

STATEMENT OF ENVIRONMENTAL EFFECTS

Berrima Cement Works Solid Waste Derived Fuels & Delivery Variation Project

Prepared for:
Boral Cement Limited

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1 Introduction

Boral submits this application pursuant to Section 4.55 (2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to modify State Significant Development (SSD) DA 401-11-2002. The proposed modification includes:

- Increase the consumption of Solid Waste Derived Fuel (SWDF) materials within the Kiln (increase to the tonnes per annum limitations for specific fuel types);
- Construct an alternative haulage access route through the site;
- Expand current storage and handling facilities at the site; and
- Increase SWDF truck deliveries and hours.

1.1 Background

The Berrima Cement Works (“the site”) operates under two development consents originally issued by the Department of Planning and Environment, now the Department of Planning, Industry, and Environment (DPIE), being DA 401-11-2002-i (Kiln 6) and DA 85-4-2005-i (Kiln 7). DA 401-11-2002-i for Kiln 6 has been modified thirteen times, with the latest modification being Modification 13 (MOD 13) as detailed in **Table 1** below.

Table 1 Berrima Cement Works DA 401-11-2002-i Modification History

Reference	Description	Date Modified
MOD 2-1-2004-i	Non-Standard Fuels	26 September 2005
MOD 109-9-2006-i	Remove prohibition of hazardous wastes	22 September 2006
MOD 12-2-2007-i	Trial use of tyre chips	13 February 2007
MOD 4	Variation to usage rate of coke fines	24 April 2008
MOD 5	Coal deliveries by rail	31 August 2009
MOD 6	Coal stockpiling for sale	20 June 2012
MOD 7	GBFS processing	16 April 2012
MOD 8	Approval / EPL Consistency	5 August 2012
MOD 9	Use of Waste Derived Fuels	5 October 2016
MOD 10	Fuel storage shed amendments	11 April 2019
MOD 11	Use of Hi Cal 50	25 October 2019
MOD 12	Use of Isotainers and Site Wide Noise Limit	7 March 2020
MOD 13	Chloride Bypass System and Use of Woodchips	31 May 2021

1.2 Site Description

The site is located south of New Berrima in the Southern Highlands, NSW in the Wingecarribee local government area (LGA). The site, identified as Lot 2 DP 774598, Lot 22 DP 582276, Lot 1 DP 582277, and Lot 1 DP 1017008, is approximately 279 ha and is wholly owned by Boral Cement Limited. Access to the site is via Taylor Avenue, which connects the with the Hume Motorway approximately 2.5 km to the west.

1.3 Proponent

The proponent and owner of the Boral Cement Works is Boral Cement Limited (Boral) and its associated subsidiary companies. The Boral Cement Works is operated by Boral Cement Limited, a wholly owned subsidiary of Boral Limited.

1.4 Existing Operations

The Boral Cement Works has operated since 1929, producing cement products comprising cement and clinker for sale in NSW and the ACT, as well as for export. The Cement Works is approved to produce up to 1.56 million tonnes per annum (mtpa) of clinker. These products are transported to market via road, rail, and sea via Port Kembla.

The facility operates one kiln and two cement mills, along with ancillary storage and stockpile facilities. Cement manufacture is an energy intensive process due to the high temperatures required to produce clinker. To fuel this process, the site has previous approval to use a range of fuel sources including coal, gas, diesel, and SWDFs, with SWDF approved for use via Modification 9 in 2016.

The expanded range of fuel sources has been progressed by Boral to reduce reliance on coal, with approximately 220,000 tonnes per annum of coal currently used to heat the kiln to 1,500 degrees Celsius (°C). Coal was historically sourced from Medway Colliery less than 10 km to the west of the site until its closure in 2013, with coal now transported significantly further by road from the Illawarra coal mines, with an associated increase in greenhouse gas emissions and road congestion.

SWDF has been consistently used in the kiln for the past five years and has been common practice throughout Europe for approximately 25 years, with cement kilns across Australia also using this fuel source for several years.

The site employs a direct work force of 130, along with a further 20 engineering and procurement roles. Additionally, the site supports indirect jobs throughout the Region associated with logistics, contractors, and suppliers. To this end, the Berrima Cement Works is one of the largest employers within the Wingecarribee LGA.

1.5 Project Need

The Cement Works remains heavily reliant on coal as the primary fuel source for the kiln, with associated environmental and cost implications. The proposed modification would increase the use of SWDF, diverting a waste product from landfill to become a valuable component of the cement manufacturing process.

In July 2021, Boral committed to the most ambitious carbon emissions targets in the global construction materials industry and has joined the Science Based Targets initiative (SBTi) Business Ambition for 1.5°C and UNFCCC Race to Zero. The new carbon reduction targets mean Boral is committed to net zero carbon emissions by no later than 2050, aligned with the most ambitious aim of the Paris Agreement to limit global warming to 1.5°C, as well as the NSW Government emission targets. In order to achieve the above climate targets, Boral is reducing reliance on coal and increasing consumption of SWDF materials.

The use of SWDF will help to reduce carbon dioxide emissions and reduce the plant's production costs, allowing the Cement Works to remain competitive relative to imported products. The successful use of SWDF at the site coupled with the recently approved Modification 13 for a Chloride Bypass System at the kiln, allowing improved management of naturally occurring volatile components from the SWDF has led to Boral seeking to increase the consumption of SWDF in the kiln.

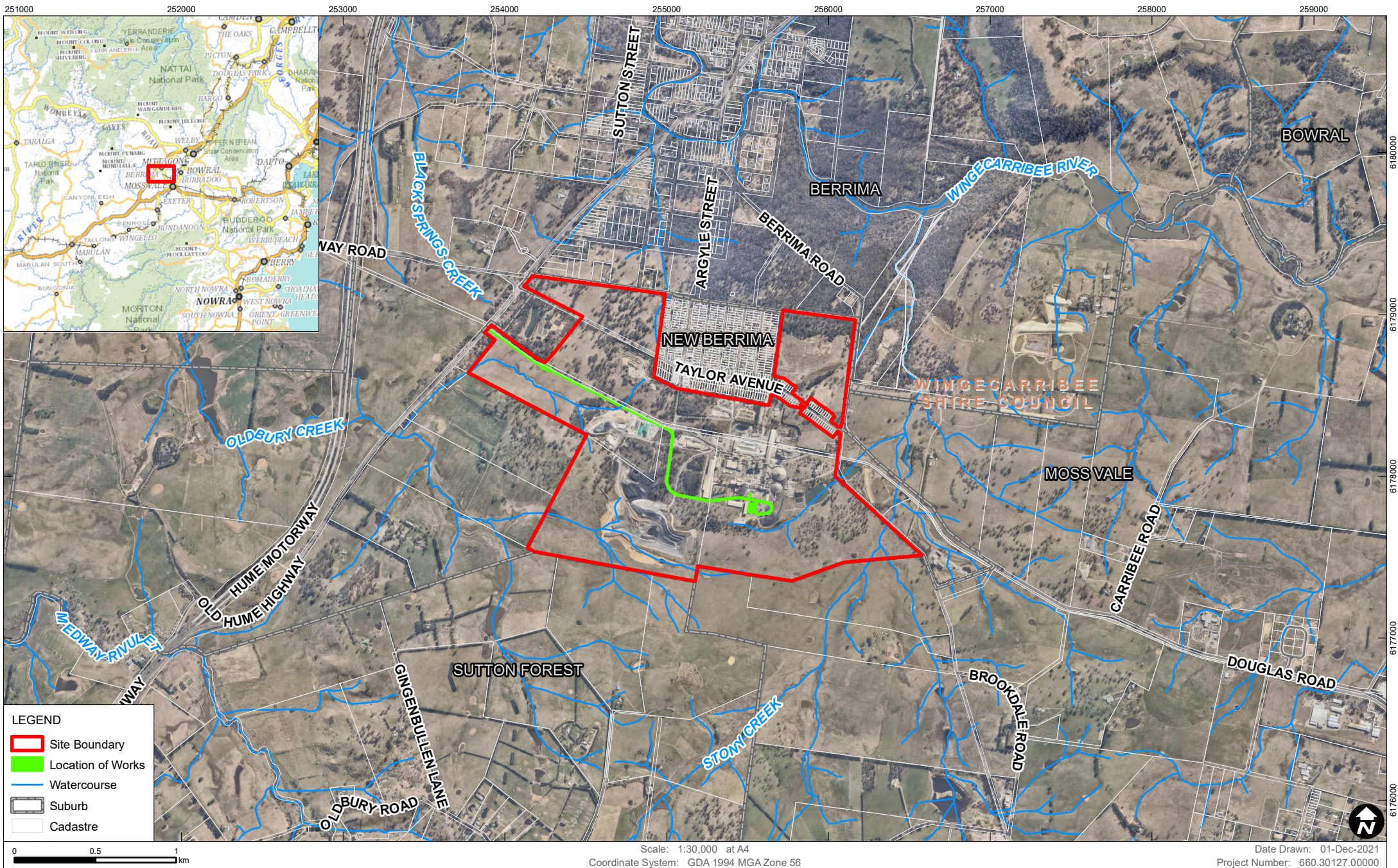
The success of the use of SWDF has given the business confidence to set targets on emissions and invest in infrastructure to commit to higher volumes of SWDF, as desired by this proposed modification.

To efficiently fuel the kiln with SWDF an ongoing regular supply is required, which current site operations and approvals do not allow. To facilitate the use of SWDF in the kiln modifications to the current approval are required to:

- Increase the permissible delivery hours
- Increase the maximum permitted deliveries to site; and
- Increase on-site storage capacity.

The modification proposes a new haul road access from the Cement Works west to the Old Hume Highway, allowing raw material delivery vehicles to bypass residences to minimise the potential for impact. The avoidance of sensitive receivers would enable increased raw material delivery duration and frequency without a negative impact. Increased storage would improve operational efficiencies within the site, while allowing for variable supply.

The proposed modification would improve the environmental performance of the site, through the reuse of waste material, diverting it from landfill and reducing the requirement for coal as a fuel source. The proposed modification would also reduce vehicle movements through New Berrima in proximity to local residences along Taylor Avenue. These changes would help future proof the site, with the transition from coal as the primary fuel source to alternative fuels such as SWDF.





Data Source: Basedata NSW SS, 2021
 Aerial imagery supplied by Nearmap (August, 2021)
 *Elevation data supplied by © Department Finance, Services and Innovation, May 2018 (Extracted 01/11/2021)

SITE PLAN Berrima Cement Works

FIGURE 2

1.6 Supporting Studies

This SEE has been prepared by SLR Consulting Australia Pty Ltd (SLR) on behalf of Boral to support the modification application under development consent DA 401-11-2002. The following technical environmental assessments have been prepared to inform this SEE:

- Air Quality Impact Assessment (AQIA) – SLR, 2021a;
- Traffic Impact Assessment (TIA) – SLR, 2022b;
- Noise Impact Assessment (NIA) – SLR, 2021c;
- Construction Waste Management Report (CWM Report) – SLR, 2021d;
- Aboriginal Cultural Heritage Due Diligence Assessment (ACHDDA) - Austral Archaeology (Austral), 2021;
- Biodiversity Development Assessment Report Waiver (BDAR Waiver) – SLR, 2021e; and
- Greenhouse Gas Assessment (GGA) – SLR, 2021f.

1.7 Structure of this Report

The SEE has been prepared to address all matters for consideration set out within Section 4.15 of the EP&A Act. The SEE comprises the following sections:

- **Section 1** - introduces the project, the site and development history;
- **Section 2** - addresses consultation undertaken for the development application with external stakeholders;
- **Section 3** - outlines all aspects of the proposed development;
- **Section 4** - addresses all relevant planning legislation, policy, and strategies applicable to the subject site and/or proposed development;
- **Section 5** - assesses the built and natural environmental factors relevant to the subject site and proposed development, including traffic, waste, air quality, noise and vibration, greenhouse gas and energy efficiency, traffic and transport, and visual character;
- **Section 6** - concludes the report; and
- **Section 7** - references the documents cited.

2 Consultation

DPIE issued Environmental Assessment Requirements (EARs) to inform the preparation of the SEE on 6 August 2021.

Table 2 below identifies the requirements within the EARs and where this SEE or supporting investigations have addressed them.

Table 2 Environmental Assessment Requirements (EARs)

Requirement	Reference
Detailed Description of the Modification – including:	
a description of how the modification integrates with existing, approved, and proposed construction works and operations of the site	Section 1.4
detailed plans of all proposed building works, including the new storage buildings and supporting infrastructure, new site access and haul road and any earthworks	Appendix A
identification of conditions proposed to be modified.	Section 5.10
Statutory and Strategic Context – including:	
demonstration the application constitutes a modification under section 4.55 of the EP&A Act and that the development will remain substantially the same as originally approved	Section 4.2.1
demonstration the proposed modification is consistent with all relevant environmental planning instruments and justification for any inconsistencies.	Section 4
Community and Stakeholder Engagement – a community and stakeholder participation strategy identifying key community members and other stakeholders, including:	
clear evidence of how each stakeholder identified in the strategy has been consulted	Section 2.1
issues raised by the community and surrounding landowners and occupiers	Section 2.1.1
clear details of how issues raised during consultation have been addressed and whether they have resulted in changes to the development	Section 2.1
details of the proposed approach to future community and stakeholder engagement.	Section 2.1.4
Air Quality and Odour – a quantitative assessment of the potential air quality, dust and odour impacts of all stages of the development, including cumulative impacts, in accordance with relevant Environment Protection Authority guidelines, including:	
a description of the receiving environment and all existing and proposed emission sources	Section 5.1.1 Appendix B
an assessment of opportunities to minimise vehicle kilometres travelled and measures to minimise the potential for air quality impacts associated with truck movements	Section 5.1.1.1 Appendix B
details of emission control techniques, and management and monitoring measures.	Section 5.1.3 Appendix B

Requirement	Reference
Traffic and Transport – a quantitative traffic impact assessment prepared in accordance with relevant Roads and Maritime Services and Austroads guidelines, that includes:	
details of all daily and peak traffic volumes likely to be generated during all key stages of construction and operation, including a description of key access / haul routes, vehicle types and potential queuing impacts	Section 5.2.2
an assessment of the predicted impacts of this traffic on road safety and the capacity of the road network, including consideration of crash history and cumulative traffic impacts at key intersections using SIDRA or similar traffic model	Section 5.2.2
details of road upgrades, infrastructure works or new roads or access points required for the development, including conceptual designs and swept path diagrams.	Section 5.2.3
Noise and Vibration – including:	
a quantitative noise and vibration impact assessment undertaken by a suitably qualified acoustic consultant in accordance with the relevant Environment Protection Authority guidelines and Australian Standards.	Section 5.3.2 Appendix D.
Soils and Water – an assessment of potential surface and groundwater impacts associated with the modification, including:	
demonstration the modified development would have a neutral or beneficial effect on water quality in accordance with State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011, including a MUSIC stormwater quality model	A separate letter has been prepared to address the requirement for a neutral or beneficial effect assessment for the proposed modification.
a detailed site water balance including a description of the water demands and breakdown of water supplies	As the proposed modification is not using any water in the process beyond what is already approved under previous modifications for SSD DA 401-11-2002 (see Section 1.1), a water balance is not required.
details of the stormwater and wastewater management system and how they integrate with existing operations, including measures to treat, reuse or dispose of water	Section 5.4.3
a description of the proposed erosion and sediment controls during construction	Section 5.4.3
characterisation of the nature and extent of any contamination on the site and surrounding area and any proposed ground disturbance.	Section 5.4.2.1
Waste Feedstock – including:	
a description of each of the waste streams that would be accepted at the site including maximum daily, weekly, and annual throughputs and the maximum size of any stockpiles	Section 3.1
details of the source of the waste streams to justify the need for the proposed processing capacity	Section 1.5 Section 3.1

