Department of Planning and Environment

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Moolarben Coal Complex -Stage 2 Modification 4

State Significant Development Modification Assessment Report (SSD-08_0135-Mod-4)

December 2023

Acknowledgement of Country

The Department of Planning and Environment acknowledges that it stands on Aboriginal land. We acknowledge the Traditional Custodians of the land and show our respect for Elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.

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Moolarben Coal Complex – Stage 2 – Modification 4 (SSD-08_0135-Mod-4) Assessment Report

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Executive Summary

Moolarben Coal Operations Pty Limited (MCO) owns and operates the Moolarben Coal Complex (the complex), an open cut and underground mine location approximately 40 kilometres (km) north-east of Mudgee in the Mid-Western Regional local government area.

The complex operates under two integrated development consents referred to as 'Stage 1' (MP 05_0117) and 'Stage 2' (MP 08_0135), which permits the extraction of up to 24 million tonnes of Run of Mine (ROM) coal, until December 2038.

Modification

MCO is seeking to modify the Stage 2 development consent to amend the layout of an underground mining area referred to as 'UG2'. The amended layout involves the extension of two longwall panels (the extension area) and an increase in depth and width of panels across the entire mining area. The modification also includes minor amendments to the location of first workings, the inclusion of non-subsiding secondary workings and construction of a remote services infrastructure area within the approved disturbance footprint. The amended mine plan would facilitate the extraction of an additional 4.5 million tonnes (Mt) of ROM coal, however no changes are proposed to the approved mine life or annual production rates.

Statutory context

The modification application was lodged under section 4.55(2) of the *Environmental Planning and* Assessment *Act 1979* (EP&A Act).

The Minister for Planning and Public Spaces (the Minister) is the consent authority for the modification application under section 4.5(a) of the EP&A Act. However, under the Minister's delegation dated 9 March 2022, the Director Resource Assessments may determine the application. This is because there were less than 15 public objections and no disclosed reportable political donations by the applicant.

Engagement

The Department exhibited the modification from 3 December 2021 until 16 December 2021. During the exhibition period, the Department received 13 submissions from members of the public and special interest groups, of which 12 objected to the modification. The key concerns raised related to subsidence and associated impacts on groundwater, surface water, biodiversity, and cultural heritage. Submissions also raised concern about the effects of coal mining on climate change.

Assessment

The Department considers the key assessment issues for the modification are related to subsidence and associated impacts on biodiversity, water resources and cultural heritage. The Department also carefully considered potential increases in greenhouse gas (GHG) emissions related to the extraction of additional coal.

The Department has considered advice from relevant NSW Government agencies, Mid-Western Regional Council (Council), and the Independent Expert Panel for Mining (the Panel).

Subsidence

The proposal would increase vertical subsidence in the existing mining area by up to 520 millimetres (mm) as a result of the increased extraction height. No changes to tilt or hogging and sagging curvature are predicted, and for this reason, the subsidence assessment concludes that the resulting impacts within the existing mining area would be similar to those approved under the original project. Subsidence would also extend into the proposed extension area, with impacts expected to be of similar magnitude to those approved in the existing mining area.

The Panel reviewed the subsidence assessment and generally accepted the prediction methodology, however made a number of recommendations to be implemented by MCO during the preparation of an extraction plan for the UG2 mining area. These recommendations included the development of monitoring and adaptive management measures for cliff lines, a significant cultural heritage site and non-conventional (far-field) subsidence impacts.

Biodiversity

The proposal does not seek to undertake any direct clearing and potential impacts on biodiversity relate to resultant impacts of subsidence. MCO's environmental assessment concluded that the amended layout would not result in a net increase in approved impacts on biodiversity values within the existing mining area. Some impacts on biodiversity values are predicted in the proposed extension area, primarily on rocky habitat for threatened species habitat including the Broad-headed Snake, Pink-tailed Worm Lizard, Eastern Cave Bat and Large-eared Pied Bat.

It was predicted that up to 5% of rocky habitat features could be impacted by subsidence, however, MCO considered that these impacts would not result in greater than negligible environmental consequence. Whilst the Department and the Panel generally agree with this conclusion, the Department considers it reasonable to impose offset obligations for the predicted impacts on habitat for the species, as it is a quantifiable prescribed impacts under the *Biodiversity Conservation Act 2016* (BC Act 2016). Given the nature of subsidence impacts, the exact location of the impact cannot be identified, only an estimate of the area of impact.

However, the Panel and the Department considers that subsidence impacts on a known maternity cave for threatened bat species would not constitute a negligible impact, as this type of breeding or maternity cave is rare in the landscape. The detection of a cave of this nature within either the existing or proposed mining area would likely require MCO to revise its mine plan, or implement other strategies to ensure a performance measure of 'negligible impact' could be achieved. The Department has recommended stringent performance measures and updates to the extraction plan requirements, including the development of a monitoring program to ensure any maternity caves are detected and managed prior to the commencement of mining.

The proposal seeks to extend two longwall panels further underneath the onsite offset area, and both BCD and public submissions raised concerns about potential impacts on biodiversity values within a secured offset area. Underground mining is not a prohibited land use within the secured onsite offset area, however, the Department considers that MCO should offset the predicted impacts on threatened species habitat in the offset area, and offset the quantified impacts on the offset area (ie double the offset credit requirements for the extent of threatened species habitat predicted to be impacted). The Department has also recommended performance measures to ensure no greater impacts on biodiversity values than predicted.

Overall, the Department considers that the proposal's impacts on biodiversity could be appropriately avoided, managed and offset, subject to the recommended conditions, including revised and additional performance measures, updated extraction plan requirements, and offsets.

Cultural Heritage

A total of 42 sites were identified across the UG2 mining areas, comprising 37 within the existing mining area and five within the proposed extension area. The proposal is predicted to result in no change or decreased impacts to the majority of sites within the mining area primarily because of amendments to the mining layout to step around cliff line 9 and the inclusion of non-subsiding secondary workings. Additionally, open sites are less susceptible to harm from ground movements and rock shelters would be subject to similar levels of tilt and curvature.

However, two rock shelters within the proposed extension area would be subject to increased impacts and are predicted to be subject to the full extent of predicted subsidence. Both sites contain stone artefacts and one contains a small PAD. Both sites have been assessed to be of low scientific significance and high cultural value and MCO propose to undertake detailed recording and surface collection of the sites and prior to impact.

The proposed mine plan includes the retention and widening of a sterilised coal pillar beneath cliff line 7 to ensure protection of a highly significant cultural heritage site, referred to as SMC236. This site includes a rock shelter containing art and an artefact scatter. The Panel accepted that the proposed layout would be appropriate to protect the site, however, recommended that a

comprehensive monitoring regime be designed as part of the extraction plan, including early warning detection to allow operations to be modified or ceased.

The Department acknowledges that the overall impact on cultural heritage would be similar or less than what is currently approved and considers that impacts of the proposal could be managed through the existing heritage management plan and ongoing consultation with Registered Aboriginal Parties and Heritage NSW.

Water Resources

The proposal would increase groundwater inflows into the UG2 mining area by approximately 98 megalitres per year (ML/year). The increase would not change the overall peak inflow for the complex and associated drawdown is not predicted to affect private bores, groundwater dependent ecosystems or a locally significant water feature (ie the Drip). The Panel agreed with these predictions but requested that the monitoring network be expanded to monitor perched water in the Triassic sandstone (if present).

Water losses associated with subsidence impacts on drainage lines are predicted to be minimal due to the ephemeral nature of the streams and existing drainage towards disturbed areas in the complex.

Greenhouse Gas Emissions

The proposal would extract an additional 4.5 Mt of ROM coal representing an approximately 1 percent increase to total ROM coal extraction from the complex (Stage 1 and 2). The additional coal proposed for extraction is estimated to generate approximately 45,000 t CO_2-e of additional Scope 1 emissions and 22,500 t CO_2-e of Scope 2 emissions.

The NSW Government has set a target of achieving net zero emission by 2050, and to deliver a 50% net emissions reduction over 2005 levels by 2030, and 70% net emissions reduction by 2035. The EPA has provided advice to the Department that MCO should prepare a greenhouse gas mitigation plan and climate change adaptation plan in accordance with requirements to be provided by the EPA. The complex is also subject to the Commonwealth Safeguard Mechanism, which sets an emissions intensity "baseline" for Scope 1 emissions.

The Department considers that the incremental increases in Scope 1 and 2 emissions would be able to be effectively managed under current NSW and Commonwealth GHG policy initiatives to ensure that NSW targets would not be compromised.

Evaluation

The Department has carried out a detailed assessment of the merits of the modification, in accordance with the relevant requirements of the EP&A Act. The Department has taken into consideration the issues raised in public submissions, government agency advice and advice provided by the Panel.

The Department's assessment has concluded that the proposal would not result in significant changes to the approved impacts of the project and that additional impacts associated with the proposal could be appropriately managed under existing and new conditions of consent.

The Department considers that many of the subsidence-related impacts of the proposal can be managed through the development of a comprehensive extraction plan and incremental increases in greenhouse gas emissions are acceptable when weighed against the relevant climate change policy framework.

The Department considers that the proposal could achieve a reasonable balance between recovery of high-quality coal resource of State significance and minimising its potential environmental and social impacts and that it is in the public interest should be approved, subject to the recommended conditions.

Contents

1 Introduction

The Moolarben Coal Complex (the complex) is an open cut and underground coal mine located approximately 40 kilometres (km) north-east of Mudgee (see **Figure 1**). The complex is operated by Moolarben Coal Operations Pty Limited (MCO), on behalf of the Moolarben Joint Venture which is owned by Yancoal and a consortium of Korean power companies.

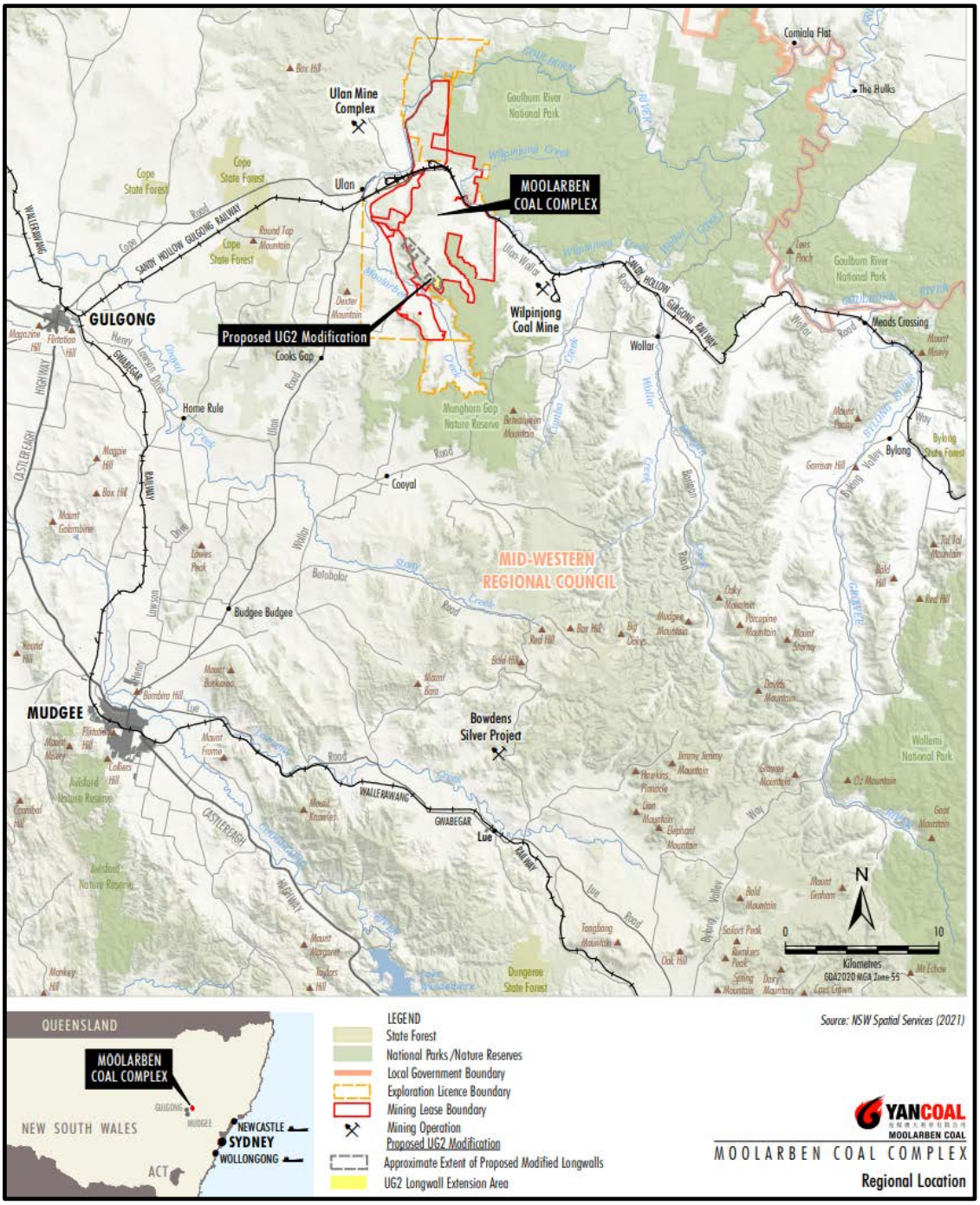

Figure 1 | Regional context map

The complex operates under two integrated development consents referred to as 'Stage 1' and 'Stage 2'.

