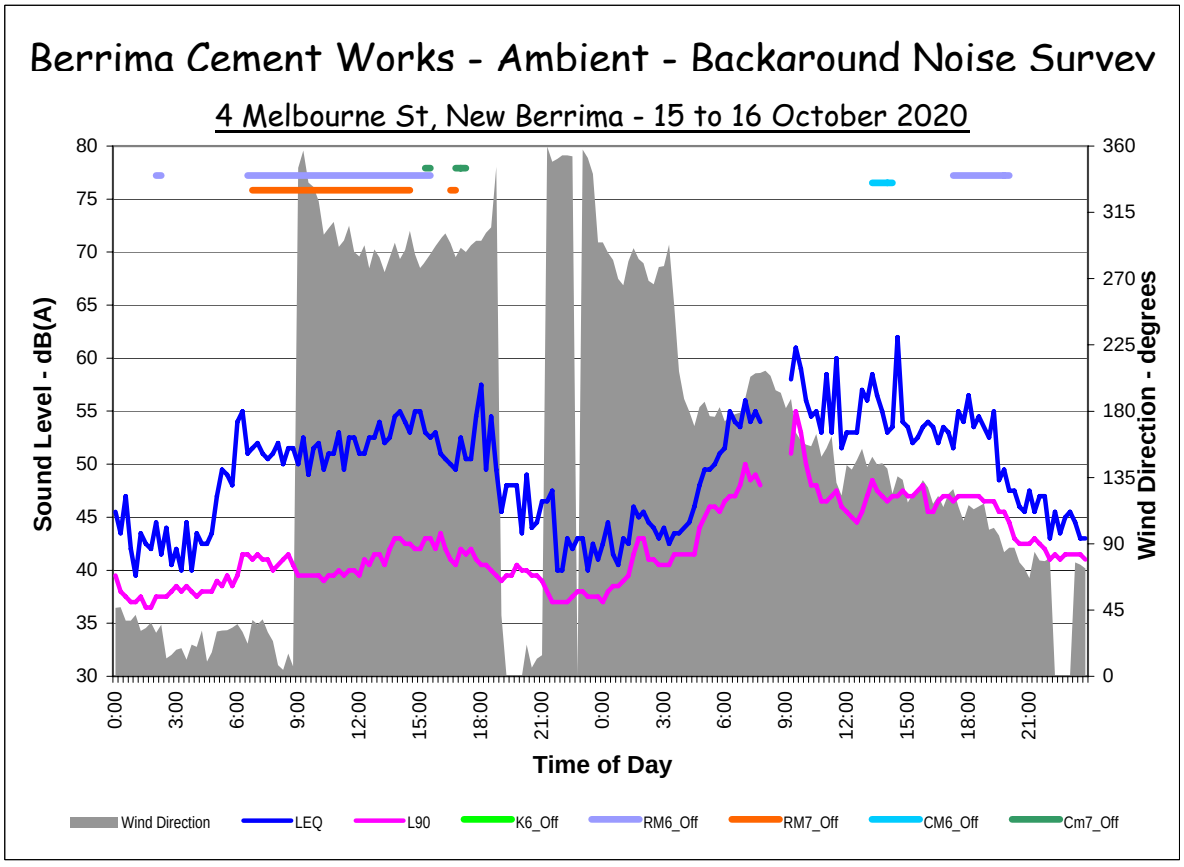
Two Day Results of Ambient Noise Monitoring



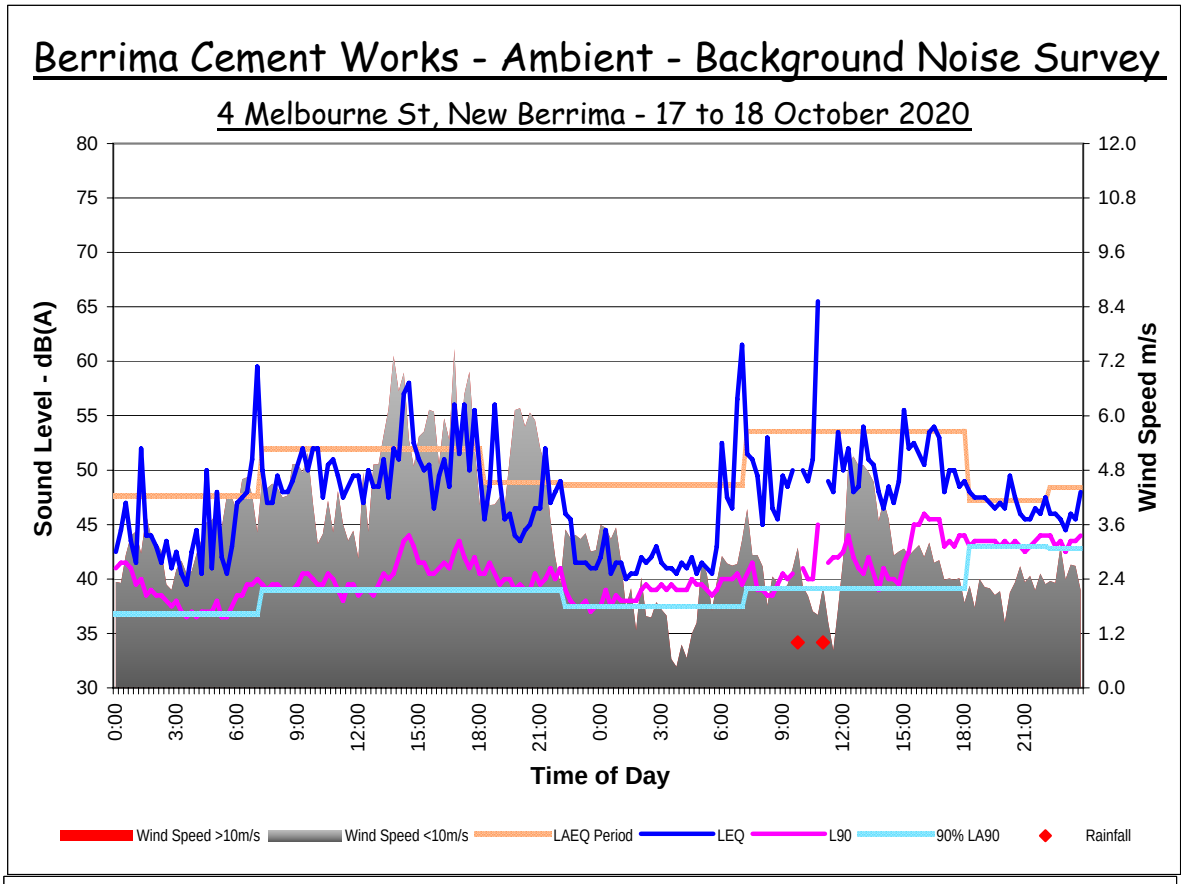


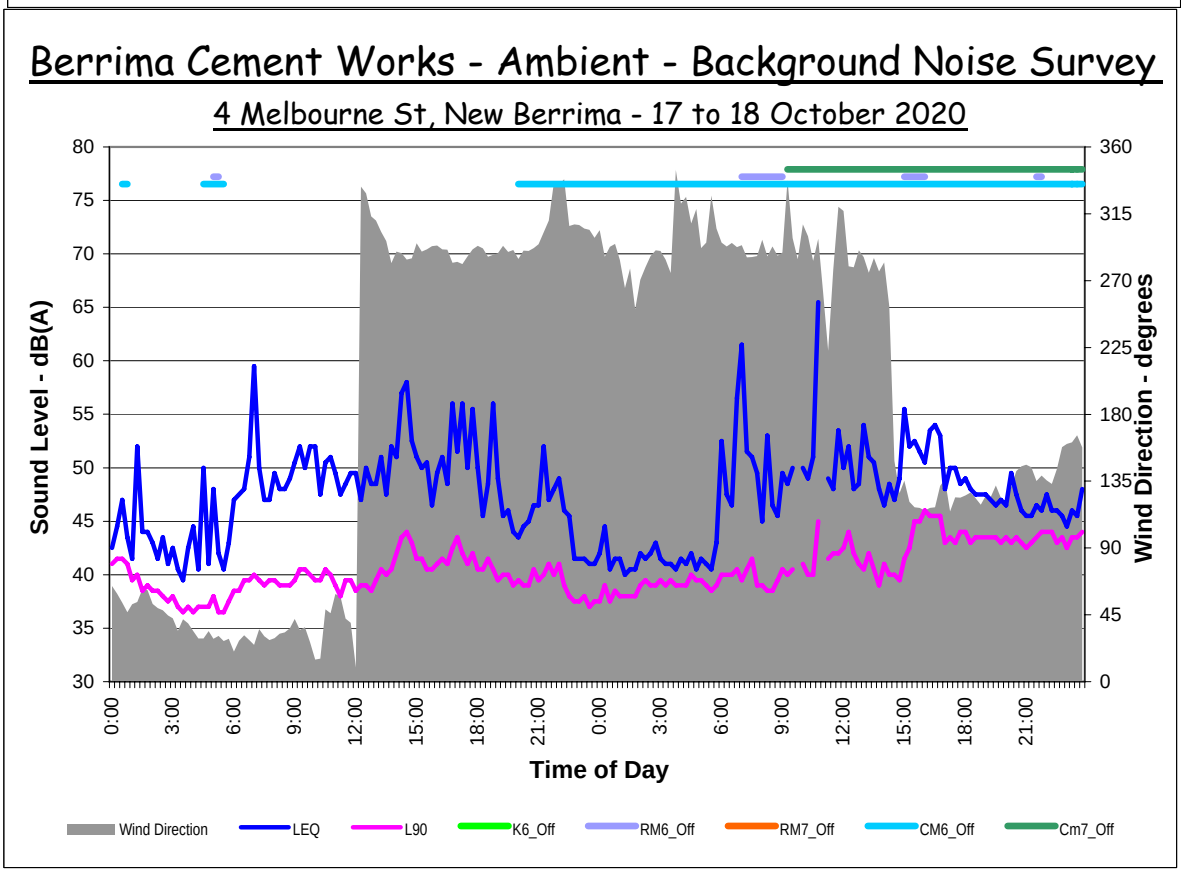
Two Day Results of Ambient Noise Monitoring



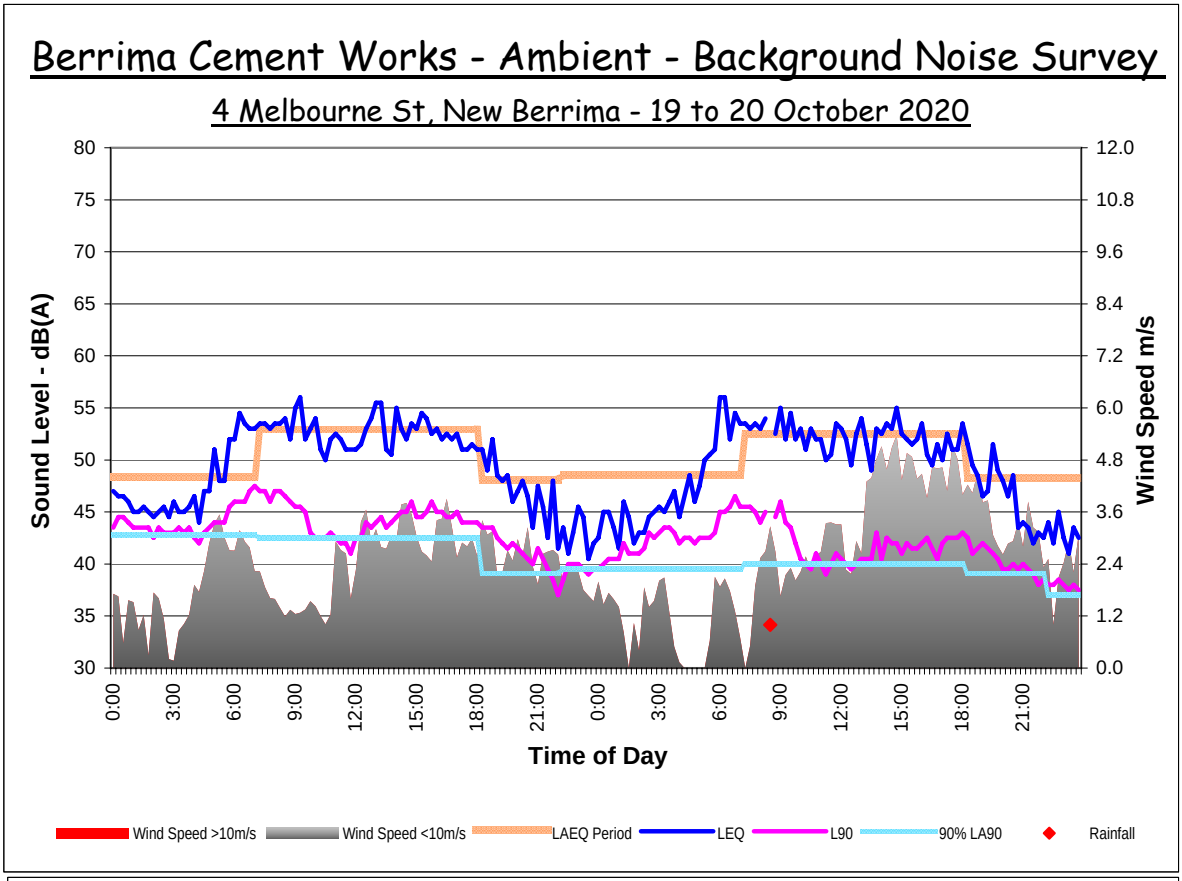


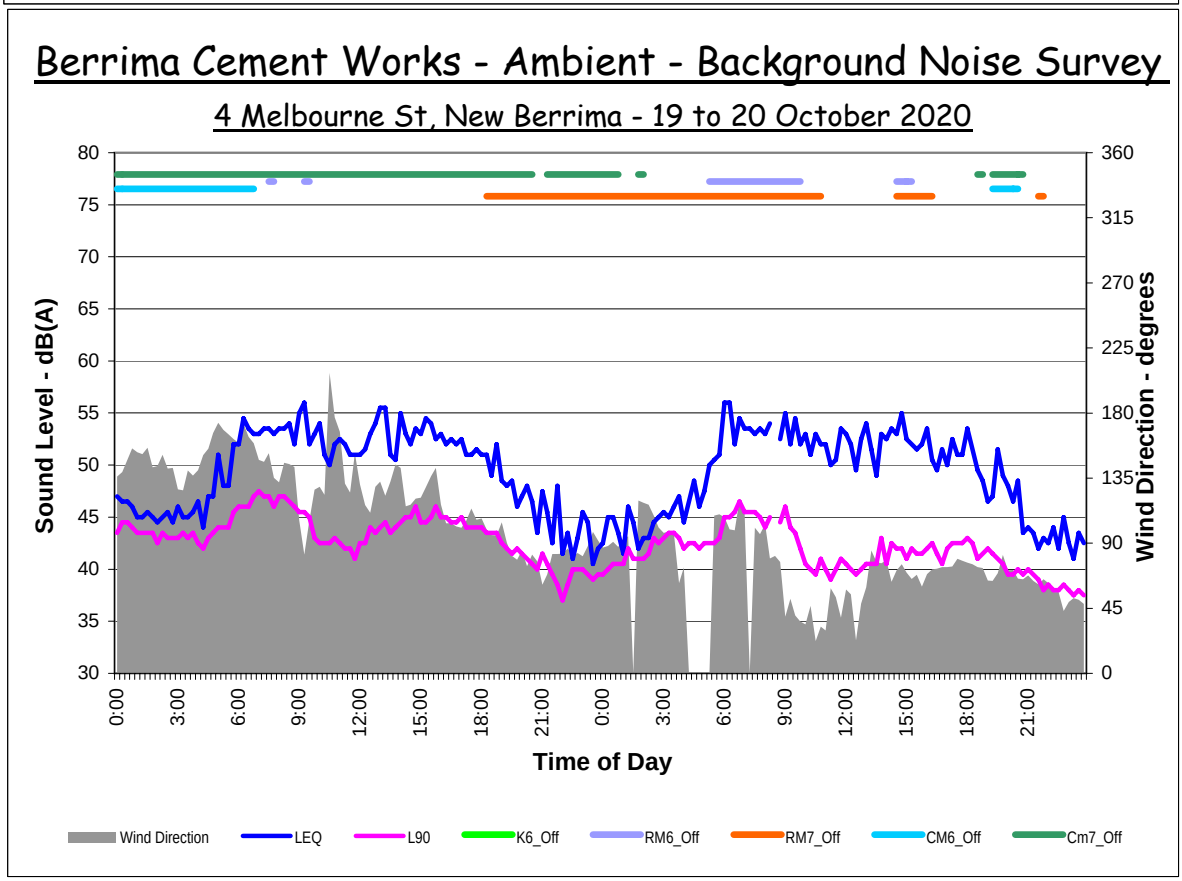
Two Day Results of Ambient Noise Monitoring



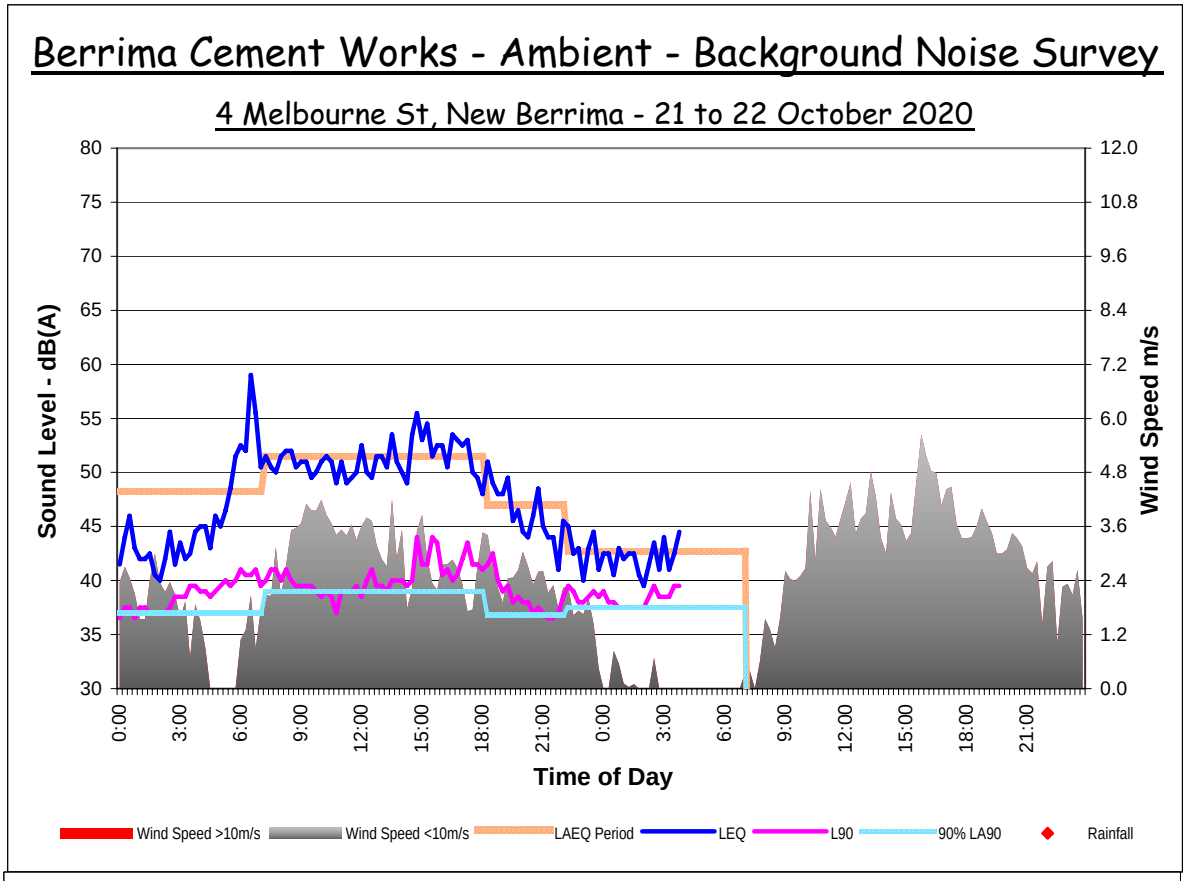


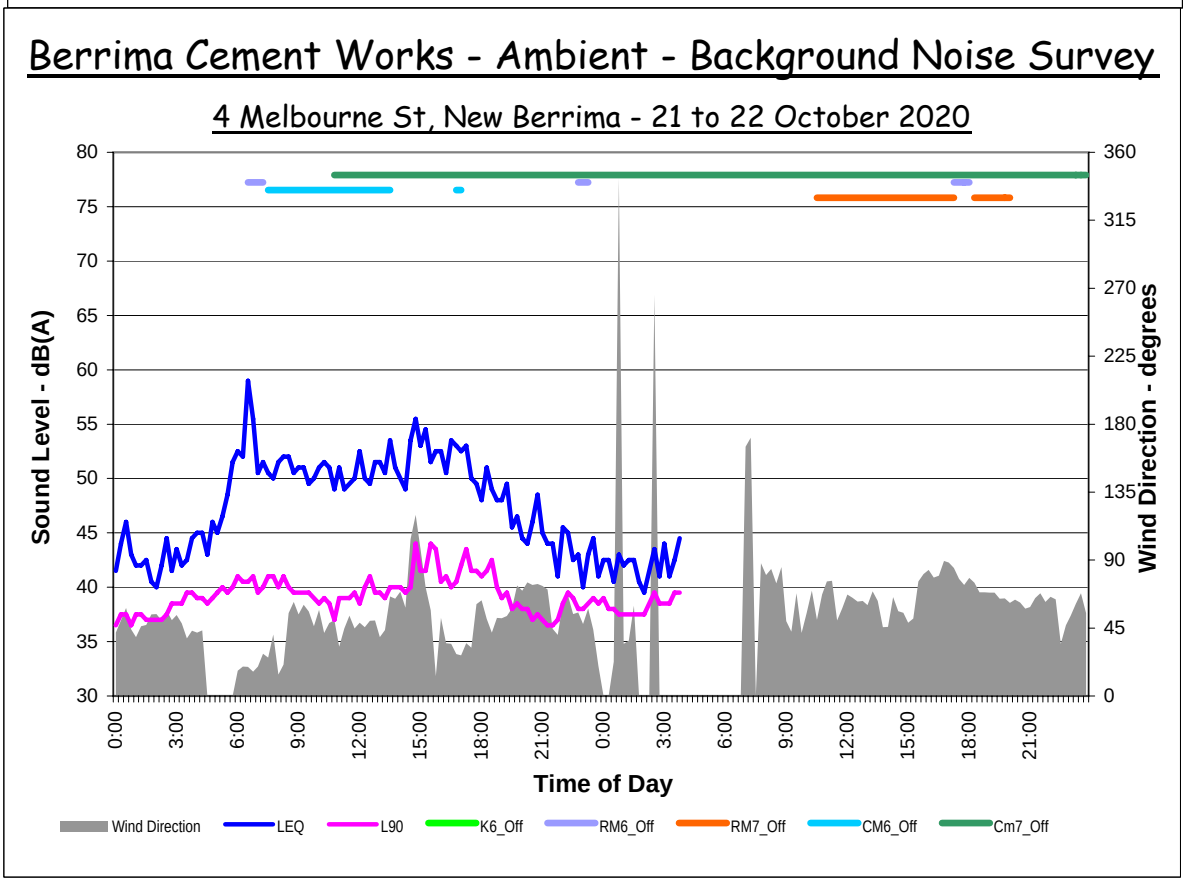
Two Day Results of Ambient Noise Monitoring

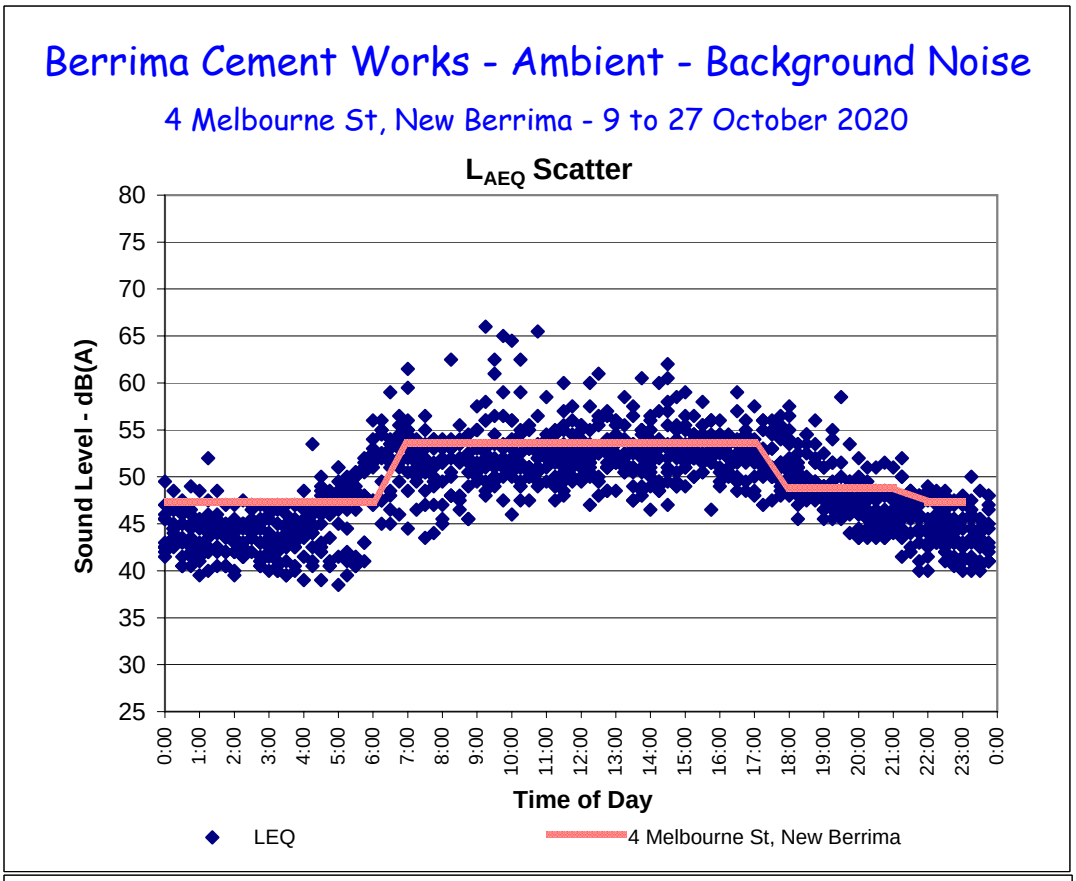


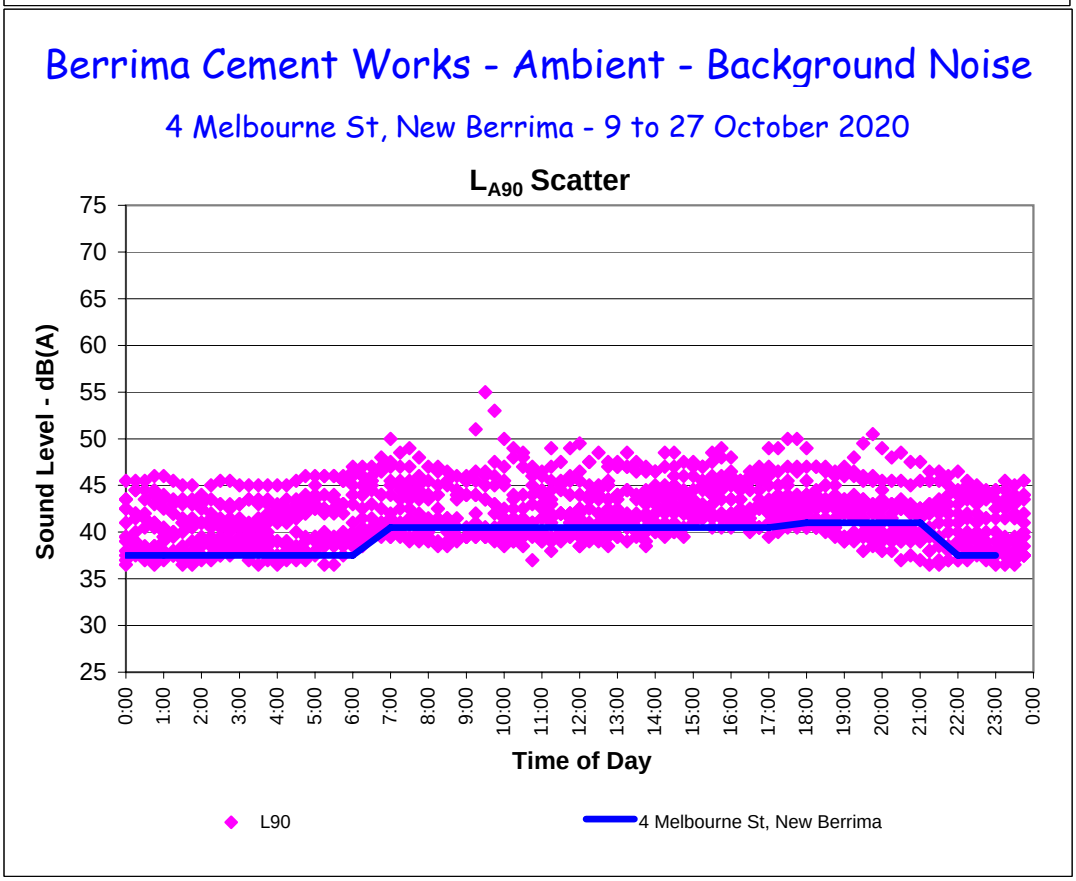


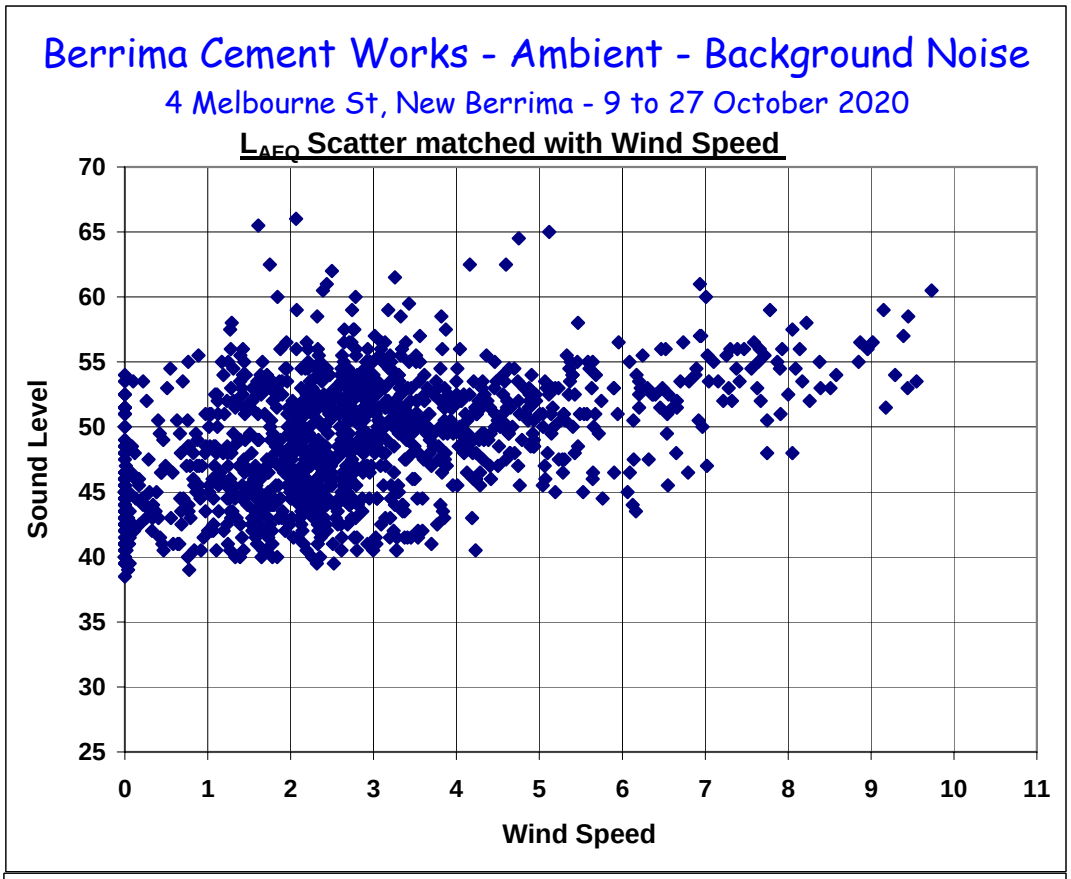
Two Day Results of Ambient Noise Monitoring

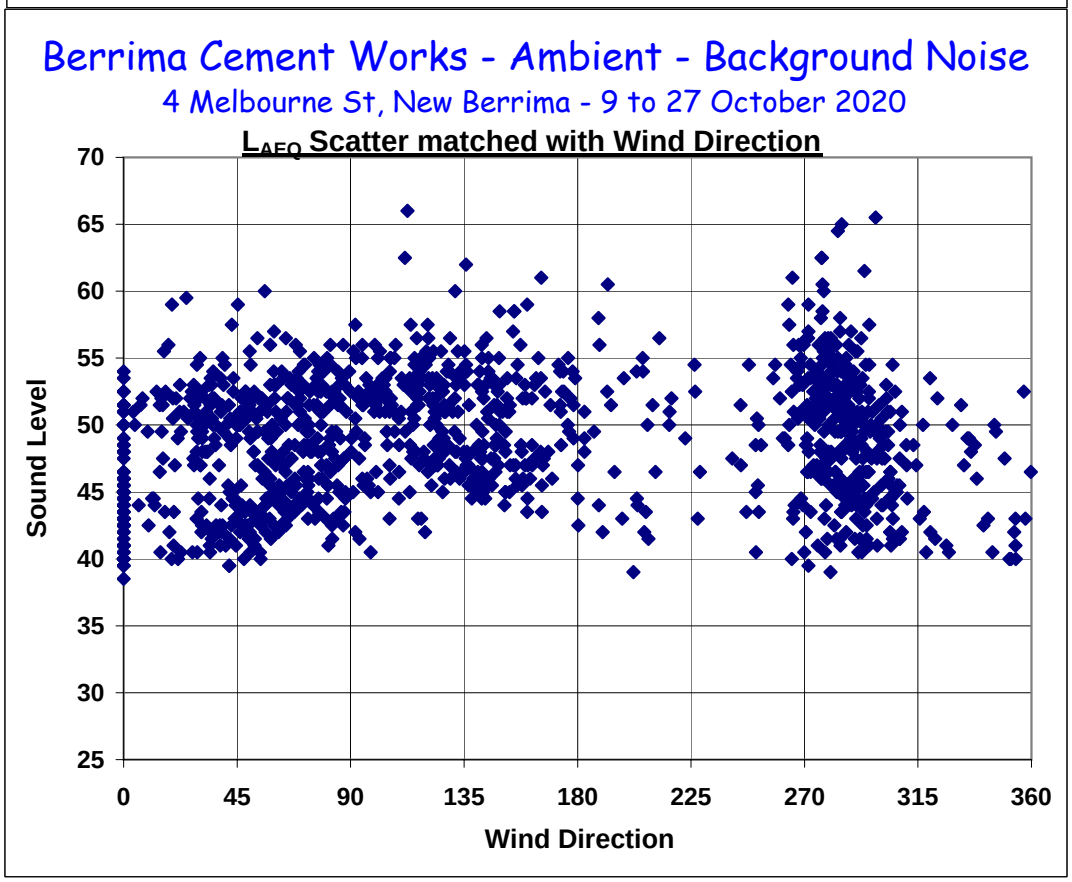


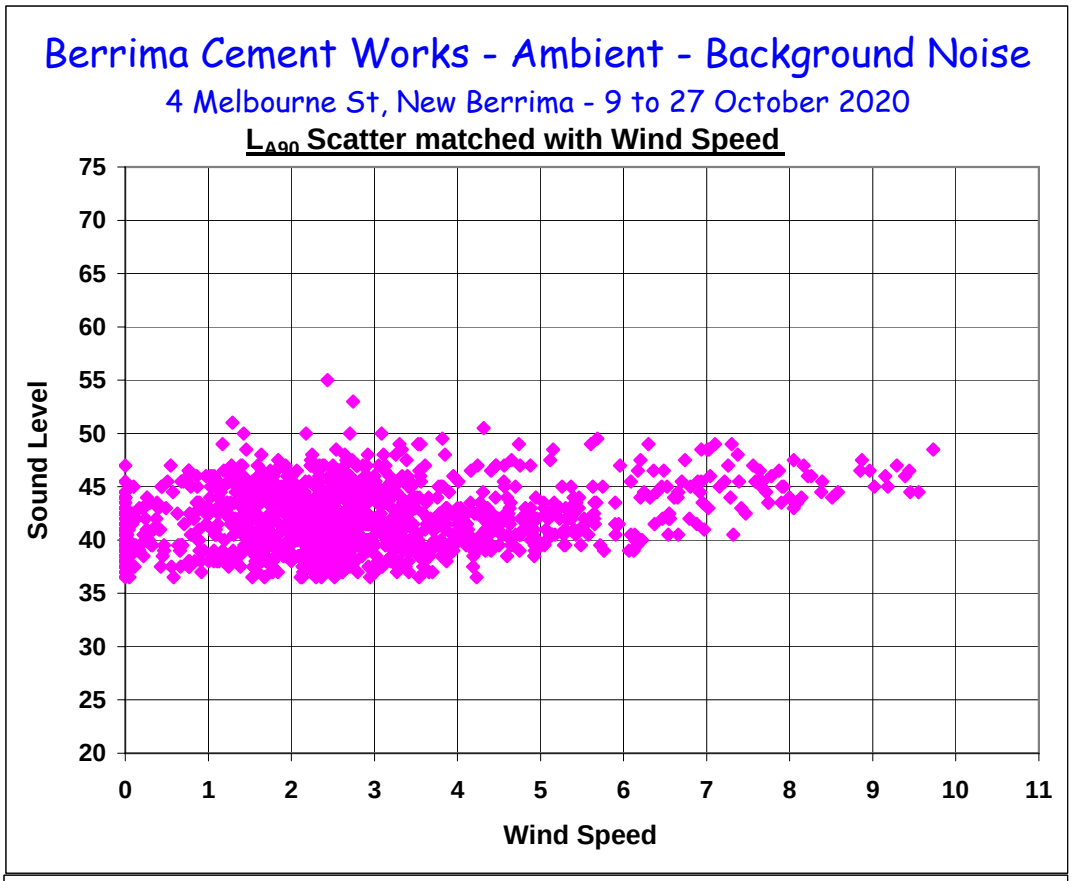


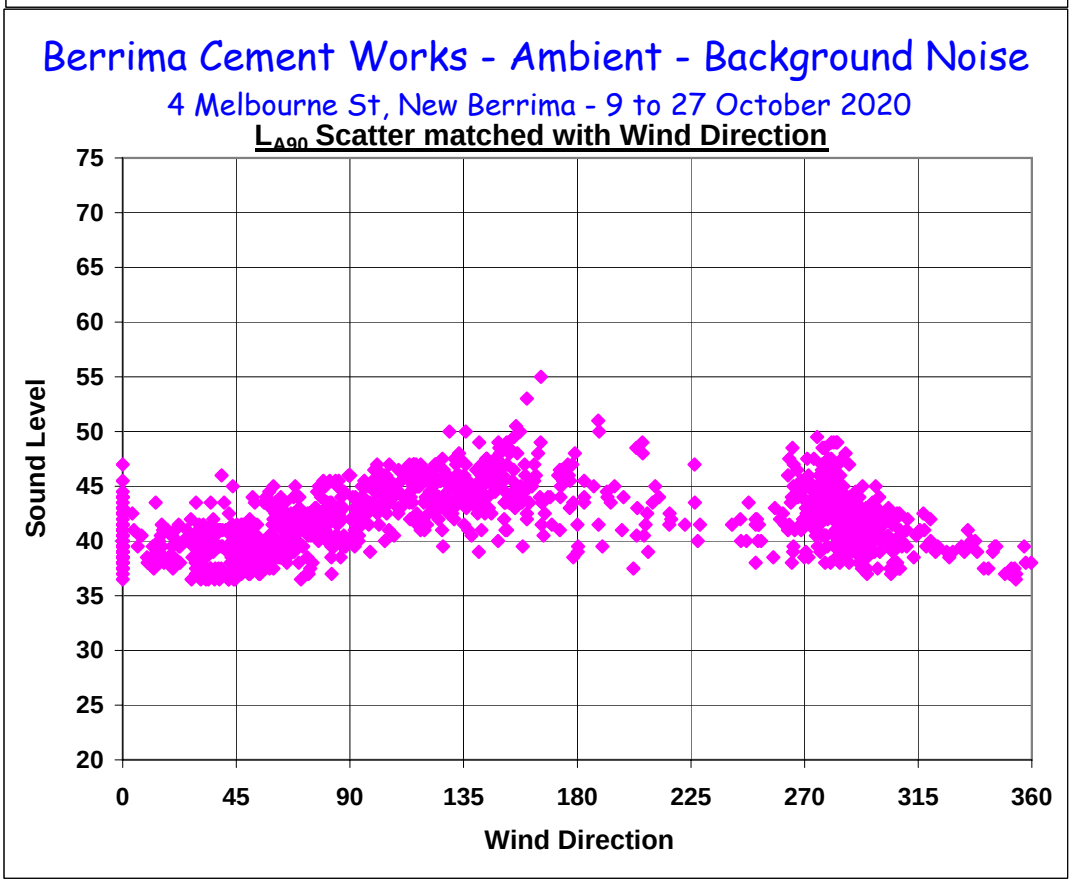

Berrima Cement Works - Ambient - Background Noise
4 Melbourne St, New Berrima - 9 to 27 October 2020
LAEQ Scatter
Sound Level - dB(A)
80
75
70
65
60
55
50
45
40
35
30
25
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00
Time of Day
LEQ
4 Melbourne St, New Berrima


Berrima Cement Works - Ambient - Background Noise
4 Melbourne St, New Berrima - 9 to 27 October 2020
LA90 Scatter
Sound Level - dB(A)
75
70
65
60
55
50
45
40
35
30
25
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00
Time of Day
L90
4 Melbourne St, New Berrima


Berrima Cement Works - Ambient - Background Noise
4 Melbourne St, New Berrima - 9 to 27 October 2020
LAEQ Scatter matched with Wind Speed
Sound Level
70
65
60
55
50
45
40
35
30
25
0
1
2
3
4
5
6
7
8
9
10
11
Wind Speed


Berrima Cement Works - Ambient - Background Noise
4 Melbourne St, New Berrima - 9 to 27 October 2020
LAEQ Scatter matched with Wind Direction
Sound Level
70
65
60
55
50
45
40
35
30
25
0
45
90
135
180
225
270
315
360
Wind Direction


Berrima Cement Works - Ambient - Background Noise
4 Melbourne St, New Berrima - 9 to 27 October 2020
LA90 Scatter matched with Wind Speed
Sound Level
75
70
65
60
55
50
45
40
35
30
25
20
0
1
2
3
4
5
6
7
8
9
10
11
Wind Speed


