



**Boral Cement Limited**

**Berrima Works**

## **Noise Management Plan**

<b>Document Filename :</b>	CMT-ENV-004 Berrima Noise Management Plan
<b>Document Owner:</b>	HSE Advisor, Berrima Works
<b>Approved By:</b>	Operations Manager, Berrima Works

### **Version History:**

<b>Version</b>	<b>Date</b>	<b>By Whom</b>	<b>Description of Changes</b>
1	30 November 2006	Grant Williams	Original version
2	26 April 2007	Grant Williams	Update to include Cement Mill 7 Project Noise Criteria
3	25 May 2008	Grant Williams	Updated to comply with Boral Cement Corporate Environmental Noise Standard
4	16 June 2008	Grant Williams	Updated monitoring sites
5	27 October 2008	Grant Williams	Added contact details for monitoring sites
6	September 2011	Alex Wnorowski	Global revision and formatting change
7	September 2014	Michael Curley	3-yearly review

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## 1. PURPOSE

Many activities that are undertaken on Boral Cement sites generate noise. These include handling, grinding and crushing of materials, train and truck movements and kiln cooling fans.

The purpose of the Berrima Works Noise Management Plan is to ensure that all personnel are aware of their obligations relating to environmental noise, such as site noise limits, and are able to put appropriate controls and management techniques for the operation of the Berrima Cement Works to minimise noise nuisance in the local community.

The Plan also enables compliance with the conditions specified in the Development Approvals for Kiln 6 and Cement Mill 7.

## 2. SCOPE

The Plan addresses:

- Current plant noise limits;
- Identification all major noise sources including those arising from the upgrade of Kiln 6 and the installation of Cement Mill 7;
- Monitoring of noise emissions from the Kiln 6 and Mill 7 upgrade;
- Compliance with relevant legislative requirements;
- Provision of measures to manage the cumulative impact of all the noise sources on site; and
- Management of non-compliance, if identified.

## 3. DEFINITIONS

<i>Ambient Noise</i>	The all-encompassing noise associated within a given environment. It is the composite of sounds from many sources, both near and far.
<i>Background Noise</i>	The underlying level of noise present in the ambient noise, excluding the noise sources under investigation.
<i>Decibel (dB)</i>	A unit of sound measurement. It is equivalent to 10 times the logarithm (to base 10) of the ratio of a given sound pressure to a reference pressure.
<i>Environmental Noise</i>	Noise that may have an impact on the community, outside the site boundary.
<i>Intrusive Noise</i>	Refers to noise that intrudes above the background level by more than 5 decibels.
DA	Development Approval - a consent issued by the Department of Planning and Environment, detailing site-specific construction and operational conditions that Boral Cement must comply with.

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DoP&E	NSW Department of Planning and Environment
EPA	NSW Environmental Protection Authority

#### 4. RESPONSIBILITIES

The following general responsibilities apply in relation to this Management Plan:

<i>Employees</i>	<p>Responsible for ensuring that the environmental noise standards for their work are achieved. This includes:</p> <ul style="list-style-type: none"> <li>➤ Observing any noise control instructions and procedures that apply to their work or operations;</li> <li>➤ Taking action to minimise or prevent noise incidents;</li> <li>➤ Identifying and reporting noise incidents;</li> <li>➤ Monitoring, reporting and assisting in the control of noise emissions to keep within approved levels.</li> </ul>
<i>Team Leaders / Front Line Supervisors</i>	<p>Responsible for minimisation of noise emissions arising from work methods and the working environment. This includes:</p> <ul style="list-style-type: none"> <li>➤ Identifying, reducing and preventing noise emissions;</li> <li>➤ Monitoring operations and maintenance work to ensure noise emissions are maintained within approved levels;</li> <li>➤ Initiating action to prevent noise incidents;</li> <li>➤ Identifying, reporting and recording noise incidents;</li> <li>➤ Initiating corrective actions to overcome noise incidents.</li> </ul>
<i>Production Manager, Technical Manager and Engineering Manager</i>	<p>Responsibility and authority to ensure that the site environmental noise objectives are achieved. This includes:</p> <ul style="list-style-type: none"> <li>➤ Ensuring staff are trained with respect to noise awareness, responsibilities, instructions and procedures;</li> <li>➤ Ensuring noise incidents are investigated and corrective and preventative action taken;</li> <li>➤ Ensuring operations comply with the conditions of Development Approvals, Environmental Protection Licence and relevant legislation;</li> <li>➤ Reviewing operations and implementing strategies to reduce noise emissions from the Works.</li> <li>➤ Developing and implementing contingency plans as required to remedy noise nuisance and minimise noise complaints.</li> </ul>
<i>HSE Advisor</i>	<p>Responsible for:</p> <ul style="list-style-type: none"> <li>➤ Ensuring periodic noise monitoring is carried out.</li> <li>➤ Ensuring that an appropriate management plan is developed and implemented if noise limits are found to have been exceeded.</li> <li>➤ Reviewing noise complaints received to determine if particular noise issues/trends are being identified.</li> </ul>



