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Marulan South Limestone Mine

Biodiversity Management Plan

Prepared for Boral Cement Limited

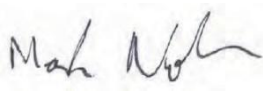


Marulan South Limestone Mine

SSD 7009 | BIODIVERSITY MANAGEMENT PLAN

Prepared for Boral Cement Limited
25 October 2022

PR163

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1 INTRODUCTION

1.1 Background

Boral Cement Limited (Boral) owns and operates the Marulan South Limestone Mine (the mine), an open cut mine located in Marulan South, New South Wales (NSW). Limestone mining north of Bungonia Gorge began around 1830 with major developments emerging in the 1920s to supply limestone for cement manufacturing and steel making.

The limestone mine was opened in 1929 to supply limestone for cement, manufacturing and steel making. By 1953 two main pits (northern mine pit and southern mine pit) were well established and by the early 1970s the facets of the business included limestone for cement, steel making, agriculture, glass making, lime manufacturing, quicklime and hydrated lime.

The mine produces up to 3.38 million tonnes (Mt) of limestone based products per year for the cement, steel, agricultural, construction and commercial markets.

Due to changes in the *NSW Mining Act 1992* (Mining Act) and the *NSW Environmental Planning & Assessment Act 1979* (EP&A Act), a State significant development (SSD) consent under the EP&A Act was required to move mining operations beyond the area covered by the mining operations plan (MOP).

Two approvals are required for the mine:

- a consent for the Project (SSD 7009) under Part 4, Division 4.7 of the EP&A Act; and
- controlled action approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) for impacts on listed threatened species and communities (sections 18 and 18A of the Act).

An environmental impact statement (EIS) was prepared to accompany the application for SSD 7009 and addresses the requirements of State agencies under the EP&A Act and the Commonwealth Department of Agriculture, Water and the Environment. A response to submissions (RTS) report was subsequently prepared to consider and respond to agency and public submissions and provide clarification of project components where relevant.

Development consent (the consent) was granted by the Department of Planning, Industry and Environment (DPHI) on 19 August 2021, to continue mining limestone at a rate of up to 4 million tonnes per annum (Mtpa) for a period of up to 30 years (the Project).

To satisfy Condition of Consent (CoC) D5(i), the EIS, RTS, development consent and other publicly available information related to the assessment and determination of SSD 7009 can be accessed on DPHI's Major Projects Planning Portal (<https://www.planningportal.nsw.gov.au/major-projects/project/9691>).

The consent requires the preparation and implementation of a number of management plans, strategies, protocols and procedures detailing environmental commitments, controls and performance objectives at the mine throughout its operational life. A Biodiversity Management Plan (BMP) is required in accordance with CoC B54.

This plan incorporates the relevant management measures presented in the EIS, RTS and conditions of consent relating to biodiversity management. This BMP will continue to remain a dynamic document which will be updated as required over the life of mining operations until 31 August 2051.

CoC B54 (a) requires this plan to be prepared by suitably qualified and experienced persons whose appointment has been endorsed by the Planning Secretary. This BMP has been prepared by Dr Emilie Mascarenhas and Mark Nolan of Cambium Group on behalf of Boral.

Their combined experience of more than 45 years includes environmental management, rehabilitation monitoring, approvals, compliance and land access in the resources sector. Endorsement was sought and received from the Planning Secretary on 17 September 2021.

1.2 Overview of operations

1.2.1 Site description

The Project site is in Marulan South, 10 km south-east of Marulan village and 35 km east of Goulburn. It is in the Goulburn Mulwaree Local Government Area (LGA).

The mine is separated from the Bungonia National Park (NP) and State Conservation Area to the south by Bungonia Creek and is separated from the Shoalhaven River and Morton NP to the east by Barbers Creek.

The Project site and surrounds are characterised by rolling hills of pasture interspersed with forest to the west, contrasting with the heavily wooded, deep gorges that begin abruptly to the east of the mine, forming part of the Great Escarpment and catchment of the Shoalhaven River.

Access is via Marulan South Road, which connects the mine and Boral's Peppertree Quarry with the Hume Highway approximately 9 km to the north-west. Boral's private rail line connects the mine and Peppertree Quarry with the Main Southern Railway approximately 6 km to the north.

The Project site covers historical and proposed future areas of disturbance and comprises two geographically separate areas:

- the existing mine including the proposed 30-year mine footprint and associated infrastructure; and
- the proposed Marulan Creek dam to be on Marulan Creek, within Boral landholdings approximately 2.5 km north of the mine entrance.

The Project site covers an area of 846.4 ha. The existing pre SSD disturbance footprint is 341.5 ha with 256.5 ha of new disturbance associated with the proposed 30-year mine plan.

Most of the Project site is zoned RU1 - Primary Production under the Goulburn Mulwaree Local Environmental Plan (LEP) 2009. Mining and extractive industries are permissible in this zone with consent. The remaining area is zoned E3 - Environmental Management. Mining and extractive industries are prohibited in this zone. However, as agriculture is permitted in the E3 zone with consent, mining is also permitted in this zone under the Mining Sate Environmental Planning Policy with consent.

1.2.2 Existing mining overview

The mine is sited on a high grade limestone resource. Subject to market demand the mine has typically produced up to 3.38 Mt of limestone and up to 200,000 t of shale per annum.

The mine currently produces a range of limestone products for internal and external customers in the Southern Highlands/Tablelands, the Illawarra and Metropolitan Sydney markets for use primarily in cement and lime manufacture, steel making, agriculture and other commercial uses. Products produced at the mine are despatched by road and rail, with the majority despatched by rail.

Historically limestone mining was focused on the approximately 200-300 m wide Eastern Limestone and was split between a north pit and a south pit. A limestone wall (referred to by the mine as the 'centre ridge') rising almost to the original land surface, divided the two pits. The

north and south pits were joined in 2016/2017 by mining the centre ridge to form a single contiguous pit, approximately 2 kilometres (km) in length. However, the north pit/south pit nomenclature remains important as current mining operation locations continue to be reported with respect to one or other of the old pits.

Limestone and shale are extracted using open-cut hard rock drill and blast techniques. Limestone is loaded using front end loaders and hauled either to stockpiles or the processing plant using haul trucks. Oversized material is stockpiled and reduced in size using a hydraulic hammer attached to an excavator.

Limestone processing facilities including primary and secondary crushing, screening, conveying and stockpiling plant and equipment are in the northern end of the north pit. Kiln stone grade limestone is also processed on site through the existing lime plant comprising kiln stone stockpiles, rotary lime kiln, hydration plant and associated auxiliary conveying, processing, storage, despatch plant and equipment. Overburden from stripping operations is emplaced in the Western Overburden Emplacement (WOE), west of the open cut pits.

1.2.3 Approved project overview

Consent was granted for a 30-year mine plan accessing approximately 120 Mt of limestone down to a depth of 335 m. The mine footprint focuses on an expansion of the pit westwards to mine the Middle Limestone and to mine deeper into the Eastern Limestone. As the Middle Limestone lies approximately 70-150 m west of the Eastern Limestone, the 30-year mine plan avoids mining where practical the interburden between these two limestone units thereby creating a smaller second, north-south oriented west pit with a ridge remaining between. The north pit will also be expanded southwards, encompassing part of the south pit, leaving the remainder of the south pit for overburden emplacement and a visual barrier. The approved disturbance area and key components are shown in Figure 1.1.

Limestone will be extracted at up to 4 Mtpa for 30 years until 31 August 2051. Clay shale will also continue to be extracted at up to 200,000 tonnes per annum (tpa). The limestone will be processed to create limestone and lime products including limestone aggregates and sand, hydrated lime and quick lime.

Existing infrastructure is being retained along with the following changes:

- relocation of a section of high voltage power line to accommodate a proposed overburden emplacement;
- realignment of a section of Marulan South Road, to accommodate a proposed overburden emplacement;
- relocation of the processing infrastructure and the stockpile and reclaim area at the northern end of the north pit to allow the northward expansion of the pit;
- development of a shared Road Sales Stockpile Area including a weighbridge and wheel wash to service both the mine and Peppertree Quarry; and
- construction of a 118 megalitre (ML) in-stream water supply dam on Marulan Creek.

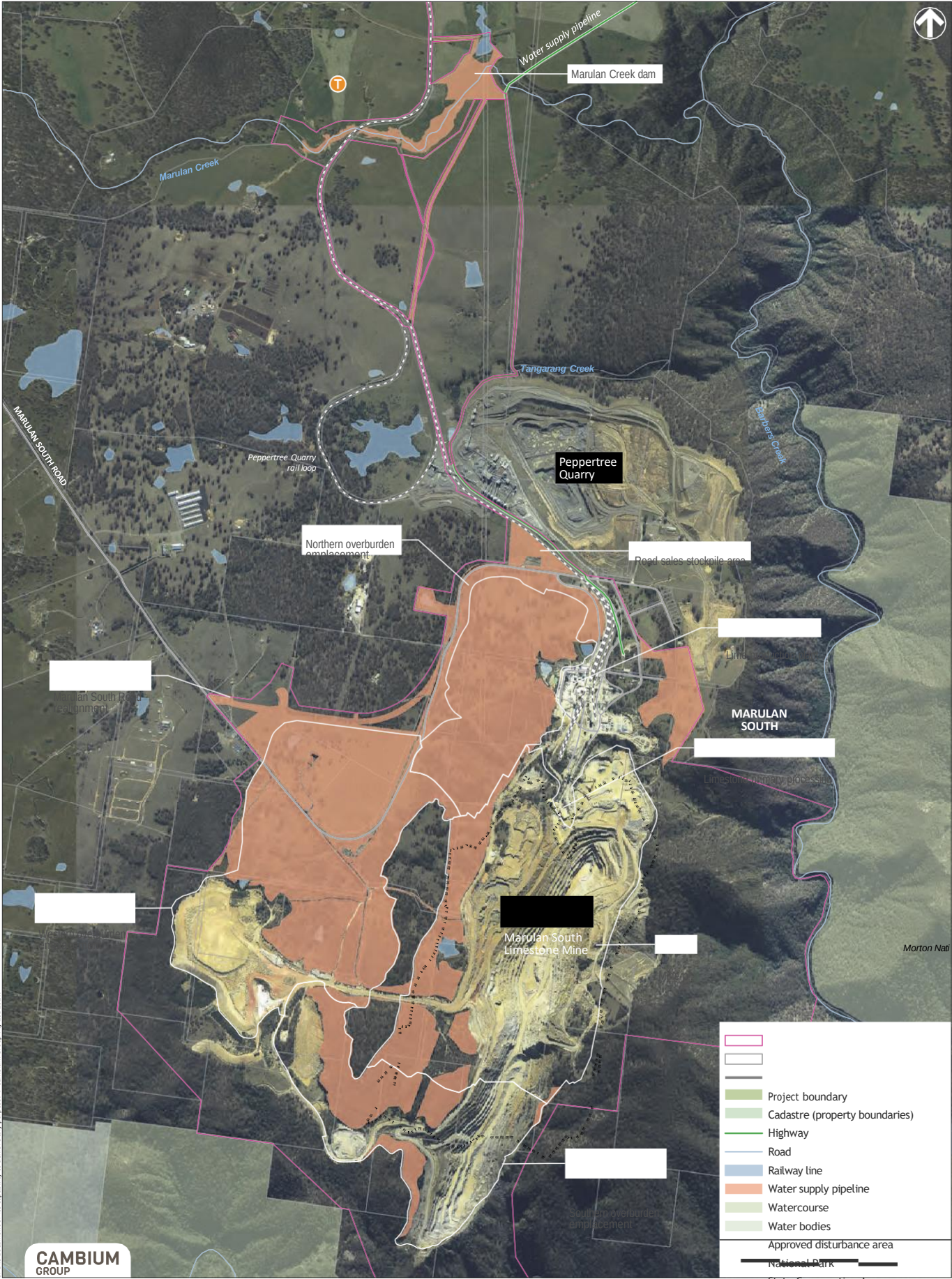
Boral will transport up to 600,000 tpa of limestone and hard rock products along Marulan South Road to the Hume Highway, as well as 120,000 tpa of limestone products to the agricultural lime manufacturing facility.

The Project provides continued direct employment for 118 people on the mine site and 73 offsite. It will operate 24-hours per day, 7 days per week. Blasting will continue to be restricted to daylight hours on weekdays, excluding public holidays.

Figure 1.1
Approved disturbance area



MARULAN SOUTH LIMESTONE MINE CONTINUED OPERATIONS
BIODIVERSITY MANAGEMENT PLAN



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1.3 Environmental management framework

The mine operates in accordance with the Boral integrated Health Safety, Environment and Quality Management System (HSEQ MS) which establishes a strategic platform for regulatory compliance and continual improvement in environmental management. This framework is documented in GRP-HSEQ-1-01 Management System Framework and Operational Control. The Boral HSEQ MS is aligned with the international standard ISO-14001.

1.3.1 Environmental Management System

CoC D1 requires the preparation of an Environmental Management Strategy (EMS) for the mine. The EMS provides the mine's strategic framework for environmental management under which the BMP operates.

1.3.2 Alignment with other plans

This biodiversity outcomes included in this BMP have been developed to align with the environmental management objectives for the mine as detailed in the following plans:

- Rehabilitation Strategy and Rehabilitation Management Plan;
- Water Management Plan including an Erosion and Sediment Control Plan;
- Aboriginal Cultural Heritage Management Plan;
- Bushfire Management Plan;
- Noise Management Plan; and
- Dust Management Plan.

Further detail on the alignment of this BMP and the above plans can be found in Chapter 5.

1.4 Purpose and objectives

This BMP describes how Boral will manage and protect biodiversity values through the construction and operation of the Project.

This BMP applies to all activities undertaken by the mine including extraction (drilling and blasting), loading and haulage of materials, stockpiling, processing (crushing, screening and conveying) and operation of the lime plant.

Specific objectives of the BMP are to:

- comply with regulatory requirements for the mine including the development consent;
- meet the obligations and commitments identified in the EIS (Element Environment, 2019);
- ensure compliance with relevant environmental legislation;
- outline management actions and controls to protect and enhance biodiversity values at the Project site;,
- ensure appropriate and representative monitoring is conducted for verification that the BMP is effectively implemented and meeting its objectives; and
- ensure appropriate contingencies and resources for mitigating adverse impacts to native vegetation areas.

The BMP is prepared for a mixed audience of consent authorities, environmental regulators and site personal; the latter of which are responsible for implementing this plan as part of day-to-day operations.

1.5 Responsibility for implementation

The Site Manager carries ultimate responsibility for the implementation of this BMP and providing the necessary resources as required. The site Environmental Coordinator is responsible for ensuring that the management measures outlined in this plan are implemented on site and carrying out and/or coordinating the monitoring and reporting requirements of this plan.

1.6 Document structure

The structure of the BMP is outlined in Table 1.1.

Table 1.1 Structure of the BMP

Section	Content
1	Provides an overview of the project and objectives of the plan.
2	Outlines statutory requirements associated with the development consent, recommendations from the EIS, key legislation and guidelines, the biodiversity offsets strategy and consultation undertaken to develop the plan.
3	Describes the existing environment.
4	Describes the management actions for vegetation clearing.
5	Describes the management actions for the management of remnant vegetation.
6	Provides performance indicators, completion criteria and remedial action for the management of remnant vegetation.
7	Describes a seasonally-based monitoring program to assess the management of remnant vegetation against the completion criteria.
8	Provides the contingency plan for implementation of the BMP.
9	Describes the environmental performance review and improvement program.
10	Outlines the management of incidents and non-compliance.