Requirement	Reference
details of how waste would be stored (including the maximum daily storage capacity of the site) and handled on site, and transported to and from the site	Section 3.4
the measures that would be implemented to ensure the development is consistent with the aims, objectives and guidance in the NSW Waste Avoidance and Resource Recovery Strategy 2014-2021.	Appendix E Section 5.5.3
Waste Management – an assessment of all waste generated at the site, including:	
a list and description, including quantities, composition and classification, of waste material produced (solid, liquid and gaseous) from the development in accordance with the EPA’s Waste Classification Guidelines	Section 5.5.2 Appendix E
details of waste management practices having regard to the EPA’s Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities (EPA, 2012)	Section 5.5.3 Appendix E
details of the type and quantity of any chemical substances to be used or stored at the site and arrangements for their safe use and storage.	Section 5.5.2 Appendix E
Aboriginal Heritage - an Aboriginal Cultural Heritage Assessment Report (ACHAR) prepared in accordance with the Code of Practice for Archaeological Investigation in NSW (DECCW 2010), and guided by the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in New South Wales (OEH 2011). The ACHAR must:	
identify, describe, and assess impacts on the Aboriginal cultural heritage values that exist across the development	Appendix F Section 5.6.2 The magnitude of the ACHDDA (Austral Archaeology, 2021) was considered appropriate for the proposed modification given the highly disturbed nature of the site and the fact it is a modification to an existing consent (see Section 1.1) under which previous Aboriginal cultural heritage assessment has been completed.
provide evidence and details of consultation with Aboriginal people in accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW 2010)	
include results of a surface survey and any test excavations and an unexpected finds protocol.	
Biodiversity -	
an assessment of the proposal’s biodiversity impacts in accordance with the Biodiversity Conservation Act 2016, including the preparation of a Biodiversity Development Assessment Report (BDAR) where required under the Act, except where a waiver for preparation of a BDAR has been granted.	Section 5.7.2 Appendix G
Visual -	
an assessment of the potential visual impacts of the modification on the amenity of the surrounding area.	Section 5.9.1
Greenhouse Gas and Energy Efficiency -	
an assessment of the energy use of the proposal and all reasonable and feasible measures that would be implemented on site to minimise the proposal’s greenhouse gas emissions.	Section 5.8 Appendix G
Planning agreement/development contributions -	

Requirement	Reference
demonstration that satisfactory arrangements have been or would be made to provide, or contribute to the provision of, necessary local and regional infrastructure required to support the modification.	Section 4.4

2.1 Community and Stakeholder Consultation

Boral maintains a dedicated Berrima Cement Works website, which is regularly updated. The website contains information regarding the site's planning approvals, including details of the proposed increase in the use of SWDF being increased to 200,000 tpa, the new bypass system, the alteration in truck movements on-site, and looking at alternative types of SWDFs as replacement fuel for the kiln. An email contact is provided so that interested members of the community can seek additional information.

2.1.1 Community Consultation

The Berrima Cement Works has an established community liaison group (CLG), which meet bi-annually to discuss all matters relating to the current and future activities at the site. Information was provided to CLG members regarding this modification at the December 2020 meeting, with the Berrima Cement Works website updated to reflect this information. The CLG has not met in 2021 due to COVID lockdowns.

Additionally, the Berrima Cements Works also holds a 'Whole of Community' meeting on an annual basis, with an open invitation to any member of the community to attend. The last Whole of Community meeting was held on 30 November 2021 at Mittagong RSL Club where an overview of the modification application was included in the presentation.

No issues have been raised by the community regarding the proposed modification, with general support for the application, particularly in relation to the alternative access route.

2.1.2 Council Consultation

Boral's stakeholder relations manager met with Council on 4 November 2021 to discuss the increase in SWDF materials as a coal replacement in the kiln and also the new access road off the Old Hume Highway. Boral and Council will be developing a short video regarding the SWDF in a series Council is promoting in 2022 regarding sustainable living. Council will also participate in an on-site tour in early 2022.

2.1.3 State and Federal Government Consultation

Correspondence was sent to Stephen Jones MP (local federal member) on 28 October 2021 regarding the SWDF facility and an invitation extended to tour the site and be given a briefing. A site visit was scheduled for 3 December but had to be postponed.

The Honourable Matt Kean MP, Minister for Energy and the Environment, was given a site tour of the existing SWDF facility and PowerPoint presentation regarding the proposed modification on 9 March 2021.

COVID travel restrictions and lockdowns have limited face to face and letterbox drop communication with community for much of late 2021.

2.1.4 Proposed Ongoing Engagement Activities

Table 3 below details the actions anticipated to be used to ensure the broadest reach of stakeholders.

Table 3 Proposed Actions for Engagement

Action	Channel	Audience	Timeframe
Ongoing media engagement	Local and regional print media, radio, and social media groups	All	Ongoing
Community updates	Hard copy brochure distributed through mailing residents, posts on community social media pages, community message boards (digital and/or hardcopy), and communication through community leaders	Local residents and stakeholders	Ongoing
Stakeholder Perception Benchmarking	In house distribution or outsource to market research company. Community sentiment can be measured through community forums (open days, surveys, local influences)	Local residents	Bi-annually
Information drop-in sessions	To be held at local central community venue or local community events	All	Quarterly
Formal presentations/briefings	Face-to-face structured presentations	Local council staff/councillors, State and Federal Members	Ongoing
Regular website updates	Available at: https://www.boral.com.au/locations/boral-cement-works-berrima	All	Ongoing

3 Proposed Modification

Boral proposes to modify development consent DA 401-11-2992 as follows:

- Increase the consumption of SWDF materials within the Kiln (increase to the tonnes per annum limitations for specific fuel types);
- Construct an alternative haulage access route through the site;
- Expand current storage and handling facilities at the site; and
- Increase SWDF truck deliveries and hours.

The kiln requires approximately 700 Gigajoules per hour of energy to maintain temperatures for optimised kiln performance and production of clinker. One truck load of coal (30 tonnes) provides 690 Gigajoules of energy, equating to approximately one hour of fuel. Conversely SWDF material provides approximately 450 Gigajoules of energy. Given SWDF is less energy dense than coal, providing only two thirds of the energy per truck compared to coal, additional truck movements are required to fuel the kiln with SWDF at the same level of efficiency. Consequently, additional truck movements spread over a longer timeframe are required.

To facilitate the increased SWDF throughput Boral propose to increase onsite storage and handling facilities, with an associated increase in truck movements and extended delivery hours. An alternate haul route, providing direct access to the Old Hume Highway is also proposed to help reduce environmental impacts on neighbouring sensitive receivers.

3.1 Consumption Limits

SWDF consumption is currently capped at 100,000 tonnes per annum (tpa). This modification proposes to increase this limit to 250,000 tpa. To facilitate this increase it is proposed to alter Condition 1.4A and amend Table 1 of the consent, which refers to the type and volumes of the permitted fuels. Proposed changes to Table 1 of the consent are described in **Table 4** below.

Table 4 Permitted Fuels for use in upgraded Kiln 6 – Proposed Amendments

Fuel	Category	Tonnes Per Annum	Changed Proposed	Proposed Modification
Natural Gas, Fuel Oil, Diesel	Standard Fuel	No limit	No	No Change
Coal	Standard Fuel	No limit	No	No Change
Coal Fines	Standard Fuel	No limit	No	No Change
Hi Cal 50	Non-Standard Fuel	10,000	No	No Change
AKF1 (liquid oily residues)	Non-Standard Fuel	20,000	No	No Change

Fuel	Category	Tonnes Per Annum	Changed Proposed	Proposed Modification
AKF5 (tyre)	Non-Standard Fuel	30,000*	Yes	No longer contain within the combined cap. Standalone cap to remain at 30,000.
Wood Waste	Non-Standard Fuel	50,000*	Yes	Increase combined cap to 250,000. Standalone cap to increase to 100,000.
RDF (Refuse Derived Fuel)	Non-Standard Fuel	80,000*	Yes	Increase combined cap to 250,000. Standalone cap to increase to 200,000.
Woodchips	Standard Fuel	50,000*	Yes	No longer contain within the combined cap. Standalone cap to increase to 150,000, with definition extended to include sawdust.

*100,000 tpa combined

The use of AKF-5 is permitted on site as per Condition 1.4B of DA 401-11-2002, however, this fuel source is yet to be trialled for the purposes of investigating design and operational aspects of the full-scale use as per condition 1.4CA of DA 401-11-2002. Boral is aiming to undertake a trial in late January to early February 2022 using the existing SWDF sheds and feeding infrastructure and if successful AKF5 will be stored within the existing and proposed SWDF sheds and fed using the same SWDF infrastructure. Should additional infrastructure be required to facilitate the use of AKF-5 as a fuel source this would be the subject of a separate modification application.

Conditions 1.4G, 1.4H, and 1.4I of the existing consent contain details of the steps Boral must take prior to the onboarding any new suppliers of the waste feedstock. As part of the modification, Boral will continue with the existing suppliers, however the consent gives flexibility to change suppliers, as long as the conditions are adhered to, as defined below:

“1.4G 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 Planning 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 Planning 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.

1.4H 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 Planning Secretary that the supplier has met the prequalification requirements set out in the approved Quality Assurance and Control Procedure for Receipt and 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 Planning 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.

1.4I 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.”

3.2 Delivery Hours and Truck Volumes

The delivery of SWDF is currently restricted to 6 am to 6 pm Monday to Friday and 7 am to 1 pm Saturday. Due to the lower relative energy properties of SWDF compared to coal, increased truck movements are required over a 24-hour time period to ensure adequate fuel supply for efficient kiln operation. Consequently, the modification seeks to allow unrestricted delivery times of SWDF to facilitate the continual supply and consumption of SWDF in the kiln, removing the bottleneck experienced by a shortage of on-site storage capacity. Note, as discussed in **Section 3.6** increased on site storage capacity is also proposed, however, this will not remove the need for 24 hour supply to the site.

Truck movements are currently limited to 317 movements per day, within the permitted hours via Taylors Avenue. **Table 5** below provides a comparison between approved and proposed truck movements per year, with the modified truck movements proposed along a new site access road included within this modification, as discussed at **Section 3.5** below.

It should be noted that those truck movements that are not proposed to change will continue along the current route, which provides a more efficient route that meets the current consent conditions. The site has approval to transport cement from the site 24 hours a day and will continue using the existing entrance. This is due to the location of the cement tanker filling facility, which is adjacent to the existing gate. A new entrance will be for trucks carrying coal, waste streams used for alternate fuels, clinker and raw materials that need to be delivered to the southern side of the plant.

The Project seeks to separate the cement finished products from the other heavy transport vehicles and provide two distinct entry/exit points to facilitate an improvement in traffic flow.

Table 5 Approved and Proposed Truck Movements

Material Type	Current Volume (approximate)	Trucks per year	Change Proposed	Proposed Volume	Proposed Trucks per Year	Route
Raw Materials	357,000	17,850	No	No Change	No Change	Existing Access
Fuels for Kiln (Coal)	170,000	6,285	Yes	56,700	2,100	New Access
Fuels for Kiln (SWDF)	100,000	4,166	Yes	250,000	10,415	New Access
Fuels for Kiln (AKF-5)	0	0	Yes	30,000	1,250	New Access
Dispatch of Clinker	300,000	10,000	No	No Change	No Change	Existing Access
Dispatch of Cement	500,000	16,700	No	No Change	No Change	Existing Access

Table 6 below identifies the daily and hourly truck movements for associated with kiln fuel, based on the annual rates identified within **Table 5** above.

Table 6 Approved and Proposed Truck Movements per Day/Hour

Material Type	Trucks per day	Trucks per hour
SWDF (existing)	16	0.7
SWDF (proposed)*	39	1.63
Coal (existing)	22	0.92
Coal (proposed)*	12	0.5

**identified truck movements are subject to the availability of an alternative fuel source, with the requirement to maintain current consumption levels of coal should the full volume of the alternate supply not be available.*

Table 5 illustrates there will be an increase of 13 truck movements per day to the site associated with the increased use of SWDF, with a corresponding reduction in coal use. **Table 6** identifies the total truck movements associated with the site in the current and proposed situation.

Table 7 Existing and Proposed Site Truck Movements per Day/Hour

Site Access	Total truck movements (raw materials, fuel and product dispatch) per day	Total truck movements (raw materials, fuel, and product dispatch) per day
Site (existing)	317	26.4
Site (proposed)*	330	28.3
Existing Access (proposed)	128	10.6
New Access (proposed)*	202	17.7

**identified truck movements are subject to the availability of an alternative fuel source, with the requirement to maintain current consumption levels of coal should the full volume of the alternate supply not be available.*

Table 6 illustrates a minor increase in truck movements under the proposed scenario, with 13 more movements to the site, however, the number of vehicles accessing the site via Taylor Avenue, in proximity to residential dwellings within New Berrima will reduce, with 202 of these truck movements proposed along the haul road discussed in **Section 3.5** below. The haul road usage will improve amenity and road safety in New Berrima, with reduced noise and emissions from trucks. The proposed duration of deliveries will disperse the delivery program, leading to reduced congestion.

3.3 New Site Access and Intersection

A new site access is proposed to be established from the west, connecting directly with the Old Hume Highway. The alternate access is illustrated in **Figure 2** and within the **Appendix A**, with landscape plans illustrating how the haul road intersection with the Old Hume Highway will integrate with the heritage fabric to the west and the fabric of the Old Hume Highway memorial corridor.

The haul road will reduce noise impacts for sensitive receivers along Taylor Avenue, lifting the constraint to 24-hour operations for trucks transporting SWDF. The haul road will be constructed on existing Boral land holdings, comprising a sealed two lane, one way in each direction that connects in with existing internal roads within the Cement Works.

A weighbridge will be established as shown in plans located in **Appendix A** to enable this haul road to satisfy the weighing requirements of trucks entering and leaving the site. Electricity supply to the weighbridge will be via a new 33 kV/low voltage substation using the existing overhead 33 kV internal power circuit.

3.4 Storage and Handling Facilities

Additional on-site storage capacity is required on site to accommodate the greater volume of SWDF received, stored, and then fed to the kiln, along with the introduction of AKF-5 fuel. The site currently has one SWDF storage shed 1,104 m² in size.

Two additional storage sheds are proposed for construction, with a combined additional floor space of 1,968 m². The additional sheds will be used for SWDF storage and handling, as well as for the potential, storage, handling, and feed infrastructure associated with AKF-5.

The sheds are proposed with the dimensions identified in **Table 8** below.

Table 8 Proposed New Storage Shed Dimensions

	Shed 1	Shed 2
Width (m)	16	0.7
Length (m)	39	1.63
Floor area (m ²)	22	0.92
Height (m)	12	0.5

The location of the sheds is illustrated in **Figure 2**.

3.5 Services

Services to be provided include:

- Electrical infrastructure near the two additional storage sheds to be constructed adjacent the existing storage shed;
- Electrical field motor-controlled centre and programmable logic controller nodes to service the additional storage sheds;
- Fire water main around the additional storage sheds;
- Weighbridge equipped with substation input/output and programmable logic controller switchroom, telemetry and satellite connection; and
- A new substation adjacent to weighbridge (location shown in **Appendix A**) using existing overhead 33 kV power circuit.

