NARRABRI MINE

BIODIVERSITY MANAGEMENT PLAN

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WHC_PLN_NAR_BIODIVERSITY MANAGEMENT PLAN

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Acronyms and abbreviations

Acronym	Description
BAM	Biodiversity Assessment Method
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BC Regulation	*Biodiversity Conservation Regulation 2017* (NSW)
BCS	The Biodiversity Conservation and Science Directorate within the EES Group of DPE
BCT	Biodiversity Conservation Trust
BDAR	Biodiversity Development Assessment Report
BMP	Biodiversity Management Plan
CCC	Community Consultative Committee
CoC	Conditions of Consent
DPE	NSW Department of Planning and Environment
EEC	Endangered Ecological Community
EES	Department of the Environment, Energy and Science (a sub department of DPE)
EIS	Environmental Impact Statement
EMS	Environmental Management Strategy
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EP&A Regulation	*Environmental Planning and Assessment Regulation 2021* (NSW)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)
ESCP	Erosion and Sediment Control Plan
ETL	electricity transmission line
GHGE	Greenhouse gas emissions
GSC	Gunnedah Shire Council
ha	hectare
HSE	Health Safety and Environment
IEA	Independent Environmental Audit
km	kilometre
LW	longwall panel
m	metre
m^2	metres squared
mgbl	depth in metres below ground level
ML	mining lease
MLA	mining lease application
MNES	Matter of National Environmental Significance
Mt	million tonnes
Mtpa	million tonnes per annum
NCOPL	Narrabri Coal Operations Pty Ltd

Acronym	Description
NSC	Narrabri Shire Council
NSW	New South Wales
OEH	The former NSW Office of Environment and Heritage
PCT	Plant Community Type
POEO Act	*Protection of the Environment Operations Act 1997* (NSW)
RAP	Registered Aboriginal Party
ROM	run of mine
TARP	trigger action response plan
WHC	Whitehaven Coal Limited

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1. Introduction

1.1 Background

The Narrabri Mine is an existing underground coal mining operation situated in the Gunnedah Coalfield, approximately 25 kilometres (**km**) southeast of Narrabri and approximately 60 km northwest of Gunnedah, within the Narrabri Shire Council (**NSC**) Local Government Area, in New South Wales (**NSW**). It is operated by Narrabri Coal Operations Pty Ltd (**NCOPL**), on behalf of the Narrabri Mine Joint Venture[1], which consists of two Whitehaven Coal Limited's (**WHC**) wholly owned subsidiaries, and other joint-venture partners.

Stage 1 was approved in November 2007 (as PA 05_0102) under Part 3A of the *Environmental Planning and Assessment Act 1979* (**EP&A Act**). Development of Stage 1 included site establishment and the construction of coal processing infrastructure commencing in 2008, with production using continuous miner mining methods up to 2.5 million tonnes per annum (**Mtpa**) commencing in 2010.

Project Approval 08_0144 for Stage 2 of the Narrabri Mine was issued under Part 3A of the EP&A Act in 2010, which allowed the Narrabri Mine to convert to a longwall mining operation to extract coal from the Hoskissons Coal Seam. Project Approval 08_0144 allowed for the production and processing of up to 11 Mtpa of Run of Mine (**ROM**) coal until July 2031. Approval under the *Environment Protection and Biodiversity Conservation Act 1999* (**EPBC Act**) was granted on 21 January 2011 (**EPBC 2009/5003**) and the Narrabri Mine converted to a longwall mining operation within Mining Lease 1609, in 2012. Following the determination of Stage 2, PA 05_0102 for Stage 1 was surrendered on 2 August 2011.

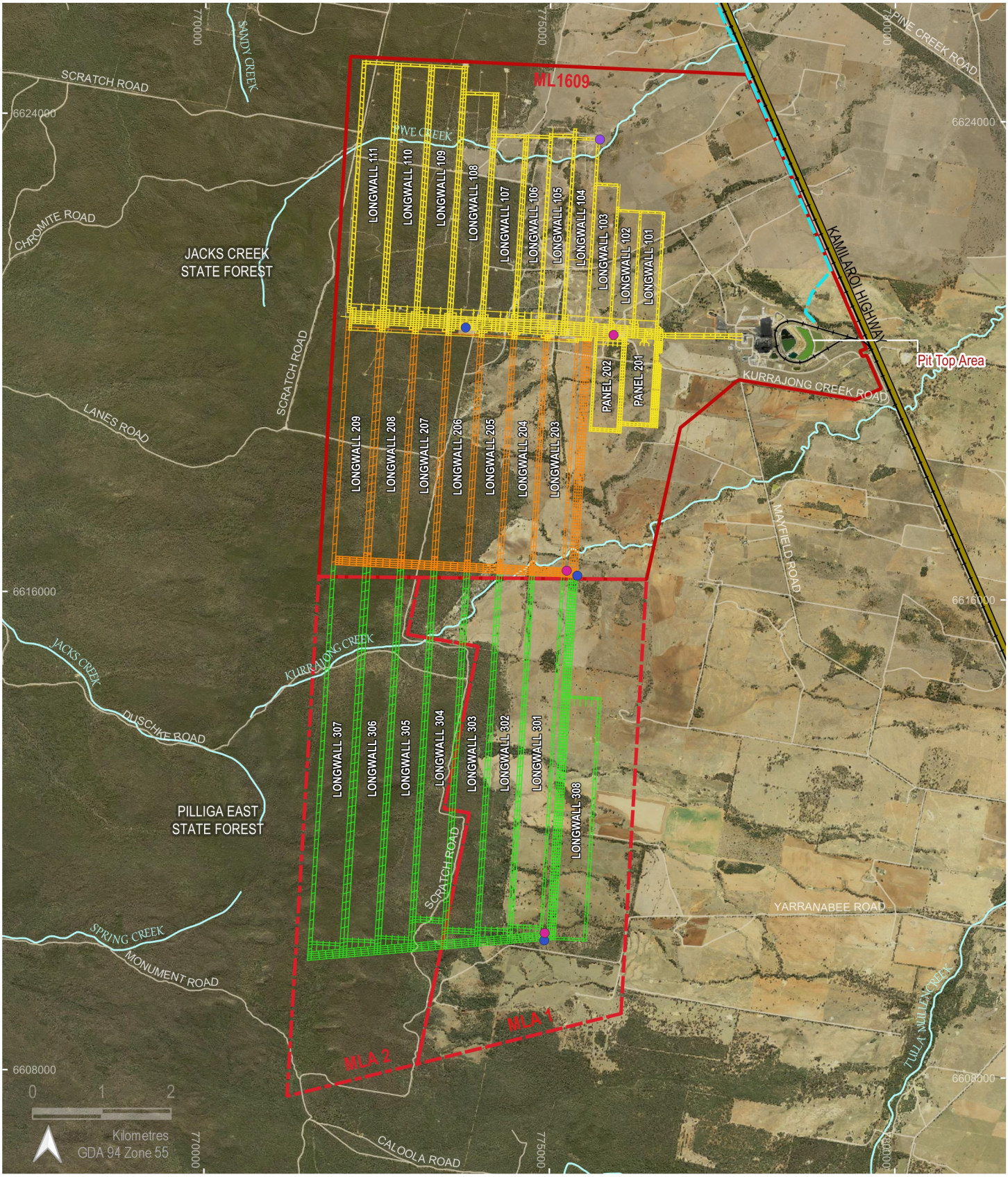
The Narrabri Underground Mine Stage 3 Extension Project (**Stage 3**) involves a southern extension to the previously approved Stage 2 mining area (approximately 609 ha of additional surface development footprint) to gain access to additional areas of coal reserves within Mining Lease Application (**MLA**) 1 and 2, an increase in the mine life to 2044, and the development of supporting surface infrastructure. Bord and pillar mining operations for panels LW 201 and LW 202 were previously approved as modification 7 (Mod 7) to PA 08_0144.

The Stage 3 Extension Project State Significant Development (**SSD**) was granted approval under section 4.38 of the EP&A Act on 1 April 2022, following the determination by the Independent Planning Commission. Approval under the EPBC Act (**EPBC 2019/8427**) is pending.

Under the Stage 3 SSD-10269 Conditions of Consent (**CoC**), NCOPL is required to surrender PA 08_0144 no more than 12 months from the date of commencement of the Stage 3 development in accordance with the *Environmental Planning and Assessment Regulation 2021* (**EP&A Regulation**). Until then, the CoC prevail to the extent of any inconsistency with the conditions of PA 08_0144.

The Narrabri Mine underground mining layout is shown in Figure 1-1 and surface development footprint is shown in Figure 1-2.

[1] For full details on the joint venture ownership, refer to the introduction of the Environmental Management Strategy.



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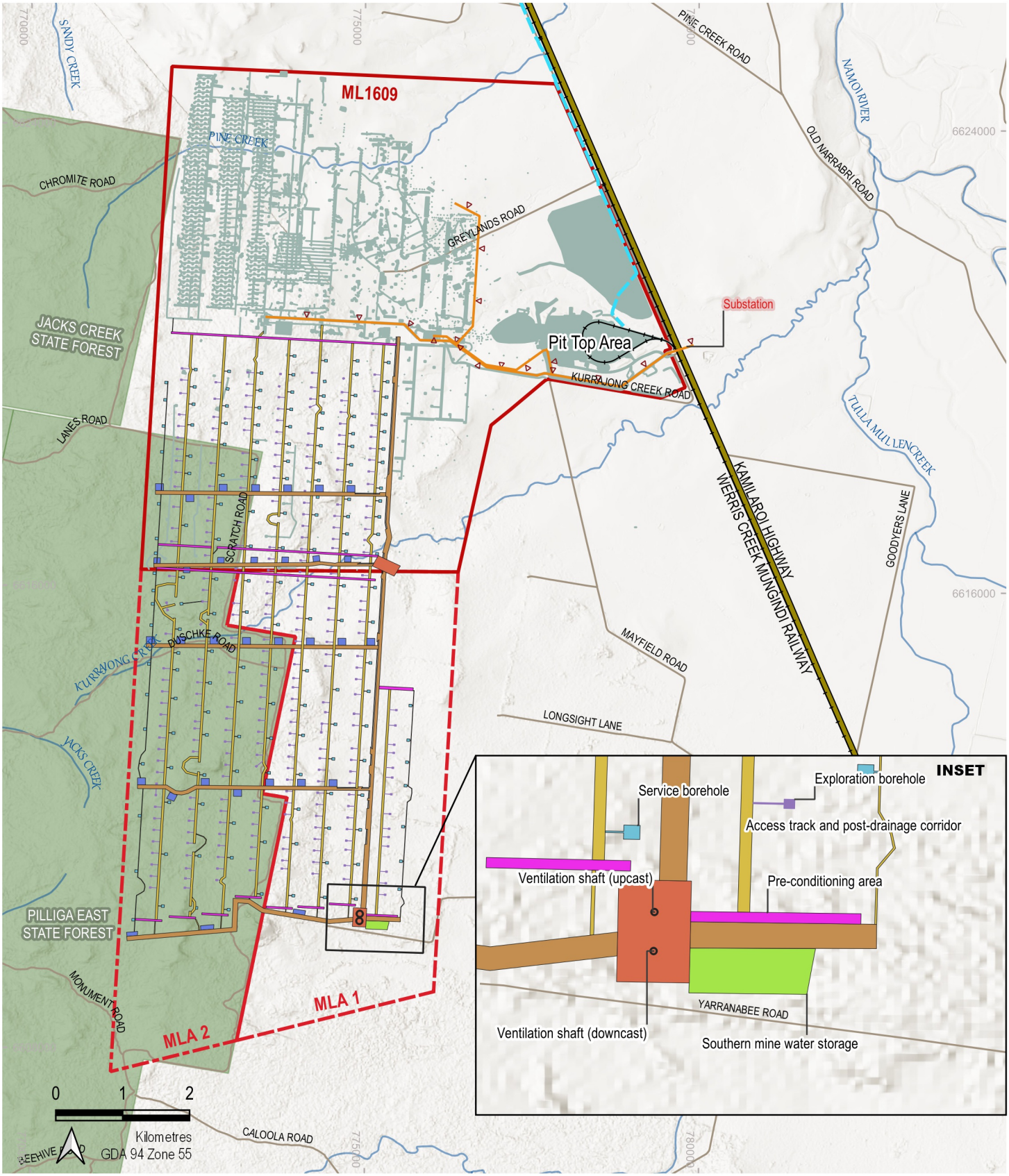
LEGEND

- ML1609
- MLA1
- MLA2
- Namoi River pipeline (buried)
- Stage 2 underground mining layout
- Stage 3 - 200 series underground mining layout
- Stage 3 - 300 series underground mining layout
- Ventilation complex (downcast)
- Ventilation complex (upcast)
- Ventilation complex (upcast - decommissioned)
- Highway
- Road
- Watercourse
- Railway

NARRABRI MINE

FIGURE 1-1
Underground Mining Layout



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LEGEND

- ML1609
- MLA1
- MLA2
- State forest
- Namoi River pipeline (buried)
- Electricity transmission line (constructed)
- Highway
- Road
- Watercourse
- Railway
- Stage 2 surface development
- Access track and post-drainage corridor
- Exploration borehole
- Pre-conditioning area
- Service borehole
- Service borehole and power reticulation
- Services corridor
- Southern mine water storage
- Ventilation complex

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FIGURE 1-2
Surface Development Footprint

1.2 Purpose and scope

This Biodiversity Management Plan (**BMP** or **Plan**) has been developed in accordance with CoC B42, EPBC 2009/5003, and the applicable Commonwealth and NSW State regulatory framework regarding biodiversity.

As required by CoC B44, NCOPL will implement the BMP as approved by the Planning Secretary. In accordance with CoC B43, NCOPL will not commence construction until this Plan is approved by the Planning Secretary.

This Plan forms part of the Narrabri Mine Environmental Management Strategy (**EMS**) and is substantially integrated with the following plans and strategies:

- Rehabilitation Strategy referred to in CoC B63;
- Rehabilitation Management Plan referred to in CoC B65;
- Water Management Plan referred to in CoC B35;
- Bushfire Management Plan referred to in CoC B59; and
- Extraction Plan referred to in CoC C8.

1.3 Objectives

The objectives of this BMP are to:

- provide details of the relevant statutory requirements, including any relevant approval, licence or lease conditions;
- provide a description of the baseline environment and predicted impacts on biodiversity;
- describe the short, medium, and long-term measures to be implemented to manage the remnant vegetation and fauna habitat on the site including areas within the approved surface disturbance footprint;
- detail the seasonally based program to monitor and report on the effectiveness of the measures against the performance indictors and completion criteria;
- describe the protocol for managing and reporting any incident, non-compliance or exceedance of any impact assessment criteria or performance criteria, complaint, or failure to comply with other statutory requirements;
- detail the regulatory reporting requirements;
- describe the protocol for periodic review of this Plan; and
- identify the roles and responsibilities for implementation of this Plan.

1.4 Preparation and consultation

This Plan has been prepared by Mr. Servaes van der Meulen and Mr. Mark Vile of Onward Consulting Pty Ltd, who are certified and accomplished environmental practitioners with more than 20 years' experience each. Considering their individual and combined industry experience and professional expertise, both Servaes and Mark are deemed to be suitably qualified and experienced for the preparation of this BMP, as required by CoC B42(a).

In accordance with CoC A20 and B42(b), the draft BMP (Revision A) was provided to the Biodiversity Conservation and Science Directorate (**BCS**) within the Department of the Environment, Energy and Science (**EES**) Group of the Department of Planning and Environment (**DPE**) on 1 July 2022 for review and comment.

Appendix A provides the correspondence from the consultation process, including a reconciliation table with the response to comments and a cross reference to the corresponding section of the BMP where these comments have been addressed.

1.5 Access to information

In accordance with CoC E17(a)(iii), the BMP will be made publicly available on the WHC website following approval by DPE. Any subsequent revision of the BMP approved by the DPE will be made publicly available on the website, and the superseded version will be removed to ensure the information is kept up to date in accordance with CoC E17(b). A copy of this Plan will also be kept on the Narrabri Mine site server. Any printed copies of this Plan are uncontrolled.

2. Roles and responsibilities

All NCOPL employees and contractors (and their sub-contractors) are responsible for the environmental performance of their activities and for complying with all legal requirements and obligations. All personnel will be required to comply with the statutory approval requirements of the activities they undertake, and any potential environmental impacts from all activities will be managed in accordance with the relevant strategies, plans and programs.

In accordance with CoC E1, the EMS sets out the roles, responsibilities, authorities and accountabilities of all key personnel involved in the environmental management of operations at Narrabri Mine, which encompasses the requirements and obligations in this BMP.

3. Statutory requirements

3.1 Environmental Planning and Assessment Act 1979

The EP&A Act provides the statutory basis and framework for planning and environmental assessment in NSW. The EP&A Act includes provisions to ensure that the potential environmental impacts of a development are assessed and considered in the decision-making process. Stage 3 is permissible with development consent under the *State Environmental Planning Policy (Resources and Energy) 2021* and is identified as 'State Significant Development' under section 4.38 of the EP&A Act, and Clause 8 and Schedule 1 of the *State Environmental Planning Policy (Planning Systems) 2021*.

3.1.1 Project approval and development consent

The Stage 3 Extension Project (SSD 10269) was approved on 1 April 2022. The Narrabri Mine also incorporates the development formerly authorised under Project Approval 08_0144, until such time as this development consent is surrendered, in accordance with CoC A16.

In accordance with CoC E5(b), Appendix B, Table B-1 provides a summary of the relevant CoC relating to biodiversity and outlines the section of the BMP in which each of these conditions have been addressed.

In accordance with CoC E5(c), Appendix C, Table C-1 provides a summary of the relevant commitments or recommendations within the Stage 3 Environmental Impact Statement (**EIS**) (Resource Strategies, 2020) relating to biodiversity and outlines the section of the BMP in which each of these commitments have been addressed. These relevant commitments or recommendations include those as amended or added to by the:

- Applicant's Submission Report submitted 31 May 2021;
- Applicant's Amendment Report submitted 31 May 2021; and
- Applicant's final Biodiversity Development Assessment Report dated September 2021.

3.2 Environmental Protection and Biodiversity Conservation Act 1999 (Cwlth)

The EPBC Act is the Commonwealth Government's key piece of environmental legislation which commenced on 16 July 2000. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities, and heritage places.

The EPBC Act defines projects that are likely to have a significant impact on a Matter of National Environmental Significance (**MNES**) as a "controlled action". A project that is, or may be, a controlled action is required to be referred to the Commonwealth Minister for the Environment (**Commonwealth Minister**) for a determination as to whether or not the action is a controlled action.

Significant impacts on listed threatened species and communities as well as significant impacts on water resources have been assessed under the bilateral agreement between the Commonwealth and the NSW Governments.

3.2.1 EPBC approval

EPBC 2009/5003 and EPBC 2019/8427 were declared a controlled action requiring approval due to potential impacts on provisions under Part 3 of Chapter 2 of the EPBC Act. EPBC 2009/5003 and EPBC 2019/8427 (once granted) will both be active for the life of mine. These two approvals overlap in the Stage 2 part of the Stage 3 development.

EPBC 2009/5003 prescribes conditions to minimise potential impacts on EPBC Act listed threatened species and communities within the mine site. The person undertaking the action must actively manage progressive disturbance of the mine site in accordance with a Rehabilitation Management Plan for the life of the mine. This Plan is substantially integrated with the Rehabilitation Management Plan.

3.3 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (**BC Act**) commenced on 25 August 2017 to allow for the identification and protection of threatened species, populations, and ecological communities in NSW, and to enable biodiversity conservation, sustainable development, and productive farming. The legislation is administered by the EES, Local Land Services and the NSW Biodiversity Conservation Trust (**BCT**).

Section 7.9 of the BC Act states that an application for an SSD under Part 4 of the EP&A Act must be accompanied by a Biodiversity Development Assessment Report (**BDAR**), Appendix D to the Stage 3 EIS.

Part 6 of the BC Act prescribes the requirements of the Biodiversity Offsets Scheme which sets out how impacts on biodiversity will be avoided and minimised. It provides a framework to avoid, minimise and offset impacts on biodiversity from development and clearing. This BMP outlines measures to avoid and minimise impacts on biodiversity.

3.4 Mining Act 1992

The *Mining Act 1992* (**Mining Act**) regulates the licensing, land access, and operations for coal mines operating in NSW. Under the Mining Act, all resource activities must be licensed, including exploration activities.

3.4.1 Mining lease

NCOPL are the holder of Mining Lease 1609 (**ML 1609**) issued in January 2008. NCOPL are required to implement all practicable measures to prevent and/or minimise any harm to the environment that may result from the construction, operation, or rehabilitation of the development.

This Plan will be updated with any relevant conditions associated with future mining leases, once these have been granted.

3.5 Other applicable legislation

Additional legislation that may be applicable to the biodiversity outcomes for the Narrabri Mine include the:

- *Water Management Act 2000*;
- *Biosecurity Act 2015*;
- *Forestry Act 2012*;
- *Fisheries Management Act 1994*; and
- *State Environmental Planning Policy (Koala Habitat Protection) 2020*[2].

3.6 Relevant guidelines, policies and standards

The following guidelines have been utilised during the preparation of this BMP:

- *Guidelines for the Translocation of Threatened Plants in Australia Third Edition* (Commander et al 2018);
- *Conservation Advice (including listing advice) for the Poplar Box Grassy Woodland on Alluvial Plains* (DEE 2019);
- *Why do fish need to cross the road? fish passage requirements for waterway crossings* (Fairfull and Witheridge 2003);
- *Policy and guidelines for fish habitat conservation and management* (DPI 2013); and
- *NSW Aquifer Interference Policy* (2012).

[2] The *State Environmental Planning Policy (Koala Habitat Protection) 2019* was the applicable planning instrument at the time of preparing the Stage 3 EIS.

4. Existing environment

4.1 Landscape features

The western portion of the surface development footprint is located within native forest and woodland of the Pilliga East State Forest, Jacks Creek State Forest, and neighbouring reserves, while the eastern portion consists of semi-cleared, relatively flat agricultural land. Natural drainage in the area consists of several first, second and third order ephemeral drainage lines.

There are no Areas of Outstanding Biodiversity Value listed under the *Biodiversity Conservation Regulation 2017* (**BC Regulation**) associated with Narrabri Mine or defined potential flyways for migratory species listed under the EPBC Act that pass over the mine site.

4.2 Native vegetation and habitat features

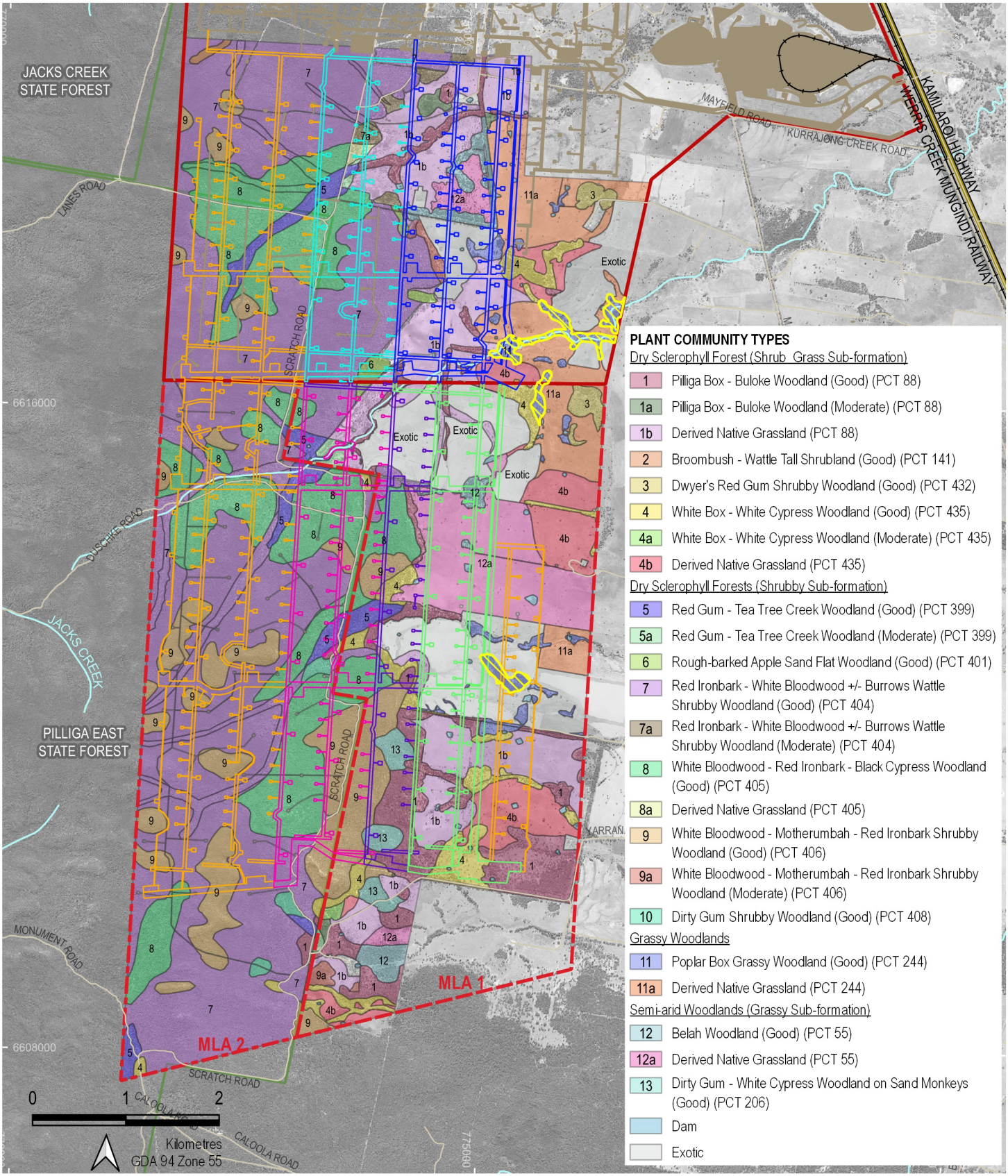
Thirteen Plant Community Types (**PCTs**) were identified within the surface development footprint and surrounds (Figure 4-1). Figure 4-1 shows these PCTs relative to the BDAR (Resource Strategies 2021) development phase.

Several of these PCTs were present in both woodland form and derived native grassland form. Native vegetation predominantly comprises Red Ironbark – White Bloodwood +/- Burrows Wattle Shrubby Woodland (PCT 404) (approximately 194.5 ha) and White Bloodwood – Red Ironbark – Black Cypress Woodland (PCT 405) (approximately 96.5 ha).

Hollow-bearing trees were identified within the woodland areas but are considered to be generally sparse (i.e., thinly dispersed/scattered or uncommon depending on the height and age of the woodland), with numbers likely to have been reduced due to historical logging. Notwithstanding, hollow-bearing trees are relatively common in PCTs containing eucalypt species. In the agricultural areas, paddock trees are present either as occasional individual trees or in groups.

Other habitat features within the surface development footprint include:

- nectar producing trees and shrubs;
- bush rocks;
- dead wood and dead trees;
- drainage features;
- farm dams; and
- rocky outcrops with bat habitat.



