NARRABRI MINE

EXTRACTION PLAN

BIODIVERSITY MANAGEMENT PLAN

LW 203 – LW 206

Prepared by:

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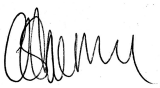
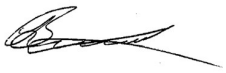
Senior Environmental Project Manager	Carmen Osborne Onward Consulting		15 August 2024
Environmental Project Manager	Linden Burch Onward Consulting		15 August 2024

Acronyms and abbreviations

Acronym	Description
BCS	The Biodiversity Conservation and Science Directorate within the NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW)
CF	Cut and flit
DCCEEW	The NSW Department of Climate Change, Energy, the Environment and Water
DEM	digital elevation model
DGS	Ditton Geotechnical Services
DPE	The NSW Department of Planning and Environment
DPHI	The NSW Department of Planning, Housing and Infrastructure
EEC	Endangered Ecological Community listed under the EPBC Act
EA	Environmental assessment
EC	electrical conductivity
EP 203-206	Extraction Plan for LW 203 to LW 206
EP-BMP	Extraction Plan - Biodiversity Management Plan (this document)
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
FBS	floristic-based subsidence
ha	hectare
IEA	Independent Environmental Audit
km	kilometre
LiDAR	light detection and ranging
LW	longwall panel
m	metre
mg/l	milligrams per litre
ML	mining lease; megalitre
mm	millimetre
mm/m	millimetre per metre
Mtpa	million tonnes per annum
NCOPL	Narrabri Coal Operations Pty Ltd
NDVI	normalised difference vegetation index
PFC	projected foliage cover
ROM	run of mine
SoC	Statement of Commitments
U95%CL	upper 95 % confidence level
WHC	Whitehaven Coal Limited
XL	Cross section cross-line across the longwall panels

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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 Local Government Area in New South Wales (**NSW**). The Narrabri Mine includes an underground coal mine, a coal handling and preparation plant 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 commencing in 2010. Following the approval of the Stage 2 Environmental Assessment (R.W Corkery & Co., 2009) (the **EA**) and the issue of the Stage 2 Project Approval 08_0144 (**Project Approval**) in July 2010, and *Environment Protection and Biodiversity Conservation Act 1999* (**EPBC Act**) 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 Cut and Flit (**CF**) 201 to CF 205. There is no change to the previously approved longwall panels LW 203 to LW 209. The bord and pillar mining will occur concurrently with existing longwall operations for a period of approximately five years, with the maximum ROM coal production rate remaining within the approved limit of 11 Mtpa.

1.2 Purpose and scope

This Extraction Plan - Biodiversity Management Plan (**EP-BMP** or **Plan**) for LW 203 to LW 206 has been prepared in accordance with Schedule 3 Condition 4(h) of the Project Approval and the Department of Planning, Housing and Infrastructure (**DPHI**) (formerly the Department of Planning and Environment [**DPE**]) *Extraction Plan Guideline* (DPE, 2022).

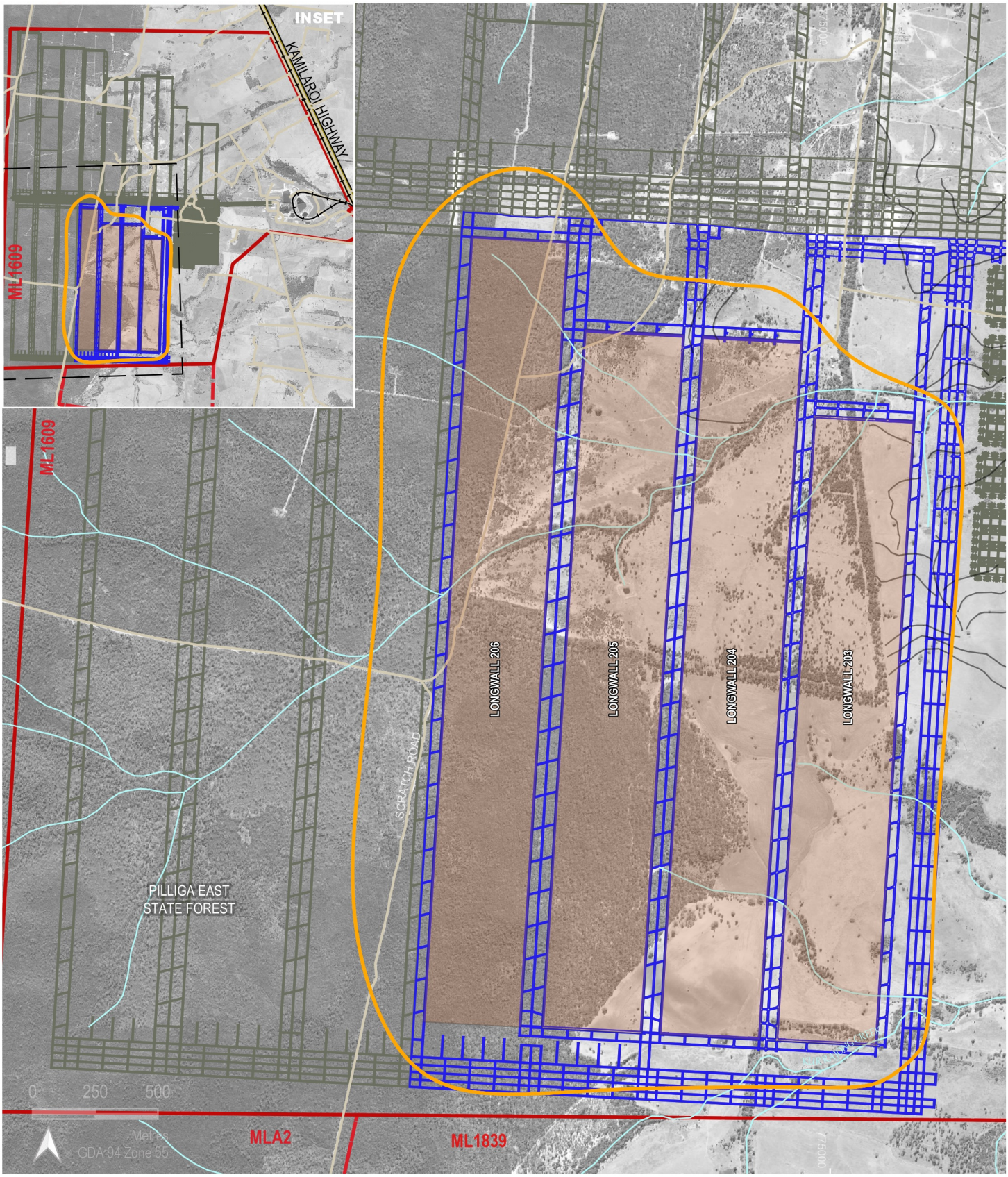
The EP-BMP sets out the objectives, performance measures and management actions required to manage and monitor the potential impacts from subsidence on biodiversity values above LW 203 to LW 206 (the **Extraction Plan Area**[2]). This Plan forms Appendix C of the Extraction Plan for LW 203 to LW 206 (**EP 203-206**).

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

[2] The area located within the 45° Angle of Draw as shown on Figure 1-1.

The Ditton Geotechnical Services Pty Ltd (**DGS**) *Mine Subsidence Assessment Report for LW 203 to LW 206* (DGS, 2022) (**Mine Subsidence Assessment Report**) has been used as a basis for developing the performance measures and management actions in response to the predicted impacts on biodiversity values within the Extraction Plan Area. The Mine Subsidence Assessment Report is presented in full as Appendix J to EP 203-206.

The Extraction Plan Area and underground mining layout is presented in Figure 1-1. A detailed description of the underground mining method is provided within EP 203-206.



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LEGEND

- ML1609
- ML1839
- MLA2
- Underground mining layout
- Longwalls 203 to 206
- Proposed longwall voids (LW203-206)
- 45 degree angle of draw
- Road
- Watercourse
- Contour bank

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FIGURE 1-1

Extraction Plan Area and Underground Mining Layout for LW 203 to LW 206

1.3 Objectives

The objectives of this EP-BMP are to:

- provide details of the relevant statutory requirements, including any relevant approval, licence or lease conditions;
- provide baseline data for existing flora and fauna, including threatened species and habitat;
- provide a description of the management of potential subsidence impacts and/or environmental consequences on flora and fauna;
- provide a monitoring program that:
  - monitors for potential impacts to flora and fauna; and
  - evaluates the effectiveness of management actions.
- provide triggers to inform additional and/or adaptive management actions;
- describe the protocol for managing and reporting any incident, non-compliance or exceedance of any impact assessment criteria or performance criteria, complaint, or failure to comply with other statutory requirements;
- detail the regulatory reporting requirements;
- describe the protocol for periodic review of this Plan; and
- identify the roles and responsibilities for implementation of this Plan.

1.4 Statutory requirements

1.4.1 Project Approval

This Plan has been developed in accordance with Schedule 3 Condition 4 of the Project Approval which requires NCOPL to prepare an Extraction Plan for all second workings within the area of the Approved Mine Plan (Appendix H of EP 203-206) to the satisfaction of the Secretary.

