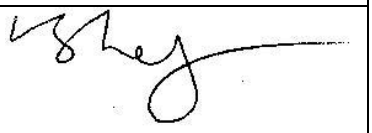
EPS

# MATERIALS RECYCLING FACILITY EXPANSION ENVIRONMENTAL IMPACT STATEMENT

*Prepared for Boral Recycling (NSW/ACT) Pty Ltd*
*Prepared by Environmental Property Services*

*Egret Street, Kooragang Island, NSW 2304*

ENVIRONMENTAL PROPERTY SERVICES
Reference No. 11200
December 2015

| Contact Information and Declaration | | |
|---|---|---|
| Declaration: | This Environmental Impact Statement (EIS) has been prepared under Part 4, Division 4.1 of the *Environmental Planning and Assessment Act 1979*, and with regard to the form and content requirements in clauses 6 and 7 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*, in respect of proposed modifications to an existing Materials Recycling Facility on Egret Street Kooragang Island.<br>The opinions and declarations in this Environmental Impact Statement are ascribed to Environmental Property Services (EPS) and are made in good faith that such statements are neither false nor misleading.<br>In preparing this EIS, EPS has considered and relied upon information obtained from the public domain, supplemented by discussions between key EPS staff, representatives from governing agencies and independents, including Boral and specialist consultants. | |
| Applicant: | Boral Recycling (NSW/ACT) Pty Ltd<br>Widemere Road<br>WETHERILL PARK NSW 2164 | |
| Prepared by: | Mike Shelly<br>Senior Environmental Consultant<br>Environmental Property Services (Aust) Pty Ltd<br>PO Box 348<br>NELSON BAY NSW 2315<br>Ph: 02 4981 1600 |  |
| Application subject land address: | Boral Recycling (NSW/ACT) Pty Ltd<br>Lot 12 DP 1032146<br>Egret Street.<br>Kooragang Island, NSW 2304 | |

| Quality Assurance & Version Control Table | | | | |
|---|---|---|---|---|
| Project: Boral Kooragang Island Materials Recycling Facility Expansion | | | | |
| Client: | Boral Recycling (NSW/ACT) Pty Ltd | | | |
| Rev No. | Date | Our Reference | Author | Reviewer |
| V01 | 11.12.2015 | *20151211_11200_BORALKI_EIS* | M. Shelly | S. McCall |
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# COMPLIANCE TABLE

| Secretary's Environmental Assessment Requirements | Section | Compliance |
|---|---|---|
| The Environmental Impact Statement General Requirements | | |
| Clauses 6 and 7 of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 and all relevant plans | Throughout EIS | |
| Details of the existing operation including: | | |
| Existing approvals | Appendix 2 | |
| A summary of the relevance of existing consent conditions | Appendix 4 | |
| Detailed description of the development including: | | |
| Plans | Throughout EIS | |
| Justification | Section 4 | |
| All relevant environmental planning instruments | Section 5 | |
| Risk assessment | Section 7 | |
| Existing environment | Section 2.1 | |
| Cumulative impacts | Section 8.12.1 | |
| Summary of mitigation measures | Section 12 | |
| Capital investment value | Section 6.1 and Appendix 3 | |
| Estimate of construction and operational jobs | Section 8.12 | |
| EIS certification | Attached | |
| Key Issues | | |
| Strategic land use planning | Section 5 and Section 4.1 | |
| Waste management | Section 3.2.2 | |
| Air quality and odour | Section 8.1 | |
| Traffic and transport | Section 8.2 | |
| Noise and vibration | Section 8.3 | |
| Soil and water | Sections 8.10, 8.4 and 8.5 | |
| Hazards and risk | Section 8.6 | |
| Flora and fauna | Section 8.7 | |
| Greenhouse gas | Section 8.8 | |
| Visual | Section 8.9 | |
| Heritage | Section 8.10.3 | |
| Socio-economics | Section 8.12 | |
| Consultation | | |
| NSW Government Agencies | Section 6.1 | |
| Port of Newcastle | Section 6.1 | |
| Newcastle City Council | Section 6.1 | |
| Local community | Section 6.2 | |

| Government Agency Comments | Section | Compliance |
|---|---|---|
| Newcastle City Council | | |
| Egret and Raven Streets are owned by the Port of Newcastle | Noted | |
| Liaise with the Fire Safety Unit of Fire & Rescue NSW | Liaised with DP&E | |
| No complaints have been received for the existing operation | Noted | |
| Prepare a visual impact assessment | Section 8.9 | |
| Department of Primary Industries - NSW Office of Water | | |
| Detail water to be taken from each surface and groundwater source | Section 6.1.6 of Appendix 8 | |
| Detail volumetric water licencing requirements | Section 5.2.5 | |
| Identify adequate and secure water sources for the life of the project | Section 8.5.6 | |
| Provide a water balance | Section 8.5.6 | |
| Impacts on surface water | Section 8.5.5 | |
| Impacts on groundwater | Section 8.5.5 | |
| Impacts on adjacent licenced water users | Appendix 8 | |
| Basic landholder rights | Appendix 8 | |
| Impacts on riparian land and groundwater dependent ecosystems | No GDEs on site | |
| Full technical details of modelling | Appendix 8 | |
| Proposed monitoring and mitigation measures | Section 8.5.8 | |
| Cumulative impacts | Appendix 8 | |
| Consideration of relevant policies and guidelines | Section 3.2 of Appendix 8 | |
| Demonstration of consistence with Water Sharing Plan | Section 3.1.2 of Appendix 8 | |
| Roads and Maritime Service (RMS) | | |
| Daily and peak traffic movements | Section 8.2.2 | |
| Trip assignments on the regional road network AM and PM | Section 8.2.2 | |
| Proposed parking provisions | Section 3.2.5 | |
| Construction Traffic Management Plan | Limited construction, plan not warranted | |
| Port of Newcastle | | |
| Consult with Port of Newcastle (PON) | Section 6.1 | |
| Provide erosion and sediment control designs | ESCP post approval | |
| Revise driveway design due to localised ponding | Direct negotiation with PON | |
| Provide details of stormwater design | Section 8.5.5 and 8.5.8 | |
| Prepare an air quality assessment, considering PON's contribution | Section 8.1 | |
| Consult with Port of Newcastle with respect to traffic | Section 8.2.1 | |

| Government Agency Comments | Section | Compliance |
|---|---|---|
| Environment Protection Authority | | |
| Details of waste acceptance, storage, processing and disposal | Section 3.2 | |
| Options for the reuse or disposal of residual waste | Section 3.2 | |
| Impacts on water quality | Section 8.5.7 and Appendix 8. | |
| Details of site water management | Section 8.5 | |
| Noise Impact (including noise assessment modelling and mitigation) | Section 8.3 | |
| Air Quality (including dust, odour other air emissions) | Section 8.1 | |
| Details of any hazardous or dangerous goods | Section 8.6 | |
| Consideration of alternatives | Section 4.4 | |
| Justification of the project | Section 4 | |
| Consideration of soil contamination | Section 8.10.2 | |

# EXECUTIVE SUMMARY

**Introduction**

This Environmental Impact Statement (EIS) has been prepared on behalf of Boral Recycling (NSW/ACT) Pty Ltd (Boral) to support a State Significant Development application under Division 4.1 of the *Environmental Planning and Assessment Act 1979*. Under this division, the proposal will require development approval from the Minister for Planning and Environment.

The proposal is for the construction of a materials recycling facility capable of processing up to 350,000 tonnes per annum of general solid waste (non-putrescible), predominantly consisting of commercial and industrial, and construction and demolition waste.

**Project Description**

The existing materials recycling facility is owned and operated by Boral under a consent granted by Newcastle City Council in 2003. The growth of the local recycling market provides an impetus to modify the facility by increasing stockpiling volumes, production volumes and operating hours to counter the current operational restrictions at the site.

Boral proposes to increase the area available for stockpiling raw materials and products, to increase the height of these stockpiles, and to process up to 350,000 tonnes of waste materials per year. Additionally, Boral proposes to increase operational hours to 24 hours per day Monday to Saturday with only maintenance occurring between 6am to 6pm Sundays and public holidays. Up to 530,000 tonnes in total of processed and unprocessed material is proposed to be stockpiled at any time.

**Outcomes and Findings**

Technical studies for the Project have been completed in accordance with the Secretary's Environmental Assessment Requirements (SEARs) and agency comments, and conclude that there will be minimal impact to the surrounding environment. The key findings are summarised below:

- **Strategic land use:** The Project is on appropriately zoned land within an industrial area isolated from sensitive receptors.
- **Waste management**: The Project is designed to manage and maximise the reuse of waste products. The economic imperatives at the facility are to minimise unwanted incoming waste, minimise material double handling, and to maximise the production of saleable materials. The efficient implementation of the current site's waste management procedures, such as load scrutiny and record keeping, will help Boral meet these imperatives.
- **Air quality**: The Project is predicted to have little effect on the existing dust environment, either as deposited dust or dust concentrations. The overwhelming contributor to predicted dust levels is measured background dust, with the Project predicted to provide a very small incremental increase. No potentially odour producing materials will be accepted at the facility.

- **Traffic:** All inbound access for Project vehicles will be via the existing access off Egret Street. The Project will generate an additional 226 heavy vehicle trips per day (vpd) at maximum capacity, which, when added to existing movements totals 326 vpd (heavy vehicles) and 30 vpd (light vehicles). Trip generation from the Project is very moderate, adding up to 30 vehicle trips per hour (vph) to the morning peak hour and 20 vph to the afternoon peak. The Project will not have a significant impact on the levels of service or capacity of the road network.
- **Noise:** Noise modelling predicted that all relevant criteria will be met at the nearest residential receivers. A noise management plan will be prepared as part of a site operations plan to detail the various operational arrangements and monitoring procedures.
- **Soil**: The site sits atop fill used in the reclamation of Kooragang Island. Details of previous contamination assessments are provided in the EIS. The extension of the current land use as part of the Project does not raise any pre-existing contamination concerns. Site management such as spill control and hydrocarbon storage will minimise the possibility of the Project causing contamination.
- **Flooding**: The site is above the 1% Annual Exceedance Probability (AEP) flood level and is located within the flood fringe of the probable maximum flood level. The Project will not impact on flood patterns or intensity nor is flooding expected to effect the operation, apart from during very serious flooding which can be expected to cut roads on the Island. The Project peak discharge rates will not cause measurable changes to flood behaviour on adjacent properties.
- **Water management**: With modelled and proposed mitigation measures, the Project will: result in no increase in peak discharge rates up to and including 100 year 72 hour events; retain all stormwater on site up to an including 20 year 48 hour events; meet Newcastle City Council's stream erosion index and post development peak flow rate requirements; allow the Boral Cement and Origin Energy sites to continue to operate unaffected. The site will discharge water during storm events above the design criteria, but given that this would occur when other parts of Kooragang Island and the Hunter River itself would be experiencing high flows, the site discharges are unlikely to measurably impact on River water quality or quantity.
- **Hazard and Risk Management**: A preliminary hazard assessment screening test in accordance with State Environmental Planning Policy 33 - Hazardous and Offensive Development (SEPP 33) shows that the Project is not potentially hazardous or offensive.
- **Biodiversity:** The site is highly disturbed by past reclamation during the formation of Kooragang Island and previous industrial activity over the entire site. A constructed drainage channel previously landscaped with Acacias and predominantly covered in exotic understorey is the only area containing any habitat for native fauna. No threatened species or ecological communities are likely to be significantly affected by the Project. No biodiversity offsetting is required under the Framework for Biodiversity Assessment for such impacts. No *Environment Protection and Biodiversity Conservation Act* (EPBC) Referral is required.
- **Greenhouse Gas**: The total GHG savings due to the Project are three times the GHG generated by the Project. The savings equate to removing 1800 cars from the roads permanently and saving the energy required to power nearly 5,000 houses per year.

- **Visual Amenity**: The Project will not significantly change the physical landscape or character of the heavy industrial landscape of Kooragang Island. The visual elements of the Project are in keeping with the existing visual character of the site and Island generally.
- **Heritage**: The site is highly disturbed and is on an artificially reclaimed island, with no known or expected Aboriginal or historical values.
- **Socio-Economic**: The socio-economic assessment concludes that the Project will provide positive social and economic outcomes for the Region by the way of employment generation and the promotion of recycling as an alternative to landfilling.
- **Cumulative**: The potential for cumulative impacts has been assessed by the individual technical studies prepared in this EIS. Cumulative impacts have been assessed and incorporated into the mitigation measures from the outset and no significant cumulative impacts have been identified. Where sufficient primary data was unavailable for third party developments, the technical studies adopted a worst case scenario approach to enable a conservative precautionary outcome.

A quantity surveyor's report has been prepared to estimate the capital investment value in accordance with the SEARs. The estimated cost for the materials recycling facility is $ 147,557 including GST.

**Conclusion**

Overall, this EIS concludes that the proposed materials recycling facility is in the public interest and is not predicted to cause significant environmental impacts or pose significant environmental risks.

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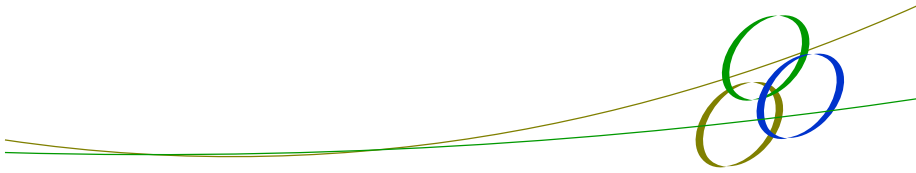
# Abbreviations and Acronyms

| Abbreviation | Description |
|---|---|
| AADT | Annual average daily traffic |
| ABS | Australian Bureau of Statistics |
| AHD | Australian Height Datum |
| CBD | Central Business District |
| C&I waste | Commercial and industrial waste |
| C&D waste | Construction and demolition waste |
| DEC | Department of Environment and Conservation |
| DECCW | Department of Environment, Climate Change and Water |
| DIICCSRTE | Australian Government Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education |
| DP&E | Department of Planning and Environment |
| EIS | Environmental Impact Statement |
| EPA | Environment Protection Authority |
| EPBC Act | *Environment Protection and Biodiversity Conservation Act, 1999* |
| EP&A Act | *Environmental Planning and Assessment Act, 1979* |
| EPL | Environment Protection Licence |
| EPS | Environmental Property Services |
| ESD | Ecologically Sustainable Development |
| FBA | Framework for Biodiversity Assessment |
| GHG | Greenhouse Gas |
| HWC | Hunter Water Corporation |
| ICNG | Interim Construction Noise Guideline |
| INP | Industrial Noise Policy |
| ISEPP | *State Environmental Planning Policy (Infrastructure) 2007* |
| LGA | Local Government Area |
| NCIG | Newcastle Coal Infrastructure Group |
| NGA | National Greenhouse Account Factors |
| OEH | Office of Environment and Heritage |
| PAA | Project Application Area |
| PMF | Probable maximum flood |
| $PM_{10}$ | Particles with an aerodynamic diameter of 10 microns or less |
| $PM_{2.5}$ | Particles with an aerodynamic diameter of 2.5 microns or less |
| POEO Act | *Protection of the Environment Operations Act 1997* |
| PWCS | Port Waratah Coal Services |
| RAV | Restricted Access Vehicle |

| Abbreviation | Description |
|---|---|
| RMS | Roads and Maritime Services |
| RTA | Roads and Traffic Authority |
| SEARs | Secretary's Environmental Assessment Requirements |
| SEPP | State Environmental Planning Policy |
| SEPP 33 | *State Environmental Planning Policy 33 – Hazardous and Offensive Development* |
| SSD | State Significant Development |
| TIA | Traffic Impact Assessment |
| TSC Act | *Threatened Species Conservation Act, 1995* |
| TSP | Total suspended particulates |
| vpd | Vehicles per day |
| vph | Vehicles per hour |



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# 1 INTRODUCTION

This Environmental Impact Statement (EIS) has been prepared to assess the environmental, social and economic matters associated with the proposed changes to Boral's materials recycling facility at Egret Street Kooragang Island. Environmental Property Services (EPS) acts on behalf of Boral Recycling (NSW) Pty Ltd (Boral) in preparing this EIS that will be determined as State Significant Development (reference: SSD 15_7038) under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

EPS has prepared this EIS in accordance with the requirements of the Secretary of the Department of Planning and Environment (DP&E) and Schedule 2 of the Environmental Planning and Assessment Regulation 2000. Secretary's Environmental Assessment Requirements (SEARs) were issued on 27 May 2015 and a copy is attached at Appendix 1. Assessments have been undertaken in accordance with the SEARs.

The EIS provides the supporting documentation for the development application to seek consent for the proposal. The following sections of the EIS examine the site location, the relationship of the proposal to the location, and the environmental, social and planning aspects of the development.

Boral currently operates a recycling facility on Egret Street, having been granted development consent by Newcastle City Council in 2003 (DA 01/2716). The facility operates as a construction and demolition resource recovery business and is approved to process 100,000 tonnes per year of raw material. Boral now seeks to modify current recycling operations to:

- Process a maximum of 350,000 tonnes of material per year;
- Expand stockpile area and height to approximately 2.9 ha and 20 m respectively;
- Stockpile up to 530,000 tonnes of material at any one time;
- Allow additional waste streams to be processed; and
- Increase the hours of operation to cater for market demand.

The objectives of the Project are to:

- Provide adequate, safe and efficient recycling opportunities for a variety of commercial and industrial, and construction and demolition wastes;
- Ease the pressure on landfills;
- Provide an environmentally sustainable alternative to landfilling; and
- Contribute to the NSW State Government's recycling goals set in the *NSW 2021* document and relevant waste strategies.

# 2 Site Description

The following information provides an overview of the regional and local context of the proposal, surrounding development and the location of key infrastructure and environmental features.

## 2.1 Context

The Site is located within Lot 12 DP 1032146 Egret Street, Kooragang Island, approximately 5 km north-northwest of the Newcastle Central Business District (see Figure 2-1). Kooragang Island consists of a series of former inter-tidal islands that were filled to form an industrial area between the north and south arms of the Hunter River. The Island contains a range of heavy port and associated industries in the immediate area of the Boral facility, such as the Port Waratah Coal Services (PWCS) Kooragang coal stockyards and loaders, the Newcastle Coal Infrastructure Group (NCIG) coal stockyards and loaders, Cargill oil refinery and stock feed processing plant, Simsmetal recycling facility, Boral cement and clinker facility, Boral concrete batching plant, the Origin Energy and BOC gas terminals and a new Shell petrol station (see Figure 2-2). A range of other industrial facilities operate on the Island and the adjacent Walsh Point and over the river in Mayfield industrial lands, including:

- PWCS Carrington coal stockyards and loader;
- Orica ammonium nitrate plant;
- HiFert distribution centre; and
- Various ship loading and unloading facilities (for cotton seed, clinker, alumina, aluminium, zinc concentrate, anhydrous ammonia and phosphate).

The light brown shading on Figure 2-1 indicates land zoned SP1 – Special Activities under the *State Environmental Planning Policy (Three Ports) 2013* (Three Ports SEPP). This zoning is an industrial zoning, with a key objective being "*To facilitate development that by its nature or scale requires separation from residential areas and other sensitive land uses*".

The Project Application Area (PAA) is wholly owned by Blue Circle Southern Cement (Boral Cement). The 12.49 ha site is occupied by four separate businesses including; Boral Recycling, Boral Concrete, Boral Cement and Origin Energy (under lease). Figure 2-2 illustrates the occupying businesses. Plate 1 to Plate 4 provide photographs of the site and surrounds.