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LEGEND

- ML1609
- MLA1
- MLA2
- Stage 2 surface development
- Highway
- Roads
- Watercourse
- Railway
- State forest

Threatened Ecological Communities

- Poplar Box Grassy Woodland on Alluvial Plains

Development footprint

- Phase 1
- Phase 2
- Phase 3
- Phase 4
- Phase 5
- Phase 6

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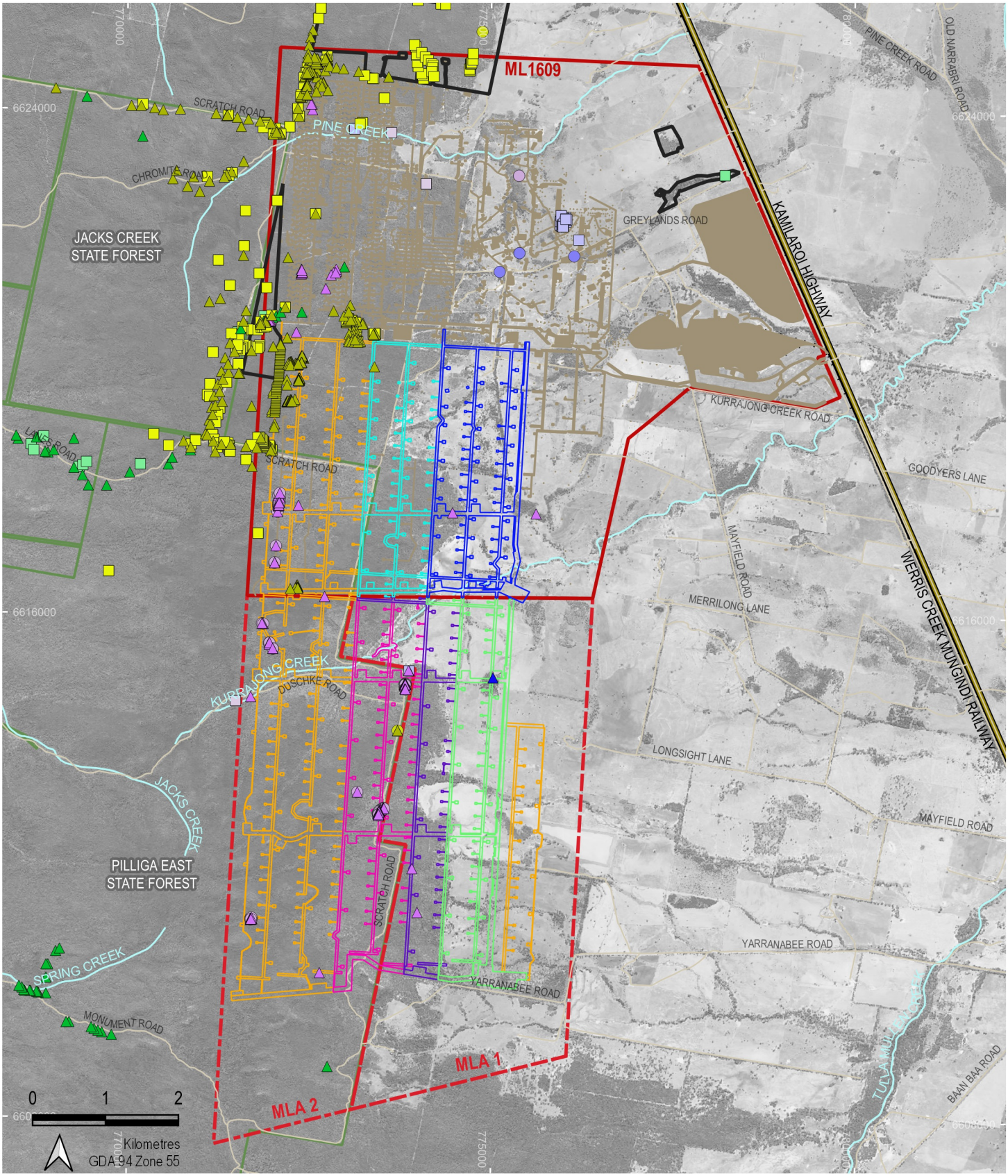
FIGURE 4-1
Vegetation Mapping

4.3 Threatened flora species

Three threatened flora species listed under the BC Act and the EPBC Act have been recorded within the surface development footprint and surrounds, namely Coolabah bertya, *Lepidium aschersonii* (Spiny peppercress) and *Tylophora linearis* (Figure 4-2). Figure 4-2 shows the threatened flora species relative to the BDAR development phase.

One other flora species listed under the BC Act was recorded outside the surface development footprint, namely *Pomaderris queenslandica* (Scant pomaderris).

No threatened ecological communities listed under the BC Act and one threatened ecological community listed under the EPBC Act, namely the Poplar Box Grassy Woodland on Alluvial Plains Endangered Ecological Community (**Poplar Box Woodland EEC**), were identified (Figure 4-1).



WHITEHAVEN COAL

ONWARD CONSULTING

LEGEND

- ML1609
- MLA1
- MLA2
- Stage 2 surface development
- Highway
- Roads
- Watercourse
- Railway
- State forest
- Narrabri Mine existing offset area

Development footprint

- Phase 1
- Phase 2
- Phase 3
- Phase 4
- Phase 5
- Phase 6

Survey	Monitoring	Database
		Coolabah Bertya
		Tylophora linearis
		Spiny Peppercress
		Scant Pomaderris

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FIGURE 4-2
Threatened Flora

4.4 Threatened fauna species

A number of threatened fauna species listed under the BC Act and/or EPBC Act that are 'ecosystem credit species' (i.e. species that can be predicted to be present based on a habitat assessment) have been recorded within or adjoining the surface development footprint.

Five 'species credit species[3]' were recorded namely the (Figure 4-3):

- *Calyptorhynchus lathami* (Glossy black-cockatoo)
- *Phascolarctos cinereus* (Koala);
- *Cercartetus nanus* (Eastern pygmy-possum);
- *Chalinolobus dwyeri* (Large-eared pied bat); and
- *Vespadelus troughtoni* (Eastern cave bat).

A further two 'species credit species' are highly likely to occur within the surface development footprint, namely the *Hoplocephalus bitorquatus* (Pale-headed snake) (previously recorded at the Narrabri Mine) and the *Petaurus norfolcensis* (Squirrel glider).

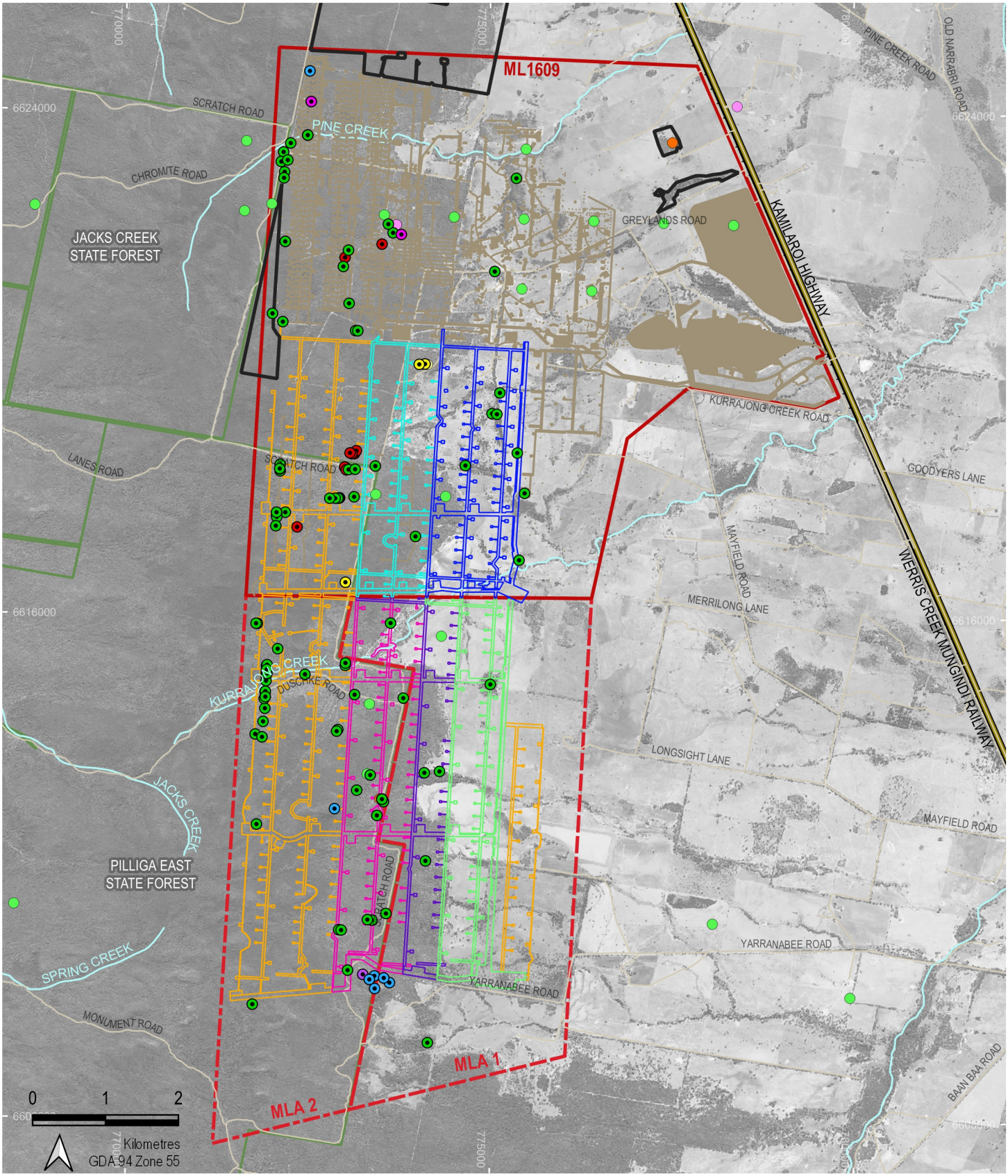
Six threatened fauna species listed under the EPBC Act were also recorded (Figure 4-4):

- *Hirundapus caudacutus* (White-throated needletail);
- *Grantiella picta* (Painted honeyeater);
- Koala;
- *Nyctophilus corbeni* (Corben's long-eared bat);
- Large-eared pied bat; and
- *Pseudomys pilligaensis* (Pilliga mouse).

No threatened species listed under the *Fisheries Management Act 1994* Act have the potential to occur within Kurrajong Creek and Pine Creek or unnamed drainage lines associated with Narrabri Mine.

Figure 4-3 and Figure 4-4 show the threatened fauna species relative to the BDAR development phase.

[3] threatened species or components of species habitat that are identified in the Threatened Species Data Collection as requiring assessment for species credits.



WHITEHAVEN COAL

ONWARD CONSULTING

LEGEND

- ML1609
- MLA1
- MLA2
- Stage 2 surface development
- Highway
- Roads
- Watercourse
- Railway
- State forest

Development footprint

- Phase 1
- Phase 2
- Phase 3
- Phase 4
- Phase 5
- Phase 6

Survey	Database
	Squirrel glider
	Pale-headed snake
	Glossy black-cockatoo
	Eastern pygmy possum
	Large-eared pied bat
	Eastern cave bat
	Koala

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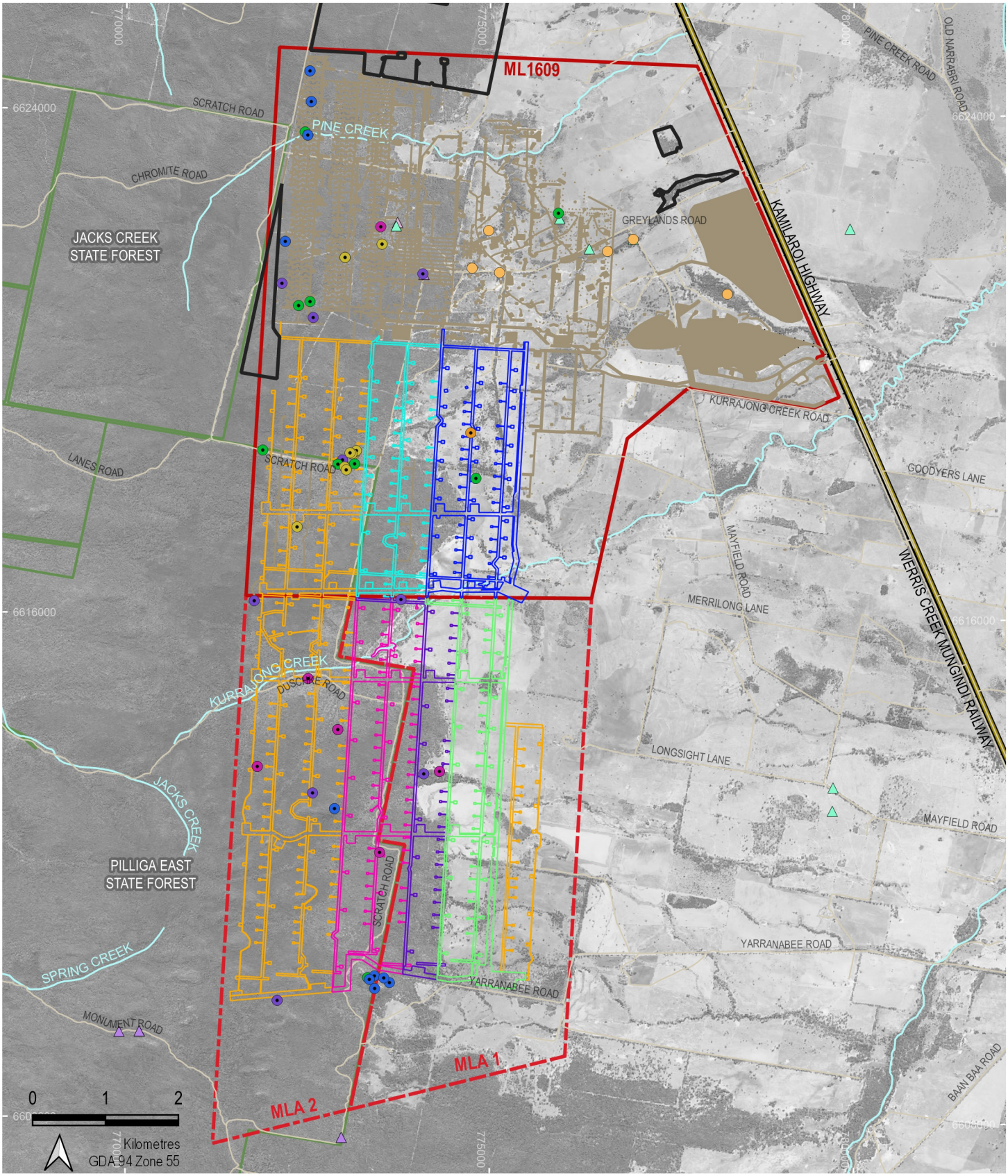
FIGURE 4-3
Threatened Fauna



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ONWARD CONSULTING

LEGEND

- ML1609
- MLA1
- MLA2
- Stage 2 surface development
- Highway
- Roads
- Watercourse
- Railway
- State forest
- Narrabri Mine existing offset area

Development footprint

- Phase 1
- Phase 2
- Phase 3
- Phase 4
- Phase 5
- Phase 6

Survey	Monitoring	Database
		Painted Honeyeater
		White-throated
		Corben's Long-eared Bat
		Pilliga Mouse
		Large-eared pied bat
		Koala

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FIGURE 4-4

Threatened Fauna Species Listed Under the EPBC Act

4.5 Introduced flora and fauna

Of the 472 plant species identified, 97 species were weeds, including 12 recognised as High Threat Exotics (Table 4-1).

Of the 208 fauna species recorded, 12 species were introduced. These are the *Acridotheres tristis* (Common myna), *Sturnus vulgaris* (Common starling), *Bos taurus* (Cattle), *Capra hircus* (Goat), *Ovis aries* (Sheep), *Sus scrofa* (Feral pig), *Canis lupus* (Dog), *Vulpes vulpes* (Red fox), *Felis catus* (Feral cat), *Lepus europaeus* (European brown hare), *Oryctolagus cuniculus* (European rabbit) and the *Mus musculus* (House mouse).

Table 4-1 High Threat Weeds

Scientific Name	Common Name	Abundance
Asparagus asparagoides	Bridal Creeper	Recorded at a single location in low abundance, within Bloodwood-Ironbark Forest, in the southern part of the surface development footprint.
Carthamus lanatus	Saffron Thistle	Common and sometimes highly abundant in derived native grassland areas.
Opuntia aurantiaca	Tiger Pear	Uncommon and low abundance in disturbed woodland areas.
Opuntia stricta	Common Prickly Pear, Smooth Pest Pear	Common but generally low abundance in more open woodland areas throughout the surface development footprint.
Opuntia spp.	A Prickly Pear	An unidentified *Opuntia* species was recorded in 17 plots across the south of the surface development footprint.
Opuntia tomentosa	Velvet Tree Pear	Common but low abundance in disturbed woodland areas in the southern part of the surface development footprint.
Bryophyllum delagoense	Mother of millions	Common but sporadic in more disturbed woodland areas across the surface development footprint. Can be locally abundant.
Eragrostis curvula	African Lovegrass	Sporadic but sometimes locally abundant, mainly in derived native grassland areas.
Hyparrhenia hirta	Coolatai Grass	Sporadic but sometimes locally abundant, mainly in derived native grassland areas.
Paspalum dilatatum	Paspalum	Sporadic but sometimes locally abundant, mainly in derived native grassland areas.
Lycium ferocissimum	African Boxthorn	Common but sporadic in more disturbed woodland areas across the surface development footprint. Can be locally abundant.
Solanum elaeagnifolium	Silver-leaved Nightshade	Common but low abundance, mainly in derived native grassland areas.

5. Potential impacts

5.1 Impacts from clearing native vegetation

Direct impacts on native vegetation as a result of clearing were assessed as part of the Stage 3 EIS. Stage 3 will require the progressive clearance of approximately 546.7 ha of native vegetation (excluding disturbance associated with the electricity transmission line [**ETL**] construction footprint and management areas, or areas of potential ponding and cracking) over a 23-year period, comprising approximately 421.6 ha of woodland and approximately 125.1 ha of derived native grassland. Overall, the most impacted community will be PCT 404 (i.e. 194.5 ha; 32% of total proposed clearance), with the majority of vegetation being required for access tracks.

A portion of the total native vegetation to be cleared (i.e. 220.5 ha; 40%) is located in Pilliga East State Forest. The remainder of the native vegetation to be cleared (i.e. 326.3 ha; 60%) is located on lands designated as RU1 Primary Production zone under the *Narrabri Local Environmental Plan 2012*.

The development will also have an impact on several EPBC Act listed species including native vegetation such as the Poplar Box Woodland EEC; Coolabah bertya; *Tylophora linearis*; and Spiny peppercress, as well as fauna including the Koala; Corben's long-eared bat; Pilliga mouse; and the Large-eared pied bat.

The ETL constructed footprint will consist of a 5 m wide disturbance corridor and an ETL Management Area which will be situated 12.5 m either side of the 5 m disturbance corridor. Within the 12.5 m buffer, only trees, shrubs and regeneration that could interfere with the ETL will be removed, leaving the remaining layers intact. The vegetation in the ETL Management Area is mostly existing cleared land (exotics) and Derived Native Grassland. The 66 kV ETL will be progressively extended as ventilation shafts and the overall mine is developed.

In regard to native fauna, clearing will result in the loss of hollow-bearing trees, bush rock removal and removal of dead wood and dead trees, which are key threatening processes listed under the BC Act. The woodland habitat to be cleared (approximately 421.6 ha) is part of a large continuous expanse of native vegetation including Jacks Creek State Forest (approximately 10,045 ha), Pilliga East State Forest (approximately 131,899 ha) and neighbouring reserves (approximately 192,366 ha total). Clearance of habitat can result in two prescribed impacts listed under the BC Regulation:

- the impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range; and
- the impacts of development on movement of threatened species that maintains their lifecycle.

The native vegetation to be cleared is quantified in Appendix D, Table D-1.

5.2 Subsidence impacts

Underground mining activities will result in subsidence of the land surface. Potential ponding impacts were assessed within the BDAR, and areas of potential ponding identified. Existing ponds are expected to extend laterally from the watercourses causing water logging resulting in possible tree stress, canopy die back, occasional tree death, altered drainage patterns, and/ or loss of fauna habitat.

With the exception of ponding impacts, potential subsidence impacts (e.g. surface cracking) are unlikely to materially impact native vegetation (including threatened species and ecological communities). This is because

surface cracks will fill naturally over time or be remediated and potential impacts on trees (dieback or tree fall [outside of potential ponding areas and identified areas of potential cracking impacts]) are unlikely based on historical experience and monitoring results.

Notwithstanding the above, subsidence ponds can become important features within an environmentally degraded landscape as they can provide habitat for waterbirds (including migratory species), frogs, eels, invertebrates and other aquatic species. Over time it is expected that ponding will create enhanced ephemeral aquatic habitats.

6. Measures to mitigate and manage impacts

6.1 Overview

The Narrabri Mine was initially approved for the clearance of 210.5 ha[4] of native woodland (Brown Bloodwood / Pilliga Box Woodland, Inland Grey Box Woodland, Riparian Forest, Callitris Forest and River Red Gum) and direct and indirect impacts on threatened flora (such as *Coolabah bertya*) and fauna (such as foraging habitat for the Superb Parrot).

The Stage 3 surface disturbance footprint is 1,225.9 ha[5], inclusive of 616.4 ha of previously approved surface disturbance footprint[6] and approximately 609.5 ha of additional surface disturbance footprint.

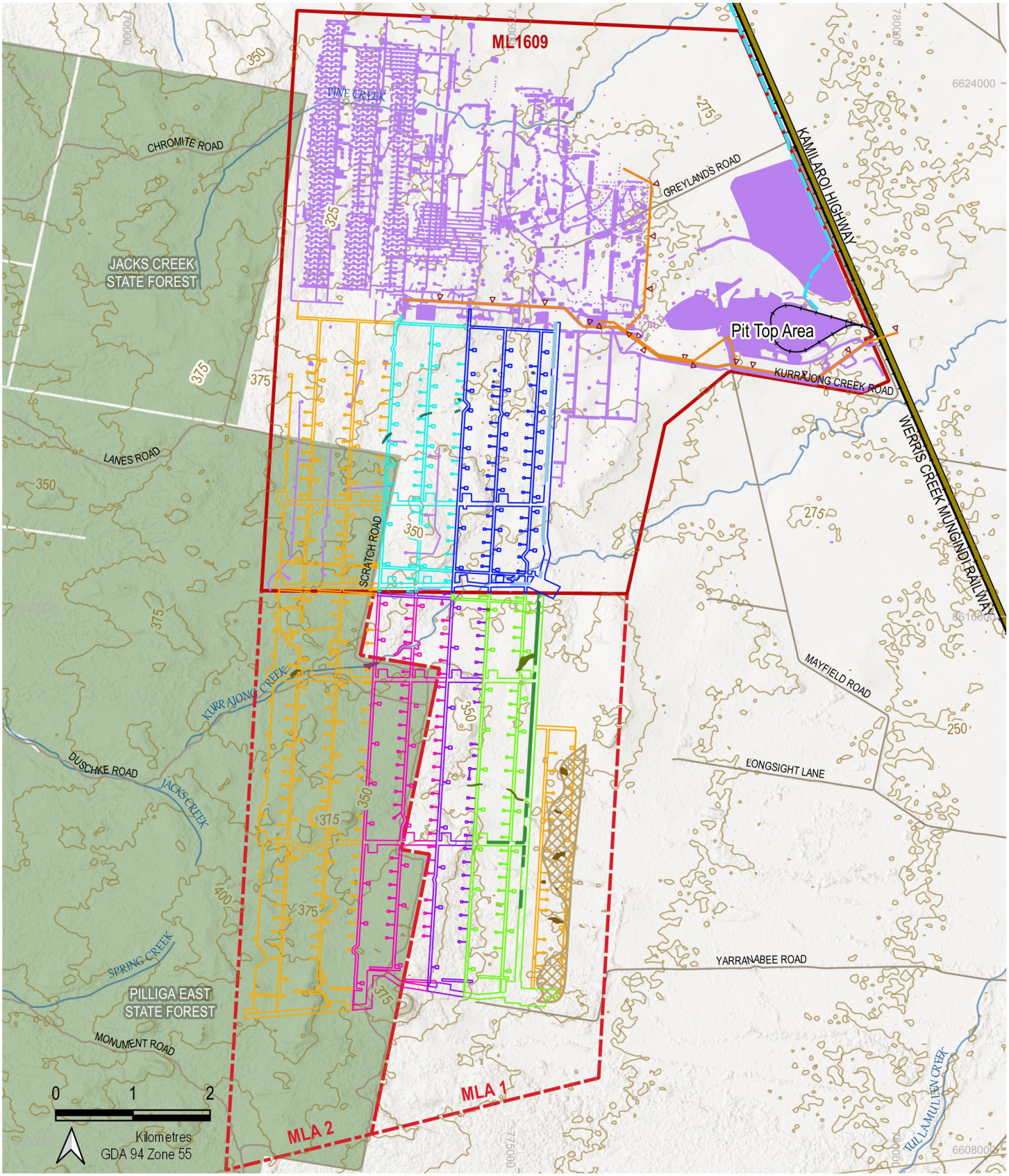
The biodiversity assessment (BDAR) for the Stage 3 EIS was conducted within the surface development footprint, as shown in Figure 6-1, to determine the existing biodiversity values, with consideration given to species previously recorded. For the purpose of the BDAR, the proposed surface disturbance areas were assessed in six development phases.

The PCTs and vegetation zones of broad condition states associated with each phase of the development are listed in Appendix D, Table D-1. Each PCT has been assigned a site-specific vegetation community name as listed in Appendix D, Table D-1.

[4] 210.5 ha is the approved native vegetation clearance area for Stage 2 and was included in the Modification 5 (PA 08_0144) Environmental Assessment.

[5] Does not include disturbance associated with ETL Management Areas, or areas of potential ponding and cracking.

[6] The approved disturbance area for Stage 2 is 750 ha. Of this, approximately 616.4 ha will now be cleared under the Stage 3 development consent.



WHITEHAVEN COAL

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LEGEND

- ML1609
- MLA1
- MLA2
- Stage 2 surface development
- Namoi River pipeline (buried)
- Electricity transmission line
- State forest
- Highway
- Roads
- Watercourse
- Railway

Development footprint Phase 1
- Land clearance
- Electricity transmission line management area
- Predicted subsidence ponding

Development footprint Phase 2
- Land clearance
- Electricity transmission line management area
- Predicted subsidence ponding

Development footprint Phase 3
- Land clearance
- Predicted subsidence ponding

Development footprint Phase 4
- Land clearance

Development footprint Phase 5
- Land clearance
- Predicted subsidence ponding

Development footprint Phase 6
- Land clearance
- Predicted subsidence ponding
- Subsidence area 180 m cover (areas of potential cracking impacts on vegetation)

NARRABRI MINE

FIGURE 6-1

Surface disturbance footprint and development phases

6.2 Biodiversity mitigation measures

All reasonable and feasible biodiversity management and mitigation measures are detailed below. Once implemented, this will result in a negligible risk to biodiversity as the mine has been designed to avoid and minimise impacts on biodiversity.

The management and implementation of the measures will be integrated with other management plans, such as the Rehabilitation Strategy referred to in CoC B63 and the Rehabilitation Management Plan referred to in CoC B65, to ensure biodiversity objectives are achieved through rehabilitation of the site.

Biodiversity Measure 1 - Vegetation Clearance Protocol

Native vegetation clearing is required for the installation of mine ventilation and gas management infrastructure, services corridors and access tracks, exploration and service boreholes, pre-conditioning of resistant strata for mine safety, and water management infrastructure. Service boreholes are typically spaced every 300 m to convey drained gas from underground workings prior to longwall mining to the surface. Gas drainage from the goaf above the longwall panel after mining is also required, with separate bore holes drilled approximately every 40 m.