2 STATUTORY REQUIREMENTS

2.1 State development consent

This BMP has been prepared in accordance with the State development consent. Table 2.1 presents the consent conditions relevant to the BMP and identifies where each condition has been addressed in this plan.

Table 2.1 Management plan requirements

Condition No.	Condition requirement	Section reference
B54	The Applicant must prepare a Biodiversity Management Plan to the satisfaction of the Planning Secretary. This plan must:	
(a)	be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary;	Section 1.1
(b)	be prepared in consultation with BCD;	Section 2.7
(c)	describe the short, medium, and long-term measures to be undertaken to manage the remnant vegetation and fauna habitat on the site and within the offset areas;	Section 2.6, 5.1
(d)	describe how biodiversity management would be integrated with similar measures within other management plans, including the Rehabilitation Management Plan referred to in condition B82.	Section 1.3.2, 4.2, 4.7, 4.8, 5.1, 5.6, 7.1.
(e)	include detailed performance and completion criteria for evaluating the performance of the Biodiversity Offset Strategy and include triggers for remedial action, where these performance or completion criteria are not met;	Section 2.6
(f)	describe how the Biodiversity Offset Strategy will be implemented and secured;	Section 2.6
(g)	describe the measures to be implemented within the approved disturbance areas to:	Section 4
(g)(i)	minimise the amount of clearing;	Section 4.2, 4.3
(g)(ii)	minimise impacts on fauna, including undertaking pre-clearance surveys and measures to minimise the risk of vehicle strike;	Section 4.3, 4.4, 4.5, 4.9.3, 0.
(g)(iii)	provide for the salvage, transplanting and/or propagation of any threatened flora found during pre-clearance surveys, in accordance with the <i>Guidelines for the Translocation of Threatened Plants in Australia</i> (Vallee et al., 2004); and	Section 4.9.2
(g)(iv)	maximise the salvage of resources, including tree hollows, vegetation and soil resources, for beneficial reuse, including fauna habitat enhancement;	Section 4.6
(h)	describe the measures to be implemented on the site to:	
(h)(i)	minimise impacts to <i>White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC</i> including potential edge effects within identified buffer zones, and contribute to conservation strategies for this CEEC;	Section 4.9.1, 5
(h)(ii)	minimise impacts on fauna habitat resources such as hunting and foraging areas, habitat trees, fallen timber and hollow-bearing trees;	Section 4.6, 5.7
(h)(iii)	enhance the quality of vegetation, vegetation connectivity and wildlife corridors including through the assisted regeneration and/or targeted revegetation of appropriate canopy, sub-canopy, understorey and ground strata;	Section 5.5, 5.6
(h)(iv)	introduce naturally scarce fauna habitat features such as nest boxes and salvaged tree hollows and promote the use of these introduced habitat features by threatened fauna species;	Section 4.6, 5.7
(h)(v)	manage any potential conflicts with Aboriginal heritage values;	Section 5.11

	(h)(vi)	protect vegetation and fauna habitat outside of the approved disturbance areas;	Section 4.3, 5
	(h)(vii)	manage the collection and propagation of seed from the local area;	Section 4.7
	(h)(viii)	control weeds, including measures to avoid and mitigate the spread of weeds;	Section 5.8
	(h)(ix)	control feral pests and diseases with consideration of actions identified in relevant threat abatement plans;	Section 5.9
	(h)(x)	control erosion;	Section 5.12
	(h)(xi)	manage any grazing and agriculture;	Section 5.4
	(h)(xii)	control access to vegetated or revegetated areas; and	Section 4.3, 0
	(h)(xiii)	manage bushfire hazards;	Section 5.10
	(i)	include a seasonally-based program to monitor and report on the effectiveness of the above measures, progress against the detailed performance indicators and completion criteria, and identify improvements that could be implemented to improve biodiversity outcomes;	Section 7
	(j)	identify the potential risks to the successful implementation of the Biodiversity Management Plan, and include a description of the contingency measures to be implemented to mitigate against these risks; and	Section 8
	(k)	include details of who would be responsible for monitoring, reviewing, and implementing the plan.	Section 1.5
D5		Management plans required under this consent must be prepared in accordance with relevant guidelines, and include:	
	(a)	Summary of relevant background or baseline data;	Section 3
	(b)	Details of:	
	(b)(i)	The relevant statutory requirements (including any relevant approval, licence or lease conditions);	Section 2
	(b)(ii)	Any relevant limits or performance measures and criteria; and	Section 6, Table 6.1
	(b)(iii)	The specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;	Section 6, Table 6.1
	(c)	Any relevant commitments or recommendations identified in the document/s listed in condition A2(c);	Section 2.2
	(d)	A description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;	Section 5, 6, 7
	(e)	A program to monitor and report on the:	
	(e)(i)	Impacts and environmental performance of the development; and	Section 9.1, Section 9.2
	(e)(ii)	Effectiveness of the management measures set out pursuant to condition D4(c);	Section 8
	(f)	A contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	Section 8
	(g)	A program to investigate and implement ways to improve the environmental performance of the development over time;	Section 9
	(h)	A protocol for managing and reporting any:	
	(h)(i)	Complaint; or	Section 10
	(h)(ii)	Failure to comply with other statutory requirements;	Section 10
	(i)	Public sources of information and data to assist stakeholders in understanding environmental impacts of the development; and	Section 9
	(j)	A protocol for periodic review of the plan.	Section 9.2

2.2 Commonwealth approval

This BMP addresses the Commonwealth approval EPBC 2015/7521 conditions as outlined in Table 2.2 below.

Table 2.2 Relevant Commonwealth approval conditions

Condition No.	Condition requirement	Section reference
Part A	Listed threatened species and ecological communities The objective of conditions 1, 2 and 3 is to minimise and compensate for the impacts of the action on protected matters.	
1.	Within the development footprint, the approval holder must not clear more than: a. 80.7 hectares of White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland; b. 132.4 hectares of Koala habitat; or c. 140.3 hectares of Large-eared Pied Bat habitat. Clearing may only be undertaken where shown within the development footprint as 'White Box-Yellow Box- Blakely's Red Gum Grassy Woodland and Derived Native Grassland' on the map at Attachment 2, where shown within the development footprint as 'Koala habitat' on the map at Attachment 3, and where shown within the development footprint as 'Large-eared Pied Bat habitat' on the map at Attachment 4.	Figure 1.1 shows the development footprint, which contains the areas of TEC and threatened species habitat listed in this condition (refer to Biodiversity Development Assessment Report (BDAR) (Niche, 2020). Section 4 outlines the management measures to restrict clearing of native vegetation to within the approved development disturbance footprint.
2	To compensate for the clearance of White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland, Koala habitat and Large-eared Pied Bat habitat, the approval holder must retire credits prior to the commencement of the action, as specified: a. a. 935 ecosystem credits for White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland; b. b. 2,454 species credits for Koala; and c. c. 3,836 species credits for Large-eared Pied Bat.	Section 2.6
3	The approval holder must comply with the State development consent conditions A2, A5, B51, B52, B53, B54, B55, B56, B76, B78, B79, B80, B81 and B82.	This BMP specifically addresses State development consent condition B54

2.3 Recommendations from the EIS

The EIS (Element Environment, 2019) recommended measures to manage and mitigate impacts on biodiversity. Table 2.3 presents these recommendations and identifies where each commitment has been addressed in this plan.

Table 2.3 Recommended management measures from the EIS

EIS section	Recommended management measure	Section reference
12.4.1 Biodiversity Management Plan	Biodiversity management plan: A biodiversity management plan (BMP) will be prepared and implemented to reduce and mitigate biodiversity impacts and will contain:	
	Demarcation and signposting – the boundary of vegetation clearing and no-go vegetation zones will be delineated with 2m high timber posts with brightly coloured tops, fences, marking tape and/or signs	Section 4.3, 5.2
	Vegetation clearing protocol – a protocol will be implemented prior to and during vegetation clearing and will cover the following: - ground dwelling fauna will be searched and relocated prior to clearing of grasslands; - suitably qualified personnel will be engaged to supervise felling of hollow bearing trees; - displaced fauna will be caught and relocated to pre-designated areas by qualified wildlife handlers; and - the NSW Wildlife Information and rescue Service will be requested to handle and care for wildlife encountered during operations.	Section 4.4, 4.5
	Pest and weed management – protocols will be implemented for: - management of feral animals such as foxes, goats, rabbits and cats within the Project site and particularly in rehabilitation areas; and - identification and management of noxious or important environmental weeds within the Projects site and particularly in areas to be cleared, so that they are not transported to rehabilitation areas or other parts of the mine.	Section 5.8, 5.9

2.4 Key environmental legislation

Key environmental legislation relating to biodiversity management includes:

- Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).
- NSW Biodiversity Conservation Act 2016 (BC Act).
- NSW Fisheries Management Act 1994 (FM Act).
- NSW Environment Planning and Assessment Act 1979 (EP&A Act).
- NSW National Parks and Wildlife Act 1974 (NPW Act).
- NSW Biosecurity Act 2015 (BS Act).
- NSW Water Management Act 2000 (WM Act).

2.5 Relevant guidelines and policies

Guidelines that have been applied to the development of this plan include:

- State Environmental Planning Policy (SEPP) Koala Habitat Protection 2020.
- State Environmental Planning Policy (SEPP) Koala Habitat Protection 2021.
- Code of Practice for Injured, Sick and Orphaned Protected Fauna (OEH 2011).

- Code of Practice for injured, sick and orphaned flying foxes (OEH 2012).
- Code of Practice for injured, sick and orphaned koalas (OEH 2011).
- Threat abatement plan for competition and land degradation by unmanaged goats (DEWHA 2008)
- Threat abatement plan for predation by European red fox (DEWHA 2008).
- Threat abatement plan for predation by feral cats (DoE 2015).
- Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (DoEE 2017).
- FloraBank Guidelines – best practice guidelines for native seed collection and use (Commander L.E, (Ed.), 2021).
- Guidelines for the Translocation of Threatened Plants in Australia – Third Edition (Commander L.E. et al. (Eds), 2018).

2.6 Biodiversity Offset Strategy

Unavoidable impacts to biodiversity are those impacts that are residual (i.e. impacts that remain after impact avoidance, management and mitigation measures are employed to reduce the type or magnitude of biodiversity impacts). The BDAR (Niche, 2020) outlines the precise nature of the offsets required in both ecosystem and species credit terms, which equates to the following:

- Total of 1,038 credits for PCT 1334 Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands (SR670)
- Total of 885 credits for PCT 778 Coast Grey Box – stringybark dry woodland on slopes of the Shoalhaven Gorges -Southern Sydney Basin (SR534)
- Total of 260 credits for PCT 1150 - Silvertop Ash - Blue-leaved Stringybark shrubby open forest on ridges, north east South Eastern Highlands Bioregion (SR624)
- Total of 325 credits for PCT 731 - Broad-leaved Peppermint - Red Stringybark grassy open forest on undulating hills, South Eastern Highlands Bioregion (SR524).

The species credits required for the Project include:

- A total of 2,454 credits for the removal of Koala habitat
- A total of 3,836 credits for the removal of Large-eared Pied Bat habitat.
- A total of 2 credits for the removal of 0.1 hectares of *Solanum celatum* (based on a buffer of 30 metres around the one individual recorded as per the requirements of the BAM).

This section outlines the approach to biodiversity offsetting proposed for the Project in accordance with the Biodiversity Assessment Method (BAM) (DPHI, 2020a) and Commonwealth offsetting requirements.

Boral propose to offset the Project using two properties, which would be established as Stewardship Sites under the BAM to provide in-perpetuity protection and management of biodiversity values. Short, medium and long term measures will be developed as part of the Biodiversity Stewardship Agreement (BSA) to manage the offset areas.

The majority of the required credits would be retired through the establishment of two Biodiversity Stewardship Sites:

- Property 1: Boral-owned land (known as 'Coolumburra') covering 1,000 ha within the Bungonia subregion. Field surveys have confirmed that the site would satisfy all of the ecosystem credit requirements (except for Box Gum Woodland) and the majority of the species credit requirements for the Project. Boral is currently negotiating a Biodiversity Stewardship Agreement with the Biodiversity Conservation Trust for this property; and
- Property 2: privately-owned land covering 360 ha, subject to an existing Biodiversity Stewardship Agreement, for which Boral has negotiated security of credits to satisfy the full

State and Commonwealth offset liabilities for Box Gum Woodland. Boral has acquired the necessary credits for Box Gum Woodland for this property

The residual species credit requirements will be met by payment into the Biodiversity Conservation Fund.

Detailed performance and completion criteria for evaluating the performance of the Biodiversity Offset Strategy including triggers for remedial action where these performance or completion criteria are not met, are contained within the management plans set up under BSAs and therefore are not discussed further in this BMP.

All credits will be retired prior to the commencement of construction unless otherwise agreed by the Planning Secretary.

2.7 Consultation

CoC B54.(b) requires this plan be prepared in consultation with the Biodiversity and Conservation Division within the Department.

Revision 1 of this plan was provided to the Biodiversity and Conservation Division on 18 February 2022. Comments on this plan were received on 17 March 2022. A summary of these comments and Boral's response is included in Appendix A. Appendix A also includes a reference to the section of this plan where additional information has been included to address the comments.

On 6 May 2022, the Biodiversity and Conservation Division provided comment on Revision 2 of this plan during a teleconference held with Neville Hattingh (Element Environment) and Emilie Mascarenhas (Cambium Group). In response to this meeting, Table 5.1 of this BMP was updated.

3 EXISTING ENVIRONMENT

3.1 Topography

The Project site is located on a plateau in the Southern Tablelands area of New South Wales. The maximum altitude of this plain is 700 m. The deeply incised Bungonia Gorge lies immediately to the south of the mine and rugged hilly terrain occurs beyond this.

The Project site is relatively flat to gently undulating.

3.2 Hydrology

Marulan Creek, which is a 4th order stream, occurs to the north of the mine at the location of the proposed Marulan Creek Dam. It has a highly disturbed catchment and supports pollution tolerant macroinvertebrate fauna and a fish community dominated by the introduced Mosquito Fish (Niche, 2018a).

A number of ephemeral drainage channels occur through the middle of the Project site, which would only provide very limited flow during high rainfall events.

There are a number of small farm dams which occur throughout the Project site. There are no wetlands within or adjacent to the development.

The gorges of Bungonia and Barbers creeks are located downstream of the mine and consist of bedrock with large boulders, supporting little macrophyte growth. The much larger Shoalhaven River system has a variety of pool and riffle habitats, substrates and macrophytes. The surface water assessment (Advisian, 2018) and the ground water assessment (AGE, 2018) indicated that there would be negligible impact to stream flow or surface/ground water quality from the Project (Niche 2018)

3.3 Native vegetation communities

The majority of native vegetation present within the Project site has been subject to historic clearing and grazing. Regeneration of these areas has occurred over the past 40 years when logging ceased. As a result, much of the native vegetation contains a relatively open woodland/forest structure with eucalypts of a similar age.

Areas that have been extensively cleared are a combination of native pasture/introduced pasture with scattered eucalypts. These more open areas are typically used for foraging by goats, rabbits and kangaroos, which has resulted in areas of bare ground.

Five native and one non-native Plant Community Types (PCTs) have been described and mapped in the disturbance footprint (Niche, 2020). The native vegetation has different condition classes as there are obvious differences in structure and quality. The PCTs and their conservation status are summarised in Table 3.1 and shown in Figure 3.1 and Figure 3.2.