Access to the site is via Lot 2 DP 1195449, which is owned by the Port of Newcastle and is zoned SP1 – Special Activities under the Three Ports SEPP. Under this zoning, roads are permitted without consent and hence the access drive to the site has not been included as a part of the site area.


| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Title:** | Site Context | | | **Figure No:** | 2-1 | | | **Date:** | 1 July 2015 |
| **Location:** | Kooragang Island, NSW Australia | **Author/ Reviewer:** | AT/MS | **Version No:** | V01 | **Map/ DWG No:** | **1** of **1** | **Job Ref:** | 11200 |

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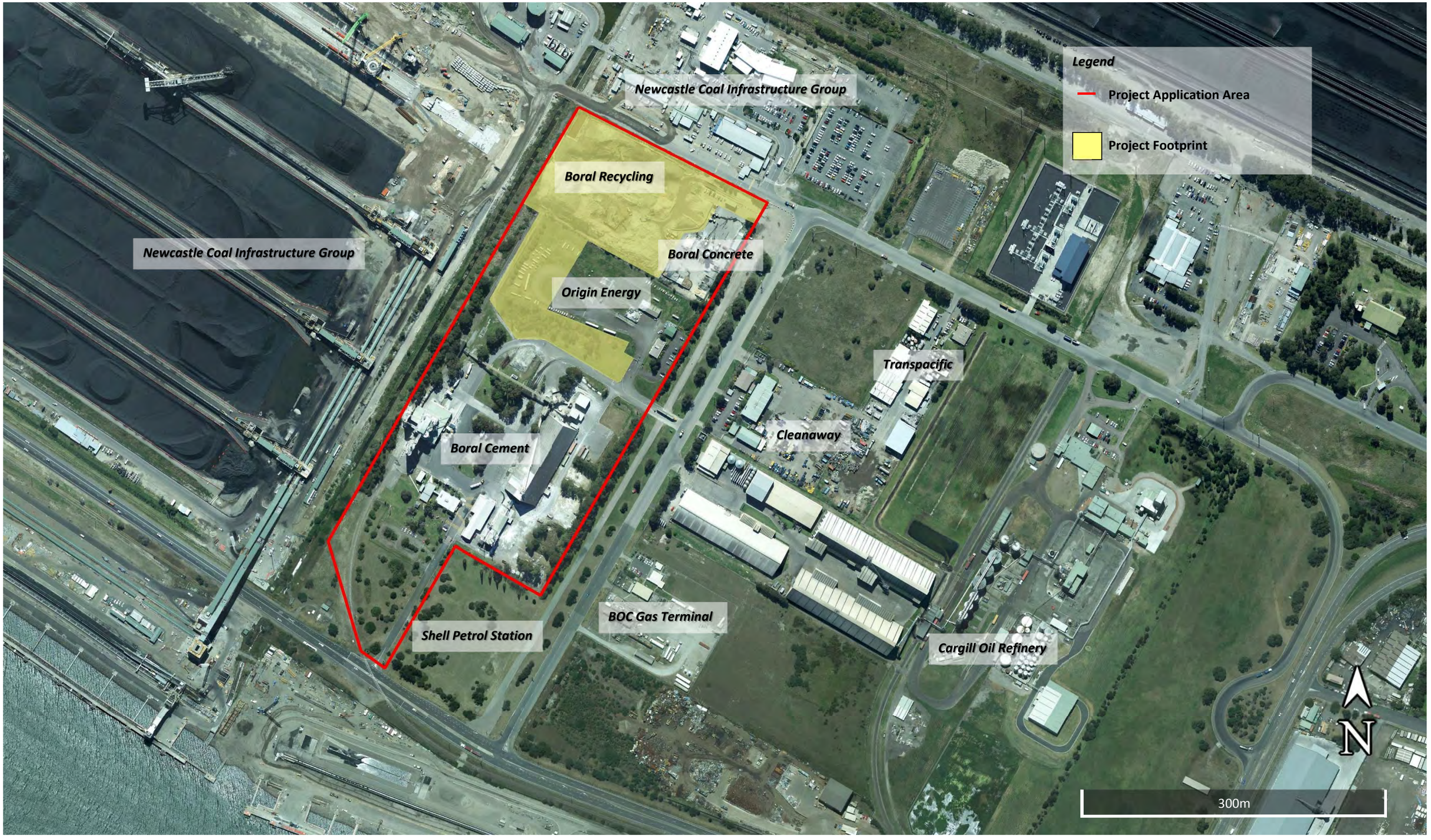


| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Title:** | Adjacent Land Users | | | **Figure No:** | 2-2 | | | **Date:** | 3 July 2015 |
| **Location:** | Kooragang Island, NSW Australia | **Author/ Reviewer:** | AT/MS | **Version No:** | V01 | **Map/ DWG No:** | **1** of **1** | **Job Ref:** | 11200 |


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**Plate 1 – General view of site in foreground. NCIG coal stacker reclaimer in background.**

**Plate 2 – View from Cormorant Road towards site with service station under construction in middle ground.**

**Plate 3 – Existing vegetated bund with NCIG coal stockyard right of security fence.**

**Plate 4 – View from Egret Street towards extension area.**

## 2.2 Existing Operations

Boral was granted development consent for the Kooragang Recycling Facility by Newcastle City Council on 20 February 2003; DA 01/2716. A copy of the development consent is attached as Appendix 2.

The following waste streams are permitted to be accepted and processed:

- Building and demolition waste;
- Asphalt waste; and
- Concrete waste.

The current plant includes:

- Front end loaders x 2;
- Medium excavators x 2;
- No more than four road trucks on site at one time; two being loaded, one leaving, and one tipping. Other trucks may queue on the incoming driveway; and
- One crusher for processing the raw material.

A pug mill and flyash silo have been approved for the facility but were not installed.

Incoming waste trucks are weighed and the loads visually inspected from the elevated weighbridge office. Trucks proceed to a check point manned by a site spotter, who again checks loads and directs the driver to the appropriate drop off point. This process is regularly monitored by the site manager via closed circuit television cameras placed on 5m poles around the site. No asbestos is accepted, and any suspected fibro or asbestos contaminated loads are turned away. All operations are carried out in accordance with the *Boral Recycling: Inspection and Receivals Protocol, 2015* and all staff retain currency with Asbestos Awareness Training. Waste materials are generally crushed and screened, after which a picker selects non-recyclables such as metals, plastics and wood fragments. These are placed into skips for disposal by contractor.

The facility operates between 9am – 5pm, Monday to Saturday. There are currently no operations on Sundays or public holidays. The site currently employs 10 full-time equivalent staff members.

The site is accessed via Egret Street, which provides sheltered turns in both directions from Cormorant Road. Egret Street is classified as a 26 m B-Double Restricted Access Vehicle route. There are 11 car parks within the Boral Recycling compound, including 2 disabled parking spaces. Additional parking is located outside the main entry gate. Drivers loading or unloading material at the site do not require car-parking spaces and the site receives limited visitors apart from material deliveries and pickups.

The site complaints register has no entries dating from the commencement of operations. Newcastle City Council confirms that no complaints have been received by Council over the life of the existing operation.

# 3 PROJECT DESCRIPTION

## 3.1 Definition

The Project is defined in accordance with Division 23 of the *State Environmental Planning Policy (Infrastructure) 2007* as a 'waste or resource management facility'. The following facilities are defined under division 23 of the SEPP Infrastructure:

- Resource recovery facility;
- Waste disposal facility;
- Waste or resource management facility; and
- Waste or resource transfer station.

The Project is best defined as a '*resource recovery facility*' or a '*waste or resource transfer station*':

> *'resource recovery facility' means a facility for the recovery of resources from waste, including such works or activities as separating and sorting, processing or treating the waste, composting, temporary storage, transfer or sale of recovered resources, energy generation from waste gases and water treatment, but not including re-manufacture of material or goods or disposal of the material by landfill or incineration.*
>
> *'waste or resource transfer station' means a facility for the collection and transfer of waste material or resources, including the receipt, sorting, compacting, temporary storage and distribution of waste or resources and the loading or unloading of waste or resources onto or from road or rail transport.*

## 3.2 Description

### 3.2.1 Overview

The facility will have the capacity to process up to 350,000 tonnes per annum of non-putrescible waste, primarily consisting of commercial and industrial (C&I), and construction and demolition (C&D) waste for reuse in secondary markets. Up to 530,000 tonnes of material is proposed to be stockpiled at any time.

A capital investment value report is attached in Appendix 3 and states that the estimated investment value is $147,557

The PAA and Project footprint are illustrated in Figure 2-2.

### 3.2.2 Waste Management

The facility will recycle and process waste produced by the construction, demolition, commercial and industrial sectors to produce products for resale. Strict quality controls will ensure the quality of the incoming materials, and this in turn will underpin the quality of the final saleable product. Specifically, this quality control will:

- Ensure the quality of incoming materials;
- Avoid raw material stockpile cross contamination; and
- Allow tracking of materials.

It is proposed to primarily accept the following waste streams:

- Building and demolition waste, as defined in Schedule 1 of the *Protection of the Environment Operations Act 1997* (POEO Act);
- Asphalt waste;
- Concrete waste from concrete batching plants;
- Virgin excavated natural material (VENM);
- Excavated natural material (ENM);
- Plasterboard and ceramics;
- Soil (meeting CT1 thresholds for General Solid Waste in Table 1 of the waste classification guidelines);
- Tiles and masonry;
- Natural quarry products;
- General or specific exempted waste (meeting all conditions of a resource recovery exemption under clause 51A of the POEO (Waste) Regulation 2014;
- Any waste that is below licensing thresholds in schedule 1 of the POEO Act; and
- Bricks, tiles and masonry seconds direct from the manufacturer.

The proposed Facility will not accept hazardous materials such as asbestos (either loose or bonded) or chemical waste. Boral will implement appropriate management procedures in accordance with *Boral Recycling Inspection and Receivals Protocol, 2015*.

All personnel undertake asbestos awareness training as part of inductions and ongoing training. The site has a double check procedure in accordance with the *Boral Recycling: Inspection and Receivals Protocol, 2015*, which involves an initial load check by the weighbridge operator, followed by a second visual check at the raw material discharge point. Both these checks are undertaken prior to unloading and include the generation of dockets signed by the relevant operators to document the process.
Additional to the double-check procedure, the Inspection and Receivals Protocol requires, that on each Wednesday, a front end loader bucket sample is taken of the day's crushing, and placed on a designated inspection pad. Here, a trained operator undertakes a visual inspection for asbestos material and collects a 20 kilogram sample for analysis by the contracted occupational hygienist. If twelve consecutive weekly samples are satisfactory, the sampling and testing regime reverts to monthly.

This process will continue as part of the Project to preclude inadvertent acceptance of asbestos containing materials.

In addition, raw material testing will be conducted in accordance with the NSW EPA's Recovered Aggregate Order 2014, which includes testing for 8 heavy metals, electrical conductivity, and foreign material. Testing frequency is as defined in the Recovered Aggregate Order 2014.

Recycled products will be sold back into the construction and other markets. The produced materials are expected to include aggregates, pipe bedding, engineered and non-engineered fill, engineered and non-engineered road base and other stabilised products. Additional products are likely to be produced, depending on demand and changes in technology and material specifications.

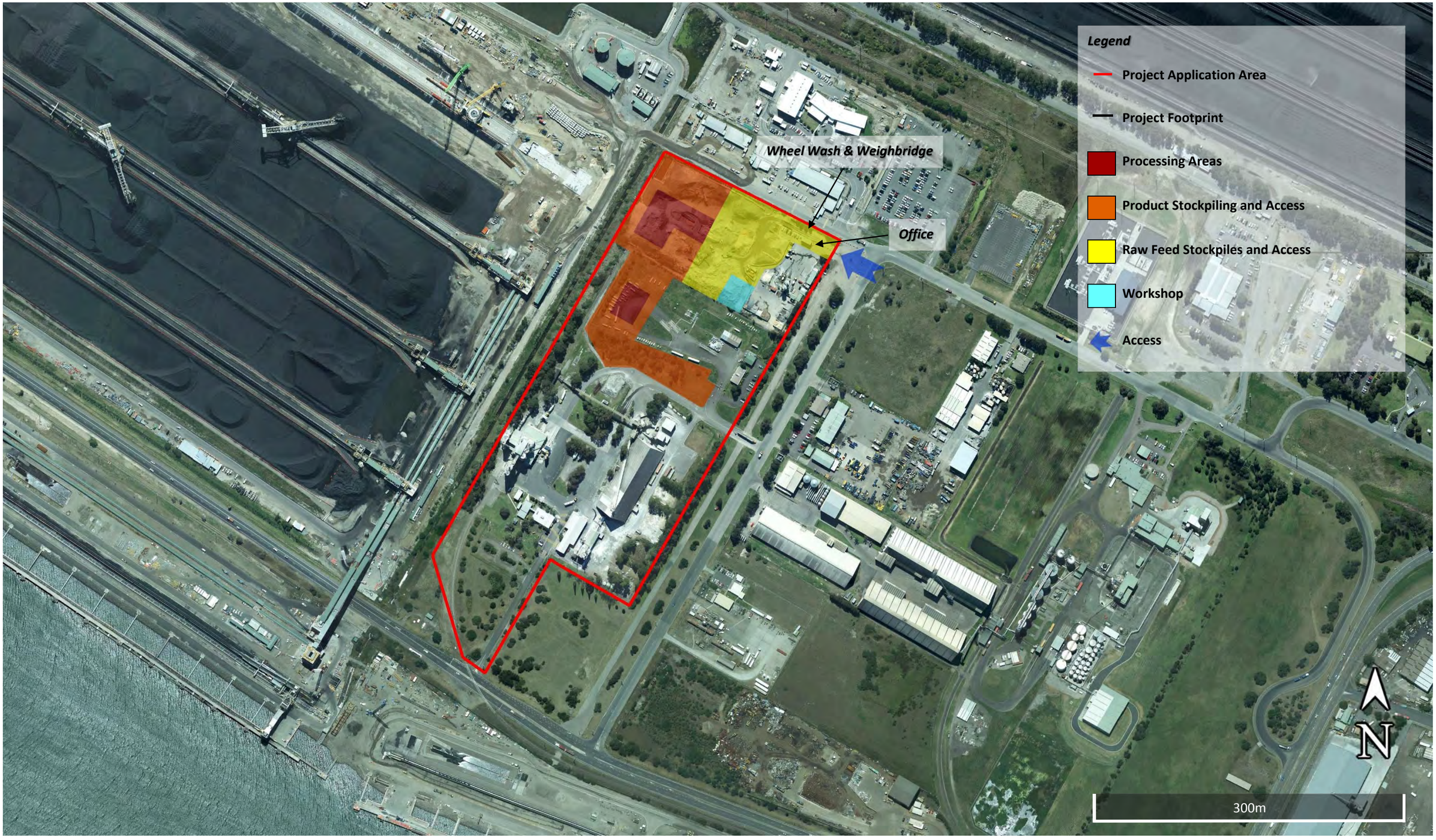
### 3.2.3 Project Design and Layout

Figure 3-1 shows the PAA and conceptual Project layout. The facility will require separate areas for flexible unloading, processing, storage and despatch. All manoeuvring and stockpile areas will be on compacted base.

Trucks with incoming loads will enter through the single entrance/exit driveway off Egret Street, proceed to the weighbridge and initial load inspection point, and then enter the internal road network. From here the incoming trucks will proceed as directed to the secondary load inspection point, and thence to the correct drop-off stockpile. Unless these same trucks backload product, they will then exit the site via the internal road network and the wheel wash.

Waste materials will be temporarily stockpiled as raw feed and will be processed as required. Processing may consist of simple blending, crushing and screening, stabilisation or a combination of all processes, depending on raw feed characteristics and the desired product specification. Various separate product stockpiles will be formed, from which materials will be despatched. This process will require incoming trucks to enter the site through the single entrance/exit driveway off Egret Street, proceed to the weighbridge, enter the internal road network, receive a load, and then exit via the wheel wash. For trucks registered at the site, weighing on exit is not required as the tare weights will have been recorded. Only trucks new to the site will be required to reweigh on exit.

The nature of the recycling business means that incoming waste volumes and types vary over the short and long term, as does product demand. To operate efficiently, a waste recycling site must maintain maximum flexibility to store and process raw feed, and to store and despatch products. As a consequence, operational tempo and stockpile sizes will vary over time. Up to 530,000 tonnes of material is proposed to be stockpiled at any time.




| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Map Title:** | Conceptual Project Layout | | | **Figure No:** | 3-1 | | | **Date:** | 3 July 2015 |
| **Location:** | Kooragang Island, NSW Australia | **Author/ Reviewer:** | AT/MS | **Version No:** | V01 | **Map/ DWG No:** | **1** of **1** | **Job Ref:** | 11200 |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### 3.2.4 Plant and Equipment

The following mobile machinery is proposed to be used:

- Front end loaders x 2;
- Medium excavators x 2 (with buckets and attachments);
- Mobile crushing and screening plant;
- A mobile stabilisation plant (with associated horizontal or vertical silo) that will be moved around the site as required; and
- No more than four road trucks on site at one time; two being loaded, one leaving, and one tipping. Other trucks may queue on the incoming driveway.

These plant items have been used for modelling, however due to improvements in plant efficiencies, changes in waste availability and product demand, these plant items may change.

### 3.2.5 Access and Parking

The site is accessed via Egret Street, which provides sheltered turns in both directions from Cormorant Road. Egret Street is classified as a 26 m B-Double Restricted Access Vehicle route. No changes to access are proposed. The current parking facilities are adequate for the facility expansion.

### 3.2.6 Site Development

Site development will involve the following sequence of works:

Phase 1 – expansion of stockpile and processing area as far as the southern boundary of the existing Origin Energy site. This will include the following works:

- Clearing and grading;
- Construction of internal roads and stockpile pads;
- Installation of plant; and
- Fencing and signage.

Phase 2 – expansion into the existing southern drainage corridor. This area will only be developed once additional stockpiling capacity is required.

- Removal and mulching of trees and shrubs;
- Clearing and grading;
- Construction of internal roads and stockpile pads;
- Installation of stormwater management systems; and
- Fencing and signage.

### 3.2.7 Hours of Operation and Staffing

It is proposed to operate the site 24 hours per day Monday to Saturday with only maintenance occurring between 6 am to 6 pm Sundays and public holidays. The current number of employees is expected to rise by one to 11 full time equivalents.

# 4 PROJECT JUSTIFICATION

## 4.1 Policy Context

The NSW Government has released a number of plans and strategies which set objectives and targets for both commercial and industrial waste, and construction and demolition waste streams. The proposed development is consistent with and will contribute to the delivery of the targets and objectives set out in these plans and strategies, which include the following:

- The *NSW 2021: A Plan to Make NSW Number One* sets the priorities for waste reform and commits to developing long term strategies that encourage resource recovery and prevent unnecessary waste. One of the targets for recycling in this plan was to increase levels of commercial and industrial waste to 63% and construction and demolition waste to 76% by the year 2014. While this target date has now passed, this plan is still used as a platform for many of the NSW EPA's strategies for waste reform.
- The *NSW Waste Avoidance and Resource Recovery Strategy 2014-21* (WARR 2014-21) was released in December 2014 and sets targets which align with the NSW Government's waste reforms in *NSW 2021: A plan to make NSW number one.* The WARR 2014-21 objectives and targets include that, by 2021–22, recycling rates increase for commercial and industrial waste from 57% (in 2010–11) to 70%, construction and demolition waste from 75% (in 2010–11) to 80% and increase the waste diverted from landfill from 63% (in 2010–11) to 75%. The proposed facility will directly support these targets.
- In February 2013 the State Government released an additional waste and resource recovery initiative titled *Waste Less, Recycle More.* Amongst other measures, the initiative aims to 'enhance recycling and alternative waste treatment infrastructure across NSW'. The document states that overall an additional 1 million tonnes of waste needs to be recycled annually (based on 2010/2011 data) to achieve targets nominated in *NSW 2021: A plan to make NSW number one*. The proposed increase in the Kooragang facility throughput will equate to one quarter of this target and has the added benefit of reducing the demand for new extractive resources.

## 4.2 Need for the Proposal

Recycling wastes makes both economic and environmental sense. Boral has been operating the Kooragang Island facility since 2003 and the demand to dispose of wastes has increased, as has the demand for buying processed wastes.

The current operating restrictions at the existing Kooragang recycling facility deny Boral the space and operating capacity to more effectively compete in the recycling market. The proposed changes to the operation will allow Boral to handle more wastes and products and importantly to handle them within the confines of the supply and demand cycles inherent in this industry.

## 4.3 Site Suitability

The site is ideal for the proposed expansion of the existing waste recycling facility for the following reasons:

- It is within a very large industrial area dominated by materials handling and stockpiling industries;
- It is ideally located near main roads;
- It is central to a considerable source of construction waste materials and to consumers of recycled construction products;
- It is distant from sensitive residential land uses; and
- The existing facility has been operating since 2003 without community complaint.

## 4.4 Alternatives

### 4.4.1 Relocation

The relocation alternative would entail the selection and purchase of new land, followed by an approval process. The original facility was located on Kooragang Island due to:

- Appropriate zoning;
- Excellent transport links;
- Boral owning the land;
- The site being central to waste supply and product demand; and
- A significant buffer to residential areas.

These benefits of the site remain, and it would be difficult to find a better site that would fulfil operational requirements, be closer to supply and demand, and that would offer increased separation from residences.

### 4.4.2 'Do nothing' Option

Over the last decade the NSW waste industry has changed significantly with the drive to set up additional recycling facilities, which makes both environmental and economic sense. The NSW State Government released the *Waste Less, Recycle More* initiative, which aims to 'enhance recycling and alternative waste treatment infrastructure across NSW'. The 'Do nothing' option would not be consistent with the initiatives and strategies of the NSW State Government and would not be a positive outcome.

## 4.5 Benefits of the Proposal

The Project is consistent with and will contribute to the delivery of the NSW's recycling strategies and initiatives for waste. Based on the socio-economic analysis, the Project will provide benefits to the local community through direct and indirect employment opportunities during the construction and operational phases.

The Project will facilitate the needs of the local community and wider Region through the use of sustainable resource recovery.

# 5 STATUTORY CONTEXT

The following section outlines the key legislation, planning instruments and existing approvals relevant to the proposed development. The following legislative instruments applying to the site are listed below:

- *Environment Protection and Biodiversity Conservation Act 1999;*
- *Environmental Planning and Assessment Act 1979;*
- *Protection of the Environment Operations Act 1997;*
- *Threatened Species Conservation Act 1995;*
- *Waste Avoidance and Resource Recovery Act 2001;*
- *Water Management Act 2000;*
- *State Environmental Planning Policy(Three Ports) 2013;*
- *State Environmental Planning Policy (State and Regional Development) 2011;*
- *State Environmental Planning Policy (Infrastructure) 2007; and*
- *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development.*

The key provisions relevant to the proposal are discussed in the following sections.

## 5.1 Commonwealth Legislation

### 5.1.1 Environment Protection and Biodiversity Conservation Act 1999

The primary objective of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is to '*provide for the protection of the environment, especially those aspects of the environment that are Matters of National Environmental Significance'*. Environmental approvals under the EPBC Act may be required for an 'action' that is likely to have a significant impact on Matters of National Environmental Significance.

Where there is potential for a proposal to have a significant impact on any Matters of National Environmental Significance, a Referral under the EPBC Act can be submitted to the Department of the Environment for consideration, concurrent with this State Significant Development application process.

The limited biodiversity value on the site ensures that the Project does not trigger any Matters of National Environmental Significance and no Referral is required.