3.6 Operations

All new equipment proposed for operations at the weighbridge and storage sheds will be manually/driver controlled by delivery staff (e.g. loading, transportation, weighbridge operation). The maintenance of any equipment could create up to 10 part time employee roles for the increased routine maintenance and works, however these would be included in any shutdown works within the broader Berrima site, and therefore the workforce would remain unchanged, with 150 direct jobs on site.

4 Statutory and Strategic Context

4.1 Commonwealth Legislation

4.1.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is administered by the Commonwealth Department of the Environment and Energy, providing a legal framework to protect and manage nationally important flora, fauna, ecological communities and heritage places defined as matters of national environmental significance. An action that “*has, will have or is likely to have a significant impact on a matter of National Environmental Significance*” may not be undertaken without prior approval of the Commonwealth Minister, as provided under Part 9 of the EPBC Act.

A Biodiversity Development Assessment Report Waiver (BDAR Waiver) has been prepared by SLR (2021e) to inform the proposed modification and is summarised in **Section 5.7**.

4.2 NSW Legislation

4.2.1 Environmental Planning and Assessment Act 1979

The EP&A Act legislates the planning process for consideration of all developments within NSW.

The Berrima Cement Works was previously approved under Part 4 of the EP&A Act in May 2003. This modification is being sought as a 4.55(2) modification under the EP&A Act, as detailed below in **Section 4.2.1.3**.

4.2.1.1 Objects of the EP&A Act

Table 9 below lists the objects of the Act and how the proposal is consistent with such objects.

Table 9 Compliance with EP&A Act Objects

EPA Objects	Compliance
a) <i>To promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State’s natural and other resources</i>	The proposed development seeks to minimise the use of a natural resource in the form of coal and replace this by diverting waste from landfill for a beneficial reuse purpose. Consequently, the Project will help to conserve the State’s natural resources.
b) <i>To facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment</i>	Ecologically sustainable development is addressed below (see Section 4.2.1.2).
c) <i>To promote the orderly and economic use and development of land</i>	The development is orderly and rational, being consistent with the applicable planning controls and providing an appropriate use for the site that is consistent with the sites previous approvals, use, and locality.
d) <i>To promote the delivery and maintenance of affordable housing</i>	Not applicable.

EPA Objects	Compliance
e) <i>To protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats</i>	The development is limited to an existing industrial site, with works predominantly limited to developed or previously disturbed locations. The proposal will aid in achieving this objective of the EP&A Act by reducing the use of coal in the kilns.
f) <i>To promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage)</i>	Austral Archaeology prepared an Aboriginal Cultural Heritage Due Diligence Assessment (ACHDDA) (2021) due to the highly disturbed nature of the site, and corresponding low potential for Aboriginal objects to be present. A summary of the findings of the ACHDDA is provided in Section 5.6 , with the full report submitted as part of the modification package.
g) <i>To promote good design and amenity of the built environment</i>	The proposed modification has been designed and sited in accordance with relevant design controls and industry best practice. The Landscape Scheme (SLR, 2021g) prepared to support the works has been designed to ensure the visual amenity along Old Hume Highway is maintained following the completion of works in the area. All other works are contained entirely within the existing site and suit existing operations subject to previous visual impact assessments.
h) <i>To promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants</i>	The potential for significant adverse impacts as a result of the proposed modification is low and can be managed effectively subject to mitigation measures implemented within a Construction Environment Management Plan (CEMP), with the benefits far outweighing those impacts.
i) <i>To promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State</i>	This has been achieved via the modification application process, facilitating State government agencies to provide their general terms of approval and other consultation as part of the modification application assessment.
j) <i>To provide increased opportunity for community participation in environmental planning and assessment.</i>	Community participation will be provided through DPIE's advertising procedures.

4.2.1.2 Ecologically Sustainable Development

Ecologically Sustainable Development (ESD) is a key object of the EP&A Act. The definition, consideration and conceptualisation of ESD was well explained by Justice Preston in *Telstra Corporation Limited v Hornsby Shire Council* [2006] NSWLEC 133. This included the “basic formulation” of “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”: Six Principles can be considered and applied:

1. Sustainable use - the aim of exploiting natural resources in a manner which is “sustainable” or “prudent” or “rational” or “wise” or “appropriate”.
2. Effective integration of economic and environmental considerations in the decision-making process.
3. The precautionary principle (referred to in 6(2)(a) of the *Protection of the Environment Administration Act 1991*).
4. Inter-generational equity - the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.

5. Conservation of biological diversity and ecological integrity should be a fundamental consideration and;
6. Internalisation of environmental costs into decision-making for economic and other development plans, programmes and projects likely to affect the environment.

The Project is consistent with the principles of ESD as it does not exploit natural resources rather it aims to reduce the reliance of coal, with the associated reduction in greenhouse gas. Furthermore, the diversion of waste from landfill, reduces the release of methane over time, while also retaining finite landfill void space. The Project is based soundly on economic and environmental considerations, with the likely environmental impacts of the proposal well understood and predictable.

4.2.1.3 Approval Pathway

Given the nature of the proposed modification, the modification is proposed to be assessed pursuant to Section 4.55 (2) of the EP&A Act, as detailed below:

***“Other modifications** A consent authority may, on application being made by the applicant or any other person entitled to act on a consent granted by the consent authority and subject to and in accordance with the regulations, modify the consent if—*

(a) it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which consent was originally granted and before that consent as originally granted was modified (if at all), and

(b) it has consulted with the relevant Minister, public authority or approval body (within the meaning of Division 4.8) in respect of a condition imposed as a requirement of a concurrence to the consent or in accordance with the general terms of an approval proposed to be granted by the approval body and that Minister, authority or body has not, within 21 days after being consulted, objected to the modification of that consent, and

(c) it has notified the application in accordance with—

(i) the regulations, if the regulations so require, or

(ii) a development control plan, if the consent authority is a council that has made a development control plan that requires the notification or advertising of applications for modification of a development consent, and

(d) it has considered any submissions made concerning the proposed modification within the period prescribed by the regulations or provided by the development control plan, as the case may be.”

The changes proposed to development consent DA 401-11-2992 through this modification application will not substantially change the operations at the site, nor will it result in a substantial deviation from what was originally approved.

The operations at the site will remain substantially the same, with the proposed modifications only resulting in an increase to on-site storage and handling facilities, and the use of a new site access to facilitate the increased consumption of SWDF at the site while reducing potential impacts of noise and traffic on surrounding properties.

The proposed modification is not anticipated to create any significant operational impacts associated with environmental matters including air quality, noise and vibration, waste management, traffic, Aboriginal cultural heritage, or biodiversity.

4.2.2 NSW Waste Legislation and Policy

The *NSW Energy from Waste Policy Statement* (the Policy Statement) (EPA, 2021) sets out the technical criteria that apply to energy from waste facilities in NSW. Eligible waste fuels listed by the EPA within the Policy Statement may be thermally treated using a range of treatment technologies, provided a resource recovery order and exemption has been granted by the EPA. Facilities proposing to use eligible waste fuels must meet certain criteria.

Any facility proposing to thermally treat a waste or waste-derived material that is not a listed eligible waste fuel (Section 3) must meet the requirements to be an energy recovery facility and demonstrate the implementation of current international best practice techniques, particularly regarding:

- Process design and control
- Emission control equipment design and control
- Emission monitoring with real-time feedback to the controls of the process
- Arrangements for the receipt of waste; and
- Management of residues from the energy recovery process.

The SWDF approved for use by Modification 9 in 2016 consisted of non-eligible waste fuels under the Policy Statement, such as wood waste and refuse derived fuel, and therefore demonstrated that the overall facility meets the criteria for an energy recovery facility. Modification 9 was approved on the basis that the then DPE and EPA were satisfied that the use of SWDF by the facility complied with all relevant Policy Statement criteria pending the implementation of additional quality control measures to address temperature and residence time for a fuel type containing halogenated organic substances. Additionally, Proof of Performance (POP) trials were conditioned in the consent as standard practice to ensure periodic reporting for each SWDF and ensure compliance with air emissions standards.

The proposed modification builds upon previously completed assessments from Modification 9, as well as updated assessments, with special consideration to air quality and greenhouse gas emissions, to ensure compliance with the Policy Statement as a result of the increased SWDF throughput.

4.2.3 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO) establishes management and licensing requirements along with other provisions to deliver environmentally appropriate outcomes. The POEO Act also establishes the ability to set various waste management requirements via the regulations. It is the primary piece of legislation regulating pollution control and waste disposal in NSW.

The site operates under an existing Environmental Protection Licence (EPL) 1698, and there are no conditions in the licence that would require alteration to accommodate the proposed modification.

4.2.4 Roads Act 1993

The *Roads Act 1993* (Roads Act) provides the regulatory framework for the use, operation, opening and closing of public roads. Subject to Section 138 of the Roads Act the following activities cannot be undertaken without the consent of the appropriate roads authority.

“(a) erect a structure or carry out a work in, on or over a public road

(b) dig up or disturb the surface of a public road

(c) remove or interfere with a structure, work or tree on a public road

(d) pump water into a public road from any land adjoining the road

(e) connect a road (whether public or private) to a classified road.”

It is anticipated that the proposed development will trigger the Section 138 of the Roads Act due to the proposed haul road connection with the Old Hume Highway, based on the following:

- Clause (a): *Erect a structure or carry out a work in, on or over a public road; and*
- Clause (b): *Dig up or disturb the surface of a public road.*

4.2.5 Bushfire Legislation and Specifications

Section 4.14 of the EP&A Act advises that development consent cannot be granted for the proposed development unless the consent authority:

*“(a) is satisfied that the development conforms to the specifications and requirements of the version (as prescribed by the regulations) of the document entitled Planning for Bush Fire Protection prepared by the NSW Rural Fire Service in co-operation with the Department (or, if another document is prescribed by the regulations for the purposes of this paragraph, that document) that are relevant to the development (**the relevant specifications and requirements**), or*

(b) has been provided with a certificate by a person who is recognised by the NSW Rural Fire Service as a qualified consultant in bush fire risk assessment stating that the development conforms to the relevant specifications and requirements.”

Portions of the site are mapped as Bushfire Prone Land under the *Wingecarribee Local Environmental Plan 2010* (LEP); however, the proposed modification does not propose any uses requiring additional bushfire impact assessment.

4.2.6 Water Management Act 2000

The *Water Management Act 2000* (WM Act) is designed to provide for sustainable and integrated management and use of State water sources. The WM Act regulates controlled activities that occur within 40 m of a water course, river bank, and lake shore or estuary mean high water mark. An approval is required to undertake controlled activities on waterfront land unless that activity is otherwise exempt as defined by section 4.46 of the Act. A Controlled Activity means:

“a) The erection of a building or the carrying out of a work (within the meaning of the Environmental Planning and Assessment Act 1979), or

b) The removal of material (whether or not extractive material) or vegetation from land, whether by way of excavation or otherwise, or

c) The deposition of material (whether or not extractive material) on land, whether by way of landfill operations or otherwise, or

d) The carrying out of any other activity that affects the quantity or flow of water in a water source.”

No works are proposed within 40 m of a water course, river bank, and lake shore or estuary mean high water mark. Consequently, the development is not subject to the provisions of the WM Act.

A desktop assessment of surface water and details of the erosion and sediment controls proposed for the duration of works has been completed to inform the proposed modification and is provided in **Section 5.4**.

4.2.7 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) commenced in August 2017 and changed the way proponents of State Significant Development (SSD) and State Significant Infrastructure (SSI) must assess the biodiversity impacts of major projects. The BC Act requires that an SSD or SSI application must be accompanied by a biodiversity development assessment report (BDAR) unless the Planning Agency Head (or delegate) and the Environment Agency Head (or delegate) determine that the proposed development is not likely to have any significant impact on biodiversity values. This determination is referred to here as a BDAR waiver.

The BC Act includes the Biodiversity Offset Scheme, which provides for biodiversity assessment and biodiversity offsetting of a range of developments in NSW according to a method, known as the Biodiversity Assessment Method or ‘BAM.’

A BDAR Waiver has been prepared by SLR (2021e) to inform the proposed modification and is summarised in **Section 5.7**.

4.2.8 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act), administered by the Department of Premier and Cabinet manages the following environmental aspects in NSW:

- Conservation of nature;
- Conservation of objects, places, and features of cultural value;
- Public appreciation, understanding, and enjoyment of nature and cultural heritage; and
- Land reserved under this Act.

The NPW Act controls development and activities within National Parks, Reserves, and Aboriginal Areas.

An Aboriginal Cultural Heritage Due Diligence Assessment (ACHDDA) has been prepared by Austral Archaeology (2021) to inform the proposed modification and is summarised in **Section 5.6**.

4.3 State Environmental Planning Policies

4.3.1 State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) aims to assist in the effective delivery of public infrastructure across the State by improving certainty and regulatory efficiency through a consistent planning assessment and approvals regime for public infrastructure and services and through the clear definition of environmental assessment and approval processes for public infrastructure and services facilities.

Clause 104 of the ISEPP relates to traffic generating development and the need for these to be considered by Transport for NSW (TfNSW) if a development generates vehicle movements over certain thresholds. Clause 104 applies to development in Schedule 3 that involves the following:

“(a) new premises of the relevant size or capacity, or

(b) an enlargement or extension of existing premises, being an alteration or addition of the relevant size or capacity.”

It is anticipated that clause 104 of the ISEPP will be triggered and Transport for New South Wales (TfNSW) concurrence will be required by way of referral.

4.3.2 State Environmental Planning Policy 55 – Remediation of Land

State Environmental Planning Policy 55 – Remediation of Land (SEPP 55) is designed to *“promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment.”* The policy applies across NSW and controls how local councils must assess development applications on contaminated land.

A search of the EPA Contaminated Land Record database was completed on 25 November 2021 and identified four sites within the Wingecarribee Shire LGA, located in the suburbs of Bowral, Joadja, Mittagong, and Moss Vale. These sites are located a sufficient distance from the site to avoid impacting operations.

Nevertheless, an unexpected finds protocol will be incorporated into the Construction Environmental Management Plan (CEMP) to guide contractors, should potentially contaminated material be encountered during works.

4.4 Contributions

The modification will not create an additional imposition on local or State infrastructure given SWDF material has previously been approved for use, with this modification simply helping to facilitate efficient operation of the site with SWDF as one of a suite of fuel sources. Consequently, there is not a requirement for further contributions to be payable.

5 Environmental Assessment

5.1 Air Quality and Odour

An Air Quality Impact Assessment (AQIA) has been prepared by SLR (2021a) to inform the proposed modification.

The AQIA (SLR, 2021a) identifies the potential air quality impacts resulting from the proposed changes to the operations and considers dust and odour emissions from the operations, including the storage of the SWDF.

5.1.1 Existing Environment

Currently, air emissions from the site include:

- Particulate matter emissions from stack sources (kiln stack, kiln cooler stack, and cement mills)
- Fugitive dust emissions from materials handling
- Fugitive dust from wind erosion of stockpiles and other exposed dusty surface areas
- Fugitive wheel generated dust from paved and unpaved truck road traffic at site; and
- Odour emissions from the SWDF storage sheds.

Site emissions, as they relate to the proposed changes with diversion of the fuel delivery transports from the current main site access via Taylor Avenue to the new access via Old Hume Highway, primarily concern wheel generated dust from sealed roads on site. The dust impact assessment component is focused on these changes. Odour emissions from the additional SWDF storage sheds are also assessed as a single odour assessment scenario.

The closest residential area and zone to the site is the New Berrima township, which has the closest sensitive residential receptors at a distance of approximately 650 m north of the No. 6 kiln stack and approximately 450 m from the closest materials handling operations and cement dispatch loading operations. There are also sensitive receptors, separate rural residences surrounding the plant to the west, south and east at distances of between 1 to 2 km.