Berrima Cement Works - Ambient - Background Noise
4 Melbourne St, New Berrima - 9 to 27 October 2020
LA90 Scatter matched with Wind Direction
Sound Level
75
70
65
60
55
50
45
40
35
30
25
20
0
45
90
135
180
225
270
315
360
Wind Direction

Recognition Research
ABN: 25 153 946 064
ACN: 153 946 064

Appendix C: Unattended environmental sound level results for Northern Boundary

North Fence, New Berrima

Daytime LAEQ **9 to 27 October 2020**

Time	9/10	10/10	11/10	12/10	13/10	14/10	15/10	16/10	17/10	18/10	19/10	20/10	21/10	22/10	23/10	24/10	25/10	Maximum	Minimum	Average	SD
7:00			52	53	57	52	50	56	50	50	53	53	49	51	51	47	56	58	47	53	2.9
7:15			51	51	54	53	50	55	49	53	53	55	51	51	51	47	55	56	47	52	2.6
7:30			50	52	52	53	52	54	48	49	53	53	51	50	52	48	55	56	48	52	2.5
7:45			49	53	51	52	50	53	48	51	53	53	50	51	51	47	56	57	47	52	2.6
8:00			51	51	50	52	49		50	48	52	52	49	51	49	47	56	56	47	51	2.7
8:15			49	50	51	52	48		49	48	56	53	48	52	49	47	56	57	47	51	3.1
8:30			51	49	52	52	52		47	50	53		50	53	48	47	56	58	47	51	3.1
8:45			50	54	50	52	49		49	51	52	53	50	51	49	47	56	58	47	51	2.9
9:00			51	50	54	52	48		50	49	51	53	49	50	49	49	55	58	48	51	2.9
9:15			48	50	51	51	47	53	49	48	51	52	48	51	48	52	54	57	47	51	2.8
9:30			48	47	49	52	47	53	50	48	50	52	49	50	46	46	55	56	46	50	3.3
9:45			47	48	49	52	47	54	48		50	49	52	50	50	50	54	56	47	51	2.7
10:00			47	48	48	52	49	54	49	47	50	53	48	48	49	48	54	55	47	50	2.9
10:15			51	47	49	53	47	54	49	46	50	49	48	51	47	50	54	57	46	50	3.1
10:30			47	46	48	53	49	54	48	51	50	51	48	48	49	47	54	56	46	50	2.9
10:45			47	48	48	52	49	55	47	54	50	50	46	49	47	48		56	46	50	3.2
11:00			49	48	48	54	49	54	54		50	51	50	46	48			56	46	50	3.0
11:15			47	49	49	51	48	55	51	47	49	49	45	49	50		53	57	45	50	3.1
11:30			48	49	49	51	48	55	47	47	49	50	47	46	48			58	46	49	3.2
11:45			49	49	49	50	48	53	47	47	49	49	47	47	50	47	52	56	47	49	2.6
12:00			48	48	50	52	47	54	47	48	51	49	47	46	48		52	57	46	50	3.1
12:15		51	48	46	50	51	49	52	49	50	49	49	50	44	48	49		58	44	50	3.0
12:30		52	49	48	50	53	49	53	49	47	50	49	50	45	48	50	53	58	45	50	3.0
12:45		51	49	48	50	52	48	52	46	46	51	50	46	45	47		53	58	45	49	3.3
13:00		51	49	48	51	51	49	52	47	47	50	49	46	47	48	49		58	46	50	2.8
13:15		51	49	48	51	49	48	54	47	49	50	49	50	47	48	48	52	58	47	50	2.7
13:30		52	48	51	51	47	49	54	46	46	50	48	47	47	48	48	53	58	46	49	3.2
13:45		50	47	48	52	50	49	54	48	45	50	49	49	46	48	49	54	56	45	50	2.9
14:00		51	48	49	51	49	55	54	48	48	52	49	48	46	48	48	54	57	46	50	3.3
14:15		51	51	47	51	51	50	53	51	47	50	50	52	45	47	47	54	57	45	50	3.0
14:30		51	52	49	50	51	49	54	50	47	52	50	48	47	46	48	54	58	46	50	3.1
14:45		52	50	50	52	50	50	54	48	47	51	49	48	47	47	47		58	47	50	2.9
15:00		53	50	48	52	50	48	53	50	47	50	48	48	46	45	50		56	45	50	2.9
15:15		52	48		52	52	50	52	47	50	50	49	49	47	46	49		55	46	50	2.4
15:30		53	49	49	51	53	48	53	48	51	52	50	49	47	48			55	47	50	2.5
15:45		53	50	49	52	52	48	53	49	51	51	50	48	46	47			57	46	50	2.7
16:00		53	47	48	51	51	51	53	50	51	51	50	46	45	46	49		56	45	50	2.9
16:15		51	49	52	53	52	49	53	50	50	50	49	46	50	52	50		57	46	51	2.5
16:30		54	50	50	52	50	49	53	48	51	50	48	48	52	46	49		56	46	50	2.5
16:45		52	50	49	54	51	49	53	51	51	49	47	48	51	48	49		56	47	51	2.3
17:00		53	50	48	56	50	50	52	50	50	50	50	60	51	46	50		60	46	51	3.4
17:15		53	48	51	56	51	49	52	48	51	50	50	55	51	47	50	56	56	47	51	2.8
17:30		52	48	50	57	49	49	53	47	49	50	50	54	49	46	48		57	46	50	3.1
17:45		52	48	49	57	50	49	53	49	50	51	49	55	49	47	48	57	57	47	51	3.0
18:00		52	51	51	56	51	47	53	47	51	51	50	55	49	47	48	57	57	47	51	3.1
Max		54	52	54	57	54	55	56	54	54	56	55	60	53	52	52	57	60	52	55	2.2
Min		50	47	46	48	47	47	52	46	45	49	47	45	44	45	46	52	55	44	48	3.2
Ave		52	49	49	51	51	49	53	49	49	51	50	49	48	48	48	54	57	48	51	2.6
SD		1.0	1.4	1.8	2.5	1.3	1.5	0.9	1.6	2.0	1.4	1.8	2.9	2.4	1.7	1.2	1.4	2.9	0.7	1.6	0.6
E Ave		52	49	50	52	51	49	54	49	49	51	51	51	49	48	48	55	57	48	51	2.5

Evening LAEQ

Time	9/10	10/10	11/10	12/10	13/10	14/10	15/10	16/10	17/10	18/10	19/10	20/10	21/10	22/10	23/10	24/10	25/10	Maximum	Minimum	Average	SD
18:00		52	51	51	56	51	47	53	47	51	51	50	55	49	47	48	57	57	47	51	3.1
18:15		51	50	50	54	50	47	55	47	50	50	50	52	49	46	50	57	57	46	51	2.8
18:30		51	52	52	53	52	49	53	49	49	49	49	55	49	49	54	56	56	49	51	2.3
18:45		51	51	49	52	51	50	52	47	50	49	49	52	49	48	53	56	56	47	51	2.2
19:00		51	51	52	53	52	47	55	47	50	49	50	48	48	46	52		55	46	50	2.7
19:15		50	52	50	55	51	48	53	47	50	49	50	48	49	47	52	55	55	47	51	2.6
19:30		51	53	50	54	52	49	52	48	50	49	49	48	48	47	51		54	47	50	2.0
19:45		51	53	49	54	51	48	51	46	50	49	49	45	47	47	52		56	45	50	3.0
20:00		50	52	48	54	50	47	51	47	50	49	47	45	47	48	49		56	45	49	2.9
20:15		48	53	47	54	50	48	51	46	50	48	48	46	45	48	50		57	45	49	3.1
20:30		49	53	48	54	50	47	51	47	50	48	49	45	46	48			54	45	49	2.7
20:45		49	52	48	55	50	49	50	49	49	48	48	46	46	47		56	56	46	50	3.2
21:00		49	53	48	55	50	49	50	48	49	50	49	45	46	49			56	45	50	3.0
21:15		49	53	48	53	51	47	51	48	50	49	49	45	46	49	49		55	45	49	2.7
21:30		49	53	48	52	51	46	50	48	50	48	49	45	45	48	51		53	45	49	2.4
21:45		50	53	48	52	50	46	51	48	51	48	48	46	45	48	52	59	59	45	50	3.6
22:00		49	54	49	52	50	46	49	49	50	46	48	47	45	48		57	57	45	50	3.4
Max		52	54	52	56	52	50	55	49	51	51	50	55	49	49	54	59	59	49	53	3.1
Min		48	50	47	52	50	46	49	46	49	46	47	45	45	46	48	55	55	45	48	2.9
Ave		50	52	49	54	51	48	52	48	50	49	49	48	47	48	51	56	56	47	50	2.8
SD		1.2	1.1	1.5	1.2	0.6	1.0	1.7	0.8	0.5	1.1	0.8	3.5	1.7	0.9	1.6	1.2	3.5	0.5	1.2	0.7
E Avg		50	52	49	54	51	48	52	48	50	49	49	49	47	48	51	57	57	47	50	2.7

Night LAEQ

Time	9/10	10/10	11/10	12/10	13/10	14/10	15/10	16/10	17/10	18/10	19/10	20/10	21/10	22/10	23/10	24/10	25/10	Maximum	Minimum	Average	SD
22:00		49	54	49	52	50	46	49	49	50	46	48	47	45	48		57	57	45	50	3.4
22:15		49	52	48	52	49	45	50	47	50	47	48	47	45	48		56	56	45	49	2.8
22:30		49	52	48	53	49	46	49	48	50	48	48	47	45	47	55	55	55	45	49	3.0
22:45		49	50	47	52	48	46	50	46	50	48	48	47	46	48	55		55	46	49	2.8
23:00		49	51	47	52	48	46	50	46	49	48	48	47	45	47	56		56	45	49	3.0
23:15		49	51	46	53	49	46	50	46	50	48	48	47	45	47	54	56	56	45	49	3.4
23:30		49	50	46	53	48	47	50	46	50	47	48	48	45	46	55	56	56	45	49	3.3
23:45		50	50	47	53	49	47	50	46	51	48	47	47	45	46	54	56	56	45	49	3.3
0:00		51	50	47	53	49	46	49	46	51	48	47	48	46	46	53	56	56	46	49	3.0
0:15		50	51	48	53	47	47	50	47	51	48	47	47	47	46	54	56	56	46	49	3.1
0:30		50	50	48	53	47	47	50	46	50	48	48	47	47	47	53		53	46	49	2.3
0:45		49	51	51	53	47	47	50	47	51	48	47	47	48	47	53	57	57	47	50	2.9
1:00		48	50	50	53	47	47	48	47	50	48	48	46	47		54	56	56	46	50	3.0
1:15		49	50	52	53	47	48	50	47	50	51	49	47	47	47	53	57	57	47	50	2.9
1:30		49	51	52	53	47	49	48	47	50	51	48	45	47		53	58	58	45	50	3.2
1:45		53	51	50	52	47	51	49	48	50	50	48	46	47		53		53	46	50	2.3
2:00		48	50	49	52	48	53	49	49	49	51	47	46	46		52	57	57	46	50	2.9
2:15		50	50	49	52	48	52	48	49	50	51	48	47	46		53	57	57	46	50	2.8
2:30		47	48	50	53	48	49	48	48	49	52	47	48	46	52	56	58	58	46	50	3.3
2:45		48	48	51	52	48	48	47	49	49	51	48	47	46	55	53	59	59	46	50	3.5
3:00		48	48	49	52	48	48	48	47	49	52	48	48	47	51	52	59	59	47	50	3.0
3:15		49	47	48	52	47	48	47	48	50	52	49	47	47	48	52	60	60	47	50	3.5
3:30		49	47	47	52	48	49	47	48	50	52	50	48	47	48	54	58	58	47	50	3.2
3:45		49	48	51	53	48	49	48	48	50	52	50	48	47	48	54	58	58	47	50	3.2
4:00		50	49	51	53	47	50	47	48	49	51	49	48	47	46	53	59	59	46	50	3.2
4:15		50	50	51	52	48	50	47	48	49	51	48	50	48	46	54	59	59	46	50	3.1
4:30		48	51	52	53	48	50	48	48	50	51	48	52	48	47	53	60	60	47	51	3.2
4:45		48	49	52	53	47	52	47	48	50	51	49	52	48	47	54		54	47	50	2.6
5:00		46	49	52	53	48	53	48	48	50	51	49	51	48	45	54	58	58	45	50	3.5
5:15		49	49	50	53	48	53	46	48	50	51	49	51	47	46	53	59	59	46	50	3.2
5:30		52	49	51	53	49	53	47	47	50	51	49	51	48	46	53	60	60	46	50	3.3
5:45		51	51	52	53	50	53	48	49	52	51	50	52	51	49	54	60	60	48	52	3.0
6:00		52	52	53	53	50	53	49	48	52	53	57	54	50	52	53	59	59	48	53	2.7
6:15		51	53	52	54	55	55	51	50	53	54	50	54	51	48	54	57	57	48	53	2.4
6:30		51	52	53	54	52	54	53	53	52	54	53	53	51	50	55	58	58	50	53	1.8
6:45		50	52	55	52	51	55	51	48	53	53	50	52	51	48	55	58	58	48	52	2.6
7:00		52	53	57	52	50	56	50	50	53	53	49	51	51	47	56	58	58	47	53	2.9
Max		53	54	57	54	55	56	53	53	53	54	57	54	51	55	56	60	60	51	55	2.1
Min		46	47	46	52	47	45	46	46	49	46	47	45	45	45	52	55	55	45	48	3.2
Ave		49	50	50	53	48	50	49	48	50	50	49	49	47	48	54	58	58	47	50	2.8
SD		1.5	1.7	2.4	0.5	1.6	3.1	1.5	1.4	1.2	2.2	1.8	2.4	1.9	2.1	1.0	1.4	3.1	0.5	1.7	0.6
E Avg		50	51	51	53	49	51	49	48	51	51	49	49	48	49	54	58	58	48	51	2.6
24hr		51	50	50	52	52	49	52	48	49	50	50	50	49	48	50	55	57	48	51	2.4

North Fence, New Berrima

Daytime LA90 **9 to 27 October 2020**

Time	9/10	10/10	11/10	12/10	13/10	14/10	15/10	16/10	17/10	18/10	19/10	20/10	21/10	22/10	23/10	24/10	25/10	Maximum	Minimum	Average	SD
7:00			49	49	52	51	47	53	45	46	51	51	46	49	49	45	53	55	45	50	3.0
7:15			48	49	51	51	47	53	45	45	51	51	46	49	49	45	52	54	45	49	2.9
7:30			47	48	49	51	47	52	45	46	51	51	47	49	48	45	53	54	45	49	2.9
7:45			47	48	48	51	46	52	45	45	51	51	47	49	47	45	53	54	45	49	3.0
8:00			47	48	48	50	46		46	44	50	50	46	50	46	45	54	54	44	49	3.1
8:15			47	47	49	50	45		45	44	50	51	45	50	46	44	53	54	44	48	3.2
8:30			48	46	49	50	46		45	45	50		45	49	45	45	53	55	45	48	3.4
8:45			47	47	48	50	44		45	45	50	50	45	48	45	45	53	55	44	48	3.4
9:00			46	45	48	50	45		46	45	49	51	45	48	44	44	53	54	44	48	3.5
9:15			45	45	47	50	44	52	45	46	49	49	45	49	44	43	52	53	43	48	3.3
9:30			44	44	46	50	44	52	46	45	49	49	44	46	43	43	52	53	43	47	3.7
9:45			45	44	46	50	44	52	45		48	46	44	45	44	43	52	54	43	47	3.6
10:00			45	44	45	50	45	52	45	45	47	47	44	44	44	43	52	53	43	47	3.5
10:15			44	43	46	50	44	51	45	44	47	46	44	43	43	44	52	54	43	47	3.7
10:30			44	43	46	50	45	52	45	43	48	46	44	44	43	43	52	53	43	46	3.5
10:45			44	43	45	50	45	52	45	44	48	46	43	44	43	44		54	43	46	3.4
11:00			44	44	46	50	45	51	44		48	46	43	44	44			54	43	46	3.4
11:15			45	44	46	49	45	52	43	45	47	45	43	44	44		51	55	43	46	3.6
11:30			46	44	47	48	45	52	44	45	47	46	43	43	44			55	43	46	3.5
11:45			46	44	46	48	45	51	44	45	47	45	43	43	45	45	51	54	43	46	3.0
12:00			46	43	47	49	44	51	44	46	48	45	43	44	44		51	54	43	47	3.3
12:15		48	46	43	48	49	45	50	44	47	48	46	43	42	45	46		55	42	46	3.2
12:30		49	46	43	48	50	45	50	43	46	48	44	43	42	45	48	51	54	42	47	3.2
12:45		49	45	44	47	50	45	50	43	45	48	45	43	42	44		51	55	42	47	3.6
13:00		48	46	44	49	47	46	51	44	44	48	45	43	44	44	46		55	43	46	3.2
13:15		48	47	45	48	46	45	52	44	45	49	45	43	43	44	46	49	55	43	47	3.1
13:30		48	45	44	48	44	47	51	44	44	48	45	44	43	44	46	51	54	43	46	3.1
13:45		48	45	43	49	47	47	51	44	43	49	46	43	43	44	47	52	53	43	47	3.3
14:00		48	45	45	48	45	47	51	45	46	49	45	44	43	44	46	52	55	43	47	3.2
14:15		48	47	45	47	46	47	51	47	45	48	47	45	42	43	45	52	55	42	47	3.1
14:30		48	49	46	47	48	46	51	47	45	49	47	44	42	44	44	52	55	42	47	3.3
14:45		49	47	45	48	47	47	51	46	45	49	45	45	43	44	44		56	43	47	3.2
15:00		50	47	46	48	48	45	51	46	46	48	45	45	42	42	45		53	42	47	2.9
15:15		49	45		49	50	47	51	45	48	48	47	46	43	43	45		52	43	47	2.8
15:30		49	46	46	49	50	46	51	45	49	49	46	47	42	42			54	42	47	3.2
15:45		50	45	46	49	49	45	51	45	49	49	46	46	43	43			54	43	47	3.1
16:00		50	45	46	50	49	47	51	46	49	48	47	42	43	43	46		53	42	47	3.1
16:15		48	46	50	49	48	46	50	45	49	48	46	43	43	44	46		54	43	47	2.9
16:30		49	47	47	50	48	45	50	45	49	48	44	43	45	43	45		52	43	47	2.7
16:45		50	47	46	51	48	45	50	46	50	48	44	43	48	43	46		53	43	47	2.9
17:00		50	45	45	54	48	46	50	45	48	48	46	47	48	42	46		54	42	48	3.0
17:15		50	45	47	54	47	46	51	45	49	48	47	48	47	43	45	54	54	43	48	3.2
17:30		49	46	47	55	47	45	51	45	48	48	48	48	47	43	46		55	43	48	2.9
17:45		49	46	46	55	47	45	51	46	48	48	46	48	46	44	46	55	55	44	48	3.1
18:00		48	48	48	53	47	45	51	45	49	48	47	48	47	44	47	55	55	44	48	2.9
Max		50	49	50	55	51	47	53	47	50	51	51	48	50	49	48	55	56	47	51	2.7
Min		48	44	43	45	44	44	50	43	43	47	44	42	42	42	43	49	52	42	45	3.4
Ave		49	46	45	49	49	45	51	45	46	48	47	45	45	44	45	52	54	44	48	3.1
SD		0.8	1.3	1.9	2.4	1.6	1.0	0.8	0.9	1.9	1.1	2.1	1.8	2.6	1.6	1.2	1.2	2.6	0.4	1.4	0.6
90%		48	44	43	46	47	44	50	44	44	47	45	43	42	43	43	51	53	42	46	3.4
																			Median	45	

Evening LA90

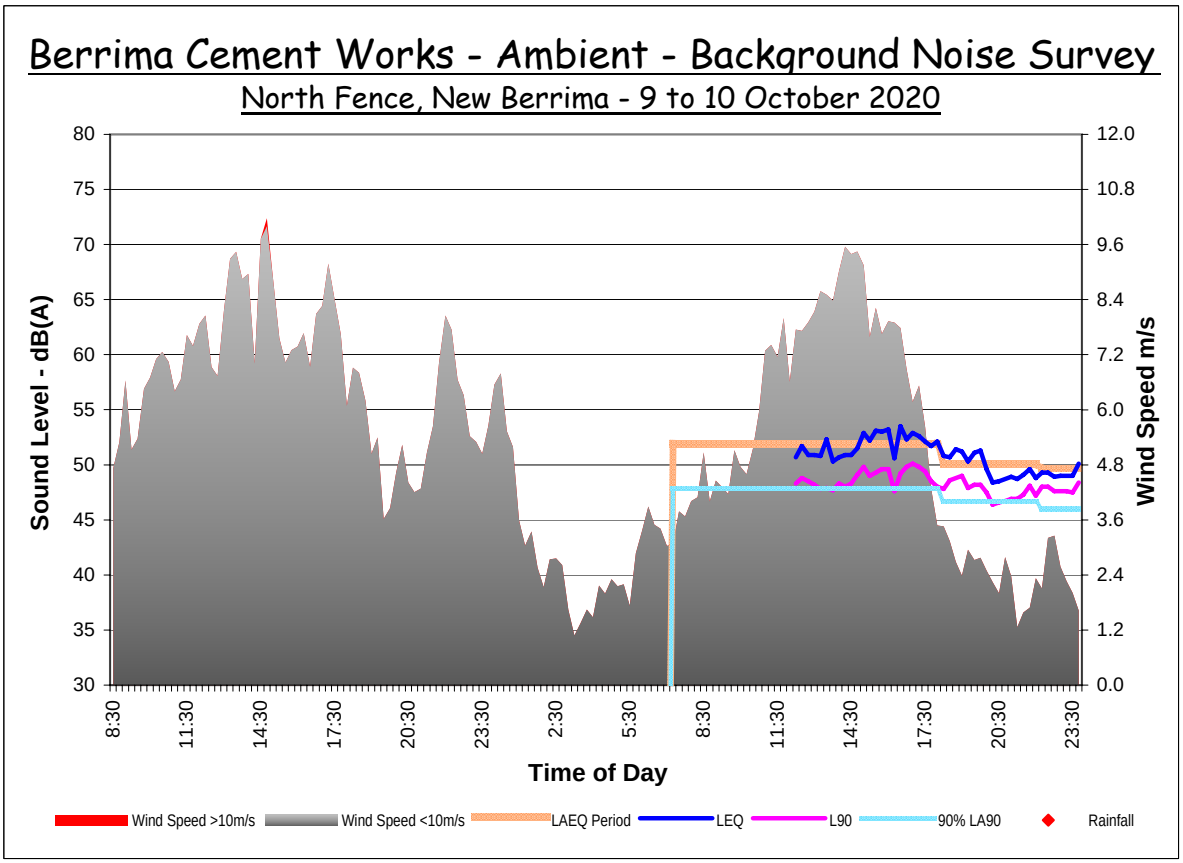
Time	9/10	10/10	11/10	12/10	13/10	14/10	15/10	16/10	17/10	18/10	19/10	20/10	21/10	22/10	23/10	24/10	25/10	Maximum	Minimum	Average	SD
18:00		48	48	48	53	47	45	51	45	49	48	47	48	47	44	47	55	55	44	48	2.9
18:15		48	47	47	52	48	45	51	45	48	48	47	48	48	44	48	55	55	44	48	2.6
18:30		49	50	47	51	49	45	51	46	48	48	46	52	46	44	48	54	54	44	48	2.6
18:45		49	49	47	51	48	45	51	45	48	48	47	44	46	45	49	54	54	44	48	2.6
19:00		49	50	46	51	49	45	51	45	49	47	48	44	46	44	50		52	44	48	2.7
19:15		48	50	47	53	49	45	51	45	49	47	48	44	46	44	50	53	53	44	48	2.9
19:30		48	51	47	52	49	45	50	45	48	47	47	43	45	45	49		52	43	47	2.5
19:45		48	51	47	52	49	46	50	45	49	47	47	44	45	45	49		54	44	48	2.8
20:00		48	51	46	53	48	46	49	45	48	48	46	43	45	45	49		54	43	48	2.9
20:15		46	51	46	52	48	47	49	44	48	46	46	43	44	45	49		53	43	47	3.0
20:30		47	51	47	53	49	46	49	45	48	46	47	43	44	45			53	43	47	2.7
20:45		47	51	47	53	48	47	49	46	48	46	46	43	44	45		54	54	43	48	3.2
21:00		47	51	47	52	49	46	49	46	48	48	47	43	43	46			54	43	48	2.9
21:15		47	51	46	51	49	46	49	46	48	47	47	43	44	46	47		53	43	47	2.7
21:30		47	52	45	51	49	45	49	46	49	47	46	43	43	46	49		52	43	47	2.5
21:45		48	52	46	50	49	45	49	46	49	46	46	44	44	45	50	55	55	44	48	3.3
22:00		47	51	47	51	48	44	48	47	49	44	46	45	43	46		55	55	43	48	3.4
Max		49	52	48	53	49	47	51	47	49	48	48	52	48	46	50	55	55	46	50	2.6
Min		46	47	45	50	47	44	48	44	48	44	46	43	43	44	47	53	53	43	46	2.8
Ave		48	50	47	52	49	45	50	45	48	47	47	44	45	45	49	54	54	44	48	2.9
SD		0.8	1.3	0.7	1.0	0.5	0.8	1.0	0.7	0.4	0.9	0.8	2.5	1.4	0.8	1.0	0.7	2.5	0.4	1.0	0.5
90%		47	48	46	51	48	45	49	45	48	46	46	43	43	44	47	53	53	43	47	2.9
																			Median	47	

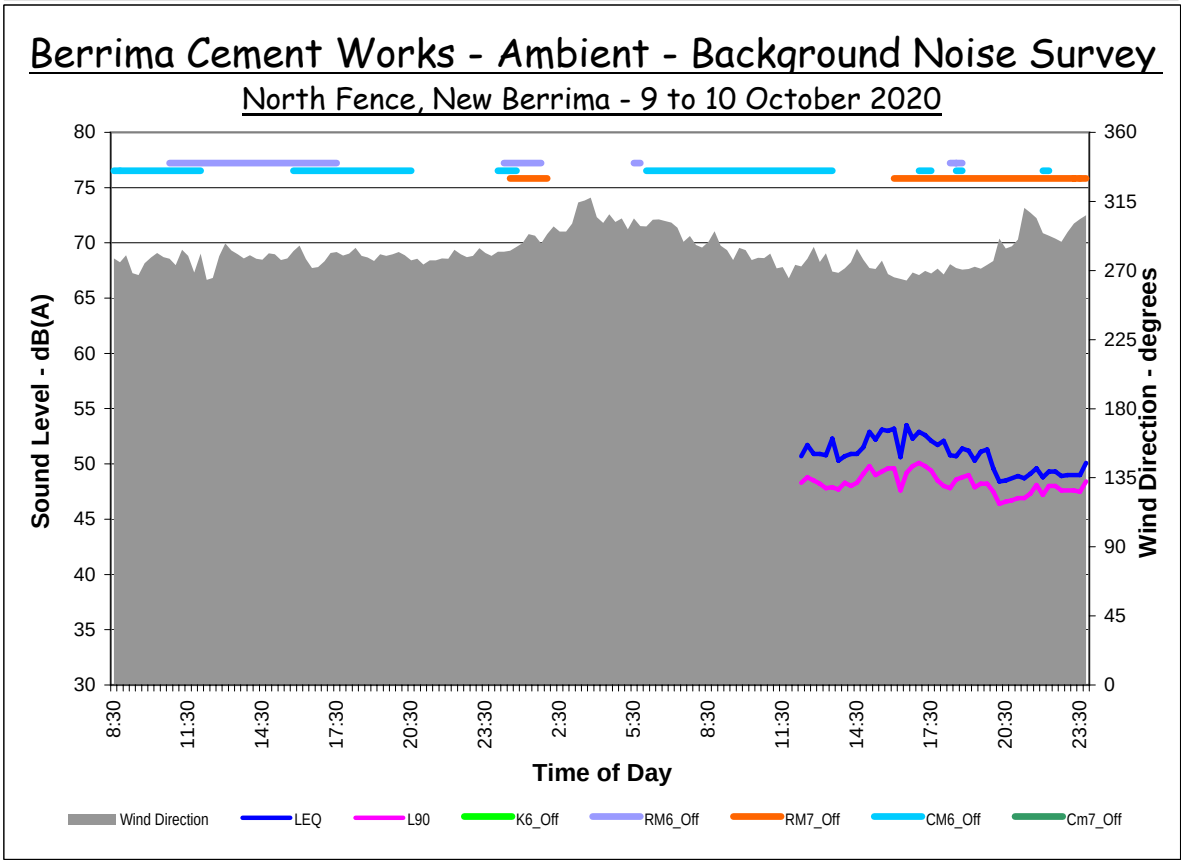
Night LA90

Time	9/10	10/10	11/10	12/10	13/10	14/10	15/10	16/10	17/10	18/10	19/10	20/10	21/10	22/10	23/10	24/10	25/10	Maximum	Minimum	Average	SD
22:00		47	51	47	51	48	44	48	47	49	44	46	45	43	46		55	55	43	48	3.4
22:15		48	51	46	50	47	44	48	45	48	45	45	46	43	46		53	53	43	47	2.8
22:30		48	50	45	51	47	44	48	44	48	47	45	45	44	45	51	53	53	44	47	3.0
22:45		48	49	45	50	46	44	48	43	48	47	46	45	44	46	53		53	43	47	2.8
23:00		48	50	45	50	46	45	48	44	48	47	45	44	43	45	54		54	43	47	3.0
23:15		48	49	44	51	46	45	48	44	49	46	45	46	44	44	52	54	54	44	48	3.3
23:30		48	49	44	51	47	45	49	44	48	46	45	46	44	44	52	54	54	44	47	3.3
23:45		48	49	45	51	47	45	48	44	49	46	45	46	43	44	52	54	54	43	47	3.2
0:00		49	49	46	51	47	45	48	44	49	47	45	46	44	44	51	54	54	44	48	3.1
0:15		49	49	46	51	45	45	48	45	49	47	44	46	45	44	52	54	54	44	48	3.1
0:30		49	49	45	51	44	46	49	44	49	47	45	46	45	44	51		51	44	47	2.3
0:45		47	50	47	51	44	46	48	45	49	47	45	46	46	45	51	54	54	44	48	2.8
1:00		46	49	49	51	45	45	47	45	48	47	45	45	45		52	54	54	45	48	2.9
1:15		46	49	51	51	45	46	47	45	48	49	46	46	45	44	51	54	54	44	48	3.0
1:30		47	50	51	50	44	47	45	46	49	49	45	44	45		51	55	55	44	48	3.2
1:45		47	50	49	50	45	48	46	46	48	48	45	45	45		51		51	45	48	2.3
2:00		47	49	48	50	45	48	46	47	48	49	45	44	44		50	55	55	44	48	2.8
2:15		47	48	48	51	45	48	46	47	48	49	45	46	44		51	54	54	44	48	2.8
2:30		45	48	48	50	46	47	46	46	48	50	45	46	44	48	52	55	55	44	48	2.9
2:45		46	47	49	51	46	46	45	46	48	50	46	45	44	50	52	56	56	44	48	3.2
3:00		46	47	47	50	46	46	45	45	48	50	46	46	45	47	51	55	55	45	48	2.8
3:15		47	47	47	50	46	46	45	46	48	50	47	45	45	45	50	56	56	45	48	3.1
3:30		47	46	46	50	46	47	44	46	48	51	48	46	45	46	52	55	55	44	48	3.0
3:45		47	47	48	51	46	47	45	46	48	50	47	46	45	45	52	55	55	45	48	3.0
4:00		48	48	49	51	45	48	44	46	48	50	47	47	45	44	51	55	55	44	48	3.0
4:15		48	49	50	51	46	48	44	47	48	50	46	48	46	44	52	55	55	44	48	3.0
4:30		47	49	49	51	46	48	45	47	48	50	46	50	46	45	51	55	55	45	49	2.9
4:45		46	48	50	51	46	50	44	46	48	49	47	51	46	45	51		52	44	48	2.6
5:00		45	48	50	52	46	51	45	46	49	50	47	50	45	43	52	55	55	43	49	3.3
5:15		47	48	48	51	46	51	44	46	49	50	47	50	45	44	51	55	55	44	48	3.1
5:30		49	47	49	51	47	51	44	45	48	50	47	50	46	44	51	57	57	44	48	3.2
5:45		49	48	49	51	46	51	45	46	50	50	47	50	47	44	51	55	55	44	49	2.9
6:00		49	49	50	51	47	51	45	46	50	51	47	50	48	45	51	55	55	45	49	2.7
6:15		48	49	49	51	48	52	46	46	51	50	46	50	48	45	52	54	54	45	49	2.6
6:30		49	50	49	51	47	51	45	45	50	51	47	50	48	45	52	54	54	45	49	2.7
6:45		48	50	52	50	46	52	45	45	51	51	47	49	49	45	52	54	54	45	49	3.0
7:00		49	49	52	51	47	53	45	46	51	51	46	49	49	45	53	55	55	45	50	3.0
Max		49	51	52	52	48	53	49	47	51	51	48	51	49	50	54	57	57	47	51	2.5
Min		45	46	44	50	44	44	44	43	48	44	44	44	43	43	50	53	53	43	46	3.2
Ave		47	49	48	51	46	47	46	45	49	49	46	47	45	45	52	55	55	45	48	2.7
SD		1.1	1.2	2.1	0.5	1.0	2.8	1.6	1.1	0.9	1.8	1.0	2.1	1.6	1.4	0.8	0.8	2.8	0.5	1.3	0.6
90%		46	47	45	50	45	44	44	44	48	46	45	45	43	44	51	54	54	43	47	3.1
																			Median	45	

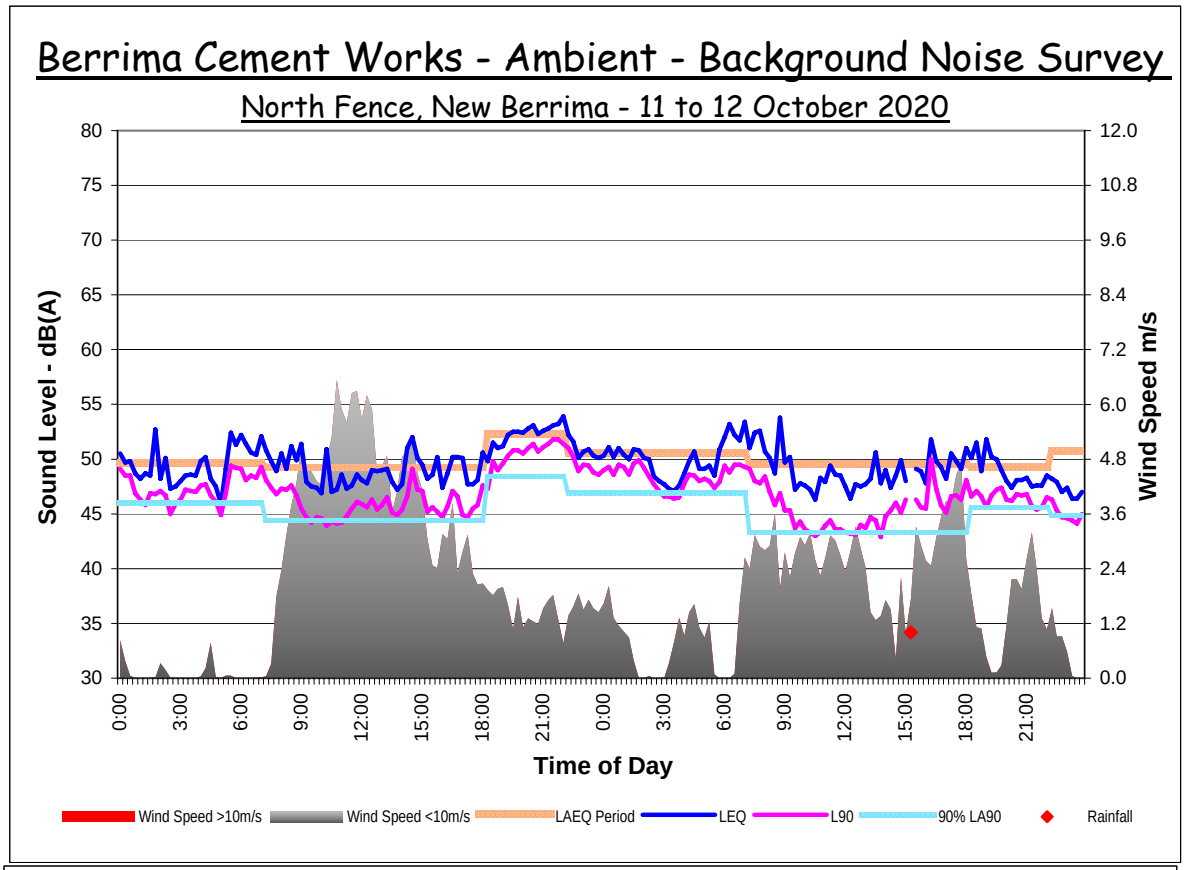
Berrima North Fence Oct20 A criteria ver3: LA90

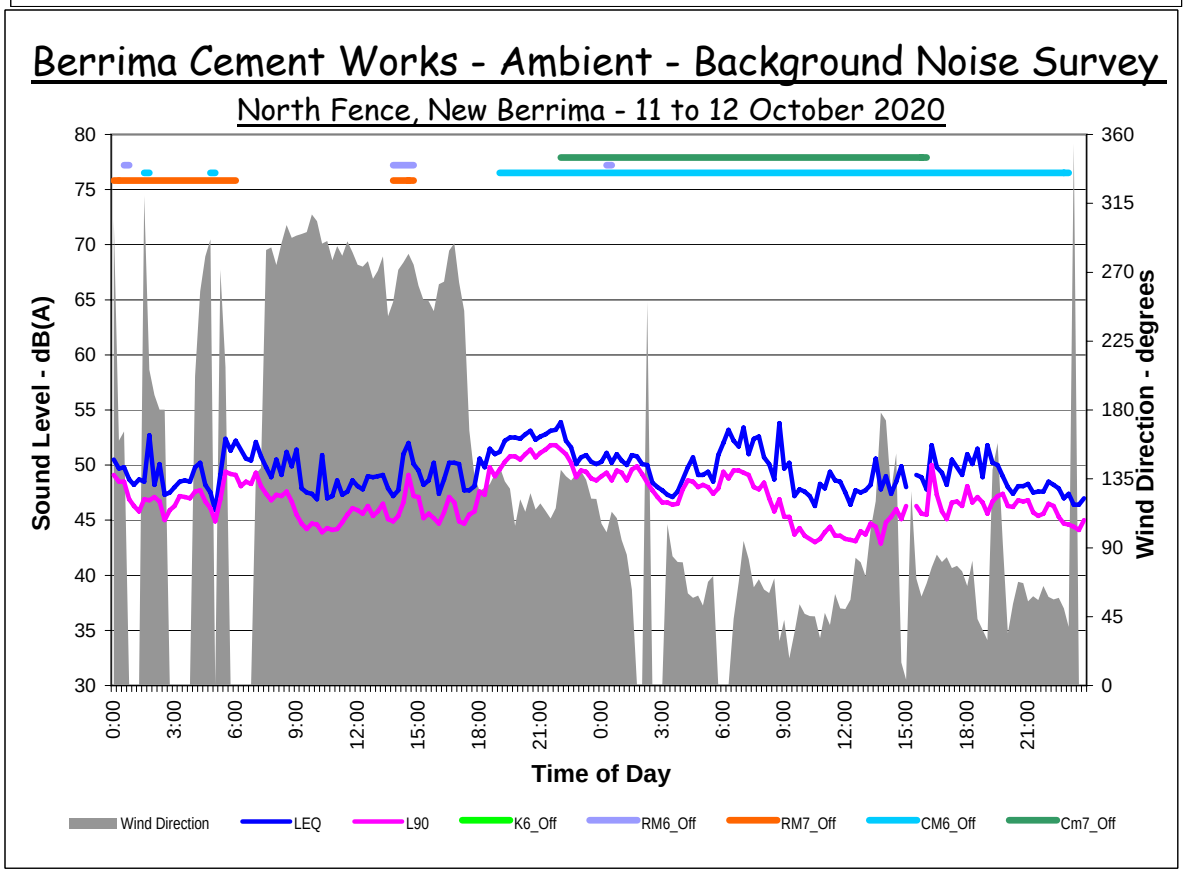
Two Day Results of Ambient Noise Monitoring