<i>Site Operations Manager</i>	<ul style="list-style-type: none"> <li>✓ Approving any communications to external parties on noise generating activities before their release.</li> <li>✓ Ensuring all personnel are aware of licence, DA and other regulatory requirements relating to plant noise.</li> <li>✓ Implementing Boral environmental policy on site;</li> <li>✓ Ensuring site environment performance objectives and targets are established, monitored and achieved;</li> <li>✓ Defining responsibilities for the EMS;</li> <li>✓ Ensuring the availability of resources;</li> <li>✓ Communicating the importance of the EMS and meeting the statutory and regulatory requirements;</li> <li>✓ Conducting management reviews of the EMS;</li> <li>✓ Ensuring that material environmental incidents are immediately reported to 5 compulsory Government Authorities;</li> <li>✓ Verifying the implementation of corrective and preventive actions; and</li> <li>✓ Recognising and responding to community concerns.</li> </ul>
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## 5. NOISE LIMITS AND MONITORING

### 5.1 CURRENT LIMITS

The Development Approvals for the Upgrade of the Kiln 6 Upgrade (DA 401-11-2002-i) and Cement Mill 7 (DA 85-4-2005-i) include noise criteria for each project. The same criteria are duplicated in the site's Environmental Protection Licence issued by Environmental Protection Authority (EPA).

Subject to compliance with these and other conditions in the DAs and EPA Licence the Kiln 6 and Cement Mill 7 can be operated 24 hours per day and seven days per week.

The Development Approvals define the maximum allowable noise contribution limits from the operation of Kiln 6 (Table 1) and Cement Mill 7 (Table 2). This condition requires Boral Cement to design, construct, operate and maintain all new and upgraded components forming part of the upgrade of Kiln 6 or the installation of Cement Mill 7 to ensure that for each receiver location listed in the following tables, the noise level at each receiver location does not exceed the maximum allowable noise contribution limit at the receiver location specified.

*Table 1 – Kiln 6 Upgrade Project : Maximum Allowable Noise Contribution Limit (dB(A))*

Receiver Location	Day <sup>a</sup>	Evening <sup>b</sup>	Night <sup>c</sup>
	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)
4 Melbourne Street	37	37	37
Chesley Park Farm	30	30	30

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Candowie Farm	37	37	37
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Table 2 – Cement Mill 7 Project : Maximum Allowable Noise Contribution Limit (dB(A))

Receiver Location	Day <sup>a</sup>	Evening <sup>b</sup>	Night <sup>c</sup>
	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (15 minute)
Adelaide Street, near Taylor Avenue, New Berrima	43	43	40
Argyle Street, near Taylor Avenue, New Berrima	43	43	40
Candowie Farm	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 10:00pm to 7:00am Monday to Saturday and 10:00pm to 8:00am on Sundays and public holidays.

Note: Noise contributions specified in Table 1 and 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.

The maximum allowable noise contributions apply under all meteorological conditions, except:

- a) during wind speeds greater than 3ms<sup>-1</sup> measured at 10 metres above ground level; or
- b) during temperature inversion conditions of greater than 3°C/ 100m and wind speeds of greater than 3ms<sup>-1</sup> measured at 10 metres above ground.

For the purpose of assessment of noise contributions specified 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.

**5.2 MONITORING**

Environmental noise monitoring is undertaken annually by a qualified noise consultant to assess noise levels at residential receiver locations and compare it to objectives in

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the Development Approvals.

Monitoring is undertaken for a minimum of 24 hours and typically over a period of seven days. Sampling intervals are 15 minutes.

In case of noise limit exceedance, data is compared with the operational reports to identify activities that were in progress during the monitoring period.

Meteorological data is recorded during the monitoring period.

The DAs specify that monitoring is to be conducted at the following locations (see Appendix 1 for contact details):

- a) 4 Melbourne Street, New Berrima;
- b) Corner of Adelaide Street and Taylor Avenue, New Berrima;
- c) Chesley Park Farm; and
- d) Northern boundary of Berrima Works.

In addition, monitoring may be conducted at:

- e) Residence of Mr Howard Smith, Berrima, corner of Australia Ave and Burwan St, Berrima.

