



UG4 LONGWALLS 401 TO 405 BIODIVERSITY MANAGEMENT PLAN

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1.0 INTRODUCTION

The Moolarben Coal Complex is an open cut and underground coal mining operation located approximately 40 kilometres north of Mudgee in the Western Coalfield of New South Wales (NSW) (**Figure 1**).

Moolarben Coal Operations Pty Ltd (MCO) is the operator of the Moolarben Coal Complex on behalf of the Moolarben Joint Venture (Moolarben Coal Mines Pty Ltd [MCM], Yancoal Moolarben [YM] Pty Ltd and a consortium of Korean power companies). MCO, MCM and YM are wholly owned subsidiaries of Yancoal Australia Limited.

The Moolarben Coal Complex comprises four approved open cut mining areas (OC1 to OC4), three approved underground mining areas (UG1, UG2 and UG4) and other mining related infrastructure (including coal processing and transport facilities) (**Figure 2**). Since the commencement of coal mining operations in 2010, mining activities have occurred within OC1, OC2, OC3, OC4, and UG1 (**Figure 2**).

The UG4 Underground Mine (UG4) is a component of the approved Moolarben Coal Project Stage 1 Approval (05_0117) (**Figure 2**). First workings for UG4 North Mains commenced in October 2020 (**Figure 3**). Secondary extraction in UG4 of the first Longwall LW401 is scheduled to commence in 2022 (**Table 2**).

Mining operations at the Moolarben Coal Complex are currently approved until 31 December 2038 and would continue to be carried out in accordance with Project Approval (05_0117) (Moolarben Coal Project Stage 1) as modified and Project Approval (08_0135) (Moolarben Coal Project Stage 2) as modified, granted under the NSW Environmental Planning and Assessment Act, 1979 (EP&A Act).

1.1 PURPOSE AND SCOPE

This UG4 Longwalls 401 to 408 Biodiversity Management Plan (LW401-408 BMP) has been prepared by MCO with input from suitably qualified experts including Niche Environment and Heritage Pty Ltd [Niche] and Mine Subsidence Engineering Consultants [MSEC], to satisfy the requirements of Project Approval (05_0117) as modified and the NSW Department of Planning, Industry and Environment (DPIE) and NSW Division of Resources and Energy (DRE) (2015) Draft *Guidelines for the Preparation of Extraction Plans*. The appointment of the team of suitably qualified and experienced persons (which includes representatives of Niche and MSEC) were endorsed by the Secretary of the DPIE on the 26 April 2021 (**Attachment 2** of the Extraction Plan).

In summary:

Purpose: This LW401-408 BMP outlines the management of potential environmental consequences on aquatic and terrestrial flora and fauna resulting from the extraction of Longwalls 401-408.

Scope: This LW401-408 BMP covers aquatic and terrestrial flora and fauna within the Longwalls 401-408 Study Area¹.

¹ Longwalls 401-408 and the area of land within the furthest extent of the 26.5 degree (°) angle of draw and 20 millimetres (mm) predicted subsidence contour.

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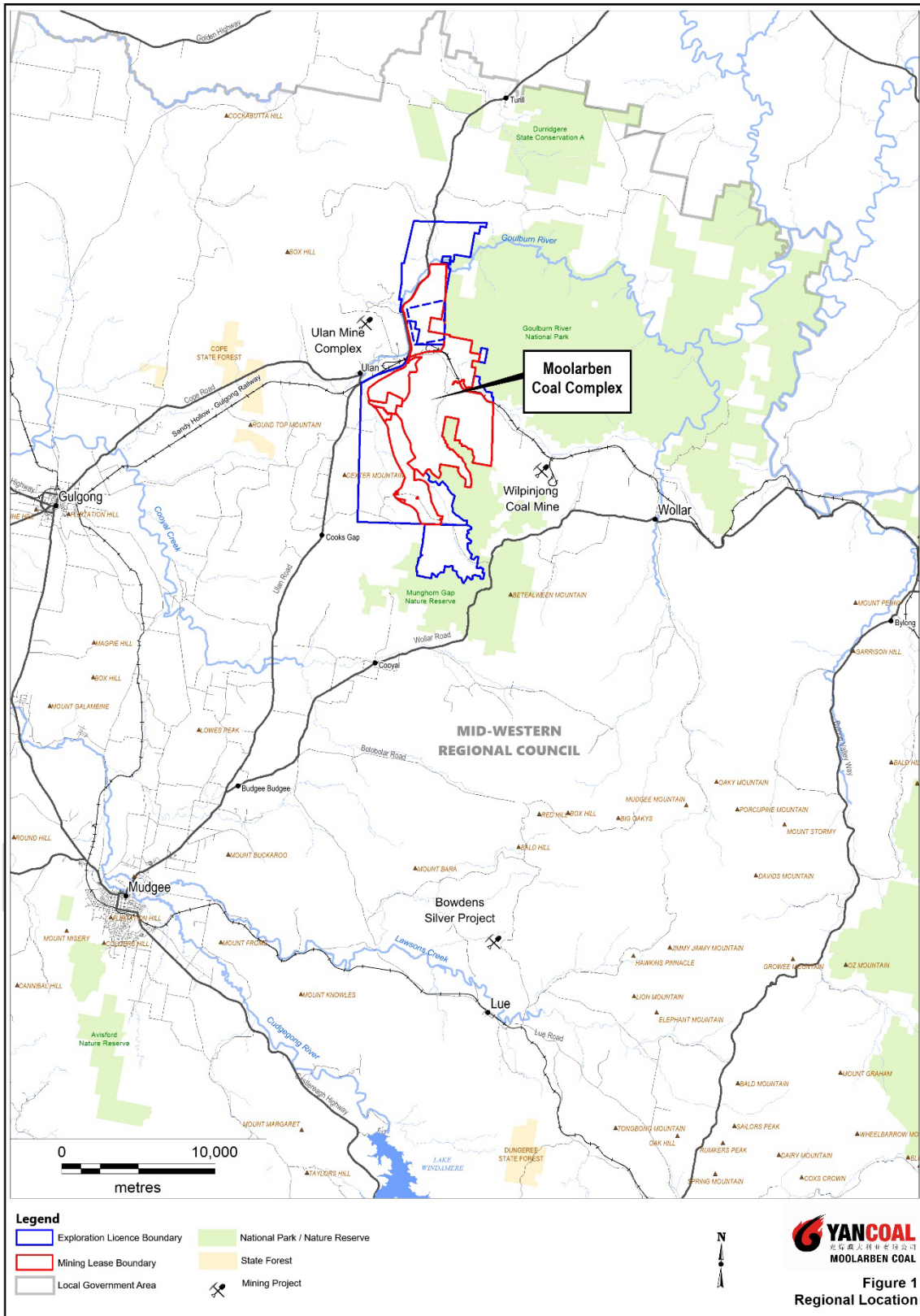
Longwalls 401-408 form part of the UG4 Underground Mine at the Moolarben Coal Complex.

A complex-wide Biodiversity Management Plan (complex-wide BMP) has been developed to manage aquatic and terrestrial flora and fauna across the Moolarben Coal Complex (including the Longwalls 401-408 Study Area covered by this LW401-408 BMP). The approved complex-wide BMP is publicly available on MCO's website (www.moolarbencoal.com.au).

To avoid duplication of existing Environmental Management Plans, this LW401-408 BMP references components of the approved complex-wide BMP.

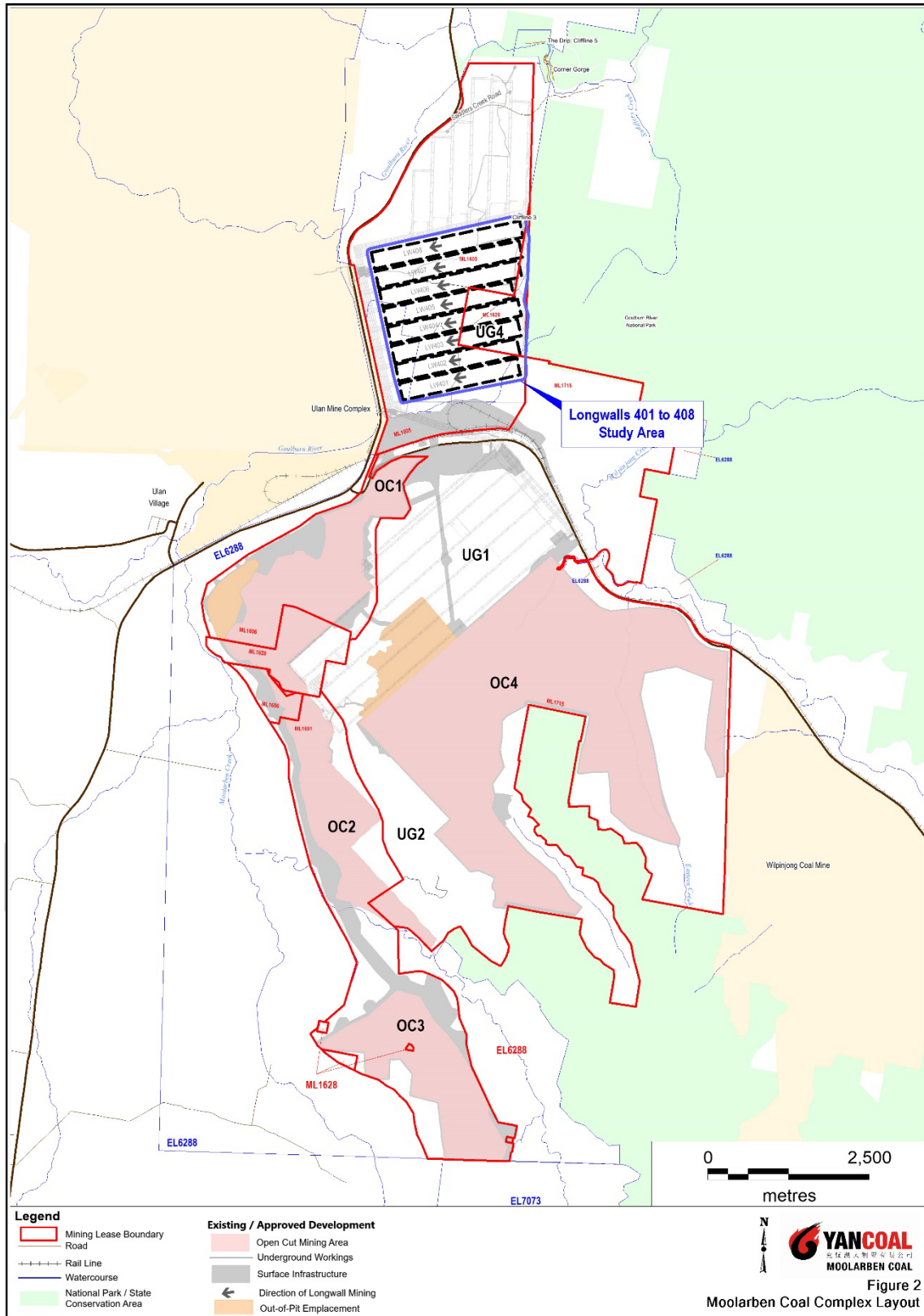
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Figure 1: Regional Location



