NARRABRI MINE

EXTRACTION PLAN
BIODIVERSITY MANAGEMENT PLAN

PANELS 201 - 202

Prepared by:

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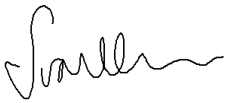
Senior Environmental Manager	S. van der Meulen Onward Consulting		30 March 2022
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Document review history

In accordance with Project Approval Schedule 6 Condition 3, this document has been reviewed as follows:

Review Date	Reason for review	Reviewed by	Revision required (Y/N)

Acronyms and abbreviations

Acronym	Description
º	degree
AHD	Australian Height Datum
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BCS	The Biodiversity Conservation and Science Directorate within DPE
BMP	Biodiversity Management Plan (this document)
BOA	Biodiversity Offset Area
CHPP	Coal Handling and Preparation Plant
cm	centimetre
DAWE	The Commonwealth Department of Agriculture, Water and Environment
DBH	diameter at breast height
DEM	digital elevation model
DGS	Ditton Geotechnical Services
DPE	The NSW Department of Planning and Environment
EA	Environmental Assessment
EEC	Endangered Ecological Community listed under the EPBC Act
EMS	NCOPL's Environmental Management System
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EP&A Regulation	Environmental Planning and Assessment Regulation 2000
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
FBS	floristic-based subsidence
FM Act	*Fisheries Management Act 1994*
ha	hectare
IEA	Independent Environmental Audit
km	kilometre
LiDAR	light detection and ranging
LMP	Land Management Plan (as Appendix I to the Extraction Plan)
LW	longwall panel
m	metre
ML	mining lease
mm	millimetre
mm/m	millimetre per metre
Mt	million tonnes
Mtpa	million tonnes per annum
NCOPL	Narrabri Coal Operations Pty Ltd
NDVI	normalised difference vegetation index
NSC	Narrabri Shire Council

Acronym	Description
OEH	The former NSW Office of Environment and Heritage
PFC	projected foliage cover
POEO Act	*Protection of the Environment Operations Act 1997* (NSW)
POEO Regulation	Protection of the Environment Operations (General) Regulation 2009
RMP	Rehabilitation Management Plan (as part of Appendix F to the Extraction Plan)
ROM	run of mine
SAT	Spot Assessment Technique
SoC	Statement of Commitments
TARP	trigger action response plan
U95%CL	upper 95 % confidence level
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. It is located approximately 25 kilometres (**km**) south-east of Narrabri and approximately 60 km north-west of Gunnedah, within the Narrabri Shire Council (**NSC**) Local Government Area in New South Wales (**NSW**). The Narrabri Mine includes an underground coal mine, a coal handling and preparation plant (**CHPP**) and associated rail siding and surface infrastructure.

The Narrabri Mine is operated by Narrabri Coal Operations Pty Ltd (**NCOPL**), on behalf of the Narrabri Mine Joint Venture, which consists of two Whitehaven Coal Limited (**WHC**) wholly owned subsidiaries, and other joint-venture partners[1]. The underground mine is covered by Mining Lease (**ML**) 1609 which covers an area of 5,298 hectares (**ha**) for the predominant purpose of mining for coal from the Hoskissons Coal Seam.

Stage 1 of the Narrabri Mine was approved in November 2007 under Part 3A of the *Environmental Planning and Assessment Act 1979* (**EP&A Act**). Construction of the mine and supporting infrastructure commenced in 2008, with production using a continuous miner following in 2010. Following the approval of the Stage 2 Environmental Assessment (R.W Corkery & Co., 2009) (the **EA**) and the issue of Project Approval 08_0144 for Stage 2 (**Project Approval**) in July 2010 and EPBC approval (2009/5003) in January 2011, the Narrabri Mine was converted to an 8 million tonnes per annum (**Mtpa**) run of mine (**ROM**) longwall mining operation, which commenced in 2012.

The Project Approval has subsequently been modified on a number of occasions. The environmental assessment for Modification 5 (Resource Strategies, 2015) (**MOD 5**), approved in December 2015, changed the mine geometry by reducing the number of longwall (**LW**) panels from 26 to 20, increased some LW panel widths and increased the production to 11 Mtpa of ROM coal until July 2031.

Modification 7, the most recent modification of the Project Approval, was approved on 23 November 2021. The environmental assessment for Modification 7 (Resource Strategies, 2021) (**MOD 7**) describes the change in mining method within the extent of the previously approved LW 201 and LW 202 and allows for up to 0.7 Mtpa via bord and pillar extraction at pillar reduction panels CF 201 to CF 205[2]. The bord and pillar mining will occur concurrently with existing longwall operations and is scheduled to commence in 2022 for a period of approximately five years. There is no change to the previously approved longwall panels LW 203 to LW 205. The maximum ROM coal production rate of the concurrent operation remains within the approved limit of 11 Mtpa.

The Extraction Plan provides further details of the Narrabri Mine operations to date; a consideration of the applicable statutory requirements and the modifications to the Project Approval; and information relevant to the extraction of coal from pillar reduction panels CF 201 to CF 205 (hereafter referred to as **Panels 201 to 202**). The surface area predicted to be affected by the proposed secondary extraction of Panels 201 to 202 has been defined as the **Extraction Plan Area**.

The underground mining layout for Panels 201 to 202 is presented in Figure 1.1.

[1] For full details on the joint venture ownership, please refer to the introduction of the Extraction Plan.

[2] The pillar reduction panel naming 'CF' is an acronym for 'cut and flit'.

Source: Geoscience Australia (2011); NSW Spatial Services (2019)

LEGEND

— — Underground Mine Footprint

—E— Electricity Transmission Line (Constructed)

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Figure 1.1 : Underground Mining Layout for Panels 201 and 202

1.2 Purpose and scope

As required by Project Approval Schedule 6 Condition 2, this Biodiversity Management Plan (**BMP**) for Panels 201 to 202 has been prepared in accordance with the NSW Department of Planning and Environment (**DPE**) *Draft Guidelines for the Preparation of Extraction Plans* (unpublished) (**Extraction Plan Guidelines**). It complies with Schedule 3 Condition 4(h) of the Project Approval, which states that the Extraction Plan is to include a BMP which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings upon flora and fauna, and which has been prepared in consultation with the Biodiversity, Conservation and Science Division (**BCS**) within DPE and the NSW Resources Regulator.

1.3 Objectives

The objectives of this BMP are to:

- provide a description of the baseline environment for flora and fauna;
- provide a monitoring program that:
  - monitors for potential impacts to flora and fauna as a result of subsidence; and
  - evaluates the effectiveness of management actions.
- provide a description of the management measures to be implemented in the event that subsidence monitoring identifies potential impacts on flora and/or fauna;
- provide an analysis of triggers to inform additional and/or adaptive management actions; and
- describe the responsibilities and requirements for the implementation, reporting, evaluation and review of this BMP.

NCOPL will implement all practical measures to prevent and/or minimise any harm to the environment that may result from construction, operation or rehabilitation activities at the Narrabri Mine.

1.4 Statutory requirements

This BMP has been prepared in accordance with the applicable conditions and requirements of the Project Approval, EPBC 2009/5003, ML 1609 and all relevant legislation and guidelines as set out in the following sections. A full consideration of the applicable compliance requirements is provided in section 2 of the Extraction Plan.

1.4.1 Project Approval

Project Approval Schedule 3 Condition 1 states that NCOPL shall ensure that clearing and disturbance of vegetation above the mining area is minimised, to the satisfaction of the Secretary. Further, Schedule 3 Condition 5 states that the BMP shall include:

(a) an assessment of the potential environmental consequences of the Extraction Plan, incorporating any relevant information that has been obtained since the Project Approval;

(b) a detailed description of the measures that would be implemented to remediate predicted impacts; and

(c) a contingency plan that expressly provides for adaptive management.

The Project Approval conditions directly relevant to this BMP have been presented in full in Table A1.1 in Attachment 1, together with a cross-reference where the requirements are addressed within this Plan.

Statement of Commitments

The Statement of Commitments for Site Operations and Management (**SoC**) is contained as Appendix 3 of the Project Approval. The specific commitments applicable to this BMP are listed in Table 1.1.

Table 1.1 - Relevant SoC requirements

SoC requirements		BMP reference
SoC	**Summary of the requirement**	
8.5	Clearly identify the boundaries of proposed disturbance. As far as practicable avoid disturbance to the vegetation of Community 3[1] along watercourses of the Mine Site.	Section 5.6
8.6	Commission a qualified ecologist to complete a pre-clearance survey of nominated areas of disturbance (to identify whether any threatened species, population or community or their habitat is present).	Section 5.6
8.7	Include an assessment of whether aquatic or fish habitat is present within the drainage features to be traversed by the access road and/or power line corridors. The location of access tracks will be determined in conjunction with an ecologist after inspecting each proposed route and determining the path with least impact on environmental values	Section 5.5
8.8	In the event that an endangered ecological community (**EEC**) or threatened species or population is identified, relocate or reorientate proposed disturbance, if practicable. If the relocation or re-orientation of the area to be disturbed is not practicable (for reasons of mine / operational safety), the consultant ecologist will relocate any fauna species residing within the area to be cleared.	Section 5.6
8.9	Retain all substantial habitat trees, wherever possible.	Section 5.6
8.10	Undertake any tree-felling in accordance with a Tree Felling Protocol. The Tree Felling Protocol will be developed by a qualified ecologist and will include, but not necessarily be limited to a description of: • the best time of the year for felling; • pre-felling mapping of habitat trees; • inspections of trees on the day of felling; • procedures for the safe removal of fauna species; • a relocation/release protocol; and • a protocol for the assessment and salvaging of tree hollows.	Section 5.6
8.11	Disperse and spread cleared native vegetation around disturbed areas to provide habitat, increase the seed bank and to provide a mulch material for nutrient cycling and water retention purposes.	In accordance with the Rehabilitation Management Plan (**RMP**)

SoC requirements		BMP reference
SoC	**Summary of the requirement**	
8.12	Strip all groundcover vegetation with the topsoil to ensure maximum retention of nutrients and native seeds to facilitate rapid vegetation of the soil stockpiles.	In accordance with the RMP
8.13	Re-site all hollows from hollow-bearing trees removed where practicable.	Section 5.6
8.14	Implement a weed management strategy, in consultation with the Livestock Health and Pest Authority (now the North West Local Land Services) and the Narrabri Shire Council weeds officer, for the retained or rehabilitated natural vegetation within the Mine Site.	Section 4 and 5
8.15	Implement a feral animal management program to lower the predator impact upon small terrestrial native species.	Section 4.4 and 4.5
8.16	Inspect the sediment dams, evaporation ponds and brine storage ponds for fauna during the course of regular maintenance and operational inspections.	Section 4.5
8.17	Undertake regular reviews of the revegetation program to ensure it remains relevant.	As part of the RMP for the mine
8.18	Time clearing within woodland communities, where practicable, to avoid fauna breeding seasons.	Section 5.6
8.19	Undertake progressive and final rehabilitation across the Project Site to recreate a final land use of agriculture and native vegetation.	As part of the RMP for the mine
8.20	Establish and implement a biodiversity offset strategy, incorporating vegetation and habitat equivalent to that disturbed by the mining activity.	Section 2

Note

1. Riparian vegetation associated with Kurrajong Creek Tributary 1

1.4.2 EPBC approval

NCOPL is subject to EPBC 2009/5003 issued under the EPBC Act. Approval Condition 3 states that in order to minimise potential impacts on EPBC Act listed threatened species and communities within the mine site, prior to any works commencing and in accordance with the NSW Director General's Assessment Report and approval conditions (26 July 2010), NCOPL must develop and implement an Extraction Plan. The final version of the Extraction Plan must be submitted to the Commonwealth Department of Agriculture, Water and Environment (**DAWE**).