As per requirements of the Protection of Environment Legislation Amendment (POELA) Act 2011, the site is obliged to publish on the Boral Cement Berrima's webpage the monitoring data that are required by the Licence. The summary report has to be updated each month with all new results received in the preceding month and uploaded by the 10<sup>th</sup> working day of the next month.

In addition to the periodic monitoring, trained and competent Berrima Cement Works personnel can monitor and record environment and plant noise using portable monitoring equipment. Noise meter is required to be calibrated as specified by the manufacturers' instructions.

### **5.3 NOISE PRP**

The current site limits for the noise relate only to Kiln 6 and Cement Mill 7 operations. The site as a whole does not have a noise limit.

This gap in the regulatory approach has recently been recognised by the Authorities and a Pollution Reduction Program (PRP) No. 7 relating to noise was added to the Environmental Licence in order to define new noise limits for the site and allow the Works sufficient time to upgrade its equipment to meet the new limits. The PRP schedule requires that:

- Background noise monitoring be completed;
- Noise assessment be undertaken in accordance with EPA Industrial Noise Policy (2000); and
- Report with determination of proposed site-specific noise levels at defined residential locations be submitted to OEH by 31 January 2012.

All the requirements of PRP7 were fulfilled in the specified timeframe. These proposed site-specific noise levels will be used by EPA to specify new noise limits in the site Licence. A suitable timeframe to implement a program of capital works necessary to achieve these limits will be agreed with the Works. The Authority has not advised the new limits to date.

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Following the changes to the Licence, an annual compliance noise survey will be required during normal operation.

## **6. MANAGING SPECIFIC NOISE SOURCES**

### **6.1 PLANT NOISE SOURCES**

As a part of the studies for the Kiln 6 and Cement Mill 7 projects, maximum sound power levels for major noise emission sources were identified.

Sound power level of the major noise sources associated with the upgraded plant was assessed by measurement of sound pressure levels at a set distance and calculation of sound power levels. The methods employed were in accordance with the requirements of AS1217.7-1985: Acoustics - Determination of sound power levels of noise sources - Survey method.

The sources along with their maximum allowable sound power level (PWL), where relevant are:

- *Raw materials handling* – contained within existing buildings and contribution to noise is minimal. No specific PWL was set.
- *Raw Mill* – new vertical spindle mill in new building on the southern side of existing building. Allowable PWL is 117 dB(A).
- *Raw Meal Handling* – new bucket elevators and air slides on the south side of the existing kiln. No specific PWL was set.
- *Gas Cleaning* – new baghouse on the southern side of the existing electrostatic precipitator. The allowable PWL is 103 dB(A).
- *Preheating* – new preheater tower with new cyclones and a calciner. The allowable PWL is 98 dB(A).
- *Cooler & Clinker Handling* – the cooler bed was widened and additional cooling fans provided. The allowable PWL is 103 dB(A).
- *Coal Mill* – dynamic separator system added with fan and dust filter system. No specific PWL was assigned for this item.
- *Cement Mill 7* – no specific PWL was assigned for this project. Assigned internal design reverberant sound pressure level (SPL) used in the calculations is 102 dB(A).

### **6.2 ENGINEERING CONTROLS**

Noise controls can be incorporated into equipment at the design stage or retrofitted later, typically at a higher cost. Possible measures that could be considered for the reduction of noise from the Berrima Works include:

#### **- For fans**

- Selection of the most aerodynamically efficient device for the task or application, with the lowest speed motor and impellor (sound level is proportional to the fifth power of the rpm);

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- Where inlets or discharges are open to atmosphere, the inclusion of appropriate silencers to reduce noise emission whilst minimising system pressure effects;
- Provision of enclosures for high noise motors or gear-boxes or fan casings. Enclosures can be fabricated from steel, concrete, timber or other material, depending on site and cost constraints, and explosive atmosphere considerations;
- Where enclosures are unsuitable, fan-casing break-out noise can be reduced by the application of suitable cladding to the exterior of the casing; and
- Consideration of operation at different speed settings for heat exchanger fans, to suit climatic conditions, or having thermostat controlled operation.

**- For materials handling, crushing and preparation**

- Selection of size based on mechanical efficiency (i.e. not over or undersized for most of the operational range involved);
- Provision of damped chutes for high impact areas of hard materials to reduce dropping impact noise;
- Design of conveyors to minimise drop-height at chutes and the number of transfer points;
- Efficient use of screens for the separation of materials, including non-steel screens to reduce impact noise on screens, and damped discharge chutes; and
- Use of vibration isolation and mounting of vibrating sections and items.

**- For solenoid valves and air-cleaning and handling systems**

- Reverse pulses on bag-houses directed to a common manifold with silencing, in place of individual, small discharger silencers which often clog and become ineffective after a short period; and
- Small silo-top bag filter systems having adequate silencing on the discharges.