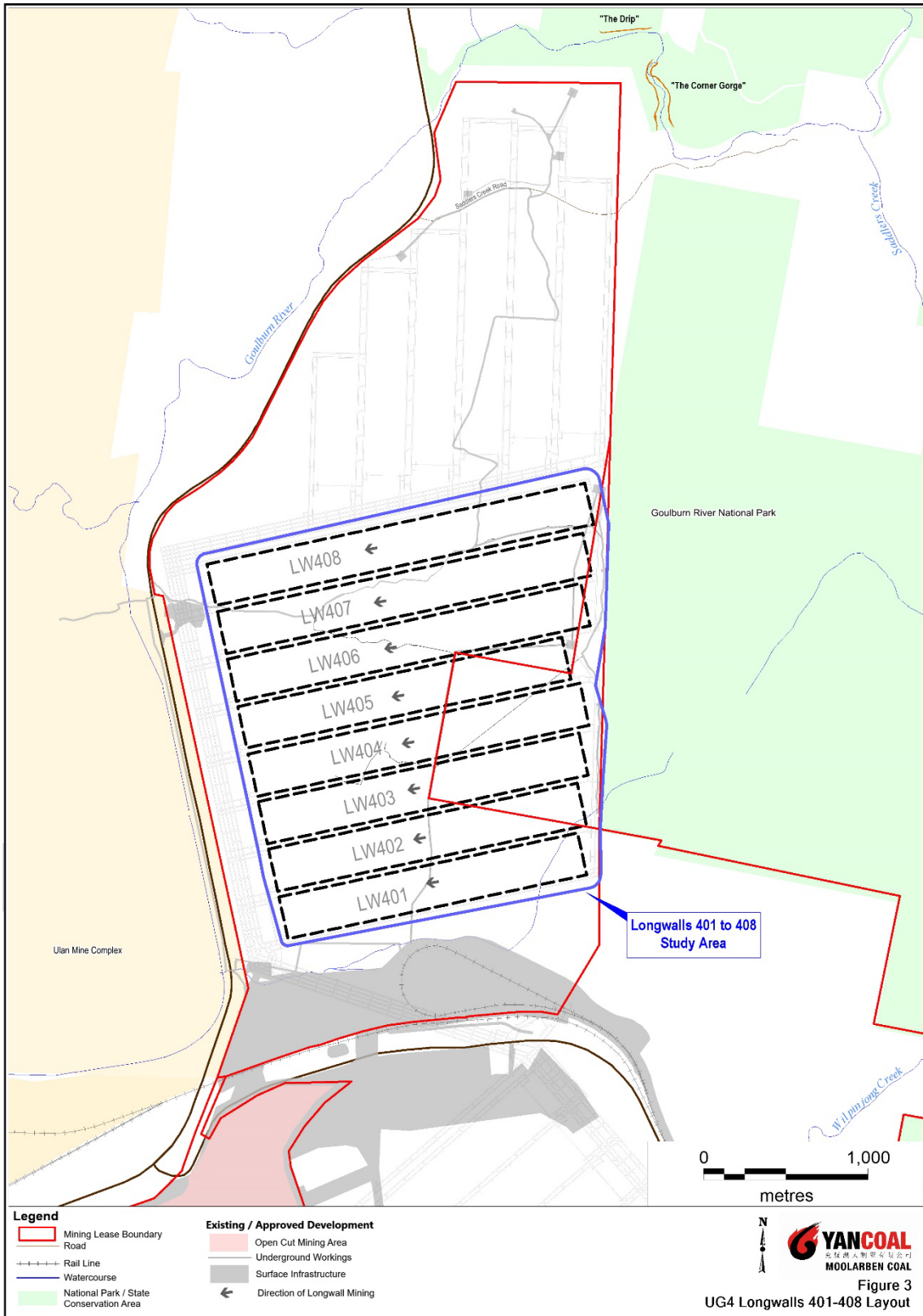
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Figure 2: Moolarben Coal Complex Layout



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Figure 3: Underground 4 Longwalls 401 to 408 Layout



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1.2 STRUCTURE OF THE LONGWALLS 401-408 BIODIVERSITY MANAGEMENT PLAN

The remainder of the LW401-408 BMP is structured as follows:

- Section 2** Describes the review and update of the LW401-408 BMP.
- Section 3** Outlines the statutory requirements applicable to the LW401-408 BMP.
- Section 4** Summarises the predicted subsidence impacts and environmental consequences resulting from the secondary extraction of Longwalls 401-408.
- Section 5** Details the performance measures and indicators that will be used to assess environmental performance in relation to aquatic and terrestrial flora and fauna.
- Section 6** Describes the monitoring program.
- Section 7** Describes the potential management measures that could be implemented to remediate any identified impacts to aquatic and terrestrial flora and fauna.
- Section 8** Provides a Contingency Plan to manage any unpredicted impacts and their consequences and describes the Trigger Action Response Plan (TARP) management tool.
- Section 9** Describes the Annual Review requirements, audits, improvement of environmental performance and preparation for future Extraction Plans.
- Section 10** Outlines the management and reporting of incidents.
- Section 11** Outlines the management and reporting of complaints.
- Section 12** Outlines the management and reporting of any non-compliance with statutory requirements.
- Section 13** Lists the documents referred to in **Sections 1 to 12** of this LW401-408 BMP.

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2.0 BIODIVERSITY MANAGEMENT PLAN REVIEW AND UPDATE

In accordance with Condition 5, Schedule 5 of Project Approval (05_0117) (as modified), this LW401-408 BMP will be reviewed as follows:

5. *Within 3 months of the submission of:*
 - (a) *the submission of annual review under condition 4 above;*
 - (b) *the submission of an incident report under condition 7 below;*
 - (c) *the submission of an audit under condition 9 below; or*
 - (d) *any modification of this approval,*

the Proponent shall review and, if necessary, revise the strategies, plans, and programs required under this approval to the satisfaction of the Secretary. Where this review leads to revisions in any such document, then within 4 weeks of the review the revised document must be submitted to the Secretary for approval.

2.1 ACCESS TO INFORMATION

In accordance with Condition 11, Schedule 5 of Project Approval (05_0117), MCO will make the approved LW401-408 BMP publicly available on the MCO website.

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3.0 STATUTORY REQUIREMENTS

MCO's statutory obligations are contained in:

- the conditions of the NSW Project Approval (05_0117) (as modified) and NSW Project Approval (08_0135) (as modified);
- the conditions of Commonwealth Approvals (EPBC 2007/3297, EPBC 2013/6926, EPBC 2008/444 and EPBC 2017/7974);
- relevant licences and permits, including conditions attached to the Environment Protection Licence (EPL) No. 12932 and Mining Leases; and
- other relevant legislation.

Obligations relevant to this LW401-408 BMP are described below.

3.1 EP&A ACT PROJECT APPROVAL

Condition 77(i), Schedule 3 of Project Approval (05_0117), requires the preparation of a Biodiversity Management Plan (i.e. this LW401-408 BMP) as a component of the Extraction Plan. In addition, Conditions 77(n), 77(p) and 78, Schedule 3 and Condition 3, Schedule 5 of Project Approval (05_0117) outline general management plan requirements that are applicable to the preparation of the LW401-408 BMP. **Table 1** presents these requirements and indicates where they are addressed within this **LW401-408 BMP**.

Table 1 Biodiversity Management Plan Requirements

Project Approval (05_0117) Condition	LW401-408 BMP Section
<p>Condition 77, Schedule 3</p> <p>77. The Proponent shall prepare and implement an Extraction Plan for all second workings on site to the satisfaction of the Secretary. Each extraction plan must:</p> <p>...</p> <p>(i) include a Biodiversity Management Plan, which has been prepared in consultation with OEH, which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on aquatic and terrestrial flora and fauna, with a specific focus on threatened species, populations and their habitats; endangered ecological communities; and water dependant ecosystems;</p> <p>...</p> <p>(n) include a contingency plan that expressly provides for adaptive management where monitoring indicates that there has been an exceedance of any performance measure in Table 18 and 19, or where such exceedances seem likely;</p> <p>...</p> <p>(p) include a program to collect sufficient baseline data for future Extraction Plans.</p>	<p>This document and complex-wide BMP</p> <p>Section 8</p> <p>Section 9.3</p>
<p>Condition 78, Schedule 3</p> <p>78 The Proponent shall ensure that the management plans required under conditions 5(g)-(l) above include:</p> <p>(a) an assessment of the potential environmental consequences of the Extraction Plan incorporating any relevant information that has been obtained since this approval; and</p> <p>(b) a detailed description of the measures that would be implemented to remediate predicted impacts.</p>	<p>Sections 4</p> <p>Section 7</p>

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Table 1 Biodiversity Management Plan Requirements (cont.)