Stage 1 (MP 05_0117) was approved by the Minister for Planning in September 2007 and comprises three open cut pits (OC1, OC2 and OC3), one underground mining area (UG4) and coal processing and transport facilities.

Stage 2 (MP 08_0135) was approved by the Minister for Planning in January 2015 and comprises one open cut pit (OC4) and two underground mining areas (UG1 and UG2). Coal extracted by the Stage 2 operations is transported to the Stage 1 processing and transport facilities.

The development consents have been modified on 15 and 3 occasions, respectively, and collectively they permit:

- the extraction of up to:
  - 16 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal from open cut pits; and
  - 8 Mtpa of ROM coal from underground mining areas;
- mining operations at the complex until 31 December 2038.

2 Proposed modification

MCO are seeking to modify the Stage 2 development consent (Modification 4) to amend the layout of the UG2 mining area.

The key aspects of the modification are described in detail in MCO's modification report (see **Appendix A1**), summarised in **Table 1** and depicted in **Figure 2**.

Table 1 | Key aspects of the modification

Project element	Approved project	Modified project
UG2 Layout *Refer to Figure 2*	• As per Figure 2 titled "Underground Longwall Layout" • Panel width 305 m	• As per Figure 2 titled "Proposed UG2 Modification", including: o Two extended longwall panels (LW 201 and 202A) o Increase panel width to 311 metres (m) o Reduced panel width of LW204 and 205 to create a larger coal pillar beneath Cliff Line 7 (from 305 m to between 234 and 257 m)

Project element	Approved project	Modified project
		o Change of mining method in the southern part of LW202B to non-subsiding secondary workings o Change in location of headings and finishing ends o Change in location to some non-subsiding first workings o Underground mining in a small portion of approved OC4 pit – in optimised areas of LW201.
UG2 Extraction Height	3.0 m	3.5 m
UG2 Mining Sequence and Naming	• Longwall panels referred to as LW10 to 13 • Extraction to progress sequentially in south to north direction	• Longwall panels renamed to LW201, 202A and 202B, 203, 204 and 205 • Extraction to progress sequentially, north to south (LW201-203) then south to north (LW204-205) – refer to **Figure 2**.
UG2 Coal Production	• Annual - up to 8 Mtpa (complex total) • Total – up to 9.4 Mt	• Annual – no change • Total – up to 13.9 Mt (an additional 4.5 Mt)
UG2 Surface Infrastructure	• No specific surface infrastructure required	• Construction and operation of a remote services infrastructure area including two service boreholes, temporary site office, layout area, surface drainage and ancillary infrastructure • To be located with the approved OC4 disturbance footprint
Offset area	• UG2 layout partially overlying onsite offset area	• UG layout to extend further under onsite offset area

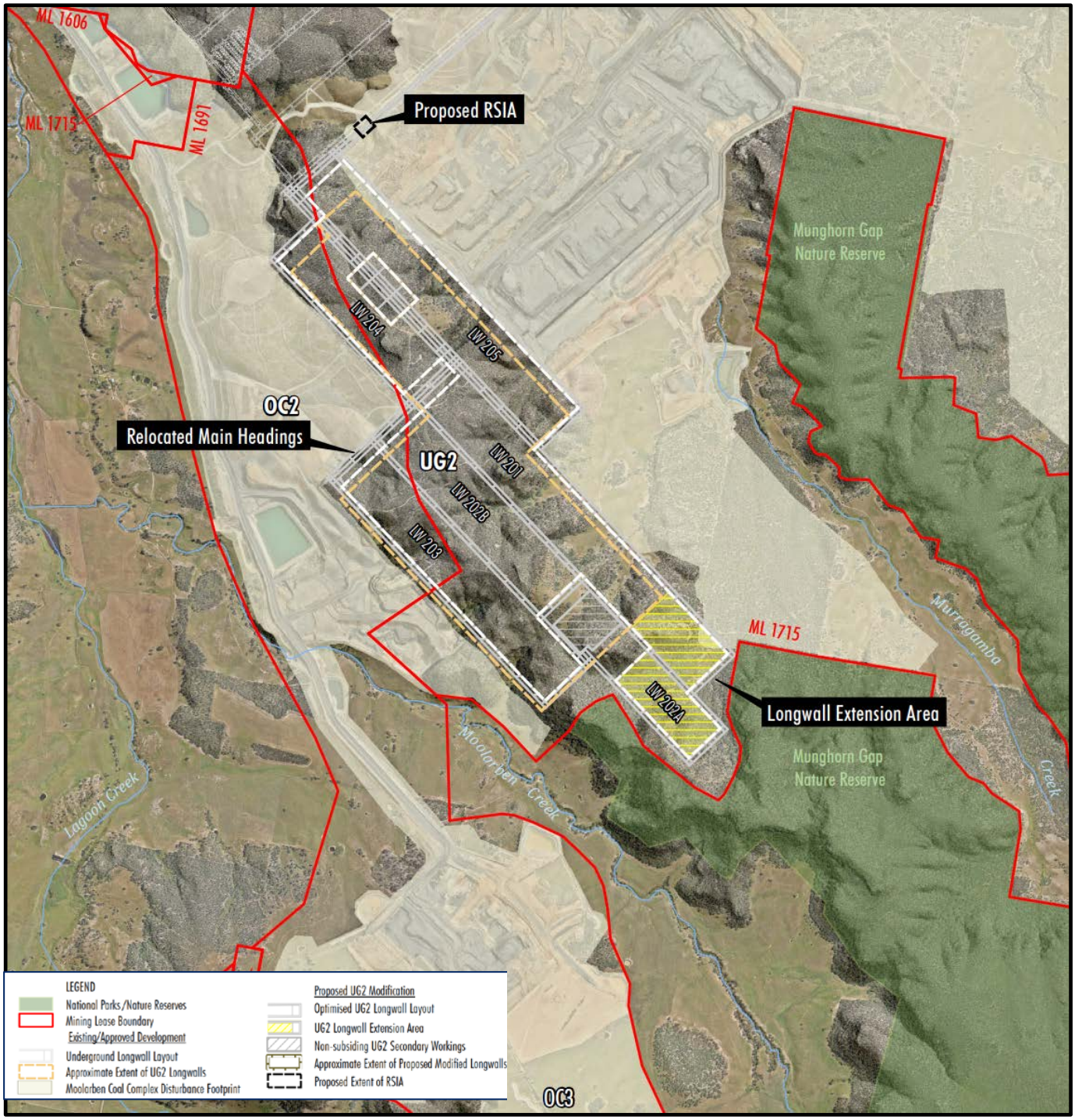

Figure 2 | Proposed Modification

3 Statutory context

3.1 Scope of modification

Table 2 | Permissibility and assessment pathway

Consideration	Description
Scope of modification	Stage 2 was approved under the now repealed Part 3A of the EP&A Act. Under clause 6 of Schedule 2 of the E*nvironmental Planning and Assessment (Savings, Transitional and Other Provisions) Regulation 2017*, the project was transitioned to State Significant Development (SSD) by order, which took effect by publication in the NSW Government Gazette on 28 June 2019. The modification application was lodged under section 4.55(2) of the EP&A Act. Under section 4.55(2), a development consent can only be modified if the consent authority is satisfied that the proposed development would remain substantially the same development as approved, including any section 75W modifications that were granted under Part 3A of the EP&A Act. The Department has reviewed the scope of the modification and considers that it meets this requirement as: • the proposed changes to the UG2 mining area are relatively small in comparison to the approved project; • there would be no change to the approved project life, annual extraction limits, or hours of operation; and • the impacts of the development as modified would be similar to the impacts of the approved project (see **section 5**). Accordingly, the Department considers that the proposed modification is within the scope of section 4.55(2) of the EP&A Act.
Consent Authority	The Minister for Planning and Public Spaces (the Minister) is the consent authority for the modification application under section 4.5(a) of the EP&A Act. However, under the Minister's delegation dated 9 March 2022, the Director Resource Assessments may determine the application. This is because there were less than 15 public objections and no disclosed reportable political donations by the applicant.

3.2 Mandatory matters for consideration

3.2.1 Matters of consideration required by the EP&A Act

The Department conducted an assessment of the proposal against the mandatory matters for consideration as part of the original assessment of MP08_0135. The Department considers this modification application does not result in significant changes that would alter the mandatory matters for consideration under section 4.15 of the EP&A Act and conclusions made as part of the original assessment.

3.2.2 Objects of the EP&A Act

The objects of the EP&A Act are the underpinning principles for all decision making under the act. They must be considered by the consent authority when determining a development application under the EP&A Act. The Department has assessed the modified project against the objects found in section 1.3 of the EP&A Act. **Appendix B** summarises how the Department considers that the proposal can be undertaken in a manner that is consistent with these objectives, including ecologically sustainable development (ESD).

3.2.3 Biodiversity development assessment report

Section 7.17(2) of the *Biodiversity Conservation Act 2016* (BC Act) requires all SSD modifications to be accompanied by a Biodiversity Development Assessment Report (BDAR) unless the authority or person determining the application is satisfied that the modification will not increase the impact on biodiversity values (as identified in the BC Act and in the *Biodiversity Conservation Regulation 2017*)

A BDAR was submitted to the Department with the modification application documents. The Department has taken the BDAR into account as part of its assessment (see **section 5.2**).

3.2.4 Reasons for granting consent for the original application

In accordance with section 4.55(3) of the EP&A Act, in determining this modification, the Department has taken into consideration the reasons for the Commission's original decision on the project. In determining the original Moolarben Coal Stage 2 Project, the Commission concluded that the project had merit subject to adherence to strict conditions.

4 Engagement

4.1 Department's engagement

After accepting the modification report, the Department:

- publicly exhibited the modification from 3 December 2021 until 16 December 2021 on the NSW planning portal;
- notified landowners in the vicinity of the site about the public exhibition;
- notified each person who made a submission in relation to the original development application; and
- notified and invited comment from relevant government agencies and Mid-Western Regional Council (Council).

A summary of the submissions and agency advice is provided in **sections 4.1.1** and **4.1.2** below. A link to all submissions and advice is provided in **A2 and A4**.

4.1.1 Summary of public submissions

The Department received 13 submissions from members of the public and special interest groups, of which 12 objected to the proposal. Key issues raised in submissions included:

- time to lodge submissions – the modification proposal was exhibited in early December and some residents did not receive the Department's notification until after the exhibition had commenced;
- lack of community consultation – some submitters considered that the company had not undertaken adequate consultation prior to the lodgement of the application;
- subsidence and associated impacts on groundwater, surface water, biodiversity, and cultural heritage;
- impacts on cultural heritage features in the vicinity of the proposal, particularly impacts on rock features and the cultural landscape;
- mining under established biodiversity offset areas; and
- impacts of coal mining on climate change.

Consultation on the modification application was undertaken in accordance with the requirements of the *Environmental Planning and Assessment Regulation 2000.* However, the Department acknowledges the dissatisfaction of some submitters in relation to the time of exhibition and consultation by the company.

4.1.2 Summary of agency advice submissions

The Department also received advice from eight government agencies, including Council as summarised in **Table 3**.