This BMP, as Appendix I to the Extraction Plan, considers the Commonwealth listed threatened species and communities and therefore satisfies this condition.

1.4.3 Mining lease

The original ML 1609, issued in 2008, has been amended to include a reference to Extraction Plans, removing the requirements for a Subsidence Management Plan. ML 1609 condition 23 is relevant to this BMP and states:

- The lease holder must not fell trees, strip bark or cut timber on the lease without the consent of the landholder who is entitled to the use of the timber, or if such a landholder refuses consent or attaches unreasonable conditions to the consent, without the approval of a warden;
- The lease holder must not cut, destroy, ringbark or remove any timber or other vegetative cover on the lease area except such as directly obstructs or prevents the carrying on of operations. Any clearing not authorised under the *Mining Act 1992* must comply with the provisions of the *Native Vegetation Act 2003*[3];and
- The lease holder must obtain all necessary approvals or licences before using timber from any Crown land within the lease area.

The land above Panels 201 to 202 is wholly owned by NCOPL. There are no further specific ML conditions related to this BMP.

1.4.4 Extraction Plan Guidelines

As stated in the Extraction Plan Guidelines, vegetation offsets to compensate for surface impacts caused by subsidence may be required by conditions of development consent. This will require appropriate provisions to be included within the relevant Extraction Plan sub-plans (generally the BMP) to codify the process by which the need for offsets will be confirmed (i.e., the exceedance of relevant performance measures) and the process by which offsets will be identified, approved, and made effective).

The offset strategy and the associated management plans are further addressed in section 2. There are no other specific requirements identified in the Extraction Plan Guidelines that relate directly to this BMP.

1.5 Risk assessment

A subsidence risk assessment has been undertaken to identify the risks associated with subsidence at the Narrabri Mine. It builds on previous risk assessments completed for LW 101 to LW 110 and is presented as Appendix K to the Extraction Plan. The updated risk assessment for Panels 201 to 202 has not identified any high-risk items and, as a result, risks associated with subsidence within the Extraction Plan Area for the Narrabri Mine have been assessed as low to moderate.

The potential environmental impacts and consequences relevant to biodiversity management are further discussed in section 3.

1.6 Consultation and approval

In accordance with Schedule 3 Condition 4(h) of the Project Approval, NCOPL has prepared this BMP in consultation with BCS and the Resources Regulator.

A draft (Revision B) of the BMP was provided to BCS and the Resources Regulator on 3 December 2021. The Resources Regulator provided a response with no specific comments regarding this BMP on 23 February 2022. BCS provided comments on 21 March 2022, with the main comment related to trigger levels that should identify targets that adhere to the SMART principles (specific, measurable, achievable, realistic and timely).

[3] The *Native Vegetation Act 2003* was repealed by section 3 of the *Local Land Services Amendment Act 2016* on 25 August 2017.

The consultation correspondence is presented in Attachment 2, including a reconciliation table provided as Table A2.1 addressing all comments.

The overall consultation process required for the Extraction Plan by the Project Approval is detailed in section 1.9 of the Extraction Plan.

1.7 Access to information

In accordance with Schedule 6 Condition 10 of the Project Approval, the approved Extraction Plan and all appendices, audits and reports, and summaries of all monitoring data (where relevant) will be made publicly available on the WHC website. All information will be kept up to date.

Note that any printed copies of this BMP are uncontrolled.

2. Baseline ecological environment

The existing surface and subsurface features associated with Panels 201 to 202 include:

- semi-cleared, gently to moderately undulating terrain (that is owned by the mine);
- one ephemeral watercourse with a sandy bed & exposed sandy clay banks with slopes up to 15º (Kurrajong Creek Tributary 1);
- one Aboriginal heritage site of 'High' Archaeological Significance (Clermont grinding groove site on exposed sandstone, possibly a partially buried loose boulder);
- several unsealed access roads and property fencing;
- five earth embankment dams for stock watering (D49, D65, D66, D67 and D68); and
- soil conservation banks (contour banks).

Land to the west of the ML consists of extensive native vegetation within Jacks Creek State Forest, the Pilliga East State Forest, and neighbouring reserves. Tehrefore, the native vegetation and fauna habitat within ML 1609 may facilitate the movement of one or more threatened fauna species across their range.

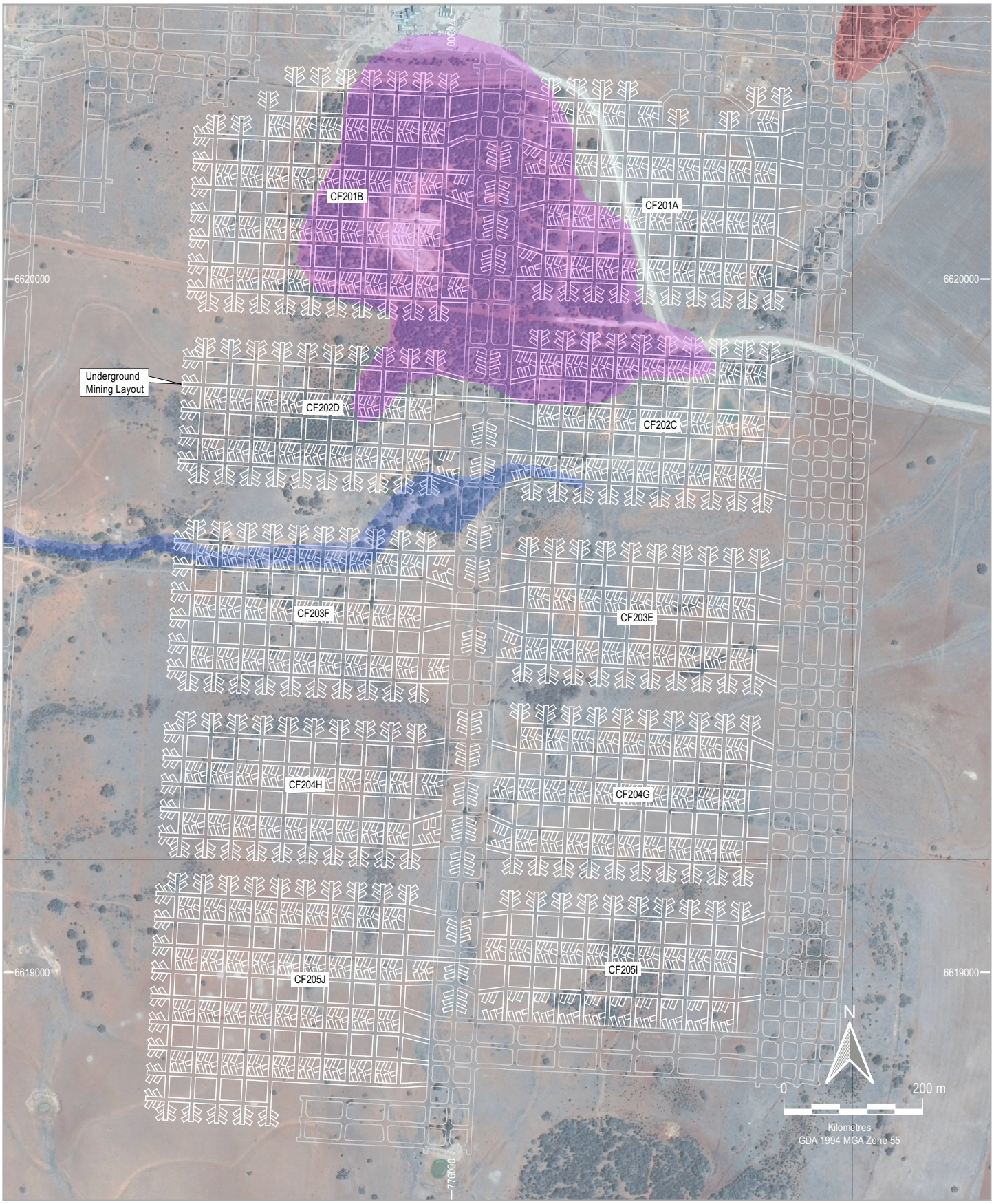
Based on the Stage 2 EA, Narrabri Mine was approved for the clearance of 210 ha of native vegetation which may result in direct and indirect impacts on threatened flora and fauna including the Coolabah bertya (*Bertya opponens*) and foraging habitat for the Superb Parrot (*Polytelis swainsonii*). A Biodiversity Offset Strategy was prepared to account for the area disturbed, which included the establishment of both onsite and off-site ('Kenna') Biodiversity Offset Areas (**BOAs**). The BOAs are managed under the relevant Biodiversity Offset Management Plans.

2.1 Woodland and riparian vegetation and habitat

Six natural vegetation communities and one artificial vegetation community occur across ML 1609. The land directly above Panels 201 to 202 is predominantly cleared, with one small remnant patch of Callitris Forest above the northern section of the Extraction Plan Area and Riparian Forest associated with Kurrajong Creek Tributary 1 (Figure 2.1). The riparian forest is relatively intact; however, has undergone some clearing and modification due to grazing. Inland Grey Box Woodland, listed as an EEC under both the EPBC Act and the NSW *Biodiversity Conservation Act 2016* (**BC Act**), is also present to the northeast of the Extraction Plan Area.

Habitat features within the Extraction Plan Area include:

- remnant woodland;
- open areas comprised of pasture and/or cropping paddocks;
- drainage lines; and
- farm dams.