Project Approval (05_0117) Condition	LW401-408 BMP Section
<p>Condition 3, Schedule 5</p> <p>3. The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:</p> <p>(a) detailed baseline data</p> <p>(b) a description of:</p> <ul style="list-style-type: none"> • the relevant statutory requirements (including any relevant approval, licence or lease conditions); • any relevant limits or performance measures/criteria; • 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; <p>(c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;</p> <p>(d) a program to monitor and report on the:</p> <ul style="list-style-type: none"> • impacts and environmental performance of the project; • effectiveness of any management measures (see c above); <p>(e) a contingency plan to manage any unpredicted impacts and their consequences;</p> <p>(f) a program to investigate and implement ways to improve the environmental performance of the project over time;</p> <p>(g) a protocol for managing and reporting any:</p> <ul style="list-style-type: none"> • incidents; • complaints; • non-compliances with statutory requirements; and • exceedences of the impact assessment criteria and/or performance criteria; and <p>(h) a protocol for periodic review of the plan.</p>	<p>Sections 4.3.1, 4.4.1, 4.5 and 4.6</p> <p>Section 3</p> <p>Section 5 Section 5</p> <p>Sections 7</p> <p>Sections 6 and 9</p> <p>Section 8 Sections 9</p> <p>Section 10 Section 11 Section 12 Section 8 Section 2</p>

3.2 OTHER LEGISLATION

MCO will operate the Moolarben Coal Complex consistent with Project Approval (05_0117) and any other legislation that is applicable to an approved Part 3A Project under the EP&A Act. The following Acts may be applicable to, but are not limited to, the conduct of the Moolarben Coal Complex:

- *Fisheries Management Act, 1994;*
- *Heritage Act, 1977;*
- *Coal Mine Subsidence Compensation Act, 2017;*
- *Mining Act, 1992;*
- *National Parks and Wildlife Act, 1974;*
- *Biodiversity Conservation Act, 2016 (BC Act);*
- *Protection of the Environment Operations Act, 1997;*
- *Roads Act, 1993;*
- *Water Act, 1912;*
- *Water Management Act, 2000;*
- *Work Health and Safety Act, 2011;* and
- *Work Health and Safety (Mines and Petroleum Sites) Act, 2013.*

Relevant licences or approvals required under these Acts will be obtained as required.

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4.0 PREDICTED SUBSIDENCE IMPACTS AND ENVIRONMENTAL CONSEQUENCES

4.1 LONGWALLS 401-408 EXTRACTION SCHEDULE

Longwalls 401-408 and the area of land within the furthest extent of the 26.5° angle of draw and 20 mm predicted subsidence contour (i.e. the Longwalls 401-408 Study Area) are shown on **Figure 3**. Longwall extraction will occur from the east to the west. The longwall layout includes approximately 260 m panel widths (void) with 35 m width pillars (solid). The provisional extraction schedule for Longwalls 401-408 is provided in **Table 22**.

Table 2 Provisional Extraction Schedule

Longwall	Estimated Start Date	Estimated Duration (months)	Estimated Completion Date
LW401	June 2022	4	October 2022
LW402	November 2022	4	March 2023
LW403	April 2023	4	August 2023
LW404	August 2023	5	January 2024
LW405	February 2024	4	June 2024
LW406	July 2024	5	December 2024
LW407	January 2025	4	May 2025
LW408	June 2025	4	November 2025

4.1 REVISED SUBSIDENCE AND IMPACT PREDICTIONS

Revised predictions of the potential subsidence effects, subsidence impacts and environmental consequences of the proposed second workings, have been prepared by MSEC incorporating any relevant information obtained since approval.

The LW401-408 BMP for UG4 has incorporated the revised subsidence predictions and impacts from the Subsidence Predictions and Impact Assessment for Longwalls 401 to 408 (MSEC, 2021) and summarised in **Section 4.3** to **Section 4.6**.

4.2 ENVIRONMENTAL RISK ASSESSMENT

An Environmental Risk Assessments (ERA) was conducted for four of the key component plans of the UG4 Longwalls 401- 408 Extraction Plan (Water Management Plan, Biodiversity Management Plan, Heritage Management Plan and Land Management Plan), to provide appropriate consideration to risk assessment and risk management in accordance with the Draft DPIE and DRE (2015) *Guidelines for the Preparation of Extraction Plans*.

The ERA workshop for LW panels 401-408 was held on 15 June 2021, facilitated by independent specialist, Risk Mentoring. The suitably qualified and experienced experts endorsed by the Secretary of the DPIE for the preparation of the UG4 Longwalls 401-408 Extraction Plan and relevant MCO personnel participated in the ERA.

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The ERA indicated that risks relevant to biodiversity in the Longwalls 401-408 Study Area were in the “Low” category, and it was expected that the risks could be managed with implementation of the appropriate mitigation, management and/or control measures.

4.3 FLORA

4.3.1 Baseline Data

Previous ecological survey work undertaken at the Moolarben Coal Complex, relevant to the UG4 Longwalls 401-408 Study Area, includes:

- Detailed Ecological Impact Assessments prepared by Moolarben Biota (2006) Stage 1 of the Moolarben Coal Project.
- UG4 Ancillary Works Modification – Biodiversity Development Assessment Report, prepared by Eco Logical Australia (2019).

Vegetation Communities

The study area has undergone extensive ecological survey including vegetation mapping and targeted threatened species survey during the preparation of the Stage 1 EIS (Moolarben Biota 2006), in addition to numerous subsequent vegetation mapping revisions (ELA 2015, 2019, 2020).

In addition to the ecological survey works described above, vegetation validation and baseline assessments were completed by Niche in 2021 to revise the existing vegetation mapping and to assign each community present to a Plant Community Type (PCT) in accordance with the current NSW Vegetation Classification System. The field validated vegetation mapping allows for consistency between the UG4 LW401-408 extraction plan and reporting/mapping previously undertaken for UG1 and biodiversity offset sites relevant to the project.

The field validated vegetation mapping determined that six PCTs in various condition states (low, medium, high and derived native grassland [DNG]) are present in the study area (as shown in **Figure 4**), consisting of the following:

- PCT 281: *Rough-Barked Apple - Red Gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion*
- PCT 477: *Inland Scribbly Gum - Red Stringybark - Black Cypress Pine - Red Ironbark open forest on sandstone hills in the southern Brigalow Belt South Bioregion and northern NSW South Western Slopes Bioregion*
- PCT 479: *Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion*
- PCT 1656: *Narrow-leaved Ironbark - Black Pine - Narrow-leaved Wattle shrub - grass open forest on sandstone slopes of the upper Hunter and Sydney Basin*
- PCT 1672: *Red Ironbark - Grey Gum - Black Pine heathy woodland on sandstone ranges of the Sydney Basin*
- PCT 1711: *Tantoon - Lepyrodia leptocaulis shrubland on sandstone drainage lines of the Sydney Basin.*

Threatened Ecological Communities

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One threatened community occurs within the study area (**Figure 5**) consisting of PCT 281 which is consistent with the threatened ecological community (TEC), *White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions*. This TEC is listed as a Critically Endangered Ecological Community (CEEC) under the NSW Biodiversity Conservation Act 2016 (BC Act) and the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). All patches of PCT 281 within the study area meet the criteria for listing under the BC Act whereas only patches of moderate and high condition PCT 281 meet the criteria for inclusion under the Commonwealth listing (Niche, 2021).

Threatened Flora

No threatened flora species were detected within the study area during the Stage 1 EIS (Moolarben Biota 2006) or Moolarben Coal Complex UG4 Ancillary Works Modification Biodiversity Development Assessment Report (ELA 2019) (Figure 4). A population of 14 individual *Androcalva procumbens* (Vulnerable, BC Act and EPBC Act) were identified during previous surveys undertaken by ELA (Niche, 2021).

No confirmed threatened flora species were detected during the baseline assessment and vegetation validation survey undertaken by Niche.