NCOPL will implement a Vegetation Clearance Protocol prior to and during native vegetation clearing to minimise the impacts on vegetation and fauna. The Vegetation Clearance Protocol includes, but is not limited to:

- mine staff and contractors involved in vegetation clearance works are be made aware of clearing limits in the relevant statutory approval documentation and of restricted access areas;
- siting access tracks and other disturbance to minimise clearance of trees with hollows (including active nests) and drainage features (i.e., creeks) where practicable;
- clearing within the surface development footprint will be undertaken progressively to maintain the continuation of mining operations and the area cleared at any particular time will generally be no greater than that required to accommodate development needs for the following 12 months;
- clearance authorisation process (i.e. Permit to Work) which includes review and signoff of the areas to be cleared by the Environmental Superintendent or delegate;
- clearly delineate the areas to be cleared on the ground prior to conducting clearing activities (e.g., paint, flagging tape and/or posts) and restrict clearing to within these areas;
- pre-clearance surveys will be undertaken by a suitably trained and qualified ecologist or wildlife handler to:
    - identify any threatened flora (if clearing is likely to impact individuals of Coolabah bertya, salvage translocations of at least a portion of the impacted individuals is to be undertaken);
    - identify any threatened fauna or potential threatened fauna activity, in particular Koala observations (e.g. individual sightings, scats, scratches and/or pock marks on trees);
    - identify trees with suspected active nests; and
    - identify trees with suspected actively used tree hollows.
- a suitably trained and qualified ecologist or wildlife handler will be present during clearing to manage fauna that may be encountered;
- options to minimise harm to fauna by modifying the clearance method is to be evaluated by the suitably trained and qualified ecologist or wildlife handler (e.g., shaking or nudging tree trunks to evacuate mobile

fauna, retaining trees with suspected active nests until the nest is disused, or controlled lowering of trees with suspected tree hollows being used by fauna with the hollow facing upwards to enable fauna to exit);

- in the unlikely event that a Koala is identified in a tree marked to be cleared, the tree will be retained (allowing a 200m avoidance zone) until the individual has self-relocated;
- management of the Koala is to be in accordance with the *Code of Practice for Injured, Sick and Orphaned Koalas* management plan prepared by the NSW Office of Environment and Heritage (OEH 2018);
- management of fauna may include relocating the individual to adjacent habitat or treating injuries (the nearest veterinary clinic, wildlife carer and/or appropriately trained ecologist contact information will be on hand in case any fauna are injured);
- selectively collect seeds from felled trees for propagation and use in rehabilitation, if practicable;
- retain ground cover (e.g., logs, fallen branches and leaf litter) within stripped topsoil to improve the viability of the soil when it is used in rehabilitation;
- conserve topsoil (i.e., seed bank) for reuse in rehabilitation; and
- retain cleared woody debris for use in rehabilitation.

NCOPL will track actual native vegetation/habitat clearance against the surface development footprint and the allowance for each PCT (Appendix D, Table D-1). In addition, NCOPL will track the clearance of the number of Coolabah bertya plants by applying the density to the area of habitat to be cleared.

Any proposed native vegetation/habitat clearance outside of the indicative surface development footprint or beyond the allowance included in the calculation of biodiversity credits, should it be required, will trigger a review of the proposed activities, the relevant development approval documentation, the Rehabilitation Forward Program, and the impact on biodiversity values.

Glossy black-cockatoo

To reduce indirect impacts to the Glossy black-cockatoo during the species breeding season (April to August), and to mitigate the likelihood of mortality to individuals, NCOPL will:

- Conduct pre-clearance surveys of potential nest trees identified during the Glossy black-cockatoo targeted 'potential nest hollow' surveys. These surveys are being conducted in accordance with CoC B40(b);
- In accordance with the Vegetation Clearing Protocol (*Biodiversity Measure 1*), if an active nest is identified:
  - investigate options to avoid clearing the identified tree/s by modifying the clearance method, to be evaluated by the suitably trained and qualified ecologist or wildlife handler; and
  - the management of identified fauna may include relocating the individual to adjacent habitat.

Biodiversity Measure 2 – Rehabilitation and revegetation

Surface disturbance areas associated with the surface development footprint will be rehabilitated and revegetated progressively, unless required for future access. The mine components that will be progressively rehabilitated include the goaf gas drainage infrastructure, service boreholes, access tracks, post drainage corridors, and the pre-conditioning areas. Other mine components, such as the vents and services corridors, will typically be decommissioned following mine closure.

The conceptual final landform will include Pit Top Area surface infrastructure, box cut, reject emplacement area, brine storage area and the underground mining area. Final land uses will include water management, State Forest, Mine Site Ecological Rehabilitation, Biodiversity Offset, woodland and pasture areas suitable for

light intensity grazing in the eastern portion of the mine. All rehabilitation and revegetation activities will be conducted in accordance with the Stage 3 Rehabilitation Management Plan.

Coolabah bertya propagation and translocation trial

A propagation and translocation trial program will be implemented for the Coolabah bertya to further the understanding around management of this species. This will involve the collection of vegetative material from the local population (either above-ground parts and/or soil seed bank) and use of the material in an attempt to re-establish individual plants in rehabilitation areas.

A 'Translocation and Propagation Management Plan' has been developed to document the requirements of the trial program (refer to Appendix E).

Other propagation and translocation programs

NCOPL will also provide for the reasonable and feasible salvage, transplanting and/or propagation of any threatened flora found during pre-clearance surveys, in accordance with the *Guidelines for the Translocation of Threatened Plants in Australia Third Edition*.

Biodiversity Measure 3 – Salvage and relocation of habitat resources

Key habitat features will be salvaged during and/or following vegetation clearance activities and stockpiled for use in rehabilitation areas. Where available, suitable salvaged hollows may be used in the nest box program (*Biodiversity Measure 4*). These features are likely to provide habitat resources for a range of invertebrate and ground-dwelling fauna.

Vegetative material from the local population of Coolabah bertya (either above ground parts and/or soil seed bank) may be re-used for the Coolabah bertya propagation and translocation trial as described above.

Biodiversity Measure 4 – Nest box program

NCOPL has previously implemented 92 nest boxes in February and March 2020. The nest boxes were designed to target threatened species known or with the potential to occur in the area, including the Glossy black-cockatoo, Little lorikeet, Eastern pygmy-possum, Squirrel glider and Microbats (e.g. Corben's long-eared bat).

The existing program will be doubled, with a further 100 salvaged hollows (*Biodiversity Measure 3*) or nest boxes to be installed. The salvaged hollows and/or nest boxes will be of varying sizes to provide nesting habitat for Glossy black-cockatoo, Little lorikeet, Eastern pygmy possum, Squirrel glider, and the various Microbat species (e.g. Corben's long-eared bat). The salvaged hollows and/or nest boxes will be installed outside of the State Forest as NSW Forestry do not support the installation within the State Forest boundary.

Site selection

NCOPL will identify a 'nest box installation' area and select individual trees suitable to host nest boxes (or salvaged hollows) for the target species. The nest box installation area/s will be located outside of proposed vegetation clearance areas. Individual tree selection will consider range of factors including:

- suitability of tree for target species (e.g. height of nest box above ground, volume of box, entry hole shape and size);
- target species home range;

- ability for target species to access a nest box;
- nest box aspect;
- distance to feeding resources;
- camouflage from potential predators; and
- safety aspects (tree risk assessment for heights access using ropes [e.g. tree health, age etc], ease of access etc.).

Once installed, a sample of 50% salvaged hollows and/or nest boxes will be monitored annually for a period of three years by suitably a qualified person to observe fauna usage. The sample will ensure coverage of all target threatened species. A monitoring report will be prepared following monitoring that includes a summary of previous monitoring reports. At completion of three years of monitoring, the program will be reviewed.

Biodiversity Measure 5 – Site induction/access

Access to Narrabri Mine over the life of mine will only be allowed for authorised personnel and approved machinery, thereby minimising uncontrolled impacts.

Actions to prevent un-authorised access include:

- installation of signage at the entry of the mine site access road (intersection with the Kamilaroi Highway) indicating that only authorised personnel are permitted on site;
- installation of signage on boundary fencing indicating that the site is an active mine and indicating that unauthorised access is not permitted;
- personnel must complete an induction process before authorised to work on site;
- all visitors and unauthorised personnel are required to sign in when arriving on site; and
- visitors and personnel not inducted will be required to be accompanied by an inducted person at all times.

Biodiversity Measure 6 – Sediment and erosion controls

The potential for localised erosion and/or channel erosion along Kurrajong Creek and other ephemeral creek lines will be managed over the life of mine using appropriate sediment and erosion controls. Erosion and sediment controls will be implemented in accordance with the Erosion and Sediment Control Plan (**ESCP**) – Attachment 2 to the Water Management Plan.

All earthworks, drainage lines and disturbed areas no longer required for mine-related activities will be stabilised via progressive rehabilitation in accordance with the Rehabilitation Management Plan.

Biodiversity Measure 7 – Creek line monitoring program

NCOPL will implement a monitoring program for creek lines which will include geomorphic surveys of creek stability and condition (e.g., stabilising damaged and eroded banks) for up to two years after longwall mining.

The creek line monitoring program is summarised in section 8.2.3.

Biodiversity Measure 8 – Construction of drainage line crossings

Construction of drainage line crossings over the life of mine will be undertaken in accordance with the policy and guideline document of DPI-Fisheries NSW *Why do fish need to cross the road?* (Fairfull and Witheridge

2003) as required by the Fisheries NSW *Policy and Guidelines for Fish Habitat Conservation and Management* (DPI 2013). The waterways that traverse the surface development footprint are categorised as Class 3[7] (Minimal fish habitat) and Class 4[8] (Unlikely fish habitat).

NCOPL will conduct quarterly visual inspections of the drainage line crossings whilst these crossing remain in-place.

Biodiversity Measure 9 – Fencing and managing Poplar Box Woodland EEC

NCOPL are required to fence and manage the areas of Poplar Box Woodland EEC outside of the surface disturbance footprint (Figure 4-1) for the life of mine. NCOPL will erect livestock proof fencing in accordance with the *Conservation Advice (including listing advice) for the Poplar Box Grassy Woodland on Alluvial Plains* (DEE 2019) (i.e. application of a 30 m buffer from edge of woodland). The areas will be signed '**Environmental Protection Area**' or similar.

Inspections of the fencing around the Poplar Box Woodland EEC will be conducted biannually (i.e. every six months) to ensure there are no occurrences of unauthorised access or livestock within the area. Weed control will also be conducted within the fenced areas following weed monitoring events (refer to *Biodiversity Measure 10*), when required.

The fenced Poplar Box Woodland EEC will also be monitored as part of the annual vegetation monitoring described in section 8.1 and section 8.2.2.

With the implementation of the above measures, it is likely to have a positive impact on the Poplar Box Woodland EEC as the occurrences of the EEC are located in areas currently used for grazing livestock. The measures, together with the performance criteria (section 7), monitoring (section 8.2.2) and the implementation of the TARP (section 9) will also contribute to conservation strategies for this community and are consistent with the key approaches to achieving the conservation objectives for the Poplar Box Woodland EEC as outlined in the *Conservation Advice (including listing advice) for the Poplar Box Grassy Woodland on Alluvial Plains* (DEE 2019).

Biodiversity Measure 10 – Weed management

All plants are regulated under the *Biosecurity Act 2015* with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant has a duty to prevent, eliminate or minimise the risk, so far as is reasonably practicable.

General measures for managing weeds onsite include:

- during introduction to site, all vehicles and mechanical equipment that will be working within native vegetation areas will be subject to a clean down to minimise seed transportation;
- ongoing identification of weeds requiring control;
- mechanical removal of identified weeds and/or the application of approved herbicides; and
- follow-up site inspections to determine the effectiveness of the eradication program.

[7] Named or unnamed waterway with intermittent flow and potential refuge, breeding or feeding areas for some aquatic fauna (e.g. fish, yabbies). Semi-permanent pools form within the waterway after a rain event.

[8] Named or unnamed waterway with intermittent flow following rain events only, little or no defined drainage channel, little or no flow or free-standing water or pools after rain events (e.g. dry gullies or shallow floodplain depressions with no permanent aquatic flora present).

Weed monitoring will occur biannually, primarily within disturbed areas and areas undergoing active regeneration/rehabilitation. Weed control will focus on the eradication of High Threat Weeds identified through the weed monitoring program with timing, frequency, and method of control as recommended by a suitably qualified person. Qualified and experienced weed management contractors will be engaged over the life of mine for weed control activities. Weed control may include a combination of herbicide application, biological controls, and manual weeding. Where possible, weed control will consider seasonal variations in rainfall and weed growth, botanical flowering times and treatment affectivity.

Biodiversity Measure 11 – Animal pest management

Animal pest identification and control will be conducted over the life of mine to detect and control animal pests that may be impacting on rehabilitation and revegetation areas. Animal pests will be identified as part of biannual monitoring and will be controlled with timing, frequency and techniques such as baiting, trapping, mustering, or shooting (as appropriate) as recommended by suitably qualified person based on the outcomes of biannual monitoring. The management of pest animals will consider the relevant threat abatement plans for Feral pig, European rabbit, Goat, Red fox and Feral cat.

NCOPL will engage qualified and experienced contractors that hold appropriate pesticide accreditation in accordance with the *Pesticides Act 1999* or Firearm Licence under the *Firearms Act 1996*. NCOPL will also ensure the contractors provide copies of their accreditation and will retain records of pest species, control techniques and location.

Biodiversity Measure 12 – Bushfire prevention and control measures

NCOPL will maintain a Bushfire Management Plan and associated standards and procedures over the life of mine to document bushfire prevention and control measures. These measures will include:

- fixed plant and building required to meet the Building Code of Australia and comply with Australian Standard *AS 2419 Fire hydrant installations System design, installation and commissioning*;
- fuel and storage areas located and constructed in accordance with AS 1940-2017, fitted with fire extinguishers and self-bunded;
- non-smoking on site;
- clear access to be maintained around all significant site infrastructure;
- implementation of fire breaks; and
- implementation of appropriate firefighting equipment.

The management of bushfire hazards is further documented in the Bushfire Management Plan.

Biodiversity Measure 13 – Remediation of surface cracks

NCOPL will conduct remediation of mine subsidence effects (i.e. surface cracking) over the life of mine. A preliminary assessment will be undertaken to minimise the environmental impact of remediation actions. Prior to any remediation, NCOPL will undertake a review of environmental impacts that may result from the remediation at the specific location and consider whether remediation would create increased impacts (e.g. due to clearing of native vegetation to enable machinery access to repair the crack or major drainage works that will cause a greater impact from excavation etc.), or if alternative methods of remediating the crack are warranted (e.g. without machinery). The review will consider, among other factors, avoidance of known locations of threatened flora species.

The standard management measures for the remediation of subsidence induced ponding include:

- ponding located in areas with no vegetation, or if vegetation is not affected, will be allowed to self-correct;
- ponding located in areas with affected vegetation, or if ponding significantly alters or affects flows, will be assessed and remedial actions (that present the lowest environmental impact) developed in consultation with a geomorphologist; and
- if EECs or archaeological deposits are impacted, or downstream water quality analysis indicates a change in EC trends (refer to the Surface Water Management Plan), the ponding will be assessed, and remediation options will be developed to afford the maximum practical protection to the affected environmental feature.

Remediation of surface cracking will be further detailed in the relevant Extraction Plan/s – Land Management Plan.

Biodiversity Measure 14 – Vehicle speed limits

To reduce the risk of vehicle strikes on fauna, speed limits will be enforced at 60 km/hr on the Mine Access Road and all internal surface roadways will be enforced at 40km/hr, unless otherwise sign posted.

6.3 Extraction plan

Prior to causing any subsidence, NCOPL will prepare and submit an Extraction Plan/s in accordance with CoC C8 for approval by DPE. The Extraction Plan/s will include performance measures for natural features, including threatened ecological communities and threatened species. NCOPL will implement an adaptive management approach to ensure the prescribed performance measures are achieved. Adaptive management will involve the monitoring and periodic evaluation of the environmental consequences against the performance measures, and adjustment (if necessary) of the management and control measures to achieve the adopted performance measures.

The Extraction Plan/s will include a Biodiversity Management Plan. Monitoring of potential subsidence impacts on EECs, threatened fauna habitat and/or threatened flora will be included within future Extraction Plan/s - Biodiversity Management Plan/s.

6.4 Aboriginal cultural heritage values

Aboriginal cultural heritage is currently managed in accordance with the Aboriginal Cultural Heritage Management Plan (**ACHMP**) which was developed in consultation with Heritage NSW and the Registered Aboriginal Parties (**RAPs**). Numerous Aboriginal cultural heritage assessments have been undertaken, both prior to construction of the mine and prior to extraction of individual longwall panels to determine the location of Aboriginal cultural heritage sites.

All RAPs are to be consulted with regarding activities associated with rehabilitation of ground disturbance areas and to mitigate potential conflicts with Aboriginal cultural heritage values (refer to measures in Appendix F).

7. Performance and completion criteria

The Narrabri Mine biodiversity performance and completion criteria are detailed in Table 7-1.

Table 7-1 Performance and completion criteria

Mitigation measure	Performance criteria	Short term management measures (Years 1 to 4)	Medium term management measures (Years 5 to 10)	Long term management measures (Years 11+)	Indicators	Completion criteria
Biodiversity Measure 1: Vegetation Clearance Protocol	• Areas to be cleared or retained are clearly delineated and mapped. • No vegetation outside of approved/delineated areas is cleared. • The area cleared at any particular time is generally no greater than that required to accommodate development needs for the following 12 months.	• Clearance authorisation process with final signoff by the Manager HSE (or delegate) for the areas to be cleared. • All staff involved in vegetation clearance works be made aware of clearing limits. • Pre-clearance habitat and fauna surveys conducted.	• Clearance authorisation process with final signoff by the Manager HSE (or delegate) for the areas to be cleared. • All staff involved in vegetation clearance works be made aware of clearing limits. • Pre-clearance habitat and fauna surveys conducted.	• Clearance authorisation process with final signoff by the Manager HSE (or delegate) for the areas to be cleared. • All staff involved in vegetation clearance works be made aware of clearing limits. • Pre-clearance habitat and fauna surveys conducted.	• Clearing outside of approved area. • Unauthorised ground disturbance.	Clearing outside of approved/delineated areas and unauthorised clearing prevented through implementation of the Vegetation Clearance Protocol and 'Permit to Work' process.
Biodiversity Measure 2: Rehabilitation and revegetation	Revegetation of cleared areas.	• Revegetation using natural regeneration. • Application of either woodland or pasture seed mix in accordance with the nominated post-mining land use where natural revegetation is unsuccessful. • Continue weed control.	• Revegetation using natural regeneration. • Application of either woodland or pasture seed mix in accordance with the nominated post-mining land use where natural revegetation is unsuccessful. Review requirement for supplementary planting. • Review the timing, frequency, and method for weed control (*Biodiversity Measure 10*) based on outcomes of rehabilitation monitoring.	• Revegetation using natural regeneration. • Application of either woodland or pasture seed mix in accordance with the nominated post-mining land use where natural revegetation is unsuccessful. Review requirement for supplementary planting. • Review the timing, frequency, and method for weed control (*Biodiversity Measure 10*) based on outcomes of rehabilitation monitoring.	Establishment of vegetation composition, structure and ecosystem function determined during annual rehabilitation monitoring.	Each variable % (i.e. vegetation composition, vegetation structure, and ecosystem function) is on a trajectory towards or is within the same range compared to the analogue site, i.e.: • N/A • Low: 0.1 – 33.3% • Moderate: 33.4 – 66.6% • High: 66.7%+ Also refer to the completion criteria in the **Rehabilitation Management Plan**.
	Propagation and translocation of Coolabah Bertya is attempted.	Implementation of the *Coolabah Bertya Translocation and Propagation Management Plan* (Appendix E)	Continue implementation of the *Coolabah Bertya Translocation and Propagation Management Plan* (Appendix E)	Continue implementation of the *Coolabah Bertya Translocation and Propagation Management Plan* (Appendix E)	Propagation and translocation of Coolabah bertya into rehabilitation areas and/or offset areas has been attempted, determined through the Coolabah bertya monitoring program (Appendix E).	To be established following implementation of the propagation and translocation trial (Appendix E).
Biodiversity Measure 3: Salvage of habitat resources for use in rehabilitation	A selection of habitat features is salvaged during vegetation clearance activities and stockpiled for use in rehabilitation areas.	Salvaged habitat features that are being retained for use in rehabilitation are stockpiled wholly within the approved disturbance footprint.	Salvaged habitat features that are being retained for use in rehabilitation are stockpiled wholly within the approved disturbance footprint.	Salvaged habitat features that are being retained for use in rehabilitation are stockpiled wholly within the approved disturbance footprint.	Key habitat features to be salvaged have been identified prior to clearance, salvaged, stockpiled and reused.	Habitat features salvaged are present in locations previously identified as containing such features.
Biodiversity Measure 4: Nest box program	Installation of nest boxes suitable for target fauna species.	• Installation of salvaged hollows or nest boxes in suitable areas purposely built and installed for target species. • Annual monitoring to assess use by target fauna species.	Medium term measures to be determined from Year 3 review of next box program.	Long term measures to be determined from Year 3 review of next box program.	Recorded usage of salvaged hollows or nest boxes by target fauna species determined during annual monitoring.	Recorded usage of salvaged hollows/nest boxes by target fauna species.

Mitigation measure	Performance criteria	Short term management measures (Years 1 to 4)	Medium term management measures (Years 5 to 10)	Long term management measures (Years 11+)	Indicators	Completion criteria
		• Annual maintenance/repair of installed salvaged hollows and/or nest boxes. • Review of nest box program in Year 3 to assess effectiveness of the program. .				
Biodiversity Measure 5: Site induction/access	Limited occurrences of unauthorised site access.	Installation of fencing, gates and signage where required, to limit access by unauthorised personnel and the public.	Maintenance of fencing, gates and signage where required, to limit access by unauthorised personnel and the public.	Maintenance of fencing, gates and signage where required, to limit access by unauthorised personnel and the public.	• All identified steps to restrict access are followed. • All staff made aware of restricted access areas.	Unauthorised access prevented through adequate fencing, signage, and records of induction sign in.
Biodiversity Measure 6: Sediment and erosion controls	No ongoing or significant erosion or slumping that impacts native vegetation.	• Retain topsoil and install appropriate erosion and sediment controls where required. • Undertake stabilisation works and remediate sections of bank which are damaged or steeply eroded.	• Retain topsoil and install appropriate erosion and sediment controls where required. • Undertake stabilisation works and remediate sections of bank which are damaged or steeply eroded.	• Retain topsoil and install appropriate erosion and sediment controls where required. • Undertake stabilisation works and remediate sections of bank which are damaged or steeply eroded.	• Erosion determined during subsidence and rehabilitation monitoring and general environmental inspections. • Bank stabilisation works conducted.	Landforms are stable with no evidence of significant erosion or slumping impacting native vegetation.
Biodiversity Measure 7: Creek line monitoring program	Geomorphic surveys and remote sensing conducted in accordance with the method detailed in section 8.2.3 and will be included in the relevant Extraction Plan.	Conduct geomorphic surveys and cross-sections of creek lines and targeted pools surveyed prior to and following subsidence.	Conduct geomorphic surveys and cross-sections of creek lines and targeted pools surveyed prior to and following subsidence.	Conduct geomorphic surveys and cross-sections of creek lines and targeted pools surveyed prior to and following subsidence.	• Surveys conducted in representative geomorphic zones. • Advancement of ponding, gully erosion and effectiveness of gully erosion stabilisation methods determined during annual surveys.	• Overall change in drainage pattern not more than predicted. • Alteration in channel dimensions or processes within normal range compared to baseline data.
Biodiversity Measure 8: Construction of drainage line crossings	Drainage line (stream) crossings do not restrict fish passage.	• Design, install and maintain any new creek crossings in accordance the *NSW Policy and Guidelines for Fish Habitat Conservation and Management* and *Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings*. • Conduct inspections during construction and operation.	• Design, install and maintain any new creek crossings in accordance the *NSW Policy and Guidelines for Fish Habitat Conservation and Management* and *Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings*. • Conduct inspections during construction and operation.	• Design, install and maintain any new creek crossings in accordance the *NSW Policy and Guidelines for Fish Habitat Conservation and Management* and *Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings*. • Conduct inspections during construction and operation.	Creek crossings are designed, installed, and maintained in accordance with the relevant guidelines as determined by visual inspections.	No evidence of fish passage restriction following construction and maintenance of drainage line crossings for the life of mine.
Biodiversity Measure 9: Fencing and managing Poplar Box Woodland EEC	Management of potential direct and indirect impacts on Poplar Box Woodland EEC.	• Installation of livestock proof fencing with a 30 m buffer from the EEC to prevent access by grazing animals. • Areas signed as “Environmental Protection Areas’’. • Conduct visual inspections of fencing and annual monitoring of vegetation (section 8.22).	• Continue visual inspections of fencing and annual monitoring of vegetation (section 8.22). • Continue annual fence maintenance program. • Also refer to *Biodiversity measure 10* (weed management).	• Continue visual inspections of fencing and annual monitoring of vegetation (section 8.2.2). • Continue annual fence maintenance program. • Also refer to *Biodiversity measure 10* (weed management).	• Livestock proof fencing is maintained, and condition determined by the visual inspections. • Measured attribute data for vegetation composition, structure and ecosystem function collected during annual	• Poplar Box Woodland EEC is maintained or enhanced in comparison to baseline dataset. • Also refer to *Biodiversity measure 10* (weed management).

Mitigation measure	Performance criteria	Short term management measures (Years 1 to 4)	Medium term management measures (Years 5 to 10)	Long term management measures (Years 11+)	Indicators	Completion criteria
		• Implement annual fence maintenance program. • Also refer to *Biodiversity measure 10* (weed management)			biodiversity monitoring (section 8.2.2). • Also refer to *Biodiversity measure 10* (weed management)	
Biodiversity Measure 10: Weed management	High Threat Weeds identified during monitoring have been controlled.	• Continue weed control focused on listed High Threat Weeds identified through weed monitoring with timing, frequency, and method of control as recommended by suitably qualified person based on outcomes of biannual monitoring. • Control of High Threat Weeds using ecologically appropriate methods for the target weed.	• Continue weed control focused on listed High Threat Weeds identified through weed monitoring with timing, frequency, and method of control as recommended by suitably qualified person based on outcomes of biannual monitoring. • Control of High Threat Weeds using ecologically appropriate methods for the target weed.	• Continue weed control focused on listed High Threat Weeds identified through weed monitoring with timing, frequency, and method of control as recommended by suitably qualified person based on outcomes of biannual monitoring. • Control of High Threat Weeds using ecologically appropriate methods for the target weed.	High Threat Weeds are controlled, determined by biannual weed monitoring.	High Threat Weed species and percentage of cover equal to or less than baseline dataset.
Biodiversity Measure 11: Animal pest management	Animal pests identified during monitoring have been controlled.	• Continue control program with timing, frequency, and method based on recommendations from a suitably qualified person based on outcomes of biannual monitoring. • Control of animal pests using ecologically appropriate methods for the target species.	• Continue control program with timing, frequency, and method based on recommendations from a suitably qualified person based on outcomes of biannual monitoring. • Control of animal pests using ecologically appropriate methods for the target species.	• Continue control program with timing, frequency, and method based on recommendations from a suitably qualified person based on outcomes of biannual monitoring. • Control of animal pests using ecologically appropriate methods for the target species.	Animal pest impacts identified during biannual monitoring.	• Rehabilitation areas have been protected for the life of mine. • Vegetation establishment and habitat establishment (*Biodiversity Measure 3*) are not impeded by animal pests.
Biodiversity Measure 12: Bushfire prevention and control measures	• Compliance with relevant Australian Standards. • Maintain fuel load onsite. • Undertake fuel reduction burns as required. • Maintain appropriate firefighting equipment.	Implementation of the Bushfire Management Plan including fuel load inspections and maintaining asset protection zones, access tracks and ETL easements.	Implementation of the Bushfire Management Plan including fuel load inspections and maintaining asset protection zones, access tracks and ETL easements.	Implementation of the Bushfire Management Plan including fuel load inspections and maintaining asset protection zones, access tracks and ETL easements.	The condition of asset protection zones, access tracks and ETL easements determined during monitoring. Fuel loads maintained.	• Asset protection zones and access tracks maintained for the life of mine. • Any outbreak of fire is contained. Also refer to the approved **Bushfire Management Plan.**
Biodiversity Measure 13: Remediation of surface cracks	Surface cracks that have not self-corrected are remediated within 1 month of identification or when safe to do so.	• Continue subsidence monitoring program and remediate surface cracks >50mm within 1 month following inspection. • Prior to any remediation, NCOPL will undertake a review of environmental impacts that may result from the remediation at the specific location and consider if remediation of surface cracks by earthmoving machinery will not result in increased environmental impacts or if alternative methods	• Continue subsidence monitoring program and remediate surface cracks >50mm within 1 month following inspection. • Prior to any remediation, NCOPL will undertake a review of environmental impacts that may result from the remediation at the specific location and consider if remediation of surface cracks by earthmoving machinery will not result in increased environmental impacts or if alternative methods	• Continue subsidence monitoring program and remediate surface cracks >50mm within 1 month following inspection. • Prior to any remediation, NCOPL will undertake a review of environmental impacts that may result from the remediation at the specific location and consider if remediation of surface cracks by earthmoving machinery will not result in increased environmental impacts or if alternative methods	Surface cracking within predicted subsidence zones determined during subsidence inspections	Landforms are stable with no evidence of surface cracks >50mm within predicted subsidence zones.