## 5.2 State Legislation and Regulations

### 5.2.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) forms the statutory framework for planning approval and environmental assessment in NSW. The objectives of the EP&A Act are set out in Section 5 of the Act and are:

> *(a) To encourage:*
>
> *(i) The proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment;*
>
> *(ii) The promotion and co-ordination of the orderly and economic use and development of land;*
>
> *(iii) The protection, provision and co-ordination of communication and utility services,*
>
> *(iv) The provision of land for public purposes;*
>
> *(v) The provision and co-ordination of community services and facilities;*
>
> *(vi) The protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats;*
>
> *(vii) Ecologically sustainable development; and*
>
> *(viii) The provision and maintenance of affordable housing.*
>
> *(b) To promote the sharing of the responsibility for environmental planning between the different levels of government in the State; and*
>
> *(c) To provide increased opportunity for public involvement and participation in environmental planning and assessment.*

By facilitating waste material recycling, the Project conserves natural resources, most particularly aggregates and fossil fuels used to excavate, process and deliver these aggregates. By providing what is often a more cost-effective construction material, the Project will facilitate some degree of economic welfare in the community. By providing a recycling facility on land that has very low ecological values is a direct application of ecologically sustainable development principles. The Project promotes the orderly economic use and development of the land as the site is within an appropriately zoned industrial area. A community consultation program has provided the community with an opportunity to be involved in the planning and assessment process.

**Approval Pathway**

Part 4 of the EP&A Act provides an approval process for State Significant Development which is either declared to be a State Significant Development by a State Environmental Planning Policy (SEPP) or by order of the Minister published in the Gazette. The Project is considered 'State Significant Development' (SSD) in accordance with Division 4.1 of Part 4 of the EP&A Act, as it is a type listed in Schedule 1 of the *State Environmental Planning Policy ( State and Regional Development*) 2011.

Specifically, Clause 23 of Schedule 1 lists '*Waste and Resource Management Facilities*' as State Significant Development if the development triggers one of the six sub-clauses. The following sub-clause provision triggers this proposal as State Significant Development:

> *(3) Development for the purpose of resource recovery or recycling facilities that handle more than 100,000 tonnes per year of waste.*

As the proposal requires approval under Part 4 of the EP&A Act, the Minister for Planning is the prescribed consent authority. Further, in accordance with the requirements for State Significant Development, SEARs have been issued and have informed the preparation of the EIS in conjunction with the relevant provisions of the *Environmental Planning and Assessment Regulation 2000*.

**Assessment Requirements**

The proposal is subject to the general assessment requirements under Part 4 of the EP&A Act. These requirements are addressed in the following sections.

**Matters for Consideration (Section 79C EP&A Act)**

Section 79C of the EP&A Act identifies matters for the consent authority to take into account when determining a development application. A checklist of these matters and where they have been addressed in the EIS is provided in Table 5-1.

Pursuant to Clause 89J (g) the following approval requirements do not apply: a water use approval under section 89, a water management work approval under section 90 or an activity approval (other than an aquifer interference approval) under section 91 of the *Water Management Act 2000*.

Table 5-1: Section 79C Matters for Consideration

| Section 79C Matters for Consideration | Relevant Section within EIS |
|---|---|
| (a) The provisions of:<br>(i) Any environmental planning instrument. | Section 5.3. |
| (ii) Any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority. | No proposed instrument has been identified as relevant to this proposal. |
| (iii) Any development control plan. | Development Control Plans do not apply to State Significant Developments. |
| (iiia) Any planning agreement that has been entered into under section 93F, or any draft planning agreement that a developer has offered to enter into under section 93F. | No planning agreement has been entered into under section 93F. |
| (iv) The regulations (to the extent that they prescribe matters for the purposes of this paragraph). | Section 5. |
| (v) Any coastal zone management plan (within the meaning of the *Coastal Protection Act 1979*) that apply. | Hunter Estuary Coastal Zone Management Plan applies. See Table 5-2. |
| (b) The likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality. | Section 8. |
| (c) The suitability of the site for the development. | Section 4.3. |
| (d) Any submissions made in accordance with this Act or the regulations. | Submissions will be addressed as received during EIS exhibition. |
| (e) The public interest. | The Project is in the greater public interest as it will facilitate waste recycling and provide cost-effective products for construction projects. |

**Hunter Estuary Coastal Zone Management Plan**

The *Hunter Estuary Coastal Zone Management Plan* is a coastal zone management plan within the meaning of the *Coastal Protection Act 1979*. The Plan provides a strategic framework for estuary management and improvement, and provides (in appendix A of that Plan) a checklist for consideration of future developments. This checklist has been reproduced as Table 5-2 along with a statement of consideration with regard to the Project.

Table 5-2: Hunter Estuary Coastal Zone Management Plan Matters

| Ref | Checklist | Consideration |
|---|---|---|
| a | Is the proposed development compassionate to existing economic, social and environmental values of the estuary, and does not diminish the significance of any of these values unless equivalent compensatory provisions have been made? | Yes. The Project will not diminish environmental values, meaning no compensatory provisions have been made. |
| b | Does the proposed development improve or maintain the environmental condition of the Hunter River estuary and its tributaries compared to existing (2008) conditions, irrespective of social, recreational, tourism, industry or economic gains? | Yes. The Project will maintain existing estuary conditions. |
| c | Does the proposed development impact on Aboriginal or early European cultural values or degrade known sites of cultural significance? | No. The project is on disturbed and filled land. |
| d | Does the proposed development duly consider existing and future risk of flooding and inundation from the Hunter River and its tributaries, catering for future climate change (to a timescale that is commensurate with the proposed development)? | Yes. The Project is above the 1% AEP level, allowing for climate change and induced sea level rise. |
| e | Does the proposed development diminish fish and prawn stocks within the estuary? | No. |
| f | Does the proposed development diminish scenic values of the estuary and its catchment area? | No. There will be no noticeable change to visual amenity. |
| g | Does the proposed development compromise any existing functionality of the Hunter Valley Flood Mitigation Scheme? | No. |
| h | Does the proposed development increase pollutant loads to the estuary or its tributaries through catchment runoff or through direct discharges compared to existing (2008) conditions? | No. |
| i | Does the proposed development exacerbate conflicts between the different user groups of the estuary or between the waterway and foreshore users? | No. |
| j | Does the proposed development disturb recognised shorebird roosting and breeding areas? | No. |
| k | Does the proposed development potentially impact on any existing Endangered Ecological Communities, estuarine and floodplain wetlands, or other significant habitats (including areas protected under international migratory treaties, areas utilised as wildlife corridors across the landscape, and fish and prawn nurseries)? | No. |
| l | Does the proposed development require significant clearing of vegetation, including clearing within an Asset Protection Zone? | No. |
| m | Does the proposed development involve bank stabilisation, excavation or river engineering works? | No. |
| n | Does the proposed development increase low flow extraction from the Hunter estuary or its tributaries? | No. |
| o | Does the proposed development involve extraction of sediment? | No. |

### 5.2.2 Protection of the Environment Operations Act 1997

The Project will require an Environment Protection Licence (EPL) under Schedule 1 of the *Protection of the Environment Operations Act 1997* as follows:

Resource recovery – Clause 34 defines the recovery of general waste as:

> *"The receiving of waste (other than hazardous waste, restricted solid waste, liquid waste or special waste) from off site and its processing, otherwise than for the recovery of energy"; and*

Waste storage – Clause 42 defines waste storage as:

> *"the receiving from off site and storing (including storage for transfer) of waste".*

The criteria for a resource recovery facility to be declared a scheduled activity under Clause 34 is:

> *"(a) involves having on site at any time more than 1,000 tonnes or 1,000 cubic metres of waste, or*
> *(b) involves processing more than 6,000 tonnes of waste per year"*

The relevant criteria for waste storage to be a declared a schedule activity under Clause 42 subclause 3(d)(i) is:

> *"(d) more than the following amounts of waste (other than waste referred to in paragraph (a) or (b)) is received per year from off site:*
> *(i) in the case of premises in the regulated area – 6,000 tonnes".*

An application to modify the existing EPL will be made following receipt of development consent.

Clause 89K of the EP&A Act states:

> *(1) An authorisation of the following kind cannot be refused if it is necessary for carrying out State significant development that is authorised by a development consent under this Division and is to be substantially consistent with the consent:*
> *e. An environment protection licence under Chapter 3 of the Protection of the Environment Operations Act 1997 (for any of the purposes referred to in section 43 of that Act).*

### 5.2.3 Threatened Species Conservation Act 1995 (TSC Act)

Schedules 1 and 2 of the TSC Act contain lists of flora and fauna species and communities, which have been determined by the NSW Scientific Committee as being under threat of serious decline that could ultimately lead to extinction. Schedule 3 of the TSC Act contains a list of 'Key Threatening Processes' which threaten, or could potentially threaten the survival or evolutionary development of a species, population or ecological community. Threats to threatened species and other plants and animals in NSW include pest animals, weeds, diseases, and habitat loss or change.

The site has a very low biodiversity value and the Project will not threaten the survival or evolutionary development of a species, population or ecological community. Section 8.7 provides further consideration of ecological values and impacts.

### 5.2.4 Waste Avoidance and Resource Recovery Act 2001

The *NSW Waste Avoidance and Resource Recovery Act 2001* creates a framework for the efficient use of resources and resource management. Clause 3 outlines the objectives of the Act as follows:

> *(a) To encourage the most efficient use of resources and to reduce environmental harm in accordance with the principles of ecologically sustainable development;*
> *(b) To ensure that resource management options are considered against a hierarchy of the following order:*
> *(i) Avoidance of unnecessary resource consumption;*
> *(ii) Resource recovery (including reuse, reprocessing, recycling and energy recovery); and*
> *(iii) Disposal.*
> *(c) To provide for the continual reduction in waste generation;*
> *(d) To minimise the consumption of natural resources and the final disposal of waste by encouraging the avoidance of waste and the reuse and recycling of waste;*
> *(e) To ensure that industry shares with the community the responsibility for reducing and dealing with waste;*
> *(f) To ensure the efficient funding of waste and resource management planning, programs, and service delivery;*
> *(g) To achieve integrated waste and resource management planning, programs and service delivery on a State-wide basis; and*
> *(h) To assist in the achievement of the objectives of the Protection of the Environment Operations Act 1997.*

The proposal is consistent with these objectives. By increasing the capacity of the existing facility, greater volumes of waste are able to be recovered and recycled thereby decreasing the amount of potential waste going to landfill. This practice is in accordance with the waste hierarchy principles of avoid, reuse and dispose, and is consistent with the *NSW Waste Avoidance and Resource Recovery Strategy 2014 – 2021*.

### 5.2.5 Water Management Act 2000

The *NSW Water Management Act 2000* (WM Act) regulates the use and interference with surface and groundwater in NSW. Under s89J of the EP&A Act, water use approvals, water management works approvals and controlled activity approvals are not required for State Significant Development. SLR has undertaken surface water and ground water assessments in accordance with industry best practice (see Appendix 8). The impacts of the Project are addressed in Section 8.5.

Water is extracted from an on-site spear point GW053226 that previously held licence number 20BL117398. This licence was inadvertently allowed to lapse and an application to NSW Office of Water will be prepared to request reinstatement.

SLR (2015) reports that the NSW Aquifer Interference Policy sets out the requirements for assessing the impacts of aquifer interference activities. SLR notes that no deep excavations are proposed as part of the Proposal and that the proposed stormwater storage / infiltration facilities have been designed to ensure groundwater is not intercepted.

## 5.3 Relevant Environmental Planning Instruments

### 5.3.1 State Environmental Planning Policy (State and Regional Development) 2011

The Project is 'State Significant Development' in accordance with Division 4.1 of Part 4 of the EP&A Act, as it is triggered as a 'Waste and Resource Management Facility' under Clause 23, Schedule 1 of the *State Environmental Planning Policy* (*State and Regional Development) 2011*. Specifically, the following provision triggers the proposal as State Significant Development:

*(3) Development for the purpose of resource recovery or recycling facilities that handle more than 100,000 tonnes per year of waste.*

The proposal is expected to handle 350,000 tonnes of waste per year, thereby exceeding the SSD trigger of 100,000 tonnes. Accordingly, the appropriate approval process is State Significant Development under Part 4 of the EP&A Act.

### 5.3.2 State Environmental Planning Policy (Infrastructure) 2007

The aim of the *State Environmental Planning Policy (Infrastructure) 2007 (ISEPP)* is to facilitate the effective delivery of infrastructure across NSW. The ISEPP allows for certain types of infrastructure to be permissible with or without consent, or as exempt or complying development. The proposed activity does not fall within the provisions of exempt or complying development under the ISEPP. Clause 120 identifies land for prescribed zones relevant to Clause 121 as follows:

> *Prescribed zone means any of the following land use zones or a land use zone that is equivalent to any of those zones:*
>
> *(a) RU1 Primary Production;*
> *(b) RU2 Rural Landscape;*
> *(c) IN1 General Industrial;*
> *(d) IN3 Heavy Industrial;*
> *(e) SP1 Special Activities; or*
> *(f) SP2 Infrastructure.*

The site is zoned SP1 – Special Activities under the provisions of the SEPP (Three Ports) 2013, meaning the proposal is to be undertaken on land within a *prescribed zone*. Clause 121 of the ISEPP outlines the following development as permitted with consent:

> ***(1) Development for the purpose of waste or resource management facilities, other than development referred to in subclause (2), may be carried out by any person with consent on land in a prescribed zone.***
> *(2) Development for the purposes of a waste or resource transfer station may be carried out by any person with consent on:*
> *(a) Land in a prescribed zone; or*
> *(b) Land in any of the following land use zones or equivalent land use zones:*
> *(i) B5 Business Development;*
> *(ii) B6 Enterprise Corridor;*
> *(iii) IN2 Light Industrial; or*
> *(iv) IN4 Working Waterfront.*
> *(c) Land on which development for any of the following purposes is permitted with consent under any environmental planning instrument:*
> *(i) Industry;*
> *(ii) Business premises or retail premises; or*
> *(iii) Freight transport facilities.*
> *(3) Development for the purpose of the recycling of construction and demolition material, or the disposal of virgin excavated natural material (as defined by the Protection of the Environment Operations Act 1997) or clean fill, may be carried out by any person with consent on land on which development for the purpose of industries, extractive industries or mining may be carried out with consent under any environmental planning instrument.*

The proposal is a development as referred to in subclause (1), therefore pursuant to Clause 121 of the ISEPP the operation of a materials recycling facility is permissible with development consent.

### 5.3.3 State Environmental Planning Policy No. 33 – Hazardous and Offensive Development

*State Environmental Planning Policy 33 – Hazardous and Offensive Development* (SEPP 33), clause 12 outlines that a Preliminary Hazard Analysis screening test must be undertaken to determine the risk of the proposal.

A potentially hazardous industry is defined within SEPP 33 as a development for the purpose of any industry which, if the development were to operate without employing any measures to reduce or minimise its impact, would pose a significant risk to human health, life or property, or to the biophysical environment.

An assessment of the Project in accordance with *Hazardous and Offensive Development – Applying SEPP 33*, is provided in Section 8.6 and concludes that the Project is not offensive or hazardous.

### 5.3.4 State Environmental Planning Policy (Three Ports) 2013

*The State Environmental Planning Policy (Three Ports) 2013 (Three Ports SEPP)* applies to the proposal as the site is within the Land Application Map for the Port of Newcastle. The site is zoned *'SP1 - Special Activities'* under the Three Ports SEPP. Waste management facilities are not listed as prohibited development or as development permitted without consent within the land use zone of SP1, therefore the proposal falls within the classification of development permitted with consent. This confirms that the development is consistent with the requirement of Clause 8(1) (a) of the *State Environmental Planning Policy (State and Regional Development) 2011*.

# 6 CONSULTATION

## 6.1 Authority Consultation

The relevant government departments and authorities consulted regarding the proposal include:

- Department of Trade and Investment, including Office of Water;
- NSW Department of Planning and Environment;
- NSW Office of Environment and Heritage (Environment Protection Authority);
- NSW Roads and Maritime Services; and
- Newcastle City Council.

A summary of each agency's requirements to be addressed are provided in the Compliance Table provided on Page iv.

The SEARs require a consideration of the relevance of the existing consent conditions with respect to the Project. Accordingly, Appendix 4 provides a summary of each condition as modified with a statement of relevance in consideration of the findings of the EIS and proposed mitigation and management measures.

## 6.2 Consultation with Neighbouring Operators

Boral directly engaged with adjacent neighbouring industrial operators by way of letters and face to face meetings. A summary of topics covered during this contact is as follows:

- **Cleanaway** - truck and skip bin storage facility located on Egret St. Cleanaway's representative raised some concern over the use of the unsealed roadway parallel with Egret Street. Boral has since emplaced additional barriers to stop this access. There were no concerns otherwise and Cleanaway was generally supportive of the Project;
- **Port Hunter Commodities** – located on Egret Street. No issues were raised;
- **BOC Gases** - industrial gas facility located on Egret Street. The BOC representative foresees no issues, however they will liaise with the Area Manager and provide further comment if necessary;
- **Origin Energy** - gas decanting facility located on Egret Street. Origin enquired about emergency access at the rear of the site and requested notification prior to commencement of any fencing to ensure contractors were correctly inducted;
- **Newcastle Coal Infrastructure Group (NCIG)** - coal stockyard and loader located on Cormorant Road and Raven Street. NCIG noted a remarkable change over the past 12 months in Boral's site management and appreciates efforts to address previous concerns;
- **Transpacific Industries Technical Services Centre** - located on Egret Street. Transpacific's representative commented that they were generally unaware of Boral's operations and have no concerns about the proposed changes; and

- **Mountain Industries** – fertiliser facility located on Egret Street. Mountain Industries saw no potential issues with the Project.

## 6.3 Community Consultation

Boral consulted with members of the following community groups regarding the proposed development:

- Correct Planning and Consultation for Mayfield (CPCFM);
- Maryville Community Group; and
- Great Lifestyle of Wickham group.

Representatives of all groups were given guided inspections of the site on 16 September and 3 November 2015 and were briefed on the proposed development. The main concerns raised by the representatives were impacts on air quality, traffic volumes both locally and regionally, and increased noise. These issues are addressed in Sections 8.1, 8.2, and 8.3 respectively.

Additionally, the proposal was mentioned in a radio and internet broadcast by the Australian Broadcasting Corporation (ABC) in late July 2015. (http://www.abc.net.au/news/2015-07-31/boral-to-ramp-up-newcastle-recycling-operations/6661854).

# 7 ENVIRONMENTAL RISK ASSESSMENT

This section provides an assessment of the potential environmental risks associated with the project and identifies key issues for further assessment. The purpose of the environmental risk assessment is to assign a semi-qualitative environmental risk to each of the identified environmental issues. Accordingly, this section considers:

- The potential environmental impacts associated with the Project including, where relevant, the environmental performance criteria and development standards; and
- The nature and extent of environmental impacts likely to remain after the implementation of mitigation and control measures.

Table 7-1 provides the risk categories used to guide the identification and application of an appropriate risk rating. The risk category is determined by both likelihood of an impact occurring and the consequences if it did.

Each environmental issue was initially rated based on potential unmitigated or uncontrolled impacts, ignoring current site mitigation and management practices. A residual risk rating was assigned based on consideration and implementation of proposed mitigation and control measures. A summary of the environmental risk analysis is provided in Table 7-2.