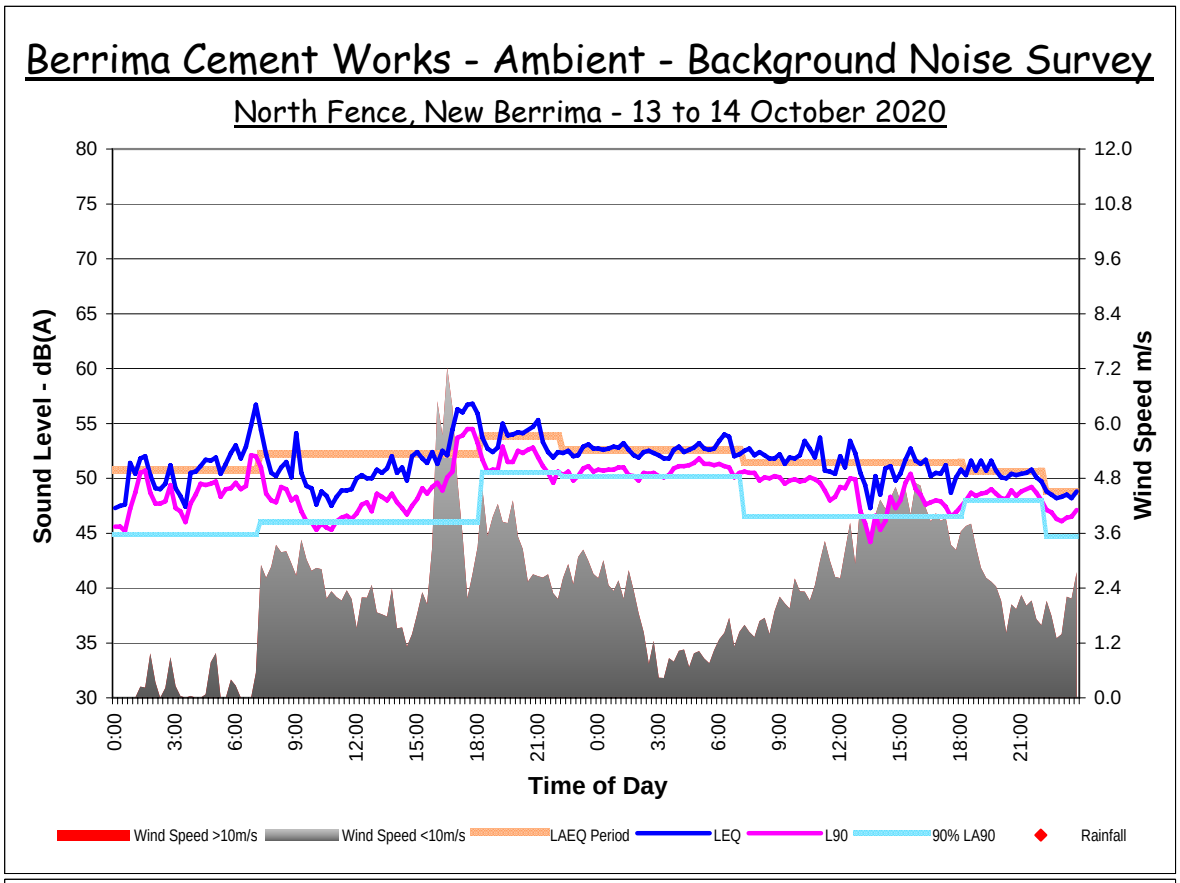


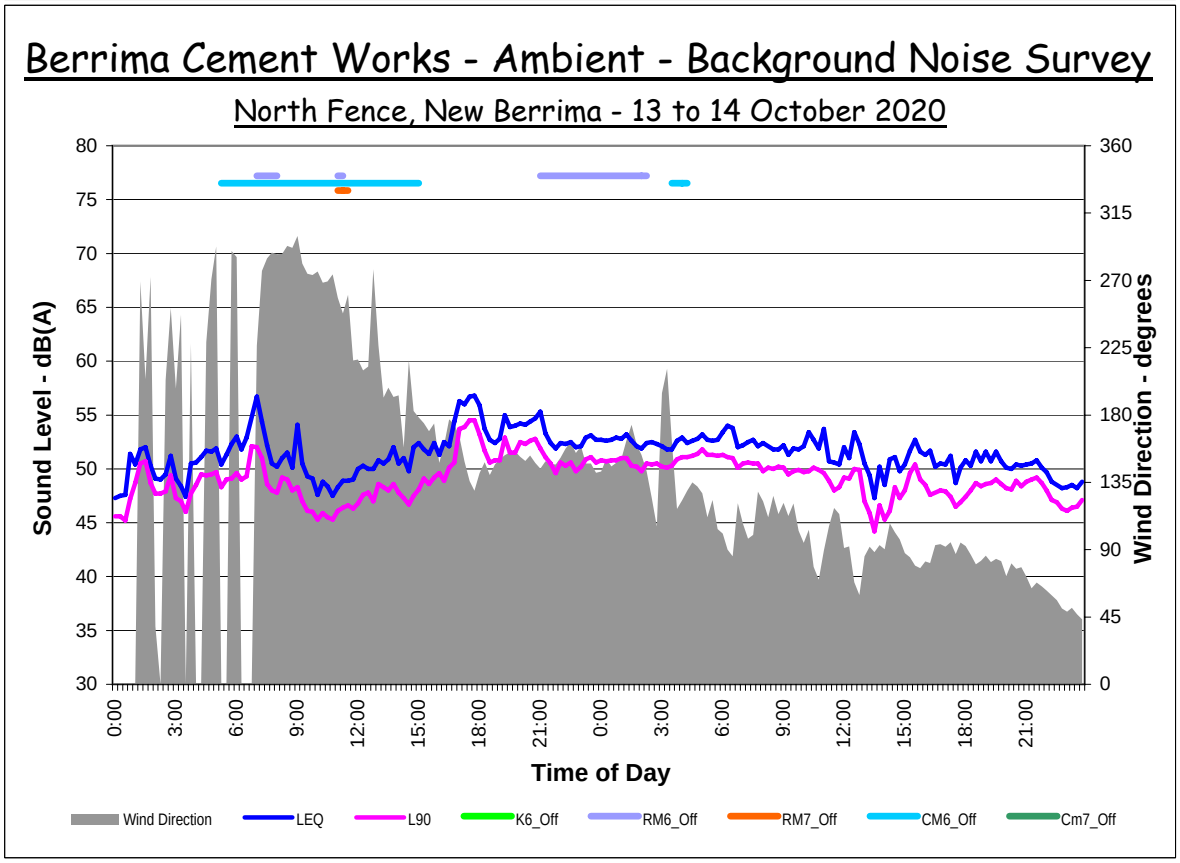


Two Day Results of Ambient Noise Monitoring

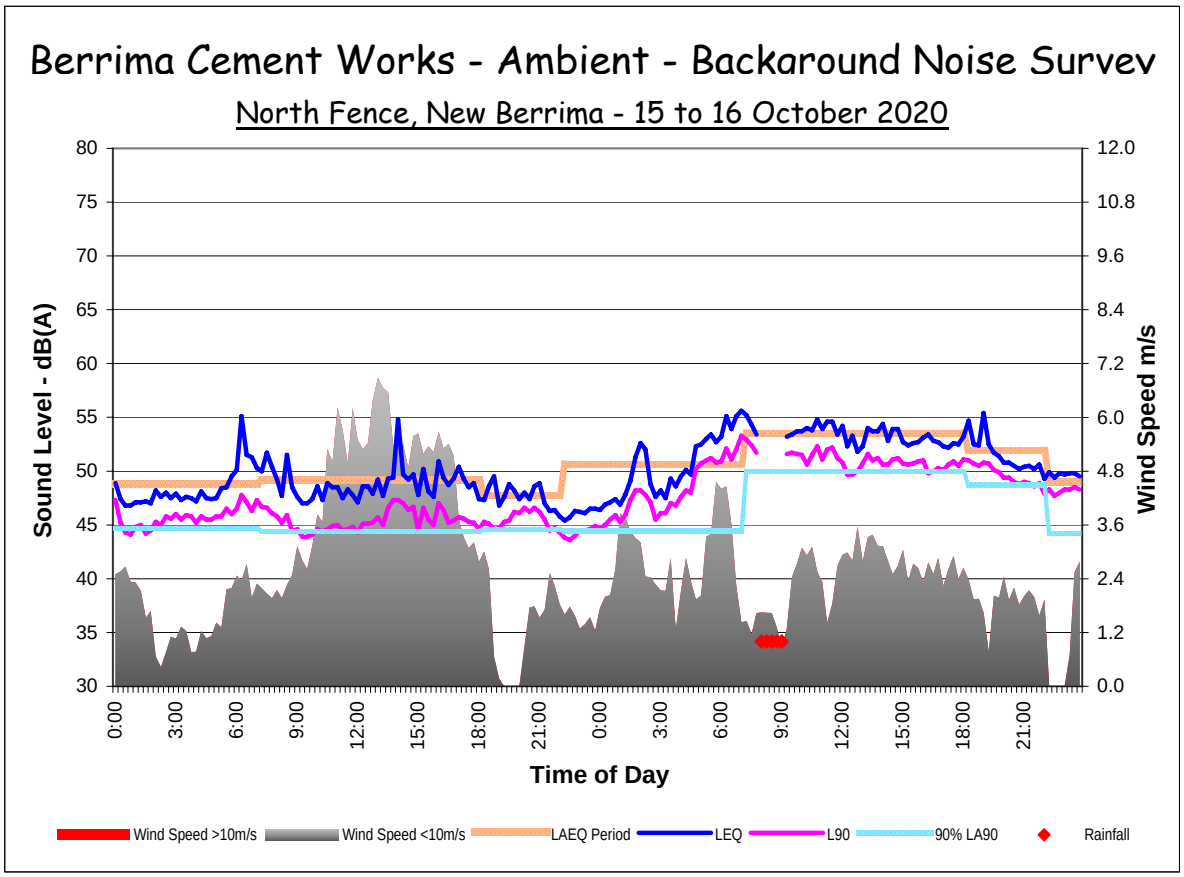


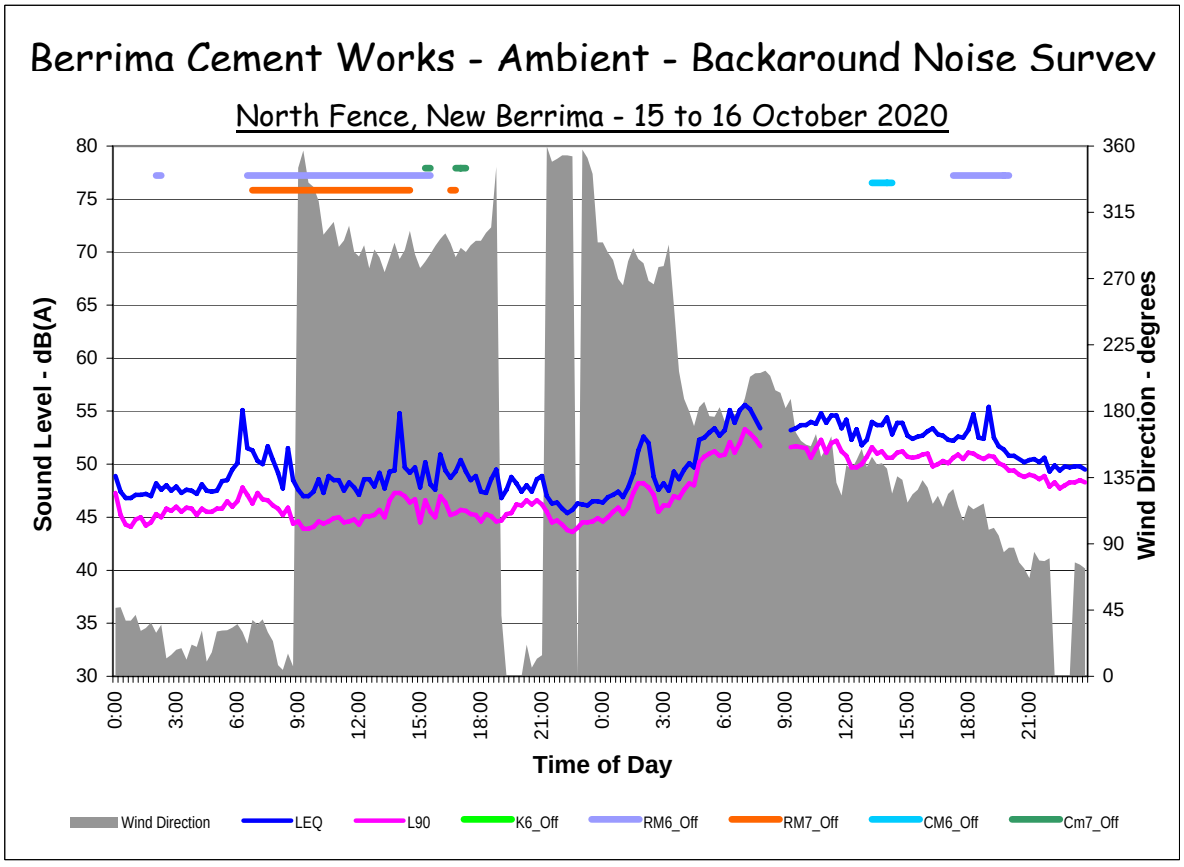



Berrima Cement Works - Ambient - Background Noise Survey
North Fence, New Berrima - 13 to 14 October 2020
Sound Level - dB(A)
Wind Speed m/s
Time of Day
Wind Speed >10m/s
Wind Speed <10m/s
LAEQ Period
LEQ
L90
90% LA90
Rainfall

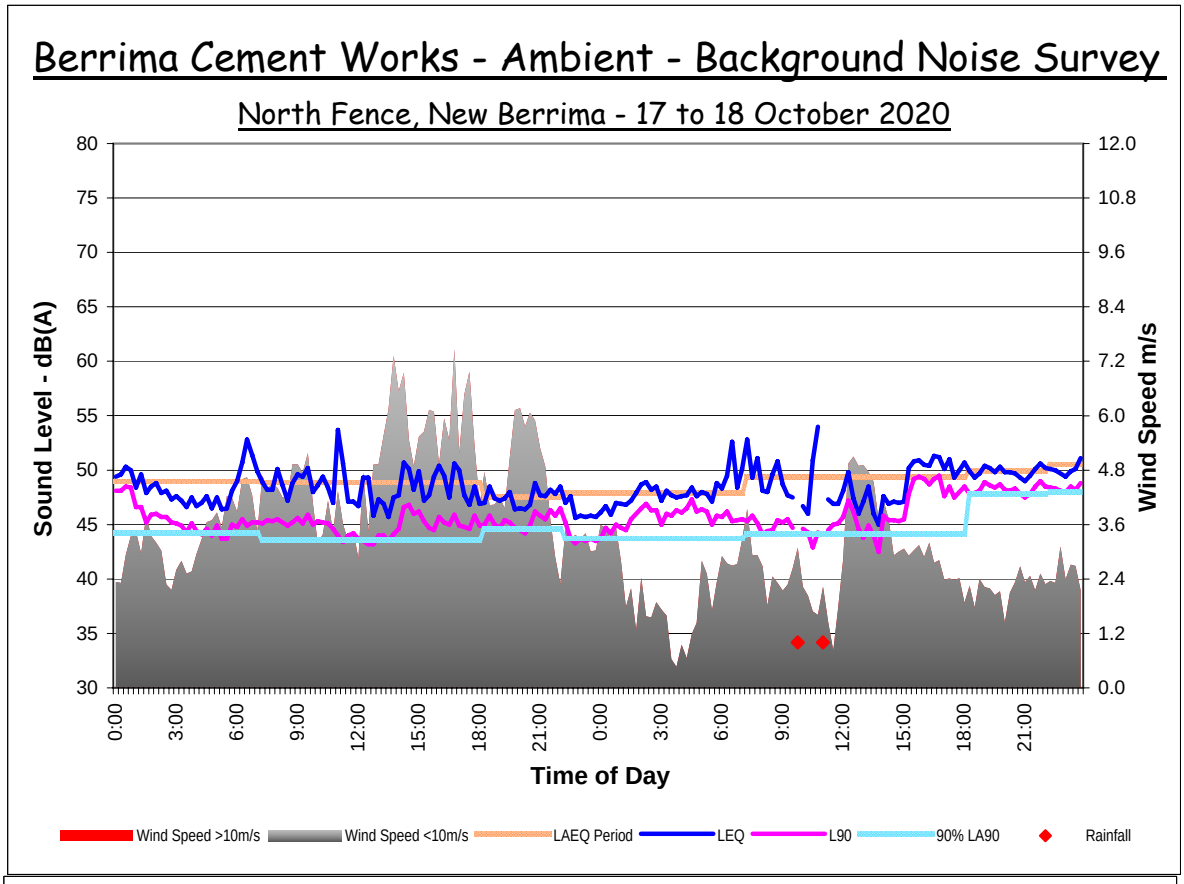

Berrima Cement Works - Ambient - Background Noise Survey
North Fence, New Berrima - 13 to 14 October 2020
Sound Level - dB(A)
Wind Direction - degrees
Time of Day
Wind Direction
LEQ
L90
K6_Off
RM6_Off
RM7_Off
CM6_Off
Cm7_Off

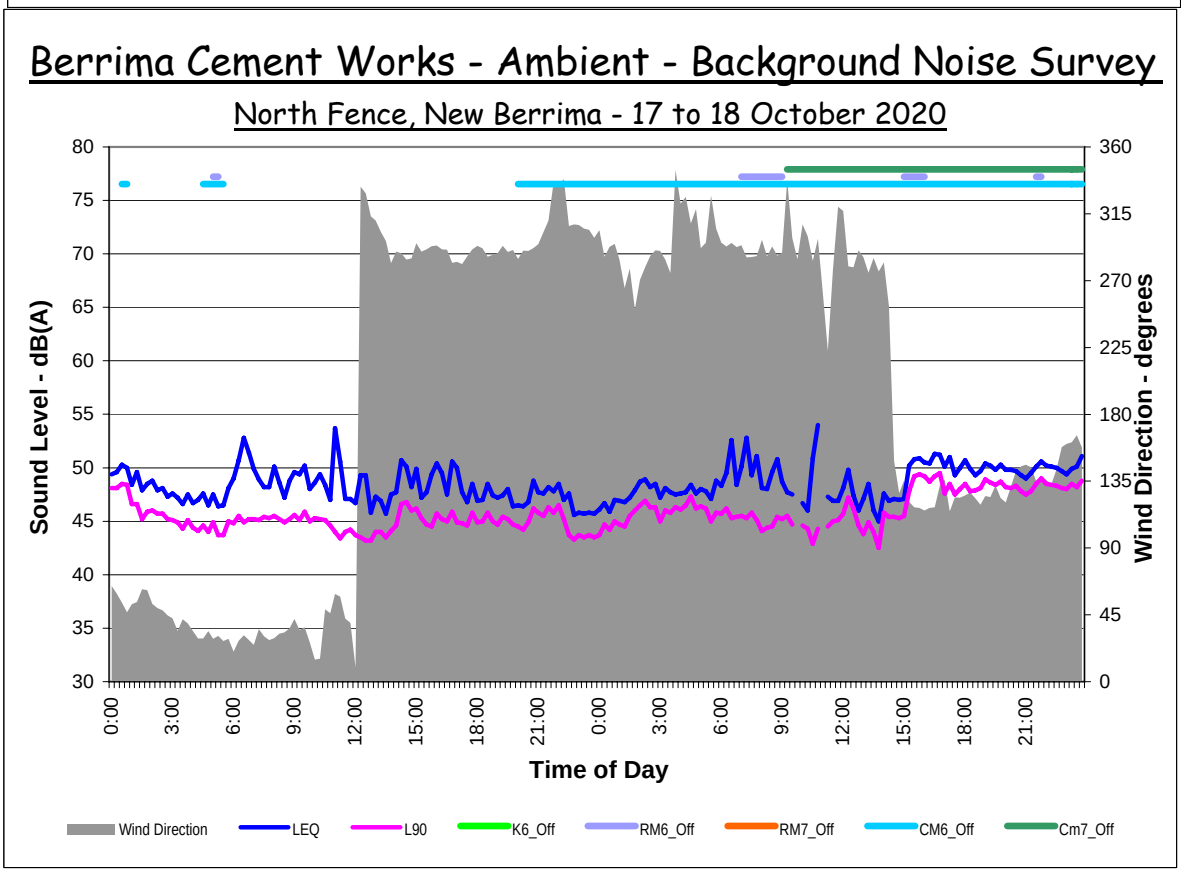
Two Day Results of Ambient Noise Monitoring

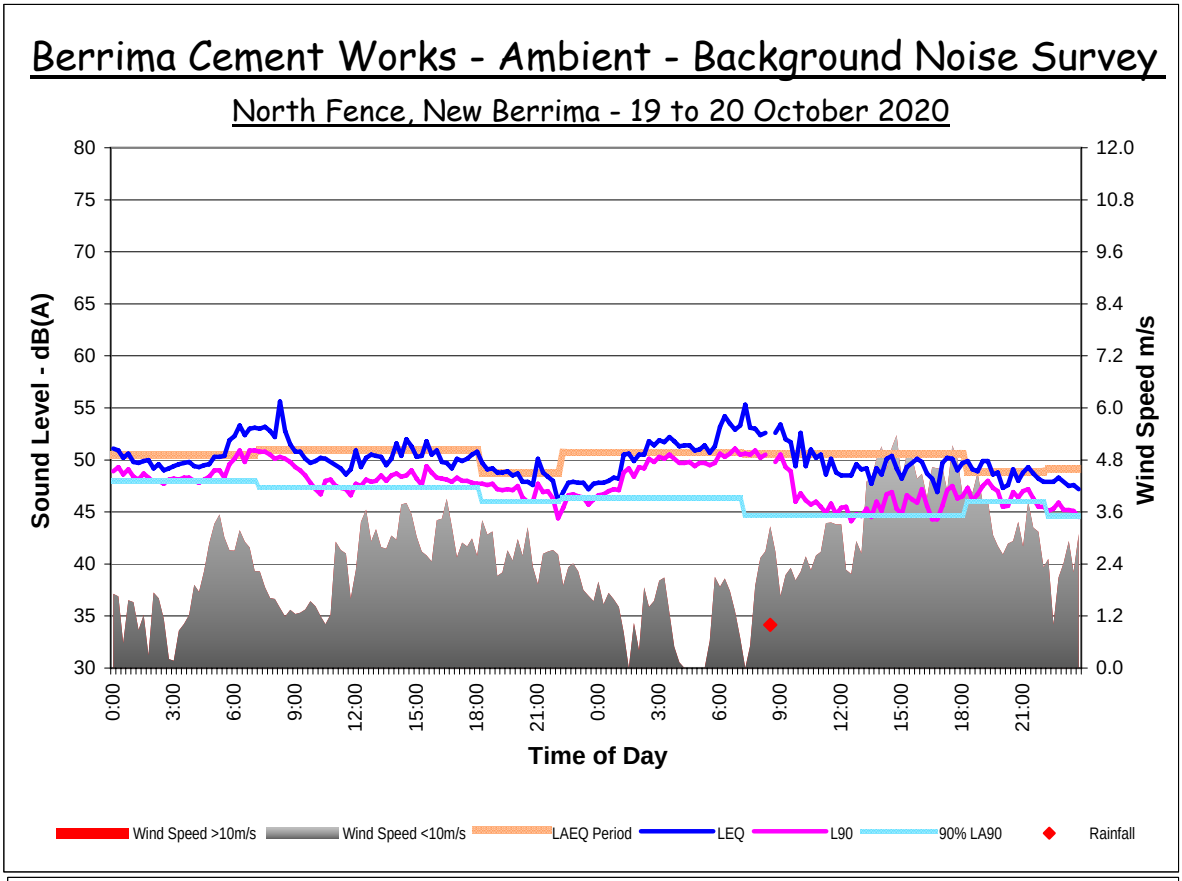


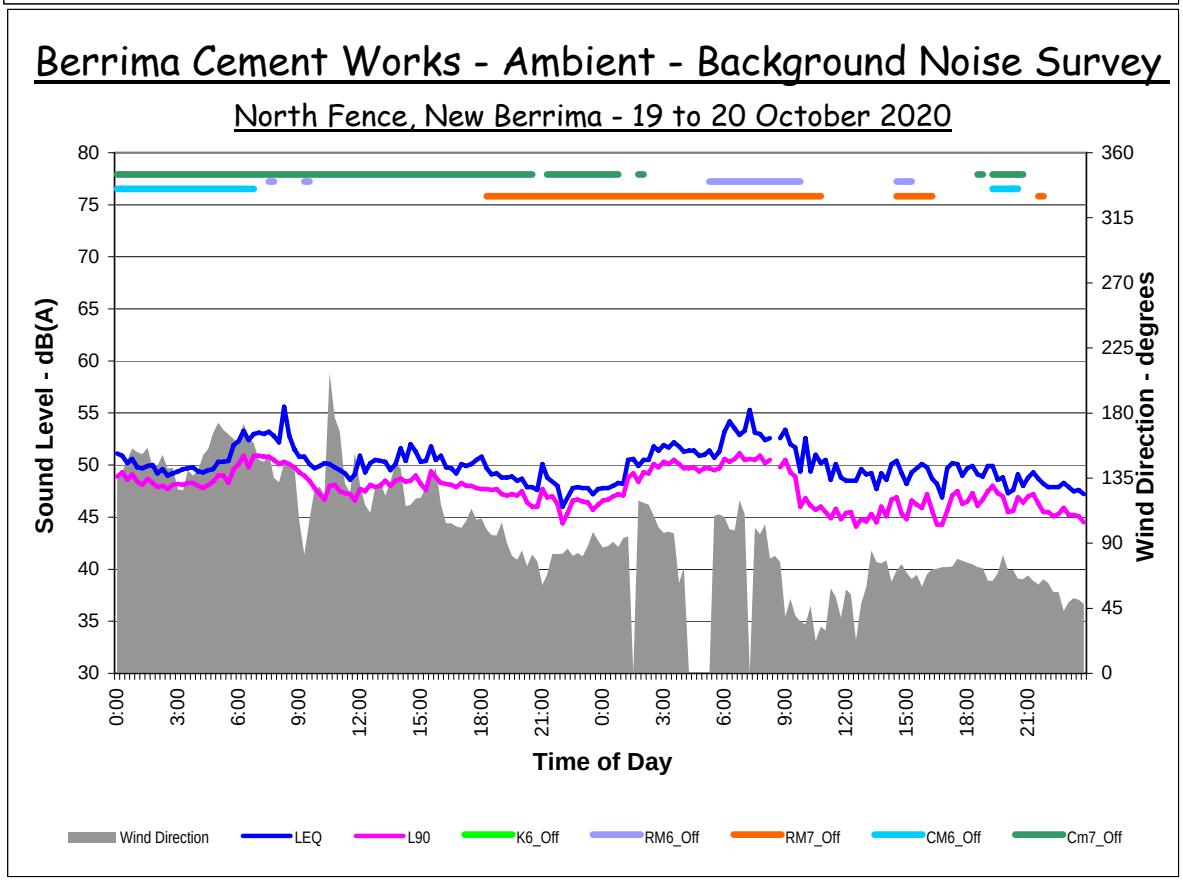


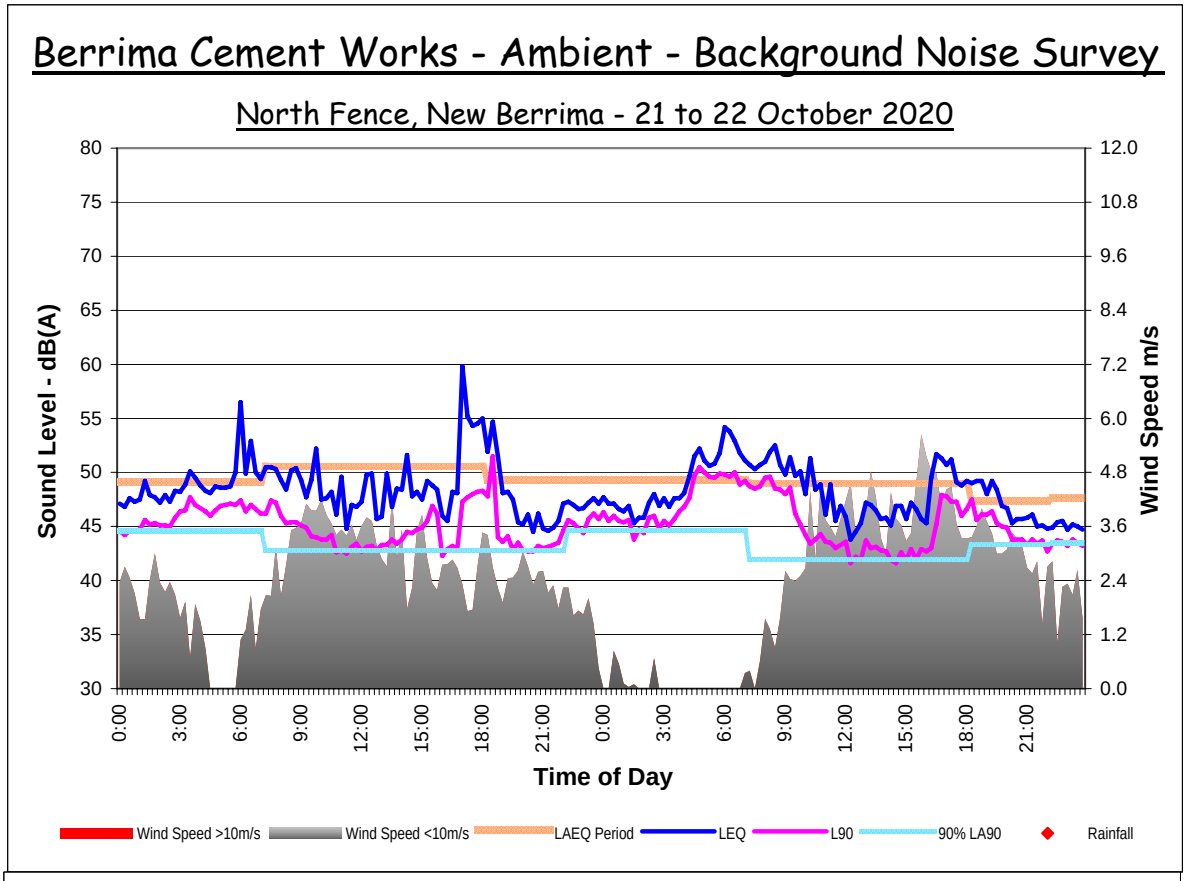
Two Day Results of Ambient Noise Monitoring

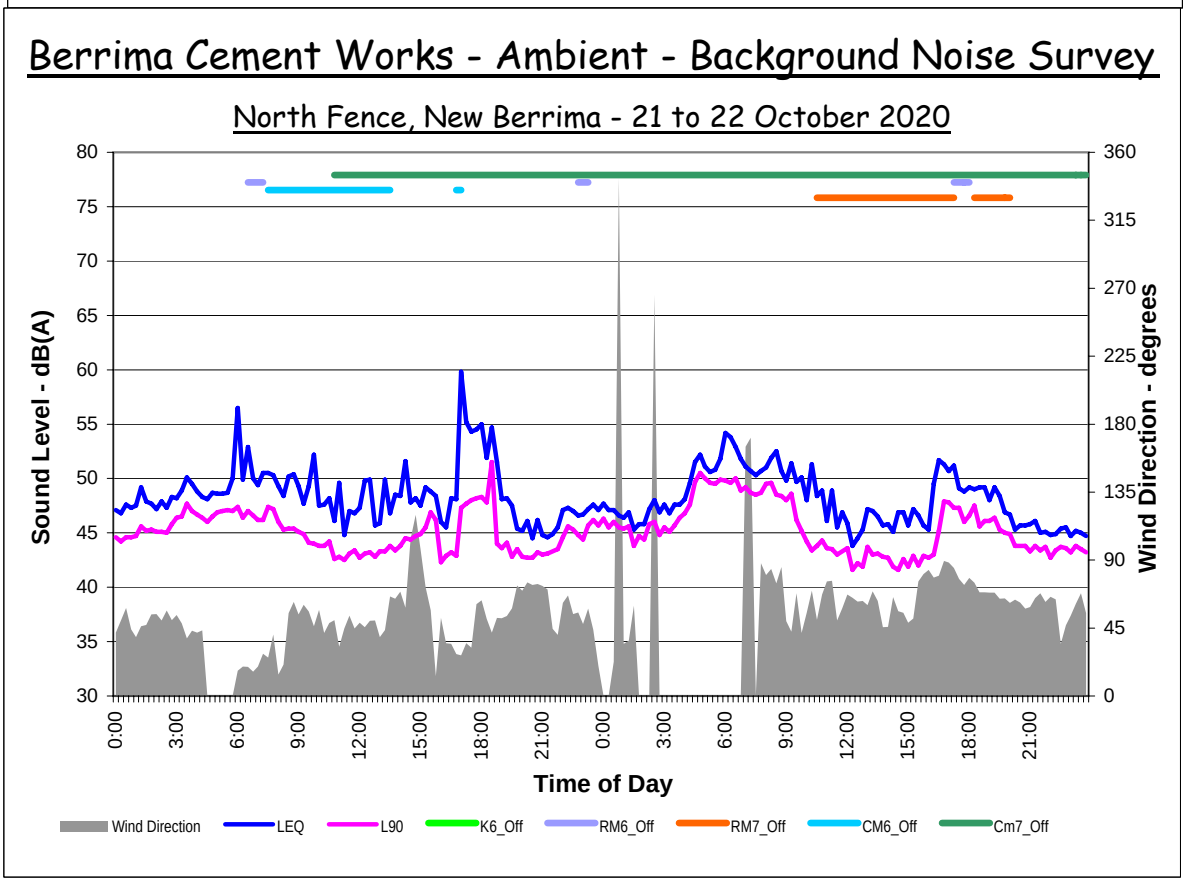


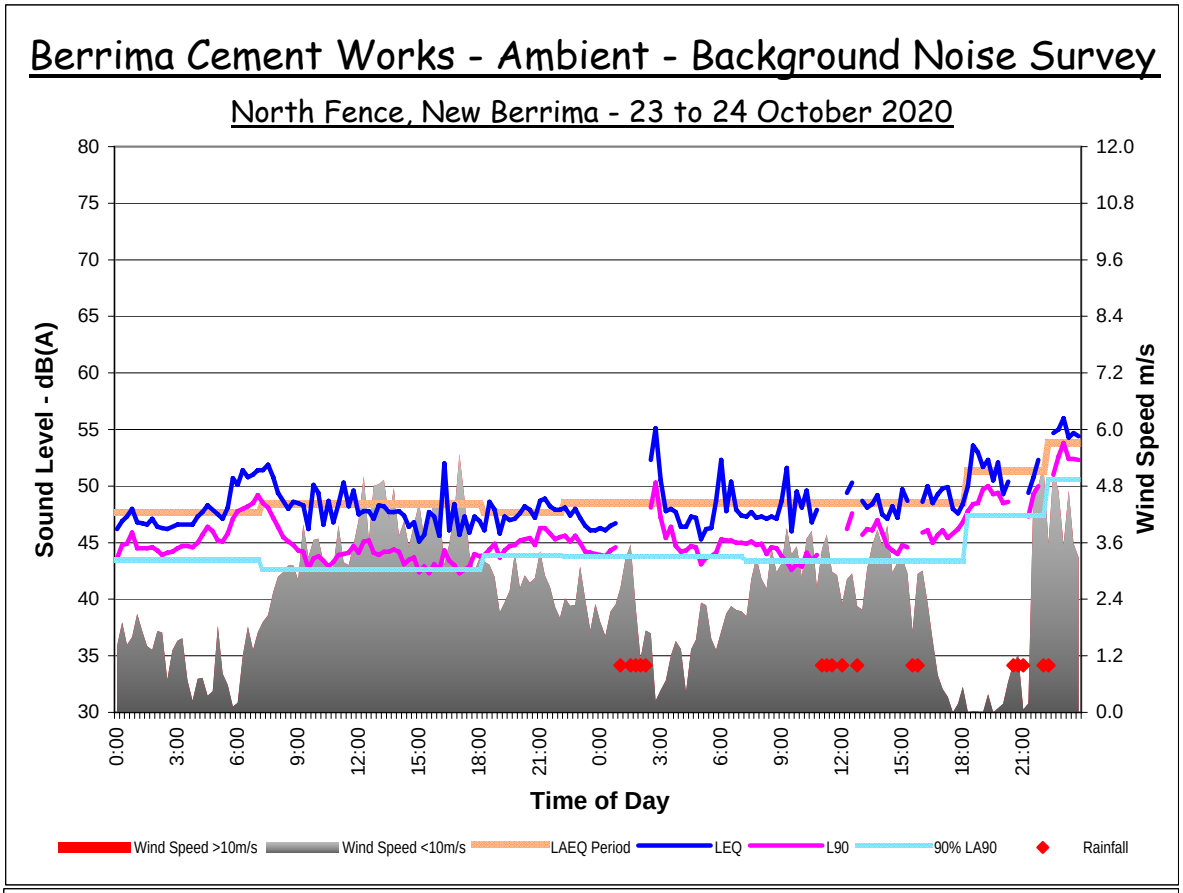


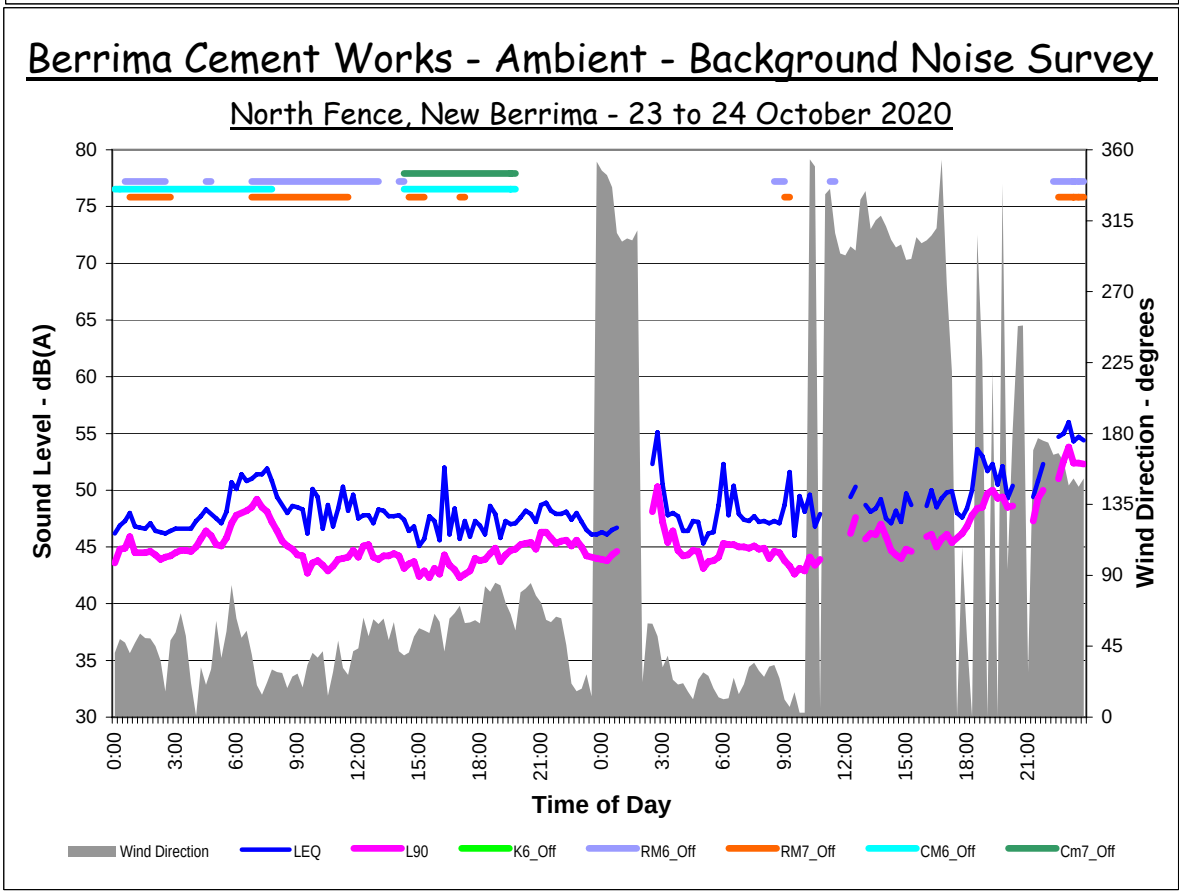

Berrima Cement Works - Ambient - Background Noise Survey
North Fence, New Berrima - 19 to 20 October 2020
Sound Level - dB(A)
Wind Speed m/s
Time of Day
Wind Speed >10m/s
Wind Speed <10m/s
LAEQ Period
LEQ
L90
90% LA90
Rainfall

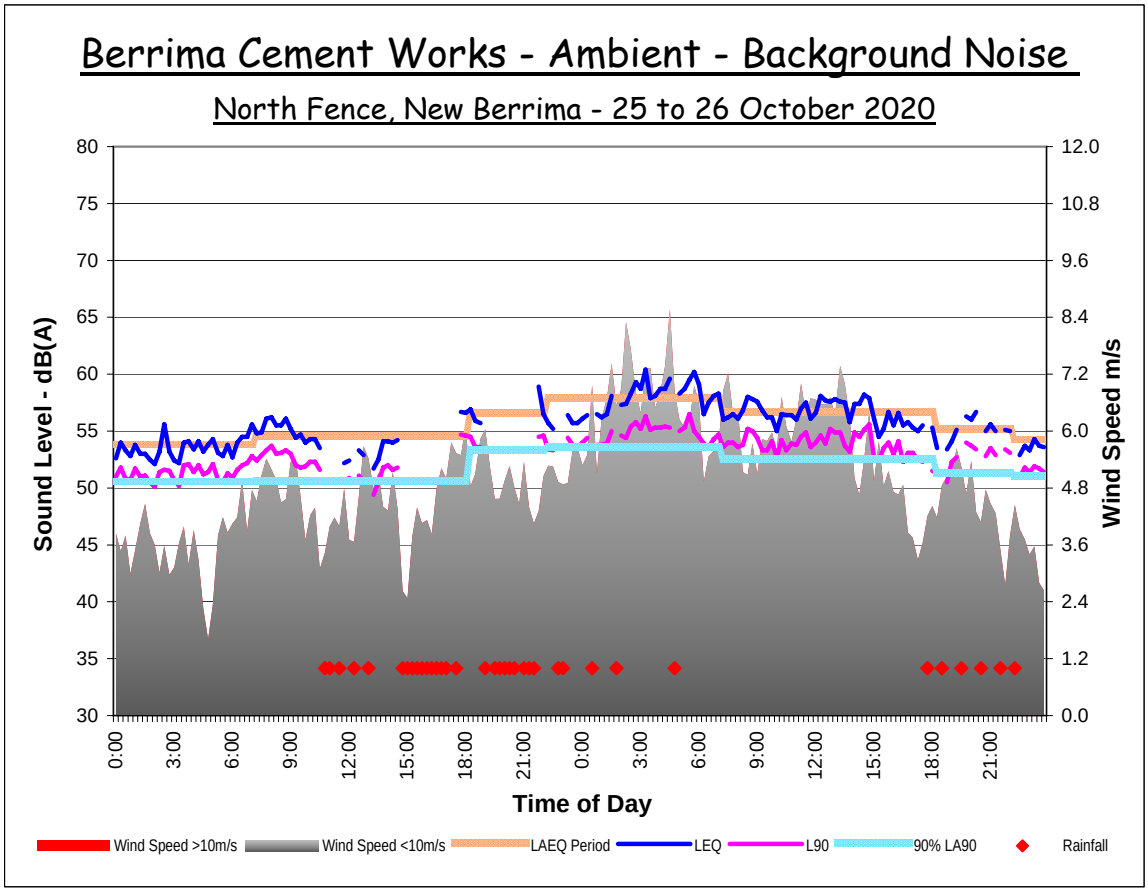

Berrima Cement Works - Ambient - Background Noise Survey
North Fence, New Berrima - 19 to 20 October 2020
Sound Level - dB(A)
Wind Direction - degrees
Time of Day
Wind Direction
LEQ
L90
K6_Off
RM6_Off
RM7_Off
CM6_Off
Cm7_Off