Table 3 | Summary of agency advice

Agency	Advice summary
DPE Water	• Requested details on surface water and groundwater take to demonstrate that sufficient water entitlement is held for the life of the project, including: – the maximum groundwater inflow predictions for the whole complex; and – the annual volume of surface water take due to subsidence related surface fracturing for the proposed project, for a range of climatic scenarios. • Requested an independent peer review of the groundwater model in accordance with the Aquifer Interference Policy (AIP). • Provided recommendations post determination including to update the site water management plan and update the site water balance to measure actual water take from surface and groundwater sources. • Acknowledged MCO's response in the Submissions Report. • Requested MCO ensure subsidence impacts to watercourses are remediated to ensure stability and natural ecological functioning.
BCD and National Parks and Wildlife Service (NPWS)	• Raised concern with the approach to assess subsidence impacts and requested that the BDAR include detailed assessment of all onsite offset areas that would experience a change in subsidence. • Requested quantification of residual prescribed impacts and credit liability for threatened species and vegetation, as well as additional targeted surveys (or other endorsed approaches) to confirm the presence or absence of *Commersonia rosea*, *Kennedia retrorsa*, and *Prasophyllum sp. Wybong*. • Raised concern regarding the proximity of mining in relation to biodiversity offset areas and the Munghorn Gap Nature Reserve and potential groundwater and far-field subsidence impacts. • Requested independent technical advice on potential subsidence and water-related impacts.

Agency	Advice summary
Environment Protection Authority (EPA)	• Noted that the proposal was largely consistent with the approved project and that no variations to the environment protection licence (EPL) would be required if the application was approved. • Recommended MCO update their Water Management Plan. • Provided advice on recommended conditions relating to GHG emissions.
Heritage NSW	• Noted the predicted impacts of the proposal on known and identified sites in the UG2 Mining area. • Noted that no change is proposed to the existing subsidence performance measures for a highly significant rock shelter S2MC236. • Advised support of the proposed management and mitigation measures in the Aboriginal Cultural Heritage Assessment Report. • Advised it had no further comments or recommendations on the proposal.
Mining, Exploration and Geoscience (MEG)	• MEG considers the modification would provide efficient and optimise resource outcomes and would provide an appropriate economic return to the NSW Government.
NSW Resources Regulator	• Raised no specific concerns. • Advised that MCO would be required to comply with rehabilitation requirements under the *Mining Act 1992* and Work Health and Safety legislation.

The following agencies raised no concerns or provided no comment:

- Heritage Council NSW; and
- Council.

4.2 Submissions Report

Following the public exhibition period, the Department asked MCO to respond to the issues raised in submissions and the advice received from government agencies. MCO provided a submissions report to the Department on November 2022 (see **Appendix A3**).

The Department published the submissions report on the NSW planning portal and forwarded the submissions report to relevant government agencies.

4.3 Independent Expert Advice

The Department sought advice on the proposal from the Independent Expert Advisory Panel for Mining (the Panel). Advice was sought primarily in relation to subsidence and biodiversity impacts following concerns raised by BCD and NPWS.

The Department requested the Panel provide advice on the following:

- whether is it reasonable to conclude that existing subsidence performance measures could be met following the incremental change in subsidence across the UG2 domain, particularly in relation to biodiversity values;
- if additional information or assessment should be provided to inform the Department's consideration of prescribed impacts;
- predicted non-conventional subsidence effects within the Munghorn Gap Nature Reserve; and
- any recommended monitoring or mitigation measures.

The Panel provided two advice reports (July 2023 and December 2023), the first of which requested additional information to inform their response to the Department's questions (see **Appendix A5**). Additional advice was provided by MCO in October 2023.

The Department has carefully considered the Panels advice in its assessment of the proposal (see **section 5**).

5 Assessment

The Department has assessed the modification application and supporting information in accordance with the relevant requirements of the EP&A Act, including the matters for consideration, as set out in section 4.15(2) of the EP&A Act.

The key assessment issue relates to subsidence and associated impacts on biodiversity, water resources and cultural heritage. Other assessment issues are considered in **section 5.5**.

5.1 Subsidence

In assessing the subsidence impacts of the proposal, the Department considers that distinction must be made between areas previously approved to be undermined (referred to as the 'existing mining area') and areas proposed for undermining as a result of the extended longwall panels (referred to as the 'extension area').

This is because the existing mining area was previously assessed and approved to experience subsidence impacts by the Planning Assessment Commission in 2015, and the Department is able to

consider the magnitude of change that the proposal would have on these approved impacts. This differs for the proposed extension area where no subsidence impacts have been previously approved.

The modification report included a subsidence assessment prepared by MSEC. **Figure 3** depicts the location of natural features in the vicinity of the mining area.

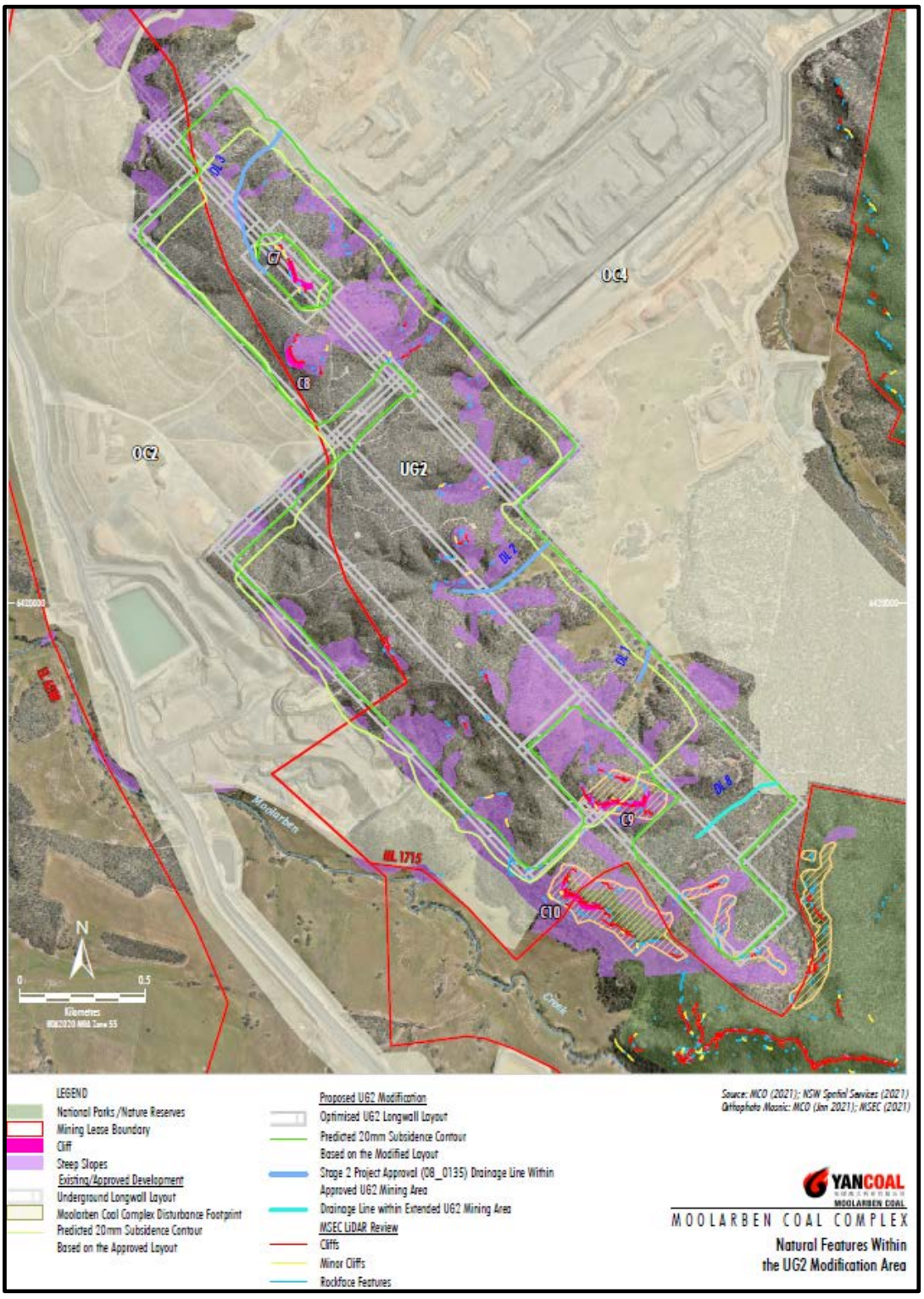

Figure 3 | Natural Features above the UG2 Mining Area

Depths of cover over the entire mining domain (including the proposed extension area) ranges from 40 m above LW203 to 155 m above LW202B.

Table 4 presents the predicted changes in maximum conventional subsidence parameters for the approved and proposed mine plans.

Table 4 | Predicted changes in conventional subsidence

Layout	Vertical subsidence (mm)	Tilt (mm/m)	Hogging Curvature (km^{-1})	Sagging Curvature (km^{-1})
Approved	1,980	> 100	> 3	> 3
Proposed (Existing Area)	2,500	> 100	> 3	> 3
Proposed (Extension Area)	2,400	> 95	> 3	> 3

The key change in conventional subsidence is an increase in vertical subsidence of 520 mm as a result of the increased extraction height. No changes to tilt or hogging and sagging curvature are predicted, and for this reason, the subsidence assessment concludes that the resulting impacts within the existing mining area would be similar to those approved under the original project. These impacts include:

- surface cracking between 150 and 500 mm wide where depths of cover are less than 100 m;
- some subsidence-related ponding and cracking within three drainage lines;
- negligible impacts on cliffs (C7, C9 and C10) - that is occasional rockfalls, displacement or dislodgement of boulders or slabs or fracturing, that in total do not impact more than 0.5% of the total face of such cliffs within any longwall mining domain);
- minor impacts on minor cliffs, rock face features and steep slopes – that is occasional rockfalls, displacement of or dislodgement of boulders or slabs, or fracturing, that in total do not impact more than 5% of the total face of such feature within any longwall mining domain)
- some cliff instabilities on up to approximately 15% of the length of C8; and
- negligible impacts on threatened species, populations and endangered ecological communities.

These predicted impacts are enforced as performance measures within the Stage 2 development consent and are supported by a requirement to prepare an extraction plan that details how these

measures would be monitored and achieved. The performance measures are depicted in **Figure 4** below.

Water Resources	
Drainage Lines (DL1 – DL7)	No greater subsidence impacts or environmental consequences than predicted in the EA
Land	
Cliffs C7, C9 and C10	Negligible environmental consequences (that is occasional rockfalls, displacement or dislodgement of boulders or slabs or fracturing, that in total do not impact more than 0.5% of the total face of such cliffs within any longwall mining domain)
Other cliffs	No greater subsidence impacts or environmental consequences than predicted in the EA
Minor cliffs Rock face features Steep slopes	Minor environmental consequences (that is, occasional rockfalls, displacement of or dislodgment of boulders or slabs, or fracturing, that in total do not impact more than 5% of the total face area of each such type of feature within any longwall mining domain)
Biodiversity	
Threatened species, threatened populations, or endangered ecological communities	Negligible subsidence impacts or environmental consequences
Heritage Sites	
Aboriginal heritage site S2MC 236 (AHIMS No.s 36-3-0016 and 36-3-0134)	Negligible subsidence impacts or environmental consequences
Historic heritage sites	No greater subsidence impact or environmental consequences than predicted in the EA
Mine workings	
First workings under an approved Extraction Plan beneath any feature where performance measures in this table require negligible subsidence impacts or negligible environmental consequences	To remain long-term stable and non-subsiding
Second workings	To be carried out only in accordance with an approved Extraction Plan

Figure 4 | Development consent subsidence performance measures

The proposed mine plan has been designed to step around Cliff 9 (C9) to avoid adverse subsidence impacts and includes some non-subsiding secondary workings in the vicinity of this feature at the southern end of Longwall 202B.

Within the extension area, the subsidence assessment concludes that subsidence impacts would be of similar magnitude to those within the existing mining area. Key features within the extension area include one additional drainage line, steep slopes, rock face features and some areas of critically endangered ecological community (CEEC) vegetation. The extension area is also almost wholly within the existing onsite offset area.

Panel Advice

As detailed in **section 4.3**, the Department sought advice on the proposed modification from the Panel on whether it was reasonable to conclude that existing performance measures could be met based on the proposed mine plan.

The Panel accepted the prediction methodology of the subsidence assessment and agreed that it was highly likely that there would be some degree of connective cracking of overburden in shallow (< 100 m depth) areas, similar to impacts observed above the UG1 domain.