Table 3.1 Plant community types (PCTs)

PCT	Conservation status	Condition	Area (ha)
PCT 1334 Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands (SR670)	Critically Endangered Ecological Community (CEEC) under BC Act and EPBC Act	Medium	48.8
		Poor	31.9
		Acacia*	7.9
PCT 778 Coast Grey Box – stringybark dry woodland on slopes of the Shoalhaven Gorges -Southern Sydney Basin (SR534)	Not listed	Medium	57.9
		Poor	7.5
PCT 1150 - Silvertop Ash - Blue-leaved Stringybark shrubby open forest on ridges, north east South Eastern Highlands Bioregion (SR624)	Not listed	Medium	13.7
		Poor	2.6
PCT 731 - Broad-leaved Peppermint - Red Stringybark grassy open forest on undulating hills, South Eastern Highlands Bioregion (SR524)	Not listed	Medium	12.0
PCT 1334 Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands (SR670) – BEST FIT	Not listed	Non EEC, water dependent	0.1
Non-native vegetation			70.0
Total			252.4
Total native vegetation			182.4

* consisting of planted and regenerating Acacias and occasional Eucalypts. Not a CEEC under the EPBC Act.

Figure 3.1
Vegetation communities in the approved disturbance area

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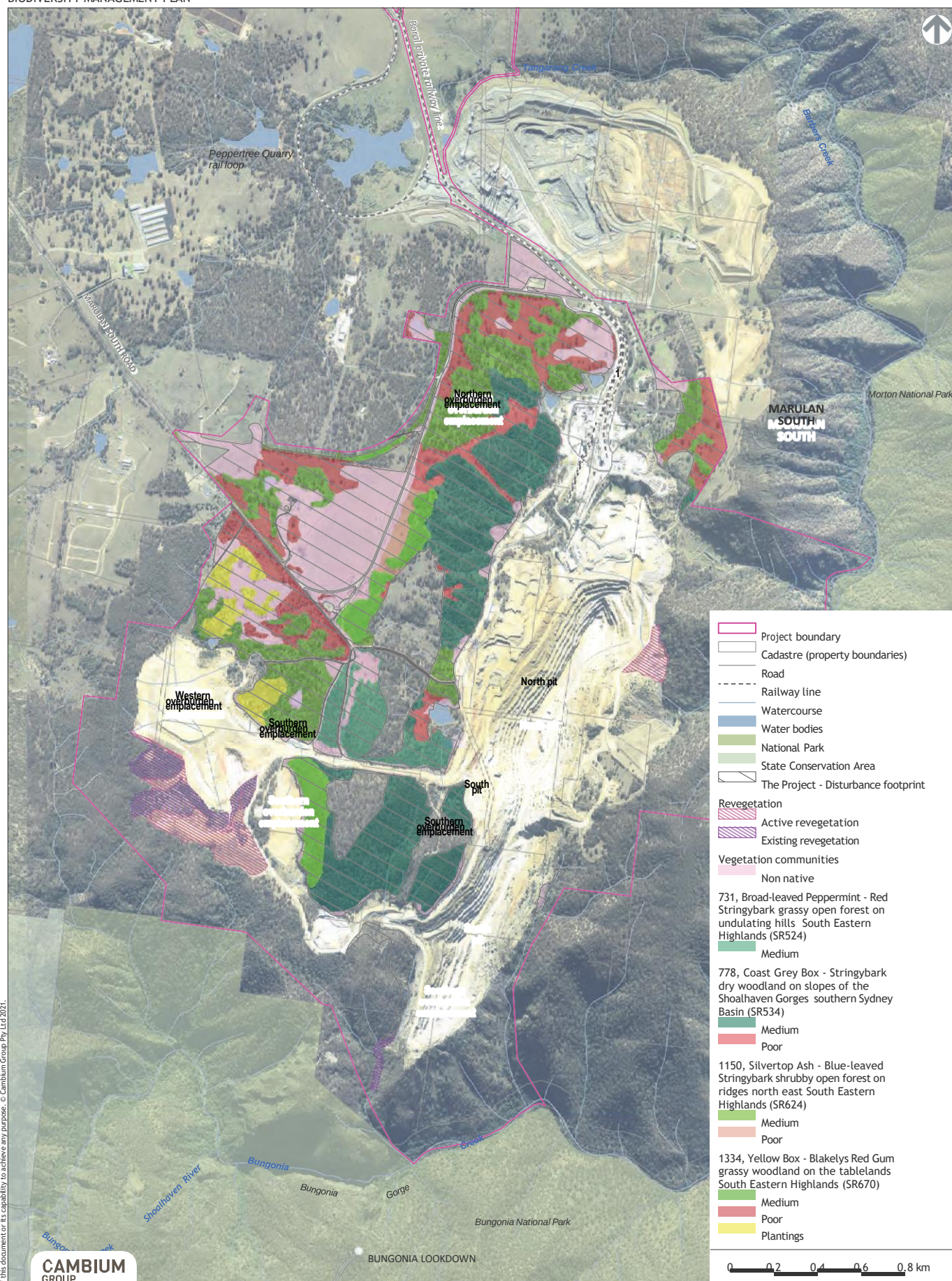
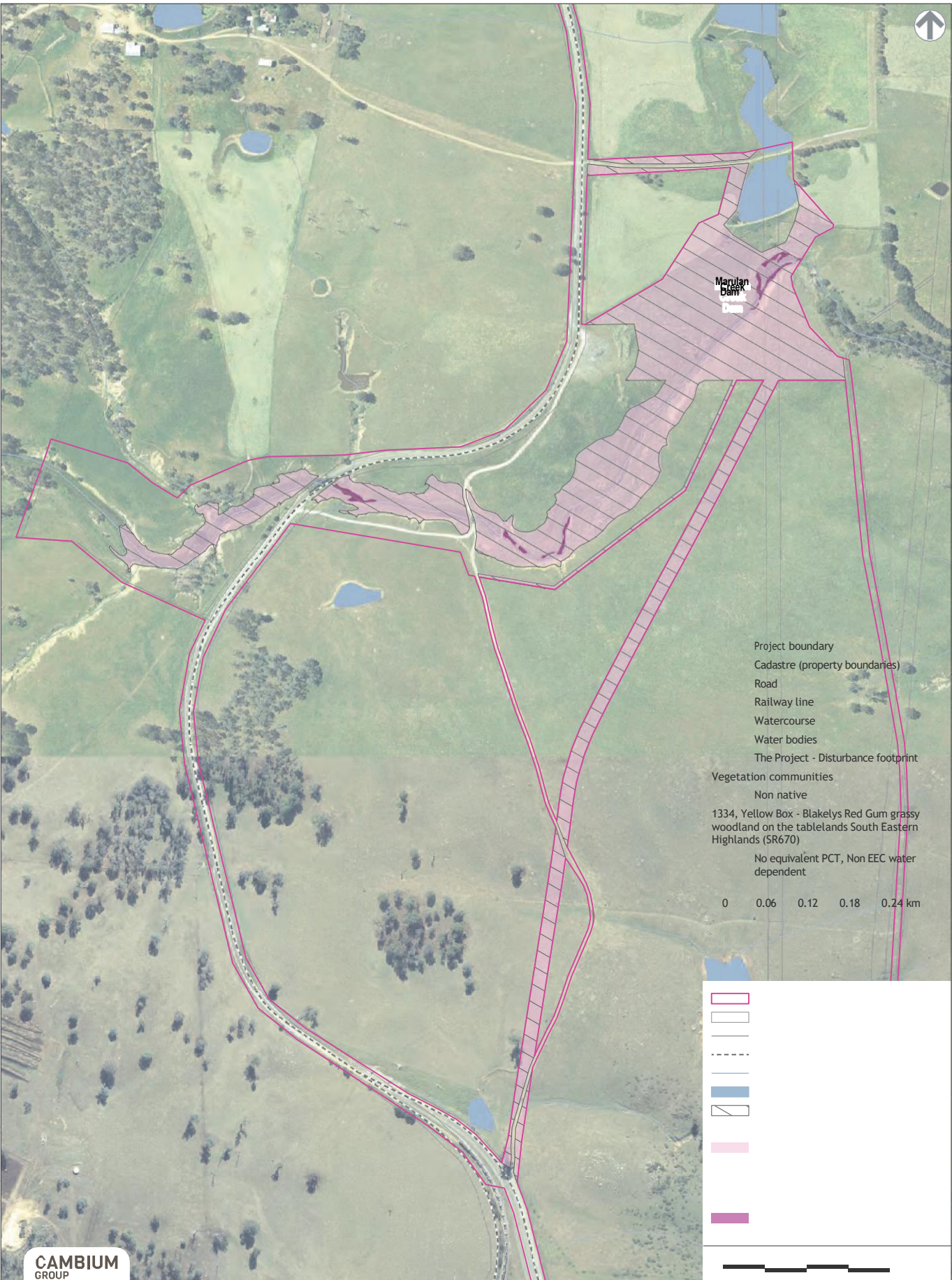


Figure 3.2
Vegetation communities in the approved disturbance area - Marulan Creek Dam

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3.4 Fauna habitats

The BDAR (Niche, 2020) describes 3 broad fauna habitat types. The condition of these habitats has been impacted by disturbances including selective clearing, weed invasion, historic cattle grazing, macropod grazing and feral animals.

3.4.1 Grassy Woodland

Grassy Woodland areas within the overburden emplacement areas are dominated by PCT1334 Yellow Box - Blakely's Red Gum grassy woodland. Habitat within these areas is variable due to previous disturbance. Where there is consistent canopy cover, trees are predominantly young mature trees or advanced regeneration, however large trees occur sporadically. Acacia thickets are common in areas where there has been recent soil disturbance. The shrub layer is typically limited in density and diversity throughout. There are occasional tree hollows and logs associated with larger trees however such features are uncommon and hollows are generally limited to small size classes (< 20 cm in diameter, frequently 5 to 10 cm).

3.4.2 Dry Sclerophyll Forests

The Dry Sclerophyll Forests vary in character from the lower elevation slopes and gullies to higher elevation areas. Lower areas primarily support a naturally higher cover of woody shrubs within the understorey and groundcover, and there has been limited to no disturbance from grazing cattle. Such areas have been previously logged however, which has limited the development of large hollow bearing trees and the presence of large logs. Higher areas of Dry Sclerophyll Forests are naturally more open and grassy and have also typically experienced greater levels of disturbance through grazing, diminishing the availability of fauna habitats, particularly shelter for ground-dwelling mammals.

3.4.3 Aquatic habitat

A number of dams occur within the Project site, which are typically less than 0.15 hectares in size. The dams differ in their shape and depth and accordingly the quantity and diversity of aquatic macrophyte and shallow benthic habitat. Such habitat is important in determining the diversity and abundance of vertebrate fauna. In general terms the dams are typical of farm dams in the area and include small areas of fringing low diversity aquatic macrophyte assemblages within their shallows. The dams would play a role in water supply for vertebrate fauna and may act as foraging habitat for bats, birds and frogs.

The ephemeral creeks throughout the Project site do not support permanent pools. Water from the minor ephemeral watercourses within the Project site is either diverted to small dams or percolates through the underlying bedrock.

Marulan Creek, which occurs within the Marulan Creek Dam disturbance footprint, provides an area of semi-permanent pooling. These areas are generally occupied by native water logged species including: *Typha orientalis*, *Phragmites australis*, *Cynodon dactylon*, *Juncus* species, and *Cyperus polystachyos*. These areas provide habitat for common amphibians identified during the field survey including: Beeping Froglet, Common Eastern Toadlet, Clicking Froglet, Spotted Marsh Frog and Striped Marsh Frog.

Bungonia Creek and Barbers Creek, which are located downstream of the mine, are in good stream health as indicated by the Australian River Assessment System (AUSRIVAS) assessment and the presence of key sensitive macroinvertebrate species. Fish communities in Barbers and Bungonia Creeks showed longitudinal distribution with Mountain Galaxias

(*Galaxias olidus*) only observed in upstream sites. This species is known to occur upstream of water falls/cascades that can act as a barrier to fish predation (Niche, 2018a).

The assessment of stygofauna and ground water dependent ecosystems (GDEs) concluded that, although stygofauna does not appear to be present within the area of operation, they do occur locally. The overall condition of the aquifers and their associated GDEs, including springs and river baseflow habitats is high and these habitats possess a healthy, highly complex and diverse aquatic ecosystem (Niche, 2018b).

3.5 Habitat connectivity

From a regional perspective, the habitats within the Project site are connected to extensive expanses of vegetation associated with the Shoalhaven gorge to the south and east in Bungonia State Conservation Area and Morton National Park. The land to the west is predominantly cleared for agriculture. However, scattered patches of native vegetation occur across the tableland areas, some of which is connected to the Project site. The Project site has some capacity to act as a linkage between the vegetated reserve areas and the patchy vegetation of the tablelands.

The Project site does not form part of any national landscape corridors (SEWPaC, 2012a) and no identified OEH wildlife corridors occur within the vicinity of the Project site.

3.6 Significant biodiversity values

Significant biodiversity values recorded as part of the BDAR (Niche, 2020) are outlined below and presented in Figure 3.3.

3.6.1 Threatened ecological communities

One Threatened Ecological Community (TEC) listed under the BC Act and EPBC Act was recorded in the Project site: White Box Yellow Box Blakely's Red Gum Woodland. The TEC coincides with the occurrence of PCT 1334 Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands (SR670). Three different condition classes of the TEC were recorded within the Project site. In total approximately 88.6 ha of the TEC listed under the BC Act and 80.7 ha listed under the EPBC Act will be impacted by the Project.

The Box Gum Woodland at the Project site is in a modified state, due to previous land clearing, grazing, feral pest grazing, over abundant herbivore grazing, and due to the abundance and spread of Serrated Tussock. Of the Box Gum Woodland to be impacted, approximately 31.9 ha is in poor condition comprising a scattered canopy with no shrub layer, and a mix of native and introduced grasses.

The Project would result in the removal of an already fragmented patch of modified Box Gum Woodland from the locality, however similar patches within the surrounding locality would not be impacted, including a patch to the immediate north of the Western Overburden Emplacement which is in a better condition (stratum layers intact, high species diversity) compared to the approved disturbance area. One of the best condition patches of the TEC occurs to the north-east of Peppertree Quarry. This patch is approximately 20 ha in size, and supports a higher diversity than that in the approved disturbance area.

3.6.2 Threatened flora species

During the field surveys for the BDAR (Niche, 2020), one individual of the threatened flora species - *Solanum celatum* (*S. celatum*), listed as threatened under the BC Act, was recorded

within the disturbance footprint. A large population of *S. celatum* is known to occur throughout the Bungonia region. No other threatened flora were detected.