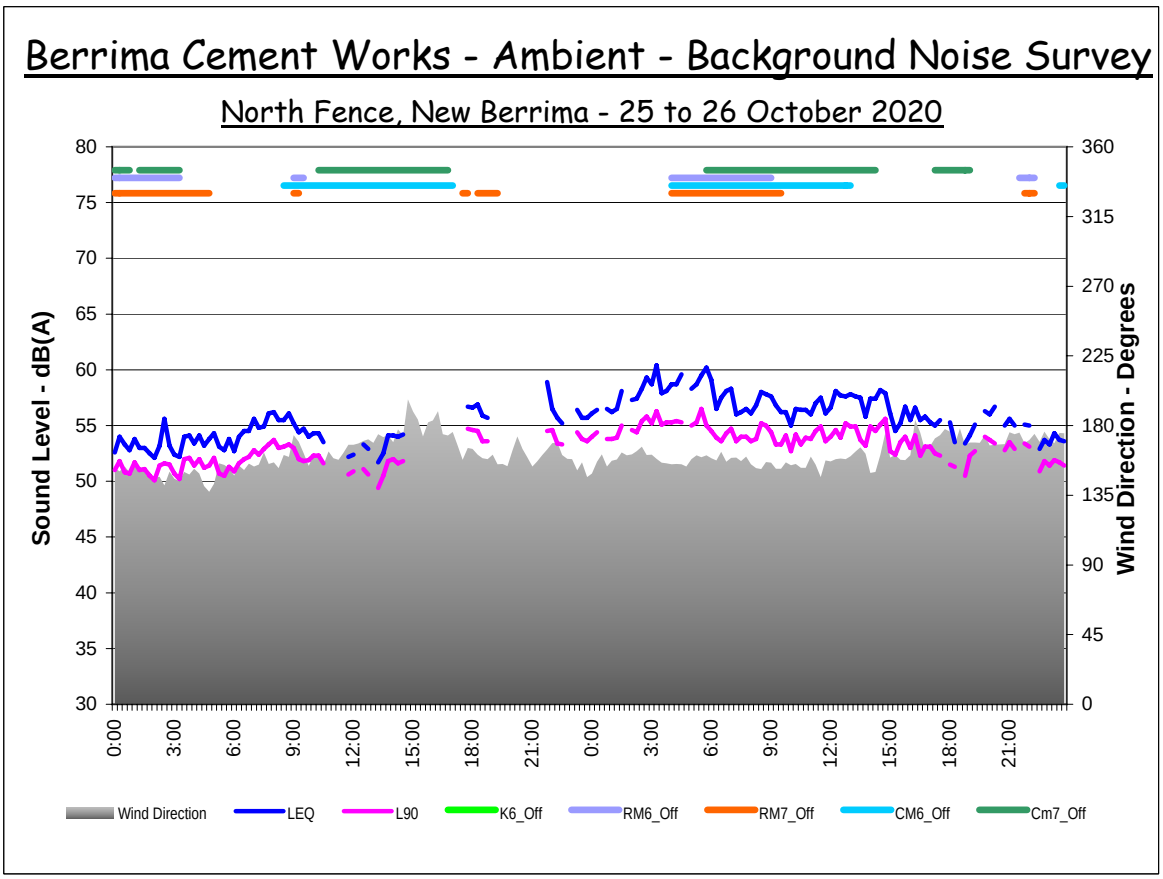

Berrima Cement Works - Ambient - Background Noise Survey
North Fence, New Berrima - 21 to 22 October 2020
Sound Level - dB(A)
Wind Speed m/s
Time of Day
Wind Speed >10m/s
Wind Speed <10m/s
LAEQ Period
LEQ
L90
90% LA90
Rainfall

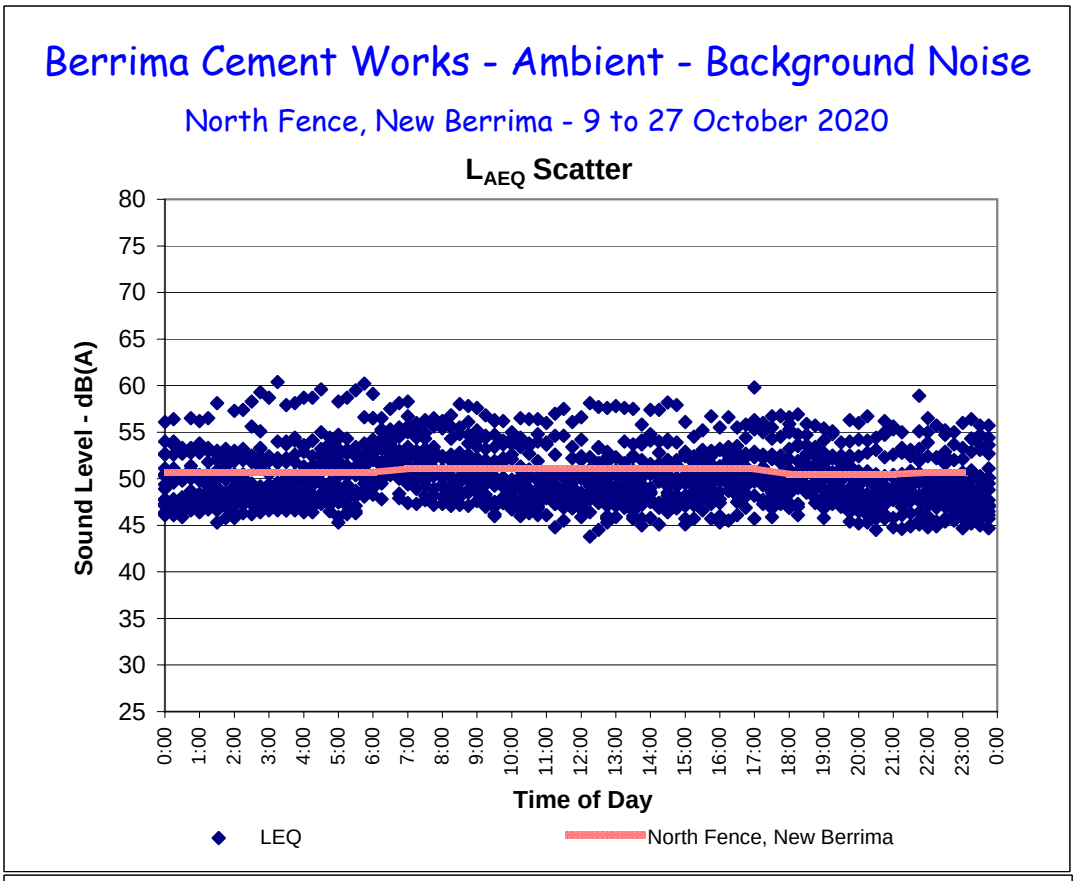

Berrima Cement Works - Ambient - Background Noise Survey
North Fence, New Berrima - 21 to 22 October 2020
Sound Level - dB(A)
Wind Direction - degrees
Time of Day
Wind Direction
LEQ
L90
K6_Off
RM6_Off
RM7_Off
CM6_Off
Cm7_Off

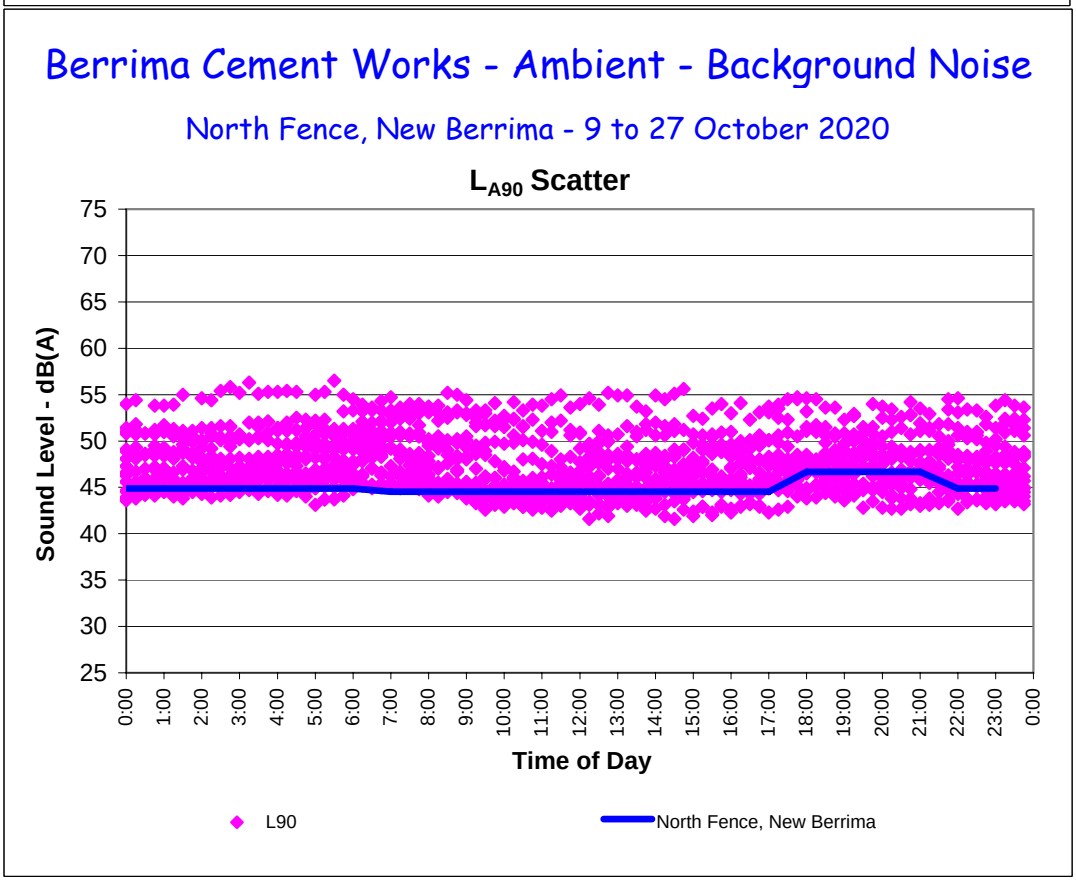

Berrima Cement Works - Ambient - Background Noise Survey
North Fence, New Berrima - 23 to 24 October 2020
Sound Level - dB(A)
Wind Speed m/s
Time of Day
Wind Speed >10m/s
Wind Speed <10m/s
LAEQ Period
LEQ
L90
90% LA90
Rainfall

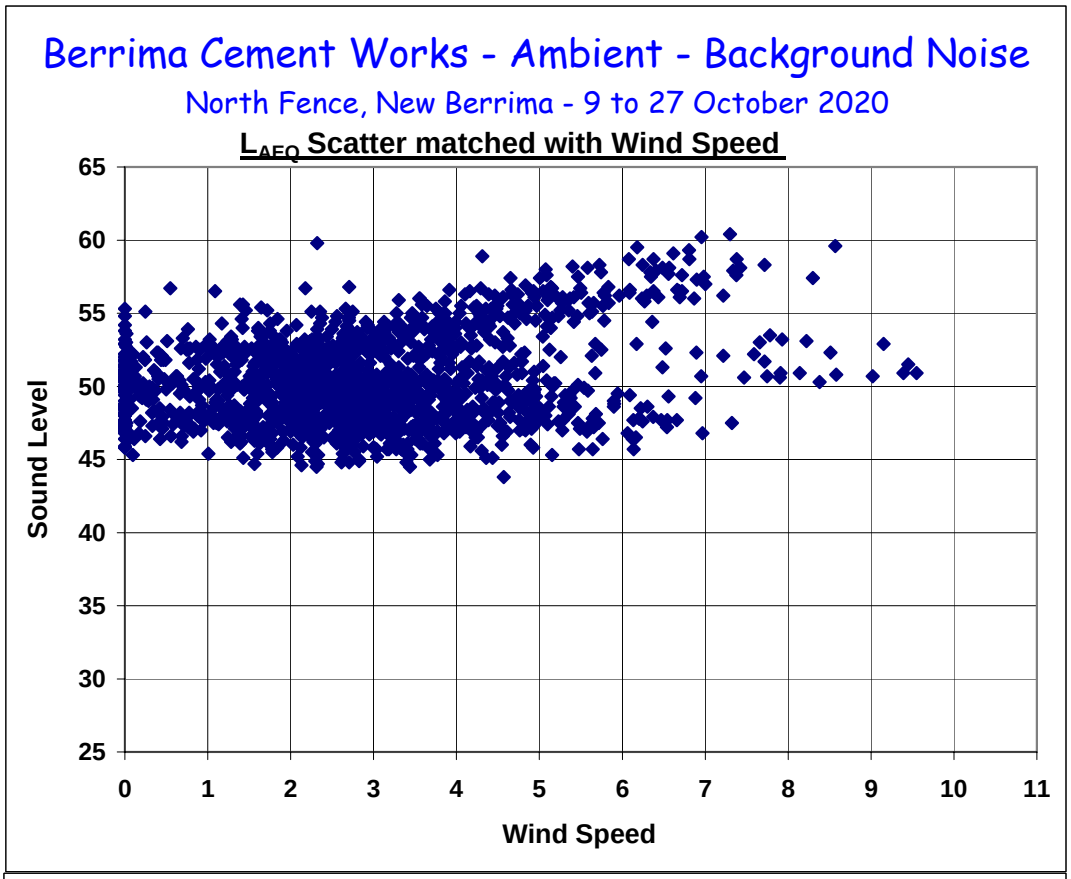

Berrima Cement Works - Ambient - Background Noise Survey
North Fence, New Berrima - 23 to 24 October 2020
Sound Level - dB(A)
Wind Direction - degrees
Time of Day
Wind Direction
LEQ
L90
K6_Off
RM6_Off
RM7_Off
CM6_Off
Cm7_Off

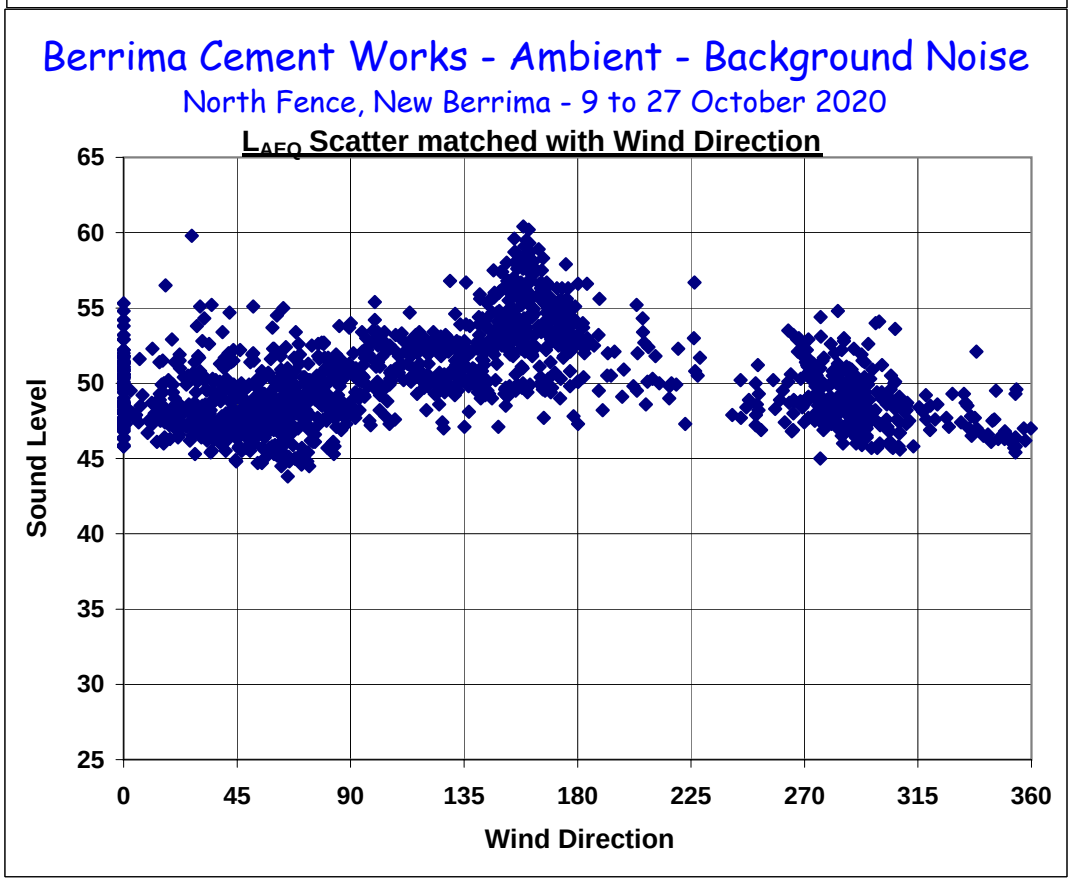

Berrima Cement Works - Ambient - Background Noise
North Fence, New Berrima - 25 to 26 October 2020
Sound Level - dB(A)
Wind Speed m/s
Time of Day
Wind Speed >10m/s
Wind Speed <10m/s
LAEQ Period
LEQ
L90
90% LA90
Rainfall

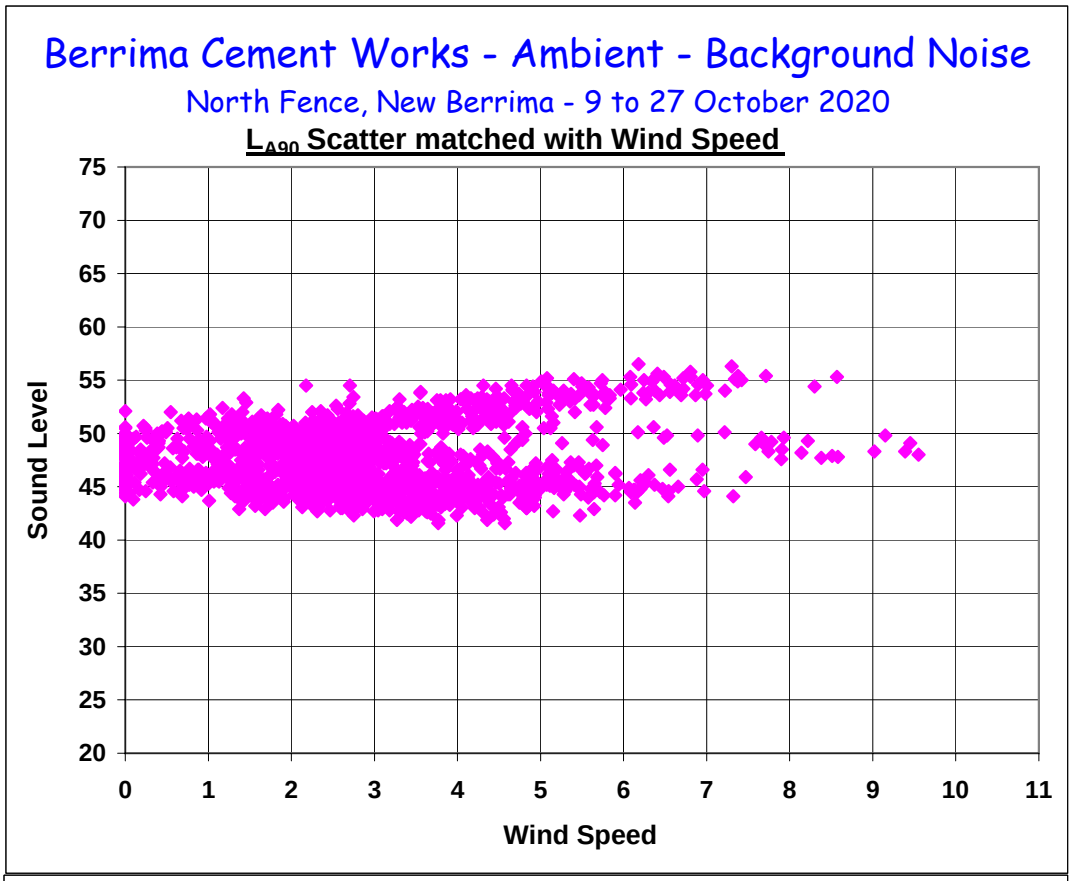

Berrima Cement Works - Ambient - Background Noise Survey
North Fence, New Berrima - 25 to 26 October 2020
Sound Level - dB(A)
Wind Direction - Degrees
Wind Direction
LEQ
L90
K6_Off
RM6_Off
RM7_Off
CM6_Off
Cm7_Off

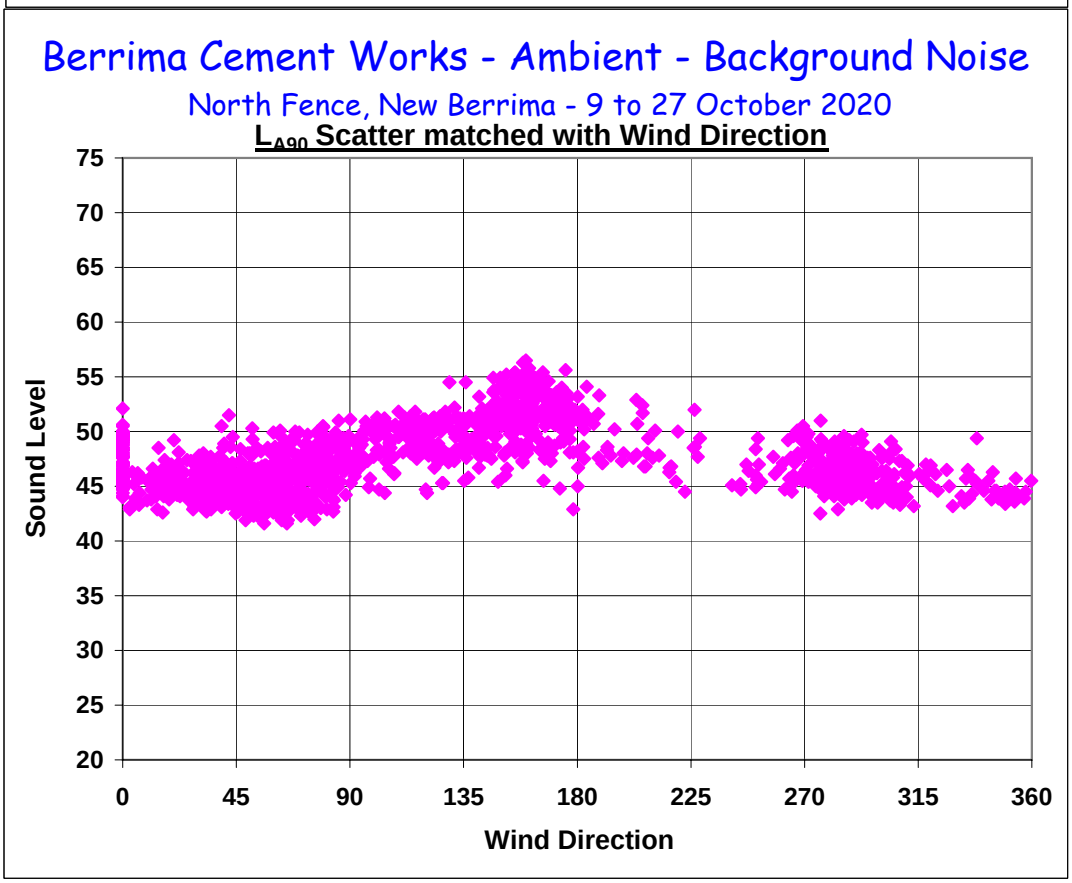

Berrima Cement Works - Ambient - Background Noise
North Fence, New Berrima - 9 to 27 October 2020
LAEQ Scatter
Sound Level - dB(A)
80
75
70
65
60
55
50
45
40
35
30
25
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00
Time of Day
LEQ
North Fence, New Berrima


Berrima Cement Works - Ambient - Background Noise
North Fence, New Berrima - 9 to 27 October 2020
LA90 Scatter
Sound Level - dB(A)
75
70
65
60
55
50
45
40
35
30
25
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00
Time of Day
L90
North Fence, New Berrima


Berrima Cement Works - Ambient - Background Noise
North Fence, New Berrima - 9 to 27 October 2020
LAEQ Scatter matched with Wind Speed
Sound Level
65
60
55
50
45
40
35
30
25
0
1
2
3
4
5
6
7
8
9
10
11
Wind Speed


Berrima Cement Works - Ambient - Background Noise
North Fence, New Berrima - 9 to 27 October 2020
LAEQ Scatter matched with Wind Direction
Sound Level
65
60
55
50
45
40
35
30
25
0
45
90
135
180
225
270
315
360
Wind Direction


Berrima Cement Works - Ambient - Background Noise
North Fence, New Berrima - 9 to 27 October 2020
L_{A90} Scatter matched with Wind Speed
Sound Level
75
70
65
60
55
50
45
40
35
30
25
20
0
1
2
3
4
5
6
7
8
9
10
11
Wind Speed


Berrima Cement Works - Ambient - Background Noise
North Fence, New Berrima - 9 to 27 October 2020
L_{A90} Scatter matched with Wind Direction
Sound Level
75
70
65
60
55
50
45
40
35
30
25
20
0
45
90
135
180
225
270
315
360
Wind Direction

ABN: 25 153 946 064
ACN: 153 946 064

Appendix D: Unattended environmental sound level results for Location 20

Location 20, New Berrima

Daytime LAEQ **9 to 27 October 2020**

Time	9/10	10/10	11/10	12/10	13/10	14/10	15/10	16/10	17/10	18/10	19/10	20/10	21/10	22/10	23/10	24/10	25/10	26/10	27/10	Maximum	Minimum	Average	SD
7:00		53	56	63	61		60	59	55	53	62	59	59	57	59	56	59	60	60	63	53	58	2.9
7:15		53	55	60	59		59	59	54	53	58	61	55	57	60	56	58	61	60	61	53	58	2.6
7:30		54	54	58	58		60	59	54	54	59	61	55	57	59	56	59	60	61	61	54	58	2.6
7:45		56	53	61	59		56	59	54	53	60	59	55	59	61	55	59	60	60	61	53	58	2.8
8:00		56	54	60	58		55		54	54	58	57	56	58	57	55	59	60	61	61	54	57	2.2
8:15		55	55	61	56		55		55	54	59	59	59	61	56	55	59	59	59	61	54	57	2.5
8:30		63	56	57	55		55		54	54	58		59	59	54	54	59	59	60	63	54	57	2.7
8:45		54	54	57	55		55		54	54	57	58	59	61	58	54	60	59	59	61	54	57	2.5
9:00		55	54	53	54		56		54	54	57	58	56	59	59	53	59	59	59	59	53	56	2.3
9:15		54	54	54	58		54	57	54	54	56	57	59	60	57	53	59	61	59	61	53	57	2.6
9:30		55	54	56	60		57	58	54	52	55	60	60	56	59	53	58	59	62	62	52	57	2.9
9:45		55	54	53	56		55	60	54		54	57	56	62	59	55	58	61	59	62	53	57	2.7
10:00		55	54	55	54		56	60	55	51	56	60	57	63	56	54	59	59	61	63	51	57	3.1
10:15		54	54	56	55		55	60	58	51	56	59	57	59	55	56	58	59	61	61	51	57	2.5
10:30		55	53	55	56		57	60	54	51	58	57	59	58	56	57	57	61	61	61	51	57	2.7
10:45		56	53	55	56		58	60	53	55	57	57	55	58	55	54		60	61	61	53	57	2.3
11:00		54	54	52	58		59	58	54		60	57	53	57	58			61	60	61	52	57	2.9
11:15		54	54	63	55		58	61	54	51	58	56	55	61	56		56	61	59	63	51	57	3.3
11:30		54	54	57	56		53	61	54	53	56	58	57	55	61			60	59	61	53	57	3.0
11:45		55	54	56	56		54	62	54	51	56	57	58	59	56	54	56	59	60	62	51	56	2.6
12:00		55	54	58			53	60	54	54	55	57	55	53	58		56	60	59	60	53	56	2.4
12:15		54	54	58			54	58	54	54	55	57	59	53	58	55		60	58	60	53	56	2.4
12:30		56	54	59			54	58	53	52	58	56	58	56	57	54	56	59	58	59	52	56	2.1
12:45		54	54	55			54	57	54	52	59	57	54	57	58		56	61	59	61	52	56	2.5
13:00		54	55	56			57	57	54	52	59	57	55	59	56	55		60	58	60	52	56	2.2
13:15		54	54	54			55	59	52	52	57	56	53	59	55	54	55	62	57	62	52	56	2.7
13:30		54	54	58			58	60	52	53	54	57	58	56	59	54	57	61	59	61	52	56	2.6
13:45		54	54	59			58	58	53	52	55	60	58	58	60	54	57	60	59	60	52	57	2.7
14:00		55	54	55			57	57	53	52	55	60	58	56	56	54	57	62	60	62	52	56	2.7
14:15		55	56	52		55	57	60	53	52	54	60	58	53	57	54	57	60	58	60	52	56	2.6
14:30		54	56	59		56	57	59	53	53	58	57	56	58	54	54	56	61	58	61	53	56	2.2
14:45		56	55	54		57	60	58	53	51	55	56	58	54	56	54		60	57	60	51	56	2.4
15:00		55	55	53		57	55	57	53	51	55	57	54	52	51	54		61	57	61	51	55	2.6
15:15		55	54			57	61	56	52	52	53	54	53	51	53	54		59	58	61	51	55	2.9
15:30		55	54	54		62	57	57	52	53	59	55	54	53	51			59	58	62	51	56	3.0
15:45		55	54	53		58	53	57	54	53	54	54	53	52	53			60	59	60	52	55	2.5
16:00		56	54	55		55	55	57	52	53	55	56	53	50	56	54		60	59	60	50	55	2.3
16:15		55	55	56		56	57	56	53	54	57	55	51	52	53	54		60	60	60	51	55	2.5
16:30		55	55	54		55	59	58	52	53	54	54	52	54	54	54		59	59	59	52	55	2.3
16:45		56	55	55		55	59	56	53	53	54	54	51	52	52	56		60	56	60	51	55	2.4
17:00	56	56	56	53		55	60	56	53	52	53	57	53	56	55	54		60	59	60	52	56	2.4
17:15	56	55	53	55		55	58	56	53	53	53	55	52	52	53	54	59	59		59	52	55	2.2
17:30	54	55	55	54		54	55	57	52	53	53	55	52	51	50	54		59		59	50	54	2.2
17:45	54	55	53	54		56	56	56	53	53	55	55	52	51	52	53	60			60	51	54	2.1
18:00	55	54	54	54		55	55	56	52	54	52	55	52	52	50	53	60	59		60	50	54	2.5
Max	56	63	56	63	61	62	61	62	58	55	62	61	60	63	61	57	60	62	62	63	55	60	2.6
Min	54	53	53	52	54	54	53	56	52	51	52	54	51	50	50	53	55	59	56	59	50	53	2.2
Ave	55	55	54	56	57	56	56	58	54	53	56	57	56	56	56	54	58	60	59	60	53	56	1.8
SD	1.0	1.4	0.7	2.8	1.9	1.9	2.1	1.6	1.0	1.1	2.3	1.9	2.7	3.4	2.9	0.9	1.5	0.9	1.3	3.4	0.7	1.8	0.8
E Ave	55	55	54	57	57	57	57	58	54	53	57	58	56	57	57	54	58	60	59	60	53	57	1.9

Evening LAEQ

Time	9/10	10/10	11/10	12/10	13/10	14/10	15/10	16/10	17/10	18/10	19/10	20/10	21/10	22/10	23/10	24/10	25/10	26/10	27/10	Maximum	Minimum	Average	SD
18:00	55	54	54	54		55	55	56	52	54	52	55	52	52	50	53	60	59		60	50	54	2.5
18:15	54	55	54	54		55	53	58	52	53	52	55	52	53	50	53	60	57		60	50	54	2.5
18:30	54	55	55	56		55	52	57	54	53	52	55	52	52	52	54	60			60	52	54	2.1
18:45	54	55	55	54		56	52	56	53	53	52	54	52	53	52	55	59	56		59	52	54	1.9
19:00	54	54	55	53		55	53	56	55	54	52	55	52	52	51	54		58		58	51	54	1.8
19:15	54	54	56	55		55	56	56	53	53	52	55	52	52	51	55	58	59		59	51	54	2.2
19:30	54	55	56	56		56	53	56	54	54	52	53	51	52	50	55				56	50	54	1.8
19:45	54	54	56	53		56	54	56	53	58	52	55	51	51	51	55		60		60	51	54	2.4
20:00	56	55	58	53		55	53	55	53	54	52	52	51	52	54	54		59		59	51	54	2.3
20:15	54	54	56	53		55	53	56	53	53	52	55	51	51	56	55		60		60	51	54	2.3
20:30	54	54	57	53		56	53	55	54	53	52	54	51	53	53					57	51	54	1.5
20:45	54	54	56	54		56	57	55	53	52	54	53	51	50	53		59	59		59	50	54	2.4
21:00	54	55	56	54		55	57	55	53	52	55	54	51	54	55			59		59	51	55	1.9
21:15	54	55	56	53		55	52	55	52	52	54	55	50	52	55	54		59		59	50	54	2.0
21:30	54	55	57	53		55	53	55	53	53	53	56	51	51	54	55				57	51	54	1.7
21:45	54	55	57	54		55	52	55	52	53	52	54	54	51	54	56	67	59		67	51	55	3.6
22:00	55	55	58	54		55	52	55	55	53	51	54	53	52	54		59	59		59	51	55	2.3
Max	56	55	58	56		56	57	58	55	58	55	56	54	54	56	56	67	60		67	54	57	3.0
Min	54	54	54	53		55	52	55	52	52	51	52	50	50	50	53	58	56		58	50	53	2.2
Ave	54	54	56	54		55	54	56	53	53	52	54	52	52	53	55	60	59		60	52	54	2.3
SD	0.6	0.4	1.1	0.9		0.5	1.5	0.9	0.8	1.3	1.0	0.9	0.9	1.1	1.8	0.8	2.6	1.1		2.6	0.4	1.1	0.5
E Avg	54	55	56	54		55	54	56	53	54	53	55	52	52	53	55	61	59		61	52	55	2.4

Night LAEQ

Time	9/10	10/10	11/10	12/10	13/10	14/10	15/10	16/10	17/10	18/10	19/10	20/10	21/10	22/10	23/10	24/10	25/10	26/10	27/10	Maximum	Minimum	Average	SD
22:00	55	55	58	54		55	52	55	55	53	51	54	53	52	54		59	59		59	51	55	2.3
22:15	54	55	55	54		54	53	55	53	53	51		53	50	54		59			59	50	54	2.0
22:30	54	54	54	54		54	53	55	55	53	51	54	52	51	54	59	59	58		59	51	54	2.3
22:45	55	54	53	54		54	54	54	53	53	52	54	52	52	54	59		58		59	52	54	2.1
23:00	54	54	53	54		54	53	54	53	52	52	54	53	51	53	59		58		59	51	54	2.0
23:15	55	54	54	53		54	53	55	53	53	53	54	52	52	53	58	60	58		60	52	54	2.4
23:30	54	54	53	53		54	53	55	53	53	52	54	52	52	53	58	59	58		59	52	54	2.2
23:45	54	54	53	53		54	53	55	54	53	55	54	53	51	53	58	59	58		59	51	54	2.1
0:00	54	54	53	53		55	53	55	53	54	52	54	51	53	53	56	59	58		59	51	54	1.9
0:15	53	53	54	53		54	53	55	53	54	52	54	51	54	53	57	59	58		59	51	54	2.1
0:30	54	55	53	54		54	53	55	54	53	53	54	51	54	53	56				56	51	54	1.2
0:45	54	54	54	55		54	53	56	54	53	52	54	51	54	54	56	59	58		59	51	54	2.0
1:00	54	53	53	54		54	52	54	53	53	52	54	51	53		58	59	58		59	51	54	2.2
1:15	54	55	53	56		55	53	55	54	53	55	56	51	54	53	57	59	58		59	51	55	2.1
1:30	53	54	54	56		56	54	54	53	53	55	54	50	53		56	60			60	50	54	2.2
1:45	54	59	54	56		53	56	54	53	53	55	55	50	53		56		58		59	50	55	2.1
2:00	54	54	52	55		55	57	54	53	52	55	54	50	53		55	60	58		60	50	55	2.3
2:15	54	56	52	56		56	54	54	53	52	56	56	51	53		56	60	57		60	51	55	2.2
2:30	53	54	51	56		55	53	55	53	51	56	54	51	53	56	58	60			60	51	54	2.5
2:45	55	54	51	56		54	55	54	54	52	56	57	51	53	57	56	60	58		60	51	55	2.5
3:00	55	54	51	55		54	54	55	53	52	56	54	51	54	54	55	60			60	51	54	2.2
3:15	53	55	51	54		53	53	54	54	52	56	55	50	54	54	56	60	58		60	50	54	2.5
3:30	53	56	51	54		53	54	54	53	53	58	55	51	53	54	58	60	58		60	51	55	2.6
3:45	55	55	51	55		54	54	54	53	53	58	58	53	53	54	58	60	59		60	51	55	2.6
4:00	55	53	52	55		53	54	53	53	52	57	55	53	53	54	57	60	57		60	52	55	2.1
4:15	55	55	52	57		56	55	53	53	54	56	55	52	54	53	58	60	58		60	52	55	2.2
4:30	55	56	54	58		55	55	54	54	53	57	56	57	57	54	58	60	60		60	53	56	2.2
4:45	55	56	52	58		54	56	53	53	52	58	55	58	57	53	58		60		60	52	56	2.4
5:00	54	55	52	57		54	57	54	54	54	57	55	57	54	53	58	60	59		60	52	55	2.2
5:15	54	56	53	56		54	57	54	54	53	59	55	54	54	55	58	60	59		60	53	56	2.3
5:30	55	57	51	56		55	57	53	53	54	55	57	58	59	53	58	60			60	51	56	2.4
5:45	54	55	51	57		54	56	54	54	55	58	58	57	58	55	57	60	60		60	51	56	2.3
6:00	55	54	55	59		56	57	54	54	57	61	58	58	58	54	57	60	61		61	54	57	2.5
6:15	54	56	57	60		63	61	54	53	58	59	58	58	61	54	58	61	61		63	53	58	3.0
6:30	54	55	58	58		59	60	54	53	57	60	61	61	58	53	58	59	62		62	53	58	2.8
6:45	54	55	57	62		56	58	56	53	60	61	58	57	59	56	58	59	61		62	53	58	2.4
7:00	53	56	63	61		60	59	55	53	62	59	59	57	59	56	59	60	60		63	53	58	2.9
Max	55	59	63	62		63	61	56	55	62	61	61	61	61	57	59	61	62		63	55	60	2.4
Min	53	53	51	53		53	52	53	53	51	51	54	50	50	53	55	59	57		59	50	53	2.4
Ave	54	55	53	56		55	55	54	54	54	55	55	53	54	54	57	60	59		60	53	55	1.9
SD	0.6	1.1	2.5	2.2		1.9	2.3	0.6	0.4	2.3	2.9	1.8	3.0	2.7	1.0	1.1	0.6	1.2		3.0	0.4	1.7	0.9
E Avg	54	55	54	56		55	55	54	54	55	56	56	54	55	54	57	60	59		60	54	56	1.7
24hr	54	55	55	56	57	56	56	57	54	53	55	57	55	56	56	55	58	60	59	60	53	56	1.7

Location 20, New Berrima

Daytime LA90 9 to 27 October 2020

Time	9/10	10/10	11/10	12/10	13/10	14/10	15/10	16/10	17/10	18/10	19/10	20/10	21/10	22/10	23/10	24/10	25/10	26/10	27/10	Maximum	Minimum	Average	SD
7:00		52	54	52	56		53	57	51	52	59	55	52	52	53	54	56	57	57	59	51	54	2.4
7:15		52	54	52	54		52	56	51	52	54	55	52	52	53	53	57	57	57	57	51	54	2.1
7:30		52	53	51	53		52	56	51	52	55	55	53	52	53	53	57	57	57	57	51	54	2.0
7:45		52	52	51	53		52	56	52	51	54	55	53	52	52	53	57	57	57	57	51	53	2.0
8:00		52	52	51	53		52		51	51	53	55	53	54	52	53	57	57	57	57	51	53	1.9
8:15		52	53	51	53		52		52	52	56	55	53	56	52	52	57	57	56	57	51	54	2.2
8:30		52	53	51	54		52		52	51	55		53	51	51	52	57	57	56	57	51	53	2.2
8:45		52	53	51	53		52		51	52	55	54	53	56	51	51	57	57	57	57	51	53	2.2
9:00		52	52	50	52		52		52	52	54	55	53	56	51	51	57	57	56	57	50	53	2.3
9:15		52	52	50	52		51	55	51	52	53	54	52	54	50	51	57	57	56	57	50	53	2.2
9:30		52	52	49	52		52	55	52	50	52	54	52	51	51	51	56	56	57	57	49	53	2.3
9:45		51	52	49	52		51	55	52		52	53	52	50	52	52	56	57	56	57	49	53	2.2
10:00		52	52	49	52		52	56	52	50	51	53	52	51	51	51	57	56	56	57	49	52	2.3
10:15		52	51	50	52		51	55	51	50	51	53	52	51	51	52	56	57	56	57	50	52	2.3
10:30		52	51	49	52		52	57	52	49	54	53	52	51	51	52	55	57	57	57	49	53	2.6
10:45		52	51	49	52		51	57	51	50	55	53	51	52	51	52		58	57	58	49	53	2.7
11:00		52	52	49	53		52	56	51		54	52	51	50	52			58	56	58	49	53	2.5
11:15		52	52	50	53		51	57	52	50	54	52	53	50	51		55	58	57	58	50	53	2.6
11:30		51	52	50	53		50	57	51	50	53	53	53	50	51			58	56	58	50	52	2.6
11:45		52	52	50	52		50	56	52	50	52	52	52	50	52	52	54	57	56	57	50	53	2.2
12:00		52	51	50			51	55	52	50	52	53	52	49	52		54	58	56	58	49	52	2.4
12:15		52	51	50			51	55	51	52	52	53	52	49	52	52		58	55	58	49	52	2.3
12:30		52	52	49			50	55	50	51	53	52	52	49	52	53	55	57	56	57	49	52	2.3
12:45		52	52	50			50	55	51	50	52	53	51	49	52		54	58	56	58	49	52	2.5
13:00		52	52	50			52	55	51	50	52	52	51	50	51	53		58	56	58	50	52	2.3
13:15		51	52	50			51	56	50	50	52	53	51	49	51	53	53	58	55	58	49	52	2.2
13:30		51	51	50			52	56	50	51	52	53	51	49	51	52	54	56	55	56	49	52	2.1
13:45		51	51	50			52	55	51	50	52	54	51	50	51	53	55	56	55	56	50	52	2.1
14:00		52	52	50			52	55	50	51	52	53	53	50	51	52	55	57	55	57	50	52	2.1
14:15		52	52	50		53	52	55	50	50	52	53	52	49	50	52	55	57	54	57	49	52	2.0
14:30		52	53	50		54	52	55	50	50	51	53	53	49	50	52	55	58	55	58	49	52	2.3
14:45		52	53	50		53	52	55	50	50	52	52	50	49	49	52		57	55	57	49	52	2.3
15:00		53	52	50		54	51	55	51	50	51	51	50	48	49	52		56	55	56	48	52	2.3
15:15		52	52			55	51	54	50	50	51	52	50	49	48	52		56	55	56	48	52	2.4
15:30		52	52	50		56	50	55	50	52	52	52	51	49	48			56	55	56	48	52	2.5
15:45		53	51	50		53	50	55	50	52	51	52	51	49	49			57	56	57	49	52	2.4
16:00		53	52	50		53	52	54	50	52	51	53	49	48	50	52		56	55	56	48	52	2.1
16:15		52	52	54		53	51	54	51	52	51	53	49	49	50	52		57	54	57	49	52	2.0
16:30		53	53	53		53	51	54	50	51	51	51	49	49	49	52		56	54	56	49	52	1.9
16:45		53	53	51		53	50	54	50	51	51	51	49	51	49	52		56	54	56	49	52	2.0
17:00	52	53	52	51		53	50	54	50	51	52	52	50	51	49	52		56	55	56	49	52	2.0
17:15	52	53	51	52		53	50	55	50	52	52	53	49	50	48	52	57	56		57	48	52	2.4
17:30	52	53	51	52		52	51	55	50	51	51	53	50	50	48	52		55		55	48	52	1.9
17:45	52	53	51	52		52	51	54	50	52	51	53	50	50	49	52	58			58	49	52	2.3
18:00	53	52	52	52		52	51	54	50	52	51	52	50	50	49	52	58	54		58	49	52	2.3
Max	53	53	54	54	56	56	53	57	52	52	59	55	53	56	53	54	58	58	57	59	52	55	2.2
Min	52	51	51	49	52	52	50	54	50	49	51	51	49	48	48	51	53	54	54	54	48	51	1.9
Ave	52	52	52	50	53	53	51	55	51	51	53	53	51	50	51	52	56	57	56	57	50	53	2.0
SD	0.4	0.6	0.7	1.1	1.1	1.0	0.8	0.9	0.6	0.9	1.6	1.0	1.3	2.0	1.4	0.7	1.3	0.8	1.0	2.0	0.4	1.0	0.4
90%	52	51	51	49	52	52	50	54	50	50	51	52	49	49	49	51	54	56	55	56	49	51	2.1
																					Median	51	