Source: Geoscience Australia (2011); NSW Spatial Services (2019)

LEGEND

- Callitris Forest
- Inland Grey Box Woodland
- Riparian Forest

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Figure 2.1: Vegetation communities above Panels 201 and 202

2.2 Threatened flora

Ecological surveys undertaken to date have recorded three threatened flora species within ML 1609, namely:

- Coolabah bertya - recorded in the western and northern boundaries of the mining lease extending into the Jacks Creek and Pilliga East State Forests (listed as vulnerable under the EPBC Act and the BC Act);
- Spiny peppercress (*Lepidium aschersonii*) - found in the remnant patch of Inland Grey Box Woodland EEC above LW 102 and LW 103 (listed as vulnerable under the EPBC Act and the BC Act); and
- *Tylophora linearis* - one record south of Panels 201 and 202 (listed as Endangered under the EPBC Act and Vulnerable under the BC Act).

Additionally, Ooline (*Cadellia petastylis*), listed as vulnerable under the EPBC Act and the BC Act, and Scant pomaderris (*Pomaderris queenslandica*), listed as Endangered under the BC Act, have the potential to occur within ML 1609.

There are no threatened flora species previously recorded within the Extraction Plan Area.

2.3 Terrestrial fauna

Ecological surveys undertaken across ML 1609 identified a total of 162 species, comprising 99 birds, 37 mammals, 16 reptiles and 10 amphibians. Of these, six species are listed under the EPBC Act, and 19 species are listed under the BC Act, as presented in Table 2.1.

Table 2.1 - Threatened fauna species recorded within ML 1609

Common Name	Scientific name	Conservation status	
		BC Act	EPBC Act
White-throated needletail	*Hirundapus caudacutus*	-	V, M
Speckled warbler	*Chthonicola sagittata*	V	-
Dusky woodswallow	*Artamus cyanopterus cyanopterus*	V	-
Diamond firetail	*Stagonopleura guttata*	V	-
Painted honeyeater	*Grantiella picta*	V	V
Varied sittella	*Daphoenositta chrysoptera*	V	-
Hooded robin (south-eastern form)	*Melanodryas cucullata cucullata*	V	-
Scarlet robin	*Petroica boodang*	V	-
Grey-crowned babbler (eastern subspecies)	*Pomatostomus temporalis temporalis*	V	-
Glossy black cockatoo	*Calyptorhynchus lathami*	V	-
Little lorikeet	*Glossopsitta pusilla*	V	-
Yellow-bellied sheath-tailed bat	*Saccolaimus flaviventris*	V	-
Large-eared pied bat	*Chalinolobus dwyeri*	V	V
Little pied bat	*Chalinolobus picatus*	V	-

Common Name	Scientific name	Conservation status	
		BC Act	EPBC Act
Corben's long-eared bat	*Nyctophilus corbeni*	V	V
Eastern cave bat	*Vespadelus troughtoni*	V	-
Eastern pygmy-possum	*Cercartetus nanus*	V	-
Black-striped wallaby	*Macropus dorsalis*	E	-
Koala	*Phascolarctos cinereus*	V	V
Pilliga mouse	*Pseudomys pilligaensis*	V	V

Notes:

Conservation status under the BC Act (current as of November 2021). E = Endangered, V = Vulnerable.
Conservation status under the EPBC Act (current as of November 2021). V = Vulnerable, M = Migratory

2.4 Aquatic biota and habitat

The Stage 2 EA assessed potential aquatic biota habitat within ML 1609 to consist of two general types of habitats, namely creek lines and farm dams. There are five farm dams above Panels 201 to 202 that are utilised for livestock watering. Most farm dams contain areas of emergent and aquatic vegetation, while some are bordered by a narrow strip of soil between the water and surrounding grass cover. Most farm dams contain relatively clear water, and all contain some aquatic macroinvertebrates.

Kurrajong Creek Tributary 1 extends above Panels 201 to 202 and continues further to the west, as shown in Figure 2.1. No threatened species listed under the NSW *Fisheries Management Act 1994* (**FM Act**) have the potential to occur within Kurrajong Creek. However, the Lowland Darling River Aquatic EEC is listed under the FM Act which includes the Namoi River and its associated tributaries (i.e., Kurrajong Creek).

2.5 Weeds and pest animals

2.5.1 Weeds

Ecological monitoring undertaken to date has identified locations where noxious and invasive weeds are most likely to occur. These locations are associated with disturbance areas, such as access tracks and areas of subsidence remediation, and cleared open grasslands. The Riparian Forest along Kurrajong Creek has previous records of noxious weeds; however, the density is generally low. Weed abundance has also been assessed as low in the Inland Grey Box Woodland EEC. Table 2.2 provides a list of noxious and invasive weeds recorded across the ML.

Table 2.2 - Noxious and invasive weeds recorded within ML 1609

Common name	Scientific name
African boxthorn	*Lycium ferocissimum*
African lovegrass	*Eragrostis curvula*
Bathurst burr	*Xanthium spinosum*
coolatai grass	*Hyparrhenia hirta*
creeping oxalis	*Oxalis corniculata*

Common name	Scientific name
galvanised burr	*Sclerolaena birchii*
innocent burrgrass	*Cenchrus incertus*
Johnson grass	*Sorghum halepense*
mintweed	*Salvia reflexa*
mother of millions	*Bryophyllum delagoense*
noogoora burr	*Xanthium occidentale*
paspalum	*Paspalum dilatatum*
prickly pear	*Opuntia spp.*
saffron thistle	*Carthamus lanatus*
silver-leaved nightshade	*Solanum elaeagnifolium*
skeleton weed	*Chondrilla juncea*
spiny burrgras	*Cenchrus longispinus*

2.5.2 Pest animals

Thirteen introduced species have been recorded across ML 1609 which include the common myna, common starling, cattle, goat, sheep, feral pig, dog, red fox, feral cat, European brown hare, European rabbit, black rat, and the house mouse.

3. Subsidence impacts and potential environmental consequences

3.1 Subsidence predictions

The Mine Subsidence Assessment Report, prepared by Ditton Geotechnical Services (DGS, 2021), provided as Appendix B to the Extraction Plan, assessed the potential subsidence impacts as a result of the seconds workings of Panels 201 to 202, namely:

- surface cracking;
- sub-surface cracking;
- erosion;
- valley closure and uplift; and
- ponding and drainage lines.

The maximum subsidence estimates due to remnant pillar crush within the panel limits after mining is completed ranges from 0.50 to 1.77 m. The timing of subsidence is difficult to predict and may not occur at all or years after mining is completed. Maximum production panel subsidence ranges from 1.42 to 1.77 m (from 34 % of the mining height [h] to 43 %h respectively), with the maximum gateroad access pillar subsidence ranging from 0.50 to 0.73 m (12 %h to 18 %h). The maximum panel tilt ranges from 14 to 36 mm/m, with the maximum panel concave curvatures range from 0.7 per kilometre (km-1) to 3.3 km-1 (radii of curvature 1.4 to 0.3 km).

Maximum panel convex curvatures range from 0.7 to 3.1 km-1 (radii of curvature 1.4 to 0.32km) with maximum panel compressive strains ranging from 7 to 31 mm/m. Maximum panel tensile strains range from 7 to 33 mm/m.

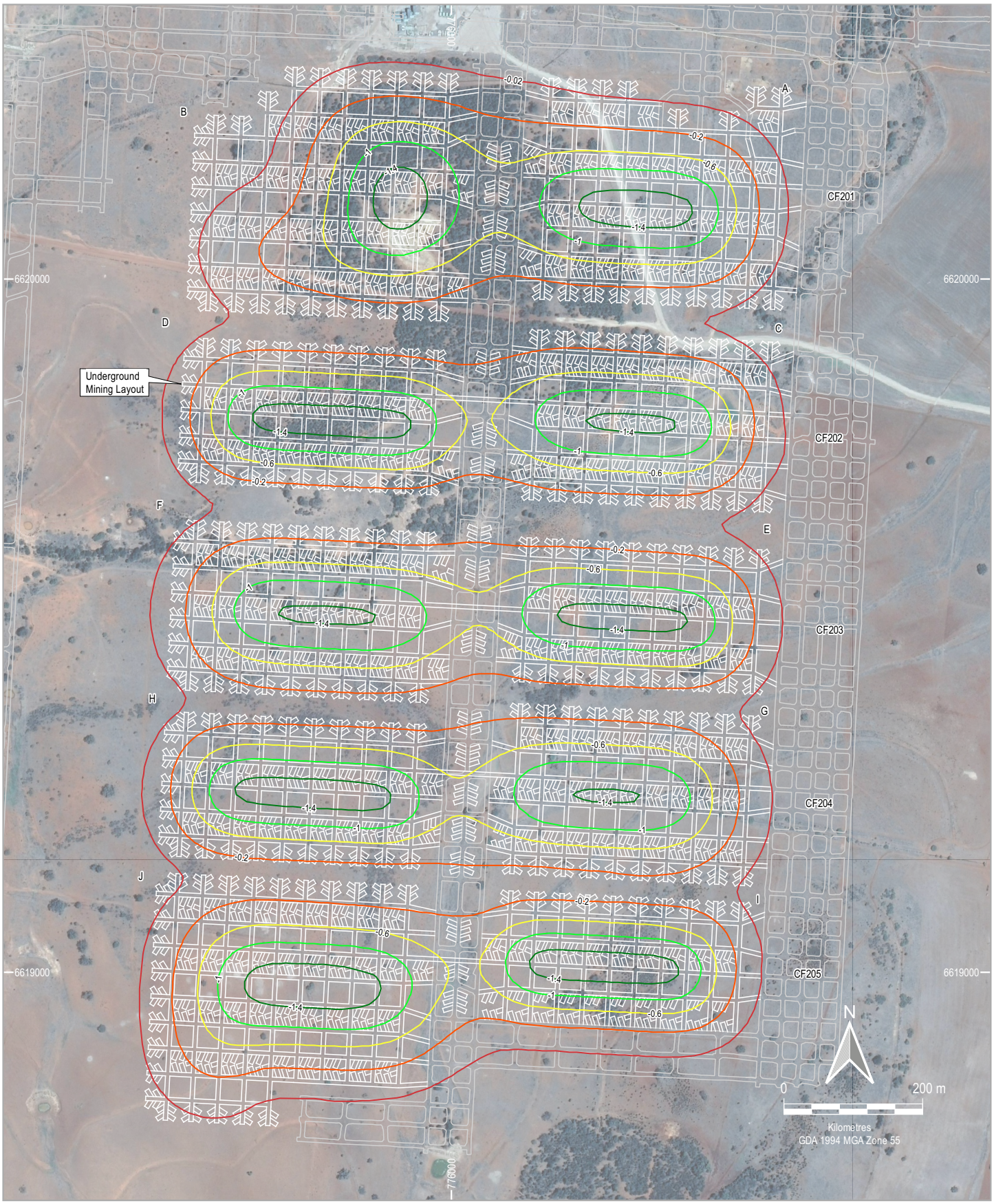
The subsidence effects (subsidence, tilt, curvature, horizontal displacements and strains) for the pillar reduction panels have been estimated based on published subsidence data for a broad range of coalfield geometries. Maximum predicted and observed subsidence values (worst-case scenarios) for extraction of these panels, as presented in Table 3.1 and Figure 3.1, have been adopted for the purposes of this BMP.