The most effective approach is to provide a noise specification for the installed new plant such that the maximum allowable noise criteria can be achieved.

It is then necessary to select equipment that can achieve specification. Where specification sound levels cannot be achieved, detailed acoustic design measures would be required to reduce the noise levels.

**6.3 BUFFER ZONES AND SCREENING**

The Berrima Cement Works is located in a predominantly rural environment. The community mainly or potentially affected by noise emissions from the Works is the village of New Berrima, located to the north of the Works. Nuisance noise is most often experienced at this location, especially at the times of prevailing southerly winds, temperature inversions and/or low cloud cover.

Boral Cement has undertaken a vegetation programme on the Berrima Cement Works site. This programme will be continued and will assist in screening the plant from view and will provide some degree of acoustic screening.

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## **7. IMPLEMENTATION & TRAINING REQUIREMENTS**

All employees should, through delivery of an appropriate training program, understand the following points:

- The most appropriate times to undertake high noise generating activities;
- The importance of keeping the doors and windows closed at all times in buildings containing noisy equipment (such as mills);
- The importance of timely equipment maintenance to prevent unnecessary noise (e.g. worn out bearings, loose rattling covers, etc.);
- The notification procedure, should it be necessary to undertake these activities outside of these times (e.g. in the case of emergency maintenance); and
- The need for use of suitable equipment such as acoustical enclosures when undertaking noisy activities, in order to minimise transmission of noise.

Further information can be found in the Boral Cement's Corporate SOP No. **CEM-ENV-005 Environmental Training**.

## **8. REPORTING AND RECORD KEEPING**

Record keeping is undertaken in accordance with various Boral policies and procedures.

- Boral Cement maintains a document control system named WizBiz to facilitate effective management and document control over controlled documents.
- SiteSafe software is mandatory to record all incidents on site, with any actions arising that are tracked until progressed and closed.
- All records are to be retained for the time periods required by statutory timeframes and/or Boral policies (refer Boral Group SOP No **GRP-OHS-007 Document Control and Records Management**).

Boral Cement has various reporting and record keeping requirement defined in the DAs and the Licence. The requirements include:

### **8.1 INCIDENT REPORTING**

Pursuant to the POELA Act 2011, Boral Cement must notify the EPA, NSW Fire & Rescue, Wingecarribee Council, WorkCover and the NSW Department of Health about any incident with actual or potential material on-site or off-site impacts on people or the biophysical environment immediately after the occurrence of the incident. Refer to site SOP CMT-ENV-009 Berrima Pollution Incident Notification.

Also, the Director General of the DoP&E has to be informed of material incidents as soon as practicable as per Development Approval requirements.

Boral Cement has to provide written details of the incident both to the EPA and the DoP&E within seven days of the date on which the incident occurred.

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In addition, Boral Cement must notify the EPA and the Director General of DoP&E of any technical unavoidable stoppages, disturbances, trips or failures of the kiln or its pollution control or pollution measurement equipment, during which the concentration of regulated substances into the air may have exceeded the emission limits.

Boral Cement has to meet any requirements of the Director General to address the cause or impact of any incident.

## **8.2 NOISE COMPLAINTS**

All community complaints shall be communicated to the appropriate staff member to be investigated in order that corrective and preventative actions be identified and implemented. A contingency plan may need to be developed and implemented as required to remedy noise nuisance and to minimise noise complaints. The complainant is to be contacted with feedback within 24 hours of receipt of the complaint. Complaints shall be recorded in the Boral incident management system.

If a complaint is a result of existing equipment malfunction, this malfunction is to be rectified within one working of the complaint being received if possible.

Results of all noise monitoring, including monitoring conducted as a result of a complaint, is to be compared with Development Approval criteria and relevant standards.

A summary of the noise complaints is to be included in the Annual Environmental Management Report to DoP&E and in the Annual Return to EPA.

## **9. REFERENCES**

For the current list of Federal and State regulations relevant to this Management Plan refer to Boral Cement SOP No. **CEM-ENV-004 *Environmental Legal Requirements***.

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**Attachment 1 – Noise Monitoring Program – Resident contact details**

4 Melbourne Street, New Berrima

Mrs Kitty Fraser, telephone 48771268

Corner of Adelaide Street and Taylor Avenue, New Berrima

Chesley Park Farm

Mr Paul Redden, 0403035182

Corner of Australia Ave and Burwan St, Berrima

Mr Howard Smith, telephone 48771070, email [hgs46@bigpond.net.au](mailto:hgs46@bigpond.net.au)

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