End of panel reporting for the UG1 mining area indicated that observed subsidence was similar or less than predicted and that surface cracking or subsidence impacts did not result in any exceedances of performance measures.

The Panel advised that it had some concerns regarding the potential for non-conventional subsidence effects on cliffs lines C9 and C10, due to their close proximity to the mining domain. Whilst they agreed these impacts would be unlikely to occur, it was strongly recommended that extensive monitoring and early detection measures be developed as part of the extraction plan for the mining area.

Additionally, the Panel requested:

- further information regarding the design of non-subsiding secondary workings be provided in the extraction plan, to ensure long-term stability performance measures could be achieved;
- early detection and monitoring measures be developed for C7, the location of a highly significant Aboriginal Heritage (site SMC236) and the C8 cliff line located within the mining domain which are subject to specific performance measures; and
- extensive monitoring of non-conventional subsidence beyond the immediate region of the subsidence area be prioritised and considered further during the development of the extraction plan (see **section 5.2.5**).

MCO agreed to these requests. Further consideration of subsidence impacts on SMC236 and Aboriginal cultural heritage is provided in **section 5.3**. Consideration of subsidence impacts on biodiversity and water resources is provided in **sections 5.2** and **5.4**, respectively.

5.2 Biodiversity

The mining area is predominantly located beneath remnant woodland and forest which is connected to the Munghorn Gap Nature Reserve in the south-east and open cut mining areas to the north, east, west and south. The majority of vegetation within the mining area conforms to Grey Gum Narrow-leaved Stringybark and Ironbark vegetation communities, with patches of Box-Gum Woodland Critically Endangered Ecological Community.

Both areas contain a variety of cliff lines and rocky features that are suitable for a number of threatened species reliant on this type of habitat. The proposal does not seek to undertake any direct clearing and therefore potential impacts on biodiversity relate to resultant impacts of subsidence.

5.2.1 Assessment of Impacts

The Stage 2 development consent contains subsidence performance measures for threatened species, populations and ecological communities, being *negligible subsidence impact or environmental consequences.* The consent also contains provisions requiring MCO to remediate or offset impacts if performance measures are exceeded. This provision does not permit the company to exceed its performance measures knowingly, but imposes a requirement to rectify unexpected impacts due to uncertainty associated with subsidence modelling and impact predictions. This type of provision has previously been included in most SSD underground mining consents in NSW.

MCO's environmental assessment concluded that the amended layout would not result in a net increase in impacts on biodiversity values within the existing mining area, and as such, no additional biodiversity assessment within this area was warranted. MCO advised that it could continue to meet all subsidence impact performance measures imposed under the Stage 2 consent, including negligible impacts on threatened species, populations and ecological communities.

The Department sought targeted advice from the Panel on this matter, including whether it was reasonable to conclude that existing performance measures could be met based on the revised mine plan.

As discussed in Section 5.1, advice from the Panel indicated that predicted subsidence changes within the existing mining area would result in similar impacts to those approved. However, the Panel sought some additional information on biodiversity values within the increased area of subsidence surrounding the existing mining area (see **Figure 5**) with a focus on presence of species habitat at risk of impacts from subsidence (refer to **Appendix A5**).

MCO undertook LiDAR mapping within this area and advised that overall, the revised layout would result in a reduction of rocky areas exposed to subsidence including up to 0.1 ha of cliffs and rock face features and up to 12 ha of habitat associated with steep slopes , due to the incorporation of areas within the OC4 disturbance area, and the proposed amended locations of first workings and non-subsiding secondary workings. MCO also advised that the extent and type of native vegetation exposed to subsidence would remain the same (ie approximately 250 ha). The Panel requested that LiDAR mapping of habitat features be verified through on-ground investigations. Additional information was provided by MCO to support the conclusions of LiDAR mapping including photographs of features within the area.

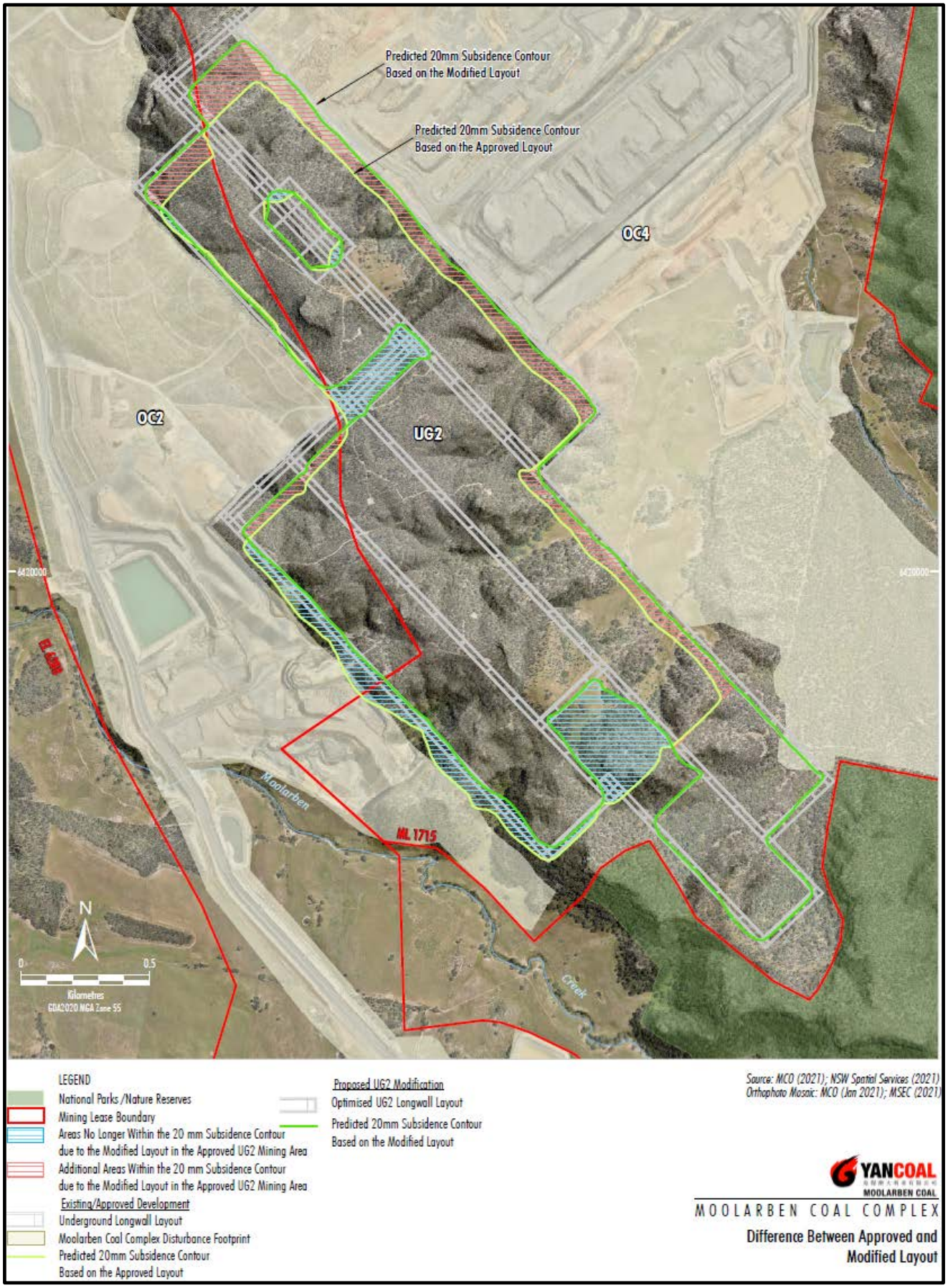

Figure 5 | Comparison of approved and proposed mine layout subsidence contours

No additional concerns were raised by the Panel and on this basis, the Department considers it reasonable to conclude that the revised mine layout would result in similar biodiversity impacts to those approved within the existing mining area. The exception to this is in relation to potential impacts on threatened bat habitat, which is discussed in further detail below.

The modification report included a BDAR that assessed impacts on biodiversity values only within the extension area. This area has not been previously approved for subsidence impacts and requires assessment in accordance with the Biodiversity Assessment Method (BAM) under the BC Act. Having regard to advice from BCD and the Panel, the Department considers that the key assessment issues for this area relate to impacts on rocky habitat for threatened species habitat and potential impacts on an established offset site. These matters are discussed in **sections 5.2.3** and **5.2.4** below.

5.2.2 Clarification of performance measures

Initially, the Panel queried whether the existing performance measures for natural and heritage features were intended to be considered separately or in conjunction with one another. This query was primarily associated with the performance measures for cliffs (ie occasional rockfalls, displacement of boulders or slabs or fracturing, that in total do not impact more than 0.5% of the total face of such cliffs within any longwall mining domain) and threatened species, populations and ecological communities (ie negligible subsidence impacts or environmental consequences).

The Panel noted that if these measures were to be considered together, then the performance measure for cliffs could be applied to all threatened microbat habitat within the mining domain (ie occasional rockfalls, displacement of boulders or slabs or fracturing, that in total do not impact more than 0.5% of the total face of such cliffs within any longwall mining domain).

The Department carefully considered this position and undertook a review of the predicted impacts and approval of the original project. This review concluded that the performance measures were not intended to be used in conjunction with one another. The key reason is because subsidence impacts on bat habitat was predicted to occur, although these impacts were concluded to be unlikely to have greater than negligible impacts on the species.

To provide clarity on this matter in the consent, the Department has recommended updates to the performance measure for threatened species, populations and ecological communities (ie negligible subsidence impacts or environmental consequences) to remove reference to 'subsidence impacts'. The Department acknowledges that it is possible for subsidence impacts at greater than negligible levels to occur, without resulting in greater than negligible environmental consequences. The Department considers that this was the intention of the approved project and performance measure.

5.2.3 Impacts on Threatened Species Habitat

Rocky features within the existing and proposed mining areas have been identified as suitable habitat for four threatened fauna species. These species include the Large-eared Pied Bat, Eastern Cave Bat, Broad-headed Snake and Pink-tailed Worm-lizard. The Striped Legless Lizard was also assumed to be present in the mining area.

Broad-headed Snake and Pink-tailed Worm-lizard

Whilst some survey effort undertaken for these species had not resulted in any identifications, the BDAR advised that it had assumed their presence due to access constraints associated with their habitat (ie deep crevices).

The Panel requested MCO undertake further survey effort to determine the presence or absence of the species which would assist in understanding the potential impacts of the proposal. MCO sought specialist species advice from Biodiversity Monitoring Services who considered that it would be difficult to completely rule out the presence of these species as not all habitat features could be thoroughly searched. On this basis, MCO advised no additional surveying was undertaken and that assuming presence was in accordance with the BAM.

Specialist advice from MCO indicated that potential subsidence impacts on habitat for these species would include:

- disturbance of up to 5% of steep slopes, rock face features and minor cliffs associated with rocky outcrops (inclusive of occasional rockfalls and dislodgement of boulders or slabs); and
- surface cracking in rocky areas.

However, it was considered that these impacts would not result in greater than negligible environmental consequence on the species itself. This is because impacts would be unlikely to dislodge burrow features and because there is a large extent of suitable habitat in the surrounding locality.

The BC Act identifies that impacts to karst, caves, crevices, cliffs, rocks and other geological features of significance that provide habitat for threatened species constitute 'prescribed' impacts, in which a consent authority may take into account in the determination of biodiversity credits required to be retired.

Although the Department and Panel agree that the predicted subsidence impacts would be unlikely to result in greater than negligible consequences to the species, in the absence of targeted surveys, the Department considers it reasonable to impose offset obligations for the predicted impacts on habitat for the species. Upon request, MCO calculated the offset liability for these species based on the predicted impacts on habitat within the proposed extension area. The calculated credit liability is presented in Table 5 below. The Department also notes that a defined species polygon area

cannot be readily determined as there is uncertainty as to exactly where within the rocky habitat features the predicted 5% of impact would occur. That is, the area would not be able to be defined within a BDAR incorporating a BAM-C case as would usually be the case for determining credit liability.

Table 5 | Offset liability for threatened species habitat within proposed extension area

Species	Offset credits
Broad-headed Snake	10
Pink-tailed Worm-Lizard	11

The Panel considered this to be a suitable approach and agreed with the calculated liability.