Evening LA90

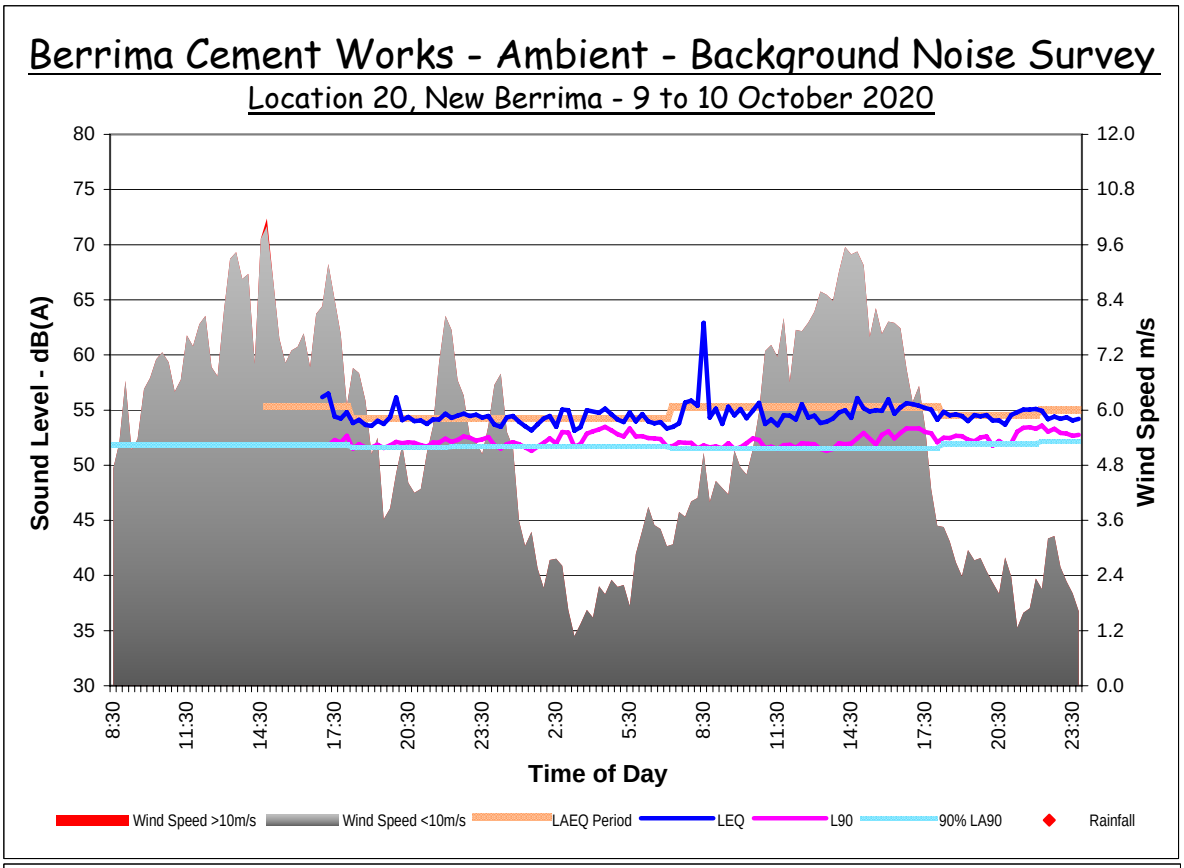
Time	9/10	10/10	11/10	12/10	13/10	14/10	15/10	16/10	17/10	18/10	19/10	20/10	21/10	22/10	23/10	24/10	25/10	26/10	27/10	Maximum	Minimum	Average	SD
18:00	53	52	52	52		52	51	54	50	52	51	52	50	50	49	52	58	54		58	49	52	2.3
18:15	52	53	51	52		53	51	55	50	51	51	53	49	51	48	52	58	55		58	48	52	2.4
18:30	52	52	53	52		53	50	55	51	51	51	52	50	50	49	53	57			57	49	52	2.1
18:45	52	53	53	52		53	51	55	51	51	51	52	50	50	50	53	57	54		57	50	52	2.0
19:00	52	53	53	51		53	51	55	51	52	50	53	50	50	49	53		56		56	49	52	1.9
19:15	52	52	54	52		53	51	55	51	52	51	53	50	51	49	54	56	57		57	49	53	2.1
19:30	52	52	54	53		53	51	54	51	52	51	52	49	50	49	54				54	49	52	1.6
19:45	52	53	54	52		54	52	54	51	52	51	52	49	50	49	54		57		57	49	52	2.1
20:00	52	53	54	52		54	51	54	51	52	51	50	50	50	52	53		57		57	50	52	2.0
20:15	52	52	55	52		54	52	54	51	51	51	51	50	49	51	54		58		58	49	52	2.2
20:30	52	52	55	52		54	52	54	52	51	51	52	50	49	51					55	49	52	1.7
20:45	52	52	54	52		54	52	54	51	51	51	52	50	49	51		57	57		57	49	52	2.4
21:00	52	52	54	52		53	52	54	50	51	52	53	50	49	52			57		57	49	52	2.1
21:15	52	53	55	52		54	51	53	50	51	52	53	48	49	52	53		57		57	48	52	2.2
21:30	52	53	55	52		54	51	53	51	52	52	53	49	50	52	53				55	49	52	1.7
21:45	52	53	55	52		54	51	53	50	52	51	53	49	50	52	54	58	58		58	49	53	2.5
22:00	52	53	55	53		53	51	53	51	52	50	52	50	49	51		58	56		58	49	52	2.4
Max	53	53	55	53		54	52	55	52	52	52	53	50	51	52	54	58	58		58	50	53	2.1
Min	52	52	51	51		52	50	53	50	51	50	50	48	49	48	52	56	54		56	48	51	2.0
Ave	52	53	54	52		53	51	54	51	51	51	52	49	50	50	53	57	56		57	49	52	2.2
SD	0.3	0.5	1.0	0.4		0.5	0.6	0.5	0.4	0.3	0.6	0.8	0.4	0.8	1.4	0.7	0.8	1.2		1.4	0.3	0.7	0.3
90%	52	52	53	52		53	51	53	50	51	51	51	49	49	49	52	57	55		57	49	52	2.1
																					Median	52	

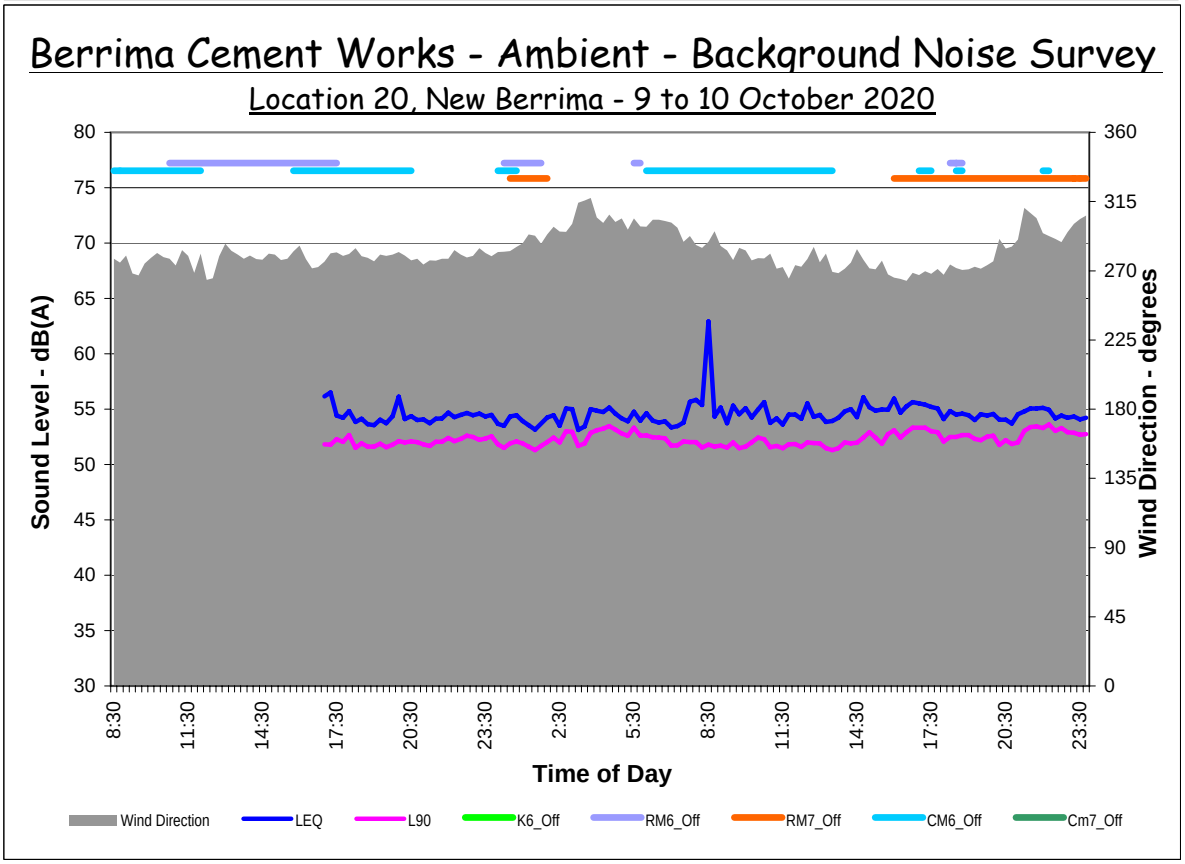
Night LA90

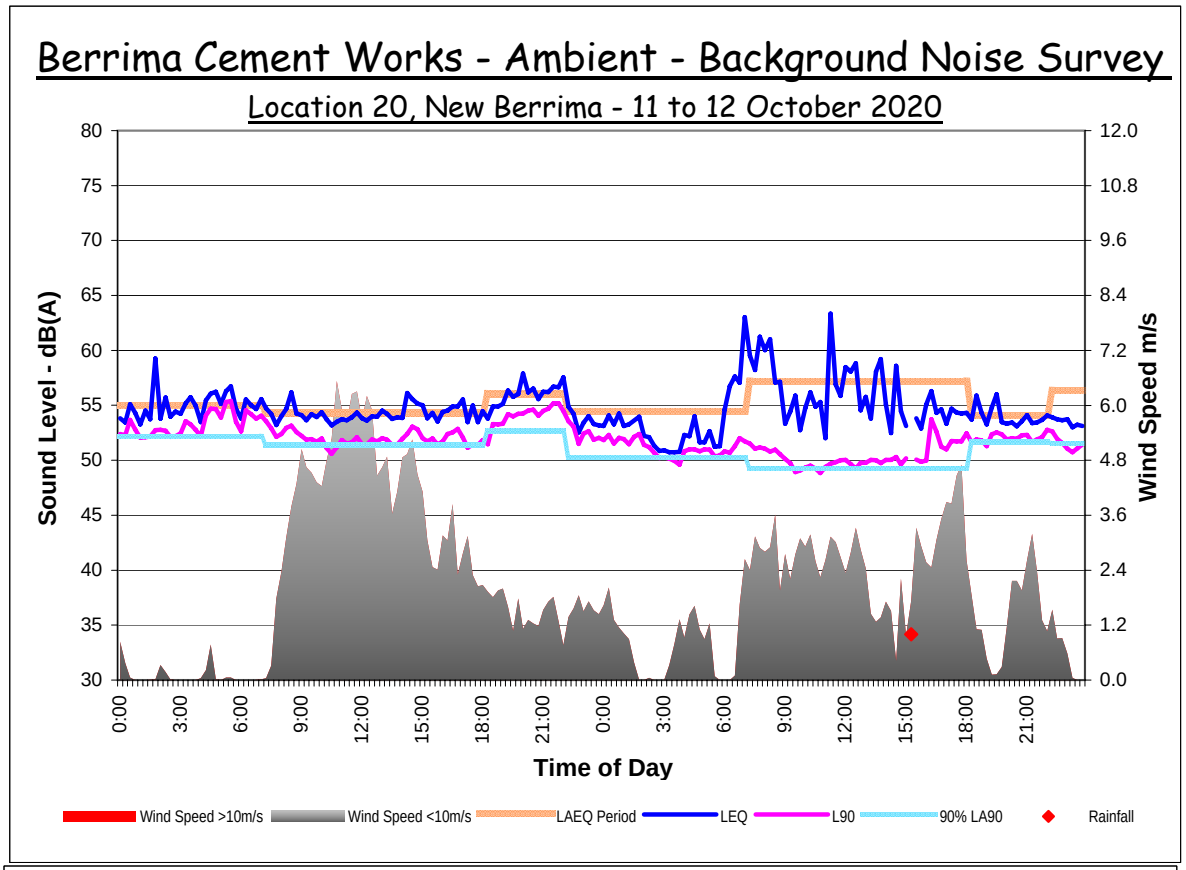
Time	9/10	10/10	11/10	12/10	13/10	14/10	15/10	16/10	17/10	18/10	19/10	20/10	21/10	22/10	23/10	24/10	25/10	26/10	27/10	Maximum	Minimum	Average	SD
22:00	52	53	55	53		53	51	53	51	52	50	52	50	49	51		58	56		58	49	52	2.4
22:15	52	54	54	53		53	51	53	51	52	50		50	49	51		57			57	49	52	2.0
22:30	52	53	53	52		53	51	53	51	51	51	52	50	50	51	55	57	56		57	50	52	2.1
22:45	53	53	52	52		53	51	53	51	51	51	52	51	50	52	57		56		57	50	52	1.8
23:00	52	53	52	51		52	51	53	51	51	51	52	50	50	51	57		56		57	50	52	1.9
23:15	52	53	53	51		52	51	54	51	51	51	52	51	50	51	56	58	56		58	50	53	2.3
23:30	52	53	52	51		52	51	54	51	51	51	52	51	51	51	56	57	56		57	51	53	2.1
23:45	53	53	52	51		52	52	54	52	52	51	52	51	50	51	55	57	56		57	50	53	2.0
0:00	52	52	52	52		52	51	54	52	52	51	52	51	50	51	54	57	55		57	50	52	1.9
0:15	52	52	52	52		52	51	54	52	52	51	51	50	52	51	55	57	56		57	50	53	1.9
0:30	52	54	52	52		52	51	54	52	52	51	52	50	52	51	54				54	50	52	1.1
0:45	52	53	52	52		52	51	54	52	52	51	52	50	52	52	54	57	55		57	50	53	1.7
1:00	52	52	52	53		52	51	53	51	51	51	52	50	51		56	57	56		57	50	53	2.0
1:15	52	52	51	55		52	52	53	52	52	53	52	50	51	52	55	57	56		57	50	53	1.9
1:30	51	52	52	55		52	53	52	51	52	54	52	49	51		55	58			58	49	53	2.1
1:45	52	53	52	54		52	53	52	51	52	53	52	49	51		54		55		55	49	52	1.6
2:00	52	53	51	54		52	52	52	51	51	54	53	49	50		54	58	55		58	49	53	2.1
2:15	52	53	51	53		52	51	52	52	51	55	53	50	50		54	57	56		57	50	53	2.0
2:30	52	52	51	54		52	51	52	52	50	55	53	50	51	53	54	58			58	50	52	2.1
2:45	53	52	50	55		52	51	52	52	51	54	52	49	51	54	54	58	56		58	49	53	2.3
3:00	53	52	50	53		52	52	52	51	51	54	53	50	52	53	53	58			58	50	52	2.0
3:15	52	54	50	53		52	51	52	52	51	54	53	49	52	52	54	58	56		58	49	53	2.1
3:30	52	53	50	52		52	52	51	52	51	55	54	49	52	53	56	58	56		58	49	53	2.3
3:45	53	53	50	53		52	52	52	52	51	55	53	50	51	52	56	58	56		58	50	53	2.3
4:00	53	52	51	53		52	52	51	52	51	54	53	50	52	52	55	58	56		58	50	53	2.1
4:15	53	54	51	56		52	53	51	52	51	54	53	50	52	51	56	58	56		58	50	53	2.2
4:30	53	55	51	54		52	53	51	53	51	54	53	52	52	52	55	58	57		58	51	53	2.1
4:45	53	55	51	54		52	54	51	52	51	54	53	53	52	52	55		56		56	51	53	1.6
5:00	53	54	51	55		52	55	51	53	52	54	53	53	52	51	56	57	56		57	51	53	1.9
5:15	53	55	51	54		52	55	51	52	52	55	53	52	52	52	55	58	56		58	51	53	2.0
5:30	53	55	50	54		52	55	51	52	52	54	53	53	52	52	55	58			58	50	53	2.0
5:45	53	54	50	54		52	54	51	52	52	54	53	53	53	52	55	57	57		57	50	53	1.9
6:00	53	53	51	56		52	54	51	52	53	55	52	52	53	52	55	57	56		57	51	53	1.8
6:15	52	55	51	55		53	55	51	52	54	54	52	52	53	52	55	57	57		57	51	53	1.9
6:30	52	54	51	54		53	55	51	52	53	55	53	52	53	51	56	56	57		57	51	53	1.9
6:45	52	54	52	56		52	55	52	52	54	55	53	51	53	51	56	57	57		57	51	54	2.1
7:00	52	54	52	56		53	57	51	52	59	55	52	52	53	54	56	57	57		59	51	54	2.3
Max	53	55	55	56		53	57	54	53	59	55	54	53	53	54	57	58	57		59	53	55	1.8
Min	51	52	50	51		52	51	51	51	50	50	51	49	49	51	53	56	55		56	49	51	2.0
Ave	52	53	51	53		52	53	52	52	52	53	53	51	51	52	55	57	56		57	51	53	1.8
SD	0.5	0.9	1.0	1.5		0.4	1.5	1.0	0.5	1.4	1.7	0.5	1.2	1.1	0.9	0.9	0.5	0.5		1.7	0.4	0.9	0.4
90%	52	52	50	52		52	51	51	51	51	51	52	49	50	51	54	57	55		57	49	52	1.9
																					Median	51	

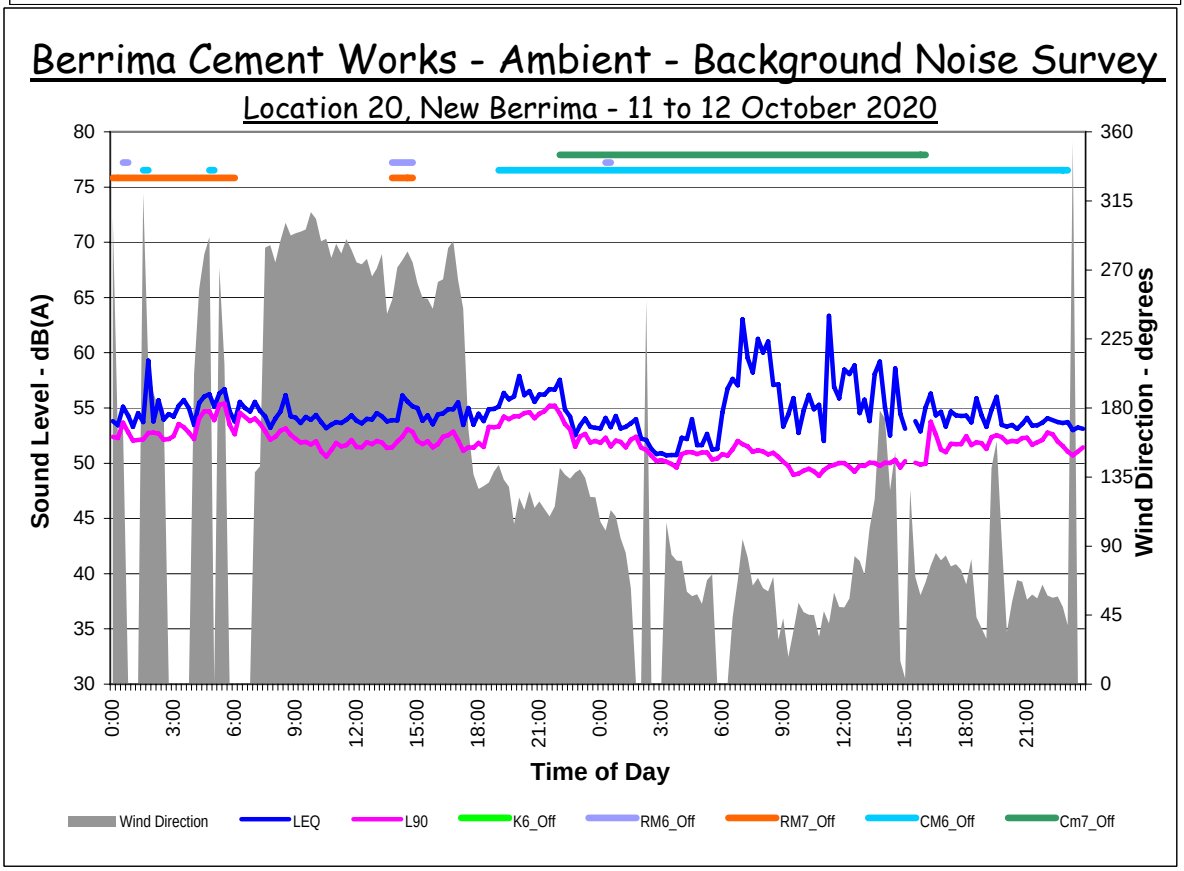
Berrima Location 20 Oct20 A criteria ver1: LA90

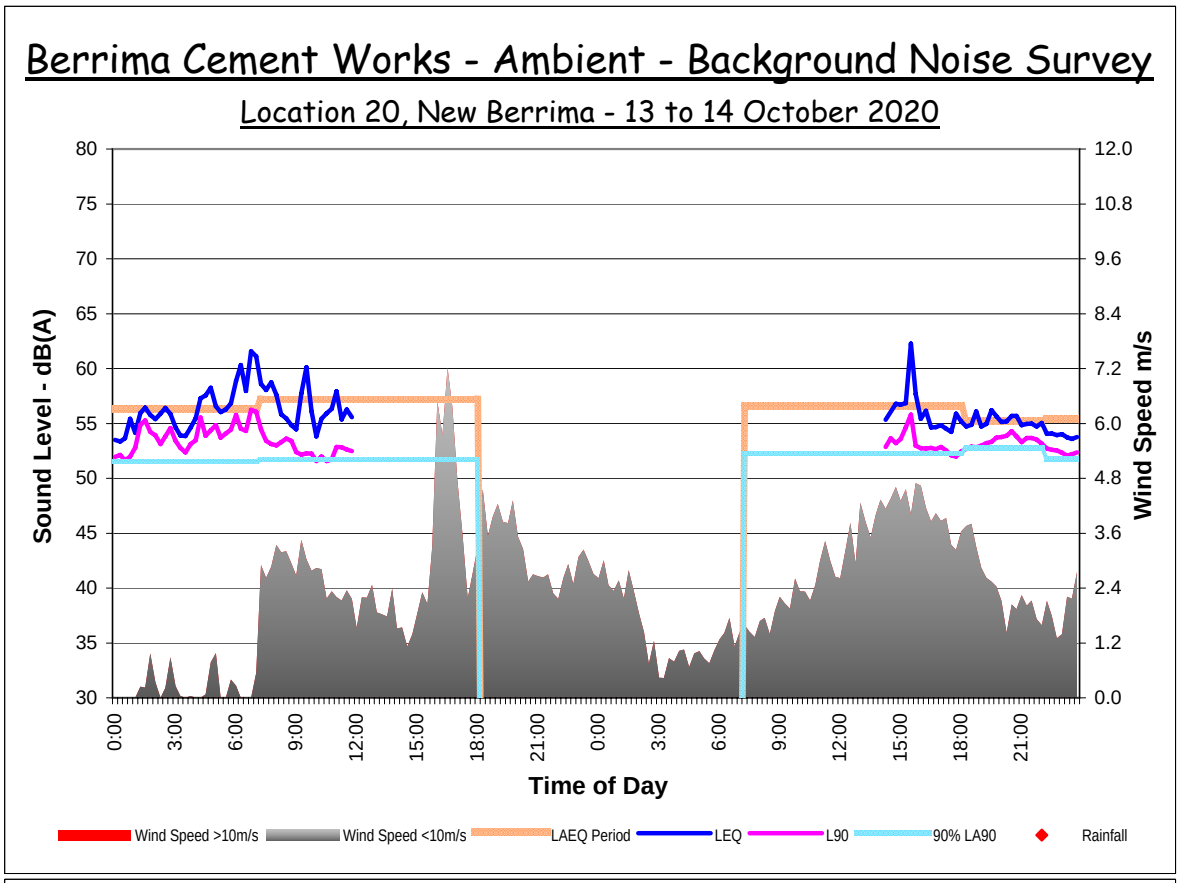
Two Day Results of Ambient Noise Monitoring

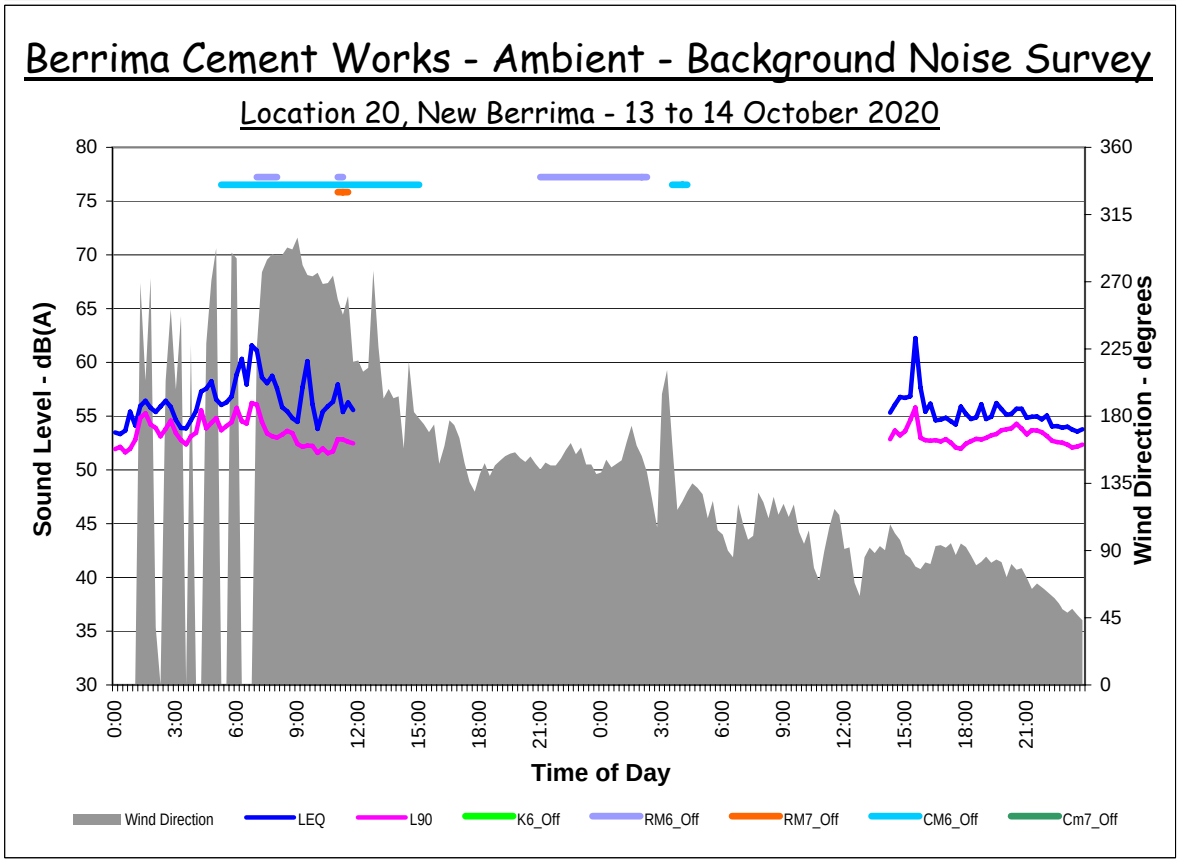


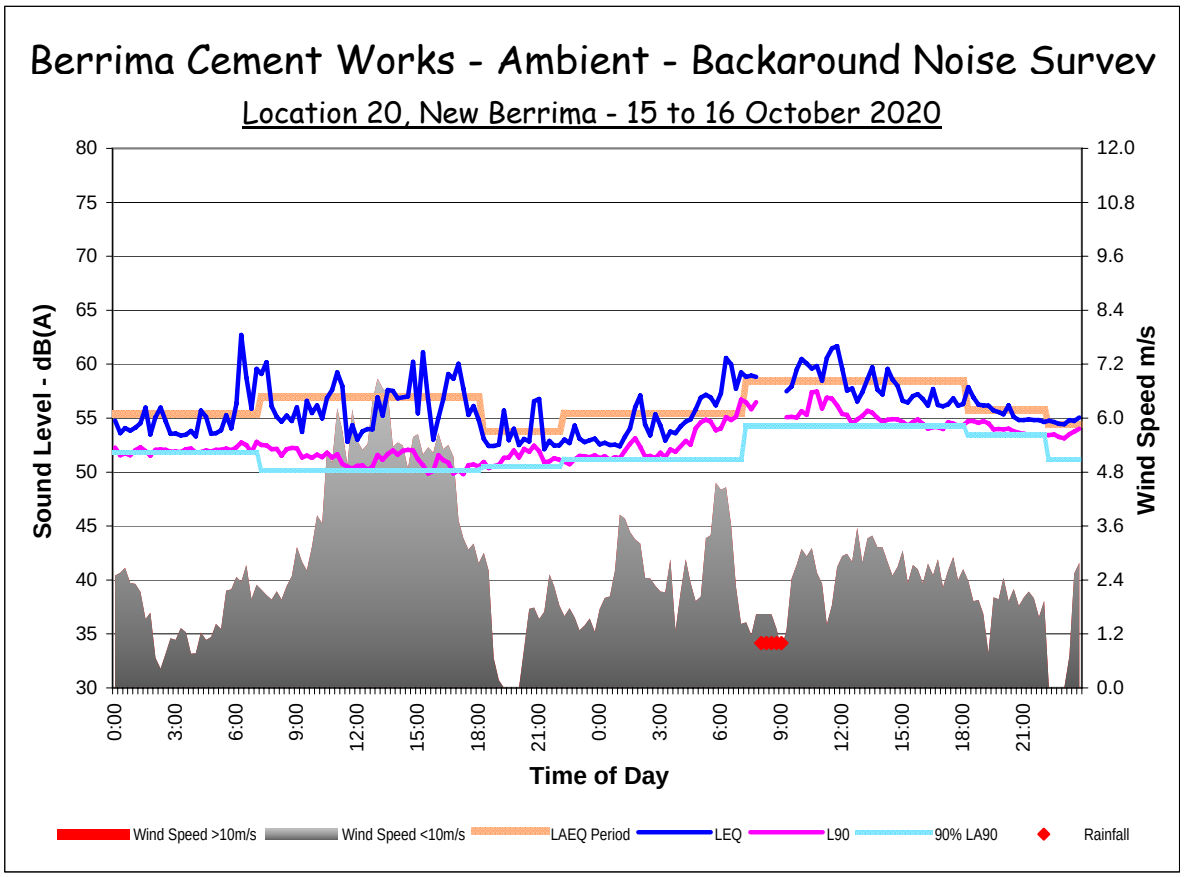


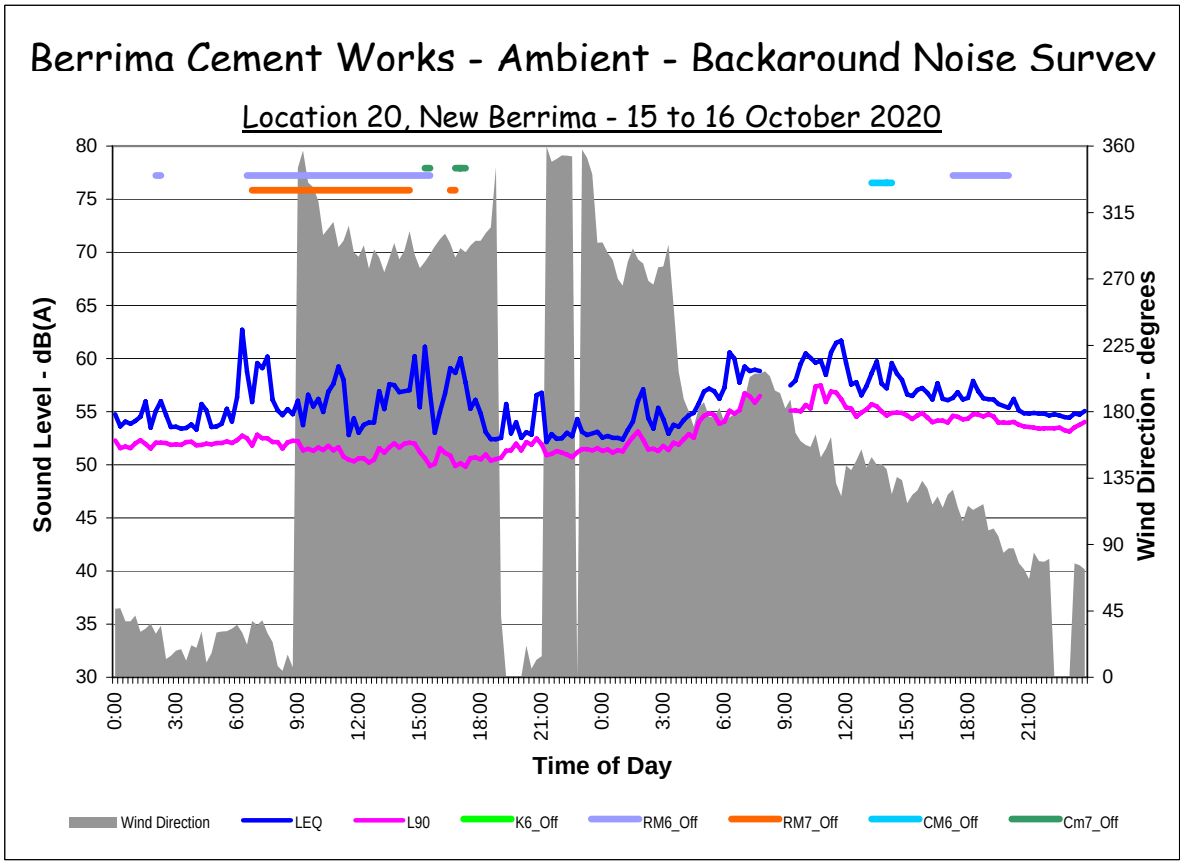

Berrima Cement Works - Ambient - Background Noise Survey
Location 20, New Berrima - 11 to 12 October 2020
Sound Level - dB(A)
Wind Speed m/s
Time of Day
Wind Speed >10m/s
Wind Speed <10m/s
LAEQ Period
LEQ
L90
90% LA90
Rainfall


Berrima Cement Works - Ambient - Background Noise Survey
Location 20, New Berrima - 11 to 12 October 2020
Sound Level - dB(A)
Wind Direction - degrees
Time of Day
Wind Direction
LEQ
L90
K6_Off
RM6_Off
RM7_Off
CM6_Off
Cm7_Off

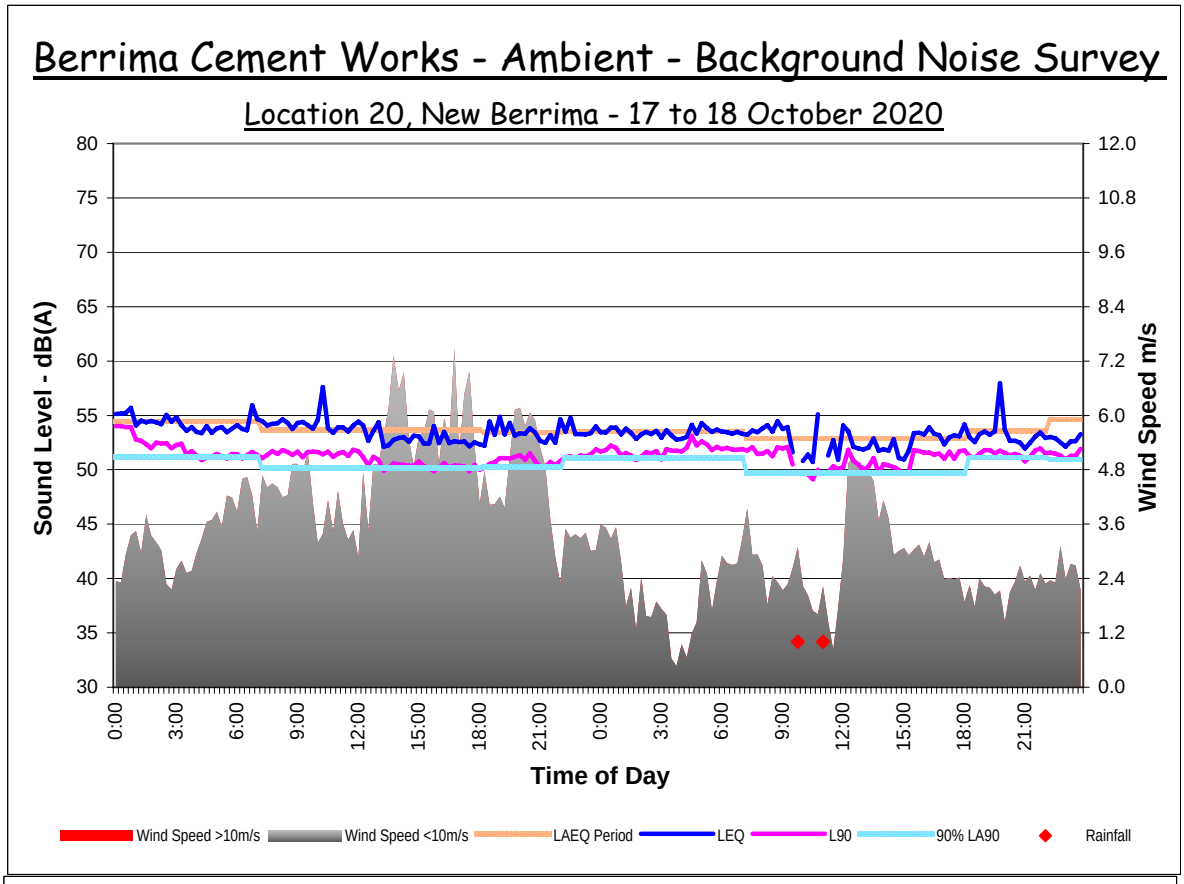

Berrima Cement Works - Ambient - Background Noise Survey
Location 20, New Berrima - 13 to 14 October 2020
Sound Level - dB(A)
Wind Speed m/s
Time of Day
Wind Speed >10m/s
Wind Speed <10m/s
LAEQ Period
LEQ
L90
90% LA90
Rainfall

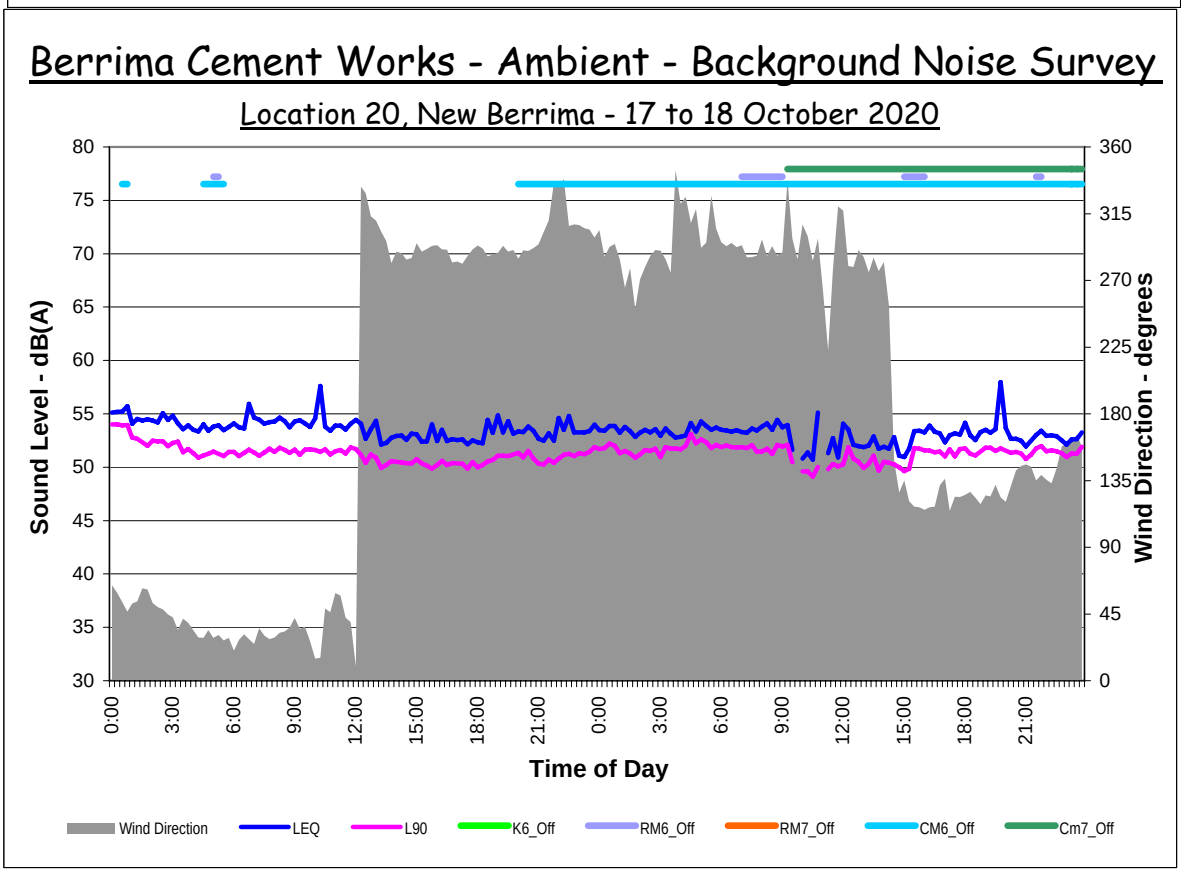

Berrima Cement Works - Ambient - Background Noise Survey
Location 20, New Berrima - 13 to 14 October 2020
Sound Level - dB(A)
Wind Direction - degrees
Time of Day
Wind Direction
LEQ
L90
K6_Off
RM6_Off
RM7_Off
CM6_Off
Cm7_Off