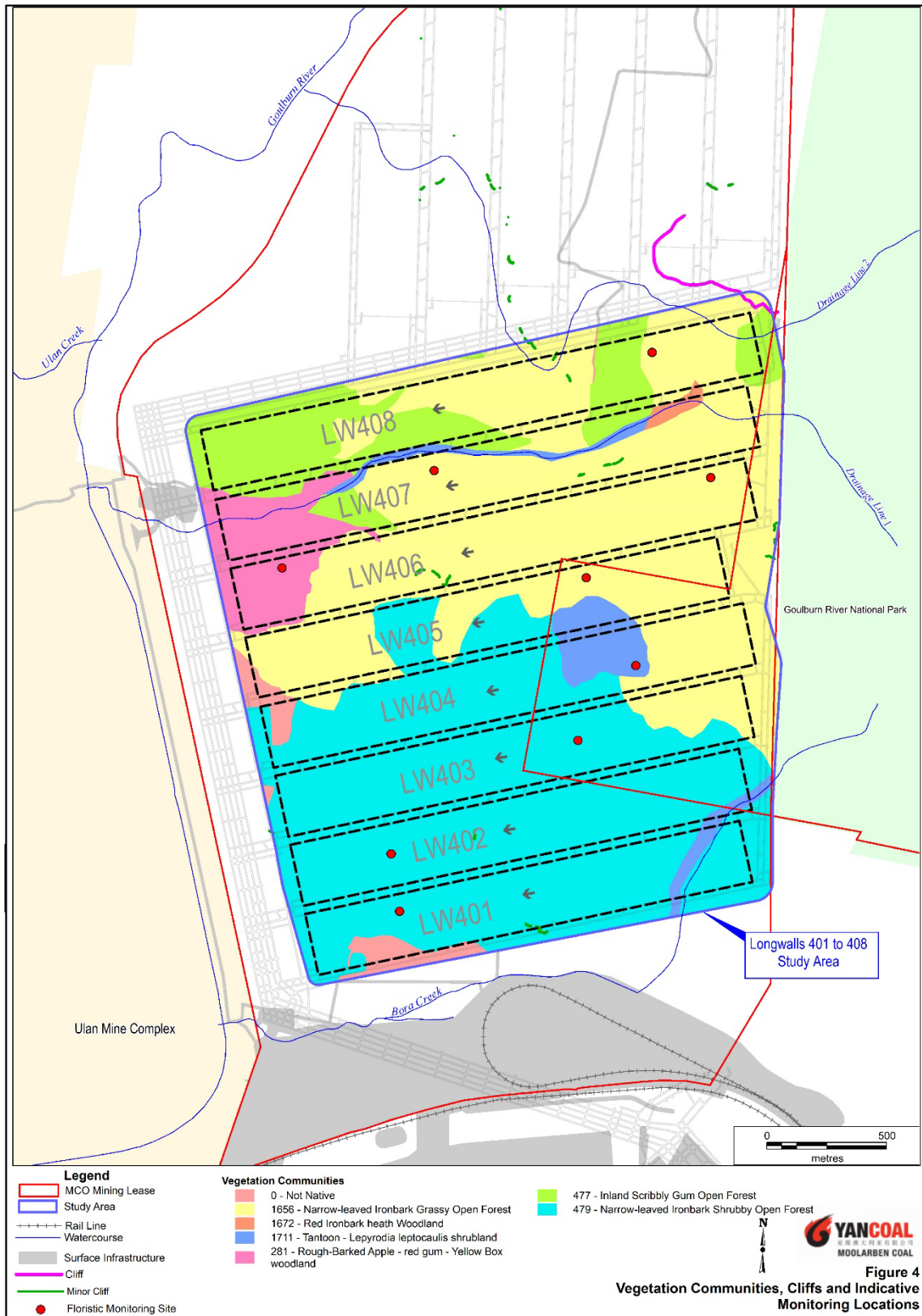
Existing Vegetation Condition

The baseline assessment reviewed the existing condition of the vegetation within the Study Area, identifying the following (Niche, 2021):

- Dieback and death of trees and shrubs resulting from the recent prolonged drought
- Poor structural integrity of PCTs resulting from drought related impacts
- Poor ecosystem function and low productivity in drought affected PCTs
- Low levels of disturbance and signs of weeds and feral animals
- Poor health/vigour of canopy trees on plateaus resulting from insect activity (borer)
- Limited extent and abundance of threatened fauna habitat resulting from drought related impacts
- Herbivory impacts resulting from native fauna species resident within the study area.

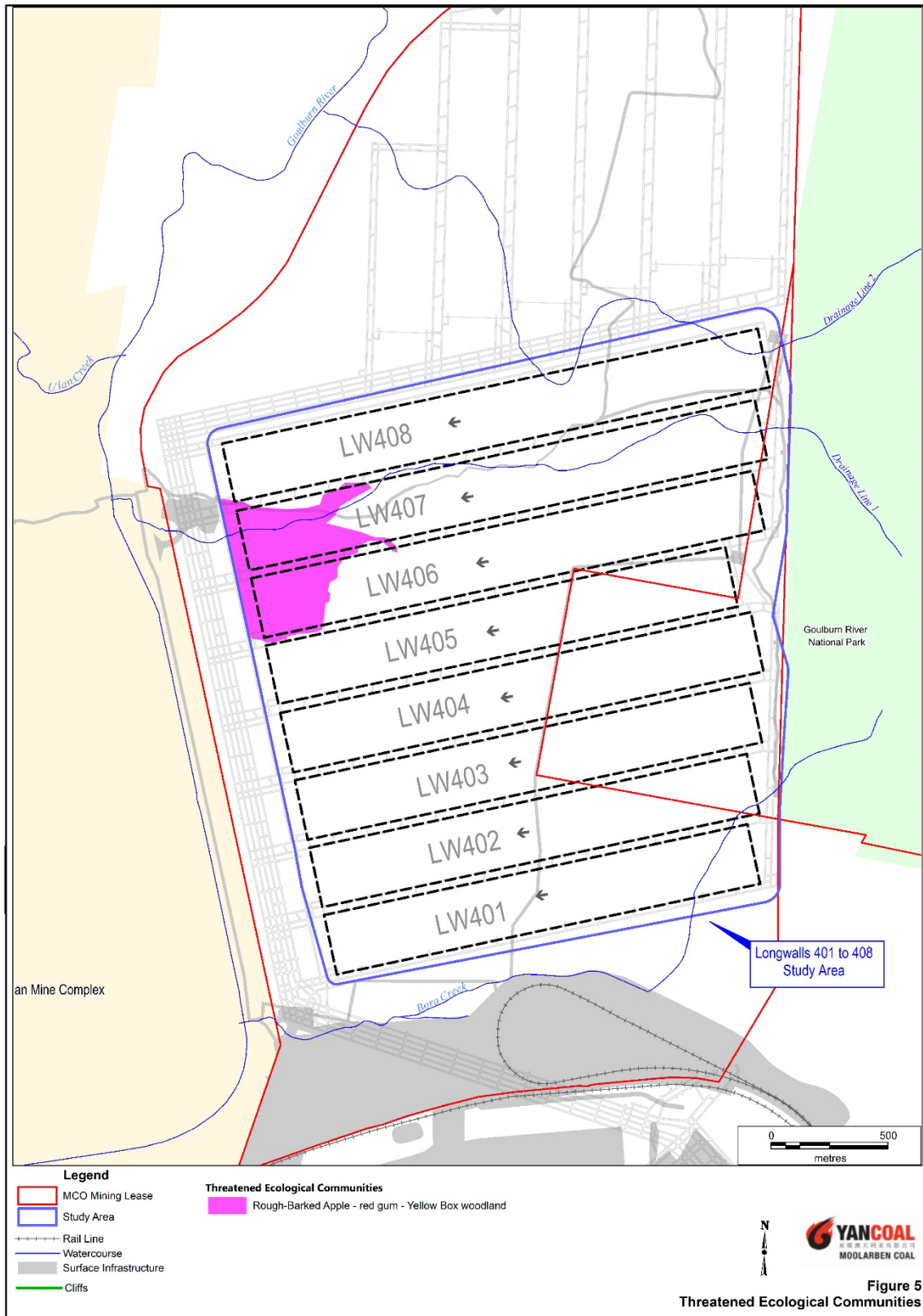
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Figure 4 Vegetation Communities in the Vicinity of Longwalls 401 to 408



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Figure 5 Threatened Ecological Communities in the Vicinity of Longwalls 401 to 408



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4.3.2 Predicted Subsidence Impacts and Environmental Consequences

Natural vegetation, which covers the majority of the Study Area, would be subjected to the full range of subsidence movements predicted by MSEC (2021) across the Longwalls 401-408 Study Area. MSEC (2021) compared the maximum predicted subsidence parameters due to the Longwalls 401-408 based on the Extraction Plan Layout with the maximum predictions due to the extraction of Longwalls 401-408 based on the Approved Layout (Table 3).

Table 3 Comparison of Maximum Predicted Total Conventional Subsidence Parameters based on the Approved Layout and Extraction Plan Layout

Layout	Subsidence ¹ (mm)	Tilt ² (mm/m)	Hogging Curvature ³ (km ⁻¹)	Sagging Curvature ³ (km ⁻¹)
Approved Layout	1900	60	>3	>3
Extraction Plan Layout	1900	60	>3	>3

Source: MSEC (2021).

mm/m = millimetres per metre, km⁻¹ = 1/kilometres.

¹ Subsidence refers to vertical displacements of the ground.

² Tilt is the change in the slope of the ground as a result of differential subsidence and is calculated as the change in subsidence between two points divided by the distance between those two points.

³ Curvature is the second derivative of subsidence, the rate of change of tilt, and is calculated as the change in tilt between two adjacent sections of the tilt profile divided by the average length of those sections.

The predicted total subsidence based on the Extraction Plan Layout is the same as that for the Approved Layout. The predicted total curvature and tilt based on the Extraction Plan Layout is the same as the Approved Layout. (MSEC, 2021). MSEC (2021) concluded that the potential impacts on natural vegetation would be the same as those assessed based on the Approved Layout.