In addition to the retirement of species credits, the Department has recommended that the development consent include subsidence performance measures specific to habitat for these species consistent with the predicted impacts. The Department also considers that the standard condition requiring offsetting of impacts above the predicted impacts/ performance measures is not warranted in this instance as an offset liability is proposed up-front, and if impacts exceed performance measures the Department would undertake compliance action, which would likely include a requirement to mitigate and offset impacts.

Striped Legless Lizard

The BDAR also advised that it assumed presence of the Striped Legless Lizard based on accessibility constraints to undertake surveys. The likelihood of this species being present in the proposed mining area was considered unlikely and it was predicted that even if present, impacts on the species would be negligible.

The Panel also requested targeted surveys be undertaken to confirm the presence or absence of this species. However, since the preparation of the BDAR, the *Threatened Reptiles – Biodiversity Assessment Method Guide (2022)* was published which indicates that suitable habitat to be surveyed for the species is 'All PCTs on the subject land' (ie vegetation).

As discussed in **sections 5.1** and above, potential subsidence impacts have been quantified for rocky features, however, the proposal would be unlikely to result in greater than negligible impacts on vegetation and PCTs within the mining area.

On this basis, the Department agrees that impacts on the Striped Legless Lizard would be negligible and that prescribed impact offsets are not required.

Bat Habitat

The Eastern Cave Bat and Large-eared Pied Bat were detected in targeted surveys within the proposed extension area (see **Figure 6**). These surveys identified both adult and juvenile bats indicating that breeding habitat is potentially present throughout the mining domain.

Both species make use of rocky features and cliff-line escarpment for roosting and breeding. There are only a few known maternity caves identified within the landscape and their specific configuration and high fidelity makes them an important feature for the species.

Upon review of the existing performance measures, the Panel advised that any subsidence impacts on a known maternity cave could not be considered negligible.

Advice from experts engaged by MCO indicated that the location and number of maternity caves for these species in the local area is currently unknown, and there are data deficiencies due to the extensive amount of cliff lines and rocky features that could contain the roosts.

The experts undertook an inspection of the extended mining area and advised that the most likely locations for a maternity cave would be within C9, C10 and the central north outcrop (see **Figure 6**). It was also recognised that cliff lines C7 and C8 within the existing mining area contain suitable features for a maternity cave.

The revised mine plan would not undermine cliff lines C7, C9 and C10, and these features would remain outside the predicted 20 mm subsidence contour. However, cliff line C8 and the central north outcrop would be exposed to the full extent of subsidence impacts.

The subsidence assessment predicts that cliff line C8 could experience instabilities on up to 15% of length of the exposed cliff line. This level of impact is approved under the Stage 2 consent and is not predicted to change as a result of the revised mine plan.

The central north outcrop is predicted to experience up to 5% of disturbance to the total face of the feature (that is, occasional rockfalls, displacement of or dislodgment of boulders or slabs).

In the absence of impacting a known maternity cave, MCO experts conclude that the predicted subsidence impacts of the proposal would have negligible impacts on both bat species. This is because non-maternity roosts are considered to be locally common and there is an extensive amount of habitat available in the vicinity.

The Panel generally agreed with this conclusion. The Department also agrees with this conclusion, however, similar to other threatened species that are reliant on rocky features, it is considered reasonable to impose offsets for the predicted subsidence impacts on threatened bat roosting habitat.

Upon request, MCO calculated the offset liability for both bat species based on potential roosting habitat within the proposed extension area, which is presented in **Table 6** below.

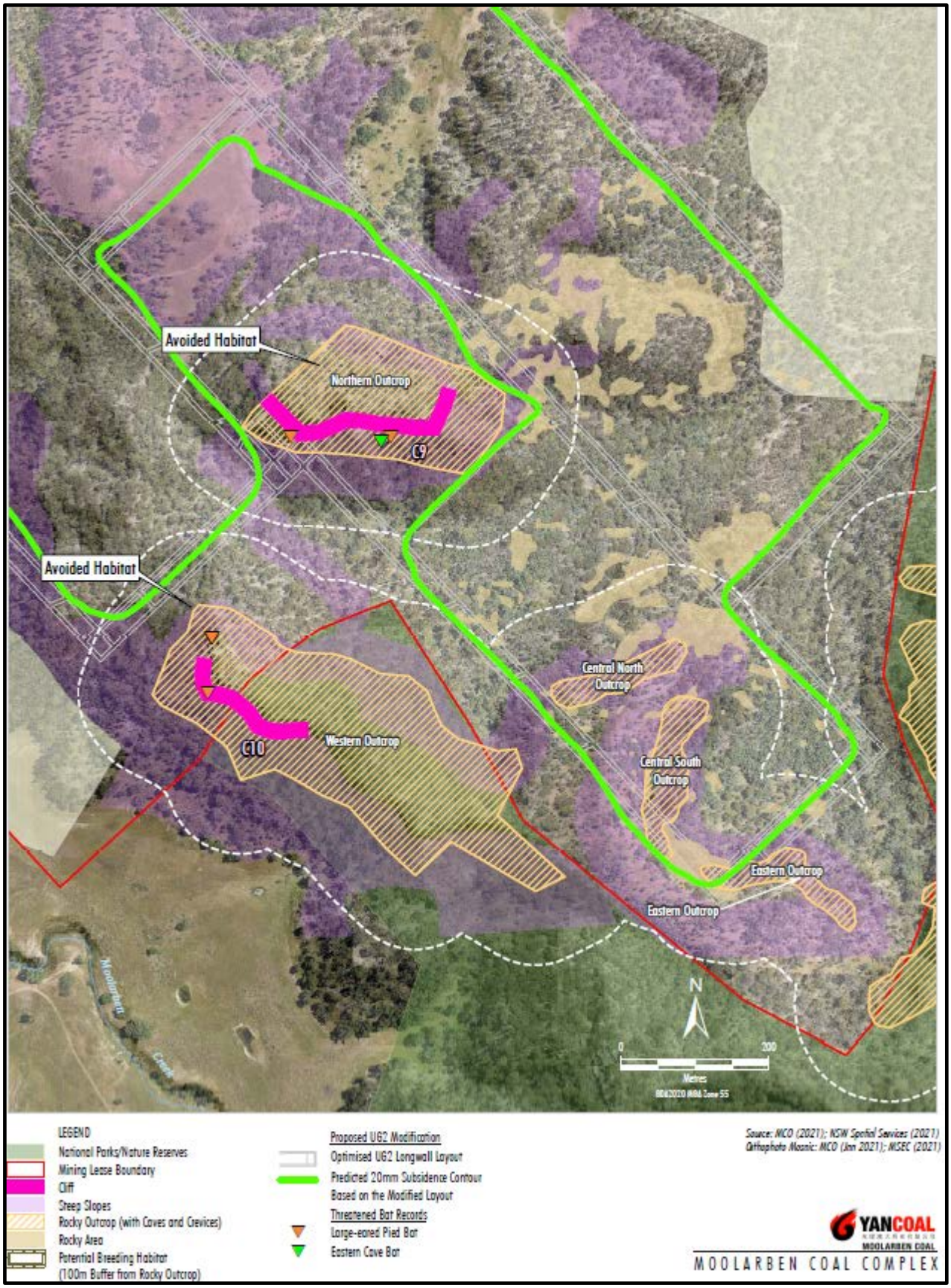

Figure 6 | Bat habitat within Extended Mining Area

Table 6 | Offset liability for bat roosting habitat within proposed extension area

Species	Offset liability
Large-eared Pied Bat	6
Eastern Cave Bat	6

The Panel considered it to be a suitable approach and agreed with the calculated liability.

MCO experts proposed that a greater than negligible impact on both bat species would involve:

- an occupied maternity site being present within the predicted subsidence extent; and
- if there was a statistical significant reduction in activity at the site, as a result of mining.

However, the Panel considered that the detection of impacts on a maternity cave post mining would be an unacceptable impact and that it is reasonable to conclude that any subsidence impacts on a known maternity / breeding cave would constitute a greater than negligible impact on the species. The Department agrees with this conclusion.

On this basis, the identification of a known maternity cave within either the existing or proposed mining area would likely require MCO to revise its mine plan, or implement other strategies to ensure the negligible performance measure could be achieved.

MCO experts proposed to implement a Bat Monitoring Program in order to identify whether any maternity caves are present in the mining domain. This program would involve targeted bat surveys within the mining area, radio tracking and monitoring of rocky features. The Panel agreed that the implementation of a comprehensive detection program would be suitable to confirm the presence or absence of the maternity caves in the mining domain and recommended the results of this program be presented in the extraction plan for the UG2 mining area.

5.2.4 Impacts on Offset Areas

The existing mining area partially underlies a biodiversity offset area (referred to as the 'onsite offset area'). This offset area was one of eight established in accordance with the Stage 2 development consent and requires enhancement of up to 420 ah of native vegetation, 51 ha of endangered ecological communities (EEC) and regeneration of 199 ha of grassland to forest/woodland. Offset areas were also noted to contain habitat for threatened species potentially impacted by the project, including bat habitat. All Stage 2 offset areas were secured under a positive and restrictive covenant in accordance with the *Conveyancing Act 1919*. The use of covenants was an accepted form of offset security prior to the commencement of the *Biodiversity Conservation Act 2016*.

The proposal seeks to extend two longwall panels further underneath the onsite offset area, and both BCD and public submissions raised concerns about potential impacts biodiversity values within a secured offset area. The Department has carefully considered this matter in consideration of the issues discussed above and in consultation with the Panel.

Firstly, it is important to note that security covenants established for the onsite offset area specifically advise that they do not prevent underground mining on the land so long as the conditions of the instrument can be met. These conditions include implementing a biodiversity management plan or otherwise protecting and conserving native vegetation and native fauna on the land and facilitating regeneration of native species. The Department therefore acknowledges that the security mechanism does not prohibit underground mining from occurring.

BCD requested that all impacts, including indirect and prescribed impacts resulting from the proposal on previously offset biodiversity values, be commensurately offset under the Biodiversity Offset Scheme (BOS).

The Department accepts that in general, calculating residual prescribed impacts is difficult, due to the uncertainty of the potential area of impact and whether those impacts would actually result in adverse environmental consequences.

In the case of the extended mining area, there is greater certainty in quantifying impacts on habitat for threatened species reliant on rocky features. This is a because the location and likely behaviour of these types of features when exposed to particular levels of subsidence is able to be reasonably estimated. For this reason, the Department considers that MCO should offset the predicted impacts on the onsite offset area in relation to rocky habitat for the four identified threatened species. The Department has therefore recommended that the credit liabilities identified in Tables 5 and 6 are doubled to account for impacts on the offset area.

There is less certainty in quantifying indirect and other residual prescribed impacts, including resultant impacts on threatened flora species (assumed present) and vegetation impacts from surface cracking and ponding along the drainage line. Conclusions from the subsidence assessment and BDAR advise that the predicted subsidence impacts would be unlikely to result in adverse impacts on biodiversity values, and the Panel agreed that upfront offset liability should be quantified only for features proposed to be impacted and that performance measures be utilised to manage any other unforeseen prescribed impacts.

On this basis, the Department considers that no additional offset requirements should be imposed for indirect and other prescribed impacts within the onsite offset area. However, the Department has recommended a performance measure for the onsite offset area requiring no greater subsidence impacts or environmental consequences than predicted.

The imposition of this measure would require MCO to establish monitoring and reporting processes to be implemented under the extraction plan which would allow the detection and subsequent rectification of unforeseen impacts.

5.2.5 Impacts on Munghorn Gap Nature Reserve

The Munghorn Gap Nature Reserve is located immediately south-east of the UG2 mining area (see **Figure 2**). BCD and public submissions raised concern about potential subsidence impacts on the reserve, including potential far-field (non-conventional) subsidence impacts and impacts on groundwater resources.

The subsidence assessment concluded that adverse impacts from far-field movements within the reserve would be unlikely. The Panel generally agreed that non-conventional subsidence movements surrounding the mining area are expected to be minor. However, the Panel strongly recommended *"extensive monitoring beyond the immediate region of the mining area to enable early detection of, and response to any adverse or excessive non-conventional behaviour"* (pg 17).

MCO agreed to this recommendation and the Department has recommended a condition to this effect.

Impacts on groundwater resources within and surrounding the mining area are further considered in **section 5.4.1** below.