In accordance with Schedule 3 Condition 4(h), the Extraction Plan must include a Biodiversity Management Plan which has been prepared in consultation with the Biodiversity Conservation and Science Directorate (**BCS**) within the NSW Department of Climate Change, Energy, the Environment and Water (**DCCEEW**) and the Resources Regulator (section 1.6), which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on flora and fauna.

Schedule 3 Condition 4(b) of the Project Approval requires the Extraction Plan and its sub plans to be approved by the Secretary prior to NCOPL carrying out any of the second workings covered by EP 203-206.

The EP-BMP must include detailed performance indicators for each relevant performance measure conditioned under Schedule 3 Condition 1 of the Project Approval (Table 1-1 and section 4). In accordance with Schedule 3 Condition 1, NCOPL must ensure that mine subsidence does not cause any exceedances of the performance measures detailed in Table 1-1.

Table 1-1 Subsidence impact performance measures

Feature	Performance Measures
Biodiversity	
Flora and Fauna	The Proponent shall ensure that clearing and disturbance of vegetation above the mining area is minimised, to the satisfaction of the Secretary.

In accordance with Schedule 6 Condition 2 of the Project Approval, management plans must include details of the relevant Project Approval conditions. Attachment 1, Table A1-1 provides a summary of the relevant Project Approval conditions and outlines the section of the EP-BMP in which each of these conditions have been addressed. Table A1-2 provides a summary of the relevant Statement of Commitments (**SoCs**) and section of the EP-BMP where these commitments have been addressed.

1.4.2 EPBC Act approval

The Narrabri Mine was granted EPBC 2009/5003 in 2011 issued under the EPBC Act (last varied on 24 March 2021).

EPBC 2009/5003 prescribes conditions to minimise potential impacts on EPBC Act listed threatened species and communities within the mine site. Condition 3 of EPBC 2009/5003 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), the person undertaking the action must develop and implement an Extraction Plan.

Table A1-3 provides a cross reference to where the relevant condition/s have been addressed within this Plan.

1.4.3 Mining lease

NCOPL are the holder of ML 1609 (issued in January 2008 and varied 19 August 2022).

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 Panels 201 to 202 and is presented as Appendix I to EP 203-206. The updated risk assessment for LW 203 to LW 206 assessed all risks identified within the Extraction Plan Area as either low or moderate.

The potential subsidence impacts and environmental consequences relevant to biodiversity are further discussed in section 3 and section 5.

1.6 Preparation and consultation

Consultation with BCS and the Resources Regulator was undertaken for the preparation of this EP-BMP in accordance with Schedule 3 Condition 4(h) of the Project Approval. The draft EP-BMP (Revision A) was provided to BCS and the Resources Regulator on 8 November 2022. NCOPL also held a briefing session with the Resources Regulator on 2 December 2022 to discuss key items pertaining to predicted subsidence and potential impacts to natural and built features.

Attachment 2 provides evidence of the consultation process, including a cross reference table addressing the comments received, and detailing the section of the Plan where these comments have been addressed (Table A2-1).

1.7 Access to information

In accordance with Schedule 6 Condition 10 of the Project Approval, the approved EP 203-206, 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 EP-BMP are uncontrolled.

2. Baseline ecological environment

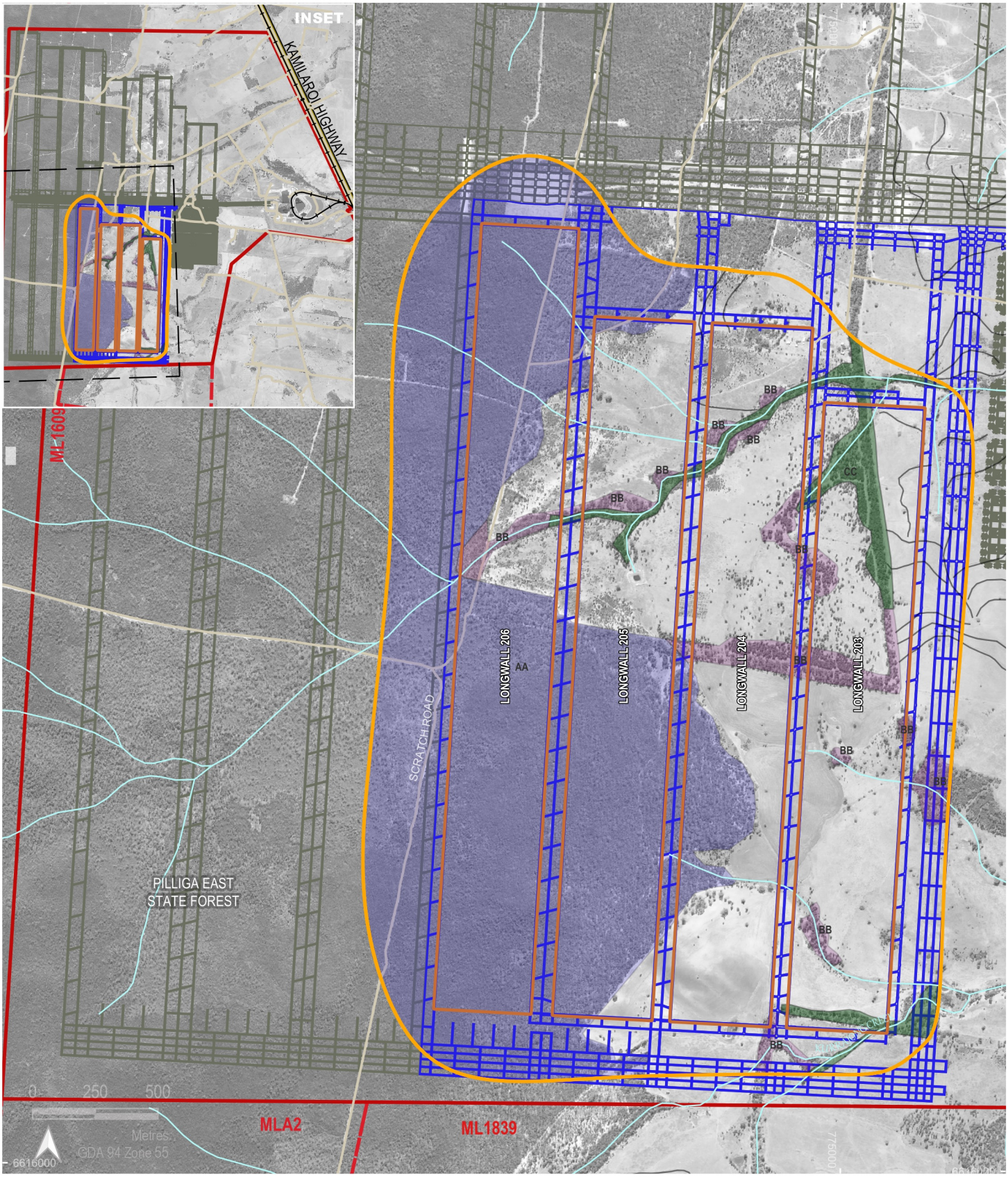
2.1 Native vegetation and habitat

The land within the Extraction Plan Area consists of cleared agricultural land and woodland areas. The native vegetation communities comprise of:

- Brown Bloodwood / Pilliga Box Woodland;
- Inland Grey Box Woodland Endangered Ecological Community (**EEC**); and
- Riparian Forest.

The riparian forest along Kurrajong Creek and its tributaries is relatively intact; however, has undergone some clearing and modification due to grazing. Habitat features within the Extraction Plan Area include native woodland and hollows, riparian forest, and watercourses.

Native vegetation and watercourses within the Extraction Plan Area are shown on Figure 2-1.



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Vegetation community

- AA Brown Bloodwood/Pilliga Box Woodland
- BB Inland Grey Box Woodland
- CC Riparian Forest

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FIGURE 2-1

Native vegetation and watercourses within the Extraction Plan Area

2.2 Threatened flora and fauna

Potential habitat for the following threatened flora and fauna is described in section 2.1.

2.2.1 Threatened flora

Two threatened flora species have been recorded within the Extraction Plan Area, namely *Bertya opponens* (Coolabah bertya) and *Tylophora linearis* (Figure 2-2). Two additional threatened flora species have been recorded outside of the Extraction Plan Area, namely *Lepidium aschersonii* (Spiny peppercress) and *Pomaderris queenslandica* (Scant pomaderris) (Figure 2-2).