Predicted subsidence impacts on biodiversity values of the study area are expected to be limited to the extent of longwall panels, being localised in nature (MSEC, 2021). It has been determined that secondary extraction at LW401-408 will not significantly impact the biodiversity values within the study area (Niche, 2021). A summary of the predicted subsidence impacts on biodiversity values includes:

Threatened Ecological Communities

- *Changes in gradients resulting in reduced grades and increased grades depending on the position of the natural vegetation in the subsidence bowl. These changes in grade may result in ponding of surface water runoff where existing natural grades are relatively shallow.*
- *It is expected that fracturing and dilation of the bedrock would occur as a result of the extraction, Fracturing and dilation of the bedrock could result in surface cracking.*
- *Predicted subsidence impacts are not expected to result in altered species composition or vegetative cover of PCT 281 within the Study Area. Based on the results of UG1 LW101-103 post mining monitoring in addition to the nature of predicted subsidence impacts, PCT 281 is not expected to experience significant reductions to species assemblage or cover as a result of predicted subsidence impacts (Niche, 2021).*

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4.4 TERRESTRIAL FAUNA

4.4.1 Baseline Data

Ecological surveys undertaken for the Stage 1 EIS (Moolarben Biota 2006) and subsequent surveys identified the following threatened fauna species on or adjacent to the Study Area include (Niche, 2021):

Mammals

- Corben’s Long-eared Bat *Nyctophilus corbeni* (Vulnerable, EPBC Act and BC Act) formerly Greater Long-eared Bat *Nyctophilus timoriensis*
- Eastern Cave Bat *Vespadelus troungtoni* (Vulnerable, BC Act)
- Large Bent-winged Bat *Miniopterus orianae oceanensis* (Vulnerable, BC Act) formerly Eastern Bentwing-bat
- Large-eared Pied Bat *Chalinolobus dwyeri* (Vulnerable, EPBC Act and BC Act)
- Squirrel Glider *Petaurus norfolcensis* (Vulnerable, BC Act)
- Yellow-bellied Sheath-tail Bat *Saccolaimus flaviventris* (Vulnerable, BC Act)

Birds

- Black-chinned Honeyeater – eastern subspecies *Melithreptus gularis gularis* (Vulnerable, BC Act)
- Brown Treecreeper – eastern subspecies *Climacteris picumnus victoriae* (Vulnerable, BC Act)
- Diamond Firetail *Stagonopleura guttata* (Vulnerable, BC Act)
- Dusky Woodswallow *Artamus cyanopterus cyanopterus* (Vulnerable, BC Act)
- Gilbert’s Whistler *Pachycephala inornata* (Vulnerable, BC Act)
- Glossy Black Cockatoo *Calyptorhynchus lathami* (Vulnerable, BC Act)
- Hooded Robin – south-eastern form *Melanodryas cucullata cucullata* (Vulnerable, BC Act)
- Painted Honeyeater *Grantiella picta* (Vulnerable, BC Act and EPBC Act)
- Powerful Owl *Ninox strenua* (Vulnerable, BC Act)
- Speckled Warbler *Cthonicola sagittata* (Vulnerable, BC Act)
- Square-tailed Kite *Lophoictinia isura* (Vulnerable, BC Act)
- Varied Sittella *Daphoenositta chrysoptera* (Vulnerable, BC Act).

4.4.2 Predicted Subsidence Impacts and Environmental Consequences

An analysis of the predicted subsidence impacts on biodiversity values has been undertaken by Niche (2021) and has determined that the majority of potential impacts in relation to fauna are predominantly indirect impacts to fauna habitat values, with direct impact limited to potential injury or death of a small number of individuals due to subsidence induced rock fall or collapse. A summary of the predicted subsidence impacts on biodiversity values includes:

Threatened Species, populations and habitats (Cave Dwelling Microbats)

- Predicted subsidence impacts relevant to threatened cave-dwelling microbats utilising the study area include localised surface tension cracking, cliff line instability and rock fall which may impact on potential roosting/breeding habitat (Niche 2021).

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- *Habitat features utilised by cave-dwelling bats were recorded in a minor cliff line C6 above LW 406 within the north-west section of the study area. The baseline assessment detected a number of bat species that may be using the cliff line as roosting habitat; however, species abundance was quite low and the habitat is unlikely to be used for breeding (Niche 2021).*
- *Predicted subsidence impacts to the minor cliff line may result in impacts to cave-dwelling microbats. Impacts may include reductions in habitat suitability and extent in addition to potential injury or mortality to individuals as a result of subsidence induced rock fall. The subsidence impacts are not expected to significantly reduce the suitability or extent of existing habitat for cave-dwelling microbats (Niche, 2021).*
- *Habitats suitable for cave-dwelling microbats were identified in MCO biodiversity offset sites within the locality including the Biodiversity Offset Area 1 (BOA1) site with additional habitat available in the adjacent Goulburn River National Park (GRNP) to the east. Baseline assessment data indicates that cave-dwelling microbat species are currently utilising suitable habitat in the BOA1 site, demonstrating its suitability as potential refuge for microbat species affected by predicted subsidence impacts (Niche, 2021).*

Threatened Species, populations and habitats (Birds)

- *Predicted subsidence impacts relevant to threatened bird species utilising the study area include localised surface tension cracking and altered overland flow which may impact health, abundance and diversity of foraging resources and sheltering resources (Niche, 2021).*
- *Alterations to hydrology resulting from surface tension cracking or surface ponding may result in localised short-term reduction in the extent and quality of foraging habitat. Impacts to foraging habitat are not expected to significantly impact species within the locality as bird species are highly mobile and are likely to seek alternative foraging habitat elsewhere within the surrounding landscape. Baseline assessment data indicates that bird species are currently utilising foraging habitat in the Biodiversity Offset Area 1, demonstrating its suitability as an alternative foraging resource. Additional high quality foraging resources are available in the adjacent GRNP and vegetated surrounds. Based on the above, it is unlikely that subsidence impacts will result in the long-term reduction of foraging habitat (Niche, 2021).*
- *Predicted subsidence impacts are not expected to affect breeding habitats within the Study Area (Niche, 2021).*

4.5 AQUATIC FAUNA

Most of the creeks and drainages in the Moolarben Coal Complex area are ephemeral or intermittent. Literature reviews and aquatic ecology studies undertaken at the Moolarben Coal Complex indicate that there are no threatened aquatic plants, fish or macroinvertebrate species or populations (as listed under EPBC Act or under the NSW *Fisheries Management Act, 1994*) listed or found in the upper Goulburn River (Ecovision, 2008) (Marine Pollution Research, 2017) (BMP, 2020).

4.6 GROUNDWATER DEPENDENT ECOSYSTEMS

There are two types of Groundwater Dependent Ecosystem (GDEs): ecosystems that are dependent in whole or in part on water reserves held in the ground; and those dependent on the surface expression of groundwater (Eamus *et al.*, 2006).

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'The Drip', on the Goulburn River north of UG4, represents the only significant seep/spring GDE within the locality, with native vegetation reliant on this surface expression of water evident within the cliff line of 'The Drip'. This water feature is likely to be fed from perched water in the Sandstone north of the Goulburn River and is not considered relevant to this Extraction Plan as there is no credible mechanism for impact from the extraction of Longwalls 401- 408.

Mapping from the Groundwater Dependent Ecosystems (GDE) Atlas (BoM, 2021) identifies the Goulburn River as a low to moderate potential aquatic GDE as well as vegetation identified as low to high potential terrestrial GDEs in the vicinity of UG4 (AGE 2021). The significant depth to water (i.e., approximately 25 – 65 metres) indicates that GDEs are not present within the UG4 area (AGE 2021).

Springs and groundwater seeps in nearby creek valleys and localised pools and soaks along the creeks support riparian vegetation (AGE 2021). None of these features constitute high priority GDEs listed under the Water Sharing Plans relevant to the Moolarben Coal Complex (AGE 2021).

No GDEs have been identified in the Longwalls 401 to 408 Study Area.

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5.0 PERFORMANCE MEASURES AND PERFORMANCE INDICATORS

Project approval condition 77 (i) requires the management of potential and/or environmental consequences of the proposed second workings on aquatic and terrestrial flora and fauna, with a specific focus on threatened species, populations and their habitats; endangered ecological communities and water dependent ecosystems.

Fauna species selected for monitoring are those which are considered to occur in habitats sensitive to direct impacts (DPIE 2020) which in the case of UG4, consists of geological features such as caves, crevices and fissures in minor cliff lines (Niche 2021)

Performance indicators have been developed to assess subsidence impacts on threatened ecological communities and threatened fauna. MCO will assess Longwalls 401-408 against the following biodiversity performance indicators:

- **Threatened ecological communities - PCT 281: Rough-Barked Apple - Red Gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion**
 - No significant reduction in vegetation integrity score greater than observed at reference sites (decrease of vegetation integrity score by 20% for two consecutive survey periods post mining) combined with observed subsidence impacts; or
 - No significant reduction in species diversity greater than observed at reference sites (a significant reduction being greater than 5 species consistently absent from established monitoring plots for 4 consecutive years) combined with observed subsidence impacts.
- **Threatened fauna - Threatened Cave-dwelling bat species**
 - No significant reduction in threatened species presence greater than observed at reference sites (at least 1 species absent from acoustic data analysis results for 4 consecutive years) combined with observed impacts to habitat directly related to subsidence.
- **Threatened Flora - *Androcalva procumbens***
 - Threatened flora remains present within the study area..

Section 6 describes the monitoring that will be conducted to assess the UG4 Underground Mine against the relevant biodiversity performance indicators.

Section 8 provides a Contingency Plan in the event biodiversity performance indicators are exceeded.

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6.0 MONITORING

The objective of biodiversity monitoring is to evaluate the vegetation and fauna habitat condition at the Moolarben Coal Complex (including recovery and or enhancement of native vegetation) and to identify appropriate management actions to be applied, where required. Sections 8.1, 8.2, 8.3 and 8.4 of the approved complex-wide BMP describe monitoring of noxious and environmental weeds, vertebrate pests, access and rehabilitation, respectively.