**Table 7-1: Environmental Risk Assessment Categories**

| Rating | Consequence - single impact and cumulative | | | | | | | Likelihood | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Certain | Probable | Possible | Remote | Negative risk or probable positive risk |
| | | | | | | | | Common | Has happened within Boral | Could happen and has happened in non-Boral projects | Not likely | Practically impossible or positively probable |
| | | | | | | | | Frequent Incidents | Regular incidents | Infrequent incidents | Unlikely to occur, very few recorded or known incidents | May occur in exceptional circumstances - almost no recorded incidents |
| | Economic | | Social | | | | Environmental | Within 3 months | Within 2 years | Within 5 years | Within 10 years | Negatively improbable or positively probable |
| | Impact to Annual Business | Business Disruption | Personal Injury | Occupational Health & Safety | Legal | Reputation | Environment | Every project | Every 2nd project | One project in five | One project in ten | Negatively or positively with frequency |
| **1 - Catastrophic** | > $5m | > 1 month | Multiple Fatalities | Exposure to a severe, adverse long-term health impact or life-threatening hazard | Litigation, heavy fines, criminal charge | Prolonged international media attention | Long term impairment habitats / ecosystem | **1** | **2** | **5** | **7** | **11** |
| **2 - Major** | $3m - $5m | 1 week to 1 month | Single Fatality | Exposure to a hazard that results in surgery or permanent disablement | Major breach / major litigation | International media attention | Long term effects on ecosystem | **3** | **4** | **8** | **12** | **16** |
| **3 - Moderate** | $0.5m - $3m | 1 day to 1 week | Serious / Disabling Injury | Exposure to a hazard that could cause injuries or health effects requiring treatment by a physician or hospitalisation | Serious breach of regulation - prosecution/ fine | National media attention | Serious medium term environmental effects | **6** | **9** | **13** | **17** | **20** |
| **4 - Minor** | $100k - $0.5m | 12 hrs to 1 day | Lost Time Injury | Exposure to a hazard that could cause injuries or adverse health effects requiring treatment by a qualified person | Non-compliance breaches in regulation | Adverse local public attention | Minor effects to biophysical environment | **10** | **14** | **18** | **21** | **23** |
| **5 - Insignificant/ Positive** | <$100k or positive | < 12 hours or positive | First Aid | An injury or ailment that does not require medical treatment by a qualified professional. | Low level compliance issues | Minimal opposition or positive influence | Limited or no physical damage | **15** | **19** | **22** | **24** | **25** |

Table 7-2: Environmental Risk Assessment

| Issue | Potential Impacts | Initial Rating | Control Measures | Residual Impacts | Final Risk Rating |
|---|---|---|---|---|---|
| Waste management | Receipt of contaminated wastes | 14 | Waste screening procedure on arrival and management of wastes. Strict application of Boral Recycling Inspection and Receivals Protocol, 2013. | Unacceptable waste loads rejected or removed. | 22 |
| Air Quality | Exceedance of criteria | 18 | Area sprays, water cart, road sweeping, and transfer sprays. | No exceedances predicted. | 24 |
| Odour | Exceedance of criteria | 24 | No potential odour causing wastes accepted. Over 2,000 m separation distance to residential receivers. | Nil. | 24 |
| Noise | Exceedance of criteria | 18 | Distance to receptors, plant maintenance and equipment locations. | No exceedances predicted. | 18 |
| Vibration | Exceedance of criteria | 25 | Over 2,000 m separation distance to residential receivers. Limited propensity of mobile plant to generate ground transmitted vibration. | Nil. | 25 |
| Soil and water | Offsite pollution | 14 | Erosion and sediment control plan measures, permanent sediment basins and drains. | Remote possibility. | 21 |
| Traffic and transport | Reduced levels of service | 21 | Routine truck scheduling. | Level of service remains acceptable. | 24 |
| Fire hazards | Burning stockpiles and mobile plant | 13 | Emergency Response Plan, no combustible materials accepted, facility close down procedure, water cart, firefighting systems, secure fencing, and fire extinguishers in mobile plant. | Remote possibility. | 21 |
| Biodiversity | None expected | 21 | Nil. | None expected. | 21 |
| Heritage | None expected | 21 | Nil. | None expected. | 21 |
| GHG | Minor | 19 | Consider GHG emissions when selecting plant and lighting. | No residual impacts. | 19 |
| Visual | Minor | 22 | Existing vegetative screening in an existing industrial landscape. | Very limited visibility. | 22 |

The risk assessment process guided those issues considered key and requiring detailed assessment. These were:

- Dust;
- Traffic;
- Noise;
- Surface water management;
- Groundwater; and
- Hazardous goods management.

The risk assessment also guided certain issues that will not be key concerns for this particular proposal. These included odour, vibration, heritage, flooding and biodiversity.

While some recycling facilities can cause odour, the current facility neither accepts odour producing waste, nor has it received any odour complaints. The proposed modifications do not entail the acceptance of odour producing waste and therefore no odour modelling is required.

As noted in the risk assessment in Table 7-2, there is significant separation distance to the nearest residential receivers and a limited propensity of the intended plant to generate ground transmitted vibration. Accordingly no vibration predictions have been undertaken.

Kooragang Island is an artificial island constructed by the extensive filling (with dredge spoil and blast furnace waste) of an area that previously consisted of a series of tidal mudflats and islands. The Boral site is on such fill and has been the site of industrial activity for many years. Accordingly it is extremely unlikely that any in-situ Aboriginal artefacts occur on the land surface at the Boral site. Similarly, the presence of historical heritage items is very unlikely. Section 8.11.1 details existing knowledge of both Aboriginal and historical heritage in the area.

While Kooragang Island is not far above sea level and is adjacent to the South Arm of the Hunter River, it is above the 1% annual exceedance probability predictions in the Newcastle Floodplain Risk Management Study (Map Series 2) (BMT WBM, 2012). This same report categorises the site as flood fringe, with regard to probable maximum flooding. Flood fringe is the least severe of the three categories analysed. Accordingly, flooding is not a key issue at the site.

The site is highly disturbed by past reclamation during the formation of Kooragang Island and previous industrial activity over the entire site. No threatened species or ecological communities are likely to be significantly affected by the Project. No biodiversity offsetting is required under the Framework for Biodiversity Assessment for such impacts. No EPBC Referral is required. Notwithstanding the outcomes of the environmental risk assessment, certain non-key issues were considered further in this EIS.

# 8 KEY ENVIRONMENTAL ISSUES

## 8.1 Air Quality

SLR Consulting (2015) prepared a detailed air quality impact assessment, which is provided in full at Appendix 5, and informs this section of the EIS. As noted in the risk assessment in Table 7-2, there is significant separation distance to the nearest residential receivers and the facility will not accept potentially odour generating wastes such as green waste or bottles. Accordingly, no odour modelling has been undertaken.

### 8.1.1 Methodology

The United States Environmental Protection Agency 'CALPUFF' model was used to predict dust deposition and concentration. The CALPUFF modelling system is the preferred model for assessing long range transport of pollutants and their impacts involving composite meteorological conditions. As part of the modelling inputs, The Air Pollution Model (TAPM version 4.0.4) and 'CALMET' (a diagnostic 3-dimensional meteorological model) were used to generate synthetic meteorological conditions, modified with data from the nearest Bureau of Meteorology stations at Williamtown RAAF and Newcastle Nobbys Signal Station.

Dust is most commonly measured and modelled in the following units:

- Deposited dust, measured in grams per square metre per month (g/m2/month). This is the dust that residents would commonly see on window sills, and it can be generated from within and outside the house;
- Total suspended particulates (TSP), measured in micrograms per cubic metre ($\mu g/m^3$);
- A subset of TSP are particles with a diameter of 10 microns or less ($PM_{10}$) measured in $\mu g/m^3$. Particles between 10 and 2.5 microns in diameter are 'inhalable coarse materials', meaning the particles of dust would not be seen but can be inhaled; and
- A subset of TSP are particles with a diameter of 2.5 microns or less ($PM_{2.5}$) measured in $\mu g/m^3$ and are categorised as 'fine particles'. These can be found in smoke and haze, or they can form when gases from power plants, industries and automobiles react in the air.

To adequately model and measure dust concentration (TSP, $PM_{10}$ and $PM_{2.5}$), different averaging periods are used. In the case of deposited dust, monthly averages are used. In the case of TSP, annual averages are reported, while for both $PM_{10}$ and $PM_{2.5}$, annual and 24 hour averages are used.

Adopted air quality criteria for the Project are listed in Table 8-1.

Table 8-1: Project Air Quality Criteria

| Pollutant | Averaging Time | Goal |
|---|---|---|
| TSP | Annual | 90 µg/m$^3$ |
| $PM_{10}$ | Maximum 24 Hours | 50 µg/m$^3$ |
| | Annual | 30 µg/m$^3$ |
| $PM_{2.5}$ | Maximum 24 Hours | 25 µg/m$^3$ (interim advisory reporting standard) |
| | Annual | 8 µg/m$^3$ (interim advisory reporting standard) |
| Dust Deposition | Annual | Maximum Incremental increase of 2 g/m$^2$/month<br>Maximum Cumulative of 4 g/m$^2$/month |

**Source:** Approved Methods, NSW DEC (2005).

### 8.1.2 Existing environment

Existing air quality data from a network of six air quality monitoring stations (at Wallsend, Newcastle, Beresfield, Carrington, Mayfield and Stockton) were analysed to determine the most relevant background dust records. Not surprisingly the different stations have recorded very different maxima and averages. Stockton in particular appears to be affected by salt spray, which leads to significantly higher recordings than the other sites. Three of the air quality monitoring stations (Carrington, Mayfield and Stockton) were relatively recently installed and a full year of data was not available. More extensive data is available from Newcastle, Beresfield and Wallsend. Newcastle has statistically higher concentrations than Beresfield and Wallsend and was adopted as background for the Project.

No relevant TSP data is available and it has been conservatively assumed that TSP is twice the recorded ambient $PM_{10}$ concentration. No dust deposition data is available on or near the PAA and a background dust level of 2 g/m$^2$/month has been assumed.

Table 8-2 lists the adopted Project background air quality.

Table 8-2: Ambient Air Quality

| Air Quality Parameter | Averaging Period | Background Level |
|---|---|---|
| TSP | Annual | 42.8 µg/m$^3$ |
| $PM_{10}$ | 24-Hour | Daily varying |
| | Annual | 21.4 µg/m$^3$ |
| $PM_{2.5}$ | 24-Hour | Daily varying |
| | Annual | 8.1 µg/m$^3$ |
| Dust Deposition | Annual | 2 g/m$^2$/month |

### 8.1.3 Impacts

Figure 8-1 shows the locations of modelled dust receptors. Note that the subtle differences in air quality prediction assessment when compared to noise prediction assessment at this site has meant that different representative receptor locations and identifiers have been used.

**$PM_{10}$**

$PM_{10}$ 24 hour modelling is carried out using contemporaneous background dust statistics. To gain a clear understanding of impacts, predictions are firstly calculated for days when background dust are highest, to which Project predictions are added. Secondly, another set of predictions is calculated for the days when the Project increment is predicted to be highest, to which the corresponding calendar day's measured background dust level is added. The $PM_{10}$ modelling adopts the worst case scenario to enable a conservative precautionary outcome.

Table 8-3 provides modelling results for 24 hour average $PM_{10}$ concentrations detailing both the project increment predictions and the contemporaneous background recordings. The relevant criterion for $PM_{10}$ 24 hour average is 50 µg/m$^3$, which is exceeded at all receptors, entirely due to background concentrations. Background recordings exceed criteria without any Project increment. The maximum Project increment is 0.6 µg/m$^3$, which indicates that the Project will have very minor incremental impact, and when added to the highest recorded background concentrations would not result in any additional locational exceedances.

**Table 8-3: Predicted 24-Hour Average $PM_{10}$ Concentrations**

| Receptor | Max Background Assessment (µg/m$^3$) | | | Max Project Increment Assessment (µg/m$^3$) | | | |
|---|---|---|---|---|---|---|---|
| | Background [1] | Increment | Total | Date | Background | Increment | Total |
| R1 | 53.7 | <0.1 | <53.8 | 4/8/2014 | 23.2 | 0.4 | 23.6 |
| R2 | 53.7 | <0.1 | <53.8 | 7/2/2014 | 24.3 | 0.4 | 24.7 |
| R3 | 53.7 | 0.1 | 53.8 | 14/5/2014 | 18.3 | 0.5 | 18.8 |
| R4 | 53.7 | 0.2 | 53.9 | 9/4/2014 | 24.2 | 0.6 | 24.8 |
| R5 | 53.7 | 0.1 | 53.8 | 6/3/2014 | 28.9 | 0.3 | 29.2 |
| R6 | 53.7 | 0.1 | 53.8 | 27/2/2014 | 24.6 | 0.3 | 24.9 |
| R7 | 53.7 | <0.1 | <53.8 | 25/8/2014 | 13.8 | 0.2 | 14.0 |
| R8 | 53.7 | <0.1 | <53.8 | 22/9/2014 | 21.1 | 0.2 | 21.3 |
| R9 | 53.7 | <0.1 | <53.8 | 8/11/2014 | 20.6 | 0.3 | 20.9 |

| Receptor | Max Background Assessment (µg/m$^3$) | | | Max Project Increment Assessment (µg/m$^3$) | | | |
|---|---|---|---|---|---|---|---|
| | Background [1] | Increment | Total | Date | Background | Increment | Total |
| R10 | 53.7 | <0.1 | <53.8 | 18/5/2014 | 21.5 | 0.2 | 21.7 |
| R11 | 53.7 | <0.1 | <53.8 | 2/6/2014 | 9.0 | 0.2 | 9.2 |
| R12 | 53.7 | <0.1 | <53.8 | 15/7/2014 | 21.0 | 0.2 | 21.2 |
| R13 | 53.7 | <0.1 | <53.8 | 15/07/2014 | 21.0 | 0.3 | 21.3 |

Note: 1 Maximum recorded background concentrations were on 31/10/2014.


| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Title:** | Dust Receptor Locations | | | **Figure No:** | 8-1 | | | **Date:** | 7 July 2015 |
| **Location:** | Kooragang Island, NSW Australia | **Author/ Reviewer:** | AT/MS | **Version No:** | V01 | **Map/ DWG No:** | **1** of **1** | **Job Ref:** | 11200 |


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Annual average $PM_{10}$ modelling does not use contemporaneous daily background concentrations but rather annual average background concentrations. Table 8-4 provides details of modelled Project increments and totals for each receptor. Both the annual average background concentrations and the total of background plus Project increments are well below the 30 µg/m$^3$ criterion. The Project contributions are insignificant.

**Table 8-4: Predicted Annual Average $PM_{10}$ Concentrations (µg/m$^3$)**

| Receptor | Background | Increment | Totals |
|---|---|---|---|
| R1 | 21.4 | <0.1 | <21.5 |
| R2 | 21.4 | <0.1 | <21.5 |
| R3 | 21.4 | <0.1 | <21.5 |
| R4 | 21.4 | <0.1 | <21.5 |
| R5 | 21.4 | <0.1 | <21.5 |
| R6 | 21.4 | <0.1 | <21.5 |
| R7 | 21.4 | <0.1 | <21.5 |
| R8 | 21.4 | <0.1 | <21.5 |
| R9 | 21.4 | <0.1 | <21.5 |
| R10 | 21.4 | <0.1 | <21.5 |
| R11 | 21.4 | <0.1 | <21.5 |
| R12 | 21.4 | <0.1 | <21.5 |
| R13 | 21.4 | <0.1 | <21.5 |

**$PM_{2.5}$**

As for $PM_{10}$, modelling for $PM_{2.5}$ 24 hour average is carried out using contemporaneous background dust statistics. Again like for $PM_{10}$, $PM_{2.5}$ predictions are firstly calculated for days when background is highest, to which Project incremental predictions are added. Secondly, another set of predictions is calculated for the days when the Project increment is predicted to be highest, to which the corresponding day's background recording is added. The relevant criterion for $PM_{2.5}$ 24 hour is 25 µg/m$^3$.

Table 8-5 provides details of $PM_{2.5}$ 24 hour dust concentrations for maximum background assessment and maximum Project increment assessment. Modelling shows that the Project increment is insignificant and that all results are below the criterion with all results wholly dominated by measured background concentrations.

Table 8-5: Predicted 24-Hour Average $PM_{2.5}$ Concentrations ($\mu g/m^3$)

| Receptor | Maximum Background Assessment | | | Maximum Project Increment Assessment | | | |
|---|---|---|---|---|---|---|---|
| | Background | Project increment | Total | Date | Background | Project increment | Total |
| R1 | 21.2 | <0.1 | <21.3 | 04/08/2014 | 13.0 | 0.1 | 13.1 |
| R2 | 21.2 | <0.1 | <21.3 | 07/02/2014 | 4.6 | 0.1 | 4.7 |
| R3 | 21.2 | <0.1 | <21.3 | 21/03/2014 | 5.6 | 0.1 | 5.7 |
| R4 | 21.2 | <0.1 | <21.3 | 09/04/2014 | 5.7 | 0.1 | 5.8 |
| R5 | 21.2 | <0.1 | <21.3 | 06/03/2014 | 7.8 | <0.1 | <7.9 |
| R6 | 21.2 | <0.1 | <21.3 | 27/02/2014 | 8.2 | <0.1 | <8.3 |
| R7 | 21.2 | <0.1 | <21.3 | 25/08/2014 | 10.0 | <0.1 | <10.1 |
| R8 | 21.2 | <0.1 | <21.3 | 22/09/2014 | 6.6 | <0.1 | <6.7 |
| R9 | 21.2 | <0.1 | <21.3 | 08/11/2014 | 5.5 | <0.1 | <5.6 |
| R10 | 21.2 | <0.1 | <21.3 | 18/05/2014 | 10.9 | <0.1 | <11.0 |
| R11 | 21.2 | <0.1 | <21.3 | 02/06/2014 | 7.0 | <0.1 | <7.1 |
| R12 | 21.2 | <0.1 | <21.3 | 15/07/2014 | 7.2 | <0.1 | <7.3 |
| R13 | 21.2 | <0.1 | <21.3 | 15/07/2014 | 7.2 | <0.1 | <7.3 |

Annual average $PM_{2.5}$ modelling is compared against annual average background concentrations. Table 8-6 provides details of modelled Project increments and totals for each receptor. The annual average background concentrations are marginally above the 8 $\mu g/m^3$ criterion. The Project contributions are insignificant, representing a little over 1% increase on the background levels and do not lead to additional exceedances of the criterion

Table 8-6: Predicted Annual Average $PM_{2.5}$ Concentrations ($\mu g/m^3$)

| Receptor | Background | Increment | Cumulative |
|---|---|---|---|
| R1 | 8.1 | <0.1 | <8.2 |
| R2 | 8.1 | <0.1 | <8.2 |
| R3 | 8.1 | <0.1 | <8.2 |
| R4 | 8.1 | <0.1 | <8.2 |
| R5 | 8.1 | <0.1 | <8.2 |
| R6 | 8.1 | <0.1 | <8.2 |
| R7 | 8.1 | <0.1 | <8.2 |
| R8 | 8.1 | <0.1 | <8.2 |
| R9 | 8.1 | <0.1 | <8.2 |
| R10 | 8.1 | <0.1 | <8.2 |
| R11 | 8.1 | <0.1 | <8.2 |
| R12 | 8.1 | <0.1 | <8.2 |
| R13 | 8.1 | <0.1 | <8.2 |

**TSP**

Table 8-7 provides predicted TSP concentrations. The sampling period for TSP calculations is annual and therefore predictions are compared against measured annual average concentrations.

**Table 8-7: Predicted Total Suspended Particulates (µg/m$^3$)**

| Receptor | Background | Increment | Cumulative |
|---|---|---|---|
| R1 | 42.8 | <0.1 | <42.9 |
| R2 | 42.8 | 0.1 | 42.9 |
| R3 | 42.8 | 0.1 | 42.9 |
| R4 | 42.8 | 0.1 | 42.9 |
| R5 | 42.8 | <0.1 | <42.9 |
| R6 | 42.8 | <0.1 | <42.9 |
| R7 | 42.8 | <0.1 | <42.9 |
| R8 | 42.8 | <0.1 | <42.9 |
| R9 | 42.8 | <0.1 | <42.9 |
| R10 | 42.8 | <0.1 | <42.9 |
| R11 | 42.8 | <0.1 | <42.9 |
| R12 | 42.8 | <0.1 | <42.9 |
| R13 | 42.8 | <0.1 | <42.9 |

The relevant criterion for TSP annual average is 90 µg/m$^3$, and predictive modelling show that this criterion will not be exceeded. The Project increment is insignificant as compared to the background concentrations.

**Dust Deposition**

Modelling predicts dust deposition rates due to the Project increment to be <0.1 g/m$^2$/month at all receptors. Added to the assumed background of 2 g/m$^2$/month, no exceedances of the 4g/m2/month criterion are predicted, even assuming worst case existing background dust levels.

**Summary**

The Project will have little effect on air quality, either as deposited dust or suspended dust concentrations. While there are very minor predicted exceedances of both the $PM_{10}$ 24 hour average and $PM_{2.5}$ annual average criteria, the overwhelming contribution to predicted dust levels is due to measured background dust, with the Project predicted to provide a very small incremental increase. There is no predicted increase in the occurrence of existing exceedances of air quality criteria.

Given the large distance between the Project site and the nearest sensitive receiver (>2km), the predicted minor impacts of the Project on these sensitive receivers, the high number of existing air quality monitoring stations in the area (currently 6), and the nature of the site's industrial neighbour (coal stockpiles), it is not considered that an air quality monitoring program operated by Boral would be required to be implemented.

### 8.1.4 Mitigation Measures

The following mitigation measures have been incorporated into dust modelling and will be implemented during operations:

- Area sprayers will be activated in dry weather as required;
- All conveyor transfer points will be fitted with water sprays;
- Compacted internal roadways and stockpile pads;
- The main access road from the wheel wash and weighbridge has been sealed;
- Sealed roads will be regularly swept; and
- A water cart will remain on site for use on manoeuvring areas in hot and dry weather.

## 8.2 Traffic

A Traffic Impact Assessment was prepared by ARC Traffic and Transport (ARC, 2015). The report is summarised in the following sections and a full copy can be found at Appendix 6.

### 8.2.1 Methodology

The Traffic Impact Assessment has addressed the SEARs and outcomes of additional consultation with Newcastle City Council, Port of Newcastle, and Roads and Maritime Services.

The assessment has included:

- Observations of the local road network providing access to the sub-regional road network, including vehicle flows, types and speeds, sight distances at key locations, and general road and intersection operations;
- An assessment of the traffic generation and distribution characteristics of the Project;
- A detailed review of available traffic survey data, including traffic counts commissioned by ARC and others for numerous Kooragang Island assessments over the past 10 years and traffic survey data provided by RMS;
- A detailed review of potential traffic increases and distribution changes due to the Project within the immediate and broader road networks;
- An assessment of future levels of service at key intersections;
- A consideration of planned road improvement projects in the area; and
- Reference to the appropriate traffic and transport guidelines and assessment criteria, including: -
    - Newcastle Development Control Plan;
    - RTA Road Design Guide;
    - RTA Guide to Traffic Generating Developments;
    - AustRoads Guide to Road Design Part 3 Road Geometry;
    - AustRoads Guide to Road Design Part 4A Unsignalised and Signalised Intersections;
    - Australian Standard 2890.1: Parking Facilities – Off Street Car Parking;
    - Australian Standard 2890.2: Parking Facilities – Off Street Commercial Vehicle Facilities; and
    - Australian Standard 2890.6: Parking Facilities – Off Street Parking for People with Disabilities.