5.1.1.1 Estimation of Air Emissions

For the emissions estimation, previous air quality and dust impact assessment studies and NPI data for the Cement Works were referenced. Of significant note is that previous dispersion modelling studies have not included emissions from the truck vehicle movements on the sealed roads at site, and therefore this inclusion adds to the overall site emissions.

Instead of modelling annual daily averages of truck movements, site access truck data for a two-month period of representative operations were analysed to determine the frequency of truck movements according to time of day for each day of the week. By including this and scaling the frequencies for each material transport reasonable conservatism was included in the assessment by making sure that periods of peak activity were included.

The annual emissions estimated for each scenario of the current and proposed operations (truck transport excerpt only) are presented in **Table 10** and **Table 11** below, with the complete tables available in the AQIA (SLR, 2021a).

Table 10 Estimated Annual Emissions Applied in the Dispersion Modelling for the Current Operations

Source	Annual Emissions (kg/yr)			Annual Emissions (%)		
	TSP	PM ₁₀	PM _{2.5}	TSP	PM ₁₀	PM _{2.5}
Truck Transports						
Raw materials	36,171	6,943	1,680	7.3%	2.5%	1.5%
Fuels for Kiln (Coal)	17,860	3,428	829	3.6%	1.2%	0.7%
Fuels for Kiln (SWDF)	10,383	1,993	482	2.1%	0.7%	0.4%
Fuels for Kiln (AKF-5)	-	-	-	-	-	-
Dispatch Clinker	8,462	1,624	393	1.7%	0.6%	0.4%
Dispatch Cement	14,132	2,713	656	2.8%	1.0%	0.6%
Diesel Loaders & Tractor	2,831	837	84	0.6%	0.3%	0.1%
Off-road Trucks	25,380	7,500	750	5.1%	2.7%	0.7%
<i>Sub Total</i>	<i>115,219</i>	<i>25,038</i>	<i>4,874</i>	<i>23.1%</i>	<i>9.0%</i>	<i>4.4%</i>

Table 11 Estimated Annual Emissions Applied in the Dispersion Modelling for the Proposed Operations

Source	Annual Emissions (kg/yr)			Annual Emissions (%)		
	TSP	PM ₁₀	PM _{2.5}	TSP	PM ₁₀	PM _{2.5}
Truck Transports						
Raw materials	36,171	6,943	1,680	7.0%	2.5%	1.5%
Fuels for Kiln (Coal)	7,182	1,379	334	1.4%	0.5%	0.3%
Fuels for Kiln (SWDF)	33,193	6,371	1,541	6.4%	2.3%	1.4%
Fuels for Kiln (AKF-5)	3,984	765	185	0.8%	0.3%	0.2%
Dispatch Clinker	8,462	1,624	393	1.6%	0.6%	0.4%
Dispatch Cement	14,132	2,713	656	2.7%	1.0%	0.6%
Diesel Loaders & Tractor	2,831	837	84	0.5%	0.3%	0.1%
Off-road Trucks	25,380	7,500	750	4.9%	2.7%	0.7%
<i>Sub Total</i>	<i>131,334</i>	<i>28,131</i>	<i>5,623</i>	<i>25.5%</i>	<i>10.0%</i>	<i>5.0%</i>

Odour emissions from the SWDF storage sheds were estimated based on the same methodology as applied for a previous assessment by AQP in 2015.

5.1.1.2 Meteorological Modelling

Data from the five most recent years from 2016 to 2020 was considered for selection of a meteorologically representative year for assessment purposes for the dispersion modelling. Data from the nearest Bureau of Meteorology weather station at Moss Vale, approximately 7.5 km to the west southwest of the Cement Works and the site air quality monitoring station (AQMS) data for the period 2017 to 2019 were also considered.

Meteorological modelling methodologies included TAPM and CALMET, which are described in detail within the AQIA (SLR, 2021a). Evaluation of meteorological data considered the following parameters:

- Wind (wind speed and direction)
 - The prevailing wind direction at the site is westerly with a relatively low frequency of southerly winds towards the New Berrima township;
- Turbulence (atmospheric stability)
 - The site shows the typical distribution of stability class for inland locations; and
- Mixing height (depth of turbulent layer)
 - The profile of the diurnal mixing heights predicted at the site show a typical profile for inland conditions.

5.1.2 Potential Impacts

5.1.2.1 Construction

For review of potential air quality impacts from the construction works, the *IAQM Guidance on the Assessment of Dust from Demolition and Construction* (IAQM, 2014) was used for screening of assessment requirements.

With no sensitive receptor within 350 m from the alignment of the new entry road, or within 500 m from the new site entrance (by distance of road), no further assessment was deemed to be required by the IAQM method.

5.1.2.2 Dispersion Modelling

CALPUFF dispersion modelling was performed for two scenarios to assess the changes in the dust emissions and resulting impacts from the proposed operations with the diversion of the fuel additional truck deliveries to the new entry via Old Hume Highway compared to the current operations with all truck traffic coming through the Taylor Avenue site entry (refer to Section 7 of **Appendix B** for detailed results and figures).

The results from the dispersion modelling show that dust impacts from the site at the corner of the New Berrima township closest to the site's Taylor Avenue entry access are elevated, and that with the introduction of the new Old Hume Highway access and diversion of some of the truck traffic from this area that there is a small improvement.

The cumulative assessment shows that contribution of background concentrations are overall low. The year of background data used in the assessment (2017) shows lower values compared to other recent years. If higher background concentrations were to be considered the predicted maximum ground level concentrations would be closer to the assessment criteria.

A large portion of the site particulate matter emissions are from stack sources and are better dispersed than fugitive emissions from ground level such as materials handling and vehicle movements. As such the contribution to ground level concentrations at surrounding sensitive receptors is higher from fugitive sources than the stack sources at site.

There is some uncertainty about the surface silt loading assumed in the emissions estimation. For improved emissions estimation of wheel generated dust at site it would be recommended that samples are taken of surface silt loadings across the plant sealed roads. From site observations in comparison to the descriptions of the reference surface silt loading values the emissions estimation may have been conservative.

The site air quality monitoring for compliance purposes is performed at the AQMS location approximately 550 m east of the operations (in the prevailing downwind direction). The dispersion modelling results show that exposure at this location is lower than at the nearest sensitive receptor locations for the New Berrima township, which also is located closer to the operations than the AQMS.

It is understood that a real-time dust monitor is in place at the northern boundary for dust management purposes to inform the operations in combined use with a Trigger and Response Plan (TARP) to avoid operations contributing to nuisance dust complaints.

Review of the predicted dust deposition results do not show higher levels in relation to potential nuisance issues. However, from review of the complaints data it is understood that complaints are most often in relation to individual events of deposition of cement dust on cars rather than higher rates on an ongoing basis over time.

The odour concentration results show that there is no issue associated with potential odour from the SWDF storage sheds.

5.1.2.3 Summary

The comparison of the results from the dispersion modelling (refer to Section 7 of Appendix B for detailed results and figures) of the current and proposed operations with a new access via the Old Hume Highway shows improvements in the air quality for the New Berrima township with diversion of the fuel related truck deliveries.

As shown in the emissions estimation and the dispersion modelling results, the new site access will not achieve a reduction in vehicle kilometres travelled at the site, but improvement in air quality for the New Berrima township is demonstrated.

5.1.3 Mitigation and Management Measures

The AQIA (SLR, 2021a) recommends the following mitigation measures and/or considerations:

- To reduce wheel generated dust emissions from sealed roads, road cleanliness is important and surface silt levels need to be kept low from carry out from less clean areas and spills. The Dust Management Plan mentions a street sweeper be regularly used for maintenance of the sealed internal haul roads. This should be reviewed and optimised and consideration should be given to updating the TARP to list street sweeping as part of the 'Level 1' trigger dust mitigation strategy actions.

5.2 Traffic and Transport

A Traffic Impact Assessment (TIA) has been prepared by SLR (2021b) to inform the proposed modification.

The TIA (SLR, 2021b) assesses the consistency of the development with Council and State planning and evaluates the impacts of the proposed development on the surrounding transport networks; identifies the transport infrastructure required to support the proposed development; and provides an assessment of the traffic and transport specific aspects of the development against the requirements of relevant standards and guidelines.

5.2.1 Existing Environment

The site is generally surrounded by undeveloped land, with the township of New Berrima located to the north of the site. The key roads surrounding the site include:

- Old Hume Highway – an Unclassified Regional Road with one traffic lane in each direction, undivided, rural cross-section with a posted speed limit of 80 km/h; and
- Taylor Avenue – a Local Road with one traffic lane in each direction, undivided, rural cross-section with a posted speed limit of 80 km/h and 50 km/h.

The site currently has two accesses, with Argyle Street for employees, visitors, and services; and Perth Street for all other heavy vehicles.

A review of data from the Transport for NSW (TfNSW) Centre for Road Safety website detailed that there were a total of ten reported crashes in the vicinity of the site within the five-year crash period, in locations shown by Figure 4 of the TIA (SLR, 2021b). One crash resulted in a fatality as a result of a head-on collision along Berrima Road and another resulted in serious injury due to vehicles crossing the Medway Road/Old Hume Highway roundabout from adjacent directions. All other reported crashes resulted in moderate or no injuries.

The data indicates that there is no recurring crash occurrence or theme in the immediate vicinity of the site that would preclude development or warrant mitigation to enable development, given that the proposed development is anticipated to reduce the cumulative traffic on Taylor Avenue and divert it to Old Hume Highway and away from the township of New Berrima.

In order to ascertain existing traffic demands, speed environment, and vehicle composition on the existing section of Taylor Avenue and the proposed section on the Old Hume Highway, automated pneumatic tube counts (ATC) surveys were completed for one week, commencing 11 September 2021 at the following locations:

- Taylor Ave between Melbourne Street and Brisbane Street; and
- Old Hume Hwy, 290 m south of Taylor Ave (adjacent to power line easement).

ATC surveys identified Friday to be the busiest day at both locations, with the peak hour volumes for this day presented in **Table 12** below.

Table 12 Peak Hour Volumes

Location	Peak	Time	Eastbound Volume (LV/HV)	Westbound Volume (LV/HV)	Total Volume
Taylor Avenue	AM	7:00 – 8:00	152 (105 / 47)	94 (56 / 38)	246 vph
	PM	3:00 – 4:00	107 (77 / 30)	160 (141 / 19)	267 vph
Location	Peak	Time	Northbound Volume (LV/HV)	Southbound Volume (LV/HV)	Total Volume
Old Hume Highway	AM	11:00-12:00	47 (32 / 15)	49 (34 / 15)	96 vph

Location	Peak	Time	Eastbound Volume (LV/HV)	Westbound Volume (LV/HV)	Total Volume
	PM	2:00-3:00	53 (41 / 12)	57 (45 / 12)	110 vph

* LV = light vehicles, HV = heavy vehicles

These volumes have been adopted as the background traffic for analysis. The counts also identified that Class 10 vehicles are the largest vehicles (up to 26 m) using the route with the exception of only five Class 11 vehicles across the surveyed week.

The proposed modification will not result in any changes to the staff numbers and staff vehicles on-site. Based on this, no changes to the light vehicle volumes are expected.

Based on existing heavy vehicle trip assignment assessment (as fully detailed in Table 11 of the TIA (SLR, 2021b)), the adopted trip assignment and resulting trucks using each road in existing conditions are as follows:

- 30% (eight trucks) will use Old Hume Highway (south):
- 60% (17 trucks) will use Medway Road; and
- 10% (three trucks) will use Old Hume Highway (north).

Existing heavy vehicle volumes using Taylor Avenue at the intersection of Old Hume Highway/Taylor Avenue/Medway Road are less than Boral's currently approved limit of an average of 26 heavy vehicles during a peak hour (i.e., 52 movements in total). As such, it is assumed that all existing heavy vehicle trips using Taylor Avenue at the subject intersection will be replaced by the post-modification generated trips.

5.2.2 Potential Impacts

5.2.2.1 Construction

The construction traffic demands of the proposed modification are expected to be associated with the workforce and the transportation of construction materials and equipment to the site.

Construction traffic demands at the intersection of Old Hume Highway/Taylor Avenue/Medway Road are expected to be 18 vehicles in during the AM period, and 18 vehicles out during the PM period.

Vehicles required to access the site during construction include the following:

- Private Vehicle;
- Coaster Bus;
- Concrete Truck;
- Heavy Rigid Vehicle;
- Six Axle Articulated Vehicle;
- B-Double;
- 32t truck and dog;
- Flat deck;
- Hook truck; and
- Low Loader.

Civil works are estimated to take a total of 30 business days (6 weeks) to complete (a conservative assumption to adopt high daily and hourly volumes, and the construction workforce is estimated to be 55 persons maximum on-site, with 50 labourers and 5 supervisors).

Based on the SIDRA assessment as summarised below in **Table 13**, the forecast construction traffic is not expected to have a noticeable impact on the roundabout operation. This is due to the low traffic demand that would be generated by the proposed civil works (approximately one vehicle in every 3.3 minutes in the AM or PM peak hours).

Table 13 Old Hume Highway / Taylor Avenue / Medway Road – SIDRA Summary Output (Construction)

Scenario	Level of Service (LOS)	DOS (%)	Critical Movement (Worst Delay - s)	Worst 95th %ile Queue (m)
Existing (Without Construction)				
Weekday AM Peak	A	0.121	12.0 (North)	4.6 (West)
Weekday PM Peak	A	0.139	12.1 (South)	5.8 (East)
With Construction				
Weekday AM Peak	A	0.130	12.1 (North)	5.2 (West)
Weekday PM Peak	A	0.139	12.1 (South)	5.8 (East)

5.2.2.2 Operation

The proposed modification will increase the total trucks using the site from 317 to 330 per day, however the addition of the proposed site access from the Old Hume Highway will divide heavy vehicle traffic generation between the two accesses.

In addition, the proposed modification is seeking approval for 24/7 delivery for SWDF, however a 12-hour delivery timeframe has been applied to determine peak hour volumes for the purposes of assessment.

The adopted peak hour resultant traffic demand estimate for the proposed modification is presented in **Table 14**.

Table 14 Proposed Development Peak Hour Traffic Demand

Access	Existing (trucks per day)	Existing (peak hour trucks)	Proposed (trucks per day)	Proposed (peak hour trucks)	Peak hour change
Taylor Ave Access	317	26.4 (26)	128	10.7 (11)	-15.7 (-16)
Old Hume Hwy Access	N/A	N/A	202	16.8 (17)	+16.8 (+17)
Total (Site)	317	26.4 (26)	330	27.5 (28)	+1.1 (1)

As outlined in **Table 14** above, it is assumed that the proposed development will increase total truck numbers by a maximum of two in the peak hour, even with a very conservative assessment.

Trip assignment for truck movements as a result of the proposed modification is assumed to be the same as existing, such that proposed traffic will follow a similar trip assignment as the existing intersection of Old Hume Highway/Taylor Avenue/Medway Road.

Post-development trip assignments are summarised below in **Table 15**.