6.1 SUBSIDENCE PARAMETERS

Subsidence parameters will be measured in accordance with the UG4 Longwalls 401-408 Subsidence Monitoring Program (LW401-408 SMP). In summary, surveys will be conducted to measure subsidence movements in three dimensions using a total station survey instrument. Subsidence movements will be measured along subsidence lines that have been positioned across the general landscape.

6.2 SUBSIDENCE IMPACTS

A monitoring program has been developed based on recommendations from Niche (2021) to monitor the impacts of the secondary extraction of Longwalls 401-408 on aquatic and terrestrial flora and fauna (and, in particular, threatened fauna and threatened ecological communities). The monitoring is based on baseline monitoring prior to mining and for two years following longwall mining beneath the monitoring location. Key components of the monitoring program are summarised in **Table 4**.

Table 4 UG4 Biodiversity Monitoring Program Overview

Monitoring Component	Parameter	Timing/Frequency	Responsibility		
Pre-mining					
UG4 subsidence monitoring lines as described in the LW401-408 SMP	Ground survey – baseline, as described in the LW401-408 SMP.	Prior to the commencement of Longwall 401 extraction.	Underground Technical Manager / Registered Mine Surveyor		
Floristic monitoring plots	Floristic survey at specific locations in the study area and reference sites consisting of a modified 50 x 20 m plot containing a nested 20 x 20 m plot along a fixed transect, recording the composition, structure and functional attributes of extant PCTs.	During spring, prior to longwall extraction beneath monitoring plots.	Environment and Community Manager		
Photo point monitoring	Two photographs (portrait and landscape) to be taken at the established pickets at the start and end of each 50 metre transect of all floristic plots.	During spring, prior to longwall extraction beneath monitoring plots.	Environment and Community Manager		
Visual assessment	Visual inspection of threatened flora populations	During spring, prior to longwall extraction.	Environment and Community Manager		
Acoustic monitoring (Microbats)	Four acoustic devices targeting bats (three in the study area and one in the reference site) to be deployed for four nights.	During spring, prior to longwall extraction beneath monitoring sites.	Environment and Community Manager		
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Table 11 (Continued): UG4 Biodiversity Monitoring Program Overview

Monitoring Component	Parameter	Timing/Frequency	Responsibility
<i>During and After Mining</i>			
UG4 subsidence monitoring lines as described in the LW401-408 SMP	Ground survey – baseline, as described in the LW401-408 SMP.	At the completion of each Longwall 401 to 408.	Underground Technical Manager / Registered Mine Surveyor
Floristic monitoring plots	Floristic survey at specific locations in the study area and reference sites consisting of a modified 50 x 20 m plot containing a nested 20 x 20 m plot along a fixed transect, recording the composition, structure and functional attributes of extant PCTs.	Annually during spring, for two years following longwall extraction beneath monitoring plots.	Environment and Community Manager
Photo point monitoring	Two photographs (portrait and landscape) to be taken at the established pickets at the start and end of each 50 metre transect of all floristic plots.	Annually during spring, for two years following longwall extraction beneath monitoring sites.	Environment and Community Manager
Visual assessment	Visual inspection of threatened flora populations	Annually during spring until the completion of LW 408	Environment and Community Manager
Acoustic monitoring (Microbats)	Four acoustic devices targeting bats (three in the study area and one in the reference site) to be deployed for four nights.	Annually during spring, for two years following longwall extraction at each monitoring site.	Environment and Community Manager

The monitoring results will be:

- Used to assess the potential environmental consequences of an observed subsidence impact (**Section 6.3**).
- Used to identify appropriate management measures, where relevant (**Section 7.0**).
- Used to assess compliance with the biodiversity performance indicators (**Section 5.0**).

In the event monitoring identifies any subsidence related impacts on aquatic or terrestrial flora and fauna, the relevant details will be recorded in the Subsidence Impact Register (**Attachment 1**) and reported where required in accordance with Project Approval (05_0117) (**Section 10.0**). More detailed information regarding monitoring methods is provided in **Sections 6.2.1 to 6.2.3** below.

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6.2.1 Floristic Plots

Nine permanent floristic plots in accordance with the NSW Biodiversity Assessment Method (BAM) (DPIE 2020) have been established at various locations of the study area, targeting PCTs potentially impacted by LW401-408 prior to commencement of works (**Figure 4**).

An additional nine permanent floristic plots have been established in corresponding PCTs at nearby reference sites to provide control data for the purpose of comparative analysis and to allow the identification of confounding bias in monitoring results.

Monitoring via floristic plots is to take place every Spring from commencement of works, over the duration of secondary extraction, extending for at least two years once mining has been completed. Annual data analysis will focus on tracking the updated VIS against the ecological trajectory scenarios in addition to comparative analysis of PCT composition, structure and function data; and indicators of vegetation stress between the study area and reference sites using descriptive statistics.

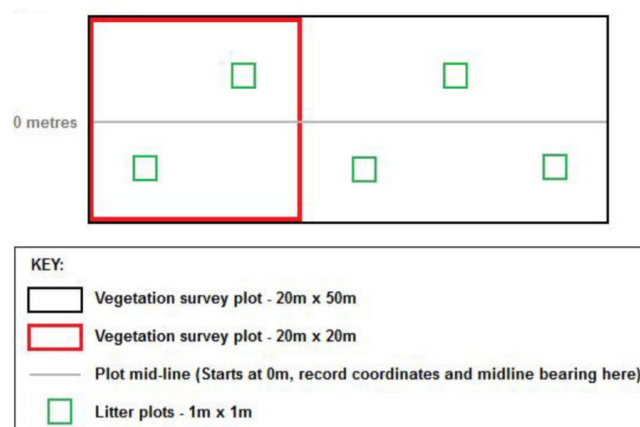
Monitoring via floristic plots is to take place every Spring over the duration of secondary extraction, extending for at least two years once mining has been completed.

Each floristic plot is to consist of a 20 x 50 metre plot (centred around a central 50 metre transect) for recording of functional attributes and a nested 20 x 20 metre quadrat for recording floristic and structural attributes (refer to **Plate 1** below). Each plot will be permanently marked with a capped star picket (or similar) to ensure the site is easily located for future monitoring rounds.

Data recorded within each 20 x 20 metre nested quadrat is to consist of:

- A full count of native and exotic species diversity.
- Projected foliage cover (PFC) of all species in increments of 0.1-1, 1-10 then 5% increments capped at 100%.
- Abundance of all species recorded within the quadrat measured at 1-10 then in increments of 10 up to 100. Upon reaching 100 individuals, further measurements will be recorded in increments of 500.
- A record of the structural layer/s occupied by each species including the dominant species occupying the canopy, mid-storey and ground layers.

Plate 1: Floristic plot layout as per the NSW BAM 2020 Operational Manual - Stage 1 (DPIE 2020)



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Data recorded within the 20 x 50 metre plot is to consist of the following:

- Diameter at breast height (DBH), measured 1.3 metres from the ground, of all canopy trees present within the plot
- Presence and number of canopy trees within specific DBH size increments (<5 cm, 5-10 cm, 11-20 cm, 21-30 cm, 31-40 cm, 41-50 cm etc)
- Number of large trees (>50 cm DBH) and presence of regenerating trees (<5 cm DBH)
- Number of hollow-bearing trees
- Length of coarse woody debris measured in metres
- Cover (%) of epicormic foliage relative to total cover of foliage within the plot
- Cover (%) of discoloured canopy foliage relative to total cover of healthy foliage within the plot
- Cover (%) of dieback relative to live vegetation within the plot and the PCT patch
- Cover value (%) of bare branches
- Count of any stags encountered within the plot
- Evidence of subsidence impacts (cracking or ponding)
- Extent of subsidence impacts (cracking or ponding) as a percent of the plot area.

Landscape characteristics recorded at each plot include aspect, slope (expressed as a percentage), type and percentage cover of surface rock, cryptograms, bare soil, presence/absence of rock outcrop, cliffs or caves, proximity to nearest waterway or waterbody in addition to soil colour and texture.

6.2.2 Photo-point Monitoring

A photo point will be established at each end of the central 50 metre transect of floristic plots. During the baseline monitoring and each subsequent monitoring round, two photographs (portrait and landscape) are to be taken at each end along the central transect, to retain a visual record.

Photographs taken at each point are to undergo comparative analysis to the baseline and previous years imagery to quantify any changes in observable dieback or stress (foliage discolouration) visible on terrestrial vegetation.

6.2.3 Monitoring for Threatened Fauna Species – Microbat Activity

Passive monitoring using acoustic devices is to be undertaken to assess potential impacts to threatened microbats previously recorded in the study area. Passive monitoring via acoustic device is easily replicated and analysed and can be used to determine changes over time to abundance, diversity, habitat preference, foraging guild and activity of target microbat species.

The diversity, abundance, habitat preference, foraging guild or residency of microbat species within the study area may be a useful surrogate for detecting subsidence related impacts in correlation with visible signs of cracking or ponding.

A total of four Anabat acoustic devices (or equivalent) will be installed in the vicinity of microbat habitat identified in the study area (three devices) and reference site (one device) for four nights to determine the identity of microbat species present on site, the approximate abundance (based on activity and number of passes) of each species on site and the average residency time on site (time and duration of activity). The results of subsequent monitoring rounds will be compared against the baseline to

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determine any changes to microbat presence, activity or residency time between the impact and reference sites.

6.2.4 Monitoring for threatened flora populations – *Androcalva procumbens*

Monitoring, including an estimated population count at each of the known locations of *Androcalva procumbens* will be undertaken annually in spring.

The estimated population counts will undergo comparative analysis to the baseline and previous years monitoring to quantify any changes.

If additional populations of *Androcalva procumbens* are detected during subsequent monitoring rounds, their locations and extents will be recorded in the annual monitoring report.