Mitigation measure	Performance criteria	Short term management measures (Years 1 to 4)	Medium term management measures (Years 5 to 10)	Long term management measures (Years 11+)	Indicators	Completion criteria
		of remediating the crack are warranted (e.g., by low impact method). The review will consider, among other factors, the known locations of threatened flora species.	of remediating the crack are warranted (e.g., by low impact method). The review will consider, among other factors, the known locations of threatened flora species.	of remediating the crack are warranted (e.g., by low impact method). The review will consider, among other factors, the known locations of threatened flora species.		
Biodiversity Measure 14: Vehicle speed limits	Limited fauna vehicle strikes due to vehicle speed.	Vehicle speeds maintained on the Mine Access Road and all other internal surface roadways for the life of mine.	Vehicle speeds maintained on the Mine Access Road and all other internal surface roadways for the life of mine.	Vehicle speeds maintained on the Mine Access Road and all other internal surface roadways for the life of mine.	Speed limits enforced and adjusted following an annual review of reported incidents involving vehicle fauna strikes.	Limited fauna vehicle strikes due to vehicle speed over the life of mine.

8. Monitoring

8.1 Monitoring program

NCOPL will implement a seasonally based monitoring program to monitor and report on the effectiveness of the measures described in section 6, and progress against the detailed performance indicators and completion criteria described in section 7. The monitoring program will also provide opportunity to identify improvements for biodiversity outcomes.

The biodiversity monitoring program is summarised in Table 8-1 and will be conducted by a suitably qualified and experienced person(s). The monitoring program will be adaptively managed using the Trigger Action Response Plan (**TARP**) (section 9).

The NCOPL Environmental Superintendent will be responsible for the monitoring, reviewing, and implementation of the biodiversity monitoring program.

Results and performance of the biodiversity monitoring program will be reported in accordance with section 11.3 and summarised in the Narrabri Mine Annual Review (section 11.1).

Table 8-1 Biodiversity monitoring program

Impact	Mitigation measure	Method	Frequency	Responsibility
Clearing of native vegetation and habitat	***Biodiversity Measure 1:*** Vegetation Clearance Protocol	Inspect delineated areas to be cleared and/or retained.	Prior to construction.	Manager HSE and Environmental Superintendent
		Review of the vegetation clearance methods and implementation of the Vegetation Clearance Protocol to identify potential improvements.	Following clearance	
	Biodiversity Measure 2: Rehabilitation and revegetation	**Refer to method in section 8.2.1.**	Annually.	Environmental Superintendent
	Biodiversity Measure 3: Salvage of habitat resources	Visual inspection of potential habitat resources to be salvaged.	Prior to and during vegetation clearance.	Environmental Superintendent
		Rehabilitation monitoring (refer to section 8.2.1) to monitor salvaged, stockpiled and reused habitat features.	Annually	
	Biodiversity Measure 4: Nest box program	Count the number of salvaged hollows/nest boxes installed (commitment to install 100), and if installed in suitable locations (section 6.2).	Annually.	Environmental Superintendent
		Inspection to determine fauna usage by target fauna species.		
		Assessment of any damage and record maintenance required.		
	Biodiversity Measure 5: Site induction/access	Review of the induction process for contractors and site personnel involved in vegetation clearance, implementation of the biodiversity measures (for vegetation clearing) and monitoring work to identify improvements.	Annually.	Environmental Superintendent
	Biodiversity Measure 6: Sediment and erosion controls	Visual inspection of controls to assess if damage/erosion has occurred and remedial work is required. Visual inspection of sediment controls to determine if dewatering or desilting is required. Monitor water quality to determine if water quality is being impacted in accordance with the Water Management Plan. **Refer to the ESCP - Attachment 2 to the Water Management Plan for additional erosion and sediment control monitoring requirements.**	Whilst controls are in place.	Environmental Superintendent
Potential impacts to streams	***Biodiversity Measure 7:*** Creek line monitoring program	Geomorphic survey of creek stability and condition for up to two years after longwall mining. **Refer to section 8.2.3.**	Annually.	Environmental Superintendent
		Remote sensing **Refer to section 8.2.3.**	• Annually (Multispectral imaging) • Triennially (LiDAR).	Environmental Superintendent
	Biodiversity Measure 8: Construction of drainage line crossings	Visual inspection of drainage line crossings whilst crossing remain in-place to ensure that the new crossing design is successful in achieving the desired flow velocities and fish passage outcomes.	During construction and quarterly whilst crossing in operation.	Civil Services Supervisor / Environmental Superintendent
Inadvertent impacts on adjacent habitat or native vegetation	***Biodiversity Measure 9:*** Fencing and managing Poplar Box Woodland EEC	Visual inspections of fencing around the Poplar Box Woodland EEC will be conducted to ensure there are no occurrences of unauthorised access or livestock within the “Environmental Protection Area”.	Biannually.	Environmental Superintendent
		Refer to Section 8.2.2.	Annually.	Environmental Superintendent

Impact	Mitigation measure	Method	Frequency	Responsibility
Indirect impacts on native vegetation and habitat	***Biodiversity Measure 10:*** Weed management	Visual inspection of vehicles entering site to confirm weed seed clean down has been completed.	During vehicle/equipment introduction to site process.	Environmental Superintendent
		Visual inspections of areas subject to disturbance and rehabilitation to determine the presence of any High Threat Weeds. The location (mapping extent), species, and estimation of cover will be recorded during each monitoring event. Retain copies of the location, species, and control methods (e.g., herbicide).	Baseline and then biannually for the life of mine Reduce to annually when vegetation established in rehabilitation areas.	Environmental Superintendent
	Biodiversity Measure 11: Animal pest management	Animal pest inspections will be conducted across the mine site to identify the appropriate resources to control and minimise animal pest populations.	Biannually.	Environmental Superintendent
	Biodiversity Measure 12: Bushfire prevention and control measures	Visual inspection to identify fuel loads including the condition of asset protection zones, access tracks and ETL easements **Refer to the Bushfire Management Plan for additional monitoring requirements.**	Annually prior to summer.	Surface Operations Manager / Environmental Superintendent
	Biodiversity Measure 13: Remediation of surface cracks	Visual inspections to identify surface cracking, ponding, erosion, sedimentation. **Refer to method in section 8.2.3.**	During active subsidence, monthly and following a significant rainfall event*	Environmental Superintendent
		Visual inspections of remediated surface cracks. **Refer to method in section 8.2.3.**	Within three months of remediation.	
		Vegetation health and regeneration. **Refer to method in section 8.2.3.**	Annually in spring.	Environmental Superintendent
	Biodiversity Measure 14: Vehicle speed limits	Review of reported incidents involving fauna vehicle strike.	Annually.	Environmental Superintendent

Notes:
*defined as a 5-day 90th percentile rainfall event which is 38.4 mm over 5 consecutive days).

8.2 Monitoring methods

8.2.1 Rehabilitation and revegetation

NCOPL will conduct monitoring of rehabilitated sites to:

- identify specific problems to enable research on causes and appropriate solutions (e.g. low emergent numbers, loss of seedlings, loss of particular species);
- determine that the actions detailed in this Plan are leading to positive biodiversity outcomes (e.g. vegetation in rehabilitation site is commensurate to analogue sites, native fauna activity observed etc.);
- track progress of rehabilitation and vegetation establishment against the relevant completion criteria; and
- provide feedback for continuous improvement of the rehabilitation and revegetation program as detailed in the Rehabilitation Management Plan.

Rehabilitation performance will be monitored annually in spring. The annual rehabilitation monitoring results will link with the TARP management system (section 9) if risks to successful rehabilitation are identified during the monitoring period.

The rehabilitation monitoring method described below will be integrated into the Rehabilitation Management Plan.

Rehabilitation and revegetation monitoring method

Rapid vegetation integrity monitoring plots (herein referred to as rehabilitation monitoring plots) will be established across the surface disturbance area, situated within service borehole and exploration borehole drill sites, and along service corridors, access tracks and mine safety pre-conditioning areas. Rehabilitation monitoring plots will consist of an approximate 20 m x 20 m plot, which will be permanently marked by metal star pickets.

The aim of the rapid vegetation integrity monitoring (informed by the BAM[9]) is to achieve a rapid vegetation integrity (condition) score. The intention of the rapid approach is to provide a method that can rapidly generate a vegetation integrity score to measure change, comparable to the full BAM method, while at the same time increasing efficiency. Monitoring will occur from the initial stages of rehabilitation to provide detailed information on rehabilitation success and to enable adaptive management of potential threats (e.g., weed incursion).

The data collected at each rehabilitation monitoring plot will include all variables currently used in a BAM assessment; however, utilises bands to categorise results for each variable. The bands used are N/A, low (0.1 – 33.3% of analogue site), moderate (33.4 – 66.6% of analogue site) and high (66.7%+ of analogue site). The variables to be collected include:

- Composition: a count of each distinct species:
  - species richness in each growth form (i.e. direct counts) - trees, shrubs, grass & grass-like, forb, fern and other.
  - number of weed species.

[9] https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/biodiversity-assessment-method-2020-200438.pdf

- Structure: an estimate of the overall percentage of each growth form group:
  - sum percent cover of each species in the following growth form - trees, shrubs, grass & grass-like, forb, fern and other.
- Function (recorded as per the BAM):
  - number of large trees;
  - total length of logs (fallen or salvaged and reused) >10cm diameter and >0.5m length;
  - average litter cover (3 x 1m^2 quadrats along midline of plot);
  - regeneration present (stems <5cm diameter at breast height); and
  - number of stem size classes present (5 – 9 cm, 10 – 19 cm, 20 – 29 cm, 30 – 49 cm, 50 – 79 cm and 80 cm+).

Two photographs will be taken within each rehabilitation monitoring plot to supplement the data. The first photograph will be taken from the most northerly corner of the plot (location recorded during initial monitoring event) in the direction of the diagonally opposite corner. The second photograph will be taken from the diagonally opposite corner in the direction of the most northerly corner of the plot.

Observations of erosion will also be recorded during each monitoring event.

Monitoring locations have been selected based on the type of disturbance (i.e. infrastructure type), access routes and PCT/mapped vegetation type. One analogue site will be established for each PCT/mapped vegetation type in accordance with the BAM (i.e. “best-on-offer” reference sites).

The indicative monitoring locations are shown in Figure 8-1. Actual monitoring locations will be determined onsite by a suitably qualified ecologist.

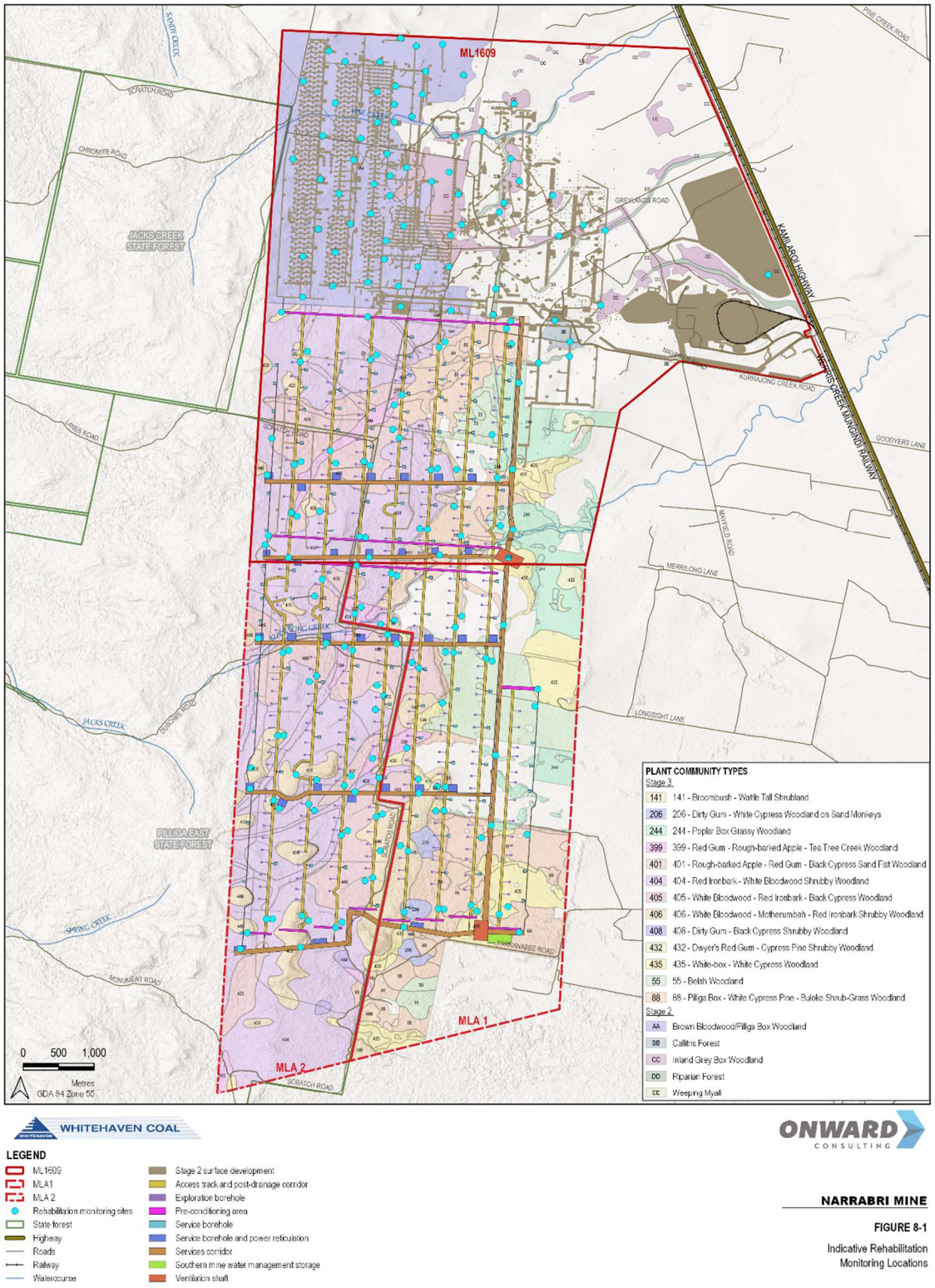
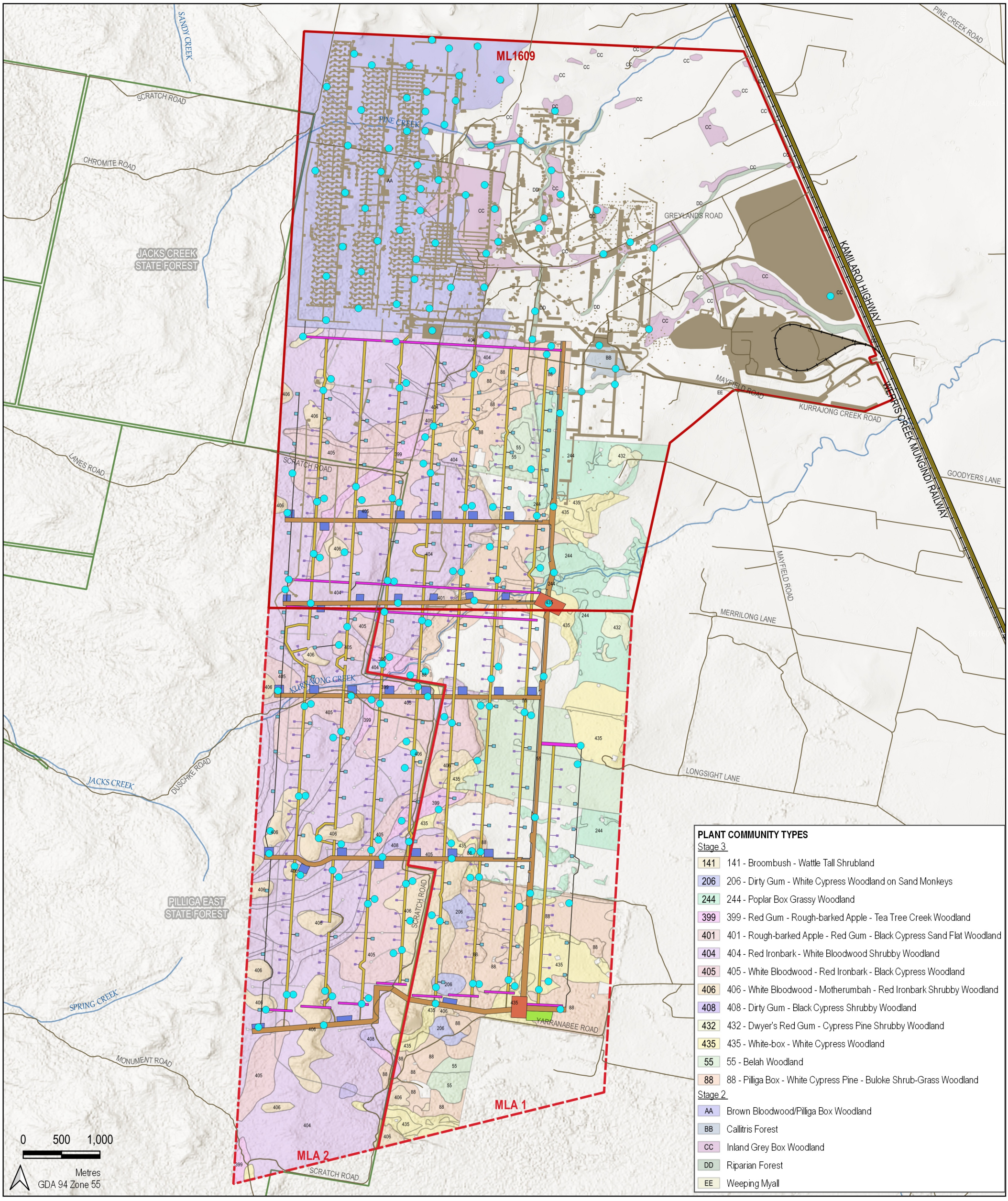


Figure 8-1 Indicative rehabilitation monitoring locations



PLANT COMMUNITY TYPES

Stage 3

- 141 - Broombush - Wattle Tall Shrubland
- 206 - Dirty Gum - White Cypress Woodland on Sand Monkeys
- 244 - Poplar Box Grassy Woodland
- 399 - Red Gum - Rough-barked Apple - Tea Tree Creek Woodland
- 401 - Rough-barked Apple - Red Gum - Black Cypress Sand Flat Woodland
- 404 - Red Ironbark - White Bloodwood Shrubby Woodland
- 405 - White Bloodwood - Red Ironbark - Black Cypress Woodland
- 406 - White Bloodwood - Motherumbah - Red Ironbark Shrubby Woodland
- 408 - Dirty Gum - Black Cypress Shrubby Woodland
- 432 - Dwyer's Red Gum - Cypress Pine Shrubby Woodland
- 435 - White-box - White Cypress Woodland
- 55 - Belah Woodland
- 88 - Pilliga Box - White Cypress Pine - Buloke Shrub-Grass Woodland

Stage 2

- AA - Brown Bloodwood/Pilliga Box Woodland
- BB - Callitris Forest
- CC - Inland Grey Box Woodland
- DD - Riparian Forest
- EE - Weeping Myall

WHITEHAVEN COAL

LEGEND

- ML1609
- MLA1
- MLA 2
- Rehabilitation monitoring sites
- State forest
- Highway
- Roads
- Railway
- Watercourse
- Stage 2 surface development
- Access track and post-drainage corridor
- Exploration borehole
- Pre-conditioning area
- Service borehole
- Service borehole and power reticulation
- Services corridor
- Southern mine water management storage
- Ventilation shaft

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NARRABRI MINE

FIGURE 8-1

Indicative Rehabilitation Monitoring Locations

Use of analogue sites

Analogue sites will be established to provide baseline data for comparison with rehabilitation monitoring sites (i.e. one analogue site for each PCT/mapped vegetation type). Baseline data will be used to quantify the vegetation integrity (condition) score and completion criteria for each PCT/mapped vegetation type. Data collected within the rehabilitation monitoring plots will be analysed against the relevant PCT/mapped vegetation type completion criteria and results reported within the annual Biodiversity Monitoring Report. Monitoring will continue for the life of mine until the completion criteria as detailed in section 7 has been met.

Remote sensing

Remote sensing (LiDAR and multi-spectral imaging) is also utilised to monitor rehabilitation success. The data captured allows for comparison of landscape condition and vegetation cover within the mining lease to that of selected analogue sites. Targeted field work will be implemented to examine the causes of any change highlighted. Refer to section 8.2.3 for further detail on monitoring via remote sensing.

8.2.2 Vegetation monitoring Poplar Box Woodland EEC

Vegetation monitoring within the fenced areas of Poplar Box Woodland EEC will follow the full BAM plot method to provide consistency in the assessment of impacts on biodiversity values and to identify the requirement for adaptive management. The Poplar Box woodland EEC will be monitored annually in spring. Composition, structure and function attribute data will be collected and compared to the baseline dataset and subsequent monitoring years to assess performance against the completion criteria (section 7). The annual monitoring results will link with the TARP management system (section 9) if risks to, or a reduction in biodiversity values are identified during the monitoring period.

Poplar Box Woodland EEC monitoring results will be reported within an annual Biodiversity Monitoring Report and will be summarised in the Narrabri Mine Annual Review (section 11.1).
Each monitoring plot will consist of a 20 m x 50 m plot with a nested 20 m x 20 m plot, inclusive of a 50 m transect running through the centre, as shown in Figure 8-2.

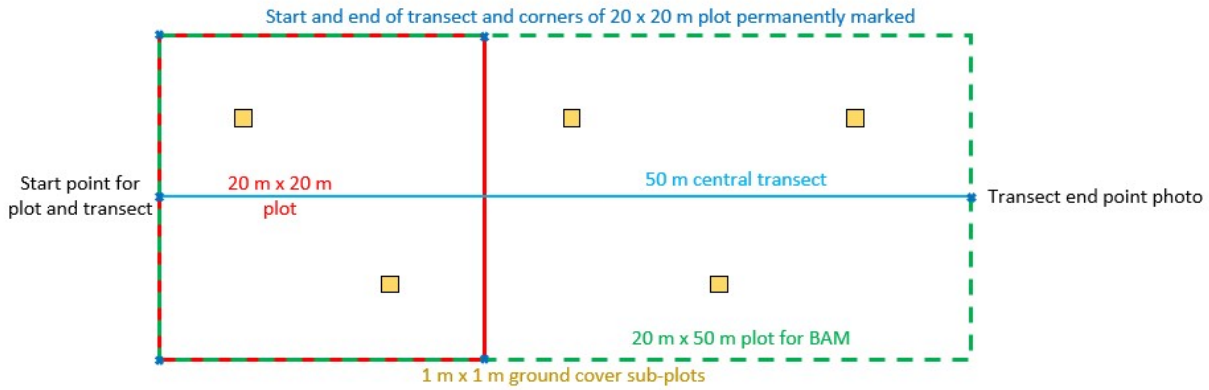


Figure 8-2 Poplar Box Woodland EEC monitoring plot

A star picket representing the start point for the plot/transect will be placed at each monitoring site and a record taken of the start point via GPS.

The Poplar Box Woodland EEC monitoring plot will measure the composition, structure, and function attributes of the vegetation community. The attributes to be measured are detailed as follows:

- Composition: a count of each distinct species. Data to be recorded for each 20 m x 20 m plot are:
  - Full species name (Genus species) for the three dominant native species within each growth form group. Dominant native species are the native species that contribute most to the total cover of the growth form group.
  - Genus name followed by species 1, species 2 and so on, or the full species name, where practicable, for all other species.
  - Whether each species is native, or high threat weed or non-high threat weed.
  - The growth form group to which each native species has been allocated.
  - The number of different native plant species recorded for each growth form group.
- Structure: the summed species foliage cover for each growth form group within each 20 m x 20 m plot:
  - Estimate of foliage cover for each native and exotic species present within the 20 m x 20 m plot. Foliage cover will be recorded:
    - In decimals if less than 1%
    - In whole numbers up to 5%
    - To the nearest 5% if >5% cover
- Function: Number of large trees, tree stem size classes and tree regeneration (native only) within each 20 m x 50 m plot:
  - number of large trees;
  - tree stem size classes (measured at 1.3 m above ground height) for all species in the tree growth form group (5 – 9 cm, 10 – 19 cm, 20 – 29 cm, 30 – 49 cm, 50 – 79 cm and 80 cm+).;
  - Tree regeneration (presence of living trees from the tree growth form group with a maximum stem diameter of <5 cm regardless of height);
  - total length of fallen logs (> 10cm in diameter);
  - average litter cover (5 x 1m^2 quadrats along midline of plot).

Coolabah bertya

The monitoring of translocated Coolabah bertya will be conducted in accordance with the *Coolabah bertya Translocation and Propagation Management Plan (*Appendix E).

8.2.3 Subsidence monitoring

Creek line monitoring

Locations for cross-sections will be determined during baseline surveys to confirm channel parameters (i.e., channel width, depth, area, and bank full level). A reach of at least 100 m in length shall be surveyed from each geomorphic zone and at least four cross sections recorded at equal intervals along the reach. Two to three reaches each at least 100 m long within a control zone will also be surveyed to provide information on natural channel variability between survey periods. These control surveys will provide an indication of natural variability due to rainfall events that can be used to determine if channel changes are mining-induced (e.g.,

changes to channel area and bed slope, erosion of channel banks and bed, or sediment deposition). Permanent pegs will be established at each cross-section to ensure comparability of cross-section sequences.

The final location of on-going monitoring reaches and cross-sections will be determined following the completion of the baseline survey.

Creek line monitoring will be undertaken annually.

Surface cracking within predicted subsidence zones

Visual inspections will be conducted to identify areas of surface cracking following longwall mining. These inspections will document crack locations, depth and width using GPS, identify erosion/potential erosion, record the nature and extent of sedimentation, and determine the appropriate management response. Subsidence monitoring of surface cracking will be further detailed in the relevant Extraction Plan.

Ponding

Identification of ponded areas will be performed during the surface cracking visual inspections to determine the location and extent of ponding within the predicted subsidence zones. Monitoring will record the location, the extent of ponding (size) and if there is vegetation within the ponded area that may require monitoring of vegetation health.

Where impacts to vegetation are detected (e.g., canopy dieback), vegetation monitoring will be conducted annually in accordance with the relevant Extraction Plan.

Remote sensing

NCOPL will utilise remote sensing light detection and ranging (LiDAR) and multi-spectral imaging to provide a quantitative comparison of landscape condition and vegetation cover within the mining lease to that of selected analogue sites. Analogue sites will be established within zones where no impacts have been predicted and the sites will have similar characteristics and biological conditions to the mining area. If changes in landscape condition and/or vegetation cover are detected, targeted field surveys will be conducted to examine the cause of change followed by the implementation of appropriate management measures.

LiDAR

LiDAR processing and analysis will be undertaken every three years (triennially), commencing with baseline surveys prior to mining a series of longwall panels.

LiDAR data will be processed into a land surface digital elevation model (DEM) across the entire landscape and reviewed against the baseline survey results to assess measured subsidence against subsidence predictions.