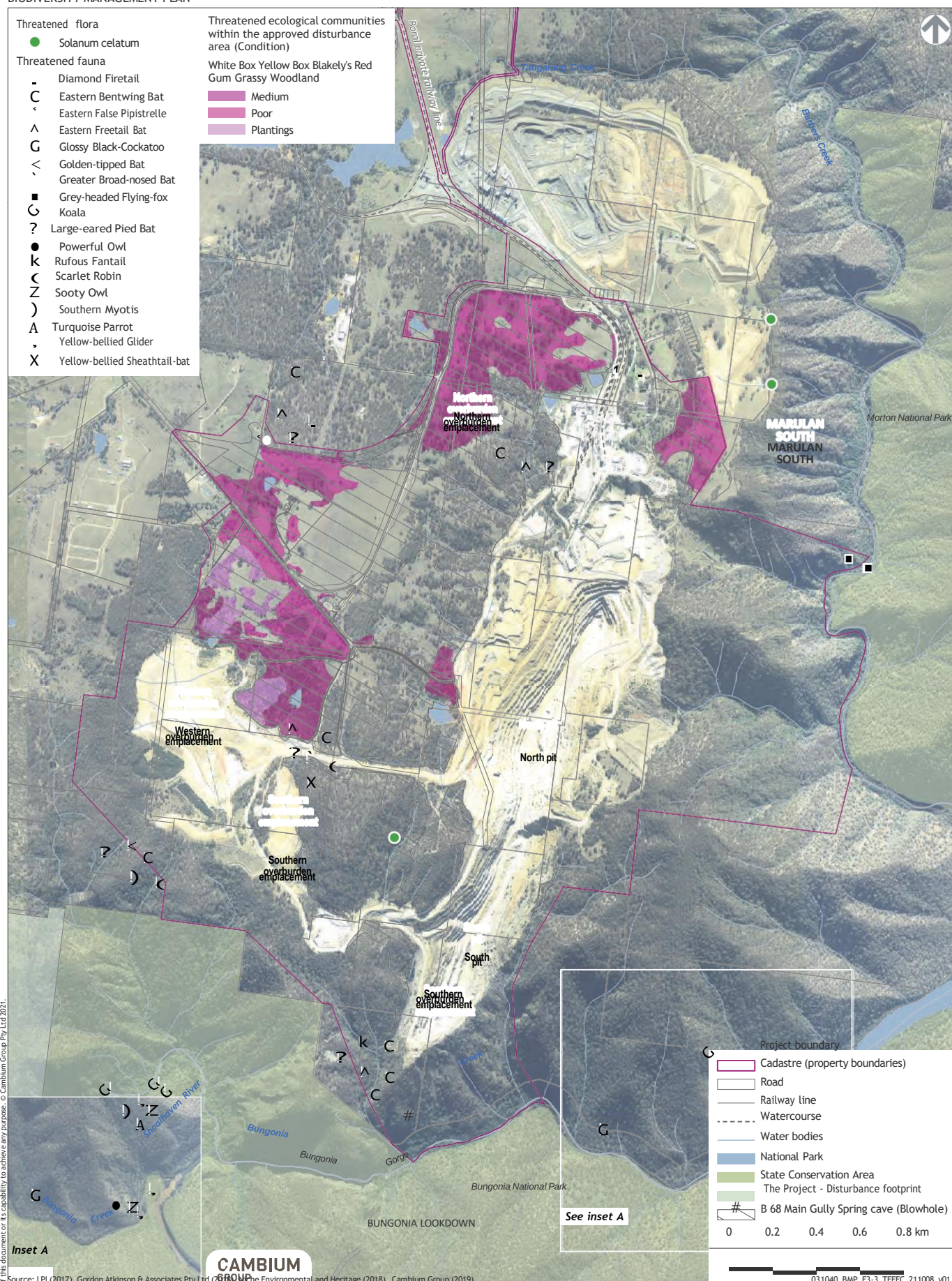
3.6.3 Threatened fauna species

The BDAR (Niche, 2020) identifies sixty-four threatened fauna that have been recorded or have predicted habitat within 10 km of the Project site.

Seven threatened fauna were recorded on the Project site (Diamond Firetail, Eastern Bent-wing-bat, Greater Broad-nosed Bat, Large-eared Pied Bat, Scarlet Robin, Eastern Free-tail Bat and Yellow-bellied Sheath-tail-bat). A further 12 species were recorded outside the Project site during the survey (Eastern False Pipistrelle, Golden-tipped Bat, Southern Myotis, Grey-headed Flying-fox, Koala, Powerful Owl, Sooty Owl, Turquoise Parrot, Varied Sittella, Glossy Black-Cockatoo, Rufous Fantail, and Yellow-bellied Glider). Most of these species were recorded away from the Project site in the extensive and intact habitat features of the Shoalhaven River.

A number of additional threatened fauna have the potential to occur within the Project site but were not recorded, most likely due to their potential use of the Project site or wider locality being limited to sporadic occurrences (e.g. nomadic birds).

Figure 3.3
Threatened flora, fauna and ecological communities within the approved disturbance area

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4 VEGETATION CLEARING MANAGEMENT

4.1 Vegetation clearing management objectives

The main objectives for vegetation clearing management are:

- to protect native trees and vegetation from inadvertent removal and disturbance during pre-construction, construction and operations;
- to minimise impacts to native fauna and their habitats; and
- to conserve and protect significant species and their habitats from damage and disturbance.

4.2 Progressive clearing

Vegetation clearing for the Project will be staged to minimise exposed areas with the potential to generate dust by completing vegetation clearing as close to the commencement of mining as practical. Staged clearing will also minimise impacts to fauna allowing time for fauna to disperse into nearby habitats.

The conceptual 30 year mine staging and rehabilitation schedule is presented in the EIS (EIS Section 4.5) and has been arranged into four stages. This is further refined by the development of the Rehabilitation Strategy required by (CoA B79). The Rehabilitation Management Plan (CoA 82) is required to show detailed staged mine plans and scheduling of clearing and progressive rehabilitation to 2025. In addition, the preparation of this Rehabilitation Management Plan and 3 year “forward program” (commencing 2022) is a requirement in accordance with Mining Amendment (Standard Conditions of Mining Leases – Rehabilitation) Regulation 2021. Vegetation clearing, land disturbance and progressive rehabilitation activities are recorded in an annual rehabilitation report.

4.3 Demarcation of disturbance boundaries and signage

Fencing and/or alternative effective markings (e.g. 2m high timber posts with brightly coloured tops or highly visible rope or tape) will be used to delineate the boundary of vegetation clearing:

- at the edge of the disturbance footprint where mining activities occur within 5 metres of native vegetation; and
- at the edge of staged clearing areas to ensure clearing does not extend into areas that have not been assessed by pre-clearance surveys.

The area outside the disturbance footprint or beyond the staged clearing boundary is to be kept free from all building materials, contaminants and other debris, and will not be used for storage of any building materials.

Signage will be used to:

- inform Project personnel and site visitors of areas of conservation value to restrict entry e.g. ‘*environmentally sensitive area*’ or ‘*restricted access area*’; and
- inform behaviour that will reduce incidental interactions with threatened species - e.g. speed limits along access roads to reduce potential for fauna vehicle strikes.

4.4 Pre-clearance surveys

Prior to clearing any vegetation within the approved disturbance areas, pre-clearance surveys will be undertaken by suitably qualified ecologists and will involve the following:

- tag and map hollow-bearing trees and other significant fauna habitats in the field. These habitat resources must not be cleared unless an ecologist is on site (see Section 4.5 below);
- assess habitat features for salvage and consider the need for nest boxes (see Section 4.6 below);
- within 21 days prior to clearing grassland, undertake surveys for ground dwelling fauna and to remove any flora/fauna habitats to adjacent areas that will not be further disturbed; and
- within 21 days prior to clearing remnant hollow-bearing trees, undertake fauna surveys including spotlighting and inspection of hollows where possible.

4.5 Clearance supervision

As soon as possible after the fauna pre-clearance surveys, all non-habitat trees will be felled.

The day prior to clearing habitat trees (which must occur within 21 days of pre-clearance fauna surveys), these trees will be shaken with machinery to encourage fauna to move out of the area.

A suitably qualified ecologist will supervise the felling of hollow-bearing trees and other significant fauna habitat identified in the pre-clearance surveys and will ensure that:

- all hollow-bearing trees that are accessible safely from the ground will be checked and identified fauna relocated;
- hollows higher up and not accessible from the ground will be identified and trees felled gently by an excavator or dozer and left overnight to allow fauna to relocate;
- any fauna displaced during clearing will be captured where possible and relocated to pre-planned areas (fauna to be captured and handled only by personnel trained to do so); and
- in the event that fauna are injured during clearing, the NSW Wildlife Information, Rescue and Education Service (WIRES) will be contacted to handle and collect for appropriate care and rehabilitation.

4.6 Salvage of fauna habitat features and installation of nest boxes

As part of the pre-clearance surveys, an assessment will be made on the salvage of habitat resources (e.g. logs and hollows) and/or installation of nest boxes. This will include:

- recommendations on the suitability, number and type of habitats features to be relocated/installed giving consideration to the type of habitat to be removed, threatened species requirements and availability of alternative habitat in the locality;
- timeframes for relocation/installation of habitat features (e.g. prior to clearing if recommended for displaced fauna);
- identification of suitable locations for relocation/installation of habitat features (e.g. retained vegetation or rehabilitation areas); and
- details on follow-up management and monitoring required, including mapping of salvaged resources.

Boral will be responsible for implementing all recommendations from the pre-clearance surveys.

4.7 Seed and vegetative material collection

Native seed collection will continue to be undertaken from onsite stands of native vegetation to provide a source of seed for use in rehabilitation. Collection of seed will commence at the early

stages of mine development and will concentrate on the proposed development area, where native vegetation will be removed, as well as associated sites. It is important that seed are collected from healthy, vigorous plants and from multiple, well-spaced individuals to encourage genetic diversity. Seed collection will also include a variety of flowering seasons and different years to account for annual variations, so that as many of the existing species as possible are sourced. Seed collection will be undertaken in accordance with the FloraBank Native Seed Collection Guidelines (FloraBank, 2021).

Planning for seed collection will consider the species, quantities and timing required to implement the Rehabilitation Strategy. Where insufficient seed is available onsite, additional seed of local provenance (i.e. from the local area) will be sourced as these plants are often better adapted to the local environmental conditions and have a greater capacity to provide habitat, food and other resources for local wildlife.

Appendix B provides an indicative species list for planting and seeding that is targeted at establishing vegetation with Box Gum Woodland characteristics, noting that the final species selection will be dependent on seed availability.

Collection and relocation of other vegetative material, in particular the salvage of habitat features, is outlined in Section 4.6.

4.8 Topsoil recovery and management

As described in the Soil, land resources and rehabilitation assessment (LAMAC, 2018), topsoil stripped from woodland areas ahead of Project related disturbance will generally contain native seedbank in the top 3-5cm. This seedbank can be useful for vegetation re-establishment, especially where direct placement of topsoil is possible. Native trees and shrubs have also been known to re-establish from roots and saplings transported with stripped topsoil.

Topsoil recovery will be undertaken ahead of major ground disturbance. Recommendations for topsoil recovery and management are provided in the Soil, land resources and rehabilitation assessment, Appendix 5 – Topsoil Management Recommendations (LAMAC, 2018) and will be implemented as specified in the Rehabilitation Strategy.

4.9 Protection of significant biodiversity

Significant biodiversity values recorded as part of the BDAR (Niche, 2020) are outlined in Section 3.6. The following sections outline the actions to protect significant biodiversity values during clearing.

4.9.1 Threatened ecological communities

Section 5 outlines the management actions that will be taken to protect and manage remnant vegetation in the Project site, including Box Gum Woodland that is to be retained outside the approved disturbance area. These management actions include those listed as '*best practice site management practices for the continued existence of Box-Gum Grassy Woodland*' in the National Recovery Plan (DECCW, 2010) including:

- maintain or improve soil conditions (e.g. demarcation of disturbance boundaries to avoid chemical or physical disturbance, Section 5.2);
- maintain or improve drainage conditions/existing hydrological regime (e.g. erosion and sediment control, Section 5.12);
- control exotic plant introductions (e.g. weed hygiene and management, Section 5.8);
- avoid inappropriate native tree planting (e.g. promote natural regeneration, Section 5.5);

- maintain or improve connectivity (e.g. natural regeneration, Section 5.5);
- maintain or improve structural diversity (e.g. demarcation of disturbance boundaries to prevent collection or clearing of fallen timber, rocks and standing dead hollow trees, Section 5.2); and
- minimise chemical use (e.g. weed management strategies that avoid overspray and impacts to non-target species, Section 5.8)

4.9.2 Threatened flora

Solanum celatum was recorded on the site during surveys undertaken for the BDAR (Niche, 2020).

Given its extremely small population size and restricted distribution, *S. celatum* is threatened by local extinction due to environmental and demographic uncertainty. Other threats include:

- habitat loss due to clearing for agriculture and urban development;
- habitat degradation, primarily by invasion of *Lantana camara*; and
- inappropriate fire regimes, particularly frequent fire.

To conserve and protect the *S. celatum* on the site the following will be undertaken:

- preclearance surveys will be conducted in accordance with Section 4.4;
- a description of the species will be included in the construction plans to ensure site personnel are aware of the species and reporting requirements;
- any new discoveries of *S. celatum* are to be recorded with GPS and this information provided to the Environmental Coordinator;
- for any new discoveries of a population of *S. celatum* in the approved disturbance area, a plan will be developed for the transplanting and/or propagation of the plants, in accordance with the Guidelines for the Translocation of Threatened Plants in Australia (Australian Network for Plant Conservation 2018 (third edition));
- livestock and vehicles will be excluded from areas outside the approved development area known to support *S. celatum*; and
- known locations of *S. celatum* within the Project site and outside the approved disturbance area will be identified with fencing (or alternative effective marking) and/or signage to minimise the risk of inadvertent impacts (e.g. weed spraying or vehicle parking).

4.9.3 Threatened fauna

As discussed in Section 3.6.3, threatened fauna have been previously recorded within the Project site and surrounds. It is therefore important that potential harm to fauna is minimised during construction and operation activities. Retention of native vegetation and the revegetation or rehabilitation areas will enhance the likelihood of the site being used as foraging habitat by threatened fauna species.

Key management actions in relation to protection of threatened fauna include:

- preclearance surveys and clearance supervision be conducted in accordance with Sections 4.4 and 4.5 respectively;
- salvage of habitats and installation of nest boxes implemented and managed as recommended by a suitably qualified ecologist (Section 4.6);
- install speed limit signage on access roads to reduce potential for fauna vehicle strikes noting that the speed limit throughout the Project site is 40km/h; and
- install fauna-sensitive lighting (high-pressure sodium lighting or luminare shields) and direct away from retained vegetation within or adjacent to the Project site.

5 REMNANT VEGETATION MANAGEMENT

5.1 Objectives for remnant vegetation management

For the purpose of this BMP, remnant vegetation includes all areas of the Project site that have not been disturbed by the construction and operation of the mine. The following management actions apply to all areas of remnant vegetation, unless otherwise specified.

The management of remnant vegetation is closely aligned with the management of rehabilitation areas, as outlined in the Rehabilitation Strategy. Accordingly, the measures presented in this BMP complement those in the Rehabilitation Strategy together with those in the Rehabilitation Management Plan and should be considered holistically. The management measures presented in this BMP and the Rehabilitation Strategy have been developed to ensure the Project site remains on a trajectory of achieving the final landform as illustrated in Figure 5.1.