### 8.2.2 Existing Environment

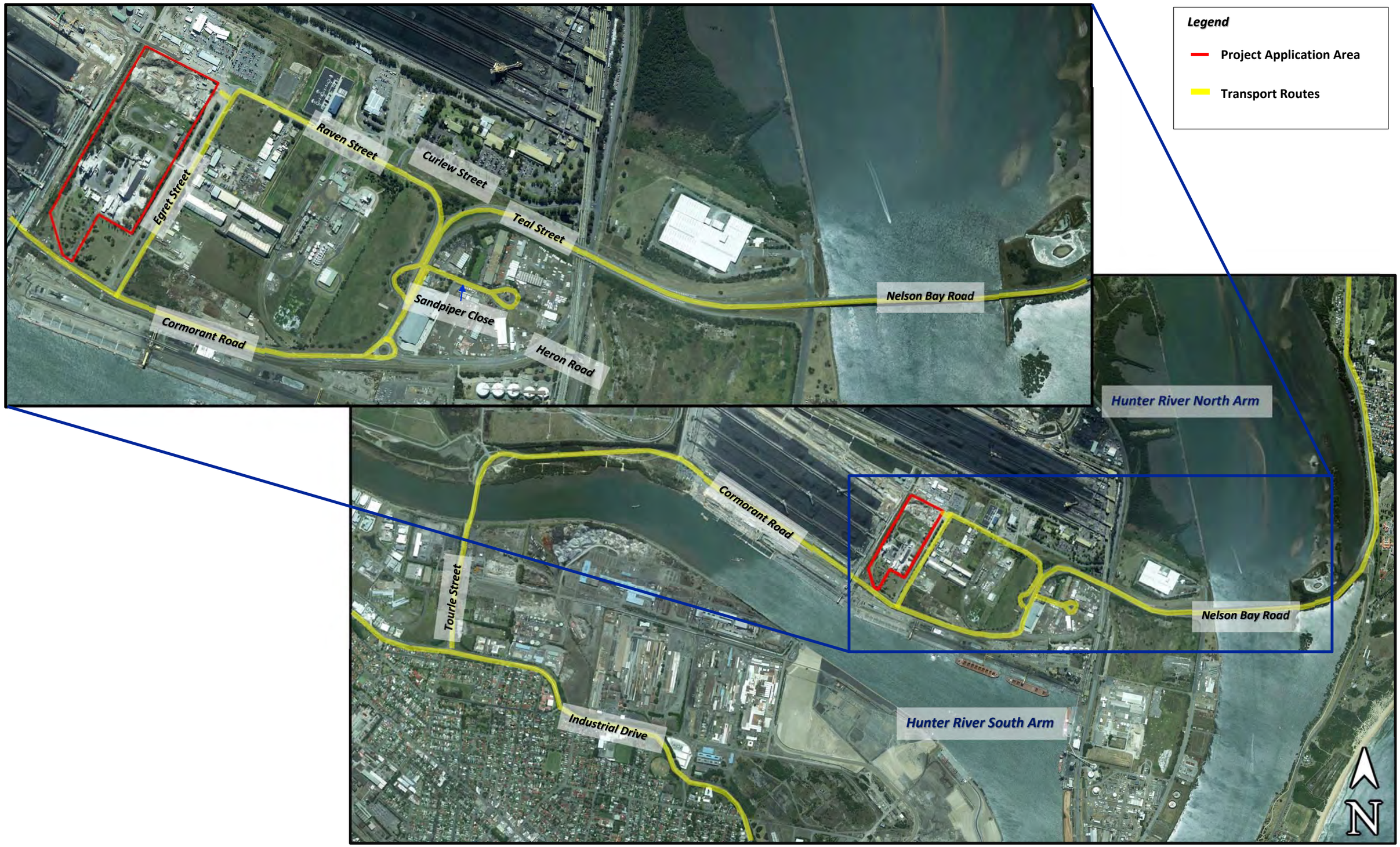
**Road Network, Intersections and Access**

The Project is located in the highly industrialised Kooragang Island and has access to the sub-regional and then onto the regional road network via Cormorant Road (MR108) to Industrial Drive and Nelson Bay Road, all of which are approved for Restricted Access Vehicles of up to 26m B-Doubles. The industrial nature of the Island provides a road network suitable for heavy vehicles and even the relatively minor roads such as Egret Street are wider than standard. Figure 8-2 shows the local road network.

Access for inbound trucks to the Project site is generally from Cormorant Road onto Egret Street. This intersection can be accessed by either eastbound or westbound inbound trucks. Outbound vehicles can traverse Egret Street onto Cormorant Road but are only permitted to turn left; the right movement is blocked by a median and is appropriately sign-posted. Accordingly all trucks turn left, and those wishing to access Industrial Drive perform a U-turn at the high capacity Cormorant Road/Teal Street Roundabout, while northbound trucks continue along Teal Street, over the Stockton Bridge and onto Nelson Bay Road.

Inbound access to the Project site is also available via a left only turn (for north or eastbound trucks) from Teal Street onto Raven Street. This intersection also allows for left turn only egress for outbound trucks. Northbound outbound trucks using this intersection continue along Stockton Bridge and onto Nelson Bay Road. Vehicles are also able to turn left from Raven Street onto Teal Street, and then immediately turn right into Sandpiper Close, which provides a protected U-turn facility for trucks wishing to return to Industrial Drive.

The local road network and key intersections operate at a good level of service, with most having significant spare capacity. The minor intersections have low peak traffic flows and excellent geometry and sight distances. The key intersections along the arterial route of Cormorant Road and Teal Street have at most moderate turning demands and operate at a high level of service.




| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Title:** | Existing Traffic Routes | | | **Figure No:** | 8-2 | | | **Date:** | 8 July 2015 |
| **Location:** | Kooragang Island, NSW Australia | **Author/ Reviewer:** | AT/MS | **Version No:** | V01 | **Map/ DWG No:** | **1** of **1** | **Job Ref:** | 11200 |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**Traffic Generation**

The site weighbridge records provided trip generation statistics. Records show that 90% of trips are generated from the direction of Newcastle, with a small minority of trips being generated from the north.

Weighbridge data analysis also shows that the average inbound load is 12.3 t, while outbound loads average 19.87 t. This disparity between inbound and outbound loads is expected and a commonly observed feature of similar recycling facilities. The Boral facility does not receive small trailer loads of waste from the public, and nor is it intended to accept such loads as part of the Project. There are other local facilities that provide for this demand.

Based on weighbridge data, the existing facility generates 130 vehicle trips per day (vpd), made up of 31 inbound loads, 19 outbound loads and minor staff and visitor vehicle movements. Given the currently restricted operating times, the existing facility generates an average of 10 vpd in commuter peak periods, ranging up to 30 vpd. The majority of trips are concentrated between later morning and mid-afternoon.

### 8.2.3 Impacts

**Traffic Generation**

The Project will generate an additional 226 heavy vehicle trips per day at maximum capacity, which, when added to existing movements, totals 326 vpd (heavy vehicles) and 30 vpd (light vehicles).

The extension of operating hours to 24 hours per day is not expected to change trip distribution, which is expected to remain concentrated within normal business hours. It is estimated that on average only 10 to 15% of trips will be generated before 600 am and after 600 pm. It is estimated that the Project will generate up to 40 trips per hour in the morning commuter peak and up to 30 trips per hour in the afternoon peak.

Trip origins are also expected to retain the current pattern, with 90% of trips to and from the Newcastle direction on average. Accordingly, it is predicted that the following additional traffic will be generated in the morning peak traffic period:

- 13 vph Cormorant Road west to Egret Street;
- 2 vph Cormorant Road east to Egret Street;
- 13 vph Egret Street to Cormorant Street and thence U-turn at Teal Street roundabout; and
- 2 vph Raven Street to Teal Street.

Similarly, the following trips are predicted for the afternoon peak:

- 9 vph Cormorant Road west to Egret Street;
- 1 vph Cormorant Road east to Egret Street;
- 9 vph Egret Street to Cormorant Street and thence U-turn at Teal Street roundabout; and
- 1 vph Raven Street to Teal Street.

**Roads and Intersections**

Key sections of the surrounding road network were examined, with the following increases predicted at nearby roads and intersections.

| | |
|---|---|
| Egret Street | The Project will generate an additional vehicle trip every 2 to 3 minutes in the peak hour on Egret Street. This will have no impact on traffic performance. |
| Raven Street | The Project will generate an additional vehicle trip every 20 to 30 minutes in the peak hour on Raven Street. This will have no impact on traffic performance. |
| Cormorant Rd/Egret St | The addition of one trip every 4 to 5 minutes in the peak hour at the intersection of Cormorant Road and Egret Street will not impact the average delay, nor compromise intersection geometry. |
| Cormorant Rd/Teal St | The addition of 13 vph in the peak hour to the U-turn movement at the Cormorant Road and Teal Street roundabout was assessed using the SIDRA intersection model, which reports no change in the Level of Service, no significant increases in average delays, nor a reduction in capacity. |
| Tourle St/Industrial Drv | The Project will add another 25 vph during peak hour to the Tourle Street and Industrial Drive intersection, split between inbound and outbound trucks and further split between east and west movements along Industrial Drive. On average the Project will add 6 to 7 additional movements to each intersection approach, which will average up to 1 to 2 additional movements per signal cycle. The Project will not have a significant impact on the intersection. |
| Teal St/Raven St | The Project will add one additional vehicle every 20 minutes to the Teal Street and Raven Street intersection in peak hour. This will have no impact on average delays, nor will it compromise the intersection geometry. |

**Queueing**

The queuing area between Egret Street and the weighbridge provides a sufficient distance such that there is no queuing back to Egret Street. To minimise the potential for queuing, the site closely manages truck movements and delivery/pick up times so that queuing is contained within the site. Note that any queueing along Egret Street would not impede the traffic flow due to the width of the road easily accommodating trucks in the kerbside lane without interfering with other traffic movements.

**Parking**

The Project will generate one additional parking space requirement. All car parking will be accommodated onsite with formal and informal spaces.

**Summary**

The Project will use the existing access roads in an industrial zone. Trip generation from the Project is insignificant, only adding up to 30 vph to the morning peak hour and 20 vph to the afternoon peak.

The Project will have no significant impact on the levels of service or capacity of the road network.

### 8.2.4 Mitigation Measures

The on-site staff car parks will be appropriately repainted to provide dimensions compliant with the requirements of AS 2890.1 and AS 2890.6.

## 8.3 Noise

A detailed noise impact assessment prepared by Muller Acoustic Consulting (MAC 2015) is provided at Appendix 7 and is summarised in this section.

### 8.3.1 Methodology

Construction noise has been assessed in accordance with the Interim Construction Noise Guideline (DECCW, 2009) (ICNG), while operational noise has been assessed in accordance with the Industrial Noise Policy (INP). Traffic noise was assessed in accordance with the NSW Road Noise Policy. The potential for sleep disturbance has been assessed using the guidance provided in the INP Application Notes and by reference to the Road Noise Policy.

As noted in the risk assessment in Table 7-2, there is significant separation distance to the nearest residential receivers and a limited propensity of the intended plant to generate ground transmitted vibration. Accordingly no vibration predictions have been undertaken.

### 8.3.2 Existing Environment and Criteria

There are numerous industrial receivers surrounding the site, while the nearest residential receivers are in Mayfield, 2.2 km to the south west, and Fern Bay, 2.6 km to the north east. Representative receiver locations are shown on Figure 8-3. Note that the representative receptor locations and identifiers in the air quality assessment differ slightly to those in the noise impact assessment due to subtle differences in assessment methodology.

Historic assessments confirmed by short term attended monitoring at R1 to R3 on 30 June 2015 have provided background noise levels. Table 8-8 provides these along with an assessment of intrusiveness and amenity criteria to generate project specific noise levels (PSNL).

**Table 8-8: Project Specific Noise Criteria, dBA LAeq(15minute)**

| Receiver | Period | RBL | Intrusiveness Criteria LAeq(15minute), dBA[2] | Amenity Criterion LAeq(period),dBA [1] | PSNL, dBA |
|---|---|---|---|---|---|
| R1 | Day | 46 | 51 | 60 | 51 LAeq(15 minute) |
| | Evening | 47 | 52 | 48 | 48 LAeq(period) |
| | Night | 43 | 48 | 39 | 39 LAeq(period) |
| R2/R3 | Day | 44 | 49 | 55 | 49 LAeq(15 minute) |
| | Evening | 45 | 50 | 45 | 45 LAeq(period) |
| | Night | 40 | 45 | 40 | 40 LAeq(period) |
| (I4/I5) | In use | - | - | 70 | 70 LAeq(period) |
| (H6) | Noisiest hour | - | - | 50 | 50 LAeq(period) |


| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Title:** | Noise Receptor Locations | | | **Figure No:** | 8-3 | | | **Date:** | 7 July 2015 |
| **Location:** | Kooragang Island, NSW Australia | **Author/ Reviewer:** | AT/MS | **Version No:** | V01 | **Map/ DWG No:** | **1** of **1** | **Job Ref:** | 11200 |

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Sleep disturbance goals are established in the INP Application Notes, which nominate a screening criteria of background noise level (LA90) plus 15 dB for maximum site noise when measured external to residential façade.

Relevant traffic noise criteria are 60 dBA LAeq (15hour) for day and 55 dBA LAeq (15hour) for night, both measured external to the house.

### 8.3.3 Impacts

**Construction**

The construction scenario adopted a generic construction fleet as follows:

- Compactor x 1
- Road truck x 4
- Grader x 1
- Backhoe/excavator x1

The above plant items were modelled at as operating concurrently, representative of a worst case scenario.

Construction noise predictions at the nearest potentially affected residences are provided in Table 8-9 and are compared to relevant criteria. Modelling predicts that construction noise will be significantly lower than the relevant criteria in all cases.

**Table 8-9: Construction Noise Predictions**

| Location | Predicted Construction Noise, LAeq(15minute) | Noise Goal (LAeq,15minute) dBA |
|---|---|---|
| R1 | <30 | 51 |
| R2 | <30 | 49 |
| R3 | <30 | 49 |
| I4 | 50 | 75 |
| I5 | 46 | 75 |
| H6 | <30 | 45 |

**Operations**

The facility's operations include processing, product loading and transportation. Noise levels at each receiver were modelled during calm and adverse meteorological conditions, assuming the following plant and equipment operating concurrently (worst case scenario):

- Mobile crusher x1
- Excavator x3
- Loader x3
- Road truck x4
- Water truck x1
- Stabiliser plant x1

Intrusive noise levels predicted at the nearest potentially affected residential locations are provided in Table 8-10. Modelling shows that the project specific noise levels will be met at all receivers.

**Table 8-10: Predicted Intrusive Noise Levels**

| Receiver | Day (Calm) | Evening (Calm) | Night (Inversion) |
|---|---|---|---|
| Residential | | | |
| R1 | 32 | 32 | 38 |
| Criteria | 51 LAeq(15 minute) | 48 LAeq(period) | 39 LAeq(period) |
| R2 | <30 | <30 | 31 |
| R3 | <30 | <30 | <30 |
| Criteria | 49 LAeq(15 minute) | 45 LAeq(period) | 45 LAeq(period) |
| Industrial | | | |
| I4 | 59 | 59 | 62 |
| I5 | 57 | 57 | 61 |
| Criteria | 70 LAeq(period) | 70 LAeq(period) | 70 LAeq(period) |
| Hospital | | | |
| H6 | <30 | <30 | <30 |
| Criteria | 50 LAeq(period) | 50 LAeq(period) | 50 LAeq(period) |

**Sleep disturbance**

Noise modelling quantified the levels from maximum night time events at the facility. Table 8-11 below provides the results of sleep disturbance modelling for the morning shoulder and shows that all sleep disturbance goals will be met.

**Table 8-11: Maximum Noise Predictions**

| Location | Predicted Maximum Noise Level LAmax, dBA | | Criteria (dBA) |
|---|---|---|---|
| | Calm Weather | Enhancing Weather | |
| R1 | 35 | 41 | 58 |
| R2 | <30 | 30 | 55 |
| R3 | <30 | <30 | 55 |

**Traffic Noise**

Road traffic noise impacts have been estimated based on the predicted increase in truck numbers to and from the facility. The United States Environmental Protection Agency's road traffic calculation method was used to predict the LAeq noise levels from site trucks travelling past receivers along Industrial Drive and Nelson Bay Road at a distance of 15 metres from the roadway.

The day time LAeq(15hour), prediction for the exiting situation is 57 dBA. The predicted increment for the increased traffic due to the project is 50 dBA, which will generate a total of 58 dBA when added to the existing situation. This total is within the criterion of 60 dBA.

The night time LAeq(15hour), prediction for the exiting situation is 54 dBA. The predicted increment for the increased traffic due to the project is 47 dBA, which will generate a total of 55 dBA when added to the existing situation. This total is within the criterion of 55 dBA.

### 8.3.4 Mitigation Measures

Given that noise modelling shows that there will be no exceedances of project specific noise levels, no effects on sleep disturbance, and no exceedance of road traffic noise criteria due to the Project, no additional mitigation measures are proposed. A noise management plan will be prepared as part of a site operations plan to detail the various operational arrangements and monitoring procedures.

## 8.4 Flooding

### 8.4.1 Existing Environment

Flood prone land is defined as that which is susceptible to flooding by either the 1% annual exceedance probability levels (1% AEP) or the probable maximum flood (PMF). The 1% AEP level is equivalent to a 1 in 100 year flood level. The PMF is the largest flood that could conceivably occur at a particular location and is estimated from probable maximum precipitation coupled with the worst flood-producing catchment conditions.

The site is above the 1% AEP predictions in the Newcastle Floodplain Risk Management Study (Map Series 2) (BMT WBM, 2012). This same report categorises the site as flood fringe, with regard to PMF. Flood fringe is the least severe of the categories analysed and is defined as "*Land that may be affected by flooding but is not designated as a floodway or flood storage"*.

A flood information certificate obtained from Newcastle City Council (No.2014/227) confirms that the site is not affected by the estimated 1% AEP level. Additionally the certificate notes the following PMF level estimates:

- 3.4 m AHD from ocean flooding, which includes a sea level rise relative to 1990 mean sea levels of 900 mm by 2100; and
- 4.5 m AHD from Hunter River flooding.

Surveys show that the site ranges in elevation from between approximately 4 and 6 m relative to Newcastle Harbour Tide Gauge Datum. Corrected to AHD, this equates to between 3 and 5m AHD. Given the PMF estimates in the Certificate No.2014/227, the site (and most of Kooragang Island) would flood in a PMF event. However as previously stated, the Newcastle Floodplain Risk Management Study regards the site as flood fringe, the least severe of flooding categories.

### 8.4.2 Impacts

The PMF flood fringe designation means that while the land might flood, the land does not convey the majority of flood flows. In fact BMT WBM (2012) notes that "*Flood fringes are non-floodway areas that, if filled, would not have a significant impact on flood levels, velocities or flowpaths."* In other words, the presence of stockpiles on the site will not significantly impact on flood behaviour. It is worth noting that much of Kooragang Island, including the very large coal stockyards are similarly designated as flood fringe, and that accordingly the adjacent very large coal stockpiles are similarly presumed to not significantly affect flood behaviour.

The proposed development is not expected to change the level, behaviour, or frequency of floods.

## 8.5 Water Management

A detailed water impact assessment prepared by SLR Consulting (2015) is provided at Appendix 8 and informs this section.

### 8.5.1 Objectives and Criteria

Site water management was assessed to consider the potential soil and water impacts associated with the Proposal, and to consider the efficacy of existing water management controls and procedures, and how they may need to be modified for the Project. The assessment of site water management aimed to comply with the SEARs and specific requirements of the Port of Newcastle, NSW Office of Water, Environment Protection Agency and Newcastle Council.

The following relevant legislation, policies and guidelines were considered as part of this assessment:

- *Water Management Act 2000* and *Water Act 1912*;
- Greater Metropolitan Region Unregulated River Water Sources (2011);
- *Protection of the Environment Operations Act 1997*
- Managing Urban Stormwater: Soils & Construction (NSW Government, 2004)
- State Environmental Planning Policy (Exempt and Complying Development Codes) 2008;
- National Water Quality Management Strategy, Department of Environment, Australian Government, 1992;
- NSW State Rivers and Estuaries Policy, NSW Government 1993; and
- Newcastle City Council Stormwater and Water Efficiency for Development - Technical Manual, 2013.

### 8.5.2 Existing Hydrology and Hydrogeology

The site is wholly within the Hunter River catchment and is located on land between the north and south arms of the River. The South Arm is approximately 150 m from the edge of the Boral landholding and an excavated drain (known as the North South Drain) flows along the western site boundary to the South Arm. The North South Drain is fed by parts of the Boral Cement site and parts of the NCIG and PWCS coal loaders via another constructed channel, known as the West East Drain.

NSW Office of Water records indicate eight licenced bores within 500 m of the site, including one operated by Boral Cement (GW200456 on Figure 8-4). The spear point GW053226, on the Boral Recycling site (adjacent to the concrete lined basin) was previously licenced for process water purposes, although the licence was inadvertently allowed to lapse.


| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Title:** | Water Management | | | **Figure No:** | 8-4 | | | **Date:** | 10 Dec 2015 |
| **Location:** | Kooragang Island, NSW Australia | **Author/ Reviewer:** | LI/MS | **Version No:** | V01 | **Map/ DWG No:** | **1** of **1** | **Job Ref:** | 11200 |


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SLR installed two groundwater monitoring bores as part of the current investigations (see R1 and C2 on Figure 8-4). Standing water levels at these and GW200456 and GW053226 were relatively flat, ranging from 2.53 and 2.62 mAHD on the day of monitoring. Groundwater flow gradient is expected to be southerly, towards the Hunter River South Arm.