5.2.6 Conclusion

The Department has carefully considered the proposal's potential impacts on biodiversity values, as well as advice from BCD and the Panel. Key potential impacts are related to subsidence effects on rocky habitat for threatened species habitat and an established offset site.

The Department has recommended that MCO be required to meet performance measures for predicted impacts on habitat for the Broad-headed Snake, Pink-tailed Worm Lizard and non-maternity roosting habitat for the Large-eared Pied Bat and the Eastern Cave Bat (ie disturbance of up to 5% of steep slopes, rock face features and minor cliffs associated with rocky outcrops). This level of impact would be unlikely to affect the local or broader population of the species, however, as an extra measure of protection, the Department has recommended that these impacts are also offset through the retirement of species credits.

The Department has recommended that MCO continue to ensure negligible environmental consequences on threatened species, populations and endangered ecological communities within the existing and proposed extended mining area. To achieve this measure, MCO would be required to ensure negligible subsidence impacts on known bat maternity caves. This may involve

amendments to the mine plan or other adaptation strategies if they are detected to be present within the mining domain.

The Department acknowledges that underground mining is not a prohibited land use within the secured onsite offset area, however, the Department considers that MCO should offset the predicted impacts on threatened species habitat in the offset area (ie doubling the credit liability) and has recommended performance measures to ensure no greater impacts on biodiversity values than predicted.

Lastly, the Department considers that performance measures imposed for the proposed extension area should not be subject to the existing remediation and offset condition (condition 2 of Schedule 4) within the development consent. This is because a breach to the performance measures would result in compliance action that would consider options for remediation and offsetting as part of that process.

Prior to the commencement of secondary workings, MCO would be required to demonstrate through an extraction plan that the measures could be achieved and appropriately monitored prior to undermining. This process provides an opportunity for review and evaluation of detailed management measures to protect biodiversity values, prior to impact.

Overall, the Department considers that the proposal's impacts on biodiversity could be appropriately avoided, managed and offset, subject to the recommended conditions.

5.3 Cultural Heritage

The UG2 mining area is located on Wiradjuri country within the administrative boundaries of the Mudgee Local Aboriginal Land Council. The mining area is predominantly comprised of sandstone ridgelines, slopes and gullies, rich in biodiversity. Water resources are also a key feature of the broader landscape and it is documented that the area would have been highly valued and utilised by Wiradjuri people.

The modification report included a cultural heritage impact assessment which was prepared in consultation with registered Aboriginal parties (RAPs). During this consultation, one RAP (the Wellington Valley Wiradjuri Aboriginal Corporation) objected to the proposed modification due to concerns about impacts on the holistic environment, including ground profile, hydrology and biodiversity. This RAP, as well as others, also disagreed with the nomenclature ranking of archaeological significance of various cultural heritage sites as low. Other comments advised that the proposed mitigation measures for limiting impacts appeared appropriate.

The proposed modification would affect cultural heritage items within the existing approved and proposed extended mining areas. A total of 42 sites were identified across the areas collectively,

comprising 37 within the existing mining area and five within the proposed extension area (see **Figure 7**).

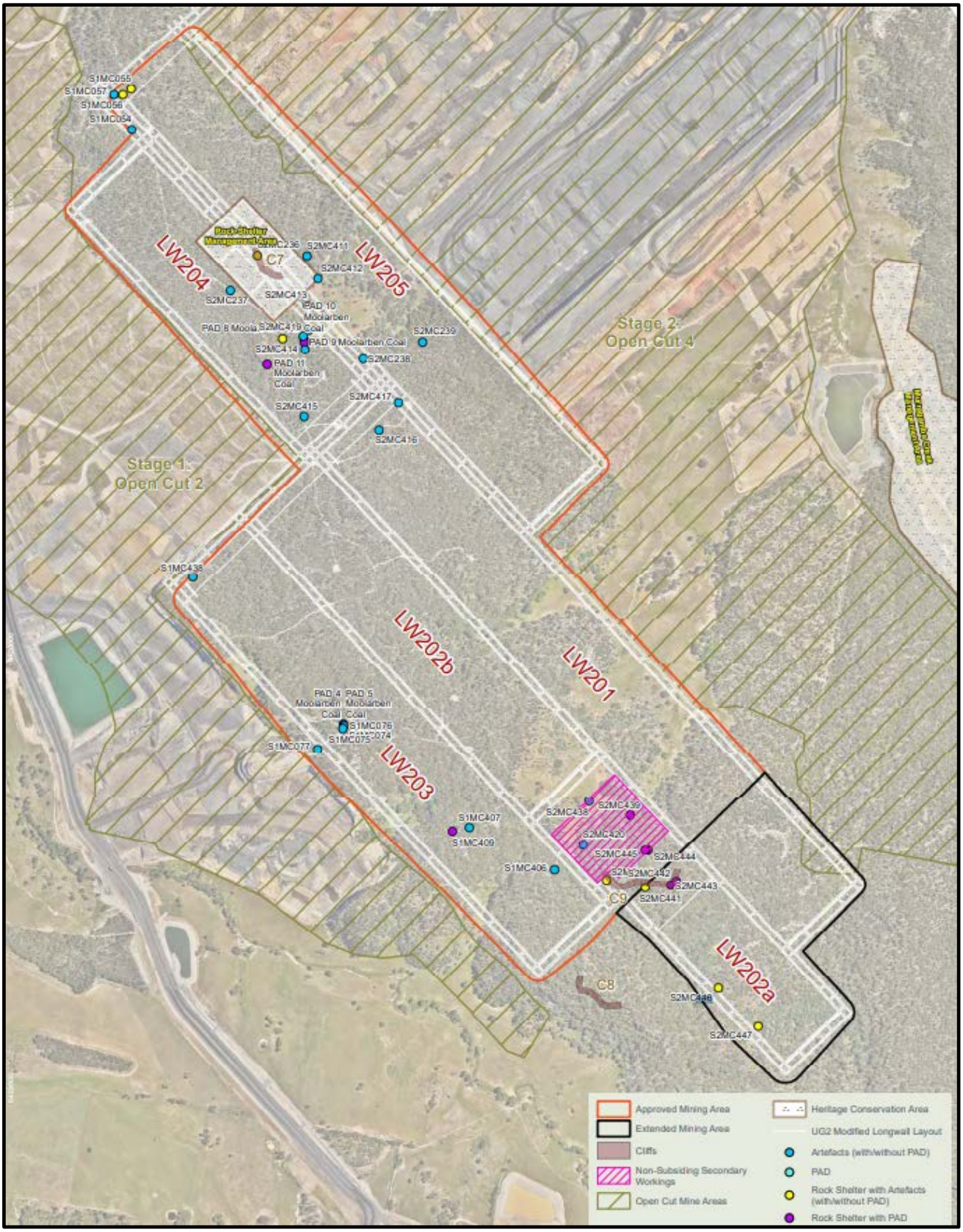

Figure 7 | Location of Cultural Heritage Sites within Existing and Proposed Mining Areas

Table 7 summarises the changes in approved impacts on cultural heritage sites within the mining area, based on the revised mine plan.

Table **7** | Change in approved levels of impact for Aboriginal heritage sites (Source: ACHA Table 16)

Change in approved level of impact	Scientific significance	Site name	Count of Aboriginal sites
Decrease			**14**
	High	S2MC238	1
	Moderate	S2MC417	1
	Low-Moderate	S2MC412, S2MC439[a], S2MC440[a], S2MC444[a], S2MC441[a,b]	5
	Low	S1MC077, S2MC413, S2MC415, S2MC416, S2MC420 S2MC438[a], S2MC445[a]	7
No change			**26**
	High	S2MC236	1
	Moderate	S1MC055	1
	Low-Moderate	S1MC438, S2MC442[a,b]	2
	Low	S1MC054, S1MC056, S1MC057, PAD 10 Moolarben Coal, PAD 11 Moolarben Coal, PAD 4 Moolarben Coal, PAD 5 Moolarben Coal, PAD 8 Moolarben Coal, PAD 9 Moolarben Coal, S1MC074, S1MC075, S1MC076, S1MC406, S1MC407, S1MC409, S2MC237, S2MC239, S2MC411, S2MC414, S2MC418, S2MC419, S2MC443[a,b]	22
Increase			**2**
	Low	S2MC446[a,b], S2MC447[a,b]	2
Total			**42**

[a] *Newly recorded Aboriginal heritage site*

[b] *Located within proposed extension area*

Table 7 indicates that there is predicted to be no change or decreased impacts to the majority of sites within the amended mining area. Sites subject to decreasing impacts are predominantly associated with the stepping back of the longwall layout around cliff line 9 and the inclusion of non-subsiding secondary workings. It should be noted that 18 of the sites within the 'no change' category

would be subject to greater levels of subsidence than what is currently predicted, however, these levels are not predicted to change the impact on the site. This is primarily because open sites are less susceptible to harm from ground movements and rock shelters would be subject to similar levels of tilt and curvature.

There are two rock shelters (S2MC446 and S2MC447) within the extension that are predicted to experience moderate to high potential for harm through subsidence impacts. Both sites contain stone artefacts and S2MC446 contains a small PAD. Both sites have been assessed to be of low scientific significance and high cultural value.

The modification report concluded that archaeological test excavation of these sites is not warranted as the PAD at SM2C446 is of poor integrity from animal and erosion disturbance and the artefact at SM2C447 would be unlikely to be impacted if subsidence does occur. On this basis, MCO propose to undertake detailed recording and surface collection of the sites and prior to impact.

The approved mine plan includes the retention of a sterilised coal pillar beneath cliff line 7 to ensure protection of a highly significant cultural heritage site, referred to as SMC236. This site includes a rock shelter containing art and an artefact scatter. Existing performance measures of the Stage 2 development consent require negligible subsidence impacts or environmental consequences on this site.

The proposed amendments to the mining layout would reduce panel widths in the vicinity of Cliff line 7 in order to ensure that negligible impact on this site is achieve.

The Panel accepted that the proposed layout would be appropriate to protect the site, however, recommended that a comprehensive monitoring regime be designed as part of the extraction plan, including an early warning detection plan with the ability to modify or stop the approaching longwall, should any excess movement become apparent. MCO agreed to this recommendation.

Heritage NSW advised that it supported the proposed management and mitigation measures for all cultural heritage sites and the continued implementation of the site's Heritage Management Plan.

In comparison to the approved project, the proposal would result in a reduced impact on cultural heritage sites due to the inclusion of non-subsiding secondary workings and the stepping back of longwalls around cliff lines C7 and C9.

Continued consultation with RAPs and Heritage NSW is essential and the Department notes that this would be facilitated through updates to the Heritage Management Plan which would occur post determination.

5.4 Water Resources

The proposal would result in some changes to groundwater inflow and drawdown and has the potential to impact drainage lines overlying the proposed mining area. The modification report included a groundwater and surface water assessment, which was reviewed by the Panel in providing their advice on the project.

5.4.1 Groundwater

The UG2 mining area is located beneath an elevated ridgeline of outcropping Triassic Narrabeen Group sandstone. Coal extraction occurs within the Ulan Seam of the Permian Illawarra Coal Measure which ranges between 40m to 155 m below the surface.

There has been extensive depressurisation of groundwater in the vicinity of the UG2 mining area as a result of previous and current mining operations.

Concerns were raised in public submissions about the proposal's potential impacts on groundwater and surface water.

Drawdown

The amended mining layout would increase inflows into the UG2 mining area by approximately 98 megalitres per year (ML/year) resulting in total inflows of approximately 900 ML/year. The increase would not change the overall peak inflow for the complex (ie approximately 4,500 ML/year), which is predicted to occur during mining of UG4, prior to longwall extraction commencing in UG2.

As a result of the increased inflows, groundwater modelling predicted some additional drawdown to occur in strata overlying the UG2 mining area, including:

- approximately 5 m within the Permian Overburden; and
- less than 2 metres within the Triassic Quartzose sediments, however the groundwater assessment asserts that the Triassic strata directly above the UG2 mining area is already unsaturated either naturally or as a result of previous mining depressurisation.

No additional drawdown is predicted to occur within the alluvium/colluvium or paleochannel sediments.

There are no private water bore users, permanent springs or known groundwater dependent systems within the immediate vicinity, and as such no additional impacts on these features are predicted. Additionally, no impacts are predicted on 'the Drip', a locally significant water feature which is located over 10 km from the UG2 mining area.