The main objectives for remnant vegetation management at the Project site are:

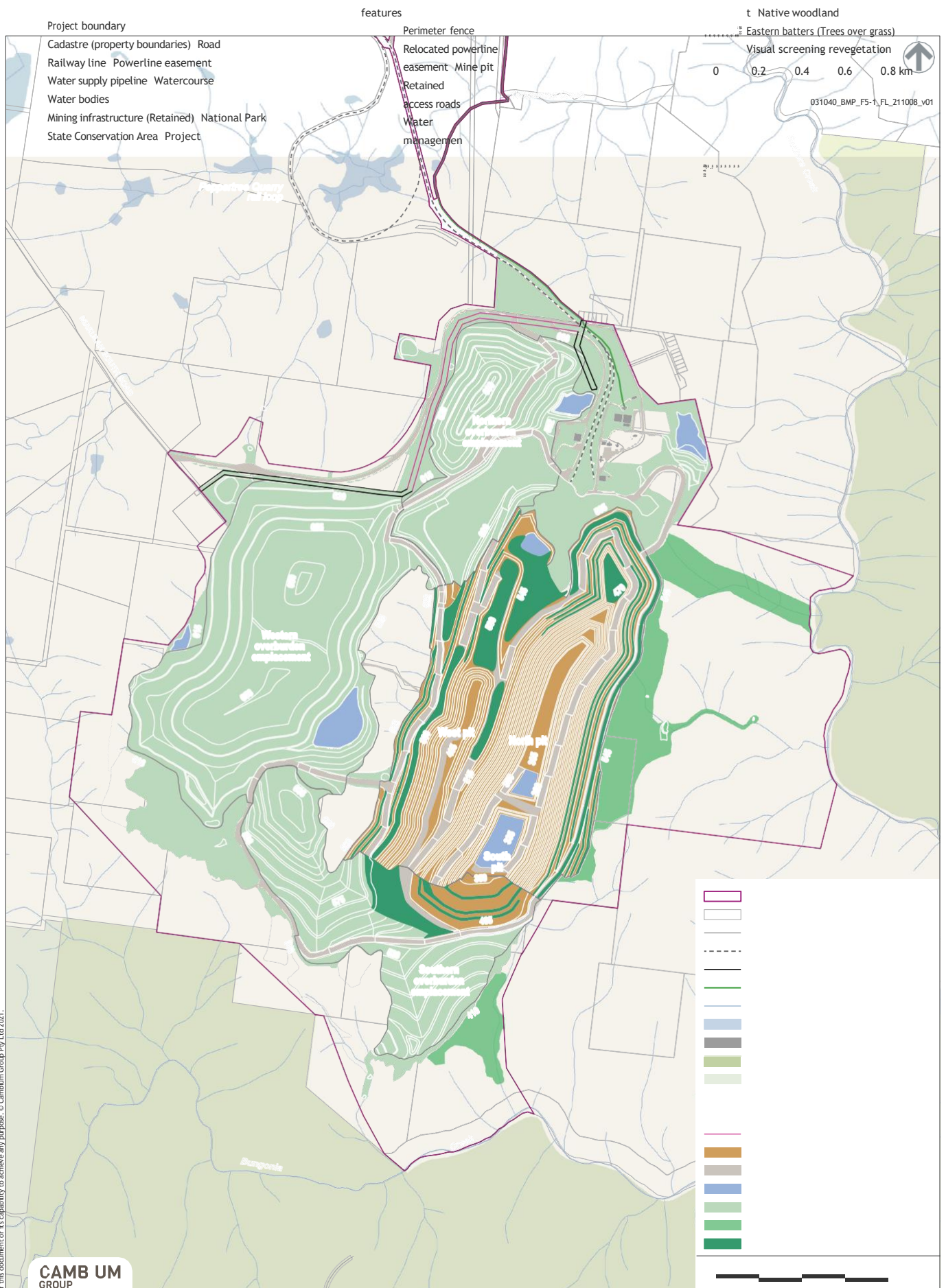
- to protect native vegetation remnants from inadvertent direct impacts;
- to maintain or improve the condition of native vegetation remnants; and
- to maintain or improve native fauna habitats.

Management of remnant vegetation includes short, medium and long term measures, which are listed in Table 5.1 and detailed in the following sections.

Table 5.1 Short, medium and long term measures to manage remnant vegetation

Management measure	Section in this BMP and other related Plans
Short term (prior to construction and during mine operation)	
Induction and training	Section 5.2
Demarcation of disturbance boundaries and signage	Section 5.2
Grazing and agriculture management	Section 5.4
Medium term (prior to construction and during mine operation and rehabilitation)	
Natural regeneration	Section 5.5
Revegetation	Section 5.6, Rehabilitation Strategy, Rehabilitation Management Plan
Enhancement of fauna habitats	Section 5.7, Rehabilitation Strategy, Rehabilitation Management Plan
Erosion and sediment control	Section 5.12, Erosion and Sediment Control Plan within the Water Management Plan
Noise, dust, vibration and light management	Section 5.13, Noise Management Plan, Air Quality and Greenhouse Gas Management Plan, Blast Management Plan
Long term (ongoing until relinquishment)	
Weed management	Section 5.8 and supported by the Weed Management Implementation Plan (Boral internal working document)
Feral animal management	Section 5.9 and supported by the Standard Operating Procedure (SOP) for pest management (Boral internal working document)
Bushfire management	Section 5.10, Bushfire Management Plan
Aboriginal heritage management	Section 5.11, Aboriginal Cultural Heritage Management Plan

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5.2 Induction and training

All employees and contractors working on the Project site will be inducted to minimise the potential environmental impacts associated with the Project. The induction will cover:

- nature of the surrounding environment;
- access restrictions to remnant vegetation areas;
- signage to ensure vehicles remain on designated roads and tracks and abide by site speed limits;
- procedures for the management of hydrocarbons and/or chemicals and the requirements for vehicles to carry spill kits; and
- management and removal of all rubbish.

If and where identified by the Environmental Coordinator, additional biodiversity specific training will be developed, implemented and delivered to relevant personnel and contractors.

5.3 Demarcation of disturbance boundaries and signage

Unrestricted access to remnant vegetation can result in degradation of areas of remnant vegetation due to:

- soil compaction;
- trampling or grazing of seedlings and young plants by livestock;
- removal of habitat features such as fallen dead timber, leaf litter, rocks and standing dead hollow trees;
- rubbish dumping or storage of materials; and
- weed spread.

In accordance with Section 4.3, fencing and/or alternative effective markings (e.g. 2m high timber posts with brightly coloured tops or highly visible rope or tape) will be used to delineate the boundary of vegetation clearing:

- at the edge of the disturbance footprint where mining activities occur within 5 metres of native vegetation; and
- at the edge of staged clearing areas to ensure clearing does not extend into areas that have not been assessed by pre-clearance surveys.

The area outside the disturbance footprint or beyond the staged clearing boundary is to be kept free from all building materials, contaminants, and other debris, and will not be used for storage of any building materials.

Signage will be used to:

- inform Project personnel and site visitors of areas of conservation value to restrict entry e.g. '*environmentally sensitive area*' or '*restricted access area*'; and
- inform behaviour that will reduce incidental interactions with threatened species - e.g. speed limits along access roads to reduce potential for fauna vehicle strikes.

5.4 Grazing and agriculture management

Grazing and agriculture will not be permitted on the Project site.

5.5 Natural regeneration

Remnant native vegetation on and adjacent to the Project site has already been degraded through clearing, weed invasion and grazing by livestock, feral pests and over abundant native herbivores. Unavoidable vegetation clearing associated with the Project will result in further fragmentation of native vegetation creating new edges along boundaries of the disturbance area, particularly where there are no existing buffers (roads, existing overburden emplacements, cleared area) between the disturbance and areas of woodland/native vegetation. This can exacerbate edge effects and limit natural regeneration, preventing seedlings from establishing due to competition from weeds, grazing pressure and trampling.

Management of remnant vegetation in accordance with this BMP, including areas of Box Gum Woodland TEC, will minimise edge effects and other indirect impacts of mine construction and operation. Management of weeds, feral animals and other indirect impacts associated with the construction and operation of the mine will assist in preventing further decline in the condition of remnant vegetation and promote natural regeneration of native vegetation and fauna habitats.

5.6 Revegetation

The Rehabilitation Strategy outlines and guides the progressive revegetation of disturbed areas including revegetation of appropriate canopy, sub-canopy, understorey and ground strata. This will enhance the quality of vegetation and provide habitat connectivity across the Project site. The objectives for native ecosystem re-establishment in rehabilitation areas include:

- establish/restore self-sustaining native woodland ecosystems;
- establish local plant community types, with a particular focus on species commensurate with *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* CEEC; and
- establish:
 - riparian habitat within any retained water features;
 - habitat, feed and foraging resources for threatened fauna species (including the Koala); and
 - vegetation connectivity and wildlife corridors, as far as is reasonable and feasible.

5.7 Enhancement of fauna habitats

Fauna habitats will be naturally enhanced as the complexity of the remnant vegetation develops through natural regeneration (Section 5.5) and as rehabilitation areas are revegetated (Section 5.6). Where recommended as part of the pre-clearance surveys (Section 4.6), salvaged habitat features and/or nest boxes will be installed, monitored and managed in suitable remnant vegetation on the Project site.

5.8 Weed management

Weeds have the opportunity to establish themselves in areas of disturbed vegetation. All areas within the Project site exhibited varying condition and weed abundance. The greatest establishment of weeds is in areas already disturbed or subject to agricultural land use, including within the Western Overburden Emplacement, northern section of the Northern Overburden Emplacement and the surrounding land. At present Boral is undertaking aerial weed spraying to maximise weed control coverage.

Extensive weed management in remnant vegetation will need to be undertaken in order to prevent further degradation and assist natural regeneration of remnant patches. Tree and shrub regeneration will help shade out and out-compete high threat and other weeds in remnant patches, to create more resilient and sustainable native woodland communities.

Ongoing management of priority weeds is being implemented by a suitably qualified contractor in accordance with the annual Weed Management Implementation Plan (Section 5.8.4). Annual reviews occur to assess the effectiveness of the weed control measures during the preceding years and detail any necessary changes to weed control measures.

Relevant resources for the management of weeds include:

- High Threat Weeds list (DPHI 2020b);
- NSW weed control handbook – A guide to weed control in non-crop, aquatic and bushland situations (DPI 2018);
- National Heritage Trust Introductory Weed Management Manual (CRC for Australian Weed Management, 2004);
- WeedWise website (DPI 2021); and
- Local Weed Management Plan (Goulburn Mulwaree Council, 2019).

5.8.1 Weed and pathogen hygiene

There is potential for weeds and plant pathogens (e.g. *Phytophthora cinnamomi*) to be introduced and spread within the Project site during mine construction and operation via machinery carrying seed/propagules. Best practice weed hygiene measures will be implemented to minimise the spread of weeds including:

- ensuring that plant and equipment is free of weeds prior to being brought to the site;
- undertake site inductions and training on weed hygiene measures;
- avoid all unnecessary movement across site by people, vehicles and machinery, particularly when weeds are in seed;
- clean equipment used for treating weed infestation prior to moving to a new area within the site to minimise the likelihood of transferring any plant material and soil; and
- seek weed free declarations for any material brought onto site.

5.8.2 High threat weeds recorded at the Project site

During the field surveys five high threat weeds as listed under the BC Act were recorded within the BAM plots during the biodiversity assessment (Niche, 2020). High threat weed species recorded include: *Nassella trichotoma* (Serrated Tussock), *Lycium ferocissimum* (African Box Thorn), *Chloris gayana* (Rhodes Grass), *Hypericum perforatum* (St Johns Wart) and *Paspalum dilatatum* (Dallas Grass).

The abundance and cover of Serrated Tussock was quite high across most of the flora plots conducted for the BDAR (Niche, 2020), in particular within the open areas which have been historically grazed. It is likely that this species would continue to expand throughout the patches and outcompete native groundcover. To minimise damage to native vegetation, early detection is essential and careful control of isolated plants is recommended. Revegetation with indigenous species is needed to prevent further infestation (CRC for Weed Management, 2003).

5.8.3 Other weed species

Other weed species that occur in the site include exotic grasses and herbs, introduced pasture grasses, non-indigenous plants or native plants that are either beyond their natural range,

hybridised with indigenous plants or threaten local vegetation communities. New weed species could also spread from nearby infestations and become established on the site. These weeds will be managed where they are considered a threat to the attainment of biodiversity objectives and progress towards the final landform.

5.8.4 Weed management implementation

Weed management is applicable to all areas in the Project site including remnant vegetation, mine operational areas and rehabilitation areas.

A Weed Management Implementation Plan will be prepared every year to guide management strategies and actions for the following 12 months. Preparation of the plan will involve:

- a site inspection during Spring/early Summer to identify and map areas of weed infestation, focusing on Weeds of National Significance and Priority Weeds listed under the Biosecurity Act 2015;
- identification of priority species and target patches, taking into account the size and density of the population, potential impact on surrounding habitat and potential for spread;
- suitable control measures (e.g. refer to NSW WeedWise website) including strategies to minimise chemical use in areas of Box Gum Woodland e.g. through techniques such as spot-spraying, basal pruning, stem injection or cut and paint application;
- timing for implementation of control measures, taking into account time of high visibility (i.e. flowering time) and preventing seed set; and
- details on follow-up treatment of recently controlled areas.

The Weed Management Implementation Plan will be suitable for tender documentation for implementation by suitably qualified contractors and will be publically available via Boral's website. A site inspection for the 2025 Weed Management Implementation Plan will be undertaken during Spring/early Summer 2024 and a copy of the Plan will be provided to DPE by the end of February 2025.

5.9 Feral animal management

Feral animals known from the area that threaten flora and fauna include rabbits, foxes, goats, pigs, cats, deer and hares.

A Standard Operating Procedure (SOP) for pest management will be prepared to outline the pest control strategy for the site. The SOP will be developed in consultation with NPWS and Local Land Service (LLS) where required and will be publically available via Boral's website. Boral will provide the SOP to DPE within 3 months of approval of this BMP. The SOP will be consistent with the relevant threat abatement plans including:

- Threat abatement plan for competition and land degradation by unmanaged goats (DEWHA 2008);
- Threat abatement plan for predation by European red fox (DEWHA 2008);
- Threat abatement plan for predation by feral cats (DoE 2015);
- Threat abatement plan for competition and land degradation by rabbits (DoEE 2016); and
- Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (DoEE 2017).

Feral animal monitoring will be undertaken during the annual Rapid Visual Assessment (RVA) (Section 7.3) and by regular observation by Boral Environmental staff.

The following will be undertaken:

- annual monitoring (Rapid Visual Assessment) and regular observation for the presence/signs of feral animals (rabbits, foxes, goats, pigs, cats, deer and hares)
- NPWS undertakes aerial culls of feral goats on a regular basis. The site will support the NPWS's culling program;
- a baiting program for foxes and wild dogs based on the monitoring above in line with Local Land Services and NPWS programs;
- management of rabbits in line with LLS best practice and regional programs;
- if monitoring or regular observation by Boral Environmental staff identifies the need for additional feral animal controls to be implemented at the Project site, best practice methods will be applied; and
- any feral animal control will be undertaken by trained and experienced contractors.

5.10 Bushfire management

Management of fire is an important and complex issue. Management must aim to achieve long term conservation of natural communities balanced against the ongoing protection of life and property within adjacent land. Boral has a detailed Emergency Management Plan (EMP) for the mine site. One of the components of the EMP is the Bushfire Management Plan. This plan was updated in 2020 and reviewed and approved by the Rural Fire Service (RFS) in September 2020. Contact details were updated in 2022.

5.11 Aboriginal heritage management

Boral has committed to demarcate and protect all identified sites within 20 m of the Project disturbance footprint. Biodiversity management actions at these sites will be in accordance with the Aboriginal Cultural Heritage Management Plan to ensure that the management of remnant vegetation does not cause any direct or indirect impacts on any identified heritage items.

5.12 Erosion and sedimentation control

Erosion of soils during construction and operation of the Project may involve the following:

- alteration of soil structure beneath infrastructure items and roads;
- increased surface water flow from the disturbance area during rain events into woodland areas which has the potential to result in erosion; and
- deposition of soil particulates in drainage lines and within remnant vegetation.