2.2.2 Threatened fauna

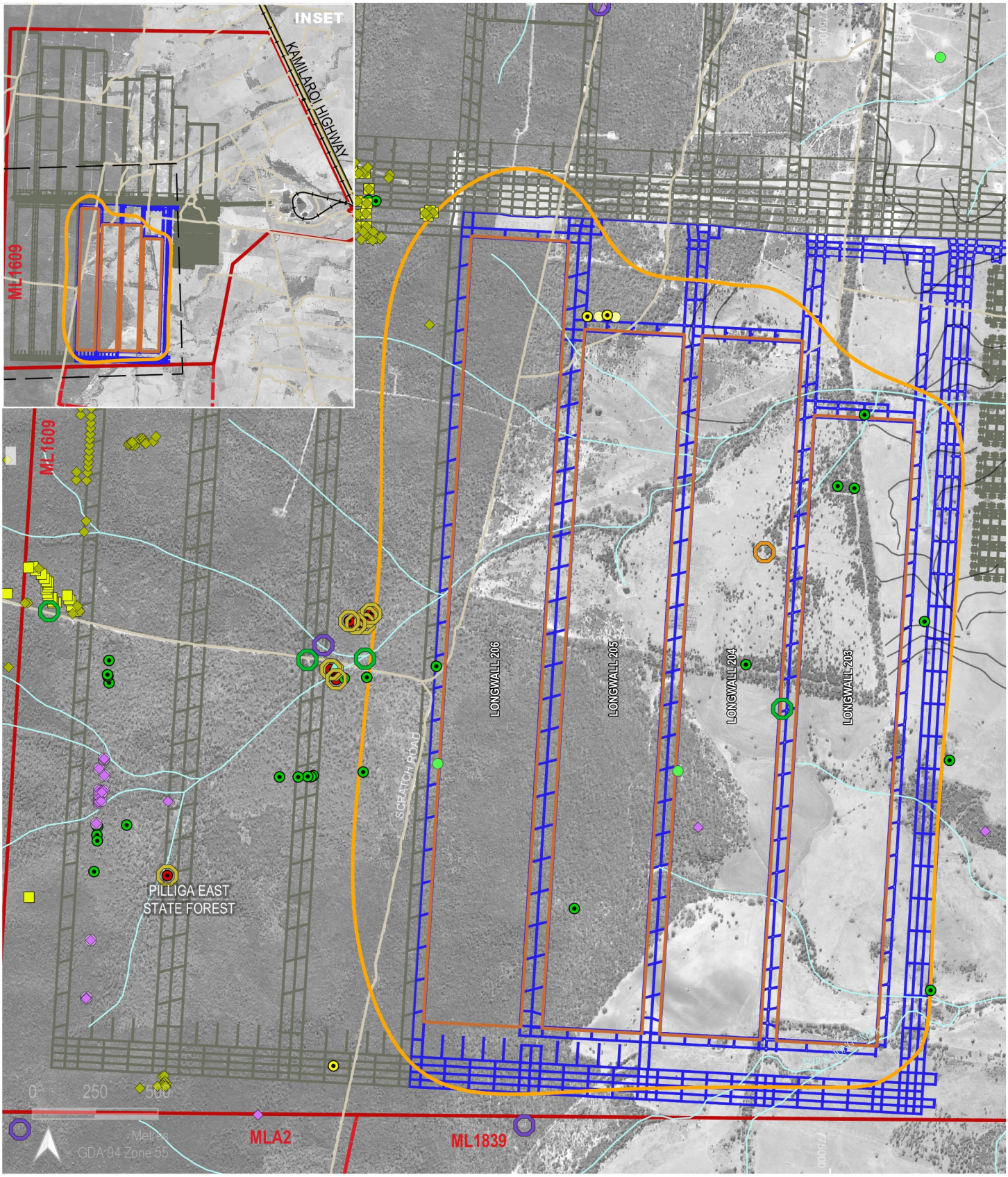
Two threatened fauna species have previously been recorded within the Extraction Plan Area (Figure 2-2), namely:

- *Calyptorhynchus lathami* (Glossy black-cockatoo); and
- *Cercartetus nanus* (Eastern pygmy-possum).

A number of other threatened fauna species have been recorded within the Narrabri Mine and surrounds (Figure 2-2) including:

- *Chalinolobus dwyeri* (Large-eared pied bat)
- *Grantiella picta* (Painted honeyeater)
- *Hirundapus caudacutus* (White-throated needletail)
- Hoplocephalus bitorquatus (Pale-headed snake)
- *Nyctophilus corbeni* (Corben's long-eared bat)
- *Petaurus norfolcensis* (Squirrel glider)
- *Phascolarctos cinereus* (Koala)
- *Pseudomys pilligaensis* (Pilliga mouse)
- *Vespadelus troughtoni* (Eastern cave bat).

No threatened species listed under the *Fisheries Management Act 1994* Act have the potential to occur within Kurrajong Creek or any unnamed drainage lines within the Extraction Plan Area.



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Threatened fauna under the EPBC Act

- Painted Honeyeater (survey)
- Corben's Long-eared Bat (survey)
- Corben's Long-eared Bat (database)
- Koala (survey)
- White-throated Needletail (survey)
- White-throated Needletail (database)

Threatened fauna

- Eastern Pygmy possum (survey)
- Eastern Pygmy possum (database)
- Glossy Black Cockatoo (survey)
- Glossy Black Cockatoo (database)
- Koala (survey)

Threatened flora

- Coolabah Bertya (survey)
- Coolabah Bertya (database)
- Scant Pomaderris (survey)
- Scant Pomaderris (database)
- Tylophora linearis (survey)
- Tylophora linearis (database)
- Tylophora linearis (monitoring)
- Spiny Peppercress (monitoring)

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FIGURE 2-2

Threatened flora and fauna records within the Extraction Plan Area

2.3 Watercourses

The Extraction Plan Area is located within the Kurrajong Creek catchment. The headwaters of Kurrajong Creek and Kurrajong Creek Tributary 1 rise in the Pilliga East State Forest to the west of the mining area. The watercourses travel north-east towards the Namoi River, converging downstream of the Narrabri Mine Pit Top (Figure 2-1).

Kurrajong Creek Tributary 1 and its tributaries traverse the northern portion of the Extraction Plan Area before flowing into Tulla Mullen Creek to the east of the mining lease. Kurrajong Creek Tributary 1 drains in a north-easterly direction and is predominately a third order watercourse. Steep to very steep incised slopes are a feature of Kurrajong Creek Tributary 1 and range between 1 m to 3.5 m high banks that extend for 20 m to 120 m.

Kurrajong Creek traverses the southern boundary of LW 203 and drains in a north-easterly direction. It is predominately a third order watercourse under the Strahler stream ordering system.

Kurrajong Creek is ill-defined to the downstream boundary of LW 203, consisting of a broad flow path with no recognised low flow channel. Creek bed material predominantly consists of a sandy loam with intermittent sand deposition. The bed slope is between approximately 0.40% to 0.95%. There is a 4 metre (**m**) headcut separating the downstream incised channel and the upstream ill-defined channel immediately east of LW 203. The drop is associated with historical headward erosion of the channel bed (i.e. not due to the existing Narrabri Mine) and will likely continue to progress upstream with successive flood events. Kurrajong Creek and its tributaries are ephemeral with minimal to no baseflow. Downstream of the headcut, Kurrajong Creek is incised with a channel width of approximately 10 m wide and vertical banks approximately 0.8 m deep.

In relation to assessing effectiveness of erosion and sediment controls, the surface water quality in the watercourses associated with the Narrabri Mine can be characterised as having variable levels of Total Suspended Solids, with median values ranging from approximately 20 milligrams per litre (**mg/L**) to 132 mg/L. Baseline surface water quality and monitoring is discussed in detail in section 2 of the Extraction Plan - Water Management Plan (**EP-WMP**) (Appendix A of EP 203-206).

2.4 Weeds and pest animals

There are 12 recognised High Threat Weeds recorded within the Narrabri Mine and surrounds (Table 2-1) and 12 pest animal species, including:

- *Acridotheres tristis* (Common myna);
- *Sturnus vulgaris* (Common starling);
- *Bos taurus* (Cattle);
- *Capra hircus* (Goat);
- *Ovis aries* (Sheep);
- *Sus scrofa* (Feral pig);
- *Canis lupus* (Dog);
- *Vulpes vulpes* (Red fox);
- *Felis catus* (Feral cat);
- *Lepus europaeus* (European brown hare);

- *Oryctolagus cuniculus* (European rabbit); and
- *Mus musculus* (House mouse).

Table 2-1 High Threat Weeds recorded at the Narrabri Mine

Scientific Name	Common Name	Abundance
Asparagus asparagoides	bridal creeper	Recorded at a single location in low abundance, within Bloodwood-Ironbark Forest.
Carthamus lanatus	saffron thistle	Common and sometimes highly abundant in derived native grassland areas.
Opuntia aurantiaca	Tiger pear	Uncommon and low abundance in disturbed woodland areas.
Opuntia stricta	common prickly pear, smooth pest pear	Common but generally low abundance in more open woodland areas.
Opuntia spp.	prickly pear	An unidentified *Opuntia* species was recorded in several locations across the mine site.
Opuntia tomentosa	velvet tree pear	Common but low abundance in disturbed woodland areas.
Bryophyllum delagoense	mother of millions	Common but sporadic in more disturbed woodland areas. Can be locally abundant.
Eragrostis curvula	african lovegrass	Sporadic but sometimes locally abundant, mainly in derived native grassland areas.
Hyparrhenia hirta	coolatai grass	Sporadic but sometimes locally abundant, mainly in derived native grassland areas.
Paspalum dilatatum	paspalum	Sporadic but sometimes locally abundant, mainly in derived native grassland areas.
Lycium ferocissimum	African boxthorn	Common but sporadic in more disturbed woodland areas. Can be locally abundant.
Solanum elaeagnifolium	silver-leaved nightshade	Common but low abundance, mainly in derived native grassland areas.