Note that the predicted values may be occasionally exceeded (up to 5% of the time) due to discontinuous strata behaviour associated with near surface cracking, joint displacement, geological features (e.g. faults) and/or rapid changes in topography (creek beds).

Table 3.1 - Maximum subsidence predictions

Panel	Final maximum subsidence (S_{max}) (m)	Maximum tilt (mm/m)	Maximum tensile strain (mm/m)	Maximum compressive strain (mm/m)
CF 201-A	1.77	22	16	17
CF 201-B	1.77	21	14	15
CF 202-C	1.77	24	19	20
CF 202-D	1.77	32	27	29
CF 203-E	1.77	31	27	29

Panel	Final maximum subsidence (S_{max}) (m)	Maximum tilt (mm/m)	Maximum tensile strain (mm/m)	Maximum compressive strain (mm/m)
CF 203-F	1.77	23	18	19
CF 204-G	1.77	23	18	19
CF 204-H	1.77	32	27	29
CF 205-I	1.77	36	31	33
CF 205-J	1.77	22	16	17



Source: Geoscience Australia (2011); NSW Spatial Services (2019)

LEGEND (m)
- -0.02
- -0.2
- -0.6
- -1
- -1.4

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Figure 3.1: Predicted Subsidence Panels 201 and 202

3.2 Woodland and riparian vegetation and habitat

Subsidence impacts that may affect the health and function of vegetation and fauna habitat include surface cracking, ponding, and root shearing. Historically, tree loss has been attributed to surface cracking and damage to tree roots from a combination of a relatively shallow depth of cover, lighter soils, and dry weather conditions. Data trends show that with an increase in depth of cover, there was a decline in subsidence impacts (MOD 5). The Mine Subsidence Assessment has considered that any large tree (Eucalypts in particular) in clayey soils with <180 m depth of cover would be at risk of root shear, which may lead to tree stress or death, particularly in dry climatic conditions.

Panels 201 and 202 have a depth of cover ranging from 182 to 210 m; meaning the risk of effects on vegetation and fauna habitat remain relatively low (Table 3.2).

Table 3.2 - Predicted maximum crack width for Extraction Plan Area in flat terrain

LW	XL	Panel width (m)	Cover depth (m)	Effective bay length (m)	Predicted maximum tensile strain (mm/m)		Predicted U95%CL crack width (mm)	
					Mean	U95%	Sand or loam	Clay or rock
CF201-CF205	6	235	182	10.0	7	31	310	620
	6	273	210	10.5	7	31	325	650

The Mine Subsidence Assessment recommends that tree condition and soil moisture conditions (within their root systems) be monitored before and after mining along the riparian sections of Kurrajong Creek Tributary No. 1 above CF 202 to CF 203.

Other potential indirect impacts may include:

- creek bank slumping affecting riparian vegetation;
- changes in soil characteristics (including water and nutrient distribution);
- transportation of weed propagules via on-going remediation works associated with mine subsidence and operations; and/or
- an increase in weeds due to ground disturbance, vehicle movements and/or movements of soil.

Positive impacts observed over time include natural regeneration of saplings in areas subject to subsidence, suggesting that subsidence impacts on native vegetation are temporary, and:

- unlikely to materially impact on vegetation or habitat within the predicted subsidence areas; and
- in areas outside of potential cracking and ponding, tree dieback and the occasional tree fall is unlikely.

3.3 Terrestrial fauna

Potential impacts on terrestrial fauna may include:

- localised and limited reduction in the habitat resources available as a consequence of subsidence; and
- surface cracking forming an area capable of ‘trapping’ ground dwelling fauna with the potential loss of some small individuals.

The risk of impacts to fauna as a result of surface cracking are considered negligible and very unlikely to result in an impact that would threaten the viability of a species population. Results of monitoring data to date have identified that there have been no vertebrate fauna deaths as a result of subsidence cracks.

3.4 Aquatic biota and habitat

The potential impacts upon aquatic biota and associated habitat are negligible as permanent aquatic habitat is limited to farm dams and Kurrajong Creek Tributary 1 is an ephemeral watercourse. Potential consequences may include:

- loss of aquatic biota and habitats (either as a consequence of dam cracking or draining); and/or
- loss of riparian habitat along kurrajong creek and its tributaries due to surface subsidence, ponding and bank cracking/slumping.

Due to the negligible impact on aquatic biota, no monitoring is proposed.

3.5 Ponding and drainage lines

A total of seven potential ponding locations were assessed as part of the Mine Subsidence Assessment. Six of the potential ponding areas already exist along the watercourses and dams. Post-mining pond depths are estimated to range from 0.1 to 5.0 m. Pond depths are estimated to increase by up to 1.3 m or decrease by up to 0.19 m. The maximum changes in pond volume (where positive represents an increase in pond size) are estimated to range from -0.225 to 27.81 megalitres. There are three dams above CF203(F) that may be inundated by post-mining ponding, as presented in Table 3.3.

Overall, the existing ponds are expected to extend laterally from the watercourses for distances ranging from 50 to 500 m. Ponding can cause water logging resulting in tree stress, canopy die back and occasional tree death, altered drainage patterns, and loss of fauna habitat.

Watercourses that may be impacted include the ephemeral Kurrajong Creek Tributary 1. Surface water flowing to the creeks may pond in areas where it currently does not pond as a result of surface gradients changing. There may be a decrease in the quantity of water reaching the creeks as it ponds and evaporates rather than flowing to the creeks. There may also be a change in water quality as salinity may increase if water ponds over saline soils.

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. Overtime it is expected that ponding will create enhanced ephemeral aquatic habitats.

Table 3.3 - Potential ponding summary for Panels 201 to 202

Potential Pond No. (Dam No.)	Panel	Pre-Mining Pond Levels (m, AHD)		Maximum Pre-Mining Pond			Post-Mining Pond Levels (m, AHD)		Maximum post-mining pond			Pond area change (10^6 L)
		Top	Bottom	Depth h(m)	Area (ha)	Vol (ML)	Top	Bot	Depth h(m)	Area (ha)	Volume (ML)	
Pillar reduction panels												
P19	CF201(B)	299.9	299.3	0.60	0.336	0.672	298.6	298.2	0.41	0.530	0.724	**0.052**
P20	CF203(F)	290.0	289.9	0.10	0.280	0.093	289.1	288.8	0.33	1.214	1.335	**1.242**
P21 (D67/68)	CF203(F)	289.9	289.76	0.15	0.355	0.178	289.3	288.6	0.71	1.496	3.541	**3.363**

3.6 Vegetation clearing

The clearing of native vegetation is required for the development of surface infrastructure prior to mining such as gas drainage facilities, service boreholes and access tracks. Repairs to surface cracks as a result of subsidence may also require additional vegetation clearing following mining.

Vegetation clearing is unlikely to have a significant impact on native vegetation, threatened flora populations and/or fauna habitat as surface disturbance and vegetation clearing activities have been designed to minimise any potential impacts. Vegetation clearing within the Extraction Plan Area will be conducted in accordance with the Vegetation Clearance Protocol[4] provided in section 4.6.

[4] SoC 8.10

4. Monitoring methods

The NCOPL biodiversity monitoring program is detailed below and summarised in section 4.5.

4.1 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 above Panels 201 to 202 to that of the selected control sites. Control sites will be established within zones where no subsidence impacts have been predicted and the sites will have similar characteristics and biological conditions to the target area. If changes in landscape condition and/or vegetation cover are detected, targeted field surveys will be conducted to examine the cause of change (refer to section 4.5), followed by the implementation of appropriate management measures (refer to section 5).

4.1.1 LiDAR

LiDAR processing and analysis will be undertaken every three years (triennially) across Panels 201 to 202, commencing with baseline prior to mining, and then triennially in spring.

LiDAR data will be processed into a land surface digital elevation model (**DEM**) across the entire landscape. Subsequent LiDAR captures will be processed similarly, and each new dataset will be subtracted from those produced from earlier captures, creating a series of DEM change images. Each dataset produced will be used to create a map for visual interpretation and analysis and for communication of results.

Reporting of LiDAR analysis and any additional surveys undertaken in response to a change will be reported in summer following the spring survey.

4.1.2 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 (World View, Geoeye, Quickbird or similar) 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 and then annually in spring for a period of two years.

Reporting of multi-spectral imagery and any additional surveys undertaken in response to a change will be reported annually following the spring survey.

4.2 Woodland and riparian vegetation and habitat

4.2.1 Floristic-based subsidence monitoring

At a local scale, field surveys will be conducted within remnant woodland and riparian vegetation above Panels 201 to 202, starting with a baseline survey in spring prior to mining. The aim is to allow a direct comparison

between woodland and riparian vegetation health and function within the Extraction Plan Area to that of the baseline data and selected control sites over time. The baseline survey will establish control sites outside of the subsidence impact area with similar stand characteristics (species, size, condition etc.).

The following method will be applied in spring in accordance with the monitoring program (refer to section 4.5; Table 4.1):

- a baseline field survey consisting of panel traverses will be conducted in spring prior to the commencement of mining to establish 20 m x 20 m floristic-based subsidence (**FBS**) monitoring plots in accordance with the method detailed in Table 4.1. Control sites will also be established during the baseline surveys;
- following the commencement of mining (year 1), survey data will be captured via the annual multi spectral imagery method (section 4.1.2) to detect any interim changes from the baseline data;
- if the results of the multi spectral imagery detect any changes, targeted field surveys will be conducted. These surveys will provide data based on a modified approach to that detailed in Table 4.1 to determine the cause of change which will allow for NCOPL to implement the most appropriate management action/s; and
- a follow up field survey consisting of FBS monitoring within the established plots will be conducted in year 2 (two years post mining) in spring to determine if the vegetation health and function within the Extraction Plan Area has remained stable over time to that of the baseline data and control sites. The monitoring will be in accordance with the method detailed in Table 4.1.