The Panel agreed with these predictions and advised it had no concerns regarding impacts on the regional groundwater system (refer to Appendix A5). However, it was identified by both the

company and the Panel that perched water tables could be sustained in the Triassic stratum at higher elevations in the Munghorn Gap Reserve.

On this basis, the panel advised:

…it is important to understand whether there is in fact any perched groundwater in this stratum, and whether there is any vertical leakage of perched groundwater to the mine and/or this water discharges at surface as evapo-transpiration or ephemeral seeps/springs

The Panel recommends that Moolarben Coal consider adding two new sites to the groundwater monitoring network at convenient, accessible locations along the southern track that overlies or borders the UG2 extraction area. The sites should be nested standpipe sites that monitor (i) perched water in the Triassic sandstone (if present) and (ii) the regional water table in the underlying Permian overburden (pg 26).

MCO agreed to this recommendation and the Department has recommended conditions to expand the monitoring network in line with the Panel's recommendation.

Groundwater quality

No change to the beneficial use category of the regional water table is anticipated. MCO advised that it would continue to implement groundwater monitoring and management processes as required under the complex Water Management Plan and extraction plans.

Water Licensing

DPE advised sufficient licences would need to be in place prior to any water take exceeding MCO's current allocation. The entitlement held by MCO in January 2023 was less than inflows predicted for the whole complex. MCO advised peak water take for the complex would occur in 2024/25 for UG4 and that it held additional water entitlement following recent purchases of the market and carry-over entitlements. As of December 2023, MCO advised that it held 3,900 ML/year of entitlement in the Sydney Basin - North Coast Fractured Groundwater Source with over 68,000 ML still available in the source.

MCO committed to obtain all required entitlement prior to take or to operate the development commensurate with available entitlement.

5.4.2 Surface Water

There are four ephemeral drainage lines overlying the UG2 mining area, three which overlie the existing mining area and one within the proposed extension area. All lines drain towards open cut mining areas or areas of rehabilitation within the complex.

For drainage lines within the existing mining area, the surface water assessment concludes that there would be minor reductions and increases in ponding depth and area within the existing mining area. Predicted changes are presented in Table 8 below.

Table 8 | Predicted changes to ponding depth and area in the existing mining area

	Approved Ponding	Predicted Change
Depth	0.1 to 0.9 m	Decrease by 0.35 m and increase up to 0.4 m
Area	Up to 0.1 ha	Decrease by 0.04 ha and increase up to 0.9 ha

Within the extended mining area, up to five new areas of ponding could form for short durations at shallow depths and areas (ie up to 0.7m and 0.2 ha) similar to the existing mining area.

Drainage lines would also be subject to some surface cracking and loss of flows into strata below. The surface water assessment concludes that stream flow losses in both the existing and extended mining areas would be similar to impacts approved for the existing mining area which includes some losses diverted into fractures during high rainfall events, and greater amounts during times of low flows. The expected losses are predicted to have minimal impact on overall flow and the broader catchment as all drainage lines:

- are ephemeral streams with a small catchment area; and
- drain towards disturbed mining areas which are captured and accounted for under the complex site water management system; and
- are not subject to baseflow contributions (noting that further investigation is required to confirm if there are any perched aquifers in the Triassic stratum subject to vertical leakage).

In response to DPE Water's request to quantify the extent of these losses, MCO advised that they would be difficult to predict and quantify. MCO committed to monitor drainage lines and remediate cracks where required. DPE Water accepted this response but requested that accurate surface water metering should be implemented where possible and used in ongoing reviews of the site water balance. Additionally, DPE Water requested that any remediation works restore natural and ecological function in accordance with the guidelines for controlled activities on waterfront land.

The proposal would not result in any changes to controlled discharges to the Goulburn River which are regulated under the Stage 1 development consent.

5.4.3 Conclusion

Overall, the Department considers that the proposal could be undertaken with only minimal incremental impacts on groundwater and surface water resources. Additional inflows into the mining area could be accounted for under existing MCO licence allocations and no additional drawdown impacts are expected to occur at private receivers, groundwater dependent ecosystems or significant water features in the extended vicinity.

Water losses associated with drainage lines are predicted to be minimal due to the ephemeral nature of the streams and existing drainage towards disturbed areas in the complex.

MCO has agreed to expand the groundwater monitoring network in line with recommendations made by the Panel and to monitor and remediate drainage lines where required. Based on advice received from DPE Water and the Panel, the Department has recommended updates to extraction plan requirements for the development.

5.5 Other Issues

The Department's consideration of other issues is summarised in **Table 9** below.

Table 9 | Assessment of other issues

Issue	Findings and conclusions
Greenhouse Gas	• The proposal would result in the extraction of an additional 4.5 Mt of ROM coal and many submissions raised concern about the impacts of coal mining on climate change and consistency with the NSW Government goal of reducing emissions. • The additional coal would represent an approximately 1 percent increase to total ROM coal extraction from the complex (Stage 1 and 2). No changes are proposed to the complex's annual production rate or mining intensity and MCO advise that there would be no change to projected annual greenhouse gas emissions (Scope 1 and 2) from the complex over the remaining mine life. • The additional coal proposed for extraction is estimated to generate approximately 45,000 t CO_2-e of additional Scope 1 emissions and 22,500 t CO_2-e of Scope 2 emissions. • MCO advise that these emissions would be associated with fugitive emissions and additional diesel and electricity consumption, and would be negligible in comparison to the approved project. • The additional product coal is estimated to generate approximately 11.75 Mt of Scope 3 emissions. These emissions would not be generated directly by the proposal but would include emissions generated during transport of the product

Issue	Findings and conclusions
	coal to customers and through the combustion of the coal for energy production. These emissions would be accounted for as Scope 1 emissions from those projects. • The NSW Government has set a goal of achieving net zero emission by 2050, and to deliver a 50% emissions reduction over 2005 levels by 2030 and 70% by 2035. *The Net Zero Stage 1: 2020-2030 Implementation Update* describes the policies and programs that will help achieve the Government's target. • Importantly, the Department's Net Zero Emissions Modelling team has advised that GHG emissions from the approved complex were accounted for in the emissions projections used for the *Net Zero Stage 1: 2020-2030 Implementation Update*. • The EPA has released its *Climate Change Policy* and *Climate Change Action Plan 2023-26* that would apply to the complex as it is regulated under an EPL. The EPA has provided advice to the Department that MCO should prepare a greenhouse gas mitigation plan and climate change adaptation plan in accordance with requirements to be provided by the EPA. The Department has noted this in the recommended conditions, on the basis that the EPA would lead the regulation of GHG emissions through requirements under the EPL. • The Department also notes that the project would be covered by the Commonwealth Safeguard Mechanism, which sets an emissions intensity "baseline" for Scope 1 emissions for facilities that emit more than 100,000 tonnes of CO2-e per year. MCO would be required to comply with the requirements of this mechanism including any changes to baseline emissions intensity over time to ensure that the Commonwealth committed total emission "hard cap" from safeguard facilities is met. • The *Climate Change (Net Zero Future) Act 2023* was passed on 30 November 2023 formalising the 2030, 2035 and 2050 net emission goals outlined in the Implementation Update. The incremental Scope 1 and 2 emissions as a result of the modification would contribute up to 0.055% and 0.091% of the 2030 and 2035 targets, respectively. These incremental increases would be able to be effectively managed under current NSW and Commonwealth GHG policy initiatives to ensure that NSW targets would not be compromised. • Overall, the Department considers that the modification is consistent with current NSW and Commonwealth policy settings in regard to GHG emissions.
Economic	• The proposal would allow for the extraction of 4.5 Mt of additional ROM coal within existing mining tenements.

Issue	Findings and conclusions
	• The additional coal is estimated to generate approximately $23 million (net present value) in royalties to the State of NSW. • No additionally jobs would be created by the proposal, however, the proposal would support ongoing employment at the complex for the remaining mine life. • MEG advised that the proposal would result in efficient and optimised resource outcomes.
Amenity	• The proposal is not expected to result in any additional noise, air quality or visual impacts on surrounding receivers. • MCO advised that it would continue to operate in accordance with existing air quality and noise criteria. • The EPA advised that no variations would be required to the site's EPL.

6 Evaluation

The Department has carried out a detailed assessment of the modification in accordance with the relevant requirements of the EP&A Act, with a particular focus on issues raised in public submissions, government agency advice and advice provided by the Panel.

The Department's assessment has concluded that the proposal would not result in significant changes to the approved impacts of the project and that impacts associated with the proposal could be appropriately managed under existing and new conditions of consent.

Key impacts associated with the modification relate to subsidence and associated impacts on land features, biodiversity, cultural heritage and water resources. The Department considers that many of these potential impacts can be managed through the development of a comprehensive extraction plan that details an extensive subsidence and groundwater monitoring network, targeted monitoring of threatened species habitat and adaptive trigger action response procedures for cliff features, non-conventional subsidence and significant the cultural heritage feature S2MC238.

The Department considers that the incremental increase in greenhouse gas emissions associated with the modification are acceptable when weighed against the relevant climate change policy framework, including the recent Net Zero Future Act, objects of the EP&A Act (including the principles of ESD) and socio-economic benefits of the project.

The Department has considered the *Strategic Statement on Coal Exploration and Mining in NSW* in its assessment. The proposal is located within the Mudgee mining precinct and is consistent with the intent of the statement, and would support the continued benefits that coal production delivers for the State, including economic benefits to regional communities, ongoing employment and workforce benefits, contribution to export earnings and the funding of public service and infrastructure through mining royalties.

The modification would provide access to additional coal seams within the existing project boundary. The Department considers that the modification has been designed in a manner that achieves a reasonable balance between recovery of high-quality coal resource of State significance and minimising its potential environmental and social impacts.

In considering the proposal's impacts against the socio-economic benefits associated with the efficient extraction of an identified coal resource, the Department considers the modification's benefits outweigh its residual costs and that it is in the public interest should be approved, subject to the recommended conditions.

7 Recommendation

It is recommended that the **Director Resource Assessments**, as delegate of the Minister for Planning and Public Spaces:

- **Considers** the findings and recommendations of this report.
- **Determines** that the application MP08_0135 MOD 4 falls within the scope of section 4.55(2) of the EP&A Act.
- **Accepts and adopts** the findings and recommendations in this report as the reasons for making the decision to approve the modification.
- **Agrees** with the key reasons for approval listed in the draft notice of decision.
- **Modify the consent** MP 08_0135.
- **Signs** the attached instrument of modification (**Appendix C**).

Recommended by:

21.12.23

Gen Lucas
Team Leader
Resource Assessments

8 Determination

The recommendation is **adopted/** ~~**not adopted**~~ by:

22/12/23

Steve O'Donoghue
Director
Resource Assessments

Appendices

Appendix A –List of referenced documents

A1 – Modification Report: Refer to the 'Modification Application' folder under the 'Assessment' tab on the Department's website at https://www.planningportal.nsw.gov.au/major-projects/projects/moolarben-stage-2-mod-4-ug2-modification

A2 – Submissions: Refer to the 'Submissions' tab on the Department's website at: https://www.planningportal.nsw.gov.au/major-projects/projects/moolarben-stage-2-mod-4-ug2-modification

A3 – Submissions Report: Refer to the 'Response to Submissions' folder on the Department's website at https://www.planningportal.nsw.gov.au/major-projects/projects/moolarben-stage-2-mod-4-ug2-modification

A4 – Agency Advice: Summarised in **Table A4.1.** Refer to the 'Agency Advice' folder under the 'Assessment' tab on the Department's website at: https://www.planningportal.nsw.gov.au/major-projects/projects/moolarben-stage-2-mod-4-ug2-modification

Table A4.1 | Agency advice

Agency	Advice
Department of Planning and Environment	
Biodiversity, Conservation and Science Directorate (BCS)	• Advice on Modification Report • Advice on Submissions Report
DPE Water	• Advice on Modification Report • Advice on Submissions Report
Environment Protection Authority (EPA)	• Advice on Modification Report • Advice on Conditions
Science, Economics and Insights Net Zero Emissions Modelling (NZEM)	• Advice on Modification Report – GHG Assessment
Department of Regional NSW	
Mining, Exploration and Geoscience (MEG) Resources Regulator	• Advice on Modification Report (MEG) • Advice on Modification Report (Resources Regulator)
Heritage NSW	

Agency	Advice
Heritage NSW (ACH)	• Advice on Modification Report
Heritage Council	• Advice on Modification Report
Councils	
Mid-Western Regional Council	• Comments on Modification Report

A5 – Additional Information: Summarised in **Table A5.1.** Refer to "Additional Information" folder under the 'Assessment' tab on the department's website at: https://www.planningportal.nsw.gov.au/major-projects/projects/moolarben-stage-2-mod-4-ug2-modification

Table A5.1 | Additional Information

Subject Area	Date
Independent Expert Advisory Panel for Mining	• Advice re: Moolarben Coal Complex UG2 Modification 4 - dated July 2023 • Advice re: Moolarben Coal Complex UG2 Modification 4 - dated December 2023
Moolarben Coal Operations Pty Limited	• Response to Panel Request for Additional Information – dated 24 October 2023 • Additional Information – dated 22 November 2023, 8 December 2023 and 21 December 2023

Appendix B –Statutory Considerations

Table C.1 summarises how the Department considers that the project can be undertaken in a manner that is consistent with these objectives, including Ecologically Sustainable Development.