3. Subsidence impacts and potential environmental consequences

3.1 Subsidence predictions

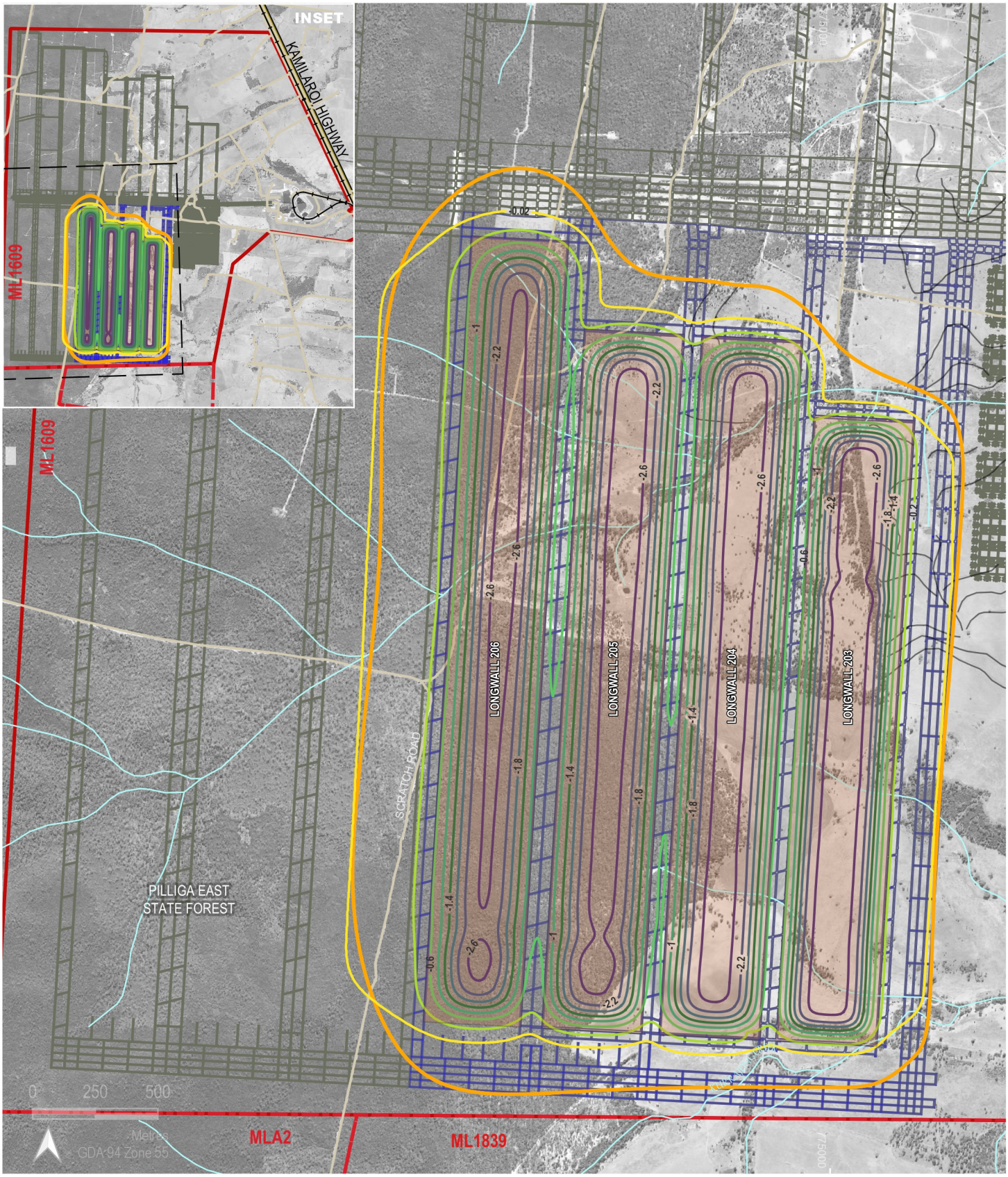
Subsidence predictions for the Extraction Plan Area were assessed and are presented in the Mine Subsidence Assessment Report (DGS, 2022). The Mine Subsidence Assessment Report details the potential impacts to natural, man-made and Aboriginal heritage features within the Extraction Plan Area based on the predictions of conventional and non-conventional subsidence. The predictions include a review of the subsidence effects measured above previously undermined LW 101 to LW 109.

The predicted maximum subsidence estimates for the Extraction Plan Area are summarised in Table 3-1 and shown on Figure 3-1.

Table 3-1 Maximum final subsidence effect predictions

LW	Cover depth (m)	Subsidence (m)	Tilt (mm/m)	Tensile strain (mm/m)	Compressive strain (mm/m)
203	200-208	2.63 - 2.80	34 - 54	15 - 32	16 - 35
204	230-242	2.72 - 2.80	29 - 47	11 - 26	12 - 27
205	248-282	2.75 - 2.80	24 - 39	9 - 19	9 - 21
206	280-311	2.75 - 2.80	20 - 33	7 - 15	7 - 16

Source: adapted from Table 4 (DGS, 2022)



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Subsidence contours (m)

- -0.02
- -0.2
- -0.6
- -1
- -1.4
- -1.8
- -2.2
- -2.6

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FIGURE 3-1

Predicted Subsidence Contours
for LW 203 to LW 206

3.1.1 Surface cracking

Based on the predicted range of maximum transverse tensile strains for the proposed longwall panels (i.e. 7 mm/m to 32 mm/m), surface crack widths are estimated to range from approximately 210 millimetres (**mm**) to 330 mm in cohesionless soils and from approximately 420 mm to 650 mm in cohesive soils or shallow rock (Table 3-2). Cracks usually develop within several days after a longwall face has retreated beneath a given location, with some of the cracks closing in the compression zone in the middle of the fully developed subsidence trough, together with new cracks developing in the tensile zones along and inside the panel sides approximately two to three weeks later.

Surface crack widths are upper 95% confidence level (**U95%CL**) values (to the nearest 10 mm), which means they may be exceeded 5% of the time (by definition) due to adverse topographic or geological conditions. Whilst this effect is unlikely to occur within the Extraction Plan Area, crack widths may exceed the predicted range near the crests of steep creek banks or elevated ridges. The steep rocky slopes above LW 204 and LW 205 are considered likely to be impacted by surface cracking more than 300 mm wide. Based on the above, it is estimated that approximately 0.02 km^2 to 0.04 km^2 of the surface will be crack affected. This represents 0.13% to 0.27% of the extracted longwall area.

Based on reference to the Australian Coal Industry's Research Program (2003), surface cracks will likely develop by the time the longwall face has retreated past a given location for a distance equal to one to two times the cover depth (i.e. ranging from 170 m to 840 m, based on cover depths at the Narrabri Mine).

Detail on steep slopes and sub surface cracking relevant to the Extraction Plan Area is presented in the Extraction Plan – Land Management Plan.

Table 3-2 Predicted maximum crack width in flat terrain

LW	Cross section cross-line (XL)	Panel width [W] (m)	Cover depth [H] (m)	Panel W/H	Effective bay length* (m)	Predicted maximum tensile strain (mm/m)		Predicted U95%CL crack width (mm)	
						Mean	U95%	Sand or Loam	Clay or Rock
203	6	402.8	208	1.94	10.4	15	29	300	600
	7	402.8	200	2.01	10.0	15	31	310	620
	8	402.8	204	1.97	10.2	16	32	330	650
204	6	402.8	232	1.74	11.6	12	24	280	560
	7	402.8	242	1.66	12.1	11	23	280	560
	8	402.8	230	1.75	11.5	13	26	300	600
205	6	399.7	248	1.61	12.4	10	20	250	500
	7	399.7	282	1.42	14.1	9	17	240	480
	8	399.7	275	1.45	13.8	9	19	260	520
206	6	395.3	280	1.41	14.0	8	15	210	420
	7	395.3	311	1.27	15.6	7	14	220	440
	8	395.3	304	1.3	15.2	8	15	230	460

Source: DGS 2022 (Table 7)
* - max (H/20, 10m)

3.1.2 Ponding

The Mine Subsidence Assessment Report predicts a maximum panel subsidence of up to 2.8 m, which may result in closed form depressions forming in some of the central areas of the longwall panels with flatter surface gradients and disrupt natural drainage pathways to watercourses and farm dams. Analysis of the pre- and post-mining surface levels suggests that ponding (if it occurs) is likely to develop along Kurrajong Creek and its tributaries.

A total of six potential ponding locations have been assessed within the Extraction Plan Area. Five of the potential ponding areas already exist along the watercourses and dams. Existing (pre-mining) and post-mining pond depths are estimated to range from 0.1 m to 4.7 m. Pond depths are estimated to increase by up to 1.3 m or decrease by up to 0.04 m.

The maximum changes in pond area (where positive represents an increase in pond area) are estimated to range from -0.42 ha to 2.92 ha. The maximum changes in pond volume (where positive represents an increase in pond volume) are estimated to range from -0.23 megalitres (**ML**) to 20.6 ML[3]. The largest ponding increases are estimated over LW 203 and LW 205.