Table 15 Post Development Trip Assignments

Access	Movement	Peak hour trucks	Total
Taylor Ave	Old Hume Hwy (S)	0	11
	Medway Rd	9	
	Old Hume Hwy (N)	2	
Old Hume Hwy (Proposed)	Old Hume Hwy (S)	8	17

5.2.2.2.1 Traffic Analysis

Based on traffic engineering design consideration, traffic analysis and SIDRA assessment for key intersections of Old Hume Highway/Taylor Avenue/Medway Road and Old Hume Highway/New Haul Road Access, the following is concluded:

- The proposed design of the new haul road access intersecting with Old Hume Highway as part of the proposed development exceeds Austroads Guidelines (Austroads Guide to Road Design Part 4A (AGRD04A-17));
- The operational assessment conducted demonstrates that the proposed development will not have any adverse impacts on the roundabout of Old Hume Highway/Taylor Avenue/Medway Road and will improve its operation by moving traffic away from Taylor Avenue; and
- The proposed Basic Right Turn (BAR) and Auxiliary Left Turn (AUL) turn treatments are considered appropriate at the new haul road access and over and above the minimum requirements of Austroads Guidelines.

5.2.3 Mitigation and Management Measures

Given the minimal impact to traffic, the TIA (SLR, 2021b) does not recommend any specific mitigation measures and/or considerations.

5.3 Noise and Vibration

A Noise Impact Assessment (NIA) has been prepared by SLR (2021c) to inform the proposed modification.

The NIA (SLR, 2021c) focuses on the change between existing on-site traffic noise and proposed on-site traffic noise as a result of the new haul road. Given there is no proposed change to cement manufacture operations at the site as a result of the modification, noise from the existing plant on site has not been included in this assessment.

5.3.1 Existing Environment

On-site traffic noise forms part of the operational noise of the facility and is covered under the existing site approval and the corresponding EPL 1698. Additional details of the noise restrictions currently in place for the site are contained in Section 3.3 of the NIA (SLR, 2021c).

In order for the proposed modification to have a minimal impact on the total noise emissions from the operation of the site, the noise targets have been established to be a minimum of 6 decibels (dB) below the existing noise limits and are presented in **Table 16**.

Table 16 On-Site Traffic Operational Noise Targets

Location	Period	LAeq(15minute)
Taylor Avenue near Adelaide Street	Day	42
	Evening	38
	Night	37
4 Melbourne Street	Day	40
	Evening	36
	Night	34
12 Brisbane Street	Day	45
	Evening	39
	Night	34

5.3.2 Potential Impacts

A SoundPlan v8.0 computer model was developed in order to predict noise emissions from the construction of the proposed haul road and takes into account source sound level emissions and locations, screening effects, receiver locations, ground topography, and noise attenuation due to spherical spreading and atmospheric absorption. The noise model also included the details of surrounding buildings with the potential to provide acoustic shielding of construction noise to surrounding receivers.

The SoundPlan v8.0 computer model developed for construction activities was also used to predict operational noise.

5.3.2.1 Construction

Construction noise modelling scenarios for four construction scenarios have been developed with proposed construction equipment and associated sound power levels (SWL) detailed in Appendix B of the NIA (SLR, 2021c). The significant stages or scenarios are summarised as follows:

- Scenario 1 – Site Establishment;
- Scenario 2 – Enabling Works;
- Scenario 3 – Road Works; and
- Scenario 4 – Shed Construction.

Construction noise from each of the construction scenarios was predicted at the nearest residential receivers as detailed below in **Table 17**.

Table 17 Predicted Daytime Construction Intrusive $L_{Aeq}(15\text{minute})$ Noise Levels (dBA re 20 μPa)

Receiver ¹	L _{Aeq} Noise Level				
	Daytime Project Specific NML	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Taylor Avenue near Howard Street ²	54	42	47	49	28
Taylor Avenue near Adelaide Street	57	38	42	44	44
4 Melbourne Street	55	39	44	46	42
12 Brisbane Street	54	37	42	44	43

Notes 1. In addition to the Taylor Avenue receiver near Adelaide Street from the Recognition Research Report, a Taylor Street receiver near Howard Street at the most impacted western end of New Berrima has been included
2. The lower NML for 12 Brisbane Street has been adopted for Taylor Avenue near Howard Avenue.

The predicted noise levels presented indicate compliance for the four construction scenarios considered. This is consistent with the proposed construction activities and distances to the receivers.

5.3.2.2 Operation

On-site Operational Noise

On-site operational traffic noise levels were predicted for both the existing and proposed scenarios at the nearest residences to the facility on or near Taylor Avenue and are presented below in **Table 18**.

Table 18 Predicted Operational On-Site Intrusive $L_{Aeq}(15\text{minute})$ Traffic Noise Levels (dBA re 20 μPa)

Location	Period	Noise Target	Predicted Noise Level $L_{Aeq}(15\text{minute})$		Compliance
			Existing	Proposal	
Taylor Avenue near Howard Street	Day	45	37	36	Achieved
	Evening	39		25	
	Night	34	37	36	
Taylor Avenue near Adelaide Street	Day	42	45	41	Achieved
	Evening	38		30	
	Night	37	45	41	
4 Melbourne Street	Day	40	39	41	Achieved
	Evening	36		30	
	Night	34	39	41	
12 Brisbane Street	Day	45	41	38	Achieved
	Evening	39		27	
	Night	34	41	38	

Due to the change in on-site access routes from the proposed haul road, there is a reduction in the on-site traffic noise at the nearest residences, of typically 1 to 4 dB, with the closer residences to the facility receiving the maximum benefit. It should be noted that these predicted noise levels reflect peak hourly movements, with the 6 am to 7 am volumes influencing the night-time predicted noise levels.

Whilst the noise targets as based on the Project Specific Noise Level (PSNLs) identified in the document titled 'PRP-7 Response – Identifying Environmental Noise Objectives For Cement Plant' (PRP-7 Response Report) (further information available in the NIA (SLR, 2021c)) have been exceeded by up to 4 dB during the night-time, there is an overall reduction in noise compared to the existing case which is of benefit to ongoing noise reduction initiatives.

Off-site Traffic Noise

Off-site operational traffic noise levels were predicted at the nearest residences to the facility and are presented below in **Table 19**.

Table 19 Predicted Operational Total Existing and Proposal Traffic Noise Levels (dBA re 20 µPa)

Access Road	Daytime LAeq(15hour) Noise Levels ¹				Night-time LAeq(9hour) Noise Levels ¹			
	Noise Criteria	Existing Traffic	Proposed Traffic	Change	Noise Criteria	Existing Traffic	Proposed Traffic	Change
Taylor Avenue near Howard Street	60 dBA	66	64	-2.0	55 dBA	62	61	-0.9
Taylor Avenue near Adelaide Street		66	64	-2.0		61	60	-0.9
4 Melbourne Street		62	59	-2.1		57	56	-0.9
12 Brisbane Street		57	55	-1.9		52	52	-0.8
Old Hume Highway		52	52	+ <0.1		47	47	+ <0.1
Medway Street		55	55	+ <0.1		50	50	+ <0.1

Note 1: Total traffic noise level inclusive of 2.5 dBA I correction.

Where the existing nominated criteria are already exceeded, the NSW Road Noise Policy (RNP) states that traffic associated with a development should not be permitted to lead to an increase in the existing noise traffic levels of more than 2 dBA. Given this, the proposed modification primarily reduces the existing road traffic noise levels at residences on Taylor Avenue by around 2 dB(A) during the daytime and 1 dB(A) at night.

Therefore the proposed modification does not result in an exceedance of the traffic noise criteria, and in most cases, slightly improves noise levels at residences along Taylor Avenue.

5.3.2.3 Vibration

The nearest residences are located 400 m from the extent of works, and the commercial structures are also distanced 125 m from the works. Accordingly, no vibration impacts are anticipated and has not been considered further in this report.

5.3.3 Summary

In summary, construction noise is expected to comply with NMLs set in accordance with the EPA's Interim Construction Noise Guideline (ICNG) (EPA, 2009).

Operational noise targets for on-site traffic noise as detailed within existing site consent conditions as noted in **Section 1.1** of this report are marginally exceeded by existing on-site traffic, with the proposed new haul road resulting in a reduction in on-site traffic noise at the nearest receivers in New Berrima to the north. The noise reductions are typically 1 dB to 4 dB.

While existing traffic noise levels exceed the RNP baseline noise levels for an arterial road at residences on Taylor Avenue, the proposed new access road to the Old Hume Highway results in a reduction in traffic noise levels at Taylor Avenue residences of typically 2 dB during the daytime and 1 dB at night. This is compliant with RNP, where existing traffic noise already exceeds the stated limits.

Existing traffic noise levels comply with the RNP baseline noise levels for an arterial road at residences on The Old Hume Highway and Medway Street. The proposed new haul road and associated increase in heavy vehicles results in negligible increases in traffic noise levels of less than 0.1 dB during the daytime and during the night-time.

The resultant noise levels remain below the RNP baseline noise levels for an arterial road.

5.3.4 Mitigation and Management Measures

Given the minimal impact, and in some cases, the improvement to acoustic amenity, the NIA (SLR, 2021c) does not recommend any specific mitigation measures and/or considerations.

5.4 Soil and Water

A desktop assessment of surface water has been completed to inform the proposed modification.

This subsection outlines the surface water management protocols for the proposed modification and provides a baseline set of management strategies to assist with effectively managing water/runoff during the construction and operational phases.

5.4.1 Existing Environment

Slopes in the area of the proposed haul road are mild with gradients typically within the 1 % to 5 % range. Runoff from the western section of the haul road will flow to the south into an existing channel which then will convey runoff to the west and into Oldbury Creek immediately adjacent to the Old Hume Highway. At least one culvert will be required to convey upslope runoff past the haul road in this section (most likely approximately 380 m to the east of the Old Hume Highway where a concentrated flow path exists in the landform). Runoff from the eastern section of the haul road is expected to flow into the existing water management dams at the cement works site.

Riverine flooding and Acid Sulfate Soils (ASS) are not expected to impact on the proposed haul road due to the elevation and proximity to the coast and rivers or creeks.

5.4.2 Potential Impacts

The transport of sediment off-site can have a wide range of detrimental effects including safety, social, economic, and environmental impacts. Pollution can occur in the form of finer sediment fractions such as silts and clays that create turbid water, and also in the form of coarse sediments such as sand particles that travel off-site.

The following activities associated with the proposed haul road and construction of storage sheds have the potential to cause environmental impacts unless controlled:

- Stripping of vegetation, subsoil, and topsoil;
- Construction and establishment of the haul road (particularly across concentrated flow paths) and new storage sheds;
- Vehicle and machinery movements (including material falling from vehicles);
- Ground disturbances; and
- Liquid waste, fuel, and oil spills.

5.4.2.1 Contamination

A search of the Environment Protection Authority (EPA) Contaminated Land Record database was completed on 3 February 2022 and did not identify any sites within the suburb of New Berrima.

A search of the *Protection of the Environment Operations Act 1997* (POEO Act) public register was also completed on 3 February 2022 and identified 4 active Environment Protection Licence (EPL) records within the suburb of New Berrima. One EPL (EPL 1698) is listed at the site and is held by Boral Cement Limited for the following:

- Cement or lime works;
- Energy recovery;
- Extractive activities;
- Resource recovery; and
- Waste storage.

5.4.3 Mitigation and Management Measures

SLR recommends the following mitigation measures and/or considerations:

5.4.3.1 Construction Phase

Erosion and Sediment Control (ESC) measures will be critical during the construction phase of the proposed haul road. A specific ESC Plan will be developed for the proposed works in accordance with the 'Blue Book' (*Managing Urban Stormwater: Soils and Construction Vol 1, 4th edition* (Landcom, 2004)). Wind and water erosion from disturbance areas cannot be eliminated completely, however the following measures will be undertaken to minimise their impact:

- Minimising the disturbance footprint;
- Staging the construction works (where possible) to minimise the area of disturbance at any one time and to reduce the potential for erosion to occur;

- Undertake any high risk short-term ground disturbance works during a period when good weather has been forecast;
- Separation and/or diversion of 'clean' water catchment runoff from disturbed runoff areas to minimise sediment-laden water volumes for management (where possible). This may involve the construction of small temporary bunds to divert upslope clean water runoff where this is required;
- Minimising soil erosion (i.e. rehabilitation, drainage, and erosion control measures) at the source, rather than trapping resultant sediment. Where this is not practicable, then all reasonable measures will be made to trap sediment by implementing sediment control measures compliant with the required treatment standards. ESC measures shall be installed prior to any ground disturbance;
- Sediment fences will be installed to control sheet flow from the ground disturbance areas during the construction works. Check dams (such as sandbags, filter socks, coir logs, rock, etc.) will be used to trap mobilised sediment in concentrated flow paths and where sediment fences cannot be installed due to impermeable surfaces. The check dams shall be installed and removed as required in relation to the staging of the ground disturbance works;
- Soil stockpiles will be placed in areas away from roadways and other drainage lines. Suitable sediment control measures will be installed downslope of soil stockpiles and upslope clean water runoff diverted (where possible);
- Sealing or revegetation of disturbed areas as soon as possible;
- Stabilised rock pads will be installed at all site entry and exit points during the construction works. Where this is not possible, visual inspections of all vehicles leaving the site will be undertaken and where it is deemed possible that sediment could be tracked onto the adjacent streets the vehicles shall be washed down in a suitable location such that the wash down water reports to appropriate sediment controls. Street sweeping will be used as an additional contingency measure where sediment is observed on the adjacent streets;
- Any liquid wastes, fuels, and oils stored on-site will be sufficiently bunded to contain any potential spills. Accidental spillage or poor management of fuels, oils, lubricants, hydraulic fluids, solvents, and other chemicals during the construction phase will be controlled through spill management actions (including the availability of spill kits) to prevent water quality impacts. Captured liquid wastes, fuels, and oils should be pumped out by a liquid waste contractor and disposed of at an appropriately licenced facility; and
- Any sodic soils encountered on site need to be managed by the application of Gypsum at a rate of approximately 1 kg/m².

5.4.3.2 Operation Phase

Surface water impacts associated with the operational phase of the proposed haul road will primarily relate to vehicle movements and material falling from trucks. The following measures will be undertaken to minimise these impacts:

- Bitumen sealing of the haul road with sufficient road crossfall to safely convey runoff from the road surface;

- Adequate drainage design including appropriate longitudinal and lateral water conveyance structures. Culvert structures will be installed beneath the haul road, as required, to safely convey upslope runoff past the haul road. Any culverts will include suitably designed and constructed headwalls/wingwalls and suitable downstream scour protection measures; and
- Visual inspections of all vehicles leaving the site will be undertaken and where it is deemed possible that sediment could be tracked onto the adjacent streets the vehicles shall be washed down in a suitable location such that the wash down water reports to appropriate sediment controls (a designated wheel wash facility is recommended). Street sweeping will be used as an additional contingency measure where sediment is observed on the adjacent streets.

5.4.3.3 Monitoring and Maintenance

Monitoring

The performance of ESC devices will decline if they are not maintained. All ESC devices structures will be inspected weekly and following significant rainfall events (i.e. > 10 mm in a 24 hour period).

Sediment laden runoff in any site excavations shall be directed into a designated sump area, treated with an appropriate flocculating agent, trucked off site by a licensed contractor and be disposed of in a suitable manner. Runoff shall only be released offsite if it conforms with the following water quality requirements:

- Total Suspended Solids (TSS) less than 50 mg/l;
- ph in the range 6.5 to 8.5 except where, and to the extent that, the natural receiving waters lie outside this range; and
- No visible oil or grease.

During the construction works monitoring of any sediment laden runoff and creek flows is recommended during or immediately following rainfall and/or flow events. If the water quality requirements detailed above are exceeded then an investigation to determine the cause of the exceedance shall be undertaken with rectification measures carried out as required.