Table C.1 | Consideration of the modification against relevant objects of the EP&A Act

Objects of the EP&A Act	Consideration
(a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources;	The modification meets this object because it would provide design and operational efficiencies to maximise the recovery of coal resources within an existing mining lease area. MCO's existing infrastructure and workforce would continue to be utilised.

Objects of the EP&A Act	Consideration
(b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment;	The Department's assessment has sought to integrate all significant environmental, social and economic considerations. The Department considers that the modification could be carried out in a manner that is consistent with the principles of ecologically sustainable development.
(c) to promote the orderly and economic use and development of land;	The modification involves a permissible land use and would be carried out within existing project boundaries. The modification would contribute to the economic benefits generated by the mine. The Department considers this represents an orderly and economic use of the land.
(e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats;	The modification would occur entirely within the MCO development consent boundary and would not require additional clearance of native vegetation. The Department has recommended stringent subsidence impact performance measures and updated conditions of consent to manage and minimise the potential impacts on biodiversity values.
(f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage);	The modification would result in similar or less subsidence impacts on the majority of Aboriginal sites within the mining area. Two additional sites subject to subsidence impacts would be managed under the existing site Heritage Management Plan, in consultation with Heritage NSW and RAPs.
(i) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State; and	The Department has assessed the modification application in consultation with Mid-Western Regional Council and other relevant NSW government authorities and has given consideration to the issues raised by these agencies in its assessment.
(j) to provide increased opportunity for community participation in environmental planning and assessment.	The Department publicly exhibited the modification application and considered all submissions in its assessment.

Matters for consideration under 4.15 of the EP&A Act

Environmental Planning Instruments	
State Environmental Planning Policy (Planning Systems) 2021	In accordance with section 2.7(2) of this State Environmental Planning Policy (SEPP), the Independent Planning Commission of NSW is the consent authority for a modification application where an applicant has disclosed a reportable political donation. MCO did not disclose a reportable political donation and consequently the Minister for Planning and Public Spaces is the consent authority for the modification. Under the Minister's delegation dated 9 March 2022, the Director Resource Assessments, may determine the application because there were less than 15 submissions objecting to the proposal.
State Environmental Planning Policy (Resources and Energy) 2021	Part 2.3 of the Resources and Energy SEPP lists a number of matters that a consent authority must consider before determining an application for consent for development for the purposes of mining. The Department has considered these matters in its assessment of the modification (throughout **section 5**, as applicable) and has included a brief outline of key considerations below. **Non-Discretionary Development Standards (section 2.16)** Section 2.16 identifies non-discretionary development standards for the purposes of section 4.15(2) of the EP&A Act in relation to the carrying out of development for the purposes of mining. The modification report sets out MCO's consideration of the applicable standards and whether or not the modified project meets them. The Department agrees with this assessment. **Compatibility with Other Land Uses (sections 2.17 and 2.19)** The Department's assessment has considered the potential impacts of the modification on other land uses in the area, including land used for conservation purposes, forestry purposes, agricultural purposes, rural dwellings and other approved mines. The Department considers that the modification would not materially change the compatibility of the project with these land uses, beyond what was considered in the original assessment. That is, the modified project would not be incompatible with the Munghorn Gap Nature Reserve and would have limited residual impacts on the capacity of other land users in the locality to undertake their activities. Voluntary Land Acquisition and Mitigation Policy (section 2.18) The modification would not change the ROM production rate or surface disturbance area. Noise emissions and particulate matter (PM) concentrations would not exceed the criteria at any surrounding privately owned receivers. Accordingly, the VLAMP provisions are not relevant. **Natural Resource Management and Environmental Management (section 2.20)** Section 2.20 requires that, before granting consent for development for the purposes of mining, the consent authority must consider whether or not the consent should be issued subject to conditions aimed at ensuring that the development is undertaken in

	an environmentally responsible manner, including conditions to ensure that impacts on significant surface water and groundwater resources, threatened species and biodiversity are avoided or minimised to the greatest extent practicable and that GHG emissions are minimised to the greatest extent practicable. Impacts on biodiversity, cultural heritage, water resources and greenhouse gas emissions are comprehensively addressed in **sections 5**. The Department considers the existing and recommended conditions of consent are adequate to ensure that the modified project is undertaken in an environmentally responsible manner. **Resource Recovery (section 2.21)** The Department has considered the recovery of coal resources in its assessment of the modification. It considers that the modified project can be carried out in an efficient manner that optimises coal resource recovery while giving appropriate recognition to and protection for the significant environmental and other values that may be affected. **Transport (section 2.22)** The key purpose of this section relevant to the project is to limit the transport of coal on public roads. The modification does not involve the transport of coal on public roads. Product coal would continue to be transported from the site by rail. **Rehabilitation (section 2.23)** Clause 17 outlines requirements relating to consideration of whether any consent granted should be subject to conditions aimed at ensuring rehabilitation of land disturbed by mining and, in particular, whether conditions should require preparation of a rehabilitation management plan, appropriate treatment of waste, remediation of soil contamination and the avoidance of public safety risks. The Department considers the existing conditions are adequate to manage rehabilitation, waste and soil contaminations.
State Environmental Planning Policy (Biodiversity and Conservation) 2021	The Department has comprehensively assessed the proposal's potential impacts on biodiversity in **section 5.2**. The Department considers that the existing and recommended conditions are adequate to manage biodiversity impacts.
State Environmental Planning Policy (Resilience and Hazards) 2021	Before granting consent for a development application that involves a "change of use", the consent authority must consider a "preliminary investigation" of whether the land involved includes "contaminated land". The modification would not involve a change of use and consequently no preliminary investigation is required. The Department is satisfied that the project area does not have a significant risk of existing contamination given its historical and current land uses, and that the development is generally consistent with the aims, objectives and provisions of the SEPP.

Mid-Western Regional Local Environment Plan 2012 (Mid-Western Regional LEP)	The modification would not change the project boundary, which is located wholly within the area to which the Mid-Western Regional LEP applies. Majority of the UG2 mining area (including the proposed extension area) is zoned for agricultural land use (RU1 Primary Production) in the Mid-Western Regional LEP, and the remainder is zoned E3 Environmental Management. There would be no changes to the permissibility of the project. Clause 5.10 and 6.5 of the Mid-Western Regional LEP outlines the provisions that relate to Aboriginal and European heritage and terrestrial biodiversity in the LGA. No heritage items listed in Schedule 5 of the Narrabri LEP are located within the proposed modification area, and the Department has carefully considered the potential impacts on Aboriginal heritage items in **section 5.3**.

The public interest

C2 Ecologically Sustainable Development (ESD)	The EP&A Act adopts the definition of ESD found in the *Protection of the Environment Administration Act 1991*, as follows: *"ecological sustainable development requires the effective integration of economic and environmental considerations in decision-making processes. Ecologically sustainable development can be achieved through the implementation of the following principles and programs:* *a) the precautionary principle;* *b) inter-generational equity;* *c) conservation of biological diversity and ecological integrity; and* *d) improved valuation, pricing and incentive mechanisms."* The Department has considered ESD and its related principles and programs. The Department has also had regard to the manner in which ESD and its principles and programs are addressed in the modification report. A summary of the Department's consideration follows. *Precautionary Principle* The ESD precautionary principle requires that: *"if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation".* The Department has assessed whether the modification threatens serious or irreversible environmental damage. The Department has carefully considered the material provided by MCO in its modification report, Submissions Report and other documents and has consulted closely with key Government agencies and the Panel to obtain advice on various aspects of the Project. The modification report contains a number of specialist environmental impact assessments. These outline the environmental impacts of the modification, which would primarily be associated with subsidence impacts and changes to impacts on biodiversity, cultural heritage and water resources due to the revised mine plan.

The development consent already incorporates a number of requirements to ensure the impacts of the approved project are avoided or minimised. The Department has considered whether these requirements are adequate to manage any additional risks from the modification and/or whether additional conditions could be imposed to manage the risks.

The Department's assessment has been guided by:

a. careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and

b. an assessment of the risk-weighted consequences of various options.

It considers that there is sufficient scientific certainty regarding environmental impacts and residual risks to enable determination of the application.

The Department considers that the existing and recommended subsidence performance measures and other conditions of consent would provide appropriate protection for biodiversity, cultural heritage, water resource and environmental values, and would minimise the potential for any serious or irreversible environmental damage.

Intergenerational Equity

The ESD principle of intergenerational equity requires that: *"the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations".*

The Department considers that the modification does not conflict with the principle of intergenerational equity. That is, the health, diversity and productivity of the environment would be maintained or enhanced.

The recommended performance measures and other conditions of consent would provide an appropriate degree of protection for the health, diversity and productivity of the environment and not constrain the ability of future generations to use or enjoy the project area in a similar way to the present and recent past.

The incremental increase in direct GHG emissions from the modification would constitute a very small contribution towards climate change at both the national and global scale. Nevertheless, the Department acknowledges that the mining of coal and its combustion is a major contributor to anthropogenic climate change, which has the potential to impact future generations. In recognition of that risk, NSW has set a goal of achieving net zero emission by 2050, and to deliver a 70% emissions reduction over 2005 levels by 2035. The Department considers that the modification would not prevent NSW from achieving those goals.

Scope 3 GHG emissions accounting would be undertaken by the entities and nations where the product coal is combusted. The Department considers that the Project's Scope 3 GHG emissions do not contravene the principle of intergenerational equity insofar as it is established and applied by NSW legislation and the applicable policy framework.

Conservation of Biological Diversity and Ecological Integrity

The ESD principle of conservation of biological diversity and ecological integrity requires that: *"conservation of biological diversity and ecological integrity should be a fundamental consideration"* in decision making processes, such as the development consent process and the environmental impact assessment process which supports it.

The modification would not require any further vegetation clearing or surface disturbance. Potential subsidence impacts on biodiversity values have been carefully considered and the Department has recommended stringent conditions to ensure impacts on biodiversity would be appropriately avoided, monitored, managed and offset.

Improved Valuation, Pricing and Incentive Mechanisms

The ESD principle of improved valuation, pricing and incentive mechanisms requires that: *"environmental factors should be included in the valuation of assets and services"* in decision making processes, including by such means as the 'polluter pays' principle, full life cycle costing and cost-effective pursuit of environmental goals.

The environmental costs of the modification have been addressed in detail in the modification report. The direct environmental effects of the modification would largely be internalised through the adoption and funding of the mitigation measures proposed by MCO or otherwise required by conditions to mitigate, remediate or offset them.

Planning Agreements

MCO makes ongoing contributions to Council through an existing voluntary planning agreement. No changes to this agreement are proposed.

Likely impacts of development, including environmental impacts on the natural and build environment and social and economic impacts on the locality

The Department has undertaken a comprehensive assessment of the likely impacts of the modification on the natural and built environment and the social and economic impacts on the locality. These matters are addressed in **section 5**.

Suitability of the site

The modification would not change the project boundary or change anything that would alter the conclusions of the original assessment of the project.

Appendix C - Notice of modification

Refer to the 'Determination' folder on the Department's website at: https://www.planningportal.nsw.gov.au/major-projects/projects/moolarben-stage-2-mod-4-ug2-modification

Appendix D – Consolidated consent

Refer to the 'Determination' folder on the Department's website at: https://www.planningportal.nsw.gov.au/major-projects/projects/moolarben-stage-2-mod-4-ug2-modification