Erosion and sedimentation control measures will be implemented during the construction and operation of the mine to limit the erosion and sedimentation caused by the Project. The specialist studies prepared for the EIS identified mitigation measures to contain the potential for erosion and sedimentation to the disturbance area, which will be incorporated into the Water Management Plan. The rehabilitated landforms will be designed to shed water without causing excessive erosion or increasing downstream pollution (LAMAC, 2018).

An Erosion and Sediment Control Plan is required as part of the Water Management Plan in accordance with CoC B45 which includes:

- identification of activities that could cause soil erosion, generate sediment or affect flooding;
- a program to periodically review sheet, rill and gully erosion risks, particularly in relation to emplacement areas;
- a program to monitor the geomorphological stability of emplacement areas, in consultation with WaterNSW;

- a description of measures to minimise soil erosion and the potential for the transport of sediment to downstream waters, and manage flood risk;
- a description of the location, function, and capacity of erosion and sediment control structures; and
- a description of what measures would be implemented to maintain (and if necessary decommission) the structures over time.

5.13 Other indirect impacts from mine construction and operation

Additional indirect impacts to remnant vegetation and fauna habitats resulting from mine construction and operation include increased dust, noise, vibration and light.

Such impacts will largely operate on a short to medium timeframe (i.e. the life of the mine) and will be minimised through management procedures and processes.

The specific indirect impacts and how they relate to the biodiversity of the Project site, along with corresponding mitigation measures are discussed in detail in Table 10 of the BDAR (Niche, 2020) and summarised below in Table 5.2. The mitigation measures provided are consistent with industry best practice to ensure that mitigation is effective and have been incorporated into the relevant management plans.

Table 5.2 Indirect impacts and mitigation measures from mine construction and operation

Indirect impact	Likely (unmitigated) impacts on biodiversity	Mitigation measures	Expected success of mitigation measures
Dust	- increase susceptibility of plants and vegetation to secondary stresses (e.g. drought, insects and pathogens) - any impacts likely to be localised	- prepare and implement an Air Quality and Greenhouse Gas Management Plan - implement dust suppression activities and manage construction and operations during windy conditions to minimise dust emissions - progressive vegetation clearing as close to the commencement of mining as practical	Current dust suppression and mitigation works are on-going at the mine. Air Quality and Greenhouse Gas Management Plan.
Noise	fauna have historically been exposed to noise impacts immediately surrounding the Project site for many years (since 1869) due to the ongoing mining operations at the site	- prepare and implement Noise Management Plan, which will reduce noise exposure to fauna occupying surrounding bushland - implement noise monitoring as per the Noise Management Plan	The Project is unlikely to result in any significant decline in fauna populations and their habitats within the locality or an increase in edge effects
Vibration	- blasting is currently conducted within the existing mine with no reported impacts on known caves - there is an ongoing history of mining within the existing south pit throughout which any roosting bats would have persisted if present	- prepare and implement Blast Management Plan - implement blast vibration and noise monitoring	Vibration from the blasting associated with the Project is unlikely to result in any impacts to the fauna habitat including caves known to occur within the locality
Artificial lighting	- potential for artificial lighting to influence the behaviour of both nocturnal and diurnal species - the lighting impacts have been occurring from the existing operations for many years	- reduce lighting to the lowest level possible that also maintains an appropriate standard of safety and security and to minimise obtrusive lighting - in-pit lighting will be directed downward to reduce the lateral spread of light - overburden emplacements will form a light barrier to vehicle headlights where possible	Whilst it is indicated by research that potential impacts may arise from artificial light, given the history of lighting impacts at the Project site, it is unlikely that the Project would result in any significant decline in fauna populations and their habitats within the locality or an increase in edge effects

6 BIODIVERSITY PERFORMANCE INDICATORS AND COMPLETION CRITERIA

Biodiversity management will be periodically measured and assessed to determine whether remnant vegetation management measures are attaining the management objectives. Specific and measurable progress indicators and completion criteria have been extrapolated from the management objectives. These criteria consist of values or standards that indicate if remnant vegetation is resilient, sustainable and consistent with the final landform.

Preliminary completion criteria associated with the rehabilitation areas are provided in the Rehabilitation Strategy.

Table 6.1 Objectives, performance indicators, completion criteria and timeframes for remnant vegetation management

Remnant vegetation management objective	Performance indicators	Completion criteria	Timeframe	Monitoring method* and triggers	Remedial actions and timeframe
Protect native vegetation remnants from inadvertent direct impacts.	Disturbance boundaries clearly mark and signage installed.	- No impact beyond the approved disturbance area. - Annual inspections confirm integrity of disturbance boundary fencing/ markings and signage is maintained. - Annual inspections find no evidence of access breaches or contamination.	Installation pre-construction. Maintenance during mine operation and landform development phase of rehabilitation.	RVA (annual) RVA monitoring reports - impacts beyond the approved disturbance boundary. - damaged/removed fencing/markings and signage - evidence of access breaches or contamination	- Cease construction works near remnant vegetation until boundary demarcation is complete. - Repair damaged disturbance boundary fencing/ markings and replace signage as necessary. - Review induction process for employees and contractors. Work near remnant vegetation to cease immediately. Remedial actions to be implemented within one month of the trigger being identified in the monitoring report.
	No evidence of grazing or agriculture within the Project site.	No grazing or agriculture within the Project site.	Pre-construction to relinquishment	RVA (annual) RVA monitoring reports evidence of grazing/agriculture within the Project site.	Remove grazing livestock. Remedial action to be implemented within one month of the trigger being identified in the monitoring report.
	Erosion and sedimentation controlled in accordance with the Erosion and	No evidence of sedimentation and erosion impacts in remnant vegetation.	During mine operation and landform development phase of rehabilitation.	RVA (annual) RVA monitoring reports evidence of sedimentation and erosion impacts on remnant vegetation.	Review implementation of erosion and sediment control measures. Remedial actions, including

	Sediment Control Plan.				planning, to commence within 1 month of the trigger being identified in the monitoring report.
Protection and enhancement of Box Gum Woodland CEEC outside the disturbance boundary	Natural regeneration progressing towards reference and benchmark values.	The Vegetation Integrity score (derived from the BAM calculator) determines if the condition of Box Gum Woodland and other remnant vegetation is maintained or improved relative to reference data and benchmark values.	Ongoing	BAM (biennial) BAM monitoring reports lower VI score relative to reference data and benchmark values over 2 consecutive monitoring events.	- Install tube stock or establish native seed. - Implement additional remedial actions recommended from BAM monitoring. - Consider introducing additional habitat features including salvaged logs, hollows and nest boxes. Remedial actions, including planning actions, to commence within one month of the trigger being identified in the monitoring report.
Maintain or improve the condition of native vegetation remnants.	Natural regeneration.	Regeneration of native canopy and shrub species observed.	Ongoing.	BAM (biennial), RVA (annual) BAM monitoring reports an absence of regenerating native canopy and shrub species in BAM plots and RVA monitoring reports little to no regeneration outside BAM plots	- Install tube stock or establish native seed. - Implement additional remedial actions recommended from BAM and RVA monitoring. Remedial actions, including planning actions, to commence within one month of the trigger being identified in the monitoring report.
	Weed management implemented.	- No new large weed infestation. - Exotic plant cover <20% - High Threat Weeds <5%	Ongoing.	BAM (biennial), RVA (annual) BAM monitoring reports exotic plant cover >20% or High Threat Weed cover >5% or RVA monitoring	Review and/or increase weed management. Remedial actions, including planning actions, to

				reports new large weed infestations	commence within one month of the trigger being identified in the monitoring report.
	Feral pest management implemented.	Control as per SOP results in low impact of feral pests	Ongoing.	RVA (annual) RVA monitoring reports damage from feral pests within the Project site or feral pest numbers that are likely to cause damage.	Review and/or increase feral pest management. Remedial actions, including planning actions, to commence within one month of the trigger being identified in the monitoring report.
	Bushfire risk managed in accordance with the Bushfire Management Plan.	Any bushfire ignition within the Project site is contained within containment boundaries and risk minimisation measures implemented.	Ongoing.	RVA (annual) Bushfire ignition not contained within the containment boundaries and risk minimisation not implemented.	Review bushfire management. Review completed within 3 months of the trigger being identified in the monitoring report.
Maintain or improve native fauna habitats.	Fauna habitat features present.	Salvaged habitat from cleared areas or nest boxes installed if recommended as part of pre-clearance surveys (Section 4.6)	During vegetation clearing phase	RVA (annual) RVA monitoring reports salvaged habitat from cleared areas or nest boxes not installed as recommended as part of pre-clearance surveys.	Introduce additional habitat features including salvaged logs, hollows and nest boxes Remedial actions, including planning actions, to commence within one month of the trigger being identified in the monitoring report.

*Details of Rapid Visual Assessments (RVA) and Biodiversity Assessment Method (BAM) provided in Section 7

7 BIODIVERSITY MONITORING

7.1 Overview of the monitoring program

Biodiversity monitoring will be undertaken to:

- assess the effectiveness of the management measures presented in Chapters 4 and 5;
- assess progress against the performance indicators presented in Chapter 6; and
- identify improvements that could be implemented to improve biodiversity outcomes.

Monitoring methods relevant to remnant vegetation are provided below. The monitoring methods relevant to rehabilitation areas are provided in the Rehabilitation Strategy and currently include the use of ecosystem function analysis methodology.

7.2 Biodiversity Assessment Method

Biodiversity Assessment Method (DPHI, 2020a) will be used to monitor the condition of areas of Box Gum Woodland and other remnant vegetation outside the approved disturbance area relative to the reference site and benchmark data (section 7.2.1 and 7.2.2 respectively). BAM monitoring will be undertaken on a biennial basis in Spring by suitably qualified consultants. Indicative monitoring locations are shown in Figure 7.1.

BAM monitoring will be used to assess changes in the structure, composition and function of the vegetation and key fauna habitats in remnant vegetation. The BAM is a method defined under the BC Act which has been developed for the consistent and streamlined assessment of biodiversity values within NSW. The BAM is described in DPHI (2020a) and includes survey of a range of attributes within a 20 x 50 metre plot. The attributes collected are then entered into the BAM calculator to generate scores for composition, structure, function and vegetation integrity. The scores are based on comparison with standard benchmarks for the relevant PCT.

Attributes measured by the BAM include:

- plant species richness in each growth form group;
- native vegetation cover in each growth form group;
- fallen logs;
- hollow-bearing trees;
- leaf litter cover;
- high threat exotic cover; and
- stem size classes (regeneration).

The outcomes of BAM monitoring will assist in guiding adaptive actions to achieve biodiversity objectives (e.g. if overstorey is not regenerating towards reference / benchmark values, this may result in further management actions such as planting tubestock).

7.2.1 Box Gum Woodland reference site

Box Gum Woodland that occurs in close proximity to the mine is likely to best represent a realistic target for measuring biodiversity outcomes for this community. This vegetation will provide a realistic target for vegetation community composition and structure, taking into account local environmental conditions and possible local constraints to management outcomes.

The Peppers Woodland area is within Boral's existing landholdings to the north of the mine. Previous surveys of the Peppers Woodland area were undertaken as part of Boral's Peppertree

Quarry Modification 4 application (Niche, 2016). These surveys mapped Box Gum woodland (Blakely's Red Gum – Yellow Box – Grassy open woodland), which was classified in two management zones (MZs) reflecting differences in the condition of the vegetation. MZ1 consists of 29.38ha of moderate/good_high and MZ2 consists of 6.53ha of moderate/good_other Box Gum Woodland according to BioBanking criteria for vegetation condition.

Three BAM monitoring plots have been established in MZ1 within the Peppers Woodland area as part of the ecological monitoring program for Boral's Peppertree Quarry (Figure 7.1). The average data from the 3 reference plots will provide the reference condition against which the condition of Box Gum Woodland in remnant vegetation at the mine will be assessed.

7.2.2 Benchmark values

The BAM allows a direct comparison of survey results to benchmark data for Plant Community Types (PCTs) within NSW. Field data collected at each monitoring site will be entered into the BAM calculator to generate an overall vegetation integrity score. This provides an indication of how similar the vegetation at the monitoring sites is to the benchmark values for the target PCT.

Vegetation integrity scores for all monitoring plots will be used to assess progress towards published benchmark values and progress towards completion criteria.

7.3 Rapid Visual Assessment

The RVA provides a formal framework to document, respond and review new and emerging threats to remnant vegetation on an annual basis.

RVAs will complement BAM monitoring and regular observations by Boral Environmental Staff to ensure the Project site remains on a trajectory of achieving the completion criteria.

Each Spring, all areas of rehabilitation and remnant vegetation will be systematically traversed by vehicle or by foot and assessed for regeneration, disturbance and threats including (but not limited to):

- evidence of regeneration;
- presence of mine rubbish;
- evidence of grazing;
- presence of exotic weeds and feral animal species (in the context of the Weed Management Implementation Plan (section 5.8.4) and Pest Management SOP (section 5.9));
- presence of domestic litter / rubbish;
- fire disturbance;
- presence of salvaged habitat and nest boxes (in accordance with the recommendations of pre-clearance surveys (section 4.6));
- evidence of nearby maintenance activities (i.e. chemical treatments, fencing, earthworks); and
- surface stability and erosion issues, including eroding factor (i.e. wind, water) and erosion type (i.e. sheet, rill/gully, pedestal, terracette, scalding).

The following information will be collected for each observation point:

- details of the observation;
- photo;
- co-ordinates; and
- status (new, ongoing, closed).

A report card will be prepared providing details and a map of all observation points. Recommendations for remedial action will be provided as required and in accordance with

Table 6.1. Outcomes of the RVA will also be reported against performance criteria provided in Table 6.1.

Any 'new' or 'ongoing' observation sites will be revisited in the subsequent year to determine if the observation has been adequately addressed as per Table 6.1. If the issue has been addressed, the observation point will be marked as 'closed' and will not need to be revisited in the subsequent year.

7.3.1 Photo point monitoring

Photo point monitoring will coincide with RVA inspections and will be established throughout the rehabilitation areas and remnant vegetation within the Project site. Photos will be captured at each photo reference point in five directions (north, east, south, west and ground) to provide a visual record of:

- rehabilitation works;
- changes to ground cover and vegetation structure; and
- emerging threats such as erosion or weed infestations.

7.4 Aquatic biodiversity and GDE monitoring

7.4.1 Baseline monitoring

In accordance with the recommendations of the EIS, the aquatic biodiversity survey locations will be surveyed in autumn and spring for one year after the start of the 30-year mine plan to add to the baseline data and capture temporal variation in stream health. Additionally, baseline monitoring of macroinvertebrates at GDE survey sites along Main Gully will also be undertaken as this creek was not previously sampled as part of the aquatic biodiversity assessment.

The methods for both aquatic biodiversity and GDE surveys will be consistent with the methods in the aquatic biodiversity assessment for the EIS (Niche, 2018a) as summarized below:

- Sampling sites will replicate those in the EIS for the aquatic ecology and also include GDE sites along main gully as shown in Figure 7.2, noting that only sites that hold sufficient water for the aquatic biodiversity field assessment methods will be included in the baseline monitoring;
- A visual assessment of aquatic habitat will be conducted using the AUSRIVAS proforma;
- Due to the difficult access to monitoring sites, the water quality portion of monitoring will refer to surface water monitoring and ground water monitoring data collected in accordance with the Surface Water Management Plan and Ground Water Management Plan respectively. However, where possible, alkalinity may be measured for use in the AUSRIVAS model;
- Macroinvertebrate field sampling, laboratory identification and data analysis will be in accordance with AUSRIVAS methods; and
- Fish monitoring will occur at opportunistic locations within proximity to the macroinvertebrate sampling sites using an array of visual, netting and trapping techniques (including fyke netting, the use of baited fish traps, seine nets and visual observations including nocturnal surveys).