6.3 ENVIRONMENTAL CONSEQUENCES

MCO will compare the results of the subsidence impact monitoring against the biodiversity performance indicators (**Section 5.0**). In the event that any observed subsidence impacts exceed a performance indicator, additional monitoring and assessment will be undertaken (**Section 7.0**).

In the event that any observed subsidence impacts exceed the biodiversity performance indicators, MCO will assess the consequences of the exceedance in accordance with the Contingency Plan described in **Section 8.0** and Trigger Action Response Plan (TARP) developed for threatened fauna and threatened ecological communities (**Attachment 2**).

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7.0 MANAGEMENT MEASURES

Biodiversity management at the Moolarben Coal Complex is currently undertaken in accordance with the approved complex-wide BMP. Section 6.0 of the approved complex-wide BMP details strategies to manage vegetation onsite and improve vegetation connectivity, and Section 7.0 of the approved complex-wide BMP describes specific biodiversity management measures.

In addition to the management measures detailed in Sections 6.0 and 7.0 of the approved complex-wide BMP, Niche (2021) has recommended a number of management measures that will be implemented, where appropriate in the Longwalls 401-408 Study Area. Management measures have been recommended for vegetation, terrestrial fauna and habitat, weed management and additional monitoring, and are summarised in **Table 5**.

Table 5 Potential Management Measures

Potential Management Measures	
Measure	Description
Vegetation management	<ul style="list-style-type: none"> The type of vegetation management measures required to remediate potential subsidence impacts will depend on the identity and functional role of affected flora species and the nature of the impact. Potential management measures may include supplementary planting focused on restoring vegetation structure and subsidence repairs.
General fauna habitat management	<ul style="list-style-type: none"> Specific fauna habitat management measures will depend on the species/fauna habitat features potentially impacted. General fauna habitat management measures recommended include the following: <ul style="list-style-type: none"> Supplementary planting of preferred foraging species. Installation of alternative roosting habitat for cave-dwelling microbats near the minor cliffline of LW 406
Weed management	<ul style="list-style-type: none"> In the event that monitoring results indicate the presence of a novel priority weed incursion or an increase to cover or abundance of existing weed incursions such that it is likely to impact the vegetation integrity score of the affected PCT, weed management measure should continue be undertaken in accordance with the BMP (MCO 2020). Vehicles utilising the overland sections of the study area should remain on established/mapped tracks at all times to reduce the likelihood of introducing weed propagules into unaffected bushland.
Additional monitoring	<ul style="list-style-type: none"> In the event that any of the performance measures (Section 5.0) are exceeded, additional monitoring may be required. Additional monitoring methods to be employed will depend on the exact nature of the exceedance and the impacted biodiversity value. Additional monitoring may include targeted survey if specific species are impacted or decreased interval between survey periods.

The implementation of management measures (**Table 5**) will be considered with regard to the specific circumstances of the subsidence impact (e.g. the location, nature and extent of the impact) and the assessment of environmental consequences. The implementation of management measures will be related to the scale of impact and the ability to, and value in, undertaking mitigation measures on a case by case basis.

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The requirement and methodology for any subsidence remediation techniques will be determined in consideration of:

- Potential impacts of the unmitigated impact, including potential risks to public safety and the potential for self-healing or long-term degradation.
- Potential impacts of the remediation technique, including site accessibility and consideration of vegetation that would potentially be disturbed (e.g. avoidance of unnecessary disturbance of mapped EECs or previously recorded threatened flora species).
- Potential impacts of remediation work, including determining whether remediation work will create no greater impact than the subsidence impact itself.

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8.0 CONTINGENCY PLAN

In the event a biodiversity performance indicator relevant to aquatic and terrestrial flora and fauna (**Section 5.0**) is considered to have been exceeded or is likely to be exceeded, MCO will implement the Contingency Plan detailed in Section 11.0 of the approved complex-wide BMP. Section 11.0 of the approved complex-wide BMP states:

In the event a performance measure detailed in Section 10 has not been met or is considered to have been exceeded, MCO will implement the following Contingency Plan:

- *The Environment and Community Manager will report the exceedance to the General Manager within 24 hours of assessment completion.*
- *MCO will report the exceedance of the performance measure to the DPIE and DPIE Biodiversity Conservation Division as soon as practicable after MCO becomes aware of the exceedance.*
- *MCO will identify an appropriate course of action with respect to the identified impact(s), in consultation with specialists and relevant agencies, as necessary. For example, identification of proposed contingency measure(s) and a program to review the effectiveness of the contingency measures. Contingency measures will be developed in consideration of the specific circumstances of the exceedance and the assessment of environmental consequences.*
- *MCO will submit the proposed course of action to the DPIE for approval.*
- *MCO will implement the approved course of action to the satisfaction of the DPIE.*
- *MCO will report the exceedance of the performance measure and the success of the approved course of action as a component of the Annual Review (Section 13).*

Examples of contingency measures/controls that relate to the subsidence performance measure listed in Section 10 include:

- *Subsidence monitoring provides timely provision of data relating to impact of subsidence.*
- *Contingency budgetary allocation for remedial works associated with subsidence.*
- *Filling of minor cracks with appropriate material (e.g. soil or mulch) to avoid the creation of drainage channels.*
- *Re-grading of isolated depressions or highpoints and revegetation.*
- *Revegetation and monitoring.*
- *Additional monitoring.*

As described in Section 10, relevant Extraction Plans for underground mining operations or subsequent revisions of this plan will describe in further detail how the subsidence related performance measure listed in Table 3 will be met.

8.1 TRIGGER ACTION RESPONSE PLAN

The framework for the various components of this LW401-408 BMP are summarised in the TARPs shown in **Attachment 2**. The TARPs illustrate how the various predicted subsidence impacts, monitoring components, performance indicators, and responsibilities are structured to achieve compliance with the relevant statutory requirements, and the framework for management and contingency actions. The TARP system provides a simple and transparent snapshot of the monitoring of environmental performance and the implementation of management and/or contingency measures.

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9.0 REVIEW AND IMPROVEMENT OF ENVIRONMENTAL PERFORMANCE

9.1 ANNUAL REVIEW

In accordance with Condition 4, Schedule 5 of Project Approval (05_0117) (as modified), MCO will conduct an annual review of operations conducted at the Moolarben Coal Complex (including the performance of this LW401-408 BMP) prior to 31 March for the preceding calendar year, or as otherwise agreed by the Secretary of the DPIE.

The Annual Review will:

- describe the works carried out in the previous calendar year, and the development proposed to be carried out over the current calendar year;
- include a comprehensive review of the monitoring results and complaints records of the Project over the previous calendar year, including a comparison of these results against the:
 - relevant statutory requirements, limits or performance measures/criteria;
 - monitoring results of previous years; and
 - relevant predictions in the EA;
- identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;
- identify any trends in the monitoring data over the life of the Project;
- identify any discrepancies between the predicted and actual impacts of the Project, and analyse the potential cause of any significant discrepancies; and
- describe what measures will be implemented over the next year to improve the environmental performance of the Project.

In accordance with Condition 11, Schedule 5 of Project Approval (05_0117), the Annual Review will be made available on the MCO website. As described in **Section 2.0**, this LW401-408 BMP will be reviewed within three months of the submission of an Annual Review, and, if necessary, revised to ensure the plan is updated on a regular basis and to incorporate any recommended measures to improve environmental performance.

9.2 AUDITS

In accordance with Condition 9, Schedule 5 of Project Approval (05_0117), an independent environmental audit was conducted by the end of December 2015 and every three years thereafter. Notwithstanding the three-yearly timing, an audit must also be carried out prior to the completion of longwall panels 404 and 408, the precise timing of these audits will be determined in consultation with the DPIE. A copy of the independent environmental audit will be provided to the Secretary of the DPIE and made available on the MCO website.

The independent environmental audit will be conducted by suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary of the DPIE. The independent environmental audit will assess the environmental performance of the Project and assess

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whether it is complying with the requirements of Project Approval (05_0117), and any other relevant approvals, and recommend measures or actions to improve the environmental performance of the Project.

As described in **Section 2.0**, this LW401-408 BMP will be reviewed within three months of the submission of an independent environmental audit, and, if necessary, revised to ensure the plan is updated on a regular basis and to incorporate any recommended measures to improve environmental performance.

9.3 FUTURE EXTRACTION PLANS

In accordance with Condition 77(p), Schedule 3 of Project Approval (05_0117), MCO will collect baseline data for future Extraction Plans. In addition to the baseline data collection, consideration of the environmental performance and management measures, in accordance with the review(s) conducted as part of this LW401-408 BMP, will inform the appropriate type and frequency of monitoring of the assets relevant to the next Extraction Plan.

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10.0 INCIDENTS

An incident is defined in Project Approval (05_0117) as a set of circumstances that:

- causes or threatens to cause material harm to the environment; and/or
- breaches or exceeds the limits or performance measures/criteria in Project Approval (05_0117) (as modified).

In the event that an incident which causes, or threatens to cause, material harm to the environment occurs, the incident will be managed in accordance with the Pollution Incident Response Management Plan.

The reporting of incidents will be conducted in accordance with Condition 7, Schedule 5 of Project Approval (05_0117).

MCO will notify the Secretary of DPIE and any other relevant agencies of any incident associated with the UG4 Underground Mine which causes or threatens to cause material harm to the environment immediately after MCO confirms that an incident has occurred. For any other incident associated with the UG4, MCO will notify the Secretary and any other relevant agencies as soon as practicable after becoming aware of the incident. Within seven days of the date of the incident, MCO will provide the Secretary of DPIE and any relevant agencies with a detailed report on the incident. The report 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.