Maintenance

During the construction and operational phases of the haul road, all ESC devices will require on-going maintenance to ensure they remain fully operational. All ESC measures will be maintained in a functioning condition until individual areas have been deemed 'successfully' sealed, stabilised, or rehabilitated. If any of the devices are seen to have a reduced level of service or is damaged in anyway, they are to be repaired immediately with the appropriate reporting documented filed and issued.

Sediment build up within the sediment control measures will be regularly removed. If this sediment is not suitable for reuse, then it shall be disposed of in a suitable and approved manner. Where significant erosion is observed to be occurring on a regular basis, additional controls will be implemented.

5.5 Waste Management

A Construction Waste Management Report (CWM Report) has been prepared by SLR (2021d) to inform the proposed modification.

The CWM Report (SLR, 2021) applies to management of waste generated from the site preparation and construction waste stages of the proposed modification and does not consider operational waste.

5.5.1 Potential Impacts

The key preparation and construction activities at the site are anticipated to include:

- Excavation and filling for site levelling purposes and road construction; and
- Construction of two new SWDF storage sheds.

A summary of likely waste types generated from site preparation and construction activities, along with their waste classifications and proposed management methods, is provided below in **Table 20**.

Table 20 Potential Waste Types and their Management Methods

Waste Types	NSW EPA Waste Classification	Proposed Management Method
Site Clearance		
Clean fill	General solid waste (non-putrescible)	On-site re-use for existing stockpile area pads or unsealed roads
Contaminated fill	To be classified subject to the results of testing	Off-site treatment and disposal to landfill
Excavated natural material (ENM) or virgin excavated natural material (VENM)	General solid waste (non-putrescible)	On-site re-use of topsoil for landscaping of the site or as fill material
Construction		
Sediment fencing, geotextile materials	General solid waste (non-putrescible)	On-site reuse where possible or disposal to landfill
Asphalt, bitumen	General solid waste (non-putrescible)	On-site reuse where possible (road base) or offsite resource recovery
Concrete	General solid waste (non-putrescible)	On-site reuse for levelling or road base or offsite resource recovery
Bricks and pavers	General solid waste (non-putrescible)	Off-site recycling
Gyprock or plasterboard	General solid waste (non-putrescible)	Off-site resource recovery
Sand or soil	General solid waste (non-putrescible)	On-site reuse
Metals such as fittings, appliances and cabling, including copper and aluminium	General solid waste (non-putrescible)	Reuse or offsite resource recovery
Conduits and pipes	General solid waste (non-putrescible)	On-site reuse
Timber	General solid waste (non-putrescible)	<i>Treated</i> : offsite resource recovery or landfill <i>Untreated</i> : offsite resource recovery
Paint	Hazardous waste	On-site reuse or Off-site recycling, Paint-back collection or disposal

Waste Types	NSW EPA Waste Classification	Proposed Management Method
Ceramics including tiles	General solid waste (non-putrescible)	Off-site recycling at a crushing and recycling company
Plant Maintenance		
Empty oil and other drums or containers, such as fuel, chemicals, paints, spill clean ups	Hazardous waste: Containers were previously used to store Dangerous Goods (Class 1, 3, 4, 5 or 8) and residues have not been removed by washing or vacuuming. General solid waste (non-putrescible): Containers have been cleaned by washing or vacuuming.	Transport to comply with the transport of Dangerous Goods Code applies in preparation for off-site recycling or disposal at licensed facility
Air filters and rags	General solid waste (non-putrescible)	Off-site disposal
Oil filters	Hazardous waste	Off-site recycling
Batteries	Hazardous waste	Off-site recycling, Contact the Australian Battery Recycling Initiative for more information
Packaging		
Packaging materials, including wood, plastic, including stretch wrap or LLPE, cardboard and metals	General solid waste (non-putrescible)	Off-site recycling
Wooden or plastic crates and pallets	General solid waste (non-putrescible)	Reused for similar projects on-site, returned to suppliers, or off-site recycling. Contact <i>Business Recycling</i> for more information
Work Compound and Associated Offices		
Food Waste	General solid (putrescible) waste	Dispose to off-site landfill with general garbage
Recyclable beverage containers including glass and plastic bottles, aluminium cans and steel cans	General solid waste (non-putrescible)	Co-mingled recycling at off-site licensed facility or deliver to local NSW container deposit scheme 'Return and Earn' facility
Clean paper and cardboard	General solid waste (non-putrescible)	Paper and cardboard recycling at off-site licensed facility
General domestic waste generated by workers such as soiled paper and cardboard and polystyrene	General solid waste (non-putrescible) mixed with putrescible waste	Disposal at off-site landfill

5.5.2 Site Preparation and Construction Waste Types and Quantities

5.5.2.1 Proposed Haul Road

A new site access is proposed to be established from the west, connecting directly with the Old Hume Highway. The haul road will be constructed on existing Boral holdings, comprising a sealed two lane, one way in each direction that connects in with existing internal roads within the Cement Works. Minimal quantities of waste will be generated during construction of the haul road. It is expected that approximately one 7 m³ skip per week of residual waste will be generated from road construction activities.

5.5.2.2 Proposed Storage Sheds

To calculate construction waste generation rates for the new SWDF storage sheds, in the absence of construction waste generation rates from Council, SLR has used the 'Factory' construction waste generation rates from Appendix A of *The Hills Development Control Plan 2012*, as shown below in **Table 21**.

Table 21 Construction Waste Generation Rates

Rate Type	Floor Area (m ²)	Waste types and quantities (tonnes)					
		Timber	Concrete	Bricks	Gyprock	Metal	Other
Factory	1,000	0.25	2.10	1.65	0.45	0.6	0.6

Based on the approximate total footprint area of the two new storage sheds, the above waste generation rates were used to estimate the waste generated from the construction of the sheds, as detailed below in **Table 22**.

Table 22 Anticipated Types and Estimated Quantities of Construction Waste

Development Component	Area (m ²)	Waste types and quantities (tonnes)					
		Timber	Concrete	Bricks	Gyprock	Metal	Other
Proposed building area	2,000	0.5	4.2	3.3	0.9	1.2	1.2

Actual waste quantities and composition will vary; however, this estimate is provided so that the Construction Site Manager may make provision for on-site or off-site re-use and recycling opportunities.

5.5.3 Mitigation and Management Measures

The CWM Report (SLR, 2021d) recommends the following mitigation measures and/or considerations:

5.5.3.1 Waste Avoidance

In accordance with the *Wingecarribee Industrial Land Development Control Plan (DCP)* and best practice waste management, the Building Contractor, Building Designer and/or equivalent roles should:

- Develop a purchasing policy based on the approximate volumes of materials to be used so that the correct quantities are purchased;
- Arrange for delivery of materials on an 'as needed' basis to avoid material degradation through weathering and moisture damage;

- Communicate strategies to handle and store waste to minimise environmental, health and amenity impacts;
- Select materials with a low environmental impact over the lifecycle of the building;
- Design the proposed modification to require standard material sizes or make arrangements with manufacturing groups for the supply of non-standard material sizes;
- Design works for de-construction;
- Reduce packaging waste by:
 - Returning packaging to suppliers where practicable to reduce waste further along the supply chain;
 - Purchasing in bulk;
 - Requesting cardboard or metal drums rather than plastics;
 - Requesting metal straps rather than shrink wrap, and;
 - Using returnable packaging such as pallets and reels;
- Use prefabricated materials;
- Preferentially use paints, floor coverings and adhesives with low VOC (volatile organic compound) content;
- Reduce the use of polyvinyl chloride products;
- Implement measures to prevent the occurrence of windblown litter, dust, and stormwater pollution; and
- Ensure subcontractors are informed of and implement site waste minimisation and management procedures.

5.5.3.2 Reuse and Recycling

Effective management of construction materials and construction and demolition waste, including options for reuse and recycling where applicable and practicable, will be conducted. Only waste that cannot be cost effectively reused or recycled are to be sent to landfill or appropriate disposal facilities.

In accordance with the DCP and best practice waste management, the following specific procedures should be implemented:

- Maximise reuse and recycling of building and construction materials and minimise disposal of materials to landfill;
- Ensure waste is minimised by the reuse and recycling of excavated and building materials on-site;

- Reuse timber formwork or waste corrugated iron as formwork and examine the useability of other materials for productive purposes;
- Source separation of offcuts to facilitate reuse, resale, or efficient recycling;
- Temporary stockpiling of surplus materials for use in later stages;
- Building waste materials shall be reused, recycled, or disposed to approved landfill sites;
- Store waste on site appropriately to prevent cross-contamination and guarantee the highest possible reuse value;
- Consider the potential of any new materials to be reused and recycled at the end of the proposed modification's life;
- Retain used crates for storage purposes unless damaged;
- Recycle cardboard, glass, and metal waste;
- Recycle or dispose of solid waste timber, brick, concrete, asphalt, and rock, where such waste cannot be re-used on site, to an appropriately licenced construction and demolition waste recycling facility or an appropriately licenced landfill; and
- Dispose of all garbage via a council approved system.

5.5.3.3 Waste Storage and Servicing

Waste Segregation and Storage

Waste materials from site preparation and construction activities are to be separated at the source where practical and stored separately on-site.

It is anticipated that the proposed modification will provide bins and areas on-site for the sorting, recycling, and disposal of building waste materials and indicated on the site plans or drawings. Enough space should be for separate storage, for example, separate skip bins or appropriately managed stockpiles, of the following waste types:

- Landfill waste
 - Non-recyclable general waste;
- Recyclable waste
 - Bricks, bitumen, concrete and scrap metal;
 - Metal and steel, in a condition suitable for recycling at metal recycling facilities;
 - Timber;
 - Glass;

- Hardstand rubble;
 - Paper and cardboard;
 - General co-mingled recycling waste;
- Reusable materials
- Excavation materials
 - Uncontaminated excavation spoil if present;
 - Contaminated excavation spoil if present; and
- Hazardous waste, if present.

If there is insufficient space on-site for full segregation of waste types, the Site Manager, or equivalent role, should consult with the waste and recycling collection contractor to confirm which waste types may be co-mingled prior to removal from the site.

Waste Servicing and Record Keeping

Documentation, such as receipts or weighbridge dockets, for the transport and disposal of waste and recycling materials from the site must be retained.

If skips and bins are reaching capacity, removal and replacement should be organised as soon as possible. All site generated building waste collected in skips and bins will leave the site and be deposited in the approved site lawfully able to accept them.

5.5.3.4 Excavated Soil

Based on the proposed construction works, it is expected that no excavated soils will be disposed off-site. However, in the unlikely scenario that excavated soils are sent off-site for disposal, the material must be classified in accordance with the *Waste Classification Guidelines and Protection of the Environment Operations (Waste) Regulation 2014* (Waste Regulation 2014). The following sampling must be undertaken, and waste classification report prepared by a suitably qualified environmental consultant:

- A minimum of 3 soil samples, at a rate of 1 soil sample per 25m³. Where the volume of material requiring classification is > 250 m³, 10 soil samples shall be collected and the 95% Upper Confidence Level calculated for each analyte. Analytical results are to be compared to the criteria in Table 1 and where required Table 2 of the Waste Regulation 2014; and
- Soil samples shall be analysed at a National Association of Testing Authorities (NATA) accredited laboratory for Total Petroleum Hydrocarbons (TPH), Benzene, Toluene, Ethyl-benzene, Xylenes (BTEX), Polycyclic Aromatic Hydrocarbons (PAHs), Organochlorine and Organophosphate Pesticides (OCP/OPP), metals (As, Cd, Total Cr, Cu, Ni, Pb, Zn, Hg) and asbestos (absence/presence).

Once classified, the material must be disposed of at a facility licensed to accept the waste.

5.5.3.5 Site Induction

All staff including sub-contractors and labourers employed during the site preparation and construction phases of the proposed modification must undergo induction training regarding waste management for the site.

Induction training is to cover, as a minimum, an outline of the WMP including:

- Legal obligations and targets;
- Emergency response procedures on-site;
- Waste priorities and opportunities for reduction, reuse, and recycling;
- Waste storage locations and separation of waste;
- Procedures for suspected contaminated and hazardous waste;
- Waste related signage;
- The implications of poor waste management practices; and
- Responsibilities and reporting, including identification of personnel responsible for waste management and individual responsibilities.

It is the responsibility of the Site Manager or Building Contractor to notify Council of the appointment of waste removal, transport, or disposal contractors.

5.5.3.6 Signage

In accordance with best practice waste management, standard signage is to be posted in all waste storage and collection areas. All waste containers should be labelled correctly and clearly to identify stored materials.

Signs approved by the NSW EPA for labelling of waste materials are available online and should be used where applicable.

5.5.3.7 Monitoring and Reporting

The following monitoring practices should be undertaken to improve site preparation and construction waste management and to obtain accurate waste generation figures:

- Conduct waste audits of current projects where feasible;
- Note waste generated and disposal methods;
- Look at past waste disposal receipts; and
- Record this information to track waste avoidance, reuse, and recycling performance and to help in waste estimations for future waste management plans.

Records of waste volumes recycled, reused or contractor removed are to be maintained. This can include dockets or receipts verifying recycling and disposal. This evidence should also be presented to regulatory bodies when required.

Daily visual inspections of waste storage areas will be undertaken by site personnel and inspection checklists and logs recorded for reporting to the Site Manager on a weekly basis or as required. These inspections will be used to identify and rectify any resource and waste management issues.

Roles and responsibilities for the purposes of waste management are detailed in Section 5.12 of the CWM Report (SLR, 2021d) and should be referenced where relevant.

5.6 Heritage

An Aboriginal Cultural Heritage Due Diligence Assessment (ACHDDA) has been prepared by Austral Archaeology (2021) to inform the proposed modification.

The study area utilised by the investigation and referred to within this sub-section is identified within Figures 1.1 and 1.2 of the full ACHDDA (Austral Archaeology, 2021) and consists of the proposed alternative haul access road to the north-west of the site, and area encompassing the proposed expansion of existing storage and handling facilities and kiln feeding infrastructure.

5.6.1 Existing Environment

5.6.1.1 Desktop

An extensive search of the Aboriginal Heritage Information Management System (AHIMS) database was conducted on 2 November 2021 with a 3 km search radius applied surrounding the study area, identifying 108 Aboriginal sites. None of the registered AHIMS sites are located within the construction impact area, however some sites are present within 200 m of the proposed works locations.

New Berrima and its associated landscapes were observed to have the potential to contain Aboriginal heritage objects and sites, with the wider Wingecarribee locality having been subject to a wide array of surveys and assessments which have had varying success in detecting such sites.

Aboriginal sites, primarily artefacts, have been observed near the study area, particularly in proximity to the Wingecarribee River, Stoney Creek, and Oldbury Creek.

5.6.1.2 Field Survey

A visual inspection of the study area was completed on 1 November 2021 consisting of a pedestrian survey along the path of the proposed access track and associated infrastructure to identify and record any Aboriginal archaeological sites visible on the surface or areas of Aboriginal archaeological potential and cultural sensitivity.

It was noted that the study area was extensively disturbed and had low surface visibility due to vegetation coverage and imported fill materials. In particular, the portions of the study area such as the existing siding, roads and buildings associated with the Berrima Cement Works were noted to be entirely overlaid with surfaces consisting of consolidated fill, concrete, and bitumen.

Along the proposed haul road, there is dense grassland with areas of exposure limited to isolated areas of erosion and cattle grazing. All stone outcrops were inspected for any evidence of grinding grooves and all mature trees within and close to the alignment were assessed for any evidence of cultural modification. The construction of the rail line has created a noticeable embankment that would have required levelling and earthworks that are likely to extend beyond its present easement, and this is likely to have impacted the integrity of deposits within the study area.