Overall, the existing ponds are expected to extend laterally from the watercourses for distances ranging from 50 m to 410 m. Existing ponded areas extend up to 270 m, indicating a potential lateral increase of up to 140 m.

3.2 Potential impacts on biodiversity

3.2.1 Native vegetation

Based on previous monitoring above LW 101 to LW 103, any large trees (eucalypts in particular) in areas with less than 180 m depth of cover in clayey soils may be at risk of root shear leading to tree stress or death, particularly if dry climatic conditions prevail at the time of longwall extraction. Trees located adjacent to ponded areas may also be subject to tree stress or death.

It is noted that the Extraction Plan Area has cover depths more than 180 m. Therefore, it is not expected that impacts to native vegetation will occur due to mine subsidence above these areas.

3.2.2 Terrestrial fauna

Surface cracks have the potential to trap small native ground-dwelling animals (e.g. lizards and mice). The size and extent of surface cracking is expected to be minor, with surface cracking predicted to be greater in the eastern portion of the Extraction Plan Area where the impacts on threatened fauna species is anticipated to be less (i.e. outside of State Forest).

Due to the negligible impact on terrestrial fauna, no fauna monitoring is proposed under this EP-BMP.

[3] The actual ponding depths, areas and volumes will also depend upon several other factors, such as rain duration, surface cracking and effective percolation rates of the surface soils along the creeks/drainage lines.

3.2.3 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 permanent ponding along Kurrajong Creek and its tributaries. 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 under this EP-BMP.

3.2.4 Vegetation clearing

The clearing of native vegetation is required for the development of surface infrastructure 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.

Surface disturbance and vegetation clearing activities within approved disturbance areas 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 provided in section 5.2.

4. Performance measures and indicators

General performance measures for biodiversity are defined under the Project Approval and are presented in Table 1-1. NCOPL will ensure that clearing and disturbance of vegetation above the mining area is minimised, to the satisfaction of the Secretary.

Additional specific performance measures and indicators have been developed to extend on the biodiversity performance measures stated in Table 1-1 and are presented in Table 4-1.

Table 4-1 Performance criteria

Performance measure	Indicator
No vegetation clearance outside of approved areas.	• No vegetation is cleared outside of approved area. • No unauthorised ground disturbance (i.e. without a Permit to Work).
No ongoing or significant (>50 mm) surface cracking, erosion, slumping, or ponding impacting native vegetation.	• Surface cracking, erosion, slumping and/or ponding determined during subsidence monitoring. • Surface crack remediation and stabilisation works conducted. • Floristic based subsidence (**FBS**) monitoring determines no impact on native vegetation. • No decline in vegetation health within ponded areas.
Surface cracks >50 mm are remediated within two months of identification or when safe to do so.	
Change to overall drainage pattern is not more than predicted.	• Changes detected during subsidence inspections and remote sensing creek line surveys. • Surface crack remediation and stabilisation works conducted.
Alteration in channel dimensions or topography/landscape morphology within normal range compared to baseline data.	
High Threat Weeds identified during monitoring have been controlled.	• High Threat Weeds are controlled determined by biannual weed monitoring.
Pest animals identified during monitoring have been controlled.	• Pest animals are controlled determined by biannual monitoring.

5. Management measures

In accordance with Schedule 2 Condition 1 of the Project Approval, NCOPL will implement all practicable measures to prevent and/or minimise any harm to the environment that may result from the construction, operation, or rehabilitation activities at the Narrabri Mine.

NCOPL will implement the management measures detailed in the following sections to ensure compliance with the performance measures listed in Table 1-1 and Table 4-1.

5.1 Remediation of surface cracks and ponding

5.1.1 Surface cracking

NCOPL will conduct remediation of surface cracking where the crack width is more than 50 mm in accordance with the Extraction Plan – Land Management Plan. A preliminary assessment will be undertaken to minimise the environmental impact of remediation actions. Prior to any remediation, NCOPL will undertake a review of environmental impacts (including impacts to biodiversity values) that may result from the remediation at the specific location and consider whether remediation will create an increased impact (e.g. clearing native vegetation to enable machinery access or major drainage works that will cause a greater impact from excavation). If the assessment concludes that there may be the potential to increase impacts on biodiversity, alternative methods of remediating the crack are warranted (e.g. without machinery).

After surface cracks have been remediated, NCOPL will conduct an inspection within three months to identify if further remediation is required.

5.1.2 Ponding

A set of criteria to determine the most suitable option for the management and remediation of ponding is presented in Table 5-1.

Table 5-1 Criteria for subsidence pond management and remediation

Type of impact	Severity	Description of severity	Management / remediation measures
Creation of subsidence pond(s) in floodplain areas isolated from the mainstream drainage path	Low	Small shallow ephemeral pond which may serve a useful ecological and/or agricultural function	Re-establish any affected contour banks and revegetate
	Moderate to High	Large semi-permanent or permanent pond with the potential to impact ecological and/or agricultural function	• Construct drainage channels to create free draining areas • Restore affected contour banks • Revegetate fringing areas around residual pond • Exclude stock access from riparian areas

Type of impact	Severity	Description of severity	Management / remediation measures
Creation of in-stream pond(s) or changes to length, depth and/or shape of existing in-stream pond(s)	Low	• Creation of similarly sized in-stream pond(s) as existed prior to subsidence effects • Changes to existing pond(s) resulting in similar size and distribution of in-stream pond(s)	Stabilise pond inlet and outlet using graded rock and vegetation enhancement
	Moderate	Moderate increase or decrease in size and distribution of in-stream pond(s) with the potential to impact ecological and/or agricultural function	• Construct in-stream barriers or drainage channels to reduce or increase the effective size and spatial distribution of pond(s) • Stabilise pond inlet and outlet using graded rock and vegetation enhancement
	High	Significant increase in size of in-stream pond(s) with high potential for impact to ecological and/or agricultural function	• Dewater ponded area • Reshape surface and infill pond • Re-establish natural drainage channel

Remediation of ponded areas will consider the following:

- ponding located in areas where vegetation is not affected, will be allowed to self-correct;
- ponding located in areas with affected vegetation, or if ponding significantly alters or affects flows, will be assessed and remedial actions (that present the lowest environmental impact) developed in consultation with a geomorphologist; and
- if EECs are impacted, or downstream water quality analysis indicates a change in electrical conductivity (**EC**) trends, the ponding will be assessed, and remediation options will be developed to afford the maximum practical protection to the affected feature.

5.2 Vegetation clearance protocol

Clearing of native vegetation is required for the installation of mine ventilation and gas management infrastructure, services corridors and access tracks, exploration and service boreholes, pre-conditioning of resistant strata for mine safety, water management infrastructure and subsidence remediation works.

Service boreholes are typically spaced every 300 m to convey drained gas from underground workings prior to longwall mining to the surface. Gas drainage from the goaf above the longwall panel after mining is also required, with separate bore holes drilled approximately every 40 m.

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

- mine staff and contractors involved in vegetation clearance works are be made aware of clearing limits in the relevant statutory approval documentation and of restricted access areas;
- siting access tracks and other disturbance to minimise clearance of trees with hollows (including active nests) and drainage features (i.e., creeks) where practicable;

- clearing within the surface development footprint will be undertaken progressively to maintain the continuation of mining operations and the area cleared at any particular time will generally be no greater than that required to accommodate development needs for the following 12 months;
- clearance authorisation process (i.e. Permit to Work) which includes review and signoff of the areas to be cleared by the Environmental Superintendent or delegate;
- clearly delineate the areas to be cleared on the ground prior to conducting clearing activities (e.g., paint, flagging tape and/or posts) and restrict clearing to within these areas;
- pre-clearance surveys will be undertaken by a suitably trained and qualified ecologist or wildlife handler to:
  - identify any threatened flora (if clearing is likely to impact individuals of Coolabah bertya, salvage translocations of at least a portion of the impacted individuals is to be undertaken);
  - identify any threatened fauna or potential threatened fauna activity, in particular Koala observations (e.g. individual sightings, scats, scratches and/or pock marks on trees);
  - identify trees with suspected active nests; and
  - identify trees with suspected actively used tree hollows.
- a suitably trained and qualified ecologist or wildlife handler will be present during clearing to manage fauna that may be encountered;
- options to minimise harm to fauna by modifying the clearance method is to be evaluated by the suitably trained and qualified ecologist or wildlife handler (e.g., shaking or nudging tree trunks to evacuate mobile fauna, retaining trees with suspected active nests until the nest is disused, or controlled lowering of trees with suspected tree hollows being used by fauna with the hollow facing upwards to enable fauna to exit);
- in the unlikely event that a Koala is identified in a tree marked to be cleared, the tree will be retained (allowing a 200m avoidance zone) until the individual has self-relocated;
- management of the Koala is to be in accordance with the *Code of Practice for Injured, Sick and Orphaned Koalas* management plan prepared by the NSW Office of Environment and Heritage (OEH 2018);
- management of fauna may include relocating the individual to adjacent habitat or treating injuries (the nearest veterinary clinic, wildlife carer and/or appropriately trained ecologist contact information will be on hand in case any fauna are injured);
- retain ground cover (e.g., logs, fallen branches and leaf litter) within stripped topsoil to improve the viability of the soil when it is used in rehabilitation;
- conserve topsoil (i.e., seed bank) for reuse in rehabilitation; and
- retain cleared woody debris for use in rehabilitation.