### 8.5.3 Current Water Management

The Boral Recycling portion of the site is relatively porous and rainfall that does not soak into the ground or stockpiles, mostly runs off towards a series of stormwater ponds that eventually overflow into a concrete lined basin via a narrow infiltration trench on the northern boundary (see Figure 8-4). There are vegetated bunds along the northern, western and southern perimeters of the existing Recycling Facility.

Runoff from a small portion of the Boral Recycling site, around the office and weighbridge, drains towards Egret Street.

Runoff from the Origin Energy site flows across grassland generally to the southeast into an excavated infiltration system known as the Central Drainage Feature that also accepts piped and overland flows from the northern part of the Boral Cement site. Personal communications from the site environmental managers indicates that the Central Drainage Feature does not overflow, likely due to the apparently high infiltration rate of the Feature itself and low runoff rates from the site.

Toilet wastes from the Recycling Facility are collected in a septic tank and periodically pumped out for disposal.

The concrete lined basin in the northwest corner of the site has not been known to overflow, presumably due to the relatively high site infiltration rate, evaporation from the basin surface, and the regular drawdown for process water. The basin provides process water for dust suppression and the wheel wash, and is topped up as required from the spear point installed at GW053226. Boral monitors pH and electrical conductivity in the basin and results are provided in Table 8-12 . While the water is highly alkaline and brackish, it has not overflowed and so cannot be considered to reflect discharge water quality. The 90$^{th}$ percentile pH value (8.81) is outside of the Managing Urban Stormwater Harvesting and Reuse (DEC, 2006) pH criteria for public health risk management (6.5-8.5) for a controlled public access industrial site.

Table 8-12: Water quality summary

| Parameter | pH | Electrical Conductivity (µS/cm) |
|---|---|---|
| Minimum | 6.70 | 1,569 |
| Mean | 7.87 | 10,263 |
| Maximum | 9.24 | 16,840 |
| 10 Percentile | 7.08 | 4,965 |
| 50 Percentile | 7.68 | 11,250 |
| 90 Percentile | 8.81 | 15,075 |

### 8.5.4 Analysis Methodology

SLR conducted RAFTS modelling in DRAINS to predict which design storm event would lead to offsite discharges from the Project site for the following scenarios:

- Scenario 1: Existing operations;
- Scenario 2: Project operations without mitigation measures; and
- Scenario 3: Project operations with mitigation measures to meet the stormwater quantity design criteria.

Appendix 8 provides full details of the model assumptions, but in essence, estimates were made to conservatively define site characteristics such as initial infiltration rates, continuing infiltration rates, and fractions of the site that are impervious. Drillers logs of material encountered during installation of groundwater monitoring bores provided sub-soil characteristics, while topography and dam overflow elevations were obtained from survey.

### 8.5.5 Hydrological Analysis Results

The results of hydrological modelling are provided in Table 8-13, which shows that in the current situation (Scenario 1), the water management system would overflow during rain in excess of a 10 year 24 hour event.

Table 8-13 also shows that the Project expansion without additional mitigation (Scenario 2) would cause discharges for rain in excess of a 2 year 30 hour event. Predicted Project overflows would not meet Newcastle City Council's stream erosion index and post development peak flow rate requirements, and so mitigation measures were developed as outlined detailed in Section 8.5.8. Modelling shows that with these measures (Scenario 3) the Project area will discharge only during rain in excess of a 20 year 72 hour event. Additionally, Table 8-13 shows that peak discharges during 100 year 72 hour events will be less than the equivalent existing peak flow rate.

The mitigated results (Scenario 3) meet Newcastle City Council's stream erosion index and post development peak flow rate requirements.

**Table 8-13: Hydrological impact modelling results**

| Design Rainfall event (ARI) | Scenario | 2 year | 10 year | 20 year | 100 year |
|---|---|---|---|---|---|
| Peak flow rate ($m^3/s$) | Scenario 1 | 0 | 0.06 | 0.07 | 0.17 |
| | Scenario 2 | 0.06 | 0.16 | 0.20 | 0.26 |
| | Scenario 3 | 0 | 0 | 0.07 | 0.13 |
| Peak water level (mAHD) | Scenario 1 | 4.40 | 4.45 | 4.47 | 4.50 |
| | Scenario 2 | 4.44 | 4.49 | 4.51 | 4.53 |
| | Scenario 3 | 4.57 | 4.89 | 4.95 | 4.98 |
| Minimum storm duration for overflows to occur (hours) | Scenario 1 | No overflow | 24 | 18 | 9 |
| | Scenario 2 | 30 | 9 | 6 | <4.5 |
| | Scenario 3 | No overflow | No overflow | 72 | 24 |

### 8.5.6 Water Balance

The concrete lined basin is crucial to the Project's operation as it collects the majority of site runoff for settlement and provides process water. To assess how the expanded Project would increase process water demands, and to predict how often the basin would dry out if not topped up, SLR prepared a GoldSim site water balance for statistically dry, wet and median rainfall years, as summarised in Table 8-14. The water balance model allowed for local rainfall, water sprays, water cart, evaporation, runoff, soakage and loss of storage capacity due to sedimentation.

Table 8-14: Water Balance

| Year | Water demand (mL) | Runoff (mL) | Overflows (mL) | Make-up demand (mL) | % demand met by runoff | Number of days basin is empty |
|---|---|---|---|---|---|---|
| **Existing (Scenario 1)** | | | | | | |
| Dry (25th percentile) | 17.41 | 8.16 | 0.04 | 9.66 | 45 | 148 |
| Median (50th percentile) | 13.56 | 8.54 | 0.77 | 6.79 | 50 | 118 |
| Wet (75th percentile) | 12.53 | 11.10 | 3.01 | 4.19 | 66 | 85 |
| **Project (Scenario 3)** | | | | | | |
| Dry (25th percentile) | 23.67 | 11.12 | 0.62 | 13.78 | 41 | 157 |
| Median (50th percentile) | 18.41 | 11.62 | 1.86 | 9.64 | 47 | 126 |
| Wet (75th percentile) | 16.99 | 15.12 | 5.28 | 6.95 | 59 | 108 |

The analysis presented in Table 8-14 shows that the Project would require more make-up water than the existing facility, a deficit that will be provided by the spear point adjacent to the concrete lined basin, or by town water as required.

### 8.5.7 Water Quality Analysis Results

Testing of the newly installed monitoring bores showed the waters to be neutral (pH 6.9 to 7.2) and brackish (up to 4,900 µS/cm conductivity). Polycyclic aromatic hydrocarbons levels were above reporting limits, a finding which is not unexpected on Kooragang Island. Poly aromatic hydrocarbon (PAH) levels were 84 µg/L and 45 µg/L in wells R1 and C2 respectively. Low levels of total recoverable hydrocarbons (TRH fraction C10-C16) were also recorded above the reporting limits with results of 140 µg/L and 93 µg/L in wells R1 and C2 respectively. Heavy metal concentrations were generally below the adopted Ecological Groundwater Investigation Levels for fresh and marine waters in both monitoring wells with the exception of zinc which exceeded the levels for fresh and marine waters at monitoring wells R1 and C2.

No Ecological Groundwater Investigation Levels exist for PAH or TRH however given their presence in the groundwater, the use of groundwater to top up the concrete storage facility may pose a risk to site operatives and visitors through inhalation of the dust suppression water aerosols. The 90 percentile pH of the water in the concrete lined storage dam is outside the public health risk management criteria (DEC, 2006) and to avoid unnecessary exposure, mitigation measures outlined in Section 8.5.8 will be applied.

### 8.5.8 Management and Mitigation Measures

For the Project to meet various requirements, the following mitigation measures are required and were modelled in Scenario 3:

- Two new infiltration basins designed for a 100 year ARI event as shown in Figure 8-4 to capture and infiltrate runoff;
- Raising the ground levels to the west of the weighbridge and sealing the block wall to the south west of the weighbridge up to a minimum level of 4.9 m AHD to effectively create a flood bund which will increase flood storage onsite.
- The vegetated bunds around the northern and western boundaries will be maintained at all times to prevent runoff from draining away to the north or west.
- Water proposed to be reused onsite will be tested and compared against the public health risk management criteria (DEC, 2006) and the adopted Ecological Groundwater Investigation Levels criteria. If the water quality exceed these criteria, water of a suitable quality will be added for dilution. Untreated water exceeding criteria will not be reused onsite.
- A sediment trap as shown on Figure 8-4**.**

With these control measures in place, the reuse of stormwater for dust suppression and wheel wash water will pose a low risk to the environment and worker health.

The two new proposed infiltration basins have been sized according to the estimated catchment runoff and hydraulic conductivity based on drill log observations. Basin 1 (see Figure 8-4) will have a base area of 415 $m^2$ and Basin 2, a base area of 870 $m^2$. Maximum water depth will be 1.3 m with a batter slop of 1V:4H. The base of each basin will be 0.8 m above the highest groundwater measured during current investigations.

Other proposed management measures are:

- Re-licencing of the spear point bore, GW053226.
- Low levels of TRH and PAH have been recorded in site groundwater. A Process Water Management plan will be prepared post-approval to manage the safe use of groundwater in the process water circuit. The plan will consider aspects such as water spray aerosol size, exposure pathways, dosages and mitigation measures.

### 8.5.9 Conclusion

With modelled and proposed mitigation measures, the Project will:

1. Result in no increase in peak discharge rates up to and including 100 year 72 hour events.
2. Retain all stormwater on site up to an including 20 year 48 hour events.
3. Meet Newcastle City Council's stream erosion index and post development peak flow rate requirements.
4. Allow the Boral Cement and Origin Energy sites to continue to operate unaffected.

The site will discharge water during storm events above the design criteria, but given that this would occur when other parts of Kooragang Island and the Hunter River itself would be experiencing high flows, the site discharges are unlikely to measurably impact on River water quality or quantity.

The Project peak discharge rates will not cause measurable changes to flood behaviour on adjacent properties.

## 8.6 SEPP 33

### 8.6.1 Methodology

The Hazardous and Offensive Development Application Guidelines, *Applying SEPP 33* (Planning NSW 2011) methodology was used to prepare a screening test for the Project.

### 8.6.2 Findings

Applying *SEPP 33* requires that both on site storage and transportation to and from site is considered. No dangerous goods are stored on site and therefore no thresholds are triggered for on-site storage.

Table 8-15 provides the categories of dangerous goods transported to site, along with their threshold levels. There are no thresholds triggered for transport.

**Table 8-15: Hazardous Materials Transported To Site**

| Material | Dangerous Goods class | Code packing group | Loads per week/year | Threshold | Threshold triggered? |
|---|---|---|---|---|---|
| Diesel | 3 | iii | 5/260 | >60/>1000 | no |

Based on the screening tests provided in Table 8-15, the proposed development is not considered a potentially hazardous industry and therefore no further consideration of SEPP 33 is required.

### 8.6.3 Mitigation Measures

The following controls will be implemented as part of the Project:

- The Project will not store hazardous materials in the Australian Dangerous Goods Code or NSW Planning-Storage and Handling of Dangerous Goods Code of Practice 2005;
- An Emergency Response Plan will be developed, maintained and implemented;
- Mobile plant and vehicles will be fitted with fire extinguishers; and
- The existing EPL 11968 will be maintained and modified as required.

## 8.7 Biodiversity

### 8.7.1 Methodology

The SEARs outlined that a biodiversity assessment should be prepared in accordance with the Framework for Biodiversity Assessment (FBA) process by an accredited person, and targeted surveys as specified by OEH. No specific targeted surveys have been required by OEH.

The majority of the site has been extensively disturbed and is currently used as an approved waste recycling facility, cement facility and gas terminal. It has little ecological value. The proposed stockpile extension area, like the rest of Kooragang Island, is reclaimed land formed primarily of sand from river dredging. Most of the extension area is mowed exotic grassland, existing worksite, or a drainage area that contains landscape plantings.

The intensity of biodiversity assessment reflects the high level of disturbance to the site. The biodiversity assessment has been written within this section of the EIS rather than as a stand-alone Biodiversity Assessment report due to the simplistic and disturbed nature of the site. It has been prepared by an accredited person (Principal Ecologist Toby Lambert – Accreditation Number 0034) in accordance with the specification of the SEAR's.

This EIS section includes consideration of:

- "Field survey methods" as outlined on the OEH website;
- The draft "Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities" (Department of Environment and Conservation 2004);
- Threatened Species Survey and Assessment Guidelines: field survey methods for fauna – amphibians (Department of Environment and Climate Change 2009);
- BioBanking Assessment Methodology 2014 (OEH 2014a);
- Framework for Biodiversity Assessment (OEH 2014b);
- BioBanking Assessment Methodology and Credit Calculator Operational Manual (DECC 2009a) and the current draft revision as updated for the FBA;

- Assessors Guide to Using the BioBanking Credit Calculator v.2 (OEH 2012);
- Policy and Guidelines for Fish Habitat Conservation and Management Update 2013 (Department of Primary Industries 2013);
- NSW State Groundwater Dependent Ecosystems Policy (DLWC 2002);
- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- NSW *Environmental Planning and Assessment Act 1979* (EP&A Act);
- NSW *Threatened Species Conservation Act 1995* (TSC Act); and
- NSW *Fisheries Management Act 1994* (FM Act).

A review of ecological studies and various databases (NSW Bionet, Threatened Species, Populations, and Ecological Communities of NSW, Spatial Information Exchange, and Commonwealth Protected Matters search tool) provided a list of threatened species, populations, ecological communities, and invasive species that had been previously reported, known or predicted to occur on or adjacent to the PAA.

### 8.7.2 Field Investigations

In 2014, SLR Consulting ecologists conducted a desktop review and inspection of the site for the potential presence of threatened species and ecological communities. A particular focus was the Green and Golden Bell Frog (*Litoria aurea*) and whether potentially suitable habitat existed for this species, which is listed as endangered under both the *Threatened Species Conservation Act 1995* (TSC Act) and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

SLR found that the central drainage feature, "*lacked the minimal dampness levels preferred by this species for movement between habitats. During periods of higher rainfall it is possible that individuals of this species could utilise the drainage feature whilst foraging, however, movement and dispersal of adult frog along the drainage feature is unlikely*..."

SLR also noted that the central drainage feature contained "*no areas that would constitute suitable breeding habitat for the Green and Golden Bell Frog… and would represent only marginal foraging habitat during high rainfall. In addition there is no aquatic emergent vegetation or shelter material such as rubble or debris, which is used as for shelter (or 'over-wintering') during cold months. A small retention basin in the southern corner of the facility…..may represent some marginal habitat ….although the presence of this species at this location is unlikely."*

In addition, SLR ecologists noted that *"Whilst Kooragang Island does contain a known population* [of the Green and Golden Bell Frog]*, there are very few records of individuals at the eastern end of the island or close to the Boral cement facility (NSW Bionet, 2014). Additionally, recent surveys and mapping of Kooragang Island as part of the T4 Environmental Assessment …… indicate that there are no areas of breeding habitat and no recent records for Green and Golden Bell Frog near the Boral facility."*

EPS's Principal Ecologist Toby Lambert subsequently undertook a further site inspection to validate SLR's preliminary advice and to determine whether additional detailed field investigations were required. This inspection was undertaken on 25 February 2015 and involved a detailed walkover, focusing on the constructed central drainage feature. Searches for the Green and Golden Bell Frog were also undertaken where any microhabitat features were observed. This inspection concluded that additional ecological investigations were not required owing to the absence of any native or remnant vegetation communities in the PAA. While a small artificial drainage line and associated shallow infiltration pit was observed to contain some native plants, these had most likely been planted when the drainage line had been constructed, or had grown into the drainage line from the surrounding disturbed environs.

### 8.7.3 Existing Environment

**Flora and Vegetation Description**

The entire site is situated on dredged materials. No native remnant vegetation communities are present on the site.

The majority of the site is occupied by stockpiled materials or recycling plant and infrastructure. The only area of the site that contained any semblance of native vegetation was along the constructed central drainage feature. In this location, a mixture of planted native and exotic flora was found. The area had been previously planted with *Acacia* spp. such as *Acacia sophorae* (Coast Wattle) and *Acacia saligna** (Golden Wreath Wattle), which was growing to a height of approximately 3 – 5 metres in some areas. Occasional individual planted *Callistemon* spp. and *Casuarina glauca* (Swamp Oak) and a small number of juveniles of these also were observed. A single planted *Eucalyptus* sp. was also observed.

Apart from these planted native shrubs and small trees, the vegetation along the central drainage feature was dominated by exotic species such as *Pennisetum clandestinum** (Kikuyu*), Andropogon virginicus** (Whisky Grass), *Chrysanthemoides monilifera* subsp. *rotundata** (Bitou Bush), *Chrysanthemoides monilifera* subsp. *monilifera** (Boneseed), *Opuntia stricta* var. *stricta** (Common Prickly Pear), *Nicotiana glauca** (Tree Tobacco), *Verbena bonariensis** (Purpletop), *Bidens pilosa** (Cobbler's Pegs), *Ricinus communis** (Castor Oil Plant) and *Foeniculum vulgare** (Fennel).

No threatened flora species were observed or considered likely to occur due to the high level of disturbance and weed invasion, and due to the absence of natural topsoil that would otherwise potentially provide a native seedbank.

**Habitats and Connectivity**

Habitat quality is generally poor. A majority of the site contained stockpiled materials or associated infrastructure, which provided virtually no habitat for native flora and fauna species.

The constructed central drainage feature provided an isolated habitat refuge for common species of native fauna. No significant habitat features such as tree hollows, rocky areas, native structure layers of vegetation or wetland / riparian environs were present. The native landscape plantings provided habitat for an assemblage of common native birds and potential habitat for a range of other native fauna. This included thick grass and exotic understorey, an Acacia shrub layer and some minor occurrences of occasional small logs and leaf litter. Highly mobile native species such as Microchiropteran bats could potentially forage in this area, although this habitat would be of low importance due to its isolation and simplistic nature.

The central drainage feature is generally isolated from any natural environments, being within a highly industrialised area. No connectivity exists to any substantive areas of natural habitats, with the flows from the drainage area passing along a constructed large north – south open drain (outside of the site) and ending in ship loading areas with no important aquatic habitat values. The central drainage feature has a storm water release valve and anecdotal observations from the site supervisor indicate that water infiltrates very easily in this location and that the valve is not known to have been opened. It is expected that this high infiltration also results in a lack of ponded water, reducing aquatic habitat quality for native species such as Green and Golden Bell Frog. In addition the central drainage feature is disconnected from the larger external drainage channel by a rail track, and a mown and fenced site boundary.

No groundwater dependent ecosystems are present within the site.

No threatened fish under the *Fisheries Management Act 1994* have suitable habitat on the site.

The site does not provide suitable habitat for species requiring special consideration such as the Koala.

Plate 5 to Plate 8 provide a series of photographs of the habitats in the vicinity of the constructed central drainage feature.

**Plate 5 – The lower (western) end of the infiltration area with planted Acacia to the left of the plate.**

**Plate 6– The low (western) point of the constructed central drainage feature, with regulated storm water release valve in centre of the plate.**

**Plate 7 – The low (western) point of the constructed centrail drainage feature, with regulated storm water release valve on right and exotic Castor Oil plant along centre of drainage line.**

**Plate 8– Small drainage pond/depression at the eastern end of the constructed centrail drainage feature.**

**Fauna**

Due to the highly disturbed nature of the site, extensive fauna surveys were not considered to be required. The ecological inspection resulted in a small number of native birds being recorded, including:

- Willy Wagtail;
- Grey Fantail;
- Silvereye;
- Australian Raven;
- Superb Fairy-wren;
- Welcome Swallow;
- Crested Pigeon;
- Australian Magpie-lark;
- Australian Magpie; and
- Masked Lapwing.

A common Garden Skink (*Lampropholis delicata*) was also recorded at the edge of the central drainage feature in long grass.

No other fauna were recorded and it is unlikely that the site contains any important habitat for threated species listed under the EPBC Act, TSC Act or FM Act.

### 8.7.4 Impacts

**Threatened Flora Species**

No detailed impact assessments were completed for any threatened flora species as no suitable habitat was present for threatened flora, and none were recorded. No further assessment is required under the TSC Act or EPBC Act.

**Threatened Ecological Communities**

No detailed impact assessments were completed for any threatened ecological communities as no suitable habitat is present for any threatened ecological community, and none were recorded. The only native plants recorded were in the constructed central drainage feature, and these had been planted as part of landscaping. This area did not display any affinities to naturally occurring threatened ecological communities. No further assessment is required under the TSC Act or EPBC Act.

**Fauna**

Due to the presence of a known Green and Golden Bell Frog population on Kooragang Island, a precautionary 7 part test has been completed and is contained at Appendix 9. The Green and Golden Bell Frog population is isolated from the site by coal stockpiles and general industrial infrastructure. The 7 part test concludes that it is unlikely that the Green and Golden Bell Frog is present on the site, and that even if it were, the impacts of the Project upon this species are unlikely to be significant.

No other threatened fauna species have been subject to further detailed impact assessments under the TSC Act or EPBC Act due to the absence of any habitat that could be considered to be important for threatened fauna.

### 8.7.5 Mitigation Measures

The previous information forms all of Stage 1 and the first part of Stage 2 of the required FBA process. Stage 2 also requires consideration of avoidance of direct and indirect impacts to biodiversity and where such impacts cannot be avoided or minimised, biodiversity offsetting to be implemented.