5.6.2 Potential Impacts

The proximity of the study area to the Berrima Cement Works, the former alignment of the Berrima Coal Company tram line (circa 1881), and landform units present within the study area indicate that the study area has been highly disturbed. Where lower disturbance levels have been observed, the identified landforms have been determined to be unlikely to contain in-situ Aboriginal objects.

As a result, the proposed modification has been assessed as being unlikely to impact Aboriginal objects and therefore the works can proceed with caution.

5.6.3 Historic Heritage

A desktop heritage assessment of the site was undertaken comprising a search of the:

- LEP;
- State Heritage Register;
- Commonwealth Heritage List; and
- EPBC Protected Matters Search Tool.

No heritage items are located within the site or the immediate area of works. The closest historic items to the site are identified below:

- LEP item no. C1843 - Berrima Landscape Conservation Area;
- LEP item no. I485 – ‘Remembrance Driveway plantings’ (Lot 1 DP 225190, Lot 1 DP 399452, and Lot 1 DP 402230); and
- LEP item no. I351 – “‘Mereworth’ house and garden’ (Lot 100 DP 839316 and Lot 200, DP 839314).

No State listed heritage items or places are located in the vicinity of the proposal.

5.6.4 Mitigation and Management Measures

The ACHDDA (Austral Archaeology, 2021) recommends the following mitigation measures and/or considerations:

- The SSD modification is exempt from the provisions of the NPW Act. As such, if any Aboriginal objects are identified during the proposed modification, these will need to be managed through an Unexpected Finds Protocol. Should Aboriginal objects be encountered during works associated with this proposal, works must cease in the vicinity and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal object the archaeologist will provide further recommendations. These may include notifying Heritage NSW and Aboriginal stakeholders;
- Aboriginal ancestral remains may be found in a variety of landscapes in NSW, including middens and sandy or soft sedimentary soils. If any suspected human remains are discovered during any activity, you must:
 - Immediately cease all work at that location and not further move or disturb the remains;
 - Notify the NSW Police and Heritage NSW's Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location; and
 - Not recommence work at that location unless authorised in writing by OEH.

SLR recommends the following mitigation measures and/or considerations:

- To ensure no impacts to local heritage items in the vicinity of works, lots identified as containing items of local heritage are to be detailed within any Construction Environment Management Plan (CEMP) as 'no-go zones.'

5.7 Biodiversity

A Biodiversity Development Assessment Report Waiver (BDAR Waiver) has been prepared by SLR (2021e) to inform the proposed modification.

The BDAR Waiver (SLR, 2021e) requests that the Secretary of DPIE, and the Minister for Energy and the Environment, consider waiving the requirements of the BC Act subject to biodiversity assessment completed for the proposed modification.

5.7.1 Existing Environment

5.7.1.1 Desktop

A search of the NSW BioNet Atlas was conducted on 29 September 2021 and returned 22 threatened species previously recorded within a 10 km radius of the site, comprising seven plants, 11 birds, and four mammals.

A search of the Protected Matters Search Tool was also completed which identified a total of 51 threatened species (10 birds, two fish, three frogs, nine mammals, 26 plants, and one reptile); 15 migratory species (and/or their habitats); and five threatened ecological communities listed in the EPBC Act which are predicted to occur within a 10 km radius of the site. No other EPBC Act matters are of relevance to the biodiversity of the site.

A review of available mapping identified the site as containing only a few small disjunct patches of native vegetation, consisting of the following:

- Plant community type (PCT) 1330 'Yellow– Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion'
 - Wholly a subset of Critically Endangered Ecological Community (CEEC) 'White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions under the BC and EPBC Act; and
- PCT 1284 'Turpentine - Smooth-barked Apple moist shrubby forest of the lower Blue Mountains, Sydney Basin Bioregion'
 - Partially contains the CEEC Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion under the BC Act and EPBC Act.

5.7.1.2 Field Survey

A visual inspection of the study area was completed on 25 August 2021 to ground-truth vegetation mapping.

It was determined that the dominant species across the site do not align with the regional vegetation mapping, with many of the characteristic canopy tree species of the mapped PCTs. Native plant species recorded on the site include *Eucalyptus macarthurii*, *Acacia decurrens*, *Themeda triandra*, and *Pteridium esculentum*. This collection of species is a best fit with PCT 1284 'Turpentine - Smooth-barked Apple moist shrubby forest of the lower Blue Mountains, Sydney Basin Bioregion.' Assessment completed on this patch resulted in an estimated vegetation integrity (VI) score of 21.4. Following this, the design of the proposed new haul road was amended as an avoidance measure to avoid the patch.

The remaining vegetation across the majority of the undeveloped portions of the site contain open areas of exotic grass.

Four individuals of *Eucalyptus m August acarthurii* (Camden Wollybutt), which is listed as 'Endangered' under the BC Act and EPBC Act, were recorded along the old rail corridor easement during the initial site inspection. No other threatened plants or animals were recorded during the site inspection and given the disturbed nature of the site and surrounds, and the evidence of historical and ongoing maintenance and disturbance within the site, it is unlikely that any threatened species occur. The proposed alignment has been moved slightly to the south of the existing powerline easement to avoid all biodiversity values identified from the site inspection and will follow the existing powerline and road easement.

5.7.2 Potential Impacts

Direct and indirect impacts to biodiversity values as a result of the proposed modification were assessed as per the categories described by DPIE (detailed in Section 3 of the BDAR Waiver (SLR, 2021e)) and are detailed below in **Table 23**.

Table 23 Assessment of Direct and Indirect Impacts

Impact	Extent of Impact Due to the Project
Direct Impacts	
Removal or modification of native vegetation	None: there will be no removal of any native vegetation.

Impact	Extent of Impact Due to the Project
Loss of individuals of a threatened species	None: there will be no loss of individuals of a threatened species.
Removal or modification of threatened species habitat other than native vegetation (micro-habitat features)	None: there will be no removal or modification of threatened species habitat other than native vegetation (micro-habitat features).
Death through trampling or vehicle strike	None: there will be no deaths through trampling or vehicle strike as the native vegetation that is remaining does not support a connecting corridor to a large patch of vegetation.
Death through poisoning	None: there will be no additional chemicals used as part of the Project
Fragmentation	None: there will be no removal of any native vegetation.
Indirect Impacts	
Predation by domestic and/or feral animals	None: there will be no removal of any native vegetation and all existing fencing will remain in place to deter feral animals from entering the existing cement facility.
Loss of shade/shelter	None: there will be no removal of any native vegetation.
Loss of individuals through starvation	None: there will be no removal of any native vegetation.
Loss of individuals through exposure	None: there will be no removal of any native vegetation.
Edge effects (noise, light, traffic)	Low: the Project will create more traffic through the existing road although this corridor of vegetation is not connected to a larger patch that any species would utilise. The native vegetation is remaining in place.
Deleterious hydrological changes	None: there are no aquatic or hydrological changes in the Project.
Weed invasion	None: the Project will not increase the exotic species more than what is existing. The only vegetation that is being removed would be exotic species and potentially reducing the invasion.
Increased human activity within or directly adjacent to sensitive habitat areas	Low: the Project will create more traffic through the existing road although this corridor of vegetation is not connected to a larger patch that any species would utilise. The native vegetation is remaining in place.
Prescribed Impacts	
The impacts of development on the following habitat of threatened species or ecological community: (i) karst, caves, crevices, cliffs and other geological features of significance, (ii) rocks, (iii) human made structures, (iv) non-native vegetation.	Whilst human-made structures and non-native vegetation are present at the site most of these features are either not considered to provide important habitat to threatened species or communities or will not be altered by the Project. The site does not contain any of the other relevant habitat features for threatened species or ecological communities.

Impact	Extent of Impact Due to the Project
The impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range.	The Project will not impact on the habitat connectivity of threatened species for the purposes of maintaining their lifecycle.
The impacts of development on movement of threatened species that maintains their lifecycle.	The Project will not impact on the movement of threatened species for the purposes of maintaining their lifecycle.
The impacts of development on water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities (including from subsidence or upsidence resulting from underground mining or other development).	The Project will not impact on the water quality, water bodies and hydrological processes such that threatened species or communities are not sustained.
The impacts of wind turbine strikes on protected animals,	No wind turbines are proposed as part of the Project.
The impacts of vehicle strikes on threatened species of animals or on animals that are part of a threatened ecological community.	The Project would be not result in vehicle strikes on any animals, including any threatened species of animals or on animals that are part of a threatened ecological community.

Therefore, it was determined that there will be no direct and two low indirect impacts to biodiversity values at the site. Additionally, no critical habitat or Areas of Outstanding Biodiversity Value (AOBVs) relevant to the site would be impacted.

5.7.2.1 BDAR Waiver Impact Assessment Requirements

BDAR waiver impact assessment requirements, as set out in Table 2 of the 'How to apply for a biodiversity development assessment report waiver for a Major Project Application' (DPIE, 2021a), are addressed below in Table 24.

Table 24 Assessment of Impacts on Biodiversity Values

Biodiversity Value	Relevant (✓ or NA)	Impact Assessment
<i>Vegetation abundance 1.4(b) BC Regulation</i> Meaning the "occurrence and abundance of vegetation at a particular site". The assessor is required to consider the following: "Where vegetation is present on the development site, provide a map on digital aerial photography or the best available imagery of the development site showing: native vegetation (including grasslands and other non-woody vegetation types) and non-native vegetation; and the area of land that is directly impacted by the proposed development, including related infrastructure such as roads, pipelines, access tracks, temporary material stockpiles, asset protection zones and powerlines, if applicable. Describe how the proposed development avoids impacts on native vegetation and identify the likelihood and extent of any remaining impacts including removal of isolated or cultivated native plants".	✓	The site contains native vegetation, although within the proposed alignment there will be no removal of native vegetation.

Biodiversity Value	Relevant (✓ or NA)	Impact Assessment
Vegetation integrity 1.5(2)(a) BC Act Meaning the “degree to which the composition, structure and function of vegetation at a particular site and the surrounding landscape has been altered from a near natural state.” The assessor is required to “describe the vegetation integrity and any impacts on vegetation integrity of identified plant communities.”	✓	A BAM plot was conducted in the patch of native vegetation closest to the proposed alignment. This produced a VI score of 21.3. Therefore, it was agreed that the area would be avoided and designs were updated to be closer to the existing road and railway corridor.
Habitat suitability 1.5(2)(b) BC Act Meaning the “degree to which the habitat needs of threatened species are present at a particular site”. The assessor is required to “Identify any threatened species or ecological communities or their habitat on the development site. Describe how the proposed development avoids impacts on habitat suitability and identify the likelihood and extent of any remaining impacts including the impacts of development on the following habitat of threatened species or ecological communities: (i) karst, caves, crevices, cliffs and other geological features of significance (ii) rocks (iii) human made structures (iv) non-native vegetation (prescribed under clause 6.1(1)(a) of the BC Regulation). Impacts may include the removal or modification (eg. noise, light etc) of the habitat of threatened species or ecological communities.	✓	The native vegetation provide a small degree of potential foraging habitat for individuals of locally occurring threatened species of birds. Although there was no evidence of any threatened species breeding habitat within the proposed alignment. This includes the absence of karsts, caves, rocks or outcrops, water and, creeks.
Threatened species abundance 1.4(a) BC Regulation Meaning the “Occurrence and abundance of threatened species or threatened ecological communities, or their habitat, at a particular site”. The assessor is required to “Describe how the proposed development avoids impacts on threatened species abundance and identify the likelihood and extent of any remaining impacts including impacts of vehicle strikes on threatened species of animals or on animals that are part of a threatened ecological community (prescribed under clause 6.1(1)(f) of the BC Regulation)”.	✓	The native vegetation provides a small degree of potential foraging habitat for individuals of locally occurring threatened species of birds. Although there was no evidence of any threatened species breeding habitat within the proposed alignment. This includes the absence of karsts, caves, rocks or outcrops, water, and creeks.
Habitat connectivity 1.4(c) BC Regulation Meaning the “Degree to which a particular site connects different areas of habitat of threatened species to facilitate the movement of those species across their range. Identify whether the development site contributes to habitat connectivity”. The assessor is required to: “Describe how the proposed development avoids impacts on habitat connectivity and identify the likelihood and extent of any remaining impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range (prescribed under clause 6.1(1)(b) of the BC Regulation).”	NA	The site is positioned in an urban industrial setting and would not play any important role in connecting different areas of habitat of threatened species to facilitate the movement of those species across their range.

Biodiversity Value	Relevant (✓ or NA)	Impact Assessment
Threatened species movement 1.4(d) BC Regulation Meaning the “Degree to which a particular site contributes to the movement of threatened species to maintain their lifecycle”. The assessor is required to: “Describe how the proposed development avoids impacts on threatened species movement and identify the likelihood and extent of any remaining impacts of development on movement of threatened species that maintains their lifecycle (prescribed under clause 6.1(1)(c) BC Regulation).”	NA	The site would play no important or measurable role in the movement of threatened species to maintain their lifecycle.
Flight path integrity 1.4(e) BC Regulation Meaning the “Degree to which the flight paths of protected animals over a particular site are free from interference”. The assessor is required to address the following: “Identify whether flight paths of protected animals occur over the development site. Protected animals are animals of a species listed or referred to in Schedule 5 of the BC Act. They include any species of birds, mammals, amphibians or reptiles that are native to Australia or that periodically or occasionally migrate to Australia. Describe how the proposed development avoids impacts on flight path integrity and identify the likelihood and extent of any remaining impacts. Note: The impacts of wind turbine strikes on protected animals are prescribed under clause 6.1(1)(e) of the BC Regulation. It is, therefore, unlikely that a BDAR waiver would be issued for a proposed wind farm.”	NA	The site is not of any significance or relevance to the flight paths of aerial or mobile threatened species (i.e. birds and bats). The proposal would not interfere with the flight path of any threatened species over the site.
Water sustainability 1.4(f) BC Regulation Meaning the “Degree to which water quality, water bodies and hydrological processes sustain threatened species and threatened ecological communities at a particular site”. The assessor is required to: “Describe how the proposed development avoids impacts on water sustainability and identify the likelihood and extent of any remaining impacts of development on water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities (including from subsidence or upsidence resulting from underground mining or other development) (prescribed under clause 6.1(1)(d) of the BC Regulation)”.	NA	Water sustainability is not relevant to the site or the Project application.

5.7.3 Summary

In summary, no Biodiversity Offsets Scheme (BOS) triggers apply to the site or the proposed modification. Furthermore, based on the findings of this report, it can be concluded that the proposed modification is not likely to have a significant impact on biodiversity values and accordingly, the BAM does not apply to this application. Hence, a BDAR is not required to accompany the application.

On this basis, a waiver is requested pursuant to section 7.9 of the BC Act, for the need to prepare a BDAR as set out in the EARs for this SEE (refer to **Section 2**).

5.7.4 Mitigation and Management Measures

The BDAR Waiver (SLR, 2021e) does not recommend any specific mitigation measures and/or considerations.

5.8 Greenhouse Gas and Energy Efficiency

A Greenhouse Gas Assessment (GGA) has been prepared by SLR (2021f) to inform the proposed modification.

The GGA (SLR, 2021f) contains an assessment of operational Scope 1, Scope 2, and Scope 3 emissions relating to the proposed modifications, identifies key energy efficiency aspects, and details recommendations where cost-effective improvements have been identified for further consideration.

Definitions of Scope 1, Scope 2, and Scope 3 emissions are detailed fully in Section 2.4 of the GGA (SLR, 2021f) for reference.

5.8.1 Existing Environment

The main emissions sources identified for the assessment are listed below in **Table 25**. Particular emphasis has been placed on identifying changes to site operations that impact on its GHG emissions, and areas where improvements may be made in the future.