7.4.2 Ongoing monitoring

After the first year of monitoring, additional monitoring will be undertaken if a surface water quality trigger threshold is exceeded on consecutive monitoring events and if additional

assessment finds that the change in water quality may be mining induced (refer to Surface Water Management Plan).

Boral will contract a suitably qualified ecologist to determine if the exceedance is likely to affect aquatic ecology and GDEs and to design/conduct an aquatic ecological monitoring program if required. This monitoring will:

- be conducted up and downstream of the impacted site;
- be consistent with this Biodiversity Management Plan and the Water Management Plan;
- use methods appropriate for the level of assessment; and
- be conducted at a frequency and over a timeframe appropriate for the level of assessment.

Figure 7.1
Indicative BAM monitoring locations in retained vegetation and reference site

MARULAN SOUTH Limestone MINE CONTINUED OPERATIONS
BIODIVERSITY MANAGEMENT PLAN

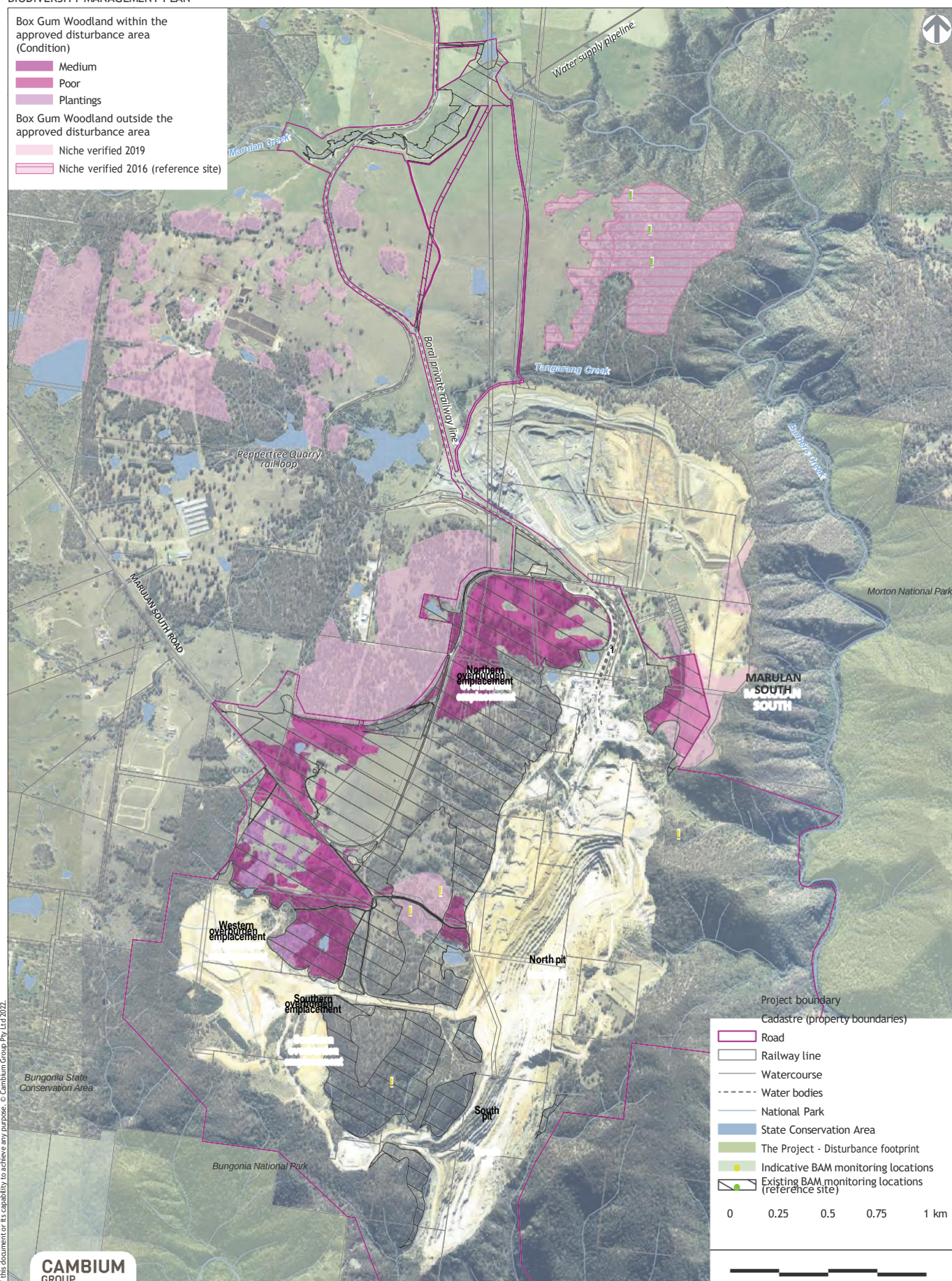
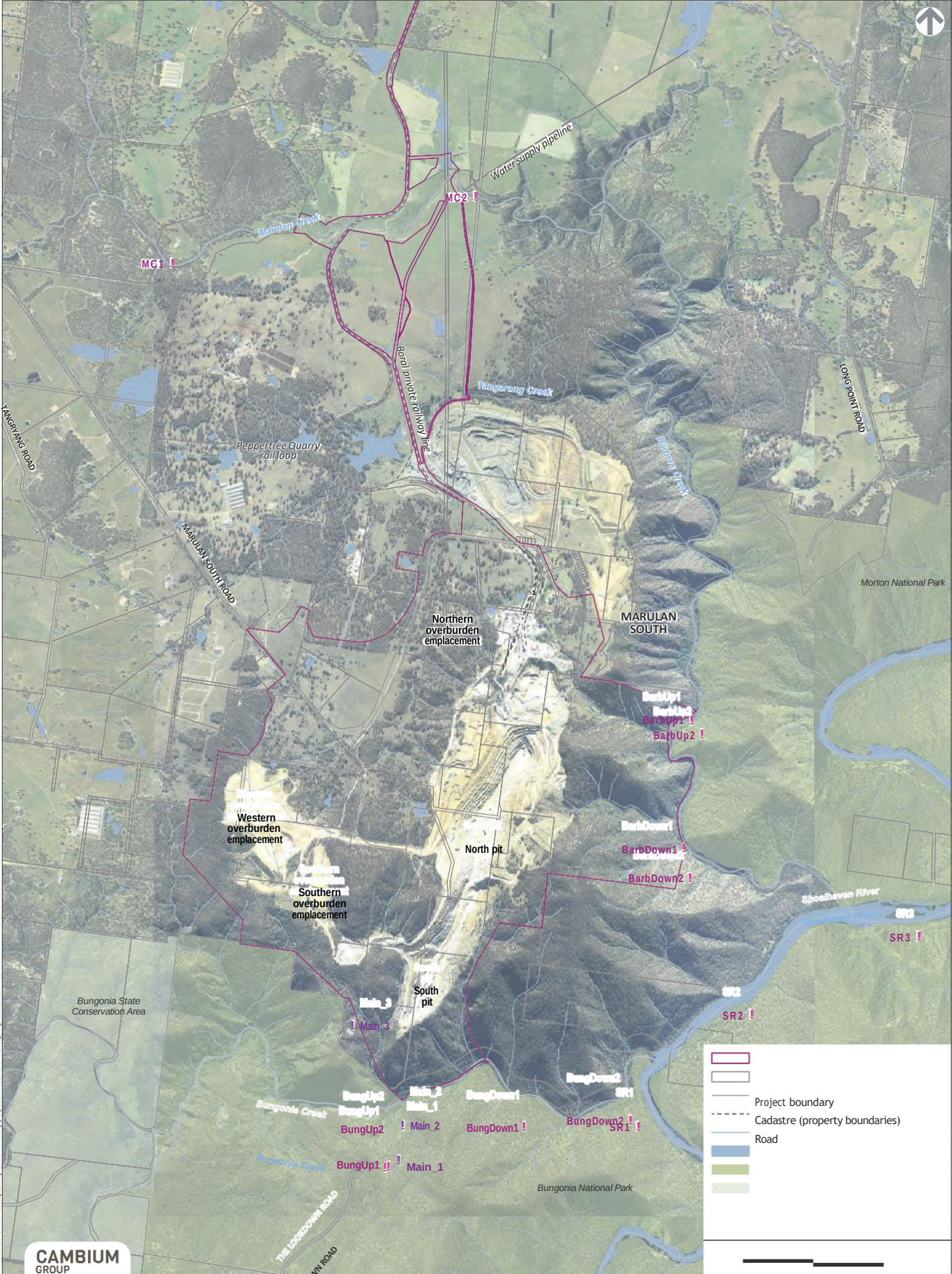


Figure 7.2
Aquatic ecology and GDE baseline monitoring locations



MARULAN SOUTH LIMESTONE MINE CONTINUED OPERATIONS
BIODIVERSITY MANAGEMENT PLAN



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Source: LPI (2017), Gordon Atkinson & Associates Pty Ltd (2018), Niche Environment and Heritage (2016, 2018), Cambium Group (2022).

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● GDE monitoring locations
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8 CONTINGENCY PLAN

Risks to the successful implementation of this BMP include:

- BMP non-compliance;
- Failure to implement the biodiversity offset strategy;
- Failure to meet performance indicators and completion criteria; and
- Impacts of extreme climatic events.

Table 8.1 identifies the key risk elements to the BMP, triggers for corrective action and the response to be implemented.

Table 8.1 Risk elements, triggers and responses to the successful implementation of this BMP

Risk Element	Trigger	Response	Timeframe for response
BMP compliance	• BMP not implemented as approved or not delivering outcomes. • Failure of responsible parties to complete required actions	• Review BMP and provide alternative/adaptive management actions to achieve success, update if required. • Review roles and responsibilities, update if required. • Review induction procedures, update if required.	Commence review within 1 month of the trigger being identified.
Offset sites	• Delay in securing Biodiversity Stewardship Agreement for Property 1.	• Review reason and responsibility for delay. • Notify and negotiate timeframe with the Planning Secretary to minimise impacts on the Project. • Consider the need to meet the residual species credit requirements using a different mechanism (e.g. payment to the Biodiversity Conservation Fund).	Commence review within 1 month of the trigger being identified.
Completion criteria	• RVA and BAM monitoring indicates performance indicators and completion criteria are not being met.	• Implement remedial actions in Table 6.1 • Review influence on success of other factors (e.g. extreme climatic conditions, disease). • Review management actions and identify new or revised management actions (e.g. additional planting, increase weed management). • Continue to monitor and review attainment of criteria.	Review and implement remedial actions in accordance with Table 6.1
Climate	• Extreme events that affect BMP success e.g. bushfire, drought	• Review management actions and update to keep Project progressing towards completion criteria. • Consider the impact of climatic conditions on timeframes for attainment of completion criteria and adjust if required.	Commence review within 1 month of the trigger being identified.

9 ENVIRONMENTAL PERFORMANCE REVIEW AND IMPROVEMENT PROGRAM

9.1 Annual review and compliance reporting

In accordance with CoC D11, by the end of July each year after the commencement of development, or other timeframe agreed by the Planning Secretary, a report will be submitted to the Department reviewing the environmental performance of the development, to the satisfaction of the Planning Secretary.

The activities and performance outcomes of the BMP will be presented in the Annual Environmental Management Report (AEMR). The report includes a detailed assessment of monitoring results, an evaluation of any trends occurring across the site, any community/stakeholder complaints or non-conformances with licences/criteria and recommendations for management actions.

The AEMR will be made publicly available on Boral's website and at the site office.

9.2 Continuous improvement

Each year following the annual review outlined in Section 9.1 and every three years after the independent environmental audit detailed in CoC D13, Boral will review this BMP. This BMP will be updated if necessary, with findings from the annual review, independent environmental audit, and biodiversity monitoring, to promote continuous improvement.

If changes are required to the BMP, it will be resubmitted to the Planning Secretary for approval within six weeks of the review. The most recent version of this BMP, as approved by the Planning Secretary, will be implemented.

The approved BMP will be made publicly available on Boral's website and at the site office.

10 INCIDENT AND NON-COMPLIANCE MANAGEMENT

10.1 Regulatory compliance

Boral will undertake regular site inspections and biodiversity monitoring (Section 7) to verify compliance with all biodiversity management requirements detailed in the development consent and this BMP.

All biodiversity management measures identified in this BMP will be included in the site's Environmental Permit Planner to manage compliance to these commitments.

10.2 Incident reporting

In accordance with CoC D9 Boral will immediately notify the Department and any other relevant agencies after it becomes aware of an incident resulting in unauthorised biodiversity impacts. The notification will be in writing through the Department's Major Projects Website and identify the development (including the development application number and name) and set out the location and nature of the incident.

The development consent defines an 'incident' as:

"An occurrence or set of circumstances that causes or threatens to cause material harm and which may or may not be or cause a non-compliance".

Material harm is defined as:

"harm to the environment that:

- involves actual or potential harm to the health or safety of human beings or to the environment that is not trivial, or
- results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding \$10,000 (such loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment)

This definition excludes "harm" that is authorised under either this consent or any other statutory approval"

10.3 Non-compliance reporting

The development consent defines a 'non-compliance' as:

"An occurrence, set of circumstances or development that is a breach of this consent".

In accordance with CoC D10 Boral will, within seven days of becoming aware of a biodiversity non-compliance, notify DPHI of the non-compliance. The notification will be in writing through the Department's Major Projects Website and identify the development (including the development application number and name), set out the condition of this consent that the development is non-compliant with, why it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance.

The Site Manager (or delegate) is responsible for reporting exceedances or incidents causing (or threatening to cause) material harm to biodiversity to the DPHI.

10.4 Complaints protocol

After receiving a biodiversity complaint, the Environment Coordinator will undertake further investigations to verify the complaint and obtain additional details required to ascertain the cause of the complaint.

Where further investigations into the complaint are undertaken, the findings and any corrective action will be discussed with the complainant.

Biodiversity related complaints received by Boral will be recorded in a complaints register which will include the following details where available:

- The date and time of the complaint;
- The method by which the complaint was made;
- Any personal details of the complainant which were provided by the complainants or, if no such details were provided, a note to that effect;
- The nature of the complaint;
- The action taken by Boral in relation to the complaint, including any follow-up contact with the complainant; and
- If no action was taken by Boral, the reasons why no action was taken.

The overarching complaints protocol for the mine, which provides further details on how all complaints will be received, recorded, handled and responded to is described in the EMS.

11 REFERENCES

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- CRC for Weed Management (2003) Weed management guide – Serrated tussock (*Nassella trichotoma*).
- DECCW (2010) National Recovery Plan for White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland. Department of Environment, Climate Change and Water, Sydney.
- DEWHA (2008) Threat Abatement Plan for predation of the European red fox.
- DOE (2015) Threat Abatement Plan for predation by feral cats.
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- DOEE (2017) Threat Abatement Plan for the predation, habitat degradation, competition and disease transmission by feral pigs.
- DPI (2018) NSW Weed Control Handbook: a guide to weed control in non-crop, aquatic and bushland situations. NSW Department of Primary Industries.
- DPI (2020) NSW WeedWise Website: <https://weeds.dpi.nsw.gov.au>
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- Florabank Guidelines – best practice guidelines for native seed collection and use (2021) Second edition. <https://www.florabank.org.au/guidelines>
- Goulburn Mulwaree Council (2019) Local Weed Management Plan.
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- Niche Environment and Heritage (2016) Peppertree BioBank Site, Marulan Site NSW: BioBanking Assessment Report. Prepared for Boral Resources (NSW) Pty Ltd
- Niche Environment and Heritage (2018a) Marulan South Limestone Mine Continued Operations – Aquatic Assessment. Prepared for Boral Cement Limited, November 2018.