The avoidance and minimisation of direct and indirect impacts to biodiversity for the Project is not strictly warranted, due to the absence of any remnant native vegetation or important habitats on the site.

As the Project will not impact upon any native vegetation communities, the FBA indicates in Section 9.4 and 9.5 that an offset is not required to be determined or provided. No offsets are proposed to be provided for the Project and as such "Stage 3 - Biodiversity Offset Strategy" of the FBA process is not required to be enacted.

No specific biodiversity mitigation measures are proposed, although the water management mitigation measures outlined in Section 8.5.8 will provide protection for downstream environments.

## 8.8 Greenhouse Gas

### 8.8.1 Methodology

This GHG assessment includes the National Greenhouse Accounts (NGA) Factors, Scopes 1 and 2.1. Scope 3 emissions were considered for the transport of materials to and from the site.

The Australian Government Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education (DIICCSRTE) "National Greenhouse Accounts Factors" Workbook (NGA Factors) (DIICCSRTE, 2014) define two types of greenhouse emissions, direct and indirect. This assessment considers both the direct and indirect emissions associated with the Project.

### 8.8.2 Impact

Table 8-16 and Table 8-17 outline the GHG emission inventories for Scope 1, 2 and 3. Factors and fuel consumption rates used are as follows:

- Scope 1 increased usage factor of 2 allows for the increase in production proposed and therefore diesel fuel consumption of fixed and mobile plant;
- Scope 2 has no increased usage factor as purchased electricity currently supplies the office and weighbridge, consumption of which will not increase as a result of the project;
- Diesel fuel energy content factor and emissions factors are all sourced from NGA Factors 2014;
- Average diesel fuel consumption of trucks (Scope 3) has been estimated at 28.7 l/100 km as per ABS 2013 for rigid trucks. This average allows for a variety of trucks such as larger articulated trucks and smaller rigid vehicles; and
- Average trip lengths have been estimated based on current and projected markets.

**Table 8-16: Scope 1 & 2 GHG Emissions**

| | Annual usage | Increased usage factor | Proposed usage | Energy factor (GJ/kL) | Energy content | Emission factor ($kgCO_2$-e) | Emissions ($tCO_2$ e/pa) |
|---|---|---|---|---|---|---|---|
| Scope 1 | | | | | | | |
| diesel (kL) | 228 | 2 | 456 | 38.6 | 17,615 | 69.5 | 1,224 |
| Scope 2 | | | | | | | |
| electricity (kWh) | 5 | 1 | 5 | na | na | 0.86 | 4 |

Table 8-17: Scope 3 GHG Emissions (diesel)

| Annual movements | Trip length | Annual consumption | Energy content factor (GJ/kL) | Energy content | Emission factor ($kgCO_2$-e) | Emissions ($tCO_2$-e /pa) |
|---|---|---|---|---|---|---|
| 92,000 | 15 | 396 | 38.6 | 15,288 | 69.5 | 1,063 |

Scope 1, 2 and Scope 3 GHG emission estimates are predicted to be 2,291 $tCO_2$-e. This is 0.0004% of the national annual GHG production of 542 Mt $CO_2$-e.

Recycling waste has benefits from an energy and greenhouse perspective. In 2010 the then Department of Environment Climate Change and Water prepared a report titled "Environmental Benefits of Recycling". Table 4 of that report quantifies the net benefits of recycling specific segregated wastes delivered to materials re-processors. For example, recycling 100,000 tonnes of concrete waste would save 35,000 Gj of energy consumption and 128,000 kL of water, which would mean that 2,000 $tCO_2$-e of GHG will not be released into the atmosphere. This greenhouse gas saving equates to taking nearly 500 cars off the road, or replacing the energy used by over 1600 households.

Different waste types have different GHG, energy and water savings factors when recycled and as the actual quantities and types of wastes to be received by the Project are subject to change due to supply and demand, an accurate calculation of savings cannot be easily made. Table 8-18 provides an estimate of potential savings, based on some assumed quantities of three key waste types.

Table 8-18: GHG, Energy and Water Savings

| Waste type | Waste recycled (tpa) | GHG ($tCO_2$-e) | | Energy (Gj) | | Water (kL) | |
|---|---|---|---|---|---|---|---|
| | | saving factor | GHG saved | saving factor | energy saved | saving factor | water saved |
| Concrete | 250,000 | 0.02 | 5,000 | 0.35 | 87,500.00 | 1.28 | 320,000 |
| Asphalt | 50,000 | 0.03 | 1,500 | 2.38 | 119,000 | 0.88 | 44,000 |
| Brick | 50,000 | 0.02 | 1,000 | 0.28 | 14,000 | 1.26 | 63,000 |
| Total | 350,000 | | 7,500 | | 220,500 | | 427,000 |

Table 8-18 shows that the total GHG savings due to the Project are three times the GHG generated by the Project. The savings equate to removing 1800 cars from the roads permanently and saving the energy required to power nearly 5,000 houses per year.

### 8.8.3 Mitigation Measures

Apart from the Project induced GHG savings, Boral will consider GHG emissions when selecting diesel and electrically powered plant, machinery and lighting.

## 8.9 Visual Amenity

### 8.9.1 Existing Environment

Key terms used in visual assessment are defined in Table 8-19.

**Table 8-19: Visual Amenity Key Terms**

| Term | Definition |
|---|---|
| Landscape Values | Landscape values may include biodiversity, geo-diversity, historic, and aesthetic values, as well as more personal values such as a person's associations, memories, knowledge or experiences of that landscape. |
| Landscape Character | The physical and cultural elements that differentiate one landscape from another. |
| Visual Significance | The weighting given to landscape values. Examples of different levels of significance are 'negligible', 'minor', 'moderate' and 'major'. |
| Visual Sensitivity | A measure of the level of concern attached by a user group to a change in the existing landscape. It is largely determined by visibility and the distance from viewing areas, but is also influenced by the disposition of the viewer to development of this type. |

The methodology for investigating the visual impact of the Project involves consideration of the landscape values, the visual sensitivity and the potential visual change.

Particular combinations of the current landform, vegetation and existing development create landscape character. The following section provides a description of the existing landscape and environment of the Project site and surrounding areas.

**Landform**

The landform of the Project site is flat, with an elevation of approximately 5m AHD. The land to the north and west is flat for several kilometres. The land to the east and across the North Arm of the Hunter River is flat as far as the suburb of Stockton. The nearest elevated land to the east is the Stockton Centre, approximately 3 kilometres from the site.

To the south of the site, the land is flat to, and across the South Arm of the Hunter River, and for several kilometres. The first elevated land towards Newcastle is at Mayfield Heights approximately three kilometres the southwest.

**Vegetation**

The Project site and most of the southern part of Kooragang Island is devoid of woody vegetation and in fact most is covered in coal stockyards, railway lines, and other industrial facilities. A double row of woody vegetation, parallel with Egret Street, has been planted alongside the Boral land. Some tall shrubs and weeds occur in the southern part of the expansion area.

The northern part of the Island consists mostly of intertidal wetlands of international significance.

**Land Use**

The site and adjacent lands are heavily industrialised. Figure 2-2 shows the immediately adjacent industrial facilities, which along with other nearby facilities include:

- Newcastle Coal Infrastructure Group coal stockyard with five coal stockpiles approximately 1,200 metres long and 25 metres high (the stockpile pad is 4 m high and the coal stockpile itself nominally 21 m high), 4 stacker-reclaimers and associated conveyor systems to the ship loaders;
- Port Waratah Coal Services Kooragang coal stockyard which has four 2,600 m long stockpiles, 3 rail dump stations, 6 stackers, 4 reclaimers and conveyor systems to the ship loaders;
- Boral's concrete batch plant, with two cement silos approximately 20 metres tall;
- Boral's cement and clinker store, with several large buildings up to 90 metres long and 30 metres tall, as well as associated silos, conveyors and a railway spur;
- Origin Energy gas decanting facility, with both underground and surface infrastructure;
- BOC industrial gas facility, with numerous above ground tanks and pressure vessels;
- Incitec Pivot's bulk distribution centre;
- Cleanaway's truck and skip bin storage facility;
- Transpacific Technical Services Centre, consisting of one large industrial building and associated yard; and
- Cargill Australia's Oilseed Processing plant for oil refining and stock feed manufacturing, consisting of numerous buildings, silos, conveyors and stacks.

The land to the east of the site includes the industrial facilities on Walsh Point, which is the site of several large industrial complexes such as the Orica chemical plant, Incitec Pivot's primary distribution centre, Patrick's stevedoring facility, and various bulk storage and ship loading/unloading docks. Across the North Arm of the Hunter River is the suburb of Stockton.

To the south of the site, in order of distance, is Boral Cement's storage facility and large warehouse, a petrol station under construction, Cormorant Road, Kooragang coal loaders, South Arm of the Hunter River, BHP remediation site, Port Waratah Coal Services Carrington coal stockyard, the BP fuel terminal and the suburb of Maryville.

Plate 1 provides a general view of the site, with recycling materials stockpiles in the foreground and NCIG stockpiles and stacker reclaimer in the background. Plate 2 provides the view towards the site from Cormorant Road, with the Boral Cement facility visible to the left and the service station under construction in the foreground. The cluster of trees in the middle are between the view point and the Project site. Plate 4 shows the view from Egret Street towards the Project site. The screening vegetation is between the viewpoint and the site.

The nearest residential area to the Project site is Mayfield East, a little over two kilometres to the south-southwest.

**Scenic Quality**

To quantify the scenic significance of the study area, the visual quality of the landscape is summarised in Table 8-20. This table provides a landscape visual quality rating for a number of landscape characteristics when viewed from the areas immediately adjacent the Project site. The applicable qualitative ratings of the Project site are shaded light grey.

The rating is divided into low, moderate and high. Each characteristic has a series of criteria to define an appropriate rating for scenic quality. Higher scenic quality is generally associated with variety, uniqueness, prominence and naturalness of landform, vegetation and water form. Lower scenic quality is generally associated with urban and industrial land uses.

Not surprisingly given the industrial nature of the site, Table 8-20 indicates that the visual quality is low.

Table 8-20: Visual Quality

| | Low | Moderate | High |
|---|---|---|---|
| Relief | Flat terrain dominant. | Undulating terrain dominant. | High hills in foreground and middle ground. |
| Vegetation | One or two vegetation types in foreground. | 3 or 4 vegetation types in foreground. Few emergent trees. | High degree of patterning in vegetation. 4 or more distinct vegetation types. |
| Naturalness | Dominance of development. | Some evidence of development but not dominant. | Absence of development or minimal dominance. |
| Water | Little or no view of water. Water in background. | Moderate extent of water. | Dominance of water in foreground and middle ground. |
| Development | Commercial and industrial structures. Large scale development. Newer residential development prominent. | Established residential development. Small scale industrial development in middle ground. | Rural structures, heritage buildings and other structures apparent. Isolated domestic structures. |
| Cultural | Area free of cultural landmarks. Presence of new development. | Established, well landscaped development, especially in middle ground and background. | Established, maintained landscapes, old towns and buildings etc. |

Footnote: The qualitative ratings for the Project site are shaded light grey.

### 8.9.2 Impact

**Scale and Dominance**

The scale of the Project in relation to the surrounding industrial landscape is minor. The proposed visual changes to the facility as approved are small, and will be absorbed by the industrial nature of the adjoining lands. The tallest planned structure, the silo, will be nominally 20 m tall, as will the maximum height of the stockpiles. The adjacent NCIG coal stockpiles are 25 m high and more than 1 km long and several adjacent silos and buildings are approximately 20 m tall.

The proposal will not be a visually intrusive feature of the landscape, and while it is potentially visible from elevated residential areas in Mayfield and other suburbs, it will sit within an overwhelmingly heavy industrial landscape.

Motorists travelling along the 80 km/hr signposted Cormorant Drive will not easily be able to see the Project site due to the intervening Boral Cement buildings, tall screening vegetation and the petrol station currently under construction. Egret Street is not a common commuter route and is mostly used by heavy vehicles and staff accessing various industrial business, including Boral Recycling. While these road-users cannot be considered to be sensitive to industrial land uses, in any event, the double row of tall shrubs along the Egret Street boundary of the site will filter views of the facility.

The development will have a low visual dominance and will be little different to the existing facility.

**Visual Sensitivity**

Visual sensitivity is a measure of the level of concern attached by a user group to a change in the existing landscape. It is largely determined by visibility and the distance from viewing areas, but is also influenced by the disposition of the viewer to development of this type.

Importantly, the scenic quality of the Project site and surrounding area is low and the Project will not transform the visual character, nor does it represent a major change to the local perception of the surrounding area.

The site is some distance from potential residential viewpoints, which significantly reduces the sensitivity of any changes.

### 8.9.3 Mitigation Measures

To ameliorate the visual impact of the Project, the following mitigation measures will be adopted:

- The double row of shrubs along Egret Street will be retained;
- The proposed silo will be painted in subdued colours; and
- Stockpiles will be kept to a maximum height of 20 m above constructed ground level.

# 8.10 Geology, Soils and Contamination

## 8.10.1 Geology and Soils

The site and most of Kooragang Island consists of artificial fill over what was a series of intertidal mudflats. The fill primarily consisted of steel making slag and dredging spoil from river channel maintenance and shipping berth construction. The surface material at the site is medium sand with scattered shells.

Acid sulphate risk maps in the Newcastle LEP do not indicate that the site has potential or actual acid sulphate soils. However, it is probable that the original material underneath the fill is potentially acid sulphate. No dewatering will occur during construction, which will be limited to minor excavation for the infiltration basins and the spreading and compaction of recycled aggregates for roadways and manoeuvring areas. Excavation will be limited to well above the groundwater table and the likely occurrence of potential acid sulphate soils.

The site is flat and so erosion risks are generally restricted to material stockpiles. In the past, there has been some loss of materials into adjacent land and an adjacent drain owned by Newcastle Ports Corporation. To resolve this issue, Boral has recently commenced extending the vegetated bund, shown in Plate 4, around the western boundary. This vegetated bund will be continued around the extension area to prevent loss of stockpiled material into the Newcastle Ports Corporation drain.

## 8.10.2 Contamination

In 2001, as part of the EIS for the now approved operation, Environmental Resources Management Pty Ltd (ERM) prepared a preliminary assessment of the potential for contaminants to be present and reported on an assessment that involved a review of historical background information, a site inspection and interviews with site staff. The ERM report informs this section.

The report (ERM 2001) noted that there has been extensive reclamation of Kooragang Island with river dredging spoil that has led to the infilling of some channels and the raising of the land surface. The geology below the site comprises of the following:

- Sand fill material, fine to medium grained, light brown, medium dense and dry to saturated. This material was encountered from the surface to depth of 3.5 metres below ground level; and
- Sand, silty sand, clay, clayey sand, clayey silty sand alluvial material, fine to medium grained, grey, black to white to dark grey and black to light grey, very loose to dense and saturated. This material was encountered below the fill to depths greater than 11 metres below ground level.

The standing water table was found to be approximately two metres below the surface.

ERM (2001) found that while the original sources of fill used to construct Kooragang Island may have been impacted by unknown contaminants, the post construction land uses were not expected to have added further contaminants.

Since the 2001 ERM assessment, the recycling facility and adjacent Boral concrete batching plant have been built and operated. Given that the facilities have not installed fuel storage tanks nor accepted wastes with the potential to contaminate the ground or groundwater, no additional risk of contamination is apparent.

The Site is on artificial fill, comprising spoil and slag, deposited in reclamation of the south-eastern section of Kooragang Island over the last 70 years. Hydrocarbon odours were observed during the drilling of monitoring wells and toluene, PAH's, heavy metals and total recoverable hydrocarbons were detected during waste classification sampling of the drilling spoil. Construction of the infiltration basins will require the excavation of potentially impacted fills and so a Contaminated Materials Handling Protocol will be developed post-approval. The most likely outcome of the development of this protocol is that non-impact excavated material will either be used on site for construction, or blended for sale as part of the recycling operations. Any impacted material will be excavated, processed and disposed of appropriately.

Given that there is no proposed change in land use, and further given that the site will remain an industrial facility on an industrial island, no further contamination risk or assessment is required.

### 8.10.3 Mitigation Measures

The vegetated bund will be extended along the entire western boundary. Standard sediment and erosion controls will be implemented during construction and operations. A Construction Erosion and Sediment Control Plan and a Contaminated Materials Handling Protocol will be prepared post approval.

## 8.11 Heritage

### 8.11.1 Existing Environment

Kooragang Island was constructed by the extensive filling (with dredge spoil and blast furnace waste) of an area that previously consisted of a series of tidal mudflats and very low islands. The Boral site is on such fill and has been the site of subsequent industrial activity for many years. Accordingly there is an extremely low likelihood of in-situ Aboriginal artefacts on the site surface.

A search of the Environment and Heritage Aboriginal Heritage Information Management System for the site and a 1,000 m radius (conducted 19/03/2015) found that no sites have been recorded. The 2006 EIS prepared for NCIG Coal Terminal, reported that the closest recorded Aboriginal sites are near the northern approach to Tourle Street Bridge (2,800 metres from the Site), and on the right bank of the Hunter River North Arm in the Hunter Estuary National Park (1,800 metres from the Site). Both sites are on un-filled portions of the Island.

The potential for historical heritage items to exist on site is extremely low, as it is for Aboriginal heritage, due to the relatively recent construction of Kooragang Island and the occurrence of industrial activities in the area.

A search of the NSW State Heritage Register (19/03/2015) found one item on Kooragang Island, being the former 131 Radar Station, located on approximately 6 km to the northwest. A search of the NSW Office of Environment and Heritage online service for the relevant local environment plan and Section 170 Registers noted the following items on Kooragang Island, all near each other and at least 6 km northwest of the Site: the former 131 Radar Station; School Masters House; and Tongues Fig Tree.

### 8.11.2 Impact

No impacts are predicted to Aboriginal or historic heritage items or places.

### 8.11.3 Mitigation Measures

No heritage mitigation measures are warranted. In the unlikely event that any skeletal material be uncovered, Boral, in accordance with the *Coroner's Act 1980,* will cease work immediately within 50 m of the discovery, and will contact the NSW Police and NSW Coroner's Office. If the remains prove to be Aboriginal, Boral will consult with a heritage consultant, the relevant Aboriginal groups and relevant State Government Agency in the first instance.

# 8.12 Socio- Economic Impact

## 8.12.1 Methodology

The purpose of this socio-economic assessment is to identify any perceived or unintended negative social or economic outcomes.

The socio-economic impact methodology included a review of a number of data sources including:

- Demographic, economic and employment data from the Australian Bureau of Statistics (ABS);
- Relevant internet sites and academic publications to identify surrounding infrastructure, including community and Council websites, State Government websites and other relevant websites;
- Technical studies prepared as part of this EIS; and
- Background literature review on waste avoidance and resource recovery, including the impacts of recycling versus landfilling.

The objectives of the social and economic impact assessment were to:

- Establish baseline data for the existing social environment;
- Assess potential social impacts of the Project;
- Identify the key economic considerations for the local and regional economy;
- Identify the potential positive and negative economic impacts on the locality and wider Region; and
- Identify mitigation measures where required.

## 8.12.2 Existing Environment

**Social Demographic Profile**

The Project site is within the northern part of the Newcastle and Lake Macquarie ABS Statistical Area (level 4). The larger Hunter Valley Statistical Area adjoins the left bank of the Hunter River North Arm near Tomago. Both areas are relevant to the Project with respect to social demographics and regional context. Table 8-21 provides demographic details for both statistical areas compared against data for NSW as a whole.

Table 8-21: Social Demographic Profile

| Parameter | Newcastle and Lake Macquarie | Hunter Valley | NSW |
|---|---|---|---|
| Population | 342,605 | 243,248 | 6,917,658 |
| Median Age | 39 | 38 | 38 |
| Aged between 0 and 19 years | 24% | 28% | 26% |
| Aged between 20 and 54 years | 46% | 45% | 48% |
| Aged 55 and over | 29% | 28% | 26% |
| Separate detached house (% of total occupied dwellings) | 81% | 76% | 70% |
| Born outside Australia | 15% | 14% | 31% |
| Certificate, diploma, degree achieved (% of population over 15 years) | 39% | 48% | 45% |
| Indigenous status | 2.9% | 3.9% | 2.5% |

**Social and Community Infrastructure**

Kooragang Island is an industrial area, with very few dwellings of any type. ABS 2011 data suggest that there are 10 dwellings and 16 residents on the Island. It appears all are located on the western end, known as Ash Island, some 6 km from the Project site. There is little community and social infrastructure on the Island, apart from road networks and industrial logistics infrastructure.

The Newcastle City Council website states that there are no sport or recreational facilities, no childcare or schooling facilities, no library or medical services and no commercial centres located on Kooragang Island.

The majority of the local community and social infrastructure is within Newcastle itself or associated suburbs, which provide the usual range of such facilities. There are well developed facilities such as public and private schools, hospitals, aged care facilities, recreation grounds and parks, and sundry community facilities.

**Economic Demographic Profile**

Table 8-22 provides an overview of the key economic variables as compared with NSW, based on 2011 Australian Bureau of Statistics census data.

Table 8-22: Economic Demographic Profile

| Parameter | Newcastle and Lake Macquarie | Hunter Valley | NSW |
|---|---|---|---|
| Median family weekly income | $1,443 | $1,407 | $1,477 |
| Median weekly household income | $1,133 | $1,158 | $1,237 |
| Unemployed, looking for work | 5.5% | 5.3% | 5.9% |
| Median weekly rent | $265 | $240 | $300 |
| Median monthly mortgage | $1,733 | $1,733 | $1,993 |

**Employment**

Table 8-23 details employment by industry and shows that the regional average is significantly higher than the state average for mining, manufacturing and construction, and significantly lower than the state value for financial and insurance services, and health care and social assistance. These differences reflect the industrial nature of the Region, which is precisely the industry that the Project aims to support.