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11.0 COMPLAINTS

MCO maintains a Community Complaints Line (Phone Number: 1800 556 484) that is dedicated to the receipt of community complaints. The Community Complaints Line is publicly advertised and operates 24 hours per day, seven days a week, to receive any complaints from neighbouring residents or other stakeholders.

MCO has developed a Community Complaints Procedure which details the process to be followed when receiving, responding to and recording community complaints. The Community Complaints Procedure is supported by a Complaints Database.

The Community Complaints Procedure is a component of the MCO Environmental Management Strategy which requires the recording of relevant information including:

- the nature of complaint;
- method of the complaint;
- relevant monitoring results and meteorological data at the time of the complaint;
- site investigation outcomes;
- any necessary site activity and activity changes;
- any necessary actions assigned; and
- communication of the investigation outcome(s) to the complainant.

In accordance with Condition 11, Schedule 5 of Project Approval (05_0117), the complaints register will be updated monthly and made available on the MCO website.

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12.0 NON-COMPLIANCE WITH STATUTORY REQUIREMENTS

A protocol for the managing and reporting of non-compliances with statutory requirements has been developed as a component of MCO's Environmental Management Strategy and is described below.

Compliance with all approvals, plans and procedures will be the responsibility of all personnel (staff and contractors) employed on or in association with the Moolarben Coal Complex.

The Environmental and Community Manager (or delegate) will undertake regular inspections, internal audits and initiate directions identifying any remediation/rectification work required, and areas of actual or potential non-compliance.

As described in **Section 10.0**, MCO will notify the Secretary of the DPIE and any other relevant agencies of any incident associated with MCO immediately after MCO becomes aware of the incident. Within seven days of the date of the incident, MCO will provide the Secretary of the DPIE and any relevant agencies with a detailed report on the incident.

A review of MCO's compliance with all conditions of Project Approval (05_0117) will be undertaken prior to (and included within) each Annual Review. The Annual Review will be made publicly available on the MCO website.

As described in **Section 9.2**, an independent environmental audit was conducted by the end of December 2015 and undertaken every three years thereafter. A copy of the audit report will be submitted to the Secretary of the DPIE and made publicly available on the MCO website.

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13.0 REFERENCES

- Australasian Groundwater and Environmental Consultants (2021) Groundwater Technical Report for Moolarben UG4 LW401 to LW408 Extraction Plan, report prepared for Moolarben Coal Operations Pty Ltd by Australasian Groundwater and Environmental Consultants.
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ATTACHMENT 1

**UG4 LONGWALLS 401 TO 408 BIODIVERSITY MANAGEMENT PLAN
SUBSIDENCE IMPACT REGISTER TEMPLATE**

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UG4 Longwalls 401 to 408 Biodiversity Management Plan – Subsidence Impact Register Template

Impact Register Number	Impacted Species or Vegetation Community	Impact Description	Does Impact Exceed the Land Performance Measure/Indicators? (Yes/No)	Were Management Measures Implemented? (Yes/No)	Were Management Measures Effective? (Yes/No)

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ATTACHMENT 2

**UG4 LONGWALLS 401 TO 408 BIODIVERSITY MANAGEMENT PLAN
TRIGGER ACTION RESPONSE PLANS**

Document	Version	Issue	Effective	Author	Approved
MCO_UG4_LW401-408_BMP	1	June 22	July 22	MCO	B. Wesley

UG4 Longwalls 401 to 408 Threatened Ecological Communities (TEC) TARP

Condition	Normal		Level 1	Level 2
	Baseline Conditions	Predicted Impacts	Implement Management Measures	Restoration/Contingency Phase
Trigger	Ongoing management of aquatic and terrestrial flora and fauna with a focus on threatened ecological communities (TEC) i.e. PCT 281 within the Study Area of Longwalls 401-408.	Subsidence parameters and environmental consequences as predicted for flora (Section 4.3) within the Study Area.	Subsidence monitoring results identifies impacts that are greater than predicted. Assessment of biodiversity performance indicator for threatened ecological communities (TEC) i.e. PCT281 (Section 5.0) has not been triggered.	Subsidence monitoring results identifies impacts that are greater than predicted. Assessment of biodiversity performance indicator for threatened ecological communities (TEC) i.e. PCT281 (Section 5.0) has been triggered.
Action	Establish baseline data, including: <ul style="list-style-type: none"> Floristic monitoring plots and photo-point monitoring sites and undertake baseline survey to determine condition, as described in Section 6.0; and Pre-extraction subsidence survey as per the UG4 Longwalls 401 to 408 Subsidence Monitoring Program 	Floristic monitoring plots and photo-point monitoring undertaken, as described in Section 6.0 and the UG4 Longwalls 401 to 408 Subsidence Monitoring Program.	Investigate to determine whether the cause of the decline is from MCO mining activity and to recommend an appropriate response action level. Management measures implemented with regard to the specific circumstances of the subsidence impact (e.g. the nature and extent of the impact) and in accordance with Section 7.0 . Follow-up inspections will be conducted to assess the effectiveness of the management measures implemented and the requirement for any additional management measures.	Implement Contingency Plan including notifications as described in Section 8.0 .
Frequency	During spring, prior to longwall extraction beneath monitoring plots.	Annually during spring, for two years following longwall extraction beneath monitoring plots.	As required, in accordance with Section 7.0 .	As required, in accordance with Section 8.0 .
Position of Decision Making	Environment and Community Manager.	Environment and Community Manager.	Environment and Community Manager and Underground Technical Manager.	Environment and Community Manager and Underground Technical Manager.

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UG4 Longwalls 401 to 408 Threatened Fauna (Cave-Dwelling Micro Bats) TARP

Condition	Normal		Level 1	Level 2
	Baseline Conditions	Predicted Impacts	Implement Management Measures	Restoration/Contingency Phase
Trigger	Ongoing management of aquatic and terrestrial flora and fauna with a focus on threatened species i.e. cave-dwelling microbats within the Study Area of Longwalls 401-408.	Subsidence parameters and environmental consequences as predicted for fauna (Section 4.4) within the Study Area.	Subsidence monitoring results identifies impacts that are greater than predicted. Assessment of biodiversity performance indicator for threatened species i.e. cave dwelling microbats (Section 5.0) has not been triggered.	Subsidence monitoring results identifies impacts that are greater than predicted. Assessment of biodiversity performance indicator for threatened ecological communities (TEC) (Section 5.0) has been triggered.
Action	Establish baseline data, including: <ul style="list-style-type: none"> • Baseline monitoring for microbats using acoustic devices within the Study Area as described in Section 6.0; and • Pre-extraction subsidence survey as per the UG4 Longwalls 401 to 408 Subsidence Monitoring Program. 	Conduct monitoring of microbats, as described in Section 6.0 and the UG4 Longwalls 401 to 408 Subsidence Monitoring Program. Implement management measures, as required, in accordance with Section 7.0 .	Management measures implemented with regard to the specific circumstances of the subsidence impact (e.g. the nature and extent of the impact) and in accordance with Section 7.0 . Follow-up inspections will be conducted to assess the effectiveness of the management measures implemented and the requirement for any additional management measures.	Implement Contingency Plan including notifications as described in Section 8.0 .
Frequency	During spring, prior to longwall extraction beneath monitoring sites.	Annually during spring, for two years following longwall extraction at each monitoring site.	As required, in accordance with Section 7.0 .	As required, in accordance with Section 8.0 .
Position of Decision Making	Environment and Community Manager.	Environment and Community Manager.	Environment and Community Manager and Underground Technical Manager.	Environment and Community Manager and Underground Technical Manager.

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UG4 Longwalls 401 to 408 Threatened Flora (*Androcalva procumbens*) TARP

Condition	Normal		Level 1	Level 2
	Baseline Conditions	Predicted Impacts	Implement Management Measures	Restoration/Contingency Phase
Trigger	Ongoing management of aquatic and terrestrial flora and fauna with a focus on threatened species i.e. <i>Androcalva procumbens</i> within the Study Area of Longwalls 401-408.	Subsidence parameters and environmental consequences as predicted for fauna (Section 4.4) within the Study Area.	Subsidence monitoring results identifies impacts that are greater than predicted. Assessment of biodiversity performance indicator for threatened flora, i.e. <i>Androcalva procumbens</i> (Section 5.0) has not been triggered.	Subsidence monitoring results identifies impacts that are greater than predicted. Assessment of biodiversity performance indicator for threatened ecological communities (TEC) (Section 5.0) has been triggered.
Action	Establish baseline data, including: <ul style="list-style-type: none"> • Baseline monitoring for threatened flora within the Study Area as described in Section 6.0; and • Pre-extraction subsidence survey as per the UG4 Longwalls 401 to 408 Subsidence Monitoring Program. 	Conduct monitoring of threatened flora, as described in Section 6.0 and the UG4 Longwalls 401 to 408 Subsidence Monitoring Program. Implement management measures, as required, in accordance with Section 7.0 .	Management measures implemented with regard to the specific circumstances of the subsidence impact (e.g. the nature and extent of the impact) and in accordance with Section 7.0 . Follow-up inspections will be conducted to assess the effectiveness of the management measures implemented and the requirement for any additional management measures.	Implement Contingency Plan including notifications as described in Section 8.0 .
Frequency	During spring, prior to longwall extraction.	Annually during spring, until the completion of LW408	As required, in accordance with Section 7.0 .	As required, in accordance with Section 8.0 .
Position of Decision Making	Environment and Community Manager.	Environment and Community Manager.	Environment and Community Manager and Underground Technical Manager.	Environment and Community Manager and Underground Technical Manager.

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