Multi-spectral image processing and analysis

The primary purpose for this monitoring is to detect changes in vegetation cover and erosion. The high-resolution multi-spectral imagery will be stratified into four impact zones (i.e., longwall, transition, pillar, control) and processed into a normalised difference vegetation index (NDVI). Each subsequent dataset will be subtracted from those produced from earlier captures creating a series of change images. Each dataset produced will be used to create a map for visual interpretation and analysis and for communication of results.

Multi-spectral image processing will be undertaken as baseline prior to mining a series of longwall panels (as per the relevant Extraction Plan) and then annually in spring.

9. Trigger Action Response Plan

A TARP (Table 9-1) has been developed to identify, assess and respond to triggers such as potential exceedances and to manage risk associated with meeting the biodiversity performance and completion criteria (section 7).

This Plan and its associated TARP are stored on the WHC intranet and are available to all NCOPL personnel.

Table 9-1 Biodiversity Trigger Action Response Plan

Mitigation measure	Performance criteria	Trigger	Response
Biodiversity Measure 1: Vegetation Clearance Protocol	No adjacent vegetation outside of delineated areas is cleared.	Clearing outside the delineated area.	• Environmental Superintendent to inform the Manager HSE. • Investigate reasons for additional clearance. • Notify the relevant agencies in accordance with section 10.
	Areas to be cleared and/or retained are clearly delineated and mapped.	Clearing in exceedance of the area required for the next 12 months i.e. the clearing extent.	• Environmental Superintendent to inform the Manager HSE. • Investigate reasons for exceedance. • Notify the relevant agencies in accordance with section 10. • Appropriately stabilise area not required for development.
Biodiversity Measure 2: Rehabilitation and revegetation	Revegetation of cleared areas.	**Level 1** Rehabilitated area/s are not on a trajectory towards completion criteria at year 5.	**Level 1** • Undertake inspection of rehabilitated area/s to identify possible threats (e.g. topsoil quantity/quality, weed and animal pest, drought conditions etc.). • Implement management actions commensurate to identified cause/risk as required (e.g. seeding).
		Level 2 Rehabilitated area/s are not on a trajectory towards completion criteria at year 10.	**Level 2** • Engage a suitably qualified person to investigate cause and recommend management measures. • Implement management actions commensurate to identified cause/risk as required (e.g. seeding).

Mitigation measure	Performance criteria	Trigger	Response
			• Increase frequency of monitoring following implementation of recommended management measures.
	Propagation and translocation of Coolabah bertya into suitable habitat is attempted.	To be established following implementation of the propagation and translocation trial (Appendix E).	To be established following implementation of the propagation and translocation trial (Appendix E).
***Biodiversity Measure 3*:** Salvage and relocation of habitat resources	A selection of habitat features is salvaged during vegetation clearance activities and stockpiled for use in rehabilitation areas.	Limited key habitat features are identified or salvaged during clearance.	Review implementation of the nest box program (*Biodiversity measure 4*) and amend program to supplement lack of habitat features salvaged.
***Biodiversity Measure 4*:** Nest box program	Recorded use of nest boxes by target fauna species.	• Less than 30% uptake of salvaged hollows and/or nest boxes by target fauna species. • Damage or deterioration of installed hollow or nest box.	• Investigate cause of low uptake on usage (i.e. suitability of location, nest box type, installation [e.g. height], use by non-native fauna etc.) and implement rectification measures as required. • Conduct repair or replacement of the damaged/deteriorated hollow or nest box.
***Biodiversity Measure 5*:** Site induction/access	Limited occurrences of unauthorised site access.	Evidence of unauthorised access.	• Review and update site induction and security controls as required. • Review fencing and signage and undertake maintenance and improvements as required.
Biodiversity Measure 6: Sediment and erosion controls	No significant erosion that impacts native vegetation	Evidence of active rill erosion or gully erosion that is > 200 mm in depth.	• Review adequacy of existing erosion and sediment controls. • Undertake repairs and implement additional controls as required. • Engage a specialist if ongoing erosion is observed following repair and implementation of additional controls.

Mitigation measure	Performance criteria	Trigger	Response
Biodiversity Measure 7: Creek line monitoring program	Change to overall drainage pattern is not more than predicted. Detected alteration in channel dimensions or processes within normal range compared to baseline data.	• Field survey indicates >20% increase in length of eroding creek line; and/or • Surface drainage pattern is significantly altered. Creek line monitoring triggers and responses will also be included in the relevant Extraction Plan.	• Notify the relevant agencies in accordance with section 10. • Consult geomorphologist or other appropriately qualified and experienced specialist to determine the extent of the impact, identify contributing factors and determine appropriate remediation measures. • Review and implement contingency measures required by other plans as relevant (e.g. the Subsidence Monitoring Program). • Consult with relevant agencies and stakeholders prior to remediation works being undertaken. • Review monitoring program as required. Creek line monitoring triggers and responses will also be included in the relevant Extraction Plan.
***Biodiversity Measure 8*:** Construction of drainage line crossings	Drainage line (stream) crossings do not restrict fish passage.	Defects detected during inspections.	Defects will be reported to the Environmental Superintendent and rectification works will be conducted as soon as practicable.
***Biodiversity measure 9*:** Fencing and managing Poplar Box Woodland EEC	• Management of potential direct and indirect impacts on Poplar Box Woodland EEC. • Also refer to weed management (*Biodiversity measure 10*).	Evidence of occasional unauthorised access.	• Review and update site induction and security controls as required. • Inspect fencing and signage and undertake maintenance and improvements as required. • Undertake additional inspections and investigate the need to install trail cameras.
		Measured decrease in Poplar Box Woodland EEC composition, structure and/or function.	• Undertake inspection of Poplar Box Woodland EEC to identify possible threats (e.g. weed and animal pest, drought conditions).

Mitigation measure	Performance criteria	Trigger	Response
			• Implement management actions commensurate to identified cause/risk as required (e.g. additional weed control). • If monitoring indicates an ongoing measured decrease in composition, structure and/or function, engage a suitably qualified person to investigate cause and recommend additional measures.
		Increase in weed infestations > 20% compared to baseline dataset.	• Undertake additional monitoring. • Increase or review/amend weed control methods. • Undertake follow up targeted weed spraying (if suitable for targeted species).
Biodiversity measure 10: Weed management	• Infestations of High Threat Weeds equal to or less than baseline dataset. • Percent cover for identified weed species equal to or less than baseline dataset. • Weeds identified during monitoring have been controlled.	**Level 1** Increase in weed infestations and High Threat Weeds > 20% compared to baseline dataset.	**Level 1** • Undertake additional monitoring. • Increase or review/amend weed control methods. • Undertake follow up targeted weed spraying (if suitable for targeted species).
		Level 2 Increase in weed infestations and High Threat Weeds > 40% compared to baseline dataset.	**Level 2** *As per Level 1* AND Review the weed management program to identify the key priority areas and investigate alternative methods for control of target species.

Mitigation measure	Performance criteria	Trigger	Response
***Biodiversity Measure 11*: Animal pest management**	• Animal pest identified during monitoring have been controlled.	Monitoring indicates animal pests impacting on rehabilitation and vegetation establishment.	Increase the frequency or extent of animal pest control based on advice from a suitably qualified person.
***Biodiversity Measure 12*: Bushfire prevention and control measures**	• No incidence of unplanned bushfire. • Any outbreak of fire is contained.	Refer to the approved Bushfire Management Plan.	Refer to the approved Bushfire Management Plan.
***Biodiversity Measure* 13: Remediation of surface cracks**	Surface cracks are remediated as soon as practicably possible (and safe to do so).	**Level 1** • Surface cracks >50 mm but <320 mm present and/or • Erosion as a result of cracking identified.	**Level 1** • Provide safety fencing and signage if required. • Advise relevant stakeholders. • Implement remediation measures as appropriate. These may include ripping of surface cracks, filling of cracks with grout, spoil or other suitable material. • Implement appropriate erosion control measures as outlined in the site Erosion and Sediment Control Plan. • Monitor remediated surface cracks within 3 months following remediation.
		Level 2 • Surface cracks >320 mm and/or crack widths more than predicted for specific soil type or natural feature. and/or • Erosion as a result of cracking identified. Surface cracking triggers and responses will also be documented in the Extraction Plan - Land Management Plan.	**Level 2** • As for Level 1 • Make area safe. On-going review and appraisal of any significant changes to surface slopes such as cracking along ridges, increased erosion down slopes, foot slope seepages and drainage path adjustments observed after each longwall is extracted. Surface cracking triggers and responses are also documented in the Extraction Plan - Land Management Plan.
	Ponding (riparian vegetation)	**Level 1**	**Level 1**

Mitigation measure	Performance criteria	Trigger	Response
		Ponding occurs in areas with no vegetation, or if vegetation is present, the vegetation is not affected.	Allow ponding to self-correct and continue to undertake inspections.
		Level 2 Ponding occurs in areas with riparian vegetation, EECs or archaeological deposits.	**Level 2** • Vegetation monitoring will be conducted in accordance with the Extraction Plan - Biodiversity Management Plan/s. • Develop remediation options to protect the affected environmental features. • Continue monitoring extent of ponding and vegetation health and assess downstream water quality results for any change in EC trends.
***Biodiversity Measure* 14:** Vehicle speed limits	Limited fauna vehicle strikes due to vehicle speed.	Incident of vehicle fauna strike.	• Investigate circumstances leading to vehicle fauna strike. • Review existing controls and implement additional measures if required (e.g. additional driver awareness training).

10. Incidents and non-compliance

10.1 Incident notification

An incident is defined under the CoC 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, as defined under the CoC, is 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 the CoC or any other statutory approval (e.g., EPL).

In accordance with CoC E9, NCOPL will notify DPE and any other relevant agencies immediately as it becomes aware of an incident. Incident notification will be made in writing via 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.

Notifications to the EPA will be made by contacting the Environment Line on 131 555 and written details of the notification will be provided within 7 days of the date on which the incident occurred.

Incident reporting and emergency response is further described in the EMS.

10.2 Non-compliance and adaptive management

The CoC defines a non-compliance as *an occurrence, set of circumstances or development that is a breach of this consent.* For clarity, 'this consent' is referring to development consent SSD-10269.

In accordance with CoC E4, where an exceedance of the relevant criteria or performance measures has occurred, NCOPL will, at the earliest opportunity, take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur. All reasonable and feasible options for remediation (where relevant) will be considered and a report submitted to the DPE describing those options and any preferred remediation measures or other course of action.

In accordance with CoC E10, within seven days of becoming aware of a non-compliance, NCOPL will notify DPE of the non-compliance[10]. The notification will be made in writing via the Department's Major Projects Website and identify the development (including the development application number and name), set out the CoC 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.

NCOPL will implement any reasonable remediation measures as directed by the Planning Secretary, to the satisfaction of the Planning Secretary.

[10] A non-compliance which has been notified as an incident under section 10.1 does not need to also be notified as a non-compliance.

11. Reporting, evaluation, and review

11.1 Annual review

NCOPL will review the performance of its biodiversity management system for the previous calendar year (section 11.3) and report results within the Annual Review to the satisfaction of the Planning Secretary and in accordance with CoC E11. Table B-1, Appendix B lists all components of the Annual Review.

In accordance with CoC E12, the Annual Review will be submitted to DPE, the IAPUM (via DPE as Secretariat), NSC and Gunnedah Shire Council (**GSC**) and regulatory agencies and made available to the CCC and any interested person upon request. The Annual Review will also be made publicly available on the WHC website.

11.2 EPBC compliance reports

In accordance with Condition 8 Approval Decision EPBC 2009/5003 a report pertaining to the annual compliance with will be provided to DAWE within three months of every 12-month anniversary of commencement of Stage 2 operations. The report must include detail on how the plans required by the conditions of the approval have been implemented.

11.3 Biodiversity reporting

The results of the biodiversity monitoring program (section 8.1) will be reported on as stated in Table 11-1 and a summary of the results will be included in the Narrabri Mine Annual Review (section 11.1).

Table 11-1 Biodiversity reporting

Aspect	Monitoring	Reporting method
Biodiversity Measure 1: Vegetation Clearance Protocol	Inspect delineated areas to be cleared and/or retained.	Pre-clearance report
	Review of the vegetation clearance methods and implementation of the Vegetation Clearance Protocol to identify potential improvements.	Pre-clearance report
Biodiversity Measure 2: Rehabilitation and revegetation	Rehabilitation and revegetation of cleared areas.	Rehabilitation Monitoring Report
	Propagation and translocation of Coolabah bertya into suitable habitat is attempted.	Coolabah bertya inspection report
Biodiversity Measure 3: Salvage and relocation of habitat resources	Visual inspection of potential habitat resources to be salvaged.	Post-clearance report
	Rehabilitation monitoring to monitor salvaged, stockpiled, and reused habitat features.	Rehabilitation Monitoring Report
Biodiversity Measure 4: Nest box program	Nest box monitoring.	Annual nest box monitoring report.

Aspect	Monitoring	Reporting method
Biodiversity Measure 5: Site induction/access	Annual review of the induction process for contractors and site personnel involved in vegetation clearance, including a review of the implementation of biodiversity measures and monitoring work to identify improvements	Document control record
Biodiversity Measure 6: Sediment and erosion controls	Site environmental inspections	Environmental Inspection Reports
Biodiversity Measure 7: Creek line monitoring program	Geomorphic survey of creek stability and condition.	Annual Creek Line Monitoring Report
	Remote sensing	Annual multispectral imaging report
		Triennial LiDAR survey report
Biodiversity Measure 8: Construction of drainage line crossings	Visual inspection of drainage line crossings	Environmental Inspection Reports
Biodiversity Measure 9: Fencing and managing Poplar Box Woodland EEC	Vegetation monitoring of Poplar Box Woodland EEC	Biodiversity Monitoring Report
Biodiversity measure 10: Weed management	Weed monitoring program	Biannual weed inspection reports
Biodiversity Measure 11: Animal pest management	Animal pest inspections	Biannual animal pest inspection reports
Biodiversity Measure 12: Bushfire prevention and control measures	Visual inspection of fuel loads and condition of asset protection zones, access tracks and ETL easements.	Inspection report
Biodiversity Measure 13: Remediation of surface cracks	Visual inspections to identify surface cracking, ponding, erosion, sedimentation.	Subsidence Monitoring Report
	Visual inspections of remediated surface cracks	Subsidence Monitoring Report
	Vegetation health and regeneration	Biodiversity Monitoring Report
Biodiversity Measure 14: Vehicle speed limits	Review of reported incidents involving fauna vehicle strike.	Incident report

11.4 Independent Environmental Audit

Within one year of commencement of the development, and every three years thereafter (unless the Planning Secretary directs otherwise), NCOPL will commission an Independent Environmental Audit (**IEA**) of the development, to be conducted in accordance with CoC E13 and CoC E14. The IEA will be led and conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Planning Secretary.

The IEA process and requirements are further described in the EMS.

11.5 EPBC approval audit

In accordance with Condition 9 of the Approval Decision EPBC 2009/5003, upon the direction of the Commonwealth Minister, NCOPL will ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the Commonwealth Minister. The independent auditor will be approved by the Commonwealth Minister prior to the commencement of the audit. Audit criteria will be agreed to by the Commonwealth Minister and the audit report will address the criteria to the satisfaction of the Commonwealth Minister.

11.6 BMP review and evaluation

In accordance with CoC E7, NCOPL will review the suitability of the BMP within three months of the:

- submission of an incident report under CoC E9 or E10;
- submission of an Annual Review under CoC E11;
- submission of an IEA under CoC E13;
- approval of any modification of the CoC (unless the conditions require otherwise); or
- notification of a change in development phase under CoC A14.

As required by CoC E8, if the review under CoC E7 determines that the BMP requires revision to either improve the environmental performance of the development, cater for a modification or comply with a direction, the revised document will be submitted to the Planning Secretary for approval within six weeks of the review. The revision status of this BMP is indicated in section 15.

A dedicated review register will be maintained which will provide the details of the review of all relevant strategies, plans and programs that need to be reviewed as required by CoC E7.

Following the implementation of the Coolabah Bertya Translocation and Propogation Trial, this BMP will be updated to include relevant completion criteria, triggers and response actions for Coolabah Bertya translocation and propagation once sufficient data is collected.

The NCOPL Environmental Superintendent will be responsible for the monitoring, reviewing and implementation of the BMP.

11.7 Improvement measures

Consent condition E5(g) requires this Plan to include a program to investigate and implement ways to improve the environmental performance of the development over time. Improvement measures may be investigated through review of the following:

- monitoring data, and any assessment of trends;
- audit outcomes, including audits of the biodiversity management measures;
- incident reports, including any community complaints; and
- industry leading practice in biodiversity and conservation management.

Reasonable and feasible improvement measures will be implemented and documented as a management measure in a revision to the Plan as described in section 11.6.

CoC E5(j) states that the Plan is to include a protocol for periodic review of the Plan. The protocol for review is set out by CoC E7, E8 and E11, which have been addressed in section 11.6.

12. Complaints management

Any complaints received in relation to biodiversity will be managed in accordance with the complaints management protocol as follows:

- publicly advertised telephone complaints line, 1800WHAVEN, will be in place to receive complaints.
- each complaint received will be recorded in a Complaints Register, which will include the following details:
  - date and time of complaint;
  - method by which a complaint was made;
  - personal details the complainant wishes to provide or, if no such details are provided, a note to that effect;
  - nature of the incident that led to the complaint;
  - action taken by NCOPL in relation to the complaint (i.e., any required remedial actions), including any follow-up contact with the complainant; and
  - if no action was taken, the reason why no action was taken.
- the Environmental Superintendent will be responsible for ensuring that an initial response is provided within 24 hours of receipt of a complaint (except in the event of complaints recorded when the mine is not operational or outside of usual business hours).
- once the identified measures are undertaken, the Environmental Superintendent will sign off on the relevant complaint within the Complaints Register.
- if necessary, follow-up monitoring will take place to confirm the source of the complaint is adequately mitigated.
- a summary of the complaints will be maintained by NCOPL and made available to the Community Consultative Committee, the complainant (on request) and on the WHC website. A summary of complaints received every 12 months will be provided in the Annual Review.

In the event that any complainant considers that NCOPL has not adequately addressed their concerns, the NCOPL representative will convene additional meetings with the complainant. If the complainant believes the matter remains unresolved, and no further agreement can be reached as to additional measures to be undertaken, then they may refer the matter to DPE.

13. References

AMBS Ecology and Heritage (2020a) *Narrabri Underground Mine Stage 3 Extension Project – Flora Survey Report.* Prepared for Narrabri Coal Operations Pty Ltd.

AMBS Ecology and Heritage (2020b) *Narrabri Underground Mine Stage 3 Extension Project – Fauna Survey Report.* Prepared for Narrabri Coal Operations Pty Ltd.

Commander, L.E., Coates, D., Broadhurst, L., Offord, C.A., Makinson, R.O. and Matthes, M (2018) *Guidelines for the translocation of threatened plants in Australia. Third Edition.* Australian Network for Plant Conservation, Canberra.

Department of Agriculture, Water and the Environment (DAWE) (2020) *Bertya opponens in Species Profile and Threats Database*, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat

Department of Energy and Environment (2019) *Conservation Advice (including listing advice) for the Poplar Box Grassy Woodland on Alluvial.*

Department of Planning and Environment (unknown) *Guidelines for the Preparation of Extraction Plans*.

Department of Primary Industries (2013) *Policy and guidelines for fish habitat conservation and management*

Fairfull, S. and Witheridge, G. (2003) *Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings.* NSW Fisheries, Cronulla, 16 pp.

NSW Independent Planning Commission (April 2022) *Development Consent SSD 10269, Narrabri Underground Mine Stage 3 Extension Project.*

NSW National Parks and Wildlife Service (2002) *Bertya sp. Cobar-Coolabah (Cunningham & Milthorpe s.n., 2/8/73) Recovery Plan*. Available at: http://www.environment.gov.au/system/files/resources/7517af79-3a7f-4a95-a4f1-29cb6613b259/files/bertya-sp.pdf (Accessed 12 May 2022).

NSW Office of Environment & Heritage (OEH) (2020) *Coolabah Bertya – profile*. Available at: https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10093

Phillips, S and Callaghan, J. (2011) *The Spot Assessment Technique: a tool for determining localised levels of habitat use by Koalas Phascolarctos cinereus*. Australian Zoologist 1 January 2011; 35 (3)

Resource Strategies (2015) *Narrabri Mine Modification 5 - Environmental Assessment*.

Resource Strategies (2021) *Narrabri Mine Modification 7 - Environmental Assessment.*

Resource Strategies Pty Ltd (October 2020) *Narrabri Underground Mine Stage 3 Extension Project – Environmental Impact Statement*. Prepared for Narrabri Coal Operations Pty Ltd.

Resource Strategies (September 2021) *Narrabri Underground Mine Stage 3 Extension Project Biodiversity Development Assessment Report*. Prepared for Narrabri Coal Operations Pty Ltd.

RW Corkery & Co. Pty Ltd (November 2009) *Environmental Assessment for the Narrabri Coal Mine Stage 2 Longwall Project*, Project Application No:MP08_0144.

14. Glossary

Term	Definition
+/-	The PCT may or may not have the species listed within the community when surveyed.
Biodiversity Assessment Method (BAM)	The Biodiversity Assessment Method outlines how an accredited person assesses impacts on biodiversity at development sites and stewardship sites. It is established under section 6.7 of the BC Act.
Conditions of Consent (CoC)	SSD 10269 issued under s4.38 of the EP&A Act
Construction	The carrying out of all physical works to enable mining operations to be carried out and decommissioning, including erection of buildings, infrastructure and other works and demolition, but not including pre-construction activities.
Date of commencement	The date notified to the Department by the Applicant under CoC A14.
Decommissioning	The permanent cessation of active use of the mine, including demolition of buildings, infrastructure and other works.
Department	The NSW Department of Planning and Environment (DPE).
Development	The Stage 3 development described in the Stage 3 EIS as modified by the CoC.
Development Footprint	The area of land that is directly impacted on by a proposed development, including access roads, and areas used to store construction materials, as shown in the Biodiversity Assessment Development Footprint described in the *Narrabri Underground Mine Stage 3 Extension Project Biodiversity Development Assessment Report* (Resource Strategies 2021).
Environmental Impact Statement	The Environmental Impact Statement titled *Narrabri Underground Mine Stage 3 Extension project – Environmental Impact Statement*, prepared by Resource Strategies Pty Ltd on behalf of the Applicant and dated October 2020, as amended or added to by the Applicant's *Submissions Report* submitted 31 May 2021, the Applicant's *Amendment Report* submitted 31 May 2021, the Applicant's final *Biodiversity Development Assessment Report* dated September 2021, and the Applicant's *Additional Information on GHGEs dated 15 October 2021 and 17 December 2021.*
Environment	Includes all aspects of the surroundings of humans, whether affecting any human as an individual or in his or her social groupings.
Incident	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	Material harm to the environment is defined in section 147 of the POEO Act.
Measure	Action taken to minimise biodiversity impacts.
Minimise	Implement all reasonable and feasible mitigation measures to reduce the impacts of the Project.
Mining operations	The carrying out of mining, including the extraction, processing, stockpiling and transportation of coal on the site and the associated removal, storage and/or emplacement of vegetation, topsoil, overburden and reject material; and includes underground development necessary for mining operations to be carried out (such as installation and use of electricity, water, communications and other services and infrastructure)
Mitigation	Activities associated with reducing the impacts of the development
Narrabri Mine	The development approved under the CoC, together with the development approved under project approval 05_0102 and project approval 08_0144.
Non-compliance	Any exceedance of a consent/licence criteria is considered a non-compliance. However, the type of regulatory action taken by a regulatory authority will depend on a number of factors, in accordance with the authority's prosecution policies and guidelines.

Term	Definition
Plan	Biodiversity Management Plan
Planning Secretary	Planning Secretary under the EP&A Act, or nominee
Pollution	Under the POEO Act, the definition of pollution is: (a) water pollution, or (b) air pollution, or (c) noise pollution, or (d) land pollution.
Pollution incident	Under the POEO Act means an incident or set of circumstances during or as a consequence of which there is or is likely to be a leak, spill or other escape or deposit of a substance, as a result of which pollution has occurred, is occurring or is likely to occur. It includes an incident or set of circumstances in which a substance has been placed or disposed of on premises, but it does not include an incident or set of circumstances involving only the emission of any noise.
Rehabilitation	The restoration of and disturbed by the development to a good condition, to ensure it is safe, stable and non-polluting.
Stage 2	Narrabri Mine Stage 2 approved under PA 08_0144
Stage 3	Narrabri Underground Mine Stage 3 Extension Project approved under SSD 10269
TEC	Threatened ecological community, as defined under the BC Act and/or EPBC Act
Threatened species	As defined under the BC Act and/or EPBC Act

15. Review history

Revision	Comments	Author	Authorised by	Date
0A	Approved by Department of Planning and Environment on 14 September 2023	Onward Consulting	Manager HSE	14 December 2022

Appendix A Consultation records

Department of Planning and Environment

Our ref:DOC22/653973
Your ref: NCO-003F-A-PLN

Brent Baker
Manager - Narrabri Coal Operations
Whitehaven Coal Limited
BrentBaker@whitehavencoal.com.au

Dear Brent

Narrabri Underground Mine Stage 3 – Biodiversity Management Plan

Thank you for your submission to the Major Projects Portal dated 1 July 2022 to the Biodiversity, Conservation and Science Directorate (BCS) of the Department of Planning and Environment (DPE) inviting comments on the Biodiversity Management Plan (BMP) for the Narrabri Underground Mine Stage 3 Extension Project.

BCS's biodiversity recommendations and detailed comments are provided in **Attachment A**.

If you require any further information regarding this matter, please do not hesitate to contact Ben Ellis, Principal Project Officer, via ben.ellis@environment.nsw.gov.au or (02) 8275 1838.

Yours sincerely

Samantha Wynn

Samantha Wynn
Senior Team Leader Planning North West
Biodiversity, Conservation and Science Directorate

1 August 2022

Attachment A – BCS's Recommendations and Detailed Comments

Attachment A

BCS's Recommendations and Detailed Comments

Narrabri Underground Mine Stage 3 – Biodiversity Management Plan

1. The translocation of Coolabah Bertya into unsuitable habitat is not supported

The Coolabah Bertya Translocation Plan states:

"Plantings and translocations are to occur in areas where Coolabah bertya is absent or occurs at low densities. Additionally, the potential disturbances associated with salvage translocations must be considered and translocations will not occur in any locations where damage to existing native vegetation may occur. Therefore, the most suitable recipient area for the translocations are areas supporting the 'Derived Wire Grass grassland' (PCT 619). Planting density will range between one plant per 1 m2 to one plant per 50 m2 …. Given the relatively large area of derived grassland (PCT 619) within the Narrabri Mine on-site offset area, it is unlikely that additional recipient sites will be required."

BCS do not support the planting and translocation of Coolabah Bertya into PCT 619 and do not consider this proposal to be consistent with the requirements detailed in Section B42 of the projects consent (SSD 10269)[1]. PCT 619 is not listed as suitable habitat for the Coolabah Bertya and would not contain the necessary microhabitats to support a self-sustaining population of the species.

BCS would be supportive of the translocation of Coolabah Bertya into the following PCT types, as these are representative of the habitat where the species occurs in the project area:

- White Bloodwood - Red Ironbark – Black Cypress Woodland (PCT 405),
- White Bloodwood - Motherumbah - Red Ironbark Shrubby Woodland (PCT 406)
- Red Ironbark – White Bloodwood +/- Burrows Wattle Shrubby Woodland (PCT 404), and
- Broombush – Wattle Tall Shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion (PCT 141)

To achieve the translocation aims of maintaining a self-sustaining population of the species recipient sites should be protected from future impacts i.e., secured and managed in perpetuity and meet the principles detailed within Section 4.2.4 of the *Guidelines for the Translocation of Threatened Plants in Australia Third Edition* (Commander et al 2018).