Reporting on the outcomes of the panel traverses and monitoring plots will take place in summer following the spring survey. Woodland and riparian vegetation monitoring can be discontinued two years after the completion of each Panel as it is expected that any subsidence related impacts to vegetation will be evidence within this timeframe.

In addition to the field surveys, routine inspections of the surface environment will be conducted by NCOPL to detect subsidence impacts such as surface cracks, ponding or other mining consequences in accordance with the LMP.

4.2.2 Vegetation in ponded areas

Photo points are to be established around the perimeter of ponded areas with significant vegetation presence, set back 10 m from the edge of the pond (at maximum fill), with photos taken facing toward the pond. Photo sequences will provide a qualitative measure of vegetative health and rehabilitation success. Vegetation within the ponded area will be quantitatively assessed utilising 2 m x 5 m plots to document the dominant vegetation types and health occurring within three zones i.e., inundated (<30 cm), not inundated but moist/boggy, and dry. Tree regeneration will also be documented.

Subsidence ponds will be identified, and parameters recorded during the subsidence monitoring conducted in accordance with the LMP.

4.2.3 Vegetation and soil in Kurrajong Creek

The Mine Subsidence Assessment recommends that tree condition and soil moisture conditions within their root systems be monitored before and after mining along the riparian sections of Kurrajong Creek Tributary 1 (above CF202 to CF203).

Vegetation health will be monitored as per section 4.2.1. Soil moisture conditions will be monitored via the EM 38[5] method annually in spring. Refer to the monitoring program in section 4.5; Table 4.1.

4.3 Terrestrial fauna surveys

Terrestrial fauna field surveys will be conducted within remnant woodland and riparian vegetation above Panels 201 to 202, starting with a baseline survey in winter/spring prior to mining. Baseline surveys will be conducted within areas of suitable habitat for threatened fauna listed under the EPBC Act and/or the BC Act that are known to occur or have the potential to occur within the Extraction Plan Area. The baseline surveys will establish control sites outside of the subsidence impact area utilising the methods detailed in section 4.5; Table 4.2.

Terrestrial fauna surveys will be conducted following mining for two consecutive years within those areas where threatened species and/or suitable habitat have been identified. Surveys will utilise a rapid approach to species identification and notes on habitat use. Suitable proxy measures for fauna (e.g., evidence of usage such as nests, scratching or scats) will also be assessed. The surveys will include the collection and comparison of data from within the control sites to determine the presence/absence of threatened fauna and habitat use.

4.4 Weeds and pest animals

4.4.1 Weeds

In accordance with SoC 8.14, NCOPL must implement a weed management strategy, in consultation with the North West Local Land Services and the NSC weeds officer, for the retained or rehabilitated natural vegetation within the Mine Site. A weed management program has been implemented at Narrabri Mine which consists of spot spraying programs (two-week programs) periodically throughout the year. Locations are based on ecological monitoring reports and locations of listed weed species.

Weed monitoring and control will be focused on areas of retained native vegetation, rehabilitated/revegetated areas and other areas of disturbance (e.g., Pit Top Area). Control will assist with the protection and management of native vegetation and fauna habitat and will also assist with regeneration of native species. Weed control in the pastoral areas is planned to be managed by pasture improvement (or as recommended in subsequent monitoring reports).

Only contractors with a Ground Applicator Licence issued under the NSW *Pesticides Act 1999* will be engaged to conduct weed control activities. NCOPL will retain copies of the locations, species targeted, and control methods used by the weed spraying contractors. In addition, NCOPL must obtain certification from plant supplier/contractors that equipment imported to the mine site has been cleaned and is free of soil and vegetation.

NCOPL has a 'general biosecurity duty' under the NSW *Biosecurity Act 2015* to ensure that, so far as is reasonably practicable, biosecurity risks are prevented, eliminated, or minimised across the ML. Weed monitoring and control is to be undertaken in accordance with the RMP and reported annually in the Narrabri Mine Annual Review.

[5] proprietary electromagnetic monitoring device for rapid soil water moisture monitoring

4.4.2 Pest animals

NCOPL coordinate routine monitoring of pest animals on an annual basis, designed to identify the presence and abundance of pest species across the mine. The monitoring will assist NCOPL in identifying the appropriate resources and timing for control. NCOPL will engage qualified and experienced contractors that hold appropriate pesticide accreditation in accordance with the *Pesticides Act 1999* (NSW) or Firearm Licence under the *Firearms Act 1996* (NSW).

Pest animal monitoring and control is to be undertaken in accordance with the RMP and reported annually in the Narrabri Mine Annual Review.

4.5 Monitoring program

A monitoring program has been designed to assess vegetation health and fauna habitat value above Panels 201 to 202 to assess potential impacts as a result of subsidence. Monitoring data will be used to assess performance against the criteria detailed in Table 4.1 and Table 4.2.

Table 4.1 - Biodiversity monitoring program

Aspect	Frequency	Method and analysis	Parameters
Topography and landscape morphology[1]	Baseline then every 3 years (triennially)	LiDAR over entire site.	• topographic form and change; and • creek line slope and volumes.
Vegetative cover characteristics[2]	Baseline and then annually in spring for two consecutive years	Multi-spectral imaging (NDVI) over Panels 201 to 202.	• vegetative biomass and cover within Extraction Plan Area; • weed presence; and • erosion.
Woodland and riparian vegetation	Prior to mining: • baseline field survey in spring Year 1: • multi-spectral imaging (as above) and targeted field surveys to determine the cause of any changes detected Year 2: • follow up field survey in spring	Field surveys: • a series of transects will be established across the width of each Panel within remnant woodland and riparian zones • along these transects, permanent monitoring plots 20 m x 20 m (FBS) will be established along each transect, with one site in each zone type: transition, pillar and longwall • each monitoring plot will be permanently marked with a metal star picket.	**Canopy health and defoliation (all 5% increments)** • percentage of epicormic foliage in relation to total tree foliage • proportion of primary branches within canopy that have died back • percentage of current canopy foliage as a proportion of the estimated canopy foliage volume/potential canopy • percentage of canopy foliage discoloured **Vegetation structure** • projected foliage cover (PFC: 1-5%, then 5% increments) of native grass/ground cover; native shrubs <1 m height, native shrubs/small trees >1 m height • PFC 5% increments of upper canopy (assessed at each quadrat corner and averaged) • exotic species cover • lower, estimated median and upper height of canopy • lower, estimated median and diameter at breast height

Aspect	Frequency	Method and analysis	Parameters
			(DBH) over bark of canopy stems (cm) • abundance of each canopy species; calculated, total stems per hectare
			Habitat features • length of fallen logs >10 cm diameter (0.5 cm increments) • number of hollow-bearing trees and stags
			Photograph of canopy • photograph of the canopy (camera placed on top of the star picket, facing up); photograph facing due north, south, east and west from the star picket
Ponding	Year 1 to Year 3: • annually in spring	• 6 photo points around the perimeter of pond, set-back 10 m from edge of pond • 2 m x 5 m vegetation plots	• photo sequences of vegetation health and regeneration • dominant vegetation types and health occurring within three zones i.e., inundated (<30 cm), not inundated but moist/boggy, and dry.
Soil moisture within riparian vegetation along Kurrajong Creek Tributary 1	Year 1 to Year 3: • annually in spring	EM 38 - proprietary electromagnetic monitoring device for rapid soil water moisture monitoring	• soil water moisture content
Threatened fauna	Prior to mining: • baseline field survey in autumn/spring Year 1 to Year 2: • field surveys in autumn/spring	Habitat management at site scale	Refer to Table 4.2

Aspect	Frequency	Method and analysis	Parameters
Trapped fauna	Ongoing	Inspect sediment dams, evaporation ponds and brine storage ponds for fauna during regular maintenance and operations.	-

1 Note LiDAR monitoring is also detailed in the Land Management Plan (LMP) and the RMP.
2 Note Multi spectral imaging (NDVI) is also detailed in the LMP and the RMP.

Table 4.2 - Terrestrial fauna monitoring program

Aspect	Frequency	Method and analysis	Parameters
Birds	• presence/absence • habitat usage	A standardised search with a stopping rule as per Watson (2004) will be used to survey for woodland birds at dawn and dusk. At each site, from a fixed-point position, two randomly selected transects will be established. Birds will be recorded while walking in a meandering path along each transect, with all birds recorded either through observation or calls. All birds seen or heard will be recorded in 5-minute intervals and recording continued until no new species are recorded for three consecutive 5 minute periods.	• baseline and then bi- annually in winter/spring for a period of two years after completion of each mining panel
Koalas	• presence/absence • habitat usage	• Koala searches to be conducted within sites containing potential feed trees (points established during baseline surveys) • record direct sightings, scratching and scats using the Spot Assessment Technique (SAT)	• baseline and then annually in spring for a period of two years after completion of each mining panel
Infra-red camera	• mammal species diversity • pest animal presence/absence	Infra-red camera with a closed baited trap placed within woodland and riparian habitat at random over each Panel	• baseline and then annually in spring for a period of two years after completion of each mining panel
Bat detection	Microbat species diversity	Two Anabat detection devices placed at monitoring points determined during the baseline surveys for a two-night period	• baseline and then annually in spring for a period of two years after completion of each mining panel
All	Incidental records	Incidental observations during routine subsidence monitoring and mine operations	• ongoing

5. Management measures

There was no material alteration to the existing impacts on flora or fauna for MOD 5 and MOD 7; therefore, no additional impact avoidance, mitigation or offset measures have been proposed.

5.1 Subsidence

NCOPL has implemented a program for managing and remediating subsidence effects such as surface cracks, erosion, ponding and creek line impacts. Currently, subsidence monitoring is conducted monthly by NCOPL. Subsidence monitoring and management is undertaken in accordance with the Subsidence Monitoring Program provided as Appendix C to the Extraction Plan, and the LMP provided as Appendix I to the Extraction Plan.

5.2 Woodland and riparian vegetation and habitat

Management measures to conserve woodland and riparian vegetation health and habitat value include:

- monitoring within the Extraction Plan Area for any changes in vegetation in accordance with the biodiversity monitoring program (section 4.5);
- restricting public access and vehicles/machinery;
- monitoring and control of invasive weeds and pest animals as part of NCOPLs 'general biosecurity duty' under the NSW *Biosecurity Act 2015*;
- certification from plant suppliers and contractors that equipment and vehicles entering the mine site is clean and free of soil and vegetation;
- preservation of stags (dead trees); and
- planting of endemic plant species.