Table 25 MOD 14 GHG Emission Sources

Scope	Activity	Source
Scope 1	On-Site Usage – Transport Activities	Diesel Fuel for Vehicles
	On-Site Usage – Stationary Activities	Diesel Fuel for Plant & Equipment
	On-Site Usage – Stationary Activities	Fuel Oil for Plant & Equipment
	Kiln Combustion	Sub-bituminous Coal
	Kiln Combustion	Coking Coal
	Kiln Combustion	Waste Derived Fuel
Scope 2	On-Site Power Usage	Electricity
Scope 3	Material Transport	Diesel Fuel for Vehicles
	Material Diverted from Landfill	Wood Waste, Woodchip & RDF

The boundary for the proposed modification was determined to be the geographical boundary of the Site for Scope 1 and Scope 2 GHG emissions. Scope 3 emissions associated with the transport of products and materials to and from the site as part of general operations were also considered within the broader reporting boundary.

5.8.2 Potential Impacts

Aggregate emission inputs were compiled based on information provided by Boral in relation to existing operations and projections based on the operations envisaged under the proposed modification. Emissions factors including fuel consumption, clinker and cement products, purchased and/or lost electricity, and landfill waste were then utilised to calculate GHG emissions. Reference should be made to Section 3 of the GGA (SLR, 2021f) for detailed calculations.

The GHG emissions for the existing operations and proposed modification operations indicate an overall significant reduction in GHG emissions and a positive outcome, specifically and overall GHG emissions decrease by 224,000 t CO₂-e per annum following the proposed modification that represents an overall decrease of almost 16 %.

5.8.3 Mitigation and Management Measures

The GGA (SLR, 2021) recommends the following mitigation measures and/or considerations:

- Vehicle Management
 - Turn off vehicles and plant and machinery when not in use;
 - Ensure vehicle and plant and equipment are regularly serviced;
 - Use efficient fuel for all on-site vehicles;
- Electricity
 - Find opportunities to offset current electricity with green power;
 - Continue to source high efficiency plant and equipment, wherever feasible;
 - Continue to source high efficiency site-wide lighting, sensor-triggered lighting and avoid over-lighting; and
- Combustion Management
 - Continue to carry out R&D on alternative combustion fuel sources, as has been done now for many years, to further minimise coal combustion use on the site.

5.9 Visual Amenity and Landscape

A desktop assessment of visual amenity has been completed to inform the proposed modification.

This subsection outlines the landscaping forming part of the proposed modification, and how the scheme is anticipated to mitigate visual impacts following construction.

5.9.1 Potential Impacts

The Landscape Scheme prepared by SLR (2021g) aims to mitigate the potential visual impacts of proposed works and contribute to the visual aesthetics of the region, with planting and landscaping works including the following:

- Low maintenance and drought tolerant planting to encourage successful establishment
- Grouped tree plantings amongst native pasture grasses contributing to the visual amenity of the surrounding landscape.
- Tree plantings to increase habitat opportunities and connectivity to surrounding vegetation; and
- Use of feature trees within landscaping to clearly identify site entrance.

Species selection has considered surrounding planting, visual amenity, local native plant community types and listed TECs as described in **Section 5.7** likely to occur within the local landscape.

All other works are contained entirely within the existing site, well screened from surrounding residential dwellings and public spaces by landforms and tree cover within the facility.

5.9.2 Mitigation and Management Measures

SLR does not recommend any specific mitigation measures and/or considerations, other than the implementation of the planting proposed within the Landscape Scheme (SLR, 2021g).

5.10 Summary of Mitigation Measures

Table 26 below contains a summary of mitigation measures to be implemented for the proposed modification for each environmental aspect assessed in **Section 5**.

Table 26 Summary of Mitigation Measures

Environmental Assessment Section	No.	Mitigation Measures
Air Quality	AQ1	To reduce wheel generated dust emissions from sealed roads, road cleanliness is important and surface silt levels need to be kept low from carry out from less clean areas and spills. The Dust Management Plan mentions a street sweeper be regularly used for maintenance of the sealed internal haul roads. This should be reviewed and optimised, and consideration should be given to updating the TARP to list street sweeping as part of the 'Level 1' trigger dust mitigation strategy actions.
Soil and Water	SW1	Minimising the disturbance footprint.
	SW2	Staging the construction works (where possible) to minimise the area of disturbance at any one time and to reduce the potential for erosion to occur.
	SW3	Minimising soil erosion (i.e. rehabilitation, drainage, and erosion control measures) at the source, rather than trapping resultant sediment. Where this is not practicable, then all reasonable measures will be made to trap sediment by implementing sediment control measures compliant with the required treatment standards. ESC measures shall be installed prior to any ground disturbance.
	SW4	Sediment fences will be installed to control sheet flow from the ground disturbance areas during the construction works. Check dams (such as sandbags, filter socks, coir logs, rock, etc.) will be used to trap mobilised sediment in concentrated flow paths and where sediment fences cannot be installed due to impermeable surfaces. The check dams shall be installed and removed as required in relation to the staging of the ground disturbance works.
	SW5	Soil stockpiles will be placed in areas away from roadways and other drainage lines. Suitable sediment control measures will be installed downslope of soil stockpiles and upslope clean water runoff diverted (where possible).
	SW6	Sealing or revegetation of disturbed areas as soon as possible.
	SW7	Stabilised rock pads will be installed at all site entry and exit points during the construction works. Where this is not possible, visual inspections of all vehicles leaving the site will be undertaken and where it is deemed possible that sediment could be tracked onto the adjacent streets the vehicles shall be washed down in a suitable location such that the wash down water reports to appropriate sediment controls. Street sweeping will be used as an additional contingency measure where sediment is observed on the adjacent streets.

Environmental Assessment Section	No.	Mitigation Measures
	SW8	Any liquid wastes, fuels, and oils stored on-site will be sufficiently bunded to contain any potential spills. Accidental spillage or poor management of fuels, oils, lubricants, hydraulic fluids, solvents, and other chemicals during the construction phase will be controlled through spill management actions (including the availability of spill kits) to prevent water quality impacts. Captured liquid wastes, fuels, and oils should be pumped out by a liquid waste contractor and disposed of at an appropriately licenced facility.
	SW9	Any sodic soils encountered on site need to be managed by the application of Gypsum at a rate of approximately 1 kg/m ² .
	SW10	Bitumen sealing of the haul road with sufficient road crossfall to safely convey runoff from the road surface.
	SW11	Adequate drainage design including appropriate longitudinal and lateral water conveyance structures. Culvert structures will be installed beneath the haul road, as required, to safely convey upslope runoff past the haul road. Any culverts will include suitably designed and constructed headwalls/wingwalls and suitable downstream scour protection measures.
	SW12	Visual inspections of all vehicles leaving the site will be undertaken and where it is deemed possible that sediment could be tracked onto the adjacent streets the vehicles shall be washed down in a suitable location such that the wash down water reports to appropriate sediment controls (a designated wheel wash facility is recommended). Street sweeping will be used as an additional contingency measure where sediment is observed on the adjacent streets.
	SW13	All ESC devices structures will be inspected weekly and following significant rainfall events (i.e. > 10 mm in a 24 hour period).
	SW14	Sediment laden runoff in any site excavations shall be directed into a designated sump area, treated with an appropriate flocculating agent, trucked off site by a licensed contractor and be disposed of in a suitable manner. Runoff shall only be released offsite if it conforms with the following water quality requirements: • Total Suspended Solids (TSS) less than 50 mg/l; • ph in the range 6.5 to 8.5 except where, and to the extent that, the natural receiving waters lie outside this range; and • No visible oil or grease.
	SW15	During the construction works monitoring of any sediment laden runoff and creek flows is recommended during or immediately following rainfall and/or flow events. If the water quality requirements detailed above are exceeded then an investigation to determine the cause of the exceedance shall be undertaken with rectification measures carried out as required.
Waste Management	WM1	Develop a purchasing policy based on the approximate volumes of materials to be used so that the correct quantities are purchased.

Environmental Assessment Section	No.	Mitigation Measures
	WM2	Arrange for delivery of materials on an 'as needed' basis to avoid material degradation through weathering and moisture damage.
	WM3	Communicate strategies to handle and store waste to minimise environmental, health and amenity impacts.
	WM4	Select materials with a low environmental impact over the lifecycle of the building.
	WM5	Design the proposed modification to require standard material sizes or make arrangements with manufacturing groups for the supply of non-standard material sizes.
	WM6	Design works for de-construction.
	WM7	Reduce packaging waste by: • Returning packaging to suppliers where practicable to reduce waste further along the supply chain; • Purchasing in bulk; • Requesting cardboard or metal drums rather than plastics; • Requesting metal straps rather than shrink wrap, and; • Using returnable packaging such as pallets and reels.
	WM8	Use prefabricated materials.
	WM9	Preferentially use paints, floor coverings and adhesives with low VOC (volatile organic compound) content.
	WM10	Reduce the use of polyvinyl chloride products.
	WM11	Implement measures to prevent the occurrence of windblown litter, dust, and stormwater pollution.
	WM12	Ensure subcontractors are informed of and implement site waste minimisation and management procedures.
	WM13	Maximise reuse and recycling of building and construction materials and minimise disposal of materials to landfill, and ensure waste is minimised by the reuse and recycling of excavated and building materials on-site.
	WM14	Reuse timber formwork or waste corrugated iron as formwork and examine the useability of other materials for productive purposes.
	WM15	Source separation of offcuts to facilitate reuse, resale, or efficient recycling; and store waste on site appropriately to prevent cross-contamination and guarantee the highest possible reuse value.

Environmental Assessment Section	No.	Mitigation Measures
	WM16	Temporary stockpiling of surplus materials for use in later stages; and retain used crates for storage purposes unless damaged
	WM17	Building waste materials shall be reused, recycled, or disposed to approved landfill sites; and consider the potential of any new materials to be reused and recycled at the end of the proposed modification's life.
	WM18	Recycle or dispose of solid waste timber, brick, concrete, asphalt, and rock, where such waste cannot be re-used on site, to an appropriately licenced construction and demolition waste recycling facility or an appropriately licenced landfill. Recycle cardboard, glass, and metal waste.
	WM19	Dispose of all general garbage via a Council approved system
	WM20	Enough space should be for separate storage, for example, separate skip bins or appropriately managed stockpiles, for landfill waste, recyclable waste, reusable materials, excavation materials, and hazardous waste (if any).
	WM21	Documentation, such as receipts or weighbridge dockets, for the transport and disposal of waste and recycling materials from the site must be retained.
	WM22	If skips and bins are reaching capacity, removal and replacement should be organised as soon as possible. All site generated building waste collected in skips and bins will leave the site and be deposited in the approved site lawfully able to accept them.
	WM23	In accordance with best practice waste management, standard signage is to be posted in all waste storage and collection areas. All waste containers should be labelled correctly and clearly to identify stored materials. Signs approved by the NSW EPA for labelling of waste materials are available online and should be used where applicable.
Aboriginal Heritage	H1	The SSD modification is exempt from the provisions of the NPW Act. As such, if any Aboriginal objects are identified during the proposed modification, these will need to be managed through an Unexpected Finds Protocol. Should Aboriginal objects be encountered during works associated with this proposal, works must cease in the vicinity and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal object, the archaeologist will provide further recommendations. These may include notifying Heritage NSW and Aboriginal stakeholders.
	H2	Aboriginal ancestral remains may be found in a variety of landscapes in NSW, including middens and sandy or soft sedimentary soils. If any suspected human remains are discovered during any activity, you must: - Immediately cease all work at that location and not further move or disturb the remains; - Notify the NSW Police and Heritage NSW's Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location; and - Not recommence work at that location unless authorised in writing by OEH.

Environmental Assessment Section	No.	Mitigation Measures
	H3	To ensure no impacts to local heritage items in the vicinity of works, lots identified as containing items of local heritage are to be detailed within any Construction Environment Management Plan (CEMP) as 'no-go zones.'
Greenhouse Gas and Energy Efficiency	GHG1	Turn off vehicles and plant and machinery when not in use.
	GHG2	Ensure vehicle and plant and equipment are regularly serviced.
	GHG3	Use efficient fuel for all on-site vehicles.

6 Conclusion

The Berrima Cement Works currently operates under two development consents originally issued by the Department of Planning and Environment (DPE), now the Department of Planning, Industry, and Environment (DPIE), being DA 401-11-2002-i (Kiln 6) which has since been subject to 13 modifications, and DA 85-4-2005-i (Kiln 7).

Boral Cement Limited (Boral) is seeking a modification to development consent DA 401-11-2002 to increase the consumption of Solid Waste Derived Fuel (SWDF) within the kiln, reducing the plant's reliance on coal and the associated greenhouse gas emissions. To facilitate the increased SWDF throughput, Boral propose to increase on-site storage and handling facilities, with an associated increase in truck movements and extended delivery hours. An alternate haul route, providing direct access to the Old Hume Highway is also proposed to help reduce environmental impacts on neighbours.

DPIE issued Environmental Assessment Requirements (EARs) to inform the preparation of the Statement of Environmental Effects (SEE) on 6 August 2021 which have been addressed throughout this SEE and across specialist assessments.

The modification is proposed under Part 4 Section 4.55(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) with input from Wingecarribee Shire Council (Council) and relevant State agencies, as well as any submissions received during the public exhibition.

The proposed modification is not anticipated to create any significant operational impacts associated with environmental matters including air quality, noise and vibration, waste management, traffic, Aboriginal cultural heritage, or biodiversity. Specialist impact assessment in areas such as traffic and transport and air quality have concluded that the proposed modification would improve existing conditions subject to appropriate mitigation measures; and other matters including noise and vibration would result in only negligible impacts.

This proposed modification would assist Boral in reaching new carbon reduction targets following their commitment to net zero carbon emissions by no later than 2050, which is aligned with the most ambitious aim of the Paris Agreement to limit global warming to 1.5°C.

Boral has defined the following five key levers that underpin its climate targets:

- Energy - by transitioning to 100 per cent renewable electricity, increasing the use of alternative fuels by 150% at its Berrima Cement kiln and improving energy efficiency
- Cementitious intensity - by optimising the energy efficiency of its Berrima Cement kiln and accelerating adoption of its leading lower carbon concrete product range
- Transport - by optimising supply chain logistics and routes, and exploring alternative fleet fuel options;
- Sourcing - by prioritising lower carbon intensity suppliers; and
- Exploring and testing emerging carbon capture use and storage (CCUS) technologies.

In summary, the potential for significant adverse impacts as a result of the proposed modification is low and can be managed effectively subject to mitigation measures implemented within a Construction Environment Management Plan (CEMP), with the benefits far outweighing those impacts.

7 References

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SLR, 2021d. *Construction Waste Management Report*. SSD The Boral Berrima Cement Works, SWDF Consumption Increase and New Access. December 2021.

SLR, 2021e. *Biodiversity Development Assessment Report Waiver*. December 2021.

SLR, 2021f. *Greenhouse Gas Assessment*. December 2021.

SLR, 2021g. *Landscape Scheme*. Landscape Mitigation Measures for Proposed New Site Access. December 2021.

APPENDIX A

Design Drawings

APPENDIX B

Air Quality Impact Assessment

APPENDIX C

Traffic Impact Assessment

APPENDIX D

Noise Impact Assessment

APPENDIX E

Construction Waste Management Report

APPENDIX F

Aboriginal Cultural Heritage Due Diligence Assessment

APPENDIX G

Biodiversity Development Assessment Report Waiver



APPENDIX H

Greenhouse Gas Assessment

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