BCS recommend that if there is no suitable habitat present in the currently identified recipient sites, which meets the principles referenced above, that alternative sites are investigated. BCS would be happy to provide endorsement for recipient sites which are assessed (with evidence and justification) to meet the principles detailed within Section 4.2.4 of the *Guidelines for the Translocation of Threatened Plants in Australia Third Edition*.

[1] B42.E iii) *Provide for the reasonable and feasible salvage, transplanting and/or propagation of any threatened flora found during pre-clearance surveys, in accordance with the Guidelines for the Translocation of Threatened Plans in Australia Third Edition (Commander et al 2018*).

Recommendations

1.1. Alternative recipient sites for Coolabah Bertya are investigated and proposed.

1.2. Provide an assessment of alternative recipient sites, which are determined to be consistent with Section 4.2.4 of the *Guidelines for the Translocation of Threatened Plants in Australia Third Edition*, to BCS for endorsement.

2. The vegetation clearance protocol should include pre-dawn surveys to reduce mortality risk for resident Koalas

The Biodiversity Management Plan (BMP) Vegetation Clearance Protocol states:

"in the unlikely event that a Koala is identified in a tree marked to be cleared, the tree will be retained until the Koala moves of its own accord;"

BCS considers that detecting Koala within tree canopies, during diurnal fauna spotting pre-clearance surveys alone, can have a high chance of non-detection. It is recommended that pre-dawn spotlighting surveys be conducted in areas of known Koala habitat, to both increase the likelihood of potential detection and reduce the likelihood of mortality to individuals.

If a Koala is identified, the containing tree and a 200m avoidance buffer should be retained to allow the safe passage of the Koala from the clearance zone.

Recommendations

2.1. Pre-dawn spotlighting surveys be conducted in areas of known Koala habitat to reduce the likelihood of mortality to individuals.

2.2. The method of clearance should allow for a 200m avoidance zone from any tree identified to contain a Koala until the individual has self-relocated.

3. Vegetation clearance should be timed to not disrupt the breeding period for Glossy-black Cockatoo

Surveys undertaken for the project identified a significant number of resident Glossy-black Cockatoos. These individuals were determined to be exhibiting breeding behaviour, which is summarised by the following statement within the BDAR:

"given that there have been regular sightings of the species in the study area (including flocks of birds with juveniles) during the breeding season, suitable foraging resources and tree hollows greater than 15 cm diameter, known foraging and potential breeding habitat is likely to occur throughout the study area (with the exception of PCT 141), including potential Paddock Trees".

BCS recommends that vegetation clearance is timed to occur outside the April to August breeding period for Glossy-black Cockatoos, to reduce indirect impacts to the species breeding cycle and decrease the likelihood of mortality to individuals. Where clearing cannot be timed outside of the breeding period the BMP should detail what mitigation measures will be put in place to reduce indirect impacts.

Recommendations

3.1. To reduce the indirect impact to the species breeding cycle and decrease the likelihood of mortality to individuals, avoid habitat clearance during the breeding period of the Glossy-black Cockatoo.

4. The BMP monitoring program and TARP should conform to SMART Principles

The BMP contains specific Trigger Action Response Plan (TARPs) criteria for each biodiversity measure.

It is noted that the triggers for some biodiversity measures are not equally specific and measurable as others. For example, the level 2 trigger for weed management states "*Weed infestations and High Threat Weeds represent >20% greater than baseline data*", this represents a trigger that is both specific and measurable. However, the following triggers are not equally specific or measurable:

- Rehabilitation and revegetation - *Only some target species are establishing within the revegetation area/s with a risk that the desired vegetation composition, structure and/or ecosystem function may not be met.*
- Sediment and erosion controls - *Active bare patches in groundcover vegetation and impacts to native vegetation evident.*
- Vehicle speed limits - *Increase in fauna vehicle strikes.*

Triggers for corrective action should form a key aspect of the BMP and should contain tailored, quantitative performance measures and targets which adhere to SMART principles (specific, measurable, achievable, realistic, timely).

Similar to the triggers for corrective action in the BMP's TARP the completion criteria for some biodiversity measures do not conform with SMART Principles, these include the completion criteria for:

- Rehabilitation and Revegetation
- The Coolabah Bertya Translocation and Propagation Management Plan
- Fencing and Managing the Poplar Box Woodland EEC

BCS recommend the completion criteria above are also revised to conform with SMART Principles.

Recommendation

4.1. Revise the triggers for corrective action and completion criteria referenced in this response to conform with SMART Principles.

5. The completion criteria for the nest box program should be improved

The completion criteria and corrective actions for the Nest Box Program focuses on the recorded usage of salvaged hollows/nest boxes by target fauna species. BCS agrees that the fauna usage can provide important information regarding the suitability of recipient habitat for salvaged hollows and nest boxes. However, installed habitat features also have the potential to degrade over time or get dislodged from trees and their on-going maintenance is critical in ensuring the long-term efficacy of nest box programs.

As such, it is recommended that an additional performance criteria and trigger for correction action are added to this biodiversity measure addressing the need for on-going maintenance and repair of salvaged hollows and nest boxes over the life of the mine.

Recommendation

5.1. Include an additional performance measure and trigger for corrective action which addresses the need for ongoing maintenance and repair of installed salvaged hollows and nest boxes.

6. The BMP should provide further clarification on the timing and frequency of vegetation monitoring

The BMP states that "*photo point monitoring will initially be used to monitor rehabilitation success, with data to be recorded for vegetation composition, structure and ecosystem function once rehabilitated areas are more established. Monitoring at adjacent PCTs will be undertaken to provide baseline data for comparison with rehabilitation sites".*

From review of the BMP the spatial location and number of sampling points which will be monitored is unclear. In addition, the timing of when monitoring methods will alter i.e. from photo points to plot based monitoring, is also unclear.

BCS recommends that plot-based monitoring is undertaken from the initial stages of rehabilitation. Plot based monitoring can provide more detailed information on whether rehabilitation efforts are tracking towards success. This information can be critical towards adaptively managing threats or changing procedures i.e. weed incursion or changes watering regimes, while revegetation progress is in its initial stages and vegetation is less resilient.

Recommendations

6.1. Provide clarification on the location and number of sampling points where vegetation monitoring is proposed to be undertaken.

6.2. Undertake plot-based monitoring during the initial stages of rehabilitation.

Table A-1 BCS consultation feedback reconciliation table

Consultation feedback	Outcome	Document reference
1. The translocation of Coolabah Bertya into unsuitable habitat is not supported		
The Coolabah Bertya Translocation Plan states: *"Plantings and translocations are to occur in areas where Coolabah bertya is absent or occurs at low densities. Additionally, the potential disturbances associated with salvage translocations must be considered and translocations will not occur in any locations where damage to existing native vegetation may occur. Therefore, the most suitable recipient area for the translocations are areas supporting the 'Derived Wire Grass grassland' (PCT 619). Planting density will range between one plant per 1 m^2 to one plant per 50 m^2 …. Given the relatively large area of derived grassland (PCT 619) within the Narrabri Mine on-site offset area, it is unlikely that additional recipient sites will be required."* BCS do not support the planting and translocation of Coolabah Bertya into PCT 619 and do not consider this proposal to be consistent with the requirements detailed in Section B42 of the projects consent (SSD 10269)[11]. PCT 619 is not listed as suitable habitat for the Coolabah Bertya and would not contain the necessary microhabitats to support a self-sustaining population of the species. BCS would be supportive of the translocation of Coolabah Bertya into the following PCT types, as these are representative of the habitat where the species occurs in the project area: • White Bloodwood - Red Ironbark – Black Cypress Woodland (PCT 405), • White Bloodwood - Motherumbah - Red Ironbark Shrubby Woodland (PCT 406) • Red Ironbark – White Bloodwood +/- Burrows Wattle Shrubby Woodland (PCT 404), and • Broombush – Wattle Tall Shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion (PCT 141) To achieve the translocation aims of maintaining a self-sustaining population of the species, recipient sites should be protected from future impacts i.e., secured and managed in perpetuity and meet the principles detailed within Section 4.2.4 of the *Guidelines for the Translocation of Threatened Plants in Australia Third Edition* (Commander et al 2018). BCS recommend that if there is no suitable habitat present in the currently identified recipient sites, which meets the principles referenced above, that alternative sites are investigated. BCS would be happy to provide endorsement for recipient sites which are assessed (with evidence and justification) to meet the principles detailed within Section 4.2.4 of the *Guidelines for the Translocation of Threatened Plants in Australia Third Edition.* <u>Recommendations</u> 1.1. Alternative recipient sites for Coolabah Bertya are investigated and proposed. 1.2. Provide an assessment of alternative recipient sites, which are determined to be consistent with Section 4.2.4 of the *Guidelines for the Translocation of Threatened Plants in Australia Third Edition,* to BCS for endorsement.	Within the surface development footprint, Coolabah bertya has been found in the following plant community types (PCTs): • PCT 435: White Box – White Cypress Pine shrub grass hills woodland; • PCT 406: White Bloodwood – Motherumbah – Red Ironbark shrubby sandstone hill woodland / open forest; and • PCT 404: Red Ironbark – White Bloodwood +/- Burrows Wattle heathy woodland. The Coolabah Bertya Translocation and Propagation Management Plan (Appendix E of the BMP) has been updated to state: *Recipient site location*: "Translocations are to occur within the known range and habitat preferences for the Coolabah bertya to maximise the chances of any necessary biotic interactions (e.g. mycorrhizal associations and pollinators). Therefore, the most suitable recipient sites for the translocations are within the Rosevale Property, the future on-site offset area, and/or rehabilitated areas that are not subject to future disturbance. Translocations will occur within the following PCTs: • PCT 435: White Box – White Cypress Pine shrub grass hills woodland; • PCT 406: White Bloodwood – Motherumbah – Red Ironbark shrubby sandstone hill woodland / open forest; and/or • PCT 404: Red Ironbark – White Bloodwood +/- Burrows Wattle heathy woodland. Planting density will range between one plant per 1 m^2 to one plant per 50 m^2. The recipient sites will be protected from future impacts i.e., secured and managed in perpetuity. Where low or no survivorship is recorded from translocations into the above PCTs, alternative sites will be investigated". A figure has also been developed to show the location of the Rosevale Property, the future onsite offset area, as well as the surface disturbance layout (i.e. future rehabilitation areas) in relation to PCT 435, PCT 406 and PCT 404.	Appendix E
2. The vegetation clearance protocol should include pre-dawn surveys to reduce mortality risk for resident Koalas		
The Biodiversity Management Plan (BMP) Vegetation Clearance Protocol states: *"in the unlikely event that a Koala is identified in a tree marked to be cleared, the tree will be retained until the Koala moves of its own accord;"* BCS considers that detecting Koala within tree canopies, during diurnal fauna spotting preclearance surveys alone, can have a high chance of non-detection. It is recommended that predawn spotlighting surveys be conducted in areas of known Koala habitat, to both increase the likelihood of potential detection and reduce the likelihood of mortality to individuals.	Despite extensive koala surveys being conducted within and surrounding the Narrabri Mine, no individuals have been recorded (only indications of potential activity e.g. scats). Therefore, NCOPL considers that the existing vegetation clearance protocol which includes conducting fauna surveys in the specific location for the proposed clearing, immediately prior to clearing, is adequate to detect koalas. Pre-dawn spotlighting surveys are not considered to be required as koalas may move by the time the clearing operations are being conducted. Clearing is generally linear and small scale and therefore presents a low risk to individual koalas that may be present in the area. NCOPLs vegetation clearance protocol, detailed in section 6.2 of the plan, has been updated to include the following: - "pre-clearance surveys will be undertaken by a suitably trained and qualified ecologist or wildlife handler to:	Section 6.2

[11] B42.E *iii) Provide for the reasonable and feasible salvage, transplanting and/or propagation of any threatened flora found during pre-clearance surveys, in accordance with the Guidelines for the Translocation of Threatened Plans in Australia Third Edition (Commander et al 2018).*

Consultation feedback	Outcome	Document reference
If a Koala is identified, the containing tree and a 200m avoidance buffer should be retained to allow the safe passage of the Koala from the clearance zone. <u>Recommendations</u> 2.1. Pre-dawn spotlighting surveys be conducted in areas of known Koala habitat to reduce the likelihood of mortality to individuals. 2.2. The method of clearance should allow for a 200m avoidance zone from any tree identified to contain a Koala until the individual has self-relocated.	• identify any threatened fauna or potential threatened fauna activity, in particular Koala observations (e.g. individual sightings, scats, scratches and/or pock marks on trees); - in the unlikely event that a Koala is identified in a tree marked to be cleared, the tree will be retained (allowing a 200m avoidance zone) until the individual has self-relocated;" In addition, it is to be noted that the vegetation clearance protocol requires a suitably trained and qualified ecologist or wildlife handler to be present during clearing to manage fauna that may be encountered, including the evaluation of options to modify the clearance method should this occur.	
3. Vegetation clearance should be timed to not disrupt the breeding period for Glossy-black Cockatoo		
Surveys undertaken for the project identified a significant number of resident Glossy-black Cockatoos. These individuals were determined to be exhibiting breeding behaviour, which is summarised by the following statement within the BDAR: *"given that there have been regular sightings of the species in the study area (including flocks of birds with juveniles) during the breeding season, suitable foraging resources and tree hollows greater than 15 cm diameter, known foraging and potential breeding habitat is likely to occur throughout the study area (with the exception of PCT 141), including potential Paddock Trees".* BCS recommends that vegetation clearance is timed to occur outside the April to August breeding period for Glossy-black Cockatoos, to reduce indirect impacts to the species breeding cycle and decrease the likelihood of mortality to individuals. Where clearing cannot be timed outside of the breeding period, the BMP should detail what mitigation measures will be put in place to reduce indirect impacts. <u>Recommendations</u> 3.1. To reduce the indirect impact to the species breeding cycle and decrease the likelihood of mortality to individuals, avoid habitat clearance during the breeding period of the Glossy-black Cockatoo.	Progressive clearing (i.e. no broadscale clearing) is required to maintain the continuation of mining operations. Consistent with NCOPL's commitment to minimising disturbance, the area to be cleared at any particular time will generally be no greater than what is required to accommodate development needs for the following 12 months (consistent with *Biodiversity Measure 1 – Vegetation Clearance Protocol*). The requirement to undertake progressive clearing to maintain the continuation of mining operations has been included within *Biodiversity Measure 1 – Vegetation Clearance Protocol*. Therefore, it is not reasonable and feasible for all clearing to be timed outside of the breeding season. Accordingly, additional mitigation measures will be implemented to reduce indirect impacts to the Glossy black-cockatoo. NCOPL has initiated further Glossy black-cockatoo 'potential nest hollow' surveys (conducted in accordance with CoC B40(b)) based on the revised survey method as outlined in the *Threatened Biodiversity Data Collection* (DPIE 2021) for each phase of the Stage 3 development. During 2021, no breeding Glossy black-cockatoos were identified in the Phase 1 area. So far in 2022, no breeding Glossy black-cockatoos have been identified in 216 potential nest trees surveyed across the Phase 2, Phase 3 or Phase 4 areas. Section 6.2 has been updated to state: "To reduce indirect impacts to the Glossy black-cockatoo during the species breeding season (April to August), and to mitigate the likelihood of mortality to individuals, NCOPL will: - Conduct pre-clearance surveys of potential nest trees identified during the Glossy black-cockatoo targeted 'potential nest hollow' surveys. These surveys are being conducted in accordance with CoC B40(b); - In accordance with the Vegetation Clearing Protocol (*Biodiversity Measure 1*), if an active nest is identified: o investigate options to avoid clearing the identified tree/s by modifying the clearance method, to be evaluated by the suitably trained and qualified ecologist or wildlife handler; and o the management of identified fauna may include relocating the individual to adjacent habitat".	Section 6.2
4. The BMP monitoring program and TARP should conform to SMART Principles		
The BMP contains specific Trigger Action Response Plan (TARPs) criteria for each biodiversity measure. It is noted that the triggers for some biodiversity measures are not equally specific and measurable as others. For example, the level 2 trigger for weed management states "Weed infestations and High Threat Weeds represent >20% greater than baseline data", this represents a trigger that is both specific and measurable. However, the following triggers are not equally specific or measurable: • Rehabilitation and revegetation - *Only some target species are establishing within the revegetation area/s with a risk that the desired vegetation composition, structure and/or ecosystem function may not be met.* • Sediment and erosion controls - *Active bare patches in groundcover vegetation and impacts to native vegetation evident.* • Vehicle speed limits - *Increase in fauna vehicle strikes.* Triggers for corrective action should form a key aspect of the BMP and should contain tailored, quantitative performance measures and targets which adhere to SMART principles (specific, measurable, achievable, realistic, timely). Similar to the triggers for corrective action in the BMP's TARP, the completion criteria for some biodiversity measures do not conform with SMART Principles, these include the completion criteria for:	The triggers for corrective action within the TARP (Section 9, Table 9-1) have been updated to conform with the SMART principles (specific, measurable, achievable, realistic, timely), namely for: • Rehabilitation and revegetation • Sediment and erosion controls • Vehicle speed limits The completion criteria for biodiversity measures (Section 7, Table 7-1) have been updated to conform with the SMART principles, namely for: • Rehabilitation and revegetation • The Coolabah Bertya Translocation and Propagation Management Plan • Fencing and Managing the Poplar Box Woodland EEC	Section 7 Section 9

Consultation feedback	Outcome	Document reference
• Rehabilitation and Revegetation • The Coolabah Bertya Translocation and Propagation Management Plan • Fencing and Managing the Poplar Box Woodland EEC BCS recommend the completion criteria above are also revised to conform with SMART Principles. <u>Recommendation</u> 4.1. Revise the triggers for corrective action and completion criteria referenced in this response to conform with SMART Principles.		
5. The completion criteria for the nest box program should be improved		
The completion criteria and corrective actions for the Nest Box Program focuses on the recorded usage of salvaged hollows/nest boxes by target fauna species. BCS agrees that the fauna usage can provide important information regarding the suitability of recipient habitat for salvaged hollows and nest boxes. However, installed habitat features also have the potential to degrade over time or get dislodged from trees and their on-going maintenance is critical in ensuring the long-term efficacy of nest box programs. As such, it is recommended that an additional performance criteria and trigger for correction action are added to this biodiversity measure addressing the need for on-going maintenance and repair of salvaged hollows and nest boxes over the life of the mine. <u>Recommendation</u> 5.1. Include an additional performance measure and trigger for corrective action which addresses the need for ongoing maintenance and repair of installed salvaged hollows and nest boxes.	Table 7-1 'short term management measures (Years 1 to 4)' have been updated to state: • Annual monitoring and maintenance/repair of installed salvaged hollows and/or nest boxes. • Review of nest box program in Year 3. The completion criteria in Table 7-1 states: • Recorded usage of salvaged hollows/nest boxes by target fauna species. The TARP (Section 9, Table 9-1) has been updated to include an additional measure and trigger for corrective action which addresses the need for ongoing maintenance and repair/replacement of installed salvaged hollows and nest boxes as follows. Trigger: • Damage or deterioration of installed hollow or nest box. Response: - Conduct repair or replacement of the damaged/deteriorated salvaged hollow or nest box.	Section 7 Section 9
6. The BMP should provide further clarification on the timing and frequency of vegetation monitoring		
The BMP states that *"photo point monitoring will initially be used to monitor rehabilitation success, with data to be recorded for vegetation composition, structure and ecosystem function once rehabilitated areas are more established. Monitoring at adjacent PCTs will be undertaken to provide baseline data for comparison with rehabilitation sites".* From review of the BMP, the spatial location and number of sampling points which will be monitored is unclear. In addition, the timing of when monitoring methods will alter i.e. from photo points to plot based monitoring, is also unclear. BCS recommends that plot-based monitoring is undertaken from the initial stages of rehabilitation. Plot based monitoring can provide more detailed information on whether rehabilitation efforts are tracking towards success. This information can be critical towards adaptively managing threats or changing procedures i.e. weed incursion or changes watering regimes, while revegetation progress is in its initial stages and vegetation is less resilient. <u>Recommendations</u> 6.1. Provide clarification on the location and number of sampling points where vegetation monitoring is proposed to be undertaken. 6.2. Undertake plot-based monitoring during the initial stages of rehabilitation.	Section 8.2.1 of the BMP has been updated to include a method for plot-based monitoring at selected rehabilitation monitoring sites to be undertaken from the initial stages of rehabilitation. The monitoring will include: • Rapid vegetation integrity monitoring plots informed by the BAM to assess vegetation composition, structure and ecosystem function. The intention of the rapid approach is to provide a method that can rapidly generate a vegetation integrity condition score to measure change, comparable to the full BAM method, while at the same time increasing efficiency. • Photo monitoring. • Establishing analogue sites to provide baseline data and completion criteria for each PCT for comparison with rehabilitation sites. • Remote sensing comparing landscape condition and vegetation cover with selected analogue sites. Monitoring locations have been selected based on the type of disturbance (i.e. infrastructure type), access routes and PCT/mapped vegetation type. One analogue site will be established for each PCT/mapped vegetation type in accordance with the BAM (i.e. "best-on-offer" reference sites). Section 8.2.1 has also been updated to provide clarification on indicative locations and number of monitoring plots as shown on Figure 8-1	Section 8.2.1

Department of Planning and Environment

Our ref: SSD-10269-PA-16

Brent Baker
Manager HSE
Narrabri Coal Operations Pty Ltd
10 Kurrajong Creek Road
Baan Baa, NSW, 2390

14/09/2023

Subject: Narrabri Coal Stage 3 – Biodiversity Management Plan

Dear Mr. Baker

I refer to your submission, requesting review and approval of the Biodiversity Management Plan for the Narrabri Coal Stage 3 project. I also acknowledge your response to the Department's review comments and request for additional information.

I note the Biodiversity Management Plan has been prepared in consultation with BCD and contains the information required by the conditions of approval.

The Department has carefully reviewed the document and is satisfied that it meets the requirements of the relevant conditions in Development Consent (SSD-10269).

Accordingly, as nominee of the Planning Secretary, I approve the Biodiversity Management Plan (Rev 0A, dated 14 December 2022).

Please ensure you make the document publicly available on the project website at the earliest convenience.

If you wish to discuss the matter further, please contact Wayne Jones on (02) 6575 34056.

Yours sincerely

Stephen O'Donoghue
Director
Resource Assessments
As nominee of the Planning Secretary

Appendix B Compliance conditions relevant to this Plan

Table B-1 SSD 10269 consent conditions directly relevant to this Plan

Condition	Requirement	Document reference
Obligation to minimise harm to the environment		
A1.	In addition to meeting the specific performance measures and criteria established under this consent, the Applicant must implement all reasonable and feasible measures to prevent, and if prevention is not reasonable and feasible, minimise, any material harm to the environment that may result from the construction and operation of the development, and any rehabilitation required under this consent.	Section 6 Section 10.2
Evidence of Consultation		
A20.	Where conditions of this consent require consultation with an identified party, the Applicant must: a) consult with the relevant party prior to submitting the subject document; and b) provide details to the Department of the consultation undertaken including: (i) the outcome of that consultation, matters resolved and unresolved; and (ii) details of any matters not resolved between the party consulted and the Applicant and how the Applicant has addressed the matters not resolved.	Section 1.4 Appendix A
Staging, combining and updating strategies, plans or programs		
A21.	With the approval of the Planning Secretary, the Applicant may:	
	a) prepare and submit any strategy, plan or program required by this consent on a staged basis (if a clear description is provided as to the specific stage and scope of the development to which the strategy, plan or program applies, the relationship of the stage to any future stages and the trigger for updating the strategy, plan or program);	No staging of the BMP proposed
	b) combine any strategy, plan or program required by this consent (if a clear relationship is demonstrated between the strategies, plans or programs that are proposed to be combined);	No combining of BMP with another plan proposed
	c) update any strategy, plan or program required by this consent (to ensure the strategies, plans and programs required under this consent are updated on a regular basis and incorporate additional measures or amendments to improve the environmental performance of the development); and	Section 11.5
	d) combine any strategy, plan or program required by this consent with any similar strategy, plan or program required by an adjoining mining consent or approval, in common ownership or management.	No combining of BMP with another plan proposed
Compliance		
A30.	The Applicant must ensure that all of its employees, contractors (and their sub-contractors) are made aware of, and are instructed to comply with, the conditions of this consent relevant to activities they carry out in respect of the development.	Section 2
Applicability of guidelines		

Condition	Requirement	Document reference
A31.	References in the conditions of this consent to any guideline, protocol, Australian Standard or policy are to such guidelines, protocols, Standards or policies in the form they are in as at the date of inclusion (or later update) in the condition.	Section 3.6
A32.	However, consistent with the conditions of this consent and without altering any limits or criteria in this consent, the Planning Secretary may. In respect of ongoing monitoring and management obligations, agree to or require compliance with an updated or revised version of such a guideline, protocol, Standard or policy, or replacement of them.	
Biodiversity Management Plan		
B42.	The Applicant must prepare a Biodiversity Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:	
	a) be prepared by a suitably qualified and experienced person/s;	Section 1.4
	b) be prepared in consultation with BCS;	
	c) describe the short, medium, and long-term measures to be undertaken to manage the remnant vegetation and fauna habitat on the site;	Section 6.2 Section 7
	d) describe how biodiversity management would be integrated with similar measures within other management plans, including the Rehabilitation Strategy referred to in condition B63 and the Rehabilitation Management Plan referred to in condition B65;	Section 1.2 Section 6.2
	e) describe the measures to be implemented within the approved disturbance areas to:	
	i) minimise the amount of clearing;	Section 6.2 Appendix E
	ii) minimise impacts on fauna, including undertaking pre-clearance surveys;	
	iii) provide for the reasonable and feasible salvage, transplanting and/or propagation of any threatened flora found during pre-clearance surveys, in accordance with the *Guidelines for the Translocation of Threatened Plants in Australia Third Edition* (Commander et al., 2018); and	
	iv) maximise the salvage of resources, including tree hollows, vegetation and soil resources, for beneficial reuse, including fauna habitat enhancement;	
	v) re-establish habitat for threatened species;	
	f) describe the measures to be implemented on the site to:	
	i) minimise impacts to threatened ecological communities listed under the BC Act and EPBC Act, and contribute to conservation strategies for these communities;	Section 6.2 Section 7 Section 8.2.2 Section 9
	ii) minimise impacts on fauna habitat resources such as hunting and foraging areas, habitat trees, fallen timber and hollow-bearing trees;	Section 6.2 Section 6.4 Appendix E Appendix F
	iii) 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;	
	iv) manage any potential conflicts with Aboriginal heritage values; and	

Condition	Requirement	Document reference
	v) protect vegetation and fauna habitat outside of the approved disturbance areas;	
	vi) manage the collection and propagation of seed from the local area;	
	vii) control weeds, including measures to avoid and mitigate the spread of noxious weeds;	
	viii) control feral pests with consideration of actions identified in relevant threat abatement plans;	
	ix) control erosion;	
	x) control access to vegetated or revegetated areas; and	
	xi) manage bushfire hazards;	
	xii) otherwise give effect to all Biodiversity Measures referenced within Section 7 of the Applicant's final Biodiversity Development Assessment Report, dated September 2021;	
	g) 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 required under conditions of this consent, and identify improvements that could be implemented to improve biodiversity outcomes; and	Section 8
	h) include details of who would be responsible for monitoring, reviewing, and implementing the plan.	Section 8.1 Section 11.6 Appendix E Appendix F
B43.	The Applicant must not commence construction until the Biodiversity Management Plan is approved by the Planning Secretary.	Section 1.2
B44.	The Applicant must implement the Biodiversity Management Plan as approved by the Planning Secretary.	
	Note: The Biodiversity Management Plan, Rehabilitation Strategy and Rehabilitation Management Plan need to be substantially integrated to ensure biodiversity objectives are achieved through rehabilitation of the site.	
Adaptive management		
E4.	The Applicant must assess and manage development-related risks to ensure that there are no exceedances of the criteria and performance measures in this consent. Any exceedance of these criteria or performance measures constitutes a breach of this consent and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation. Where any exceedance of these criteria or performance measures has occurred, the Applicant must, at the earliest opportunity:	
	a) take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur;	Section 9 Section 10.2
	b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other course of action; and	
	c) implement reasonable remediation measures as directed by the Planning Secretary.	
	to the satisfaction of the Planning Secretary.	
Management plan requirements		