The implementation of management measures will be considered regarding the specific circumstances of the predicted impact and the assessment of the environmental consequences.

5.3 Threatened flora

Preclearance surveys will be conducted prior to surface disturbance to identify habitat features, additional threatened flora and fauna not previously recorded and to clearly demarcate the area to be cleared. Threatened flora will be clearly marked prior to and during clearing to avoid impacts in accordance with the Vegetation Clearance Protocol detailed in section 4.6.

5.4 Ponding and drainage lines

The standard management measures for ponding are:

- ponding located in areas with no significant vegetation, or if vegetation is not affected and the water quality of the ponded water is non-saline, the ponding will to be allowed to self-correct; or
- ponding in areas with significant vegetation or if ponding significantly alters or affects flows, these ponds are to be assessed and remedial measures (e.g., drainage) developed and implemented in consultation with a geomorphologist.

Additional management measures include:

- ponding water will be sampled in accordance with the frequency specified in the Water Management Plan to test for water salinity changes. The monitoring frequency can be adjusted, as dictated by the results. Over time, regular water testing will build up a general trend for the condition of the water being collected. Further investigation can then be started, should these trends change during the mining operations;
- if important environmental features are impacted (i.e., riparian vegetation, EEC or archaeological deposits), or water quality analysis indicates an increase in salinity, the ponding will be assessed, and remediation options will be developed to protect the affected environmental features and prevent saline water discharging downstream.

5.5 Aquatic biota and habitat

Prior to surface disturbance and vegetation clearance, an assessment of whether aquatic or fish habitat is present within the drainage features to be traversed by the access road and/or power line corridors is to be conducted.

The location of access tracks will be determined in conjunction with an ecologist after inspecting each proposed route and determining the path with least impact on environmental values.

5.6 Vegetation clearance protocol

The location of vegetation clearing will be pre-determined to minimise the amount of disturbance wherever practically possible. Clearing works will be undertaken within their defined impact area and clearly demarcated to avoid any unnecessary impact on adjacent remnant vegetation. Vegetation clearing will be progressive and selective with clearance of vegetation undertaken in relatively narrow strips. Areas where there are records of threatened flora species will be demarcated to avoid impacts.

Clearing will be followed by progressive mine rehabilitation to re-connect habitat (i.e., ripping and seeding where necessary to supplement natural regeneration from the existing soil seed bank). Measures for rehabilitation are detailed in the RMP, provided in Appendix F to the Extraction Plan.

If possible, mature trees with tree hollows would be retained where it is practicable to do so. Where it is necessary to disturb areas of native vegetation for the purposes of subsidence remediation works, a due diligence assessment will be undertaken in accordance with the Vegetation Clearance Protocol.

In the first instance, any disturbance will be minimised by way of utilisation of existing access tracks and avoidance of significant vegetation where possible.

The clearing of vegetation will follow the protocol detailed below:

- 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;
- clearly delineate 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);
- where possible, avoid disturbance to the riparian vegetation along Kurrajong Creek Tributary 1 (Figure 2.1);
- 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* (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 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.

5.7 Adaptive management

Where a performance criterion has been exceeded (e.g., vegetation dieback), it may be appropriate to conduct additional monitoring (e.g., increase the frequency of monitoring or the parameters monitored) or to conduct additional test work. Implementation of the Trigger Action Response Plan (**TARP**) detailed in section 7 may be required.

6. Performance criteria

Performance measures for the management of biodiversity are listed in Table 6.1.

Table 6.1 - Performance criteria

Performance measure	Performance criteria
To minimise the clearing and disturbance of vegetation above the mining area	• areas of NDVI change no greater than 1 standard deviation from the mean change and no greater than 0.1 ha in area • canopy dieback is not substantially greater than that observed during baseline traverses and considered beyond natural seasonal dieback and natural variation due to weather • data does not indicate declining trend in vegetation and habitat conditions • less than 10% increase in weed cover in impact quadrats in comparison to control quadrats • clearing does not exceed the estimated area of clearing assessed by the Stage 2 EA and as updated in Mod 5
Threatened fauna populations and habitat are maintained	• threatened fauna and their habitat do not experience adverse impacts, including reduction in habitat area, hollow-bearing trees and woody debris

7. Trigger action response plan

The monitoring outlined in this BMP aims to identify the impacts and environmental consequences of mining on biodiversity values above Panels 201 to 202. Contingency measures must consider the specific issue, potential environmental consequence and relevant actions required. In the event the subsidence effects and consequences on flora and fauna exceed or are likely to exceed the performance criteria nominated within this BMP, NCOPL will implement the TARP detailed in Table 7.1. Contingency measures identified in other Extraction Plan sub plans shall also be adhered to.

Table 7.1 - Biodiversity management TARP

Aspect	Monitoring		Response	
	Methodology	**Purpose**	**Trigger**	**Action**
Woodland and riparian vegetation	**Parameters:** • refer to Table 4.1 **Analysis:** • comparison of attributes between impact and control zones • comparison of attributes within plots over time **Frequency:** • remote sensing – annually in spring • field survey in year 2	• to identify any changes in vegetation health and habitat value	**Level 1** • NDVI monitoring identifies no change (i.e., within +/- 1 std dev from average) in an area that exceeds 0.1 ha. • Canopy is unchanged from that observed in baseline monitoring (with consideration given to natural variation) • No declining trend observable in comparison to control sites • Increase in weed cover in impact vs control sites is <10%	**Level 1** • no action required, continue monitoring
			Level 2 • NDVI monitoring identifies change > +/- 2 std dev from average in an area that exceeds 0.1ha. • canopy change is greater than that observed in baseline monitoring (with consideration given to natural variation) • definable trend of decline observable in comparison to control sites • increase in weed cover in impact vs control sites is >10%	**Level 2** • conduct site investigation to determine the cause of change and appropriate management response which may include planting of endemic species, weed control measures etc • review monitoring program as required
	Parameters: • pre-clearing and clearing survey data and mapping **Analysis:** • comparison of pre-clearing and clearing survey data and mapping • cumulative tally of cleared areas above Panels 201 to 202 **Frequency:** • annually	• to minimise vegetation clearing • to preserve remnant vegetation identified in pre-clearing surveys • map clearing areas to determine if actual clearing aligns with pre-clearing survey recommendations and clearance footprint.	**Level 1** • area of actual clearing is within approved	**Level 1** • no action required
			Level 2 • area of actual clearing exceeds approved	**Level 2** • Environmental Superintendent to inform the General Manager • investigate reasons for exceedance • DPE and the Resources Regulator to be notified and actions discussed • undertake rehabilitation and revegetation of equivalent area in accordance with RMP as required
Threatened fauna	**Parameters:** • threatened fauna occurrence • presence/absence of pest animals **Frequency:** • two years after mining	• to monitor any change in fauna species occurrence	**Level 1** • no loss of habitat including hollow bearing trees and woody debris • less than 10% decrease in recorded fauna numbers (allowing for natural variation due to weather etc) • pest animal abundance declining	**Level 1** • no action required, continue monitoring
			Level 2 • increasing trend in the loss of habitat including hollow bearing trees and woody debris • greater than 10% decrease in recorded fauna numbers (allowing for natural variation due to weather etc) • pest animal abundance increasing	**Level 2** • a site-specific management report to be prepared and implemented where necessary in accordance with the threat abatement plan (if relevant). Actions may include targeted monitoring to determine overall impact to population of impacted species.

8. Plan implementation

8.1 Roles and responsibilities

To ensure adequate implementation of this BMP, the following responsibilities have been assigned to relevant NCOPL personnel as detailed in Table 8.1. It is also noted that additional responsibilities are referred to within the Extraction Plan and the appended sub-plans.

Table 8.1 - Roles and responsibilities

Roles	Responsibilities
General Manager	• Ensure that adequate resources are available to NCOPL personnel to facilitate the completion of their responsibilities under this BMP. • Communication with statutory agencies and departments, public authorities and the community.
Mine Manager	• Ensure all contractors, sub-contractors and service-personnel are appropriately qualified, competent and licensed to undertake the required work and have a good environmental performance record. • Ensure the BMP is implemented and adhered to.
Environmental Superintendent	• Ensure that all environmental monitoring and reporting is undertaken in accordance with this BMP and various approval requirements, and is checked, processed, and filed appropriately. • Advise on matters identified in all approval, permit, licence and consent documents and ensure all operations are conducted in compliance with those conditions, and all other environmental obligations. • Liaise with stakeholders regarding subsidence impact management. • Authorise changes to this BMP.

Though retaining the responsibilities identified above, these personnel may, at their discretion, delegate specific tasks to suitably qualified and experienced operational personnel or consultants.

9. Reporting, evaluation and review

9.1 Annual Review

In accordance with Schedule 6 Condition 6, NCOPL will review the performance of its biodiversity management for the previous calendar year and report the relevant results within the Annual Review, to the satisfaction of the Secretary. The Annual Review will at minimum provide information regarding the effectiveness of the management measures to prevent, and if prevention is not reasonable and feasible, to minimise any impact on flora and fauna.

Further, the Annual Review requires a number of items to be reviewed or assessed. In summary these are:

- monitoring results and complaints;
- non-compliances and incidents;
- compliance with performance measures;
- discrepancies between predicted and actual impacts; and
- measures to be implemented to improve environmental performance.

The Annual Review may also make recommendations for any additions, changes or improvements to the biodiversity management process.

The Annual Review will be made available on the WHC website.

9.2 Independent environmental audits

Prior to 13 September 2010, and every 3 years thereafter, unless the Secretary directs otherwise, NCOPL will commission and pay the full cost of an Independent Environmental Audit (**IEA**) of the operations at Narrabri Mine (Stages 1 and 2), to be conducted in accordance with the requirements under Schedule 6 Condition 7.

The audit team will be led by a suitably qualified auditor and the IEA will be conducted by suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary.

9.3 Management plan review and evaluation

As required by Schedule 6 Condition 3 of the Project Approval, within three months of any of the following:

- completion of an independent environmental audit (as required by Schedule 6 Condition 7);
- submission of an Incident Report (as required by Schedule 6 Condition 4);
- submission of an Annual Review (as required by Schedule 6 Condition 6); and
- any modification to the conditions of the Project Approval (unless the conditions require otherwise),

NCOPL will the review, and if necessary, revise this BMP. This is to ensure that the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the Narrabri Mine operations. The review history table in the front of this Plan provides the details of each review.