Table 8-23: Employment by Industry

| Industry | Lake Macquarie and Newcastle | Hunter Valley | Regional average | NSW |
|---|---|---|---|---|
| Agriculture, forestry and fishing | 0% | 3% | 2% | 2% |
| Mining | 4% | 9% | 6% | 1% |
| Manufacturing | 15% | 10% | 13% | 8% |
| Electricity, gas, water and waste | 3% | 2% | 2% | 1% |
| Construction | 13% | 8% | 11% | 7% |
| Wholesale trade | 4% | 3% | 3% | 4% |
| Retail trade | 8% | 11% | 9% | 10% |
| Accommodation and food services | 5% | 8% | 7% | 7% |
| Transport, postal and warehousing | 6% | 4% | 5% | 5% |
| Information and telecommunications | 1% | 1% | 1% | 2% |
| Financial and insurance services | 2% | 2% | 2% | 5% |
| Rental, hiring and real estate services | 1% | 2% | 1% | 2% |
| Professional, scientific & technical services | 7% | 4% | 6% | 8% |
| Administrative and support services | 3% | 3% | 3% | 3% |
| Public administration and safety | 7% | 6% | 7% | 6% |
| Education and training | 5% | 6% | 6% | 8% |
| Health care and social assistance | 6% | 10% | 8% | 12% |
| Arts and recreation services | 1% | 1% | 1% | 1% |
| Other services | 4% | 5% | 5% | 4% |
| Inadequately described/Not stated | 2% | 2% | 2% | 2% |

The Project is anticipated to increase employment by one person for a total of 11 full-time equivalent positions.

**Economic Multiplier**

Input-output multipliers are most commonly used to quantify the economic impacts (both direct and indirect) relating to policies and projects. In terms of the materials recycling facility, the construction phase of the proposal will have 'flow-on' benefits to the activities of other industries as well as the economy of the wider region. These benefits are broadly grouped into two categories: production induced effect, and consumption induced effect.

While not an exact science, an estimate of the size of these impacts can be illustrated using published industry multipliers such as those produced by the ABS, which estimates that for every one full time equivalent employment position (FTE) created by the project, 3.1 FTE jobs are indirectly created due to the production and consumption induced effects.

The operational workforce is anticipated to comprise a total of 11 FTE roles that will indirectly contribute to 34 jobs. It is reasonable to assume that the majority of all roles created by this project (directly and indirectly) will be filled from within the regional economy.

**Waste Industry**

Across Australia, factors such as population growth and increased consumption levels has resulted in an average waste generation increase of 4.3 percent per year. During 2008-2009 alone, NSW generated a total of 16 Mt of waste. This trend of waste generation has since continued, and NSW is currently generating more waste than ever before. As recognised in the *NSW Waste Avoidance and Resource Recovery Strategy 2014-2021* (NSW Waste Strategy) prepared by the NSW Environment Protection Authority, the increased waste generation places increased pressure on the environment to not only absorb the waste, but also to provide resources for new materials. In addition, the *Industry Reference Group Report 'Waste'* (Transport NSW, 2012) has identified that the resource recovery rates are currently well below the projected target rates.

Based on these strategies and findings, there is an obvious need to promote opportunities for waste reduction and resource recovery in all areas of society. The proposal to increase the resource recovery capacity of the existing Boral recycling facility directly supports this need, and is directly in accordance with the targets listed within the NSW Waste Strategy, including:

- **Increase recycling**: By 2021-2022, increase recycling rates for construction and demolition waste from 75% (in 2010-2011) to 80%; and
- **Divert more waste from landfill**: By 2021-2022, increase the waste diverted from landfill from 63% (in 2010-2011) to 75%.

Further, the proposed materials recycling facility is in accordance with the waste hierarchy as established under the *Waste Avoidance and Resource Recovery Act 2001* (NSW). The hierarchy provides an authoritative list of priorities for resource management options:

1. Avoidance including action to reduce the amount of waste generated by households, industry and all levels of government;
2. Resource recovery including reuse, recycling, reprocessing and energy recovery, consistent with the most efficient use of the recovered resources; and
3. Disposal including management of all disposal options in the most environmentally responsible manner.

The increased capacity provided by the proposal will provide an environmentally sustainable waste management option that focuses on the re-use of materials thereby reducing the amount of potential waste sent to landfill.

### 8.12.3 Impacts

The Project will provide positive social and economic outcomes for the Region by the way of direct and indirect employment generation and the promotion of recycling versus landfill waste management.

The following positive social and economic impacts are expected to result from the Project:

- Direct and indirect employment;
- Promotion of sustainable waste recovery and recycling in line with the strategic planning policies, and provide a positive waste management alternative to landfilling;
- A suitable land-use and development option in the Kooragang Island industrial area;
- Facilitation of the priorities in the *Waste Avoidance and Resource Recovery Act 2001* (NSW); and
- No negative outcomes for, or measurable shifts in local demographics or population.

Notwithstanding the positive outcomes of the Project, the following potential negative impacts have been identified:

- Slight increase of traffic in the area during construction and operational periods; and
- Perceived potential for impact on the noise and air amenity of the neighbourhood.

Traffic impacts and noise and air (dust) impacts are addressed in Sections 8.2.3, 8.3.3 and 8.1.3 respectively. These perceived impacts will not be realised because of the distance between the closest residential areas and the Project, as well as the capacity of the existing road network to absorb the increased traffic movements.

Overall, the Project will provide increased economic stimulus to the Region, additional employment opportunities and a strategic benefit for the Region and wider NSW through the promotion of waste reduction and recycling activities on site. These positive impacts will effectively ameliorate any actual or perceived negative socio-economic impacts.

# 9 CUMULATIVE IMPACTS

## 9.1 Introduction

This section considers the potential cumulative impacts that may arise as a result of the Project at different spatial and temporal scales. The cumulative impact assessment combines the residual impacts of the Project with the impacts of existing and approved development in the immediate locality and wider Region. The cumulative impact of the Project necessarily considers the mixed developments and land uses adjacent to the site, and has been prepared in accordance with the following objectives:

- Identify and assess the cumulative impacts of existing, approved and proposed developments within the locality;
- Determine how the construction and operation of the Project may contribute to the overall impacts on environmental, social and economic values of the Region; and
- Identify mitigation strategies to minimise the Project's contribution to negative cumulative impacts.

## 9.2 Cumulative Assessment

The following industrial facilities operate near Boral's Recycling facility:

- Port Waratah Coal Services (PWCS) Kooragang coal loader;
- Newcastle Coal Infrastructure Group coal loader;
- Cargill vegetable oil refinery and stock feed processing plant;
- Simsmetal recycling facility;
- Boral Cement clinker processing plant;
- Boral concrete batching plant; and
- Origin Energy gas terminal.

A range of other industrial facilities operate on the Island and the adjacent Walsh Point and over the river in Mayfield industrial lands, including:

- PWCS Port Waratah coal loader;
- Orica ammonia nitrate plant;
- HiFert distribution centre; and
- Various ship loading and unloading facilities (for cotton seed, clinker, alumina, aluminium, zinc concentrate, anhydrous ammonia and phosphate).

Given the proximity of the Project to other industrial facilities in the Kooragang Island industrial area, certain impacts such as dust, traffic, noise, greenhouse gases and visual impact can and will add to existing emissions from other facilities.

The potential for cumulative impacts has been assessed by the individual technical studies prepared as part of this EIS. In this regard, cumulative impacts have been assessed and incorporated into the mitigation measures from the outset with no potential for significant cumulative impacts identified. Where sufficient primary data was unavailable for third party developments, the technical studies adopted a worst case scenario approach to enable a conservative precautionary outcome.

The following technical studies assessed cumulative impacts within the context of existing industry, facilities under construction, and future developments:

- Air quality: The air quality predictions are cumulative as they used baseline data to which emissions from the Project were added. The Project will have little effect on air quality, either as deposited dust or suspended dust concentrations. The overwhelming contribution to predicted dust levels is due to measured background dust, with the Project predicted to provide a very small incremental increase. There is no predicted increase in the occurrence of existing exceedances of air quality criteria. No odour causing wastes will be accepted by the Project and accordingly no additional odour emissions are predicted;
- Traffic: The traffic assessment is cumulative in that it considered baseline traffic counts, to which the Project traffic predictions were added. Trip generation from the Project is insignificant, and will have no significant impact on the levels of service or capacity of the existing road network.
- Noise: The noise predictions are cumulative in that they account for background noise emissions, to which were added Project contributions. A comparison of predicted noise emissions from the Project against measured night time noise levels at representative residences shows that the Project will not increase measured cumulative industrial noise.
- Water Management: Site water flows do to some extent add to flows from adjoining sites, for example in flows in the North South Drain. All water analyses have taken into account flows from these sources.
- Hazards: A preliminary hazard assessment screening test was prepared in accordance with SEPP 33 Hazardous and Offensive Development. The Project will not store hazardous materials as defined in the Australian Dangerous Goods Code and is not considered a potential hazardous industry;

- Biodiversity: Biodiversity impacts from individual projects or land clearing do accumulate with regard to their effect on species and communities. However, Kooragang Island is primarily a manufactured landscape, consisting of predominantly exotic grasslands fringed with semi-aquatic habitats. The clearing of a small area of landscaped plantings interspersed with weeds, that does not provide breeding habitat for threatened species, will not measurably add to other biodiversity impacts in the area;
- Greenhouse gases: The predicted greenhouse gas emissions from the Project were calculated in the absence of additional sources, as the specific local sources are unknown. The effect of greenhouse gases are cumulative globally and while the project will contribute immeasurably to this effect, it will conversely reduce the demand for new aggregates, the production of which consumes energy and releases greenhouse gases. The Project will reprocess waste materials such as concrete and directly replace the demand for new products, thus reducing greenhouse gas emissions. The Project will be net negative for GHG production;
- Visual amenity: The visual analysis has considered the cumulative effect by considering the Project within the existing baseline visual landscape. There will be no change to the existing industrial landscape as a result of the Project;
- Heritage: The potential for Aboriginal and historical heritage items to exist on site is extremely low, due to the relatively recent construction of Kooragang Island and the occurrence of industry in the area. Therefore, no impacts are predicted to Aboriginal or historic heritage items or places; and
- Socio-economics: There is a positive socio-economic cumulative impact created by the proposal through the promotion of strategic and sustainable recycling activities, increased direct and indirect employment opportunities, and improved economic stimulus for the Region.

# 10 ECOLOGICALLY SUSTAINABLE DEVELOPMENT

The objectives of the EP&A Act include the encouragement of the principles of Ecologically Sustainable Development (ESD). Supplementary to the EP&A Act objectives, section 7 (1(f)) of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* requires a proponent to include in an EIS the reasons justifying the development, including the principles of ESD. Section 7(4) of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* defines the principles of ESD as follows:

> *(a) The **precautionary principle**, namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:*
>
> > *(i) Careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and*
> >
> > *(ii) An assessment of the risk-weighted consequences of various options,*
>
> *(b) **Inter-generational equity**, namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,*
>
> *(c) **Conservation of biological diversity and ecological integrity**, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,*
>
> *(d) **Improved valuation, pricing and incentive mechanisms**, namely, that environmental factors should be included in the valuation of assets and services, such as:*
>
> > *(i) Polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,*
> >
> > *(ii) The users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,*
> >
> > *(iii) Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.*

The following sections provide the evaluation of the Project with regard to ESD.

## 10.1 Precautionary Principle

The precautionary principle requires careful evaluation of potential environmental damage and risk-weighted consequences of such damage to avoid serious or irreversible harm. In this sense the precautionary principle promotes proactive environmental protection as opposed to reactive measures following environmental damage. In order to satisfy the precautionary principle, the potential for serious or irreversible environmental damage must be anticipated, measured and prevented from the outset to ensure a level of scientific certainty has been achieved in relation to the proposed development.

Accordingly, this EIS has undertaken an evaluation of all key environmental components, as well as secondary components with the potential to influence environmental damage including social and economic considerations. Detailed assessment of key issues and proposed mitigation and management procedures have been conducted as documented in the previous sections of the EIS. Through the adoption of an anticipatory approach, each potential issue arising from the Project has been identified, evaluated and mitigated through a series of design or management solutions.

The assessment process has involved a detailed study of the existing environment and the use of engineering and scientific modelling and study to assess and determine potential impacts as a result of the Project. The process also relied on the experience and expertise of the specialists engaged throughout the assessment phase. To this end, there has been careful consideration to avoid, where possible, irreversible damage to the environment, including the following measures:

- The best available scientific information for the Project area has been relied upon. Where uncertainty in data has been identified, modelling and assessment have been based on an objectively 'worst-case scenario' case analysis with appropriate contingency measures;
- The location and footprint of the Project is on industrial zoned land within an established industrial estate; and
- Modelling of reasonable worst case scenario air quality emissions, noise emissions, traffic impacts and greenhouse gas emissions has provided greater scientific certainty about the potentially adverse impacts of the Project. This has subsequently resulted in conservative mitigation measures to manage and monitor anticipated environmental impacts.

The EIS has anticipated, assessed and managed the potential impacts and uncertainties arising from the Project. It is considered that the uncertainties do not pose a risk of serious or irreversible damage to the environment and is therefore in accordance with the precautionary principle.

## 10.2 Inter-generational Equity

The concept of inter-generational equity requires that the present generation preserves or enhances the health, diversity and productivity of the environment for the benefit of future generations. Essentially it refers to equality between generations. The concept includes both intra-generational equity, i.e. within generations, and inter-generational equity, i.e. between generations. This means that the principle extends beyond the requirement of environmental protection and enhancement for inter-generations, but also requires that the economic and social benefits of the proposal are equally distributed among members of a community intra-generationally.

Throughout the assessment, the type and extent of potential impacts caused by the Project have been analysed and mitigated. The assessment methodologies have adopted a risk-based and worst case scenario approach to ensure improved environmental, social and economic protection for current and future generations. The environmental management and mitigation measures have been developed to minimise the impact of the Project on the environment for future generations.

One very significant issue around inter-generational equity is human-induced climate change driven by atmospheric emissions. Climate change is directly threatening large human populations, especially in low lying countries, and those where rainfall patterns are expected to change to the detriment of food production. The Project will have net beneficial impact on GHG owing to the significant GHG savings due to the replacement of virgin excavated aggregates. Additionally, the proposed recycling facility will reduce annual water and energy usage by an estimated 427,000 kL and 220,500 Gj respectively when compared to the excavation, processing and transport of virgin aggregates. The Project also significantly reduces pressure on limited landfill space. An estimated 435,000 $m^3$ of landfill void space will be diverted annually by the Project.

## 10.3 Conservation of Biological Diversity

The conservation of biological diversity refers to the maintenance of species richness, ecosystem diversity and health and the links and processes between them. The Project site is located on filled land within a heavy industrial estate and has very limited biodiversity value. An ecological assessment has been undertaken by a qualified specialist to identify the extent of biological diversity on site and the surrounding area, and also to confirm that no significant adverse impacts are expected as a result of the Project.

## 10.4 Improved Valuation, Pricing and Incentive Mechanisms

The principle of improved valuation and pricing mechanisms refers to the need to determine proper values of services provided by the natural environment. The objective is to apply economic terms and values to the elements of the natural environment. The Project optimises the valuation and pricing of natural resources by encouraging diversion away from landfilling and encouraging recycling. Further justification in this regard is provided in Section 8.12.2.

# 11 ENVIRONMENTAL MANAGEMENT

The approved facility operates under an Environmental Management Plan (EMP) that provides details around:

- Responsibilities;
- Environmental monitoring;
- Environmental requirements;
- Complaints management;
- Induction and training;
- Environmental management and contingencies; and
- Environmental procedures for key aspects of the operation such as health and safety, security, traffic, water management, dust management, noise management, contamination prevention, waste management, archaeological chance finds, and flood response.

Following determination of the Development Application, the Environmental Management Plan will be revised taking into account the following documents:

- This EIS;
- New conditions of consent; and
- Any other approval, licence or permit issued or modified.

The following matters will be addressed in the new Environmental Management Plan:

- Project Description;
- Environmental management structure and responsibilities;
- Approval and licensing requirements;
- Environmental training requirements;
- Emergency contacts and response procedures;
- Risk assessment;
- Environmental monitoring;
- Environmental auditing;
- Corrective actions; and
- EMP review schedule.

# 12 SUMMARY OF MITIGATION MEASURES

Table 12-1 provides a list of mitigation measures.

**Table 12-1: Summary of Mitigation Measures**

| |
|---|
| **Waste Management** |
| • Adhere to Boral Inspection and Receivals Protocol, 2015.<br>• Conduct raw material testing in accordance with the NSW EPA's Recovered Aggregate Order 2014, which includes testing for 8 heavy metals, electrical conductivity, and foreign material.<br>• Maintain waste screening double check procedure.<br>• Load weighing and docket procedure.<br>• Product asbestos analysis procedure. |
| **Dust** |
| • Area sprayers will be activated in dry weather as required.<br>• Stacker above processed stockpile and transfer points will be fitted with water sprays.<br>• Maintenance of compacted internal roadways and stockpile pads.<br>• Maintenance of seal on the main access road from the wheel wash and weighbridge.<br>• Sealed roads will be regularly swept.<br>A water cart will remain on site for use on manoeuvring areas in hot and dry weather. |
| **Traffic** |
| Staff car parks repainted compliant with AS 2890.1 and AS 2890.6. |
| **Noise and Vibration** |
| No specific measures required. |
| **Flooding** |
| Given the site is above the 1% AEP flood level, no measures are required. |
| **Water Management** |
| • Two new infiltration basins will be built to capture and treat runoff from 100 year ARI storms.<br>• Ground levels near the weighbridge will be raised to 4.9 mAHD.<br>• Northern and western perimeter bunds will be maintained.<br>• Water quality in the concrete lined storage dam will be monitored against public health risk management criteria (DEC, 2006) and the adopted Ecological Groundwater Investigation Levels criteria. If the water quality exceed these criteria, water of a suitable quality will be added for dilution.<br>• A sediment trap will be built in the north of the site.<br>• Spear point bore GW053226 will be re-licenced.<br>• A Process Water Management plan will be prepared post-approval to manage the safe use of groundwater in the process water circuit. |

| SEPP 33 and hazards |
| --- |
| No storage of hazardous materials as defined in the Australian Dangerous Goods Code or NSW Planning-Storage and Handling of Dangerous Goods Code of Practice 2005.<br>Development of an Emergency Response Plan.<br>Mobile plant and vehicles to be fitted with fire extinguishers.<br>• The existing Environment Protection Licence 11968 will be maintained and modified as required.<br>Securely fence the facility. |
| **Biodiversity** |
| The very low biodiversity value means that no mitigation measures are required. |
| **Greenhouse Gases** |
| • Consider GHG emissions when selecting diesel and electrically powered plant, machinery and lighting. |
| **Visual Amenity** |
| • Maintain shrubs along Egret Street.<br>• Silo painted in subdued colours.<br>• Stockpiles maximum height of 20 m above constructed ground level. |
| **Heritage** |
| • Apply chance find protocols. If any skeletal material is uncovered, cease work within 50 m and contact the NSW Police and NSW Coroner's Office. If the remains prove to be Aboriginal, consult with a heritage consultant, relevant Aboriginal groups and relevant State Government Agency. |
| **Socio-Economic Environment** |
| • No specific additional mitigation measures are required to manage socio-economic aspects of the Project. The proposed mitigation measures for waste management, greenhouse gas abatement, noise, traffic, air quality, visual amenity, heritage, and risk management will directly mitigate potential socio-economic aspects. |

# 13 CONCLUSION

This EIS has been prepared for the proposed expansion of the existing Boral materials recycling facility on Kooragang Island.

This EIS has outlined the relevant environmental, social and economic matters associated with the proposal that will not result in any significant social, economic or environmental impacts.

The statement provides information as required for assessment pursuant to Section 79c of the *Environmental Planning and Assessment Act 1979*, matters for consideration pursuant to Schedule 2 of the Environmental Planning and Assessment Regulation 2000 and addresses the SEARs.

The proposal is strategically important for waste recovery in the Hunter Region and provides significant environmental benefits that arise from recycling, such as greenhouse gas reductions, water consumption reductions, preservation of raw materials and reduction in landfilling. The Project will facilitate construction projects, both public and private by the production and sale of cost-effective recycled construction materials.

On merit it is considered that the proposed development addresses all regulatory and environmental assessment criteria and is suitable for approval.

# 14 REFERENCE LIST


ARC (2015), *Boral Resource Recovery Facility, Kooragang Island Expansion Proposal Traffic Impact Assessment.*

BMT WBM (2012) *Newcastle City-wide Floodplain Risk Management Study and Plan.*

Department of Environment Climate Change and Water (2010) *Environmental Benefits of Recycling.*

Environmental Resources Management Pty Ltd (2001), *Proposed Slag, Building and Demolition Waste Recycling Plant Kooragang Island Lot 1 DP 594332: Phase I – Preliminary Site Investigation.*

Muller Acoustic Consulting (2015), *Kooragang Recycling Facility-Environmental Impact Assessment.*

SLR Consulting (2015) *Boral Kooragang Recycling Facility Air Quality Impact Assessment.*

SLR Consulting (2015) *Boral Kooragang Recycling Facility Water Management Assessment*