Niche Environment and Heritage (2018b) Marulan South Limestone Mine Continued Operations – Stygofauna and Ground Water Dependent Ecosystem Assessment. Prepared for Boral Cement Limited, November 2018.

Niche Environment and Heritage (2020) Marulan South Limestone Mine Continued Operations – Biodiversity Development Assessment Report. Prepared for Boral Cement Limited, May 2020.

OEH (2011) Code of Practice for Injured, Sick and Orphaned Protected Fauna. Office of Environment and Heritage, NSW.

OEH (2011) Code of Practice for Injured, Sick and Orphaned Koalas. Office of Environment and Heritage, NSW.

OEH (2012) Code of Practice for Injured, Sick and Orphaned Flying-foxes. Office of Environment and Heritage, NSW.

APPENDIX A

Evidence of consultation

Condition	Comment	Response	Section updated
B54			
(a) be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary;	Suitably qualified and endorsed by Planning Secretary.	Agreed	
(b) be prepared in consultation with BCD;	This is BCD's first review of the draft BMP, March 2022	Agreed	
(c) describe the short, medium, and long-term measures to be undertaken to manage the remnant vegetation and fauna habitat on the site and within the offset areas;	In table 5.1 short/medium/long terms aren't temporally defined. Objectives or targets are not defined with the reported measures reading as high level actions; suggest defining short/medium/long term targets and associated actions to achieve each.	Temporal definition of short, medium and long term added to Table 5.1. Objectives for management of remnant vegetation are provided in Section 5.1 Further details on the actions associated with the short/medium/long term measures are provided in the sections 5.2– 5.13.	Table 5.1
(d) describe how biodiversity management would be integrated with similar measures within other management plans, including the Rehabilitation Management Plan referred to in condition B82;	1.3.2 alignment with other plans – lists six other plans. Alignment between overarching measures in table 5.1 and other plans would be beneficial.	Alignment with the Rehabilitation Strategy and Rehabilitation Management Plan has been added to Section 4.2 and is provided within the text in Chapter 5 and other sections as relevant.	Section 1.3.2, Section 4.2
(e) include detailed performance and completion criteria for evaluating the performance of the Biodiversity Offset Strategy and include triggers for remedial action, where these performance or completion criteria are not met;	Section 2.6 Not included. Noting that the strategy provided does include measures to meet the credit obligations, though these obligations are not quoted.	As per Section 2.6, this will be addressed in the management plans set up under the BSAs. Triggers and response for establishing the offset sites are provided in Chapter 8. Credit obligations added to Section 2.6	Section 2.6
(f) describe how the Biodiversity Offset Strategy will be implemented and secured;	Section 2.6 Offset strategy is provided highlighting two main sources of credits, and includes a commitment to retire credits prior to the commencement of construction unless otherwise agreed to by the Planning Secretary is made.	Agreed	

(g) describe the measures to be implemented within the approved disturbance areas to:			
(i) minimise the amount of clearing;	Section 4.2, 4.3 4.2 Progressive clearing is said to be staged, but clarity around what is meant by staged or how this relates to minimising clearing isn't provided.	Section 4.2 – additional detail provided regarding mine staging and clearing schedules. Section 4.3 – demarcation of disturbance boundaries and signage will ensure clearing is only undertaken within the approved disturbance boundary.	Section 4.2
ii) minimise impacts on fauna, including undertaking pre-clearance surveys and measures to minimise the risk of vehicle strike;	Section 4.3, 4.4, 4.5, 4.9.3, 5.2. 4.9.3 what will speed be restricted to? Throughout the site or only portions? Please clarify.	Section 4.9.3 updated to clarify that the speed limit throughout the Project site is 40km/h.	Section 4.9.3
(iii) provide for the salvage, transplanting and/or propagation of any threatened flora found during preclearance surveys, in accordance with the Guidelines for the Translocation of Threatened Plants in Australia (Vallee et al., 2004); and	To note: reference in the CoA are for a previous version, the BMP correctly references the current version.	Agreed	

(iv) maximise the salvage of resources, including tree hollows, vegetation and soil resources, for beneficial reuse, including fauna habitat enhancement;	Discussed in section 4.6 Not specific about what would make habitat resources suitable for translocation. No commitments to timeframes for relocation or installation. No information provided about size or installation requirements for nest boxes. No plan for follow-up management or monitoring commitments / requirements of salvaged resources. No targets for salvaged materials / decision making framework for when nest boxes would be used as a suitable substitute. Need to include information on nest box dimensions / parameters. Need to include commitments / method to map and monitor salvaged resources.	Section 4.6 states that these details will be developed as part of the preclearance surveys (which will be undertaken by suitably qualified ecologists). Section 5.7 commits to implementing the recommendations from the preclearance surveys. Section 4.6, dot point 1 Section 4.6, dot point 2 Section 4.6, dot point 1 Section 4.6, dot point 4 Section 4.6, dot point 1 Section 4.6, dot point 1 Section 4.6, dot point 4 updated to include mapping	Section 4.6
(h) describe the measures to be implemented on the site to:			

(i) minimise impacts to White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC including potential edge effects within identified buffer zones, and contribute to conservation strategies for this CEEC;	Section 4.9.1, overarching action statements, ensure links to table 6.1 Section 5 Table 5.1 define short, medium and long term; Table 6.1, include performance triggers that would require remedial action to be implemented Table 6.1, include timeframe for delivery of remedial action from when trigger is activated/realised Include updated monitoring if/where remediation has been applied.	Section 4.9.1 provides examples of management measures (Chapter 5) that protect TECs in accordance with the National Recovery plan. The links have been made clearer by cross-referencing the relevant sections. These management measures are presented as performance indicators in Table 6.1. Temporal definition of short, medium and long term added to Table 5.1. Triggers and timeframes for remedial actions added to Table 6.1.	Section 4.9.1, Section 5.1, Table 6.1
(ii) minimise impacts on fauna habitat resources such as hunting and foraging areas, habitat trees, fallen timber and hollow-bearing trees;	Section 5.7 (with links to 4.6) Need to include actual commitments to ensure fauna habitat resources are either salvaged or replaced. Must include triggers/decision framework for when nest boxes would be required. Add a map (or add to an existing map) that shows where salvaged resources would be relocated to or where next boxes to replace lost habitat resources would be placed. Nest box install parameters, such as size, height etc, needs to be documents to guide future installs.	Section 4.6 states that these details will be developed as part of the preclearance surveys (which will be undertaken by suitably qualified ecologists). Section 5.7 commits to implementing the recommendations from the preclearance surveys. Section 4.6, dot point 1. Section 4.6, dot point 3 - to be determined as part of the pre-clearance surveys Section 4.6, dot point 1	

(iii) enhance the quality of vegetation, vegetation connectivity and wildlife corridors including through the assisted regeneration and/or targeted revegetation of appropriate canopy, sub-canopy, understorey and ground strata;	Section 5.6, rehabilitation management plan has not been provided for review.	The Rehabilitation Strategy has been prepared which outlines and guides the progressive revegetation of disturbed areas.	Section 5.6
(iv) introduce naturally scarce fauna habitat features such as nest boxes and salvaged tree hollows and promote the use of these introduced habitat features by threatened fauna species;	See previous comments on section 4.6 and 5.7	See previous responses	
(v) manage any potential conflicts with Aboriginal heritage values;			
(vi) protect vegetation and fauna habitat outside of the approved disturbance areas;			
(vii) manage the collection and propagation of seed from the local area;	Details deferred to the rehabilitation management plan which has not been reviewed by BCD.	Section 4.7 updated to include details on seed collection.	Section 4.7
(viii) control weeds, including measures to avoid and mitigate the spread of weeds;	Details deferred to the weed management implementation plan which has not been reviewed by BCD.	Section 5.8 provides details on the approach to controlling weeds, including measures to avoid and mitigate the spread of weeds. The Weed Management Implementation Plan is part of this approach and will be prepared every year to provide targeted management strategies and actions for the following 12 months.	
(ix) control feral pests and diseases with consideration of actions identified in relevant threat abatement plans;	Will be deferred to a Standard Operating Procedure for pest management in consultation with LLS and NPWS.	Agreed	
(x) control erosion;	Deferred to an erosion and sediment control plan as part of the water management plan	Agreed	
(xi) manage any grazing and agriculture;			
(xii) control access to vegetated or revegetated areas; and			
(xiii) manage bushfire hazards			

(i) include a seasonally-based program to monitor and report on the effectiveness of the above measures, progress against the detailed performance indicators and completion criteria, and identify improvements that could be implemented to improve biodiversity outcomes;	7.2.2 include the target benchmark values in the plan. Include trigger points, numeric targets where possible, for when targeted remediation would be required (ie the VI score is x below target benchmark).	Trigger points added to Table 6.1 Numerical trigger/target values have been provided for exotic plant cover and High Threat Weed cover. A numerical value for triggers/targets has not been assigned for Vegetation Integrity (VI) scores since the completion criteria is to maintain or improve <i>relative to</i> reference data and benchmark values. The first round of monitoring will provide the baseline VI score. Changes in this value at subsequent monitoring events, relative to the benchmark value, will be interpreted in the context of the reference site to take into account natural annual variation.	Table 6.1
(j) identify the potential risks to the successful implementation of the Biodiversity Management Plan, and include a description of the contingency measures to be implemented to mitigate against these risks	Section 8 / Table 8.1 Include timeframes for responses.	Timeframes added to Table 8.1	Table 8.1
(k) include details of who would be responsible for monitoring, reviewing, and implementing the plan			
D5 Management plans required under this consent must be prepared in accordance with relevant guidelines, and include:			
(a) Summary of relevant background or baseline data;	Table 3.1 add additional information such as target benchmark vegetation integrity scores	As above, the first round of monitoring will provide the baseline VI score. Changes in this value at subsequent monitoring events will be interpreted in the context of the reference site to take into account natural annual variation.	
(b)(i) The relevant statutory requirements (including any relevant approval, licence or lease conditions);			
(b)(ii) Any relevant limits or performance measures and criteria;	See previous comments on table 6.1	Triggers and timeframes for remedial actions added to Table 6.1.	Table 6.1

(b)(iii) The specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures	See previous comments on table 6.1	Triggers and timeframes for remedial actions added to Table 6.1.	Table 6.1
(C) Any relevant commitments or recommendations identified in the document/s listed in condition A2			
(d) A description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;			
(e)(i) Impacts and environmental performance of the development;			
(e)(ii) Effectiveness of the management measures set out pursuant to condition D4	Section 8 Timelines for when a trigger is activated/realised to the implementation of the response to be included.	Timeframes added to Table 8.1	Table 8.1
(f) A contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	Section 8 Timelines for when a trigger is activated/realised to the implementation of the response to be included.	Timeframes added to Table 8.1	Table 8.1
(g) A program to investigate and implement ways to improve the environmental performance of the development over time;			
(h)	Complaint protocol not included.		
(h)(i) A protocol for managing and reporting any: complaint	Complaint protocol not included.	Complaint protocol added to Section 10.4.	Section 10.4
(h)(ii) A protocol for managing and reporting any: failure to comply with other statutory requirements			

(i) Public sources of information and data to assist stakeholders in understanding environmental impacts of the development;			
(j) A protocol for periodic review of the plan.			

APPENDIX B

Indicative species list for planting and seeding

Indicative species list for planting and seeding

Species	Species
<i>Eucalyptus melliodora</i>	<i>Crassula sieberiana</i>
<i>Eucalyptus bosistoana</i>	<i>Cymbonotus lawsonianus</i>
<i>Eucalyptus amplifolia</i>	<i>Cynoglossum australe</i>
<i>Eucalyptus blakelyi</i>	<i>Cynoglossum suaveolens</i>
<i>Eucalyptus eugenioides</i>	<i>Daucus glochidiatus</i>
<i>Allocasuarina littoralis</i>	<i>Dianella longifolia</i>
<i>Myoporum montanum</i>	<i>Dichondra</i> spp.
<i>Olearia viscidula</i>	<i>Dichopogon fimbriatus</i>
<i>Lissanthe strigosa</i>	<i>Einadia hastata</i>
<i>Cassinia arcuata</i>	<i>Einadia nutans</i> subsp. <i>nutans</i>
<i>Acacia brownii</i>	<i>Einadia trigonos</i>
<i>Acacia deanei</i>	<i>Eryngium ovinum</i>
<i>Acacia genistifolia</i>	<i>Euchiton sphaericus</i>
<i>Daviesia leptophylla</i>	<i>Geranium retrorsum</i>
<i>Dillwynia sieberi</i>	<i>Geranium solanderi</i>
<i>Pimelea curviflora</i>	<i>Gonocarpus tetragynus</i>
<i>Aristida ramosa</i>	<i>Goodenia hederacea</i>
<i>Aristida vagans</i>	<i>Hydrocotyle laxiflora</i>
<i>Austrostipa bigeniculata</i>	<i>Hypericum gramineum</i>
<i>Austrostipa densiflora</i>	<i>Lagenophora stipitata</i>
<i>Austrostipa rudis</i>	<i>Laxmannia gracilis</i>
<i>Austrostipa scabra</i>	<i>Lepidium pseudohyssopifolium</i>
<i>Bothriochloa macra</i>	<i>Mentha diemenica</i>
<i>Carex inversa</i>	<i>Microtis parviflora</i>
<i>Dichelachne rara</i>	<i>Microtis unifolia</i>
<i>Echinopogon caespitosus</i>	<i>Opercularia diphylla</i>
<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	<i>Oxalis chnoodes</i>
<i>Microlaena stipoides</i>	<i>Oxalis perennans</i>
<i>Panicum effusum</i>	<i>Plantago varia</i>
<i>Poa meionectes</i>	<i>Poranthera microphylla</i>
<i>Poa meionectes</i>	<i>Schenkia australis</i>
<i>Poa sieberiana</i>	<i>Scutellaria humilis</i>
<i>Rytidosperma caespitosum</i>	<i>Sebaea ovata</i>
<i>Rytidosperma laeve</i>	<i>Senecio quadridentatus</i>
<i>Rytidosperma pallida</i>	<i>Sigesbeckia orientalis</i> subsp. <i>orientalis</i>
<i>Schoenus apogon</i>	<i>Stylidium graminifolium</i>
<i>Sorghum leiocladum</i>	<i>Tricoryne elatior</i>
<i>Sporobolus creber</i>	<i>Veronica plebeia</i>
<i>Themeda triandra</i>	<i>Vittadinia cuneata</i>
<i>Acaena echinata</i>	<i>Vittadinia</i> spp.
<i>Ajuga australis</i>	<i>Wahlenbergia communis</i>
<i>Asperula conferta</i>	<i>Wahlenbergia gracilis</i>
<i>Bossiaea prostrata</i>	<i>Wahlenbergia luteola</i>

<i>Chrysocephalum apiculatum</i>	<i>Wahlenbergia stricta</i>
<i>Chrysocephalum semipapposum</i>	<i>Zornia dyctiocarpa</i> var. <i>dyctiocarpa</i>
<i>Convolvulus erubescens</i>	<i>Cheilanthes sieberi</i>

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