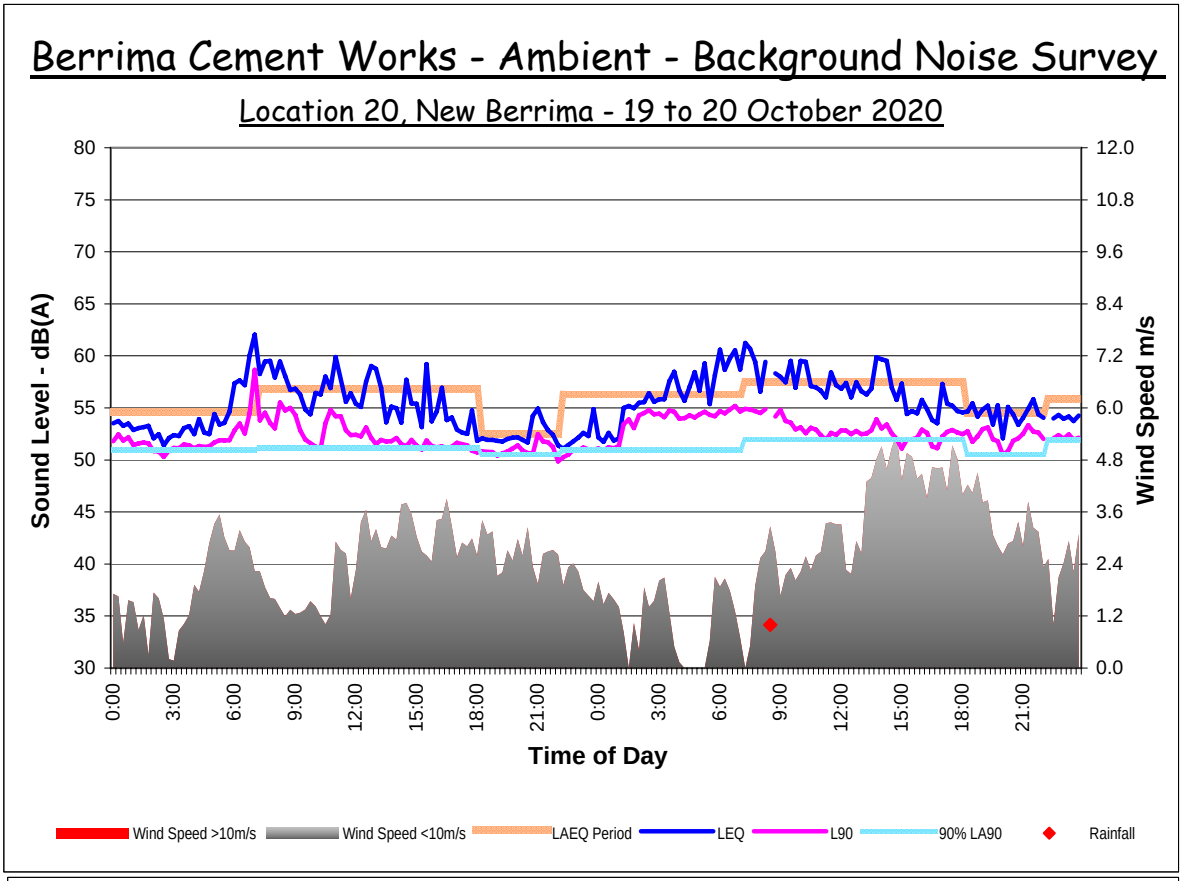

Berrima Cement Works - Ambient - Backaround Noise Survev
Location 20, New Berrima - 15 to 16 October 2020
Sound Level - dB(A)
Wind Speed m/s
Time of Day
Wind Speed >10m/s
Wind Speed <10m/s
LAEQ Period
LEQ
L90
90% LA90
Rainfall

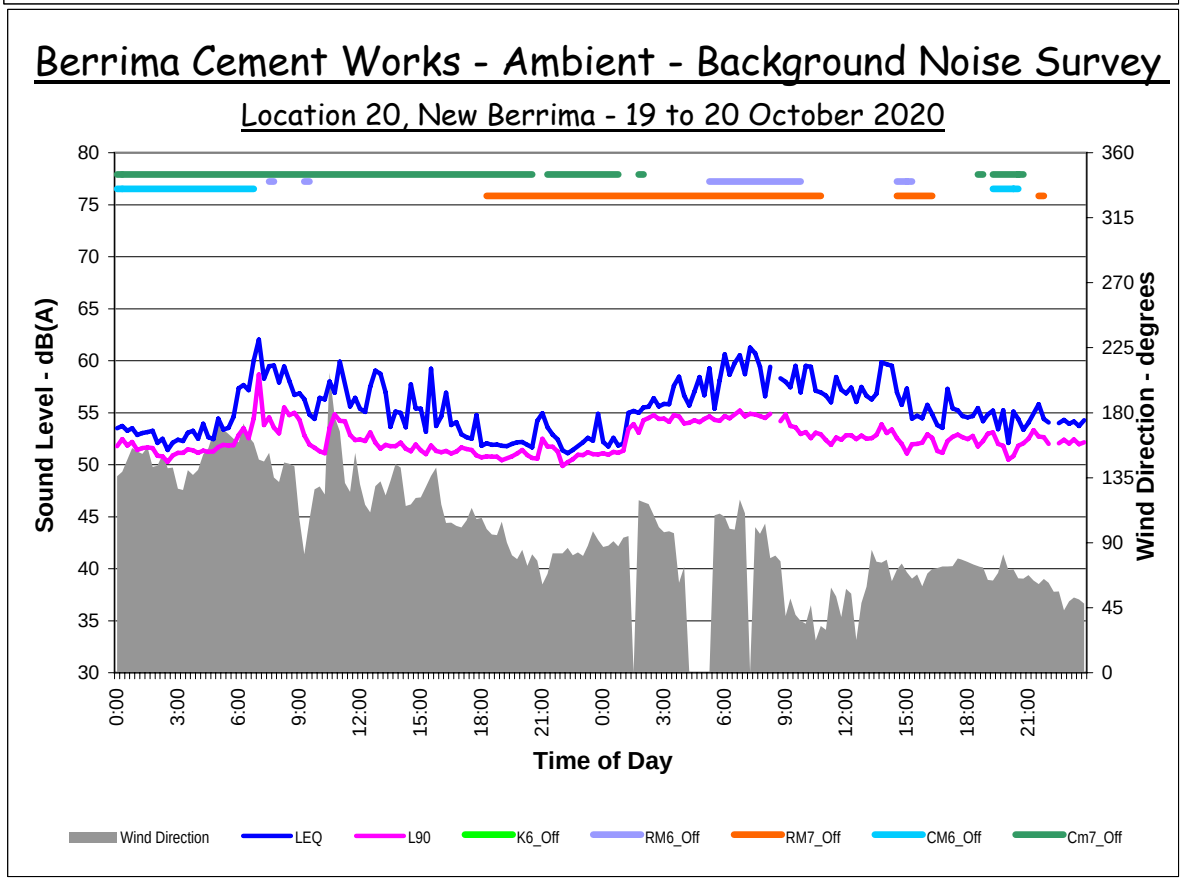

Berrima Cement Works - Ambient - Backaround Noise Survev
Location 20, New Berrima - 15 to 16 October 2020
Sound Level - dB(A)
Wind Direction - degrees
Time of Day
Wind Direction
LEQ
L90
K6_Off
RM6_Off
RM7_Off
CM6_Off
Cm7_Off

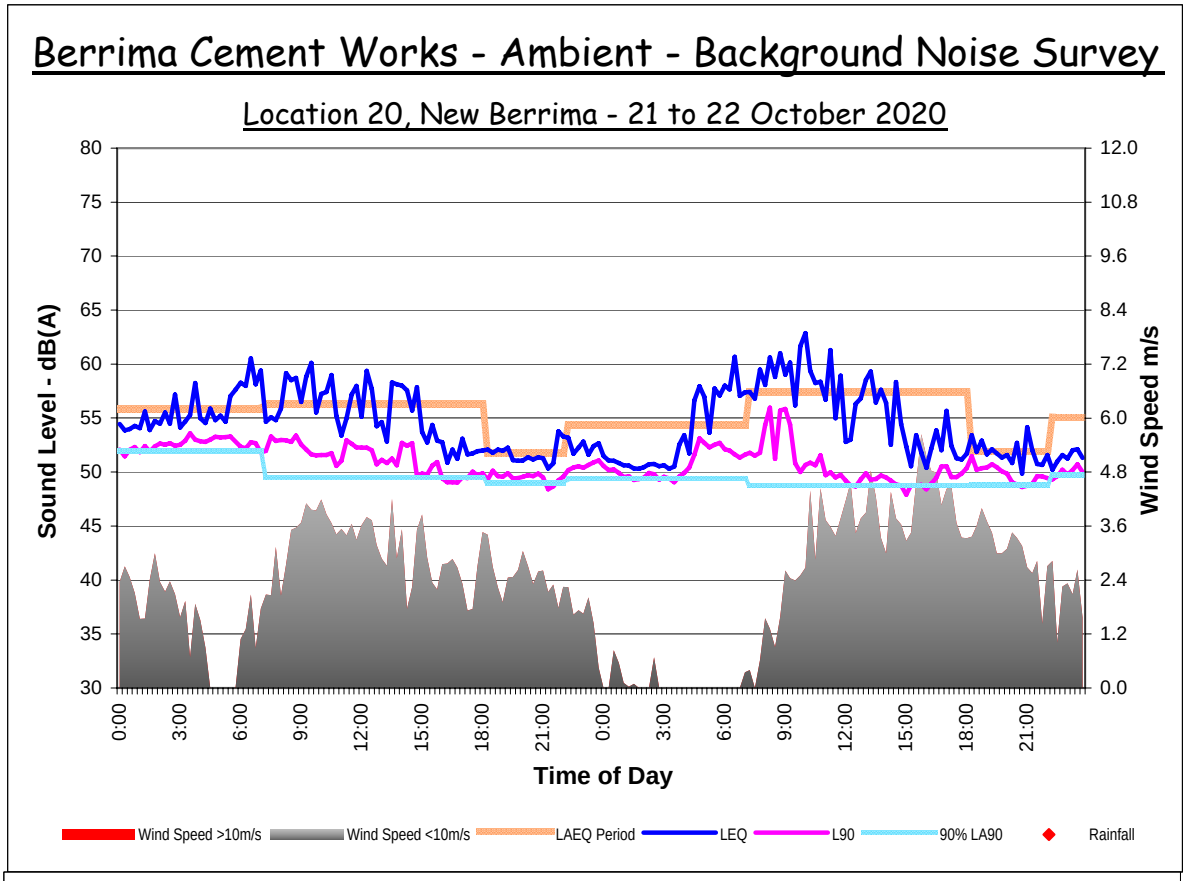
Two Day Results of Ambient Noise Monitoring

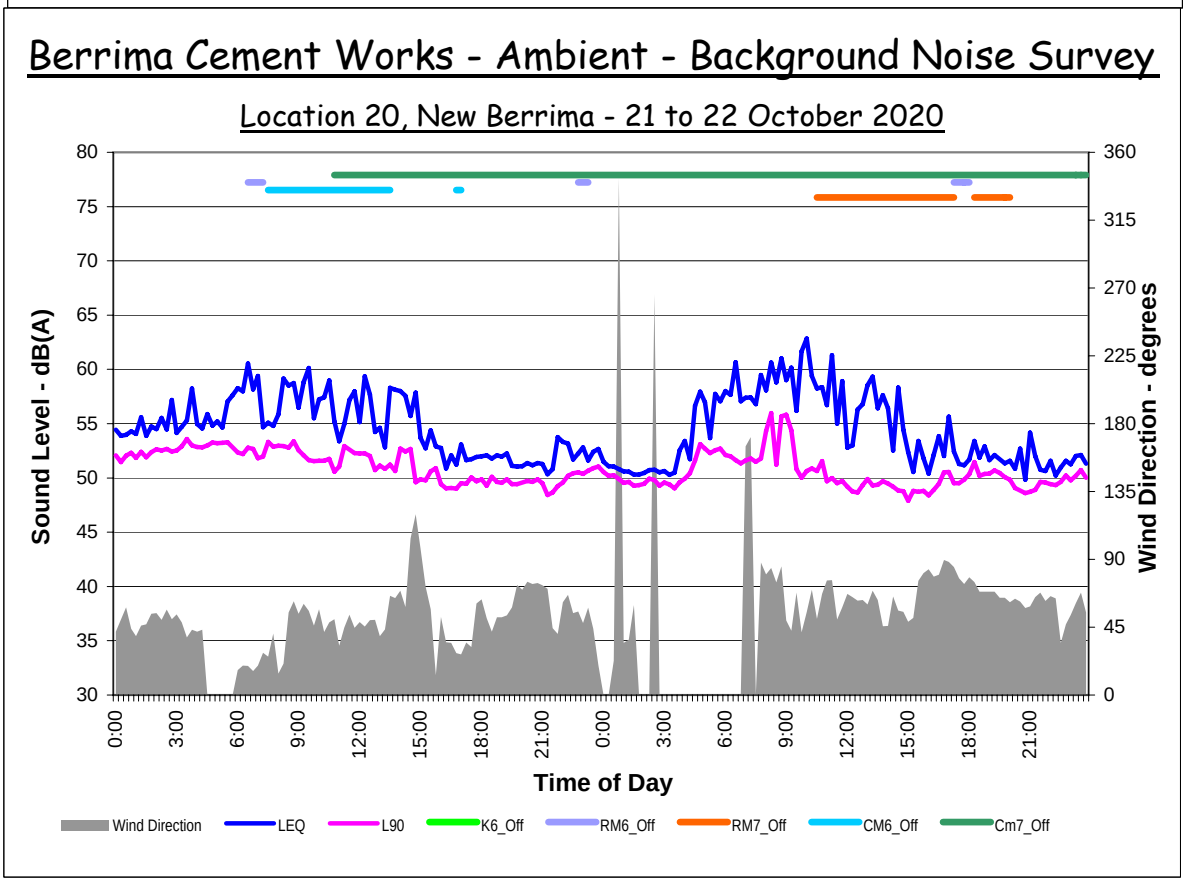


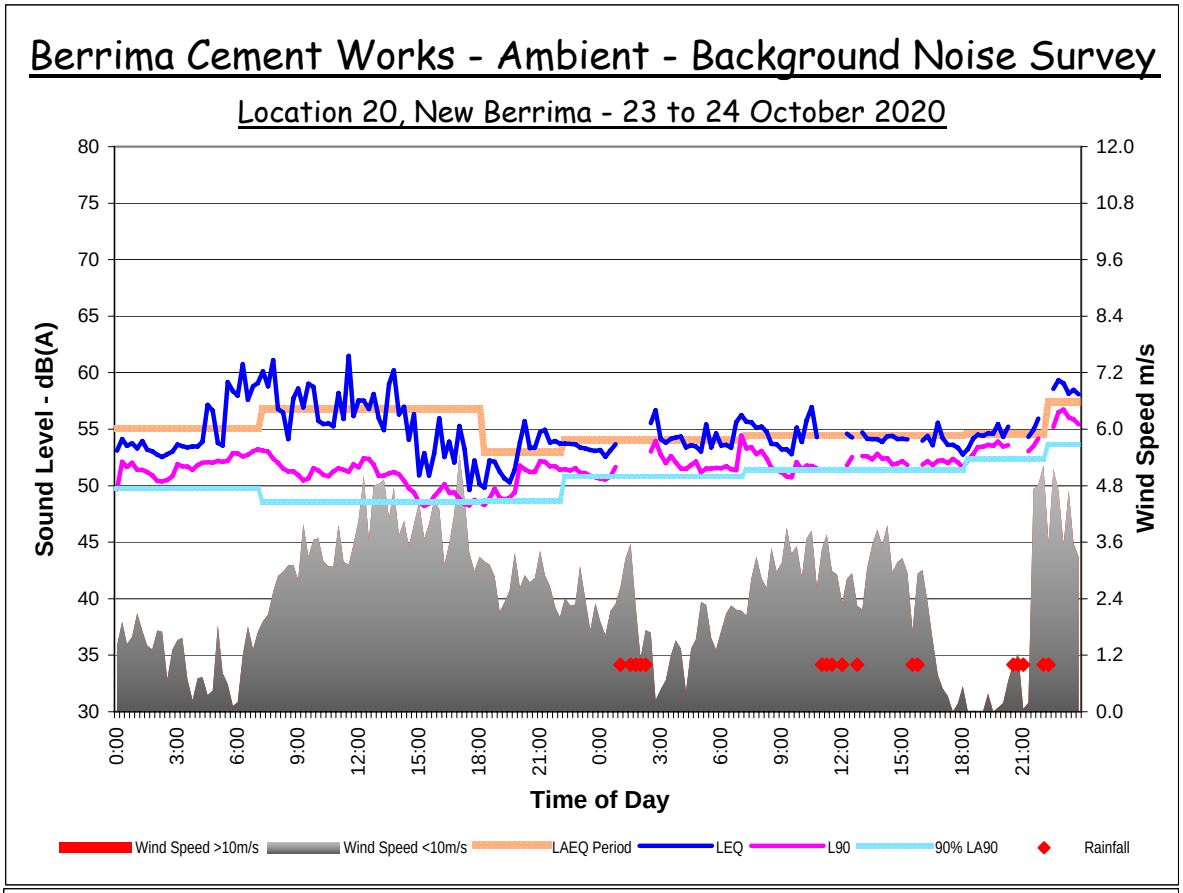


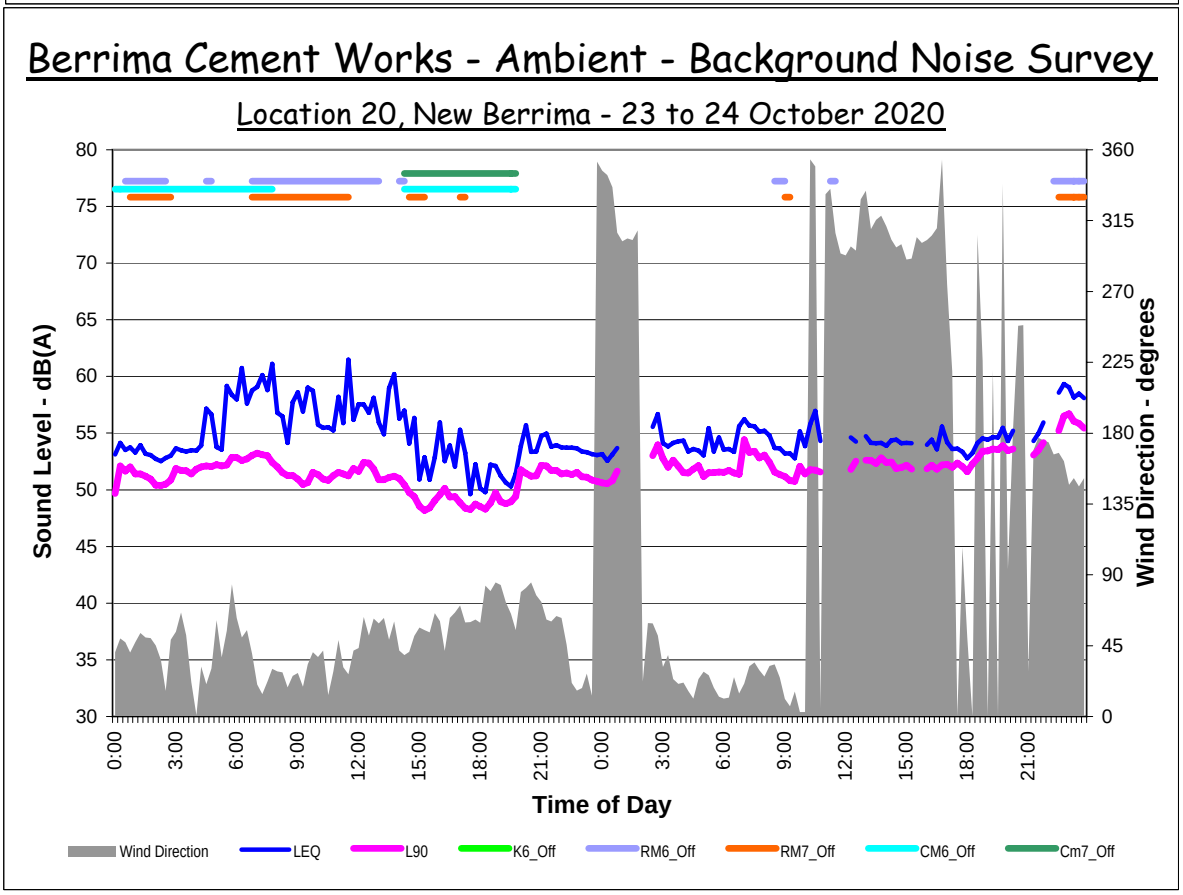

Berrima Cement Works - Ambient - Background Noise Survey
Location 20, New Berrima - 19 to 20 October 2020
Sound Level - dB(A)
Wind Speed m/s
Time of Day
Wind Speed >10m/s
Wind Speed <10m/s
LAEQ Period
LEQ
L90
90% LA90
Rainfall

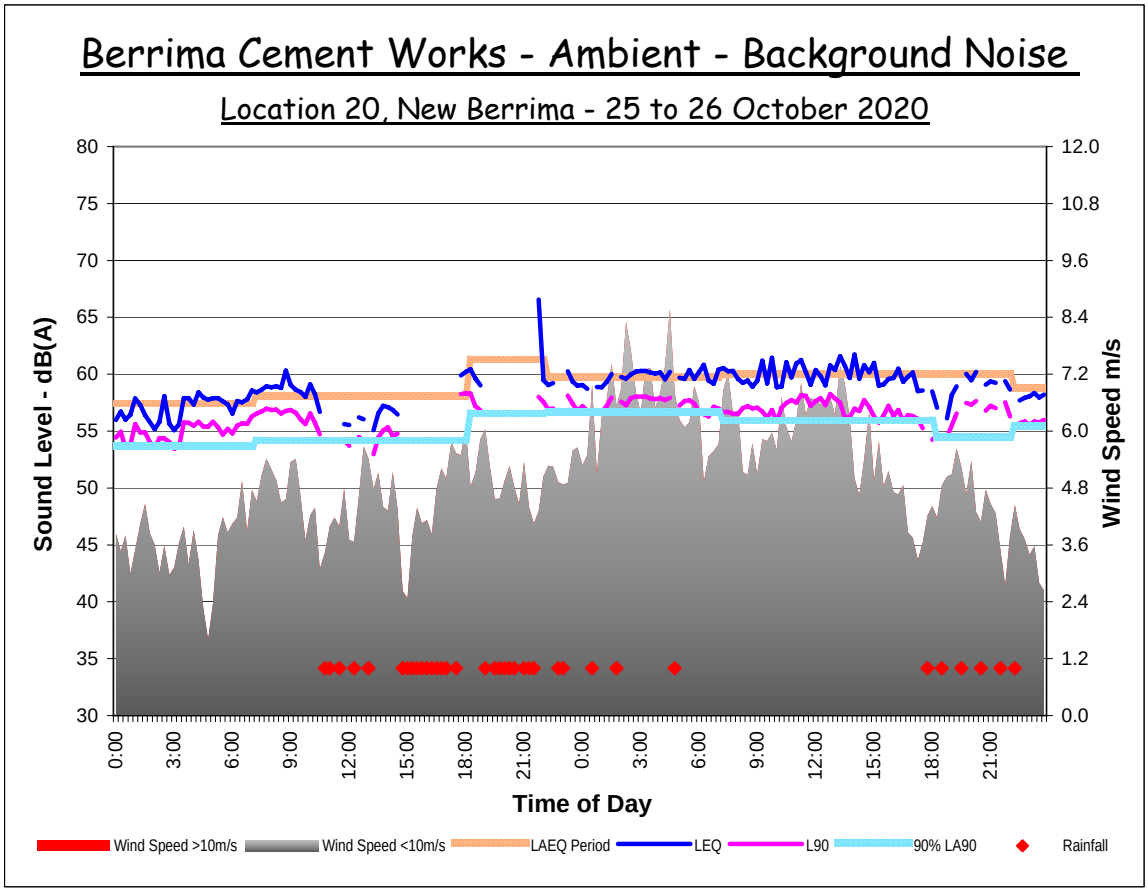

Berrima Cement Works - Ambient - Background Noise Survey
Location 20, New Berrima - 19 to 20 October 2020
Sound Level - dB(A)
Wind Direction - degrees
Time of Day
Wind Direction
LEQ
L90
K6_Off
RM6_Off
RM7_Off
CM6_Off
Cm7_Off

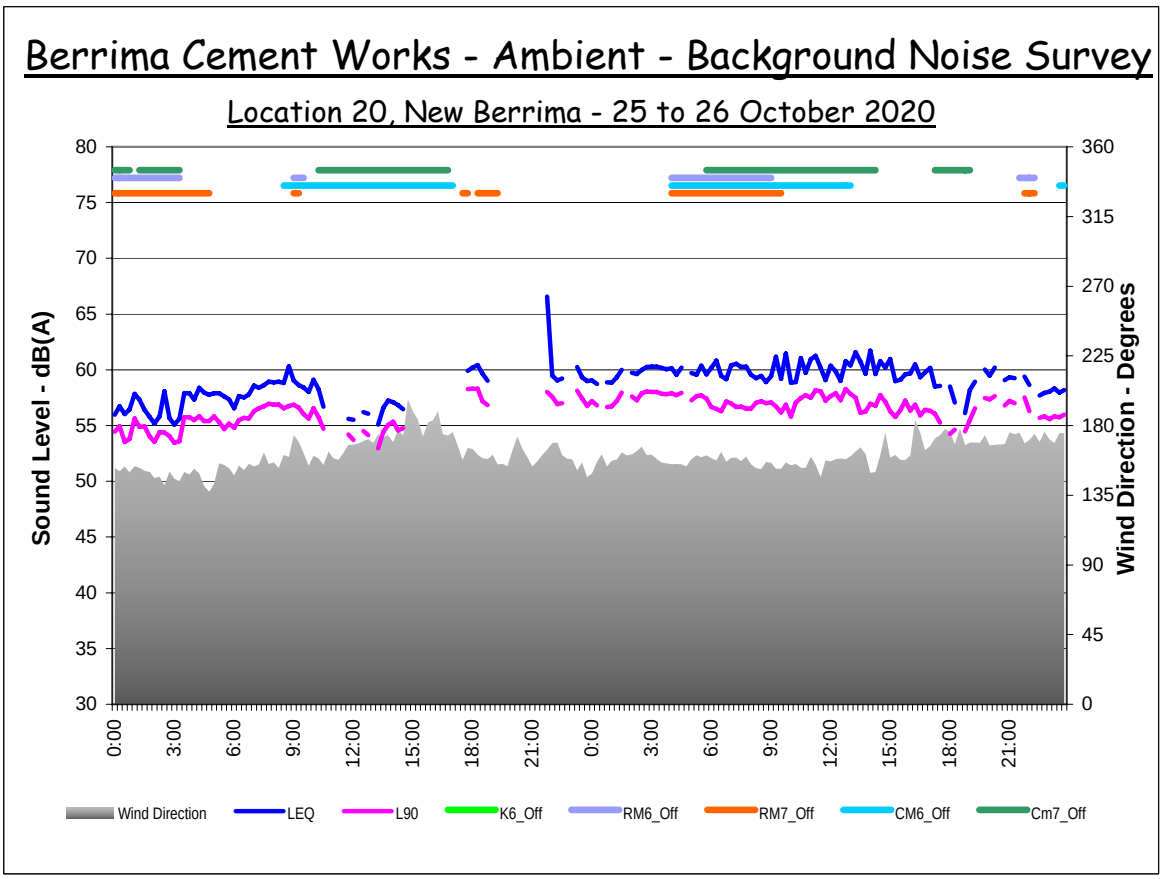

Berrima Cement Works - Ambient - Background Noise Survey
Location 20, New Berrima - 21 to 22 October 2020
Sound Level - dB(A)
Wind Speed m/s
Time of Day
Wind Speed >10m/s
Wind Speed <10m/s
LAEQ Period
LEQ
L90
90% LA90
Rainfall

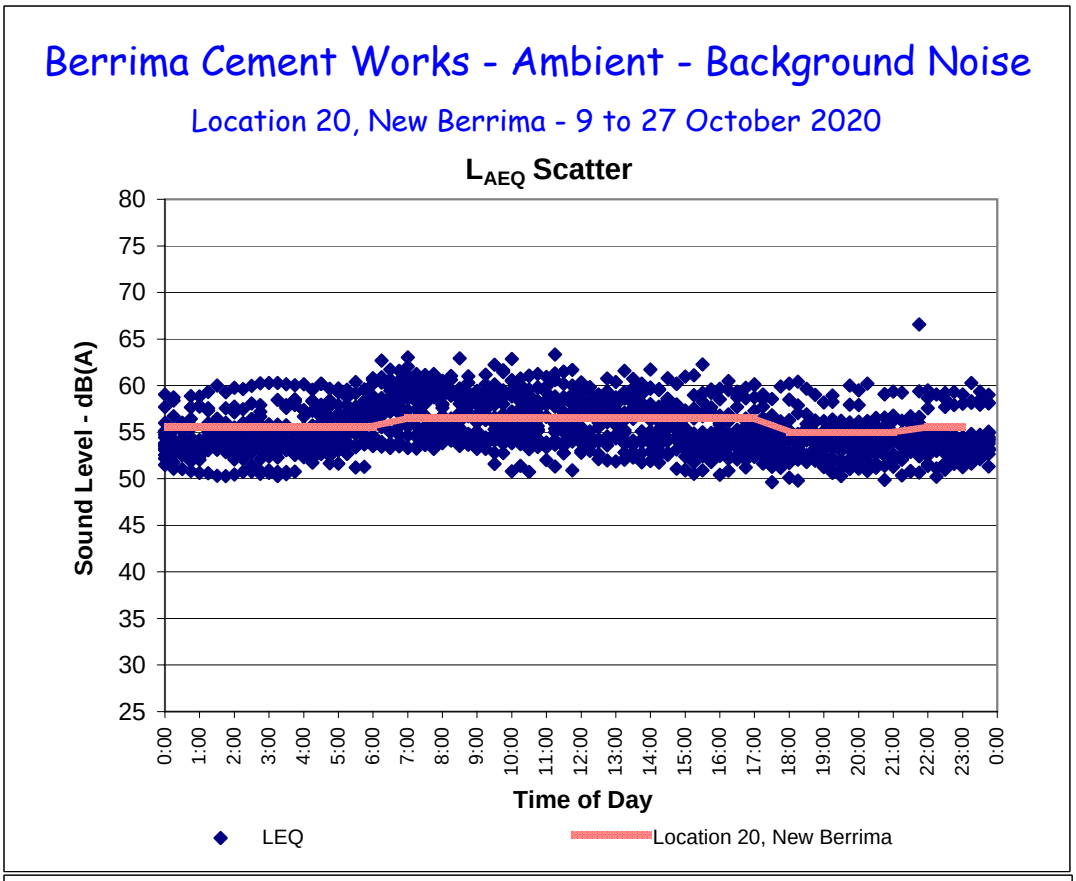

Berrima Cement Works - Ambient - Background Noise Survey
Location 20, New Berrima - 21 to 22 October 2020
Sound Level - dB(A)
Wind Direction - degrees
Time of Day
Wind Direction
LEQ
L90
K6_Off
RM6_Off
RM7_Off
CM6_Off
Cm7_Off

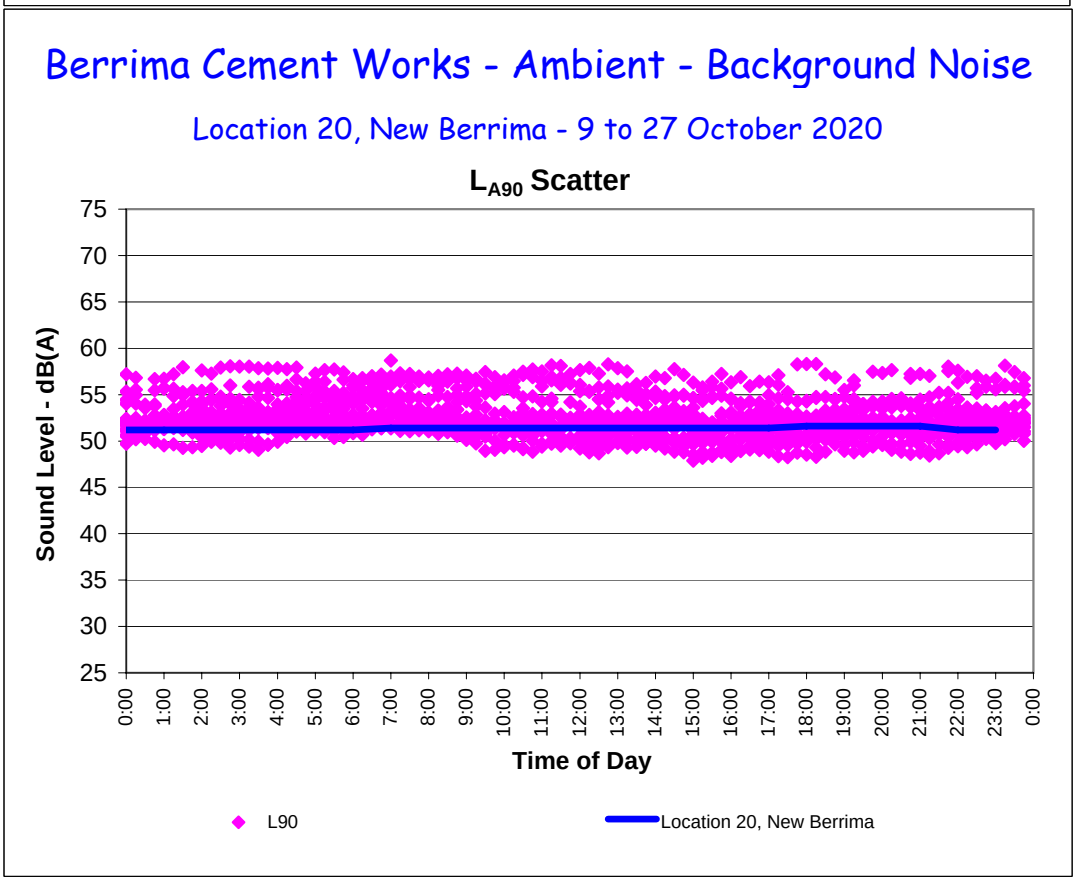

Berrima Cement Works - Ambient - Background Noise Survey
Location 20, New Berrima - 23 to 24 October 2020
Sound Level - dB(A)
Wind Speed m/s
Time of Day
Wind Speed >10m/s
Wind Speed <10m/s
LAEQ Period
LEQ
L90
90% LA90
Rainfall

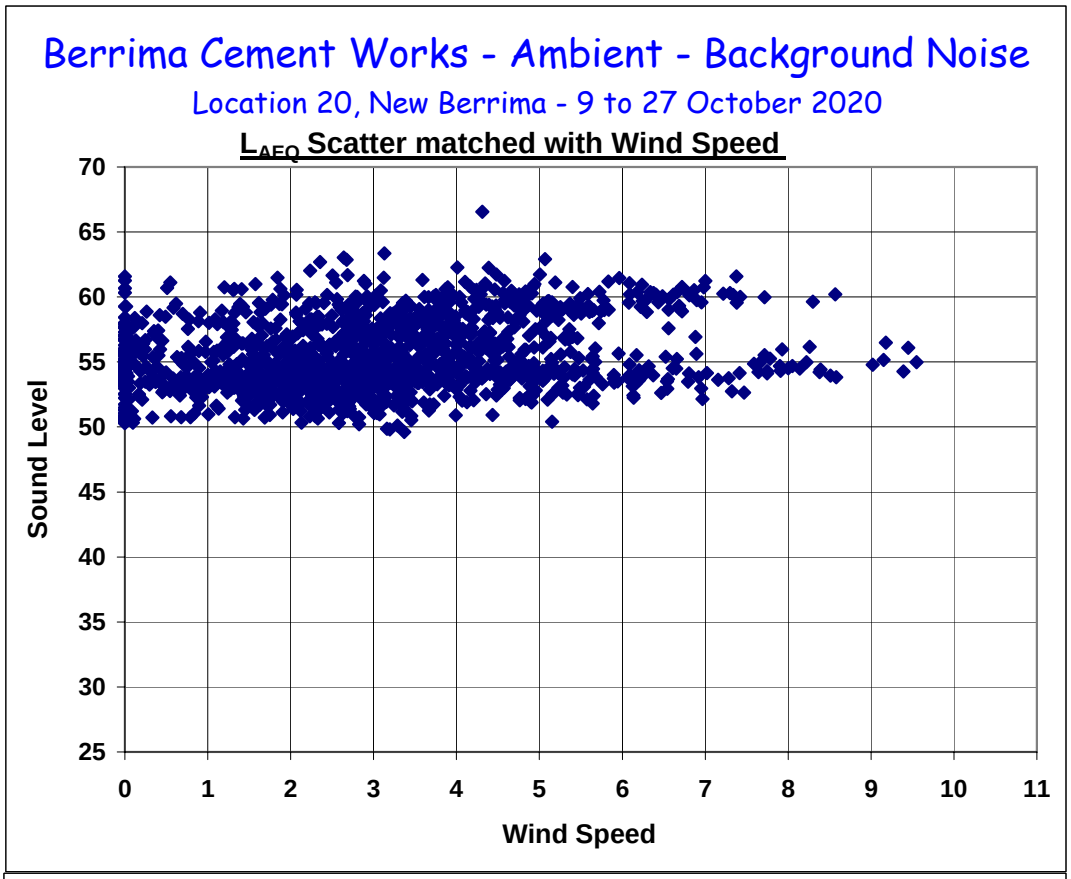

Berrima Cement Works - Ambient - Background Noise Survey
Location 20, New Berrima - 23 to 24 October 2020
Sound Level - dB(A)
Wind Direction - degrees
Time of Day
Wind Direction
LEQ
L90
K6_Off
RM6_Off
RM7_Off
CM6_Off
Cm7_Off

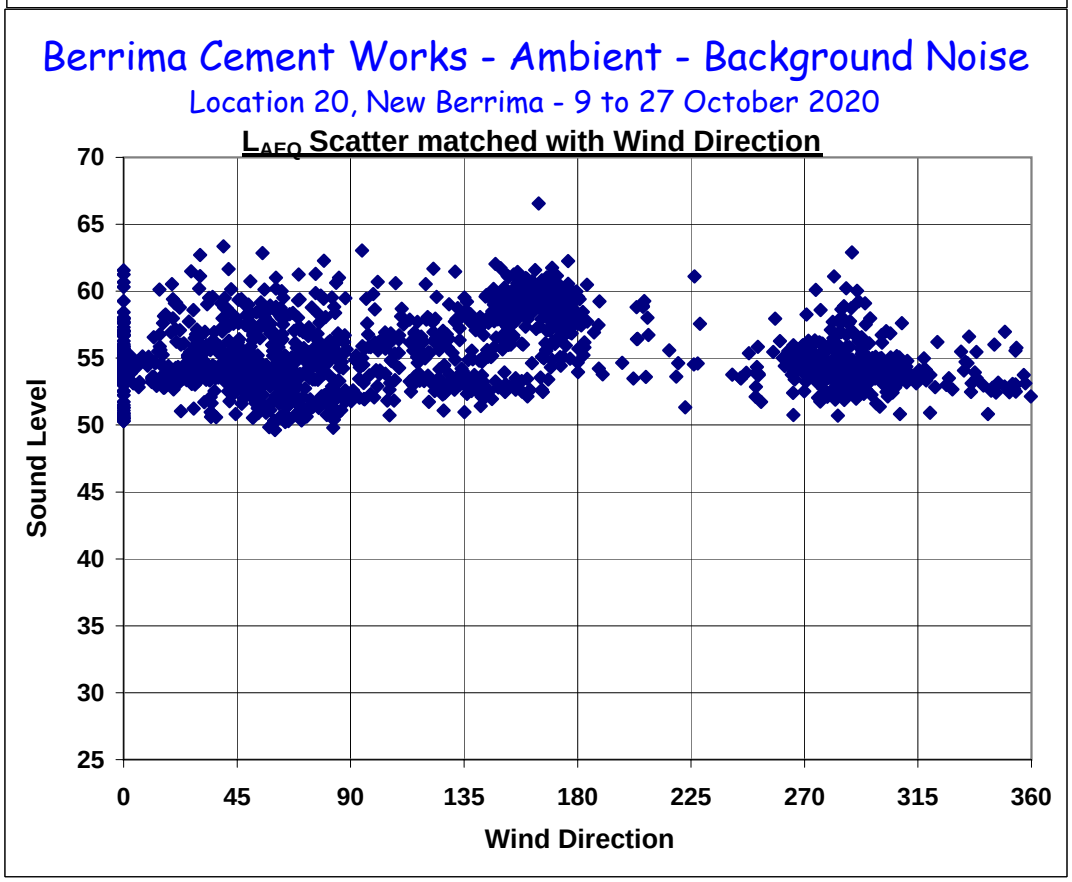

Berrima Cement Works - Ambient - Background Noise
Location 20, New Berrima - 25 to 26 October 2020
Sound Level - dB(A)
Wind Speed m/s
Time of Day
Wind Speed >10m/s
Wind Speed <10m/s
LAEQ Period
LEQ
L90
90% LA90
Rainfall