NCOPL will track actual native vegetation clearance against the approved surface development footprint. In addition, NCOPL will track the clearance of the number of Coolabah bertya plants by applying the density to the area of habitat to be cleared.

5.3 Sediment and erosion control

The potential for localised erosion and/or channel erosion along Kurrajong Creek and other ephemeral creek lines will be managed over the life of mine using appropriate sediment and erosion controls. Erosion and sediment controls will be implemented in accordance with the EP-WMP.

All earthworks, drainage lines and disturbed areas no longer required for mine-related activities will be stabilised via progressive rehabilitation.

6. Subsidence impact monitoring

6.1 Visual subsidence inspections

Monthly visual inspections behind the longwall face (i.e. during active subsidence) will be conducted to determine surface crack locations, depth, width and length, the extent of any ponding and presence of vegetation, and observations of erosion and/or sedimentation. Surface cracks with widths more than 50 mm will be remediated within two months of being identified in accordance with section 5.1.1.

Surface cracking and ponding are also assessed following a significant rainfall event (defined as a 5-day 90th percentile rainfall event which is 38.4 mm over 5 consecutive days).

After surface cracks have been remediated, NCOPL will conduct an inspection within three months to identify if further remediation is required.

6.2 Creek line monitoring

Baseline surveys of watercourses and drainage lines will be conducted via remote sensing (multi-spectral image or LiDAR) prior to longwall mining to record creek bank condition and natural drainage patterns. Remote sensing will then be utilised during and following mining to determine changes in creek bank condition, cross sectional changes, and/or overall changes to drainage patterns. If changes are detected, NCOPL will conduct a direct field survey to ground truth and develop appropriate remediation measures.

Visual watercourse inspections (including photographs) will also be conducted as a baseline and then quarterly for a period of two years to monitor for bed and bank stability, vegetation health within ponded areas, and erosion and sedimentation. If vegetation is identified as being impacted (e.g. canopy dieback), NCOPL will determine the most suitable option for the management and remediation of the ponded area in accordance with section 5.1.2.

Following a significant rainfall event (defined as a 5-day 90th percentile rainfall event which is 38.4 mm over 5 consecutive days), restriction of flows and hence restriction of fish passage will be assessed to facilitate appropriate restorative measures (if required).

6.3 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 LW 203 to 206 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, followed by the implementation of appropriate management measures.

LiDAR

LiDAR processing and analysis will be undertaken every three years (triennially). LiDAR data is processed into a land surface digital elevation model (**DEM**) across the mine. 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.

Multi-spectral image processing and analysis

The primary purpose for this monitoring is to detect changes in vegetation cover and erosion over time. 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 two years after the completion of each longwall.

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

6.4 Floristic-based subsidence monitoring

At a local scale, field surveys will be conducted within areas of remnant woodland, starting with a baseline survey in spring prior to mining. The aim is to allow a direct comparison between woodland 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 of the same vegetation type outside of the impact zone. At least one impact monitoring site and one control site will be established per vegetation type.

Monitoring will be conducted over a period of up to three years for each longwall panel as follows:

- Prior to commencement of mining:
  - A baseline field survey will be conducted in spring to establish a minimum of two 20 m x 20 m floristic-based subsidence (**FBS**) monitoring plots for each vegetation type within the Extraction Plan Area in accordance with the method detailed in Table 6-1. Control sites will also be established during the baseline surveys.
- Following the commencement of mining:
  - Survey data will be captured via the annual multi spectral imagery method (section 6.3) to detect any interim changes. 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 the vegetation monitoring method detailed in Table 6-1 to determine the cause of change, which will allow for NCOPL to implement the most appropriate management action/s.
- Following completion of each longwall panel:
  - Conduct follow up FBS monitoring within the established plots to determine any change to vegetation health or function in comparison to the control sites. The monitoring will be in accordance with the method detailed in Table 6-1.

Reporting on the outcomes of the FBS monitoring will take place in summer following the spring survey. FBS monitoring can be discontinued two years after the completion of each longwall as it is expected that any subsidence related impacts to vegetation will be evidenced within this timeframe.

6.5 Weeds

NCOPL will conduct biannual weed monitoring and control within disturbed areas and areas undergoing rehabilitation/regeneration to determine the presence of any High Threat Weeds. The location (mapping extent), species, and estimation of cover will be recorded during each monitoring event to inform control efforts. Weed control will assist with the protection and management of native vegetation and fauna habitat and the regeneration of native species. The location, species, and control methods (e.g., herbicide) used will be recorded by the licensed contractor and records retained by NCOPL.

6.6 Pest animals

Pest animal identification and control will be conducted over the life of mine to detect and control pest animals that may be impacting on rehabilitated/revegetated areas. Pest animals will be identified as part of the biannual monitoring program to inform control efforts. The timing, frequency and control techniques (such as baiting, trapping, mustering, or shooting) will be determined by a suitably qualified person/s. The management of pest animals will consider the relevant threat abatement plans for Feral pig, European rabbit, Goat, Red fox and Feral cat.

NCOPL will also ensure the pest animal contractors provide copies of their accreditation and will retain records of pest species, control techniques and location.
Opportunistic observations of pest animals will be reported to the Environmental Superintendent.

6.7 Biodiversity monitoring program summary

Table 6-1 provides a summary of the requirements for the EP-BMP monitoring program.

Table 6-1 Biodiversity monitoring program LW 203 to LW 206

Aspect	Frequency	Method and analysis	Parameters
Subsidence	• During active subsidence, monthly and following a significant rainfall event *. • Three months following remediation of surface cracks.	**Visual inspections directly behind the longwall face to:** • Identify areas of surface cracking and ponding, including presence of vegetation. • Identify erosion/potential erosion. • Record sedimentation. • Determine appropriate management response.	• Surface crack GPS location, depth, width and length. • Ponding GPS location, width, depth, area, presence of vegetation. • Bed and bank stability. • Watercourse erosion and potential for erosion (e.g., knickpoints, head cuts). • Sedimentation.
Watercourses and ponding	Baseline and then quarterly and following mining for a period of two years.	**Visual inspection and photographs within the active subsidence zone to:** • Identify areas of ponding, including impacts to vegetation. • Identify erosion/potential erosion. • Record sedimentation. • Determine appropriate management response.	• Ponding GPS location, width, depth, length, impacts to vegetation. • Bed and bank stability. • Watercourse erosion and potential for erosion (e.g., knickpoints, head cuts). • Sedimentation.
Creek line surveys	Baseline then annually/triennially (refer to remote sensing below)	• Assessment of creek bank condition and altered drainage patterns compared to baseline. • Assessment of bed and bank slopes following subsidence and likely effects of increased channel gradients (e.g. upstream and downstream of chain pillars). • Effectiveness of gully erosion stabilisation methods. • Field survey if changed detected following remote sensing.	• Refer to remote sensing below.
Remote sensing	**LiDAR:** • Baseline then every three years (triennially).	LiDAR over entire site.	• Topographic form and change. • Creek line slope and volumes.
	Multi spectral imaging: • Baseline and then annually in spring until the completion of mining for LW 203 to LW 206	Multi-spectral imaging (NDVI) over LW 203 to LW 206.	• Vegetative biomass and cover within Extraction Plan Area. • Weed presence. • Erosion.
Direct field survey	Following changes detected during remote sensing.	• Field inspection. • Sampling/testing as required.	Determined during field survey.
Native vegetation (FBS)	**Prior to mining:** • Baseline field survey in spring. **Year 1:** • Multi-spectral remote imaging and targeted field surveys to determine the cause of any changes detected. **Year 2:** • Follow up field survey in spring.	**Field surveys:** • Establish a series of transects across the width of each longwall panel. • Establish permanent 20 m x 20 m monitoring plots along each transect with a minimum of two 20 m x 20 m FBS monitoring plots for each vegetation type. • Monitoring plots are to be established in areas of highest expected subsidence and surface cracking to ensure the maximum impact resulting from extraction is captured. • Mark each monitoring plot 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). • Lower, estimated median and upper height of canopy. • Lower, estimated median and diameter at breast height (DBH) over bark of canopy stems (cm). • Abundance of each canopy species; calculated, total stems per

Aspect	Frequency	Method and analysis	Parameters
			hectare. • Exotic species cover. **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.
Weeds	Baseline and then biannually for the life of mine. (Reduce to annually when vegetation established in rehabilitation areas).	Visual inspections of disturbed and rehabilitated areas to determine the presence of High Threat Weeds and control techniques required.	The location (mapping extent), species, and estimation of cover will be recorded during each monitoring event.
Pest animals	Biannually for the life of mine.	Visual inspections across the mine to identify the appropriate resources for control.	Record pest animal species, abundance, location.

Notes:

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

7. Contingency response

In the event that a non-compliance against a performance measure has occurred, or is likely to occur, NCOPL will:

1. Report the non-compliance as soon as practicable to the relevant agencies as required under the Project Approval and relevant legislation in accordance with section 8.
2. Identify and implement an appropriate course of action with respect to the non-compliance in consultation with a suitably qualified person/s and the relevant agencies.
3. Review the effectiveness of the EP-BMP management measures in accordance with section 9.4.