Condition	Requirement	Document reference
E5.	Management plans required under this consent must be prepared in accordance with relevant guidelines, and include:	
	a) a summary of relevant background or baseline data;	Section 4
	b) details of:	
	i) the relevant statutory requirements (including any relevant approval, licence or lease conditions);	Section 3
	ii) any relevant limits or performance measures and criteria; and	Section 7
	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;	
	c) any relevant commitments or recommendations identified in the document/s listed in condition A2(c);	Appendix C
	d) a description of the management measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;	Section 6
	e) a program to monitor and report on the:	
	i) impacts and environmental performance of the development; and	Section 5 Section 8
	ii) effectiveness of the management measures set out pursuant to paragraph (d);	
	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 9
	g) a program to investigate and implement ways to improve the environmental performance of the development over time;	Section 11.7
	h) a protocol for managing and reporting any:	
	iv) incident, non-compliance or exceedance of any impact assessment criterion or performance criterion;	Section 10
	v) complaint; or	Section 12
	vi) failure to comply with other statutory requirements;	Section 10.2
	i) public sources of information and data to assist stakeholders in understanding environmental impacts of the development; and	Section 1.5 Section 3.6 Section 13
	j) a protocol for periodic review of the plan.	Section 11.6
E6.	The Applicant must ensure that management plans prepared for the development are consistent with the conditions of this consent and any EPL issued for the site.	Appendix B
Revision of strategies, plans and programs		
E7.	Within three months of the:	Section 11.6
	i) submission of an incident report under condition E9 or E10;	
	j) submission of an Annual Review under condition E11;	
	k) submission of an Independent Environmental Audit under condition E13;	

Condition	Requirement	Document reference
	l) approval of any modification of the conditions of this consent (unless the conditions require otherwise); or	
	m) notification of a change in development phase under condition A14,	
	the suitability of existing strategies, plans and programs required under this consent must be reviewed by the Applicant.	
E8.	If necessary, to either improve the environmental performance of the development, cater for a modification or comply with a direction, the strategies, plans and programs required under this consent must be revised, to the satisfaction of the Planning Secretary. Where revisions are required, the revised document must be submitted to the Planning Secretary for approval within six weeks of the review.	Section 11.6
	***Note**: This is to ensure strategies, plans and programs are updated on a regular basis and to incorporate any recommended measures to improve the environmental performance of the development.*	
Incident notification		
E9.	The Applicant must immediately notify the Department and any other relevant agencies immediately after it becomes aware of an incident. The notification must be in writing via 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.	Section 10.1
Non-compliance notification		
E10.	Within seven days of becoming aware of a non-compliance, the Applicant must notify the Department of the noncompliance. The Notification must be in writing via 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.	Section 10.2
	***Note**: A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance.*	
Annual Review		
E11.	By the end of March in each year after the commencement of the development, or other timeframe agreed by the Planning Secretary, a report must be submitted to the Department reviewing the environmental performance of the development, to the satisfaction of the Planning Secretary. This review must: (a) describe the development (including any rehabilitation) that was carried out in the previous calendar year, and the development that is proposed to be carried out over the current calendar year; (b) include a comprehensive review of the monitoring results and complaints record of the development over the previous calendar year, including a comparison of these results against the: (i) relevant statutory requirements, limits or performance measures/criteria; (ii) requirements of any plan or program required under this consent; (iii) monitoring results of previous years; and (iv) relevant predictions in the document/s listed in condition A2(c);	Section 11.1

Condition	Requirement	Document reference
	(c) identify any non-compliance or incident which occurred in the previous calendar year, and describe what actions were (or are being) taken to rectify the non-compliance and avoid reoccurrence; (d) evaluate and report on: (i) the effectiveness of the noise and air quality management systems; and (ii) compliance with the performance measures, criteria and operating conditions of this consent; (e) include an addendum report on Scope 1 and Scope 2 GHGE, which reports: (i) annual methane and annual total CO_{2-e} emissions (both categorised by source) and emissions intensity (based on ROM coal production); (ii) overall annual emissions intensity, benchmarked against representative industry sectors and the predictions in the EIS, and performance measures in Table 3; and (iii) measures undertaken to minimise Scope 1 and Scope 2 GHGE, including actions under condition B19, and estimated reductions in CO_{2-e} as a result of measures implemented; (f) identify any trends in the monitoring data over the life of the development; (g) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and (h) describe what measures will be implemented over the next calendar year to improve the environmental performance of the development.	
E12.	Copies of the Annual Review must be submitted to the Mining Panel (via the Department as Secretariat), NSC and GSC and regulatory agencies and made available to the CCC and any interested person upon request.	Section 11.1
Independent Environmental Audit		
E13.	Within one year of commencement of development under this consent, and every three years after, unless the Planning Secretary directs otherwise, the Applicant must commission and pay the full cost of an Independent Environmental Audit of the development.:	Section 11.4
E14.	Within three months of commencing an Independent Environmental Audit, or other timeframe agreed by the Planning Secretary, the Applicant must submit a copy of the audit report to the Planning Secretary, and any other NSW agency that requests it, together with its response to any recommendations contained in the audit report, and a timetable for the implementation of the recommendations. The recommendations must be implemented to the satisfaction of the Planning Secretary.	Section 11.4
Access to information		
E17.	Before the commencement of construction until the completion of all rehabilitation required under this consent, the Applicant must:	
	a) make the following information and documents (as they are obtained, approved or as otherwise stipulated within the conditions of this consent) publicly available on its website: i) the documents referred to in condition A2(c) of this consent; ii) all current statutory approvals for the development; iii) all approved strategies, plans and programs required under the conditions of this consent;	Section 1.5 Section 3 Section 10 Section 11 Section 12 Appendix B

Condition	Requirement	Document reference
	iv) the proposed staging plans for the development if construction, mining operations or decommissioning is to be staged; v) minutes of CCC meetings; vi) regular reporting on the environmental performance of the development in accordance with the reporting requirements in any plans or programs approved under the conditions of this consent; vii) a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs; viii) a summary of the current phase and progress of the development; ix) contact details to enquire about the development or to make a complaint; x) a complaints register, updated monthly; xi) the Annual Reviews of the development; xii) audit reports prepared as part of any Independent Environmental Audit of the development and the Applicant's response to the recommendations in any audit report; xiii) any other matter required by the Planning Secretary; and	Appendix C
	b) keep such information up to date, to the satisfaction of the Planning Secretary.	

Table B-2 EPBC Approval 2009/5003 conditions directly relevant to this Plan

Condition	Requirement	Document reference
5.	In order to minimise potential impacts on EPBC Act listed threatened species and communities within the mine site, the person undertaking the action must actively manage progressive disturbance of the mine site in accordance with a *Rehabilitation Management Plan* for the life of the mine. The *Rehabilitation Management Plan* must be developed and implemented prior to any Works commencing and in accordance with the NSW Director General's Assessment Report and approval conditions (26 July 2010). The final version of this plan must be submitted to the Department.	Section 6.2 Also refer to the Rehabilitation Management Plan
8.	Within three months of every 12 month anniversary of the Commencement of the Action, the person undertaking the action must provide a report to the Department demonstrating compliance with the conditions of this approval over the previous 12 months. This report must include details of how the plans required by the conditions of this approval have been implemented. Annual reports must be provided until the Minister is satisfied that the pe	Section 11.2
9.	Upon the direction of the Minister, the person undertaking the action must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the Minister. The independent auditor must be approved by the Minister prior to the commencement of the audit. Audit criteria must be agreed to by the Minister and the audit report must address the criteria to the satisfaction of the Minister.	Section 11.4
13.	The person undertaking the action must maintain accurate records substantiating all activities associated with or relevant to the above conditions of approval, including measures taken to implement the management plans and strategies required by this approval, and make them available upon request to the Department. Such records may be subject to audit by the Department or an independent auditor in accordance with section 458 of the EPBC Act, or used to verify compliance with the conditions of approval. Summaries of audits may be posted on the Department's website. The results of audits may also be publicised through the general media.	Section 11.1

Appendix C EIS Commitments

Table C-1 Key EIS biodiversity commitments

Source	Aspect	Details	Reference
EIS Section 2.5.1	Indicative Surface Development Footprint	The indicative Surface Development Footprint is the area of land proposed to be directly impacted by the Project based on the current mine design (Figure 2-6). Some flexibility in the indicative Surface Development Footprint is needed over the life of the Project to allow for further detailed mine planning during development and operations, operational/mine safety requirements and for specific siting of infrastructure to minimise impacts. Any such changes are expected to be minor and, therefore, would not have an increased impact on the biodiversity values identified in the EIS. Throughout the life of the Project, NCOPL would track actual native vegetation/habitat clearance against the indicative Surface Development Footprint and the allowance included in the calculation of biodiversity credits (Section 6.7.6). Any proposed native vegetation/habitat clearance outside of the indicative Surface Development Footprint or beyond the allowance, should it be required, would trigger a review of the proposed activities, the relevant Project approval documentation and MOP and the impact on biodiversity values. To facilitate this review, Vegetation Zones (Plant Community Types in broad condition states) and habitat for species credit species (i.e. those species which a species polygon is required to be determined by the area of habitat) have been mapped in and surrounding the indicative Surface Development Footprint. This mapping is provided in the BDAR.	Figure 1-2 Section 4.2 Section 6.2
EIS Section 2.5.1	Indicative Surface Development Footprint	There is a single species credit species recorded, namely Coolabah Bertya, for which the credit requirement is required by the DPIE to be determined by a count of the number of individual plants within the indicative Surface Development Footprint. For this species, the credit requirement was based on a conservative estimate of the density of Coolabah Bertya individuals for each Vegetation Zone (which exceeded the count of the number of individual plants). NCOPL would track the clearance of the number of Coolabah Bertya plants by applying the density to the area of habitat to be cleared.	Section 6.2
EIS Section 2.5.1	Indicative Surface Development Footprint	Impacts during clearing would be minimised through the implementation of a vegetation clearance protocol.	Section 6.2
EIS Section 2.14	Rehabilitation and remediation activities	The Project would require the progressive rehabilitation of surface development areas and the remediation of subsidence impacts in the underground mine area. The Project would be rehabilitated to a safe, stable and non-polluting landform of a similar character to surrounding areas. Rehabilitation would be undertaken progressively as soon as reasonably practicable as areas become available following mining operations.	Section 6.2
EIS Section 6.7.3	Measures to avoid and minimise impacts	Avoidance and minimisation of potential biodiversity impacts have been considered in the site selection, project design, construction and operation and rehabilitation for the Project where possible, based on the outcomes of baseline survey work. NCOPL would implement the following actions to avoid and minimise impacts on specific biodiversity values before construction and during operations: • During operations, a vegetation clearance protocol would be implemented during construction and operation, including delineating areas to be cleared and/or retained. • During operations, NCOPL aims to reinstate connectivity through progressive revegetation of temporarily disturbed areas. • During operations, a speed limit of 40 kilometres per hour (km/h) would be applied to roadways required as part of the Project*. It is not practical to fence roadways in order to prevent animal entry, as such fences may instead adversely impact the movement of threatened species. Further, due to the length and arrangement of the access roads this would not be practical. Surface infrastructure would be constructed progressively throughout the mine life and a vegetation clearing protocol would be implemented. Throughout the life of the Project, NCOPL would track actual native vegetation/habitat clearance against the Biodiversity Assessment Development Footprint and the allowance. **Note: This speed limited was updated in the Amended BDAR (September, 2021) to allow 60 km/h on Mine Access Road.*	Section 6.2
EIS Section 6.7.4	Indirect impacts	NCOPL would implement other measures that are relevant to reducing potential indirect impacts on biodiversity, such as groundwater, surface water, noise and air quality as described in Sections 6.4.4, 6.5.4, 6.8.5 and 6.9.5.	Groundwater Management Plan - Attachment 3 of the Water Management Plan Surface Water Management Plan - Attachment 4 of the Water Management Plan Noise Management Plan

Source	Aspect	Details	Reference
			Air Quality Management Plan
Amended BDAR Section 7.1	Biodiversity Measure 1 – Vegetation Clearance Protocol	The Vegetation Clearance Protocol would include, but not be limited to: • mine staff and contractors involved in vegetation clearance works would be made aware of clearing limits in the relevant Project approval documentation and of restricted access areas; • micro-siting of access tracks and other disturbance to minimise clearance of trees with hollows and drainage features (creeks); • the area cleared at any particular time would generally be no greater than that required to accommodate development needs for the following 12 months; • clearance authorisation process with final signoff for the areas to be cleared by the Environment Superintendent or delegate; • clear delineation of the areas to be cleared on the ground prior to clearing activities (e.g. paint, flagging tape and posts) and restriction of clearing to within these areas (signposts to alert personnel not to enter vegetation outside of the disturbance areas); • pre-clearance fauna surveys would be undertaken by a suitably trained and qualified ecologist or wildlife handler to: ▪ identify trees with suspected active nests; and ▪ identify trees with suspected actively used tree hollows; • a suitably trained and qualified ecologist or wildlife handler would be present during the clearing of habitat to manage animals that may be encountered during land clearing; • options to minimise harm to fauna by modifying the clearance method would be evaluated by the suitably trained and qualified ecologist or wildlife handler (e.g. shaking or nudging tree trunks to evacuate mobile fauna, retaining trees with suspected active nests until the nest is disused or lowering trees with suspected • tree hollows being used by fauna with the hollow facing upwards to enable fauna to exit); • in the unlikely event that a Koala is identified in a tree marked to be cleared, the tree would be retained until the Koala moves of its own accord; • management of the Koala in consideration of the Code of Practice for Injured, Sick and Orphaned Koalas management plan prepared by OEH (2018b); • management of fauna may include relocating the individual to adjacent habitat or treating injuries (the nearest veterinary clinic, wildlife carer and/or appropriately trained ecologist contact information would be on hand in case any fauna are injured); • the selective collection of seed from felled trees for propagation and use in rehabilitation; • the retention of ground cover (e.g. logs, fallen branches and leaf litter) within stripped topsoil to improve the viability of the soil when it is used in rehabilitation; • the management of topsoil (seed bank) for reuse on rehabilitation; and • salvage of suitable hollows and logs for use in rehabilitation.	Section 6.2
Amended BDAR Section 7.2	Biodiversity Measure 2 – Rehabilitation and Revegetation	Surface disturbance areas associated with the Development Footprint would be rehabilitated and revegetated (when the surface facilities are no longer required or at the end of the mine life where no further ongoing beneficial use is identified). Mine components that would be progressively rehabilitated include goaf gas drainage infrastructure, service boreholes, access tracks and post drainage corridor and pre-conditioning area. Other mine components, such as the vents and services corridors, would typically be decommissioned following mine closure. The conceptual final landform would include woodland and pasture areas to provide habitat for flora and fauna.	Section 6.2 Rehabilitation Management Plan
Amended BDAR Section 7.2	Biodiversity Measure 2 – Rehabilitation and Revegetation	A propagation and translocation trial would be implemented for the Coolabah Bertya. This would involve collection of vegetative material from the local population (either above-ground parts and/or soil seed bank) and use of that material in an attempt to re-establish individual plants in rehabilitation areas. NCOPL accept BCS's recommendation for preparation of a 'translocation and propagation management plan' in consultation with BCS and a suitably qualified person for Coolabah Bertya.	Section 6.2 Appendix E
Amended BDAR Section 7.3	Biodiversity Measure 3 – Salvage and Relocation of Habitat Resources	Key habitat features would be salvaged during vegetation clearance activities and stockpiled for relocation to rehabilitation areas.	Section 6.2
Amended BDAR Section 7.3	Biodiversity Measure 3 – Salvage and Relocation of Habitat Resources	Vegetative material from the local population of Coolabah Bertya (either above-ground parts and/or soil seed bank) may be re-used for the Coolabah Bertya propagation and translocation trial.	Section 6.2 Appendix E
Amended BDAR Section 7.4	Biodiversity Measure 4 – Nest Box Program	The existing programme would be doubled for the Project with a further 100 salvaged hollows or nest boxes (Biodiversity Measure 3) of varying sizes to provide nesting habitat for Glossy Black-Cockatoo, Eastern Pygmy-possum, Squirrel Glider and Corben's Long-eared Bat. The nest boxes would be installed outside of the State Forest as NSW Forestry do not support the installation of the nest boxes within the State Forest because of issues with attracting pests and bees, and also disrupt forestry activities.	Section 6.2 Section 7 Section 11.1

Source	Aspect	Details	Reference
		The nest box programme would be documented in a BMP. Once installed, the nest boxes would be monitored by suitably qualified personnel to observe fauna usage. A monitoring report would be prepared annually that includes a summary of previous monitoring reports. The monitoring results would be reported in the Annual Review.	
Amended BDAR Section 7.5	Biodiversity Measure 5 – Site Induction/Access	Access to active operational/construction areas would only be allowed for authorised personnel and machinery.	Section 6.2
Amended BDAR Section 7.6	Biodiversity Measure 6 – Sediment and Erosion Controls	The potential for localised Project-related channel erosion on Kurrajong Creek and other ephemeral creek lines would be managed using appropriate sediment and erosion controls	Section 6.2 ESCP - Attachment 2 of the Water Management Plan
Amended BDAR Section 7.7	Biodiversity Measure 7 – Creek Line Monitoring Program	The Narrabri Mine Land Management Plan (ELA, 2019c) (or the latest approved version) provides a monitoring program for creek lines for the purpose of monitoring changes to creek condition and triggering management actions, if required (e.g. stabilising damaged and eroded banks).	Extraction Plan – Land Management Plan
Amended BDAR Section 7.8	Biodiversity Measure 8 – Construction of Drainage Line Crossings	Construction of drainage line crossings would be undertaken in accordance with the policy and guideline document of DPI-Fisheries NSW *Why do fish need to cross the road?* (Fairfull and Witheridge, 2003) as required by the Fisheries NSW *Policy and Guidelines for Fish Habitat Conservation and Management* (DPI, 2013). The waterways traversed by the Development Footprint are Class 3 (Minimal fish habitat13) and Class 4 (Unlikely fish habitat14) (Fairfull and Witheridge, 2003). Crossings would involve installation of fords or culverts.	Section 6.2 ESCP - Attachment 2 of the Water Management Plan
Amended BDAR Section 7.9	Biodiversity Measure 9 – Fencing and Managing Poplar Box Woodland EEC	The Conservation Advice (including listing advice) for the Poplar Box Grassy Woodland on Alluvial Plains (DEE, 2019) recommends the application of 30 m buffers from the Poplar Box Woodland EEC. NCOPL would erect a livestock proof fence around a 30 m buffer from the Poplar Box Woodland EEC within ML 1609, MLA 1 and MLA 2 (outside of the development footprint). The areas would be signed 'Environmental Protection Area' or similar. Weed management measures would be undertaken within the fenced area. In this way, the Project is likely to have a positive impact on the Poplar Box Woodland EEC as the occurrences are currently in paddocks used for grazing livestock. The management of the Poplar Box Woodland EEC would be documented in a BMP.	Section 6.2
Amended BDAR Section 7.10	Biodiversity Measure 10 – Weed Management	Qualified and experienced weed management contractors would manage environmental weeds within ML 1609, MLA 1 and MLA 2. Weed management measures would be documented in a BMP and include: • During introduction to site all vehicles and mechanical equipment that will be working within native vegetation areas will be subject to a clean down to minimise seed transport off-site. • Identification of weeds requiring control. • Mechanical removal of identified weeds and/or the application of approved herbicides. • Follow-up site inspections to determine the effectiveness of the eradication programmes	Section 6.2 Section 8
Amended BDAR Section 7.11	Biodiversity Measure 11 – Animal Pest Management	Qualified and experienced animal pest management contractors would manage animal pest species in ML 1609, MLA 1 and MLA 2 to reduce the likelihood of populations increasing due to the Project. Animal pest management measures would be documented in a BMP. The management of animal pests would consider the relevant threat abatement plans for Feral Pig, European Rabbit, Goat, Red Fox and Feral Cat (DEWHA, 2008c and 2008d; DotE, 2015a; DEE, 2016 and 2017).	Section 6.2
Amended BDAR Section 7.12	Biodiversity Measure 12 – Bushfire Prevention and Control Measures	The Narrabri Mine maintains a Bushfire Prevention Standard (NCOPL, 2016) and Fire Danger Trigger Action Response Plans (NCOPL, 2019) to provide bushfire prevention and control measures for the Narrabri Mine. These measures include: • Fixed plant and building required to meet the Building Code of Australia and comply with Australian Standard (AS) 2419. • Fuel and storage areas located and constructed in accordance with AS 1940-2017, fitted with fire extinguishers and self-bunded. • The Narrabri Mine is a non-smoking site. • Clear access is maintained around all mining-related activities. • Implementation of fire breaks. • Implementation of appropriate firefighting equipment.	Section 6.2
Amended BDAR Section 7.13	Biodiversity Measure 13 – Remediation of surface cracks considered too large to natural close	Remediation of mine subsidence effects (e.g. surface cracking and minor erosion). A preliminary assessment would be undertaken to minimise impact of remediation actions. Prior to any remediation of surface cracks, NCOPL would undertake a review of environmental impacts that may result from the remediation at the specific location and consider whether remediation of surface cracks is environmentally beneficial or if alternative methods of remediating the crack are warranted (e.g. without machinery). The review would consider, among other factors, avoidance of known locations of threatened flora species.	Section 6.2
Amended BDAR Section 7.14	Biodiversity Measure 14 – Vehicle Speed Limits	During operations, a speed limit of 40 km/h would be applied to surface roadways required as part of the Project (excluding the Mine Access Road).	Section 6.2
Amended BDAR Section 7.16	Monitoring program	A monitoring program is provided in Table 14 of the Amended BDAR.	Section 8
Amended BDAR Section 7.17	Performance and completion criteria	Performance and completion criteria are provided in Table 15 of the Amended BDAR.	Section 7

Source	Aspect	Details	Reference
Response to Submission Report Section 4.2.5	Riparian vegetation monitoring	As described in the BDAR, a Creek Line Monitoring Programme is comprised of annual geomorphic survey of creek stability and condition for up to two years after longwall mining in the vicinity of the creek is complete. The stated key performance criteria is noted as a 'change to overall drainage pattern is not more than predicted detected alteration in channel dimensions or processes within normal range compared to baseline data'. Remediation of ponding areas would include: • Ponding areas located in areas with no significant vegetation and where the water quality of the ponded water is non-saline are to be allowed to self-correct. • Ponding areas located in areas with significant vegetation to be assessed and remedial measures (e.g. drainage) developed and implemented in consultation with the landholder and a suitably qualified specialist (e.g. hydrogeologist, geomorphologist).	Section 8
Response to Submission Report Section 4.2.7	Bushfire risks from rehabilitation and offset areas	Existing specific mitigation and management measures to reduce bushfire risk that would continue to be implemented for the Project include: • Fixed plant and building required to meet the Building Code of Australia and comply with Australian Standard (AS) 2419. • Self-bunded fuel and storage areas located and constructed in accordance with AS 1940-2017, fitted with fire extinguishers. • Maintenance of a non-smoking site. • Clear access is maintained around all mining-related activities. • Implementation of fire breaks as a component of planned infrastructure corridors (i.e. including services and gas drainage). • Availability of appropriate firefighting equipment.	Bushfire Management Plan Rehabilitation Management Plan
		In addition, consistent with NSCs recommendation, NCOPL would provide a minimum separation distance of 100 m from all dwellings at the time revegetation works are being carried out.	