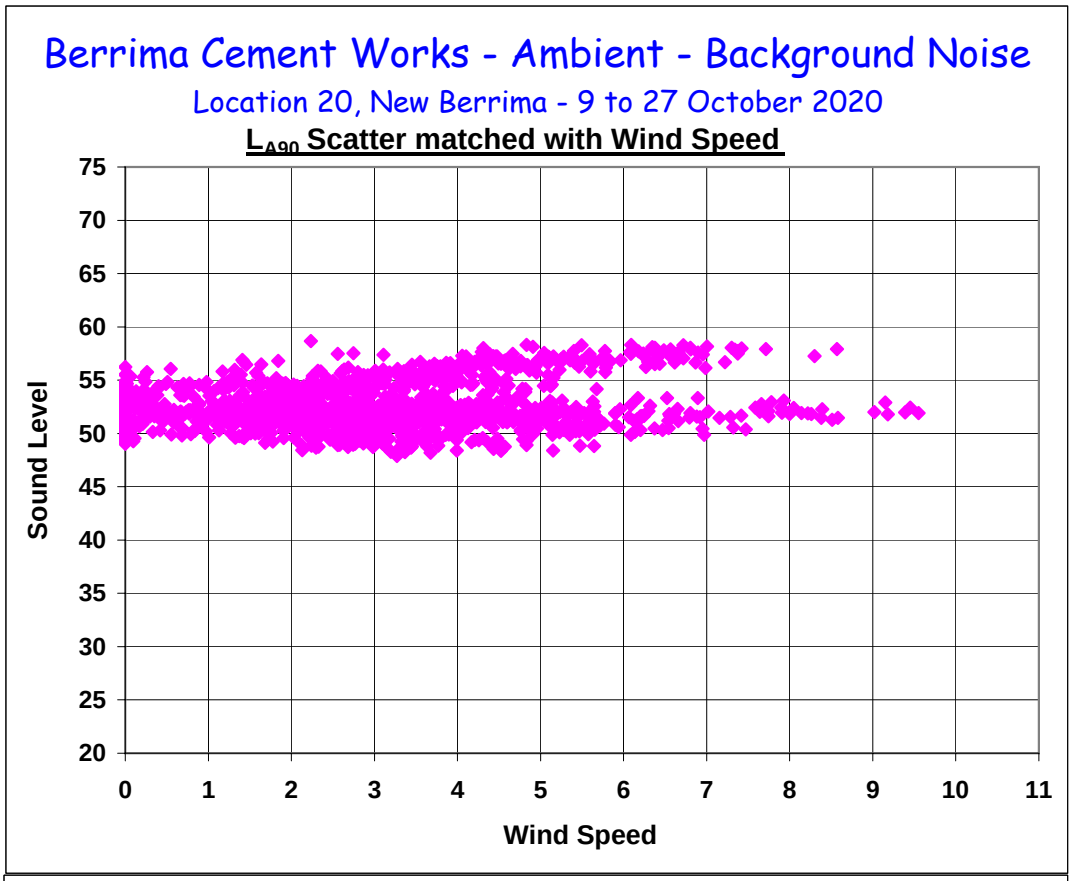

Berrima Cement Works - Ambient - Background Noise Survey
Location 20, New Berrima - 25 to 26 October 2020
Sound Level - dB(A)
Wind Direction - Degrees
Wind Direction
LEQ
L90
K6_Off
RM6_Off
RM7_Off
CM6_Off
Cm7_Off

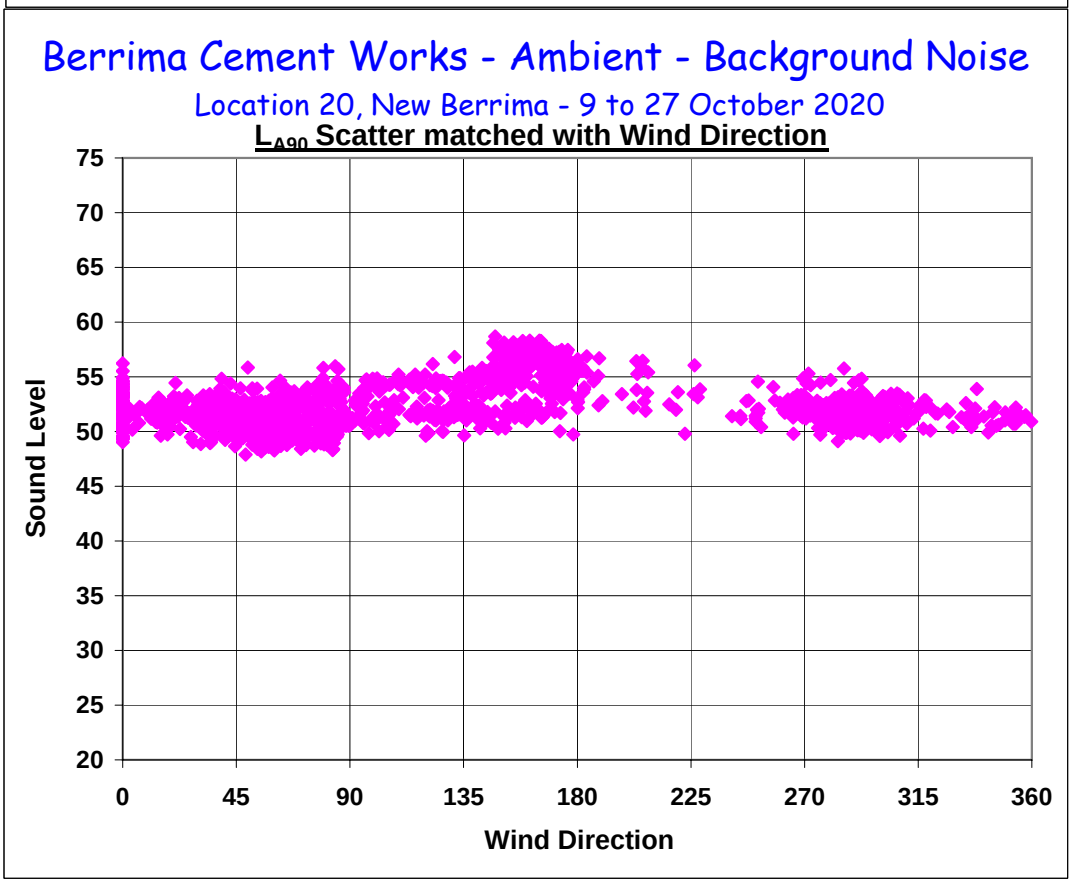

Berrima Cement Works - Ambient - Background Noise
Location 20, New Berrima - 9 to 27 October 2020
LAEQ Scatter
Sound Level - dB(A)
80
75
70
65
60
55
50
45
40
35
30
25
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00
Time of Day
LEQ
Location 20, New Berrima


Berrima Cement Works - Ambient - Background Noise
Location 20, New Berrima - 9 to 27 October 2020
LA90 Scatter
Sound Level - dB(A)
75
70
65
60
55
50
45
40
35
30
25
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00
Time of Day
L90
Location 20, New Berrima


Berrima Cement Works - Ambient - Background Noise
Location 20, New Berrima - 9 to 27 October 2020
LAEQ Scatter matched with Wind Speed
Sound Level
70
65
60
55
50
45
40
35
30
25
0
1
2
3
4
5
6
7
8
9
10
11
Wind Speed

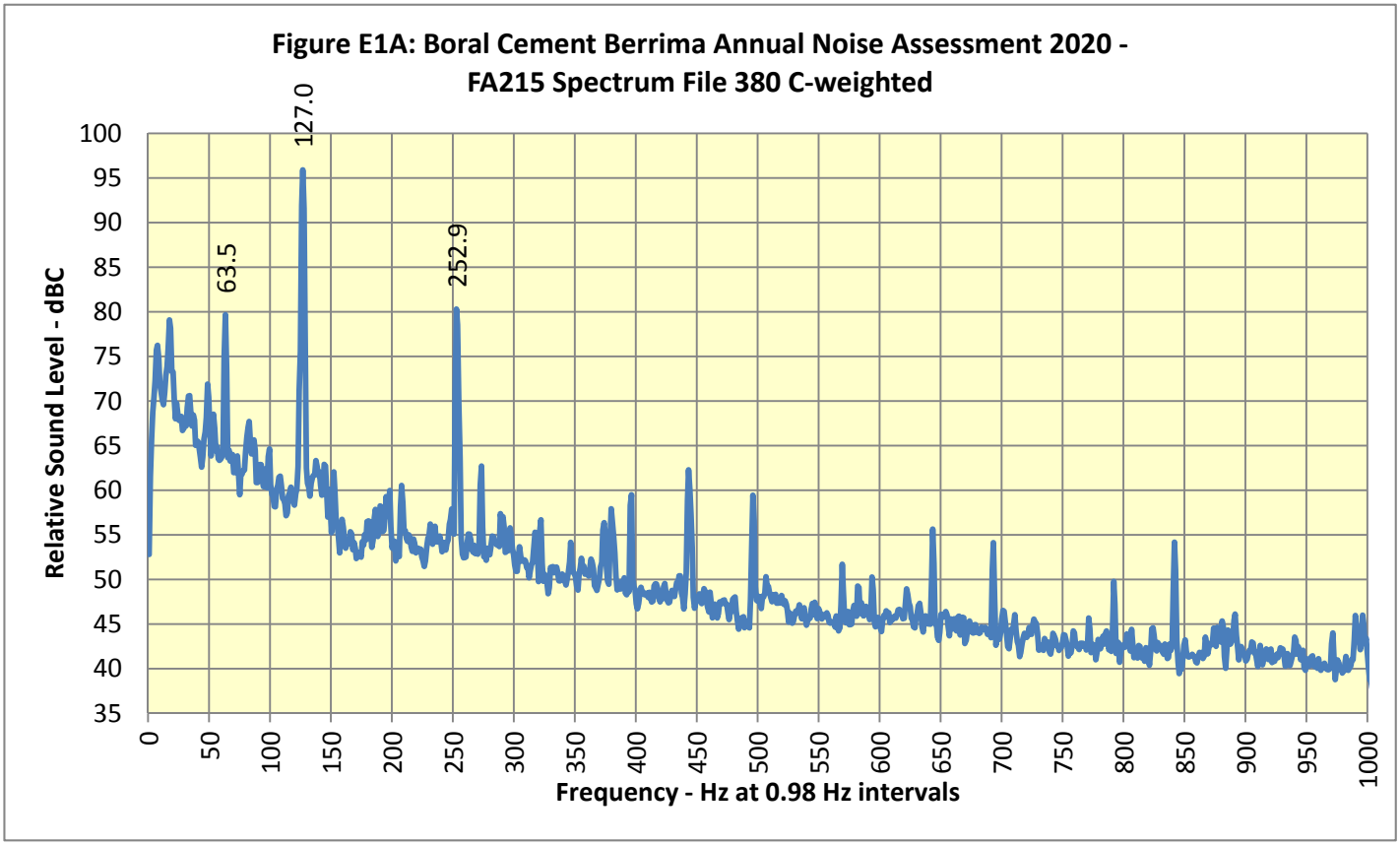

Berrima Cement Works - Ambient - Background Noise
Location 20, New Berrima - 9 to 27 October 2020
LAEQ Scatter matched with Wind Direction
Sound Level
70
65
60
55
50
45
40
35
30
25
0
45
90
135
180
225
270
315
360
Wind Direction

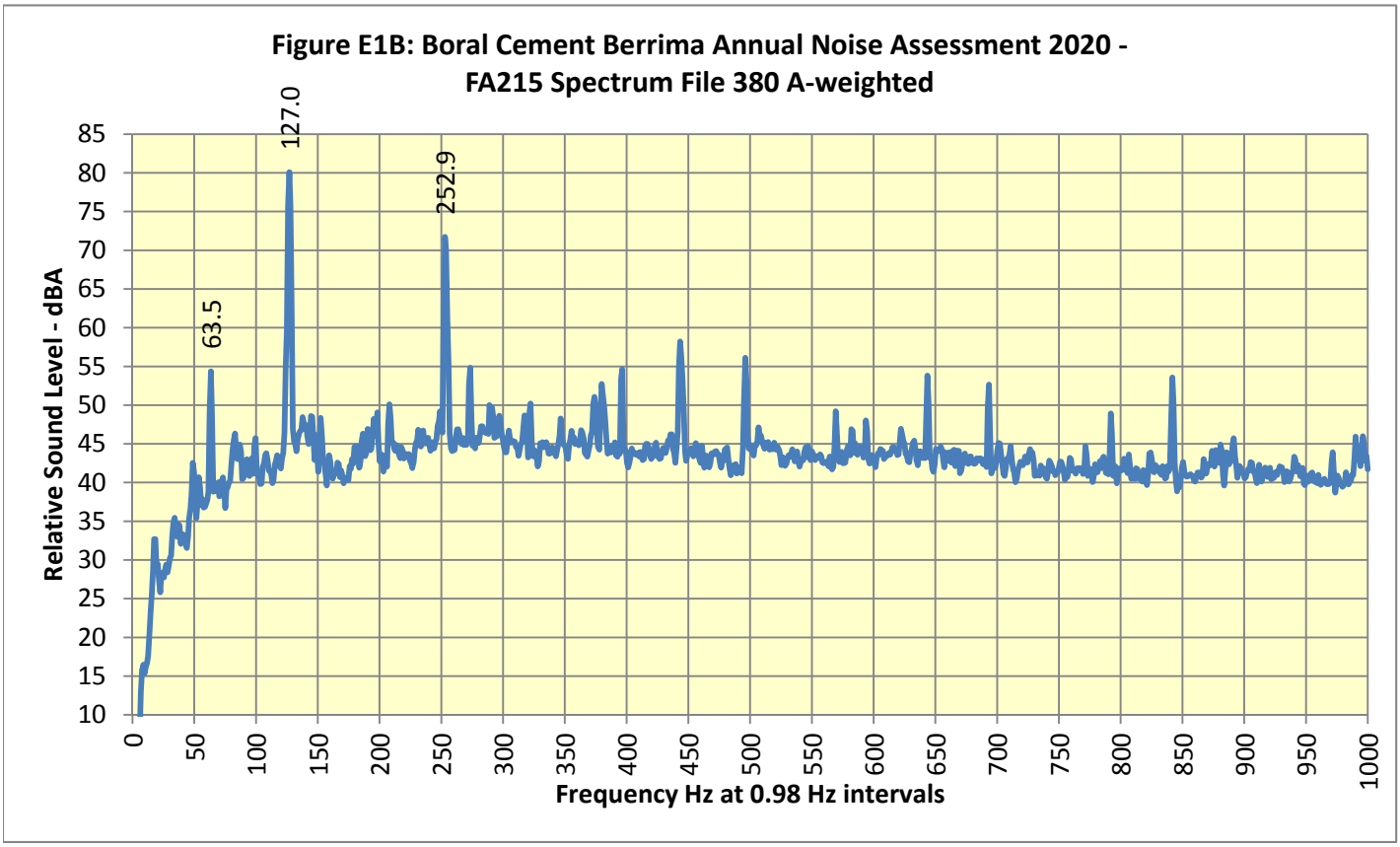

Berrima Cement Works - Ambient - Background Noise
Location 20, New Berrima - 9 to 27 October 2020
LA90 Scatter matched with Wind Speed
Sound Level
75
70
65
60
55
50
45
40
35
30
25
20
0
1
2
3
4
5
6
7
8
9
10
11
Wind Speed


Berrima Cement Works - Ambient - Background Noise
Location 20, New Berrima - 9 to 27 October 2020
LA90 Scatter matched with Wind Direction
Sound Level
75
70
65
60
55
50
45
40
35
30
25
20
0
45
90
135
180
225
270
315
360
Wind Direction

ABN: 25 153 946 064
ACN: 153 946 064

Appendix E: Narrow-band spectra from attended measurement recordings





spectrum man 380

Narrow Band Analysis

Berrima Cement Annual Compliance Noise Study October 2020

Figure E2: Day time Spectrum for Train Run Out Loc 20
measured at 4:39 PM 21/10/20 237 sec DR-100_0110

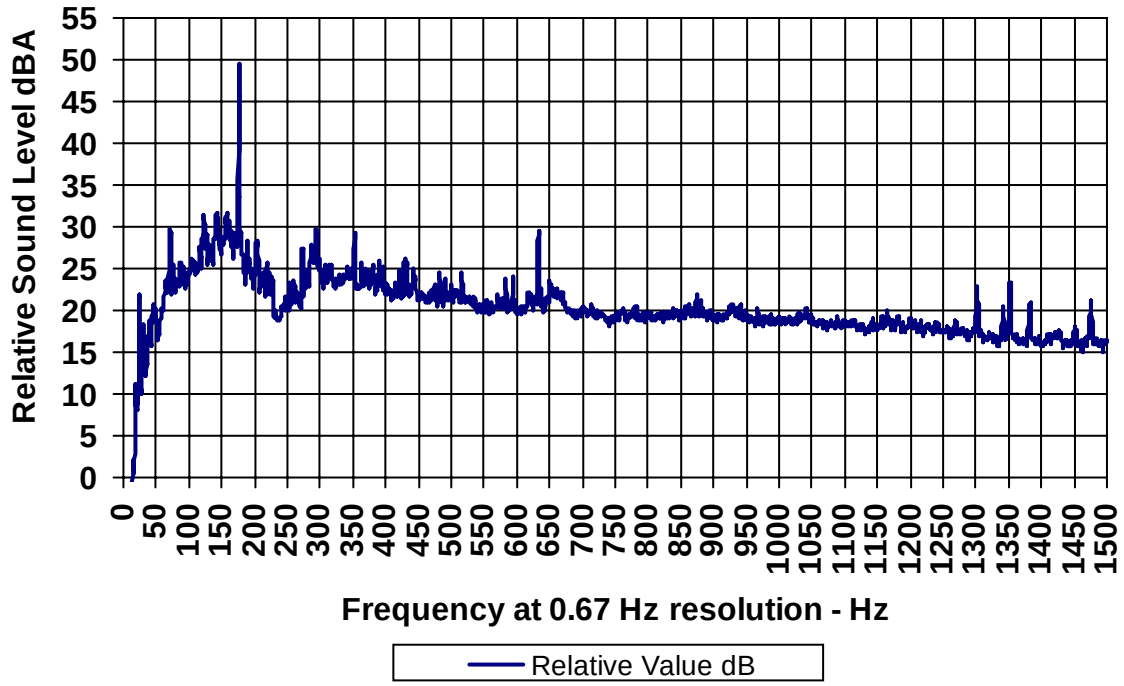


Figure E3: Evening time Spectrum for - Before Intermodal 12 Brisbane St
measured at 9:17 PM 12/10/20 2m DR-100_0096

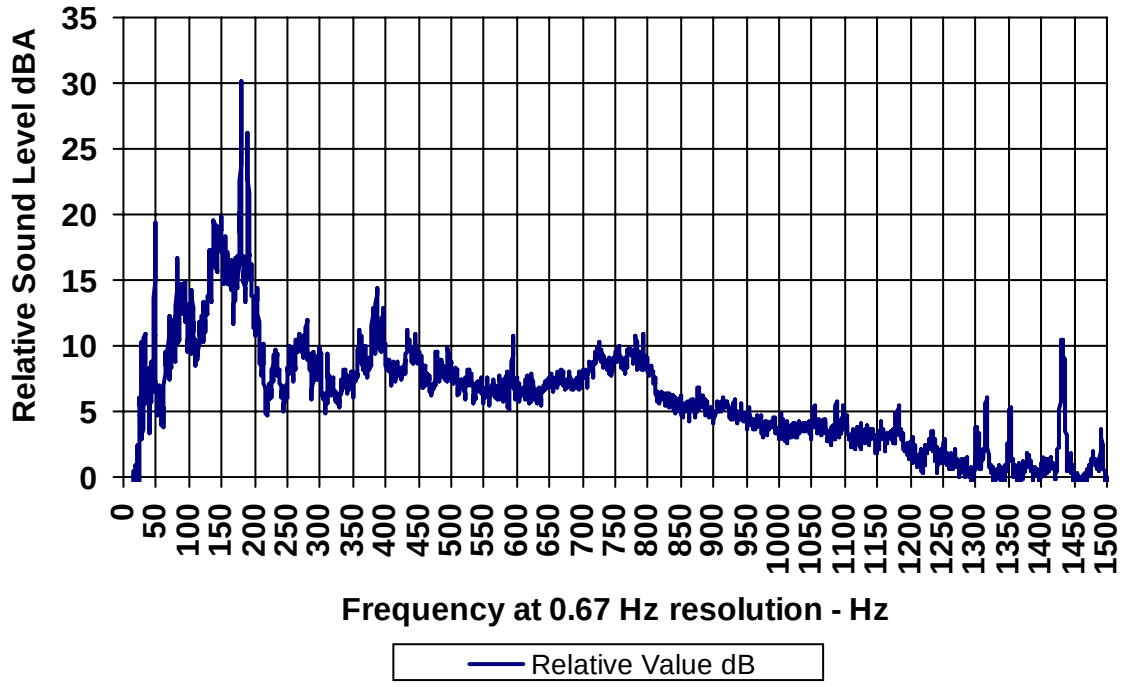


Figure E4: Evening time Spectrum for - Before Intermodal 4 Melbourne St measured at 8:51 PM 12/10/20 2m1s DR-100_0094

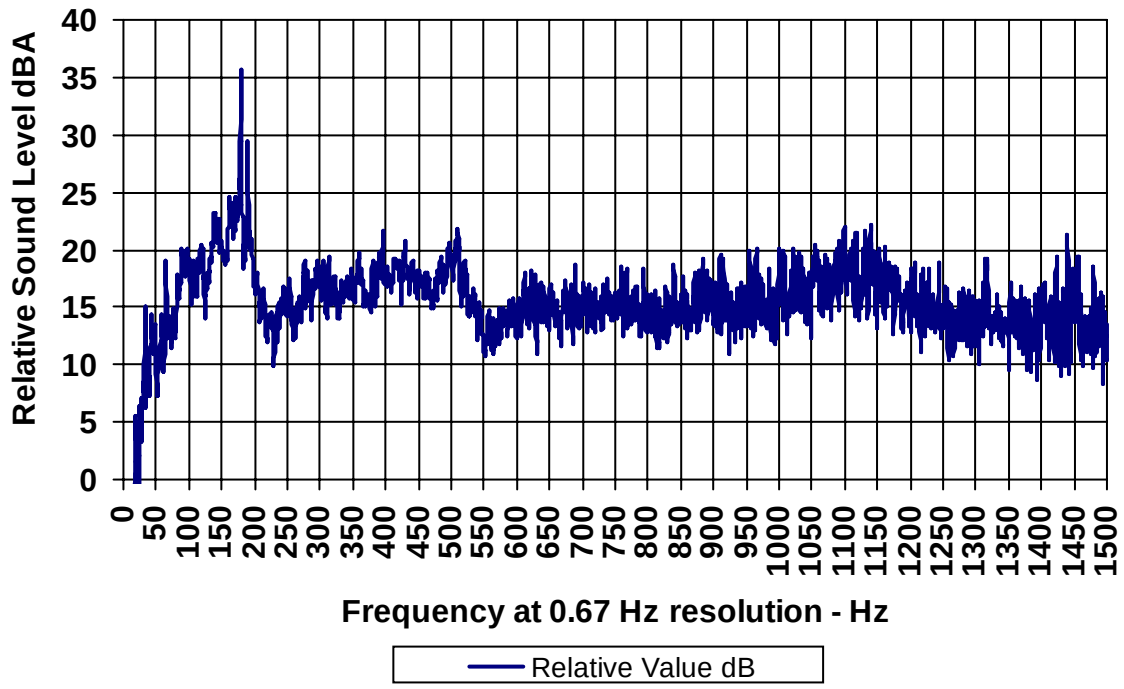


Figure E5: Evening time Spectrum for - Before Intermodal North Fence measured at 8:10 PM 12/10/20 2m DR-100_0090

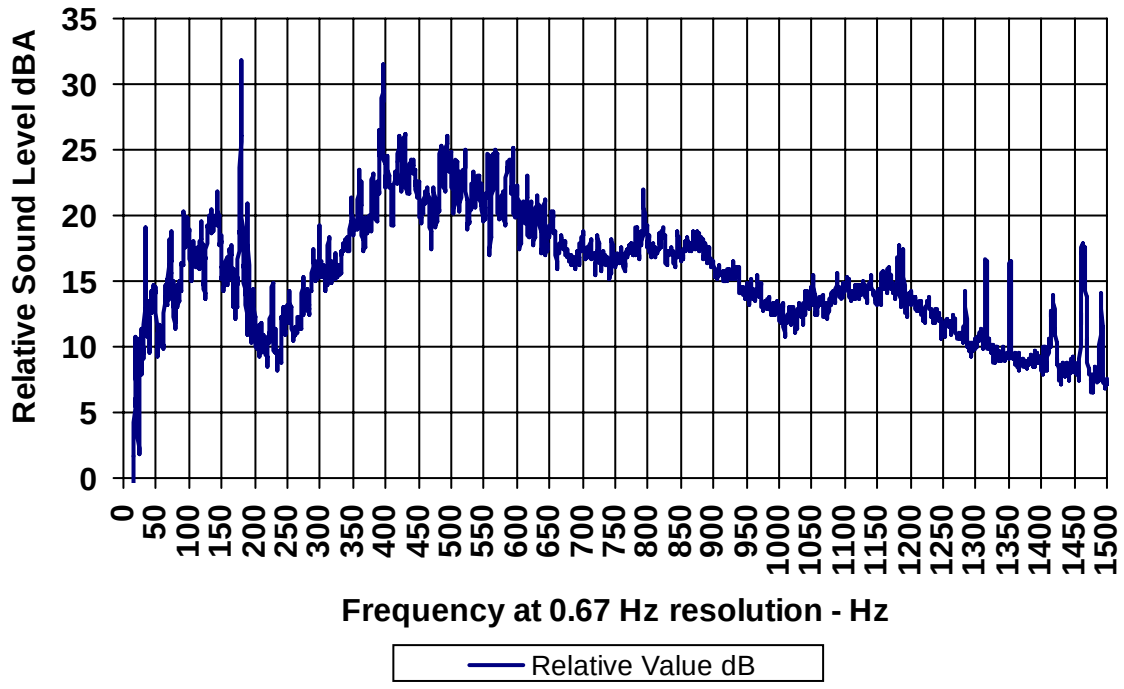


Figure E6: Evening time Spectrum for - Before Intermodal Taylor Av
measured at 9:41 PM 12/10/20 2m DR-100_0097

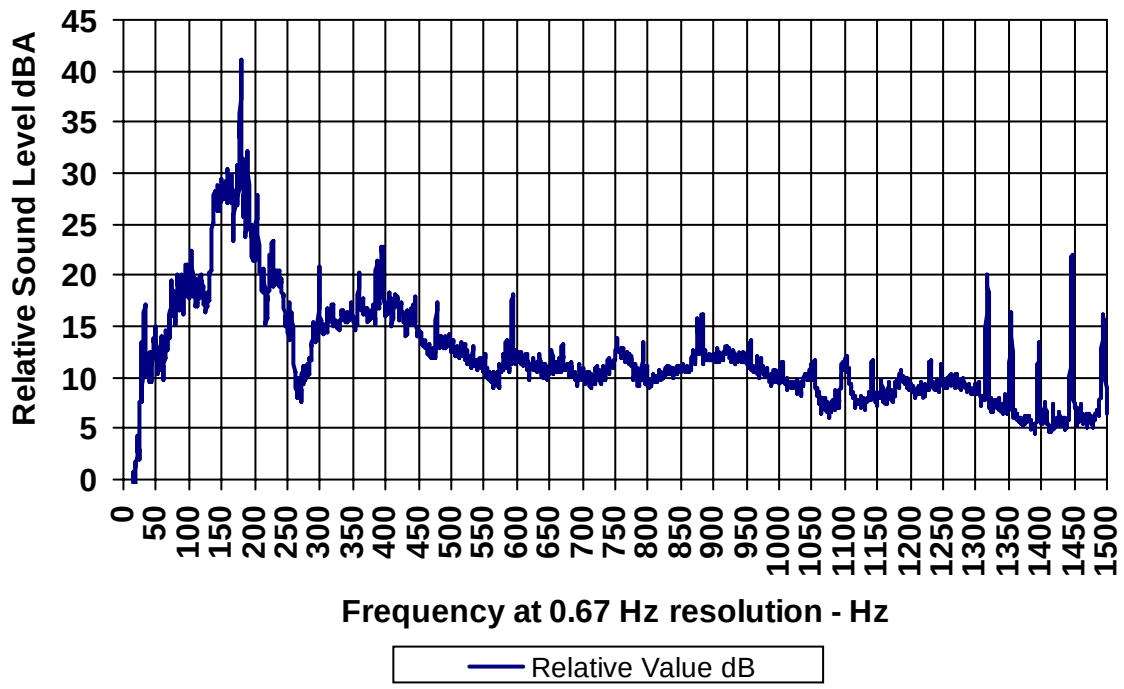


Figure E7: Evening time Spectrum for 12 Brisbane St
measured at 9:00 PM 21/10/20 2m1s DR-100_0117

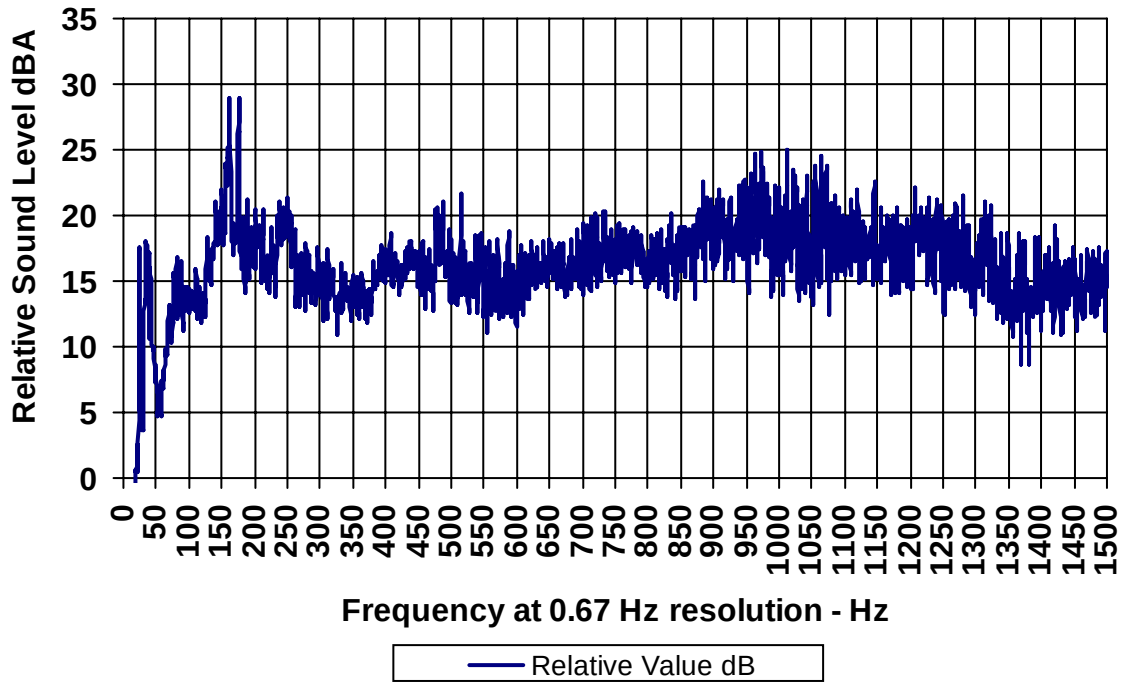


Figure E8: Evening time Spectrum for 4 Melbourne St measured at 8:36 PM 21/10/20 2m1s DR-100_0116

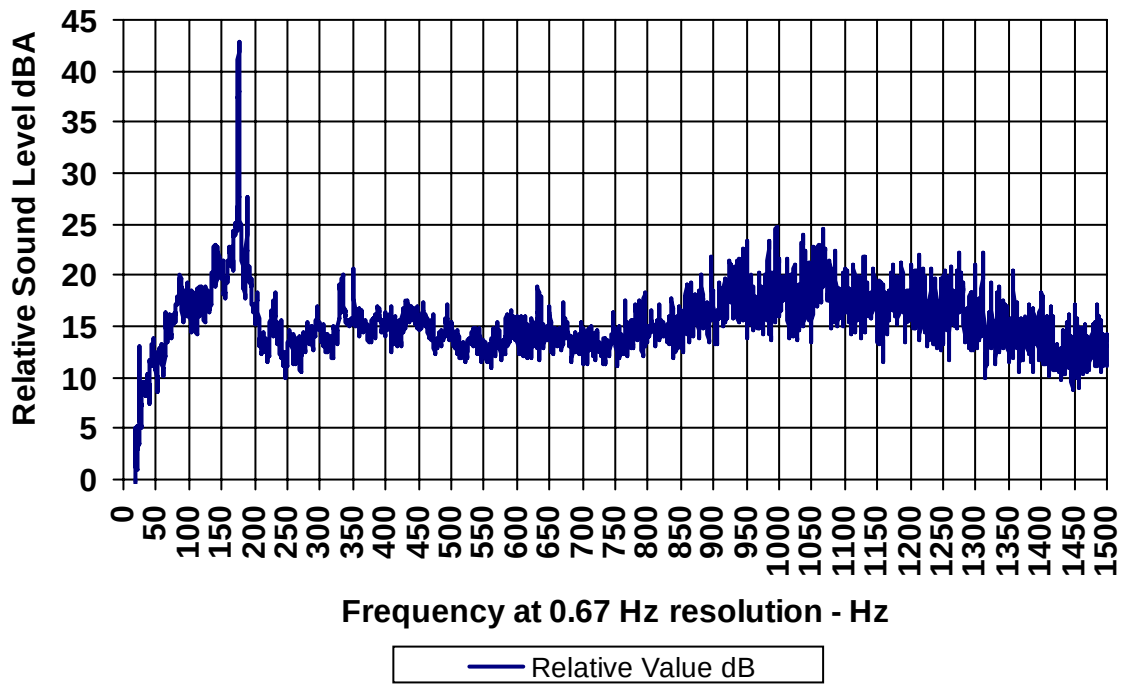


Figure E9: Evening time Spectrum for Argyle St measured at 8:13 PM 21/10/20 2m2s DR-100_0115

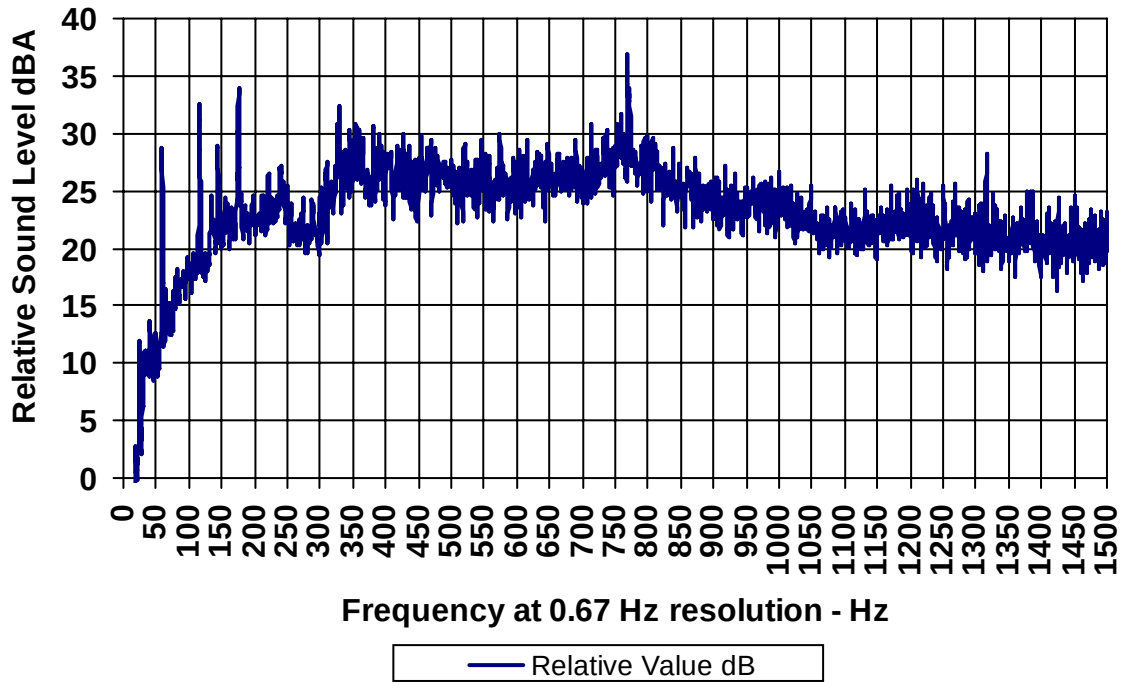


Figure E10: Evening time Spectrum for Loc 20 measured at 7:20 PM 21/10/20 2min3 sec DR-100_0113

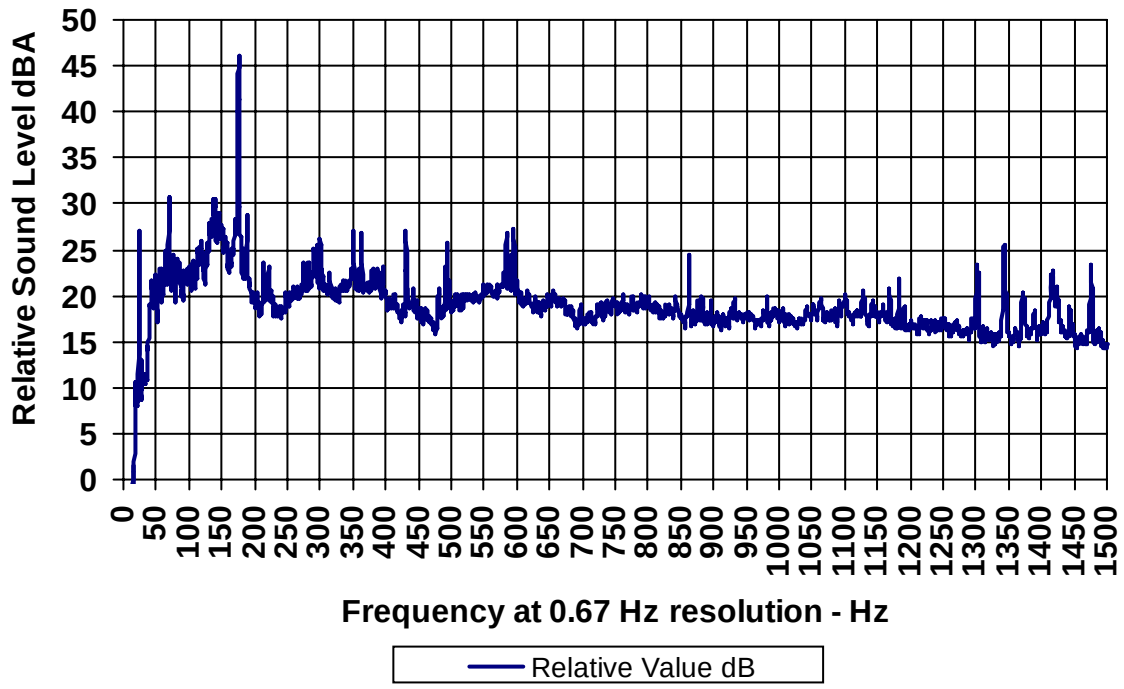


Figure E11: Evening time Spectrum for North Fence measured at 7:43 PM 21/10/20 2m32s DR-100_0114

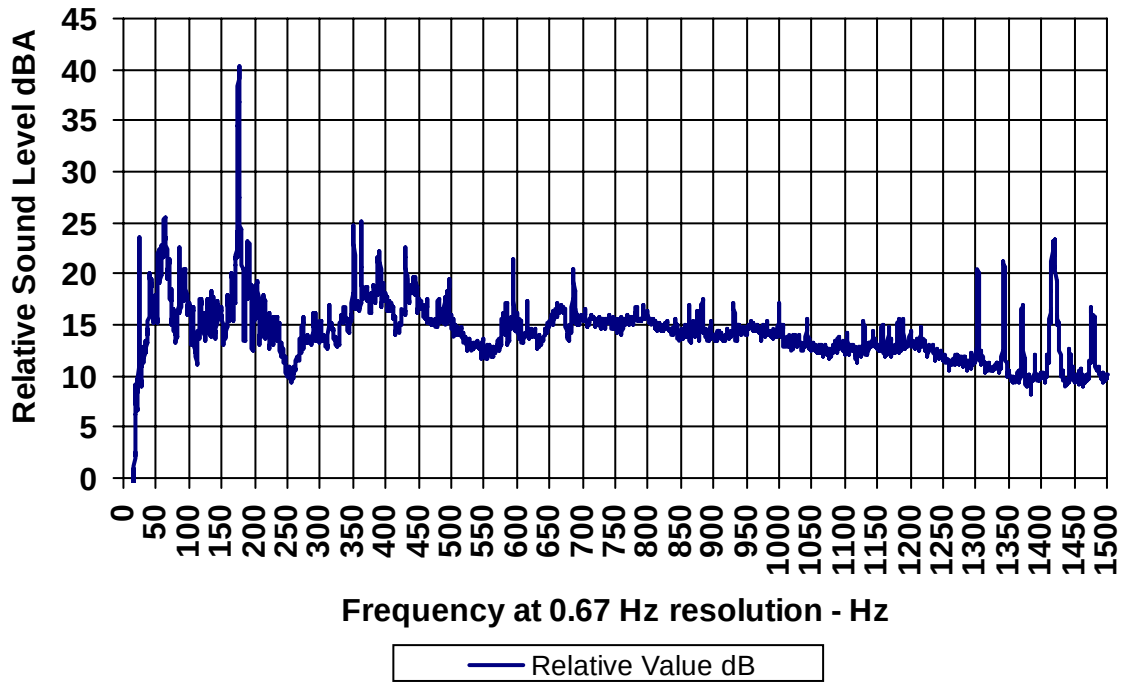


Figure E12: Evening time Spectrum for Taylor Av measured at 9:27 PM 21/10/20 1m30s DR-100_0118

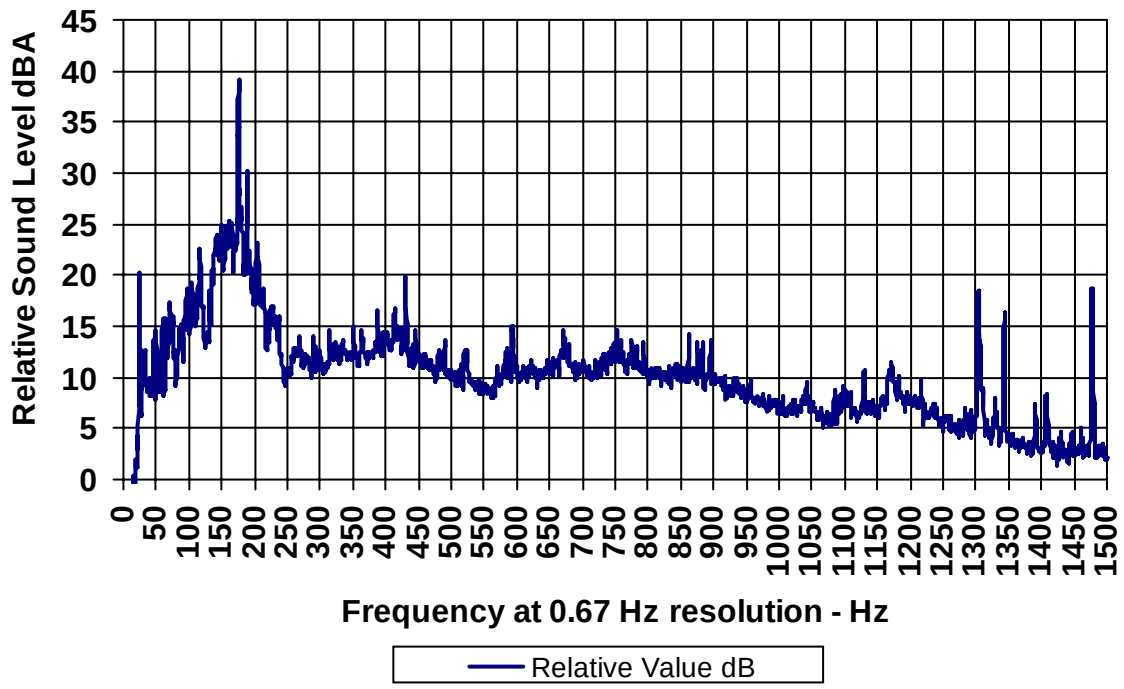


Figure E13: Night time Spectrum for 12 Brisbane St measured at 12:04 AM 22/10/20 1m31s DR-100_0123