A Trigger Action Response Plan (Table 7-1) has been developed to identify, assess and respond to triggers and manage risks associated with meeting the biodiversity performance measures.

Table 7-1 Trigger Action Response Plan

Aspect	Performance measure	Response	
		Trigger	**Action**
Vegetation Clearance Protocol	No vegetation clearance outside of approved areas.	**Level 1** • Clearing within the delineated area.	**Level 1** • No action required.
		Level 2 • Clearing outside the delineated area.	**Level 2** • Environmental Superintendent to inform the General Manager. • Investigate reasons for exceedance. • Relevant agencies to be notified and actions discussed.
Remediation of surface cracks	Surface cracks are remediated within two months of identification or when safe to do so.	**Level 1** • Surface cracks >50 mm but <320 mm present. and/or • Erosion as a result of cracking identified.	**Level 1** • Provide safety fencing and signage if required. • Advise relevant stakeholders. • Implement remediation measures as appropriate. These may include ripping of surface cracks, filling of cracks with grout, spoil or other suitable material. • Implement appropriate control measures as outlined in the Extraction Plan - Water Management Plan. • Monitor remediated surface cracks within 3 months following remediation.
		Level 2 • Surface cracks >320 mm and/or crack widths more than predicted for specific soil type or natural feature.	**Level 2** • As for Level 1 • Make area safe. • Investigate the reasons for exceedance of predictions. • Review and update predictions and assessment of potential impacts.
Sediment and erosion controls	No ongoing or significant erosion.	**Level 1** • Evidence of active rill erosion, gully erosion <200 mm in depth or slumping.	**Level 1** • Document occurrence. • Continue monitoring. • Summarise occurrence in relevant reports.
		Level 2 • Evidence of active rill or gully erosion >200 mm in depth or significant slumping.	**Level 2** • As per Level 1 • Review adequacy of existing erosion and sediment controls. • Undertake repairs and implement additional controls as required. • Engage a specialist if ongoing erosion is observed following repair and implementation of additional controls.
Creek line surveys	Change to overall drainage pattern is not more than predicted and detected alteration in channel dimensions or processes within normal range compared to baseline data.	**Level 1** • Monitoring indicates <20% increase in length of eroding creek line. and/or • Surface drainage pattern is unchanged. • Bed and banks are stable.	**Level 1** • Document observed changes. • Continue monitoring. • Summarise occurrence in relevant reports.

Aspect	Performance measure	Response	
		Trigger	**Action**
		Level 2 • Monitoring indicates >20% increase in length of eroding creek line. and/or • Surface drainage pattern is significantly altered. • Changes in bed and bank stability.	**Level 2** • As for Level 1 • Consult with a geomorphologist or other appropriately qualified and experienced specialist to determine the extent of the impact, identify contributing factors and determine appropriate remediation measures. • Review and implement contingency measures required by other plans as relevant (e.g. the Subsidence Monitoring Program). • Review monitoring program as required. • Relevant agencies to be notified and actions discussed.
Topography and landscape morphology form	Detected alteration in channel dimensions or topography/landscape morphology within normal range compared to baseline data.	**Level 1** • Surface gradient change as detected by LiDAR is >1.5% and <3%.	**Level 1** • Document observed changes. • Continue monitoring. • Summarise occurrence in relevant reports.
		Level 2 • Surface gradient change as detected by LiDAR is >3% and <5%.	**Level 2** • As for Level 1 • Consult geomorphologist or other appropriately qualified and experienced specialist to review DEM and conduct site investigation to assess changes and provide recommendations for remediation which may include re-establishing drainage pathways with earthworks and implementation of erosion control measures. • Notify relevant agencies if in-stream works are to be undertaken.
Native vegetation	No ongoing or significant surface cracking, erosion, or slumping impacting native vegetation.	**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 from previous monitoring event 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 from previous monitoring event is >10%.	**Level 2** • Conduct site investigation to determine the cause of change and appropriate management response which may include planting of endemic species, or additional weed control. • Review monitoring program as required.
Ponding (riparian vegetation)	Surface water ponding does not result in adverse impacts to vegetation health.	**Level 1** • Identified minor impacts to vegetation due to creation of small ephemeral ponds or minor increase or decrease in size and distribution of in-stream ponds.	**Level 1** • Record visual observations, including photographs. • Investigate options to remediate based on risk assessment (low risk to ecological and/or agricultural function). Remediation options may include: ▪ Re-establish any affected contour banks and revegetate. ▪ Stabilise pond inlet and outlet using graded rock and vegetation enhancement.

Aspect	Performance measure	Response	
		Trigger	**Action**
		Level 2 • Significant impacts to vegetation identified (e.g. canopy dieback, tree death) due to creation of large semi-permanent ponds or moderate to significant increase or decrease in size and/or distribution of in-stream ponds.	**Level 2** • Record visual observations, including photographs. • Investigate options to remediate based on risk assessment (moderate to high risk to ecological and/or agricultural function). Remediation options may include: ▪ Construct drainage channels to create free draining areas and restore affected contour banks ▪ Revegetate fringing areas around residual pond ▪ Exclude stock access from riparian areas ▪ Construct in-stream barriers or drainage channels to reduce or increase the effective size and spatial distribution of pond(s) ▪ Stabilise pond inlet and outlet using graded rock and vegetation enhancement ▪ Dewater ponded area ▪ Reshape surface and infill pond ▪ Re-establish natural drainage channel
Weed management	High Threat Weeds identified during monitoring have been controlled.	**Level 1** • Increase in High Threat Weeds > 20% compared to baseline dataset.	**Level 1** • Undertake additional monitoring. • Increase or review/amend weed control methods. • Undertake follow up targeted control.
		Level 2 • Increase in High Threat Weeds > 40% compared to baseline dataset.	**Level 2** • As per Level 1 • Review the weed management program to identify the key priority areas and investigate alternative methods for control of target species.
Animal pest management	Pest animals identified during monitoring have been controlled.	**Level 1** • Monitoring indicates pest animals impacting on native vegetation.	**Level 1** • Increase the frequency or extent of pest animal control based on advice from a suitably qualified person.

8. Incidents and non-compliance

8.1 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 the Project Approval or any other statutory approval (e.g., the Environmental Protection License [**EPL**]).

In the event of any exceedance of the 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 NSW Environment Protection Authority will be made by contacting the Environment Line on 131 555 and written details of the notification will be provided within 7 days of the date on which the incident occurred.

Incident reporting and emergency response is further described in NCOPLs Environmental Management Strategy.

8.2 Non-compliance notification

In accordance with Schedule 6 Condition 2, where a non-compliance with a statutory requirement/s 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 DPHI of the non-compliance[4]. 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.

[4] A non-compliance which has been notified as an incident under section 8.1 does not need to also be notified as a non-compliance under section 8.2.

9. Reporting, evaluation and review

9.1 Annual review

In accordance with Schedule 6 Condition 6, NCOPL will review the performance of its environmental 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 biodiversity values.

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 NCOPLs environmental management procedures.

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 development (Stages 1 and 2), to be conducted in accordance with the requirements of 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 IEA (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 then review, and if necessary, revise this EP-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.

Condition 3 of Schedule 6 further states that if the review determines that this EP-BMP requires revision, then this will be completed to the satisfaction of the Secretary. A dedicated review register will be maintained which will provide the details of the review of all relevant strategies, plans and programs that need to be reviewed as

required under Schedule 6 Condition 3 of the Project Approval. The revision status of this EP-BMP is indicated in section 14.

9.4 Improvement measures

Project Approval Schedule 6 Condition 2(f) requires this Plan to include a program to investigate and implement ways to improve the environmental performance of the development over time. Improvement measures may be investigated through review of the following:

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

Reasonable and feasible improvement measures will be implemented and documented as a management measure in a revision to the Plan as described in section 9.4.

In accordance with Schedule 6 Condition 2(g) a protocol for periodic review of this Plan has been addressed under section 9.3.

10. Complaints management

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

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

In the event that any complainant considers that NCOPL has not adequately addressed their concerns, the NCOPL representative will convene additional meetings with the complainant.

11. Plan implementation

11.1 Roles and responsibilities

During the operational phases of the development, the Narrabri Mine will be managed by the General Manager who will have overall responsibility for ensuring contractors, employees and service providers comply with all laws, regulations, licences, approvals. Table 11-1 outlines the roles and responsibilities outlines within this EP-BMP.

Table 11-1 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 EP 203-206.
Mining Engineering Manager	• Ensure all contractors, sub-contractors and service-personnel are appropriately qualified, competent, and licensed to undertake the required work under this EP 203-206.
Environmental Manager	• Review and authorisation of changes to this EP 203-206 • Responsible for decision making in relation to the activation of TARP responses and/or contingency planning. • Manage incident, non-compliance and other reporting requirements. • Communicate with statutory agencies and departments, public authorities, and the community.
Environmental Superintendent	• Ensure that all environmental monitoring and reporting is undertaken in accordance with this EP 203-206 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.
Surface Operations Manager	• Provides notification to all mine personnel advising of potential subsidence hazards and impacts. • Maintains access to critical surface infrastructure and facilitates inspections and remedial works.
Civil Services Coordinator	• Inspect and monitor the condition and safety of roads and tracks around the mine site. • Remediates subsidence impacts to maintain trafficability of access roads and tracks.
Technical Services Manager	• Provide technical advice to support decision making in relation to the activation of TARP responses and/or contingency planning. • Liaise with stakeholders regarding subsidence impact management. • Decommission mining infrastructure prior to subsidence impacts.
Registered Mine Surveyor	• Ensure the subsidence monitoring program is implemented and adhered to.