Condition 3 of Schedule 6 further states that if the review determines that this BMP requires revision, then this will be completed to the satisfaction of the Secretary.

It should be noted that this BMP has revised down the timeframe for biodiversity monitoring. Since it is expected that subsidence impacts would be most evident within two years after mining, it is recommended that if no impacts associated with subsidence have been observed within this timeframe, biodiversity monitoring can be scaled back or ceased. This will be done in consultation with the relevant government agencies and departments.

10. Incidents and non-compliance

10.1 Incident notification

An incident is defined under the Project Approval as *a set of circumstances that causes or threatens to cause material harm, and/or breaches or exceeds the limits of performance measures/criteria*. Material harm to the environment is defined under the Project Approval as *involving actual or potential harm to the health or safety of human beings or to the environment that is not trivial.* This definition excludes "harm" that is authorised under either the Project Approval or any other statutory approval (e.g., the EPL).

In the event of any exceedance of performance criteria, NCOPL will advise the Secretary and any other relevant agencies as soon as practicable after becoming aware of the incident, in accordance with Schedule 6 Condition 4. Within 7 days of the event, NCOPL will also provide the Secretary and any relevant agencies a detailed report which will:

- describe the date, time and nature of the exceedance/incident;
- identify the cause (or likely cause) of the exceedance/incident;
- describe what action has been taken to date; and
- describe the proposed measures to address the exceedance/incident.

Notifications to the EPA will be made by contacting the Environment Line service 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 NCO's Environmental Management System.

10.2 Non-compliance notification

In accordance with Schedule 6 Condition 2, where a non-compliance with statutory requirements or 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. Once this has been achieved, all reasonable and feasible options for remediation (where relevant) will be considered.

In accordance with Schedule 6 Condition 4, within seven days of becoming aware of a non-compliance, NCOPL will notify DPE of the non-compliance[6]. The notification will be made in writing via the Major Projects website and identify the development (including the development application number and name), set out the condition or requirement 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 Secretary, to the satisfaction of the Secretary.

[6] 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. Complaints management

Any complaints received in relation to this BMP 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 the 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; and
- 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.

The Environmental Superintendent retains ultimate responsibility to ensure that complaints received are properly recorded and addressed appropriately.

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.

12. References

AMBS Ecology & Heritage (2020). Narrabri Underground Mine Stage 3 Extension Project – Fauna Survey. Consultancy report to Narrabri Coal Operations Pty Ltd.

AMBS Ecology & Heritage (2020). Narrabri Underground Mine Stage 3 Extension Project – Flora Survey. Consultancy report to Narrabri Coal Operations Pty Ltd.

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

Ditton Geotechnical Services (2017) *Mine Subsidence Assessment for the Proposed LW107 to LW110 Extraction Plan at the Narrabri Mine*. Prepared for Narrabri Coal Operations Pty Ltd.

Ditton Geotechnical Services (2021) *Mine Subsidence Assessment for Pillar Reduction Panels CF201-CF205 (A-J) and Longwalls LW203 to LW205 at the Narrabri Underground Mine*. Prepared for Narrabri Coal Operations Pty Ltd. DGS Report No. NAR-004/8. Prepared for Narrabri Coal Operations Pty Ltd.

NSW Trade & Investment (2013). *ESG3: Mining Operations Plan (MOP) Guidelines*. Department of Trade and Investment, Regional Infrastructure and Services - Division of Resources and Energy.

Office of Environment and Heritage (OEH) (2018). *Code of Practice for Injured, Sick and Orphaned Koalas*.

Resource Strategies (2015) *Narrabri Mine Modification 5 - Environmental Assessment*. Prepared for Narrabri Coal Operations Pty Ltd.

Resource Strategies (2021) *Narrabri Mine Modification 7 - Environmental Assessment.* Prepared for Narrabri Coal Operations Pty Ltd.

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

Watson, D.M. 2004, *Comparative evaluation of new approaches to survey birds in Wildlife Research* 31, pp.1-11.

13. Glossary

Term	Definition[7]
Biodiversity Conservation Act 2016 (NSW)	An Act relating to the conservation of biodiversity; and to repeal the *Threatened Species Conservation Act 1995*, the *Nature Conservation Trust Act 2001* and the animal and plant provisions of the *National Parks and Wildlife Act 1974*. It commenced on 25 August 2017.
Biosecurity Act 2015 (NSW)	An Act to provide for the prevention, elimination, minimisation and management of biosecurity risks.
Cover depth	The depth of coal seam from the ground surface (metres).
Environmental consequences	The environmental consequences of subsidence impacts including: damage to built features; loss of surface flows to the sub-surface; loss of standing pools; adverse water quality impacts; development of iron bacterial mats; cliff falls; rock falls; damage to Aboriginal heritage sites; impacts to aquatic ecology; ponding.
Extraction Plan Area	The area predicted to be affected by the proposed secondary extraction of the approved pillar reduction panels CF 201-CF205
Firearms Act 1996 (NSW)	Regulates permits, licensing, transporting, altering, advertising, safe-keeping and supplying firearms.
Fisheries Management Act 1994 (NSW)	An Act relating to the management of fishery resources.
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
Minimise	Implement all reasonable and feasible mitigation measures to reduce the impacts of the Narrabri Mine
MOD 5	Reduced the number of longwall panels from 26 to 20; increased the longwall panel widths for LW 107 to LW 120 from approximately 295 m to approximately 400 m; extended the western footprint approximately 60 m; and increased the maximum ROM coal processing rate from 8 Mtpa to 11 Mtpa.
MOD 7	Describes the change in mining method within the extent of the previously approved LW 201 and LW 202 and allows for up to 0.7 Mtpa via bord and pillar extraction at pillar reduction panels CF 201 to CF 205
Panels 201 to 202	Pillar reduction panels CF 201 to CF 205
Pesticides Act 1999 (NSW)	An Act (and the Pesticides Regulation 2017) to regulate the safe and correct use of pesticides in NSW, from the point of sale to protect the environment and community.
Project Approval	Development consent (DA_08_0144) issued on 26th July 2010 under Section 75J of the Environmental Planning and Assessment Act 1979 by the Department of Planning & Infrastructure (as modified).
Rehabilitation	The restoration of land disturbed by the development to ensure it is safe, stable and non-polluting over the short, medium and long term
Second workings	Extraction of coal from longwall panels, mini-wall panels, or pillar extraction.
Subsidence	The totality of subsidence effects, subsidence impacts and environmental

[7] The majority of the definitions are as provided in Project Approval 08_0144.

Term	Definition[7]
	consequences of subsidence impacts.
Subsidence effects	Deformation of the ground mass due to mining, including all mining-induced ground movements, including both vertical and horizontal displacement, tilt, strain and curvature.
Subsidence impacts	Physical changes to the ground and its surface caused by subsidence effects, including tensile and shear cracking of the rock mass, localised buckling of strata caused by valley closure and upsidence and surface depressions or troughs.
Tensile strain	An increase in the distance between two points on the surface. This is likely to cause cracking at the surface if it exceeds 2 mm/m. Tensile strains are usually associated with convex (hogging) curvatures near the sides (or ends) of the panels.
Tilt	The rate of change of subsidence between two points (A and B), measured at set distances apart (usually 10m). Tilt is plotted at the mid-point between the points and is a measure of the amount of differential subsidence
Upsidence	Relative vertical upward movements of the ground surface associated with subsidence.
Watercourse	A river, creek or other stream, including a stream in the form of an anabranch or tributary, in which water flows permanently or intermittently, regardless of the frequency of flow events: In a natural channel, whether artificially modified or not, or in an artificial channel that has changed the course of the stream. It also includes weirs, lakes and dams

Attachment 1 Compliance conditions relevant to the BMP

Table A1.1 - Relevant Project Approval 08_0144 requirements

Project Approval 08_0144 conditions		Document reference
Condition	**Requirement**	
Schedule 2 Condition 1	The Proponent shall 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 project.	Section 1.3
Schedule 2 Condition 11	With the approval of the Secretary, the Proponent may submit any management plan or monitoring program required by this approval on a progressive basis. ***Note**: The conditions of this approval require certain strategies, plans, and programs to be prepared for the project. They also require these documents to be reviewed and audited on a regular basis to ensure they remain effective. However, in some instances, it will not be necessary or practicable to prepare these documents for the whole project at any one time, particularly as these documents are intended to be dynamic and improved over time. Consequently, the documents may be prepared and implemented on a progressive basis, subject to the conditions of this approval. In doing this however, the Proponent will need to demonstrate that it has suitable documents in place to manage the existing operations of the project.*	There is no staging for the BMP for Panels 201-202
Schedule 3, Condition 1	The Proponent shall ensure that mine subsidence does not cause any exceedances of the performance measures in Table 1. **Table 1: Subsidence Impact Performance Measures** **Biodiversity** The Proponent shall ensure that clearing and disturbance of vegetation above the mining area is minimised, to the satisfaction of the Secretary.	Section 5.6
Schedule 3, Condition 4 (h)	The Proponent shall prepare and implement Extraction Plans for any second workings to be mined to the satisfaction of the Secretary. Each Extraction Plan must: include a: Biodiversity Management Plan, which has been prepared in consultation with DPE and the Resources Regulator, which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on flora and fauna;	This Plan
	***Notes**:* *Management plans prepared under condition 4(h) should address all potential impacts of proposed underground coal extraction on the relevant features. Other similar management plans required under this approval (eg under conditions 13 and 23 of schedule 4 or condition 3 of schedule 5) are not required to duplicate these plans or to otherwise address the impacts associated with underground coal extraction.*	
Schedule 3, Condition 5	The Proponent shall ensure that the management plans required under Schedule 3 Condition 4(h) include:	
	a) an assessment of the potential environmental consequences of the Extraction Plan, incorporating any relevant information that has been obtained since this approval;	Section 3