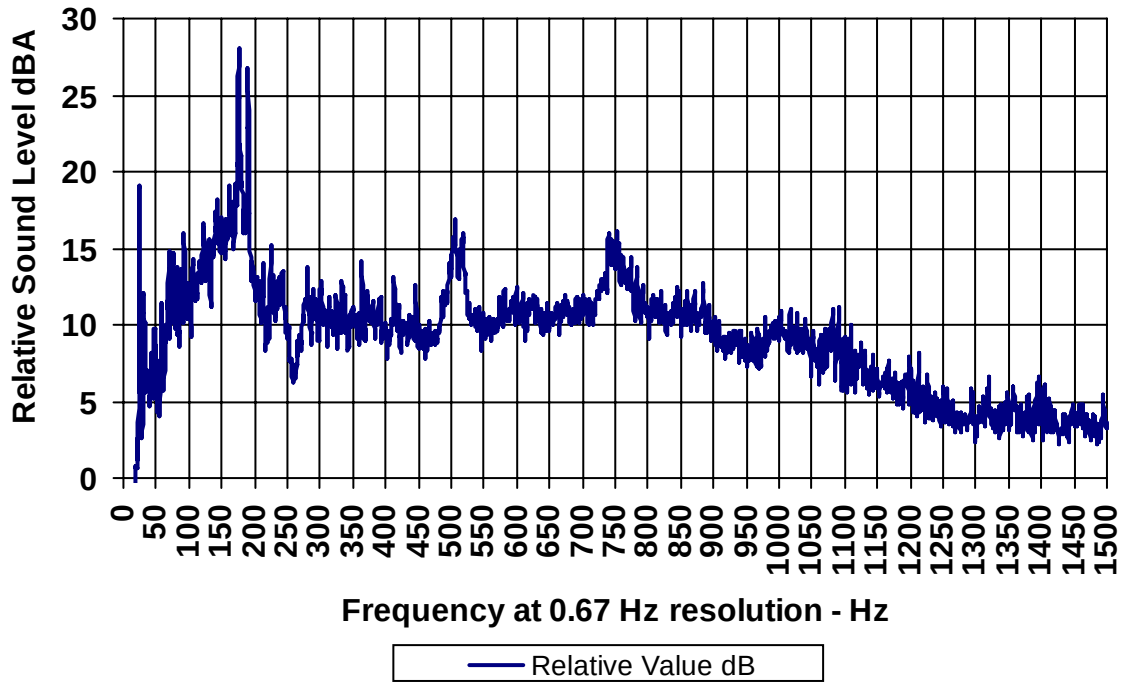


Figure E14: Night time Spectrum for 4 Melbourne St measured at 10:21 PM 21/10/20 1m DR-100_0120

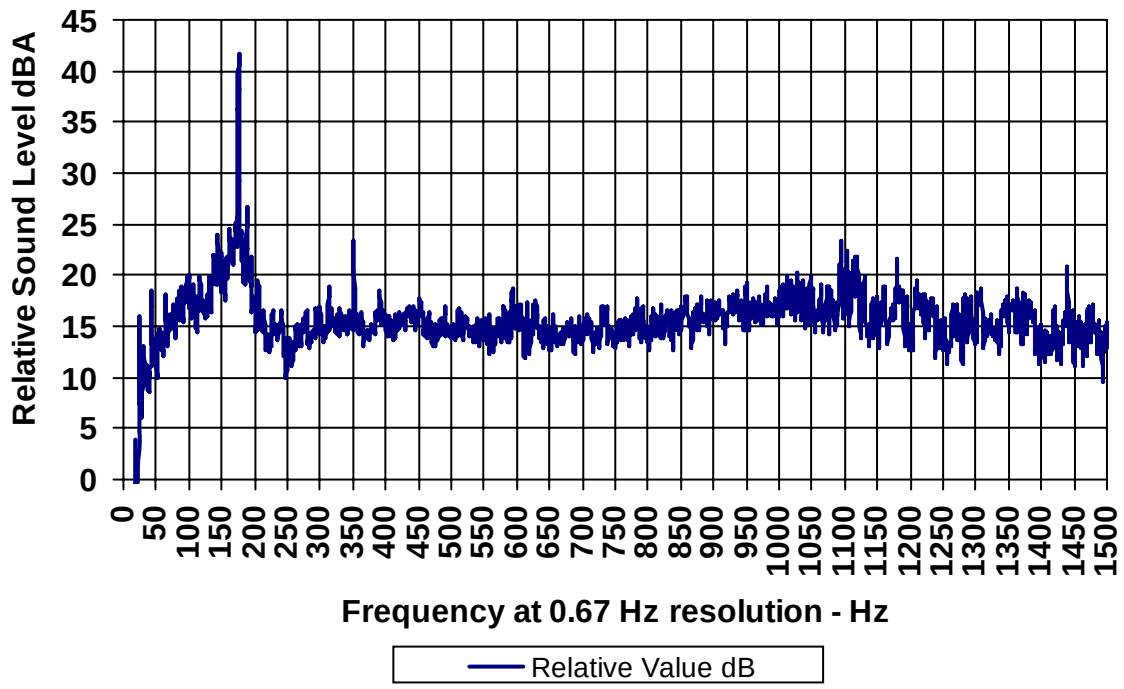


Figure E15: Night time Spectrum for Argyle St measured at 12:26 AM 22/10/20 2m DR-100_0124

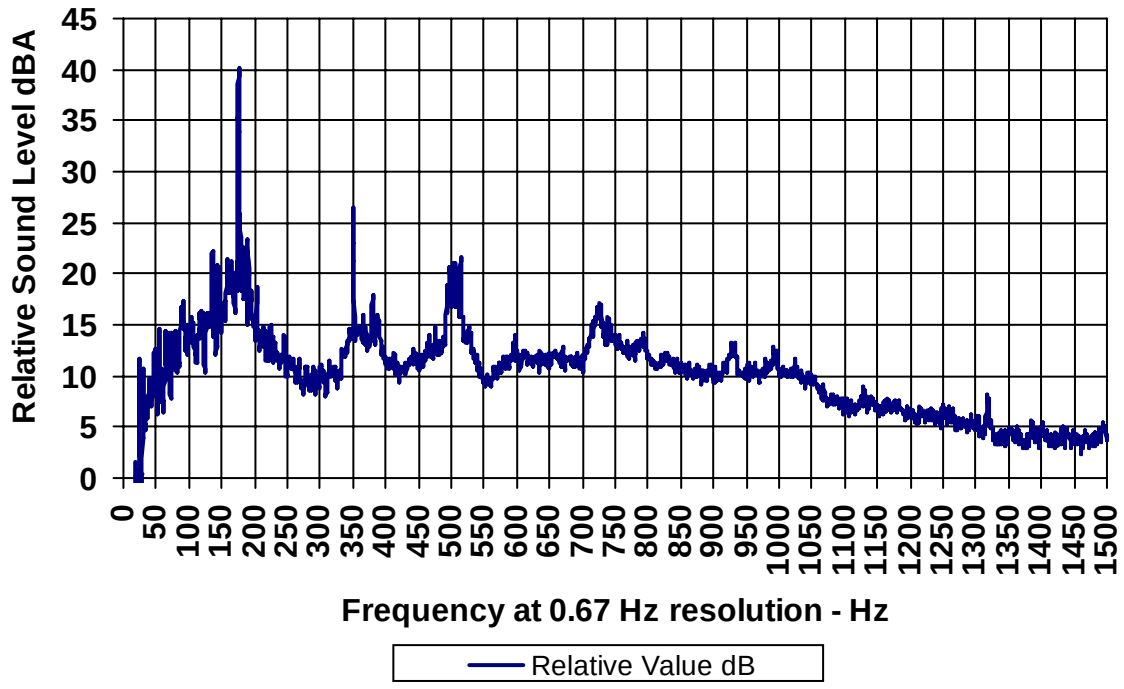


Figure E16: Night time Spectrum for Loc 20 measured at 10:46 PM 21/10/20 1m30s DR-100_0121

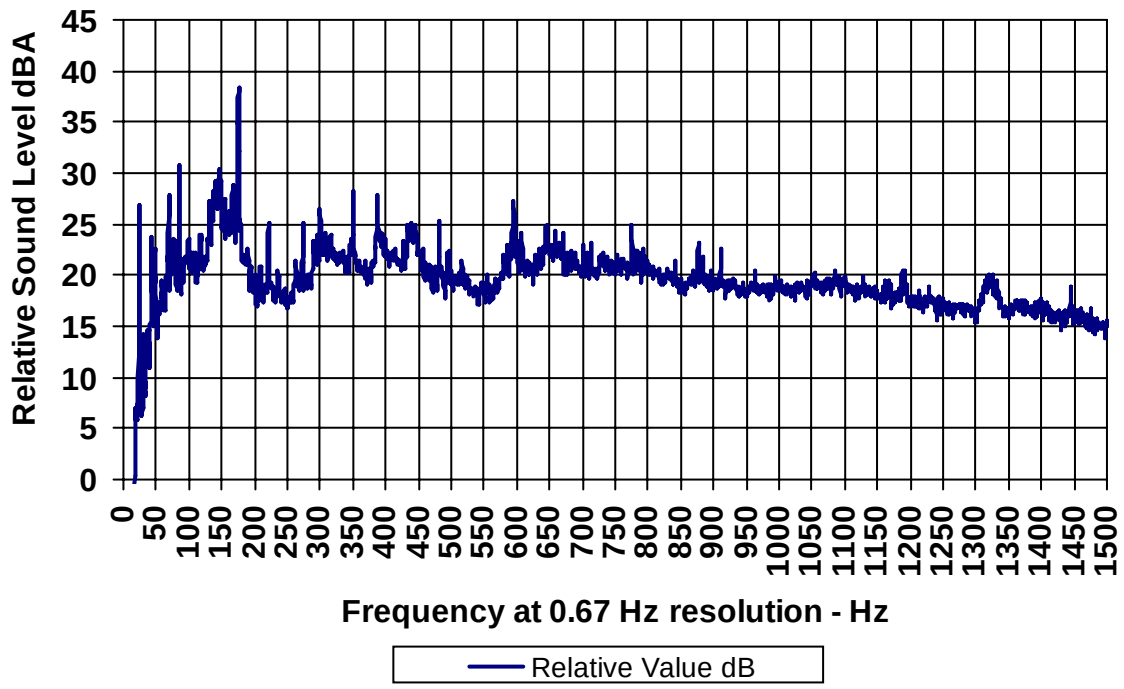


Figure E17: Night time Spectrum for North Fence measured at 11:10 PM 21/10/20 1m30s DR-100_0122

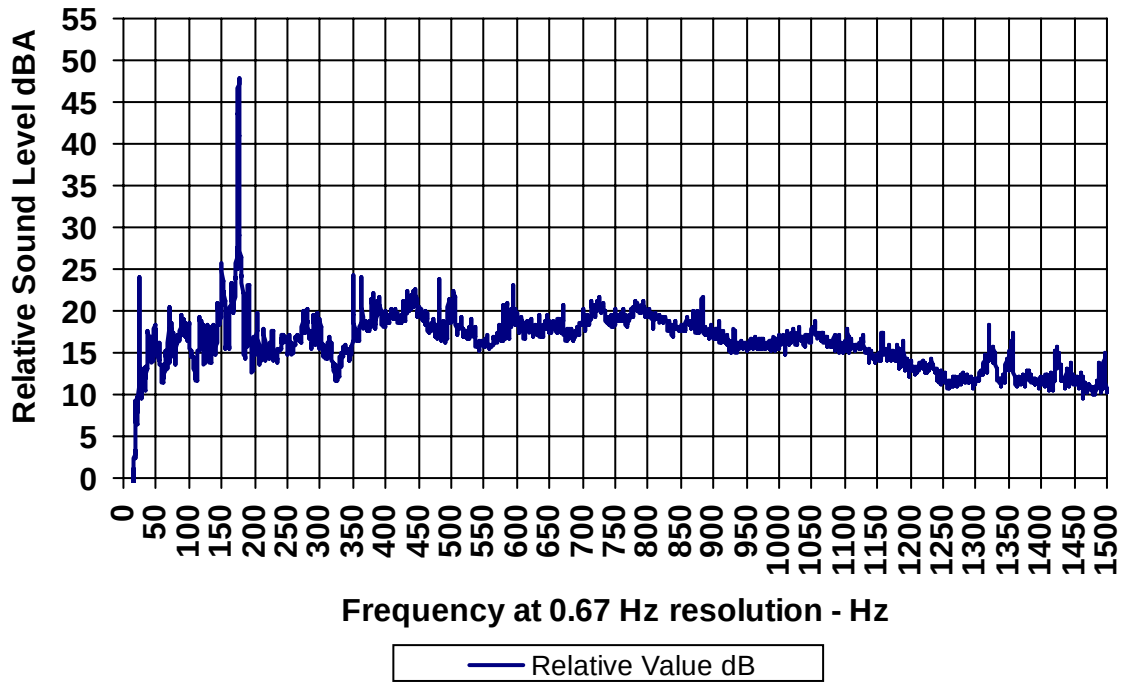


Figure E18: Night time Spectrum for Taylor Av measured at 10:00 PM 21/10/20 1m DR-100_0119

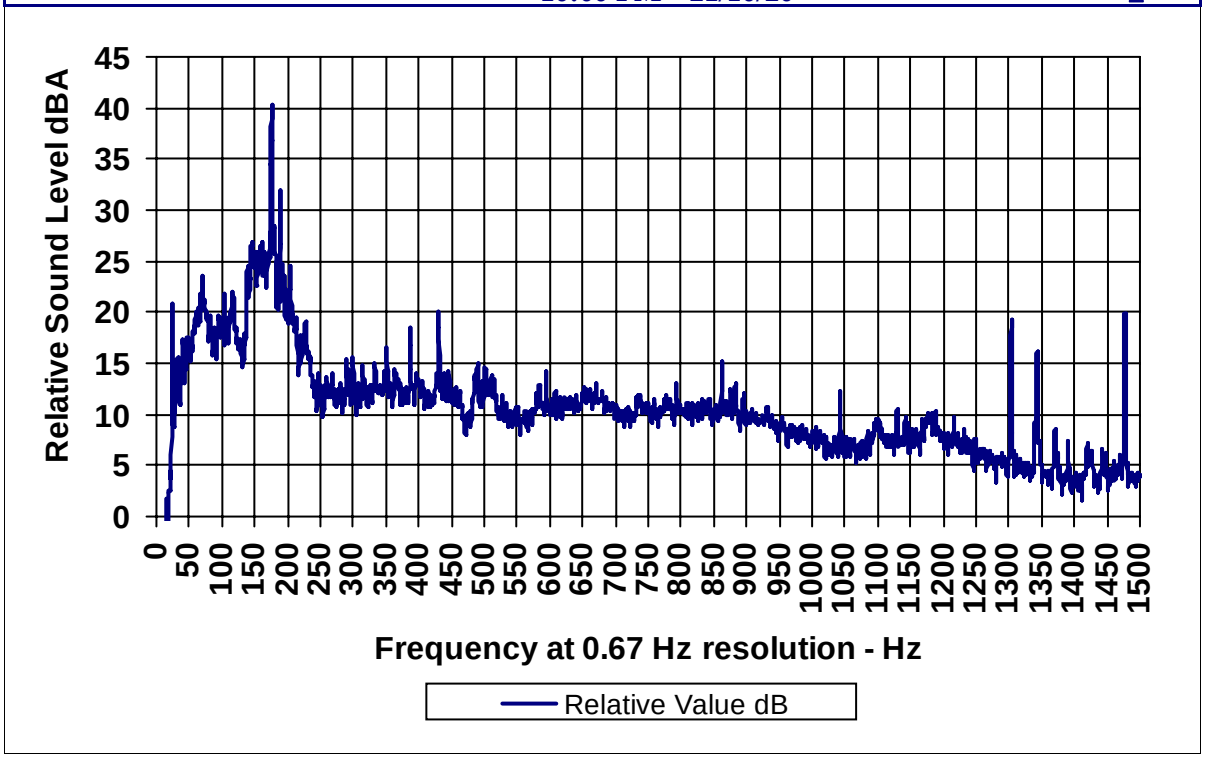


Figure E19:

Day Time Spectrum for Adelaide St near Taylor Ave (20m) inline with 72 Taylor measured at 5:48pm 27/10/20

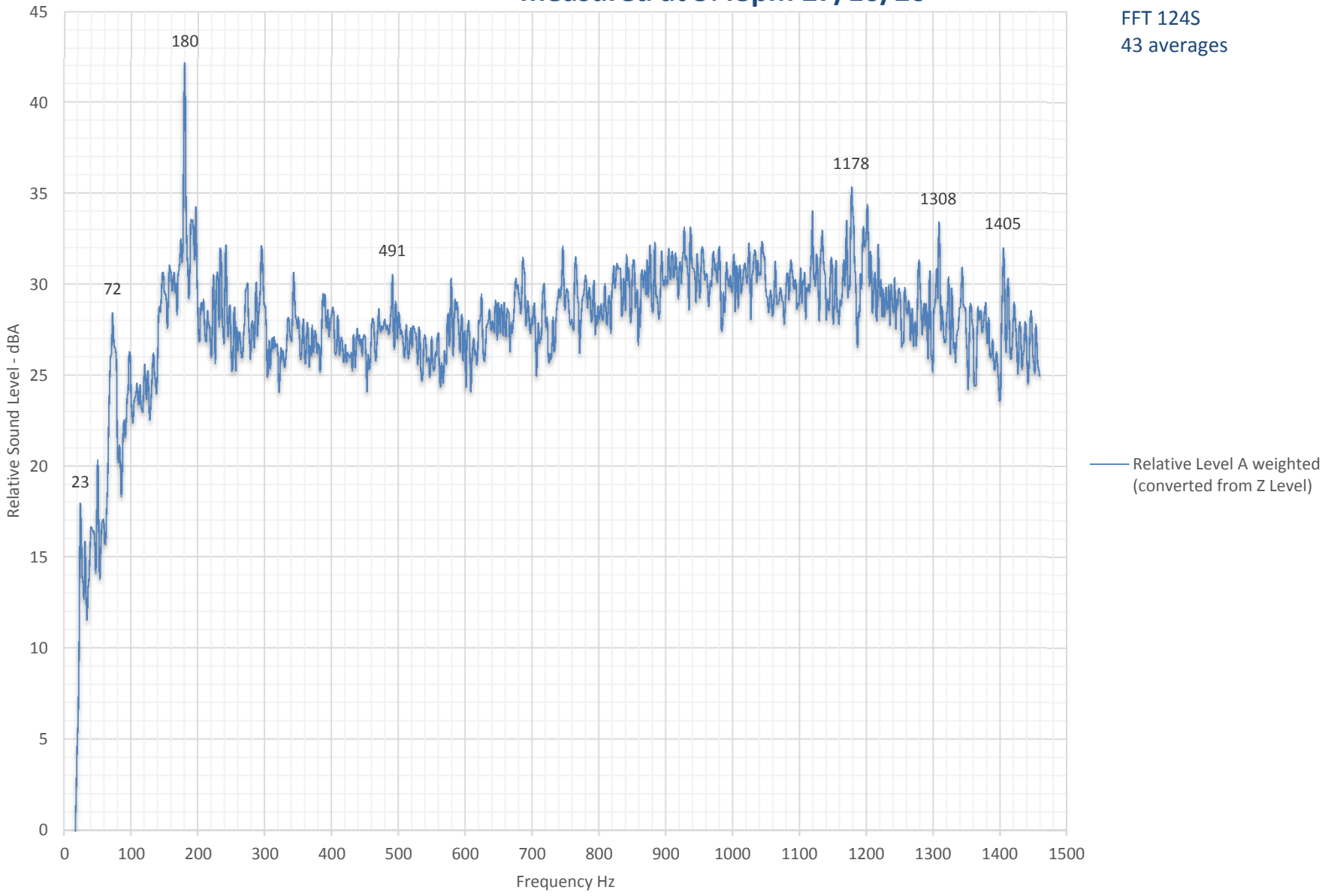


Figure E20:

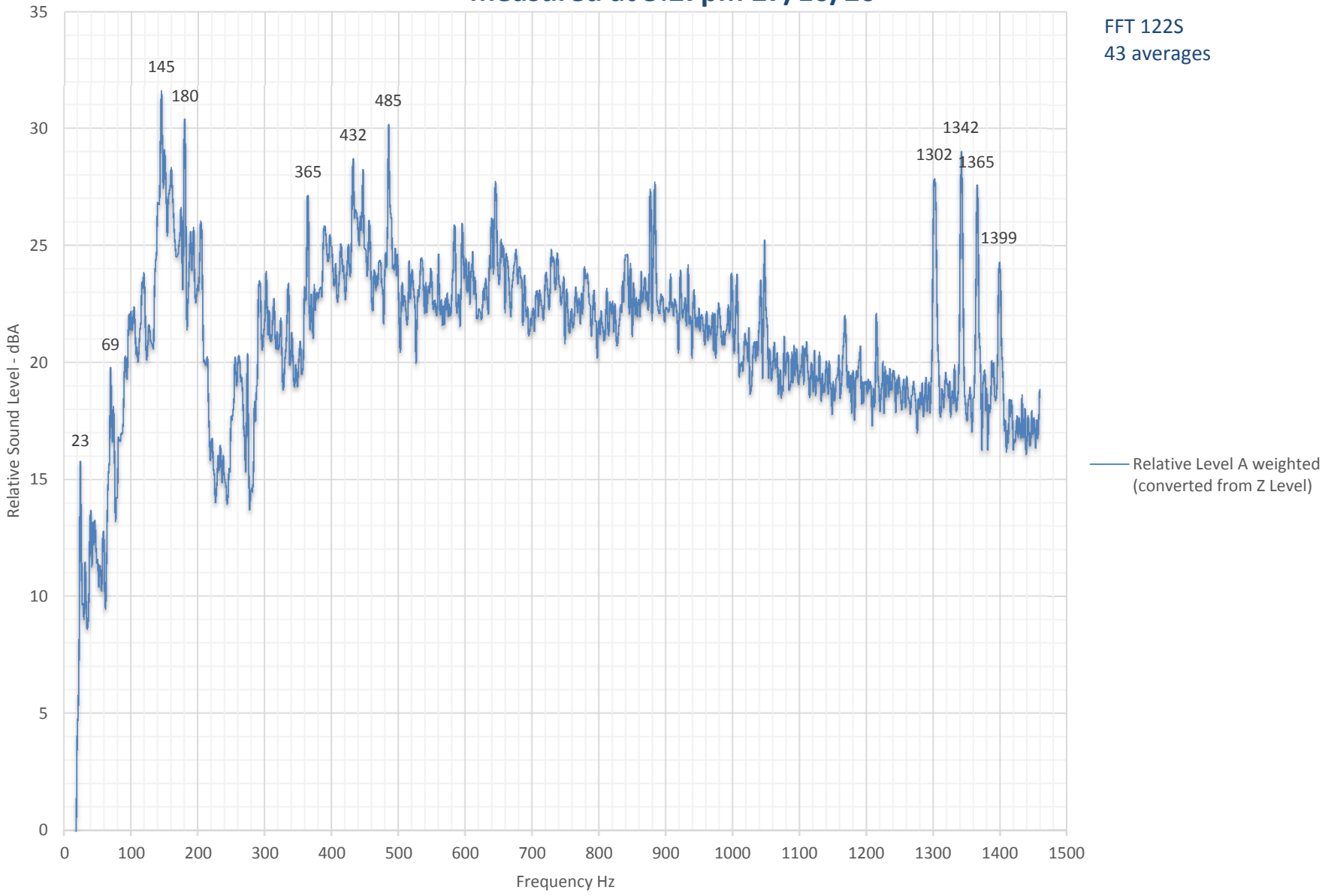
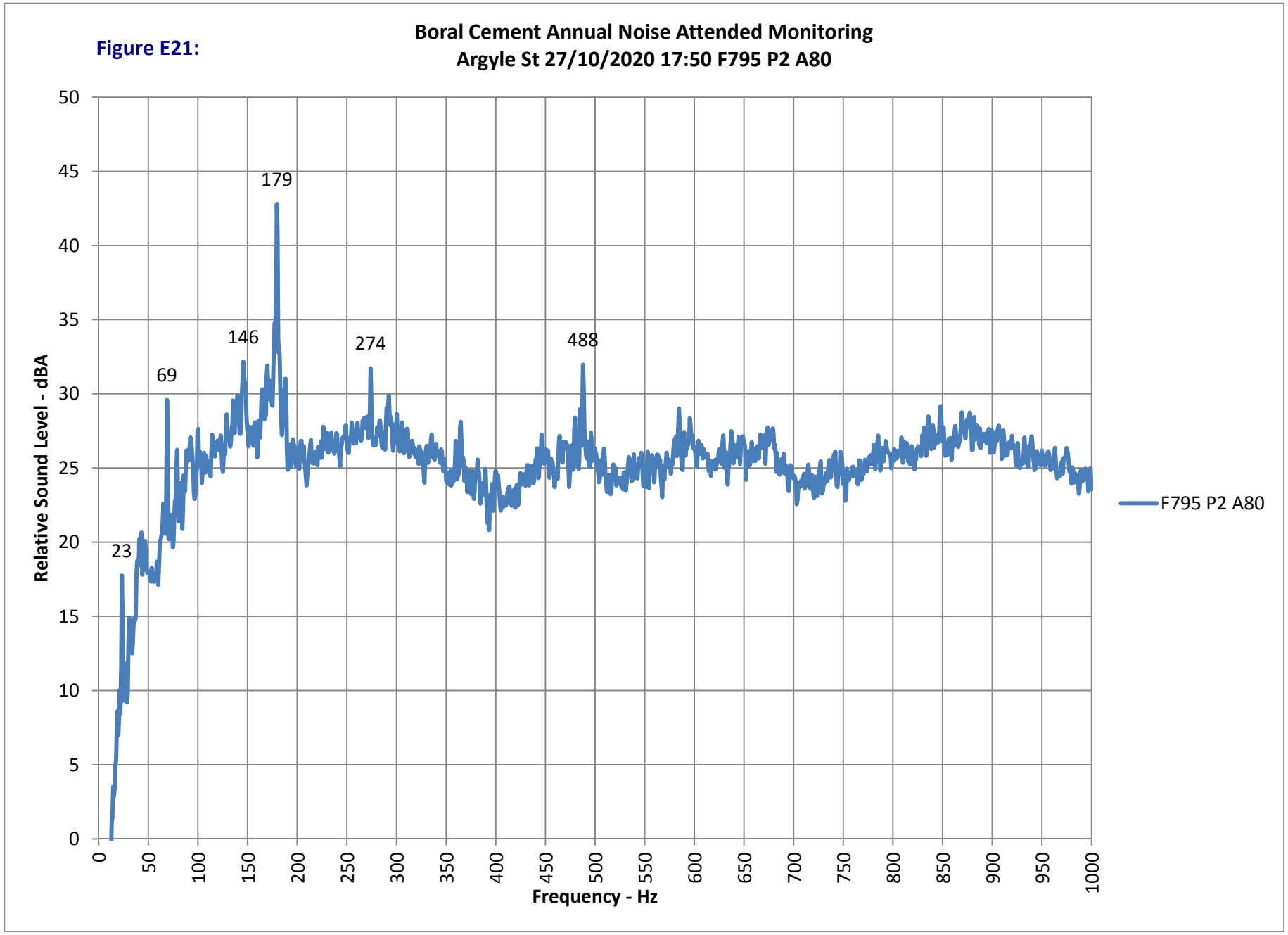

Day Time Spectrum for 12 Brisbane St
measured at 5:27pm 27/10/20
FFT 122S
43 averages
Relative Sound Level - dBA
Frequency Hz
Relative Level A weighted
(converted from Z Level)
23
69
145
180
365
432
485
1302
1342
1365
1399
0
5
10
15
20
25
30
35
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500

Figure E21:


Boral Cement Annual Noise Attended Monitoring
Argyle St 27/10/2020 17:50 F795 P2 A80
Relative Sound Level - dBA
Frequency - Hz
0
5
10
15
20
25
30
35
40
45
50
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
23
69
146
179
274
488
F795 P2 A80

ABN: 25 153 946 064
ACN: 153 946 064

Appendix F: Attended monitoring results

Enviromental Noise Level Assessment Report

Recognition
Research

for : *Commencing on:*

Berrima Cement Annual Compliance Noise Study - 2020 Friday, 9 October 2020

Berrima Cement Annual Compliance Noise Study - 2020

Condition	*Description*	*Meter*	*Ref #*	*weighting*	*Duration (secs)*	*Date*	*Time*	*L01*	*L90*	*Leq*	*Lce*	*Lceq -Laeq*	*Comments:*
Day Time	4 Melbourne St	Rion NA-28	1	A	900	9/10/2020	9:10 AM	69	49	58	70	11.5	Wind 0 to 2 m/s, S to SW, 11oC. Site noise audible included train horn 66, train move 52 to 54, train wheel squeal 55, curve noise 51. Passing trucks 70 to 75 on road bumps, cars pass 60+, ambient 47 to 50, quiet 47, birds 66 to 70
			Hourly Average										
			Temp °C	*Wind speed (Km/hr)*	*Direction degrees*								
			12	21	272								
	Location 20	Rion NA-27	55	A	600	21/10/2020	3:55 PM	63	49	53	71	18	Train idling at eastern end
			Hourly Average										
			Temp °C	*Wind speed (Km/hr)*	*Direction degrees*								
			21	10	60								
	Location 20	Rion NA-27	56	A	900	21/10/2020	4:06 PM	55	50	52	70	18.2	Train idling at eastern end Loco also @ CM6 near tower Birds , Truck Taylor 54 dBA
			Hourly Average										
			Temp °C	*Wind speed (Km/hr)*	*Direction degrees*								
			20	10	37								

Berrima Cement Annual Compliance Noise Study - 2020

Condition	Description	Meter	Ref #	weighting	Duration (secs)	Date	Time	L01	L90	Leq	Lce	Lceq -Laeq	Comments:
Day Time	Isotainer Monitor Position	Rion NA-27	58	A	900	21/10/2020	5:16 PM	58	50	53	71	18.1	Train Moving Raw Material Truck Local 60 Rail Squeal material line Train idling 53
		Hourly Average	Temp °C	Wind speed (Km/hr)	Direction degrees								
			20	8	39								
	North Fence	Norsonic 140	120	A	900	27/10/2020	4:19 PM	58	51	54	70	16.3	Overcast Ambient 51 Birds 53,58,53 dBA truck local 56,57 truck taylor 56 Plane 57
		Hourly Average	Temp °C	Wind speed (Km/hr)	Direction degrees								
			12	13	161								
	Location 20	Rion NA-28	451	A	900	27/10/2020	4:20 PM	70	54	59	73	14.5	Overcast, dry, 14C, wind 0-1.5m /s SE. Train horn E of clinker building 60, ambient varies 54 to 59.CM5 W wall fan apparent varies on wind . Intermodal loading activities occurring but can't identify levels for activities here as they are within the ambient variation. Truck pass B double to 70, semi-trailer 59 around bend S, then out 75, passing truck 75 on bumps in road
		Hourly Average	Temp °C	Wind speed (Km/hr)	Direction degrees								
			12	13	161								
	Location 20	Rion NA-28	452	C	103	27/10/2020	4:37 PM	73	70	71	71	0	Location 20 Record C wt 80 Tas 793 Intermodal lifting clunk
		Hourly Average	Temp °C	Wind speed (Km/hr)	Direction degrees								
			12	13	161								

Berrima Cement Annual Compliance Noise Study - 2020

Condition	Description	Meter	Ref #	weighting	Duration (secs)	Date	Time	L01	L90	Leq	Lce	Lceq -Laeq	Comments:
Day Time	Traffic island near Location 20	Rion NA-28	453	A	500	27/10/2020	4:41 PM	62	56	58	72	14.4	Traffic Island, Intermodal trucks delivering and departing site, wind 1-2m/s SE from IM site to here. Ambient 56 to 58
			Hourly Average										
			Temp °C	*Wind speed (Km/hr)*	*Direction degrees*								
			12	13	161								
	12 Brisbane St.	Norsonic 140	121	A	900	27/10/2020	5:27 PM	68	47	59	68	9.1	Industry noticeable Birds 53,58,54, 53 dBA cars local 67,67,64,79, 65 boral truck taylor 53 empty ; 56 full ute strarting 57-63 Voices Dog Barking 51, 53, 50, 49, 60 FFT #122S
			Hourly Average										
			Temp °C	*Wind speed (Km/hr)*	*Direction degrees*								
			12	11	156								
	4 Melbourne St	Rion NA-28	454	A	900	27/10/2020	5:30 PM	67	50	57	69	12.1	Wind 0-2m/s SE, overcast 13C. Quiet 48-50, cars to 65, trucks to 70. Plant broadband non-tonal continuous base, varying on wind ~50 to 54
			Hourly Average										
			Temp °C	*Wind speed (Km/hr)*	*Direction degrees*								
			12	11	156								
	Adelaide St near Taylor Ave (20m) in line with 72 Taylor Façade	Norsonic 140	123	A	900	27/10/2020	5:48 PM	73	51	61	71	10.5	Industry noticeable 48 - 51 Birds 53,58,54, 53 dBA Cars local 58, 64, 65 Cars taylor 63,67,69,72,61,66 Motor bike local 67,57,57,58,55 dBA ; Boral truck taylor 75 empty ; 74 full Voices Dog Barking 66,53,53 FFT #124S
			Hourly Average										
			Temp °C	*Wind speed (Km/hr)*	*Direction degrees*								
			12	11	156								

Berrima Cement Annual Compliance Noise Study - 2020

Condition	Description	Meter	Ref #	weighting	Duration (secs)	Date	Time	L01	L90	Leq	Lce	Lceq -Laeq	Comments:
Day Time	Arglye St (near pole)	Rion NA-28	455	A	600	27/10/2020	5:48 PM	69	49	57	68	10.8	Traffic on Taylor Ave. main source, quiet 48-50. Plant relatively constant, some unloading dump truck noise from centre of plant area.
				Hourly Average									
			Temp °C	*Wind speed (Km/hr)*	*Direction degrees*								
			12	11	156								
Day Time - Train Run-out	Location 20	Rion NA-27	57	A	900	21/10/2020	4:39 PM	62	50	54	69	15.6	Train Horn 4:40pm Reach loader started Truck - works 63 Horn 4:48pm Rail Squeal
				Hourly Average									
			Temp °C	*Wind speed (Km/hr)*	*Direction degrees*								
			20	10	37								
Evening Time	Location 20	Rion NA-27	74	A	900	21/10/2020	7:20 PM	55	50	51	70	18.6	Still conditions Industrial noise Birds (distant) Dog barking (constant)- taylor st Revserving Beacon shale area Train moving Rail Squeal
				Hourly Average									
			Temp °C	*Wind speed (Km/hr)*	*Direction degrees*								
			16	9	59								
	North Fence	Rion NA-27	75	A	900	21/10/2020	7:43 PM	51	44	46	67	20.7	Industrial noise 45-46 dBA Birds (distant) Dog barking (constant)- taylor st Front End loader @ shale area observed Observed a "Surge in noise" from 43 to 48/50 dbA, particularly in the 160 - 200Hz range is prominate
				Hourly Average									
			Temp °C	*Wind speed (Km/hr)*	*Direction degrees*								
			16	9	59								

Berrima Cement Annual Compliance Noise Study - 2020

Condition	Description	Meter	Ref #	weighting	Duration (secs)	Date	Time	L01	L90	Leq	Lce	Lceq -Laeq	Comments:
Evening Time	Arglye St (near pole)	Rion NA-27	77	A	900	21/10/2020	8:13 PM	66	39	54	66	12	Breeze from North Industrial noise 39-40 dBA Dog barking 45 dBA Cars 56,63,61,66,58,61,58,57,59,60 Truck 65; Cement truck 66,76 Voices, car in Argle St 52 Observed a "Surge" in the 160 - 200Hz range
				Hourly Average									
				Temp °C	*Wind speed (Km/hr)*	*Direction degrees*							
				15	10	73							
	4 Melbourne St	Rion NA-27	78	A	900	21/10/2020	8:36 PM	66	40	54	68	14.2	Still conditions to slight from north Cars 62,64,62,53,54,65,60 dBA Cement truck 75 Plane 47 Observed a "Surge" in the 160 - 200Hz range
				Hourly Average									
				Temp °C	*Wind speed (Km/hr)*	*Direction degrees*							
				15	10	73							
	12 Brisbane St	Rion NA-27	79	A	900	21/10/2020	9:00 PM	47	37	40	61	20.9	Cars 46,42 dBA Highway traffic equally prominate as works Slight amount of "Surge" in the 160 - 200Hz range observed
				Hourly Average									
				Temp °C	*Wind speed (Km/hr)*	*Direction degrees*							
				14	8	57							
	Adelaide St near Taylor Ave (20m) in line with 72 Taylor Façade	Rion NA-27	80	A	900	21/10/2020	9:27 PM	61	41	48	64	15.5	Cars 61,60,59,60,56,65, 70 dBA Highway traffic equally prominate as works "Surge" in the 160 - 200Hz range observed Gate alarm 43 Birds 47
				Hourly Average									
				Temp °C	*Wind speed (Km/hr)*	*Direction degrees*							
				14	8	57							

Berrima Cement Annual Compliance Noise Study - 2020

Condition	Description	Meter	Ref #	weighting	Duration (secs)	Date	Time	L01	L90	Leq	Lce	Lceq -Laeq	Comments:
Evening Time - Before Intermodal	North Fence	Rion NA-27	34	A	900	12/10/2020	8:10 PM	49	46	47	64	16.6	No Wind - No Cloud 3m north of the pole Train startup ; some wheel squeal Industrial Noise ~ 47 dBA Truck Taylor Ave
													Hourly Average Temp °C: 12 Wind speed (Km/hr): 7 Direction degrees: 56
	4 Melbourne St	Rion NA-27	35	A	900	12/10/2020	8:51 PM	59	42	47	61	13.8	Some wheel squeal Industrial Noise ~ 43 dBA Cars - Taylor Ave 57, 64, 61, 63, 64, 62 dBA
													Hourly Average Temp °C: 12 Wind speed (Km/hr): 7 Direction degrees: 56
	12 Brisbane St	Rion NA-27	36	A	900	12/10/2020	9:17 PM	54	36	41	59	17.6	Slight Wind from North to Still Industrial Noise ~ 37-38 dBA Cars - Taylor Ave 48 dBA
													Hourly Average Temp °C: 13 Wind speed (Km/hr): 9 Direction degrees: 59
	Adelaide St near Taylor Ave (20m) in line with 72 Taylor Façade	Rion NA-27	37	A	900	12/10/2020	9:41 PM	66	44	54	67	12.9	Slight Wind from North to Still Industrial Noise ~ 45-46 dBA Cars - Taylor Ave 62, 63 dBA Trucks - Taylor Ave 75, 78 dBA Horn in works Dog Barking 58 dBA
													Hourly Average Temp °C: 13 Wind speed (Km/hr): 9 Direction degrees: 59

Berrima Cement Annual Compliance Noise Study - 2020

Condition	Description	Meter	Ref #	weighting	Duration (secs)	Date	Time	L01	L90	Leq	Lce	Lceq -Laeq	Comments:
Night Time	Adelaide St near Taylor Ave (20m) in line with 72 Taylor Façade	Rion NA-27	81	A	900	21/10/2020	10:00 PM	65	44	53	66	13.3	Cars 54,62,65,69 dBA "Surge" in the 160 - 200Hz range observed Gate alarm cement truck 70 Meter on Low power
		Hourly Average											
		Temp °C	*Wind speed (Km/hr)*	*Direction degrees*									
		13	7	59									
	4 Melbourne St.	Rion NA-27	82	A	900	21/10/2020	10:21 PM	60	44	49	64	15	Still Coonditions Ambient 44 Cars 62,60,63 dBA Highway traffic "Surge" in the 160 - 200Hz range observed truck 67 Meter on Low power
		Hourly Average											
		Temp °C	*Wind speed (Km/hr)*	*Direction degrees*									
		13	7	59									
	Location 20	Rion NA-27	83	A	900	21/10/2020	10:46 PM	65	51	53	71	17.4	Highway traffic truck local 67 Train Loco idling surging not noticeable rail squeal Car 55 loco 54-50 Meter on Low power
		Hourly Average											
		Temp °C	*Wind speed (Km/hr)*	*Direction degrees*									
		13	7	59									
	North Fence	Rion NA-27	84	A	900	21/10/2020	11:10 PM	52	48	49	68	18.8	Still Coonditions Train idling Cars 62,60,63 dBA Highway traffic "Surge" in the 160 - 200Hz range observed 49-51 dBA truck taylor 49 Meter on Low power
		Hourly Average											
		Temp °C	*Wind speed (Km/hr)*	*Direction degrees*									
		13	5	42									

Berrima Cement Annual Compliance Noise Study - 2020

Condition	Description	Meter	Ref #	weighting	Duration (secs)	Date	Time	L01	L90	Leq	Lce	Lceq -Laeq	Comments:
Night Time	12 Brisbane St.	Rion NA-27	85	A	900	22/10/2020	12:04 AM	52	38	43	63	19.7	Ambient 40 Cars43,49dBA Highway traffic prominent "Surge" in the 160 - 200Hz range observed 49-51 dBA truck taylor 49 Meter on Low power

Hourly Average

Temp °C	Wind speed (Km/hr)	Direction degrees
13	1	91

	Arglye St (near pole)	Rion NA-27	86	A	900	22/10/2020	12:26 AM	66	42	52	65	13.7	Ambient 40 Cars 63, 65dBA Highway traffic prominent "Surge" in the 160 - 200Hz range observed 49-51 dBA cement truck taylor 68 garbage truckoutside Gen Store 64 car Local 63 Meter on Low power

Hourly Average

Temp °C	Wind speed (Km/hr)	Direction degrees
13	1	91

Instrument :	Serial No	Calibrate Date	Measurement Date :	Pre Cal :	Post Cal :
Norsonic 140	1406081	6/11/2020			
			27/10/2020	94	93.7
Rion NA-27	00270216	7/08/2021			
			12/10/2020	94.2	93.7
			21/10/2020	94.1	93.2
			22/10/2020	94.1	93.2
Rion NA-28	860028	30/08/2021			
			9/10/2020	94	93.9
			27/10/2020	94	94

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