12. References

Department of Planning and Environment (October 2022). *Extraction Plan Guideline*

Ditton Geotechnical Services (2022) *Mine Subsidence Assessment for Longwalls LW203 to LW206 at the Narrabri Underground Mine.* Prepared for Narrabri Coal Operations Pty Ltd.

NSW Department of Planning, Industry and Environment (November 2021). *Project Approval Narrabri Coal Project – Stage 2*

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

RW. Corkery & Co. Pty. Limited. (2009). *Environmental Assessment for the Narrabri Coal Mine Stage 2 Longwall Project.* Prepared for Narrabri Coal Operations Pty Ltd.

13. Glossary

Term	Definition
Active subsidence	The period of time that movement of the ground can occur after underground mining.
Angle of Draw	The angle with the vertical, made by a straight line extending away from the limits of extraction at seam level to the ground surface, spanning the horizontal distance in which subsidence may occur.
Applicant	Narrabri Coal Operations Pty Ltd.
Chain pillar	The pillar(s) of coal left between adjacent longwall panels. This forms a barrier that allows the goaf to be sealed off and facilitates tailgate roof stability.
Cover depth	The depth of coal seam from the ground surface (metres).
Compressive strain	A decrease in the distance between two points on the surface. This can cause shear cracking or steps at the surface if > 3 millimetres per metre (mm/m).
Department	Planning and Assessment Group within the NSW Department of Planning, Housing and Infrastructure (DPHI).
Development	The Stage 2 development described in the Stage 2 EA as modified by the Project Approval.
Environmental consequences	The environmental consequences of subsidence impacts including: damage to built features; loss of surface flows to the subsurface; 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 longwall panels LW 203 to LW 206.
First workings	Development of the main headings and gate roads to establish access to the coal in the mining area.
Goaf	The mined-out area into which the immediate roof strata breaks.
Incident	A set of circumstances that causes or threatens to cause material harm to the environment, and/or breaches or exceeds the limits of performance measures/criteria in the Project Approval.
Material harm	Material harm to the environment is defined in section 147 of the *Protection of the Environment Operations Act 1997*.
Mining operations	The extraction, processing, and transportation of coal on the site, including the formation of mine access drifts and associated surface infrastructure such as gas and water drainage facilities.
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
Narrabri Mine	The development approved under Project Approval 05_0102 and Project Approval 08_0144.
Project Approval	Development consent (PA 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).
Regeneration	The restoration of ecosystems by allowing or assisting the natural regrowth of native vegetation.
Rehabilitation	The treatment or management of land disturbed by the project for the purpose of establishing a safe, stable and non-polluting environment including the remediation of impacts.
Second workings	Extraction of coal from longwall panels, mini-wall panels, or pillar extraction.

Term	Definition
Secretary	Planning Secretary under the EP&A Act, or nominee.
Stage 1	The project approval granted by the Minister Planning for the Narrabri Coal Project, dated 14 November 2007.
Stage 2	Narrabri Mine Stage 2 approved under Project Approval 08_0144.
Statement of Commitments	The Proponent's revised commitments in Appendix 3 of the Project Approval, dated May 2010.
Subsidence	The totality of subsidence effects, subsidence impacts and environmental consequences of subsidence impacts.
Subsidence effects	Deformation of the ground mass due to mining, including all mining-induced ground movements, such as 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.
the Proponent	Narrabri Coal Operations Pty Ltd
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.
Vertical subsidence	Vertical downward movements of the ground surface caused by underground coal mining.
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.

14. Review history

Revision	Comments	Author	Authorised by	Date
0B	Issued as final	Onward Consulting	B. Baker	15 August 2024

Attachment 1 Compliance conditions relevant to this Plan

Table A1-1 Project Approval conditions relevant to this Plan

Condition	Requirement	Document reference
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 5
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.*	No staging of the EP-BMP proposed.
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*** Flora and Fauna: The Proponent shall ensure that clearing and disturbance of vegetation above the mining area is minimised, to the satisfaction of the Secretary.	Section 1.4.1
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;	Section 1.4.1 Section 1.6
	***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
	b) a detailed description of the measures that would be implemented to remediate predicted impacts; and	Section 5

Condition	Requirement	Document reference
	c) a contingency plan that expressly provides for adaptive management.;	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 1.4.1 Section 4
	• 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 4
	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 6
	• effectiveness of any management measures (see (c) above);	Section 6
	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 9.4
	g) a protocol for managing and reporting any:	
	• incidents;	Section 8.1
	• complaints;	Section 10
	• non-compliances with statutory requirements; and	Section 8.2
	• 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	
	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.	

Condition	Requirement	Document reference
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 8.1
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 1.7 Section 9.1
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

Table A1-2 Relevant Statement of Commitments

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 along watercourses of the Mine Site.	Section 5.2
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 5.2
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 5.2
8.9	Retain all substantial habitat trees, wherever possible.	Section 5.2
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 5.2
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.	Section 5.2
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.	Section 5.2
8.13	Re-site all hollows from hollow-bearing trees removed where practicable.	Section 5.2
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 6.6
8.15	Implement a feral animal management program to lower the predator impact upon small terrestrial native species.	Section 6.7
8.18	Time clearing within woodland communities, where practicable, to avoid fauna breeding seasons.	Section 5.2
8.19	Undertake progressive and final rehabilitation across the Project Site to recreate a final land use of agriculture and native vegetation.	Section 5.2 Section 5.3

Table A1-3 Relevant EPBC 2009/5003 requirements

EPBC 2009/5003 conditions		Document reference
Condition	**Requirement**	
Condition 3	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 this plan must be submitted to DAWE.	Section 1.4.2

Attachment 2 Consultation records

Department of Planning and Environment

Our ref:DOC22/1060753
Your ref: LW 203 – LW 206

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

Dear Brent

LW 203-LW206 Extraction Plan – Biodiversity Management Plan

Thank you for your e-mail dated 9 November 2022 to the Biodiversity, Conservation and Science Directorate (BCS) of the Department of Planning and Environment (DPE) inviting comments on the Environmental Impact Statement (EIS) for the LW 203-LW206 Extraction Plan – Biodiversity Management Plan.

Section 6.1.4 of the Biodiversity Management Plan states:

Prior to commencement of mining:

- *A baseline field survey will be conducted in spring to establish a minimum of one 20 m x 20 m floristic-based subsidence (FBS) monitoring plot for each vegetation type within the Extraction Plan Area (unless within a ponded area – refer to section 6.1.5) in accordance with the method detailed in Table 6-1. Control sites will also be established during the baseline surveys*

BCS recommends that a minimum of 2 monitoring plots are undertaken for each vegetation type (excluding control plots), to ensure a representative sample of each vegetation type is collected.

In addition, monitoring plots should be placed in areas of highest expected subsidence and surface cracking to ensure that the maximum impact resulting from extraction is captured.

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

Yours sincerely

Ben Ellis
A/ Principal Project Manager
Biodiversity, Conservation and Science Directorate

1 December 2022

Table A2-1 Consultation feedback - BCS

Consultation feedback	Outcome	Document reference
Section 6.1.4 of the Biodiversity Management Plan states: Prior to commencement of mining: • A baseline field survey will be conducted in spring to establish a minimum of one 20 m x 20m floristic-based subsidence (FBS) monitoring plot for each vegetation type within the Extraction Plan Area (unless within a ponded area – refer to section 6.1.5) in accordance with the method detailed in Table 6-1. Control sites will also be established during the baseline surveys. BCS recommends that a minimum of 2 monitoring plots are undertaken for each vegetation type (excluding control plots), to ensure a representative sample of each vegetation type is collected. In addition, monitoring plots should be placed in areas of highest expected subsidence and surface cracking to ensure that the maximum impact resulting from extraction is captured.	Section 6.1.4, bullet point one has been amended to state: Prior to commencement of mining: • A baseline field survey will be conducted in spring to establish a minimum of two 20 m x 20 m floristic-based subsidence (FBS) monitoring plots for each vegetation type within the Extraction Plan Area (unless within a ponded area – refer to section 6.1.5) in accordance with the method detailed in Table 6-1. Control sites will also be established during the baseline surveys. Additionally, the method for vegetation monitoring in Table 6-1 has been updated to state: Field surveys: • Establish a series of transects across the width of each longwall panel. • Establish permanent 20 m x 20 m monitoring plots along each transect with a minimum of two 20 m x 20 m FBS monitoring plots for each vegetation type. • Monitoring plots are to be established in areas of highest expected subsidence and surface cracking to ensure the maximum impact resulting from extraction is captured. • Mark each monitoring plot with a metal star picket.	Section 6.4 Table 6-1