Project Approval 08_0144 conditions		Document reference
Condition	**Requirement**	
	b) a detailed description of the measures that would be implemented to remediate predicted impacts; and	Section 5
	c) a contingency plan that expressly provides for adaptive management.;	Section 5.7 Section 7
Schedule 6, Condition 2	The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:	
	a) detailed baseline data;	Section 2
	b) a description of:	
	• the relevant statutory requirements (including any relevant approval, licence or lease conditions);	Section 1.4
	• any relevant limits or performance measures/criteria;	Section 6
	• the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures	Section 6
	c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria:	Section 5
	d) a program to monitor and report on the:	
	• impacts and environmental performance of the project;	Section 4
	• effectiveness of any management measures (see (c) above);	Section 4
	e) a contingency plan to manage any unpredicted impacts and their consequences;	Section 7
	f) a program to investigate and implement ways to improve the environmental performance of the project over time;	Section 4
	g) a protocol for managing and reporting any:	
	• incidents;	Section 10.1
	• complaints;	Section 11
	• non-compliances with statutory requirements; and	Section 10.2
	• exceedances of the impact assessment criteria and/or performance criteria; and	
	h) a protocol for periodic review of the plan.	Section 9.3
Schedule 6 Condition 3	Within 3 months of the submission of an:	
	a) audit under condition 7 of Schedule 6;	Section 9.3
	b) incident report under condition 4 of Schedule 6; and	
	c) annual review under condition 5 of Schedule 6; and	

Project Approval 08_0144 conditions		Document reference
Condition	**Requirement**	
	d) any modification to the conditions of this approval (unless the conditions require otherwise), the Proponent shall review, and if necessary revise, the strategies, plans, and programs required under this approval to the satisfaction of the Secretary.	
Schedule 6 Condition 4	The Proponent shall notify the Secretary in writing via the Major Projects website and any other relevant agencies of any incident associated with the project as soon as practicable after the Proponent becomes aware of the incident. Within 7 days of the date of the incident, the Proponent shall provide the Secretary and any relevant agencies with a detailed report on the incident.	Section 10.1
Schedule 6 Condition 5	The Proponent shall provide regular reporting on the environmental performance of the project on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this approval, and to the satisfaction of the Secretary.	Section 9
Schedule 6 Condition 6	By the end of March each year, the Proponent must submit a review of the environmental performance of the project for the previous calendar year to the satisfaction of the Secretary.	Section 9.1
Schedule 6 Condition 7	Prior to 13 September 2010, and every 3 years thereafter, unless the Secretary directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project (Stages 1 and 2).	Section 9.2
Schedule 6 Condition 10	The Proponent shall: (a) make copies of the following publicly available on its website: • the documents referred to in Condition 2 of Schedule 2; • all current statutory approvals for the project; • all approved strategies, plans and programs required under the conditions of this approval; • a comprehensive summary of the monitoring results of the project, reported in accordance with the specifications in any conditions of this approval, or any approved plans and programs; • a complaints register, updated on a monthly basis; • minutes of CCC meetings; • the annual reviews of the project; • any independent environmental audit of the project, and the Proponent's response to the recommendations in any audit; • any other matter required by the Secretary; and	Section 1.7
	(b) keep this information up-to-date, to the satisfaction of the Secretary.	Section 1.7

Attachment 2 Consultation records

NSW GOVERNMENT | Regional NSW

DOC RVF22/403#1
MAAG0013080

Mr Brent Baker
NCO-approval@whitehavencoal.com.au

Via: Major Project Portal / Email

Dear Mr Baker,

Re. Extraction Plan – Narrabri Coal Stage 2

I refer to your request of 3 December 2021 for advice regarding the Narrabri Coal Stage 2 – Extraction Plan. The Resources Regulator has reviewed the request.

Assessment
Based on the review of the Extraction Plan, the variations to the extraction plan and subsidence monitoring program satisfies Condition 8 of Mining Authorisation Number ML1609, and Condition 4 of the Extraction Plan condition in the development consent.

However, the extraction plan consists of a change in mining method (herringbone) which will introduce new hazards requiring new controls. This will be further assessed with when Narrabri coal submit a secondary extraction HRA application.

Based on the information provided the mine operator has developed the management plans required by the Project Approval Condition 4(g).

However, there appears to be powerlines and communication cables that pass across the northern periphery of the panels in question and which would be in the area of subsidence affectation that are not addressed in the Built Features Management Plan. It is not clear from the information provided if this is mine infrastructure. This issue needs to be brought to the attention of DPIE.

The proposed mining will be regulated in relation to subsidence WHS risks under relevant WHS law, in particular as a High Risk Activity notification under Clause 33 and Schedule 3 Clause 16(3)(e) of the Work Health and Safety (Mines and Petroleum Sites) Regulation 2014.

Limitations
The Extraction Plan is assessed and determined by DPIE under the conditions of the development consent. The Resources Regulator provides advice to DPIE to assist in the determination.

516 High Street MAITLAND NSW 2320 Australia | PO Box 344 HRMC NSW 2310 Australia |Tel: +612 4931 6666

Regulatory requirements if approved

The authorisation holder is required to ensure that the rehabilitation commitments outlined in any approved Extraction Plan are included in the Mining Operations Plan / Rehabilitation Management Plan regulated by the Resources Regulator under the conditions of the mining lease and the *Mining Act 1992*. The authorisation holder must ensure the Mining Operations Plan / Rehabilitation Management Plan for the area covered by this Extraction Plan is updated where necessary.

The Resources Regulator may undertake assessments of the mine operators' proposed mining activities under the *Work Health and Safety (Mines and Petroleum Sites) Act 2013* and Regulation as well as other WHS regulatory obligations.

Subsidence associated with the proposed Extraction Plan will be regulated by under relevant provisions of WHS laws in particular Clause 33 and Clause 67 of the *Work Health and Safety (Mines and Petroleum Sites) Regulation 2014* relating to High Risk Activities and Subsidence.

Background

The NSW Resources Regulator is responsible for compliance and enforcement of the Extraction Plan is so far as it relates to requirements under the Mining Act 1992 and Work Health and Safety legislation. This role principally relates to rehabilitation, workplace safety and public safety.

The Mining Act Inspectorate within the Resources Regulator undertake risk-based compliance and enforcement activities in relation to obligations under the *Mining Act 1992*. This includes undertaking assessment and compliance activities in relation to mine rehabilitation activities and determination of security deposits.

The Mine Safety Inspectorate within the Resources Regulator is responsible for ensuring the mine operators' compliance with the Work Health and Safety (WHS) legislation, in particular the effective management of risks associated with the principal hazards as specified in the *Work Health and Safety (Mines and Petroleum Sites) Regulation 2014*.

Contact

Should you require any further information or clarification, please contact the Office of the Executive Director (ED.ResourcesRegulator@planning.nsw.gov.au)

Yours sincerely,

Peter Day
Executive Director
Resources Regulator

23 February 2022

NSW GOVERNMENT | Planning, Industry & Environment

Our ref: DOC21/1096933

Mr Brent Baker
Narrabri Coal Operations
approval@whitehavencoal.com.au

Dear Brent

Narrabri Coal Mine – Panels 201-202 – Extraction and Biodiversity Management Plans

Thank you for your e-mail dated 3 December 2021 to the Biodiversity, Conservation and Science Directorate (BCS) of the Department of Planning, Industry and Environment inviting comments on the Extraction and Biodiversity Management Plans for panels 201-202.

BCS has reviewed the plans and our comments are provided in **Attachment A.**

Please note that BCS no longer has responsibility for Cultural Heritage matters. As discussed over the phone the Heritage Management Plan will need to be referred to Department of Premier and Cabinet, Heritage Division at heritagemailbox@environment.nsw.gov.au .

If you require any further information regarding this matter, please contact Michelle Howarth, Senior Conservation Planning Officer, via michelle.howarth@environment.nsw.gov.au or (02) 6883 5339.

Yours sincerely

Samantha Wynn

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

17 December 2021

NSW GOVERNMENT | Planning, Industry & Environment

Attachment A

BCS's comments and recommendations

Narrabri Mine – Panels 201 - 202 – Extraction Plan and Biodiversity Management Plan

Reference in Plan	BCS Comments	BCS Recommendations
Table 7.1 of BMP 'Threatened fauna'	The trigger detailed in Table 7.1 for threatened fauna 'greater than 10% decrease in recorded fauna numbers' has a response of 'no action required'. This is not an adequate response.	A decrease of greater than 10% could be considered a significant change and therefore an appropriate action must be identified to respond to this.
Table 6.1 of BMP 'Threatened fauna populations' And Table 7.1 of BMP 'Threatened fauna'	The performance criteria for 'Threatened fauna populations and habitat are maintained' in table 6.1 states 'threatened fauna and their habitat do not experience adverse impacts, including reduction in habitat area, hollow-bearing trees and woody debris' However, in table 7.1 the level 1 trigger for threatened fauna states 'loss of habitat presence, hollow bearing trees and woody debris' and the level 1 action is 'no action required. This is not an adequate response.	The trigger should identify targets that adhere to the SMART principles (specific, measurable, achievable, realistic and timely). Given that there is no specific loss targets identified for this trigger, an appropriate response is required if any loss is detected.

Table A2.1 - Biodiversity Management Plan (Draft Revision B) - comments reconciliation

Resources Regulator comments

Item	Section #	Section heading	Existing text / explanation	Comment / recommendation	Response
No comments on the BMP					

BCS comments

Item	Section #	Section heading	Existing text / explanation	Comment / recommendation	Response
1	7	Trigger action response plan	Table 7.1 – Biodiversity Management TARP	The trigger detailed in Table 7.1 for threatened fauna 'greater than 10% decrease in recorded fauna numbers' has a response of 'no action required'. This is not an adequate response. A decrease of greater than 10% could be considered a significant change and therefore an appropriate action must be identified to respond to this.	The trigger levels in the table were incorrect and the relevant responses in Table 7.1 - *Threatened fauna* have been amended (refer to Item #2 below). The action for trigger Level 1 (no action required) is now correct.
2	6 and 7	Performance criteria and Trigger action response plan	Table 6.1 of BMP 'Threatened fauna populations' and Table 7.1 of BMP 'Threatened fauna'	The performance criteria for 'Threatened fauna populations and habitat are maintained' in table 6.1 states 'threatened fauna and their habitat do not experience adverse impacts, including reduction in habitat area, hollow-bearing trees and woody debris' However, in table 7.1 the level 1 trigger for threatened fauna states 'loss of habitat presence, hollow bearing trees and woody debris' and the level 1 action is 'no action required. This is not an adequate response. The trigger should identify targets that adhere to the SMART principles (specific, measurable, achievable, realistic and timely). Given that there are no specific loss targets identified for this trigger, an appropriate response is required if any loss is detected.	The trigger levels in the table were incorrect and the relevant responses in Table 7.1 - *Threatened fauna* have been amended as follows: **Level 1:** • No loss of habitat including hollow bearing trees and woody debris • Less than 10% decrease in recorded fauna numbers (allowing for natural variation due to weather etc) **Level 2:** • Increasing trend in the loss of habitat including hollow bearing trees and woody debris • Greater than 10% decrease in recorded fauna numbers (allowing for natural variation due to weather etc)