Appendix D Development Footprint Plant Community Types

Table D-1 Plant Community Types within the Phases of the Development Footprint

Veg Zone	Vegetation Community	PCT ID	Phase 1				Phase 2				Phase 3			Phase 4		Phase 5			Phase 6				Overall Impacts			
			Clearance Area (ha)	Area of Potential Ponding (ha)	ETL Management (ha)	Total Area (ha)	Clearance Area (ha)	Area of Potential Ponding (ha)	ETL Management (ha)	Total Area (ha)	Clearance Area (ha)	Area of Potential Ponding (ha)	Total Area (ha)	Clearance Area (ha)	Total Area (ha)	Clearance Area (ha)	Area of Potential Ponding (ha)	Total Area (ha)	Clearance Area (ha)	Area of Potential Ponding (ha)	Area of Potential Cracking Impacts on Vegetation (ha)	Total Area (ha)	Clearance Area (ha)	Area of Potential Ponding (ha)	ETL Management (ha)	Area of Potential Cracking Impacts on Vegetation (ha)
Dry Sclerophyll Forests (Shrub/Grass Sub-formation)																										
Pilliga Outwash Dry Sclerophyll Forests																										
1	Pilliga Box – Buloke Woodland (Good)	88	5.4	0.1	0	5.5	19.9	0.2	0	20.1	0.5	0.3	0.8	6.7	6.7	1.3	0	1.3	1.1	0	13.7	14.8	34.9	0.6	0	13.7
1a	Pilliga Box – Buloke Woodland (Moderate)	88	0.1	0.1	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.1	0	0
1b	Derived Native Grassland	88	37.7	0	2.6	40.3	12.8	0	0.8	13.6	3.6	0	3.6	2.1	2.1	2.7	0	2.7	2.4	0	5.8	8.2	61.3	0	3.4	5.8
2	Broombush – Wattle Tall Shrubland (Good)	141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	0	0	0.5	0.5	0	0	0
North-west Slopes Dry Sclerophyll Woodlands																										
3	Dwyer's Red Gum Shrubby Woodland (Good)	432	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	White Box – White Cypress Woodland (Good)	435	4.2	0	0	4.2	18.6	0	0	18.6	0	0	0	2.7	2.7	1	0	1	0.7	0.6	0.4	1.7	27.2	0.6	0	0.4
4a	White Box – White Cypress Woodland (Moderate)	435	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4b	Derived Native Grassland	435	9.1	0	0.7	9.8	2.8	0	0.2	3	0	0	0	0	0	0	0	0	4.4	0.1	5.3	9.8	16.3	0.1	0.9	5.3

Veg Zone	Vegetation Community (AMBS, 2020a) (Attachment B)	PCT ID	Phase 1				Phase 2				Phase 3			Phase 4		Phase 5			Phase 6				Overall Impacts			
			Clearance Area (ha)	Area of Potential Ponding (ha)	ETL Management (ha)	Total Area (ha)	Clearance Area (ha)	Area of Potential Ponding (ha)	ETL Management (ha)	Total Area (ha)	Clearance Area (ha)	Area of Potential Ponding (ha)	Total Area (ha)	Clearance Area (ha)	Total Area (ha)	Clearance Area (ha)	Area of Potential Ponding (ha)	Total Area (ha)	Clearance Area (ha)	Area of Potential Ponding (ha)	Area of Potential Cracking Impacts on Vegetation (ha)	Total Area (ha)	Clearance Area (ha)	Area of Potential Ponding (ha)	ETL Management (ha)	Area of Potential Cracking Impacts on Vegetation (ha)
Dry Sclerophyll Forest (Shrubby Sub-formation)																										
Western Slopes Dry Sclerophyll Forests																										
5	Red Gum – Tea Tree Creek Woodland (Good)	399	0	0	0	0	0	0	0	0	1.1	0.3	1.4	1	1	5.3	0.5	5.8	3.7	0	0	3.7	11.1	0.8	0	0
5a	Red Gum – Tea Tree Creek Woodland (Moderate)	399	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	0	0.9	0	0	0	0	0.9	0	0	0
6	Rough-barked Apple Sand Flat Woodland (Good)	401	0.8	0	0	0.8	0	0	0	0	2.9	0	2.9	0.4	0.4	0.2	0	0.2	0	0	0	0	4.3	0	0	0
7	Red Ironbark – White Bloodwood +/- Burrows Wattle Shrubby Woodland (Good)	404	11.1	0	0	11.1	0	0	0	0	36.9	0	36.9	4.7	4.7	22	0.1	22.1	117.2	0.5	0	117.7	191.9	0.6	0	0
7a	Red Ironbark – White Bloodwood +/- Burrows Wattle Shrubby Woodland (Moderate)	404	0.5	0	0	0.5	0	0	0	0	1.5	0	1.5	0	0	0	0	0	0	0	0	0	2	0	0	0

Veg Zone	Vegetation Community (AMBS, 2020a) (Attachment B)	PCT ID	Phase 1				Phase 2				Phase 3			Phase 4		Phase 5			Phase 6				Overall Impacts			
			Clearance Area (ha)	Area of Potential Ponding (ha)	ETL Management (ha)	Total Area (ha)	Clearance Area (ha)	Area of Potential Ponding (ha)	ETL Management (ha)	Total Area (ha)	Clearance Area (ha)	Area of Potential Ponding (ha)	Total Area (ha)	Clearance Area (ha)	Total Area (ha)	Clearance Area (ha)	Area of Potential Ponding (ha)	Total Area (ha)	Clearance Area (ha)	Area of Potential Ponding (ha)	Area of Potential Cracking Impacts on Vegetation (ha)	Total Area (ha)	Clearance Area (ha)	Area of Potential Ponding (ha)	ETL Management (ha)	Area of Potential Cracking Impacts on Vegetation (ha)
8	White Bloodwood – Red Ironbark – Black Cypress Woodland (Good)	405	0	0	0	0	0	0	0	0	10.2	0	10.2	7.4	7.4	33	0	33	45.2	0	0	45.2	95.8	0	0	0
8a	Derived Native Grassland	405	0	0	0	0	0	0	0	0	0.7	0	0.7	0	0	0	0	0	0	0	0	0	0.7	0	0	0
9	White Bloodwood – Motherumbah – Red Ironbark Shrubby Woodland (Good)	406	0	0	0	0	0	0	0	0	0	0	0	9.5	9.5	12.9	0	12.9	13.1	0	0	13.1	35.5	0	0	0
9a	White Bloodwood – Motherumbah – Red Ironbark Shrubby Woodland (Moderate)	406	0.9	0	0	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	0	0	0
10	Dirty Gum Shrubby Woodland (Good)	408	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0.1	0	0	0	0	0.1	0	0	0

Veg Zone	Vegetation Community (AMBS, 2020a) (Attachment B)	PCT ID	Phase 1				Phase 2				Phase 3			Phase 4		Phase 5			Phase 6				Overall Impacts			
			Clearance Area (ha)	Area of Potential Ponding (ha)	ETL Management (ha)	Total Area (ha)	Clearance Area (ha)	Area of Potential Ponding (ha)	ETL Management (ha)	Total Area (ha)	Clearance Area (ha)	Area of Potential Ponding (ha)	Total Area (ha)	Clearance Area (ha)	Total Area (ha)	Clearance Area (ha)	Area of Potential Ponding (ha)	Total Area (ha)	Clearance Area (ha)	Area of Potential Ponding (ha)	Area of Potential Cracking Impacts on Vegetation (ha)	Total Area (ha)	Clearance Area (ha)	Area of Potential Ponding (ha)	ETL Management (ha)	Area of Potential Cracking Impacts on Vegetation (ha)
Grassy Woodlands																										
Floodplain Transition Woodlands																										
11	Poplar Box Grassy Woodland (Good)	244	2.8[A]	0	0	2.8	3.1[B]	0.2	0	3.3	0	0	0	0	0	0	0	0	1.3[C]	0.2	10.9[D]	12.4	7.2	0.4	0	10.9
11a	Derived Native Grassland	244	16.2	0	4.4	20.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.6	3.6	16.2	0	4.4	3.6
Semi-arid Woodlands (Grassy Sub-formation)																										
North-west Floodplain Woodlands																										
12	Belah Woodland (Good)	55	3	0	0	3	4.2	0	0	4.2	0	0	0	0.4	0.4	0	0	0	0	0	0	0	7.6	0	0	0
12a	Derived Native Grassland	55	2.6	0	0	2.6	20.2	0	4.2	24.4	0	0	0	1.6	1.6	0	0	0	6.2	0.4	13.8	20.4	30.6	0.4	4.2	13.8
North-west Alluvial Sand Woodlands																										
13	Dirty Gum – White Cypress Woodland on Sand Monkeys (Good)	206	0	0	0	0	0	0	0	0	0	0	0	1.6	1.6	0	0	0	0	0	0	0	1.6	0	0	0
Total Area (ha) Woodland			**28.8**	**0.2**	**0**	**29**	**45.8**	**0.4**	**0**	**46.2**	**53.1**	**0.6**	**53.7**	**34.4**	**34.4**	**76.7**	**0.6**	**77.3**	**182.8**	**1.3**	**25**	**209.1**	**421.6**	**3.1**	**0**	**25**
Total Area (ha) Derived Native Grassland			**65.6**	**0**	**7.7**	**73.3**	**35.8**	**0**	**5.2**	**41**	**4.3**	**0**	**4.3**	**3.7**	**3.7**	**2.7**	**0**	**2.7**	**13**	**0.5**	**28.5**	**42**	**125.1**	**0.5**	**12.9**	**28.5**
Total Area (ha) Native Vegetation			**94.4**	**0.2**	**7.7**	**102.3**	**81.6**	**0.4**	**5.2**	**87.2**	**57.4**	**0.6**	**58**	**38.1**	**38.1**	**79.4**	**0.6**	**80**	**195.8**	**1.8**	**53.5**	**251.1**	**546.7**	**3.6**	**12.9**	**53.5**

Note: Highlighting in the above table is to separate the data for each phase.

A Approximately 2.1 ha represents the Poplar Box Woodland EEC.

B Approximately 1 ha represents the Poplar Box Woodland EEC.

C Approximately 0.7 ha represents the Poplar Box Woodland EEC.

D Approximately 4.1 ha represents the Poplar Box Woodland EEC.

Appendix E Coolabah Bertya Translocation and Propagation Management Plan

Introduction

This Coolabah bertya Translocation and Propagation Management Plan (the **Plan**) has been developed to meet the requirements of *Biodiversity Measure 2 – Rehabilitation and Revegetation*. NCOPL has committed to implementing a propagation and translocation trial (the **program**) for Coolabah bertya (*Bertya opponens*), which has been developed in consultation with the Biodiversity Conservation and Science Directorate (**BCS**) within the Department of the Environment, Energy and Science (**EES**) Group of the Department of Planning and Environment (**DPE**) (refer to Appendix A).

Section 7.2 of the BDAR (Resource Strategies 2021) states that:

A propagation and translocation trial would be implemented for the Coolabah Bertya. This would involve collection of vegetative material from the local population (either above-ground parts and/or soil seed bank) and use of that material in an attempt to re-establish individual plants in rehabilitation areas. NCOPL accept BCS's recommendation for preparation of a 'translocation and propagation management plan' in consultation with BCS and a suitably qualified person for Coolabah Bertya.

Aims and objectives

The program aims to directly support the conservation of Coolabah Bertya by maintaining a self-sustaining, genetically diverse population of the species. The program will involve the collection of vegetative material from the local population (either above-ground parts and/or soil seed bank) and use of the material in an attempt to re-establish individual plants in biodiversity offset areas and/or rehabilitation areas.

The objectives of this Plan are to:

- guide the successful translocation of Coolabah bertya to suitable habitat within protected areas that form part of the Narrabri Mine on-site offset area (Rosevale Property) and the future onsite off-set area, and rehabilitation areas;
- increase resilience of the existing population of Coolabah bertya by increasing the diversity of age classes and overall extent;
- conserve the genetic diversity within the existing population of Coolabah bertya within the Narrabri Mine on-site offset areas, including the future off-set area, and rehabilitation areas; and
- provide clear management and monitoring measures to ensure the long-term success of the translocation program.

Ecology

Distribution and habitat

Coolabah bertya is found from central Queensland south into the north-western plains of NSW (DPE 2020). In NSW, the species has a highly restricted distribution where it is currently known from three populations (DPE 2020). Across its range, the species is found in a variety of vegetation types such as open shrubland, woodland or open forest communities and is generally associated with well drained, sandy soils and a sparse, grassy groundcover (DAWE 2020).

Within the surface development footprint, Coolabah bertya has been found in the following plant community types (**PCTs**) (Resource Strategies 2021, p.g. 65):

- PCT 406: White Bloodwood – Motherumbah – Red Ironbark shrubby sandstone hill woodland / open forest;
- PCT 405: White Bloodwood - Red Ironbark – Black Cypress Woodland;
- PCT 404: Red Ironbark – White Bloodwood +/- Burrows Wattle heathy woodland; and/or
- PCT 141: Broombush – Wattle Tall Shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion.

Phenology

In NSW, Coolabah bertya flowers between July and August, although mass flowering may occur in response to above average rainfall throughout the year (NPWS 2002). Based on the design of the fruiting capsule, it has been suggested that seed dispersal occurs through an explosive release mechanism, where the seed is projected a short distance from the parent plant (NPWS 2002). During rainfall events, seeds may be further dispersed through surface runoff (NPWS 2002).

Seed germination experiments on other species within the Bertya genus indicate that seeds may contain a form of conditional dormancy with gibberellic acid (a germination hormone) (NPWS 2002). It is likely that fire can break this dormancy and stimulate germination from the seed bank (DPIE 2020).

Translocation method

Translocation will be undertaken in accordance with the *Guidelines for the Translocation of Threatened Plants in Australia Third Edition* (Commander et al. 2018). A number of translocation methods may be utitlised to allow for the translocation to adapt to available resources and where the initial results of one method prove unsuccessful. It is likely that more than one option will be implemented concurrently. Methods of translocation may include:

- salvage translocations, including the following techniques:
  - seed collection and propagation; and/or
  - whole plant translocation.
- seed collection (from transplanted plants) and propagation.

Clearing within the surface development footprint will be undertaken progressively. Wherever these actions are likely to impact individuals of Coolabah bertya, salvage translocations of at least a portion of the impacted individuals should be undertaken. There may also be opportunities for salvage translocations as part of ongoing management of the on-site offset area, including fire trail establishment and maintenance, and ongoing maintenance of boundary fences.

Translocation via seed collection from existing populations and subsequent seed propagation and planting is considered one of the most effective sources of regenerative material due to capacity to encompass a large proportion of the species diversity within a population (Commander et al. 2018). The collection of Coolabah bertya seed and planting of seedlings germinated in a nursery, represents the most effective way to achieve the aims of the translocation. Seed collection may also occur as part of salvage translocations.

Inspections and seed collection

Visual inspections of Coolabah bertya populations will be undertaken quarterly. One of the aims of the inspections is to monitor seed production. Where seed production is identified during the inspections, seed collection, management and storage will be undertaken in consideration of the Florabank guidelines (http://www.florabank.org.au/). Specifically, seed collection from non-salvage plants is to:

- be limited to a maximum of 20% of the capsules from each plant annually;
- include no more than 100 individuals per year;
- collect seed from spatially separated individuals to reduce chance of collecting seeds from related plants; and
- be fully documented so that data on the plants and locations where seed collection occurred can be tracked over time.

Collected seeds will be germinated within nursery conditions. Retention of some collected seed is recommended to enable planting over multiple years and allows for future plantings if the initial plantings/translocations fail.

Seed collection will also occur during salvage translocation.

Whole plant translocations (salvage)

While transplanting has a low success rate generally, it is considered a worthwhile mitigation measure considering the fate of plants within the surface disturbance footprint. Therefore, within approved disturbance areas, any Coolabah bertya seedling will be targeted for whole plant translocations prior to disturbance/grading. Efforts will focus on younger and smaller seedlings where there is an increased chance of being able to translocate the plants without disturbing its root system.

Initially, translocations will include a small number of individuals as a trial (recommended between 50 to 100 individuals although the exact number will be determined by availability of seedlings for translocation), so that the ideal translocation process and equipment for the species and site can be identified. A trial will also produce a small number of recipient plants for ongoing management during the initial phases of the translocation program.

Prior to any 'salvage' translocation, recipient site selection and preparation must occur and any seed on the individuals to be translocated will be collected. All salvaged plants will be permanently tagged at the recipient site in a manner that allows them to be found.

Timing

Seed will be collected during the annual visual inspections as previously discussed. In addition, any and all seed detected during pre-clearance surveys (as required under section 6.2 of the BMP), as well as above-ground parts will be salvaged during clearing. Seed collection may also occur during salvage translocations.

The translocation and propagation program will be implemented throughout the life of mine.

Translocation of propagated seedlings

Prior to any translocation of propagated seedlings, recipient site selection and preparation must occur. Seedlings will be planted at least 2-3 m apart to avoid competition during establishment. For convenience during monitoring and maintenance of translocated plants, large gaps (> 5-10 m) between translocated plants will also be avoided where possible.

Recipient site selection

Translocations are to occur within the known range and habitat preferences for the Coolabah bertya to maximise the chances of any necessary biotic interactions (e.g. mycorrhizal associations and pollinators). Therefore, the most suitable recipient sites for the translocations are within the Rosevale Property, the future on-site offset area, and/or rehabilitated areas that contain representative habitat for the species and that are not subject to future disturbance. Translocations will occur within the following PCTs:

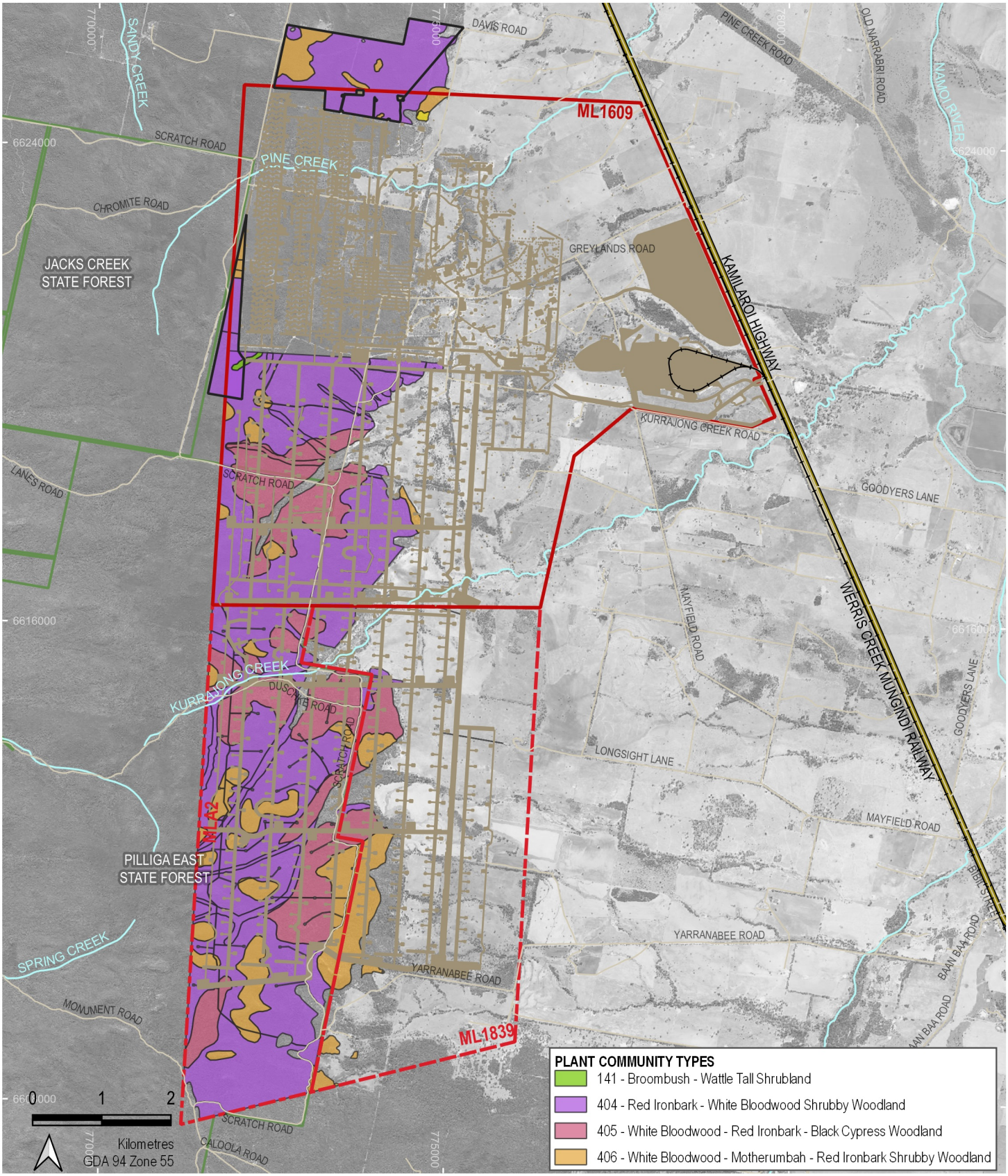
- PCT 406: White Bloodwood – Motherumbah – Red Ironbark shrubby sandstone hill woodland / open forest;
- PCT 405: White Bloodwood - Red Ironbark – Black Cypress Woodland;
- PCT 404: Red Ironbark – White Bloodwood +/- Burrows Wattle heathy woodland; and/or
- PCT 141: Broombush – Wattle Tall Shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion.

The PCTs listed above are suitable recipient sites that are consistent with section 4.2.4 of the *Guidelines for the Translocation of Threatened Plants in Australia Third Edition* (Commander et al 2018).

Plantings and translocations are to occur in areas where Coolabah bertya is absent or occurs at low densities. Additionally, the potential disturbances associated with salvage translocations must be considered and translocations will not occur in any locations where damage to existing native vegetation may occur.

Planting density will range between one plant per 1 m^2 to one plant per 50 m^2. The recipient sites will be protected from future impacts i.e., secured and managed in perpetuity. Where low or no survivorship is recorded from translocations into the above PCTs, alternative sites will be investigated.

Figure E-1 shows the location of the Rosevale Property, the future onsite offset area, as well as the surface disturbance layout (i.e. future rehabilitation areas) in relation to PCT 406, PCT 405, PCT 404 and PCT 141.



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LEGEND

- ML1609
- ML 1839
- MLA2
- Surface development footprint
- Rosevale and onsite offset area
- Highway
- Roads
- Watercourse
- Railway
- State forest

NARRABRI MINE

FIGURE E-1
Coolabah Bertya Translocation and Propagation Areas

Timing

Following successful seed germination, or propagation via cuttings, seedlings will be planted into in autumn/winter, with high soil moisture and low levels of heat stress.

It is recommended that not all propagated individuals are planted in year 1. Planting will be conducted over multiple seasons to allow for lessons learned to be incorporated into the future translocations and as it gives better protection against the potential consequences of adverse stochastic events. This will also compliment the seed collection program which is to take place over multiple years. Seed propagation usually takes about 12 to 18 months to germinate and grow to a suitable sized seedling for planting. Therefore, timeframes for germination need to be considered and accounted for when planning for the translocation.

To achieve the aims of this Plan, to maintain a self-sustaining, genetically diverse population of the species, translocation will continue for as long as resources are available (including salvage plants, seeds, tubestock, staff etc.).

Fencing and protection

To prevent grazing and ground disturbance from native and introduced fauna, a fence must be erected around each recipient site, or individual tree guards installed. Fences or individual guards will be of a type which excludes macropods and additional measures to exclude rabbits and hares may be required depending on the different sites. Where individual tree guards are utilised, these guards will remain in place until plants are of a suitable size and are considered able to tolerate and survive the level of grazing pressure present within the translocation site. Stakes may also be used to support the plants initially, if required.

Watering schedule

All translocated plants will be permanently tagged so they can be found easily for watering and monitoring. Watering during hot and/or dry periods may be beneficial during the plant establishment phase. If a site is exposed to seasonally dry conditions, weekly or fortnightly watering of translocated individuals will occur during the first two dry seasons to mitigate losses during this time. Post-translocation actions including timing, frequency and amount of watering will be documented to inform decision-making for any future planting events.

Monitoring and maintenance

NCOPL will implement a monitoring program to monitor seed production, germination and to increase knowledge of Coolabah bertya's ecology and reproductive habits.

All translocated plants must be permanently tagged, and data collected prior to planting to enable comparisons over time, between individuals and between recipient sites. All translocated plants will undergo monitoring, not only a subset. Monitoring of translocated plants is to take place monthly for the first year after a seedling is planted, quarterly for the two proceeding years and biannually after that. Monitoring will continue for a minimum of 5 years after planting, dependent on the success of the translocation program and availability of seed for collection during the preceding five years.

Reference sites/plants must also be monitored to provide benchmark data and assist in determining attrition or impacts that may be attributed to a natural event that has impacted the general population and not just translocated individuals. Natural populations of Coolabah bertya within the Narrabri Mine on-site offset area (Rosevale Property) will be used as reference sites and monitored quarterly to assess rates of attrition, flowering, fruiting and natural recruitment.

Given the abundance of Coolabah bertya within the on-site offset area, monitoring data will be collected in fixed plots (5 x 5 m). Variables to be monitored for translocated individuals and within reference plots are detailed within Table E-1.

Table E-1 Data to be monitored for translocated Coolabah bertya and reference plots

Data to be collected	Translocated individuals	Reference plots
Vegetative growth	Height of individual plant	Median height of all Coolabah bertya plants within plot
Plant health / vigour	Repeatable scale of measurement as per the following: • Plant dead • Widespread dieback/damage • Dieback/damage observed on multiple branches • Minor dieback/damage evident on isolated leaves or branches • Healthy plant with no signs of dieback/damage	Estimate proportion of Coolabah bertya with dieback including the median level of dieback as per the scale for translocated individuals.
Reproductive status	Repeatable scale of measurement as per the following: • No flowers (incl. buds) or fruits observed • Isolated flowers or fruits • Flowering/fruiting on 5 – 25% of branches • Flowering/fruiting on 25 – 75% of branches • Flowering/fruiting on 75 – 100% of branches	Proportion of population with reproductive material and median level of flowering/fruiting as per the scale for translocated individuals.

Collection of this data will provide quantitative data which will guide future management actions including:

- Time to maturity (e.g. first flowering)
- Flowering / fruiting (comparisons between sites and populations).
- What proportion of plants are producing viable seed?
- Evidence of second generation and abundance.
- Any experimental micro-siting and treatment variables implemented as part of the program (e.g. fenced / unfenced, shaded / unshaded).

All aspects such a watering frequency, unusual climatic conditions and rainfall will also be considered and documented.

Review and reporting

Results of the program will be summarised in the Narrabri Mine Annual Review. Quarterly reports are to present the success and failures of the various stages of the strategy and make recommendations for future stages.

Appendix F Aboriginal cultural heritage management

To mitigate potential conflicts with Aboriginal cultural heritage sites, the following measures will be implemented in accordance with the Aboriginal Cultural Heritage Management Plan.

Surface development footprint:

- maintain an up-to-date spatial database of known Aboriginal cultural heritage sites and mark these sites on relevant mine documentation and plans;
- continue to implement a protocol for surface disturbance works to reduce the risk of accidental damage to known Aboriginal cultural heritage sites (i.e. demarcation of Aboriginal cultural heritage sites located in proximity to, but outside of, proposed disturbance areas);
- the location of known Aboriginal cultural heritage sites will be considered during final detailed engineering designs of surface infrastructure;
- surface impacts will be avoided at the two grinding groove sites (Mayfield GG1 and Longsight GG1), and within the Mining Reduction Zone (Clermont GG1);
- where practicable, known Aboriginal cultural heritage sites will be avoided during construction and operational works associated with components with flexible design;
- where changes to current design of the Surface Development Footprint mean that avoidance of known Aboriginal cultural heritage sites is not practicable , the site(s) will be subject to salvage of a representative collection of visible surface artefacts in consultation with the Aboriginal community, and an assessment undertaken whether the site is likely to hold in situ subsurface archaeological deposits that warrant excavation;
- protocols for the management of previously unidentified Aboriginal cultural heritage sites and/or human remains will be implemented;
- a protocol to be developed that prescribe the involvement of RAPs in cultural heritage works conducted under this Plan; and
- a communication protocol to be developed that describes clear methods of communication, including expectations of suitable notification and response times between NCOPL and the RAPs.

Options for the final storage location (Keeping Place) of any collected artefacts is to be determined in consultation with the RAPs, with consideration of returning all cultural objects to the landscape post-rehabilitation and/or retaining for use by the Aboriginal community for display/educational purposes.

Vegetation and soil stripping:

Any soil disturbance work within 100 m of a water course or drainage line or in areas not previously inspected by RAPs for cultural heritage purposes requires the presence of the RAPs to monitor the works and minimise the risk of Aboriginal sites/objects of being disturbed by clearing activities.

Should an emergency situation arise that requires vegetation clearance (e.g. firefighting, hazardous materials spill) in the vicinity of protected Aboriginal cultural heritage sites, vegetation clearance will be undertaken with minimum possible disturbance to the topsoil. Under section 87A of the *National Parks and Wildlife Act 1974*, the concept of 'Harming or desecrating' Aboriginal objects or places does not apply for:

- emergency firefighting or bush fire hazard reduction work within the meaning of the NSW *Rural Fires Act 1997* that is authorised or required to be carried out under that Act; and
- anything authorised by or under the NSW *State Emergency and Rescue Management Act 1989* in relation to an emergency (within the meaning of that Act) and that is reasonably necessary in order to avoid an actual or imminent threat to life or property.

Activities relating to maintenance, construction and initial mining, or operational activities do not comprise emergency situations.

Subsidence:

- where subsidence-related impacts such as surface cracking are identified within the boundary of an existing site of moderate (or high) scientific significance, or where remediation works are required to address subsidence impacts, the site will be inspected by a qualified archaeologist to determine the nature and extent of impacts, and whether mitigation is required or feasible;
- mitigation measures may include further monitoring, surface collection or open area salvage excavation (if warranted);
- there will be temporary salvage of artefacts within the subsidence area;
- implementation of the Mining Reduction Zone for Claremont GG1; and
- investigations of the grinding groove site Mayfield GG1 by an appropriately qualified specialist (e.g. archaeologist, geologist, geomorphologist) and RAPs are required to determine potential connection to bedrock. If connection to bedrock is identified, additional management measures will be determined by the qualified archaeologist in consultation with the RAPs.

A procedure for subsidence repair in the vicinity of Aboriginal cultural heritage sites has been prepared in consultation with the RAPs to develop a method for conducting surface crack repair and other subsidence impacts. The procedure aims to enable rehabilitation activities which avoid and/or minimise any potential adverse impacts to Aboriginal cultural heritage values.

Site specific subsidence management measures will be detailed in the Extraction Plan (**EP**) Aboriginal Heritage Management Plan/s, with the proposed measures subject to approval by the RAPs and the relevant regulatory agencies.

General measures:

- seek to minimise the risk of inadvertent damage to Aboriginal cultural heritage sites by promoting an awareness of heritage conservation via the induction process;
- a comprehensive Aboriginal Cultural Heritage Sites Database, which contains all relevant information of Aboriginal cultural heritage sites located at the Narrabri Mine and surrounds, will be established and maintained for the life of mine;
- all known Aboriginal cultural heritage sites within the mine site will be fenced and appropriately signed to avoid accidental damage;
- maintain ongoing consultation with the Aboriginal community over the life of mine, including appropriate Aboriginal representation during archaeological fieldwork;
- provide opportunities for Aboriginal community members to access known Aboriginal cultural heritage sites located on NCOPL-owned land in accordance with relevant work health and safety requirements; and
- NCOPL will investigate opportunities to incorporate RAPs in on site activities such as biodiversity management and rehabilitation.

Should any skeletal remains be identified, work in that location will cease immediately and the find notified to the relevant authorities (including the NSW Police) (see Appendix F). Subject to the NSW Police requiring no further involvement, the management of any Aboriginal skeletal remains will be determined in consultation with Heritage NSW and the RAPs.